

BPS64510PC-2008083446
SEQUENCE LISTING

<110> BASF Plant Science GmbH

<120> Lipid Metabolism Proteins, Combinations of Lipid Metabolism Proteins and Uses Thereof

<130> BPS64510PC

<140> Current patent application

<141> CCYY MM DD

<160> 1025

<170> Biomax PatentTool according to PatentIN 3.1 format

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<211> 1818

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<213> Escherichia coli

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Asn	Phe	Leu	Ala	Glu	Gln	Pro	Asp	Leu	Asn	Phe	His	Asn	Arg	Glu	Val	
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Leu	Arg	Ala	Phe	Lys	Gly	Asn	Lys	Lys	Lys	Val	Lys	Leu	Ala	Tyr	Ser	
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Ile	Leu	Phe	Met	Phe	Asp	Gly	Phe	Ala	Thr	Ile	Tyr	Tyr	Gly	Asp	Glu	
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Trp	Asp	Asn	Met	Asp	Glu	Asp	Met	Leu	Gln	Phe	Leu	Lys	Lys	Leu	Gly	
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Glu	Ile	Arg	Arg	Met	Tyr	His	Thr	Gly	Ser	Ala	Gly	Ile	Ile	Thr	Val	
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Glu	Glu	Thr	Gln	Glu	Cys	Lys	Tyr	Ile	Thr	Arg	Leu	Ser	Gly	Glu	Ser	
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Asp	Asp	Leu	Lys	Phe	Lys	Ile	Ala	Asn	Leu	Ile	Pro	Gly	Lys	Tyr	His	
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Phe	Lys	Ile	Ala	Ile	Asp	Gln	Tyr	Lys	Ile	Leu	Arg	Glu	Ala	Glu	Asn	
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Asn	Pro	Asp	Tyr	Ala	Gln	Phe	Cys	Ala	Ile	Ile	Asp	Lys	Lys	Leu	Met	
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Phe	Glu	Val	Asp	Asn	Ser	Arg	Leu	Pro	Lys	Glu	Gly	Tyr	Phe	Ser	Pro
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Lys	Val	His	Ile	Glu	His	Glu	Gly	Gly	Ser	Lys	Ile	Ile	Tyr	His	Ile
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Phe	Pro	Asp	Arg	Phe	Phe	Arg	Val	Gly	Pro	His	Leu	Pro	Thr	Leu	Ser
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Gln	Gln	Asn	Val	Met	Asn	Ile	Leu	Asp	Ser	His	Asp	Thr	Glu	Arg	Ile
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Trp	Asp	Asn	Met	Asp	Glu	Asp	Met	Leu	Gln	Phe	Leu	Lys	Lys	Leu	Gly
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Glu	Ile	Arg	Arg	Met	Tyr	His	Thr	Gly	Ser	Ala	Gly	Ile	Ile	Thr	Val
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Glu	Glu	Thr	Gln	Glu	Cys	Lys	Tyr	Ile	Thr	Arg	Leu	Ser	Gly	Glu	Ser
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<212> DNA

<213> Thermotoga maritima MSB8

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Ile Phe Pro Asp Arg Phe Phe Ile Gly Lys Gly Lys Thr Val Glu Asp
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Lys Lys Asp Leu Tyr Leu Lys Arg Gly Gly Val Ile Glu Lys Trp Gly
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gtt cct ccc cgc aaa ctt ccc ggt gct cag cac gtg aag atc ttc tac     192
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Gly Gly Asp Leu Trp Gly Ile Ala Glu Lys Val Asp Tyr Phe Glu Glu
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Leu Gly Ile Asn Val Leu Tyr Leu Thr Pro Ile Phe Leu Ser Asp Thr
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Asn His Lys Tyr Asp Thr Ile Asp Tyr Phe Arg Val Asp Pro Gln Phe
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Ser Met Lys Leu Ile Leu Asp Gly Val Phe Asn His Val Gly Ser Gln
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His Pro Trp Phe Lys Lys Ala Lys Lys Asn Asp Pro Glu Tyr Val Asn
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Arg Phe Phe Leu Tyr Lys Asp Arg His Arg Ser Trp Phe Asp Val Gly
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agc ctt ccc gag ctg aac gtg gaa gtc gaa gtg aag gaa tac att     576
Ser Leu Pro Glu Leu Asn Val Glu Val Glu Glu Val Lys Glu Tyr Ile
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Trp Thr Tyr Pro Ala Gly Trp Asp Met Val Asp Gly Leu Met Asn Tyr
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Asn Phe Arg Asn Leu Val Leu Ser Tyr Val Asn Gly Glu Thr Asp Ser
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ata ggt ttt cac ctg gaa aga gct tac agg gag acg aag aac ata ttc     864
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Gly Cys Trp Asn Met Leu Asp Ser His Asp Thr Pro Arg Leu Ala Thr
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Met Val Pro Asp Arg Asp Leu Arg Lys Leu Ala Val Val Leu Gln Phe
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act tat ccc ggt gtt ctc gtt tac tat gga aca gag ata ggt ctc     1008
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Ser	Ile	Pro	Asp	Gly	Lys	Ile	Met	Asn	Thr	Thr	Pro	Leu	Val	Asp	Val	
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Phe	Ser	Gly	Glu	Arg	Phe	His	Val	Asp	Gly	Gly	Val	Val	Lys	Leu	Pro	
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Leu	Leu	Ala	Arg	Ser	Phe	Arg	Ile	Leu	Lys	Pro	Glu	Asp	Leu	Arg	Val	
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<213> Thermotoga maritima MSB8

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Asn	Phe	Arg	Asn	Leu	Val	Leu	Ser	Tyr	Val	Asn	Gly	Glu	Thr	Asp	Ser	
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 Gly Cys Trp Asn Met Leu Asp Ser His Asp Thr Pro Arg Leu Ala Thr
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 Met Val Pro Asp Arg Asp Leu Arg Lys Leu Ala Val Val Leu Gln Phe
 305 310 315 320
 Thr Tyr Pro Gly Val Pro Leu Val Tyr Tyr Gly Thr Glu Ile Gly Leu
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 Thr Gly Gly Glu Asp Pro Glu Cys Arg Ala Thr Met Glu Trp Asn Arg
 340 345 350
 Glu Lys Trp Asp Val Asp Leu Phe Glu Phe Tyr Lys Lys Met Ile Arg
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 370 375 380
 Asn Asp Ser Pro Leu Ala Phe Leu Arg Lys Ala Pro His Pro Leu Gln
 385 390 395 400
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 Ser Ile Pro Asp Gly Lys Ile Met Asn Thr Thr Pro Leu Val Asp Val
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<212> DNA

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aac ctt gaa gaa gta aaa tac ccc gtc gtc tac gaa att ttc att cgc	192
Asn Leu Glu Glu Val Lys Tyr Pro Val Val Tyr Glu Ile Phe Ile Arg	
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Ser Phe Tyr Asp Arg Asp Gly Asn Gly Val Gly Asp Leu Asn Gly Val	
65 70 75 80	
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Ser Gln Lys Val Asp Tyr Leu Lys Glu Leu Gly Val Asp Ala Val Trp	
85 90 95	
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Phe Met Pro Phe Asn Glu Ala Val Ser Tyr His Gly Tyr Asp Ile Thr	
100 105 110	
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Asp Tyr Tyr Asn Val Glu Lys Asp Tyr Gly Thr Met Glu Asp Leu Glu	
115 120 125	
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Asn Met Ile Gln Val Leu His Glu Asn Gly Ile Lys Val Ile Met Asp	
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Lys	Gly	Gln	Lys	Val	Trp	Tyr	Phe	Gly	Leu	Phe	Gly	Tyr	Asn	Met	Pro	
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Asp	Leu	Asn	His	Asp	Ser	Gln	Lys	Val	Arg	Glu	Glu	Val	Lys	Lys	Ile	
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Ala	Lys	His	Ile	Tyr	Gly	Trp	Ser	Trp	Asp	Asp	Gly	Ile	Gln	Glu	Ser	
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Phe	Ile	Lys	Lys	Arg	Ala	Ala	Leu	Trp	Tyr	Phe	Leu	Ile	Phe	Thr	Leu	
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Lys	Gly	Ser	Pro	Val	Ile	Tyr	Tyr	Gly	Gly	Glu	Ile	Gly	Thr	Arg	Gly	
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Phe	Lys	Trp	His	Gly	Pro	Val	Tyr	Asp	Glu	Pro	Val	Arg	Glu	Pro	Met	
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Gln	Trp	Tyr	Ala	Ser	Gly	Thr	Gly	Glu	Gly	Gln	Thr	Phe	Trp	Thr	Lys	
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Gly	Cys	Ile	Tyr	Asp	Asp	Pro	Tyr	Asp	Gly	Phe	Ser	Val	Glu	Glu	Gln	
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Phe	Arg	Lys	Asp	His	Asp	Ala	Ile	Leu	Asn	Gly	Asp	Gln	Thr	Ile	Phe	
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Lys	Leu	Leu	Val	Val	Leu	Asn	Pro	Asp	Pro	Val	Trp	Gln	Asn	Ser	Phe	
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Thr	Phe	Glu	Glu	Asn	Met	Thr	Met	Ile	Leu	Glu	Val	Asp	Phe	Glu	Asn	
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Phe	Ile	Trp	Asn	Glu	Ser	Asn	Val	Ser	Phe	Ser	Ala	Gly	Glu	Ser	Phe
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1671

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<211> 556

<212> PRT

<213> Thermotoga maritima MSB8

<400> 12

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Ser	Ser	Asn	Pro	His	Ser	Asn	Ser	Thr	Asn	Thr	Asp	Gly	Thr	Ser	Ser
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Asn	Leu	Glu	Glu	Val	Lys	Tyr	Pro	Val	Val	Tyr	Glu	Ile	Phe	Ile	Arg
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Ser	Phe	Tyr	Asp	Arg	Asp	Gly	Asn	Gly	Val	Gly	Asp	Leu	Asn	Gly	Val
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Ser	Gln	Lys	Val	Asp	Tyr	Leu	Lys	Glu	Leu	Gly	Val	Asp	Ala	Val	Trp
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Phe	Met	Pro	Phe	Asn	Glu	Ala	Val	Ser	Tyr	His	Gly	Tyr	Asp	Ile	Thr
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Asp	Tyr	Tyr	Asn	Val	Glu	Lys	Asp	Tyr	Gly	Thr	Met	Glu	Asp	Leu	Glu
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Lys	Gly	Gln	Lys	Val	Trp	Tyr	Phe	Gly	Leu	Phe	Gly	Tyr	Asn	Met	Pro
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Val	Asp	Phe	Trp	Ile	Ser	Lys	Gly	Val	Asp	Gly	Phe	Arg	Ile	Asp	Ala
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Glu	Glu	Ser	Phe	Leu	Phe	Leu	Glu	Asn	His	Asp	Leu	His	Arg	Phe	Phe
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Phe	Ile	Lys	Lys	Arg	Ala	Ala	Leu	Trp	Tyr	Phe	Leu	Ile	Phe	Thr	Leu
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Lys	Gly	Ser	Pro	Val	Ile	Tyr	Tyr	Gly	Gly	Glu	Ile	Gly	Thr	Arg	Gly
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Phe	Lys	Trp	His	Gly	Pro	Val	Tyr	Asp	Glu	Pro	Val	Arg	Glu	Pro	Met
385					390					395					400
Gln	Trp	Tyr	Ala	Ser	Gly	Thr	Gly	Glu	Gly	Gln	Thr	Phe	Trp	Thr	Lys
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Glu	Val	Tyr	Lys	Asn	Ala	Gly	Ile	Thr	Phe	Gly	Asn	Ala	Asp	Val	Asp
			420					425					430		
Gly	Cys	Ile	Tyr	Asp	Asp	Pro	Tyr	Asp	Gly	Phe	Ser	Val	Glu	Glu	Gln
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Glu	Ser	Asp	Pro	Lys	Ser	Leu	Leu	Asn	Phe	Ile	Arg	Phe	Ile	Leu	Asn

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 Phe Arg Lys Asp His Asp 455
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 Arg Asp Trp Lys Asn 485 Leu Ile Ala Phe Tyr Arg Glu Ser Ser Asn 480
 Lys Leu Leu Val Val Leu Asn Pro Asp 490 Val Trp Gln Asn Ser Phe 495
 Thr Phe Glu 500 Asn Met Thr Met 505 Ile Leu Glu Val Asp 510 Phe Glu Asn 515
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 Thr Val Asp Pro Met Lys 535 Ala Tyr Ile Phe Lys Lys 540
 545 550 555

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<211> 1737

<212> DNA

<213> Bacillus halodurans C-125

<220>

<221> CDS

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Tyr	Asp	Lys	Ser	Thr	Met	His	Ile	Arg	Leu	Arg	Thr	Gly	Lys	Asn	His	
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Gly	Glu	Ser	Gly	Phe	Leu	Asp	Thr	Pro	Ser	Lys	Asp	Thr	Ser	Asp	Tyr	
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Trp	Val	Lys	Asp	Thr	Val	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	Phe	Ala	
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Asn	Gly	Asp	Pro	Ser	Arg	Asn	Pro	Glu	Gly	Thr	Leu	Pro	Trp	Gly	Ser	
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Asp	Phe	Pro	Val	Arg	Ala	Glu	Glu	Pro	Pro	Asn	Tyr	Asp	Thr	Phe	Ala					
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Phe	Thr	Pro	Phe	Met	Pro	Lys	Phe	Asn	Thr	Glu	Asn	Glu	Glu	Val	Arg					
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Phe	Asp	Ala	Val	Met	Asn	Tyr	Pro	Leu	Thr	Asn	Ala	Ile	Ile	Asp	Phe					
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Gln	Leu	Thr	His	Met	Tyr	Pro	Ile	His	Val	Gln	Gln	Val	Ala	Phe	Asn					
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Asn	Gln	Glu	Leu	Leu	Ser	Phe	Val	Lys	Arg	Leu	Ile	Gln	Leu	Arg	Lys					
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gat	tct	tct	ctt	ctc	atc	tat	caa	aag	aca	tac	gaa	aat	caa	cag	ctc					1584
Asp	Ser	Ser	Leu	Leu	Ile	Tyr	Gln	Lys	Thr	Tyr	Glu	Asn	Gln	Gln	Leu					
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Val	Ser	Trp	Thr	Asn	Arg	Asn	Ala	Asn	Asp	Leu	Leu	Thr	Gly	Glu	Thr					
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Phe	Ser	Leu	Ala	Thr	Glu	Ile	Val	Ile	Pro	Ala	Lys	Ser	Ala	Met	Val					
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<212> PRT

<213> Bacillus halodurans C-125

<400> 14

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35      40      45
Asn Gln Trp Val Thr Ser Lys Lys Glu Met Thr Pro Thr Gly Ser Asp
50      55      60
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65      70      75      80
Leu Arg Tyr Gly Phe Glu Ile Ile Thr Lys Thr Glu Thr Ile Tyr Tyr
85      90      95
Gly Glu Ser Gly Phe Leu Asp Thr Pro Ser Lys Asp Thr Ser Asp Tyr
100      105      110
Phe Cys Phe Pro Phe Met Asn Pro Ala Asp Leu Phe Ser Pro Pro Glu
115      120      125
Trp Val Lys Asp Thr Val Trp Tyr Gln Ile Phe Pro Glu Arg Phe Ala
130      135      140
Asn Gly Asp Pro Ser Arg Asn Pro Glu Gly Thr Leu Pro Trp Gly Ser
145      150      155      160
Ala Ala Pro Thr Pro Thr Asn His Phe Gly Gly Asp Leu Gln Gly Ile
165      170      175
Ile Asp His Leu Asp Tyr Leu Gln Glu Leu Gly Ile Asn Gly Ile Tyr
180      185      190
Leu Thr Pro Ile Phe Glu Ala Ser Asn His Lys Tyr Asp Thr Ile
195      200      205
Asp Tyr Leu Lys Val Asp Pro His Phe Gly Asp Lys Thr Thr Phe Lys
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Arg Leu Val Asp Glu Cys His Lys Arg Gly Ile Arg Ile Met Leu Asp
225      230      235      240
Ala Val Phe Asn His Ala Gly Phe Tyr Phe Pro Pro Phe Gln Asp Val
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Leu Lys Asn Gln Gln His Ser Lys Tyr Ser Asp Trp Phe His Leu Arg
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Asp Phe Pro Val Arg Ala Glu Glu Pro Pro Asn Tyr Asp Thr Phe Ala
275      280      285
Phe Thr Pro Phe Met Pro Lys Phe Asn Thr Glu Asn Glu Glu Val Arg
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Glu Tyr Leu Leu Asn Val Ala Thr Tyr Trp Ile Lys Glu Phe Asp Ile
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Asp Gly Trp Arg Leu Asp Val Ala Asn Glu Val Asp His Ala Phe Trp
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Arg Glu Phe Arg Lys Arg Val Lys Ala Leu Lys Pro Asp Leu Tyr Ile
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Ala Gly Lys Gln Lys Ile Gly Gln Gln Arg Phe Glu His Val Ile Thr
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Gln Leu Thr His Met Tyr Pro Ile His Val Gln Gln Val Ala Phe Asn
405      410      415
Leu Leu Gly Ser His Asp Thr Pro Arg Ile Leu Thr Gln Thr Asp Asn
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Gln Glu Lys Ala Phe Gly Thr Glu Gly Asp Leu Thr Phe Val Glu Asn
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 Ala Ile Ser Gln²⁰ Lys Glu Leu Val Ile²⁵ Arg Leu Arg Val Ala Lys Glu
 gat aga ggt att act gtt aat ttg gtc cac ggg cct aaa tat ggt tat 144
 Asp Arg Gly³⁵ Ile Thr Val Asn⁴⁰ Leu Val His Gly Pro⁴⁵ Lys Tyr Gly Tyr
 cat gaa ttc caa gaa gaa ttg gaa atg tca gtt gcc tat aca gac cat 192
 His Glu Phe Gln Glu Glu Leu⁵⁵ Glu Met Ser Val Ala Tyr Thr Asp His
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 Thr His Ala Tyr Tyr Glu⁷⁰ Thr Thr Leu Thr Leu⁷⁵ Asp Asp Val Arg Leu⁸⁰
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 Ala Tyr Ile Phe Lys⁸⁵ Ile Glu Glu Glu Gly⁹⁰ Gln Thr Tyr Tyr Phe Ser⁹⁵
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 Glu Asp Gly¹⁰⁰ Leu Thr Thr Ser Tyr Asp¹⁰⁵ Phe Ser Asn Gly¹¹⁰ Phe Tyr Asn
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 Ser Asp Tyr Tyr Ala Ile Asp²¹⁵ Pro Gln Phe Gly Thr²²⁰ Lys Tyr Asp Leu
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<212> PRT

<213> Streptococcus pyogenes M1 GAS

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Ile	Thr	Ser	Gln	Leu	Asp	Tyr	Leu	Gln	Lys	Leu	Gly	Ile	Thr	Ala	Ile		
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Trp	Leu	Ser	Pro	Val	Tyr	Gln	Ser	Pro	Met	Asp	Asp	Asn	Gly	Tyr	Asp		
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Ile	Ser	Asp	Tyr	Glu	Ala	Ile	Ala	Asp	Val	Phe	Gly	Asp	Met	Ala	Asp		
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Met	Asp	Glu	Leu	Leu	Ala	Ala	Ala	Asn	Glu	Arg	Gly	Ile	Lys	Ile	Ile		
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Met	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Glu	His	Ala	Trp	Phe	Val		
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Glu	Ala	Arg	Glu	Asn	Pro	Asn	Ser	Pro	Glu	Arg	Asp	Tyr	Tyr	Ile	Trp		

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 Glu Leu Asp Glu Ala Ser Gly Gln Tyr Tyr Leu His Leu Phe Ser Lys
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 Lys Gln Pro Asp Leu Asn Trp Glu Asn Ala Gln Leu Arg Gln Lys Ile
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 Tyr Asp Met Met Asn Phe Trp Ile Ala Lys Gly Ile Gly Gly Phe Arg
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 Met Asp Val Ile Asp Leu Ile Gly Lys Val Pro Asp Leu Glu Ile Thr
 195 200 205
 Gly Asn Gly Pro Arg Leu His Asp Tyr Leu Lys Glu Met Asn Gln Ala
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 Thr Pro Glu Ile Ala Arg Gln Tyr Ser Arg Pro Glu Asn Lys Glu Leu
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 Ser Met Val Phe Gln Phe Glu His Val Gly Leu Gln His Lys Pro Asp
 260 265 270
 Ala Pro Lys Trp Asp Tyr Ala Lys Glu Leu Asp Val Pro Ala Leu Lys
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 Ala Ile Phe Ser Lys Trp Gln Thr Glu Leu Lys Leu Gly Glu Gly Trp
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 Asn Ser Leu Phe Trp Asn Asn His Asp Leu Pro Arg Val Leu Ser Ile
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 Trp Gly Asn Asp Ser Thr Tyr Arg Glu Lys Ser Ala Lys Ala Leu Ala
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 Asp Ile Glu Ser Leu Asn Tyr Ala Lys Glu Ala Met Gly Asn Gly Val
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 Asn Val Ala Asp Ala Leu Ala Asp Pro Asp Ser Ile Phe Tyr Thr Tyr
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 455 460 465
 Asp Tyr His Leu Leu Pro Thr Ala Asp Lys Val Phe Ala Tyr Gln Arg
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48

96

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acc Thr 65	gaa Glu	cgc Arg	ctc Leu	ggt Gly	gcg Ala 70	ctc Leu	ctc Leu	ggc Gly	ggg Gly	cac His 75	gtc Val	cgc Arg	gtg Val	cgg Arg	ctg Leu 80	240
cgg Arg	acc Thr	acc Thr	ctg Leu	ccg Pro 85	gtc Val	ctg Leu	ggc Gly	gtg Val	cgc Arg 90	ctc Leu	aaa Lys	gtc Val	gtg Val	cag Gln 95	atc Ile	288
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gaa Glu	ggc Gly	cgc Arg 115	tgg Trp	ttc Phe	gag Glu	gcc Ala	gac Asp 120	ctg Leu	ccg Pro	ctg Leu	cac His	gag Glu 125	gcc Ala	cgc Arg	gtg Val	384
cgc Arg 130	tac Tyr	gcc Ala	tgg Trp	cac His	ctc Leu	gac Asp 135	ctg Leu	cct Pro	ggc Gly	gac Asp	cac His 140	ctc Leu	aac Asn	ctg Leu	acc Thr	432
cgg Arg 145	ctg Leu	ggg Gly	ctg Leu	cac His	cac His 150	gcg Ala	cgc Arg	cgg Arg	ggc Gly	ttt Phe 155	cgc Arg	tcg Ser	tgg Trp	ttt Phe	cag Gln 160	480
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Glu 625	Trp	Gln	Asp	Ala	Leu 630	Ser	Gly	Glu	Arg	Leu 635	Gly	Gly	Gly	Glu	Val 640	
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 Leu Ser Val Ala Glu Tyr Trp Met His Phe Gly Ile Asp Gly Trp Arg
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 Ile Trp Gly Asp Ala Gly Arg Trp Leu Ala Gly Asp Gln Phe Asp Ala
 260 265 270

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Arg	Thr	Leu	Asp	His	Pro	Met	Asn	Glu	Arg	Ser	Gly	Thr	Gly	Arg	Val	
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Glu	Pro	Leu	Asp	Ala	Ala	Ala	Phe	Ala	Val	Arg	Val	Glu	Glu	Val	Thr	
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Arg	Met	Tyr	His	Pro	Ala	Val	Val	Arg	Ala	Gln	Leu	Asn	Leu	Leu	Asp	
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tcg	cac	gac	acc	gcc	cgc	ttc	ctg	acg	gcg	gtg	ggc	ggc	gac	gcc	tcg	1056
Ser	His	Asp	Thr	Ala	Arg	Phe	Leu	Thr	Ala	Val	Gly	Gly	Asp	Ala	Ser	
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Cys	Leu	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Leu	Pro	Gly	Gly	Val	Asp	Pro	
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Asp	Thr	Leu	Thr	Leu	Val	Arg	Glu	Leu	Thr	Ala	Ala	Arg	His	Arg	Ser	
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Gln	Val	Ser	Phe	Ala	Arg	Lys	His	Asp	Gly	Glu	Ala	Ala	Tyr	Val	Ala	
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Tyr Asp Glu Asp Arg Pro Ala Asn Tyr Ala Ala Trp Trp Gly Ile Arg
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Ala Leu Pro Lys Phe Asn Thr Asp His Pro Glu Val Arg Glu Phe Leu
      180      185      190
Leu Ser Val Ala Glu Tyr Trp Met His Phe Gly Ile Asp Gly Trp Arg
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Leu Asp Val Pro Asn Glu Ile Asp Asp Asp Ala Phe Trp Gln Glu Phe
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Ile Trp Gly Asp Ala Gly Arg Trp Leu Ala Gly Asp Gln Phe Asp Ala
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Val Met Asn Tyr His Phe Thr Arg Pro Cys Leu Gly Phe Phe Gly Ala
      240      245      250
Arg Thr Leu Asp His Pro Met Asn Glu Arg Ser Gly Thr Gly Arg Val
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Glu Pro Leu Asp Ala Ala Ala Phe Ala Val Arg Val Glu Glu Val Thr
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Ser His Asp Thr Ala Arg Phe Leu Thr Ala Val Gly Gly Asp Ala Ser
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Ala Gln Arg Leu Ala Leu Val Phe Gln Phe Ser Tyr Val Gly Ala Pro
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Cys Leu Tyr Tyr Gly Asp Glu Ile Gly Leu Pro Gly Gly Val Asp Pro
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Asp Cys Arg Arg Ala Phe Pro Trp Asp Glu Pro Gln Thr Trp Asp His
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Gln Val Ser Phe Ala Arg Lys His Asp Gly Glu Ala Ala Tyr Val Ala
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tcc ctg caa ggc gag ctg aaa tgg tgg caa agc ggc atc att tac cag      144
Ser Leu Gln Gly Glu Leu Lys Trp Trp Gln Ser Gly Ile Ile Tyr Gln
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att tac cca cgt tcc tat cag gac agc aac ggc gac ggc gtg ggc gac      192
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Seite 32

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cag	gcg	gtg	tgg	ctc	tcc	ccc	att	ttc	aaa	agc	ccg	atg	cgc	gat	ttc	288	
Gln	Ala	Val	Trp	Leu	Ser	Pro	Ile	Phe	Lys	Ser	Pro	Met	Arg	Asp	Phe		
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gga	tac	gac	gtg	gcg	gat	tac	tgc	gac	att	gac	ccg	gtg	ttc	ggc	acg	336	
Gly	Tyr	Asp	Val	Ala	Asp	Tyr	Cys	Asp	Ile	Asp	Pro	Val	Phe	Gly	Thr		
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Leu	Glu	Gln	Phe	Asp	Ala	Leu	Val	Ala	Glu	Ala	His	Arg	Leu	Gly	Leu		
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Lys	Val	Met	Leu	Asp	Tyr	Val	Pro	Asn	His	Thr	Ser	Ser	Asp	His	Ala		
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Tyr	Val	Trp	Arg	Asp	Pro	Ala	Pro	Asp	Gly	Gly	Leu	Pro	Asn	Asn	Trp		
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Arg	Thr	Pro	Met	Gln	Trp	Glu	Ala	Ala	Pro	Gly	Ala	Gly	Phe	Thr	Ala		
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Glu	Glu	Arg	Ala	Val	Ala	Ala	Thr	Gly	Gln	Thr	Leu	Leu	Ser	Ser	Arg		
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Phe	Asp	Ser	Leu	Phe	Leu	Phe	Ser	Leu	Gln	Ala	Ala	Met	Arg	Gly	Ser	
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Val	Met	Gly	Ala	Ser	Ser	Leu	Val	Asn	Val	Arg	Glu	Val	Leu	Arg	Arg	
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Ser	Asp	Glu	Leu	Ala	Arg	Pro	Gly	Glu	Val	Ala	Leu	Phe	Leu	Asp	Asn	
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Gln	Ala	Arg	Thr	Lys	Tyr	Gly	Leu	Arg	Ala	Leu	Leu	Thr	Leu	Arg	Gly	
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Val	Pro	Val	Leu	Tyr	Gln	Gly	Thr	Glu	Ile	Ala	Met	Arg	Gly	Gly	Ala	
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Asp	Pro	Asp	Asn	Arg	Arg	Asp	Met	Arg	Phe	Glu	Ser	Gln	Trp	Thr	Pro	
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Ala	Glu	Lys	Ala	Val	Tyr	Asn	Val	Ala	Arg	Asp	Ala	Ile	Ala	Val	Arg	
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Pro	Asp	Arg	Gln	Ala	Asp	Asp	Leu	Leu	Leu	Thr	Arg	Glu	Gln	Gly		
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Tyr	Ser	Leu	Lys	Leu	Ser	Thr	Leu	Gly	Ile	Lys	Ala	Asn	Ala	Gln	Asp	
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Val	Thr	Lys	Thr	Leu	Phe	Ala	Gly	Gln	Asp	Ala	Lys	Val	Ser	Val	Lys	
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<211> 483

<212> PRT

<213> Deinococcus radiodurans R1

<400> 26

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Thr	Ala	Ile	Trp	Met	Thr	Pro	Ile	Tyr	Arg	Gln	Gln	Thr	Ala	Lys	Ser	
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Ser	Asp	Glu	Leu	Ala	Arg	Pro	Gly	Glu	Val	Ala	Leu	Phe	Leu	Asp	Asn	
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Gln	Ala	Arg	Thr	Lys	Tyr	Gly	Leu	Arg	Ala	Leu	Leu	Thr	Leu	Arg	Gly	
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Asp	Pro	Asp	Asn	Arg	Arg	Asp	Met	Arg	Phe	Glu	Ser	Gln	Trp	Thr	Pro	
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Ala	Glu	Lys	Ala	Val	Tyr	Asn	Val	Ala	Arg	Asp	Ala	Ile	Ala	Val	Arg	
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Lys	Ala	Ser	Pro	Pro	Leu	Ser	Arg	Gly	Thr	Gln	Thr	Leu	Leu	Pro	Val	
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Gly	Gln	Arg	Val	Leu	Val	Ala	Trp	His	Asn	Gly	Leu	Lys	Arg	Gln	Ser	
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 Gly Gly Tyr Leu His Leu Ser Leu Pro Pro Lys Asp Ala Ala Ala Phe
 465 470 475 480
 Val Leu Arg

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<211> 1659

<212> DNA

<213> Deinococcus radiodurans R1

<220>

<221> CDS

<222> (1)..(1659)

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Phe	Pro	Gly	Leu	Thr	Ser	Arg	Leu	Asp	Tyr	Leu	Lys	Asn	Leu	Gly	Val	
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Arg	Val	Ile	Gly	Asp	Leu	Val	Thr	Asn	His	Thr	Ser	Ser	Asp	His	Pro	
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Asp	Ala	Val	Pro	Tyr	Leu	Ile	Glu	Arg	Glu	Gly	Thr	Ser	Cys	Glu	Asn	
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Val	Ser	Asn	Phe	Ala	Gly	Asn	Ala	Gln	Ala	Gly	Leu	Leu	Asp	Leu	Ala	
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Pro	Phe	Val	Gly	Arg	Ala	Pro	Val	Thr	Leu	Ser	Gly	Ala	Ser	Pro	Leu	
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<212> PRT

<213> Deinococcus radiodurans R1

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Phe	Pro	Gly	Leu	Thr	Ser	Arg	Leu	Asp	Tyr	Leu	Lys	Asn	Leu	Gly	Val	
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Arg	Val	Ile	Gly 100	Asp	Leu	Val	Thr	Asn 105	His	Thr	Ser	Ser	Asp 110	His	Pro
Trp	Phe	Gln 115	Ala	Ala	Arg	Arg	Gly 120	Pro	Thr	Leu	Pro	Asp 125	Gly	Ser	Pro
Asn	Glu 130	Tyr	His	Asp	Tyr	Tyr 135	Val	Trp	Ser	Asp	Glu 140	Gly	Lys	Glu	Tyr
Ala 145	Asp	Thr	Arg	Ile	Ile 150	Phe	Thr	Asp	Thr	Glu 155	Val	Ser	Asn	Trp	Thr 160
Leu	Asp	Glu	Gln	Ala 165	Gly	Lys	Tyr	Tyr	Trp 170	His	Arg	Phe	Phe	Ala 175	Ser
Gln	Pro	Asp	Leu 180	Asn	Tyr	Asp	Asn	Pro 185	Lys	Val	Val	Glu	Glu 190	Leu	His
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Arg	Glu	Tyr	Pro	Gly 245	Arg	Leu	Leu	Leu	Ala 250	Glu	Ala	Asn	Gln	Trp 255	Pro
Glu	Glu	Val	Val 260	Glu	Tyr	Phe	Gly	Thr 265	Glu	Ala	Glu	Pro	Glu 270	Phe	His
Met	Cys	Phe 275	Asn	Phe	Pro	Val	Met 280	Pro	Arg	Leu	Tyr	Met 285	Ser	Leu	Lys
Arg	Glu 290	Asp	Thr	Ser	Ser	Ile 295	Arg	Glu	Ile	Met	Gly 300	Arg	Leu	Pro	Lys
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Arg	Leu	Ala 355	Pro	Leu	Leu	Asp	Asn 360	Asp	Arg	Arg	Arg	Ile 365	Glu	Leu	Leu
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Ser	Leu 450	Leu	Lys	Trp	Thr	Ala 455	Arg	Gln	Leu	Glu	Leu 460	Arg	Arg	Ala	His
Pro	Ala	Phe	Ala	His	Gly 470	Asp	Leu	Thr	Phe	Ile 475	Glu	Thr	Gly	Asn	Pro 480
Ala	Ile	Leu	Ala	Phe 485	Thr	Arg	Gln	Tyr	Asp 490	Gly	Glu	Thr	Leu	Leu 495	Ile
Val	Ser	Asn	Phe 500	Ala	Gly	Asn	Ala	Gln 505	Ala	Gly	Leu	Leu	Asp 510	Leu	Ala
Pro	Phe	Val 515	Gly	Arg	Ala	Pro	Val 520	Thr	Leu	Ser	Gly	Ala 525	Ser	Pro	Leu
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<211> 1824

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<213> Mycoplasma pulmonis UAB CTIP

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Asp	Lys	Asn	Phe	Lys	Lys	Asn	Ile	Glu	Lys	Glu	Asn	Leu	Asn	Asn	Leu	
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Glu	Lys	Gln	Lys	Ser	Asn	Val	Ile	Tyr	Gln	Leu	Thr	Val	Tyr	Ser	Phe	
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Gly	Asn	Thr	Lys	Tyr	Gln	Asn	Tyr	Tyr	Tyr	Phe	Leu	Asp	Glu	Asn	Ile	
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Ser	Lys	Asp	Thr	Gln	Gly	Leu	Gly	Ile	Asp	Ser	Gln	Asp	Leu	Arg	Asn	
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Gln	Phe	Lys	Asn	Leu	Lys	Asn	Lys	Gln	Ala	Ser	Asn	Lys	Lys	Tyr	Val	
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Ala	His	Phe	Trp	Pro	Gly	Met	Pro	Asp	Leu	Asn	Leu	Asn	Asn	Ser	Asp	
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Asn	Gln	His	Lys	Pro	Arg	Glu	Asn	Gly	Asn	Gln	Lys	Ile	Asn	Ser	Ile	
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caa	aga	tca	tct	aaa	gaa	cca	ttt	tta	ttt	ggg	gag	tga	tga	aaa	tct	960
Gln	Arg	Ser	Ser	Lys	Glu	Pro	Phe	Leu	Phe	Gly	Glu	Trp	Trp	Lys	Ser	
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cct	ttt	gaa	gca	aat	gac	tat	ctt	gat	att	aaa	aat	caa	gga	tta	gat	1008
Pro	Phe	Glu	Ala	Asn	Asp	Tyr	Leu	Asp	Ile	Lys	Asn	Gln	Gly	Leu	Asp	
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Ser	Thr	Trp	Met	Pro	Phe	Leu	Asp	Asn	His	Asp	Val	Glu	Arg	Trp	Ile		
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Asn	Lys	Val	Arg	Arg	Gln	Ile	Asn	Lys	Asn	Val	Ala	Ser	Val	Asp	Lys		
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Leu	Ser	Glu	Leu	Glu	Ile	Ser	Leu	Met	Lys	Tyr	Ala	Leu	Val	Ser	Leu		
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tta	cat	gga	gga	ccc	aaa	caa	gct	gga	gat	cat	ttt	gta	aga	gag	gct		1344
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Phe	Pro	Trp	Lys	Asp	Arg	Thr	Lys	Gln	Val	Asp	Phe	Tyr	Glu	Leu	Arg		
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Val	Lys	Gln	Leu	Asn	Glu	Ile	Arg	Asn	Lys	Tyr	Gln	Tyr	Val	Val	Ser		
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Gln	Asp	Pro	Asn	Thr	Ile	Ala	Asp	Leu	Glu	Glu	Ile	Leu	Ser	Glu	Ser		
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Gly	Glu	Tyr	Leu	Leu	Tyr	Ile	Phe	Gly	Trp	Gly	Asn	Asn	Asp	Ile	Ser		
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Phe	Lys	Ile	Lys	Asn	Asn	Phe	Lys	Ile	Asp	Gln	Ile	Leu	Leu	Gln	Lys		
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Asn	Ile	Asn	Ile	Asn	Thr	Gln	Thr	Arg	Glu	Ile	Ser	Ser	Ser	Gly	Ile		
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ggt	act	tat	gct	gtt	tta	aaa	att	aat	aaa	aaa	agt	gag	gca	att			1821
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Asp	Lys	Asn	Phe	Lys	Lys	Asn	Ile	Glu	Lys	Glu	Asn	Leu	Asn	Asn	Leu	
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Thr	Tyr	Val	Asp	Lys	Ser	Leu	Glu	Ala	Lys	Asn	Glu	Ala	Pro	Phe	Ile	
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			130	Val	Ser	His	Ala	Asn	Gly	Ile	Lys	Val	Val	Met	Asp	Leu	Val		
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					210	Phe	Trp	Pro	Gly	Met	Pro	Asp	Leu	Asn	Leu	Asn	Asn	Ser	
					225	Ile	Lys	Glu	Leu	Lys	Ala	Ile	Gln	Arg	Tyr	Trp	Ser	Lys	
					240	Val	Asp	Gly	Phe	Arg	Tyr	His	Phe	Phe	Asp	Ser	Asn		
					260	Asn	Gln	His	Lys	Pro	Arg	Glu	Asn	Gly	Asn	Gln	Lys	Ile	
					275	Phe	Gln	Lys	Leu	Arg	Ser	Thr	Asn	Lys	Glu	Ala	Ile	Asn	
					290	Gln	Arg	Ser	Ser	Lys	Glu	Pro	Phe	Leu	Phe	Gly	Glu	Trp	
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					320	Ser	Val	Ile	Asp	Gly	Arg	Asn	Trp	Lys	Asp	Asn	Ile	Asn	
					340	Asn	Ala	Lys	Glu	Gln	Arg	Ala	Leu	Glu	Phe	Leu	Asn	Asn	
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					385	Leu	Ser	Glu	Leu	Glu	Ile	Ser	Leu	Met	Lys	Tyr	Ala	Leu	
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					420	Leu	His	Gly	Gly	Pro	Lys	Gln	Ala	Gly	Asp	His	Phe	Val	
					435	Phe	Pro	Trp	Lys	Asp	Arg	Thr	Lys	Gln	Val	Asp	Phe	Tyr	
					450	Ser	Gly	Lys	Glu	Asn	Ser	Arg	Ile	Phe	Leu	Asn	Leu	Ser	
					465	Glu	Lys	Ile	Glu	Asp	Ala	Ile	Lys	Asn	Glu	Asn	Ser	Thr	
					480	Val	Lys	Gln	Leu	Asn	Glu	Ile	Arg	Asn	Lys	Tyr	Gln	Tyr	
					500	Gln	Asp	Pro	Asn	Thr	Ile	Ala	Asp	Leu	Glu	Glu	Ile	Leu	
					515	Glu	Ile	Arg	Lys	Tyr	Gln	Asn	Leu	Asn	Leu	Arg	Lys	Asn	
					530	Gly	Glu	Tyr	Leu	Leu	Tyr	Ile	Phe	Gly	Trp	Gly	Asn	Asn	
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Ser Ala Ala Ala Leu Pro Ala Asp Pro Thr Trp Phe Lys His Ala Val
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Phe Tyr Glu Val Leu Val Arg Ala Phe Phe Asp Ala Ser Ala Asp Gly
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Ser Gly Asp Leu Arg Gly Leu Ile Asp Arg Leu Asp Tyr Leu Gln Trp
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Leu Gly Ile Asp Cys Ile Trp Leu Pro Pro Phe Tyr Asp Ser Pro Leu
      85      90      95
cgc gac ggc ggt tac gac att cgc gac ttc tac aag gtg ctg ccc gaa      336
Arg Asp Gly Gly Tyr Asp Ile Arg Asp Phe Tyr Lys Val Leu Pro Glu
      100      105      110
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Phe Gly Thr Val Asp Asp Phe Val Ala Leu Val Asp Ala Ala His Arg
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Arg Gly Ile Arg Ile Ile Thr Asp Leu Val Met Asn His Thr Ser Glu
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tcg cac ccc tgg ttt cag gag tcc cgc cgc gac cca gac gga ccg tac      480
Ser His Pro Trp Phe Gln Glu Ser Arg Arg Asp Pro Asp Gly Pro Tyr
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Gly Asp Tyr Tyr Val Trp Ser Asp Thr Ser Glu Arg Tyr Thr Asp Ala
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cgg atc atc ttc gtc gac acc gaa gag tcg aac tgg tca ttc gat cct      576
Arg Ile Ile Phe Val Asp Thr Glu Glu Ser Asn Trp Ser Phe Asp Pro
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Glu	Ser	Arg	Phe	Pro	Ile	Ser	Glu	Ile	Ile	Ala	Gln	Thr	Pro	Pro	Ile																																			
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Pro	Asp	Met	Ala	Gln	Trp	Gly	Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu																																			
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Thr	Leu	Glu	Met	Val	Thr	Asp	Glu	Glu	Arg	Asp	Tyr	Met	Tyr	Ala	Glu																																			
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Ala	Leu	Leu	Leu	Ser	Leu	Pro	Gly	Ser	Pro	Val	Leu	Tyr	Tyr	Gly	Asp																																			
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Glu	Ile	Gly	Met	Gly	Asp	Val	Ile	Trp	Leu	Gly	Asp	Arg	Asp	Gly	Val																																			
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Arg	Ile	Pro	Met	Gln	Trp	Thr	Pro	Asp	Arg	Asn	Ala	Gly	Phe	Ser	Thr																																			
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Ala	Asn	Pro	Gly	Arg	Leu	Tyr	Leu	Pro	Pro	Ser	Gln	Asp	Pro	Val	Tyr																																			
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ggg	tat	cag	gcc	gtc	aac	gtc	gag	gcg	caa	cg	gac	acc	tcg	acg	tcg		1440																																	
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ctg	ctc	aac	ttc	act	cg	acc	atg	ctg	gcc	gtg	cg	cg	cga	cac	ccc		1488																																	
Leu	Leu	Asn	Phe	Thr	Arg	Thr	Met	Leu	Ala	Val	Arg	Arg	Arg	His	Pro																																			
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ctc	tgt	gtc	aac	aac	ctg	tcg	cga	ttc	ccg	cag	ccc	atc	gaa	ttg	gac		1632																																	
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Leu	Gln	Gln	Trp	Thr	Asn	Tyr	Thr	Pro	Val	Glu	Leu	Thr	Gly	His	Val																																			
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gag	ttt	cca	cg	atc	ggc	cag	gtg	ccc	tat	ctg	ctg	acg	ctg	cca	gga		1728																																	
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																	565																570																575	
cac	ggg	ttc	tac	tgg	ttc	cag	ttg	acc	aca	cat	gag	gtg	ggg	gca	cct		1776																																	
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<212> PRT

<213> Mycobacterium tuberculosis CDC1551

<400> 32

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Phe Tyr Glu Val Leu Val Arg Ala Phe Phe Asp Ala Ser Ala Asp Gly

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Phe	Gly	Thr 115	Val	Asp	Asp	Phe	Val 120	Ala	Leu	Val	Asp	Ala 125	Ala	His	Arg
Arg	Gly 130	Ile	Arg	Ile	Ile	Thr 135	Asp	Leu	Val	Met	Asn 140	His	Thr	Ser	Glu
Ser 145	His	Pro	Trp	Phe	Gln 150	Glu	Ser	Arg	Arg	Asp 155	Pro	Asp	Gly	Pro	Tyr 160
Gly	Asp	Tyr	Tyr	Val 165	Trp	Ser	Asp	Thr	Ser 170	Glu	Arg	Tyr	Thr	Asp 175	Ala
Arg	Ile	Ile	Phe 180	Val	Asp	Thr	Glu	Glu 185	Ser	Asn	Trp	Ser	Phe 190	Asp	Pro
Val	Arg	Arg 195	Gln	Phe	Tyr	Trp	His 200	Arg	Phe	Phe	Ser	His 205	Gln	Pro	Asp
Leu	Asn 210	Tyr	Asp	Asn	Pro	Ala 215	Val	Gln	Glu	Ala	Met 220	Ile	Asp	Val	Ile
Arg 225	Phe	Trp	Leu	Gly	Leu 230	Gly	Ile	Asp	Gly	Phe 235	Arg	Leu	Asp	Ala	Val 240
Pro	Tyr	Leu	Phe	Glu 245	Arg	Glu	Gly	Thr	Asn 250	Cys	Glu	Asn	Leu	Pro 255	Glu
Thr	His	Ala	Phe 260	Leu	Lys	Arg	Val	Arg 265	Lys	Val	Val	Asp	Asp 270	Glu	Phe
Pro	Gly	Arg 275	Val	Leu	Leu	Ala	Glu 280	Ala	Asn	Gln	Trp	Pro 285	Gly	Asp	Val
Val	Glu 290	Tyr	Phe	Gly	Asp	Pro 295	Asn	Thr	Gly	Gly	Asp 300	Glu	Cys	His	Met
Ala 305	Phe	His	Phe	Pro	Leu 310	Met	Pro	Arg	Ile	Phe 315	Met	Ala	Val	Arg	Arg 320
Glu	Ser	Arg	Phe	Pro 325	Ile	Ser	Glu	Ile	Ile 330	Ala	Gln	Thr	Pro	Pro 335	Ile
Pro	Asp	Met	Ala 340	Gln	Trp	Gly	Ile	Phe 345	Leu	Arg	Asn	His	Asp 350	Glu	Leu
Thr	Leu	Glu 355	Met	Val	Thr	Asp	Glu 360	Glu	Arg	Asp	Tyr	Met 365	Tyr	Ala	Glu
Tyr	Ala 370	Lys	Asp	Pro	Arg	Met 375	Lys	Ala	Asn	Val	Gly 380	Ile	Arg	Arg	Arg
Leu 385	Ala	Pro	Leu	Leu	Asp 390	Asn	Asp	Arg	Asn	Gln 395	Ile	Glu	Leu	Phe	Thr 400
Ala	Leu	Leu	Leu	Ser 405	Leu	Pro	Gly	Ser	Pro 410	Val	Leu	Tyr	Tyr	Gly 415	Asp
Glu	Ile	Gly	Met 420	Gly	Asp	Val	Ile	Trp 425	Leu	Gly	Asp	Arg	Asp 430	Gly	Val
Arg	Ile	Pro 435	Met	Gln	Trp	Thr	Pro 440	Asp	Arg	Asn	Ala	Gly 445	Phe	Ser	Thr
Ala	Asn 450	Pro	Gly	Arg	Leu	Tyr 455	Leu	Pro	Pro	Ser	Gln 460	Asp	Pro	Val	Tyr
Gly 465	Tyr	Gln	Ala	Val	Asn 470	Val	Glu	Ala	Gln	Arg 475	Asp	Thr	Ser	Thr	Ser 480
Leu	Leu	Asn	Phe	Thr 485	Arg	Thr	Met	Leu	Ala 490	Val	Arg	Arg	Arg	His 495	Pro
Ala	Phe	Ala	Val 500	Gly	Ala	Phe	Gln	Glu 505	Leu	Gly	Gly	Ser	Asn 510	Pro	Ser
Val	Leu	Ala 515	Tyr	Val	Arg	Gln	Val 520	Ala	Gly	Asp	Asp	Gly 525	Asp	Thr	Val
Leu	Cys 530	Val	Asn	Asn	Leu	Ser 535	Arg	Phe	Pro	Gln	Pro 540	Ile	Glu	Leu	Asp
Leu 545	Gln	Gln	Trp	Thr	Asn 550	Tyr	Thr	Pro	Val	Glu 555	Leu	Thr	Gly	His	Val 560
Glu	Phe	Pro	Arg	Ile 565	Gly	Gln	Val	Pro	Tyr 570	Leu	Leu	Thr	Leu	Pro 575	Gly
His	Gly	Phe	Tyr 580	Trp	Phe	Gln	Leu	Thr 585	Thr	His	Glu	Val	Gly 590	Ala	Pro
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 Ala Ser Ala Arg Arg Pro Glu Pro Asp Pro Met Gly Glu Pro Trp Trp
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 tcg cga gcc gtg ttc tac cag gtc tat ccc cga tcg ttc gcc gac agc 144
 Ser Arg Ala Val Phe Tyr Gln Val Tyr Pro Arg Ser Phe Ala Asp Ser
 35 40 45
 aac ggc gac ggg gtg ggc gac ctg gac ggg ttg gcg agc cgg ctt gac 192
 Asn Gly Asp Gly Val Gly Asp Leu Asp Gly Leu Ala Ser Arg Leu Asp
 50 55 60
 cac ctg caa cag ctc ggt gtc gac gcg atc tgg atc aac ccg gtc acc 240
 His Leu Gln Gln Leu Gly Val Asp Ala Ile Trp Ile Asn Pro Val Thr
 65 70 75 80
 gtc tcg ccg atg gca gac cac gga tac gac gtc gcc gat ccc cgc gac 288
 Val Ser Pro Met Ala Asp His Gly Tyr Asp Val Ala Asp Pro Arg Asp
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 atc gac cca ctc ttc ggc ggg atg ccg gcg ttc gaa cgg ttg gtc gct 336
 Ile Asp Pro Leu Phe Gly Gly Met Pro Ala Phe Glu Arg Leu Val Ala
 100 105 110
 gcg gca cac cgg cag ggc atc aaa gtc acc acg gac gtg gtg ccc aac 384
 Ala Ala His Arg Gln Gly Ile Lys Val Thr Thr Asp Val Val Pro Asn
 115 120 125
 cac acc agt tcg gcg cac cca tgg ttt cag gcc gcg ctg gct gac ctc 432
 His Thr Ser Ser Ala His Pro Trp Phe Gln Ala Ala Leu Ala Asp Leu
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 Pro Gly Ser Pro Ala Arg Asp Arg Tyr Phe Phe Arg Asp Gly Arg Gly
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 Pro Asp Gly Ser Leu Pro Pro Asn Asn Trp Glu Ser Val Phe Gly Gly
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 Pro Ala Trp Thr Arg Val Arg Glu Pro Asp Gly Asn Pro Gly Gln Trp
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 Tyr Leu His Leu Phe Asp Thr Glu Gln Pro Asp Leu Asn Trp Asp Asn
 195 200 205
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 Pro Glu Ile Leu Asp Asp Phe Glu Lys Thr Leu Arg Phe Trp Leu Asp
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 Arg Gly Val Asp Gly Phe Arg Ile Asp Val Ala His Gly Met Ala Lys
 225 230 235 240
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 Pro Pro Gly Leu Pro Asp Ser Pro Asp Leu Gly Ile Glu Val Leu His
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 cac cgc gat gac gac ccg cgc ttc aac cac ccg aat gtg cac gcg att 816
 His Arg Asp Asp Asp Pro Arg Phe Asn His Pro Asn Val His Ala Ile
 260 265 270
 cac cgc gac atc cgc acg gtg atc gac gag tac ccc gga gcg gta acc 864
 His Arg Asp Ile Arg Thr Val Ile Asp Glu Tyr Pro Gly Ala Val Thr
 275 280 285
 gtc ggc gag gtg tgg gta cac gac aac gcc cgc tgg gcg gag tat ctg 912
 Val Gly Glu Val Trp Val His Asp Asn Ala Arg Trp Ala Glu Tyr Leu
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Glu	Phe	Asp	Ala	Ala	Glu	Ile	Arg	Asp	Ala	Val	Ala	Asn	Ser	Leu	Ala	
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Ala	Ala	Ala	Leu	Gln	Asn	Ala	Thr	Pro	Thr	Trp	Thr	Leu	Ala	Asn	His	
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Glu	Arg	Gly	Arg	Asp	Gly	Cys	Arg	Val	Pro	Ile	Pro	Trp	Ser	Gly	Asn	
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Ile	Pro	Pro	Phe	Gly	Phe	Ser	Thr	Cys	Pro	Asp	Thr	Trp	Leu	Pro	Met	
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Pro	Pro	Glu	Trp	Ala	Ala	Leu	Thr	Ala	Glu	Lys	Gln	Arg	Ala	Asp	Ala	
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ggc	tcg	acc	ttg	tcg	ttt	ttt	cga	ctt	gca	ctc	aga	tta	cgt	agg	gaa	1440
Gly	Ser	Thr	Leu	Ser	Phe	Phe	Arg	Leu	Ala	Leu	Arg	Leu	Arg	Arg	Glu	
465					470				475						480	
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Arg	Asn	Glu	Phe	Asp	Gly	Asp	Val	Asp	Trp	Leu	Ala	Ala	Pro	Asp	Asp	
				485					490					495		
gcg	ctg	ata	ttc	cgg	cgt	cac	ggc	ggg	ggt	ttg	gtg	tgc	gcg	ctc	aac	1536
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Ala	Ala	Glu	Arg	Pro	Leu	Ala	Leu	Pro	Ala	Gly	Glu	Pro	Ile	Leu	Ala	
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Leu	Val															
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<212> PRT

<213> Mycobacterium tuberculosis CDC1551

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Asn	Gly	Asp	Gly	Val	Gly	Asp	Leu	Asp	Gly	Leu	Ala	Ser	Arg	Leu	Asp	
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Ile	Asp	Pro	Leu	Phe	Gly	Gly	Met	Pro	Ala	Phe	Glu	Arg	Leu	Val	Ala	
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 Pro Ala Trp Thr Arg Val Arg Glu Pro Asp Gly Asn Pro Gly Gln Trp
 180 185 190
 Tyr Leu His Leu Phe Asp Thr Glu Gln Pro Asp Leu Asn Trp Asp Asn
 195 200 205
 Pro Glu Ile Leu Asp Asp Phe Glu Lys Thr Leu Arg Phe Trp Leu Asp
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 Arg Gly Val Asp Gly Phe Arg Ile Asp Val Ala His Gly Met Ala Lys
 225 230 235 240
 Pro Pro Gly Leu Pro Asp Ser Pro Asp Leu Gly Ile Glu Val Leu His
 245 250 255
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 260 265 270
 His Arg Asp Ile Arg Thr Val Ile Asp Glu Tyr Pro Gly Ala Val Thr
 275 280 285
 Val Gly Glu Val Trp Val His Asp Asn Ala Arg Trp Ala Glu Tyr Leu
 290 295 300
 Arg Pro Asp Glu Leu His Leu Gly Phe Asn Phe Arg Leu Ala Arg Thr
 305 310 315 320
 Glu Phe Asp Ala Ala Glu Ile Arg Asp Ala Val Ala Asn Ser Leu Ala
 325 330 335
 Ala Ala Ala Leu Gln Asn Ala Thr Pro Thr Trp Thr Leu Ala Asn His
 340 345 350
 Asp Val Gly Arg Glu Val Ser Arg Tyr Gly Gly Gly Glu Ile Gly Leu
 355 360 365
 Arg Arg Ala Lys Ala Met Ala Val Val Met Leu Ala Leu Pro Gly Val
 370 375 380
 Val Phe Leu Tyr Asn Gly Gln Glu Leu Gly Leu Pro Asp Val Asp Leu
 385 390 395 400
 Pro Asp Glu Val Leu Gln Asp Pro Thr Trp Glu Arg Ser Gly Arg Thr
 405 410 415
 Glu Arg Gly Arg Asp Gly Cys Arg Val Pro Ile Pro Trp Ser Gly Asn
 420 425 430
 Ile Pro Pro Phe Gly Phe Ser Thr Cys Pro Asp Thr Trp Leu Pro Met
 435 440 445
 Pro Pro Glu Trp Ala Ala Leu Thr Ala Glu Lys Gln Arg Ala Asp Ala
 450 455 460
 Gly Ser Thr Leu Ser Phe Arg Leu Ala Leu Arg Leu Arg Arg Glu
 465 470 475 480
 Arg Asn Glu Phe Asp Gly Asp Val Asp Trp Leu Ala Ala Pro Asp Asp
 485 490 495
 Ala Leu Ile Phe Arg Arg His Gly Gly Gly Leu Val Cys Ala Leu Asn
 500 505 510
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 Leu Val
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<211> 1356

<212> DNA

<213> Clostridium acetobutylicum ATCC 824

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Tyr 65	Asp	Thr	Ala	Asp	Tyr 70	Tyr	Thr	Val	Asp	Arg 75	Arg	Leu	Gly	Thr	Asn 80		
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Phe	Met 115	Asp	Leu	Ile	Ile	Asn	Lys 120	Gln	Thr	Ser	Ser	Phe 125	Ala	Thr	Trp		
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Ser 210	Asp	Asp	Phe	Phe	Leu	Leu 215	Gly	Glu	Ile	Ile	Phe 220	Gly	Asp	Tyr	Thr		
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Arg 225	Phe	Ala	Ser	Lys	Asn 230	Ile	Leu	Asp	Ser	Val 235	Thr	Asn	Tyr	Glu 240	Cys		
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Tyr	Lys	Gly	Leu 245	Tyr	Ser	Ser	His	Asn 250	Ser	Leu	Asn	Tyr	Phe 255	Glu	Ile		
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Ala	Tyr	Ser 260	Leu	Asn	Arg	Gln	Phe 265	Gly	Asp	Gly	Gly	Ile 270	Tyr	Lys	Asn		
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Ile	Pro 275	Leu	Tyr	Asn	Phe	Val	Asp 280	Asn	His	Asp	Val 285	Asn	Arg	Ile	Ala		
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Ser 290	Thr	Leu	Ile	Asp	Ala 295	Ala	Asn	Ile	Tyr	Pro 300	Ile	Tyr	Thr	Ile	Leu		
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Phe 305	Thr	Ile	Pro	Gly	Ile 310	Pro	Ser	Ile	Tyr	Tyr 315	Gly	Ser	Asp	Phe	Gly 320		
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Ile	Thr	Gly	Val 325	Lys	Gln	Asn	Asn	Ser 330	Asp	Lys	Tyr	Leu	Arg	Pro 335	Arg		
cta	aaa	att	aat	gaa	tta	aaa	aac	tct	aaa	gaa	aac	aaa	cct	ttg	aat	1056	
Leu	Lys	Ile 340	Asn	Glu	Leu	Lys	Asn 345	Ser	Lys	Glu	Asn	Lys 350	Pro	Leu	Asn		
aat	ttt	ata	aaa	aag	ctt	tgc	cat	att	cga	ata	aat	tct	gaa	gca	tta	1104	
Asn	Phe 355	Ile	Lys	Lys	Leu	Cys	His 360	Ile	Arg	Ile	Asn	Ser 365	Glu	Ala	Leu		
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370						375					380						
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Phe	Leu	Arg	Tyr	Thr	Asp	Ser	Glu	Lys	Ile	Ile	Val	Ala	Leu	Asn	Cys		
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Ser	Lys	Glu	Cys	Ser	Gln	Ile	Glu	Phe	Ser	Asn	Asp	Met	Asn	Ala	Thr		
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tct	tta	ttt	gat	ctt	ata	gag	aaa	aaa	agc	tta	aag	cta	gaa	cct	aat		1296
Ser	Leu	Phe	Asp	Leu	Ile	Glu	Lys	Lys	Ser	Leu	Lys	Leu	Glu	Pro	Asn		
			420				425						430				
gga	act	ata	agt	ata	acc	tta	cag	gaa	aac	caa	gca	aga	ata	ttt	aaa		1344
Gly	Thr	Ile	Ser	Ile	Thr	Leu	Gln	Glu	Asn	Gln	Ala	Arg	Ile	Phe	Lys		
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<211> 451

<212> PRT

<213> Clostridium acetobutylicum ATCC 824

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Asp	Thr	Leu	Lys	Lys	Leu	Ile	Asn	Lys	Leu	His	Lys	Asn	Gly	Ile	Lys		
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Val	Val	Leu	Asp	Gly	Val	Phe	Asn	His	Val	Gly	Arg	Asn	Phe	Pro	Gln		
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Phe	Ser	Gly	Val	Asp	Phe	Asn	Ser	Lys	Ser	Pro	Tyr	Asn	Asp	Asp	Phe		
	130					135					140						
Ser	Tyr	Asp	Thr	Trp	Asn	Gly	Cys	Tyr	Asp	Leu	Val	Lys	Leu	Asn	Phe		
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Ser	Asp	Asp	Phe	Phe	Leu	Leu	Gly	Glu	Ile	Ile	Phe	Gly	Asp	Tyr	Thr		
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Tyr	Lys	Gly	Leu	Tyr	Ser	Ser	His	Asn	Ser	Leu	Asn	Tyr	Phe	Glu	Ile		
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Ala	Tyr	Ser	Leu	Asn	Arg	Gln	Phe	Gly	Asp	Gly	Gly	Ile	Tyr	Lys	Asn		
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Ile	Pro	Leu	Tyr	Asn	Phe	Val	Asp	Asn	His	Asp	Val	Asn	Arg	Ile	Ala		
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Ser	Thr	Leu	Ile	Asp	Ala	Ala	Asn	Ile	Tyr	Pro	Ile	Tyr	Thr	Ile	Leu		
	290				295					300							
Phe	Thr	Ile	Pro	Gly	Ile	Pro	Ser	Ile	Tyr	Tyr	Gly	Ser	Asp	Phe	Gly		
305				310					315						320		
Ile	Thr	Gly	Val	Lys	Gln	Asn	Asn	Ser	Asp	Lys	Tyr	Leu	Arg	Pro	Arg		
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Leu	Lys	Ile	Asn	Glu	Leu	Lys	Asn	Ser	Lys	Glu	Asn	Lys	Pro	Leu	Asn		
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Asn	Phe	Ile	Lys	Lys	Leu	Cys	His	Ile	Arg	Ile	Asn	Ser	Glu	Ala	Leu		

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Phe  Leu Arg Tyr Thr Asp Ser  Glu Lys Ile Ile Val Ala Leu Asn Cys
385      390      395      400
Ser  Lys Glu Cys Ser  Gln Ile Glu Phe Ser Asn Asp Met Asn Ala Thr
      405      410      415
Ser  Leu Phe Asp  Leu Ile Glu Lys Lys Ser Leu Lys Leu Glu Pro Asn
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Gly Thr Ile Ser Ile Thr Leu Gln Glu Asn Gln Ala Arg Ile Phe Lys
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Val Ser Phe
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<211> 1785

<212> DNA

<213> Agrobacterium tumefaciens str. C58

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<221> CDS

<222> (1)..(1785)

<223> transl_table=11

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Ile Ser Cys Val Ala Cys Ser Arg Ala Pro Ser Arg Glu Ala Asp His
      20      25      30
tcc atg aac gcc cat acc aga cag gac act tcc atg acc gct tcg gtg      144
Ser Met Asn Ala His Thr Arg Gln Asp Thr Ser Met Thr Ala Ser Val
      35      40      45
act tcc gct ttg acg cct aac aag gac tgg tgg cgt ggt gcg gtg atc      192
Thr Ser Ala Leu Thr Pro Asn Lys Asp Trp Trp Arg Gly Ala Val Ile
      50      55      60
tat cag atc tac ccg cgc tcc tat cag gac tcc aat ggc gac ggc atc      240
Tyr Gln Ile Tyr Pro Arg Ser Tyr Gln Asp Ser Asn Gly Asp Gly Ile
      65      70      75      80
ggc gat ctc aag ggc att acc gac cgt ctg cat cac atc gcc ggt ctc      288
Gly Asp Leu Lys Gly Ile Thr Asp Arg Leu His His Ile Ala Gly Leu
      85      90      95
ggt gcc gat gcg atc tgg att tcg ccc ttt ttc acc tcg ccg atg aag      336
Gly Ala Asp Ala Ile Trp Ile Ser Pro Phe Phe Thr Ser Pro Met Lys
      100      105      110
gat ttc ggc tac gac gtc tcg aac tat gtc gat gtc gat ccg atg ttc      384
Asp Phe Gly Tyr Asp Val Ser Asn Tyr Val Asp Val Asp Pro Met Phe
      115      120      125
ggc acg ctt gcc gat ttc gac ggg ctg att gcc gaa gcc cac cgg ctt      432
Gly Thr Leu Ala Asp Phe Asp Gly Leu Ile Ala Glu Ala His Arg Leu
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ggc atc cgc gtg atg atc gac ctc gtt ctg tcg cac acg tct gac cag      480
Gly Ile Arg Val Met Ile Asp Leu Val Leu Ser His Thr Ser Asp Gln
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cat ccg tgg ttc gtg gaa agc cgc gcc agc cgc aac aat ccg aaa tcg      528
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gac tgg tat gtc tgg tcg gaa gcg aag ccc gat ggc aca ccg cct aac      576
Asp Trp Tyr Val Trp Ser Glu Ala Lys Pro Asp Gly Thr Pro Pro Asn
      180      185      190
aac tgg ctg tcg atc ttc ggc ggt tcc ggc tgg cag tgg gat ccc acc      624
Asn Trp Leu Ser Ile Phe Gly Gly Ser Gly Trp Gln Trp Asp Pro Thr
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cgc atg caa tat tac atg cac aac ttc ctg acc tcg caa ccg gac ctc      672
Arg Met Gln Tyr Tyr Met His Asn Phe Leu Thr Ser Gln Pro Asp Leu
      210      215      220
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Asn Leu His Asn Pro Glu Val Gln Glu Glu Leu Leu Asn Ile Thr Arg

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Phe	Tyr	Phe	His 260	Asp	Leu	Glu	Leu	Arg 265	Asp	Asn	Pro	Ala	Leu 270	Ala	Pro			
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Glu	Arg	Arg 275	Asn	Ala	Ser	Thr	Ala 280	Pro	Ala	Val	Asn	Pro 285	Tyr	Asn	Phe			
cag	gaa	cat	ctc	tac	gat	aag	aac	cgc	ccg	gaa	aac	atc	gcc	ttc	ctg	912		
Gln	Glu 290	His	Leu	Tyr	Asp	Lys 295	Asn	Arg	Pro	Glu	Asn 300	Ile	Ala	Phe	Leu			
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Lys 305	Arg	Phe	Arg	Ala	Val 310	Leu	Asp	Glu	Phe	Pro 315	Asp	Ile	Ala	Ala	Val 320			
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acc	tcc	ggc	gat	gac	aag	atg	cag	atg	tgc	tat	gcc	ttc	gaa	ttc	ctc	1056		
Thr	Ser	Gly	Asp 340	Asp	Lys	Met	Gln	Met 345	Cys	Tyr	Ala	Phe	Glu 350	Phe	Leu			
gca	ccc	gat	gcg	ctc	acc	ccc	cag	cgc	gtt	gcc	gat	gtg	cag	gcg	gat	1104		
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Phe	Ala 370	Arg	Ala	Ala	Pro	Glu 375	Gly	Trp	Ala	Cys	Trp 380	Ala	Phe	Ser	Asn			
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His 385	Asp	Val	Val	Arg	His 390	Val	Ser	Arg	Trp	Gly 395	Glu	His	Val	Glu 400	Asp			
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gat	att	gct	ttc	gag	gac	tta	cag	gac	ccc	tat	ggc	atc	cag	ttc	tgg	1344		
Asp	Ile	Ala 435	Phe	Glu	Asp	Leu	Gln 440	Asp	Pro	Tyr	Gly	Ile 445	Gln	Phe	Trp			
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Pro	Glu 450	Phe	Lys	Gly	Arg	Asp 455	Gly	Cys	Arg	Thr	Pro 460	Met	Val	Trp	Asp			
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Ala 465	Gly	His	Ala	Gln	Ala 470	Gly	Phe	Ser	Thr	Ser 475	Asp	Lys	Ile	Trp	Leu			
ccc	att	ccg	gcc	gag	cac	aag	cag	cgc	gcc	gtc	agc	gcc	cag	cag	ggc	1488		
Pro	Ile	Pro	Ala	Glu 485	His	Lys	Gln	Arg	Ala 490	Val	Ser	Ala	Gln 495	Gln	Gly			
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Asn	Glu	Ala	Ser 500	Val	Leu	Glu	His	Tyr 505	Arg	Arg	Phe	Leu	Ala 510	Phe	Arg			
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Lys	Gln	His 515	Pro	Ala	Phe	Ala	Lys 520	Gly	Gly	Ile	Glu	Phe 525	Gln	Pro	Leu			
gag	gga	gac	gtg	ctg	agc	tac	acc	cgc	aag	ctg	ggc	aac	gaa	acc	att	1632		
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ctg	tgc	ctt	ttc	aat	ctg	tcc	gca	acg	ccg	gca	aat	gcc	acg	ctg	ccg	1680		
Leu 545	Cys	Leu	Phe	Asn	Leu 550	Ser	Ala	Thr	Pro	Ala 555	Asn	Ala	Thr	Leu	Pro 560			
aaa	ggg	aac	tgg	gag	gtt	ctc	gaa	ggc	cat	ggc	ttt	gca	agc	ggc	ctt	1728		
Lys	Gly	Asn	Trp	Glu 565	Val	Leu	Glu	Gly	His 570	Gly	Phe	Ala	Ser	Gly 575	Leu			
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<400> 38

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Gly Thr Leu Ala Asp Phe Asp Gly Leu Ile Ala Glu Ala His Arg Leu
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Gly Ile Arg Val Met Ile Asp Leu Val Leu Ser His Thr Ser Asp Gln
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His Pro Trp Phe Val Glu Ser Arg Ala Ser Arg Asn Asn Pro Lys Ser
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      180      185      190
Asn Trp Leu Ser Ile Phe Gly Gly Ser Gly Trp Gln Trp Asp Pro Thr
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210      215      220
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Phe Tyr Phe His Asp Leu Glu Leu Arg Asp Asn Pro Ala Leu Ala Pro
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275      280      285
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Lys Arg Phe Arg Ala Val Leu Asp Glu Phe Pro Asp Ile Ala Ala Val
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Gly Glu Val Gly Asp Ser Gln Arg Gly Leu Glu Ile Val Gly Glu Tyr
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Thr Ser Gly Asp Asp Lys Met Gln Met Cys Tyr Ala Phe Glu Phe Leu
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Ala Pro Asp Ala Leu Thr Pro Gln Arg Val Ala Asp Val Gln Ala Asp
355      360      365
Phe Ala Arg Ala Ala Pro Glu Gly Trp Ala Cys Trp Ala Phe Ser Asn
370      375      380
His Asp Val Val Arg His Val Ser Arg Trp Gly Glu His Val Glu Asp
385      390      395      400
Lys Asp Ala Phe Ala Lys Leu Leu Ser Ala Leu Leu Met Thr Gln Arg
405      410      415
Gly Ser Val Cys Ile Tyr Glu Gly Glu Glu Leu Gly Leu Thr Glu Ala
420      425      430
Asp Ile Ala Phe Glu Asp Leu Gln Asp Pro Tyr Gly Ile Gln Phe Trp
435      440      445
Pro Glu Phe Lys Gly Arg Asp Gly Cys Arg Thr Pro Met Val Trp Asp
450      455      460
Ala Gly His Ala Gln Ala Gly Phe Ser Thr Ser Asp Lys Ile Trp Leu
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Pro Ile Pro Ala Glu His Lys Gln Arg Ala Val Ser Ala Gln Gln Gly

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 Lys Gln His Pro 500 Ala Phe Ala Lys 505 Gly Gly Ile Glu Phe 510 Gln Pro Leu
 Glu Gly Asp Val Leu Ser Tyr 520 Thr Arg Lys Leu Gly 525 Asn Glu Thr Ile
 Leu Cys Leu Phe Asn Leu 535 Ser Ala Thr Pro Ala 540 Asn Ala Thr Leu Pro
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Lys	Ser	Phe	Met	Asp	Ser	Asn	Glu	Asp	Gly	Val	Gly	Asp	Leu	Pro	Gly	
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Ile	Thr	Ser	Lys	Leu	Asp	Tyr	Leu	Ala	Lys	Leu	Gly	Ile	Thr	Ala	Ile	
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Trp	Leu	Ser	Pro	Val	Tyr	Asp	Ser	Pro	Met	Asp	Asp	Asn	Gly	Tyr	Asp	
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Ile	Ala	Asp	Tyr	Gln	Ala	Ile	Ala	Ala	Ile	Phe	Gly	Thr	Met	Glu	Asp	
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Glu	Ala	Cys	Glu	Asn	Pro	Asn	Ser	Pro	Glu	Arg	Asp	Tyr	Tyr	Ile	Trp	
		115					120					125				
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Arg	Asp	Glu	Pro	Asn	Asp	Leu	Asp	Ser	Ile	Phe	Ser	Gly	Ser	Ala	Trp	
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Glu	Tyr	Asp	Glu	Lys	Ser	Gly	Gln	Tyr	Tyr	Leu	His	Phe	Phe	Ser	Lys	
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aaa	cag	ccg	gat	ctc	aat	tgg	gaa	aat	gaa	aaa	ctt	cgc	cag	aaa	att	528
Lys	Gln	Pro	Asp	Leu	Asn	Trp	Glu	Asn	Glu	Lys	Leu	Arg	Gln	Lys	Ile	
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tat	gag	atg	atg	gac	ttc	tgg	att	gat	aaa	ggt	att	ggt	ggt	ttc	cgt	576
Tyr	Glu	Met	Met	Asp	Phe	Trp	Ile	Asp	Lys	Gly	Ile	Gly	Gly	Phe	Arg	
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Met	Asp	Val	Ile	Asp	Met	Ile	Gly	Lys	Ile	Pro	Asp	Glu	Lys	Val	Val	
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aat	aat	ggt	cct	atg	ctc	cat	ccc	tat	ctc	aag	gaa	atg	aat	cag	gcg	672
Asn	Asn	Gly	Pro	Met	Leu	His	Pro	Tyr	Leu	Lys	Glu	Met	Asn	Gln	Ala	
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Thr	Pro	Glu	Ile	Ala	Lys	Leu	Tyr	Ser	Asp	Pro	Lys	Gly	Gln	Glu	Leu	
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tct	atg	gtc	ttc	cag	ttt	gaa	cat	atc	ggg	ctt	cag	tat	cag	gaa	ggg	816
Ser	Met	Val	Phe	Gln	Phe	Glu	His	Ile	Gly	Leu	Gln	Tyr	Gln	Glu	Gly	
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Gln	Pro	Lys	Trp	His	Tyr	Gln	Lys	Glu	Leu	Asn	Ile	Ala	Lys	Leu	Lys	
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Glu	Ile	Phe	Asn	Lys	Trp	Gln	Thr	Glu	Leu	Gly	Val	Glu	Asp	Gly	Trp	
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aat	tcc	ctc	ttc	tgg	aac	aat	cat	gac	ctc	cct	cgt	att	gtc	tca	atc	960
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Trp	Gly	Asn	Asp	Gln	Glu	Tyr	Arg	Glu	Lys	Ser	Ala	Lys	Ala	Phe	Ala	
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Ile	Leu	Leu	His	Leu	Met	Arg	Gly	Thr	Pro	Tyr	Ile	Tyr	Gln	Gly	Glu	
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Asp	Ile	Glu	Ser	Leu	Asn	Tyr	Ala	Arg	Glu	Ala	Leu	Glu	Lys	Gly	Val	
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Pro	Ile	Glu	Glu	Ile	Met	Asp	Ser	Ile	Arg	Val	Ile	Gly	Arg	Asp	Asn	
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gcc	cgt	acc	cct	atg	caa	tgg	gac	gag	agc	aaa	aac	gct	ggg	ttc	tca	1248
Ala	Arg	Thr	Pro	Met	Gln	Trp	Asp	Glu	Ser	Lys	Asn	Ala	Gly	Phe	Ser	
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aca	ggg	caa	cct	tgg	ttg	gcg	gtt	aat	cca	aac	tac	gag	atg	atc	aac	1296
Thr	Gly	Gln	Pro	Trp	Leu	Ala	Val	Asn	Pro	Asn	Tyr	Glu	Met	Ile	Asn	
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Lys	Leu	Val	Gln	Ile	Arg	Lys	Glu	Asn	Ser	Trp	Leu	Ile	Arg	Ala	Asp	
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Phe	Glu	Leu	Leu	Asp	Thr	Ala	Asp	Lys	Val	Phe	Ala	Tyr	Ile	Arg	Lys	
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Asp	Gly	Asp	Arg	Arg	Phe	Leu	Val	Val	Ala	Asn	Leu	Ser	Asn	Glu	Glu	
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caa	gac	ttg	aca	gta	gaa	gga	aac	gtc	aaa	tct	gtc	ttg	att	gaa	aac	1536
Gln	Asp	Leu	Thr	Val	Glu	Gly	Asn	Val	Lys	Ser	Val	Leu	Ile	Glu	Asn	
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Thr	Leu	Ala	Gln	Glu	Val	Phe	Glu	Lys	Gln	Ile	Leu	Val	Pro	Trp	Asp	
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<212> PRT

<213> Streptococcus pneumoniae R6

<400> 40

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Trp	Leu	Ser	Pro	Val	Tyr	Asp	Ser	Pro	Met	Asp	Asp	Asn	Gly	Tyr	Asp
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Ile	Ala	Asp	Tyr	Gln	Ala	Ile	Ala	Ala	Ile	Phe	Gly	Thr	Met	Glu	Asp
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Met	Asp	Gln	Leu	Ile	Ala	Glu	Ala	Lys	Lys	Arg	Asp	Ile	Arg	Ile	Ile
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Met	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Glu	His	Ala	Trp	Phe	Val
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Glu	Ala	Cys	Glu	Asn	Pro	Asn	Ser	Pro	Glu	Arg	Asp	Tyr	Tyr	Ile	Trp
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Arg	Asp	Glu	Pro	Asn	Asp	Leu	Asp	Ser	Ile	Phe	Ser	Gly	Ser	Ala	Trp
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Lys	Gln	Pro	Asp	Leu	Asn	Trp	Glu	Asn	Glu	Lys	Leu	Arg	Gln	Lys	Ile
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Tyr	Glu	Met	Met	Asp	Phe	Trp	Ile	Asp	Lys	Gly	Ile	Gly	Gly	Phe	Arg
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Met	Asp	Val	Ile	Asp	Met	Ile	Gly	Lys	Ile	Pro	Asp	Glu	Lys	Val	Val
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Thr	Phe	Gly	Asp	Lys	Asp	Leu	Leu	Thr	Val	Gly	Glu	Thr	Trp	Gly	Ala
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Trp	Gly	Asn	Asp	Gln	Glu	Tyr	Arg	Glu	Lys	Ser	Ala	Lys	Ala	Phe	Ala
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Ile	Leu	Leu	His	Leu	Met	Arg	Gly	Thr	Pro	Tyr	Ile	Tyr	Gln	Gly	Glu
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Asp	Ile	Glu	Ser	Leu	Asn	Tyr	Ala	Arg	Glu	Ala	Leu	Glu	Lys	Gly	Val
	370					375					380				
Pro	Ile	Glu	Glu	Ile	Met	Asp	Ser	Ile	Arg	Val	Ile	Gly	Arg	Asp	Asn
385					390					395					400
Ala	Arg	Thr	Pro	Met	Gln	Trp	Asp	Glu	Ser	Lys	Asn	Ala	Gly	Phe	Ser
				405					410					415	
Thr	Gly	Gln	Pro	Trp	Leu	Ala	Val	Asn	Pro	Asn	Tyr	Glu	Met	Ile	Asn
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Val	Gln	Glu	Ala	Leu	Ala	Asn	Pro	Asp	Ser	Ile	Phe	Tyr	Thr	Tyr	Gln
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	450					455					460				
Phe	Glu	Leu	Leu	Asp	Thr	Ala	Asp	Lys	Val	Phe	Ala	Tyr	Ile	Arg	Lys
465					470					475					480
Asp	Gly	Asp	Arg	Arg	Phe	Leu	Val	Val	Ala	Asn	Leu	Ser	Asn	Glu	Glu
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Gln	Asp	Leu	Thr	Val	Glu	Gly	Asn	Val	Lys	Ser	Val	Leu	Ile	Glu	Asn
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Thr	Leu	Ala	Gln	Glu	Val	Phe	Glu	Lys	Gln	Ile	Leu	Val	Pro	Trp	Asp
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Ala	Phe	Cys	Val	Glu	Leu	Leu									
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<211> 1764

<212> DNA

<213> Streptococcus pneumoniae R6

<220>

<221> CDS

<222> (1)..(1764)

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ggg cct gag tcg gag tat gcc tat ctt tat aag gat aag aaa ctc cat	96
Gly Pro Glu Ser Glu Tyr Ala Tyr Leu Tyr Lys Asp Lys Lys Leu His	
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att cga att cga act aag aaa ggg gac att gaa agc atc aac ttg cac	144
Ile Arg Ile Arg Thr Lys Lys Gly Asp Ile Glu Ser Ile Asn Leu His	
35 40 45	
tat ggg gac cct ttt atc ttt atg gag gag ttt tat cag gat aca aaa	192
Tyr Gly Asp Pro Phe Ile Phe Met Glu Glu Phe Tyr Gln Asp Thr Lys	
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gaa atg gtc aag ata act tct ggt acc tta ttt gac cat tgg cag gtt	240
Glu Met Val Lys Ile Thr Ser Gly Thr Leu Phe Asp His Trp Gln Val	
65 70 75 80	
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Glu Val Ser Val Asp Phe Ala Arg Ile Gln Tyr Leu Phe Glu Leu Arg	
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gat aca gaa ggt caa aat att ttg tat ggc gat aaa ggg tgt gtg gaa	336
Asp Thr Glu Gly Gln Asn Ile Leu Tyr Gly Asp Lys Gly Cys Val Glu	
100 105 110	
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Asn Ser Leu Glu Asn Leu His Ala Ile Gly Asn Gly Phe Lys Leu Pro	
115 120 125	
tat ctt cat gag att gat gcc tgc aag gtt cct gac tgg gtt tca aat	432
Tyr Leu His Glu Ile Asp Ala Cys Lys Val Pro Asp Trp Val Ser Asn	
130 135 140	
acg gta tgg tat cag ata ttt cct gaa aga ttt gcc aat ggc aat gct	480
Thr Val Trp Tyr Gln Ile Phe Pro Glu Arg Phe Ala Asn Gly Asn Ala	
145 150 155 160	
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Leu Leu Asn Pro Glu Gly Thr Leu Asp Trp Asp Ser Ser Val Thr Pro	
165 170 175	
aag agc gat gat ttc ttt ggt ggt gat tta cag ggg att att gat cat	576
Lys Ser Asp Asp Phe Phe Gly Gly Asp Leu Gln Gly Ile Ile Asp His	
180 185 190	
atg gat tac ttg caa gac ttg ggt att act gga cta tat ctt tgt ccc	624
Met Asp Tyr Leu Gln Asp Leu Gly Ile Thr Gly Leu Tyr Leu Cys Pro	
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Ile Phe Glu Ser Thr Ser Asn His Lys Tyr Asn Thr Thr Asp Tyr Phe	
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Glu Ile Asp Arg His Phe Gly Asp Lys Glu Thr Phe Arg Glu Leu Val	
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Asp Gln Ala His His Arg Gly Met Lys Val Met Leu Asp Ala Val Phe	
245 250 255	
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Asn His Ile Ala Ser Gln Ser Leu Gln Trp Lys Asn Val Val Lys Asn	
260 265 270	
ggt gaa cag tct gct tat aag gat tgg ttc cat att caa caa ttc cca	864
Gly Glu Gln Ser Ala Tyr Lys Asp Trp Phe His Ile Gln Gln Phe Pro	
275 280 285	
gtg aca act gaa aag cta gtt aat aag aga gac tta ccc tat cat gtt	912
Val Thr Thr Glu Lys Leu Val Asn Lys Arg Asp Leu Pro Tyr His Val	
290 295 300	
ttt ggt ttc gag gac tat atg cct aag cta aat aca gcc aat cca gag	960
Phe Gly Phe Glu Asp Tyr Met Pro Lys Leu Asn Thr Ala Asn Pro Glu	
305 310 315 320	

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Val	Lys	Asn	Tyr	Leu	Leu	Lys	Val	Ala	Thr	Tyr	Trp	Ile	Glu	Glu	Phe	
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Phe	Trp	Lys	Asp	Phe	Arg	Lys	Ala	Val	Leu	Ala	Lys	Asn	Pro	Asp	Leu	
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Phe	Asn	Leu	Leu	Asp	Ser	His	Asp	Thr	Glu	Arg	Ile	Leu	Trp	Thr	Ala	
			435				440					445				
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Asn	Glu	Asp	Val	Gln	Leu	Val	Lys	Ser	Ala	Leu	Ala	Phe	Leu	Phe	Leu	
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Gln	Lys	Gly	Thr	Pro	Cys	Ile	Tyr	Tyr	Val	Thr	Glu	Leu	Ala	Leu	Thr	
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Gly	Gly	Pro	Asp	Pro	Asp	Cys	Arg	Arg	Cys	Met	Pro	Trp	Glu	Arg	Val	
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Ser	Ser	Asp	Asn	Asp	Met	Leu	Asn	Phe	Met	Lys	Arg	Leu	Ile	Lys	Ile	
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Arg	Lys	Tyr	Ala	Ser	Val	Ile	Ile	Ser	His	Gly	Lys	Tyr	Ser	Leu	Gln	
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gaa	atc	aac	tct	gat	cta	gta	gct	ctg	gaa	tgg	aaa	tac	gaa	gga	cgg	1632
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Lys	Glu	Ala	Val	Ala	Leu	Ala	Ser	Asn	Cys	Gln	Glu	Leu	Asp	Asn	Gln	
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<212> PRT

<213> Streptococcus pneumoniae R6

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Ile	Arg	Ile	Arg	Thr	Lys	Lys	Gly	Asp	Ile	Glu	Ser	Ile	Asn	Leu	His	
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Glu	Val	Ser	Val	Asp	Phe	Ala	Arg	Ile	Gln	Tyr	Leu	Phe	Glu	Leu	Arg	

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Tyr	Leu	His	Glu	Ile	Asp	Ala	Cys	Lys	Val	Pro	Asp	Trp	Val	Ser	Asn
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	145				150					155					160
Leu	Leu	Asn	Pro	Glu	Gly	Thr	Leu	Asp	Trp	Asp	Ser	Ser	Val	Thr	Pro
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Asp	Gln	Ala	His	His	Arg	Gly	Met	Lys	Val	Met	Leu	Asp	Ala	Val	Phe
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Gly	Gly	Pro	Asp	Pro	Asp	Cys	Arg	Arg	Cys	Met	Pro	Trp	Glu	Arg	Val
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<212> DNA

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Lys	Val	His	Leu	Gly	Lys	Ile	Asp	Ala	Ser	Thr	Ala	Tyr	Val	Glu	Gly	
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Glu	Ser	Thr	Asp	Glu	Val	Asp	Gly	Leu	Val	Pro	Asp	Lys	Tyr	Glu	Phe	
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Ser	Asn	Met	Phe	Gln	Val	Ser	Leu	Trp	Leu	Asp	Ala	Val	Tyr	His	Asp	
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cct	gat	ctt	tct	caa	ttt	tcc	tgc	ata	ctt	gac	gat	agg	ttg	atg	gat	336
Pro	Asp	Leu	Ser	Gln	Phe	Ser	Cys	Ile	Leu	Asp	Asp	Arg	Leu	Met	Asp	
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att	agg	ata	gct	gtg	ccc	aag	cag	gtg	gtc	tcg	ggt	cgt	att	tta	act	384
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Glu	Ser	Glu	Val	Lys	Val	Val	Tyr	Ser	Arg	Arg	Ser	Ser	Gln	Ala	Thr	
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Tyr	Asp	Ile	Val	Glu	Phe	Val	Ile	Ser	Gly	Val	Ser	Gly	Tyr	Ala	Phe	
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Lys	Arg	Ile	Asn	Ser	Glu	Gly	Asn	Ser	Lys	Ile	Met	Tyr	His	Ile	Phe	
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cca	gat	cgt	ttc	cat	cgt	tat	ggt	gaa	gat	cgt	ccg	ggc	ctc	ata	aaa	624
Pro	Asp	Arg	Phe	His	Arg	Tyr	Gly	Glu	Asp	Arg	Pro	Gly	Leu	Ile	Lys	
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Trp	Gly	Glu	Lys	Pro	Ser	Arg	Asp	Ser	Phe	Phe	Gly	Gly	Asn	Leu	Glu	
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Leu	Asp	Met	Val	Phe	Asn	His	Thr	Ser	Thr	Asp	Phe	Pro	Ala	Phe	Arg	
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Asp	Val	Ile	Glu	Lys	Gly	Arg	Asn	Ser	Pro	Tyr	Tyr	Arg	Trp	Tyr	Ile	
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Phe	His	Arg	Asp	Glu	Phe	Thr	Val	Phe	Arg	Gly	Arg	Gly	Lys	Arg	Gly	
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Gly	Thr	Gly	Ile	Leu	His	Ile	Gly	Glu	Ala	Trp	Cys	Leu	Pro	Thr	Tyr	
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Gln	Ala	Met	Met	Asn	Val	Leu	Asp	Ser	His	Asp	Thr	Pro	Arg	Ile	Leu	
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Arg	Ile	Leu	Asn	Gly	Asp	Arg	Lys	Lys	Val	Lys	Leu	Ala	Tyr	Ser	Ile	
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Glu	Asp	Glu	Ala	Ser	Phe	Val	Ile	Glu	Lys	Val	Lys	Ala	Gly	Arg	Ser	
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Ile	Ser	Val	His	Met	Ala	Lys	Asn	Gly	Arg	Met	Lys	Phe	Pro	Lys	Asp	
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Thr	Phe	Asn	Cys	Gln	Gly	Glu	Gly	Ser	Ile	Val	Leu	Glu	Gly	Asn	Ser	
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Ile	Arg	Ile 115	Ala	Val	Pro	Lys	Gln 120	Val	Val	Ser	Val	Arg 125	Ile	Leu	Thr
Glu	Ser 130	Glu	Val	Lys	Val	Val 135	Tyr	Ser	Arg	Arg	Ser 140	Ser	Gln	Ala	Thr
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Glu	Val	Asp	Gln 165	Val	Arg	Tyr	Pro	Asp	His 170	Gly	Tyr	Tyr	Arg	Ser 175	Thr
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Pro	Asp	Arg 195	Phe	His	Arg	Tyr	Gly 200	Glu	Asp	Arg	Pro	Gly 205	Leu	Ile	Lys
Trp	Gly 210	Glu	Lys	Pro	Ser	Arg 215	Asp	Ser	Phe	Phe	Gly 220	Gly	Asn	Leu	Glu
Gly 225	Ile	Arg	Gln	Lys	Ile 230	Gln	Tyr	Ile	Lys	Asp 235	Leu	Arg	Val	Asp	His 240
Ile	Tyr	Leu	Asn 245	Pro	Leu	Phe	Lys	Ser	Lys 250	Ser	Asn	His	Arg	Tyr 255	Asp
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Phe	His	Arg	Asp	Glu 325	Phe	Thr	Val	Phe	Arg 330	Gly	Arg	Gly	Lys	Arg 335	Gly
Ser	Tyr	Pro	Ser 340	Tyr	Glu	Thr	Phe	Met 345	Gly	Tyr	Gly	Gly	Met 350	Pro	Lys
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Lys	Tyr 370	Tyr	Val	Gln	Lys	Phe 375	Asp	Val	Asp	Gly	Phe 380	Arg	Tyr	Asp	Val
Ala 385	His	Ser	Ile	Tyr	Ser 390	Lys	Phe	Phe	Glu	Glu 395	Val	Phe	Ser	Glu	Ile 400
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Gln 465	Ala	Met	Met	Asn 470	Val	Leu	Asp	Ser	His	Asp 475	Thr	Pro	Arg	Ile	Leu 480
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Gly	Leu	Asp 515	Gly	Gly	Lys	Asp	Pro 520	Asp	Asp	Arg	Arg	Cys 525	Phe	Pro	Trp
Asp	Ser 530	Met	Asp	Glu	Asp	Met 535	His	Ser	Phe	Phe	Met 540	Asn	Leu	Gly	Asp
Leu 545	Arg	Glu	Lys	Tyr	Ser 550	Leu	Gly	Ser	Ala	Gly 555	Val	Ile	Thr	Val	Phe 560
Glu	Asp	Glu	Ala	Ser 565	Phe	Val	Ile	Glu	Lys 570	Val	Lys	Ala	Gly	Arg 575	Ser
Ile	Ser	Val	His 580	Met	Ala	Lys	Asn	Gly 585	Arg	Met	Lys	Phe	Pro 590	Lys	Asp
Ser	Leu	Ile 595	Ala	Val	Arg	Glu	Asn 600	Gln	Lys	Glu	Val	Lys 605	Pro	Trp	Asp
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 Phe Tyr Gln Ile Phe Pro Asp Arg Phe Ala Ile Gly Gln Gln Gln Ala
 35 40 45
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 Gln Val Asp Pro Leu Leu Gly Gly Asn Glu Ala Leu Gln Ala Leu Leu
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 Thr Gln Ala His Arg Arg Glu Met Lys Val Val Leu Asp Gly Val Phe
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 Leu Ser Ala Tyr Asp Gly Ser Leu Pro Ala Asn Tyr Arg Gly Trp Val
 180 185 190
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 Asp Leu Arg Ala Leu Pro Gln Phe Asn His Asp His Pro Asp Val Arg
 195 200 205
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 Glu Tyr Leu Met Arg Val Gly Glu Tyr Trp Ile Ala Gln Gly Ile Asp
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 Gln Glu Phe Arg Cys Arg Val Lys Ala Ile Asn Pro Glu Ala Tyr Ile
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 gtg ggg gaa att tgg tgt gat gct agc ccc tgg tta gcc gga gat caa 816
 Val Gly Glu Ile Trp Cys Asp Ala Ser Pro Trp Leu Ala Gly Asp Gln
 260 265 270
 ttc gat ggg gtg atg aac tat cgc ttt acc gaa cct acc gta gct ttt 864
 Phe Asp Gly Val Met Asn Tyr Arg Phe Thr Glu Pro Thr Val Ala Phe
 275 280 285
 gcc att ggc gat cgc ctg caa aaa gaa cat cta cgg ggg gaa gaa tat 912
 Ala Ile Gly Asp Arg Leu Gln Lys Glu His Leu Arg Gly Glu Glu Tyr

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290	295	300		
cgt cct tac cca gcc cta act gca gaa gcc tat ggg gaa aga att agc	act gca gaa gcc tat ggg gaa aga att agc	ggg gaa aga att agc		960
Arg Pro Tyr Pro Ala Leu Thr Ala Glu Ala Tyr Gly Glu Arg Ile Ser	Thr Ala Glu Ala Tyr Gly Glu Arg Ile Ser	Gly Glu Arg Ile Ser		
305	310	315		
caa ctg ctg caa caa cat ccc tgg gaa att cag tta acc caa tta aat	cat ccc tgg gaa att cag tta acc caa tta aat	cag tta acc caa tta aat		1008
Gln Leu Leu Gln Gln His Pro Trp Glu Ile Gln Leu Thr Gln Leu Asn	His Pro Trp Glu Ile Gln Leu Thr Gln Leu Asn	Gln Leu Thr Gln Leu Asn		
325	330	335		
tta ctc aac agc cac gac acc gcc cgc tta acc cta gcc aat ggc	acc gcc cgc tta acc cta gcc aat ggc	acc cta gcc aat ggc		1056
Leu Leu Asn Ser His Asp Thr Ala Arg Leu Leu Thr Leu Ala Asn Gly	Thr Ala Arg Leu Leu Thr Leu Ala Asn Gly	Leu Thr Leu Ala Asn Gly		
340	345	350		
gat cgg ccc agc gtt aac ctc gct ctt tta ctg atg ttt act ttc ccc	ctc gct ctt tta ctg atg ttt act ttc ccc	ctg atg ttt act ttc ccc		1104
Asp Arg Pro Ser Val Asn Leu Ala Leu Leu Leu Met Phe Thr Phe Pro	Leu Ala Leu Leu Leu Met Phe Thr Phe Pro	Leu Leu Met Phe Thr Phe Pro		
355	360	365		
ggg gct ccc tgt gtt tac tac gga gac gaa gtg ggt ttg cct ggg gag	gct ccc tgt gtt tac tac gga gac gaa gtg ggt ttg cct ggg gag	gtg ggt ttg cct ggg gag		1152
Gly Ala Pro Cys Val Tyr Tyr Gly Asp Glu Val Gly Leu Pro Gly Glu	Ala Pro Cys Val Tyr Tyr Gly Asp Glu Val Gly Leu Pro Gly Glu	Pro Gly Leu Pro Gly Glu		
370	375	380		
gcc gac ccc gat tgt cgc cga gtt ttt cct gct aaa act gac tgg gac	gac ccc gat tgt cgc cga gtt ttt cct gct aaa act gac tgg gac	act gac tgg gac		1200
Ala Asp Pro Asp Cys Arg Arg Val Phe Pro Ala Lys Thr Asp Trp Asp	Asp Pro Asp Cys Arg Arg Val Phe Pro Ala Lys Thr Asp Trp Asp	Pro Ala Lys Thr Asp Trp Asp		400
385	390	400		
ttg gat tgt tgg gaa ttc tac cgc caa ttg att gcc ctg cgc cat cgc	gat tgt tgg gaa ttc tac cgc caa ttg att gcc ctg cgc cat cgc	ttg att gcc ctg cgc cat cgc		1248
Leu Asp Cys Trp Glu Phe Tyr Arg Gln Leu Ile Ala Leu Arg His Arg	Asp Cys Trp Glu Phe Tyr Arg Gln Leu Ile Ala Leu Arg His Arg	Leu Arg His Arg		
405	410	415		
tat caa tgt ttg caa ttg ggg gat tac aaa att atc gcc acg gca ggt	caa ttg ggg gat tac aaa att atc gcc acg gca ggt	att atc gcc acg gca ggt		1296
Tyr Gln Cys Leu Gln Leu Gly Asp Tyr Lys Ile Ile Ala Thr Ala Gly	Gln Cys Leu Gln Leu Gly Asp Tyr Lys Ile Ile Ala Thr Ala Gly	Cys Leu Gln Leu Gly Asp Tyr Lys Ile Ile Ala Thr Ala Gly		
420	425	430		
atg ggc tat gtt ttt caa cgg caa tac ggc gat gaa acc cta atg gtt	gcg caa tac ggc gat gaa acc cta atg gtt	atg ggc tat gtt ttt caa cgg caa tac ggc gat gaa acc cta atg gtt		1344
Met Gly Tyr Val Phe Gln Arg Gln Tyr Gly Asp Glu Thr Leu Met Val	Gln Arg Gln Tyr Gly Asp Glu Thr Leu Met Val	Gln Tyr Gly Asp Glu Thr Leu Met Val		
435	440	445		
gcc gtt aat agt ggt gac aac ata ata gaa att ata tta tct cca gac	gtt aat agt ggt gac aac ata ata gaa att ata tta tct cca gac	aat agt ggt gac aac ata ata gaa att ata tta tct cca gac		1392
Ala Val Asn Ser Gly Asp Asn Ile Ile Glu Ile Ile Leu Ser Pro Asp	Val Asn Ser Gly Asp Asn Ile Ile Glu Ile Ile Leu Ser Pro Asp	Val Asn Ser Gly Asp Asn Ile Ile Glu Ile Ile Leu Ser Pro Asp		
450	455	460		
ata ata aat ttg gat aaa ata gac ata gct gaa cct gta ttt agc gct	ata aat ttg gat aaa ata gac ata gct gaa cct gta ttt agc gct	aat ttg gat aaa ata gac ata gct gaa cct gta ttt agc gct		1440
Ile Ile Asn Leu Asp Lys Ile Asp Ile Ala Glu Pro Val Phe Ser Ala	Ile Asn Leu Asp Lys Ile Asp Ile Ala Glu Pro Val Phe Ser Ala	Ile Asn Leu Asp Lys Ile Asp Ile Ala Glu Pro Val Phe Ser Ala		480
465	470	475		
aat ggt gag acc gta att gac cgg aac acc gca ggg tta ctt ttg acc	ggt gag acc gta att gac cgg aac acc gca ggg tta ctt ttg acc	gag acc gta att gac cgg aac acc gca ggg tta ctt ttg acc		1488
Asn Gly Glu Thr Val Ile Asp Arg Asn Thr Ala Gly Leu Leu Thr	Gly Glu Thr Val Ile Asp Arg Asn Thr Ala Gly Leu Leu Thr	Glu Thr Val Ile Asp Arg Asn Thr Ala Gly Leu Leu Thr		
485	490	495		
atg gcc cct caa tca gga gca gct ttc gcc atc att tga	gcc cct caa tca gga gca gct ttc gcc atc att tga	cct caa tca gga gca gct ttc gcc atc att tga		1527
Met Ala Pro Gln Ser Gly Ala Ala Phe Ala Ile Ile	Ala Pro Gln Ser Gly Ala Ala Phe Ala Ile Ile	Met Ala Pro Gln Ser Gly Ala Ala Phe Ala Ile Ile		
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<211> 508

<212> PRT

<213> Synechocystis sp. PCC 6803

<400> 46

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Phe Tyr Gln Ile Phe Pro Asp Arg Phe Ala Ile Gly Gln Gln Ala	
35 40 45	
Ile Ala Val Ala Gln Gln Pro Lys Leu Glu Pro Trp Glu Ala Pro Pro	
50 55 60	
Thr Val Gln Gly Tyr Lys Gly Gly Asn Leu Trp Gly Val Ile Glu His	
65 70 75 80	
Leu Asp Tyr Leu Gln Asp Ser Gly Ile Thr Ala Leu Tyr Leu Thr Pro	
85 90 95	
Ile Phe Gln Ser Ala Cys Asn His Arg Tyr His Thr His Asp Tyr Tyr	
100 105 110	
Gln Val Asp Pro Leu Leu Gly Gly Asn Glu Ala Leu Gln Ala Leu Leu	
115 120 125	
Thr Gln Ala His Arg Arg Glu Met Lys Val Val Leu Asp Gly Val Phe	
130 135 140	
Asn His Ala Ser Arg Gly Phe Tyr Phe Phe Asn Asp Ile Leu Glu Asn	
145 150 155 160	
Gly Pro His Ser Pro Trp Leu Asp Trp Phe His Ile Glu Asp Trp Pro	
165 170 175	

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Leu Ser Ala Tyr Asp Gly Ser Leu Pro Ala Asn Tyr Arg Gly Trp Val
 180 185 190
 Asp Leu Arg Ala Leu Pro Gln Phe Asn His Asp His Pro Asp Val Arg
 195 200 205
 Glu Tyr Leu Met Arg Val Gly Glu Tyr Trp Ile Ala Gln Gly Ile Asp
 210 215 220
 Gly Trp Arg Leu Asp Val Pro Asp Cys Val Lys Ala Glu Gly Phe Trp
 225 230 235 240
 Gln Glu Phe Arg Cys Arg Val Lys Ala Ile Asn Pro Glu Ala Tyr Ile
 245 250 255
 Val Gly Glu Ile Trp Cys Asp Ala Ser Pro Trp Leu Ala Gly Asp Gln
 260 265 270
 Phe Asp Gly Val Met Asn Tyr Arg Phe Thr Glu Pro Thr Val Ala Phe
 275 280 285
 Ala Ile Gly Asp Arg Leu Gln Lys Glu His Leu Arg Gly Glu Glu Tyr
 290 295 300
 Arg Pro Tyr Pro Ala Leu Thr Ala Glu Ala Tyr Gly Glu Arg Ile Ser
 305 310 315 320
 Gln Leu Leu Gln Gln His Pro Trp Glu Ile Gln Leu Thr Gln Leu Asn
 325 330 335
 Leu Leu Asn Ser His Asp Thr Ala Arg Leu Leu Thr Leu Ala Asn Gly
 340 345 350
 Asp Arg Pro Ser Val Asn Leu Ala Leu Leu Leu Met Phe Thr Phe Pro
 355 360 365
 Gly Ala Pro Cys Val Tyr Tyr Gly Asp Glu Val Gly Leu Pro Gly Glu
 370 375 380
 Ala Asp Pro Asp Cys Arg Arg Val Phe Pro Ala Lys Thr Asp Trp Asp
 385 390 395 400
 Leu Asp Cys Trp Glu Phe Tyr Arg Gln Leu Ile Ala Leu Arg His Arg
 405 410 415
 Tyr Gln Cys Leu Gln Leu Gly Asp Tyr Lys Ile Ile Ala Thr Ala Gly
 420 425 430
 Met Gly Tyr Val Phe Gln Arg Gln Tyr Gly Asp Glu Thr Leu Met Val
 435 440 445
 Ala Val Asn Ser Gly Asp Asn Ile Ile Glu Ile Ile Leu Ser Pro Asp
 450 455 460
 Ile Ile Asn Leu Asp Lys Ile Asp Ile Ala Glu Pro Val Phe Ser Ala
 465 470 475 480
 Asn Gly Glu Thr Val Ile Asp Arg Asn Thr Ala Gly Leu Leu Leu Thr
 485 490 495
 Met Ala Pro Gln Ser Gly Ala Ala Phe Ala Ile Ile
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 aac gat aaa tta acc att acg ctg tgg ctg agc gga gaa aat ccg ccg 96
 Asn Asp Lys Leu Thr Ile Thr Leu Trp Leu Ser Gly Glu Asn Pro Pro
 20 25 30
 tct cgc gtg acg ttg cgc tca gaa ttc gat aat gaa gaa atc tca ctg 144
 Ser Arg Val Thr Leu Arg Ser Glu Phe Asp Asn Glu Glu Ile Ser Leu
 35 40 45
 gcg atg cgc aaa cag cgc cgc cag ccg cag ccg ggc gtg acg gcg tgg 192
 Ala Met Arg Lys Gln Arg Arg Gln Pro Gln Pro Gly Val Thr Ala Trp
 50 55 60
 cga gcg acg ctc aat atc gcg tta ggg caa ccc cgt cgc cgt tac agc 240
 Arg Ala Thr Leu Asn Ile Ala Leu Gly Gln Pro Arg Arg Arg Tyr Ser
 65 70 75 80

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ttt	aaa	ttg	ctt	tgg	cat	gac	cgc	cag	ctt	tgg	ttt	acg	cca	cag	gga	288
Phe	Lys	Leu	Leu	Trp	His	Asp	Arg	Gln	Leu	Trp	Phe	Thr	Pro	Gln	Gly	
				85					90					95		
ttt	agc	cgt	ttt	ccg	cct	gcg	cgt	ctg	gaa	caa	ttt	gcg	ggt	gat	gtg	336
Phe	Ser	Arg	Phe	Pro	Pro	Ala	Arg	Leu	Glu	Gln	Phe	Ala	Val	Asp	Val	
			100					105					110			
ccg	gat	agc	ggc	ccg	cag	tgg	gtc	gcc	gat	caa	att	ttt	tat	cag	atc	384
Pro	Asp	Ser	Gly	Pro	Gln	Trp	Val	Ala	Asp	Gln	Ile	Phe	Tyr	Gln	Ile	
			115				120					125				
ttc	ccg	gat	cgt	ttt	gcc	cgc	agc	cag	tct	cgt	gaa	gcc	ggg	cag	gac	432
Phe	Pro	Asp	Arg	Phe	Ala	Arg	Ser	Gln	Ser	Arg	Glu	Ala	Gly	Gln	Asp	
	130					135					140					
cgg	gtg	tac	tac	cat	cat	gcc	gca	ggc	cag	gag	att	gtg	ctg	cgc	gac	480
Arg	Val	Tyr	Tyr	His	His	Ala	Ala	Gly	Gln	Glu	Ile	Val	Leu	Arg	Asp	
	145				150					155					160	
tgg	gac	gat	cct	tta	acc	ccc	cag	gcg	ggc	ggc	tcc	acc	ttt	tac	ggc	528
Trp	Asp	Asp	Pro	Leu	Thr	Pro	Gln	Ala	Gly	Gly	Ser	Thr	Phe	Tyr	Gly	
				165					170					175		
ggc	tgt	ctg	aat	ggc	att	tgt	gag	aag	ctg	ccg	tat	ctg	aaa	aaa	ctg	576
Gly	Cys	Leu	Asn	Gly	Ile	Cys	Glu	Lys	Leu	Pro	Tyr	Leu	Lys	Lys	Leu	
			180					185					190			
ggc	gtc	aca	gcg	cta	tat	ctg	aat	ccg	gta	ttt	acc	gcg	ccg	agc	gtc	624
Gly	Val	Thr	Ala	Leu	Tyr	Leu	Asn	Pro	Val	Phe	Thr	Ala	Pro	Ser	Val	
			195				200					205				
cat	aag	tac	gat	acg	gaa	gat	tat	cgc	cat	gtc	gat	ccg	caa	ttt	ggc	672
His	Lys	Tyr	Asp	Thr	Glu	Asp	Tyr	Arg	His	Val	Asp	Pro	Gln	Phe	Gly	
	210					215					220					
ggc	gat	cgg	gcg	ctg	cta	cgc	ctg	cgg	cgt	aaa	acc	cag	gtg	cag	ggc	720
Gly	Asp	Arg	Ala	Leu	Leu	Arg	Leu	Arg	Arg	Lys	Thr	Gln	Val	Gln	Gly	
	225				230					235					240	
atg	agg	ctg	gtg	ctg	gat	ggc	gtg	ttt	aat	cat	agc	ggc	gac	tcg	cat	768
Met	Arg	Leu	Val	Leu	Asp	Gly	Val	Phe	Asn	His	Ser	Gly	Asp	Ser	His	
				245					250					255		
gtg	tgg	ttt	gac	agg	cat	aac	cgc	agc	act	ggc	ggc	gcg	tgc	cat	cac	816
Val	Trp	Phe	Asp	Arg	His	Asn	Arg	Ser	Thr	Gly	Gly	Ala	Cys	His	His	
			260					265					270			
ccg	gac	tcg	ccg	tgg	cgc	gac	tgg	tac	tcc	ttt	tca	cca	caa	ggc	gtg	864
Pro	Asp	Ser	Pro	Trp	Arg	Asp	Trp	Tyr	Ser	Phe	Ser	Pro	Gln	Gly	Val	
			275				280					285				
gcg	ctg	gac	tgg	ctg	ggt	tat	ccg	agc	ctg	ccg	aaa	ctc	gat	tat	caa	912
Ala	Leu	Asp	Trp	Leu	Gly	Tyr	Pro	Ser	Leu	Pro	Lys	Leu	Asp	Tyr	Gln	
	290					295					300					
tca	gaa	acg	ctg	gtc	gat	gag	atc	tat	cgc	ggt	gag	gac	agt	atc	gtt	960
Ser	Glu	Thr	Leu	Val	Asp	Glu	Ile	Tyr	Arg	Gly	Glu	Asp	Ser	Ile	Val	
	305				310					315					320	
cgt	cac	tgg	cta	aag	gct	ccg	tgg	aat	atg	gac	ggc	tgg	cgg	ctg	gat	1008
Arg	His	Trp	Leu	Lys	Ala	Pro	Trp	Asn	Met	Asp	Gly	Trp	Arg	Leu	Asp	
				325					330					335		
gtc	gta	cat	atg	ctg	ggc	gag	gcg	ggc	ggg	gcg	cgt	cat	aat	ttg	cag	1056
Val	Val	His	Met	Leu	Gly	Glu	Ala	Gly	Gly	Ala	Arg	His	Asn	Leu	Gln	
			340					345					350			
cac	gtc	gcc	ggt	att	acc	cgg	gcg	gca	aaa	gag	gcg	cag	ccc	gaa	gcc	1104
His	Val	Ala	Gly	Ile	Thr	Arg	Ala	Ala	Lys	Glu	Ala	Gln	Pro	Glu	Ala	
			355				360					365				
tat	att	gtg	ggg	gaa	cat	ttc	ggc	gat	gcg	cgg	cag	tgg	cta	cag	gcc	1152
Tyr	Ile	Val	Gly	Glu	His	Phe	Gly	Asp	Ala	Arg	Gln	Trp	Leu	Gln	Ala	
	370					375					380					
gat	gcg	gaa	gat	gcc	gcc	atg	aat	tat	cgc	ggc	ttc	acc	ttc	ccg	cta	1200
Asp	Ala	Glu	Asp	Ala	Ala	Met	Asn	Tyr	Arg	Gly	Phe	Thr	Phe	Pro	Leu	
	385				390					395					400	
tgg	gga	ttt	ctc	gcc	aat	act	gat	atc	gct	tac	gaa	cca	cag	cat	att	1248
Trp	Gly	Phe	Leu	Ala	Asn	Thr	Asp	Ile	Ala	Tyr	Glu	Pro	Gln	His	Ile	
				405					410					415		
gat	gcc	cgg	acc	tgt	atc	gcg	tgg	atg	gat	aac	tac	cgc	gcc	ggg	ctg	1296
Asp	Ala	Arg	Thr	Cys	Ile	Ala	Trp	Met	Asp	Asn	Tyr	Arg	Ala	Gly	Leu	
			420					425					430			
tca	cat	cag	caa	caa	ctg	cgc	atg	ttt	aat	caa	ctc	gac	agc	cat	gat	1344
Ser	His	Gln	Gln	Gln	Leu	Arg	Met	Phe	Asn	Gln	Leu	Asp	Ser	His	Asp	
			435				440					445				

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Thr	Ala	Arg	Phe	Lys	Thr	Leu	Leu	Gly	Lys	Asp	Ala	Ala	Arg	Leu	Pro	
	450					455				460						
ctg	gcg	gtg	gtc	tgg	ctg	ttt	acc	tgg	ccc	ggc	gtg	cca	tgt	att	tat	1440
Leu	Ala	Val	Val	Trp	Leu	Phe	Thr	Trp	Pro	Gly	Val	Pro	Cys	Ile	Tyr	
465					470					475					480	
tac	ggc	gat	gaa	gtc	ggc	gtg	gac	ggc	gca	aat	gac	ccc	atg	tgc	cg	1488
Tyr	Gly	Asp	Glu	Val	Gly	Val	Asp	Gly	Ala	Asn	Asp	Pro	Met	Cys	Arg	
				485					490					495		
aaa	ccg	ttc	cca	tgg	gat	gaa	cg	aag	cag	gac	ggc	aac	ttg	ctg	gcg	1536
Lys	Pro	Phe	Pro	Trp	Asp	Glu	Arg	Lys	Gln	Asp	Gly	Asn	Leu	Leu	Ala	
			500					505					510			
ctg	tac	cag	cgt	atg	gcg	aaa	ctg	cg	cag	agc	agt	ctg	gcg	ctg	cgt	1584
Leu	Tyr	Gln	Arg	Met	Ala	Lys	Leu	Arg	Gln	Ser	Ser	Leu	Ala	Leu	Arg	
		515					520					525				
cgt	ggc	gga	tgc	cag	gcg	ctg	tat	gcc	gaa	ggt	gac	gta	gtg	gta	ttc	1632
Arg	Gly	Gly	Cys	Gln	Ala	Leu	Tyr	Ala	Glu	Gly	Asp	Val	Val	Val	Phe	
	530					535					540					
gtg	cga	gtt	tat	cag	cag	cag	gcg	ctg	gtg	gcg	att	aac	cg	ggc		1680
Val	Arg	Val	Tyr	Gln	Gln	Gln	Arg	Ala	Leu	Val	Ala	Ile	Asn	Arg	Gly	
545					550				555						560	
gag	gcc	tgt	gaa	gtg	gcg	ctg	gaa	gcg	ttg	ccg	ttg	ctg	aac	gtg	gcc	1728
Glu	Ala	Cys	Glu	Val	Ala	Leu	Glu	Ala	Leu	Pro	Leu	Leu	Asn	Val	Ala	
				565					570					575		
gga	tgg	caa	tgt	aaa	acg	gga	agc	ggt	gat	atc	cg	gag	gga	aga	ctt	1776
Gly	Trp	Gln	Cys	Lys	Thr	Gly	Ser	Gly	Asp	Ile	Arg	Glu	Gly	Arg	Leu	
			580					585					590			
agt	tta	ccc	gcg	att	tcc	gcg	acg	gta	tgg	atg	aat	cg	tga			1818
Ser	Leu	Pro	Ala	Ile	Ser	Ala	Thr	Val	Trp	Met	Asn	Arg				
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<211> 605

<212> PRT

<213> Salmonella typhimurium LT2

<400> 48

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			20					25					30		
Ser	Arg	Val	Thr	Leu	Arg	Ser	Glu	Phe	Asp	Asn	Glu	Glu	Ile	Ser	Leu
		35					40					45			
Ala	Met	Arg	Lys	Gln	Arg	Arg	Gln	Pro	Gln	Pro	Gly	Val	Thr	Ala	Trp
	50					55					60				
Arg	Ala	Thr	Leu	Asn	Ile	Ala	Leu	Gly	Gln	Pro	Arg	Arg	Arg	Tyr	Ser
65				70					75					80	
Phe	Lys	Leu	Leu	Trp	His	Asp	Arg	Gln	Leu	Trp	Phe	Thr	Pro	Gln	Gly
				85					90					95	
Phe	Ser	Arg	Phe	Pro	Pro	Ala	Arg	Leu	Glu	Gln	Phe	Ala	Val	Asp	Val
			100					105					110		
Pro	Asp	Ser	Gly	Pro	Gln	Trp	Val	Ala	Asp	Gln	Ile	Phe	Tyr	Gln	Ile
		115					120					125			
Phe	Pro	Asp	Arg	Phe	Ala	Arg	Ser	Gln	Ser	Arg	Glu	Ala	Gly	Gln	Asp
	130					135					140				
Arg	Val	Tyr	Tyr	His	His	Ala	Ala	Gly	Gln	Glu	Ile	Val	Leu	Arg	Asp
145				150					155					160	
Trp	Asp	Asp	Pro	Leu	Thr	Pro	Gln	Ala	Gly	Gly	Ser	Thr	Phe	Tyr	Gly
				165					170					175	
Gly	Cys	Leu	Asn	Gly	Ile	Cys	Glu	Lys	Leu	Pro	Tyr	Leu	Lys	Lys	Leu
			180					185					190		
Gly	Val	Thr	Ala	Leu	Tyr	Leu	Asn	Pro	Val	Phe	Thr	Ala	Pro	Ser	Val
		195					200					205			
His	Lys	Tyr	Asp	Thr	Glu	Asp	Tyr	Arg	His	Val	Asp	Pro	Gln	Phe	Gly
	210					215					220				
Gly	Asp	Arg	Ala	Leu	Leu	Arg	Leu	Arg	Arg	Lys	Thr	Gln	Val	Gln	Gly
225					230					235					240
Met	Arg	Leu	Val	Leu	Asp	Gly	Val	Phe	Asn	His	Ser	Gly	Asp	Ser	His
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Val Trp Phe Asp Arg His Asn Arg Ser Thr Gly Gly Ala Cys His His
 260 270
 Pro Asp Ser Pro Trp Arg Asp Trp Tyr Ser Phe Ser Pro Gln Gly Val
 275 280 285
 Ala Leu Asp Trp Leu Gly Tyr Pro Ser Leu Pro Lys Leu Asp Tyr Gln
 290 295 300
 Ser Glu Thr Leu Val Asp Glu Ile Tyr Arg Gly Glu Asp Ser Ile Val
 305 310 315 320
 Arg His Trp Leu Lys Ala Pro Trp Asn Met Asp Gly Trp Arg Leu Asp
 325 330 335
 Val Val His Met Leu Gly Glu Ala Gly Gly Ala Arg His Asn Leu Gln
 340 345 350
 His Val Ala Gly Ile Thr Arg Ala Ala Lys Glu Ala Gln Pro Glu Ala
 355 360 365
 Tyr Ile Val Gly Glu His Phe Gly Asp Ala Arg Gln Trp Leu Gln Ala
 370 375 380
 Asp Ala Glu Asp Ala Ala Met Asn Tyr Arg Gly Phe Thr Phe Pro Leu
 385 390 395 400
 Trp Gly Phe Leu Ala Asn Thr Asp Ile Ala Tyr Glu Pro Gln His Ile
 405 410 415
 Asp Ala Arg Thr Cys Ile Ala Trp Met Asp Asn Tyr Arg Ala Gly Leu
 420 425 430
 Ser His Gln Gln Gln Leu Arg Met Phe Asn Gln Leu Asp Ser His Asp
 435 440 445
 Thr Ala Arg Phe Lys Thr Leu Leu Gly Lys Asp Ala Ala Arg Leu Pro
 450 455 460
 Leu Ala Val Val Trp Leu Phe Thr Trp Pro Gly Val Pro Cys Ile Tyr
 465 470 475 480
 Tyr Gly Asp Glu Val Gly Val Asp Gly Ala Asn Asp Pro Met Cys Arg
 485 490 495
 Lys Pro Phe Pro Trp Asp Glu Arg Lys Gln Asp Gly Asn Leu Leu Ala
 500 505 510
 Leu Tyr Gln Arg Met Ala Lys Leu Arg Gln Ser Ser Leu Ala Leu Arg
 515 520 525
 Arg Gly Gly Cys Gln Ala Leu Tyr Ala Glu Gly Asp Val Val Val Phe
 530 535 540
 Val Arg Val Tyr Gln Gln Gln Arg Ala Leu Val Ala Ile Asn Arg Gly
 545 550 555 560
 Glu Ala Cys Glu Val Ala Leu Glu Ala Leu Pro Leu Leu Asn Val Ala
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 gga att atc gag aaa tta gat tat tta aaa gag ctt ggt gta gac gtt 144
 Gly Ile Ile Glu Lys Leu Asp Tyr Leu Lys Glu Leu Gly Val Asp Val
 35 40 45
 atc tgg ttg tcc ccg gtg tac gat tcg ccg caa gat gac aat ggt tac 192
 Ile Trp Leu Ser Pro Val Tyr Asp Ser Pro Gln Asp Asp Asn Gly Tyr
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 gat att cgc gat tat caa aaa att tac gaa gaa tat ggt gac atg gcg 240
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gtg	atg	gac	tta	gtt	gtt	aac	cat	act	tct	gat	gaa	cat	aag	tgg	ttt
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gaa	gaa	tct	cgg	aaa	tcc	aaa	gat	aac	cca	tat	cgc	gat	tac	tat	ttc
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Glu	Val	Asp	Met	Ile	Phe	Thr	Phe	Glu	His	Met	Asn	Leu	Asp	Ser	Asp
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agc	tta	tac	tgg	aac	aat	cat	gac	caa	cca	cga	atc	ggt	tct	cgc	ttc
Ser	Leu	Tyr	Trp	Asn	Asn	His	Asp	Gln	Pro	Arg	Ile	Val	Ser	Arg	Phe
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Gly	Asn	Asp	Asn	Arg	Phe	Arg	Val	Arg	Ser	Ala	Lys	Met	Leu	Ala	Thr
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Cys	Leu	His	Met	Met	Lys	Gly	Thr	Pro	Tyr	Ile	Tyr	Gln	Gly	Glu	Glu
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Ile	Gly	Met	Thr	Asn	Val	His	Phe	Glu	Thr	Leu	Asp	Asp	Tyr	Arg	Asp
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Arg	Thr	Pro	Tyr	Gln	Trp	Asp	Asn	Ser	Glu	Asn	Ala	Gly	Phe	Thr	Thr
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Glu	Glu	Ala	Leu	Lys	Asn	Pro	Asp	Ser	Ile	Phe	Tyr	Tyr	Tyr	Gln	Asn	
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ctt	att	aag	tta	cga	aaa	acg	act	gaa	atc	atc	aca	aca	ggt	aat	tat	1440
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Arg	Leu	Leu	Leu	Pro	Lys	Asp	Glu	Ala	Ile	Phe	Ala	Tyr	Glu	Arg	Tyr	
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Thr	Glu	Asn	Glu	Lys	Leu	Val	Val	Leu	Cys	Asn	Phe	Thr	Glu	Glu	Glu	
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Val	Leu	Val	Asn	Asn	Val	Pro	Asn	Ile	Ile	Glu	Gly	Thr	Leu	Arg	Pro	
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<213> *Listeria monocytogenes* EGD-e

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Thr	Phe	Asp	Gln	Leu	Gln	Gly	Leu	His	Asp	Arg	Asp	Met	Lys	Leu		
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Pro	Ala	Trp	Glu	Leu	Asp	Glu	Lys	Thr	Gly	Glu	Tyr	Tyr	Leu	His	Leu	
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		260					265					270				
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		275					280					285				
Ser	Asp	Asn	Lys	Trp	Asp	Leu	Lys	Pro	Ile	Tyr	Leu	Pro	Asp	Leu	Lys	
	290					295					300					
Glu	Asn	Met	Ser	Glu	Trp	Gln	Val	Ala	Leu	Gln	Glu	Asn	Gly	Trp	Asn	

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 Gly Asn Asp Asn Arg Phe Arg Val Arg Ser Ala Lys Met Leu Ala Thr
 Cys Leu His Met Met Lys Gly Thr Pro Tyr Ile Tyr Gln Gly Glu Glu
 Ile Gly Met Thr Asn Val His Phe Glu Thr Leu Asp Tyr Arg Asp
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 His Glu Ser Ile Met Gln Ser Ile Tyr Thr Lys Gly Arg Asp Asn Ala
 Arg Thr Pro Tyr Gln Trp Asp Asn Ser Glu Asn Ala Gly Phe Thr Thr
 Gly Thr Pro Trp Leu Lys Val Asn Pro Arg Tyr Thr Glu Ile Asn Asn
 Glu Glu Ala Leu Lys Asn Pro Asp Ser Ile Phe Tyr Tyr Gln Asn
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 Thr Glu Asn Glu Lys Leu Val Val Leu Cys Asn Phe Thr Glu Glu Glu
 Gln Val Ile Ser Asp Glu Thr Ile Leu Asn Glu Ile Gln Lys Gly Ser
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 20 25 30
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 Asp Ile Ser Lys Val Thr Leu Ile Ala Ala Asp Pro Tyr Leu Trp Lys
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 Asp Gly Lys Trp Gln Ser Glu Ser Tyr Thr Met Arg Lys Ile Ala Glu
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 aca gaa gag cat gat tat tgg ttt ttt gca att aca cca gaa cat aga 240
 Thr Glu Glu His Asp Tyr Trp Phe Phe Ala Ile Thr Pro Glu His Arg
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 Arg Leu Gln Tyr Gly Phe Leu Leu Thr Asp Thr Glu Gly Glu Thr Thr
 85 90 95
 ttt tat ggc gga cgt ggt ttt ttt gag ccg acc gag gcg aat tta gct 336
 Phe Tyr Gly Arg Gly Phe Phe Glu Pro Thr Glu Ala Asn Leu Ala
 100 105 110
 acg atg gat tat tac ttt aaa ttt ccg ttt atc cat gca gta gat aca 384
 Thr Met Asp Tyr Tyr Phe Lys Phe Pro Phe Ile His Ala Val Asp Thr
 115 120 125
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ttg Leu	ccg Pro	tgg Trp	ggg Gly	agt Ser 165	aaa Lys	gat Asp	ccg Pro	aat Asn	aca Thr 170	aca Thr	gac Asp	ttt Phe	ttt Phe	ggt Gly 175	gga Gly 160	528
gat Asp	att Ile	gaa Glu	ggg Gly 180	att Ile	atc Ile	gag Glu	cac His	tta Leu 185	gat Asp	tat Tyr	tta Leu	gca Ala	gag Glu 190	ctt Leu	ggt Gly	576
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aaa Lys	tac Tyr 210	gac Asp	aca Thr	att Ile	gat Asp	tat Tyr 215	aaa Lys	aaa Lys	att Ile	gat Asp	ccg Pro 220	cac His	ttt Phe	gga Gly	gac Asp	672
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cgc Arg	att Ile	atg Met	cta Leu 245	gat Asp	gcg Ala	gtg Val	ttc Phe	aat Asn	cat His 250	att Ile	ggg Gly	gat Asp	act Thr	tct Ser 255	cca Pro	768
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atc Ile 290	gaa Glu	gga Gly	gaa Glu	cca Pro	aca Thr	ctt Leu 295	tct Ser	tat Tyr	gat Asp	aca Thr	ttt Phe 300	gct Ala	ttc Phe	aca Thr	acg Thr	912
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ctg Leu	gat Asp	att Ile	gcg Ala 325	act Thr	tac Tyr	tgg Trp	att Ile	cgt Arg	gag Glu 330	ttt Phe	gat Asp	att Ile	gac Asp	ggt Gly 335	tgg Trp	1008
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gta Val 385	atg Met	aat Asn	tat Tyr	cca Pro	ttt Phe 390	aca Thr	caa Gln	acg Thr	att Ile	att Ile 395	gag Glu	aac Asn	ttt Phe	att Ile	gaa Glu 400	1200
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atg Met	cgc Arg	tac Tyr 420	cca Pro	aat Asn	caa Gln	gtg Val	aat Asn 425	gaa Glu	gtg Val	att Met	ttt Phe	aac Asn 430	atg Met 430	ctt Leu	gat Asp	1296
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ggt Gly	tgc Cys	cgt Arg	aag Lys 485	tgt Cys	atg Met	gaa Glu	tgg Trp	gac Asp	gaa Glu 490	gca Ala	aaa Lys	caa Gln	aat Asn 495	caa Gln 495	gat Asp	1488
atg Met	cta Leu	gca Ala	ttt Phe	aca Thr	aaa Lys	caa Gln	cta Leu	atc Ile	gct Ala	cta Leu	aga Arg	aaa Lys	gat Asp	aat Asn	caa Gln	1536

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Leu	Pro	Trp	Gly	Ser	Lys	Asp	Pro	Asn	Thr	Thr	Asp	Phe	Phe	Gly	Gly
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His	Met	Pro	Lys	Leu	Asn	Thr	Ala	Asn	Pro	Glu	Val	Gln	Lys	Tyr	Leu
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 Lys Lys Ala Gln Ala Glu Lys 345 Glu Asp Ile Tyr Ile 350 Leu Gly Glu
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 Ile Trp His Asp Ser Trp Ile 360 Trp Leu Leu Gly Asp Glu 365 Phe His Ala
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 Val Met Asn Tyr Pro Phe 375 Thr Gln Thr Ile Ile 380 Glu Asn Phe Ile Glu
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 Glu Lys Ile Thr Pro 390 Glu Gln Met Val Ser 395 Gly Ile Asn Glu Gln Tyr
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 Met Arg Tyr Pro Asn Gln Val Asn Glu Val Met Phe Asn Met Leu Asp
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 Ser His Asp Thr Ala Arg Ile Leu 425 Thr Arg Ala Asn Asn Asp Glu Asp
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 Lys Val Lys Gln Ala Leu Ala 440 Phe Met Phe Ala His Thr Gly Ser Pro
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 Cys Ile Tyr Tyr Gly Thr 455 Glu Ile Gly Met Asp Gly Gly Asn Asp Pro
 465
 Gly Cys Arg Lys Cys 470 Met Glu Trp Asp Glu Ala Lys Gln Asn Gln Asp
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 Met Leu Ala Phe Thr Lys Gln Leu Ile 490 Ala Leu Arg Lys Asp Asn Gln
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 Ala Ile Ile Thr Ser Gly Glu Leu 505 Thr Trp Leu Glu Ala Ser Ser Glu
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 Thr Gly Ile Thr Ala Phe Ser 520 Lys Glu Leu Asn Gly Glu Lys Leu His
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<212> DNA

<213> Nostoc sp. PCC 7120

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Ile	Phe	Pro	Asp	Arg	Phe	Ala	Arg	Ser	Lys	Gln	Pro	His	Lys	Arg	Leu	
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Leu	Arg	Asp	Ala	Arg	Trp	Glu	Asp	Trp	Asp	Ala	Met	Pro	Thr	Leu	Gln	
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Gly	Tyr	Lys	Gly	Gly	Asp	Leu	Trp	Gly	Ile	Met	Glu	Gln	Leu	Asp	Tyr	
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tct	gcc	agc	aat	cac	cgc	tat	cat	acc	cac	gac	tat	tat	caa	gta	gac	288
Ser	Ala	Ser	Asn	His	Arg	Tyr	His	Thr	His	Asp	Tyr	Tyr	Gln	Val	Asp	
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ccg	atg	ttg	ggg	ggg	aat	gcc	gct	ttt	aag	gaa	tta	cta	gac	gca	tcc	336
Pro	Met	Leu	Gly	Gly	Asn	Ala	Ala	Phe	Lys	Glu	Leu	Leu	Asp	Ala	Ser	
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cac	gaa	cgc	aat	att	aaa	gtt	gtc	ctc	gat	ggc	gta	ttt	aat	cat	tcc	384
His	Glu	Arg	Asn	Ile	Lys	Val	Val	Leu	Asp	Gly	Val	Phe	Asn	His	Ser	
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Ser	Arg	Gly	Phe	Phe	Phe	Phe	His	Asp	Val	Leu	Glu	Asn	Gly	Pro	His	

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Ala	Leu	Pro	Val	Phe	Asn	His	Asp	Asn	Pro	Glu	Val	Arg	Glu	Tyr	Ile			
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Val	Trp	Gly	Asp	Ser	Ser	Glu	Trp	Leu	Asp	Gly	Thr	Gln	Phe	Asp	Gly			
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Leu	Arg	Thr	Gly	Asp	Tyr	Gln	Val	Ile	Trp	Ala	Gln	Gly	Ala	Leu	Tyr			
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Val	Gly	Thr	Ala	Thr	Ala	Gln	Ala	Asn	Val	Asp	Val	Ala	Ser	Leu	Gln			
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Thr	Gln	Pro	Asn	Lys	Ile	Leu	Tyr	Gly	Gln	Ala	Glu	Phe	His	Trp	His			
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Asn	Thr	Glu	Glu	Thr	Lys	Gln	Leu	Phe	Leu	Ser	Leu	Pro	Pro	Arg	Ser	480		
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<212> PRT

<213> Nostoc sp. PCC 7120

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50      55      60
Ile Gln Asp Leu Gly Ile Asp Ala Ile Tyr Phe Thr Pro Ile Phe Gln
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Ser Ala Ser Asn His Arg Tyr His Thr His Asp Tyr Tyr Gln Val Asp
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100      105      110
His Glu Arg Asn Ile Lys Val Val Leu Asp Gly Val Phe Asn His Ser
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Ser Pro Trp Val Asn Trp Phe Lys Ile Glu Gly Trp Pro Leu Ala Pro
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Tyr Thr Gly Glu Leu Pro Ala Asn Tyr Val Gly Trp Ala Asp Asn Arg
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Ala Leu Pro Val Phe Asn His Asp Asn Pro Glu Val Arg Glu Tyr Ile
180      185      190
Met Glu Ile Ala Glu Tyr Trp Ile Lys Phe Gly Ile Asp Gly Trp Arg
195      200      205
Leu Asp Val Pro Phe Glu Ile Lys Thr Pro Gly Phe Trp Gln Glu Phe
210      215      220
Arg Asp Arg Val Lys Ala Ile Asn Pro Glu Ala Tyr Ile Val Gly Glu
225      230      235      240
Val Trp Gly Asp Ser Ser Glu Trp Leu Asp Gly Thr Gln Phe Asp Gly
245      250      255
Val Met Asn Tyr Leu Phe Ala Gly Pro Thr Ile Ala Phe Ala Ala Gly
260      265      270
Asp Arg Val Val Leu Glu Gln Val Gln Ser Arg Asp Tyr Gln Pro Tyr
275      280      285
Pro Pro Leu Phe Ala Ala Glu Tyr Ala Thr Lys Ile Gln Glu Val Leu
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Gln Leu Tyr Pro Trp Asp Ile Gln Leu Thr Gln Leu Asn Leu Leu Ala
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Ser His Asp Thr Ala Arg Leu Leu Thr Ile Ala Gly Gly Asp Gln Ala
325      330      335
Ser Ile Gln Leu Ala Thr Leu Leu Leu Leu Thr Phe Pro Gly Ala Pro
340      345      350
Ser Ile Tyr Tyr Gly Asp Glu Val Gly Leu Pro Gly Gly Ile Asp Pro
355      360      365
Asp Ser Arg Arg Gly Phe Pro Leu Glu Ala Asn Trp Asp Arg Glu Ile
370      375      380
Tyr Gln Thr His Arg Gln Leu Ile Ala Leu Arg Arg Thr Tyr Pro Ala
385      390      395      400
Leu Arg Thr Gly Asp Tyr Gln Val Ile Trp Ala Gln Gly Ala Leu Tyr
405      410      415
Ile Phe Ala Arg Thr Leu Gly Lys Glu Glu Leu Ile Ile Ala Val Asn
420      425      430
Val Gly Thr Ala Thr Ala Gln Ala Asn Val Asp Val Ala Ser Leu Gln
435      440      445
Thr Gln Pro Asn Lys Ile Leu Tyr Gly Gln Ala Glu Phe His Trp His
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Lys Asp Ala Val Ile Tyr Gln Leu His Val Lys Ser Phe Cys Asp Ser
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Asp Asn Asp Gly Val Gly Asp Phe Pro Gly Leu Ile Ser Lys Leu Asp
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Tyr Ile Ala Glu Leu Gly Val Asp Ala Ile Trp Leu Leu Pro Phe Tyr
50      55      60
ccc tcg ccg cgc cgc gac ggc tac gac atc gcc gaa tac cgc ggc      240
Pro Ser Pro Arg Arg Asp Gly Tyr Asp Ile Ala Glu Tyr Arg Gly
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Val His Pro Asp Tyr Gly Thr Met Ala Asp Ala Arg Arg Phe Ile Ala
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Glu Ala His Ala Arg Gly Leu Arg Val Ile Thr Glu Leu Val Ile Asn
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cac acc tcg gac cag cac ccg tgg ttc cag cgc gcg cgg cgc gcc aag      384
His Thr Ser Asp Gln His Pro Trp Phe Gln Arg Ala Arg Arg Ala Lys
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Ala Gly Ser Ala Leu Arg Asp Phe Tyr Val Trp Ser Asp His Asp Lys
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Lys Tyr Ala Gly Thr Arg Ile Ile Phe Ile Asp Thr Glu Pro Ser Asn
145      150      155
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Trp Thr Trp Asp Pro Val Ala Asp Ala Tyr Tyr Trp His Arg Phe Tyr
165      170      175
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180      185      190
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Val Leu Gly Val Met Lys Phe Trp Leu Asn Leu Gly Val Asp Gly Leu
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Arg Leu Asp Ala Val Pro Tyr Leu Val Glu Arg Glu Gly Thr Ala Asn
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Glu Asn Leu Pro Glu Thr His Ala Val Leu Arg Lys Ile Arg Ala Ala
225      230      235
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Met Asp Ala Glu Phe Lys Asn Arg Leu Leu Leu Ala Glu Ala Asn Gln
245      250      255
tgg ccc gaa gac aca cag gaa tac ttc ggc aac ggc gac gag tgc cac      816
Trp Pro Glu Asp Thr Gln Glu Tyr Phe Gly Asn Gly Asp Glu Cys His
260      265      270
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Met Ala Phe His Phe Pro Leu Met Pro Arg Met Tyr Met Ala Ile Ala
275      280      285
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Phe	Pro	Pro	Ile	Gly	Gln	Leu	Pro	Tyr	Leu	Leu	Thr	Leu	Pro	Pro	Tyr				
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gcg	ggg	gcg	acc	cg	ccc	gag	gtg	ttc	atc	aac	gag	atc	gcc	gtc	acg				1968
Ala	Gly	Ala	Thr	Arg	Pro	Glu	Val	Phe	Ile	Asn	Glu	Ile	Ala	Val	Thr				
				645															
ctg	ggc	gac	gcg	gac	ggc	acc	gag	cg	acc	gag	cg	tac	ctg	ctg	ccg				2016
Leu	Gly	Asp	Ala	Asp	Gly	Thr	Glu	Arg	Thr	Glu	Arg	Tyr	Leu	Leu	Pro				
				660															
ctg	tgc	atc	gcg	tgg	gag	agc	gcc	acg	ctg	ccc	gcg	ctg	ccg	atc	cag				2064
Leu	Ser	Ile	Ala	Trp	Glu	Ser	Ala	Thr	Leu	Pro	Ala	Leu	Pro	Ile	Gln				

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ctg	gcg	675	ctg	gcg	gcg	gtg	680	gcg	gcg	cat	gtc	685	tac	ctg	acc	2112
Leu	Ala	690	Leu	Ala	Arg	Val	Arg	Gly	Arg	His	Val	700	Tyr	Leu	Thr	
gat	gcc	ttc	acc	acc	gag	acc	ttc	gcc	cgt	gtg	ctg	ctg	gcc	aac	ctg	2160
Asp	Ala	Phe	Thr	Thr	Glu	Thr	Phe	Ala	Arg	Val	Leu	Leu	Ala	Asn	Leu	
705					710					715					720	
gtg	cgc	ggc	gtc	acg	ctg	gag	gcc	agc	gac	ggc	cgc	gtg	cat	ttc	gag	2208
Val	Arg	Gly	Val	Thr	Leu	Glu	Ala	Ser	Asp	Gly	Arg	Val	His	Phe	Glu	
				725					730					735		
ccc	gag	ccg	cac	ctg	gcc	gaa	ctg	gcc	gag	ccg	ccg	gtg	gcc	gcc	gaa	2256
Pro	Glu	Pro	His	Leu	Ala	Glu	Leu	Ala	Glu	Pro	Pro	Val	Ala	Ala	Glu	
			740					745					750			
acc	gcg	gcg	gtg	cgc	ccg	gcg	ccg	ctg	ccg	ctg	gcg	ccc	gac	gcg	ccg	2304
Thr	Ala	Ala	Val	Arg	Pro	Ala	Pro	Leu	Pro	Leu	Ala	Pro	Asp	Ala	Pro	
		755					760					765				
gtg	cag	tgg	ctg	gcg	gcg	gag	cag	tcc	aac	agc	tcg	ctg	gtg	atc	ggc	2352
Val	Gln	Trp	Leu	Ala	Ala	Glu	Gln	Ser	Asn	Ser	Ser	Leu	Val	Ile	Gly	
		770				775					780					
gaa	tcg	gtc	atc	gtc	aag	ctg	atc	cgc	cgc	gtg	gcg	gcg	ggt	gtg	cat	2400
Glu	Ser	Val	Ile	Val	Lys	Leu	Ile	Arg	Arg	Val	Ala	Ala	Gly	Val	His	
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ccg	gaa	gtg	gag	atg	acg	cgc	cac	ctc	acg	cgc	atc	ggc	tat	gcc	aac	2448
Pro	Glu	Val	Glu	Met	Thr	Arg	His	Leu	Thr	Arg	Ile	Gly	Tyr	Ala	Asn	
				805					810					815		
acg	gcc	gcg	ctg	atc	ggc	gag	atc	gcg	cac	gag	ggc	gcg	gac	ggc	gag	2496
Thr	Ala	Ala	Leu	Ile	Gly	Glu	Ile	Ala	His	Glu	Gly	Ala	Asp	Gly	Glu	
			820					825					830			
cgc	agc	acg	ctg	gcc	gtg	ctc	cag	agc	ttc	gtg	ccc	aac	cag	ggc	gat	2544
Arg	Ser	Thr	Leu	Ala	Val	Leu	Gln	Ser	Phe	Val	Pro	Asn	Gln	Gly	Asp	
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gcg	tgg	aca	tgg	gca	ctc	gac	tac	ctg	cgc	cgc	acc	att	gat	gag	ctg	2592
Ala	Trp	Thr	Trp	Ala	Leu	Asp	Tyr	Leu	Arg	Arg	Thr	Ile	Asp	Glu	Leu	
		850				855					860					
gcg	gtg	ctg	acg	gag	gcc	gtc	tcg	gcc	ggc	gac	ggc	gac	gcg	gcg	ccc	2640
Ala	Val	Leu	Thr	Glu	Ala	Val	Ser	Ala	Gly	Asp	Gly	Asp	Ala	Ala	Pro	
865					870					875					880	
acc	gcc	gtc	tcg	gaa	gcg	cgc	acc	gat	acc	gac	gaa	gcg	ctg	gcg	ggc	2688
Thr	Ala	Val	Ser	Glu	Ala	Arg	Thr	Asp	Thr	Asp	Glu	Ala	Leu	Ala	Gly	
				885				890						895		
tac	ctg	gcc	ttc	atc	ggc	gcg	atc	ggc	acg	cgc	cta	ggc	gag	ctg	cac	2736
Tyr	Leu	Ala	Phe	Ile	Gly	Ala	Ile	Gly	Thr	Arg	Leu	Gly	Glu	Leu	His	
			900					905					910			
gtc	gcg	ctg	gcc	ggg	ccg	tcg	gac	gat	ccg	gcc	ttc	ggc	acc	cgc	gcc	2784
Val	Ala	Leu	Ala	Gly	Pro	Ser	Asp	Asp	Pro	Ala	Phe	Gly	Thr	Arg	Ala	
		915					920					925				
gcc	gac	gcc	gac	gac	gca	gcc	ttc	tgg	acc	gcg	cgc	gtg	gac	gag	gag	2832
Ala	Asp	Ala	Asp	Asp	Ala	Ala	Phe	Trp	Thr	Ala	Arg	Val	Asp	Glu	Glu	
		930				935					940					
ctg	gcc	cgc	gcg	ctc	gac	cac	ctc	gcg	gca	tgg	cag	gcg	gcc	aac	gga	2880
Leu	Ala	Arg	Ala	Leu	Asp	His	Leu	Ala	Ala	Trp	Gln	Ala	Ala	Asn	Gly	
945					950					955					960	
ccg	cgc	gcc	gag	gtc	ggc	tgg	ctg	ctg	tcg	cag	cgc	gat	gcc	ctg	ctg	2928
Pro	Arg	Ala	Glu	Val	Gly	Trp	Leu	Leu	Ser	Gln	Arg	Asp	Ala	Leu	Leu	
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gaa	gcc	gcc	cgc	gaa	cgc	gca	cag	ggc	ggc	ctg	ggc	gcg	atg	ctg	gcg	2976
Glu	Ala	Ala	Arg	Glu	Arg	Ala	Gln	Gly	Gly	Leu	Gly	Ala	Met	Leu	Ala	
				980				985					990			
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Arg	Val	His	Gly	Asp	Phe	His	Leu	Gly	Gln	Val	Leu	Val	Ala	Gln	Gly	
		995					1000					1005				
gat	gcc	tac	ctg	atc	gac	ttc	gag	ggc	gag	ccg	tcg	cgc	ccg	gtg	gac	3072
Asp	Ala	Tyr	Leu	Ile	Asp	Phe	Glu	Gly	Glu	Pro	Ser	Arg	Pro	Val	Asp	
		1010				1015					1020					
gag	cgc	cgc	cgc	aag	acc	agc	ccg	ctg	cgc	gac	gtg	gcc	ggg	ctg	gtg	3120
Glu	Arg	Arg	Arg	Lys	Thr	Ser	Pro	Leu	Arg	Asp	Val	Ala	Gly	Leu	Val	
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cgc	tcg	ctc	gac	tac	gtg	gtg	ggc	gcc	atg	cgc	cag	ggc	ccc	gag	cat	3168
Arg	Ser	Leu	Asp	Tyr	Val	Val	Gly	Ala	Met	Arg	Gln	Gly	Pro	Glu	His	

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gtg	gcc	gga	ccg	gcg	cag	gag	cgg	cgc	gac	cag	ctg	ctc	gaa	cgc	ttc				
Val	Ala	Gly	Pro	Ala	Gln	Glu	Arg	Arg	Asp	Gln	Leu	Leu	Glu	Arg	Phe				
			1060					1065				1070							
cg	aat	gcg	tcc	acc	gag	cg	ttc	ctg	gag	gcc	tac	gcg	gcc	gcc	atc				
Arg	Asn	Ala	Ser	Thr	Glu	Arg	Phe	Leu	Glu	Ala	Tyr	Ala	Ala	Ala	Ile				
		1075					1080				1085								
ctg	gcc	tcc	ggt	tcc	gat	gac	ggc	tgc	atg	ctc	gat	ctg	gac	ctg					
Leu	Ala	Ser	Gly	Ser	Asp	Asp	Gly	Ala	Cys	Met	Leu	Asp	Leu	Asp	Leu				
	1090					1095			1100										
ctc	gac	ctg	ttc	ctg	ttg	gag	aag	gcg	gcc	tac	gag	gtc	aac	tac	gaa				
Leu	Asp	Leu	Phe	Leu	Leu	Glu	Lys	Ala	Ala	Tyr	Glu	Val	Asn	Tyr	Glu				
	1105				1110				1115						1120				
gcg	gcc	aac	ccg	ccg	acg	tgg	ctg	ccg	atc	ccg	ctg	gcg	ggc	ctg	gcg				
Ala	Ala	Asn	Arg	Pro	Thr	Trp	Leu	Pro	Ile	Pro	Leu	Ala	Gly	Leu	Ala				
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cg	gtg	gcg	cg	cg	ctg	ctg	cca	gcg	gac	gtg	gca	ccg	ccc	gtg	gcg				
Arg	Val	Ala	Arg	Arg	Leu	Leu	Pro	Ala	Asp	Val	Ala	Pro	Pro	Val	Ala				
		1140					1145					1150							
cg	gat	ccg	ctc	gga	ggc	ccg	ccg	tga											
Arg	Asp	Pro	Leu	Gly	Gly	Pro	Pro												
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<211> 1160

<212> PRT

<213> Ralstonia solanacearum GMI1000

<400> 56

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Lys	Asp	Ala	Val	Ile	Tyr	Gln	Leu	His	Val	Lys	Ser	Phe	Cys	Asp	Ser				
			20					25					30						
Asp	Asn	Asp	Gly	Val	Gly	Asp	Phe	Pro	Gly	Leu	Ile	Ser	Lys	Leu	Asp				
		35					40					45							
Tyr	Ile	Ala	Glu	Leu	Gly	Val	Asp	Ala	Ile	Trp	Leu	Leu	Pro	Phe	Tyr				
	50					55					60								
Pro	Ser	Pro	Arg	Arg	Asp	Asp	Gly	Tyr	Asp	Ile	Ala	Glu	Tyr	Arg	Gly				
65					70				75						80				
Val	His	Pro	Asp	Tyr	Gly	Thr	Met	Ala	Asp	Ala	Arg	Arg	Phe	Ile	Ala				
			85						90					95					
Glu	Ala	His	Ala	Arg	Gly	Leu	Arg	Val	Ile	Thr	Glu	Leu	Val	Ile	Asn				
			100					105					110						
His	Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Arg	Ala	Arg	Arg	Ala	Lys				
		115					120					125							
Ala	Gly	Ser	Ala	Leu	Arg	Asp	Phe	Tyr	Val	Trp	Ser	Asp	His	Asp	Lys				
	130					135					140								
Lys	Tyr	Ala	Gly	Thr	Arg	Ile	Ile	Phe	Ile	Asp	Thr	Glu	Pro	Ser	Asn				
145					150				155						160				
Trp	Thr	Trp	Asp	Pro	Val	Ala	Asp	Ala	Tyr	Tyr	Trp	His	Arg	Phe	Tyr				
			165						170					175					
Ser	His	Gln	Pro	Asp	Leu	Asn	Phe	Asp	Asn	Pro	Arg	Val	Leu	Lys	Ala				
			180					185					190						
Val	Leu	Gly	Val	Met	Lys	Phe	Trp	Leu	Asn	Leu	Gly	Val	Asp	Gly	Leu				
		195					200					205							
Arg	Leu	Asp	Ala	Val	Pro	Tyr	Leu	Val	Glu	Arg	Glu	Gly	Thr	Ala	Asn				
	210					215					220								
Glu	Asn	Leu	Pro	Glu	Thr	His	Ala	Val	Leu	Arg	Lys	Ile	Arg	Ala	Ala				
225					230					235					240				
Met	Asp	Ala	Glu	Phe	Lys	Asn	Arg	Leu	Leu	Leu	Ala	Glu	Ala	Asn	Gln				
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Trp	Pro	Glu	Asp	Thr	Gln	Glu	Tyr	Phe	Gly	Asn	Gly	Asp	Glu	Cys	His				
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Met	Ala	Phe	His	Phe	Pro	Leu	Met	Pro	Arg	Met	Tyr	Met	Ala	Ile	Ala				
		275					280					285							
Arg	Glu	Asp	Arg	Phe	Pro	Ile	Thr	Asp	Ile	Met	Arg	Gln	Thr	Pro	Glu				
	290					295					300								
Val	Pro	Pro	Thr	Cys	Gln	Trp	Ala	Ile	Phe	Leu	Arg	Asn	His	Asp	Glu				
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				325					330					335	
Val	Tyr	Ala	Ser	Asp	Arg	Arg	Ala	Arg	Leu	Asn	Leu	Gly	Ile	Arg	Arg
			340					345					350		
Arg	Leu	Ala	Pro	Leu	Leu	Glu	Arg	Asp	Arg	Arg	Arg	Val	Glu	Leu	Met
		355					360					365			
Asn	Ser	Leu	Leu	Phe	Ser	Met	Pro	Gly	Thr	Pro	Val	Met	Tyr	Tyr	Gly
	370					375					380				
Asp	Glu	Ile	Gly	Met	Gly	Asp	Asn	Ile	His	Leu	Gly	Asp	Arg	Asp	Gly
385					390					395					400
Val	Arg	Thr	Pro	Met	Gln	Trp	Ser	Pro	Asp	Arg	Asn	Gly	Gly	Phe	Ser
				405					410					415	
Arg	Ala	Asp	Pro	Glu	Gln	Leu	Val	Leu	Pro	Ala	Ile	Met	Gly	Ser	Leu
			420					425					430		
Tyr	Gly	Tyr	Glu	Ser	Val	Asn	Val	Glu	Ala	Gln	Thr	Arg	Asp	Ala	His
		435					440					445			
Ser	Leu	Leu	Asn	Trp	Thr	Arg	Arg	Leu	Leu	Ala	Thr	Arg	Lys	Arg	His
	450					455					460				
Arg	Val	Phe	Gly	Arg	Gly	Ser	Ile	Gln	Phe	Leu	Gln	Pro	Ala	Asn	Arg
465					470					475					480
Lys	Val	Leu	Ala	Tyr	Ala	Arg	Ala	Leu	Glu	Gly	Glu	Ala	Pro	Ile	Leu
				485					490					495	
Cys	Val	Ala	Asn	Leu	Ser	Arg	Ala	Ser	Gln	Ala	Val	Glu	Leu	Asp	Leu
			500					505					510		
Ala	Ala	Tyr	Ala	Gln	Arg	Val	Pro	Val	Glu	Leu	Ile	Gly	Gly	Thr	Ala
		515					520					525			
Phe	Pro	Pro	Ile	Gly	Gln	Leu	Pro	Tyr	Leu	Leu	Thr	Leu	Pro	Pro	Tyr
	530					535					540				
Ala	Phe	Tyr	Trp	Leu	Glu	Leu	Arg	Glu	Asn	Glu	Pro	Gly	Pro	Ser	Trp
545					550					555					560
Ala	Gln	Pro	Ala	Ala	Glu	Gln	Leu	Pro	Glu	Phe	Thr	Thr	Leu	Val	Leu
				565					570					575	
Arg	Ala	Gly	Leu	Asp	Ala	Leu	Ala	Asp	Thr	Arg	Gln	Arg	Glu	Ala	His
			580					585					590		
Arg	Gln	Leu	Val	Glu	Arg	Glu	Ile	Leu	Pro	Thr	Tyr	Leu	Pro	Lys	Arg
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Arg	Trp	Phe	Ala	Ala	Lys	Asp	Ser	Val	Leu	Arg	Gly	Ala	His	Phe	Ala
	610					615					620				
Trp	Gly	Thr	Glu	Leu	Pro	Val	Asp	Ala	Ala	Ser	Thr	Asn	Arg	Pro	Leu
625					630					635					640
Ala	Gly	Ala	Thr	Arg	Pro	Glu	Val	Phe	Ile	Asn	Glu	Ile	Ala	Val	Thr
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Leu	Gly	Asp	Ala	Asp	Gly	Thr	Glu	Arg	Thr	Glu	Arg	Tyr	Leu	Leu	Pro
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Leu	Ser	Ile	Ala	Trp	Glu	Ser	Ala	Thr	Leu	Pro	Ala	Leu	Pro	Ile	Gln
		675					680					685			
Leu	Ala	Leu	Ala	Arg	Val	Arg	Arg	Gly	Arg	His	Val	Gly	Tyr	Leu	Thr
	690					695					700				
Asp	Ala	Phe	Thr	Thr	Glu	Thr	Phe	Ala	Arg	Val	Leu	Leu	Ala	Asn	Leu
705					710					715					720
Val	Arg	Gly	Val	Thr	Leu	Glu	Ala	Ser	Asp	Gly	Arg	Val	His	Phe	Glu
				725					730					735	
Pro	Glu	Pro	His	Leu	Ala	Glu	Leu	Ala	Glu	Pro	Pro	Val	Ala	Ala	Glu
			740					745					750		
Thr	Ala	Ala	Val	Arg	Pro	Ala	Pro	Leu	Pro	Leu	Ala	Pro	Asp	Ala	Pro
		755					760					765			
Val	Gln	Trp	Leu	Ala	Ala	Glu	Gln	Ser	Asn	Ser	Ser	Leu	Val	Ile	Gly
	770					775					780				
Glu	Ser	Val	Ile	Val	Lys	Leu	Ile	Arg	Arg	Val	Ala	Ala	Gly	Val	His
785					790					795					800
Pro	Glu	Val	Glu	Met	Thr	Arg	His	Leu	Thr	Arg	Ile	Gly	Tyr	Ala	Asn
				805					810					815	
Thr	Ala	Ala	Leu	Ile	Gly	Glu	Ile	Ala	His	Glu	Gly	Ala	Asp	Gly	Glu
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Arg	Ser	Thr	Leu	Ala	Val	Leu	Gln	Ser	Phe	Val	Pro	Asn	Gln	Gly	Asp
		835					840					845			
Ala	Trp	Thr	Trp	Ala	Leu	Asp	Tyr	Leu	Arg	Arg	Thr	Ile	Asp	Glu	Leu
	850					855					860				
Ala	Val	Leu	Thr	Glu	Ala	Val	Ser	Ala	Gly	Asp	Gly	Asp	Ala	Ala	Pro

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865 Thr Ala Val Ser Glu 870 Ala Arg Thr Asp Thr 875 Asp Glu Ala Leu Ala 880 Gly
 Tyr Leu Ala Phe Ile Gly Ala Ile Gly Thr Arg Leu Gly Glu Leu His
 Val Ala Leu Ala Gly Pro Ser Asp Asp Pro Ala Phe Gly Thr Arg Ala
 Ala Asp Ala Asp Asp Ala Ala Phe Trp Thr Ala Arg Val Asp Glu Glu
 Leu Ala Arg Ala Leu Asp His Leu Ala Ala Trp Gln Ala Ala Asn Gly
 945 Pro Arg Ala Glu Val Gly Trp Leu Leu Ser Gln Arg Asp Ala Leu Leu
 Glu Ala Ala Arg Glu Arg Ala Gln Gly Gly Leu Gly Ala Met Leu Ala
 Arg Val His Gly Asp Phe His Leu Gly Gln Val Leu Val Ala Gln Gly
 Asp Ala Tyr Leu Ile Asp Phe Glu Gly Glu Pro Ser Arg Pro Val Asp
 1010 Glu Arg Arg Arg Lys Thr Ser Pro Leu Arg Asp Val Ala Gly Leu Val
 1025 Arg Ser Leu Asp Tyr Val Val Gly Ala Met Arg Gln Gly Pro Glu His
 Val Ala Gly Pro Ala Gln Glu Arg Arg Asp Gln Leu Leu Glu Arg Phe
 Arg Asn Ala Ser Thr Glu Arg Phe Leu Glu Ala Tyr Ala Ala Ala Ile
 Leu Ala Ser Gly Ser Asp Asp Gly Ala Cys Met Leu Asp Leu Asp Leu
 1090 Leu Asp Leu Phe Leu Leu Glu Lys Ala Ala Tyr Glu Val Asn Tyr Glu
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 Arg Val Ala Arg Arg Leu Leu Pro Ala Asp Val Ala Pro Pro Val Ala
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<211> 1821

<212> DNA

<213> Clostridium perfringens str. 13

<220>

<221> CDS

<222> (1)..(1821)

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Glu Pro Phe Gly Ala Val Ser Ile Gly Ser Lys Val Ser Leu Arg Leu	
20 25 30	
gaa tgc gaa gag tgt gga gaa gtt ttt ata gag gta ata aag ttt gat	144
Glu Cys Glu Glu Cys Gly Glu Val Phe Ile Glu Val Ile Lys Phe Asp	
35 40 45	
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Gly Ser Arg Tyr Ser Ile Pro Met Thr Ile Glu Glu Arg Arg Asn Glu	
50 55 60	
tgc ata att tat aaa ggg att ata gac act aca aac tcc tta gga gta	240
Cys Ile Ile Tyr Lys Gly Ile Ile Asp Thr Thr Asn Ser Leu Gly Val	
65 70 75 80	
ata aat tat tac ttt aaa tac att aag gac gga ttt act aag tat tat	288
Ile Asn Tyr Tyr Phe Lys Tyr Ile Lys Asp Gly Phe Thr Lys Tyr Tyr	
85 90 95	
gga aat aat gat gaa tgt tta gga gga gag gga aag ata tat tat gat	336
Gly Asn Asn Asp Glu Cys Leu Gly Gly Glu Gly Lys Ile Tyr Tyr Asp	

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Phe Pro Asn Tyr Tyr Gln Ile Thr Val Tyr Glu Asp Asn Lys Ile Pro				
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Ser Trp Tyr Lys Glu Gly Ile Ile Tyr Gln Ile Phe Val Asp Arg Phe				
130	135	140		
ttt aat ggg aat aag aat agt gtg ata tta aat aaa aag aaa aat agc				480
Phe Asn Gly Asn Lys Asn Ser Val Ile Leu Asn Lys Lys Lys Asn Ser				
145	150	155		
ttt ata tat ggt aat tgg tat gat gag cca atg tat ata aga gat aat				528
Phe Ile Tyr Gly Asn Trp Tyr Asp Glu Pro Met Tyr Ile Arg Asp Asn				
165	170	175		
aat gga agt att aaa cgg tgg ggt ttt tat gga ggt aat tta agg gga				576
Asn Gly Ser Ile Lys Arg Trp Gly Phe Tyr Gly Gly Asn Leu Arg Gly				
180	185	190		
gta att gaa aaa tta gat tat ata aaa tct tta ggt gta aat att ata				624
Val Ile Glu Lys Leu Asp Tyr Ile Lys Ser Leu Gly Val Asn Ile Ile				
195	200	205		
tac atg aat cca atc ttt gat gct gtg agt tgt cat aaa tat gat act				672
Tyr Met Asn Pro Ile Phe Asp Ala Val Ser Cys His Lys Tyr Asp Thr				
210	215	220		
gga gat tat gaa aat att gat aag atg tat gga act aac agt gat ttt				720
Gly Asp Tyr Glu Asn Ile Asp Lys Met Tyr Gly Thr Asn Ser Asp Phe				
225	230	235		
aag gaa ttg tgc caa aaa gct gag gaa aaa ggt ata agg ata ata tta				768
Lys Glu Leu Cys Gln Lys Ala Glu Glu Lys Gly Ile Arg Ile Ile Leu				
245	250	255		
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Asp Gly Val Phe Ser His Thr Gly Ser Asp Ser Arg Tyr Phe Asn Lys				
260	265	270		
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Tyr Gly Asn Tyr Gly Glu Leu Gly Ala Tyr Glu Ser Lys Tyr Ser Lys				
275	280	285		
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Tyr Tyr Lys Trp Tyr Arg Phe Tyr Asp Tyr Pro Asn Ser Tyr Glu Cys				
290	295	300		
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Trp Trp Gly Phe Glu Asn Gln Pro Asn Val Glu Glu Leu Glu Lys Thr				
305	310	315		
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Tyr Ser Asp Tyr Ile Val Asn Ser Glu Asn Ser Ile Ile Ala Lys Trp				
325	330	335		
ctt aga tta gga gca agt ggt tgg agg cta gat gta gca gat gaa ctt				1056
Leu Arg Leu Gly Ala Ser Gly Trp Arg Leu Asp Val Ala Asp Glu Leu				
340	345	350		
ccg gat gaa ttc ata caa atg att aag gaa agg atg aaa aat gag aaa				1104
Pro Asp Glu Phe Ile Gln Met Ile Lys Glu Arg Met Lys Asn Glu Lys				
355	360	365		
gaa gat agt gtg ctt ata gga gag gtt tgg gaa gat gct tca aat aag				1152
Glu Asp Ser Val Leu Ile Gly Glu Val Trp Glu Asp Ala Ser Asn Lys				
370	375	380		
gtt agc tat tca aaa aga aga aaa tat tta tta gga gat gaa tta gat				1200
Val Ser Tyr Ser Lys Arg Arg Lys Tyr Leu Leu Gly Asp Glu Leu Asp				
385	390	395		
tct gta aca aat tac cct tat aga gat ata att tct aat ttt tta aat				1248
Ser Val Thr Asn Tyr Pro Tyr Arg Asp Ile Ile Ser Asn Phe Leu Asn				
405	410	415		
gaa gaa ata agt tca aag gat ttt tat aaa gta ata atg agc ata aaa				1296
Glu Glu Ile Ser Ser Lys Asp Phe Tyr Lys Val Ile Met Ser Ile Lys				
420	425	430		
gaa aat tat cca aga gaa aac ttt tat gca aat atg aat att cta ggg				1344
Glu Asn Tyr Pro Arg Glu Asn Phe Tyr Ala Asn Met Asn Ile Leu Gly				
435	440	445		
aac cat gac aca gaa aga ata ctt aca gta tta aaa gag aat tta aat				1392
Asn His Asp Thr Glu Arg Ile Leu Thr Val Leu Lys Glu Asn Leu Asn				
450	455	460		
aag tta aaa tta gct cta tgt ctt caa atg act tta cct gga gtt ccc				1440
Lys Leu Lys Leu Ala Leu Cys Leu Gln Met Thr Leu Pro Gly Val Pro				

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465	tta	att	tat	tat	ggc	470	gat	gag	gca	gga	475	tta	gga	aat	aag	gat	480	cct	
Leu	Ile	Tyr	Tyr	Gly	485	Asp	Glu	Ala	Gly	Leu	490	Gly	Asn	Lys	Asp	Pro		1488	
gaa	aat	aga	aag	acc	tat	cct	tgg	gga	cga	gaa	aat	aag	gaa	ata	tta		1536		
Glu	Asn	Arg	Lys	Thr	Tyr	Pro	Trp	Gly	Arg	Glu	Asn	Lys	Glu	Ile	Leu				
			500					505					510						
agt	tat	tat	agc	ttt	ttc	gga	aac	ttt	aga	aag	aat	gaa	gag	gtt	tta		1584		
Ser	Tyr	Tyr	Ser	Phe	Phe	Gly	Asn	Phe	Arg	Lys	Asn	Glu	Glu	Val	Leu				
		515					520					525							
aga	aag	gga	gat	ttt	tat	att	ttt	aag	gat	aca	cct	gag	gat	gtt	att		1632		
Arg	Lys	Gly	Asp	Phe	Tyr	Ile	Phe	Lys	Asp	Thr	Pro	Glu	Asp	Val	Ile				
		530				535					540								
gct	ttt	aag	aga	gtt	tat	aaa	gat	aaa	gaa	atg	ata	att	ata	gta	aac		1680		
Ala	Phe	Lys	Arg	Val	Tyr	Lys	Asp	Lys	Glu	Met	Ile	Ile	Ile	Val	Asn				
				545	550					555					560				
agg	agt	aat	tct	aga	aaa	acc	ata	acc	tta	gat	agc	gag	aaa	gga	aga		1728		
Arg	Ser	Asn	Ser	Arg	Lys	Thr	Ile	Thr	Leu	Asp	Ser	Glu	Lys	Gly	Arg				
				565					570					575					
tat	aaa	gat	aaa	ttt	tct	aag	gaa	gaa	ttt	tat	ggt	gat	ggt	agc	att		1776		
Tyr	Lys	Asp	Lys	Phe	Ser	Lys	Glu	Glu	Phe	Tyr	Gly	Asp	Gly	Ser	Ile				
			580					585					590						
act	tta	gaa	gta	gaa	aga	gaa	aat	tat	aaa	att	tta	act	aat	tag			1821		
Thr	Leu	Glu	Val	Glu	Arg	Glu	Asn	Tyr	Lys	Ile	Leu	Thr	Asn						
		595					600					605							

<210> 58

<211> 606

<212> PRT

<213> Clostridium perfringens str. 13

<400> 58

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Glu	Pro	Phe	Gly	Ala	Val	Ser	Ile	Gly	Ser	Lys	Val	Ser	Leu	Arg	Leu
			20					25					30		
Glu	Cys	Glu	Glu	Cys	Gly	Glu	Val	Phe	Ile	Glu	Val	Ile	Lys	Phe	Asp
			35				40					45			
Gly	Ser	Arg	Tyr	Ser	Ile	Pro	Met	Thr	Ile	Glu	Glu	Arg	Arg	Asn	Glu
			50			55					60				
Cys	Ile	Ile	Tyr	Lys	Gly	Ile	Ile	Asp	Thr	Thr	Asn	Ser	Leu	Gly	Val
65					70					75					80
Ile	Asn	Tyr	Tyr	Phe	Lys	Tyr	Ile	Lys	Asp	Gly	Phe	Thr	Lys	Tyr	Tyr
				85					90					95	
Gly	Asn	Asn	Asp	Glu	Cys	Leu	Gly	Gly	Glu	Gly	Lys	Ile	Tyr	Tyr	Asp
			100					105					110		
Phe	Pro	Asn	Tyr	Tyr	Gln	Ile	Thr	Val	Tyr	Glu	Asp	Asn	Lys	Ile	Pro
		115					120					125			
Ser	Trp	Tyr	Lys	Glu	Gly	Ile	Ile	Tyr	Gln	Ile	Phe	Val	Asp	Arg	Phe
		130				135					140				
Phe	Asn	Gly	Asn	Lys	Asn	Ser	Val	Ile	Leu	Asn	Lys	Lys	Lys	Asn	Ser
					150					155					160
Phe	Ile	Tyr	Gly	Asn	Trp	Tyr	Asp	Glu	Pro	Met	Tyr	Ile	Arg	Asp	Asn
				165					170					175	
Asn	Gly	Ser	Ile	Lys	Arg	Trp	Gly	Phe	Tyr	Gly	Gly	Asn	Leu	Arg	Gly
			180					185					190		
Val	Ile	Glu	Lys	Leu	Asp	Tyr	Ile	Lys	Ser	Leu	Gly	Val	Asn	Ile	Ile
		195					200					205			
Tyr	Met	Asn	Pro	Ile	Phe	Asp	Ala	Val	Ser	Cys	His	Lys	Tyr	Asp	Thr
	210					215					220				
Gly	Asp	Tyr	Glu	Asn	Ile	Asp	Lys	Met	Tyr	Gly	Thr	Asn	Ser	Asp	Phe
					230					235					240
Lys	Glu	Leu	Cys	Gln	Lys	Ala	Glu	Glu	Lys	Gly	Ile	Arg	Ile	Ile	Leu
				245					250					255	
Asp	Gly	Val	Phe	Ser	His	Thr	Gly	Ser	Asp	Ser	Arg	Tyr	Phe	Asn	Lys
			260					265					270		
Tyr	Gly	Asn	Tyr	Gly	Glu	Leu	Gly	Ala	Tyr	Glu	Ser	Lys	Tyr	Ser	Lys
		275					280					285			
Tyr	Tyr	Lys	Trp	Tyr	Arg	Phe	Tyr	Asp	Tyr	Pro	Asn	Ser	Tyr	Glu	Cys

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290 295 300
 Trp Trp Gly Phe Glu Asn Gln Pro Asn Val Glu Glu Leu Glu Lys Thr
 305 310 315 320
 Tyr Ser Asp Tyr Ile Val Asn Ser Glu Asn Ser Ile Ile Ala Lys Trp
 325 330 335
 Leu Arg Leu Gly Ala Ser Gly Trp Arg Leu Asp Val Ala Asp Glu Leu
 340 345 350
 Pro Asp Glu Phe Ile Gln Met Ile Lys Glu Arg Met Lys Asn Glu Lys
 355 360 365
 Glu Asp Ser Val Leu Ile Gly Glu Val Trp Glu Asp Ala Ser Asn Lys
 370 375 380
 Val Ser Tyr Ser Lys Arg Arg Lys Tyr Leu Leu Gly Asp Glu Leu Asp
 385 390 395 400
 Ser Val Thr Asn Tyr Pro Tyr Arg Asp Ile Ile Ser Asn Phe Leu Asn
 405 410 415
 Glu Glu Ile Ser Ser Lys Asp Phe Tyr Lys Val Ile Met Ser Ile Lys
 420 425 430
 Glu Asn Tyr Pro Arg Glu Asn Phe Tyr Ala Asn Met Asn Ile Leu Gly
 435 440 445
 Asn His Asp Thr Glu Arg Ile Leu Thr Val Leu Lys Glu Asn Leu Asn
 450 455 460
 Lys Leu Lys Leu Ala Leu Cys Leu Gln Met Thr Leu Pro Gly Val Pro
 465 470 475 480
 Leu Ile Tyr Tyr Gly Asp Glu Ala Gly Leu Leu Gly Asn Lys Asp Pro
 485 490 495
 Glu Asn Arg Lys Thr Tyr Pro Trp Gly Arg Glu Asn Lys Glu Ile Leu
 500 505 510
 Ser Tyr Tyr Ser Phe Phe Gly Asn Phe Arg Lys Asn Glu Glu Val Leu
 515 520 525
 Arg Lys Gly Asp Phe Tyr Ile Phe Lys Asp Thr Pro Glu Asp Val Ile
 530 535 540
 Ala Phe Lys Arg Val Tyr Lys Asp Lys Glu Met Ile Ile Ile Val Asn
 545 550 555 560
 Arg Ser Asn Ser Arg Lys Thr Ile Thr Leu Asp Ser Glu Lys Gly Arg
 565 570 575
 Tyr Lys Asp Lys Phe Ser Lys Glu Glu Phe Tyr Gly Asp Gly Ser Ile
 580 585 590
 Thr Leu Glu Val Glu Arg Glu Asn Tyr Lys Ile Leu Thr Asn
 595 600 605

<210> 59

<211> 1665

<212> DNA

<213> Clostridium perfringens str. 13

<220>

<221> CDS

<222> (1)..(1665)

<223> transl_table=11

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aag agc ttt atg gat tct aat ggt gat ggt ata ggt gat att caa ggt	96
Lys Ser Phe Met Asp Ser Asn Gly Asp Gly Ile Gly Asp Ile Gln Gly	
20 25 30	
ata ata tct aaa tta gat tat tta aaa gat tta ggt att gat tta atc	144
Ile Ile Ser Lys Leu Asp Tyr Leu Lys Asp Leu Gly Ile Asp Leu Ile	
35 40 45	
tgg tta tgt cca atg tat aaa tca ccg aat cat gat aat ggt tat gac	192
Trp Leu Cys Pro Met Tyr Lys Ser Pro Asn His Asp Asn Gly Tyr Asp	
50 55 60	
att agt gat tat aaa gat atc tta gat gaa ttt gga act atg gat gat	240
Ile Ser Asp Tyr Lys Asp Ile Leu Asp Glu Phe Gly Thr Met Asp Asp	
65 70 75 80	
ttt aat gaa ttg ctt aat gag gtt cat aat aga ggg atg aag ctt att	288
Phe Asn Glu Leu Leu Asn Glu Val His Asn Arg Gly Met Lys Leu Ile	
85 90 95	

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ata Ile	gat Asp	tta Leu	gta Val 100	ata Ile	aat Asn	cac His	act Thr	agt Ser 105	cat His	gaa Glu	cat His	cca Pro	tgg Trp 110	ttt Phe	ata Ile	336
gaa Glu	tca Ser	aga Arg 115	tct Ser	tct Ser	agg Arg	gat Asp	aat Asn 120	cct Pro	aaa Lys	aga Arg	gat Asp	tgg Trp 125	tat Tyr	att Ile	tgg Trp	384
aga Arg	gaa Glu 130	ggt Gly	aaa Lys	ggg Gly	gat Asp	gag Glu 135	gaa Glu	cct Pro	aat Asn	aac Asn	tgg Trp 140	gaa Glu	agt Ser	ata Ile	ttt Phe	432
aaa Lys 145	ggt Gly	tca Ser	gct Ala	tgg Trp	gaa Glu 150	ttc Phe	tgt Cys	gag Glu	aat Asn	agt Ser 155	gaa Glu	gag Glu	tat Tyr	tac Tyr	cta Leu 160	480
cat His	tta Leu	ttt Phe	gct Ala	aaa Lys 165	gag Glu	caa Gln	cca Pro	gat Asp	tta Leu 170	aac Asn	tgg Trp	gag Glu	aat Asn	aaa Lys 175	gag Glu	528
gta Val	aga Arg	aat Asn	gaa Glu 180	cta Leu	tat Tyr	aaa Lys	atg Met	ata Ile 185	aac Asn	tgg Trp	tgg Trp	ctt Leu	gat Asp 190	aag Lys	ggt Gly	576
att Ile	gat Asp	ggg Gly 195	aga Phe	gtt Arg	gat Val	gcc Ala 200	ata Ile	agt Ser	cac His	ata Ile	aaa Lys 205	aaa Lys	gaa Glu	gag Glu		624
ggt Gly	ctt Leu 210	aag Lys	gat Asp	atg Met	gat Asp	aat Asn 215	cca Pro	gag Glu	gga Gly	ctt Leu	aaa Lys 220	tat Tyr	gtt Val	tca Ser	tcc Ser	672
ttt Phe 225	gaa Glu	aag Lys	cat His	atg Met	aat Asn 230	gta Val	gag Glu	gga Gly	ata Ile	aat Asn 235	tct Ser	cat His	ctt Leu	aaa Lys	gaa Glu 240	720
cta Leu	aaa Lys	gaa Glu	gaa Glu	act Thr 245	ttt Phe	tca Ser	aag Lys	tat Tyr	aat Asn 250	ata Ile	gtt Val	aca Thr	gtt Val	gga Gly 255	gaa Glu	768
gca Ala	aat Asn	gga Gly	gtt Val 260	agt Ser	gcc Ala	aat Asn	gaa Glu	gct Ala 265	gat Asp	cac His	tgg Trp	gta Val 270	gct Ala	gaa Glu	gat Asp	816
gag Glu	gga Gly	aca Thr 275	ttt Phe	aat Asn	atg Met	ata Ile	ttc Phe 280	caa Gln	ttt Phe	gag Glu	cat His	ctt Leu 285	aat Asn	ctt Leu	tgg Trp	864
aat Asn	tat Tyr 290	gaa Glu	gag Glu	gga Gly	caa Gln	gga Gly 295	ttt Phe	gat Asp	gtg Val	aag Lys	gca Ala 300	tac Tyr	aaa Lys	gat Asp	gtt Val	912
tta Leu 305	aca Thr	aat Asn	tgg Trp	caa Gln	aat Asn 310	tct Ser	tta Leu	gaa Glu	ggt Gly	aaa Lys 315	gga Gly	tgg Trp	aat Asn	gca Ala	ctt Leu 320	960
ttc Phe	att Ile	gaa Glu	aat Asn	cat His 325	gat Asp	ata Ile	cct Pro	aga Arg	gtt Val 330	gtt Val	tca Ser	act Thr	tgg Trp	gga Gly 335	aat Asn	1008
gac Asp	aag Lys	gaa Glu	tat Tyr 340	act Leu	gaa Glu	tgt Cys	gca Ala 345	aaa Lys	gct Ala	ttt Phe	gga Gly	gca Ala 350	att Ile	tat Tyr		1056
ttc Phe	tta Leu	caa Gln 355	aag Lys	gga Gly	acc Thr	cct Pro	ttc Phe 360	ata Ile	tac Tyr	caa Gln	ggg Gly 365	caa Gln	gaa Glu	ctt Leu	ggt Gly	1104
atg Met	aca Thr 370	aat Asn	gtt Val	aaa Lys	tat Tyr	cat His 375	agc Ser	ata Ile	tct Ser	gag Glu	tat Tyr 380	aat Asn	gat Asp	gtt Val	aaa Lys	1152
act Thr 385	ata Ile	aat Asn	act Thr	tac Tyr	aat Asn 390	gaa Glu	aga Arg	att Ile	gaa Glu	agt Ser 395	ggt Gly	gtt Val	tca Ser	gag Glu	gaa Glu 400	1200
ata Ile	gca Ala	tta Leu	aaa Lys	gaa Glu 405	gct Ala	tgg Trp	gta Val	act Thr	tca Ser 410	aga Arg	gat Asp	aat Asn	tca Ser	aga Arg 415	aca Thr	1248
cct Pro	atg Met	caa Gln	tgg Trp 420	aat Asn	tca Ser	agt Ser	gag Glu	aat Asn 425	gca Ala	ggg Gly	ttt Phe	act Thr 430	tgt Cys	gga Gly	aaa Lys	1296
cct Pro	tgg Trp	ata Ile 435	gga Gly	gtt Val	aat Asn	gaa Glu	aat Asn 440	tat Tyr	aaa Lys	aca Thr	ata Ile	aat Asn 445	gta Val	gaa Glu	gtt Val	1344
gaa Glu	gaa Glu 450	agg Arg	gat Asp	gaa Glu	aat Asn	tca Ser 455	gtt Val	tta Leu	aac Asn	ttc Phe	tat Tyr 460	aaa Lys	aag Lys	ctt Leu	ata Ile	1392

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aaa	ctt	aaa	aag	tct	aat	gaa	gct	tta	atc	tat	ggt	gta	tat	gat	tta	1440
Lys	Leu	Lys	Lys	Ser	Asn	Glu	Ala	Leu	Ile	Tyr	Gly	Val	Tyr	Asp	Leu	
465					470					475					480	
atc	ctt	gaa	gag	gat	gaa	aat	atc	ttt	gct	tat	aca	aga	act	tta	aat	1488
Ile	Leu	Glu	Glu	Asp	Glu	Asn	Ile	Phe	Ala	Tyr	Thr	Arg	Thr	Leu	Asn	
				485					490						495	
aat	gaa	aag	ttc	ttg	ata	atg	gct	aat	tta	act	gga	gaa	aat	gcc	aag	1536
Asn	Glu	Lys	Phe	Leu	Ile	Met	Ala	Asn	Leu	Thr	Gly	Glu	Asn	Ala	Lys	
			500					505					510			
tac	atg	tat	gag	aaa	gaa	aaa	ctt	aat	tct	aag	gat	tta	att	ctt	aac	1584
Tyr	Met	Tyr	Glu	Lys	Glu	Lys	Leu	Asn	Ser	Lys	Asp	Leu	Ile	Leu	Asn	
		515					520					525				
aat	tat	gag	gtt	tgt	gaa	cat	aaa	aac	tta	aca	gag	ttt	aca	tta	aaa	1632
Asn	Tyr	Glu	Val	Cys	Glu	His	Lys	Asn	Leu	Thr	Glu	Phe	Thr	Leu	Lys	
	530					535					540					
cct	tat	gaa	tgc	aga	gta	tat	aag	ctt	tct	taa						1665
Pro	Tyr	Glu	Cys	Arg	Val	Tyr	Lys	Leu	Ser							
545					550											

<210> 60

<211> 554

<212> PRT

<213> Clostridium perfringens str. 13

<400> 60

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			20					25					30			
Ile	Ile	Ser	Lys	Leu	Asp	Tyr	Leu	Lys	Asp	Leu	Gly	Ile	Asp	Leu	Ile	
		35					40					45				
Trp	Leu	Cys	Pro	Met	Tyr	Lys	Ser	Pro	Asn	His	Asp	Asn	Gly	Tyr	Asp	
	50					55					60					
Ile	Ser	Asp	Tyr	Lys	Asp	Ile	Leu	Asp	Glu	Phe	Gly	Thr	Met	Asp	Asp	
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Phe	Asn	Glu	Leu	Leu	Asn	Glu	Val	His	Asn	Arg	Gly	Met	Lys	Leu	Ile	
				85					90					95		
Ile	Asp	Leu	Val	Ile	Asn	His	Thr	Ser	His	Glu	His	Pro	Trp	Phe	Ile	
			100					105					110			
Glu	Ser	Arg	Ser	Ser	Arg	Asp	Asn	Pro	Lys	Arg	Asp	Trp	Tyr	Ile	Trp	
		115					120					125				
Arg	Glu	Gly	Lys	Gly	Asp	Glu	Glu	Pro	Asn	Asn	Trp	Glu	Ser	Ile	Phe	
	130					135					140					
Lys	Gly	Ser	Ala	Trp	Glu	Phe	Cys	Glu	Asn	Ser	Glu	Glu	Tyr	Tyr	Leu	
	145				150					155					160	
His	Leu	Phe	Ala	Lys	Glu	Gln	Pro	Asp	Leu	Asn	Trp	Glu	Asn	Lys	Glu	
				165					170					175		
Val	Arg	Asn	Glu	Leu	Tyr	Lys	Met	Ile	Asn	Trp	Trp	Leu	Asp	Lys	Gly	
			180					185					190			
Ile	Asp	Gly	Phe	Arg	Val	Asp	Ala	Ile	Ser	His	Ile	Lys	Lys	Glu	Glu	
		195					200					205				
Gly	Leu	Lys	Asp	Met	Asp	Asn	Pro	Glu	Gly	Leu	Lys	Tyr	Val	Ser	Ser	
	210					215					220					
Phe	Glu	Lys	His	Met	Asn	Val	Glu	Gly	Ile	Asn	Ser	His	Leu	Lys	Glu	
	225				230					235					240	
Leu	Lys	Glu	Glu	Thr	Phe	Ser	Lys	Tyr	Asn	Ile	Val	Thr	Val	Gly	Glu	
				245					250					255		
Ala	Asn	Gly	Val	Ser	Ala	Asn	Glu	Ala	Asp	His	Trp	Val	Ala	Glu	Asp	
			260					265					270			
Glu	Gly	Thr	Phe	Asn	Met	Ile	Phe	Gln	Phe	Glu	His	Leu	Asn	Leu	Trp	
		275					280					285				
Asn	Tyr	Glu	Glu	Gly	Gln	Gly	Phe	Asp	Val	Lys	Ala	Tyr	Lys	Asp	Val	
	290					295					300					
Leu	Thr	Asn	Trp	Gln	Asn	Ser	Leu	Glu	Gly	Lys	Gly	Trp	Asn	Ala	Leu	
	305				310					315					320	
Phe	Ile	Glu	Asn	His	Asp	Ile	Pro	Arg	Val	Val	Ser	Thr	Trp	Gly	Asn	
				325					330					335		
Asp	Lys	Glu	Tyr	Leu	Thr	Glu	Cys	Ala	Lys	Ala	Phe	Gly	Ala	Ile	Tyr	
			340					345					350			

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Phe Leu Gln Lys Gly Thr Pro Phe Ile Tyr Gln Gly Gln Glu Leu Gly
 355 360 365
 Met Thr Asn Val Lys Tyr His Ser Ile Ser Glu Tyr Asn Asp Val Lys
 370 375 380
 Thr Ile Asn Thr Tyr Asn Glu Arg Ile Glu Ser Gly Val Ser Glu Glu
 385 390 400
 Ile Ala Leu Lys Glu Ala Trp Val Thr Ser Arg Asp Asn Ser Arg Thr
 405 410 415
 Pro Met Gln Trp Asn Ser Ser Glu Asn Ala Gly Phe Thr Cys Gly Lys
 420 425 430
 Pro Trp Ile Gly Val Asn Glu Asn Tyr Lys Thr Ile Asn Val Glu Val
 435 440 445
 Glu Glu Arg Asp Glu Asn Ser Val Leu Asn Phe Tyr Lys Lys Leu Ile
 450 455 460
 Lys Leu Lys Lys Ser Asn Glu Ala Leu Ile Tyr Gly Val Tyr Asp Leu
 465 470 475 480
 Ile Leu Glu Glu Asp Glu Asn Ile Phe Ala Tyr Thr Arg Thr Leu Asn
 485 490 495
 Asn Glu Lys Phe Leu Ile Met Ala Asn Leu Thr Gly Glu Asn Ala Lys
 500 505 510
 Tyr Met Tyr Glu Lys Glu Lys Leu Asn Ser Lys Asp Leu Ile Leu Asn
 515 520 525
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 530 535 540
 Pro Tyr Glu Cys Arg Val Tyr Lys Leu Ser
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<210> 61

<211> 1833

<212> DNA

<213> Clostridium perfringens str. 13

<220>

<221> CDS

<222> (1)..(1833)

<223> transl_table=11

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tat tct tat gga tat gat aat gaa act ttg cat tta aga gtt aag act	96
Tyr Ser Tyr Gly Tyr Asp Asn Glu Thr Leu His Leu Arg Val Lys Thr	
20 25 30	
aaa aaa ggt gaa gtt aat aaa gtg gaa ata aga att gga gat cct tac	144
Lys Lys Gly Glu Val Asn Lys Val Glu Ile Arg Ile Gly Asp Pro Tyr	
35 40 45	
ata tgg gat gaa ggt ggt tgt gat gga gga aat atg aat gcc act gga	192
Ile Trp Asp Glu Gly Gly Cys Asp Gly Gly Asn Met Asn Ala Thr Gly	
50 55 60	
gga cga tgg aca ggt gga aaa agt tat cct atg aga aag gaa tgc gaa	240
Gly Arg Trp Thr Gly Gly Lys Ser Tyr Pro Met Arg Lys Glu Cys Glu	
65 70 75 80	
aca aaa tac ttt gat cac tgg ata gta ggg tat aaa cca tta acc aaa	288
Thr Lys Tyr Phe Asp His Trp Ile Val Gly Tyr Lys Pro Leu Thr Lys	
85 90 95	
cgt tca aga tat gga ttt ata tta tat gga gat gag gaa act ctt tta	336
Arg Ser Arg Tyr Gly Phe Ile Leu Tyr Gly Asp Glu Glu Thr Leu Leu	
100 105 110	
tgc aca gaa aaa aga ata gag gag tta gat gga aag tat gat gaa gaa	384
Cys Thr Glu Lys Arg Ile Glu Glu Leu Asp Gly Lys Tyr Asp Glu Glu	
115 120 125	
aaa tta agt gct ata gga aac ttt tat tgt ttt cca tat tta aat gcc	432
Lys Leu Ser Ala Ile Gly Asn Phe Tyr Cys Phe Pro Tyr Leu Asn Ala	
130 135 140	
ata gat gtt gct aaa aca cca caa tgg gta aag gat act gtt tgg tat	480
Ile Asp Val Ala Lys Thr Pro Gln Trp Val Lys Asp Thr Val Trp Tyr	
145 150 155 160	
caa ata ttc cca gat aga ttt tgc aat gga gat aaa tca ata gat cca	528

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Gln	Ile	Phe	Pro	Asp 165	Arg	Phe	Cys	Asn	Gly 170	Asp	Lys	Ser	Ile	Asp 175	Pro		
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gga Gly	gga Gly	gat Asp 195	tta Leu	cag Gln	gga Gly	gtt Val	tta Leu 200	gat Asp	aaa Lys	tta Leu	gat Asp	tac Tyr 205	tta Leu	tgc Cys	gat Asp		624
ctt Leu 210	gga Gly	att Ile	aat Asn	gga Gly	cta Leu	tat Tyr 215	ttt Phe	tgt Cys	cca Pro	gta Val	ttt Phe 220	gaa Glu	gct Ala	act Thr	gag Glu		672
aat Asn 225	cat His	agg Arg	tat Tyr	gaa Glu	act Thr 230	ata Ile	gat Asp	tat Tyr	ttt Phe 235	aaa Lys	gta Val	gat Asp	cca Pro	gca Ala	ctt Leu 240		720
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tca Ser	cca Pro	aaa Lys 275	tgg Trp	caa Gln	gat Asp	gta Val	tta Leu 280	aag Lys	aat Asn	aat Asn	gaa Glu	aaa Lys 285	tca Ser	aga Arg	tat Tyr		864
aag Lys 290	gat Asp	tgg Trp	ttt Phe	tgt Cys	ata Ile	aag Lys 295	ttc Phe	cca Pro	gtg Val	ctt Leu 300	gaa Glu	aat Asn	ggc Gly	tta Leu			912
gaa Glu 305	aat Asn	gtt Val	gat Asp	gga Gly	aat Asn 310	aat Asn	ttg Leu	aat Asn	tat Tyr	gaa Glu 315	acc Thr	ttt Phe	gga Gly	aga Arg	ata Ile 320		960
gcc Ala	aca Thr	atg Met	cct Pro	aaa Lys 325	cta Leu	aat Asn	act Thr	gaa Glu	aac Asn 330	cca Pro	gag Glu	gtt Val	gta Val 335	gaa Glu	tat Tyr		1008
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gaa Glu 385	gtt Val	tgg Trp	cat His	gat Asp	gga Gly 390	ctt Leu	cca Pro	tgg Trp	ctt Leu	atg Met 395	gga Gly	gat Asp	cag Gln	ttt Phe	gat Asp 400		1200
tca Ser	gtt Val	atg Met	aat Asn	tac Tyr 405	cct Pro	gtt Val	aca Thr	gat Asp	gca Ala 410	gta Val	aaa Lys	gaa Glu	tat Tyr	ttt Phe 415	tgt Cys		1248
tta Leu	aat Asn	caa Gln	tct Ser 420	aat Asn	cca Pro	gaa Glu	gat Asp	ttt Phe 425	aaa Lys	tat Tyr	atg Met	ata Ile	gaa Glu 430	gct Ala	aat Asn		1296
aag Lys	gtt Val	agc Ser 435	tat Tyr	tta Leu	aga Arg	caa Gln	ata Ile 440	gga Gly	gaa Glu	aca Thr	ata Ile	ttt Phe 445	aac Asn	ttg Leu	tta Leu		1344
gat Asp 450	agt Ser	cat His	gat Asp	act Thr	cca Pro	aga Arg 455	ata Ile	tta Leu	act Thr	gta Val	gct Ala 460	gga Gly	gga Gly	aat Asn	aag Lys		1392
gat Asp 465	aag Lys	atg Met	aaa Lys	cta Leu	gct Ala 470	tat Tyr	ctg Leu	ttt Phe	atg Met	ttt Phe 475	act Thr	caa Gln	gct Ala	ggc Gly	tct Ser 480		1440
cca Pro	tgt Cys	ata Ile	tat Tyr 485	tat Tyr	gga Gly	gat Asp	gaa Glu	gtt Val	ggg Gly 490	atg Met	gaa Glu	gga Gly	aat Asn	caa Gln 495	gga Gly		1488
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caa Gln	gac Asp	aaa Lys 515	gat Asp	atg Met	ctt Leu	aag Lys	ttt Phe 520	atg Met	aaa Lys	caa Gln	ata Ile	ata Ile 525	aaa Lys	ata Ile	aga Arg		1584
aaa	gaa	aat	aag	gaa	tta	aat	tta	tta	gat	aat	aat	tgg	ata	aga	gct		1632

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Asn	Lys	Asp	Glu	Asn	Ile	Leu	Ile	Tyr	Ser	Lys	Glu	Asn	Ile	Phe	Ile	
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Ile	Met	Asn	Asn	Ser	Glu	Asn	Glu	Glu	Lys	Ile	Tyr	Leu	Pro	Lys	Glu	
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ctt	aaa	aat	aat	aag	att	aat	gat	tta	ttt	gaa	gaa	aaa	att	gaa	ctc	1776
Leu	Lys	Asn	Asn	Lys	Ile	Asn	Asp	Leu	Phe	Glu	Glu	Lys	Ile	Glu	Leu	
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Leu	Lys	Glu	Asp	Ile	Asp	Leu	Lys	Pro	Phe	Ala	Phe	Lys	Val	Tyr	Lys	
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<212> PRT

<213> Clostridium perfringens str. 13

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Thr	Lys	Tyr	Phe	Asp	His	Trp	Ile	Val	Gly	Tyr	Lys	Pro	Leu	Thr	Lys	
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Lys	Leu	Ser	Ala	Ile	Gly	Asn	Phe	Tyr	Cys	Phe	Pro	Tyr	Leu	Asn	Ala	
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Gln	Ile	Phe	Pro	Asp	Arg	Phe	Cys	Asn	Gly	Asp	Lys	Ser	Ile	Asp	Pro	
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Glu	Asn	Val	Glu	Pro	Trp	Gly	Thr	Glu	Pro	Thr	Arg	Asp	Asn	Phe	Met	
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Gly	Gly	Asp	Leu	Gln	Gly	Val	Leu	Asp	Lys	Leu	Asp	Tyr	Leu	Cys	Asp	
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Asn	His	Arg	Tyr	Glu	Thr	Ile	Asp	Tyr	Phe	Lys	Val	Asp	Pro	Ala	Leu	
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Gly	Gly	Asn	Glu	Val	Phe	Lys	Lys	Leu	Val	Ser	Glu	Ala	His	Lys	Arg	
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Ser	Pro	Lys	Trp	Gln	Asp	Val	Leu	Lys	Asn	Asn	Glu	Lys	Ser	Arg	Tyr	
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385 Ser Val Met Asn Tyr 390 Pro Val Thr Asp Ala 395 Val Lys Glu Tyr Phe Cys
405 Leu Asn Gln Ser 420 Asn Pro Glu Asp Phe 425 Lys Tyr Met Ile Glu Ala Asn
435 Lys Val Ser Tyr Leu Arg Gln Ile Gly Glu Thr Ile Phe Asn Leu Leu
440 Asp Ser His Asp Thr Pro Arg 455 Ile Leu Thr Val Ala 460 Gly Gly Asn Lys
465 Asp Lys Met Lys Leu Ala 470 Tyr Leu Phe Met Phe 475 Thr Gln Ala Gly Ser
Pro Cys Ile Tyr Tyr 485 Gly Asp Glu Val Gly 490 Met Glu Gly Asn Gln Gly
500 Met Gly Met Glu Phe His Arg Arg Cys 505 Met Ile Trp Asp Glu Asn Lys
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555 Ile Met Asn Asn Ser 565 Glu Asn Glu Glu Lys Ile Tyr Leu Pro Lys Glu
570 Leu Lys Asn Asn Lys Ile Asn Asp Leu 585 Phe Glu Glu Lys Ile Glu Leu
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Ala Glu Val Glu Phe Ser Leu Ile Arg Glu Gly Ser Tyr Ala Tyr Leu
20      25      30
ctt ggt gac ttt aat gca ttt aat gag gga agt ttt aga atg gag caa      144
Leu Gly Asp Phe Asn Ala Phe Asn Glu Gly Ser Phe Arg Met Glu Gln
35      40      45
gaa gga aag aat tgg aag att aaa atc gcc ctt cca gaa ggg gta tgg      192
Glu Gly Lys Asn Trp Lys Ile Lys Ile Ala Leu Pro Glu Gly Val Trp
50      55      60
cac tat gct ttt tca ata gat ggg aaa ttc gtc tta gat cca gat aat      240
His Tyr Ala Phe Ser Ile Asp Gly Lys Phe Val Leu Asp Pro Asp Asn
65      70      75      80
cct gaa aga aga gta tat act aga aag ggt tac aaa ttc cac aga gaa      288
Pro Glu Arg Arg Val Tyr Thr Arg Lys Gly Tyr Lys Phe His Arg Glu
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gtt aat gtt gca aga att gtc aaa agt gac gat ttg gtt ttc cat act      336
Val Asn Val Ala Arg Ile Val Lys Ser Asp Asp Leu Val Phe His Thr
105      110      115
cct tct ctc ctg tat ctg tat gaa att ttt ggg agg gtt cac gtt ctt      384
Pro Ser Leu Leu Tyr Leu Tyr Glu Ile Phe Gly Arg Val His Val Leu
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aag Lys 145	cat His	gtt Val	cct Pro	atg Met	agg Arg 150	aag Lys	aag Lys	gct Ala	tct Ser	gat Asp 155	gag Glu	cta Leu	ttt Phe	gat Asp	tac Tyr 160	480
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gaa Glu	gta Val	tta Leu	aca Thr 180	atg Met	gaa Glu	gga Gly	gca Ala	aaa Lys 185	ttt Phe	gag Glu	tat Tyr	ggt Gly	caa Gln 190	ttt Phe	aag Lys	576
gcg Ala	aga Arg	ccc Pro 195	ttc Phe	agt Ser	atc Ile	gaa Glu	ttt Phe	cca Pro	acc Thr	tgg Trp	gtt Val	att Ile 205	gac Asp	agg Arg	gta Val	624
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tat Tyr	tta Leu	act Thr	cca Pro 260	atc Ile	ttc Phe	agt Ser	tcc Ser	ctc Leu 265	aca Thr	tat Tyr	cat His	gga Gly	tat Tyr 270	gac Asp	ata Ile	816
gtt Val	gat Asp	tat Tyr 275	ttc Phe	cac His	gtt Val	gca Ala	agg Arg 280	aga Arg	ctt Leu	gga Gly	gga Gly	gac Asp 285	agg Arg	gcc Ala	ttt Phe	864
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gat Asp 305	ggg Gly	gta Val	ttt Phe	cac His 310	cat His	acg Thr	agc Ser	ttt Phe	ttc Phe 315	cac His	cca Pro	tat Tyr	ttc Phe	caa Gln	gat Asp 320	960
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tac Tyr	tta Leu	att Ile 435	gga Gly	gaa Glu	gtt Val	atg Met	gat Asp 440	gat Asp	gca Ala	agg Arg	tta Leu	tgg Trp 445	ctg Leu	ttt Phe	gat Asp	1344
aaa Lys	ttc Phe 450	cat His	gga Gly	gtc Val	atg Met	aac Asn 455	tat Tyr	cgg Arg	ctc Leu	tat Tyr	gat Asp 460	gca Ala	atc Ile	tta Leu	agg Arg	1392
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gag Glu	ctc Leu	tta Leu	agc Ser	tcg Ser 485	tat Tyr	tat Tyr	ggc Gly	cca Pro	gca Ala 490	gag Glu	tat Tyr	cta Leu	atg Met	tat Tyr 495	aat Asn	1488

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Lys	Arg	Lys	Tyr	Val	Cys	Ala	Leu	Val	Phe	Leu	Met	Thr	Tyr	Lys	Gly	
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Arg	Lys	Asn	Asn	Lys	Ala	Leu	Leu	Phe	Gly	Asn	Phe	Val	Pro	Val	Lys	
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<212> PRT

<213> Pyrococcus furiosus DSM 3638

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His	Tyr	Ala	Phe	Ser	Ile	Asp	Gly	Lys	Phe	Val	Leu	Asp	Pro	Asp	Asn	
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Pro	Glu	Arg	Arg	Val	Tyr	Thr	Arg	Lys	Gly	Tyr	Lys	Phe	His	Arg	Glu	
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Val	Asn	Val	Ala	Arg	Ile	Val	Lys	Ser	Asp	Asp	Leu	Val	Phe	His	Thr	
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Pro	Ser	Leu	Leu	Tyr	Leu	Tyr	Glu	Ile	Phe	Gly	Arg	Val	His	Val	Leu	
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Lys	His	Val	Pro	Met	Arg	Lys	Lys	Ala	Ser	Asp	Glu	Leu	Phe	Asp	Tyr	
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Phe	Glu	Val	Ile	Val	Glu	Gly	Gly	Asp	Lys	Arg	Leu	Asn	Tyr	Ser	Phe	
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 Val Asp Tyr Phe His Val Ala Arg Arg Leu Gly Gly Asp Arg Ala Phe
 275 280 285
 Val Asp Leu Leu Ser Glu Leu Lys Arg Phe Asp Ile Lys Val Ile Leu
 290 295 300
 Asp Gly Val Phe His His Thr Ser Phe Phe His Pro Tyr Phe Gln Asp
 305 310 315 320
 Val Val Arg Lys Gly Glu Asn Ser Ser Phe Lys Asn Phe Tyr Arg Ile
 325 330 335
 Ile Lys Phe Pro Val Val Ser Lys Glu Phe Leu Gln Ile Leu His Ser
 340 345 350
 Lys Ser Ser Trp Glu Glu Lys Tyr Lys Lys Ile Lys Ser Leu Gly Trp
 355 360 365
 Asn Tyr Glu Ser Phe Phe Ser Val Trp Ile Met Pro Arg Leu Asn His
 370 375 380
 Asp Asn Pro Lys Val Arg Glu Phe Ile Lys Asn Val Ile Leu Phe Trp
 385 390 395 400
 Thr Asn Lys Gly Val Asp Gly Phe Arg Met Asp Val Ala His Gly Val
 405 410 415
 Pro Pro Glu Val Trp Lys Glu Val Arg Glu Ala Leu Pro Lys Glu Lys
 420 425 430
 Tyr Leu Ile Gly Glu Val Met Asp Asp Ala Arg Leu Trp Leu Phe Asp
 435 440 445
 Lys Phe His Gly Val Met Asn Tyr Arg Leu Tyr Asp Ala Ile Leu Arg
 450 455 460
 Phe Phe Gly Tyr Glu Glu Ile Thr Ala Glu Glu Phe Leu Asn Glu Leu
 465 470 475 480
 Glu Leu Leu Ser Ser Tyr Tyr Gly Pro Ala Glu Tyr Leu Met Tyr Asn
 485 490 495
 Phe Leu Asp Asn His Asp Val Glu Arg Phe Leu Asp Ile Val Gly Asp
 500 505 510
 Lys Arg Lys Tyr Val Cys Ala Leu Val Phe Leu Met Thr Tyr Lys Gly
 515 520 525
 Ile Pro Ser Leu Phe Tyr Gly Asp Glu Ile Gly Leu Arg Gly Ile Asn
 530 535 540
 Leu Gln Gly Met Glu Ser Ser Arg Ala Pro Met Leu Trp Asn Glu Glu
 545 550 555 560
 Glu Trp Asp Gln Arg Ile Leu Glu Ile Thr Lys Thr Leu Val Lys Ile
 565 570 575
 Arg Lys Asn Asn Lys Ala Leu Leu Phe Gly Asn Phe Val Pro Val Lys
 580 585 590
 Phe Lys Arg Lys Phe Met Val Tyr Lys Arg Glu His Met Gly Glu Arg
 595 600 605
 Thr Ile Val Ala Ile Asn Tyr Ser Asn Ser Arg Val Lys Glu Leu Gly
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 Lys Leu Ile Lys Tyr
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<210> 65

<211> 1614

<212> DNA

<213> Streptococcus pyogenes MGAS8232

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<221> CDS

<222> (1)..(1614)

<223> transl_table=11

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 Arg Ser Phe Lys Asp Thr Asn Gly Asn Gly Ile Gly Asp Leu Lys Gly
 20 25 30
 att acc agt caa ctg gac tac ttg caa aaa ctt ggc att aca gcc att
 35 40 45 50 55 60 65

48

96

144

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tgg	tta	tct	cct	gtt	tac	caa	agt	cca	atg	gat	gac	aat	ggt	tat	gac	192
Trp	Leu	Ser	Pro	Val	Tyr	Gln	Ser	Pro	Met	Asp	Asp	Asn	Gly	Tyr	Asp	
	50					55					60					
atc	tct	gac	tat	gaa	gcg	att	gct	gat	gtt	ttt	gga	gac	atg	gca	gat	240
Ile	Ser	Asp	Tyr	Glu	Ala	Ile	Ala	Asp	Val	Phe	Gly	Asp	Met	Ala	Asp	
	65				70					75					80	
atg	gat	gag	ctc	ttg	gca	gca	gct	aat	gag	cga	ggc	att	aag	att	atc	288
Met	Asp	Glu	Leu	Leu	Ala	Ala	Ala	Asn	Glu	Arg	Gly	Ile	Lys	Ile	Ile	
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atg	gac	ttg	gtg	gtc	aac	cat	acg	tct	gat	gag	cac	gct	tgg	ttt	gtt	336
Met	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Glu	His	Ala	Trp	Phe	Val	
			100					105					110			
gaa	gct	agg	gaa	aac	tct	aat	agt	cct	gag	cgt	gat	ttt	tat	att	tgg	384
Glu	Ala	Arg	Glu	Asn	Ser	Asn	Ser	Pro	Glu	Arg	Asp	Phe	Tyr	Ile	Trp	
		115					120					125				
cga	gat	gaa	cct	aac	gat	ttg	act	tct	att	ttt	agt	ggc	tca	gct	tgg	432
Arg	Asp	Glu	Pro	Asn	Asp	Leu	Thr	Ser	Ile	Phe	Ser	Gly	Ser	Ala	Trp	
	130					135					140					
gaa	tat	gat	aat	gca	tca	ggg	caa	tat	tat	ttg	cac	ctt	ttt	agc	aaa	480
Glu	Tyr	Asp	Asn	Ala	Ser	Gly	Gln	Tyr	Tyr	Leu	His	Leu	Phe	Ser	Lys	
	145				150					155					160	
cgt	cag	cca	gat	ctc	aac	ttg	gag	aat	gaa	gct	ttg	cgt	cat	aaa	att	528
Arg	Gln	Pro	Asp	Leu	Asn	Trp	Glu	Asn	Glu	Ala	Leu	Arg	His	Lys	Ile	
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tac	gat	atg	atg	aat	ttc	tgg	att	gcc	aaa	ggc	ata	ggt	ggt	ttt	cgg	576
Tyr	Asp	Met	Met	Asn	Phe	Trp	Ile	Ala	Lys	Gly	Ile	Gly	Gly	Phe	Arg	
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Gly	Asn	Gly	Pro	Arg	Leu	His	Asp	Tyr	Leu	Lys	Glu	Met	Asn	Gln	Ala	
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Thr	Phe	Gly	Asn	His	Asp	Val	Met	Thr	Val	Gly	Glu	Thr	Trp	Gly	Ala	
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Thr	Pro	Glu	Ile	Ala	Arg	Gln	Tyr	Ser	Arg	Pro	Glu	Asn	Lys	Glu	Leu	
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Ser	Met	Val	Phe	Gln	Phe	Glu	His	Val	Gly	Leu	Gln	His	Lys	Pro	Asp	
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gct	ccc	aag	tgg	gat	tat	gcg	gaa	ctg	gat	gtt	cct	gct	ctg	aaa		864
Ala	Pro	Lys	Trp	Asp	Tyr	Ala	Glu	Leu	Asp	Val	Pro	Ala	Leu	Lys		
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gct	att	ttt	agc	aag	tgg	cag	aca	gaa	tta	aag	ttg	gga	gaa	ggc	tgg	912
Ala	Ile	Phe	Ser	Lys	Trp	Gln	Thr	Glu	Leu	Lys	Leu	Gly	Glu	Gly	Trp	
	290					295					300					
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Asn	Ser	Leu	Phe	Trp	Asn	Asn	His	Asp	Leu	Pro	Arg	Val	Leu	Ser	Ile	
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Trp	Gly	Asn	Asp	Ser	Thr	Tyr	Arg	Glu	Lys	Ser	Ala	Lys	Ala	Leu	Ala	
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att	tta	ctg	cat	ttg	atg	cga	gga	acc	cct	tac	att	tac	caa	gga	gaa	1056
Ile	Leu	Leu	His	Leu	Met	Arg	Gly	Thr	Pro	Tyr	Ile	Tyr	Gln	Gly	Glu	
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Glu	Ile	Gly	Met	Thr	Asn	Tyr	Pro	Phe	Lys	Asp	Leu	Thr	Glu	Val	Asn	
		355					360					365				
gat	att	gag	tcc	ctt	aac	tat	gct	aaa	gaa	gct	atg	gga	aat	gga	gtg	1152
Asp	Ile	Glu	Ser	Leu	Asn	Tyr	Ala	Lys	Glu	Ala	Met	Gly	Asn	Gly	Val	
		370				375					380					
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Ser	Ala	Ala	Arg	Val	Met	Asp	Ser	Ile	Arg	Lys	Val	Gly	Arg	Asp	Asn	
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gct	aga	acg	ccg	atg	cag	tgg	tct	aag	gat	aca	cat	gct	ggc	ttt	tct	1248

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Lys	Ala	Gln	Glu	Thr	Trp	Leu	Pro	Val	Asn	Pro	Asn	Tyr	Gln	Asp	Ile		
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aat	gtg	gcc	gat	gcc	ctt	gct	gat	cca	gat	tct	att	ttt	tac	act	tac	1344	
Asn	Val	Ala	Asp	Ala	Leu	Ala	Asp	Pro	Asp	Ser	Ile	Phe	Tyr	Thr	Tyr		
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caa	aaa	ttg	att	gcc	ttg	cgt	aag	gag	caa	gac	tgg	cta	ggt	gaa	gcg	1392	
Gln	Lys	Leu	Ile	Ala	Leu	Arg	Lys	Glu	Gln	Asp	Trp	Leu	Val	Glu	Ala		
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gat	tat	cac	ctc	ttg	cca	aca	gct	gat	aaa	gtg	ttt	gct	tat	cag	cgt	1440	
Asp	Tyr	His	Leu	Leu	Pro	Thr	Ala	Asp	Lys	Val	Phe	Ala	Tyr	Gln	Arg		
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cag	ctt	gga	gaa	gag	aca	tat	gtg	att	gtt	gtc	aat	gtg	tct	gat	caa	1488	
Gln	Leu	Gly	Glu	Glu	Thr	Tyr	Val	Ile	Val	Val	Asn	Val	Ser	Asp	Gln		
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gag	caa	gtc	ttt	gcc	aaa	gat	tta	gcg	ggg	gca	gaa	gtg	gtc	atc	acc	1536	
Glu	Gln	Val	Phe	Ala	Lys	Asp	Leu	Ala	Gly	Ala	Glu	Val	Val	Ile	Thr		
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aat	aca	gat	gtg	gac	aaa	gtg	tta	gag	acc	aag	cac	tta	caa	cct	tgg	1584	
Asn	Thr	Asp	Val	Asp	Lys	Val	Leu	Glu	Thr	Lys	His	Leu	Gln	Pro	Trp		
			515				520					525					
gat	gcc	ttt	tgt	ctc	aaa	ctg	aag	gcc	tag							1614	
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<211> 537

<212> PRT

<213> Streptococcus pyogenes MGAS8232

<400> 66

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Ile	Thr	Ser	Gln	Leu	Asp	Tyr	Leu	Gln	Lys	Leu	Gly	Ile	Thr	Ala	Ile		
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Trp	Leu	Ser	Pro	Val	Tyr	Gln	Ser	Pro	Met	Asp	Asp	Asn	Gly	Tyr	Asp		
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Ile	Ser	Asp	Tyr	Glu	Ala	Ile	Ala	Asp	Val	Phe	Gly	Asp	Met	Ala	Asp		
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Met	Asp	Glu	Leu	Leu	Ala	Ala	Ala	Asn	Glu	Arg	Gly	Ile	Lys	Ile	Ile		
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Glu	Ala	Arg	Glu	Asn	Ser	Asn	Ser	Pro	Glu	Arg	Asp	Phe	Tyr	Ile	Trp		
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Arg	Asp	Glu	Pro	Asn	Asp	Leu	Thr	Ser	Ile	Phe	Ser	Gly	Ser	Ala	Trp		
		130				135					140						
Glu	Tyr	Asp	Asn	Ala	Ser	Gly	Gln	Tyr	Tyr	Leu	His	Leu	Phe	Ser	Lys		
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Tyr	Asp	Met	Met	Asn	Phe	Trp	Ile	Ala	Lys	Gly	Ile	Gly	Gly	Phe	Arg		
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Thr	Phe	Gly	Asn	His	Asp	Val	Met	Thr	Val	Gly	Glu	Thr	Trp	Gly	Ala		
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				245					250					255			
Ser	Met	Val	Phe	Gln	Phe	Glu	His	Val	Gly	Leu	Gln	His	Lys	Pro	Asp		
			260					265					270				
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 Asn Ser Leu Phe Trp Asn Asn His Asp Leu Pro Arg Val Leu Ser Ile
 305 310 315 320
 Trp Gly Asn Asp Ser Thr Tyr Arg Glu Lys Ser Ala Lys Ala Leu Ala
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 340 345 350
 Glu Ile Gly Met Thr Asn Tyr Pro Phe Lys Asp Leu Thr Glu Val Asn
 355 360 365
 Asp Ile Glu Ser Leu Asn Tyr Ala Lys Glu Ala Met Gly Asn Gly Val
 370 375 380
 Ser Ala Ala Arg Val Met Asp Ser Ile Arg Lys Val Gly Arg Asp Asn
 385 390 395 400
 Ala Arg Thr Pro Met Gln Trp Ser Lys Asp Thr His Ala Gly Phe Ser
 405 410 415
 Lys Ala Gln Glu Thr Trp Leu Pro Val Asn Pro Asn Tyr Gln Asp Ile
 420 425 430
 Asn Val Ala Asp Ala Leu Ala Asp Pro Asp Ser Ile Phe Tyr Thr Tyr
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 Gln Lys Leu Ile Ala Leu Arg Lys Glu Gln Asp Trp Leu Val Glu Ala
 450 455 460
 Asp Tyr His Leu Leu Pro Thr Ala Asp Lys Val Phe Ala Tyr Gln Arg
 465 470 475 480
 Gln Leu Gly Glu Glu Thr Tyr Val Ile Val Val Asn Val Ser Asp Gln
 485 490 495
 Glu Gln Val Phe Ala Lys Asp Leu Ala Gly Ala Glu Val Val Ile Thr
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 Asp Ala Phe Cys Leu Lys Leu Lys Ala
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<211> 1725

<212> DNA

<213> Thermoanaerobacter tengcongensis MB4

<220>

<221> CDS

<222> (1)..(1725)

<223> transl_table=11

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cct gta aat aaa gac caa tta aaa ata gtc ttg aga acg gca gtt ttc	96
Pro Val Asn Lys Asp Gln Leu Lys Ile Val Leu Arg Thr Ala Val Phe	
20 25 30	
gat gtg gat agg gta tac att ctt ttt aaa gac agg tat gac tgg ctg	144
Asp Val Asp Arg Val Tyr Ile Leu Phe Lys Asp Arg Tyr Asp Trp Leu	
35 40 45	
ggc aaa ttt aaa ata aag cct atg acc tta gtt cac act aac gag ctt	192
Gly Lys Phe Lys Ile Lys Pro Met Thr Leu Val His Thr Asn Glu Leu	
50 55 60	
ttt gac tat tat gag act act ctt gaa tta aat aag agg ttt ttg tac	240
Phe Asp Tyr Tyr Glu Thr Thr Leu Glu Leu Asn Lys Arg Phe Leu Tyr	
65 70 75 80	
ttt ttt tat tta gtt tca gaa acg gga gaa aaa ctt tat tac aca gaa	288
Phe Phe Tyr Leu Val Ser Glu Thr Gly Glu Lys Leu Tyr Tyr Thr Glu	
85 90 95	
gct ggt ttt ttc aaa aag agg cca gag gat agc ttc tgg ggt ttt ttc	336
Ala Gly Phe Phe Lys Lys Arg Pro Glu Asp Ser Phe Trp Gly Phe Phe	
100 105 110	
cac tat ccc tat ata agg gaa aag gat ata ttt tct cct ccg gat tgg	384
His Tyr Pro Tyr Ile Arg Glu Lys Asp Ile Phe Ser Pro Pro Asp Trp	
115 120 125	
gca aac gag tgc ata gtg tat cag ata ttt cca gac aga ttc aac aat	432

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Gly	Asp	Arg	Thr	Asn	Asp	Pro	Glu	Asn	Val	Lys	Pro	Trp	Gly	Glu	Lys	
145					150					155					160	
ccg	act	gca	gat	tct	ttt	ttt	gga	ggg	gat	tta	cag	gga	ata	atc	gac	528
Pro	Thr	Ala	Asp	Ser	Phe	Phe	Gly	Gly	Asp	Leu	Gln	Gly	Ile	Ile	Asp	
				165					170					175		
aaa	ata	gat	tat	tta	aaa	gag	tta	ggg	ata	aat	gcc	att	tat	tta	act	576
Lys	Ile	Asp	Tyr	Leu	Lys	Glu	Leu	Gly	Ile	Asn	Ala	Ile	Tyr	Leu	Thr	
			180					185					190			
cca	ata	ttt	ttg	tct	cct	tct	act	cac	aaa	tac	gac	acc	acg	gat	tat	624
Pro	Ile	Phe	Leu	Ser	Pro	Ser	Thr	His	Lys	Tyr	Asp	Thr	Thr	Asp	Tyr	
		195					200					205				
tac	acg	ata	gac	cct	cat	ttt	ggt	gac	acg	gaa	aaa	gct	aaa	gaa	ttg	672
Tyr	Thr	Ile	Asp	Pro	His	Phe	Gly	Asp	Thr	Glu	Lys	Ala	Lys	Glu	Leu	
		210				215					220					
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Val	Arg	Lys	Cys	His	Asp	Asn	Gly	Ile	Lys	Val	Ile	Phe	Asp	Ala	Val	
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Phe	Asn	His	Cys	Gly	Tyr	Asp	Phe	Phe	Ala	Phe	Gln	Asp	Val	Val	Lys	
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aat	ggg	ccg	aag	tca	aag	tac	tgg	gat	tgg	ttc	aat	gtg	tac	gaa	tgg	816
Asn	Gly	Pro	Lys	Ser	Lys	Tyr	Trp	Asp	Trp	Phe	Asn	Val	Tyr	Glu	Trp	
			260					265					270			
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Pro	Ile	Lys	Thr	His	Pro	Lys	Pro	Thr	Tyr	Glu	Thr	Phe	Gly	Glu	Asn	
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Val	Trp	Arg	Met	Pro	Lys	Leu	Met	Thr	Lys	Asn	Pro	Glu	Val	Gln	Lys	
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Tyr	Leu	Leu	Glu	Val	Ala	Glu	Tyr	Trp	Ile	Lys	Glu	Val	Asp	Ile	Asp	
305					310					315					320	
ggc	tgg	cga	ttg	gac	gtt	gcc	aac	gaa	ata	gac	cat	cac	ttc	tgg	aga	1008
Gly	Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Ile	Asp	His	His	Phe	Trp	Arg	
				325					330					335		
aag	ttt	aga	gag	gtt	gta	aaa	aat	gcc	aaa	aaa	gat	gcc	ata	ata	gta	1056
Lys	Phe	Arg	Glu	Val	Val	Lys	Asn	Ala	Lys	Lys	Asp	Ala	Ile	Ile	Val	
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gga	gaa	gtg	tgg	cat	gat	gct	tct	ccg	tgg	tta	aga	ggg	gac	cag	ttt	1104
Gly	Glu	Val	Trp	His	Asp	Ala	Ser	Pro	Trp	Leu	Arg	Gly	Asp	Gln	Phe	
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Asp	Ser	Val	Met	Asn	Tyr	Pro	Phe	Arg	Asn	Ala	Val	Val	Asp	Phe	Phe	
		370				375					380					
gcg	aag	agg	aaa	ata	agt	gct	gta	aaa	ttc	aac	aca	ctg	ata	act	gag	1200
Ala	Lys	Arg	Lys	Ile	Ser	Ala	Val	Lys	Phe	Asn	Thr	Leu	Ile	Thr	Glu	
385					390				395						400	
cag	ctt	atg	aga	cac	atg	gat	agc	gtt	aat	aga	gtc	atg	ttt	aac	ctc	1248
Gln	Leu	Met	Arg	His	Met	Asp	Ser	Val	Asn	Arg	Val	Met	Phe	Asn	Leu	
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ata	ggt	agt	cac	gac	act	gaa	agg	ttt	ttg	act	ctc	gca	aat	ggc	atg	1296
Ile	Gly	Ser	His	Asp	Thr	Glu	Arg	Phe	Leu	Thr	Leu	Ala	Asn	Gly	Met	
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gtg	gcg	cgg	atg	aaa	tta	gct	ttg	gtt	cag	ttt	aca	ttt	gtg	gga		1344
Val	Ala	Arg	Met	Lys	Leu	Ala	Leu	Val	Phe	Gln	Phe	Thr	Phe	Val	Gly	
		435				440						445				
gtg	ccg	tac	atc	tac	tat	gga	gac	gaa	gct	gga	atg	gtg	gga	gga	ttt	1392
Val	Pro	Tyr	Ile	Tyr	Tyr	Gly	Asp	Glu	Ala	Gly	Met	Val	Gly	Gly	Phe	
		450				455					460					
gac	cct	gac	tgc	aga	agg	tgc	atg	ata	tgg	gag	gag	gaa	aag	cag	aac	1440
Asp	Pro	Asp	Cys	Arg	Arg	Cys	Met	Ile	Trp	Glu	Glu	Glu	Lys	Gln	Asn	
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Lys	Gly	Leu	Phe	Glu	Phe	Tyr	Lys	Lys	Leu	Ile	Arg	Ile	Arg	Lys	Glu	
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Arg	Val	Phe	Ala	Phe	Arg	Arg	Glu	Tyr	Lys	Gly	Asn	Ser	Ile	Val	Val		
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Ile	Ile	Asn	Asn	Ser	Ser	Lys	Glu	Glu	Val	Ile	Phe	Leu	Glu	Glu	Ala		
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gga	gga	aaa	gag	gat	ata	tta	aaa	atg	gga	gaa	tta	aaa	agg	agt	ggc		1680
Gly	Gly	Lys	Glu	Asp	Ile	Leu	Lys	Met	Gly	Glu	Leu	Lys	Arg	Ser	Gly		
		545			550				555						560		
aat	ttg	ctg	tat	ctt	aag	cct	aac	act	gcc	tat	att	ttg	aag	tag			1725
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<211> 574

<212> PRT

<213> Thermoanaerobacter tengcongensis MB4

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Asp	Val	Asp	Arg	Val	Tyr	Ile	Leu	Phe	Lys	Asp	Arg	Tyr	Asp	Trp	Leu		
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Gly	Lys	Phe	Lys	Ile	Lys	Pro	Met	Thr	Leu	Val	His	Thr	Asn	Glu	Leu		
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Phe	Asp	Tyr	Tyr	Glu	Thr	Thr	Leu	Glu	Leu	Asn	Lys	Arg	Phe	Leu	Tyr		
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Phe	Phe	Tyr	Leu	Val	Ser	Glu	Thr	Gly	Glu	Lys	Leu	Tyr	Tyr	Thr	Glu		
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His	Tyr	Pro	Tyr	Ile	Arg	Glu	Lys	Asp	Ile	Phe	Ser	Pro	Pro	Asp	Trp		
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Ala	Asn	Glu	Cys	Ile	Val	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe	Asn	Asn		
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Lys	Ile	Asp	Tyr	Leu	Lys	Glu	Leu	Gly	Ile	Asn	Ala	Ile	Tyr	Leu	Thr		
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Pro	Ile	Phe	Leu	Ser	Pro	Ser	Thr	His	Lys	Tyr	Asp	Thr	Thr	Asp	Tyr		
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	290					295					300						
Tyr	Leu	Leu	Glu	Val	Ala	Glu	Tyr	Trp	Ile	Lys	Glu	Val	Asp	Ile	Asp		
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			325						330					335			
Lys	Phe	Arg	Glu	Val	Val	Lys	Asn	Ala	Lys	Lys	Asp	Ala	Ile	Ile	Val		
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Gly	Glu	Val	Trp	His	Asp	Ala	Ser	Pro	Trp	Leu	Arg	Gly	Asp	Gln	Phe		
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Asp	Ser	Val	Met	Asn	Tyr	Pro	Phe	Arg	Asn	Ala	Val	Val	Asp	Phe	Phe		
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 420 425 430
 Val Ala Arg Met Lys Leu Ala Leu Val Phe Gln Phe Thr Phe Val Gly
 435 440 445
 Val Pro Tyr Ile Tyr Tyr Gly Asp Glu Ala Gly Met Val Gly Gly Phe
 450 455 460
 Asp Pro Asp Cys Arg Arg Cys Met Ile Trp Glu Glu Glu Lys Gln Asn
 465 470 475 480
 Lys Gly Leu Phe Glu Phe Tyr Lys Lys Leu Ile Arg Ile Arg Lys Glu
 485 490 495
 His Glu Glu Leu Lys Tyr Gly Asn Phe Thr Thr Leu Tyr Ala Val Gly
 500 505 510
 Arg Val Phe Ala Phe Arg Arg Glu Tyr Lys Gly Asn Ser Ile Val Val
 515 520 525
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<211> 1575

<212> DNA

<213> Thermoanaerobacter tengcongensis MB4

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Leu	Phe	Phe	Ser	Gly	Cys	Ser	Ser	Lys	Gln	Glu	Ala	Lys	Ala	Pro	Lys	
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Ser	Glu	Val	Ile	Tyr	Gln	Val	Met	Val	Asp	Arg	Phe	Tyr	Asn	Gly	Asp	
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Pro	Ser	Asn	Asp	Asp	Pro	Glu	Val	Ser	Lys	Gly	Met	Phe	Asp	Pro	Thr	
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Ser	Pro	Val	Val	Asp	Asn	Ile	Asn	Lys	Pro	Ala	Val	Tyr	Asn	Gly	Glu	
			100					105					110			
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Glu	Glu	His	Phe	Gly	Thr	Trp	Glu	Asp	Phe	Asp	Asn	Phe	Val	Lys	Val	
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Lys	Leu	Phe	His	His	Asn	Gly	Ser	Ile	Ser	Asn	Trp	Asn	Asn	Leu	Lys	
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Met	Glu	Trp	Val	Lys	Ser	Phe	Ala	Asn	Thr	Ile	Tyr	Ser	Ile	Lys	Lys	
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ttg	ata	aaa	gag	ctg	tca	agg	tta	agg	cag	ctc	act	cca	gcc	cta	cag	1296
Leu	Ile	Lys	Glu	Leu	Ser	Arg	Leu	Arg	Gln	Leu	Thr	Pro	Ala	Leu	Gln	
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Tyr	Gly	Thr	Thr	Thr	Ala	Arg	Tyr	Ile	Ser	Asp	Asp	Val	Tyr	Ile	Tyr	
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gaa	agg	cag	tat	gga	aaa	gat	gtg	ctg	gtt	gcg	ata	aat	aaa	gga		1392
Glu	Arg	Gln	Tyr	Gly	Lys	Asp	Val	Val	Leu	Val	Ala	Ile	Asn	Lys	Gly	
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Tyr	Lys	Asp	Tyr	Leu	Lys	Gly	Leu	Leu	Glu	Gly	Val	Glu	Leu	Lys	Val	
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aca	aaa	ggc	aat	gga	gaa	aac	cta	gtg	caa	ggt	ttg	act	tta	cct	ggg	1536
Thr	Lys	Gly	Asn	Gly	Glu	Asn	Leu	Val	Gln	Gly	Leu	Thr	Leu	Pro	Gly	
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gac	agc	gta	agt	gtg	tgg	aca	aat	gtg	aaa	gcg	aag	taa				1575
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His Thr Asn Trp Arg Met Tyr Trp Gly Gly Asp Leu Lys Gly Leu Thr
65      70      75      80
Glu Lys Ile Pro Tyr Ile Lys Gly Met Gly Val Thr Ala Ile Trp Ile
85      90      95
Ser Pro Val Val Asp Asn Ile Asn Lys Pro Ala Val Tyr Asn Gly Glu
100     105
Ile Asn Ala Pro Tyr His Gly Tyr Trp Ala Arg Asp Phe Lys Arg Val
115     120
Glu Glu His Phe Gly Thr Trp Glu Asp Phe Asp Asn Phe Val Lys Val
130     135     140
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Thr Ser Pro Ala Asp Glu Glu Asn Pro Asp Phe Ala Glu Asn Gly Ala
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Leu Tyr Asp Asp Gly Lys Leu Leu Gly Thr Tyr Ser Asn Asp Ser Leu
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Lys Leu Phe His His Asn Gly Ser Ile Ser Asn Trp Asn Asn Leu Lys
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Glu Leu Gln Asp Lys Asn Leu Phe Asp Leu Ala Asp Leu Asp Gln Ser
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Tyr Glu Asn Pro Tyr Lys Leu Val Ala Phe Ile Asp Asn His Asp Met
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Pro Arg Phe Leu Ser Leu Asn Asn Asp Lys Asp Lys Leu His Glu Ala
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Ile Ala Phe Val Met Thr Thr Arg Gly Ile Pro Val Ile Tyr Tyr Gly
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Thr Glu Gln Tyr Leu His Asn Asp Thr Asn Gly Gly Asn Asp Pro Tyr
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Cys Leu Trp Leu Pro Pro Phe Phe Lys Ser Pro Leu Arg Asp Gly Gly
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Val Ile Ile Asp Phe Val Met Asn His Thr Ser Asp Gln His Pro Trp
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Phe Gln Glu Ser Arg Lys Asn Pro Asp Gly Pro Tyr Gly Asp Tyr Tyr
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Val Asp Thr Glu Ala Ser Asn Trp Thr His Asp Pro Val Arg Gly Gln
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Leu Leu Ala Glu Ala Asn Gln Trp Pro Glu Asp Val Val Asp Tyr Phe
260 265 270
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Pro Val Met Pro Arg Ile Phe Met Ala Val Arg Arg Glu Ser Arg Tyr
290 295 300

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<212> PRT

<213> Streptomyces coelicolor A3(2)

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Phe	Gln	Glu	115 Ser	Arg	Lys	Asn	120 Pro	Asp	Gly	Pro	Tyr	Gly	125 Asp	Tyr	Tyr
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Tyr	Tyr	Trp	His	180 Arg	Phe	Phe	Ser	His	Gln	Pro	Asp	Leu	Asn	Tyr	Glu
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Gln	Trp	Gly	Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met
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Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	Thr	Asp	
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Tyr	Gln	Asp	Glu	Thr	Val	Leu	Cys	Val	Ala	Asn	Leu	Ser	His	Thr	Leu	
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Gln	Ser	Asn	Ser	Ser	Leu	Val	Val	Ala	Asp	Lys	Ala	Val	Phe	Lys	Leu																																	
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 Asp Phe Glu Gln Leu Val Ala Gln Ala His Ala Arg Gly Ile Arg Ile
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 Gln Arg Ala Arg Asn Ala Pro Ala Gly Ser Pro Glu Arg Asp Phe Tyr
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 Val Trp Ser Asp Thr Asp Gln Glu Tyr Glu Gly Thr Arg Ile Ile Phe
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 Cys Asp Thr Glu Lys Ser Asn Trp Thr Trp Asp Pro Val Ala Gly Gln
 165 170 175
 Tyr Phe Trp His Arg Phe Tyr Ser His Gln Pro Asp Leu Asn Phe Asp
 180 185 190
 Asn Pro Ala Val Leu Glu Ser Val Leu Glu Val Met Arg Phe Trp Leu
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 Asp Arg Gly Val Asp Gly Leu Arg Leu Asp Ala Val Pro Tyr Leu Ile
 210 215 220
 Glu Arg Ser Gly Thr Ser Asn Glu Asn Leu Pro Glu Thr His Ala Ile
 225 230 235 240
 Leu Arg Lys Ile Arg Ala Thr Leu Asp Ala Glu Tyr Pro Asp Arg Met
 245 250 255
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 260 265 270
 Gly Gln Asn Ala Asp Glu Cys His Met Ala Phe His Phe Pro Leu Met
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 Pro Arg Met Tyr Met Ala Ile Ala Arg Glu Asp Arg Phe Pro Ile Thr
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 Ile Phe Leu Arg Asn His Asp Glu Leu Thr Leu Glu Met Val Thr Asp
 325 330 335
 Ser Glu Arg Asp Tyr Leu Trp Gln Thr Tyr Ala Ser Asp Arg Arg Ala
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 Arg Ile Asn Leu Gly Ile Arg Arg Arg Leu Ala Pro Leu Leu Glu Arg
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 Asp Arg Arg Arg Ile Glu Leu Met Thr Ser Leu Leu Leu Thr Met Pro
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 Gly Thr Pro Val Leu Tyr Tyr Gly Asp Glu Ile Gly Met Gly Asp Asn
 385 390 395 400
 Ile His Leu Gly Asp Arg Asp Gly Val Arg Thr Pro Met Gln Trp Ser
 405 410 415
 Ile Asp Arg Asn Gly Gly Phe Ser Arg Ala Asp Pro Ala Ala Leu Val
 420 425 430
 Leu Pro Pro Val Met Asp Pro Leu Tyr Gly Phe Gln Ala Val Asn Val

Glu 435	Ala 450	Gln 465	Ile 470	Arg 485	Asp 495	Gln 510	His 525	Ser 540	Leu 555	Leu 570	Thr 585	Trp 600	Thr 615	Arg 630	Arg 645
Val 465	Leu 475	Ser 485	Val 495	Arg 510	Lys 525	Arg 540	Tyr 555	Gln 570	Ala 585	Phe 600	Gly 615	Ala 630	Gly 645	Thr 660	Leu 675
Arg 480	Phe 495	Leu 510	Tyr 525	Pro 540	Gly 555	Asn 570	Arg 585	Met 600	Ala 615	Leu 630	Ala 645	Leu 660	Thr 675	Arg 690	Leu 705
Tyr 495	Gln 510	Asp 525	Glu 540	Thr 555	Val 570	Leu 585	Cys 600	Val 615	Ala 630	Asn 645	Leu 660	Ser 675	His 690	Arg 705	Ala 720
Gln 510	Ala 525	Val 540	Glu 555	Leu 570	Asp 585	Leu 600	Ser 615	Glu 630	Phe 645	Thr 660	Val 675	Ala 690	Gln 705	Gly 720	Ala 735
Asp 525	Ile 540	Ile 555	Gly 570	Gly 585	Gly 600	Ser 615	Phe 630	Pro 645	Pro 660	Ile 675	Gly 690	Arg 705	Thr 720	Pro 735	Ala 750
Leu 545	Leu 555	Thr 570	Val 585	Pro 600	Pro 615	Phe 630	Gly 645	Phe 660	Tyr 675	Ala 690	Phe 705	Gln 720	Thr 735	Arg 750	Ser 765
Glu 560	Gly 575	Thr 590	Leu 605	Pro 620	Asp 635	Trp 645	His 660	Val 675	Pro 690	Ser 705	Ala 720	Pro 735	Val 750	Arg 765	Leu 780
Asp 575	Tyr 590	Arg 605	Thr 620	Leu 635	Val 645	Leu 660	Arg 675	Ser 690	Asp 705	Thr 720	Glu 735	Gly 750	Glu 765	Thr 780	Leu 795
Leu 595	Leu 610	Pro 625	His 640	Leu 655	Ala 670	Thr 685	Leu 700	Glu 715	Gly 730	Ile 745	Leu 760	Pro 775	Leu 790	Leu 805	Ser 820
Leu 610	Ser 625	Ala 640	Arg 655	Arg 670	Trp 685	Phe 700	Ser 715	Ala 730	Lys 745	Asp 760	Leu 775	Thr 790	Ala 805	Gly 820	Ala 835
Val 625	Arg 640	Ile 655	Ser 670	Arg 685	Arg 700	Thr 715	Pro 730	Leu 745	Pro 760	Gly 775	Ala 790	Thr 805	Pro 820	Thr 835	Val 850
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Tyr 690	Leu 705	Thr 720	Asp 735	Ala 750	Phe 765	Ala 780	Leu 795	Lys 810	Pro 825	Met 840	Val 855	Thr 870	Gly 885	Val 900	His 915
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Gln 750	Ser 765	Asn 780	Ser 795	Ser 810	Leu 825	Val 840	Val 855	Asp 870	Lys 885	Ala 900	Ala 915	Ala 930	Gln 945	Gly 960	Asp 975
Leu 770	Arg 785	His 800	Val 815	Ala 830	Thr 845	Gly 860	Ala 875	Pro 890	Glu 905	Thr 920	Ile 935	Glu 950	Ile 965	Leu 980	Asp 995
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 Gly Val Gly Val Asp Ala His Leu Asp Asp Phe Leu Val Glu Phe Arg
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 Ala Ser Ala His Pro Trp Ile Ala Pro Ala Ala Phe Asn Ala Ala Thr
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 Leu Leu Phe Leu Val Glu Lys Ala Cys Tyr Glu Val Arg Tyr Glu Ala
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Pro Arg Ser Phe Leu Asp Ser Asn Gly Asp Gly Val Gly Asp Leu Pro	
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Gly Ile Ile Ala Lys Leu Asp Tyr Ile Ala Gly Leu Gly Val Asp Ala	
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85 90 95	
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Gln Glu Ser Arg Gln Asp Arg Ser Asn Pro Lys Ala Asp Trp Tyr Val	
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Trp Ala Asp Pro Arg Glu Asp Gly Thr Pro Pro Asn Asn Trp Leu Ser	
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Tyr Leu His Asn Phe Leu Val Asp Gln Pro Asp Leu Asn Phe His Asn	
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Asp Ala Gln Leu Arg Asp Asn Pro Ala Lys Pro Ala Asp Lys Arg Val	

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Gly	Arg	Gly	Phe	Ser	Ala	Asp	Asn	Pro	Tyr	Ala	Tyr	Gln	Tyr	His	Tyr
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Phe	Asn	Asn	Thr	Gln	Pro	Glu	Asn	Leu	Ala	Phe	Leu	Glu	Arg	Leu	Arg
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Gly	Leu	Leu	Asp	Leu	Tyr	Pro	Asn	Ala	Val	Ser	Leu	Gly	Glu	Ile	Ser
			260					265					270		
Ser	Glu	Asp	Ser	Leu	Ala	Thr	Thr	Ala	Glu	Tyr	Thr	Ala	Gln	Gly	Arg
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Leu	His	Met	Gly	Tyr	Ser	Phe	Glu	Leu	Leu	Val	Gln	Asp	Tyr	Ser	Ala
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Ala	Tyr	Ile	Arg	Asp	Thr	Val	Ser	Arg	Leu	Glu	Ala	Thr	Met	Leu	Glu
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Gly	Trp	Pro	Cys	Trp	Ala	Ile	Ser	Asn	His	Asp	Val	Val	Arg	Ala	Val
				325					330					335	
Thr	Arg	Trp	Gly	Gly	Ala	His	Ala	Thr	Pro	Ala	Phe	Ala	Arg	Met	Val
			340					345					350		
Val	Ala	Leu	Leu	Cys	Ser	Leu	Arg	Gly	Ser	Ile	Cys	Leu	Tyr	Gln	Gly
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Glu	Glu	Leu	Gly	Leu	Ser	Glu	Ala	Glu	Val	Ala	Phe	Glu	Asp	Leu	Gln
	370					375					380				
Asp	Pro	Tyr	Gly	Ile	Thr	Phe	Trp	Pro	Thr	Phe	Lys	Gly	Arg	Asp	Gly
385					390					395					400
Cys	Arg	Thr	Pro	Met	Pro	Trp	Thr	Asp	Ala	Pro	Ser	Ala	Gly	Phe	Thr
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Ser	Gly	Lys	Pro	Trp	Leu	Pro	Leu	Ala	Ala	Ser	His	Arg	Ala	Ala	Ala
			420					425					430		
Val	Ser	Val	Gln	Gln	Asp	Asp	Ala	His	Ser	Val	Leu	Ser	Ala	Val	Arg
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Asp	Phe	Leu	Ala	Trp	Arg	Lys	Glu	Met	Pro	Ala	Leu	Arg	Glu	Gly	Ser
	450					455					460				
Ile	Ala	Phe	Tyr	Asp	Thr	Ala	Glu	Pro	Val	Leu	Met	Phe	Arg	Arg	Glu
465					470					475					480
His	Ala	Gly	Gln	Val	Val	Leu	Leu	Ala	Phe	Asn	Leu	Ser	Ala	Asp	Pro
				485					490					495	
Ala	Asp	Leu	Ala	Leu	Pro	Ala	Gly	Glu	Trp	Glu	Gln	Val	Asp	Val	Pro
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Gly	Val	Glu	Leu	Gly	Ala	Met	Asp	Gly	Gly	His	Leu	Arg	Leu	Ala	Gly
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His	Ala	Val	Val	Ala	Ala	Val	Gly	Arg	Gly						
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 <213> Xanthomonas axonopodis pv. citri str. 306

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 <222> (1)..(1617)
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ccg cgt agc ttt ccg gat tcc aat ggc gat ggg gtc ggc gat ctg ccg	96
Pro Arg Ser Phe Pro Asp Ser Asn Gly Asp Gly Val Gly Asp Leu Pro	
20 25 30	
ggc atc atc gcc aag ctc gac tac atc gct ggg ctg ggc gtg gat gcc	144
Gly Ile Ile Ala Lys Leu Asp Tyr Ile Ala Gly Leu Gly Val Asp Ala	
35 40 45	
atc tgg atc tcg ccg ttt ttc aag tcg ccg atg gca gat ttc ggc tat	192
Ile Trp Ile Ser Pro Phe Phe Lys Ser Pro Met Ala Asp Phe Gly Tyr	
50 55 60	
gac atc gcg gac tac cgt gcg gtg gat ccg ttg ttc gga acg ctg gac	240
Asp Ile Ala Asp Tyr Arg Ala Val Asp Pro Leu Phe Gly Thr Leu Asp	
65 70 75 80	
gat ttc gac cgt ctg ctc gac agg gcg cat gcg ctt ggc ctg aag gtg	288
Asp Phe Asp Arg Leu Leu Asp Arg Ala His Ala Leu Gly Leu Lys Val	
85 90 95	
atg atc gat cag gtg ttg agc cac acc tcg atc gaa cat gcg tgg ttc	336
Met Ile Asp Gln Val Leu Ser His Thr Ser Ile Glu His Ala Trp Phe	
100 105 110	
cag gaa agc cgg cag gac cgg acc aat gcg aag gcg gat tgg tat gtg	384
Gln Glu Ser Arg Gln Asp Arg Thr Asn Ala Lys Ala Asp Trp Tyr Val	
115 120 125	
tgg gcc gat ccg cgc gag gac gga acg ccg ccc aac aac tgg ttg tcg	432
Trp Ala Asp Pro Arg Glu Asp Gly Thr Pro Pro Asn Asn Trp Leu Ser	
130 135 140	
ctg ttc ggt ggt gtg gcg tgg cag tgg gag ccg ccg cgc gag cag tac	480
Leu Phe Gly Gly Val Ala Trp Gln Trp Glu Pro Arg Arg Glu Gln Tyr	
145 150 155 160	
tac ctg cat aac ttc ctg gtc gat cag ccg gac ctc aat ttc cat aat	528
Tyr Leu His Asn Phe Leu Val Asp Gln Pro Asp Leu Asn Phe His Asn	
165 170 175	
gcg gag gtg cag cag gca acc ctg gac aat gtg ccg ttc tgg ttg gat	576
Ala Glu Val Gln Gln Ala Thr Leu Asp Asn Val Arg Phe Trp Leu Asp	
180 185 190	
cgt gga gta gat ggc ttt cgc ctg gac gcg atc aac ttc ttc cat	624
Arg Gly Val Asp Gly Phe Arg Leu Asp Ala Ile Asn Phe Cys Phe His	
195 200 205	
gac gcg cag ctg cgc gat aac ccg gcc aag ccg gcc gac aag ccg gtg	672
Asp Ala Gln Leu Arg Asp Asn Pro Ala Lys Pro Ala Asp Lys Arg Val	
210 215 220	
ggg cgt ggc ttt agc gcg gac aat ccg tac gcc tat cag tac cac tac	720
Gly Arg Gly Phe Ser Ala Asp Asn Pro Tyr Ala Tyr Gln Tyr His Tyr	
225 230 235 240	
ttc aac aac acg cag ccg gag aac ctg gcg ttc ctg gag cgc ctg cgt	768
Phe Asn Asn Thr Gln Pro Glu Asn Leu Ala Phe Leu Glu Arg Leu Arg	
245 250 255	
gcg ctg ctc gat cgc tat ccg gat gcg gta agc ctg ggc gaa atc tct	816
Ala Leu Leu Asp Arg Tyr Pro Asp Ala Val Ser Leu Gly Glu Ile Ser	
260 265 270	
tcg gaa gac tcg ctg gcg acc acg gcc gaa tac acc gcc aag ggc cgc	864
Ser Glu Asp Ser Leu Ala Thr Thr Ala Glu Tyr Thr Ala Lys Gly Arg	
275 280 285	
ttg cac atg ggc tac agc ttc gag ctg ttg gtg cag gat tac agc gcg	912
Leu His Met Gly Tyr Ser Phe Glu Leu Leu Val Gln Asp Tyr Ser Ala	
290 295 300	
gcg tac atc cgc gga acg gtc agc agg ctc gag gcc acc atg ttg gaa	960
Ala Tyr Ile Arg Gly Thr Val Ser Arg Leu Glu Ala Thr Met Leu Glu	

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Thr	Arg	Trp	Gly	Gly	Glu	Asp	Ala	Ser	Pro	Ala	Phe	Ala	Arg	Met	Val				
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Val	Ala	Leu	Leu	Cys	Ser	Leu	Arg	Gly	Ser	Val	Cys	Leu	Tyr	Gln	Gly				
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Glu	Glu	Leu	Gly	Leu	Gly	Glu	Ala	Asp	Val	Ala	Phe	Glu	Asp	Leu	Arg				
gat	ccg	tac	ggc	atc	acg	ttc	tgg	ccg	acc	ttc	aag	ggc	cg	gat	gga			1200	
Asp	Pro	Tyr	Gly	Ile	Thr	Phe	Trp	Pro	Thr	Phe	Lys	Gly	Arg	Asp	Gly				
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Cys	Arg	Thr	Pro	Met	Pro	Trp	Thr	Asp	Ala	Pro	Ser	Ala	Gly	Phe	Thr				
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Ser	Gly	Lys	Pro	Trp	Leu	Pro	Leu	Ser	Glu	Pro	His	Arg	Leu	Ala	Ala				
			420					425					430						
gtg	agt	gtg	cag	cag	gac	gat	gcc	cag	tct	gtg	ctg	cg	gca	gtg	cgg			1344	
Val	Ser	Val	Gln	Gln	Asp	Asp	Ala	Gln	Ser	Val	Leu	Arg	Ala	Val	Arg				
		435					440					445							
gca	ttt	ctg	agt	tgg	cg	agg	agc	atg	ccg	gcc	ctg	ctc	gaa	ggg	gcg			1392	
Ala	Phe	Leu	Ser	Trp	Arg	Arg	Ser	Met	Pro	Ala	Leu	Leu	Glu	Gly	Ala				
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atc	gcg	ttc	tac	gac	atc	gca	gag	ccg	gtg	ctg	atg	ttc	cg	cgt	gag			1440	
Ile	Ala	Phe	Tyr	Asp	Ile	Ala	Glu	Pro	Val	Leu	Met	Phe	Arg	Arg	Glu				
465					470					475					480				
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His	Ala	Gly	Gln	Val	Met	Leu	Leu	Ala	Phe	Asn	Leu	Ser	Ala	Asp	Ile				
			485					490					495						
acc	gag	ctg	gca	ctg	cct	gcg	ggg	gca	tgg	cg	cag	atc	gat	gtg	ccg			1536	
Thr	Glu	Leu	Ala	Leu	Pro	Ala	Gly	Ala	Trp	Arg	Gln	Ile	Asp	Val	Pro				
			500					505					510						
ggg	gtg	gag	cgt	ggc	gtg	atc	gag	cat	ggc	cg	gtg	cg	ttg	ccg	ggg			1584	
Gly	Val	Glu	Arg	Gly	Val	Ile	Glu	His	Gly	Arg	Val	Arg	Leu	Pro	Gly				
		515					520					525							
cat	gct	gtg	gtt	tgc	gca	atg	ggc	ggg	cag	tga								1617	
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<211> 538

<212> PRT

<213> Xanthomonas axonopodis pv. citri str. 306

<400> 78

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Gly Ile Ile Ala Lys Leu Asp Tyr Ile Ala Gly Leu Gly Val Asp Ala
35 40 45
Ile Trp Ile Ser Pro Phe Phe Lys Ser Pro Met Ala Asp Phe Gly Tyr
50 55 60
Asp Ile Ala Asp Tyr Arg Ala Val Asp Pro Leu Phe Gly Thr Leu Asp
65 70 75 80
Asp Phe Asp Arg Leu Leu Asp Arg Ala His Ala Leu Gly Leu Lys Val
85 90 95
Met Ile Asp Gln Val Leu Ser His Thr Ser Ile Glu His Ala Trp Phe
100 105 110
Gln Glu Ser Arg Gln Asp Arg Thr Asn Ala Lys Ala Asp Trp Tyr Val
115 120 125
Trp Ala Asp Pro Arg Glu Asp Gly Thr Pro Pro Asn Asn Trp Leu Ser
130 135 140
Leu Phe Gly Gly Val Ala Trp Gln Trp Glu Pro Arg Arg Glu Gln Tyr

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145      150      155      160
Tyr Leu His Asn Phe Leu Val Asp Gln Pro Asp Leu Asn Phe His Asn
165
Ala Glu Val Gln Gln Ala Thr Leu Asp Asn Val Arg Phe Trp Leu Asp
180
Arg Gly Val Asp Gly Phe Arg Leu Asp Ala Ile Asn Phe Cys Phe His
195
Asp Ala Gln Leu Arg Asp Asn Pro Ala Lys Pro Ala Asp Lys Arg Val
210
Gly Arg Gly Phe Ser Ala Asp Asn Pro Tyr Ala Tyr Gln Tyr His Tyr
225
Phe Asn Asn Thr Gln Pro Glu Asn Leu Ala Phe Leu Glu Arg Leu Arg
245
Ala Leu Leu Asp Arg Tyr Pro Asp Ala Val Ser Leu Gly Glu Ile Ser
260
Ser Glu Asp Ser Leu Ala Thr Thr Ala Glu Tyr Thr Ala Lys Gly Arg
275
Leu His Met Gly Tyr Ser Phe Glu Leu Leu Val Gln Asp Tyr Ser Ala
290
Ala Tyr Ile Arg Gly Thr Val Ser Arg Leu Glu Ala Thr Met Leu Glu
305
Gly Trp Pro Cys Trp Ala Ile Ser Asn His Asp Val Val Arg Ala Val
325
Thr Arg Trp Gly Glu Asp Ala Ser Pro Ala Phe Ala Arg Met Val
340
Val Ala Leu Leu Cys Ser Leu Arg Gly Ser Val Cys Leu Tyr Gln Gly
355
Glu Glu Leu Gly Leu Gly Glu Ala Asp Val Ala Phe Glu Asp Leu Arg
370
Asp Pro Tyr Gly Ile Thr Phe Trp Pro Thr Phe Lys Gly Arg Asp Gly
385
Cys Arg Thr Pro Met Pro Trp Thr Asp Ala Pro Ser Ala Gly Phe Thr
405
Ser Gly Lys Pro Trp Leu Pro Leu Ser Glu Pro His Arg Leu Ala Ala
420
Val Ser Val Gln Gln Asp Asp Ala Gln Ser Val Leu Arg Ala Val Arg
435
Ala Phe Leu Ser Trp Arg Arg Ser Met Pro Ala Leu Leu Glu Gly Ala
450
Ile Ala Phe Tyr Asp Ile Ala Glu Pro Val Leu Met Phe Arg Arg Glu
465
His Ala Gly Gln Val Met Leu Leu Ala Phe Asn Leu Ser Ala Asp Ile
485
Thr Glu Leu Ala Leu Pro Ala Gly Ala Trp Arg Gln Ile Asp Val Pro
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Gly Val Glu Arg Gly Val Ile Glu His Gly Arg Val Arg Leu Pro Gly
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His Ala Val Val Cys Ala Met Gly Gly Gln
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535

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<210> 79

<211> 3327

<212> DNA

<213> Chlorobium tepidum TLS

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<221> CDS

<222> (1)..(3327)

<223> transl_table=11

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tac aag gat gcc att att tat gaa cta cat gtc aaa acc ttc tgt gac      96
Tyr Lys Asp Ala Ile Ile Tyr Glu Leu His Val Lys Thr Phe Cys Asp
20      25      30
agc gat aac gat ggc atc ggt gat ttt cgc ggc ctg aag agc cgc ctc      144
Ser Asp Asn Asp Gly Ile Gly Asp Phe Arg Gly Leu Lys Ser Arg Leu

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Gly	Tyr	Leu	Glu	Ser	Leu	Gly	Val	Thr	Ala	Ile	Trp	Ile	Leu	Pro	Phe	
	50					55					60					
tac	ccc	tcg	cca	ctg	cgc	gac	gac	ggc	tac	gac	atc	gcc	gat	tac	aag	240
Tyr	Pro	Ser	Pro	Leu	Arg	Asp	Asp	Gly	Tyr	Asp	Ile	Ala	Asp	Tyr	Lys	
65					70					75					80	
tcg	gtc	aat	ccc	gac	tac	ggc	acg	atc	gag	gat	ttc	cgc	gac	ttc	ctc	288
Ser	Val	Asn	Pro	Asp	Tyr	Gly	Thr	Ile	Glu	Asp	Phe	Arg	Asp	Phe	Leu	
				85					90					95		
gaa	gag	gcg	cat	cgg	cgc	ggc	atc	aag	gtg	att	acc	gag	ctg	gtg	gtg	336
Glu	Glu	Ala	His	Arg	Arg	Gly	Ile	Lys	Val	Ile	Thr	Glu	Leu	Val	Val	
			100					105					110			
aac	cac	acc	tcc	gac	cag	cac	gag	tgg	ttc	aaa	aaa	gcc	cgc	aag	gct	384
Asn	His	Thr	Ser	Asp	Gln	His	Glu	Trp	Phe	Lys	Lys	Ala	Arg	Lys	Ala	
		115					120					125				
ccg	aaa	ggg	tcg	ccg	gag	cgc	gac	ttt	tac	gtc	tgg	agc	gac	gac	ccg	432
Pro	Lys	Gly	Ser	Pro	Glu	Arg	Asp	Phe	Tyr	Val	Trp	Ser	Asp	Asp	Pro	
	130					135					140					
acg	aag	tat	ggc	gag	gcg	cgc	att	att	ttc	cag	gac	ttc	gag	gct	tcg	480
Thr	Lys	Tyr	Gly	Glu	Ala	Arg	Ile	Ile	Phe	Gln	Asp	Phe	Glu	Ala	Ser	
145				150					155						160	
aac	tgg	acc	tgg	gat	ccc	gtg	gct	ggc	cag	tac	tac	tgg	cac	cgc	ttt	528
Asn	Trp	Thr	Trp	Asp	Pro	Val	Ala	Gly	Gln	Tyr	Tyr	Trp	His	Arg	Phe	
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Phe	His	His	Gln	Pro	Asp	Leu	Asn	Phe	Glu	Asn	Pro	Ala	Val	His	Gln	
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gcg	ctg	ttc	gac	gtg	ctc	gat	ttc	tgg	ctc	ggc	atg	gga	gtg	gat	ggc	624
Ala	Leu	Phe	Asp	Val	Leu	Asp	Phe	Trp	Leu	Gly	Met	Gly	Val	Asp	Gly	
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ctg	cgg	ctt	gat	gcc	gta	ccc	tac	ctc	tac	gag	gct	gaa	ggc	acc	aac	672
Leu	Arg	Leu	Asp	Ala	Val	Pro	Tyr	Leu	Tyr	Glu	Ala	Glu	Gly	Thr	Asn	
	210					215				220						
tgt	gag	aac	ctg	ccg	cag	acc	ttc	gag	ttc	ctg	cgc	aag	ctg	cgc	tct	720
Cys	Glu	Asn	Leu	Pro	Gln	Thr	Phe	Glu	Phe	Leu	Arg	Lys	Leu	Arg	Ser	
225					230					235					240	
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Tyr	Val	Asp	Glu	His	Tyr	Pro	Asn	Arg	Met	Leu	Leu	Ala	Glu	Ala	Asn	
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cag	tgg	ccg	gag	gac	tcc	gcc	gcc	tat	ctt	ggc	aag	ggg	gac	atg	tgc	816
Gln	Trp	Pro	Glu	Asp	Ser	Ala	Ala	Tyr	Leu	Gly	Lys	Gly	Asp	Met	Cys	
			260					265				270				
cac	atg	aac	ttc	cat	ttc	ccg	ctc	atg	ccg	cgc	atg	tat	atg	gcg	ctg	864
His	Met	Asn	Phe	His	Phe	Pro	Leu	Met	Pro	Arg	Met	Tyr	Met	Ala	Leu	
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Ala	Thr	Glu	Asp	Arg	Phe	Pro	Ile	Ile	Asp	Ile	Leu	Ala	Gln	Thr	Pro	
	290					295					300					
gaa	att	ccg	gag	agc	tgc	cag	tgg	gcg	tcg	ttc	ctg	cgc	aac	cac	gac	960
Glu	Ile	Pro	Glu	Ser	Cys	Gln	Trp	Ala	Ser	Phe	Leu	Arg	Asn	His	Asp	
305					310					315					320	
gag	ctg	acg	ctt	gaa	atg	gtg	acc	gac	gag	gag	cgc	gac	tac	atg	cgc	1008
Glu	Leu	Thr	Leu	Glu	Met	Val	Thr	Asp	Glu	Glu	Arg	Asp	Tyr	Met	Arg	
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cgc	gtt	tat	gcc	cac	gat	gtc	aag	gcg	cgc	atc	aac	ctc	ggc	atc	cgc	1056
Arg	Val	Tyr	Ala	His	Asp	Val	Lys	Ala	Arg	Ile	Asn	Leu	Gly	Ile	Arg	
			340					345				350				
cgc	cgc	ctc	gcg	ccg	ctc	atg	tcg	aac	gac	cgc	cgc	cgc	atc	gag	ctg	1104
Arg	Arg	Leu	Ala	Pro	Leu	Met	Ser	Asn	Asp	Arg	Arg	Arg	Ile	Glu	Leu	
		355				360						365				
atg	aac	atc	atg	ctg	ctc	tcc	ctg	ccc	ggt	act	ccg	gtg	ctc	tat	tac	1152
Met	Asn	Ile	Met	Leu	Leu	Ser	Leu	Pro	Gly	Thr	Pro	Val	Leu	Tyr	Tyr	
	370					375					380					
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Gly	Asp	Glu	Ile	Gly	Met	Gly	Asp	Asn	Tyr	Tyr	Leu	Gly	Asp	Arg	Asp	
385					390				395						400	
ggc	gtg	cgc	acc	ccg	atg	cag	tgg	aac	gcc	gac	cgc	aac	gcg	ggc	ttt	1248
Gly	Val	Arg	Thr	Pro	Met	Gln	Trp	Asn	Ala	Asp	Arg	Asn	Ala	Gly	Phe	

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Ser	Arg	Ala	Asn	ccg	Gln	Arg	Leu	Leu	ctg	Pro	Val	Ile	Ile	gac	Pro	
			420	Pro				425	Leu				430	Asp		
gag	tac	cac	tat	gaa	gcg	gtt	aac	gtc	gag	gtg	cag	gag	tcc	aat	ccc	1344
Glu	Tyr	His	Tyr	Glu	Ala	Val	Asn	Val	Glu	Val	Gln	Glu	Ser	Asn	Pro	
		435					440					445				
aac	tcg	ctg	ctc	tgg	tgg	atg	cgc	cac	acc	atc	gcc	acg	gcc	cgc	cgc	1392
Asn	Ser	Leu	Leu	Trp	Trp	Met	Arg	His	Thr	Ile	Ala	Thr	Ala	Arg	Arg	
	450					455					460					
ttc	cga	gcg	ttc	agc	cgc	ggc	acc	atc	gag	ttc	ctc	aac	gcc	aac	aac	1440
Phe	Arg	Ala	Phe	Ser	Arg	Gly	Thr	Ile	Glu	Phe	Leu	Asn	Ala	Asn	Asn	
465					470					475				480		
ccc	aag	gtg	ctg	atg	ttt	atc	cgc	tcg	tac	gaa	gat	gaa	acc	atc	ctc	1488
Pro	Lys	Val	Leu	Met	Phe	Ile	Arg	Ser	Tyr	Glu	Asp	Glu	Thr	Ile	Leu	
			485					490						495		
acc	gtg	atc	aac	ctg	tcc	cgc	aac	gca	cag	gtg	atc	aac	gtc	gat	ctt	1536
Thr	Val	Ile	Asn	Leu	Ser	Arg	Asn	Ala	Gln	Val	Ile	Asn	Val	Asp	Leu	
			500					505					510			
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Ser	Ala	Tyr	Glu	Gly	Cys	Val	Pro	Glu	Glu	Ile	Phe	Ser	Met	Asn	Arg	
	515						520				525					
ttc	ccg	aga	gtg	cac	aaa	aca	cca	tat	atg	gtc	gcg	ctc	gga	cca	tac	1632
Phe	Pro	Arg	Val	His	Lys	Thr	Pro	Tyr	Met	Val	Ala	Leu	Gly	Pro	Tyr	
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Ser	Arg	Leu	Leu	Asp	Leu	Ile	Leu	His	Arg	Glu	Thr	Trp	Ser	Gly	Ala	
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	Arg	Pro	Glu	Asp	Arg	Lys	Ala	Leu	Glu	Pro	Trp	Ala	Glu	Leu	Trp	Ser			
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 Gly Tyr Leu Glu Ser Leu Gly Val Thr Ala Ile Trp Ile Leu Pro Phe
 50 55 60
 Tyr Pro Ser Pro Leu Arg Asp Asp Gly Tyr Asp Ile Ala Asp Tyr Lys
 65 70 75 80
 Ser Val Asn Pro Asp Tyr Gly Thr Ile Glu Asp Phe Arg Asp Phe Leu
 85 90 95
 Glu Glu Ala His Arg Arg Gly Ile Lys Val Ile Thr Glu Leu Val Val
 100 105 110
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 115 120 125
 Pro Lys Gly Ser Pro Glu Arg Asp Phe Tyr Val Trp Ser Asp Asp Pro
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 Thr Lys Tyr Gly Glu Ala Arg Ile Ile Phe Gln Asp Phe Glu Ala Ser
 145 150 155 160
 Asn Trp Thr Trp Asp Pro Val Ala Gly Gln Tyr Tyr Trp His Arg Phe
 165 170 175
 Phe His His Gln Pro Asp Leu Asn Phe Glu Asn Pro Ala Val His Gln
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 Ala Leu Phe Asp Val Leu Asp Phe Trp Leu Gly Met Gly Val Asp Gly
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 Cys Glu Asn Leu Pro Gln Thr Phe Glu Phe Leu Arg Lys Leu Arg Ser
 225 230 235 240
 Tyr Val Asp Glu His Tyr Pro Asn Arg Met Leu Leu Ala Glu Ala Asn
 245 250 255
 Gln Trp Pro Glu Asp Ser Ala Ala Tyr Leu Gly Lys Gly Asp Met Cys
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 His Met Asn Phe His Phe Pro Leu Met Pro Arg Met Tyr Met Ala Leu
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 Ala Thr Glu Asp Arg Phe Pro Ile Ile Asp Ile Leu Ala Gln Thr Pro
 290 295 300
 Glu Ile Pro Glu Ser Cys Gln Trp Ala Ser Phe Leu Arg Asn His Asp
 305 310 315 320
 Glu Leu Thr Leu Glu Met Val Thr Asp Glu Glu Arg Asp Tyr Met Arg
 325 330 335
 Arg Val Tyr Ala His Asp Val Lys Ala Arg Ile Asn Leu Gly Ile Arg
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 Met Asn Ile Met Leu Leu Ser Leu Pro Gly Thr Pro Val Leu Tyr Tyr
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 385 390 395 400
 Gly Val Arg Thr Pro Met Gln Trp Asn Ala Asp Arg Asn Ala Gly Phe
 405 410 415
 Ser Arg Ala Asn Pro Gln Arg Leu Leu Leu Pro Val Ile Ile Asp Pro
 420 425 430
 Glu Tyr His Tyr Glu Ala Val Asn Val Glu Val Gln Glu Ser Asn Pro
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 Pro Lys Val Leu Met Phe Ile Arg Ser Tyr Glu Asp Glu Thr Ile Leu
 485 490 495
 Thr Val Ile Asn Leu Ser Arg Asn Ala Gln Val Ile Asn Val Asp Leu
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 Ser Ala Tyr Glu Gly Cys Val Pro Glu Glu Ile Phe Ser Met Asn Arg
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 Phe Pro Arg Val His Lys Thr Pro Tyr Met Val Ala Leu Gly Pro Tyr

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	Thr	Ala	Phe	Ala	Met	Thr	Glu	Val	Asn	Tyr	Pro	Ser	Gly	Glu	Asn	Glu
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	Gly	Leu	Glu	Gly	Phe	Leu	Ile	Asp	Ala	Ser	Ala	Asp	Glu	Thr	Phe	Arg
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	Leu	Tyr	Arg	Lys	Ile	Asp	Ser	Gly	Met	Ala	Pro	Glu	Ile	Glu	Ile	Ser
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	Gly	Ser	Val	Asp	Thr	Asp	Ala	Ala	Phe	Ser	Pro	Glu	Pro	Phe	Thr	Thr
	Leu	Tyr	Gln	Arg	Ser	Ile	Tyr	Gln	Ala	Met	Thr	Asp	Gln	Val	Lys	Arg
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 Tyr Asp Val Ala Asp Tyr Cys Ala Ile Asp Pro Ala Tyr Gly Thr Leu
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 Asp Asp Phe Lys Arg Leu Val Ala Gly Ala His Gln Arg Gly Ile Arg
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 Tyr Thr Asp Gly Pro Arg Ile His Glu Phe Leu Gln Glu Leu Ser Arg
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 Asp Val Phe Gln Pro Arg Arg Leu Met Thr Val Gly Glu Met Ser Ser
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acc	ccc	atg	caa	tgg	gat	agc	agc	gat	aat	gcg	ggg	ttc	agc	caa	ggc	
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act	ccc	tgg	att	gcc	cct	tgc	agc	aat	tat	cat	gag	att	aac	gtt	aat	
Thr	Pro	Trp	Ile	Ala	Pro	Cys	Ser	Asn	Tyr	His	Glu	Ile	Asn	Val	Asn	1344
gcc	gca	ttg	gcc	gac	gct	gac	tcg	gtg	ttt	tat	gcc	tat	caa	tac	ctg	
Ala	Ala	Leu	Ala	Asp	Ala	Asp	Ser	Val	Phe	Tyr	Ala	Tyr	Gln	Tyr	Leu	1392
ata	gcc	ctg	cgt	aaa	caa	tac	gat	att	ttc	act	ttc	ggg	gat	tat	cag	
Ile	Ala	Leu	Arg	Lys	Gln	Tyr	Asp	Ile	Phe	Thr	Phe	Gly	Asp	Tyr	Gln	1440
gat	ctt	tgc	cca	cag	cac	cct	gat	tta	tgg	tgc	tat	ttg	cgc	agt	tgg	
Asp	Leu	Cys	Pro	Gln	His	Pro	Asp	Leu	Trp	Cys	Tyr	Leu	Arg	Ser	Trp	1488
caa	ggg	aag	caa	ctg	ttg	gta	gtc	gct	aac	ctg	agt	gaa	gag	ccc	cag	
Gln	Gly	Lys	Gln	Leu	Leu	Val	Val	Ala	Asn	Leu	Ser	Glu	Glu	Pro	Gln	1536
cga	tgg	caa	ccc	gag	ggc	ctc	acg	ctg	gac	ggg	aat	tgg	caa	tta	ttg	
Arg	Trp	Gln	Pro	Glu	Gly	Leu	Thr	Leu	Asp	Gly	Asn	Trp	Gln	Leu	Leu	1584
atg	agc	agc	tac	gac	caa	agc	gcc	ttc	caa	ccg	caa	gat	atg	ata	tta	
Met	Ser	Ser	Tyr	Asp	Gln	Ser	Ala	Phe	Gln	Pro	Gln	Asp	Met	Ile	Leu	1632
cgc	gga	tat	gag	ggg	att	tat	tgg	gta	tgt	gag	taa					1668
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<210> 82

<211> 555

<212> PRT

<213> Yersinia pestis KIM

<400> 82

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			20					25					30			
Ala	Gly	Val	Ala	Gln	Arg	Leu	Asp	Tyr	Leu	Gln	Lys	Leu	Gly	Val	Asp	
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Ala	Ile	Trp	Leu	Thr	Pro	Val	Tyr	Val	Ser	Pro	Gln	Val	Asp	Asn	Gly	
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Tyr	Asp	Val	Ala	Asp	Tyr	Cys	Ala	Ile	Asp	Pro	Ala	Tyr	Gly	Thr	Leu	
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Ile	Ile	Met	Asp	Met	Val	Phe	Asn	His	Thr	Ser	Thr	Glu	His	Ala	Trp
Phe	Lys	Ala	Ser	Gln	Asp	Arg	Asn	Ser	Pro	Tyr	Arg	Gln	Phe	Tyr	Ile
Trp	Arg	Asp	Gly	Asp	Gly	Gly	Asp	Gly	Ser	Leu	Pro	Asn	Asn	Trp	Arg
Ser	Lys	Phe	Gly	Gly	His	Ala	Trp	Gln	Trp	His	Ala	Ala	Ser	Gly	Gln
Tyr	Tyr	Leu	His	Leu	Phe	Ala	Pro	Glu	Gln	Ala	Asp	Leu	Asn	Trp	Glu
His	Gln	Pro	Val	Arg	Asp	Glu	Leu	Lys	Lys	Val	Cys	Glu	Phe	Trp	Ala
Asp	Leu	Gly	Val	Asp	Gly	Leu	Arg	Leu	Asp	Val	Ile	Asn	Leu	Val	Ser
Lys	Gln	Gln	Asp	Phe	Pro	Asn	Asp	Leu	Asp	Gly	Asp	Gly	Arg	Arg	Phe
Tyr	Thr	Asp	Gly	Pro	Arg	Ile	His	Glu	Phe	Leu	Gln	Glu	Leu	Ser	Arg
Asp	Val	Phe	Gln	Pro	Arg	Arg	Leu	Met	Thr	Val	Gly	Glu	Met	Ser	Ser
Thr	Arg	Leu	Glu	His	Cys	Gln	Arg	Tyr	Ala	Ala	Leu	Gly	Gly	Asp	Glu
Leu	Ser	Met	Thr	Phe	Asn	Phe	His	His	Leu	Lys	Val	Asp	Tyr	Leu	Asn
Gly	Glu	Lys	Trp	Ser	Leu	Met	Pro	Pro	Asn	Arg	Val	Glu	Leu	Lys	His
Ile	Phe	Asn	Gln	Trp	Gln	Gln	Gly	Met	His	Asn	Arg	Ala	Trp	Asn	Ala
Leu	Phe	Trp	Cys	Asn	His	Asp	Gln	Pro	Arg	Ile	Val	Ser	Arg	Phe	Gly
His	Glu	Gly	Ala	Leu	Arg	Leu	Pro	Ala	Ala	Lys	Met	Leu	Ala	Met	Val
Leu	His	Gly	Met	Gln	Gly	Thr	Pro	Tyr	Ile	Tyr	Gln	Gly	Glu	Glu	Ile
Gly	Met	Thr	Asn	Pro	Asn	Phe	Thr	Asp	Ile	Thr	Gln	Tyr	Arg	Asp	Val
Glu	Ser	Leu	Asn	Met	Phe	Ala	Glu	Leu	Ser	Val	Ala	Gly	Arg	Glu	Pro
Asp	Glu	Leu	Leu	Ala	Ile	Leu	Ala	Ala	Lys	Ser	Arg	Asp	Asn	Ser	Arg
Thr	Pro	Met	Gln	Trp	Asp	Ser	Ser	Asp	Asn	Ala	Gly	Phe	Ser	Gln	Gly
Thr	Pro	Trp	Ile	Ala	Pro	Cys	Ser	Asn	Tyr	His	Glu	Ile	Asn	Val	Asn
Ala	Ala	Leu	Ala	Asp	Ala	Asp	Ser	Val	Phe	Tyr	Ala	Tyr	Gln	Tyr	Leu
Ile	Ala	Leu	Arg	Lys	Gln	Tyr	Asp	Ile	Phe	Thr	Phe	Gly	Asp	Tyr	Gln
Asp	Leu	Cys	Pro	Gln	His	Pro	Asp	Leu	Trp	Cys	Tyr	Leu	Arg	Ser	Trp
Gln	Gly	Lys	Gln	Leu	Leu	Val	Val	Ala	Asn	Leu	Ser	Glu	Glu	Pro	Gln
Arg	Trp	Gln	Pro	Glu	Gly	Leu	Thr	Leu	Asp	Gly	Asn	Trp	Gln	Leu	Leu
Met	Ser	Ser	Tyr	Asp	Gln	Ser	Ala	Phe	Gln	Pro	Gln	Asp	Met	Ile	Leu
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<210> 83

<211> 1830

<212> DNA

<213> Yersinia pestis KIM

<220>

<221> CDS

<222> (1)..(1830)

<223> transl_table=11

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gac	gac	gca	tta	cat	atc	acg	ctc	tgg	ttg	caa	ggt	gat	agt	tta	cct	96
Asp	Asp	Ala	Leu	His	Ile	Thr	Leu	Trp	Leu	Gln	Gly	Asp	Ser	Leu	Pro	
			20					25					30			
gcg	caa	gtc	ttt	ctg	cgt	tgt	gag	cca	gat	aat	gaa	gag	tgg	ctg	ctc	144
Ala	Gln	Val	Phe	Leu	Arg	Cys	Glu	Pro	Asp	Asn	Glu	Glu	Trp	Leu	Leu	
		35					40				45					
act	atg	gag	ggg	cat	gag	agc	cat	gat	cgt	tgg	cgc	tat	agc	ggt	tct	192
Thr	Met	Glu	Gly	His	Glu	Ser	His	Asp	Arg	Trp	Arg	Tyr	Ser	Val	Ser	
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Leu	Pro	Leu	Tyr	Glu	Gly	Gln	Pro	Thr	Arg	Arg	Tyr	Cys	Phe	Lys	Leu	
65				70					75						80	
tta	tgg	gat	gac	cgc	caa	cag	tgg	ttt	ggc	ccg	ttg	ggg	ttc	tcg	gtg	288
Leu	Trp	Asp	Asp	Arg	Gln	Gln	Trp	Phe	Gly	Pro	Leu	Gly	Phe	Ser	Val	
				85					90					95		
att	cct	cca	gca	cag	ttg	gca	cag	ttt	gct	gta	gat	gta	ccc	gat	agc	336
Ile	Pro	Pro	Ala	Gln	Leu	Ala	Gln	Phe	Ala	Val	Asp	Val	Pro	Asp	Ser	
			100					105					110			
ggg	cct	gat	tgg	gtc	gcg	gac	caa	ggt	ttt	tat	cag	atc	ttc	ccc	gat	384
Gly	Pro	Asp	Trp	Val	Ala	Asp	Gln	Val	Phe	Tyr	Gln	Ile	Phe	Pro	Asp	
		115					120					125				
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Arg	Phe	Ala	Ser	Ser	Gln	Ala	Asp	His	Gly	Val	Gln	Glu	Gly	Ser	Tyr	
	130					135				140						
att	cat	cat	gcg	gcc	ggt	tgc	ccg	gta	tct	cgc	cgc	gag	tgg	cag	cag	480
Ile	His	His	Ala	Ala	Gly	Cys	Pro	Val	Ser	Arg	Arg	Glu	Trp	Gln	Gln	
145				150					155						160	
cca	ttg	gat	gat	gtg	cat	gcc	gca	tcg	aca	ttt	tat	ggt	ggc	gat	ctg	528
Pro	Leu	Asp	Asp	Val	His	Ala	Ala	Ser	Thr	Phe	Tyr	Gly	Gly	Asp	Leu	
				165					170					175		
gcc	ggt	att	agt	cag	aaa	atc	cct	tac	ttt	caa	caa	ctg	ggg	ggt	acg	576
Ala	Gly	Ile	Ser	Gln	Lys	Ile	Pro	Tyr	Phe	Gln	Gln	Leu	Gly	Val	Thr	
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gca	ctg	tat	ttg	aac	cct	att	ttt	acc	gct	ccc	agt	gtg	cat	aaa	tat	624
Ala	Leu	Tyr	Leu	Asn	Pro	Ile	Phe	Thr	Ala	Pro	Ser	Val	His	Lys	Tyr	
		195				200					205					
gat	act	gaa	gat	tat	tat	cag	ggt	gat	ccc	tac	ttg	ggg	gga	gag	cgt	672
Asp	Thr	Glu	Asp	Tyr	Tyr	Gln	Val	Asp	Pro	Tyr	Leu	Gly	Gly	Glu	Arg	
	210					215				220						
gat	ttc	ttg	caa	ttg	cga	gcc	gct	acc	cgt	gaa	gta	gga	ata	aag	ttg	720
Asp	Phe	Leu	Gln	Leu	Arg	Ala	Ala	Thr	Arg	Glu	Val	Gly	Ile	Lys	Leu	
225					230					235					240	
gtg	ctc	gat	ggc	gtg	ttt	aac	cac	acg	ggt	gat	tct	cat	cgc	tgg	ttt	768
Val	Leu	Asp	Gly	Val	Phe	Asn	His	Thr	Gly	Asp	Ser	His	Arg	Trp	Phe	
			245						250					255		
gat	cgc	tat	caa	ggg	gaa	aac	ggc	tgc	cat	cac	gaa	gat	tcg			816
Asp	Arg	Tyr	Gln	Gln	Gly	Glu	Asn	Gly	Ala	Cys	His	His	Glu	Asp	Ser	
			260				265				270					
cct	tat	cgt	ggt	tgg	ttt	acg	ttc	ctc	cct	gat	gga	cga	gca	tta	gat	864
Pro	Tyr	Arg	Gly	Trp	Phe	Thr	Phe	Leu	Pro	Asp	Gly	Arg	Ala	Leu	Asp	
		275					280					285				
tgg	aaa	ggt	aat	gcc	agt	ttg	cca	aaa	ctt	aat	ttt	gcc	aat	gaa	gag	912
Trp	Lys	Gly	Asn	Ala	Ser	Leu	Pro	Lys	Leu	Asn	Phe	Ala	Asn	Glu	Glu	
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gtc	gct	gaa	cga	atc	tat	cgc	agt	gat	gac	agc	gtc	gtg	cgt	tat	tgg	960
Val	Ala	Glu	Arg	Ile	Tyr	Arg	Ser	Asp	Asp	Ser	Val	Val	Arg	Tyr	Trp	
305				310						315					320	
tta	cgg	cca	cca	tac	agt	att	gat	ggc	tgg	cgt	ctg	gat	gtc	gta	cac	1008
Leu	Arg	Pro	Pro	Tyr	Ser	Ile	Asp	Gly	Trp	Arg	Leu	Asp	Val	Val	His	
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atg	ctc	ggg	gaa	gat	ggc	ggc	gct	aaa	ggg	aat	ttg	cac	cat	ctg	cac	1056
Met	Leu	Gly	Glu	Asp	Gly	Gly	Ala	Lys	Gly	Asn	Leu	His	His	Leu	His	
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Gly	Ile	Tyr	Gln	Ala	Ala	Lys	Glu	Glu	Asn	Pro	Gln	Ala	Tyr	Ile	Leu	
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ggc	gaa	cat	ttt	ggc	gat	gca	cgt	aat	tgg	ttg	cac	gct	gga	gtg	gaa	1152
Gly	Glu	His	Phe	Gly	Asp	Ala	Arg	Asn	Trp	Leu	His	Ala	Gly	Val	Glu	
	370					375					380					
gac	gcg	gca	atg	aat	tat	atg	ggg	ttt	gct	ttg	ccg	gtc	cgc	agt	ttt	1200
Asp	Ala	Ala	Met	Asn	Tyr	Met	Gly	Phe	Ala	Leu	Pro	Val	Arg	Ser	Phe	
385					390					395					400	
ctc	gcc	gag	cta	gat	gtg	gct	tgc	cat	cct	ata	aaa	ttg	gat	gct	gcg	1248
Leu	Ala	Glu	Leu	Asp	Val	Ala	Cys	His	Pro	Ile	Lys	Leu	Asp	Ala	Ala	
				405					410					415		
gat	tgc	gcc	tac	tgg	atg	gat	gag	tac	cgc	gca	gga	ttg	ccc	cat	agc	1296
Asp	Cys	Ala	Tyr	Trp	Met	Asp	Glu	Tyr	Arg	Ala	Gly	Leu	Pro	His	Ser	
			420					425					430			
cag	caa	ctc	cgt	tta	ttt	aat	caa	tta	gat	agc	cat	gat	act	gcc	cgt	1344
Gln	Gln	Leu	Arg	Leu	Phe	Asn	Gln	Leu	Asp	Ser	His	Asp	Thr	Ala	Arg	
		435					440					445				
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Phe	Leu	Thr	Leu	Leu	Lys	Gly	Asp	Lys	Thr	Arg	Met	Gln	Met	Ala	Leu	
	450					455					460					
ata	tgg	ttg	ttt	agt	tgg	att	ggg	gtg	cct	tgc	cta	ttt	tat	ggg	gat	1440
Ile	Trp	Leu	Phe	Ser	Trp	Ile	Gly	Val	Pro	Cys	Leu	Phe	Tyr	Gly	Asp	
465					470					475					480	
gag	att	ggg	ctg	gat	gga	ggg	aat	gat	ccg	ttc	tgc	cgc	aaa	ccg	ttc	1488
Glu	Ile	Gly	Leu	Asp	Gly	Gly	Asn	Asp	Pro	Phe	Cys	Arg	Lys	Pro	Phe	
				485					490					495		
ccg	tgg	gat	gag	gct	cag	tgg	gat	cat	gac	cta	tta	tca	ctg	tgt	caa	1536
Pro	Trp	Asp	Glu	Ala	Gln	Trp	Asp	His	Asp	Leu	Leu	Ser	Leu	Cys	Gln	
			500					505					510			
cgt	atg	gcg	gct	tta	cgc	cac	aaa	agc	ata	gcg	ttg	cgg	cgc	ggg	ggg	1584
Arg	Met	Ala	Ala	Leu	Arg	His	Lys	Ser	Ile	Ala	Leu	Arg	Arg	Gly	Gly	
		515					520					525				
tgt	cag	gtg	atc	cat	gcc	agt	ggg	gat	tcc	ctg	gtc	ttt	att	cgt	agc	1632
Cys	Gln	Val	Ile	His	Ala	Ser	Gly	Asp	Ser	Leu	Val	Phe	Ile	Arg	Ser	
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tat	caa	act	gag	cgt	gtg	atg	gtg	gcg	ata	caa	cgt	tcc	gat	gat	gcg	1680
Tyr	Gln	Thr	Glu	Arg	Val	Met	Val	Ala	Ile	Gln	Arg	Ser	Asp	Asp	Ala	
545					550					555					560	
gat	att	ttc	ctg	ccc	gcc	tct	cct	tta	ctc	aat	gtg	gct	gag	tgg	cag	1728
Asp	Ile	Phe	Leu	Pro	Ala	Ser	Pro	Leu	Leu	Asn	Val	Ala	Glu	Trp	Gln	
				565					570					575		
cgt	ctg	gaa	ggg	gga	gga	gac	ctg	gct	gtc	agt	gag	act	ggg	gta	aac	1776
Arg	Leu	Glu	Gly	Gly	Gly	Asp	Leu	Ala	Val	Ser	Glu	Thr	Gly	Val	Asn	
			580					585					590			
atg	ggg	ctg	gag	ggg	aag	agt	gtt	acc	ttg	tgg	tgt	ggg	gtt	ggg	gag	1824
Met	Gly	Leu	Glu	Gly	Lys	Ser	Val	Thr	Leu	Trp	Cys	Gly	Val	Gly	Glu	
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Cys																

<210> 84

<211> 609

<212> PRT

<213> Yersinia pestis KIM

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			20					25					30			
Ala	Gln	Val	Phe	Leu	Arg	Cys	Glu	Pro	Asp	Asn	Glu	Glu	Trp	Leu	Leu	
		35					40				45					
Thr	Met	Glu	Gly	His	Glu	Ser	His	Asp	Arg	Trp	Arg	Tyr	Ser	Val	Ser	
	50					55					60					
Leu	Pro	Leu	Tyr	Glu	Gly	Gln	Pro	Thr	Arg	Arg	Tyr	Cys	Phe	Lys	Leu	
65				70					75						80	
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 <212> DNA
 <213> Streptococcus agalactiae 2603V/R

<220>
 <221> CDS
 <222> (1)..(1608)
 <223> transl_table=11

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cgt tca ttt atg gat tca gat ggt gat ggt gtg ggg gac att aaa ggg      96
Arg Ser Phe Met Asp Ser Asp Gly Asp Gly Val Gly Asp Ile Lys Gly
          20          25          30
att act agc aaa cta gac tac ctt gaa aaa tta ggg att act gct atc      144
Ile Thr Ser Lys Leu Asp Tyr Leu Glu Lys Leu Gly Ile Thr Ala Ile
          35          40          45
tgg tta tca cct gtt tat caa agt cca atg gat gac aat ggt tat gat      192
Trp Leu Ser Pro Val Tyr Gln Ser Pro Met Asp Asp Asn Gly Tyr Asp
          50          55          60
att tca gat tat caa gcc att gca gat att ttt ggt gat atg aat gat      240
Ile Ser Asp Tyr Gln Ala Ile Ala Asp Ile Phe Gly Asp Met Asn Asp
          65          70          75
atg gac caa ctg tta caa gag gca aat caa cgc ggg att aaa atc atc      288
Met Asp Gln Leu Leu Gln Glu Ala Asn Gln Arg Gly Ile Lys Ile Ile
          80          85          90
atg gat ttg gta gtg aat cat acc tct gat gaa cat gct tgg ttc gta      336
Met Asp Leu Val Val Asn His Thr Ser Asp Glu His Ala Trp Phe Val
          100          105          110
gaa gcg cga gaa aac cct aat agt cct gaa cgt gat ttt tat att tgg      384
Glu Ala Arg Glu Asn Pro Asn Ser Pro Glu Arg Asp Phe Tyr Ile Trp
          115          120          125
cga gat gaa cct aac gat ttg act tct att ttt agt ggc tca gct tgg      432
Arg Asp Glu Pro Asn Asp Leu Thr Ser Ile Phe Ser Gly Ser Ala Trp
          130          135          140
gaa tat gat aaa gta tca ggt caa tat tat ttg cac ctt ttt agc aaa      480
Glu Tyr Asp Lys Val Ser Gly Gln Tyr Tyr Leu His Leu Phe Ser Lys
          145          150          155
cgt cag cca gat ctc aac tgg gag aat gaa gct tta cgt cat aaa att      528
Arg Gln Pro Asp Leu Asn Trp Glu Asn Glu Ala Leu Arg His Lys Ile
          160          165          170
tat gat atg atg aat ttc tgg att gat aag ggt att ggt ggt ttc cgt      576
Tyr Asp Met Met Asn Phe Trp Ile Asp Lys Gly Ile Gly Gly Phe Arg
          180          185          190
atg gat gtc att gat tta att ggg aaa att cca gat aag ggc att act      624
Met Asp Val Ile Asp Leu Ile Gly Lys Ile Pro Asp Lys Gly Ile Thr
          195          200          205
ggt aat gga cca aaa ctt cat gat tat ctt aaa gaa atg aac aga gct      672
Gly Asn Gly Pro Lys Leu His Asp Tyr Leu Lys Glu Met Asn Arg Ala
          210          215          220
agt ttt gga aag cat gac tta ttg acg gtg ggt gaa act tgg gga gca      720
Ser Phe Gly Lys His Asp Leu Leu Thr Val Gly Glu Thr Trp Gly Ala
          225          230          235
acg cca gac att gca aaa caa tac tca aat ccc gat aat gaa gaa tta      768
Thr Pro Asp Ile Ala Lys Gln Tyr Ser Asn Pro Asp Asn Glu Glu Leu
          240          245          250
tct atg gtc ttt caa ttt gaa cat gta ggt ctt caa cat aaa cct gac      816
Ser Met Val Phe Gln Phe Glu His Val Gly Leu Gln His Lys Pro Asp
          255          260          265
gct cct aag tgg gat tac agt gac gga tta gat gtt cca gca ttg aaa      864
Ala Pro Lys Trp Asp Tyr Ser Asp Gly Leu Asp Val Pro Ala Leu Lys
          270          275          280
gat att ttt aca aaa tgg caa aca caa ttg gag ctt ggc caa ggt tgg      912
Asp Ile Phe Thr Lys Trp Gln Thr Gln Leu Glu Leu Gly Gln Gly Trp
          285          290          295
aat tct tta ttc tgg aat aat cat gac ctt cct cga gtg ctc tcg atc      960
Asn Ser Leu Phe Trp Asn Asn His Asp Leu Pro Arg Val Leu Ser Ile
  
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Trp	Gly	Asn	Asp	Ser	Ser	Asp	Asn	Arg	Lys	Gln	Ser	Ala	Lys	Ala	Lys	Ala	Leu	Ala		
				325						330							335			
atc	cta	cta	cat	ttg	atg	cgt	gga	acg	cct	tat	atc	tat	caa	ggg	gaa	1056				
Ile	Leu	Leu	His	Leu	Met	Arg	Gly	Thr	Pro	Tyr	Ile	Tyr	Gln	Gly	Glu					
			340					345					350							
gaa	att	ggt	atg	act	aat	tat	cca	ttt	gag	tgt	tta	gca	gat	gta	gat	1104				
Glu	Ile	Gly	Met	Thr	Asn	Tyr	Pro	Phe	Glu	Cys	Leu	Ala	Asp	Val	Asp					
		355					360					365								
gat	att	gaa	tcc	ctt	aac	tat	gct	aaa	gaa	gcc	atg	gat	aat	ggg	gta	1152				
Asp	Ile	Glu	Ser	Leu	Asn	Tyr	Ala	Lys	Glu	Ala	Met	Asp	Asn	Gly	Val					
		370				375				380										
tct	gaa	gca	aca	att	tta	gat	agt	att	cgt	aaa	gtc	ggg	cgt	gat	aat	1200				
Ser	Glu	Ala	Thr	Ile	Leu	Asp	Ser	Ile	Arg	Lys	Val	Gly	Arg	Asp	Asn					
385					390					395					400					
gct	cgt	act	cca	atg	cag	tgg	agt	caa	gaa	cat	caa	gct	ggg	ttt	act	1248				
Ala	Arg	Thr	Pro	Met	Gln	Trp	Ser	Gln	Glu	His	Gln	Ala	Gly	Phe	Thr					
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aaa	ggt	acc	cca	tgg	cta	gca	gtc	aat	ccc	aat	tat	cag	gaa	att	aat	1296				
Lys	Gly	Thr	Pro	Trp	Leu	Ala	Val	Asn	Pro	Asn	Tyr	Gln	Glu	Ile	Asn					
			420					425					430							
gtg	gag	gca	gcg	tta	aat	gat	acg	gaa	agt	att	ttt	tat	act	tat	caa	1344				
Val	Glu	Ala	Ala	Leu	Asn	Asp	Thr	Glu	Ser	Ile	Phe	Tyr	Thr	Tyr	Gln					
		435					440					445								
aaa	tta	ggt	gct	tta	cgt	aaa	gaa	cac	gac	tgg	tta	ggt	gat	gct	gat	1392				
Lys	Leu	Val	Ala	Leu	Arg	Lys	Glu	His	Asp	Trp	Leu	Val	Asp	Ala	Asp					
		450				455					460									
ttt	aaa	ctt	ttg	gaa	aca	gca	gat	aag	gta	ttt	gct	tat	ggt	cgt	caa	1440				
Phe	Lys	Leu	Leu	Glu	Thr	Ala	Asp	Lys	Val	Phe	Ala	Tyr	Val	Arg	Gln					
465					470					475					480					
aca	gat	aaa	gaa	cgt	tat	tta	ata	ggt	gcg	aac	tta	tcc	gat	caa	aac	1488				
Thr	Asp	Lys	Glu	Arg	Tyr	Leu	Ile	Val	Ala	Asn	Leu	Ser	Asp	Gln	Asn					
				485				490						495						
caa	tct	ttt	gaa	ttt	cca	gaa	gct	ggt	aaa	gaa	act	att	att	tca	aat	1536				
Gln	Ser	Phe	Glu	Phe	Pro	Glu	Ala	Val	Lys	Glu	Thr	Ile	Ile	Ser	Asn					
			500				505					510								
aca	gag	ggt	caa	gaa	gta	cta	tca	agt	aac	act	ctc	aag	ccg	tgg	gat	1584				
Thr	Glu	Val	Gln	Glu	Val	Leu	Ser	Ser	Asn	Thr	Leu	Lys	Pro	Trp	Asp					
		515					520					525								
gcc	ttc	tgc	ata	gag	cta	ttc	taa									1608				
Ala	Phe	Cys	Ile	Glu	Leu	Phe														
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<210> 86

<211> 535

<212> PRT

<213> Streptococcus agalactiae 2603V/R

<400> 86

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Ile	Thr	Ser	Lys	Leu	Asp	Tyr	Leu	Glu	Lys	Leu	Gly	Ile	Thr	Ala	Ile				
		35					40					45							
Trp	Leu	Ser	Pro	Val	Tyr	Gln	Ser	Pro	Met	Asp	Asp	Asn	Gly	Tyr	Asp				
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Ile	Ser	Asp	Tyr	Gln	Ala	Ile	Ala	Asp	Ile	Phe	Gly	Asp	Met	Asn	Asp				
65				70						75				80					
Met	Asp	Gln	Leu	Leu	Gln	Glu	Ala	Asn	Gln	Arg	Gly	Ile	Lys	Ile	Ile				
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Met	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Glu	His	Ala	Trp	Phe	Val				
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Glu	Ala	Arg	Glu	Asn	Pro	Asn	Ser	Pro	Glu	Arg	Asp	Phe	Tyr	Ile	Trp				
		115					120					125							
Arg	Asp	Glu	Pro	Asn	Asp	Leu	Thr	Ser	Ile	Phe	Ser	Gly	Ser	Ala	Trp				
	130					135					140								
Glu	Tyr	Asp	Lys	Val	Ser	Gly	Gln	Tyr	Tyr	Leu	His	Leu	Phe	Ser	Lys				

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145 Arg Gln Pro Asp Leu 150 Asn Trp Glu Asn Glu 155 Ala Leu Arg His Lys 160 Ile
 Tyr Asp Met Met Asn Phe Trp Ile Asp Lys Gly Ile Gly Gly Phe Arg
 Met Asp Val Ile Asp Leu Ile Gly Lys Ile Pro Asp Lys Gly Ile Thr
 Gly Asn Gly Pro Lys Leu His Asp Tyr Leu Lys Glu Met Asn Arg Ala
 Ser Phe Gly Lys His Asp Leu Leu Thr Val Gly Glu Thr Trp Gly Ala
 Thr Pro Asp Ile Ala Lys Gln Tyr Ser Asn Pro Asp Asn Glu Glu Leu
 Ser Met Val Phe Gln Phe Glu His Val Gly Leu Gln His Lys Pro Asp
 Ala Pro Lys Trp Asp Tyr Ser Asp Gly Leu Asp Val Pro Ala Leu Lys
 Asp Ile Phe Thr Lys Trp Gln Thr Gln Leu Glu Leu Gly Gln Gly Trp
 Asn Ser Leu Phe Trp Asn Asn His Asp Leu Pro Arg Val Leu Ser Ile
 Trp Gly Asn Asp Ser Asp Asn Arg Lys Gln Ser Ala Lys Ala Leu Ala
 Ile Leu Leu His Leu Met Arg Gly Thr Pro Tyr Ile Tyr Gln Gly Glu
 Glu Ile Gly Met Thr Asn Tyr Pro Phe Glu Cys Leu Ala Asp Val Asp
 Asp Ile Glu Ser Leu Asn Tyr Ala Lys Glu Ala Met Asp Asn Gly Val
 Ser Glu Ala Thr Ile Leu Asp Ser Ile Arg Lys Val Gly Arg Asp Asn
 Ala Arg Thr Pro Met Gln Trp Ser Gln Glu His Gln Ala Gly Phe Thr
 Lys Gly Thr Pro Trp Leu Ala Val Asn Pro Asn Tyr Gln Glu Ile Asn
 Val Glu Ala Ala Leu Asn Asp Thr Glu Ser Ile Phe Tyr Thr Tyr Gln
 Lys Leu Val Ala Leu Arg Lys Glu His Asp Trp Leu Val Asp Ala Asp
 Phe Lys Leu Leu Glu Thr Ala Asp Lys Val Phe Ala Tyr Val Arg Gln
 Thr Asp Lys Glu Arg Tyr Leu Ile Val Ala Asn Leu Ser Asp Gln Asn
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<210> 87

<211> 1497

<212> DNA

<213> Oceanobacillus iheyensis HTE831

<220>

<221> CDS

<222> (1)..(1497)

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 1 5 10 15
 tta ttg cct gta act aat gta aac gca gaa gaa cca atc aat ata cat 96
 Leu Leu Pro Val Thr Asn Val Asn Ala Glu Glu Pro Ile Asn Ile His
 20 25 30
 aat gaa att att tat gat att tta gtt gat cgt ttt aat aat gga gat 144
 Asn Glu Ile Ile Tyr Asp Ile Leu Val Asp Arg Phe Asn Asn Gly Asp

		35						40						45					
tct	gag	gaa	acg	gaa	gaa	att	gct	gtg	gat	gac	ccg	aat	gca	tac	cac			192	
Ser	Glu	Glu	Thr	Glu	Glu	Ile	Ala	Val	Asp	Asp	Pro	Asn	Ala	Tyr	His				
		50			55						60								
ggt	ggc	gat	att	aaa	ggt	ata	att	gat	caa	cta	gat	cga	cta	aag	gaa			240	
Gly	Gly	Asp	Ile	Lys	Gly	Ile	Ile	Asp	Gln	Leu	Asp	Arg	Leu	Lys	Glu				
		65			70						75			80					
atg	ggg	att	act	acc	att	tca	tta	tcc	cct	tta	atg	act	aat	caa	cag			288	
Met	Gly	Ile	Thr	Thr	Ile	Ser	Leu	Ser	Pro	Leu	Met	Thr	Asn	Gln	Gln				
				85					90						95				
aat	ggt	tat	cac	gga	tat	tgg	gtc	ctt	gat	tat	ttt	gaa	ata	gac	gag			336	
Asn	Gly	Tyr	His	Gly	Tyr	Trp	Val	Leu	Asp	Tyr	Phe	Glu	Ile	Asp	Glu				
				100			105						110						
caa	tta	gga	acc	atg	gaa	gat	ctt	aat	cag	ttg	att	gaa	caa	gca	cat			384	
Gln	Leu	Gly	Thr	Met	Glu	Asp	Leu	Asn	Gln	Leu	Ile	Glu	Gln	Ala	His				
				115			120						125						
caa	cgt	gat	atg	aaa	gta	gtt	atg	gat	atg	gta	atc	aat	tat	gct	gca			432	
Gln	Arg	Asp	Met	Lys	Val	Val	Met	Asp	Met	Val	Ile	Asn	Tyr	Ala	Ala				
				130	135						140								
gca	tca	cat	gaa	gta	aca	gaa	gac	gaa	act	aaa	gct	gat	tgg	tgg	acg			480	
Ala	Ser	His	Glu	Val	Thr	Glu	Asp	Glu	Thr	Lys	Ala	Asp	Trp	Trp	Thr				
				145	150						155				160				
gaa	cct	tct	tac	aca	gct	gca	tct	tgg	tct	gct	aat	gca	ctt	caa	tgg			528	
Glu	Pro	Ser	Tyr	Thr	Ala	Ala	Ser	Trp	Ser	Ala	Asn	Ala	Leu	Gln	Trp				
				165			170						175						
aat	ttg	aat	caa	cct	gaa	gtt	gcg	gag	aat	atg	ata	aat	gtt	gca	gac			576	
Asn	Leu	Asn	Gln	Pro	Glu	Val	Ala	Glu	Asn	Met	Ile	Asn	Val	Ala	Asp				
				180			185						190						
tac	tgg	atg	gaa	gag	acg	gag	ata	gat	ggt	ttt	acg	tta	cat	gct	gtt			624	
Tyr	Trp	Met	Glu	Glu	Thr	Glu	Ile	Asp	Gly	Phe	Thr	Leu	His	Ala	Val				
				195			200						205						
gat	caa	gcg	cca	att	gac	ttt	ctt	caa	gaa	tat	aca	caa	cat	ata	aaa			672	
Asp	Gln	Ala	Pro	Ile	Asp	Phe	Leu	Gln	Glu	Tyr	Thr	Gln	His	Ile	Lys				
				210	215						220								
gaa	aca	gat	gaa	gaa	ttt	tat	tta	ata	gga	gat	ata	tta	gat	cca	gaa			720	
Glu	Thr	Asp	Glu	Glu	Phe	Tyr	Leu	Ile	Gly	Asp	Ile	Leu	Asp	Pro	Glu				
				225	230				235				240						
tct	gct	aac	att	caa	gaa	tta	gaa	gaa	aca	cct	ctg	gat	att	gta	gct			768	
Ser	Ala	Asn	Ile	Gln	Glu	Leu	Glu	Glu	Thr	Pro	Leu	Asp	Ile	Val	Ala				
				245			250						255						
aat	cct	atg	ctg	cat	gaa	cgg	tta	aaa	caa	gta	ttc	tct	gat	gtg	gat			816	
Asn	Pro	Met	Leu	His	Glu	Arg	Leu	Lys	Gln	Val	Phe	Ser	Asp	Val	Asp				
				260			265						270						
aat	cca	gtt	tct	gag	gtg	tac	cat	caa	tgg	gag	aat	tta	gag	aca	gac			864	
Asn	Pro	Val	Ser	Glu	Val	Tyr	His	Gln	Trp	Glu	Asn	Leu	Glu	Thr	Asp				
				275			280						285						
tct	ccg	tta	att	aca	att	gat	aat	ttt	aca	gaa	gaa	cgt	ttt	acc	aat			912	
Ser	Pro	Leu	Ile	Thr	Ile	Asp	Asn	Phe	Thr	Glu	Glu	Arg	Phe	Thr	Asn				
				290	295						300								
gca	tat	tcg	aag	aac	caa	cga	aat	tca	ctg	aca	gca	tgg	aca	cta	gca			960	
Ala	Tyr	Ser	Lys	Asn	Gln	Arg	Asn	Ser	Leu	Thr	Ala	Trp	Thr	Leu	Ala				
				305	310				315				320						
ttg	aca	tat	atg	tat	act	aca	cca	gga	aca	cct	cta	att	gtt	caa	ggt			1008	
Leu	Thr	Tyr	Met	Tyr	Thr	Thr	Pro	Gly	Thr	Pro	Leu	Ile	Val	Gln	Gly				
				325			330						335						
acg	gag	ttg	cca	atg	tat	ggt	gga	gat	gaa	gag	gag	tct	cag	cga	ctt			1056	
Thr	Glu	Leu	Pro	Met	Tyr	Gly	Gly	Asp	Glu	Glu	Glu	Ser	Gln	Arg	Leu				
				340			345						350						
gta	cca	ttt	aat	agt	ggg	gac	cca	gaa	ttg	aaa	gaa	ttt	cat	act	aga			1104	
Val	Pro	Phe	Asn	Ser	Gly	Asp	Pro	Glu	Leu	Lys	Glu	Phe	His	Thr	Arg				
				355			360						365						
ata	gcg	tct	tta	cga	aat	gaa	ttt	cct	gca	cta	cga	caa	ggt	gac	att			1152	
Ile	Ala	Ser	Leu	Arg	Asn	Glu	Phe	Pro	Ala	Leu	Arg	Gln	Gly	Asp	Ile				
				370	375						380								
gaa	cta	gtc	gat	acc	gtt	gat	tcg	atg	ata	gtc	tat	aaa	aga	agt	tat			1200	
Glu	Leu	Val	Asp	Thr	Val	Asp	Ser	Met	Ile	Val	Tyr	Lys	Arg	Ser	Tyr				
				385	390				395						400				
gaa	ggc	caa	acg	atg	tat	gtt	gcg	att	aac	aat	gga	agt	gag	tct	gct			1248	
Glu	Gly	Gln	Thr	Met	Tyr	Val	Ala	Ile	Asn	Asn	Gly	Ser	Glu	Ser	Ala				

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Tyr	Val	Asp	Val	Thr	Asp	Val	Asp	Ala	Asn	Lys	Glu	Leu	Arg	Gly	His	1296
			420					425					430			
tta	caa	gat	aat	ttg	ggt	cgt	gaa	aac	caa	gaa	ggg	aat	cat	cga	att	1344
Leu	Gln	Asp	Asn	Leu	Val	Arg	Glu	Asn	Gln	Glu	Gly	Asn	His	Arg	Ile	
		435					440					445				
gga	ata	cca	cgt	gaa	tct	gta	gaa	gtg	tat	gaa	gta	cag	gat	gat	cat	1392
Gly	Ile	Pro	Arg	Glu	Ser	Val	Glu	Val	Tyr	Glu	Val	Gln	Asp	Asp	His	
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ggt	ctt	aac	tgg	tgg	ttt	att	gga	ttt	att	ggt	atg	ggt	att	ttg	gcc	1440
Gly	Leu	Asn	Trp	Trp	Phe	Ile	Gly	Phe	Ile	Val	Met	Val	Ile	Leu	Ala	
	465				470					475					480	
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Phe	Ile	Ala	Gly	Val	Ile	Tyr	Leu	Thr	Ile	Lys	Gln	Arg	Lys	Arg	Glu	
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aag	aaa	taa														1497
Lys	Lys															

<210> 88

<211> 498

<212> PRT

<213> Oceanobacillus iheyensis HTE831

<400> 88

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			20					25					30			
Asn	Glu	Ile	Ile	Tyr	Asp	Ile	Leu	Val	Asp	Arg	Phe	Asn	Asn	Gly	Asp	
		35					40					45				
Ser	Glu	Glu	Thr	Glu	Glu	Ile	Ala	Val	Asp	Asp	Pro	Asn	Ala	Tyr	His	
	50					55					60					
Gly	Gly	Asp	Ile	Lys	Gly	Ile	Ile	Asp	Gln	Leu	Asp	Arg	Leu	Lys	Glu	
65					70				75						80	
Met	Gly	Ile	Thr	Thr	Ile	Ser	Leu	Ser	Pro	Leu	Met	Thr	Asn	Gln	Gln	
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Asn	Gly	Tyr	His	Gly	Tyr	Trp	Val	Leu	Asp	Tyr	Phe	Glu	Ile	Asp	Glu	
		100						105					110			
Gln	Leu	Gly	Thr	Met	Glu	Asp	Leu	Asn	Gln	Leu	Ile	Glu	Gln	Ala	His	
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Gln	Arg	Asp	Met	Lys	Val	Val	Met	Asp	Met	Val	Ile	Asn	Tyr	Ala	Ala	
	130					135					140					
Ala	Ser	His	Glu	Val	Thr	Glu	Asp	Glu	Thr	Lys	Ala	Asp	Trp	Trp	Thr	
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Glu	Pro	Ser	Tyr	Thr	Ala	Ala	Ser	Trp	Ser	Ala	Asn	Ala	Leu	Gln	Trp	
			165						170					175		
Asn	Leu	Asn	Gln	Pro	Glu	Val	Ala	Glu	Asn	Met	Ile	Asn	Val	Ala	Asp	
		180						185					190			
Tyr	Trp	Met	Glu	Glu	Thr	Glu	Ile	Asp	Gly	Phe	Thr	Leu	His	Ala	Val	
		195					200						205			
Asp	Gln	Ala	Pro	Ile	Asp	Phe	Leu	Gln	Glu	Tyr	Thr	Gln	His	Ile	Lys	
	210					215					220					
Glu	Thr	Asp	Glu	Glu	Phe	Tyr	Leu	Ile	Gly	Asp	Ile	Leu	Asp	Pro	Glu	
225					230					235					240	
Ser	Ala	Asn	Ile	Gln	Glu	Leu	Glu	Glu	Thr	Pro	Leu	Asp	Ile	Val	Ala	
			245						250					255		
Asn	Pro	Met	Leu	His	Glu	Arg	Leu	Lys	Gln	Val	Phe	Ser	Asp	Val	Asp	
		260						265						270		
Asn	Pro	Val	Ser	Glu	Val	Tyr	His	Gln	Trp	Glu	Asn	Leu	Glu	Thr	Asp	
		275					280					285				
Ser	Pro	Leu	Ile	Thr	Ile	Asp	Asn	Phe	Thr	Glu	Glu	Arg	Phe	Thr	Asn	
	290					295					300					
Ala	Tyr	Ser	Lys	Asn	Gln	Arg	Asn	Ser	Leu	Thr	Ala	Trp	Thr	Leu	Ala	
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Leu	Thr	Tyr	Met	Tyr	Thr	Thr	Pro	Gly	Thr	Pro	Leu	Ile	Val	Gln	Gly	
			325						330					335		
Thr	Glu	Leu	Pro	Met	Tyr	Gly	Gly	Asp	Glu	Glu	Glu	Ser	Gln	Arg	Leu	

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 Ile Ala Ser 355 Leu Arg Asn Glu 360 Phe Pro Ala Leu Arg Gln Gly Asp Ile
 Glu 370 Leu Val Asp Thr Val 375 Asp Ser Met Ile Val 380 Tyr Lys Arg Ser Tyr
 385 Glu Gly Gln Thr Met 390 Tyr Val Ala Ile Asn 395 Asn Gly Ser Glu Ser Ala
 Tyr Val Asp 405 Val Thr Asp Val Asp 410 Ala Asn Lys Glu Leu Arg Gly His
 Leu Gln Asp 420 Asn Leu Val Arg Glu 425 Asn Gln Glu Gly Asn 430 His Arg Ile
 Gly Ile 435 Pro Arg Glu Ser Val 440 Glu Val Tyr Glu Val 445 Gln Asp Asp His
 450 Glu Leu Asn Trp Trp Phe 455 Ile Gly Phe Ile Val 460 Met Val Ile Leu Ala
 465 Phe Ile Ala Gly Val 470 Ile Tyr Leu Thr Ile 475 Lys Gln Arg Lys Arg 480 Glu
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<210> 89

<211> 1752

<212> DNA

<213> Oceanobacillus iheyensis HTE831

<220>

<221> CDS

<222> (1)..(1752)

<223> transl_table=11

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ctt tac aaa gag aat acg tta cac att cgt tta caa aca aag aaa gat	96
Leu Tyr Lys Glu Asn Thr Leu His Ile Arg Leu Gln Thr Lys Lys Asp	
20 25 30	
gat gta gta aaa gcc aca ctt atc tat gca gat cct tat aat tgg gat	144
Asp Val Val Lys Ala Thr Leu Ile Tyr Ala Asp Pro Tyr Asn Trp Asp	
35 40 45	
gat tca gga tgg att tat aac aag gca gac atg cgt ctc ata gct tcc	192
Asp Ser Gly Trp Ile Tyr Asn Lys Ala Asp Met Arg Leu Ile Ala Ser	
50 55 60	
gat cag cta ttc gat tat tgg caa att gaa att tat tgt aaa aca cgt	240
Asp Gln Leu Phe Asp Tyr Trp Gln Ile Glu Ile Tyr Cys Lys Thr Arg	
65 70 75 80	
cga ata aga tat gga ttt caa tta tct gat act aaa gaa act ctt att	288
Arg Ile Arg Tyr Gly Phe Gln Leu Ser Asp Thr Lys Glu Thr Leu Ile	
85 90 95	
tat aca gag aaa gga ttt tat aaa gaa att cca aat gat gac act gct	336
Tyr Thr Glu Lys Gly Phe Tyr Lys Glu Ile Pro Asn Asp Asp Thr Ala	
100 105 110	
tat tac ttc tgc ttc cct ttt tta aac cca ata gat caa ttt caa gca	384
Tyr Tyr Phe Cys Phe Pro Phe Leu Asn Pro Ile Asp Gln Phe Gln Ala	
115 120 125	
cca gaa tgg gta aag gaa act gta tgg tat caa att ttt cct gaa cga	432
Pro Glu Trp Val Lys Glu Thr Val Trp Tyr Gln Ile Phe Pro Glu Arg	
130 135 140	
ttt gcg aac gga aat gaa aca att aat cct cct gga act tta cct tgg	480
Phe Ala Asn Gly Asn Glu Thr Ile Asn Pro Pro Gly Thr Leu Pro Trp	
145 150 155 160	
gga agc act acc cct aca cct aca gat ttt ttt ggt ggt gac ttt caa	528
Gly Ser Thr Thr Pro Thr Pro Thr Asp Phe Phe Gly Gly Asp Phe Gln	
165 170 175	
ggt ata atc aat cac ttg gat tat ctt gta gat tta ggt att tcc ggt	576
Gly Ile Ile Asn His Leu Asp Tyr Leu Val Asp Leu Gly Ile Ser Gly	
180 185 190	

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acg Thr	att Ile 210	gac Asp	tat Tyr	atg Met	gaa Glu	atc Ile 215	gat Asp	cct Pro	caa Gln	ttt Phe	ggg Gly 220	gat Asp	aaa Lys	cag Gln	aca Thr	672
ttt Phe 225	cga Arg	aag Lys	tta Leu	gtt Val	aaa Lys 230	gct Ala	tgt Cys	cat His	caa Gln	cga Arg 235	gga Gly	att Ile	cgc Arg	att Ile	atg Met 240	720
ctt Leu	gat Asp	gct Ala	gta Val	ttt Phe 245	aat Asn	cat His	agt Ser	ggc Gly	tat Tyr 250	ttc Phe	ttt Phe	gaa Glu	cca Pro	ttt Phe 255	cag Gln	768
gat Asp	gtg Val	tta Leu	aaa Lys 260	aac Asn	caa Gln	gag Glu	aag Lys	tct Ser 265	att Ile	tat Tyr	aag Lys	gaa Glu	tgg Trp 270	ttt Phe	cat His	816
atc Ile	gag Glu	agt Ser 275	ttt Phe	cct Pro	ttg Leu	aga Arg	aca Thr 280	gac Asp	cca Pro	gca Ala	cca Pro	aac Asn 285	tat Tyr	gac Asp	acc Thr	864
ttt Phe	gca Ala 290	tat Tyr	gta Val	ggc Gly	tca Ser	atg Met 295	cca Pro	aaa Lys	cta Leu	aat Asn	aca Thr 300	gag Glu	cac His	ccg Pro	gaa Glu	912
gtg Val 305	aaa Lys	tca Ser	tat Tyr	tta Leu	ctt Leu 310	aaa Lys	gta Val	gca Ala	tca Ser	tat Tyr 315	tgg Trp	att Ile	gaa Glu	gag Glu	ttt Phe 320	960
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tat Tyr	att Ile	ctc Leu 355	gga Gly	gaa Glu	ata Ile	tgg Trp	cat His 360	gat Asp	tcg Ser	atg Met	ccc Pro	tgg Trp 365	tta Leu	caa Gln	gga Gly	1104
gat Asp	caa Gln 370	ttt Phe	gac Asp	gca Ala	gta Val	atg Met 375	aac Asn	tat Tyr	cca Pro	ctt Leu	acc Thr 380	agt Ser	gct Ala	gca Ala	ctt Leu	1152
gat Asp 385	ttt Phe	att Ile	gca Ala	aag Lys	gaa Glu 390	aaa Lys	ata Ile	gat Asp	gtt Val	aaa Lys 395	gaa Glu	ttt Phe	gtc Val	caa Gln	caa Gln 400	1200
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aac Asn	aat Asn	caa Gln 435	gtc Val	gaa Glu	aaa Lys	gca Ala 440	aaa Lys	cta Leu	tat Tyr	ata Ile	tta Leu 445	tta Leu	tta Leu	acg Thr		1344
atg Met	cca Pro 450	ggc Gly	tct Ser	cct Pro	tgt Cys	att Ile 455	tat Tyr	tat Tyr	gga Gly	gat Asp	gaa Glu 460	att Ile	gga Gly	atg Met	act Thr	1392
gga Gly 465	gaa Glu	ggg Gly	gat Asp	cct Pro	ggc Gly 470	aga Cys	gaa Glu	tgt Cys	atg Met 475	tgg Val	gac Trp	gag Asp	aat Glu	aat Asn 480		1440
gaa Glu	caa Gln	aat Asn	gta Val	gaa Glu 485	tta Leu	aaa Lys	tct Ser	ttc Phe	ctt Leu 490	aaa Lys	aaa Lys	tta Leu	att Ile	cat His 495	gtg Val	1488
cgg Arg	aaa Lys	acg Thr	gaa Glu 500	aag Lys	gct Ala	gtt Val	gca Ala 505	aat Asn	caa Gln	gga Gly	gaa Glu	ttt Phe 510	tca Ser	ttt Phe	gta Val	1536
aaa Lys	act Thr	agt Ser 515	gat Asp	aat Asn	tat Tyr	ttc Phe	att Ile 520	tat Tyr	aaa Lys	ctt Leu	ttt Phe 525	caa Gln	cag Gln	cat His	atg Met	1584
gaa Glu	att Ile 530	tat Tyr	att Ile	att Ile	ata Ile	aac Asn 535	cca Pro	agt Ser	aat Asn	cag Gln	gct Ala 540	ctc Leu	gaa Glu	gta Val	tca Ser	1632
ctt Leu 545	ccg Pro	gta Val	acc Thr	aag Lys	tgg Trp 550	aac Asn	agt Ser	gcc Ala	ttc Phe	gat Asp 555	tta Leu	tgg Trp	gag Glu	gaa Glu	gat Asp 560	1680

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gat	ttc	aat	att	aac	act	cca	ata	aaa	tgt	gag	gaa	aat	agt	ttc	aaa	1728
Asp	Phe	Asn	Ile	Asn	Thr	Pro	Ile	Lys	Cys	Glu	Glu	Asn	Ser	Phe	Lys	
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<212> PRT

<213> Oceanobacillus iheyensis HTE831

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Asp	Gln	Leu	Phe	Asp	Tyr	Trp	Gln	Ile	Glu	Ile	Tyr	Cys	Lys	Thr	Arg	
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Arg	Ile	Arg	Tyr	Gly	Phe	Gln	Leu	Ser	Asp	Thr	Lys	Glu	Thr	Leu	Ile	
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Tyr	Thr	Glu	Lys	Gly	Phe	Tyr	Lys	Glu	Ile	Pro	Asn	Asp	Asp	Thr	Ala	
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Tyr	Tyr	Phe	Cys	Phe	Pro	Phe	Leu	Asn	Pro	Ile	Asp	Gln	Phe	Gln	Ala	
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Pro	Glu	Trp	Val	Lys	Glu	Thr	Val	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	
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Phe	Ala	Asn	Gly	Asn	Glu	Thr	Ile	Asn	Pro	Pro	Gly	Thr	Leu	Pro	Trp	
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Gly	Ser	Thr	Thr	Pro	Thr	Pro	Thr	Asp	Phe	Phe	Gly	Gly	Asp	Phe	Gln	
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Gly	Ile	Ile	Asn	His	Leu	Asp	Tyr	Leu	Val	Asp	Leu	Gly	Ile	Ser	Gly	
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Ile	Tyr	Phe	Thr	Pro	Ile	Phe	Lys	Ala	Phe	Ser	Asn	His	Lys	Tyr	Asp	
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Thr	Ile	Asp	Tyr	Met	Glu	Ile	Asp	Pro	Gln	Phe	Gly	Asp	Lys	Gln	Thr	
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Phe	Arg	Lys	Leu	Val	Lys	Ala	Cys	His	Gln	Arg	Gly	Ile	Arg	Ile	Met	
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Val	Lys	Ser	Tyr	Leu	Leu	Lys	Val	Ala	Ser	Tyr	Trp	Ile	Glu	Glu	Phe	
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Phe	Trp	Arg	Asp	Phe	Arg	Arg	Gln	Val	Lys	Ser	Ile	Lys	Pro	Asp	Val	
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Asp	Gln	Phe	Asp	Ala	Val	Met	Asn	Tyr	Pro	Leu	Thr	Ser	Ala	Ala	Leu	
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Asp	Phe	Ile	Ala	Lys	Glu	Lys	Ile	Asp	Val	Lys	Glu	Phe	Val	Gln	Gln	
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Ile	Ser	Asn	Val	Leu	Leu	Ser	Tyr	Pro	Gln	Asn	Val	Asn	Glu	Val	Ala	
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Phe	Asn	Leu	Leu	Gly	Ser	His	Asp	Thr	Pro	Arg	Val	Leu	Thr	His	Cys	
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Asn	Asn	Gln	Val	Glu	Lys	Ala	Lys	Leu	Leu	Tyr	Ile	Leu	Leu	Leu	Thr	
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 Gly Glu Gly Asp Pro Gly Cys Arg Glu Cys Met Val Trp Asp Glu Asn
 465 470 475 480
 Glu Gln Asn Val Glu Leu Lys Ser Phe Leu Lys Lys Leu Ile His Val
 485 490
 Arg Lys Thr Glu Lys Ala Val Ala Asn Gln Gly Glu Phe Ser Phe Val
 500 505 510
 Lys Thr Ser Asp Asn Tyr Phe Ile Tyr Lys Leu Phe Gln Gln His Met
 515 520 525
 Glu Ile Tyr Ile Ile Ile Asn Pro Ser Asn Gln Ala Leu Glu Val Ser
 530 535 540
 Leu Pro Val Thr Lys Trp Asn Ser Ala Phe Asp Leu Trp Glu Glu Asp
 545 550 555 560
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 Ile Ile Lys Val Asn Tyr Ser
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<211> 1398

<212> DNA

<213> Bifidobacterium longum NCC2705

<220>

<221> CDS

<222> (1)..(1398)

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Gly	Phe	Ala	Pro	Arg	Cys	Ala	Lys	Met	Asp	Thr	Val	Ser	Ile	Arg	Arg	
			20					25					30			
tgc	aca	gtg	gtt	gta	agc	acg	gat	tcg	agc	cgc	aca	atg	ccc	gat	tgg	144
Cys	Thr	Val	Val	Val	Ser	Thr	Asp	Ser	Ser	Arg	Thr	Met	Pro	Asp	Trp	
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gtg	aag	tac	ggg	gtg	ttc	tgg	cac	gtg	tat	ccg	ctg	ggc	ttc	tgc	ggt	192
Val	Lys	Tyr	Gly	Val	Phe	Trp	His	Val	Tyr	Pro	Leu	Gly	Phe	Cys	Gly	
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Ala	Asp	Ile	Arg	Pro	Ala	Gly	Pro	Arg	Arg	Phe	His	Gly	Arg	Gly	Leu	
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gac	gcg	ata	att	ccc	tgg	ctg	gag	tac	gtg	cgc	gat	cta	ggc	gcg	tcc	288
Asp	Ala	Ile	Ile	Pro	Trp	Leu	Glu	Tyr	Val	Arg	Asp	Leu	Gly	Ala	Ser	
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Gly	Leu	Leu	Leu	Gly	Pro	Val	Phe	Glu	Ser	Ala	Thr	His	Gly	Tyr	Asp	
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Thr	Leu	Asp	His	Met	His	Ile	Asp	Val	Arg	Leu	Gly	Gly	Asp	Ala	Ala	
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Phe	Asp	Gln	Leu	Val	Ala	Ala	Cys	Arg	Asp	Met	Gly	Leu	Gln	Val	Met	
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ctg	gat	ggc	gtg	ttc	aat	cac	gtg	agc	cgc	aat	cat	ccg	gcc	gtt	cag	480
Leu	Asp	Gly	Val	Phe	Asn	His	Val	Ser	Arg	Asn	His	Pro	Ala	Val	Gln	
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gcg	gcg	ctt	gac	gag	acc	gcc	gga	cgc	ttg	aat	ccg	gcc	gac	aac	ccg	528
Ala	Ala	Leu	Asp	Glu	Thr	Ala	Gly	Arg	Leu	Asn	Pro	Ala	Asp	Asn	Pro	
				165				170						175		
tgg	cat	ggt	ctg	gtc	cgc	gcg	cat	gtc	ggt	gat	aat	ggc	gaa	ccc	gct	576
Trp	His	Gly	Leu	Val	Arg	Ala	His	Val	Gly	Asp	Asn	Gly	Glu	Pro	Ala	
			180					185					190			
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Leu	Asp	Val	Phe	Glu	Gly	His	Gly	Asp	Leu	Val	Ala	Leu	Asp	His	Ser	
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Ala	Asp	Glu	Thr	Val	Asp	Tyr	Val	Val	His	Val	Met	Ser	His	Trp	Leu	
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gat	cgc	gga	gcc	gcc	ggc	tgg	cgc	ctc	gac	gcc	gcg	tat	gcc	gtg	ccg	720
Asp	Arg	Gly	Ala	Ala	Gly	Trp	Arg	Leu	Asp	Ala	Ala	Tyr	Ala	Val	Pro	
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Ser	Pro	Phe	Trp	Ala	Arg	Val	Leu	Pro	Gln	Val	Lys	Ala	Ala	His	Pro	
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Ile	Glu	Glu	Ser	Thr	Met	Asp	Ser	Ile	Thr	Gln	Tyr	Glu	Leu	Trp	Lys	
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Asn	Leu	Lys	Arg	His	Asn	Ala	Phe	Leu	Asp	Ser	Phe	Val	Pro	Gln	Thr	
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gcc	aag	gcg	gcg	ttg	gca	ttg	gcg	gtg	ctc	atg	acg	gtc	ggc	ggc	gtg	1056
Ala	Lys	Ala	Ala	Leu	Ala	Leu	Ala	Val	Leu	Met	Thr	Val	Gly	Gly	Val	
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Ala	Leu	Ile	Ala	Leu	Arg	Arg	Arg	Asn	Pro	Trp	Leu	Leu	Asp	Ala	Arg	
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Thr	Glu	Ala	Val	Lys	Leu	Glu	Asn	Lys	His	Phe	Val	Tyr	Arg	Ser	Thr	
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Trp																
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<212> PRT

<213> Bifidobacterium longum NCC2705

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Ala	Asp	Ile	Arg	Pro	Ala	Gly	Pro	Arg	Arg	Phe	His	Gly	Arg	Gly	Leu	
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Asp	Ala	Ile	Ile	Pro	Trp	Leu	Glu	Tyr	Val	Arg	Asp	Leu	Gly	Ala	Ser	

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 Phe Asp Gln Leu Val Ala Ala Cys Arg Asp Met Gly Leu Gln Val Met
 130 135 140
 Leu Asp Gly Val Phe Asn His Val Ser Arg Asn His Pro Ala Val Gln
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 Ala Ala Leu Asp Glu Thr Ala Gly Arg Leu Asn Pro Ala Asp Asn Pro
 160 165 170 175
 Trp His Gly Leu Val Arg Ala His Val Gly Asp Asn Gly Glu Pro Ala
 180 185 190
 Leu Asp Val Phe Glu Gly His Gly Asp Leu Val Ala Leu Asp His Ser
 195 200 205
 Ala Asp Glu Thr Val Asp Tyr Val Val His Val Met Ser His Trp Leu
 210 215 220
 Asp Arg Gly Ala Ala Gly Trp Arg Leu Asp Ala Tyr Ala Val Pro
 225 230 235 240
 Ser Pro Phe Trp Ala Arg Val Leu Pro Gln Val Lys Ala Ala His Pro
 245 250 255
 Tyr Ser Trp Ile Phe Gly Glu Val Ile His Gly Asp Tyr Pro Arg Ile
 260 265 270
 Ile Glu Glu Ser Thr Met Asp Ser Ile Thr Gln Tyr Glu Leu Trp Lys
 275 280 285
 Ser Ile Gln His Ala Leu Glu Thr Glu Asn Phe Phe Glu Leu Asp Trp
 290 295 300
 Asn Leu Lys Arg His Asn Ala Phe Leu Asp Ser Phe Val Pro Gln Thr
 305 310 315 320
 Phe Ile Gly Asn His Asp Val Thr Arg Ile Ala Ser Gln Ile Gly Pro
 325 330 335
 Ala Lys Ala Ala Leu Ala Leu Ala Val Leu Met Thr Val Gly Gly Val
 340 345 350
 Pro Ser Ile Tyr Tyr Gly Asp Glu Gln Gly Tyr Val Gly Val Lys Gln
 355 360 365
 Glu Arg Phe Gly Gly Asp Asp Val Arg Pro Lys Phe Pro Gly Ser
 370 375 380
 Pro Ala Glu Leu Ser Thr Leu Gly Glu Pro Thr Tyr Arg Leu His Gln
 385 390 395 400
 Ala Leu Ile Ala Leu Arg Arg Arg Asn Pro Trp Leu Leu Asp Ala Arg
 405 410 415
 Thr Glu Ala Val Lys Leu Glu Asn Lys His Phe Val Tyr Arg Ser Thr
 420 425 430
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<211> 1818

<212> DNA

<213> Shigella flexneri 2a str. 301

<220>

<221> CDS

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 Ser Lys Asp Gln Leu Leu Ile Thr Leu Trp Leu Thr Gly Glu Asp Pro
 20 25 30
 ccg cag cgc att atg ctg cgt aca gaa cac gat aac gaa gaa atg tca
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 35 40 45 50

48

96

144

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																50																	55																	60																																	
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<212> PRT

<213> Shigella flexneri 2a str. 301

<400> 94

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110	Ile	Phe	Pro	Asp	Arg	Phe	Ala	Arg	Ser	Leu	Pro	Arg	Glu	Ala	Glu
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Asn Ser Glu Ser Pro Trp Arg Asp Trp Tyr Ser Phe Ser Asp Asp Gly
275      280      285
Thr Ala Leu Asp Trp Leu Gly Tyr Ala Ser Leu Thr Lys Leu Asp Tyr
290      295      300
Gln Ser Glu Ser Leu Val Asn Glu Ile Tyr Arg Gly Glu Asp Ser Ile
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Gln His Val Ala Gly Ile Thr Glu Ala Ala Lys Glu Thr Gln Pro Glu
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Ala Tyr Ile Val Gly Glu His Phe Gly Asp Ala Arg Gln Trp Leu Gln
370      375      380
Ala Asp Val Glu Asp Ala Ala Met Asn Tyr Arg Gly Phe Thr Phe Pro
385      390      395
Leu Trp Gly Phe Leu Ala Asn Thr Asp Ile Ser Tyr Asp Pro Gln Gln
405      410      415
Ile Asp Ala Gln Thr Cys Met Ala Trp Met Asp Asn Tyr Arg Ala Gly
420      425      430
Leu Ser His Gln Gln Gln Leu Arg Met Phe Asn Gln Leu Asp Ser His
435      440      445
Asp Thr Ala Arg Phe Lys Thr Leu Leu Gly Arg Asp Ile Ala Arg Leu
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Pro Leu Ala Val Val Trp Leu Phe Thr Trp Pro Gly Val Pro Cys Ile
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Tyr Tyr Gly Asp Glu Val Gly Leu Asp Gly Lys Asn Asp Pro Phe Cys
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Arg Lys Pro Phe Pro Trp Gln Val Glu Lys Gln Asp Thr Ala Leu Phe
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Ala Leu Tyr Arg Arg Met Ile Val Leu Arg Lys Lys Ser Gln Ala Leu
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Arg Arg Gly Gly Cys Gln Val Leu Tyr Ala Glu Asp Asn Val Val Val
530      535      540
Phe Val Arg Val Leu Asn Gln Gln Arg Val Leu Val Ala Ile Asn Arg
545      550      555
Gly Glu Ala Ser Glu Val Val Leu Pro Ala Ser Pro Phe Leu Asn Ala
565      570      575
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48

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96

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His	Gly	Tyr	Asp	Val	Ser	Asp	Tyr	Tyr	Ser	Ile	Ala	Pro	Glu	Tyr	Gly	
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Ser	Glu	Asp	Ser	Asp	Ser	Leu	Leu	Asn	Thr	Tyr	Lys	Ser	Val	Leu	Arg	
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Glu	Glu	Asn	Val	Pro	Lys	Asp	Met	Leu	Val	Tyr	Leu	Arg	Glu	Phe	Gly	
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Lys	Glu	Arg	Lys	Leu	Ile	Val	Phe	Asn	Phe	Gly	Lys	Lys	Thr	Lys	Phe	
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Phe	Ser	Asn	Pro	Thr	Asp	Cys	Arg	Lys	Tyr	Phe	Phe	Ser	Thr	Val	Ser	
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<211> 581

<212> PRT

<213> *Leptospira interrogans* serovar Lai str. 56601

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Tyr Tyr Asn Pro Glu Val Lys Lys Lys Ala Met Phe Asp Val Leu Arg Phe
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 Trp Leu Lys Lys Gly Val Asp Gly Phe Arg Leu Asp Ile Phe His Ala
 225 230 235 240
 Ile Tyr Lys Asp Lys Tyr Phe Arg Asp Asn Pro Phe Arg Phe Lys Tyr
 245 250 255
 Ile Val Ser Glu Asn Asp His Asp Gly Tyr Phe Gln Ser Arg Val His
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 Thr Val Asn His Pro Asn Asn Phe Ala Phe Ala Lys Glu Leu Arg Ser
 275 280 285
 Val Leu Asp Glu Phe Asp Gly Asp Arg Phe Ala Val Gly Glu Val Ala
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 Gly Asp Asp His Ile Ile Lys Arg Tyr Leu Gly Glu Lys Lys Asp Gly
 305 310 315 320
 Leu Asn Leu Ile Phe Leu Phe Glu Thr Leu Leu Leu Lys Phe Lys Thr
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 Ser Phe Phe Lys Gly Ile Val Lys Lys Met Glu Gln Val Tyr Pro Tyr
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 Pro Asn Val Pro Thr Tyr Val Phe Gly Asn His Asp Gln Arg Arg Tyr
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 Phe Gln Phe Thr Ala Arg Gly Val Pro Val Thr Tyr Tyr Gly Glu Glu
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 Ile Gly Met Thr Asn Glu Thr Ile Lys Leu Thr Glu Ala Gln Asp Pro
 405 410 415
 Leu Ala Arg Ile Tyr Arg Trp Leu Gly Asp Ser Leu Ser Glu Leu Leu
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 Gly Leu Ala Asp Val Ile Ile Arg Asp Arg Ala Arg Ser Pro Met Gln
 435 440 445
 Trp Asp Asp Ser Pro Asn Ala Gly Phe Thr Val Gln Glu Ala Lys Pro
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 Trp Ile Arg Val His Gly Asn Tyr Arg Glu Arg Asn Val Leu Ile Glu
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 Ser Glu Asp Ser Asp Ser Leu Leu Asn Thr Tyr Lys Ser Val Leu Arg
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 Ile Arg Asn Gly Ser Phe Ala Leu Lys Glu Gly Ser Leu Arg Leu Ile
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 Glu Glu Asn Val Pro Lys Asp Met Leu Val Tyr Leu Arg Glu Phe Gly
 515 520 525
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 Phe Ser Asn Pro Thr Asp Cys Arg Lys Tyr Phe Phe Ser Thr Val Ser
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<211> 1839

<212> DNA

<213> Corynebacterium efficiens YS-314

<220>

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Thr Asp Thr Thr Pro Leu Ser Ser Asp Leu Ile Pro Glu Ser Thr Ala

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cgc ccg gta gtc gat gcc gag ggc ttc atc att gag cat gag tcg gag 144

Arg Pro Val Val Asp Ala Glu Gly Phe Ile Ile Glu His Glu Ser Glu

35 40 45

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Leu	Thr	Glu	Lys	Leu	Asp	Tyr	Ile	Gln	Trp	Leu	Gly	Val	Asp	Cys	Ile	
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Thr	Asp	Leu	Val	Met	Asn	His	Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	
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Gln	Ser	Arg	Thr	Asp	Pro	Asp	Gly	Pro	Tyr	Gly	Asp	Phe	Tyr	Val	Trp	
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Gly	Asp	Asp	Pro	Glu	Met	Tyr	Lys	Glu	Ala	Arg	Ile	Ile	Phe	Val	Asp	
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Gly	Leu	Asp	Gly	Phe	Arg	Leu	Asp	Ala	Val	Pro	Tyr	Leu	Phe	Glu	Arg	
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Glu	Gly	Thr	Asn	Gly	Glu	Asn	Leu	Pro	Glu	Thr	His	Glu	Phe	Leu	Lys	
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Arg	Cys	Arg	Arg	Val	Ile	Asp	Glu	Glu	Tyr	Pro	Gly	Arg	Ile	Val	Leu	
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Lys	Glu	Lys	Gly	Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	Pro	Leu	Met	
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ccc	cgc	atc	ttc	atg	ggt	gtg	cgc	cag	ggg	tcc	cgc	acc	ccg	gtc	agt	1056
Pro	Arg	Ile	Phe	Met	Gly	Val	Arg	Gln	Gly	Ser	Arg	Thr	Pro	Val	Ser	
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Glu	Ile	Leu	Glu	His	Thr	Pro	Asp	Ile	Pro	Lys	Thr	Ala	Gln	Trp	Gly	
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Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	Ser	Glu	
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Glu	Glu	Arg	Ala	Tyr	Met	Tyr	Gln	Gln	Phe	Ala	Pro	Glu	Pro	Arg	Met	
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Arg	Ala	Asn	Val	Gly	Ile	Arg	Arg	Arg	Leu	Ala	Thr	Leu	Val	Asp	Gly	
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ggt	tcc	ccc	gtg	ctg	tac	tac	ggc	gat	gag	atc	ggc	atg	ggc	gac	aac	1344
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Ile	Trp	Leu	Pro	Asp	Arg	Asp	Gly	Val	Arg	Thr	Pro	Met	Gln	Trp	Ser	
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Asn	Asp	Arg	Asn	Gly	Gly	Phe	Ser	Lys	Ala	Asp	Pro	Glu	Arg	Leu	Tyr	
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Leu	Pro	Ala	Ile	Gln	Asn	Asp	Arg	Phe	Gly	Tyr	Ala	Gln	Val	Asn	Val	
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gaa	acc	cag	ctc	aag	cag	gag	aac	tcc	ctg	ctg	cag	tgg	atc	cg	aac	1536
Glu	Thr	Gln	Leu	Lys	Gln	Glu	Asn	Ser	Leu	Leu	Gln	Trp	Ile	Arg	Asn	
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Gln	Ile	Met	Ile	Arg	Lys	Gln	Tyr	Lys	Ala	Phe	Gly	Lys	Gly	Thr	Tyr	
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Arg	Glu	Ile	Asp	Ser	Thr	Asn	Glu	Ala	Val	Leu	Thr	Phe	Leu	Arg	Glu	
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Tyr	Lys	Gly	Gln	Thr	Ile	Leu	Cys	Val	Asn	Asn	Met	Ser	Lys	Leu	Pro	
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Gln	Ala	Val	Ala	Leu	Asp	Leu	Ser	Glu	Phe	Ala	Gly	Ile	Thr	Pro	Arg	
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gag	gtc	tcc	ggc	ggc	cag	tac	ttc	ccc	acc	atc	ggt	gag	cg	cag	tgt	1776
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Val	Phe	Thr	Leu	Ala	Pro	His	Gly	Phe	Phe	Trp	Leu	Asp	Leu	Thr	Gly	
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<212> PRT

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Glu	Tyr	His	Thr	Pro	Thr	Pro	Ala	Pro	Gly	Glu	Gln	Pro	Trp	Glu	Lys	
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His	Asp	Arg	Glu	Trp	Tyr	Lys	Asp	Ala	Val	Phe	Tyr	Glu	Val	Leu	Val	
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Arg	Ala	Phe	Tyr	Asp	Pro	Asp	Asn	Thr	Gly	Ser	Gly	Thr	Leu	Lys	Gly	
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Ile	Arg	Asn	Phe	Arg	Glu	Ile	Leu	Pro	Glu	Phe	Gly	Thr	Val	Glu	Asp	
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Phe	Val	Glu	Leu	Val	Asp	Gln	Ala	His	Arg	Arg	Gly	Leu	Arg	Val	Ile	
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Glu	Gly	Thr	Asn	Gly	Glu	Asn	Leu	Pro	Glu	Thr	His	Glu	Phe	Leu	Lys
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Arg	Cys	Arg	Arg	Val	Ile	Asp	Glu	Glu	Tyr	Pro	Gly	Arg	Ile	Val	Leu
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Ala	Glu	Ala	Asn	Gln	Trp	Pro	His	Asp	Val	Val	Glu	Tyr	Phe	Gly	Glu
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Lys	Glu	Lys	Gly	Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	Pro	Leu	Met
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Pro	Arg	Ile	Phe	Met	Gly	Val	Arg	Gln	Gly	Ser	Arg	Thr	Pro	Val	Ser
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Arg	Ala	Asn	Val	Gly	Ile	Arg	Arg	Arg	Leu	Ala	Thr	Leu	Val	Asp	Gly
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Asp	Arg	Asn	Gln	Leu	Glu	Leu	Leu	His	Gly	Leu	Leu	Leu	Ser	Leu	Pro
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Ile	Trp	Leu	Pro	Asp	Arg	Asp	Gly	Val	Arg	Thr	Pro	Met	Gln	Trp	Ser
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Leu	Pro	Ala	Ile	Gln	Asn	Asp	Arg	Phe	Gly	Tyr	Ala	Gln	Val	Asn	Val
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Glu	Thr	Gln	Leu	Lys	Gln	Glu	Asn	Ser	Leu	Leu	Gln	Trp	Ile	Arg	Asn
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Gln	Ile	Met	Ile	Arg	Lys	Gln	Tyr	Lys	Ala	Phe	Gly	Lys	Gly	Thr	Tyr
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Ile	Gln	Ala	Val	Tyr	Leu	Arg	His	Glu	Pro	Asp	Asn	Glu	Glu	Tyr	Leu			
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Ala	Ser	Phe	Pro	Leu	Asn	Lys	Asp	Arg	Glu	Ile	Thr	Gln	Tyr	Val	Phe			
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aaa	gtg	atc	aca	gaa	ggt	gcc	act	gtc	tgg	tta	gac	gct	cgt	ggc	gta			288
Lys	Val	Ile	Thr	Glu	Gly	Ala	Thr	Val	Trp	Leu	Asp	Ala	Arg	Gly	Val			
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cag	aaa	cgg	atg	cca	ggc	agc	gag	tac	cat	ttc	aaa	tac	aac	caa	tct			336
Gln	Lys	Arg	Met	Pro	Gly	Ser	Glu	Tyr	His	Phe	Lys	Tyr	Asn	Gln	Ser			
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cat	cag	ccg	cca	gag	tgg	gtg	agt	gag	cag	att	ttc	tac	caa	att	ttc			384
His	Gln	Pro	Pro	Glu	Trp	Val	Ser	Glu	Gln	Ile	Phe	Tyr	Gln	Ile	Phe			
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cct	gat	cga	ttc	tgt	aat	ggt	aac	cca	gag	atc	agc	gtt	aaa	agt	ggc			432
Pro	Asp	Arg	Phe	Cys	Asn	Gly	Asn	Pro	Glu	Ile	Ser	Val	Lys	Ser	Gly			
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Gly	Ala	Ala	Val	Asp	Lys	His	Asn	Gly	Tyr	Gly	Gly	Cys	Glu	Phe	Tyr			
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Leu	Gly	Val	Thr	Ala	Leu	Tyr	Leu	Asn	Pro	Ile	Phe	Ser	Ala	Pro	Ser			
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Asn	His	Lys	Tyr	Asp	Thr	Thr	Asp	Tyr	Leu	Thr	Ile	Asp	Pro	His	Leu			
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Gly	Met	Lys	Ile	Val	Leu	Asp	Ala	Val	Phe	Asn	His	Thr	Ser	Cys	Glu			
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His	Pro	Trp	Phe	Asp	Lys	Asn	Gly	Val	Gly	Glu	Ile	Gly	Ala	Tyr	His			
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Gln	Asn	Tyr	Ile	Gly	Trp	Lys	Gly	Val	Asp	Ser	Leu	Pro	Val	Leu	Asn			
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Phe	Glu	Asn	Ala	Glu	Val	Arg	Asn	Tyr	Ile	Tyr	Ala	Ser	Glu	His	Ala			
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Ala	Ile	Arg	His	Trp	Leu	Lys	Ala	Pro	Tyr	Arg	Ile	Asp	Gly	Trp	Arg			
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Pro Val Arg Ala Leu Leu Ala Gln Lys Asp	Ile Ala Tyr His Pro Ile					1248
405	gag atc gac tgc atc gat	410	ttt gtt gat tgg cta aat	415	gaa tca cgc gct	
Glu Ile Asp Cys Ile Asp Phe Val Asp Trp Leu Asn Glu Ser Arg Ala						1296
420	aaa gta cct tgg ctt aac	425	cag ctc agc cag ttc	430	aat caa ctt gac agc	
Lys Val Pro Trp Leu Asn Gln Leu Ser Gln Phe Asn Gln Leu Asp Ser						1344
435	cac gat acc gca cgt ttt	440	att acc ttg ttg gaa aat	445	gac gac caa gcg cgc	
His Asp Thr Ala Arg Phe Ile Thr Leu Leu Glu Asn Asp Gln Ala Arg						1392
450	atg aac att gct ctc ggc	455	ttg ctg ttc act tat	460	gtc gga acc cct tgt	
Met Asn Ile Ala Leu Gly Leu Leu Phe Thr Tyr Val Gly Thr Pro Cys						1440
465	atc tat tat ggt agt gaa gtt	470	gga ctg gaa ggt gag	475	aat gac cca gat	
Ile Tyr Tyr Gly Ser Glu Val Gly Leu Glu Gly Glu Asn Asp Pro Asp						1488
485	aac cgc cgc tgt ttc	490	ccg tgg gag cgt gtt	495	ggt cat gtg gag acg ttc	
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500	caa tat cac caa cgt ctc	505	att gaa ctt cgc aaa	510	acg tct aag gcg ctg	
Gln Tyr His Gln Arg Leu Ile Glu Leu Arg Lys Thr Ser Lys Ala Leu						1584
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530	ttt gct cgt cag tat ggt	535	gaa gac act ctg ctt	540	gtg atg gtc aac tta	
Phe Ala Arg Gln Tyr Gly Glu Asp Thr Leu Leu Val Met Val Asn Leu						1680
545	gat tcg aag gca tgc tct	550	atg acg ctg cca att	555	tggtg caa ctt gga aag	
Asp Ser Lys Ala Cys Ser Met Thr Leu Pro Ile Trp Gln Leu Gly aag						1728
565	ccg caa gga cgt ctg gtt	570	tcc cta ttg ggt aat	575	gaa agt gct ttg caa	
Pro Gln Gly Arg Leu Val Ser Leu Leu Gly Asn Glu Ser Ala Leu Gln						1776
580	gta aat agt aaa gtt gtg	585	ggt aat atc tct tct	590	gaa tcc att caa att	
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<213> Vibrio vulnificus CMCP6

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Val Glu Met Gln Arg Val Ser Lys Leu Gly Glu Leu Asp Gly Trp Gln	35 40 45
Ala Ser Phe Pro Leu Asn Lys Asp Arg Glu Ile Thr Gln Tyr Val Phe	50 55 60
65 Lys Val Ile Thr Glu Gly Ala Thr Val Trp Leu Asp Ala Arg Gly Val	65 70 75
Gln Lys Arg Met Pro Gly Ser Glu Tyr His Phe Lys Tyr Asn Gln Ser	80 85 90
His Gln Pro Glu Trp Val Ser Glu Gln Ile Phe Tyr Gln Ile Phe	95 100 105
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Lys	Val	Pro	Trp	Leu	Asn	Gln	Leu	Ser	Gln	Phe	Asn	Gln	Leu	Asp	Ser
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His	Asp	Thr	Ala	Arg	Phe	Ile	Thr	Leu	Leu	Glu	Asn	Asp	Gln	Ala	Arg
	450					455					460				
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Ile	Tyr	Tyr	Gly	Ser	Glu	Val	Gly	Leu	Glu	Gly	Glu	Asn	Asp	Pro	Asp
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Ala	Val	Ile	Asn	His	Ser	Gly	Tyr	Ser	Thr	Leu	Ala	Asp	Leu	Gln	Phe	
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gcg Ala	acg Thr	aaa Lys	agc Ser	ctc Leu 485	gat Asp	gcg Ala	tgg Trp	cgc Arg	aaa Lys 490	gcc Ala	aat Asn	ggc Gly	caa Gln	tcg Ser 495	ggt Gly	1488
gcg Ala	cca Pro	ttt Phe 500	tgg Trp	atg Met	atg Met	ggg Gly	gaa Glu	gtg Val 505	tgg Trp	ggc Gly	cac His	tca Ser	gcc Ala 510	tac Tyr	cgc Arg	1536
agc Ser	cct Pro	tat Tyr 515	ttt Phe	gac Asp	gac Asp	ggt Gly	ttt Phe 520	gat Asp	gcg Ala	ctg Leu	atc Ile	aac Asn 525	ttc Phe	gat Asp	atg Met	1584
cag Gln	aag Lys 530	aaa Lys	ctc Leu	gat Asp	aaa Lys	ggc Gly 535	gca Ala	gcc Ala	tgt Cys	ttt Phe	agc Ser 540	caa Gln	atg Met	gcc Ala	gat Asp	1632
acc Thr 545	tat Tyr	cgc Arg	gat Asp	tac Tyr	gcc Ala 550	aac Asn	acc Thr	atc Ile	gcg Ala	cag Gln 555	cag Gln	agt Ser	gat Asp	ttt Phe	aat Asn 560	1680
cca Pro	gtg Val	agc Ser	tac Tyr	atg Met 565	tcc Ser	tcg Ser	cac His	gat Asp	act Thr 570	gag Glu	ctg Leu	ttc Phe	ttt Phe	agc Ser 575	cga Arg	1728
ttt Phe	aaa Lys	gac Asp	tat Tyr 580	gcc Ala	gtg Val	cag Gln	cgc Arg	aac Asn 585	gcc Ala	gcg Ala	aac Asn	gca Ala	ttg Leu 590	ctg Leu	ctc Leu	1776
agc Ser	cct Pro	ggt Gly 595	gcg Ala	gtg Val	cag Gln	att Ile	tac Tyr 600	tat Tyr	ggt Gly	gat Asp	gaa Glu	gta Val 605	ggg Gly	cgc Arg	aat Asn	1824
att Ile	ggc Gly 610	cca Pro	tac Tyr	gcg Ala	gat Asp	gat Asp 615	ttc Phe	cat His	caa Gln	ggc Gly	act Thr 620	cgc Arg	tcg Ser	gac Asp	atg Met	1872
gta Val 625	tgg Trp	caa Gln	ttg Leu	agc Ser	gca Ala 630	gag Glu	caa Gln	caa Gln	aca Thr	ttg Leu 635	ctc Leu	aat Asn	cat His	tgg Trp	cag Gln 640	1920
aaa Lys	ctg Leu	ggc Gly	cag Gln	ttc Phe 645	cgc Arg	cgg Arg	gcg Ala	cat His	ccc Pro 650	gcg Ala	att Ile	ggc Gly	gct Ala	ggt Gly 655	gtg Val	1968
cat His	cag Gln	gag Glu	att Ile 660	gaa Glu	caa Gln	act Thr	ggc Gly	gcg Ala 665	tac Tyr	ggt Val	ttc Phe	tcc Ser	cgc Arg 670	acc Thr	tta Leu	2016
ggg Gly	gat Asp	gac Asp 675	aaa Lys	gtg Val	gtt Val	gtg Val	gcg Ala 680	ttt Phe	gtt Val	ggt Gly	cac His	gcc Ala 685	gtg Val	caa Gln		2061
tag																2064

<210> 102
 <211> 687
 <212> PRT
 <213> *Vibrio vulnificus* CMCP6

<400> 102
 Met Lys Leu Asn Ala Ile Thr Leu Thr Leu Leu Ser Ser Thr Ala
 1 5 10 15
 Ala Ile Ala Glu Pro Asn Leu Thr Ile Ser Thr Thr Thr Asn Ser Arg
 20 25 30
 Asp Phe Pro Leu Ser Ala Glu Gln Pro Leu Val Val Pro Leu Val Lys
 35 40 45
 Glu Ser Tyr Gln Leu Lys Ile Thr Gly Leu Glu Gly Asp Cys Gln Ala
 50 55 60
 Pro Asp Ala Gln Val Ile Lys Phe Asn Gln Pro Ile Ala Leu Asn Cys
 65 70 75 80
 Gly Lys Val Thr Glu Leu Pro Leu Lys Ile Arg Phe Thr Gly Asp Tyr
 85 90 95
 Ser Phe Glu Leu Asp Ala Asn Ala Asn Thr Leu Thr Phe Lys Arg Glu
 100 105 110
 Pro Lys Lys Val Ala Lys Thr Glu Phe Lys Arg Pro Leu Pro Gln Val
 115 120 125
 Thr Cys Glu Val Tyr Gln Gly Gly Glu Val Thr Ile Glu Leu Gly Asp
 130 135 140
 Ser Phe Lys Asp Gly Thr Ser Leu Arg Asp Ala Tyr Ser Gly Gln Val
 145 150 155 160
 Val Ser Val Lys Lys Gly Lys Val Ser Leu Thr Pro Ser Ala Gln Ser
 165 170 175
 Gly Gly Leu Val Leu Leu Glu Pro Val Lys Gln Asn Lys Lys Ala Arg
 180 185 190
 Pro Phe Asp Tyr Arg Asn Ala Asn Ile Tyr Phe Val Met Val Asp Arg
 195 200 205
 Phe Asn Asn Gly Asp Thr Ser Asn Asp Gln Ser Tyr Gly Arg Gln Lys
 210 215 220
 Asp Gly Lys Glu Glu Ile Gly Thr Phe His Gly Gly Asp Leu Lys Gly
 225 230 235 240
 Val Ile Glu Lys Leu Asp Tyr Ile Gln Arg Leu Gly Thr Asp Ala Ile
 245 250 255
 Trp Leu Ser Pro Ile Val Glu Gln Val His Gly Phe Val Gly Gly Gly
 260 265 270
 Asp Ser Gly Ser Phe Pro Phe Tyr Ala Tyr His Gly Tyr Trp Thr Arg
 275 280 285
 Asp Phe Thr Lys Ile Asp Glu Asn Phe Gly Arg Asp Glu Asp Leu Lys
 290 295 300
 Thr Leu Val Glu Glu Ala His Lys Arg Gly Ile Lys Val Leu Leu Asp
 305 310 315 320
 Ala Val Ile Asn His Ser Gly Tyr Ser Thr Leu Ala Asp Leu Gln Phe
 325 330 335
 Asp Gly Met Gln Val Thr Thr Lys Glu Ala Asn Leu Pro Glu Lys Trp
 340 345 350
 Ala Asn Trp Gln Pro Thr Ser Gly Glu Asn Trp His Ser Tyr His Ser
 355 360 365
 Ala Ile Asp Tyr Gln Ser Gln Asn Trp Ser Gln Trp Trp Gly Ala Asp
 370 375 380
 Trp Val Arg Thr Gly Leu Pro Gly Tyr Gln Gln Pro Gly Ser Ser Asp
 385 390 395 400
 Ile Thr Leu Ser Leu Ala Gly Leu Pro Asp Phe Arg Thr Glu Ser Thr
 405 410 415
 Gln Ala Val Thr Pro Pro Gln Trp Leu Leu Glu Asn Pro Gly Thr Arg
 420 425 430
 Val Val Ala Arg Asp Asn Tyr Thr Val Ser Asp Tyr Leu Ile Glu Trp
 435 440 445
 Gln Thr Asp Trp Val Lys Arg Phe Gly Ile Asp Gly Tyr Arg Val Asp
 450 455 460
 Thr Val Lys His Val Glu Gly Glu Val Trp Lys Arg Leu Lys Gln Glu
 465 470 475 480
 Ala Thr Lys Ser Leu Asp Ala Trp Arg Lys Ala Asn Gly Gln Ser Gly
 485 490 495
 Ala Pro Phe Trp Met Met Gly Glu Val Trp Gly His Ser Ala Tyr Arg

Ser	Pro	Tyr	500	Phe	Asp	Asp	Gly	Phe	505	Asp	Ala	Leu	Ile	Asn	510	Phe	Asp	Met
Gln	Lys	515	Lys	Leu	Asp	Lys	Gly	520	Ala	Ala	Cys	Phe	Ser	525	Gln	Met	Ala	Asp
Thr	545	Tyr	Arg	Asp	Tyr	Ala	550	Asn	Thr	Ile	Ala	Gln	555	Gln	Ser	Asp	Phe	Asn
Pro	Val	Ser	Tyr	Met	565	Ser	Ser	His	Asp	Thr	570	Glu	Leu	Phe	Phe	Ser	575	Arg
Phe	Lys	Asp	Tyr	Ala	580	Val	Gln	Arg	Asn	585	Ala	Ala	Asn	Ala	Leu	590	Leu	Leu
Ser	Pro	Gly	Ala	Val	Gln	Ile	Tyr	600	Tyr	Gly	Asp	Glu	Val	605	Gly	Arg	Asn	
Ile	Gly	610	Pro	Tyr	Ala	Asp	Asp	615	Phe	His	Gln	Gly	Thr	620	Arg	Ser	Asp	Met
Val	625	Trp	Gln	Leu	Ser	Ala	630	Glu	Gln	Gln	Thr	Leu	635	Leu	Asn	His	Trp	Gln
Lys	Leu	Gly	Gln	Phe	645	Arg	Arg	Ala	His	Pro	650	Ala	Ile	Gly	Ala	Gly	655	Val
His	Gln	Glu	Ile	Glu	Gln	Thr	Gly	Ala	665	Tyr	Val	Phe	Ser	Arg	670	Thr	Leu	
Gly	Asp	Asp	675	Lys	Val	Val	Val	Ala	680	Phe	Val	Gly	His	Ala	685	Gln		

<213> *Bradyrhizobium japonicum* USDA 110

<222> (1) .. (1464)

atg Met 1	gca Ala	cag Gln	ggc Gly	gag Glu 5	gtg Val	aat Asn	tgg Trp	tgg Trp	cgc Arg 10	gac Asp	ggc Gly	atc Ile	ttc Phe 15	tac Tyr 20	cag Gln
gtc Val	tat Tyr	ccg Pro	cgc Arg 20	tcg Ser	ttt Phe	cag Gln	gac Asp	agc Ser 25	gac Asp	ggg Gly	gac Asp	ggc Gly	gtc Val 30	ggc Gly	gat Asp
ctc Leu	gcc Ala	ggc Gly 35	atc Ile	ttg Leu	cgg Arg	cgg Arg	ctg Leu 40	cct Pro	tat Tyr	gtg Val	aag Lys	tcg Ser 45	ctc Leu	ggc Gly	gtc Val
gac Asp	gcg Ala 50	atc Ile	tgg Trp	ctg Leu	tcg Ser	ccg Pro 55	atc Ile	ttc Phe	ccc Pro	tcg Ser	ccg Pro 60	atg Met	gcc Ala	gat Asp	ttc Phe
ggc Gly 65	tac Tyr	gac Asp	att Ile	tcc Ser	gac Asp 70	cat His	acc Thr	ggc Gly	atc Ile	gat Asp 75	ccg Pro	ctg Leu	ttc Phe	ggc Gly	acg Thr 80
atg Met	gcg Ala	gat Asp	ttc Phe	gac Asp 85	gcg Ala	ctg Leu	ctc Leu	acg Thr	gcc Ala 90	gcg Ala	cat His	gag Glu	cat His	ggg Gly 95	ctc Leu
aag Lys	ctg Leu	atc Ile	ctc Leu 100	gac Asp	ctc Leu	gtg Val	ccc Pro	aac Asn 105	cac His	acc Thr	tcg Ser	gac Asp	cag Gln 110	cat His	ccc Pro
tgg Trp	ttt Phe	gtc Val 115	gag Glu	agc Ser	cgg Arg	tcc Ser	tcg Ser 120	cgc Arg	gac Asp	aat Asn	ccc Pro	aag Lys 125	cgc Arg	gac Asp	tgg Trp
tac Tyr	gtc Val 130	tgg Trp	cgc Arg	gat Asp	ccg Pro	gcg Ala 135	ccc Pro	gat Asp	ggc Gly	ggc Gly	gtg Val 140	ccg Pro	aac Asn	aac Asn	tgg Trp
ctg Leu 145	tcc Ser	gag Glu	ttc Phe	ggc Gly	ggc Gly 150	agc Ser	gcg Ala	tgg Trp	cag Gln	ttc Phe 155	gac Asp	gag Glu	acg Thr	acg Thr	ggg Gly 160
caa Gln	tat Tyr	tac Tyr	tat Tyr	cac His 165	gcc Ala	ttc Phe	ctc Leu	gcc Ala	cag Gln 170	cag Gln	ccg Pro	gac Asp	ctc Leu	aac Asn 175	tgg Trp
cg Arg	aac Asn	ccg Pro	gac Asp	gtc Val	gcg Arg	gcg Ala	gcg Ala	atc Ile	tac Tyr	gac Asp	gcg Ala	atg Met	cgg Arg	ttc Phe	tgg Trp

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ctg	gac	aag	180	gtc	gac	ggc	185	gtc	gac	gtg	190	cac	ctg	
Leu	Asp	Lys	195	Val	Asp	Gly	200	Val	Asp	Val	205	Trp	His	Leu
atc	aag	gac	gcc	gaa	ttc	cg	gac	aat	ccg	ctc	aat	cct	cac	gtc
Ile	Lys	Asp	Ala	Glu	Phe	Arg	215	Asn	Pro	Leu	Asn	Pro	His	Val
gag	ggc	cgt	ccg	ccg	aac	gag	aag	atc	ctg	acg	caa	tat	tcc	acc
Glu	Gly	Arg	Pro	Pro	Asn	Glu	Lys	Ile	Leu	Thr	Gln	Tyr	Ser	Thr
225					230					235				240
cag	ccg	ccg	ttc	aac	ttc	gcg	ctg	ctc	tcg	acg	ttc	tgg	agc	gcg
Gln	Pro	Pro	Phe	Asn	Phe	Ala	Leu	Leu	Ser	Thr	Phe	Trp	Ser	Ala
			245						250					255
tcg	atc	gag	acg	atc	atc	gac	gac	tac	gag	aag	gcg	ctg	ccg	aaa
Ser	Ile	Glu	Thr	Ile	Ile	Asp	Asp	Tyr	Glu	Lys	Ala	Leu	Pro	Lys
			260					265					270	
gcc	tgg	ccg	aac	tgg	gtg	ctc	ggc	aat	cac	gac	cg	ccg	cg	gtc
Ala	Trp	Pro	Asn	Trp	Val	Leu	Gly	Asn	His	Asp	Arg	Pro	Arg	Val
			275				280						285	Ala
agc	cgt	gtc	ggg	ccc	gag	cag	gcc	cg	gtc	gcc	gcc	atg	ctg	ctg
Ser	Arg	Val	Gly	Pro	Glu	Gln	Ala	Arg	Val	Ala	Ala	Met	Leu	Leu
			290			295				300				
acg	ctg	cg	ggc	acg	ccg	acg	ctc	tat	tac	ggc	gac	gag	atc	ggc
Thr	Leu	Arg	Gly	Thr	Pro	Thr	Leu	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly
305					310					315				320
cat	cag	ctc	gcg	atc	gcg	ccc	gag	gac	gtg	cg	gat	ccc	ttc	gag
His	Gln	Leu	Ala	Ile	Ala	Pro	Glu	Asp	Val	Arg	Asp	Pro	Phe	Glu
			325						330					335
aac	gtg	ccc	ggc	atc	ggc	gtc	ggc	cg	gac	ggt	tgc	cg	acg	ccg
Asn	Val	Pro	Gly	Ile	Gly	Val	Gly	Arg	Asp	Gly	Cys	Arg	Thr	Pro
			340				345						350	Met
cag	tgg	gat	tcc	tcg	aac	ttc	gcc	ggc	ttc	tcg	aac	gtc	agg	ccg
Gln	Trp	Asp	Ser	Ser	Asn	Phe	Ala	Gly	Phe	Ser	Asn	Val	Arg	Pro
			355				360					365		Trp
ctg	ccg	ctg	cct	gag	gat	cat	atc	cac	gag	aat	gtc	aat	ctc	gaa
Leu	Pro	Leu	Pro	Glu	Asp	His	Ile	His	Glu	Asn	Val	Val	Asn	Glu
			370			375					380			
gcc	gac	acg	cg	tcg	atc	ctc	agc	ctg	tac	agg	cg	ctc	atc	gtg
Ala	Asp	Thr	Arg	Ser	Ile	Leu	Ser	Leu	Tyr	Arg	Arg	Leu	Ile	Val
385					390					395				400
cga	aag	agc	agc	ccg	ccc	ctg	gtg	gcc	ggc	aac	tat	cat	ccg	atc
Arg	Lys	Ser	Ser	Pro	Pro	Leu	Val	Ala	Gly	Asn	Tyr	His	Pro	Ile
				405					410					415
gcg	cag	ggc	gat	ctc	ctg	atc	tac	cg	cg	gag	gcc	gag	ggc	agg
Ala	Gln	Gly	Asp	Leu	Leu	Ile	Tyr	Arg	Arg	Glu	Ala	Glu	Gly	Arg
			420					425					430	Ala
gtg	atc	gtg	gcc	ctc	aat	ctc	ggc	ccc	gac	ccg	atc	gcc	gtc	acc
Val	Ile	Val	Ala	Leu	Asn	Leu	Gly	Pro	Asp	Pro	Ile	Ala	Val	Thr
			435				440					445		Thr
agc	gcg	atc	cg	ttc	ggc	agc	gag	atc	ctg	ctg	tcg	acg	ttc	ctg
Ser	Ala	Ile	Arg	Phe	Gly	Ser	Glu	Ile	Leu	Leu	Ser	Thr	Phe	Leu
			450			455					460			Asp
cgt	gag	ggt	gag	cg	ctg	gaa	ggg	gtg	ctg	gat	ctg	cg	ggg	aat
Arg	Glu	Gly	Glu	Arg	Leu	Glu	Gly	Val	Leu	Asp	Leu	Arg	Gly	Asn
465					470					475				480
ggg	gtg	atc	gtg	cag	ccg	ccc	taa							
Gly	Val	Ile	Val	Gln	Pro	Pro								
				485										

<210> 104

<211> 487

<212> PRT

<213> Bradyrhizobium japonicum USDA 110

<400> 104

Met Ala Gln Gly Glu Val Asn Trp Trp Arg Asp Gly Ile Phe Tyr Gln
1 5 10 15
Val Tyr Pro Arg Ser Phe Gln Asp Ser Asp Gly Asp Gly Val Gly Asp
20 25 30

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Leu Ala Gly Ile Leu Arg Arg Leu Pro Tyr Val Lys Ser Leu Gly Val
 35 40 45
 Asp Ala Ile Trp Leu Ser Pro Ile Phe Pro Ser Pro Met Ala Asp Phe
 50 55 60
 Gly Tyr Asp Ile Ser Asp His Thr Gly Ile Asp Pro Leu Phe Gly Thr
 65 70 75 80
 Met Ala Asp Phe Asp Ala Leu Leu Thr Ala His Glu His Gly Leu
 85 90 95
 Lys Leu Ile Leu Asp Leu Val Pro Asn His Thr Ser Asp Gln His Pro
 100 105 110
 Trp Phe Val Glu Ser Arg Ser Ser Arg Asp Asn Pro Lys Arg Asp Trp
 115 120 125
 Tyr Val Trp Arg Asp Pro Ala Pro Asp Gly Gly Val Pro Asn Asn Trp
 130 135 140
 Leu Ser Glu Phe Gly Gly Ser Ala Trp Gln Phe Asp Glu Thr Thr Gly
 145 150 155 160
 Gln Tyr Tyr Tyr His Ala Phe Leu Ala Gln Gln Pro Asp Leu Asn Trp
 165 170 175
 Arg Asn Pro Asp Val Arg Ala Ala Ile Tyr Asp Ala Met Arg Phe Trp
 180 185 190
 Leu Asp Lys Gly Val Asp Gly Phe Arg Val Asp Val Ile Trp His Leu
 195 200 205
 Ile Lys Asp Ala Glu Phe Arg Asp Asn Pro Leu Asn Pro His Tyr Val
 210 215 220
 Glu Gly Arg Pro Pro Asn Glu Lys Ile Leu Thr Gln Tyr Ser Thr Asp
 225 230 235 240
 Gln Pro Pro Phe Asn Phe Ala Leu Leu Ser Thr Phe Trp Ser Ala Arg
 245 250 255
 Ser Ile Glu Thr Ile Ile Asp Asp Tyr Glu Lys Ala Leu Pro Lys Gly
 260 265 270
 Ala Trp Pro Asn Trp Val Leu Gly Asn His Asp Arg Pro Arg Val Ala
 275 280 285
 Ser Arg Val Gly Pro Glu Gln Ala Arg Val Ala Ala Met Leu Leu Leu
 290 295 300
 Thr Leu Arg Gly Thr Pro Thr Leu Tyr Tyr Gly Asp Glu Ile Gly Met
 305 310 315 320
 His Gln Leu Ala Ile Ala Pro Glu Asp Val Arg Asp Pro Phe Glu Lys
 325 330 335
 Asn Val Pro Gly Ile Gly Val Gly Arg Asp Gly Cys Arg Thr Pro Met
 340 345 350
 Gln Trp Asp Ser Ser Asn Phe Ala Gly Phe Ser Asn Val Arg Pro Trp
 355 360 365
 Leu Pro Leu Pro Glu Asp His Ile His Glu Asn Val Val Asn Leu Glu
 370 375 380
 Ala Asp Thr Arg Ser Ile Leu Ser Leu Tyr Arg Arg Leu Ile Val Leu
 385 390 395 400
 Arg Lys Ser Ser Pro Leu Val Ala Gly Asn Tyr His Pro Ile Ala
 405 410 415
 Ala Gln Gly Asp Leu Leu Ile Tyr Arg Arg Glu Ala Glu Gly Arg Ala
 420 425 430
 Val Ile Val Ala Leu Asn Leu Gly Pro Asp Pro Ile Ala Val Thr Thr
 435 440 445
 Ser Ala Ile Arg Phe Gly Ser Glu Ile Leu Leu Ser Thr Phe Leu Asp
 450 455 460
 Arg Glu Gly Glu Arg Leu Glu Gly Val Leu Asp Leu Arg Gly Asn Glu
 465 470 475 480
 Gly Val Ile Val Gln Pro Pro
 485

<210> 105

<211> 1698

<212> DNA

<213> Bradyrhizobium japonicum USDA 110

<220>

<221> CDS

<222> (1)..(1698)

<400> 105

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Met	Ile	Asp	Asp	Leu	Trp	Tyr	Lys	Asn	Gly	Val	Ile	Tyr	Cys	Leu	Ser	
1				5					10					15		
gtc	ggc	acc	tat	atg	gat	gcc	gac	ggc	gac	ggc	gtc	ggc	gac	ttc	aag	96
Val	Gly	Thr	Tyr	Met	Asp	Ala	Asp	Gly	Asp	Gly	Val	Gly	Asp	Phe	Lys	
			20					25					30			
ggc	ctg	ctg	cgg	cgg	ctc	gac	tat	ctg	cac	ggc	ctc	ggc	atc	acc	acg	144
Gly	Leu	Leu	Arg	Arg	Leu	Asp	Tyr	Leu	His	Gly	Leu	Gly	Ile	Thr	Thr	
			35				40					45				
atc	tgg	ctg	atg	cca	ttc	cag	acc	tcg	ccc	ggc	cgc	gac	gac	ggc	tac	192
Ile	Trp	Leu	Met	Pro	Phe	Gln	Thr	Ser	Pro	Gly	Arg	Asp	Asp	Gly	Tyr	
	50					55				60						
gac	atc	ggc	gac	tat	tac	agc	gtc	gat	tcc	cgc	tac	ggc	acg	ctc	ggc	240
Asp	Ile	Ala	Asp	Tyr	Tyr	Ser	Val	Asp	Ser	Arg	Tyr	Gly	Thr	Leu	Gly	
65					70				75						80	
gac	ttc	gtc	gaa	ttc	gcc	cat	ggc	tgc	aag	cag	cgc	ggc	atc	cgc	atc	288
Asp	Phe	Val	Glu	Phe	Ala	His	Gly	Cys	Lys	Gln	Arg	Gly	Ile	Arg	Ile	
				85					90					95		
atc	atc	gac	ctc	gtc	gtc	aac	cac	acc	tcg	gac	cag	cat	cgc	tgg	ttc	336
Ile	Ile	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Gln	His	Arg	Trp	Phe	
			100					105					110			
aag	gac	gcg	cgg	cgc	gac	aag	aac	tcg	ccc	tat	cgc	gac	tgg	tac	gtc	384
Lys	Asp	Ala	Arg	Arg	Asp	Lys	Asn	Ser	Pro	Tyr	Arg	Asp	Trp	Tyr	Val	
		115					120					125				
tgg	tcc	gac	acg	aag	ccc	gcc	aat	gcc	aac	aag	ggc	atg	gtg	ttt	ccc	432
Trp	Ser	Asp	Thr	Lys	Pro	Ala	Asn	Ala	Asn	Lys	Gly	Met	Val	Phe	Pro	
	130					135					140					
ggc	gtg	cag	aaa	tcg	acc	tgg	acg	cgc	gac	aag	gac	gcc	ggc	gcc	tgg	480
Gly	Val	Gln	Lys	Ser	Thr	Trp	Thr	Arg	Asp	Lys	Asp	Ala	Gly	Ala	Trp	
					150					155					160	
tat	ttt	cat	cgc	ttc	tac	gat	ttt	cag	ccc	gac	ctc	aac	acc	tcg	aac	528
Tyr	Phe	His	Arg	Phe	Tyr	Asp	Phe	Gln	Pro	Asp	Leu	Asn	Thr	Ser	Asn	
				165				170						175		
ccg	cac	gtg	cag	gcc	gag	atc	ttg	aag	atc	atg	ggc	ttc	tgg	atc	cag	576
Pro	His	Val	Gln	Ala	Glu	Ile	Leu	Lys	Ile	Met	Gly	Phe	Trp	Ile	Gln	
			180					185					190			
ctc	ggc	gtc	tcc	gga	ttc	cgc	atg	gac	gcc	gtg	ccc	ttc	gtg	atc	gcg	624
Leu	Gly	Val	Ser	Gly	Phe	Arg	Met	Asp	Ala	Val	Pro	Phe	Val	Ile	Ala	
		195					200					205				
acc	aag	ggc	gcc	aag	gtg	aag	aag	ccg	gtc	gag	caa	tac	gac	atg	ctg	672
Thr	Lys	Gly	Ala	Lys	Val	Lys	Lys	Pro	Val	Glu	Gln	Tyr	Asp	Met	Leu	
	210					215					220					
cgc	gcg	ttc	cgc	gaa	ttc	ctg	caa	tgg	cgc	cag	ggt	gac	gcc	atc	atc	720
Arg	Ala	Phe	Arg	Glu	Phe	Leu	Gln	Trp	Arg	Gln	Gly	Asp	Ala	Ile	Ile	
					230					235					240	
ctc	gcc	gaa	gcc	aat	gtg	ctg	ccg	gaa	acc	gac	atg	gaa	tat	ttc	ggc	768
Leu	Ala	Glu	Ala	Asn	Val	Leu	Pro	Glu	Thr	Asp	Met	Glu	Tyr	Phe	Gly	
				245					250					255		
cgc	gat	gcc	gac	cgc	atg	cac	atg	atg	ttc	aac	ttc	cac	gtc	aac	cag	816
Arg	Asp	Ala	Asp	Arg	Met	His	Met	Met	Phe	Asn	Phe	His	Val	Asn	Gln	
			260					265					270			
cat	ctg	ttc	tat	gcg	ctg	gcg	tcg	gcc	gac	tcg	cga	ccg	ctg	gca	aag	864
His	Leu	Phe	Tyr	Ala	Leu	Ala	Ser	Ala	Asp	Ser	Arg	Pro	Leu	Ala	Lys	
		275					280					285				
gcg	ctg	aag	gcg	acc	aag	ccg	cgg	ccg	ggc	tcg	gcg	caa	tgg	ggc	ctg	912
Ala	Leu	Lys	Ala	Thr	Lys	Pro	Arg	Pro	Gly	Ser	Ala	Gln	Trp	Gly	Leu	
		290				295					300					
ttc	ctg	cgc	aat	cac	gac	gag	ctc	gat	ctc	ggg	cgc	ttg	acc	ccg	gcg	960
Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Asp	Leu	Gly	Arg	Leu	Thr	Pro	Ala	
					310					315					320	
cag	cgc	gac	acc	gtg	ttc	aag	agc	ttc	ggc	ccc	gac	aag	gac	atg	cag	1008
Gln	Arg	Asp	Thr	Val	Phe	Lys	Ser	Phe	Gly	Pro	Asp	Lys	Asp	Met	Gln	
				325					330					335		
ctc	tac	gac	cgc	ggc	att	cgc	cgc	cgc	ctc	gcg	ccg	atg	ctc	ggc	ggc	1056
Leu	Tyr	Asp	Arg	Gly	Ile	Arg	Arg	Arg	Leu	Ala	Pro	Met	Leu	Gly	Gly	
			340					345					350			
gac	cgc	agg	cgg	ctc	gag	ctt	gcc	tac	agc	ctg	atg	tgc	acg	ctg	ccg	1104
Asp	Arg	Arg	Arg	Leu	Glu	Leu	Ala	Tyr	Ser	Leu	Met	Cys	Thr	Leu	Pro	
		355					360					365				

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gga	acg	ccc	gtg	atc	cgc	tat	ggc	gac	gag	atc	ggg	atg	ggc	gac	gat	1152
Gly	Thr	Pro	Val	Ile	Arg	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly	Asp	Asp	
370						375					380					
ctc	tca	ttg	ccg	gag	cgc	aat	tgc	gcg	cgc	acg	ccg	atg	caa	tgg	tcg	1200
Leu	Ser	Leu	Pro	Glu	Arg	Asn	Cys	Ala	Arg	Thr	Pro	Met	Gln	Trp	Ser	
385						390										
acc	gag	ccg	cat	ggc	ggc	ttc	acc	aag	aac	gac	aag	ccg	gcc	tgt	ccc	1248
Thr	Glu	Pro	His	Gly	Gly	Phe	Thr	Lys	Asn	Asp	Lys	Pro	Ala	Cys	Pro	
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gtc	atc	gac	aag	ggc	cct	tat	ggc	ttt	ccg	cac	gtc	aac	gtc	gcc	aag	1296
Val	Ile	Asp	Lys	Gly	Pro	Tyr	Gly	Phe	Pro	His	Val	Asn	Val	Ala	Lys	
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cag	cgg	cgc	gat	gcc	aat	tcc	atg	ctg	aac	tgg	acc	gaa	cgc	atc	gtc	1344
Gln	Arg	Arg	Asp	Ala	Asn	Ser	Met	Leu	Asn	Trp	Thr	Glu	Arg	Ile	Val	
			435				440					445				
cgc	atg	cgc	aag	gag	gtg	ccg	gag	atc	ggc	tgg	ggc	gat	ttc	gcg	gtc	1392
Arg	Met	Arg	Lys	Glu	Val	Pro	Glu	Ile	Gly	Trp	Gly	Asp	Phe	Ala	Val	
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Ile	Ala	Thr	Arg	Asp	Pro	Ala	Val	Phe	Ile	Met	Arg	Tyr	Asp	Trp	Arg	
					470					475						
aac	aat	tcg	gtg	ctg	ttc	gtg	cac	aat	ctc	gat	gag	aag	cca	cgc	gag	1488
Asn	Asn	Ser	Val	Leu	Phe	Val	His	Asn	Leu	Asp	Glu	Lys	Pro	Arg	Glu	
				485					490					495		
atc	gcg	ttc	tcg	acg	ggg	ctg	cct	gat	gat	gcc	ggc	gcg	cac	ctg	atc	1536
Ile	Ala	Phe	Ser	Thr	Gly	Leu	Pro	Asp	Asp	Ala	Gly	Ala	His	Leu	Ile	
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aat	ctg	ctc	gcg	gaa	gac	cac	agc	cac	gcc	gac	aag	cgc	ggc	cag	cac	1584
Asn	Leu	Leu	Ala	Glu	Asp	His	Ser	His	Ala	Asp	Lys	Arg	Gly	Gln	His	
			515				520					525				
cgc	gtc	gtg	ctg	gag	ccg	tat	ggc	tat	cgc	tgg	tat	cgg	gtc	ggc	ggg	1632
Arg	Val	Val	Leu	Glu	Pro	Tyr	Gly	Tyr	Arg	Trp	Tyr	Arg	Val	Gly	Gly	
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ttg	gat	tat	ctc	ttg	aag	cgg	agc	gat	atc	gac	ggg	gat	act	gcg	ggg	1680
Leu	Asp	Tyr	Leu	Leu	Lys	Arg	Ser	Asp	Ile	Asp	Gly	Asp	Thr	Ala	Gly	
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Asn	Lys	His	Pro	Gly												
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<210> 106

<211> 565

<212> PRT

<213> Bradyrhizobium japonicum USDA 110

<400> 106

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Gly	Leu	Leu	Arg	Arg	Leu	Asp	Tyr	Leu	His	Gly	Leu	Gly	Ile	Thr	Thr	
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Ile	Trp	Leu	Met	Pro	Phe	Gln	Thr	Ser	Pro	Gly	Arg	Asp	Asp	Gly	Tyr	
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Asp	Ile	Ala	Asp	Tyr	Tyr	Ser	Val	Asp	Ser	Arg	Tyr	Gly	Thr	Leu	Gly	
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Asp	Phe	Val	Glu	Phe	Ala	His	Gly	Cys	Lys	Gln	Arg	Gly	Ile	Arg	Ile	
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Ile	Ile	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Gln	His	Arg	Trp	Phe	
			100					105					110			
Lys	Asp	Ala	Arg	Arg	Asp	Lys	Asn	Ser	Pro	Tyr	Arg	Asp	Trp	Tyr	Val	
		115					120					125				
Trp	Ser	Asp	Thr	Lys	Pro	Ala	Asn	Ala	Asn	Lys	Gly	Met	Val	Phe	Pro	
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Gly	Val	Gln	Lys	Ser	Thr	Trp	Thr	Arg	Asp	Lys	Asp	Ala	Gly	Ala	Trp	
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Tyr	Phe	His	Arg	Phe	Tyr	Asp	Phe	Gln	Pro	Asp	Leu	Asn	Thr	Ser	Asn	
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Pro	His	Val	Gln	Ala	Glu	Ile	Leu	Lys	Ile	Met	Gly	Phe	Trp	Ile	Gln	

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Thr Lys Gly Ala Lys Val Lys Lys Pro Val Glu Gln Tyr Asp Met Leu
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Arg Ala Phe Arg Glu Phe Leu Gln Trp Arg Gln Gly Asp Ala Ile Ile
225      230      235
Leu Ala Glu Ala Asn Val Leu Pro Glu Thr Asp Met Glu Tyr Phe Gly
245      250      255
Arg Asp Ala Asp Arg Met His Met Met Phe Asn Phe His Val Asn Gln
260      265      270
His Leu Phe Tyr Ala Leu Ala Ser Ala Asp Ser Arg Pro Leu Ala Lys
275      280      285
Ala Leu Lys Ala Thr Lys Pro Arg Pro Gly Ser Ala Gln Trp Gly Leu
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Phe Leu Arg Asn His Asp Glu Leu Asp Leu Gly Arg Leu Thr Pro Ala
305      310      315
Gln Arg Asp Thr Val Phe Lys Ser Phe Gly Pro Asp Lys Asp Met Gln
325      330      335
Leu Tyr Asp Arg Gly Ile Arg Arg Arg Leu Ala Pro Met Leu Gly Gly
340      345      350
Asp Arg Arg Arg Leu Glu Leu Ala Tyr Ser Leu Met Cys Thr Leu Pro
355      360      365
Gly Thr Pro Val Ile Arg Tyr Gly Asp Glu Ile Gly Met Gly Asp Asp
370      375      380
Leu Ser Leu Pro Glu Arg Asn Cys Ala Arg Thr Pro Met Gln Trp Ser
385      390      395
Thr Glu Pro His Gly Gly Phe Thr Lys Asn Asp Lys Pro Ala Cys Pro
405      410      415
Val Ile Asp Lys Gly Pro Tyr Gly Phe Pro His Val Asn Val Ala Lys
420      425      430
Gln Arg Arg Asp Ala Asn Ser Met Leu Asn Trp Thr Glu Arg Ile Val
435      440      445
Arg Met Arg Lys Glu Val Pro Glu Ile Gly Trp Gly Asp Phe Ala Val
450      455      460
Ile Ala Thr Arg Asp Pro Ala Val Phe Ile Met Arg Tyr Asp Trp Arg
465      470      475
Asn Asn Ser Val Leu Phe Val His Asn Leu Asp Glu Lys Pro Arg Glu
485      490      495
Ile Ala Phe Ser Thr Gly Leu Pro Asp Ala Gly Ala His Leu Ile
500      505      510
Asn Leu Leu Ala Glu Asp His Ser His Ala Asp Lys Arg Gly Gln His
515      520      525
Arg Val Val Leu Glu Pro Tyr Gly Tyr Arg Trp Tyr Arg Val Gly Gly
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Leu Asp Tyr Leu Leu Lys Arg Ser Asp Ile Asp Gly Asp Thr Ala Gly
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<210> 107

<211> 1626

<212> DNA

<213> Lactobacillus plantarum WCFS1

<220>

<221> CDS

<222> (1)..(1626)

<223> transl_table=11

<400> 107

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cgt agc ttt caa gat agt aac ggg gat gga att ggt gac atc cct ggg
Arg Ser Phe Gln Asp Ser Asn Gly Asp Gly Ile Gly Asp Ile Pro Gly
20      25      30
att atc agt cgg ctc gat tac ttg gca acc ctt ggt gtg gat gcg ctg
Ile Ile Ser Arg Leu Asp Tyr Leu Ala Thr Leu Gly Val Asp Ala Leu

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48

96

144

40 45

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gcg	gga	ttt	aca	405	ggc	aaa	cca	410	gca	atc	aat	gcc	415	tat	
Ala	Gly	Phe	Thr	420	Gly	Lys	Pro	Trp	Leu	Ala	Ile	Asn	Ala	Asn	Tyr
ccg	agg	atc	aat	ggt	gcg	gcc	gcc	caa	gcg	gac	tac	caa	tcg	ata	tgg
Pro	Arg	Ile	Asn	Val	Ala	Ala	Ala	Gln	Ala	Asp	Tyr	Gln	Ser	Ile	Trp
tgg	acg	tat	cag	cg	cta	att	aga	tta	cg	aaa	cag	tcg	g	gtg	ttg
Trp	Thr	Tyr	Gln	Arg	Leu	Ile	Arg	Leu	Arg	Lys	Gln	Ser	Ala	Val	Leu
caa	cag	ggt	gag	ttt	acc	gag	tta	tca	g	gta	ccg	gca	cca	atc	g
Gln	Gln	Gly	Glu	Phe	Thr	Glu	Leu	Ser	Ala	Val	Pro	Ala	Pro	Ile	Val
gcc	tac	act	cg	act	tgg	caa	caa	acc	caa	tgg	cta	att	tgc	g	aat
Ala	Tyr	Thr	Arg	Thr	Trp	Gln	Gln	Thr	Gln	Trp	Leu	Ile	Cys	Ala	Asn
ttt	gct	gat	aca	ctt	att	acg	gta	gat	cta	cca	aag	cga	gca	tct	gag
Phe	Ala	Asp	500	Leu	Ile	Thr	Val	Asp	Leu	Pro	Lys	Arg	510	Ser	Glu
tta	atc	atc	agt	aac	tat	caa	gat	tat	cct	gag	caa	ctg	ggg	cg	gtg
Leu	Ile	Ile	Ser	Asn	Tyr	Gln	Asp	Tyr	Pro	Glu	Gln	Leu	Gly	Arg	Val
gta	tta	cga	ccg	tat	gaa	gcg	ttt	atc	ctt	gca	tta	agc	tag		
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<210> 108

<211> 541

<212> PRT

<213> Lactobacillus plantarum WCFS1

<400> 108

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			20					25					30		
Ile	Ile	Ser	Arg	Leu	Asp	Tyr	Leu	Ala	Thr	Leu	Gly	Val	Asp	Ala	Leu
			35				40					45			
Trp	Leu	Ser	Pro	Val	Tyr	Lys	Ser	Pro	Asn	Thr	Asp	Asn	Gly	Tyr	Asp
			50			55					60				
Ile	Ala	Asp	Tyr	Gln	Ala	Ile	Asp	Pro	Ala	Tyr	Gly	Thr	Met	Ala	Asp
65				70						75				80	
Met	Asp	Gln	Leu	Ile	Ala	Gln	Ala	Ala	Gln	Arg	Gly	Ile	Lys	Ile	Val
				85				90					95		
Met	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Glu	His	Leu	Trp	Phe	Val
			100					105					110		
Asp	Ala	Cys	Gln	Asn	Pro	Asp	Ser	Pro	Thr	Arg	Asp	Tyr	Tyr	Val	Trp
		115					120					125			
Ala	Asp	Ala	Val	Asp	Gly	His	Ala	Pro	Asn	Asp	Leu	Thr	Ser	Gly	Phe
		130				135					140				
Ser	Gly	Gly	Ser	Ala	Trp	Glu	Leu	Asp	Glu	Leu	Thr	Gly	Gln	Tyr	Phe
145				150						155				160	
Leu	His	Leu	Phe	Ser	Lys	Lys	Gln	Ile	Asp	Leu	Asn	Trp	Gln	Asn	Pro
				165				170					175		
Asp	Leu	Arg	Arg	Ala	Ile	Tyr	Arg	Met	Met	Asn	Phe	Trp	Ile	Asp	Lys
			180					185					190		
Gly	Ile	Glu	Gly	Phe	Arg	Met	Asp	Val	Ile	Asp	Met	Ile	Ala	Lys	Glu
		195					200					205			
Pro	Arg	Ala	Lys	Ile	Leu	Val	Asn	Gly	Pro	His	Leu	His	Glu	Tyr	Leu
			210			215					220				
His	Glu	Met	Asn	Arg	Gln	Thr	Trp	Arg	Asn	Arg	Asp	Phe	Leu	Thr	Val
225				230						235				240	
Gly	Glu	Ala	Trp	Ser	Ala	Ser	Pro	Glu	Asp	Ala	Arg	Gln	Tyr	Ser	Asp
				245					250				255		
Glu	Gln	Arg	Glu	Glu	Leu	Ser	Met	Val	Phe	Gln	Phe	Gly	His	Leu	Trp
			260					265					270		
Ala	Asp	Arg	Gln	Val	Gly	Gly	Glu	Lys	Trp	Glu	Gln	Arg	Pro	Leu	Asp
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Val	Ala	Gln	Leu	Lys	Gln	Ala	Leu	Tyr	Ala	Cys	Gln	Thr	Thr	Met	Ala

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					325					330					335	
	Lys	Met	Leu	Ala	Ile	Ala	Leu	His	Gly	Leu	Lys	Gly	Thr	Pro	Phe	Val
				340					345					350		
	Tyr	Gln	Gly	Glu	Glu	Ile	Gly	Met	Thr	Asp	Cys	Pro	Val	Ala	Thr	Ile
			355					360					365			
	Asp	Gln	Val	Asn	Asp	Val	Glu	Ala	Arg	Thr	Ile	Tyr	Arg	Gln	Leu	Arg
							375					380				
	Ala	Gln	Gly	Asp	Asp	Ala	Gly	Thr	Ala	Met	Gln	Lys	Ile	Asn	Ile	Phe
385						390					395					400
	Asn	Arg	Asp	Asn	Ala	Arg	Thr	Pro	Met	Gln	Trp	Thr	Ala	Lys	Gln	His
				405						410					415	
	Ala	Gly	Phe	Thr	Thr	Gly	Lys	Pro	Trp	Leu	Ala	Ile	Asn	Ala	Asn	Tyr
				420					425					430		
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			435					440					445			
	Trp	Thr	Tyr	Gln	Arg	Leu	Ile	Arg	Leu	Arg	Lys	Gln	Ser	Ala	Val	Leu
						455						460				
	Gln	Gln	Gly	Glu	Phe	Thr	Glu	Leu	Ser	Ala	Val	Pro	Ala	Pro	Ile	Val
465						470					475					480
	Ala	Tyr	Thr	Arg	Thr	Trp	Gln	Gln	Thr	Gln	Trp	Leu	Ile	Cys	Ala	Asn
					485					490					495	
	Phe	Ala	Asp	Thr	Leu	Ile	Thr	Val	Asp	Leu	Pro	Lys	Arg	Ala	Ser	Glu
				500					505					510		
	Leu	Ile	Ile	Ser	Asn	Tyr	Gln	Asp	Tyr	Pro	Glu	Gln	Leu	Gly	Arg	Val
			515					520					525			
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<210> 109

<211> 1827

<212> DNA

<213> *Vibrio parahaemolyticus* RIMD 2210633

<220>

<221> CDS

<222> (1)..(1827)

<223> transl_table=11

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ttc	gat	ggg	aaa	cgc	gtg	aag	gtc	tgt	cta	aaa	aca	gaa	gcg	tta	aca	96
Phe	Asp	Gly	Lys	Arg	Val	Lys	Val	Cys	Leu	Lys	Thr	Glu	Ala	Leu	Thr	
			20					25					30			
ttt	gat	gct	gtt	tat	gtg	cgt	att	gag	cca	gac	aac	gaa	gaa	tac	ctt	144
Phe	Asp	Ala	Val	Tyr	Val	Arg	Ile	Glu	Pro	Asp	Asn	Glu	Glu	Tyr	Leu	
			35				40					45				
gtc	gcc	atg	gtg	caa	tgc	ggg	aga	gct	gga	gag	tta	ctg	ctg	tgg	gaa	192
Val	Ala	Met	Val	Gln	Cys	Gly	Arg	Ala	Gly	Glu	Leu	Leu	Leu	Trp	Glu	
			50			55					60					
gta	tcg	ttc	gag	ccg	aat	aga	gat	cga	gac	atc	acc	cac	tat	gta	ttt	240
Val	Ser	Phe	Glu	Pro	Asn	Arg	Asp	Arg	Asp	Ile	Thr	His	Tyr	Val	Phe	
					70					75				80		
aaa	gtc	gtt	aga	aat	ggg	cag	caa	tat	tgg	cta	gac	gca	cgt	gga	gtg	288
Lys	Val	Val	Arg	Asn	Gly	Gln	Gln	Tyr	Trp	Leu	Asp	Ala	Arg	Gly	Val	
				85					90					95		
caa	aaa	cgt	att	ccg	ccc	aaa	gaa	ttt	cat	ttc	aaa	ttg	aat	gta	aac	336
Gln	Lys	Arg	Ile	Pro	Pro	Lys	Glu	Phe	His	Phe	Lys	Leu	Asn	Val	Asn	
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cat	caa	ccg	cca	aag	tgg	gtt	caa	gaa	caa	gtt	ttc	tat	cag	att	ttt	384
His	Gln	Pro	Pro	Lys	Trp	Val	Gln	Glu	Gln	Val	Phe	Tyr	Gln	Ile	Phe	
			115				120					125				
cct	gat	cgt	ttt	gcc	gcg	agt	caa	agt	gag	tct	gcg	att	cgt	gaa	gcg	432
Pro	Asp	Arg	Phe	Ala	Ala	Ser	Gln	Ser	Glu	Ser	Ala	Ile	Arg	Glu	Ala	

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Met	Gln	Trp	Leu	Tyr	Cys	Asp	Glu	Arg	Ala	Phe	Ala	Tyr	Ala	Arg	Gln	
	530					535					540					
ctt	ggt	gaa	gag	acg	atc	att	ggt	gca	gtc	aat	att	ggt	cta	caa	gaa	1680
Leu	Gly	Glu	Glu	Thr	Ile	Ile	Val	Ala	Val	Asn	Ile	Gly	Leu	Gln	Glu	
545					550					555					560	
agc	acg	att	gac	cta	cca	ttg	tgg	cag	tta	ggc	ttg	aat	gcg	aaa	cac	1728
Ser	Thr	Ile	Asp	Leu	Pro	Leu	Trp	Gln	Leu	Gly	Leu	Asn	Ala	Lys	His	
			565					570						575		
ttg	cat	caa	tta	tta	gat	aag	tgt	gaa	ata	att	gat	tat	gaa	ggt	cat	1776
Leu	His	Gln	Leu	Leu	Asp	Lys	Cys	Glu	Ile	Ile	Asp	Tyr	Glu	Gly	His	
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<211> 608

<212> PRT

<213> *Vibrio parahaemolyticus* RIMD 2210633

<400> 110

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			20					25					30			
Phe	Asp	Ala	Val	Tyr	Val	Arg	Ile	Glu	Pro	Asp	Asn	Glu	Glu	Tyr	Leu	
		35					40					45				
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Val	Ser	Phe	Glu	Pro	Asn	Arg	Asp	Arg	Asp	Ile	Thr	His	Tyr	Val	Phe	
65					70					75					80	
Lys	Val	Val	Arg	Asn	Gly	Gln	Gln	Tyr	Trp	Leu	Asp	Ala	Arg	Gly	Val	
				85					90					95		
Gln	Lys	Arg	Ile	Pro	Pro	Lys	Glu	Phe	His	Phe	Lys	Leu	Asn	Val	Asn	
			100					105					110			
His	Gln	Pro	Pro	Lys	Trp	Val	Gln	Glu	Gln	Val	Phe	Tyr	Gln	Ile	Phe	
		115					120					125				
Pro	Asp	Arg	Phe	Ala	Ala	Ser	Gln	Ser	Glu	Ser	Ala	Ile	Arg	Glu	Ala	
	130					135					140					
Tyr	Tyr	Glu	Tyr	Asp	Pro	Asp	Ala	Glu	Ile	Lys	Met	Trp	Gly	Glu	Pro	
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Val	Gly	Asn	His	Gln	Asn	Ser	Gly	Ala	Arg	Glu	Phe	Phe	Gly	Gly	Asp	
				165					170					175		
Leu	Lys	Gly	Val	Glu	Gln	Lys	Leu	Gly	Tyr	Leu	Glu	Gln	Leu	Gly	Val	
			180					185					190			
Thr	Ala	Leu	Tyr	Phe	Asn	Pro	Ile	Phe	Ser	Ser	Pro	Ser	Asn	His	Lys	
	195						200					205				
Tyr	Asp	Thr	Thr	Asp	Tyr	Phe	Thr	Ile	Asp	Pro	Met	Leu	Gly	Thr	Asn	
	210					215					220					
Glu	His	Phe	Ala	Ser	Leu	Cys	Glu	Lys	Ile	Arg	Ser	Lys	Asn	Met	Lys	
225					230					235					240	
Ile	Val	Leu	Asp	Ala	Val	Phe	Asn	His	Thr	Ser	Val	His	His	Pro	Trp	
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Gly	Trp	Lys	Gly	Ile	Asp	Asn	Leu	Pro	Val	Leu	Asn	Phe	Glu	Asn	His	
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Glu	Val	Arg	Glu	Tyr	Ile	Tyr	Gln	Gly	Glu	Ala	Ser	Val	Ile	Lys	His	
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Trp Leu Lys Pro Pro Tyr Ser Val Asp Gly Trp Arg Phe Asp Val Ile
 325 330
 His Met Leu Gly Glu Gly Glu Gly Ala Lys Asn Asn Ala His Tyr Val
 340 345 350
 Lys Ala Phe Arg Gln Ala Thr Lys Ser Val Asn Pro Asn Ala Tyr Val
 355 360 365
 Leu Gly Glu His Phe Phe Glu Ala Thr Gln Trp Leu Gln Gly Glu Gln
 370 375 380
 Glu Asp Gly Ala Met Asn Tyr Tyr Gly Phe Ala His Pro Val Arg Ala
 385 390 395 400
 Phe Ile Ala His Gln Asp Ile Thr Tyr Asp Pro Ile Asp Ile Asp Gly
 405 410 415
 Phe Glu Phe Lys Ala Trp Leu Asp Glu Ala Arg Ala Lys Val Pro Phe
 420 425 430
 Ala Asn Gln Leu Ser Gln Leu Asn Gln Leu Asp Ser His Asp Thr Ala
 435 440 445
 Arg Phe Leu Thr Leu Val Asn Gly Asp Glu Lys Lys Met Lys Ile Ala
 450 455 460
 Leu Ala Leu Leu Met Thr Tyr Val Gly Ala Pro Cys Ile Tyr Tyr Gly
 465 470 475 480
 Ser Glu Val Gly Leu Glu Gly Ser Phe Asp Pro Asp Asn Arg Arg Cys
 485 490 495
 Phe Pro Trp His Leu Val Gln Gly Ser Pro Trp Leu His Leu Tyr Gln
 500 505 510
 Gln Trp Ile Glu Ile Arg Lys Gln Phe Gln Ala Leu Gln Ser Gly Ser
 515 520 525
 Met Gln Trp Leu Tyr Cys Asp Glu Arg Ala Phe Ala Tyr Ala Arg Gln
 530 535 540
 Leu Gly Glu Glu Thr Ile Ile Val Ala Val Asn Ile Gly Leu Gln Glu
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 Ser Thr Ile Asp Leu Pro Leu Trp Gln Leu Gly Leu Asn Ala Lys His
 565 570 575 580
 Leu His Gln Leu Leu Asp Lys Cys Glu Ile Ile Asp Tyr Glu Gly His
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<210> 111

<211> 1818

<212> DNA

<213> *Salmonella enterica* subsp. *enterica* serovar Typhi Ty2

<220>

<221> CDS

<222> (1)..(1818)

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Asn Asp Lys Leu Thr Ile Thr Leu Trp Leu Ser Gly Glu Asn Pro Pro	
20 25 30	
tct cgc gtg acg ttg cgc tca gaa ttc gat aac gaa gaa atc tca ctg	144
Ser Arg Val Thr Leu Arg Ser Glu Phe Asp Asn Glu Glu Ile Ser Leu	
35 40 45	
gcg atg cgc aaa cag cgc cgc cag ccg cag ccg ggc gtg acg gcg tgg	192
Ala Met Arg Lys Gln Arg Arg Gln Pro Gln Pro Gly Val Thr Ala Trp	
50 55 60	
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Arg Ala Thr Leu Asn Ile Ala Leu Gly Gln Pro Arg Arg Arg Tyr Ser	
65 70 75 80	
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Phe Lys Leu Leu Trp His Asp Arg Gln Arg Trp Phe Thr Pro Gln Gly	
85 90 95	
ttt agc tgc ttt cca ccc gcg cgt ctg gaa caa ttt gcg gtt gat gtg	336
Phe Ser Cys Phe Pro Pro Ala Arg Leu Glu Gln Phe Ala Val Asp Val	
100 105 110	

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Pro	Asp	Ser	Gly	Pro	Gln	Trp	Val	Ala	Asp	Gln	Ile	Phe	Tyr	Gln	Ile	
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Phe	Pro	Asp	Arg	Phe	Ala	Arg	Ser	Ala	Thr	Arg	Glu	Ala	Asp	Gln	Asp	
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Arg	Val	Tyr	Tyr	His	His	Ala	Ala	Gly	Gln	Glu	Ile	Val	Leu	Arg	Asp	
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Trp	Asp	Asp	Pro	Leu	Thr	Pro	Gln	Ala	Gly	Gly	Ser	Thr	Phe	Tyr	Gly	
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Gly	Cys	Leu	Asn	Gly	Ile	Cys	Glu	Lys	Leu	Pro	Tyr	Leu	Lys	Lys	Leu	
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Gly	Val	Thr	Ala	Leu	Tyr	Leu	Asn	Pro	Val	Phe	Thr	Ala	Pro	Ser	Val	
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cat	aag	tac	gac	acg	gaa	gat	tat	cgc	cat	gtc	gat	ccg	caa	ttt	ggc	672
His	Lys	Tyr	Asp	Thr	Glu	Asp	Tyr	Arg	His	Val	Asp	Pro	Gln	Phe	Gly	
	210					215					220					
ggc	gat	cgg	gcg	ctg	cta	cgc	ctg	cgg	cgt	gaa	acg	caa	gca	cag	ggc	720
Gly	Asp	Arg	Ala	Leu	Leu	Arg	Leu	Arg	Arg	Glu	Thr	Gln	Ala	Gln	Gly	
225				230						235					240	
atg	agg	ctg	gtg	ctg	gat	ggc	gtg	ttt	aac	cat	agc	ggc	gac	tcg	cat	768
Met	Arg	Leu	Val	Leu	Asp	Gly	Val	Phe	Asn	His	Ser	Gly	Asp	Ser	His	
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Ala	Trp	Phe	Asp	Arg	His	Asn	Arg	Ser	Thr	Gly	Gly	Ala	Cys	His	His	
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Pro	Asp	Ser	Pro	Trp	Arg	Asp	Trp	Tyr	Ser	Phe	Ser	Pro	Gln	Gly	Val	
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gcg	ctg	gac	tgg	ctg	ggt	tat	ccg	agc	ctg	ccg	aaa	ctc	gat	tat	caa	912
Ala	Leu	Asp	Trp	Leu	Gly	Tyr	Pro	Ser	Leu	Pro	Lys	Leu	Asp	Tyr	Gln	
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Ser	Glu	Thr	Leu	Val	Asp	Glu	Ile	Tyr	Arg	Gly	Glu	Asp	Ser	Ile	Val	
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cgt	cac	tgg	cta	aag	gca	ccg	tgg	aat	atg	gac	ggc	tgg	cgg	ctg	gat	1008
Arg	His	Trp	Leu	Lys	Ala	Pro	Trp	Asn	Met	Asp	Gly	Trp	Arg	Leu	Asp	
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gtc	gta	cat	atg	ctg	ggc	gag	gcg	ggc	ggg	gcg	cgc	cac	aat	ttg	cag	1056
Val	Val	His	Met	Leu	Gly	Glu	Ala	Gly	Gly	Ala	Arg	His	Asn	Leu	Gln	
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His	Val	Ala	Gly	Ile	Thr	Arg	Ala	Ala	Lys	Glu	Ala	Gln	Pro	Glu	Ala	
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tat	att	gtg	ggg	gaa	cat	ttc	agc	gat	gcg	cgg	cag	tgg	cta	cag	gcc	1152
Tyr	Ile	Val	Gly	Glu	His	Phe	Ser	Asp	Ala	Arg	Gln	Trp	Leu	Gln	Ala	
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Asp	Ala	Glu	Asp	Ala	Ala	Met	Asn	Tyr	Arg	Gly	Phe	Thr	Phe	Pro	Leu	
	385			390						395					400	
tgg	gga	ttt	ctc	gcc	aat	act	gat	atc	gct	tac	gaa	cca	cag	cat	att	1248
Trp	Gly	Phe	Leu	Ala	Asn	Thr	Asp	Ile	Ala	Tyr	Glu	Pro	Gln	His	Ile	
				405					410					415		
gat	gcc	cgg	acc	tgt	atc	gcg	tgg	atg	aac	tac	cgc	gcc	gga	tta		1296
Asp	Ala	Arg	Thr	Cys	Ile	Ala	Trp	Met	Asn	Tyr	Arg	Ala	Gly	Leu		
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tcg	cac	cag	cag	caa	ctg	cgc	atg	ttt	aat	caa	ctc	gac	agc	cat	gat	1344
Ser	His	Gln	Gln	Gln	Leu	Arg	Met	Phe	Asn	Gln	Leu	Asp	Ser	His	Asp	
		435					440					445				
act	gcg	cgc	ttt	aaa	acc	ctg	ctg	ggt	aaa	gac	gcg	gcg	cgc	ctg	ccg	1392
Thr	Ala	Arg	Phe	Lys	Thr	Leu	Leu	Gly	Lys	Asp	Ala	Ala	Arg	Leu	Pro	
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Leu	Ala	Val	Val	Trp	Leu	Phe	Thr	Trp	Pro	Gly	Val	Pro	Cys	Ile	Tyr	
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aaa	ccg	ttc	cca	tgg	gat	gaa	cgc	aag	cag	gac	ggc	aac	ttg	ctg	gcg	1536
Lys	Pro	Phe	Pro	Trp	Asp	Glu	Arg	Lys	Gln	Asp	Gly	Asn	Leu	Leu	Ala	
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Leu	Tyr	Gln	Arg	Met	Ala	Lys	Leu	Arg	Gln	Ser	Ser	Leu	Ala	Leu	Arg	
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cgt	ggc	gga	tgc	cag	gcg	ctg	tat	gcc	gaa	ggc	gac	gta	gtg	gta	ttc	1632
Arg	Gly	Gly	Cys	Gln	Ala	Leu	Tyr	Ala	Glu	Gly	Asp	Val	Val	Val	Phe	
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gtg	cga	gtt	tat	cag	cag	cag	cgg	gcg	ctg	gtg	gac	att	aac	cgg	ggc	1680
Val	Arg	Val	Tyr	Gln	Gln	Gln	Arg	Ala	Leu	Val	Ala	Ile	Asn	Arg	Gly	
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gag	gcc	tgt	gaa	gtg	gcg	ctg	gaa	gcg	ttg	ccg	ttg	ctg	aac	gtg	gcc	1728
Glu	Ala	Cys	Glu	Val	Ala	Leu	Glu	Ala	Leu	Pro	Leu	Leu	Asn	Val	Ala	
				565					570					575		
gga	tgg	caa	tgt	aaa	acg	gga	agc	ggc	gac	atc	cgc	gag	gga	aga	ctt	1776
Gly	Trp	Gln	Cys	Lys	Thr	Gly	Ser	Gly	Asp	Ile	Arg	Glu	Gly	Arg	Leu	
			580					585					590			
agt	tta	ccc	gcg	att	tcc	gcg	acg	gta	tgg	atg	aat	cgt	tga			1818
Ser	Leu	Pro	Ala	Ile	Ser	Ala	Thr	Val	Trp	Met	Asn	Arg				
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<212> PRT

<213> Salmonella enterica subsp. enterica serovar Typhi Ty2

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			20					25					30			
Ser	Arg	Val	Thr	Leu	Arg	Ser	Glu	Phe	Asp	Asn	Glu	Glu	Ile	Ser	Leu	
		35					40					45				
Ala	Met	Arg	Lys	Gln	Arg	Arg	Gln	Pro	Gln	Pro	Gly	Val	Thr	Ala	Trp	
	50					55					60					
Arg	Ala	Thr	Leu	Asn	Ile	Ala	Leu	Gly	Gln	Pro	Arg	Arg	Arg	Tyr	Ser	
65				70					75					80		
Phe	Lys	Leu	Leu	Trp	His	Asp	Arg	Gln	Arg	Trp	Phe	Thr	Pro	Gln	Gly	
				85				90						95		
Phe	Ser	Cys	Phe	Pro	Pro	Ala	Arg	Leu	Glu	Gln	Phe	Ala	Val	Asp	Val	
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Pro	Asp	Ser	Gly	Pro	Gln	Trp	Val	Ala	Asp	Gln	Ile	Phe	Tyr	Gln	Ile	
		115					120					125				
Phe	Pro	Asp	Arg	Phe	Ala	Arg	Ser	Ala	Thr	Arg	Glu	Ala	Asp	Gln	Asp	
	130					135					140					
Arg	Val	Tyr	Tyr	His	His	Ala	Ala	Gly	Gln	Glu	Ile	Val	Leu	Arg	Asp	
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Gly	Cys	Leu	Asn	Gly	Ile	Cys	Glu	Lys	Leu	Pro	Tyr	Leu	Lys	Lys	Leu	
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Gly	Val	Thr	Ala	Leu	Tyr	Leu	Asn	Pro	Val	Phe	Thr	Ala	Pro	Ser	Val	
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	210					215					220					
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Ala	Trp	Phe	Asp	Arg	His	Asn	Arg	Ser	Thr	Gly	Gly	Ala	Cys	His	His	
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Pro	Asp	Ser	Pro	Trp	Arg	Asp	Trp	Tyr	Ser	Phe	Ser	Pro	Gln	Gly	Val	
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Arg His Trp Leu Lys Ala Pro Trp Asn Met Asp Gly Trp Arg Leu Asp
325 330 335
Val Val His Met Leu Gly Glu Ala Gly Gly Ala Arg His Asn Leu Gln
340 345 350
His Val Ala Gly Ile Thr Arg Ala Ala Lys Glu Ala Gln Pro Glu Ala
355 360 365
Tyr Ile Val Gly Glu His Phe Ser Asp Ala Arg Gln Trp Leu Gln Ala
370 375 380
Asp Ala Glu Asp Ala Ala Met Asn Tyr Arg Gly Phe Thr Phe Pro Leu
385 390 395 400
Trp Gly Phe Leu Ala Asn Thr Asp Ile Ala Tyr Glu Pro Gln His Ile
405 410 415
Asp Ala Arg Thr Cys Ile Ala Trp Met Asp Asn Tyr Arg Ala Gly Leu
420 425 430
Ser His Gln Gln Gln Leu Arg Met Phe Asn Gln Leu Asp Ser His Asp
435 440 445
Thr Ala Arg Phe Lys Thr Leu Gly Lys Asp Ala Ala Arg Leu Pro
450 455 460
Leu Ala Val Val Trp Leu Phe Thr Trp Pro Gly Val Pro Cys Ile Tyr
465 470 475 480
Tyr Gly Asp Glu Val Gly Val Asp Gly Ala Asn Asp Pro Met Cys Arg
485 490 495
Lys Pro Phe Pro Trp Asp Glu Arg Lys Gln Asp Gly Asn Leu Leu Ala
500 505 510
Leu Tyr Gln Arg Met Ala Lys Leu Arg Gln Ser Ser Leu Ala Leu Arg
515 520 525
Arg Gly Gly Cys Gln Ala Leu Tyr Ala Glu Gly Asp Val Val Val Phe
530 535 540
Val Arg Val Tyr Gln Gln Gln Arg Ala Leu Val Ala Ile Asn Arg Gly
545 550 555 560
Glu Ala Cys Glu Val Ala Leu Glu Ala Leu Pro Leu Leu Asn Val Ala
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580 585 590
Ser Leu Pro Ala Ile Ser Ala Thr Val Trp Met Asn Arg
595 600 605

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<211> 2079

<212> DNA

<213> Bacteroides thetaiotaomicron VPI-5482

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Met Ala Phe Met Thr Ala Cys Ser Asp Asp Lys Asn Ile Thr Asp Pro
20 25 30
gct ccg gaa ccc gaa ccg ccc gtc gaa ggg caa tgg acc gca ctt acc      144
Ala Pro Glu Pro Glu Pro Val Glu Gly Gln Trp Thr Ala Leu Thr
35 40 45
gcc tct ccc gac aca tgg gac gag acc aaa cgg gca gac atc tcc tac      192
Ala Ser Pro Asp Thr Trp Asp Glu Thr Lys Arg Ala Asp Ile Ser Tyr
50 55 60
caa tta ctg ctc tat tcc ttc gcc gac agc gac gga gac gga tat gga      240
Gln Leu Leu Leu Tyr Ser Phe Ala Asp Ser Asp Gly Asp Gly Tyr Gly
65 70 75 80
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Asp Leu Asn Gly Val Thr Gln Lys Leu Asp Tyr Leu Asn Gln Leu Gly
85 90 95
gtg aaa gcc ctc tgg ctc tct ccc atc cac ccc tgt atg tct tat cac      336

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Gly	Tyr	Asp	Val	Thr	Asp	Tyr	Thr	Lys	Val	Asn	Pro	Gln	Leu	Gly	Thr	
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Glu	Ser	Asp	Phe	Asp	Arg	Leu	Val	Thr	Glu	Ala	His	Asn	Arg	Gly	Ile	
	130					135					140					
aag	att	tat	ctg	gac	tac	gta	atg	aac	cac	acc	ggc	act	gcc	cac	ccg	480
Lys	Ile	Tyr	Leu	Asp	Tyr	Val	Met	Asn	His	Thr	Gly	Thr	Ala	His	Pro	
145				150						155					160	
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Trp	Phe	Thr	Glu	Ala	Ser	Ser	Ser	Ser	Glu	Ser	Pro	Tyr	Arg	Asn	Tyr	
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tat	tct	ttc	tct	gaa	gac	ccg	aaa	aca	gat	atc	gca	gca	ggc	aaa	atc	576
Tyr	Ser	Phe	Ser	Glu	Asp	Pro	Lys	Thr	Asp	Ile	Ala	Ala	Gly	Lys	Ile	
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gcc	atg	atc	acc	caa	gaa	gga	gca	gcc	gga	tac	aat	gcc	gca	gaa	tgg	624
Ala	Met	Ile	Thr	Gln	Glu	Gly	Ala	Ala	Gly	Tyr	Asn	Ala	Ala	Glu	Trp	
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Phe	Gln	Val	Ser	Asp	Glu	Thr	Ala	Ala	Val	Lys	Gly	Leu	Leu	Lys	Phe	
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Thr	Leu	Asp	Trp	Ser	Asn	Ala	Pro	Ser	Pro	Ile	Leu	Val	Val	Ser	Thr	
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Gly	Thr	Lys	Ala	Asp	Glu	Asp	Asn	Pro	Asp	Thr	Gly	Thr	Asp	Asn	Ala	
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Lys	Tyr	Leu	Tyr	Tyr	Gly	Glu	Asp	Ile	Cys	Lys	Lys	Phe	Tyr	Asp	Lys	
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gga	aac	aac	atc	tat	gaa	ctc	acc	gtc	gac	ttt	gag	tcc	act	tgg	ggg	864
Gly	Asn	Asn	Ile	Tyr	Glu	Leu	Thr	Val	Asp	Phe	Glu	Ser	Thr	Trp	Gly	
		275					280					285				
ctt	ctg	atc	cgt	act	agc	aat	gct	tct	ttc	tgg	cca	tcc	gga	aca	aaa	912
Leu	Leu	Ile	Arg	Thr	Ser	Asn	Ala	Ser	Phe	Trp	Pro	Ser	Gly	Thr	Lys	
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Tyr	Gly	Ala	Ser	Ser	Ser	Ser	Glu	Lys	Leu	Ala	Leu	Asn	Lys	Asp	Phe	
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Lys	Leu	Thr	Asn	Ala	Gly	Asn	Pro	Ala	Asn	Ile	Met	Phe	Asp	Ser	Gln	
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cag	atc	acc	tat	ttc	cat	tct	cat	ttc	tgc	acc	gac	tgg	ttt	gcc	gac	1056
Gln	Ile	Thr	Tyr	Phe	His	Ser	His	Phe	Cys	Thr	Asp	Trp	Phe	Ala	Asp	
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ctt	aac	tac	ggc	cct	gta	gac	cag	gca	ggc	gaa	tca	ccg	gca	tat	cag	1104
Leu	Asn	Tyr	Gly	Pro	Val	Asp	Gln	Ala	Gly	Glu	Ser	Pro	Ala	Tyr	Gln	
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Ala	Ile	Ala	Asp	Ala	Ala	Lys	Gly	Trp	Ile	Ala	Arg	Gly	Val	Asp	Gly	
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ctc	cgc	ctc	gac	gcc	gtg	aag	cac	atc	tac	cac	agt	gag	acc	agc	gaa	1200
Leu	Arg	Leu	Asp	Ala	Val	Lys	His	Ile	Tyr	His	Ser	Glu	Thr	Ser	Glu	
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Glu	Asn	Pro	Arg	Phe	Leu	Lys	Met	Phe	Tyr	Glu	Asp	Met	Asn	Ala	Tyr	
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Tyr	Lys	Gln	Lys	Gly	His	Thr	Asp	Asp	Phe	Tyr	Met	Ile	Gly	Glu	Val	
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Leu	Ser	Glu	Tyr	Asp	Lys	Val	Ala	Pro	Tyr	Tyr	Lys	Gly	Leu	Pro	Ala	
		435				440						445				
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Leu	Phe	Glu	Phe	Ser	Phe	Trp	Tyr	Arg	Leu	Glu	Trp	Gly	Ile	Asn	Asn	
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Ser 465	Thr	Gly	Cys	Tyr	Phe 470	Ala	Lys	Asp	Ile	Leu 475	Ser	Tyr	Gln	Gln	Lys 480	
tac	gcc	aac	tat	cga	agc	gat	tac	atc	gaa	gca	acg	aaa	ctg	agt	aac	1488
Tyr	Ala	Asn	Tyr	Arg	Ser	Asp	Tyr	Ile	Glu	Ala	Thr	Lys	Leu	Ser	Asn	
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cat	gac	gaa	gac	cgt	aca	tcg	tcc	aag	ttg	ggg	aaa	tcc	gcc	gac	aaa	1536
His	Asp	Glu	Asp	Arg	Thr	Ser	Ser	Lys	Leu	Gly	Lys	Ser	Ala	Asp	Lys	
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Cys	Lys	Leu	Ala	Ala	Ala	Val	Leu	Leu	Thr	Ser	Ala	Gly	His	Pro	Tyr	
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Ile	Tyr	Tyr	Gly	Glu	Glu	Leu	Gly	Leu	Tyr	Gly	Thr	Lys	Asp	Asn	Gly	
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Asp	Glu	Tyr	Val	Arg	Ser	Pro	Met	Leu	Trp	Gly	Asp	Ser	Tyr	Thr	Thr	
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Val	Ala	Asp	Gln	Gln	Ala	Asp	Thr	His	Ser	Leu	Leu	Asn	Ile	Tyr	Phe	
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Ser	Leu	Thr	Arg	Leu	Arg	Asn	Thr	Tyr	Pro	Ala	Leu	Ala	Glu	Gly	Asn	
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Met	Thr	Lys	His	Ser	Val	Tyr	Asn	Glu	Ser	Gln	Glu	Lys	Asp	Tyr	Lys	
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Ile	Glu	Lys	Val	Leu	Phe	Val	Asn	Gly	Glu	Thr	Gln	Gln	Asn	Thr	Asp	
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Ser	Asp	Ser	Tyr	Thr	Leu	Lys	Leu	Gly	Gly	Tyr	Ala	Ser	Val	Val	Phe	
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Lys	Leu	Gly	Asn													
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Ala	Pro	Glu	Pro	Glu	Pro	Pro	Val	Glu	Gly	Gln	Trp	Thr	Ala	Leu	Thr	
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Ala	Ser	Pro	Asp	Thr	Trp	Asp	Glu	Thr	Lys	Arg	Ala	Asp	Ile	Ser	Tyr	
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Gln	Leu	Leu	Leu	Tyr	Ser	Phe	Ala	Asp	Ser	Asp	Gly	Asp	Gly	Tyr	Gly	
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Asp	Leu	Asn	Gly	Val	Thr	Gln	Lys	Leu	Asp	Tyr	Leu	Asn	Gln	Leu	Gly	
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Val	Lys	Ala	Leu	Trp	Leu	Ser	Pro	Ile	His	Pro	Cys	Met	Ser	Tyr	His	
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Gly	Tyr	Asp	Val	Thr	Asp	Tyr	Thr	Lys	Val	Asn	Pro	Gln	Leu	Gly	Thr	
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Glu	Ser	Asp	Phe	Asp	Arg	Leu	Val	Thr	Glu	Ala	His	Asn	Arg	Gly	Ile	
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Trp	Phe	Thr	Glu	Ala 165	Ser	Ser	Ser	Ser	Glu 170	Ser	Pro	Tyr	Arg	Asn 175	Tyr
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Ala	Met	Ile 195	Thr	Gln	Glu	Gly	Ala 200	Ala	Gly	Tyr	Asn 205	Ala	Ala	Glu	Trp
Phe	Gln 210	Val	Ser	Asp	Glu	Thr 215	Ala	Ala	Val	Lys	Gly 220	Leu	Leu	Lys	Phe
Thr 225	Leu	Asp	Trp	Ser	Asn 230	Ala	Pro	Ser	Pro	Ile 235	Leu	Val	Val	Ser	Thr 240
Gly	Thr	Lys	Ala	Asp 245	Glu	Asp	Asn	Pro	Asp 250	Thr	Gly	Thr	Asp	Asn 255	Ala
Lys	Tyr	Leu	Tyr 260	Tyr	Gly	Glu	Asp	Ile 265	Cys	Lys	Lys	Phe	Tyr 270	Asp	Lys
Gly	Asn 275	Asn	Ile	Tyr	Glu	Leu	Thr 280	Val	Asp	Phe	Glu	Ser 285	Thr	Trp	Gly
Leu 290	Leu	Ile	Arg	Thr	Ser	Asn 295	Ala	Ser	Phe	Trp	Pro 300	Ser	Gly	Thr	Lys
Tyr 305	Gly	Ala	Ser	Ser	Ser 310	Ser	Glu	Lys	Leu	Ala 315	Leu	Asn	Lys	Asp	Phe 320
Lys	Leu	Thr	Asn	Ala 325	Gly	Asn	Pro	Ala	Asn 330	Ile	Met	Phe	Asp	Ser 335	Gln
Gln	Ile	Thr	Tyr 340	Phe	His	Ser	His	Phe 345	Cys	Thr	Asp	Trp	Phe 350	Ala	Asp
Leu	Asn 355	Tyr	Gly	Pro	Val	Asp	Gln 360	Ala	Gly	Glu	Ser	Pro 365	Ala	Tyr	Gln
Ala 370	Ile	Ala	Asp	Ala	Ala	Lys 375	Gly	Trp	Ile	Ala	Arg 380	Gly	Val	Asp	Gly
Leu 385	Arg	Leu	Asp	Ala	Val 390	Lys	His	Ile	Tyr	His 395	Ser	Glu	Thr	Ser	Glu 400
Glu	Asn	Pro	Arg	Phe 405	Leu	Lys	Met	Phe	Tyr 410	Glu	Asp	Met	Asn 415	Ala	Tyr
Tyr	Lys	Gln	Lys 420	Gly	His	Thr	Asp	Asp 425	Phe	Tyr	Met	Ile	Gly 430	Glu	Val
Leu	Ser	Glu	Tyr 435	Asp	Lys	Val	Ala 440	Pro	Tyr	Tyr	Lys	Gly 445	Leu	Pro	Ala
Leu 450	Phe	Glu	Phe	Ser	Phe	Trp 455	Tyr	Arg	Leu	Glu	Trp 460	Gly	Ile	Asn	Asn
Ser 465	Thr	Gly	Cys	Tyr	Phe 470	Ala	Lys	Asp	Ile	Leu 475	Ser	Tyr	Gln	Gln	Lys 480
Tyr	Ala	Asn	Tyr	Arg 485	Ser	Asp	Tyr	Ile	Glu 490	Ala	Thr	Lys	Leu	Ser 495	Asn
His	Asp	Glu	Asp 500	Arg	Thr	Ser	Ser	Lys 505	Leu	Gly	Lys	Ser	Ala 510	Asp	Lys
Cys	Lys	Leu 515	Ala	Ala	Ala	Val	Leu 520	Leu	Thr	Ser	Ala	Gly 525	His	Pro	Tyr
Ile	Tyr 530	Tyr	Gly	Glu	Glu	Leu 535	Gly	Leu	Tyr	Gly	Thr 540	Lys	Asp	Asn	Gly
Asp 545	Glu	Tyr	Val	Arg	Ser 550	Pro	Met	Leu	Trp	Gly 555	Asp	Ser	Tyr	Thr	Thr 560
Asn	Tyr	Thr	Asp	Lys 565	Thr	Asp	Ala	Thr	Val 570	Ser	Lys	Asn	Val	Lys 575	Thr
Val	Ala	Asp	Gln 580	Gln	Ala	Asp	Thr	His 585	Ser	Leu	Leu	Asn	Ile 590	Tyr	Phe
Ser	Leu	Thr 595	Arg	Leu	Arg	Asn	Thr 600	Tyr	Pro	Ala	Leu	Ala 605	Glu	Gly	Asn
Met	Thr 610	Lys	His	Ser	Val	Tyr 615	Asn	Glu	Ser	Gln	Glu	Lys	Asp	Tyr	Lys
Pro 625	Ile	Ala	Ala	Trp	Tyr 630	Met	Thr	Lys	Asp	Asn 635	Glu	Lys	Leu	Leu	Val 640
Ile	His	Asn	Phe	Gly 645	Gly	Thr	Ala	Met	Gln 650	Leu	Pro	Leu	Thr	Asp 655	Lys
Ile	Glu	Lys	Val 660	Leu	Phe	Val	Asn	Gly 665	Glu	Thr	Gln	Gln	Asn	Thr	Asp
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Lys	Leu	Gly	Asn												

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 ctt cac cag gta ttc gca aca agc act ata aag aaa gta gcc ccg acc 96
 Leu His Gln Val Phe Ala Thr Ser Thr Ile Lys Lys Val Ala Pro Thr
 20 25 30
 ttt tgg tgg gca gga atg aag aat ccc gaa ttg cag ata cta tta tat 144
 Phe Trp Trp Ala Gly Met Lys Asn Pro Glu Leu Gln Ile Leu Leu Tyr
 35 40 45
 ggt gac cgc ata tca tcc gca gac gtc agt ctt tct gcc gat aat atc 192
 Gly Asp Arg Ile Ser Ser Ala Asp Val Ser Leu Ser Ala Asp Asn Ile
 50 55 60
 acg ctg caa gaa gtg gtg aag cag gag aat cct aat tat ctg gtt ctg 240
 Thr Leu Gln Glu Val Val Lys Gln Glu Asn Pro Asn Tyr Leu Val Leu
 65 70 75 80
 tat tta gac ctt tcg aag gct gct cca cag aac ttt gac atc atc ctg 288
 Tyr Leu Asp Leu Ser Lys Ala Ala Pro Gln Asn Phe Asp Ile Ile Leu
 85 90 95
 aaa caa ggc aaa aag cag aca aaa atc cct tac gag ctt aaa cag cgc 336
 Lys Gln Gly Lys Lys Gln Thr Lys Ile Pro Tyr Glu Leu Lys Gln Arg
 100 105 110
 cgg ccg aat gct tcg gca gta gaa ggt ttt gat tcg agc gac gtg ctt 384
 Arg Pro Asn Ala Ser Ala Val Glu Gly Phe Asp Ser Ser Asp Val Leu
 115 120 125
 tat ctt att atg ccg gac cgt ttt gcc aat ggc aac ccc tcc aac gac 432
 Tyr Leu Ile Met Pro Asp Arg Phe Ala Asn Gly Asn Pro Ser Asn Asp
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 atc att ccc gga atg ctg gaa gga aat gta gac cgt aat gag cct ttc 480
 Ile Ile Pro Gly Met Leu Glu Gly Asn Val Asp Arg Asn Glu Pro Phe
 145 150 155 160
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 Ala Arg His Gly Gly Asp Leu Lys Gly Ile Glu Asn His Leu Asp Tyr
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 180 185 190
 aat gac atg aaa gaa gga tcg tat cac ggt tat gcc att acc gat tat 624
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 245 250 255
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 Lys Asp Trp Phe Asn Phe Glu Gly Asn Tyr Val Gln Thr Ser Phe Lys
 260 265 270
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 Thr Ala Thr Gln Met Asp Pro Tyr Ala Ser Asp Tyr Glu Lys Lys Ile
 275 280 285
 gct atc gac ggt tgg ttc aca acc atg ccg gac ttc aac caa aga 912
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Ala	Phe	Asp	Glu	Glu	Thr	Thr	Glu	Trp	Asn	Gly	Gly	Leu	Phe	Arg	Leu				
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Tyr	Glu	Tyr	Leu	Ser	Gln	Asp	Ile	Val	Tyr	Ser	His	Pro	Met	Ser	Leu				
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aaa	tca	gtc	gtt	gtt	ttc	ctg	aat	gga	aac	gac	cg	gaa	cag	acc	att		1728		
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Gly	Asp	Arg	Ile	Ser	Ser	Ala	Asp	Val	Ser	Leu	Ser	Ala	Asp	Asn
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Ile	Ile	Pro	Gly	Met	Leu	Glu	Gly	Asn	Val	Asp	Arg	Asn	Glu	Pro
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			165						170				175	Tyr
Ile	Ala	Asp	Leu	Gly	Val	Thr	Ser	Ile	Trp	Leu	Asn	Pro	Ile	Gln
			180					185					190	Glu
Asn	Asp	Met	Lys	Glu	Gly	Ser	Tyr	His	Gly	Tyr	Ala	Ile	Thr	Asp
		195					200					205		Tyr
Tyr	Gln	Val	Asp	Arg	Arg	Phe	Gly	Ser	Asn	Glu	Glu	Phe	Arg	Lys
	210					215					220			Leu
Thr	Gln	Glu	Ala	Asn	Ala	Lys	Gly	Leu	Lys	Val	Val	Met	Asp	Met
225					230					235				Ile
Phe	Asn	His	Cys	Gly	Ser	Asp	Asn	Tyr	Leu	Phe	Lys	Asp	Met	Pro
			245						250				255	Ser
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			260					265				270		Lys
Thr	Ala	Thr	Gln	Met	Asp	Pro	Tyr	Ala	Ser	Asp	Tyr	Glu	Lys	Lys
		275					280					285		Ile
Ala	Ile	Asp	Gly	Trp	Phe	Thr	Leu	Thr	Met	Pro	Asp	Phe	Asn	Gln
	290					295					300			Arg
Asn	Arg	His	Val	Ala	Thr	Tyr	Leu	Ile	Gln	Ser	Ser	Ile	Trp	Trp
305					310					315				Ile
Glu	Tyr	Ala	Gly	Ile	Asn	Gly	Ile	Arg	Gln	Asp	Thr	His	Pro	Tyr
			325						330				335	Ala
Asp	Phe	Asp	Met	Met	Ala	Arg	Trp	Cys	Lys	Ala	Val	Asn	Glu	Glu
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Pro	Lys	Phe	Asn	Ile	Val	Gly	Glu	Thr	Trp	Leu	Gly	Asn	Asn	Val
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Ala	Phe	Asp	Glu	Glu	Thr	Thr	Glu	Trp	Asn	Gly	Gly	Leu	Phe	Arg
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Tyr	Glu	Tyr	Leu	Ser	Gln	Asp	Ile	Val	Tyr	Ser	His	Pro	Met	Ser
			420					425					430	Leu
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		435					440					445		Glu
Ala	Asp	Thr	Lys	Asn	Leu	Asp	Arg	Tyr	Lys	Gln	Ala	Leu	Thr	Phe
	450					455					460			Leu
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Met	Ala	Ala	Asp	Lys	Ala	Asn	Gly	Asp	Gly	Leu	Leu	Arg	Cys	Asp
			485						490				495	Phe
Pro	Gly	Gly	Trp	Pro	Asn	Asp	Thr	Lys	Asn	Cys	Phe	Asp	Ala	Asn
			500					505					510	
Arg	Thr	Pro	Gln	Gln	Asn	Glu	Ala	Phe	Ser	Phe	Met	Gln	Lys	Leu
		515					520					525		Leu
Gln	Trp	Arg	Lys	Gly	Asn	Glu	Val	Ile	Ala	Lys	Gly	Gln	Leu	Lys
	530					535					540			His
Phe	Ala	Pro	Asn	Lys	Gly	Val	Tyr	Val	Tyr	Glu	Arg	Lys	Tyr	Gly
545					550					555				Asp
														560

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Lys Ser Val Val Val Phe Leu Asn Gly Asn Asp Arg Glu Gln Thr Ile
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 Asp Leu Val Pro Tyr Gln Glu Ile Leu Pro Ala Ser Ser Ala Phe Asp
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 Ser Arg Glu Ile Tyr Leu Leu Ser Phe
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 Leu Tyr Thr Glu Glu Thr Met His Ile Arg Leu Arg Thr Ala Lys Gly
 20 25 30
 gac att gcc tct gtc caa tta gtg caa gga gat cct tat ctt tta ggg 144
 Asp Ile Ala Ser Val Gln Leu Val Gln Gly Asp Pro Tyr Leu Leu Gly
 35 40 45
 aaa gaa aag tgg tac caa cag tcg tta acc atg gag aag tta gta tct 192
 Lys Glu Lys Trp Tyr Gln Gln Ser Leu Thr Met Glu Lys Leu Val Ser
 50 55 60
 acg gag tta tat gat tac tgg ttt att gca tta agt gca aaa ttt aaa 240
 Thr Glu Leu Tyr Asp Tyr Trp Phe Ile Ala Leu Ser Ala Lys Phe Lys
 65 70 75 80
 cgc ctt tca tat gct ttt act tta gta ggg gcg gat ggt ttg agg gcg 288
 Arg Leu Ser Tyr Ala Phe Thr Leu Val Gly Ala Asp Gly Leu Arg Ala
 85 90 95
 ttt tat ggc gaa cac ggc att tat cct tta gaa gaa aag tat tta gag 336
 Phe Tyr Gly Glu His Gly Ile Tyr Pro Leu Glu Glu Lys Tyr Leu Glu
 100 105 110
 atg gcg aat aat tat ttt cgg atg ccg tat ttt cat gaa atc gat cgt 384
 Met Ala Asn Asn Tyr Phe Arg Met Pro Tyr Phe His Glu Ile Asp Arg
 115 120 125
 ttt aaa gca cct gaa tgg gta aaa gaa acg gtt tgg tat caa ata ttt 432
 Phe Lys Ala Pro Glu Trp Val Lys Glu Thr Val Trp Tyr Gln Ile Phe
 130 135 140
 cca gag cgt ttt gca aat ggt gat ctc gcc aat gat cct gaa ggg acg 480
 Pro Glu Arg Phe Ala Asn Gly Asp Leu Ala Asn Asp Pro Glu Gly Thr
 145 150 155 160
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 Leu Pro Trp Gly Ser Lys Arg Pro Asp Arg Gln Asp Phe Phe Gly Gly
 165 170 175
 gat ttg caa ggg gtg cta gat cat ctt gat tac att gaa gat tta ggt 576
 Asp Leu Gln Gly Val Leu Asp His Leu Asp Tyr Ile Glu Asp Leu Gly
 180 185 190
 gtt aac ggc tta tat ttt tgc cca att ttt gaa gcg ttt tct aat cac 624
 Val Asn Gly Leu Tyr Phe Cys Pro Ile Phe Glu Ala Phe Ser Asn His
 195 200 205
 aaa tat gat acg att gat tat tta aaa att gac cca gct ttt ggt gat 672
 Lys Tyr Asp Thr Ile Asp Tyr Leu Lys Ile Asp Pro Ala Phe Gly Asp
 210 215 220
 ggt gct acc ttt aag cgt tta gtc gaa gag tgt cat cga cgg ggc atc 720
 Gly Ala Thr Phe Lys Arg Leu Val Glu Glu Cys His Arg Arg Gly Ile
 225 230 235 240
 aag att atg ttg gac gcc gtt ttt aac cat atg ggg gac act tcg cct 768
 Lys Ile Met Leu Asp Ala Val Phe Asn His Met Gly Asp Thr Ser Pro
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Trp	Phe	His	Val	Asn	Glu	Phe	Pro	Ala	Ser	Tyr	Glu	Glu	Ser	Ala	Asp	
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ttt	gaa	gaa	gca	agc	aac	att	acc	tat	gat	act	ttt	gca	ttc	act	ccg	912
Phe	Glu	Glu	Ala	Ser	Asn	Ile	Thr	Tyr	Asp	Thr	Phe	Ala	Phe	Thr	Pro	
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cat	atg	cct	aaa	tta	aat	aca	gca	aat	cca	gaa	gtg	caa	gcc	tat	ctt	960
His	Met	Pro	Lys	Leu	Asn	Thr	Ala	Asn	Pro	Glu	Val	Gln	Ala	Tyr	Leu	
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tta	gaa	att	gct	cgt	tat	tgg	att	gag	gaa	tat	gat	att	gac	gcc	tgg	1008
Leu	Glu	Ile	Ala	Arg	Tyr	Trp	Ile	Glu	Glu	Tyr	Asp	Ile	Asp	Ala	Trp	
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cgt	tta	gat	gtg	gca	aac	gaa	gtg	gat	cat	gcg	ttc	tgg	aaa	aaa	ttc	1056
Arg	Leu	Asp	Val	Ala	Asn	Glu	Val	Asp	His	Ala	Phe	Trp	Lys	Lys	Phe	
			340					345					350			
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Arg	Gln	Thr	Cys	Asp	Asp	Ala	Lys	Glu	Asp	Phe	Tyr	Ile	Leu	Gly	Glu	
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Ile	Trp	His	Ser	Ser	Gln	Ser	Trp	Leu	Gln	Gly	Asp	Glu	Phe	His	Ala	
	370					375					380					
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Val	Met	Asn	Tyr	Ala	Tyr	Thr	Asp	Ala	Ile	Met	Gly	Tyr	Phe	Val	Lys	
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caa	gaa	ctg	tcc	ttg	gaa	aag	atg	ctt	tct	gaa	atg	aac	aac	cag	tta	1248
Gln	Glu	Leu	Ser	Leu	Glu	Lys	Met	Leu	Ser	Glu	Met	Asn	Asn	Gln	Leu	
				405					410					415		
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Met	Leu	Tyr	Arg	Gln	Gln	Thr	Asn	Gln	Met	Gln	Phe	Asn	Val	Leu	Asp	
			420					425					430			
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Ser	His	Asp	Thr	Pro	Arg	Leu	Leu	His	Glu	Thr	Lys	Glu	Asp	Lys	Glu	
		435					440					445				
ctg	atg	cgc	caa	gta	tta	gcg	ttt	acg	tat	att	caa	cca	ggg	gtc	cct	1392
Leu	Met	Arg	Gln	Val	Leu	Ala	Phe	Thr	Tyr	Ile	Gln	Pro	Gly	Val	Pro	
	450					455					460					
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Cys	Leu	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Thr	Gly	Asp	Met	Asp	Pro	
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gat	tgt	cgt	cgt	tgt	atg	ggt	tgg	gag	gaa	aat	cag	caa	gat	ttg	gat	1488
Asp	Cys	Arg	Arg	Cys	Met	Val	Trp	Glu	Glu	Asn	Gln	Gln	Asp	Leu	Asp	
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Leu	Lys	Glu	Phe	Val	Lys	Ser	Leu	Ile	Ala	Leu	Arg	Lys	Lys	Tyr	Ala	
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Ala	Val	Phe	Ser	Gly	Gly	Thr	Ile	Asp	Trp	Thr	Gly	Thr	Ser	Phe	Glu	
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Thr	Gly	Leu	Ile	Arg	Leu	Ala	Cys	Arg	Leu	Glu	Gln	Gln	Thr	Ile	Tyr	
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Arg	Glu	Val	Leu	Leu	Ser	Ser	Ser	Ile	Glu	Ile	Ala	Ser	Glu	Gln	Ile	
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Asp	Ile	Ala	Ser	Val	Gln	Leu	Val	Gln	Gly	Asp	Pro	Tyr	Leu	Leu	Gly
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Lys	Glu	Lys	Trp	Tyr	Gln	Gln	Ser	Leu	Thr	Met	Glu	Lys	Leu	Val	Ser
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Thr	Glu	Leu	Tyr	Asp	Tyr	Trp	Phe	Ile	Ala	Leu	Ser	Ala	Lys	Phe	Lys
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Arg	Leu	Ser	Tyr	Ala	Phe	Thr	Leu	Val	Gly	Ala	Asp	Gly	Leu	Arg	Ala
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Phe	Tyr	Gly	Glu	His	Gly	Ile	Tyr	Pro	Leu	Glu	Glu	Lys	Tyr	Leu	Glu
			100					105					110		
Met	Ala	Asn	Asn	Tyr	Phe	Arg	Met	Pro	Tyr	Phe	His	Glu	Ile	Asp	Arg
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Phe	Lys	Ala	Pro	Glu	Trp	Val	Lys	Glu	Thr	Val	Trp	Tyr	Gln	Ile	Phe
	130					135					140				
Pro	Glu	Arg	Phe	Ala	Asn	Gly	Asp	Leu	Ala	Asn	Asp	Pro	Glu	Gly	Thr
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Leu	Pro	Trp	Gly	Ser	Lys	Arg	Pro	Asp	Arg	Gln	Asp	Phe	Phe	Gly	Gly
				165					170					175	
Asp	Leu	Gln	Gly	Val	Leu	Asp	His	Leu	Asp	Tyr	Ile	Glu	Asp	Leu	Gly
			180					185					190		
Val	Asn	Gly	Leu	Tyr	Phe	Cys	Pro	Ile	Phe	Glu	Ala	Phe	Ser	Asn	His
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Lys	Tyr	Asp	Thr	Ile	Asp	Tyr	Leu	Lys	Ile	Asp	Pro	Ala	Phe	Gly	Asp
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Gly	Ala	Thr	Phe	Lys	Arg	Leu	Val	Glu	Glu	Cys	His	Arg	Arg	Gly	Ile
225					230					235					240
Lys	Ile	Met	Leu	Asp	Ala	Val	Phe	Asn	His	Met	Gly	Asp	Thr	Ser	Pro
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Gln	Trp	Gln	Asp	Val	Leu	Lys	Asn	Gly	Gln	Asp	Ser	Ile	Tyr	Ala	Asp
			260					265					270		
Trp	Phe	His	Val	Asn	Glu	Phe	Pro	Ala	Ser	Tyr	Glu	Glu	Ser	Ala	Asp
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Phe	Glu	Glu	Ala	Ser	Asn	Ile	Thr	Tyr	Asp	Thr	Phe	Ala	Phe	Thr	Pro
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His	Met	Pro	Lys	Leu	Asn	Thr	Ala	Asn	Pro	Glu	Val	Gln	Ala	Tyr	Leu
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Leu	Glu	Ile	Ala	Arg	Tyr	Trp	Ile	Glu	Glu	Tyr	Asp	Ile	Asp	Ala	Trp
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Arg	Leu	Asp	Val	Ala	Asn	Glu	Val	Asp	His	Ala	Phe	Trp	Lys	Lys	Phe
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Arg	Gln	Thr	Cys	Asp	Asp	Ala	Lys	Glu	Asp	Phe	Tyr	Ile	Leu	Gly	Glu
		355					360					365			
Ile	Trp	His	Ser	Ser	Gln	Ser	Trp	Leu	Gln	Gly	Asp	Glu	Phe	His	Ala
	370					375					380				
Val	Met	Asn	Tyr	Ala	Tyr	Thr	Asp	Ala	Ile	Met	Gly	Tyr	Phe	Val	Lys
385					390					395					400
Gln	Glu	Leu	Ser	Leu	Glu	Lys	Met	Leu	Ser	Glu	Met	Asn	Asn	Gln	Leu
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Met	Leu	Tyr	Arg	Gln	Gln	Thr	Asn	Gln	Met	Gln	Phe	Asn	Val	Leu	Asp
			420					425					430		
Ser	His	Asp	Thr	Pro	Arg	Leu	Leu	His	Glu	Thr	Lys	Glu	Asp	Lys	Glu
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Leu	Met	Arg	Gln	Val	Leu	Ala	Phe	Thr	Tyr	Ile	Gln	Pro	Gly	Val	Pro
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Cys	Leu	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Thr	Gly	Asp	Met	Asp	Pro
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Asp	Cys	Arg	Arg	Cys	Met	Val	Trp	Glu	Glu	Asn	Gln	Gln	Asp	Leu	Asp
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Leu	Lys	Glu	Phe	Val	Lys	Ser	Leu	Ile	Ala	Leu	Arg	Lys	Lys	Tyr	Ala
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Ala	Val	Phe	Ser	Gly	Gly	Thr	Ile	Asp	Trp	Thr	Gly	Thr	Ser	Phe	Glu
		515					520					525			
Thr	Gly	Leu	Ile	Arg	Leu	Ala	Cys	Arg	Leu	Glu	Glu	Gln	Thr	Ile	Tyr
	530					535					540				
Gly	Ile	Phe	Asn	Thr	Gly	Gln	Glu	Thr	Gln	Phe	Val	Asp	Arg	Thr	Asp

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 Ser Phe Lys Asp Ser Asn Gly Asp Gly Ile Gly Asp Leu Gln Gly Ile
 20 25 30
 att gag aaa tta ccg tat tta aaa gaa cta ggg gtc gat ttt tta tgg 144
 Ile Glu Lys Leu Pro Tyr Leu Lys Glu Leu Gly Val Asp Phe Leu Trp
 35 40 45
 tta aat ccg att tac act tcg cca aac gtt gac aat ggt tat gat att 192
 Leu Asn Pro Ile Tyr Thr Ser Pro Asn Val Asp Asn Gly Tyr Asp Ile
 50 55 60
 gcg gat tat caa ggg att cag cca gag ttt ggt acg atg gaa gat ttt 240
 Ala Asp Tyr Gln Gly Ile Gln Pro Glu Phe Gly Thr Met Glu Asp Phe
 65 70 75 80
 caa gaa ctt ttg gac caa gcg cat caa tta ggt ttg aag att att ctt 288
 Gln Glu Leu Leu Asp Gln Ala His Gln Leu Gly Leu Lys Ile Ile Leu
 85 90 95
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 Asp Leu Val Val Asn His Thr Ser Asp Gln His Pro Trp Phe Val Glu
 100 105 110
 gcg aaa aaa agt tta gat aat ccg tat cgt gag tat tat tta tgg gcc 384
 Ala Lys Lys Ser Leu Asp Asn Pro Tyr Arg Glu Tyr Tyr Leu Trp Ala
 115 120 125
 gat gcg aca cca gat cgt atg ccg aat gaa tgg caa agc ttt ttt ggt 432
 Asp Ala Thr Pro Asp Arg Met Pro Asn Glu Trp Gln Ser Phe Phe Gly
 130 135 140
 ggc tcg act tgg acg tat gac gaa ggt aca aag caa gca tat ttt cat 480
 Gly Ser Thr Trp Thr Tyr Asp Glu Gly Thr Lys Gln Ala Tyr Phe His
 145 150 155 160
 gtg ttt gca aaa gag caa cct gat ttg aac tgg aaa aat cct aaa gtt 528
 Val Phe Ala Lys Glu Gln Pro Asp Leu Asn Trp Lys Asn Pro Lys Val
 165 170 175
 cgt gaa gag att tat gcg atg att cgc tgg tgg tta gat ttg gga att 576
 Arg Glu Glu Ile Tyr Ala Met Ile Arg Trp Trp Leu Asp Leu Gly Ile
 180 185 190
 gat ggt ttc cga ttg gat gcg att agt cat atc caa aaa gaa cct tgg 624
 Asp Gly Phe Arg Leu Asp Ala Ile Ser His Ile Gln Lys Glu Pro Trp
 195 200 205
 gat ttt aaa att acc acg aat ccg tgg gct cca ttt atg aat gta aaa 672
 Asp Phe Lys Ile Thr Thr Asn Pro Trp Ala Pro Phe Met Asn Val Lys
 210 215 220
 ggc att gaa gac tat atg ctg gat ttg aaa gtt att ttt gct gag tat 720
 Gly Ile Glu Asp Tyr Met Leu Asp Leu Lys Val Ile Phe Ala Glu Tyr
 225 230 235 240
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 Asp Ile Met Thr Val Gly Glu Ala Ser Gly Val Ser Ser Lys Lys Ala
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 gtg gaa tgg acc aat gat gcg ggc tat ctg aat atg att ttt gaa tta 816
 Val Glu Trp Thr Asn Asp Ala Gly Tyr Leu Asn Met Ile Phe Glu Leu
 260 265 270
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Leu	Gly	Tyr	Lys	Lys	Val	Met	Ala	Arg	Trp	Gln	Lys	His	Leu	Gly	Thr		
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gaa	ggc	tgg	aat	gca	tta	tat	gta	gaa	aat	cat	gat	aat	ccc	aga	atc	960	
Glu	Gly	Trp	Asn	Ala	Leu	Tyr	Val	Glu	Asn	His	Asp	Asn	Pro	Arg	Ile		
	305				310					315					320		
aat	tca	att	tta	ggc	aat	gaa	acc	tct	cat	tct	gct	aag	gcg	att	gga	1008	
Asn	Ser	Ile	Leu	Gly	Asn	Glu	Thr	Ser	His	Ser	Ala	Lys	Ala	Ile	Gly		
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Thr	Ile	Ala	Leu	Leu	Leu	Arg	Gly	Thr	Pro	Phe	Ile	Tyr	Gln	Gly	Gln		
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Ala	Lys	Asp	Ser	His	Asn	His	Tyr	Arg	Leu	Leu	Ile	Glu	Ser	Gly	Tyr		
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Asp	Ala	Lys	Gln	Ala	Leu	Lys	Glu	Val	Ala	His	Trp	Thr	Arg	Asp	His		
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Ser	Arg	Thr	Pro	Met	Gln	Trp	Thr	Ser	Gln	Glu	Ala	Ser	Ser	Phe	Thr		
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tcg	ggg	cat	ccg	tg	tta	gca	att	cat	ccc	aat	ttc	aaa	gaa	ata	aat	1296	
Ser	Gly	His	Pro	Trp	Leu	Ala	Ile	His	Pro	Asn	Phe	Lys	Glu	Ile	Asn		
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Val	Ala	Asp	Gln	Glu	Thr	Asp	Ala	Gln	Ser	Val	Leu	Asn	Tyr	Tyr	Lys		
		435					440				445						
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Lys	Leu	Ile	Ala	Leu	Arg	Lys	Asp	Asn	Pro	Val	Phe	Thr	Asp	Gly	Gln		
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Phe	Glu	Leu	Leu	Ala	Pro	Asn	His	Pro	Ser	Val	Phe	Ala	Phe	Leu	Arg		
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Lys	Thr	Thr	Glu	Ala	Thr	Ala	Leu	Val	Ile	Val	Asn	Leu	Ser	Gly	Glu		
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Lys	Cys	Gln	Phe	Asp	Leu	Pro	Asn	Lys	Leu	Leu	Gly	Arg	Lys	Trp	Gln		
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caa	tta	tta	ggg	aat	caa	gat	ttt	acg	gtg	aag	aaa	cgg	atg	cag	tta	1584	
Gln	Leu	Gly	Asn	Gln	Asp	Phe	Thr	Val	Lys	Lys		525					
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<211> 537

<212> PRT

<213> Enterococcus faecalis v583

<400> 120

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Ile	Glu	Lys	Leu	Pro	Tyr	Leu	Lys	Glu	Leu	Gly	Val	Asp	Phe	Leu	Trp
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Leu	Asn	Pro	Ile	Tyr	Thr	Ser	Pro	Asn	Val	Asp	Asn	Gly	Tyr	Asp	Ile
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Ala	Asp	Tyr	Gln	Gly	Ile	Gln	Pro	Glu	Phe	Gly	Thr	Met	Glu	Asp	Phe
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Gln	Glu	Leu	Leu	Asp	Gln	Ala	His	Gln	Leu	Gly	Leu	Lys	Ile	Ile	Leu
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Gly	Ser	Thr	Trp	Thr	Tyr	Asp	Glu	Gly	Thr	Lys	Gln	Ala	Tyr	Phe	His
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Val	Phe	Ala	Lys	Glu	Gln	Pro	Asp	Leu	Asn	Trp	Lys	Asn	Pro	Lys	Val
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Asp	Gly	Phe	Arg	Leu	Asp	Ala	Ile	Ser	His	Ile	Gln	Lys	Glu	Pro	Trp
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Glu	His	Asn	Val	Arg	Glu	Gly	Lys	Pro	Gly	Glu	Glu	Arg	Leu	Asn	Ile
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Leu	Gly	Tyr	Lys	Lys	Val	Met	Ala	Arg	Trp	Gln	Lys	His	Leu	Gly	Thr
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Glu	Gly	Trp	Asn	Ala	Leu	Tyr	Val	Glu	Asn	His	Asp	Asn	Pro	Arg	Ile
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Asn	Ser	Ile	Leu	Gly	Asn	Glu	Thr	Ser	His	Ser	Ala	Lys	Ala	Ile	Gly
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Thr	Ile	Ala	Leu	Leu	Leu	Arg	Gly	Thr	Pro	Phe	Ile	Tyr	Gln	Gly	Gln
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Ala	Lys	Asp	Ser	His	Asn	His	Tyr	Arg	Leu	Leu	Ile	Glu	Ser	Gly	Tyr
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Asp	Ala	Lys	Gln	Ala	Leu	Lys	Glu	Val	Ala	His	Trp	Thr	Arg	Asp	His
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Ser	Arg	Thr	Pro	Met	Gln	Trp	Thr	Ser	Gln	Glu	Ala	Ser	Ser	Phe	Thr
				405					410					415	
Ser	Gly	His	Pro	Trp	Leu	Ala	Ile	His	Pro	Asn	Phe	Lys	Glu	Ile	Asn
			420					425					430		
Val	Ala	Asp	Gln	Glu	Thr	Asp	Ala	Gln	Ser	Val	Leu	Asn	Tyr	Tyr	Lys
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Lys	Leu	Ile	Ala	Leu	Arg	Lys	Asp	Asn	Pro	Val	Phe	Thr	Asp	Gly	Gln
	450					455					460				
Phe	Glu	Leu	Leu	Ala	Pro	Asn	His	Pro	Ser	Val	Phe	Ala	Phe	Leu	Arg
465					470					475					480
Lys	Thr	Thr	Glu	Ala	Thr	Ala	Leu	Val	Ile	Val	Asn	Leu	Ser	Gly	Glu
				485					490					495	
Lys	Cys	Gln	Phe	Asp	Leu	Pro	Asn	Lys	Leu	Leu	Gly	Arg	Lys	Trp	Gln
			500					505					510		
Gln	Leu	Leu	Gly	Asn	Gln	Asp	Phe	Thr	Val	Lys	Lys	Arg	Met	Gln	Leu
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<211> 1674

<212> DNA

<213> Enterococcus faecalis V583

<220>

<221> CDS

<222> (1)..(1674)

<223> transl_table=11

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att Ile	att Ile	caa Gln 35	aaa Lys	ctg Leu	gat Asp	tac Tyr	tta Leu 40	gaa Glu	aat Asn	tta Leu	gga Gly	att Ile 45	acg Thr	ctg Leu	att Ile	144
tgg Trp	ctg Leu 50	agt Ser	cca Pro	atg Met	tac Tyr	ccg Pro 55	tcg Ser	cca Pro	atg Met	gct Ala	gac Asp 60	aat Asn	gga Gly	tat Tyr	gat Asp	192
att Ile 65	tca Ser	gac Asp	tat Tyr	tat Tyr	ggt Gly 70	att Ile	tct Ser	agc Ser	gat Asp	ttt Phe 75	ggt Gly	aca Thr	atg Met	gca Ala	gac Asp 80	240
ttc Phe	gat Asp	gaa Glu	ctc Leu	att Ile 85	gaa Glu	gaa Glu	gca Ala	aaa Lys	aaa Lys 90	cga Arg	aac Asn	ata Ile	aaa Lys	ggt Val 95	att Ile	288
tta Leu	gat Asp	ttg Leu	gtg Val 100	gta Val	aac Asn	cat His	aca Thr	tct Ser 105	gat Asp	gaa Glu	cat His	gct Ala	tgg Trp 110	ttt Phe	caa Gln	336
gat Asp	ggt Val	tta Leu 115	aaa Lys	aat Asn	cct Pro	caa Gln	agt Ser 120	cgt Arg	ttt Phe	cga Arg	gac Asp	ttt Phe 125	tat Tyr	att Ile	ata Ile	384
aaa Lys	gaa Glu 130	gga Gly	cga Arg	gaa Glu	gca Ala	cct Pro 135	aca Thr	aat Asn	tgg Trp	cgg Arg	tct Ser 140	aac Asn	ttc Phe	ggt Gly	ggt Gly	432
agt Ser 145	ggt Val	tgg Trp	gaa Glu	aaa Lys	tta Leu 150	cct Pro	ggg Gly	gaa Glu	gat Asp	gcc Ala 155	tac Tyr	tac Tyr	ttt Phe	cat His	gcc Ala 160	480
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gga Gly	agc Ser 290	gaa Glu	tgg Trp	ttt Phe	tat Tyr	aga Arg 295	atc Ile	gat Asp	tgg Trp	tct Ser	tgg Trp 300	aat Asn	gat Asp	tta Leu	cgc Arg	912
aca Thr 305	tta Leu	att Ile	ttc Phe	aaa Lys	cag Gln 310	caa Gln	gaa Glu	gcc Ala	atg Met	caa Gln 315	gag Glu	gct Ala	ggt Gly	tgg Trp	agt Ser 320	960
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Pro	Lys	Glu	Ala	Leu	Ser	Leu	Val	Asn	Leu	Arg	Ser	Arg	Asp	Asn	Ala	
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Arg	Thr	Pro	Phe	Pro	Trp	Asn	Asp	Ser	Met	Tyr	Gly	Gly	Phe	Ser	Ser	
			420					425					430			
gtc	aag	cct	tgg	tta	gga	atg	gtg	gat	aat	tat	aaa	gaa	atc	aat	gcc	1344
Val	Lys	Pro	Trp	Leu	Gly	Met	Val	Asp	Asn	Tyr	Lys	Glu	Ile	Asn	Ala	
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gaa	gca	gaa	ata	aaa	aat	agt	caa	agt	att	ttt	cat	ttc	tat	aag	cgg	1392
Glu	Ala	Glu	Ile	Lys	Asn	Ser	Gln	Ser	Ile	Phe	His	Phe	Tyr	Lys	Arg	
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atg	att	gca	ttt	cgt	caa	aag	agt	ccc	tat	aca	gac	atc	tta	ctt	tat	1440
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Gly	Thr	Phe	Glu	Gly	Leu	Ser	Asn	Leu	Pro	Asp	Asn	Val	Ile	Ala	Tyr	
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aaa	cgc	aaa	tta	aat	gaa	aaa	acg	att	tac	gcc	ttt	ttt	aat	ttt	ggt	1536
Lys	Arg	Lys	Leu	Asn	Glu	Lys	Thr	Ile	Tyr	Ala	Phe	Phe	Asn	Phe	Gly	
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Asp	Thr	Gln	Ser	Glu	Glu	Arg	Glu	Gln	Leu	Val	Gln	Gln	Gly	Thr	Leu	
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tta	aaa	agc	tat	caa	gga	cta	ttg	att	act	ata	aat	gag	tag			1674
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<211> 557

<212> PRT

<213> Enterococcus faecalis V583

<400> 122

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Ile	Ile	Gln	Lys	Leu	Asp	Tyr	Leu	Glu	Asn	Leu	Gly	Ile	Thr	Leu	Ile	
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Trp	Leu	Ser	Pro	Met	Tyr	Pro	Ser	Pro	Met	Ala	Asp	Asn	Gly	Tyr	Asp	
		50				55					60					
Ile	Ser	Asp	Tyr	Tyr	Gly	Ile	Ser	Ser	Asp	Phe	Gly	Thr	Met	Ala	Asp	
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Phe	Asp	Glu	Leu	Ile	Glu	Glu	Ala	Lys	Lys	Arg	Asn	Ile	Lys	Val	Ile	
				85					90					95		
Leu	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Glu	His	Ala	Trp	Phe	Gln	
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Asp	Val	Leu	Lys	Asn	Pro	Gln	Ser	Arg	Phe	Arg	Asp	Phe	Tyr	Ile	Ile	
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Lys	Glu	Gly	Arg	Glu	Ala	Pro	Thr	Asn	Trp	Arg	Ser	Asn	Phe	Gly	Gly	
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Ser	Val	Trp	Glu	Lys	Leu	Pro	Gly	Glu	Asp	Ala	Tyr	Tyr	Phe	His	Ala	
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Lys	Glu	Ile	Tyr	Gln	Met	Ile	Arg	Phe	Trp	Leu	Asn	Lys	Gly	Ile	Ala	
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Gly	Phe	Arg	Val	Asp	Ala	Ile	Asn	Phe	Ile	Lys	Lys	Asp	Leu	Thr	Trp	
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 Ala Ser Arg Asn Met Pro Gly Met Ser Asp Phe Leu Asn Glu Leu Lys
 225 230 235 240
 Glu Lys Ala Phe Ala Gly Phe Asp Ile Val Thr Val Ala Glu Ala Ala
 245 250 255
 Gly Val Asn Tyr Leu Asn Leu Ser Glu Phe Ile Gly Glu Thr Gly Tyr
 260 265 270
 Phe Asp Met Ile Phe Asp Phe Lys Trp Ala Asp Leu Asp Val Lys Ser
 275 280 285
 Gly Ser Glu Trp Phe Tyr Arg Ile Asp Trp Ser Trp Asn Asp Leu Arg
 290 295 300
 Thr Leu Ile Phe Lys Gln Gln Glu Ala Met Gln Glu Ala Gly Trp Ser
 305 310 315 320
 Ala Asn Phe Ile Glu Asn His Asp Gln Pro Arg Ala Thr Thr Lys Tyr
 325 330 335
 Leu Lys Glu Gln Ala Gln Gln Pro Asn Ala Val Lys Thr Phe Gly Ala
 340 345 350
 Met Tyr Phe Phe Leu Arg Gly Thr Pro Phe Ile Tyr Gln Gly Gln Glu
 355 360 365
 Leu Gly Met Thr Asn Phe Glu Arg Gly Ser Ile Asp Glu Phe Asp Asp
 370 375 380
 Ile Ser Ser Ile Asp Gln Tyr Tyr Arg Ala Ile Lys Glu Gly Phe Thr
 385 390 395 400
 Pro Lys Glu Ala Leu Ser Leu Val Asn Leu Arg Ser Arg Asp Asn Ala
 405 410 415
 Arg Thr Pro Phe Pro Trp Asn Asp Ser Met Tyr Gly Gly Phe Ser Ser
 420 425 430
 Val Lys Pro Trp Leu Gly Met Val Asp Asn Tyr Lys Glu Ile Asn Ala
 435 440 445
 Glu Ala Glu Ile Lys Asn Ser Gln Ser Ile Phe His Phe Tyr Lys Arg
 450 455 460
 Met Ile Ala Phe Arg Gln Lys Ser Pro Tyr Thr Asp Ile Leu Leu Tyr
 465 470 475 480
 Gly Thr Phe Glu Gly Leu Ser Asn Leu Pro Asp Asn Val Ile Ala Tyr
 485 490 495
 Lys Arg Lys Leu Asn Glu Lys Thr Ile Tyr Ala Phe Phe Asn Phe Gly
 500 505 510
 Glu Ala Val Pro Ile Pro His Tyr Leu Val Asn Gly Thr Val Ile Phe
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<210> 123

<211> 1719

<212> DNA

<213> Streptomyces avermitilis MA-4680

<220>

<221> CDS

<222> (1)..(1719)

<400> 123

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Lys	Gly	Leu	Thr	Ala	Lys	Leu	Asp	Tyr	Leu	Gln	Trp	Leu	Gly	Val	Asp	
	50					55			60							
tgc	ctg	tgg	ctg	ccg	ccg	ttc	ttc	aag	tcc	ccc	ctg	cgc	gac	ggc	ggc	240
Cys	Leu	Trp	Leu	Pro	Pro	Phe	Phe	Lys	Ser	Pro	Leu	Arg	Asp	Gly	Gly	
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				85					90					95		
gcc	gac	ttc	gtc	gag	ttc	gtg	gac	gcg	gcc	cac	cag	cgc	ggc	atg	cgc	336
Ala	Asp	Phe	Val	Glu	Phe	Val	Asp	Ala	Ala	His	Gln	Arg	Gly	Met	Arg	
			100					105					110			
gtg	atc	atc	gac	ttc	gtg	atg	aac	cac	acc	agc	gac	ctg	cac	ccg	tgg	384
Val	Ile	Ile	Asp	Phe	Val	Met	Asn	His	Thr	Ser	Asp	Leu	His	Pro	Trp	
		115					120					125				
ttc	cag	gag	tcc	cgc	agc	aac	ccc	gac	ggc	ccc	tac	ggc	gac	tac	tac	432
Phe	Gln	Glu	Ser	Arg	Ser	Asn	Pro	Asp	Gly	Pro	Tyr	Gly	Asp	Tyr	Tyr	
	130					135					140					
gtg	tgg	gcc	gac	gac	gac	aag	cag	tac	cag	gac	gcc	cgg	atc	atc	ttc	480
Val	Trp	Ala	Asp	Asp	Asp	Lys	Gln	Tyr	Gln	Asp	Ala	Arg	Ile	Ile	Phe	
	145				150					155					160	
gtc	gac	acc	gag	gcc	tcc	aac	tgg	acc	ttc	gac	ccg	gtc	cgc	aag	cag	528
Val	Asp	Thr	Glu	Ala	Ser	Asn	Trp	Thr	Phe	Asp	Pro	Val	Arg	Lys	Gln	
				165					170					175		
tac	tac	tgg	cac	cgc	ttc	ttc	tcc	cac	cag	ccc	gac	ctc	aac	tac	gag	576
Tyr	Tyr	Trp	His	Arg	Phe	Phe	Ser	His	Gln	Pro	Asp	Leu	Asn	Tyr	Glu	
			180					185					190			
aac	ccg	gcg	gtg	cag	gag	gag	atc	gtc	tcc	gcc	ctg	cgg	ttc	tgg	ctc	624
Asn	Pro	Ala	Val	Gln	Glu	Glu	Ile	Val	Ser	Ala	Leu	Arg	Phe	Trp	Leu	
			195				200					205				
gac	ctc	ggc	atc	gac	ggc	ttc	cgc	ctc	gac	gcg	gtg	ccg	tac	ctg	tac	672
Asp	Leu	Gly	Ile	Asp	Gly	Phe	Arg	Leu	Asp	Ala	Val	Pro	Tyr	Leu	Tyr	
	210				215						220					
cag	cag	gaa	ggc	acc	aac	tgc	gag	aac	ctg	ccg	gcg	acg	cac	gag	ttc	720
Gln	Gln	Glu	Gly	Thr	Asn	Cys	Glu	Asn	Leu	Pro	Ala	Thr	His	Glu	Phe	
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ctg	aag	cgg	gtg	cgc	aag	gag	atc	gac	acg	cac	tat	ccg	gac	acg	gtg	768
Leu	Lys	Arg	Val	Arg	Lys	Glu	Ile	Asp	Thr	His	Tyr	Pro	Asp	Thr	Val	
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ctg	ctc	gcg	gag	gcg	aac	cag	tgg	ccg	gag	gac	gtg	gtc	gac	tac	ttc	816
Leu	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	Glu	Asp	Val	Val	Asp	Tyr	Phe	
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ggc	gac	ttc	ccc	tcg	ggc	ggc	gac	gag	tgc	cac	atg	gcg	ttc	cat	ttc	864
Gly	Asp	Phe	Pro	Ser	Gly	Gly	Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	
		275					280					285				
ccg	gtc	atg	ccg	cgg	atc	ttc	atg	gcg	gtg	cgg	cgt	gag	tcg	cgg	tat	912
Pro	Val	Met	Pro	Arg	Ile	Phe	Met	Ala	Val	Arg	Arg	Glu	Ser	Arg	Tyr	
	290					295					300					
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Pro	Val	Ser	Glu	Ile	Leu	Ala	Lys	Thr	Pro	Ala	Ile	Pro	Ser	Ser	Cys	
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Gln	Trp	Gly	Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	
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gtc	acc	gac	gag	gaa	cgc	gac	tac	atg	tgg	gcg	gag	tac	gcc	aag	gat	1056
Val	Thr	Asp	Glu	Glu	Arg	Asp	Tyr	Met	Trp	Ala	Glu	Tyr	Ala	Lys	Asp	
			340					345					350			
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Pro	Arg	Met	Arg	Ala	Asn	Ile	Gly	Ile	Arg	Arg	Arg	Leu	Ala	Pro	Leu	
		355					360					365				
ctg	gac	aac	gac	cgc	aac	cag	atc	gag	ctg	ttc	acc	gcg	ctg	ctg	ctg	1152
Leu	Asp	Asn	Asp	Arg	Asn	Gln	Ile	Glu	Leu	Phe	Thr	Ala	Leu	Leu	Leu	
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Ser	Leu	Pro	Gly	Ser	Pro	Ile	Leu	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	
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Gly	Asp	Asn	Ile	Trp	Leu	Gly	Asp	Arg	Asp	Ala	Val	Arg	Thr	Pro	Met	
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Gln	Trp	Thr	Pro	Asp	Arg	Asn	Ala	Gly	Phe	Ser	Ser	Cys	Asp	Pro	Gly	
				420				425					430			
cgt	ctg	tat	ctg	ccc	acg	atc	atg	gat	ccg	gtc	tac	ggg	tac	cag	gtc	1344
Arg	Leu	Tyr	Leu	Pro	Thr	Ile	Met	Asp	Pro	Val	Tyr	Gly	Tyr	Gln	Val	
							440					445				

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Thr	Asn	Val	Glu	Ala	Ser	Met	Ser	Ser	Pro	Ser	Ser	Leu	Leu	His	Trp	
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acc	cgg	cgg	atg	atc	gag	atc	cgt	aag	cag	aac	ccg	gcg	ttc	ggc	ctc	1440
Thr	Arg	Arg	Met	Ile	Glu	Ile	Arg	Lys	Gln	Asn	Pro	Ala	Phe	Gly	Leu	
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Gly	Ser	Tyr	Thr	Glu	Leu	Gln	Ser	Ser	Asn	Pro	Ala	Val	Leu	Ala	Phe	
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Leu	Arg	Glu	Ala	Pro	Ser	Thr	Gly	Gly	Asn	Gly	Asp	Asp	Leu	Val	Leu	
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Cys	Val	His	Asn	Phe	Ser	Arg	Phe	Ala	Gln	Pro	Thr	Glu	Leu	Asp	Leu	
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Arg	Ala	Phe	Ser	Gly	Arg	His	Pro	Val	Glu	Leu	Ile	Gly	Gly	Val	Arg	
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Phe	Pro	Ala	Ile	Gly	Glu	Leu	Pro	Tyr	Leu	Leu	Thr	Leu	Ala	Gly	His	
545					550					555					560	
ggc	ttc	tac	tgg	ttc	cgg	ctc	cgc	aag	gac	gcc	gtc	tag				1719
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<211> 572

<212> PRT

<213> Streptomyces avermitilis MA-4680

<400> 124

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Leu	Val	Arg	Ser	Phe	Gln	Asp	Ser	Asn	Gly	Asp	Gly	Val	Gly	Asp	Leu	
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Lys	Gly	Leu	Thr	Ala	Lys	Leu	Asp	Tyr	Leu	Gln	Trp	Leu	Gly	Val	Asp	
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Cys	Leu	Trp	Leu	Pro	Pro	Phe	Phe	Lys	Ser	Pro	Leu	Arg	Asp	Gly	Gly	
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Tyr	Asp	Val	Ser	Asp	Tyr	Thr	Ala	Val	Leu	Pro	Glu	Phe	Gly	Asp	Leu	
			85					90					95			
Ala	Asp	Phe	Val	Glu	Phe	Val	Asp	Ala	Ala	His	Gln	Arg	Gly	Met	Arg	
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Val	Ile	Ile	Asp	Phe	Val	Met	Asn	His	Thr	Ser	Asp	Leu	His	Pro	Trp	
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Phe	Gln	Glu	Ser	Arg	Ser	Asn	Pro	Asp	Gly	Pro	Tyr	Gly	Asp	Tyr	Tyr	
	130					135					140					
Val	Trp	Ala	Asp	Asp	Asp	Lys	Gln	Tyr	Gln	Asp	Ala	Arg	Ile	Ile	Phe	
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Tyr	Tyr	Trp	His	Arg	Phe	Phe	Ser	His	Gln	Pro	Asp	Leu	Asn	Tyr	Glu	
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Asn	Pro	Ala	Val	Gln	Glu	Glu	Ile	Val	Ser	Ala	Leu	Arg	Phe	Trp	Leu	
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Asp	Leu	Gly	Ile	Asp	Gly	Phe	Arg	Leu	Asp	Ala	Val	Pro	Tyr	Leu	Tyr	
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Gln	Gln	Glu	Gly	Thr	Asn	Cys	Glu	Asn	Leu	Pro	Ala	Thr	His	Glu	Phe	
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Leu	Lys	Arg	Val	Arg	Lys	Glu	Ile	Asp	Thr	His	Tyr	Pro	Asp	Thr	Val	
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Leu	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	Glu	Asp	Val	Val	Asp	Tyr	Phe	
			260					265					270			
Gly	Asp	Phe	Pro	Ser	Gly	Gly	Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	
		275					280					285				
Pro	Val	Met	Pro	Arg	Ile	Phe	Met	Ala	Val	Arg	Arg	Glu	Ser	Arg	Tyr	
	290					295					300					

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Pro Val Ser Glu Ile Leu Ala Lys Thr Pro Ala Ile Pro Ser Ser Cys
 305 310 315 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400
 Gln Trp Gly Ile Phe Leu Arg Asn His Asp Glu Leu Thr Leu Glu Met
 Val Thr Asp Glu Glu Arg Asp Tyr Met Trp Ala Glu Tyr Ala Lys Asp
 Pro Arg Met Arg Ala Asn Ile Gly Ile Arg Arg Arg Leu Ala Pro Leu
 Leu Asp Asn Asp Arg Asn Gln Ile Glu Leu Phe Thr Ala Leu Leu Leu
 Ser Leu Pro Gly Ser Pro Ile Leu Tyr Tyr Gly Asp Glu Ile Gly Met
 385 390 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480
 Gly Asp Asn Ile Trp Leu Gly Asp Arg Asp Ala Val Arg Thr Pro Met
 Gln Trp Thr Pro Asp Arg Asn Ala Gly Phe Ser Ser Cys Asp Pro Gly
 Arg Leu Tyr Leu Pro Thr Ile Met Asp Pro Val Tyr Gly Tyr Gln Val
 Thr Asn Val Glu Ala Ser Met Ser Ser Pro Ser Ser Leu Leu His Trp
 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525 530 535 540
 Thr Arg Arg Met Ile Glu Ile Arg Lys Gln Asn Pro Ala Phe Gly Leu
 Gly Ser Tyr Thr Glu Leu Gln Ser Ser Asn Pro Ala Val Leu Ala Phe
 Leu Arg Glu Ala Pro Ser Thr Gly Gly Asn Gly Asp Asp Leu Val Leu
 Cys Val His Asn Phe Ser Arg Phe Ala Gln Pro Thr Glu Leu Asp Leu
 Arg Ala Phe Ser Gly Arg His Pro Val Glu Leu Ile Gly Gly Val Arg
 530 535 540 545 550 555 560 565 570
 Phe Pro Ala Ile Gly Glu Leu Pro Tyr Leu Leu Thr Leu Ala Gly His
 Gly Phe Tyr Trp Phe Arg Leu Arg Lys Asp Ala Val

<210> 125

<211> 1752

<212> DNA

<213> Streptomyces avermitilis MA-4680

<220>

<221> CDS

<222> (1)..(1752)

<400> 125

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Lys Asp Arg Asp Pro Glu Trp Phe Lys Arg Ala Val Phe Tyr Glu Val	
20 25 30	
ctg gtc cgc tcc ttc cag gac agc aac ggc gac ggt gtc ggc gac ctg	144
Leu Val Arg Ser Phe Gln Asp Ser Asn Gly Asp Gly Val Gly Asp Leu	
35 40 45	
aag ggc ctg acc gcc aag ctg gac tat ctg cag tgg ctg ggc gtg gac	192
Lys Gly Leu Thr Ala Lys Leu Asp Tyr Leu Gln Trp Leu Gly Val Asp	
50 55 60	
tgc ctg tgg ctg ccg ccg ttc ttc aag tcc ccc ctg cgc gac ggc gcc	240
Cys Leu Trp Leu Pro Pro Phe Phe Lys Ser Pro Leu Arg Asp Gly Gly	
65 70 75 80	
tac gac gtc tcc gac tac acc gcg gtg ctg ccc gag ttc ggt gac ctg	288
Tyr Asp Val Ser Asp Tyr Thr Ala Val Leu Pro Glu Phe Gly Asp Leu	
85 90 95	
gcc gac ttc gtc gag ttc gtg gac gcg gcc cac cag cgc ggc atg cgc	336
Ala Asp Phe Val Glu Phe Val Asp Ala Ala His Gln Arg Gly Met Arg	
100 105 110	
gtg atc atc gac ttc gtg atg aac cac acc agt gac ctg cat ccg tgg	384
Val Ile Ile Asp Phe Val Met Asn His Thr Ser Asp Leu His Pro Trp	
115 120 125	

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Phe	Gln	Glu	Ser	Arg	Ser	Asn	Pro	Asp	Gly	Pro	Tyr	Gly	Asp	Tyr	Tyr	
	130					135					140					
gtg	tgg	gcc	gac	gac	gac	aag	cag	tac	cag	gac	gcc	cgg	atc	atc	ttc	480
Val	Trp	Ala	Asp	Asp	Asp	Lys	Gln	Tyr	Gln	Asp	Ala	Arg	Ile	Ile	Phe	
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Val	Asp	Thr	Glu	Ala	Ser	Asn	Trp	Thr	Tyr	Asp	Pro	Val	Arg	Lys	Gln	
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tac	tac	tgg	cac	cgc	ttc	ttc	tcc	cac	cag	ccc	gac	ctc	aac	tac	gag	576
Tyr	Tyr	Trp	His	Arg	Phe	Phe	Ser	His	Gln	Pro	Asp	Leu	Asn	Tyr	Glu	
			180					185					190			
agt	gcc	gcc	gtc	cag	gag	gag	atc	ctg	gcg	gcg	ctg	cgg	ttc	tgg	ctc	624
Ser	Ala	Ala	Val	Gln	Glu	Glu	Ile	Leu	Ala	Ala	Leu	Arg	Phe	Trp	Leu	
		195					200					205				
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Asp	Leu	Gly	Ile	Asp	Gly	Phe	Arg	Leu	Asp	Ala	Val	Pro	Tyr	Leu	Tyr	
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ctg	aag	cgg	gtg	cgc	aag	gag	atc	gac	acg	cac	tat	ccg	gac	acg	gtg	768
Leu	Lys	Arg	Val	Arg	Lys	Glu	Ile	Asp	Thr	His	Tyr	Pro	Asp	Thr	Val	
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Leu	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	Glu	Asp	Val	Val	Asp	Tyr	Phe	
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Gly	Asp	Phe	Pro	Ser	Gly	Gly	Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	
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ccg	gtc	atg	ccg	cgg	atc	ttc	atg	gcg	gtg	cgg	cgt	gag	tcg	cgg	tat	912
Pro	Val	Met	Pro	Arg	Ile	Phe	Met	Ala	Val	Arg	Arg	Glu	Ser	Arg	Tyr	
	290				295					300						
ccg	gtg	tcg	gag	atc	ctg	gcg	aag	acg	ccg	gcg	atc	ccg	tcg	agc	tgc	960
Pro	Val	Ser	Glu	Ile	Leu	Ala	Lys	Thr	Pro	Ala	Ile	Pro	Ser	Ser	Cys	
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Gln	Trp	Gly	Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	
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Pro	Arg	Met	Arg	Ala	Asn	Ile	Gly	Ile	Arg	Arg	Arg	Leu	Ala	Pro	Leu	
		355				360					365					
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Leu	Asp	Asn	Asp	Arg	Asn	Gln	Ile	Glu	Leu	Phe	Thr	Ala	Leu	Leu	Leu	
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Gln	Trp	Thr	Pro	Asp	Arg	Asn	Ala	Gly	Phe	Ser	Ser	Ser	Cys	Pro	Gly	
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Arg	Leu	Tyr	Leu	Pro	Thr	Ile	Met	Asp	Pro	Val	Tyr	Gly	Tyr	Gln	Val	
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Thr	Asn	Val	Glu	Ala	Ser	Met	Ser	Ser	Pro	Ser	Ser	Leu	Leu	His	Trp	
		450				455					460					
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Thr	Arg	Arg	Met	Ile	Glu	Ile	Arg	Lys	Gln	Asn	Pro	Ala	Phe	Gly	Leu	
465					470				475						480	
ggc	tcg	tac	acc	gaa	ctc	cag	tcc	tcg	aac	ccg	gcc	gtc	ctc	gcg	ttc	1488
Gly	Ser	Tyr	Thr	Glu	Leu	Gln	Ser	Ser	Asn	Pro	Ala	Val	Leu	Ala	Phe	
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tgc	gtg	cac	aac	ttc	tcc	cgg	ttc	gcg	cag	ccc	acg	gag	ctg	gat	ctg	1584
Cys	Val	His	Asn	Phe	Ser	Arg	Phe	Ala	Gln	Pro	Thr	Glu	Leu	Asp	Leu	
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cgg	gcg	ttc	agc	ggc	cgt	cat	ccg	gtc	gag	ctg	atc	ggc	ggg	gtc	cgc	1632
Arg	Ala	Phe	Ser	Gly	Arg	His	Pro	Val	Glu	Leu	Ile	Gly	Gly	Val	Arg	
	530					535					540					
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Phe	Pro	Ala	Ile	Gly	Glu	Leu	Pro	Tyr	Leu	Leu	Thr	Leu	Ala	Gly	His	
545				550					555						560	
ggc	ttc	tac	tgg	ttc	cgg	ctc	cgc	aag	gac	gtc	acc	cag	gtc	acc	aag	1728
Gly	Phe	Tyr	Trp	Phe	Arg	Leu	Arg	Lys	Asp	Val	Thr	Gln	Val	Thr	Lys	
				565					570					575		
gtg	agc	ttg	ttc	gtg	agc	tct	tga									1752
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<211> 583

<212> PRT

<213> Streptomyces avermitilis MA-4680

<400> 126

Met	Ile	Val	Asn	Glu	Pro	Val	Pro	Asp	Thr	Phe	Glu	Asp	Thr	Pro	Ala	
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Lys	Asp	Arg	Asp	Pro	Glu	Trp	Phe	Lys	Arg	Ala	Val	Phe	Tyr	Glu	Val	
			20					25					30			
Leu	Val	Arg	Ser	Phe	Gln	Asp	Ser	Asn	Gly	Asp	Gly	Val	Gly	Asp	Leu	
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Lys	Gly	Leu	Thr	Ala	Lys	Leu	Asp	Tyr	Leu	Gln	Trp	Leu	Gly	Val	Asp	
	50					55				60						
Cys	Leu	Trp	Leu	Pro	Pro	Phe	Phe	Lys	Ser	Pro	Leu	Arg	Asp	Gly	Gly	
65				70					75						80	
Tyr	Asp	Val	Ser	Asp	Tyr	Thr	Ala	Val	Leu	Pro	Glu	Phe	Gly	Asp	Leu	
			85					90					95			
Ala	Asp	Phe	Val	Glu	Phe	Val	Asp	Ala	Ala	His	Gln	Arg	Gly	Met	Arg	
		100					105					110				
Val	Ile	Ile	Asp	Phe	Val	Met	Asn	His	Thr	Ser	Asp	Leu	His	Pro	Trp	
	115						120					125				
Phe	Gln	Glu	Ser	Arg	Ser	Asn	Pro	Asp	Gly	Pro	Tyr	Gly	Asp	Tyr	Tyr	
	130					135				140						
Val	Trp	Ala	Asp	Asp	Asp	Lys	Gln	Tyr	Gln	Asp	Ala	Arg	Ile	Ile	Phe	
145				150					155						160	
Val	Asp	Thr	Glu	Ala	Ser	Asn	Trp	Thr	Tyr	Asp	Pro	Val	Arg	Lys	Gln	
			165					170					175			
Tyr	Tyr	Trp	His	Arg	Phe	Phe	Ser	His	Gln	Pro	Asp	Leu	Asn	Tyr	Glu	
		180					185					190				
Ser	Ala	Ala	Val	Gln	Glu	Glu	Ile	Leu	Ala	Ala	Leu	Arg	Phe	Trp	Leu	
	195					200					205					
Asp	Leu	Gly	Ile	Asp	Gly	Phe	Arg	Leu	Asp	Ala	Val	Pro	Tyr	Leu	Tyr	
	210					215				220						
Asn	Glu	Glu	Gly	Thr	Asn	Cys	Glu	Asn	Leu	Pro	Ala	Thr	His	Glu	Phe	
225				230					235					240		
Leu	Lys	Arg	Val	Arg	Lys	Glu	Ile	Asp	Thr	His	Tyr	Pro	Asp	Thr	Val	
			245					250					255			
Leu	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	Glu	Asp	Val	Val	Asp	Tyr	Phe	
		260					265						270			
Gly	Asp	Phe	Pro	Ser	Gly	Gly	Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	
	275					280				285						
Pro	Val	Met	Pro	Arg	Ile	Phe	Met	Ala	Val	Arg	Arg	Glu	Ser	Arg	Tyr	
	290					295				300						
Pro	Val	Ser	Glu	Ile	Leu	Ala	Lys	Thr	Pro	Ala	Ile	Pro	Ser	Ser	Cys	
305				310					315						320	
Gln	Trp	Gly	Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	
			325					330					335			
Val	Thr	Asp	Glu	Glu	Arg	Asp	Tyr	Met	Trp	Ala	Glu	Tyr	Ala	Lys	Asp	
			340					345					350			

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Pro Arg Met Arg Ala Asn Ile Gly Ile Arg Arg Arg Leu Ala Pro Leu
 355 365
 Leu Asp Asn Asp Arg Asn Gln Ile Glu Leu Phe Thr Ala Leu Leu Leu
 370 375 380
 Ser Leu Pro Gly Ser Pro Ile Leu Tyr Tyr Gly Asp Glu Ile Gly Met
 385 390 395 400
 Gly Asp Asn Ile Trp Leu Gly Asp Arg Asp Ala Val Arg Thr Pro Met
 405 410 415
 Gln Trp Thr Pro Asp Arg Asn Ala Gly Phe Ser Ser Cys Asp Pro Gly
 420 425 430
 Arg Leu Tyr Leu Pro Thr Ile Met Asp Pro Val Tyr Gly Tyr Gln Val
 435 440 445
 Thr Asn Val Glu Ala Ser Met Ser Ser Pro Ser Ser Leu Leu His Trp
 450 455 460
 Thr Arg Arg Met Ile Glu Ile Arg Lys Gln Asn Pro Ala Phe Gly Leu
 465 470 475 480
 Gly Ser Tyr Thr Glu Leu Gln Ser Ser Asn Pro Ala Val Leu Ala Phe
 485 490 495
 Leu Arg Glu Ala Pro Ser Thr Gly Gly Asn Gly Asp Asp Leu Val Leu
 500 505 510
 Cys Val His Asn Phe Ser Arg Phe Ala Gln Pro Thr Glu Leu Asp Leu
 515 520 525
 Arg Ala Phe Ser Gly Arg His Pro Val Glu Leu Ile Gly Gly Val Arg
 530 535 540
 Phe Pro Ala Ile Gly Glu Leu Pro Tyr Leu Leu Thr Leu Ala Gly His
 545 550 555 560
 Gly Phe Tyr Trp Phe Arg Leu Arg Lys Asp Val Thr Gln Val Thr Lys
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 Val Ser Leu Phe Val Ser Ser
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<210> 127

<211> 1665

<212> DNA

<213> Bacillus anthracis str. Ames

<220>

<221> CDS

<222> (1)..(1665)

<223> transl_table=11

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cgt agc ttt atg gat tca aat ggt gat att gga gat tta caa ggt	96
Arg Ser Phe Met Asp Ser Asn Gly Asp Gly Ile Gly Asp Leu Gln Gly	
20 25 30	
att att gcg aaa ctg gat tat tta aaa gat tta gga ata gat gta att	144
Ile Ile Ala Lys Leu Asp Tyr Leu Lys Asp Leu Gly Ile Asp Val Ile	
35 40 45	
tgg att tgt cca atg tat aag tca cct aat gat gat aat ggt tat gac	192
Trp Ile Cys Pro Met Tyr Lys Ser Pro Asn Asp Asp Asn Gly Tyr Asp	
50 55 60	
att agt gat tat caa gat att atg gat gag ttt ggg acg atg gaa gac	240
Ile Ser Asp Tyr Gln Asp Ile Met Asp Glu Phe Gly Thr Met Glu Asp	
65 70 75 80	
ttt gat gct tta cta gat gaa gtt cat aaa cgt gat atg aag ctt att	288
Phe Asp Ala Leu Leu Asp Glu Val His Lys Arg Asp Met Lys Leu Ile	
85 90 95	
att gat tta gtt att aat cat aca agt gat gaa cat cca tgg ttt att	336
Ile Asp Leu Val Ile Asn His Thr Ser Asp Glu His Pro Trp Phe Ile	
100 105 110	
gag tct cgt tca tct aaa gac aat ccg aag cgt gat tgg tat att tgg	384
Glu Ser Arg Ser Ser Lys Asp Asn Pro Lys Arg Asp Trp Tyr Ile Trp	
115 120 125	
cat gat ggt aaa gat ggt gca gaa cca aac aac tgg gaa agt att ttt	432
His Asp Gly Lys Asp Gly Ala Glu Pro Asn Asn Trp Glu Ser Ile Phe	
130 135 140	

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aat Asn 145	ggt Gly	tcg Ser	gca Ala	tgg Trp	gag Glu 150	tat Tyr	gat Asp	gaa Glu	gta Val	aca Thr 155	gga Gly	caa Gln	tat Tyr	tat Tyr	tta Leu 160	480
cac His	tta Leu	ttc Phe	tcg Ser	cgt Arg 165	aaa Lys	caa Gln	cca Pro	gat Asp	tta Leu 170	aac Asn	tgg Trp	gag Glu	aat Asn	aaa Lys 175	gaa Glu	528
ggt Val	cga Arg	gaa Glu	gtg Val 180	cta Leu	tac Tyr	gat Asp	aca Thr	ggt Val 185	aat Asn	tgg Trp	tgg Trp	ctt Leu	gat Asp 190	aaa Lys	gga Gly	576
att Ile	gat Asp	ggt Gly 195	ttc Phe	cga Arg	gta Val	gat Asp	gca Ala 200	atc Ile	agc Ser	cat His	att Ile	aaa Lys 205	aaa Lys	gaa Glu	gat Asp	624
ggc Gly	ttt Phe 210	aaa Lys	gat Asp	atg Met	cca Pro	aat Asn 215	cca Pro	aaa Lys	gga Gly	cta Leu	aag Lys 220	tat Tyr	ggt Val	cca Pro	tct Ser	672
ttt Phe 225	gat Asp	aaa Lys	cat His	atg Met	aat Asn 230	gtg Val	gat Asp	ggt Gly	att Ile	caa Gln 235	cct Pro	tta Leu	tta Leu	gaa Glu	gaa Glu 240	720
tta Leu	aaa Lys	gaa Glu	aat Asn	acg Thr 245	ttt Phe	tct Ser	aag Lys	tac Tyr	gat Asp 250	att Ile	atg Met	act Thr	ggt Val 255	ggt Gly	gaa Glu	768
gcg Ala	aat Asn	ggc Gly	gtt Val 260	aag Lys	att Ile	gaa Glu	gat Asp	gct Ala 265	gag Glu	ctt Leu	tgg Trp	ggt Val	gga Gly 270	gaa Glu	gag Glu	816
caa Gln	ggt Gly	aag Lys 275	ttc Phe	aat Asn	atg Met	gta Val	ttc Phe 280	caa Gln	ttc Phe	gaa Glu	cat His	tta Leu 285	agt Ser	tta Leu	tgg Trp	864
gat Asp	gca Ala 290	gaa Glu	aag Lys	aag Lys	aaa Lys	gat Asp 295	ctt Leu	gat Asp	ggt Val	gta Val	ggg Gly 300	ctg Leu	aaa Lys	aag Lys	gta Val	912
tta Leu 305	acg Thr	aaa Lys	tgg Trp	caa Gln 310	aaa Lys	ggg Gly	tta Leu	gaa Glu	aat Asn	aaa Lys 315	gga Gly	tgg Trp	aat Asn	gct Ala	tta Leu 320	960
tat Tyr	att Ile	gag Glu	aat Asn	cac His 325	gat Asp	aag Lys	ccg Pro	cgt Arg	atc Ile 330	ggt Val	tca Ser	act Thr	tgg Trp	gga Gly 335	gat Asp	1008
gat Asp	aaa Lys	caa Gln	tat Tyr 340	tgg Trp	cgt Arg	gaa Glu	agt Ser	gcg Ala 345	aca Thr	gct Ala	tta Leu	gga Gly 350	gca Ala	atg Met	tat Tyr	1056
ttc Phe	ttt Phe 355	atg Met	cac His	ggt Gly	aca Thr	ccg Pro	ttt Phe 360	att Ile	tat Tyr	caa Gln	gga Gly	caa Gln 365	gaa Glu	att Ile	ggg Gly	1104
atg Met 370	aca Thr	aat Asn	gtt Val	caa Gln	ttc Phe	cca Pro 375	aac Asn	att Ile	gaa Glu	gat Asp	tac Tyr 380	gat Asp	gat Asp	gta Val	gca Ala	1152
att Ile 385	aaa Lys	aat Asn	tta Leu	tat Tyr	cgc Arg 390	gag Glu	aaa Lys	att Ile	gca Ala 395	gag Gly	gta Val	tcc Ser	cat His	caa Gln 400		1200
gat Asp	atg Met	atg Met	gaa Glu	att Ile 405	ata Ile	tgg Trp	gct Ala	tct Ser	tgc Cys 410	cgc Arg	gat Asp	aat Asn	tca Ser	cgt Arg 415	acg Thr	1248
cct Pro	atg Met	cat His	tgg Trp 420	gac Asp	gat Asp	gag Glu	ata Ile	aat Asn 425	gct Ala	ggt Gly	ttc Phe	aca Thr 430	aca Thr	ggt Gly	acg Thr	1296
cct Pro	tgg Trp	ttt Phe 435	ggt Gly	atg Met	aat Asn	caa Gln	aac Asn 440	tac Tyr	aaa Lys	gaa Glu	atc Ile	aat Asn 445	ggt Val	gca Ala	aag Lys	1344
caa Gln 450	aag Lys	aat Asn	gaa Glu	gag Glu	aac Asn	tct Ser 455	att Ile	ttc Phe	aat Asn	ttc Phe	tat Tyr 460	aag Lys	aaa Lys	atg Met	att Ile	1392
gcc Ala 465	ctg Leu	aaa Lys	aaa Lys	gag Glu	cat His 470	gat Asp	gta Val	ctg Leu	aat Asn	tat Tyr 475	ggt Gly	acg Thr	tac Tyr	gat Asp	tta Leu 480	1440
ctt Leu	tta Leu	gaa Glu	gat Asp	gac Asp 485	ccg Pro	caa Gln	att Ile	tat Tyr	gca Ala 490	tat Tyr	act Thr	cgt Arg	aca Thr	cta Leu 495	aac Asn	1488
gat Asp	gaa Glu	aaa Lys	ata Ile 500	gtc Val	gta Val	att Ile	agt Ser	aat Asn 505	atc Ile	tca Ser	aaa Lys	gag Glu	gaa Glu 510	gct Ala	gtg Val	1536

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tat	aat	gag	gat	tta	ttt	gca	cta	gaa	cgc	aaa	cgt	ttg	ctt	tta	aat	1584
Tyr	Asn	Glu	Asp	Leu	Phe	Ala	Leu	Glu	Arg	Lys	Arg	Leu	Leu	Leu	Asn	
		515					520					525				
aac	tat	gaa	gtt	gcg	gaa	cat	gaa	caa	tta	act	aca	atc	acg	tta	aag	1632
Asn	Tyr	Glu	Val	Ala	Glu	His	Glu	Gln	Leu	Thr	Thr	Ile	Thr	Leu	Lys	
		530				535					540					
cct	tat	gaa	aca	agg	gtt	tat	cgc	att	tca	taa						1665
Pro	Tyr	Glu	Thr	Arg	Val	Tyr	Arg	Ile	Ser							
		545			550											

<210> 128

<211> 554

<212> PRT

<213> Bacillus anthracis str. Ames

<400> 128

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			20					25					30			
Ile	Ile	Ala	Lys	Leu	Asp	Tyr	Leu	Lys	Asp	Leu	Gly	Ile	Asp	Val	Ile	
		35					40					45				
Trp	Ile	Cys	Pro	Met	Tyr	Lys	Ser	Pro	Asn	Asp	Asp	Asn	Gly	Tyr	Asp	
	50					55					60					
Ile	Ser	Asp	Tyr	Gln	Asp	Ile	Met	Asp	Glu	Phe	Gly	Thr	Met	Glu	Asp	
65					70					75					80	
Phe	Asp	Ala	Leu	Leu	Asp	Glu	Val	His	Lys	Arg	Asp	Met	Lys	Leu	Ile	
			85						90					95		
Ile	Asp	Leu	Val	Ile	Asn	His	Thr	Ser	Asp	Glu	His	Pro	Trp	Phe	Ile	
			100					105					110			
Glu	Ser	Arg	Ser	Ser	Lys	Asp	Asn	Pro	Lys	Arg	Asp	Trp	Tyr	Ile	Trp	
		115					120					125				
His	Asp	Gly	Lys	Asp	Gly	Ala	Glu	Pro	Asn	Asn	Trp	Glu	Ser	Ile	Phe	
	130					135					140					
Asn	Gly	Ser	Ala	Trp	Glu	Tyr	Asp	Glu	Val	Thr	Gly	Gln	Tyr	Tyr	Leu	
145					150					155					160	
His	Leu	Phe	Ser	Arg	Lys	Gln	Pro	Asp	Leu	Asn	Trp	Glu	Asn	Lys	Glu	
			165						170					175		
Val	Arg	Glu	Val	Leu	Tyr	Asp	Thr	Val	Asn	Trp	Trp	Leu	Asp	Lys	Gly	
			180					185					190			
Ile	Asp	Gly	Phe	Arg	Val	Asp	Ala	Ile	Ser	His	Ile	Lys	Lys	Glu	Asp	
		195					200					205				
Gly	Phe	Lys	Asp	Met	Pro	Asn	Pro	Lys	Gly	Leu	Lys	Tyr	Val	Pro	Ser	
	210					215					220					
Phe	Asp	Lys	His	Met	Asn	Val	Asp	Gly	Ile	Gln	Pro	Leu	Leu	Glu	Glu	
225					230					235					240	
Leu	Lys	Glu	Asn	Thr	Phe	Ser	Lys	Tyr	Asp	Ile	Met	Thr	Val	Gly	Glu	
			245						250					255		
Ala	Asn	Gly	Val	Lys	Ile	Glu	Asp	Ala	Glu	Leu	Trp	Val	Gly	Glu	Glu	
			260					265					270			
Gln	Gly	Lys	Phe	Asn	Met	Val	Phe	Gln	Phe	Glu	His	Leu	Ser	Leu	Trp	
		275					280					285				
Asp	Ala	Glu	Lys	Lys	Lys	Asp	Leu	Asp	Val	Val	Gly	Leu	Lys	Lys	Val	
	290					295					300					
Leu	Thr	Lys	Trp	Gln	Lys	Gly	Leu	Glu	Asn	Lys	Gly	Trp	Asn	Ala	Leu	
305					310					315					320	
Tyr	Ile	Glu	Asn	His	Asp	Lys	Pro	Arg	Ile	Val	Ser	Thr	Trp	Gly	Asp	
			325						330					335		
Asp	Lys	Gln	Tyr	Trp	Arg	Glu	Ser	Ala	Thr	Ala	Leu	Gly	Ala	Met	Tyr	
			340					345					350			
Phe	Phe	Met	His	Gly	Thr	Pro	Phe	Ile	Tyr	Gln	Gly	Gln	Glu	Ile	Gly	
		355					360					365				
Met	Thr	Asn	Val	Gln	Phe	Pro	Asn	Ile	Glu	Asp	Tyr	Asp	Asp	Val	Ala	
	370					375					380					
Ile	Lys	Asn	Leu	Tyr	Arg	Glu	Lys	Ile	Ala	Glu	Gly	Val	Ser	His	Gln	
385					390					395					400	
Asp	Met	Met	Glu	Ile	Ile	Trp	Ala	Ser	Cys	Arg	Asp	Asn	Ser	Arg	Thr	
			405						410					415		
Pro	Met	His	Trp	Asp	Asp	Glu	Ile	Asn	Ala	Gly	Phe	Thr	Thr	Gly	Thr	

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420
 Pro Trp Phe Gly Met Asn Gln Asn Tyr Lys Glu Ile Asn Val Ala Lys
 435
 Gln Lys Asn Glu Glu Asn Ser Ile Phe Asn Phe Tyr Lys Lys Met Ile
 450
 Ala Leu Lys Lys Glu His Asp Val Leu Asn Tyr Gly Thr Tyr Asp Leu
 465
 Leu Leu Glu Asp Asp Pro Gln Ile Tyr Ala Tyr Thr Arg Thr Leu Asn
 485
 Asp Glu Lys Ile Val Val Ile Ser Asn Ile Ser Lys Glu Glu Ala Val
 500
 Tyr Asn Glu Asp Leu Phe Ala Leu Glu Arg Lys Arg Leu Leu Leu Asn
 515
 Asn Tyr Glu Val Ala Glu His Glu Gln Leu Thr Thr Ile Thr Leu Lys
 530
 Pro Tyr Glu Thr Arg Val Tyr Arg Ile Ser
 545
 550

<210> 129

<211> 1761

<212> DNA

<213> Bacillus anthracis str. Ames

<220>

<221> CDS

<222> (1)..(1761)

<223> transl_table=11

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Ala	Tyr	Asp	Glu	Lys	Thr	Ile	His	Ile	Arg	Ile	Arg	Thr	Lys	Arg	Asp	
			20					25					30			
gat	gtt	caa	agc	acc	act	ctt	att	tat	ggg	gat	cct	tat	gaa	tgg	aaa	144
Asp	Val	Gln	Ser	Thr	Thr	Leu	Ile	Tyr	Gly	Asp	Pro	Tyr	Glu	Trp	Lys	
			35					40					45			
gac	ggg	aag	tgg	att	tct	tca	agt	aca	ccg	atg	aaa	aaa	act	ggg	tct	192
Asp	Gly	Lys	Trp	Ile	Ser	Ser	Ser	Thr	Pro	Met	Lys	Lys	Thr	Gly	Ser	
			50					55					60			
act	gca	ttg	ttt	gat	tat	tgg	ttc	att	tcc	atc	gag	ccg	aaa	ttt	aag	240
Thr	Ala	Leu	Phe	Asp	Tyr	Trp	Phe	Ile	Ser	Ile	Glu	Pro	Lys	Phe	Lys	
cgc	tta	cgt	tat	gga	ttt	gaa	tta	aaa	aac	gat	aca	gac	act	ctt	att	288
Arg	Leu	Arg	Tyr	Gly	Phe	Glu	Leu	Lys	Asn	Asp	Thr	Asp	Thr	Leu	Ile	
tat	gca	gag	cga	gga	ttt	ttt	tct	acc	act	cca	aat	gat	gac	gtt	ggg	336
Tyr	Ala	Glu	Arg	Gly	Phe	Phe	Ser	Thr	Thr	Pro	Asn	Asp	Asp	Val	Gly	
aac	ttt	ttc	tgt	ttt	cca	ttt	att	cat	gca	aat	gat	gta	ttc	aaa	gca	384
Asn	Phe	Phe	Cys	Phe	Pro	Phe	Ile	His	Ala	Asn	Asp	Val	Phe	Lys	Ala	
cct	tct	tgg	att	aaa	gat	act	gtt	tgg	tat	caa	att	ttc	cca	gaa	cgg	432
Pro	Ser	Trp	Ile	Lys	Asp	Thr	Val	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	
ttc	gct	aat	gga	gat	cat	acg	ctg	aat	cca	gaa	aac	acc	ctt	cct	tgg	480
Phe	Ala	Asn	Gly	Asp	His	Thr	Leu	Asn	Pro	Glu	Asn	Thr	Leu	Pro	Trp	
ggc	agc	gct	gag	cca	act	cca	act	aat	ttt	ttc	ggg	gga	gat	ttt	gct	528
Gly	Ser	Ala	Glu	Pro	Thr	Pro	Thr	Asn	Phe	Phe	Gly	Gly	Asp	Phe	Ala	
ggg	att	att	caa	aac	ctt	gat	tac	ctt	ggt	aag	ctt	gga	att	tca	gga	576
Gly	Ile	Ile	Gln	Asn	Leu	Asp	Tyr	Leu	Val	Lys	Leu	Gly	Ile	Ser	Gly	
ata	tat	ttc	aca	cct	att	ttc	aaa	gca	cat	tca	aac	cat	aaa	tat	gac	624
Ile	Tyr	Phe	Thr	Pro	Ile	Phe	Lys	Ala	His	Ser	Asn	His	Lys	Tyr	Asp	
aca	att	gac	tac	atg	gaa	atc	gat	cca	caa	ttt	ggg	aca	aaa	gaa	aca	672

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Thr	Ile	Asp	Tyr	Met	Glu	Ile	Asp	Pro	Gln	Phe	Gly	Thr	Lys	Glu	Thr		
210	210					215					220						
ttc	aaa	gaa	ctc	gtt	cag	gca	tgt	cat	aca	cac	ggg	ata	aaa	gta	atg	720	
Phe	Lys	Glu	Leu	Val	Gln	Ala	Cys	His	Thr	His	Gly	Ile	Lys	Val	Met		
225					230					235					240		
ctc	gat	gct	gta	ttc	aat	cac	agt	gga	tac	ttt	ttc	gat	aaa	ttt	caa	768	
Leu	Asp	Ala	Val	Phe	Asn	His	Ser	Gly	Tyr	Phe	Phe	Asp	Lys	Phe	Gln		
				245					250					255			
gac	gta	cta	caa	aat	ggg	gag	cag	tca	gca	tat	aaa	gaa	tgg	ttc	cat	816	
Asp	Val	Leu	Gln	Asn	Gly	Glu	Gln	Ser	Ala	Tyr	Lys	Glu	Trp	Phe	His		
			260					265					270				
att	cat	gag	ttc	cca	att	aga	act	gag	cca	ctc	ccg	aat	tat	gat	act	864	
Ile	His	Glu	Phe	Pro	Ile	Arg	Thr	Glu	Pro	Leu	Pro	Asn	Tyr	Asp	Thr		
		275					280					285					
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Phe	Ala	Phe	Thr	Pro	Tyr	Met	Pro	Lys	Leu	Asn	Thr	Ala	His	Pro	Asp		
290					295						300						
gta	aaa	gaa	tac	tta	ctt	gaa	gta	ggg	cgt	tat	tgg	gtg	aga	gaa	ttc	960	
Val	Lys	Glu	Tyr	Leu	Leu	Glu	Val	Gly	Arg	Tyr	Trp	Val	Arg	Glu	Phe		
305					310					315					320		
aat	ata	gac	ggg	tgg	cg	ctt	gat	gta	gca	aat	gaa	gtc	gac	cat	aac	1008	
Asn	Ile	Asp	Gly	Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Val	Asp	His	Asn		
				325					330					335			
ttt	tgg	aga	gaa	ttt	cga	agt	gag	ata	aaa	gca	tta	aat	tct	gaa	gta	1056	
Phe	Trp	Arg	Glu	Phe	Arg	Ser	Glu	Ile	Lys	Ala	Leu	Asn	Ser	Glu	Val		
			340					345					350				
tat	att	tta	gga	gaa	att	tgg	cac	gat	gca	ctt	cca	tgg	cta	caa	gga	1104	
Tyr	Ile	Leu	Gly	Glu	Ile	Trp	His	Asp	Ala	Leu	Pro	Trp	Leu	Gln	Gly		
		355					360					365					
gat	caa	ttc	gat	gct	gtc	atg	agc	tat	cct	gtt	aca	aac	gcc	cta	ctg	1152	
Asp	Gln	Phe	Asp	Ala	Val	Met	Ser	Tyr	Pro	Val	Thr	Asn	Ala	Leu	Leu		
					375						380						
tct	tac	ttt	gct	aac	gat	tcc	att	aag	gca	aat	gaa	ttt	atg	aaa	caa	1200	
Ser	Tyr	Phe	Ala	Asn	Asp	Ser	Ile	Lys	Ala	Asn	Glu	Phe	Met	Lys	Gln		
385					390					395					400		
att	aca	gaa	tct	cta	cat	tcc	tac	tct	atg	aat	gta	aat	gaa	gca	gca	1248	
Ile	Thr	Glu	Ser	Leu	His	Ser	Tyr	Ser	Met	Asn	Val	Asn	Glu	Ala	Ala		
				405					410					415			
ttt	cat	tta	tta	gat	agc	cat	gat	aca	cca	aga	att	ttg	aca	aca	tgt	1296	
Phe	His	Leu	Leu	Asp	Ser	His	Asp	Thr	Pro	Arg	Ile	Leu	Thr	Thr	Cys		
			420					425					430				
aac	gga	gat	aaa	aat	aag	tta	aaa	tta	ctt	tat	gta	ttc	cat	ctt	tct	1344	
Asn	Gly	Asp	Lys	Asn	Lys	Leu	Lys	Leu	Leu	Tyr	Val	Phe	His	Leu	Ser		
		435					440					445					
ttc	atc	ggc	tct	cct	tgt	att	tat	tat	gga	gac	gaa	att	ggg	atg	gac	1392	
Phe	Ile	Gly	Ser	Pro	Cys	Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Asp		
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ggc	ggg	atg	gac	cca	gat	tgt	cg	aaa	tgt	atg	gtt	tgg	gat	acg	gaa	1440	
Gly	Gly	Met	Asp	Pro	Asp	Cys	Arg	Lys	Cys	Met	Val	Trp	Asp	Thr	Glu		
465					470				475						480		
gaa	caa	gat	cat	aca	tta	ttt	aca	cat	gta	caa	aca	tta	att	tca	tta	1488	
Glu	Gln	Asp	His	Thr	Leu	Phe	Thr	His	Val	Gln	Thr	Leu	Ile	Ser	Leu		
				485					490					495			
cga	aag	caa	tat	aaa	gca	ttt	gga	gga	cat	ggg	act	ttc	caa	ttc	att	1536	
Arg	Lys	Gln	Tyr	Lys	Ala	Phe	Gly	Gly	His	Gly	Thr	Phe	Gln	Phe	Ile		
			500				505					510					
gaa	gca	aat	gat	gaa	tat	aat	tat	tct	tat	acg	aaa	aca	tat	gaa		1584	
Glu	Ala	Asn	Asp	Glu	Tyr	Asn	Tyr	Ile	Ser	Tyr	Thr	Lys	Thr	Tyr	Glu		
		515					520					525					
gat	gaa	acg	atc	ttt	ttc	gtt	tta	aat	ccg	act	aat	agt	gat	att	aca	1632	
Asp	Glu	Thr	Ile	Phe	Phe	Val	Leu	Asn	Pro	Thr	Asn	Ser	Asp	Ile	Thr		
		530				535					540						
gct	tca	ctc	cct	ctc	cat	gtt	act	gga	aag	aaa	atc	att	aat	att	tat	1680	
Ala	Ser	Leu	Pro	Leu	His	Val	Thr	Gly	Lys	Lys	Ile	Ile	Asn	Ile	Tyr		
545					550					555					560		
aca	aac	gaa	gaa	ttt	tca	gcg	gaa	gca	agt	gta	tta	caa	gtt	aca	ctt	1728	
Thr	Asn	Glu	Glu	Phe	Ser	Ala	Glu	Ala	Ser	Val	Leu	Gln	Val	Thr	Leu		
				565					570					575			
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<211> 586

<212> PRT

<213> Bacillus anthracis str. Ames

<400> 130

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 Asp Val Gln Ser Thr Thr Leu Ile Tyr Gly Asp Pro Tyr Glu Trp Lys
 35 40 45
 Asp Gly Lys Trp Ile Ser Ser Ser Thr Pro Met Lys Lys Thr Gly Ser
 50 55 60
 Thr Ala Leu Phe Asp Tyr Trp Phe Ile Ser Ile Glu Pro Lys Phe Lys
 65 70 75 80
 Arg Leu Arg Tyr Gly Phe Glu Leu Lys Asn Asp Thr Asp Thr Leu Ile
 85 90 95
 Tyr Ala Glu Arg Gly Phe Phe Ser Thr Thr Pro Asn Asp Asp Val Gly
 100 105 110
 Asn Phe Phe Cys Phe Pro Phe Ile His Ala Asn Asp Val Phe Lys Ala
 115 120 125
 Pro Ser Trp Ile Lys Asp Thr Val Trp Tyr Gln Ile Phe Pro Glu Arg
 130 135 140
 Phe Ala Asn Gly Asp His Thr Leu Asn Pro Glu Asn Thr Leu Pro Trp
 145 150 155 160
 Gly Ser Ala Glu Pro Thr Pro Thr Asn Phe Phe Gly Gly Asp Phe Ala
 165 170 175
 Gly Ile Ile Gln Asn Leu Asp Tyr Leu Val Lys Leu Gly Ile Ser Gly
 180 185 190
 Ile Tyr Phe Thr Pro Ile Phe Lys Ala His Ser Asn His Lys Tyr Asp
 195 200 205
 Thr Ile Asp Tyr Met Glu Ile Asp Pro Gln Phe Gly Thr Lys Glu Thr
 210 215 220
 Phe Lys Glu Leu Val Gln Ala Cys His Thr His Gly Ile Lys Val Met
 225 230 235 240
 Leu Asp Ala Val Phe Asn His Ser Gly Tyr Phe Phe Asp Lys Phe Gln
 245 250 255
 Asp Val Leu Gln Asn Gly Glu Gln Ser Ala Tyr Lys Glu Trp Phe His
 260 265 270
 Ile His Glu Phe Pro Ile Arg Thr Glu Pro Leu Pro Asn Tyr Asp Thr
 275 280 285
 Phe Ala Phe Thr Pro Tyr Met Pro Lys Leu Asn Thr Ala His Pro Asp
 290 295 300
 Val Lys Glu Tyr Leu Leu Glu Val Gly Arg Tyr Trp Val Arg Glu Phe
 305 310 315 320
 Asn Ile Asp Gly Trp Arg Leu Asp Val Ala Asn Glu Val Asp His Asn
 325 330 335
 Phe Trp Arg Glu Phe Arg Ser Glu Ile Lys Ala Leu Asn Ser Glu Val
 340 345 350
 Tyr Ile Leu Gly Glu Ile Trp His Asp Ala Leu Pro Trp Leu Gln Gly
 355 360 365
 Asp Gln Phe Asp Ala Val Met Ser Tyr Pro Val Thr Asn Ala Leu Leu
 370 375 380
 Ser Tyr Phe Ala Asn Asp Ser Ile Lys Ala Asn Glu Phe Met Lys Gln
 385 390 395 400
 Ile Thr Glu Ser Leu His Ser Tyr Ser Met Asn Val Asn Glu Ala Ala
 405 410 415
 Phe His Leu Leu Asp Ser His Asp Thr Pro Arg Ile Leu Thr Thr Cys
 420 425 430
 Asn Gly Asp Lys Asn Lys Leu Lys Leu Leu Tyr Val Phe His Leu Ser
 435 440 445
 Phe Ile Gly Ser Pro Cys Ile Tyr Tyr Gly Asp Glu Ile Gly Met Asp
 450 455 460
 Gly Gly Met Asp Pro Asp Cys Arg Lys Cys Met Val Trp Asp Thr Glu
 465 470 475 480

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Glu	Gln	Asp	His	Thr	Leu	Phe	Thr	His	Val	Gln	Thr	Leu	Ile	Ser	Leu
Arg	Lys	Gln	Tyr	Lys	Ala	Phe	Gly	Gly	His	Gly	Thr	Phe	Gln	Phe	Ile
Glu	Ala	Asn	Asp	Glu	Tyr	Asn	Tyr	Ile	Ser	Tyr	Thr	Lys	Thr	Tyr	Glu
Asp	Glu	Thr	Ile	Phe	Phe	Val	Leu	Asn	Pro	Thr	Asn	Ser	Asp	Ile	Thr
Ala	Ser	Leu	Pro	Leu	His	Val	Thr	Gly	Lys	Lys	Ile	Ile	Asn	Ile	Tyr
Thr	Asn	Glu	Glu	Phe	Ser	Ala	Glu	Ala	Ser	Val	Leu	Gln	Val	Thr	Leu
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 <213> Mycobacterium bovis AF2122/97

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gcc agc gct cgt cga ccg gag cca gat ccg atg ggc gag ccg tgg tgg	96
Ala Ser Ala Arg Arg Pro Glu Pro Asp Pro Met Gly Glu Pro Trp Trp	
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tcg cga gcc gtg ttc tac cag gtc tat ccc cga tcg ttc gcc gac agc	144
Ser Arg Ala Val Phe Tyr Gln Val Tyr Pro Arg Ser Phe Ala Asp Ser	
35 40 45	
aac ggc gac ggg gtg ggc gac ctg gac ggg ttg gcg agc cgg ctt gac	192
Asn Gly Asp Gly Val Gly Asp Leu Asp Gly Leu Ala Ser Arg Leu Asp	
50 55 60	
cac ctg caa cag ctc ggt gtc gac gcg atc tgg atc aac ccg gtc acc	240
His Leu Gln Gln Leu Gly Val Asp Ala Ile Trp Ile Asn Pro Val Thr	
65 70 75 80	
gtc tcg ccg atg gca gac cac gga tac gac gtc gcc gat ccc cgc gac	288
Val Ser Pro Met Ala Asp His Gly Tyr Asp Val Ala Asp Pro Arg Asp	
85 90 95	
atc gac cca ctc ttc ggc ggg atg ccg gcg ttc gaa cgg ttg gtc gct	336
Ile Asp Pro Leu Phe Gly Gly Met Pro Ala Phe Glu Arg Leu Val Ala	
100 105 110	
gcg gca cac cgg cag ggc atc aaa gtc acc atg gac gtg gtg ccc aac	384
Ala Ala His Arg Gln Gly Ile Lys Val Thr Met Asp Val Val Pro Asn	
115 120 125	
cac acc agt tcg gcg cac cca tgg ttt cag gcc gcg ctg gct gac ctc	432
His Thr Ser Ser Ala His Trp Phe Gln Ala Leu Ala Asp Leu	
130 135 140	
ccg ggt agc ccg gcg ccg gat cgc tat ttc ttt cgc gac ggg ccg ggc	480
Pro Gly Ser Pro Ala Arg Asp Arg Tyr Phe Phe Arg Asp Gly Arg Gly	
145 150 155 160	
ccc gac ggg tcg ctg ccg ccg aac aac tgg gag tcg gtg ttc ggc ggg	528
Pro Asp Gly Ser Leu Pro Pro Asn Asn Trp Glu Ser Val Phe Gly Gly	
165 170 175	
ccg gcc tgg acc cga gtg cgc gaa ccg gac ggc aac ccg ggc cag tgg	576
Pro Ala Trp Thr Arg Val Arg Glu Pro Asp Gly Asn Pro Gly Gln Trp	
180 185 190	
tac ctg cac ctt ttc gac acc gaa cag ccg gac ctg aac tcg gac aac	624
Tyr Leu His Leu Phe Asp Thr Glu Gln Pro Asp Leu Asn Ser Asp Asn	
195 200 205	
ccg gaa atc ctt gac gac ttc gag aaa aca ctg cgc ttc tgg ctg gac	672
Pro Glu Ile Leu Asp Asp Phe Glu Lys Thr Leu Arg Phe Trp Leu Asp	
210 215 220	
cgc ggc gtg gat ggc ttc cgc atc gac gtg gcg cac ggc atg gcc aag	720

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Arg 225	Gly	Val	Asp	Gly	Phe 230	Arg	Ile	Asp	Val	Ala 235	His	Gly	Met	Ala	Lys 240	
ccc Pro	ccg Pro	ggc Gly	ctg Leu	ccg Pro 245	gac Asp	tca Ser	ccg Pro	gac Asp	ctg Leu 250	ggc Gly	atc Ile	gag Glu	gtg Val	ctg Leu 255	cac His	768
cac His	cgc Arg	gat Asp	gac Asp 260	gac Asp	ccg Pro	cgc Arg	ttc Phe	aac Asn 265	cac His	ccg Pro	aat Asn	gtg Val 270	cac His	gcg Ala	att Ile	816
cac His	cgc Arg	gac Asp 275	atc Ile	cgc Arg	acg Thr	gtg Val 280	atc Ile	gac Asp	gag Glu	tac Tyr	ccc Pro	gga Gly 285	gcg Ala	gta Val	acc Thr	864
gtc Val	ggc Gly 290	gag Glu	gtg Val	tgg Trp	gta Val 295	cac His	gac Asp	aac Asn	gcc Ala	cgc Arg	tgg Trp 300	gcg Ala	gag Glu	tat Tyr	ctg Leu	912
cgg Arg 305	ccc Pro	gac Asp	gaa Glu	ctg Leu	cat His 310	ctc Leu	ggc Gly	ttc Phe	aat Asn	ttc Phe 315	cgg Arg	ctg Leu	gcg Ala	cga Arg	acc Thr 320	960
gag Glu	ttc Phe	gac Asp	gcc Ala 325	gcc Ala	gag Glu	atc Ile	cgc Arg	gac Asp	gag Ala 330	gtg Val	gag Ala	aac Asn	tcc Ser	ctg Leu 335	gcc Ala	1008
gcc Ala	gag Ala	gag Ala	ctg Leu 340	cag Gln	aac Asn	gag Ala	acc Thr	cca Pro 345	acc Thr	tgg Trp	acg Thr	ctg Leu	gcc Ala 350	aat Asn	cac His	1056
gat Asp	gtg Val	gga Gly 355	cgg Arg	gag Glu	gtt Val	agc Ser	cgc Arg 360	tac Tyr	ggc Gly	ggc Gly	ggc Gly	gag Glu 365	atc Ile	ggg Gly	ctg Leu	1104
cgc Arg 370	cgg Arg	gcc Ala	aag Lys	gag Ala	atg Met	gag Ala 375	gtg Val	gtg Val	atg Met	ctc Leu	gcc Ala 380	ctg Leu	ccg Pro	ggc Gly	gtg Val	1152
gtc Val 385	ttc Phe	ctc Leu	tac Tyr	aac Asn	ggc Gly 390	cag Gln	gaa Glu	ctg Leu	ggt Gly	ttg Leu 395	ccc Pro	gac Asp	gtg Val	gac Asp	ctg Leu 400	1200
ccc Pro	gac Asp	gag Glu	gtg Val	ctg Leu 405	cag Gln	gat Asp	ccg Pro	acg Thr	tgg Trp 410	gaa Glu	cgc Arg	tcg Ser	gga Gly	cgc Arg 415	acc Thr	1248
gaa Glu	cgc Arg	ggt Gly	cgc Arg 420	gat Asp	ggc Gly	tgc Cys	cgg Arg	gtg Val 425	ccg Pro	att Ile	ccc Pro	tgg Trp 430	tcg Ser	ggc Gly	aac Asn	1296
att Ile	ccc Pro 435	ccg Pro	ttc Phe	ggg Gly	ttc Phe	tcg Ser	acg Thr 440	tgt Cys	cca Pro	gac Asp	acc Thr	tgg Trp 445	ttg Leu	ccg Pro	atg Met	1344
ccg Pro 450	ccg Pro	gaa Glu	tgg Trp	gag Ala	gag Ala 455	ctg Leu	acc Thr	gcc Ala	gaa Glu	aaa Lys	caa Gln 460	cgc Arg	gct Ala	gat Asp	gcc Ala	1392
ggc Gly 465	tcg Ser	acc Thr	ttg Leu	tcg Ser	ttt Phe 470	cga Arg	ctt Leu	gca Ala 475	ctc Leu	aga Arg	tta Leu	cgt Arg	agg Arg	gaa Glu 480		1440
cga Arg	aat Asn	gaa Glu	ttc Phe 485	gac Asp	ggc Gly	gac Asp	gtc Val	gac Asp	tgg Trp 490	ctg Leu	gcc Ala	gag Ala	ccc Pro	gac Asp 495	gat Asp	1488
gag Ala	ctg Leu	ata Ile	ttc Phe 500	cgg Arg	cgt Arg	cac His	ggc Gly 505	ggg Gly	ggt Gly	ttg Leu	gtg Val	tgc Cys 510	gag Ala	ctc Leu	aac Asn	1536
gcc Ala	gct Ala	gag Glu 515	cgt Arg	ccg Pro	ctg Leu	gag Ala	ctg Leu 520	ccg Pro	gca Ala	ggt Gly	gaa Glu	ccc Pro 525	atc Ile	ctg Leu	gcc Ala	1584
agc Ser	gca Ala 530	ccg Pro	ttg Leu	acc Thr	gac Asp	gcc Ala 535	acg Thr	ttg Leu	cca Pro	ccc Pro	aat Asn 540	gcc Ala	gag Ala	gcc Ala	tgg Trp	1632
ctg Leu 545	gtg Val	tag														1641

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<211> 546

<212> PRT

<213> Mycobacterium bovis AF2122/97

<400> 132

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Ala	Ser	Ala	Arg	Arg	Pro	Glu	Pro	Asp	Pro	Met	Gly	Glu	Pro	Trp	Trp
			20					25					30		
Ser	Arg	Ala	Val	Phe	Tyr	Gln	Val	Tyr	Pro	Arg	Ser	Phe	Ala	Asp	Ser
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Asn	Gly	Asp	Gly	Val	Gly	Asp	Leu	Asp	Gly	Leu	Ala	Ser	Arg	Leu	Asp
	50					55					60				
His	Leu	Gln	Gln	Leu	Gly	Val	Asp	Ala	Ile	Trp	Ile	Asn	Pro	Val	Thr
65					70					75					80
Val	Ser	Pro	Met	Ala	Asp	His	Gly	Tyr	Asp	Val	Ala	Asp	Pro	Arg	Asp
				85					90					95	
Ile	Asp	Pro	Leu	Phe	Gly	Gly	Met	Pro	Ala	Phe	Glu	Arg	Leu	Val	Ala
			100					105					110		
Ala	Ala	His	Arg	Gln	Gly	Ile	Lys	Val	Thr	Met	Asp	Val	Val	Pro	Asn
		115					120					125			
His	Thr	Ser	Ser	Ala	His	Pro	Trp	Phe	Gln	Ala	Ala	Leu	Ala	Asp	Leu
	130					135					140				
Pro	Gly	Ser	Pro	Ala	Arg	Asp	Arg	Tyr	Phe	Phe	Arg	Asp	Gly	Arg	Gly
145					150					155					160
Pro	Asp	Gly	Ser	Leu	Pro	Pro	Asn	Asn	Trp	Glu	Ser	Val	Phe	Gly	Gly
				165					170					175	
Pro	Ala	Trp	Thr	Arg	Val	Arg	Glu	Pro	Asp	Gly	Asn	Pro	Gly	Gln	Trp
			180					185					190		
Tyr	Leu	His	Leu	Phe	Asp	Thr	Glu	Gln	Pro	Asp	Leu	Asn	Ser	Asp	Asn
		195					200					205			
Pro	Glu	Ile	Leu	Asp	Asp	Phe	Glu	Lys	Thr	Leu	Arg	Phe	Trp	Leu	Asp
	210					215					220				
Arg	Gly	Val	Asp	Gly	Phe	Arg	Ile	Asp	Val	Ala	His	Gly	Met	Ala	Lys
225					230					235					240
Pro	Pro	Gly	Leu	Pro	Asp	Ser	Pro	Asp	Leu	Gly	Ile	Glu	Val	Leu	His
				245					250					255	
His	Arg	Asp	Asp	Asp	Pro	Arg	Phe	Asn	His	Pro	Asn	Val	His	Ala	Ile
			260					265					270		
His	Arg	Asp	Ile	Arg	Thr	Val	Ile	Asp	Glu	Tyr	Pro	Gly	Ala	Val	Thr
		275					280					285			
Val	Gly	Glu	Val	Trp	Val	His	Asp	Asn	Ala	Arg	Trp	Ala	Glu	Tyr	Leu
	290					295					300				
Arg	Pro	Asp	Glu	Leu	His	Leu	Gly	Phe	Asn	Phe	Arg	Leu	Ala	Arg	Thr
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Glu	Phe	Asp	Ala	Ala	Glu	Ile	Arg	Asp	Ala	Val	Ala	Asn	Ser	Leu	Ala
				325					330					335	
Ala	Ala	Ala	Leu	Gln	Asn	Ala	Thr	Pro	Thr	Trp	Thr	Leu	Ala	Asn	His
			340					345					350		
Asp	Val	Gly	Arg	Glu	Val	Ser	Arg	Tyr	Gly	Gly	Gly	Glu	Ile	Gly	Leu
		355					360					365			
Arg	Arg	Ala	Lys	Ala	Met	Ala	Val	Val	Met	Leu	Ala	Leu	Pro	Gly	Val
	370					375					380				
Val	Phe	Leu	Tyr	Asn	Gly	Gln	Glu	Leu	Gly	Leu	Pro	Asp	Val	Asp	Leu
385					390					395					400
Pro	Asp	Glu	Val	Leu	Gln	Asp	Pro	Thr	Trp	Glu	Arg	Ser	Gly	Arg	Thr
				405					410					415	
Glu	Arg	Gly	Arg	Asp	Gly	Cys	Arg	Val	Pro	Ile	Pro	Trp	Ser	Gly	Asn
			420					425					430		
Ile	Pro	Pro	Phe	Gly	Phe	Ser	Thr	Cys	Pro	Asp	Thr	Trp	Leu	Pro	Met
		435					440					445			
Pro	Pro	Glu	Trp	Ala	Ala	Leu	Thr	Ala	Glu	Lys	Gln	Arg	Ala	Asp	Ala
		450				455					460				
Gly	Ser	Thr	Leu	Ser	Phe	Phe	Arg	Leu	Ala	Leu	Arg	Leu	Arg	Arg	Glu
465					470					475					480
Arg	Asn	Glu	Phe	Asp	Gly	Asp	Val	Asp	Trp	Leu	Ala	Ala	Pro	Asp	Asp
				485					490					495	
Ala	Leu	Ile	Phe	Arg	Arg	His	Gly	Gly	Gly	Leu	Val	Cys	Ala	Leu	Asn
			500					505					510		
Ala	Ala	Glu	Arg	Pro	Leu	Ala	Leu	Pro	Ala	Gly	Glu	Pro	Ile	Leu	Ala
		515					520					525			
Ser	Ala	Pro	Leu	Thr	Asp	Ala	Thr	Leu	Pro	Pro	Asn	Ala	Ala	Ala	Trp
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545

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 Ala Ile Ala Pro Arg Phe Ala Asn Ser Asn Phe Thr Pro His Asn Arg
 20 25 30
 cca agg cat ccc ttc act atc aaa acg cat tca caa aaa tct gct ccg 144
 Pro Arg His Pro Phe Thr Ile Lys Thr His Ser Gln Lys Ser Ala Pro
 35 40 45
 tcg aaa cca gcc gaa cgt cgc tgg tgg gaa acc ggt gtg atc tat caa 192
 Ser Lys Pro Ala Glu Arg Arg Trp Trp Glu Thr Gly Val Ile Tyr Gln
 50 55 60
 atc tat ccg cgg tct ttc caa gac agc aat gcc gac ggt gtg ggc gat 240
 Ile Tyr Pro Arg Ser Phe Gln Asp Ser Asn Ala Asp Gly Val Gly Asp
 65 70 75 80
 ctg gca ggt atc aag caa cgg ctg gac tat ctg gtt cgc ctc gga gtt 288
 Leu Ala Gly Ile Lys Gln Arg Leu Asp Tyr Leu Val Arg Leu Gly Val
 85 90 95
 gac gcg gta tgg ctt tca ccg att tat cct tcg ccg atg ttc gat ttc 336
 Asp Ala Val Trp Leu Ser Pro Ile Tyr Pro Ser Pro Met Phe Asp Phe
 100 105 110
 ggt tac gac gtc tcg gac tac tgc ggc att gat ccg ttg ttc ggt gat 384
 Gly Tyr Asp Val Ser Asp Tyr Cys Gly Ile Asp Pro Leu Phe Gly Asp
 115 120 125
 ctg aca gcc ttc gat cgg ttg ctc acc gcc atg cat tcg cgt ggt ctc 432
 Leu Thr Ala Phe Asp Arg Leu Leu Thr Ala Met His Ser Arg Gly Leu
 130 135 140
 aag ctt ctg atg gac ttt ttc ccg aac cac tca gat caa cat cca 480
 Lys Leu Leu Met Asp Phe Val Pro Asn His Ser Ser Asp Gln His Pro
 145 150 155 160
 tgg ttt gtc cag agc cgt tca tct cgc gac aat ccc aag cgg gat tgg 528
 Trp Phe Val Gln Ser Arg Ser Ser Arg Asp Asn Pro Lys Arg Asp Trp
 165 170 175
 tac atc tgg cga gat gca tca gct gac ggc ggt cca cct aac aat tgg 576
 Tyr Ile Trp Arg Asp Ala Ser Ala Asp Gly Gly Pro Pro Asn Asn Trp
 180 185 190
 atc agc gat ttc ggt ggc tcg tct tgg caa tgg gac gca acg acc cgg 624
 Ile Ser Asp Phe Gly Gly Ser Ser Trp Gln Trp Asp Ala Thr Thr Arg
 195 200 205
 caa tac tat ttg cac gcc ttt ctt ccg cag caa ccc gat ctc aac tgg 672
 Gln Tyr Tyr Leu His Ala Phe Leu Pro Gln Gln Pro Asp Leu Asn Trp
 210 215 220
 cgt cat ccc gaa ctg cgt gag gcg atg atg aat gtc ctg cgg ttc tgg 720
 Arg His Pro Glu Leu Arg Arg Glu Ala Met Met Asn Val Leu Arg Phe Trp
 225 230 235 240
 ttg gat cgc ggt gtc gat gga ttt cgc atg gac gtg ctt tgg cac atc 768
 Leu Asp Arg Gly Val Asp Gly Phe Arg Met Asp Val Leu Trp His Ile
 245 250 255
 gtc aaa gac gcc gct ctt cga gac aat ccg atc aat ccg gac tgg acg 816
 Val Lys Asp Ala Leu Arg Asp Asn Pro Ile Asn Pro Asp Trp Thr
 260 265 270
 tct gac cgt aca cag cgt gac cag ctg att cag ctg cac tcc acc gac 864
 Ser Asp Arg Thr Gln Arg Asp Gln Leu Ile Gln Leu His Ser Thr Asp
 275 280 285
 caa cca gaa gcc cat tca atc gcg gct gag ttt cgc act ttg gcg gac 912
 Gln Pro Glu Ala His Ser Ile Ala Glu Phe Arg Thr Leu Ala Asp

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ttc	gcg	ccg	cgc	ccg	gcc	agc	gag	cgc	gac	gcc	gcc	ctg	gcg	ggc	gag	2640		
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aag	gac	gtt	gcc	ggt	att	ctg	cgc	tcg	ttc	gac	tat	gcg	gtg	gcc	gaa	2976		
Lys	Asp	Val	Ala	Gly	Ile	Leu	Arg	Ser	Phe	Asp	Tyr	Ala	Val	Ala	Glu			
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Glu	Ala	Leu	Leu	Ala	Arg	Phe	Arg	Gln	Arg	Ala	Gly	Ala	Ala	Leu	Leu			
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Arg	Ala	Gln	Ala	Leu	Thr	Cys	Leu	Tyr	Leu	Leu	Glu	Lys	Ala	Ala	Tyr		
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Glu	Ile	Cys	Tyr	Glu	Ser	Ala	Tyr	Arg	Pro	Glu	Arg	Leu	Pro	Val	Pro		
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Ile	His	Gly	Leu	Ala	Glu	Thr	Ala	Arg	Ala	Ala	Leu	Leu	Ala	Ala	Ala		
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<211> 1113

<212> PRT

<213> Bordetella pertussis Tohama I

<400> 136

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Ala	Arg	Gly	Leu	Arg	Val	Ile	Thr	Glu	Leu	Val	Ile	Asn	His	Thr	Ser		
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Asp	Gln	His	Pro	Trp	Phe	Gln	Arg	Ala	Arg	Ala	Ala	Arg	Pro	Gly	Ser		
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Ala	His	Arg	Ala	Tyr	Tyr	Val	Trp	Ser	Asp	Asp	Asp	Lys	Ala	Tyr	Ala		
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Pro	Asp	Leu	Asn	Tyr	Asp	Asn	Pro	Gln	Val	Leu	Arg	Glu	Val	Leu	Gly		
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Ala	Met	Arg	Tyr	Trp	Leu	Asp	Met	Gly	Val	Asp	Gly	Leu	Arg	Leu	Asp		
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Val	Leu	Pro	Ala	Tyr	Leu	Gln	Arg	Gln	Arg	Trp	Tyr	Ala	Ala	Arg	Arg				
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Phe	Ala	Pro	Arg	Pro	Ala	Ser	Glu	Arg	Asp	Ala	Ala	Leu	Ala	Gly	Glu				
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Arg	Ala	Val	Ala	Gln	Leu	Asp	Arg	Ala	Leu	Gln	Ala	Leu	Arg	Ala	Cys				
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 Glu Pro Ala Arg Pro Met Ala Glu Arg Arg Gln Leu Ser Ser Pro Phe
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 Lys Asp Val Ala Gly Ile Leu Arg Ser Phe Asp Tyr Ala Val Ala Glu
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 Leu Ser Arg Asp Asp Pro Leu Gly Ala Pro Arg Asp Phe Asn Thr
 995 1000 1005
 Gly Val Ala Glu Pro Ala Asp Pro Ala Ser Ala Pro Arg Glu Thr Arg
 1010 1015 1020
 Glu Ala Leu Leu Ala Arg Phe Arg Gln Arg Ala Gly Ala Ala Leu Leu
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 Glu Ile Cys Tyr Glu Ser Ala Tyr Arg Pro Glu Arg Leu Pro Val Pro
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Val Ile Tyr Gln Leu His Val Lys Ser Phe Phe Asp Ala Asn Asp Asp	
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Gly Val Gly Asp Phe Ala Gly Leu Ala Lys Leu Asp Tyr Ile Val	
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Glu Leu Gly Val Asn Thr Ile Trp Leu Leu Pro Phe Tyr Pro Ser Pro	
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Arg Arg Asp Asp Gly Tyr Asp Ile Ala Asp Tyr Arg Gly Val His Pro	
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gac tat ggc tcg ctg gcc gac gcc ccg ccg ctg gtg ccg gcc cac	288
Asp Tyr Gly Ser Leu Ala Asp Ala Arg Arg Leu Val Arg Ala Ala His	
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gcg ccg ggc ctg cgc gtc atc acc gag ctg gtc atc aac cac acc tcc	336
Ala Arg Gly Leu Arg Val Ile Thr Glu Leu Val Ile Asn His Thr Ser	
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Asp Gln His Pro Trp Phe Gln Arg Ala Arg Ala Ala Arg Pro Gly Ser	
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Ala His Arg Ala Tyr Tyr Val Trp Ser Asp Asp Asp Lys Ala Tyr Ala	
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Gly Thr Arg Ile Ile Phe Cys Asp Thr Glu Lys Ser Asn Trp Thr Trp	
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Asp Pro Val Ala Gly Ala Tyr Phe Trp His Arg Phe Tyr Ser His Gln	
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Pro Asp Leu Asn Tyr Asp Asn Pro Gln Val Leu Arg Glu Val Leu Gly	
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Pro	Glu	Thr	His	Ala	Ile	Leu	Arg	Arg	Ile	Arg	Arg	Val	Ile	Asp	Ser	
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Asp	Ala	Gln	Glu	Tyr	Phe	Gly	Ala	Gly	Asp	Glu	Cys	His	Met	Ala	Phe	
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Pro	Leu	Leu	Glu	Arg	Asp	Arg	Arg	Arg	Ile	Glu	Leu	Met	Asn	Ser	Leu	
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Leu	Leu	Ser	Met	Pro	Gly	Thr	Pro	Val	Leu	Tyr		Gly	Asp	Glu	Leu	
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Gly	Met	Gly	Asp	Asn	Ile	His	Leu	Gly	Asp	Arg	Asp	Gly	Val	Arg	Thr	
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Pro	Met	Gln	Trp	Ser	Pro	Asp	Arg	Asn	Gly	Gly	Phe	Ser	Arg	Ala	Asp	
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Pro	Glu	Arg	Leu	Pro	Leu	Pro	Leu	Leu	Met	Gly	Pro	Leu	Tyr	Gly	Tyr	
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Glu	Ala	Val	Asn	Val	Glu	Ala	Gln	Gln	Arg	Asp	Pro	His	Ser	Leu	Leu	
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Asn	Trp	Thr	Arg	Arg	Met	Leu	Ala	Lys	Arg	Arg	Gln	Ser	His	Val	Phe	
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Gly	Glu	Leu	Pro	Tyr	Leu	Leu	Thr	Leu	Pro	Pro	Phe	Gly	Phe	Tyr	Trp	
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Pro	Arg	Arg	Phe	His	Thr	Pro	Val	Ala	Leu	Ala	Trp	Gln	Asp	Asp	Thr	
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Phe	Ala	Pro	Arg	Pro	Ala	Ser	Glu	Arg	Asp	Ala	Ala	Leu	Ala	Gly	Glu	
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Gln Gly Asp Gln Ala Pro His Thr Leu Ala Leu Ala His Ala Tyr Val
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Phe Ala Pro Arg Pro Ala Ser Glu Arg Asp Ala Ala Leu Ala Gly Glu
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agc Ser	ctt Leu	tgc Cys 275	tgg Trp	gtt Val	gct Ala	ggt Gly	aag Lys 280	cga Arg	tta Leu	cgc Arg	cgt Arg	cgg Arg 285	tat Tyr	cgc Arg	aat Asn	864
cct Pro	gcc Ala 290	tat Tyr	ccc Pro	ctt Leu	gac Asp	cct Pro 295	ctg Leu	agt Ser	ggg Gly	gag Glu	gct Ala 300	ttt Phe	gtt Val	gag Glu	cta Leu	912
ttg Leu 305	gca Ala	aca Thr	acg Thr	ctg Leu	ggt Gly 310	tgg Trp	tat Tyr	cga Arg	cct Pro	gag Glu 315	gtg Val	aac Asn	cgc Arg	agc Ser	cag Gln 320	960
ttg Leu	aac Asn	ttg Leu	ctt Leu	gat Asp 325	agc Ser	cac His	gat Asp	gtg Val	ccg Pro 330	aga Arg	gct Ala	ttg Leu	cac His	aca Thr 335	ctt Leu	1008
cag Gln	ggg Gly	gat Asp	ctt Leu 340	gcg Ala	ttg Leu	aag Lys	ttg Leu 345	gtg Ala	ctt Leu	ctg Leu	ttg Leu	ttg Leu 350	ttt Phe	ttt Leu	ttg Leu	1056
caa Gln	cca Pro	ggg Gly 355	gcg Ala	cct Pro	tgc Cys	atc Ile	tac Tyr 360	tac Tyr	ggc Gly	aca Thr	gag Glu	gcg Ala 365	ggt Gly	ttg Leu	cag Gln	1104
ggt Gly	ggc Gly 370	cct Pro	gaa Glu	cca Pro	ggt Gly	tgc Cys 375	cga Arg	gaa Glu	ggg Gly	ttc Phe	cct Pro 380	tgg Trp	cat His	acg Thr	cct Pro	1152
tgg Trp 385	cct Pro	gca Ala	gac Asp	ctg Leu	cgc Arg	gat Asp	ttc Phe	att Ile	cag Gln	tcg Ser 395	ttg Leu	agt Ser	gat Asp	ctg Leu	cgc Arg 400	1200
caa Gln	cgt Arg	tgc Cys	cca Pro	gcg Ala 405	ttg Leu	agt Ser	gat Asp	ggc Gly	ggt Gly 410	ttg Leu	caa Gln	tgg Trp	caa Gln	ccg Pro 415	att Ile	1248
gga Gly	gct Ala	gat Asp	gca Ala 420	ctt Leu	cat His	gct Ala	tgg Trp	ctg Leu 425	atg Met	cag Gln	ccc Pro	gag Glu	cca Pro 430	ggc Gly	aca Thr	1296

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aca	caa	aag	gag	acg	ccg	att	cag	gtg	tgg	gtc	aat	cgc	agt	cgc	agg	1344
Thr	Gln	Lys	Glu	Thr	Pro	Ile	Gln	Val	Trp	Val	Asn	Arg	Ser	Arg	Arg	
		435					440				445					
tca	tgg	ttg	cgg	atg	aaa	ggc	tca	tcg	aca	gac	cct	ctt	tgg	ctg	gaa	1392
Ser	Trp	Leu	Arg	Met	Lys	Gly	Ser	Ser	Thr	Asp	Pro	Leu	Trp	Leu	Glu	
	450					455				460						
gga	gca	ttg	gaa	tgc	aat	ggc	cgg	gga	tta	ggc	cct	caa	tca	gca	gtg	1440
Gly	Ala	Leu	Glu	Cys	Asn	Gly	Arg	Gly	Leu	Gly	Pro	Gln	Ser	Ala	Val	
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Leu	Phe	His														

<210> 140

<211> 483

<212> PRT

<213> *Prochlorococcus marinus* str. MIT 9313

<400> 140

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Cys	Ser	Gly	Arg	Val	Leu	Ala	His	Gln	His	Leu	Ala	Leu	Arg	Cys	Trp	
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Gly	Ser	Asp	Pro	Ser	Glu	Gln	Gly	Phe	Gln	Gly	Gly	Asp	Leu	Tyr	Gly	
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Val	Ile	Glu	Ala	Leu	Asp	His	Leu	Gln	Ala	Leu	Gly	Ile	Ser	Cys	Leu	
65					70					75					80	
Tyr	Leu	Thr	Pro	Val	Phe	Ser	Ser	Ala	Ala	Asn	His	Arg	Tyr	His	Ala	
				85					90					95		
Tyr	Asp	Tyr	Leu	Gln	Val	Asp	Pro	Leu	Leu	Gly	Gly	Asn	Ala	Ala	Leu	
			100					105					110			
Glu	Ala	Leu	Ile	Glu	Ala	Val	His	Arg	Arg	Gly	Met	Arg	Ile	Ile	Leu	
		115					120					125				
Asp	Gly	Val	Phe	Asn	His	Cys	Gly	Arg	Gly	Phe	Trp	Ala	Phe	His	His	
	130					135				140						
Leu	Leu	Glu	Asn	Gly	Glu	Ala	Ser	Pro	Tyr	Arg	Asp	Trp	Phe	Glu	Val	
145					150					155					160	
Arg	Gln	Trp	Pro	Leu	His	Pro	Tyr	Pro	Arg	Arg	Gly	Gln	Asp	Cys	Gly	
				165					170					175		
Tyr	Ser	Cys	Trp	Trp	Asn	Asp	Pro	Ala	Leu	Pro	Lys	Phe	Asn	His	Ala	
			180					185					190			
His	Ala	Pro	Val	Arg	Glu	Tyr	Leu	Ile	Ala	Val	Ala	Arg	Tyr	Trp	Leu	
		195					200					205				
Glu	Gln	Gly	Ile	Asp	Gly	Trp	Arg	Leu	Asp	Val	Ala	Asp	Glu	Val	Pro	
	210					215					220					
Ala	Glu	Phe	Trp	Leu	Glu	Phe	Arg	His	Met	Val	Lys	Ala	Val	Asn	Pro	
225					230					235					240	
Asp	Ala	Trp	Ile	Leu	Ala	Glu	Ile	Trp	Gly	Asp	Ala	Arg	Pro	Trp	Leu	
				245					250					255		
Gln	Gly	Gln	His	Phe	Asp	Gly	Val	Met	Asn	Tyr	Arg	Met	Gly	Trp	Ser	
			260					265					270			
Ser	Leu	Cys	Trp	Val	Ala	Gly	Lys	Arg	Leu	Arg	Arg	Arg	Tyr	Arg	Asn	
		275					280					285				
Pro	Ala	Tyr	Pro	Leu	Asp	Pro	Leu	Ser	Gly	Glu	Ala	Phe	Val	Glu	Leu	
	290					295					300					
Leu	Ala	Thr	Thr	Leu	Gly	Trp	Tyr	Arg	Pro	Glu	Val	Asn	Arg	Ser	Gln	
305					310					315					320	
Leu	Asn	Leu	Leu	Asp	Ser	His	Asp	Val	Pro	Arg	Ala	Leu	His	Thr	Leu	
				325					330					335		
Gln	Gly	Asp	Leu	Ala	Ala	Leu	Lys	Leu	Ala	Leu	Leu	Leu	Leu	Phe	Leu	
			340					345						350		
Gln	Pro	Gly	Ala	Pro	Cys	Ile	Tyr	Tyr	Gly	Thr	Glu	Ala	Gly	Leu	Gln	
		355					360					365				
Gly	Gly	Pro	Glu	Pro	Gly	Cys	Arg	Glu	Gly	Phe	Pro	Trp	His	Thr	Pro	
	370					375					380					
Trp	Pro	Ala	Asp	Leu	Arg	Asp	Phe	Ile	Gln	Ser	Leu	Ser	Asp	Leu	Arg	
385					390					395					400	

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Gln Arg Cys Pro Ala⁴⁰⁵ Leu Ser Asp Gly⁴¹⁰ Leu Gln Trp Gln Pro Ile
 Gly Ala Asp Ala⁴²⁰ Leu His Ala Trp Leu⁴²⁵ Met Gln Pro Glu Pro⁴³⁰ Gly Thr
 Thr Gln Lys⁴³⁵ Glu Thr Pro Ile Gln⁴⁴⁰ Val Trp Val Asn Arg⁴⁴⁵ Ser Arg Arg
 Ser Trp⁴⁵⁰ Leu Arg Met Lys Gly⁴⁵⁵ Ser Ser Thr Asp Pro⁴⁶⁰ Leu Trp Leu Glu
 Gly⁴⁶⁵ Ala Leu Glu Cys Asn⁴⁷⁰ Gly Arg Gly Leu Gly⁴⁷⁵ Pro Gln Ser Ala Val⁴⁸⁰
 Leu Phe His

<210> 141
 <211> 1407
 <212> DNA
 <213> Synechococcus sp. WH 8102

<220>
 <221> CDS
 <222> (1)..(1407)
 <223> transl_table=11

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 gcc gtg gtg tat cag atc ttt ccg gat cga ttc cgc cgc agt ggt cag 96
 Ala Val Val Tyr²⁰ Gln Ile Phe Pro Asp²⁵ Arg Phe Arg Arg Ser Gly Gln
 20 25 30
 gtg aag gct cag caa cat ctt gag ctg aag ccc tgg ggc agt gat ccc 144
 Val Lys Ala Gln Gln His Leu Glu Leu Lys Pro Trp Gly⁴⁵ Ser Asp Pro
 35 40 45
 cgt gag cag ggc ttt caa ggg ggg gat ctc tac ggg gtg atc gag gcg 192
 Arg Glu⁵⁰ Gln Gly Phe Gln Gly⁵⁵ Gly Asp Leu Tyr⁶⁰ Val Ile Glu Ala
 50 55 60
 ttg gat cag ctg cag gcc atg ggc atc agc tgc ctg tac ctc acg ccg 240
 Leu Asp Gln Leu Gln Ala Met Gly Ile Ser Cys⁷⁵ Leu Tyr Leu Thr Pro
 65 70 75 80
 atc ttc agc tcc gcc gcc aat cac cgc tat cac gcc tac gac tat ttc 288
 Ile Phe Ser Ser⁸⁵ Ala Asn His Arg Tyr⁹⁰ His Ala Tyr Asp Tyr Phe
 85 90 95
 gag gtg gat ccc ctg ctg ggg ggg aat gac gct ctg gat acg ttg atc 336
 Glu Val Asp Pro¹⁰⁰ Leu Leu Gly Gly Asn Asp Ala Leu Asp Thr Leu Ile
 100 105 110
 gca gcc tta cac cag cgg ggc atg cgg ctg gtg ctc gat ggt gtg ttc 384
 Ala Ala Leu His Gln Arg Gly Met Arg Leu Val Leu Asp Gly Val Phe
 115 120 125
 aac cac tgc ggc cgt ggc ttc tgg gcc ttt cat cac ctg gtg gaa aac 432
 Asn His Cys Gly Arg Gly Phe Trp Ala Phe His His Leu Val Glu Asn
 130 135 140
 ggc cag gac tcc ccc tac cgg gat tgg ttc aat gtg cac cgc tgg cct 480
 Gly Gln Asp Ser Pro Tyr¹⁵⁰ Arg Asp Trp Phe Asn Val His Arg Trp Pro
 145 150 155 160
 gta aag ccg tat ccg gcc gag ggc gag gac tgc ggc tac gat tgc tgg 528
 Val Lys Pro Tyr Pro¹⁶⁵ Ala Glu Gly Glu Asp Cys Gly Tyr Asp Cys Trp
 165 170 175
 tgg gct gtg cct gat ctg ccc aag ttc aac cat gcc aat ccc gca gtg 576
 Trp Ala Val Pro Asp Leu Pro Lys Phe Asn His Ala Asn Pro Ala Val
 180 185 190
 cgg gac cat ctg ttg gag gtg ggt cgt ttc tgg ctg gaa cgg ggc atc 624
 Arg Asp His¹⁹⁵ Leu Leu Glu Val Gly Arg Phe Trp Leu Glu Arg Gly Ile
 195 200 205
 gat ggt tgg cgt ctg gat gtg ccc gcg gaa gtg cca gcc gag ttc tgg 672
 Asp Gly Trp Arg Leu Asp Val Pro Ala Glu Val Pro Ala Glu Phe Trp
 210 215 220
 gtg gat ttc cgt cgc gtg gtg cgg gag gtc aac cct gac gcc tgg atc 720
 Val Asp Phe Arg Arg Val Val Arg Glu Val Asn Pro Asp Ala Trp Ile
 225 230 235 240

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gtg	ggt	gag	atc	tgg	ggt	gat	gcc	cgg	gag	tgg	ctg	cgg	ggc	gag	cac	768
Val	Gly	Glu	Ile	Trp	Gly	Asp	Ala	Arg	Glu	Trp	Leu	Arg	Gly	Glu	His	
				245					250					255		
ttt	gat	ggg	gtg	atg	aat	tac	cgc	ctc	ggc	tgg	agc	agc	ctc	ggc	tgg	816
Phe	Asp	Gly	Val	Met	Asn	Tyr	Arg	Leu	Gly	Trp	Ser	Ser	Leu	Gly	Trp	
			260					265					270			
gtg	gca	gga	gat	cgg	ttg	agg	cag	gga	tac	cgc	aat	ccg	gag	tac	cca	864
Val	Ala	Gly	Asp	Arg	Leu	Arg	Gln	Gly	Tyr	Arg	Asn	Pro	Glu	Tyr	Pro	
			275				280					285				
ctg	aat	ccc	ctc	agt	agc	gag	gat	ttg	atc	gaa	atc	tgg	agc	acc	acg	912
Leu	Asn	Pro	Leu	Ser	Ser	Glu	Asp	Leu	Ile	Glu	Ile	Trp	Ser	Thr	Thr	
			290			295				300						
tcc	ggt	tgg	tac	cgc	cca	gcc	gtg	aat	cga	gct	cag	atg	aac	ctg	ctc	960
Ser	Gly	Trp	Tyr	Arg	Pro	Ala	Val	Asn	Arg	Ala	Gln	Met	Asn	Leu	Leu	
					310					315					320	
gat	agc	cac	gat	gtt	cct	cgg	gca	ctc	cac	agc	ctc	gat	gga	gat	gtg	1008
Asp	Ser	His	Asp	Val	Pro	Arg	Ala	Leu	His	Ser	Leu	Asp	Gly	Asp	Val	
				325					330					335		
aag	gct	ctg	aag	ctc	gcc	ctg	ctg	ctg	atc	ttt	ctg	cag	caa	ggg	gcc	1056
Lys	Ala	Leu	Lys	Leu	Ala	Leu	Leu	Leu	Ile	Phe	Leu	Gln	Gln	Gly	Ala	
			340				345						350			
cca	tgc	gtg	tac	tac	ggc	acc	gaa	tct	gga	ttg	tgc	ggt	ggc	ccg	gaa	1104
Pro	Cys	Val	Tyr	Tyr	Gly	Thr	Glu	Ser	Gly	Leu	Cys	Gly	Gly	Pro	Glu	
			355				360					365				
ccc	gcc	tgt	cgt	gaa	gcc	ttt	ccc	tgg	ggt	gaa	ccc	tgg	cct	gcg	gat	1152
Pro	Ala	Cys	Arg	Glu	Ala	Phe	Pro	Trp	Gly	Glu	Pro	Trp	Pro	Ala	Asp	
				370		375					380					
ctg	agc	tca	acc	att	gcg	gcc	ttg	gct	gat	ctc	cgg	cga	aat	caa	ccc	1200
Leu	Ser	Ser	Thr	Ile	Ala	Ala	Leu	Ala	Asp	Leu	Arg	Arg	Asn	Gln	Pro	
				385		390				395					400	
aat	ctc	att	cgc	ggc	gat	ctg	aag	tgg	gag	ccg	atc	gga	cgc	gac	gga	1248
Asn	Leu	Ile	Arg	Gly	Asp	Leu	Lys	Trp	Glu	Pro	Ile	Gly	Arg	Asp	Gly	
				405				410						415		
ctg	ctg	gga	agc	acc	cct	ggc	ggt	tta	agc	gtc	tgg	gtt	aac	cgc	agc	1296
Leu	Leu	Gly	Ser	Thr	Pro	Gly	Gly	Leu	Ser	Val	Trp	Val	Asn	Arg	Ser	
				420			425						430			
acc	acg	acc	tcg	ctg	cag	att	gat	cct	ggg	att	tcc	aga	atc	tgg	agt	1344
Thr	Thr	Thr	Ser	Leu	Gln	Ile	Asp	Pro	Gly	Ile	Ser	Arg	Ile	Trp	Ser	
				435			440					445				
tgt	ggc	gcc	tgc	gat	gga	caa	gct	cta	gag	ccg	caa	tct	gca	gtg	gtg	1392
Cys	Gly	Ala	Cys	Asp	Gly	Gln	Ala	Leu	Glu	Pro	Gln	Ser	Ala	Val	Val	
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cat	ctg	cag	gga	taa												1407
His	Leu	Gln	Gly													
				465												

<210> 142

<211> 468

<212> PRT

<213> Synechococcus sp. WH 8102

<400> 142

Met	Ala	Ser	Ser	Thr	Pro	Phe	His	Asp	Pro	Pro	Ala	Trp	Val	Ala	Asp	
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Ala	Val	Val	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe	Arg	Arg	Ser	Gly	Gln	
			20					25					30			
Val	Lys	Ala	Gln	Gln	His	Leu	Glu	Leu	Lys	Pro	Trp	Gly	Ser	Asp	Pro	
			35				40					45				
Arg	Glu	Gln	Gly	Phe	Gln	Gly	Gly	Asp	Leu	Tyr	Gly	Val	Ile	Glu	Ala	
			50			55					60					
Leu	Asp	Gln	Leu	Gln	Ala	Met	Gly	Ile	Ser	Cys	Leu	Tyr	Leu	Thr	Pro	
65				70						75					80	
Ile	Phe	Ser	Ser	Ala	Asn	His	Arg	Tyr	His	Ala	Tyr	Asp	Tyr	Phe		
				85				90					95			
Glu	Val	Asp	Pro	Leu	Leu	Gly	Gly	Asn	Asp	Ala	Leu	Asp	Thr	Leu	Ile	
			100					105					110			
Ala	Ala	Leu	His	Gln	Arg	Gly	Met	Arg	Leu	Val	Leu	Asp	Gly	Val	Phe	
			115				120					125				
Asn	His	Cys	Gly	Arg	Gly	Phe	Trp	Ala	Phe	His	His	Leu	Val	Glu	Asn	

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130 135 140
 Gly Gln Asp Ser Pro Tyr Arg Asp Trp Phe Asn Val His Arg Trp Pro
 145 Val Lys Pro Tyr Pro Ala Glu Gly Glu Asp Cys Gly Tyr Asp Cys Trp
 165 170 175
 Trp Ala Val Pro Asp Leu Pro Lys Phe Asn His Ala Asn Pro Ala Val
 180 185 190
 Arg Asp His Leu Leu Glu Val Gly Arg Phe Trp Leu Glu Arg Gly Ile
 195 200 205
 Asp Gly Trp Arg Leu Asp Val Pro Ala Glu Val Pro Ala Glu Phe Trp
 210 215 220
 Val Asp Phe Arg Arg Val Val Arg Glu Val Asn Pro Asp Ala Trp Ile
 225 230 235 240
 Val Gly Glu Ile Trp Gly Asp Ala Arg Glu Trp Leu Arg Gly Glu His
 245 250 255
 Phe Asp Gly Val Met Asn Tyr Arg Leu Gly Trp Ser Ser Leu Gly Trp
 260 265 270
 Val Ala Gly Asp Arg Leu Arg Gln Gly Tyr Arg Asn Pro Glu Tyr Pro
 275 280 285
 Leu Asn Pro Leu Ser Ser Glu Asp Leu Ile Glu Ile Trp Ser Thr Thr
 290 295 300
 Ser Gly Trp Tyr Arg Pro Ala Val Asn Arg Ala Gln Met Asn Leu Leu
 305 310 315 320
 Asp Ser His Asp Val Pro Arg Ala Leu His Ser Leu Asp Gly Asp Val
 325 330 335
 Lys Ala Leu Lys Leu Ala Leu Leu Ile Phe Leu Gln Gln Gly Ala
 340 345 350
 Pro Cys Val Tyr Tyr Gly Thr Glu Ser Gly Leu Cys Gly Gly Pro Glu
 355 360 365
 Pro Ala Cys Arg Glu Ala Phe Pro Trp Gly Glu Pro Trp Pro Ala Asp
 370 375 380
 Leu Ser Ser Thr Ile Ala Ala Leu Ala Asp Leu Arg Arg Asn Gln Pro
 385 390 395 400
 Asn Leu Ile Arg Gly Asp Leu Lys Trp Glu Pro Ile Gly Arg Asp Gly
 405 410 415
 Leu Leu Gly Ser Thr Pro Gly Gly Leu Ser Val Trp Val Asn Arg Ser
 420 425 430
 Thr Thr Thr Ser Leu Gln Ile Asp Pro Gly Ile Ser Arg Ile Trp Ser
 435 440 445
 Cys Gly Ala Cys Asp Gly Gln Ala Leu Glu Pro Gln Ser Ala Val Val
 450 455 460
 His Leu Gln Gly
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<210> 143

<211> 1662

<212> DNA

<213> Synechococcus sp. WH 8102

<220>

<221> CDS

<222> (1)..(1662)

<223> transl_table=11

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atc gtg cgc agc ttc gcc gat ggc aac ggt gat ggc atc ggc gat ttc	96
Ile Val Arg Ser Phe Ala Asp Gly Asn Gly Asp Gly Ile Gly Asp Phe	
20 25 30	
aag ggt ctg gct tcg cgc ttg ccc tat ctg cgc tgg ctc ggg gtg aag	144
Lys Gly Ala Ser Arg Leu Pro Tyr Leu Arg Trp Leu Gly Val Lys	
35 40 45	
acg ctc tgg ctg aca ccc acg tac cca tct ccc tta cgg gat ggt ggc	192
Thr Leu Trp Leu Thr Pro Thr Tyr Pro Ser Pro Leu Arg Asp Gly Gly	
50 55 60	
tac gac atc acc gac ttc aag gac att cac cct gat ctg ggc gat ctg	240
Tyr Asp Ile Thr Asp Phe Lys Asp Ile His Pro Asp Leu Gly Asp Leu	

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65	gcg	tcg	ttc	cat	cgg	70	ttt	ctg	acg	gca	gcc	75	cac	agc	cag	ggc	atg	80	cgc		288
	Ala	Ser	Phe	His	Arg		Phe	Leu	Thr	Ala	Ala		His	Ser	Gln	Gly	Met		Arg		
					85							90					95				
	gtg	att	ctc	gat	ctg	gtg	ctg	aac	cac	acc	agc	gac	ctt	cac	ccc	tgg					336
	Val	Ile	Leu	Asp	Leu	Val	Leu	Asn	His	Thr	Ser	Asp	Leu	His	Pro	Trp					
				100					105												
	ttc	cag	cga	gcc	cgc	tgg	gcc	ccc	aag	ggc	agc	act	gaa	cgg	gat	gtg					384
	Phe	Gln	Arg	Ala	Arg	Trp	Ala	Pro	Lys	Gly	Ser	Thr	Glu	Arg	Asp	Val					
			115					120					125								
	tac	gtc	tgg	agc	gac	gac	cca	tcc	cgc	tac	agc	gac	gcc	ccg	gtg	ctg					432
	Tyr	Val	Trp	Ser	Asp	Asp	Pro	Ser	Arg	Tyr	Ser	Asp	Ala	Pro	Val	Leu					
								135					140								
	ttc	cgg	cac	ttt	gaa	gcg	tcc	aac	tgg	gag	tgg	gac	cca	gtg	gcg	gag					480
	Phe	Arg	His	Phe	Glu	Ala	Ser	Asn	Trp	Glu	Trp	Asp	Pro	Val	Ala	Glu					
					150							155									
	cag	tac	tac	ctg	cac	cgt	ttc	ctg	agc	cat	cag	ccc	gac	ctc	aac	tac					528
	Gln	Tyr	Tyr	Leu	His	Arg	Phe	Leu	Ser	His	Gln	Pro	Asp	Leu	Asn	Tyr					
					165																
	gcc	aac	ccg	tgg	gtg	cag	gag	gcc	atg	ctc	gag	gtg	ggt	gac	ttc	tgg					576
	Ala	Asn	Pro	Trp	Val	Gln	Glu	Ala	Met	Leu	Glu	Val	Val	Asp	Phe	Trp					
				180					185					190							
	ctg	gag	cgt	ggg	gtc	gac	ggc	ttt	cgc	ctt	gat	gcg	gtg	ccg	ttt	ctg					624
	Leu	Glu	Arg	Gly	Val	Asp	Gly	Phe	Arg	Leu	Asp	Ala	Val	Pro	Phe	Leu					
				195				200						205							
	ttt	gag	gag	gag	ggc	acc	cgg	tgt	gaa	ggg	ttg	ccg	gag	acc	cat	gcc					672
	Phe	Glu	Glu	Glu	Gly	Thr	Arg	Cys	Glu	Gly	Leu	Pro	Glu	Thr	His	Ala					
					215								220								
	ttc	ctg	cgg	cgt	ctg	cgg	gcc	cgt	gtg	gat	gcc	atg	gga	cga	gag	gtg					720
	Phe	Leu	Arg	Arg	Leu	Arg	Ala	Arg	Val	Asp	Ala	Met	Gly	Arg	Glu	Val					
					230							235									
	ctg	ttg	ctg	ggg	gaa	gcg	atc	caa	ccc	gtg	cag	gag	gca	gcc	ccc	tat					768
	Leu	Leu	Leu	Gly	Glu	Ala	Ile	Gln	Pro	Val	Gln	Glu	Ala	Ala	Pro	Tyr					
					245																
	ctg	gcg	aag	gac	gaa	ctg	cac	gga	gcc	ttc	aac	ttc	gtg	ctc	aca	gcc					816
	Leu	Ala	Lys	Asp	Glu	Leu	His	Gly	Ala	Phe	Asn	Phe	Val	Leu	Thr	Ala					
				260					265												
	cat	ctg	ttc	gct	gct	gtg	gcc	tcc	ggc	agc	act	cgc	cag	ctc	ggg	gac					864
	His	Leu	Phe	Ala	Ala	Val	Ala	Ser	Gly	Ser	Thr	Arg	Gln	Leu	Gly	Asp					
				275				280					285								
	tgt	ctc	aac	gag	gcg	gaa	cac	gcg	ggt	gat	ggc	ccg	cgc	tgg	gcc	ctg					912
	Cys	Leu	Asn	Glu	Ala	Glu	His	Ala	Val	Asp	Gly	Pro	Arg	Trp	Ala	Leu					
				290			295					300									
	ccg	ctc	cgc	aac	cac	gac	gag	ctc	tgg	ctg	ggg	gat	ggg	cac	ctg	atc					960
	Pro	Leu	Arg	Asn	His	Asp	Glu	Leu	Trp	Leu	Gly	Asp	Gly	His	Leu	Ile					
						310						315									
	ccc	gac	gag	gtg	atc	cag	tcg	atc	cgg	gtg	ggc	ttg	ccc	cag	ggg	cag					1008
	Pro	Asp	Glu	Val	Ile	Gln	Ser	Ile	Arg	Val	Gly	Leu	Pro	Gln	Gly	Gln					
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	ggg	cat	tgg	ctc	aac	tgg	ggc	atc	aac	cgt	cga	ttg	gca	ccg	ctg	ctc					1056
	Gly	His	Trp	Leu	Asn	Trp	Gly	Ile	Asn	Arg	Arg	Leu	Ala	Pro	Leu	Leu					
									345												
	aat	ggc	gac	ccc	cgc	tcc	aac	cga	ctg	ctt	cac	gga	ctg	att	tac	agc					1104
	Asn	Gly	Asp	Pro	Arg	Ser	Asn	Arg	Leu	Leu	His	Gly	Leu	Ile	Tyr	Ser					
				355				360					365								
	ctt	cca	ggc	atg	ccc	tgc	ctg	tat	tac	ggc	gac	gag	ctg	ggg	atg	ggg					1152
	Leu	Pro	Gly	Met	Pro	Cys	Leu	Tyr	Tyr	Gly	Asp	Glu	Leu	Gly	Met	Gly					
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	gat	tgg	ccg	ggg	tta	cgg	gat	cgg	gat	ccg	aac	cgc	aca	ccc	atg	gcc					1200
	Asp	Trp	Pro	Gly	Leu	Arg	Asp	Arg	Asp	Pro	Asn	Arg	Thr	Pro	Met	Ala					
						390						395									
	tgg	aca	cct	gcc	cgc	aac	ggt	ggc	ttc	tcc	tcg	gct	ccc	gac	cct	ttg					1248
	Trp	Thr	Pro	Ala	Arg	Asn	Gly	Gly	Phe	Ser	Ala	Pro	Asp	Pro	Leu						
					405							410									
	ctg	gtg	ctt	ccg	ccg	atc	aca	gct	cct	ggg	tac	gac	tac	cga	gtc	gtg					1296
	Leu	Val	Leu	Pro	Pro	Ile	Thr	Ala	Pro	Gly	Tyr	Asp	Tyr	Arg	Val	Val					
					420				425												
	aac	ggt	gag	gta	cag	aaa	cag	ctg	ccg	ggt	tcc	ttg	ctg	aac	tgg	cac					1344
	Asn	Val	Glu	Val	Gln	Lys	Gln	Leu	Pro	Gly	Ser	Leu	Leu	Asn	Trp	His					

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tca ttg cag ctg ttg ccg tgc agc cat ccc ggt gcc ttg gtt tac gtc				
Ser Leu Gln Leu Leu Pro Cys Ser His Pro Gly Ala Leu Val Tyr Val				
465	470	475	480	
cgC Arg 485	gCg Ala Thr	act Glu	gag Ala Met	acg Thr
gCg Ala Thr	gag Glu	gCg Ala Met	acg Thr	gtg Val
gcc gga gcc tcc ttc agc ctg gat ctc acg gcc tgg gag ggc ttg cgg				
Ala Gly Ala Ser Phe Ser Leu Asp Leu Thr Ala Trp Glu Gly Leu Arg				
500	505	510	515	
act Thr Arg 515	gag Glu Val	atg Met	tgg Trp	ggC Gly
act Thr Arg 515	gag Glu Val	atg Met	tgg Trp	ggC Gly
tgG ttt gtg aat ctg tct cct tac ggc atc aac tgG tgG ttg atc ggc				
Trp Phe Val Asn Leu Ser Pro Tyr Gly Ile Asn Trp Trp Leu Ile Gly				
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<211> 553

<212> PRT

<213> Synechococcus sp. WH 8102

<400> 144

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20 Lys Gly Leu Ala Ser Arg Leu Pro Tyr Leu Arg Trp Leu Gly Val Lys	
35 Thr Leu Trp Leu Thr Pro Thr Tyr Pro Ser Pro Leu Arg Asp Gly Gly	
50 Tyr Asp Ile Thr Asp Phe Lys Asp Ile His Pro Asp Leu Gly Asp Leu	
65 Ala Ser Phe His Arg Phe Leu Thr Ala Ala His Ser Gln Gly Met Arg	
80 Val Ile Leu Asp Leu Val Leu Asn His Thr Ser Asp Leu His Pro Trp	
95 Phe Gln Arg Ala Arg Trp Ala Pro Lys Gly Ser Thr Glu Arg Asp Val	
110 Tyr Val Trp Ser Asp Asp Pro Ser Arg Tyr Ser Asp Ala Pro Val Leu	
125 Phe Arg His Phe Glu Ala Ser Asn Trp Glu Trp Asp Pro Val Ala Glu	
140 Gln Tyr Tyr Leu His Arg Phe Leu Ser His Gln Pro Asp Leu Asn Tyr	
160 Ala Asn Pro Trp Val Gln Glu Ala Met Leu Glu Val Val Asp Phe Trp	
175 Leu Glu Arg Gly Val Asp Gly Phe Arg Leu Asp Ala Val Pro Phe Leu	
190 Phe Glu Glu Glu Gly Thr Arg Cys Glu Gly Leu Pro Glu Thr His Ala	
205 Phe Leu Arg Arg Leu Arg Ala Arg Val Asp Ala Met Gly Arg Glu Val	
220 Leu Leu Leu Gly Glu Ala Ile Gln Pro Val Gln Glu Ala Ala Pro Tyr	
240 Leu Ala Lys Asp Glu Leu His Gly Ala Phe Asn Phe Val Leu Thr Ala	
255 His Leu Phe Ala Ala Val Ala Ser Gly Ser Thr Arg Gln Leu Gly Asp	
270 Cys Leu Asn Glu Ala Glu His Ala Val Asp Gly Pro Arg Trp Ala Leu	
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300 305	310 320

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Pro Asp Glu Val Ile Gln Ser Ile Arg Val Gly Leu Pro Gln Gly Gln
 325 330
 Gly His Trp Leu Asn Trp Gly Ile Asn Arg Arg Leu Ala Pro Leu Leu
 340 345 350
 Asn Gly Asp Pro Arg Ser Asn Arg Leu Leu His Gly Leu Ile Tyr Ser
 355 360 365
 Leu Pro Gly Met Pro Cys Leu Tyr Tyr Gly Asp Glu Leu Gly Met Gly
 370 375 380
 Asp Trp Pro Gly Leu Arg Asp Arg Asp Pro Asn Arg Thr Pro Met Ala
 385 390 395 400
 Trp Thr Pro Ala Arg Asn Gly Gly Phe Ser Ser Ala Pro Asp Pro Leu
 405 410 415
 Leu Val Leu Pro Ile Thr Ala Pro Gly Tyr Asp Tyr Arg Val Val
 420 425 430
 Asn Val Glu Val Gln Lys Gln Leu Pro Gly Ser Leu Leu Asn Trp His
 435 440 445
 Arg Arg Met Leu Thr Cys Arg Arg Leu Leu Pro Ala Leu Ala His Gly
 450 455 460
 Ser Leu Gln Leu Leu Pro Cys Ser His Pro Gly Ala Leu Val Tyr Val
 465 470 475 480
 Arg Ala Thr Glu Ala Met Thr Val Leu Val Ala Gly Asn Val Thr Ala
 485 490 495
 Ala Gly Ala Ser Phe Ser Leu Asp Leu Thr Ala Trp Glu Gly Leu Arg
 500 505 510
 Thr Arg Glu Val Met Trp Gly Cys Glu Phe Pro Leu Ala Ser Arg Glu
 515 520 525
 Trp Phe Val Asn Leu Ser Pro Tyr Gly Ile Asn Trp Trp Leu Ile Gly
 530 535 540
 Glu Val Asp Thr Ala Val Pro Val Ser
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<210> 145

<211> 1863

<212> DNA

<213> Gloeobacter violaceus PCC 7421

<220>

<221> CDS

<222> (1)..(1863)

<223> transl_table=11

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gat ctg cgg ccg cgc ggc caa gtg cat ccg agc ccg gca agc tgg cgc	96
Asp Leu Arg Pro Arg Gly Gln Val His Pro Ser Pro Ala Ser Trp Arg	
20 25 30	
gat cag ttt ctc tac cag ctg ttg ccg gac cgc ttc agc gac ggc cgc	144
Asp Gln Phe Leu Tyr Gln Leu Leu Pro Asp Arg Phe Ser Asp Gly Arg	
35 40 45	
gag gcg gat cgg ccg ctt ttt gac ccg gcc gat ccg gcc cga ttc cag	192
Glu Ala Asp Arg Pro Leu Phe Asp Pro Ala Asp Pro Ala Arg Phe Gln	
50 55 60	
gtc aaa gac aga gga gcc tgg atg gcg gcg ggg aag cga ttc gta ggt	240
Val Lys Asp Arg Gly Ala Trp Met Ala Ala Gly Lys Arg Phe Val Gly	
65 70 75 80	
gga acc ctc aaa ggc gtc atc agc aag ctc gac tat ctg cag ggg ctc	288
Gly Thr Leu Lys Gly Val Ile Ser Lys Leu Asp Tyr Leu Gln Gly Leu	
85 90 95	
ggg gtg acg acg ctg tgg ctc aac cca ccc tgg aag cag cga gcg gat	336
Gly Val Thr Thr Leu Trp Leu Asn Pro Trp Lys Gln Arg Ala Asp	
100 105 110	
ctg gag act tat cac ggc tac ggt att cag aac ttt ttc gac atc gat	384
Leu Glu Thr Tyr His Gly Tyr Gly Ile Gln Asn Phe Phe Asp Ile Asp	
115 120 125	
ccg cgc ttc ggg acc cgc cag gat ctg cgc gac ttg gtc gat gcc gcc	432
Pro Arg Phe Gly Thr Arg Gln Asp Leu Arg Asp Val Asp Ala Ala	
130 135 140	

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cac His 145	gca Ala	cgg Arg	ggc Gly	ctg Leu 150	tac Tyr	gtc Val	atc Ile	ctc Leu	gat Asp	gtg Val 155	atc Ile	tat Tyr	aac Asn	cac His	agc Ser 160	480
ggc Gly	aac Asn	aac Asn	tgg Trp 165	ttc Phe	tac Tyr	cga Arg	gac Asp	gaa Glu 170	tgg Trp 170	gac Asp	ggc Gly	agc Ser	ccg Pro	caa Gln 175	tcg Ser	528
atg Met	cgc Arg	ccc Pro	tac Tyr 180	cgc Arg	tat Tyr	gcg Ala	ccc Pro	ggc Gly 185	tat Tyr	ccg Pro	gtg Val	cac His	ggg Gly 190	tgg Trp	cgc Arg	576
tcc Ser	ggc Gly	gac Asp 195	ggg Gly	cgc Arg	agc Ser	gtg Val	ggg Gly 200	gag Glu	att Ile	ggt Val	tct Ser	ctc Leu 205	gac Asp	gac Asp	ggc Gly	624
gtc Val	tgg Trp 210	ccc Pro	gag Glu	gag Glu	ttt Phe	caa Gln 215	aac Asn	ttt Phe	gac Asp	tgg Trp	tac Tyr 220	acc Thr	cgc Arg	gcc Ala	ggg Gly	672
cgg Arg 225	atc Ile	atc Ile	aac Asn	tgg Trp	agc Ser 230	gaa Glu	gcg Ala	gcc Ala	tgg Trp	gag Glu 235	gat Asp	tat Tyr	ctg Leu	agc Ser	ccc Pro 240	720
cag Gln	gtc Val	gaa Glu	ttt Phe	cgc Arg 245	cgg Arg	ggc Gly	gat Asp	ttt Phe	ttt Phe 250	gat Asp	ctc Leu	aaa Lys	gac Asp	ttc Phe 255	aac Asn	768
ctg Leu	gcc Ala	aat Asn	ccc Pro 260	gcc Ala	acc Thr	atc Ile	gcc Ala	ggg Gly 265	ttg Leu	gcc Ala	cgc Arg	gtc Val	tac Tyr 270	cag Gln	tac Tyr	816
tgg Trp	att Ile	gcc Ala 275	ctc Leu	agt Ser	gac Asp	tgc Cys	gac Asp 280	gga Gly	ttt Phe	cgt Arg	gtc Val	gat Asp 285	gcg Ala	gtc Val	aag Lys	864
cac His	gtc Val 290	tcc Ser	cct Pro	gtc Val	gaa Glu	tcg Ser 295	cgc Arg	aag Lys	ttc Phe	tgc Cys	gcg Ala 300	gcc Ala	atc Ile	aac Asn	gag Glu	912
tat Tyr 305	gcc Ala	cag Gln	tcg Ser	atc Ile	ggc Gly 310	aag Lys	gac Asp	aat Asn	ttt Phe	ttg Leu 315	ctc Leu	acc Thr	ggg Gly	gaa Glu	ctc Leu 320	960
acc Thr	gac Asp	gac Asp	cgc Arg	atg Met 325	ctg Leu	ctt Leu	gcc Ala	tac Tyr	ctc Leu 330	gac Asp	atc Ile	gtc Val	ggg Gly 335	cgc Arg	aac Asn	1008
ctg Leu	gat Asp	gcg Ala	gcc Ala 340	ctc Leu	gac Asp	atc Ile	gtc Val	agc Ser 345	gcg Ala	ccg Pro	att Ile	cag Gln	ctg Leu 350	acc Thr	gcc Ala	1056
gca Ala	gcc Ala	aag Lys 355	ggc Gly	ctt Leu	gct Ala	cac His	ccg Pro 360	ggc Gly	gcc Ala	ttc Phe	ttc Phe	ggg Gly 365	ctt Leu	tac Tyr	gac Asp	1104
gag Glu	aac Asn 370	acc Thr	ctg Leu	gcg Ala	ggc Gly	gcc Ala 375	tac Tyr	cgc Arg	cag Gln	agc Ser	ggg Gly 380	ctt Leu	tat Tyr	cat His	gtc Val	1152
tcg Ser 385	gtc Val	ctc Leu	gac Asp	gat Asp	cac His 390	gac Asp	atg Met	tcc Ser	tcg Ser	cgc Arg 395	agc Ser	tac Tyr	aaa Lys	tcg Ser	cgc Arg 400	1200
ttt Phe	gcc Ala	gcc Ala	cac His	ggc Gly 405	gaa Glu	ggg Gly	gtg Val	ccc Pro	aac Asn 410	ctt Leu	tac Tyr	cgg Arg	cag Gln	gtg Val 415	gcc Ala	1248
cac His	gcg Ala	gtc Val	ggc Gly 420	gtg Val	caa Gln	ctg Leu	acg Thr	atg Met 425	ccc Pro	ggg Gly	att Ile	cct Pro	tcg Ser	att Ile	tac Tyr	1296
tac Tyr	ggc Gly	acc Thr 435	gaa Glu	cag Gln	gcc Ala	ctg Leu	gac Asp 440	ggc Gly	tcc Ser	gag Glu	agc Ser	aac Asn 445	cac His	gac Asp	tac Tyr	1344
ggc Gly	atc Ile 450	gat Asp	ggg Gly	tcg Ser	cac His	gaa Glu 455	tat Tyr	gtc Val	gat Asp	cgc Arg	tac Tyr 460	cgc Arg	gaa Glu	gcg Ala	1392	
atg Met 465	ttc Phe	ggg Gly	ggg Gly	gcc Ala	ttt Phe 470	ggg Gly	gcc Ala	ttt Phe	cgc Arg	acc Thr 475	gag Glu	ggg Gly	tgc Cys	cac His	ttt Phe 480	1440
ttc Phe	aac Asn	ccg Pro	gat Asp	cac His 485	cct Pro	acc Thr	tat Tyr	ctg Leu	cgc Arg 490	atc Ile	gcc Ala	gcc Ala	atc Ile	gcc Ala 495	cgc Arg	1488
ctg Leu	cgc Arg	aac Asn	cgt Arg 500	ctg Leu	gac Asp	gcc Ala	gtc Val	ggc Gly 505	aaa Lys	acc Thr	ctg Leu	cgc Arg	cgg Arg 510	ggg Gly	cat His	1536

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ggg	gcc	ggc	gag	ctg	gtg	gcc	tgg	tcg	caa	att	ctg	ttc	gag	acg	gag	1632
Gly	Ala	Gly	Glu	Leu	Val	Ala	Trp	Ser	Gln	Ile	Leu	Phe	Glu	Thr	Glu	
	530					535					540					
gcg	ctg	atg	gtc	ctc	aac	acc	cac	ggc	ctg	gag	aat	cga	ggt	gcc	gag	1680
Ala	Leu	Met	Val	Leu	Asn	Thr	His	Gly	Leu	Glu	Asn	Arg	Gly	Ala	Glu	
545					550					555					560	
gtg	acc	gtc	gag	acc	tcg	ctg	cac	ccg	gaa	ggt	tcg	tcg	atg	gcc	gtc	1728
Val	Thr	Val	Glu	Thr	Ser	Leu	His	Pro	Glu	Gly	Ser	Ser	Met	Ala	Val	
				565					570					575		
ctg	tac	cac	agc	gaa	tgg	agc	gac	gac	cag	ctg	cgt	cag	ccg	ccg	tcg	1776
Leu	Tyr	His	Ser	Glu	Trp	Ser	Asp	Asp	Gln	Leu	Arg	Gln	Pro	Pro	Ser	
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gct	cag	acc	gtg	cct	gtc	gag	tat	ggc	cac	ggt	cgc	gcc	acg	gtg	cgc	1824
Ala	Gln	Thr	Val	Pro	Val	Glu	Tyr	Gly	His	Gly	Arg	Ala	Thr	Val	Arg	
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atc	gac	ctg	ccc	ccc	tgc	ggc	atg	gtg	att	ctg	agc	tga				1863
Ile	Asp	Leu	Pro	Pro	Cys	Gly	Met	Val	Ile	Leu	Ser					
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<210> 146

<211> 620

<212> PRT

<213> Gloeobacter violaceus PCC 7421

<400> 146

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			20					25					30			
Asp	Gln	Phe	Leu	Tyr	Gln	Leu	Leu	Pro	Asp	Arg	Phe	Ser	Asp	Gly	Arg	
		35					40					45				
Glu	Ala	Asp	Arg	Pro	Leu	Phe	Asp	Pro	Ala	Asp	Pro	Ala	Arg	Phe	Gln	
	50					55					60					
Val	Lys	Asp	Arg	Gly	Ala	Trp	Met	Ala	Ala	Gly	Lys	Arg	Phe	Val	Gly	
65				70						75					80	
Gly	Thr	Leu	Lys	Gly	Val	Ile	Ser	Lys	Leu	Asp	Tyr	Leu	Gln	Gly	Leu	
				85					90					95		
Gly	Val	Thr	Thr	Leu	Trp	Leu	Asn	Pro	Pro	Trp	Lys	Gln	Arg	Ala	Asp	
			100					105					110			
Leu	Glu	Thr	Tyr	His	Gly	Tyr	Gly	Ile	Gln	Asn	Phe	Phe	Asp	Ile	Asp	
		115					120					125				
Pro	Arg	Phe	Gly	Thr	Arg	Gln	Asp	Leu	Arg	Asp	Leu	Val	Asp	Ala	Ala	
	130					135					140					
His	Ala	Arg	Gly	Leu	Tyr	Val	Ile	Leu	Asp	Val	Ile	Tyr	Asn	His	Ser	
145				150						155					160	
Gly	Asn	Asn	Trp	Phe	Tyr	Arg	Asp	Glu	Trp	Asp	Gly	Ser	Pro	Gln	Ser	
			165						170					175		
Met	Arg	Pro	Tyr	Arg	Tyr	Ala	Pro	Gly	Tyr	Pro	Val	His	Gly	Trp	Arg	
			180					185					190			
Ser	Gly	Asp	Gly	Arg	Ser	Val	Gly	Glu	Ile	Val	Ser	Leu	Asp	Asp	Gly	
		195					200					205				
Val	Trp	Pro	Glu	Glu	Phe	Gln	Asn	Phe	Asp	Trp	Tyr	Thr	Arg	Ala	Gly	
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Arg	Ile	Ile	Asn	Trp	Ser	Glu	Ala	Ala	Trp	Glu	Asp	Tyr	Leu	Ser	Pro	
225				230						235					240	
Gln	Val	Glu	Phe	Arg	Arg	Gly	Asp	Phe	Phe	Asp	Leu	Lys	Asp	Phe	Asn	
			245						250					255		
Leu	Ala	Asn	Pro	Ala	Thr	Ile	Ala	Gly	Leu	Ala	Arg	Val	Tyr	Gln	Tyr	
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Trp	Ile	Ala	Leu	Ser	Asp	Cys	Asp	Gly	Phe	Arg	Val	Asp	Ala	Val	Lys	
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His	Val	Ser	Pro	Val	Glu	Ser	Arg	Lys	Phe	Cys	Ala	Ala	Ile	Asn	Glu	
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Tyr	Ala	Gln	Ser	Ile	Gly	Lys	Asp	Asn	Phe	Leu	Thr	Gly	Glu	Leu		
305				310						315				320		
Thr	Asp	Asp	Arg	Met	Leu	Leu	Ala	Tyr	Leu	Asp	Ile	Val	Gly	Arg	Asn	

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325 330 335
 Leu Asp Ala Ala Leu Asp Ile Val Ser Ala Pro Ile Gln Leu Thr Ala
 340 345 350
 Ala Ala Lys Gly Leu Ala His Pro Gly Ala Phe Phe Gly Leu Tyr Asp
 355 360 365
 Glu Asn Thr Leu Ala Gly Ala Tyr Arg Gln Ser Gly Leu Tyr His Val
 370 375 380
 Ser Val Leu Asp Asp His Asp Met Ser Ser Arg Ser Tyr Lys Ser Arg
 385 390 395 400
 Phe Ala Ala His Gly Glu Gly Val Pro Asn Leu Tyr Arg Gln Val Ala
 405 410 415
 His Ala Val Gly Val Gln Leu Thr Met Pro Gly Ile Pro Ser Ile Tyr
 420 425 430
 Tyr Gly Thr Glu Gln Ala Leu Asp Gly Ser Glu Ser Asn His Asp Tyr
 435 440 445
 Gly Ile Asp Gly Ser His Glu Tyr Val Asp Arg Tyr Val Arg Glu Ala
 450 455 460
 Met Phe Gly Gly Ala Phe Gly Ala Phe Arg Thr Glu Gly Cys His Phe
 465 470 475 480
 Phe Asn Pro Asp His Pro Thr Tyr Leu Arg Ile Ala Ala Ile Ala Arg
 485 490 495
 Leu Arg Asn Arg Leu Asp Ala Val Gly Lys Thr Leu Arg Arg Gly His
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 His Tyr Leu Arg Glu Thr Ser Phe Val His Arg Pro Phe Val Leu Pro
 515 520 525
 Gly Ala Gly Glu Leu Val Ala Trp Ser Gln Ile Leu Phe Glu Thr Glu
 530 535 540
 Ala Leu Met Val Leu Asn Thr His Gly Leu Glu Asn Arg Gly Ala Glu
 545 550 555 560
 Val Thr Val Glu Thr Ser Leu His Pro Glu Gly Ser Ser Met Ala Val
 565 570 575
 Leu Tyr His Ser Glu Trp Ser Asp Asp Gln Leu Arg Gln Pro Pro Ser
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<211> 1443

<212> DNA

<213> Gloeobacter violaceus PCC 7421

<220>

<221> CDS

<222> (1)..(1443)

<223> transl_table=11

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Ile	Phe	Pro	Asp	Arg	Phe	Ser	Arg	Thr	Gln	Gln	Leu	Lys	Gln	Lys	Leu	
			20				25						30			
ttg	cag	gcg	gtc	tcc	ttc	gag	gat	tgg	gca	gcc	gcc	ccg	acc	ctc	tac	144
Leu	Gln	Ala	Val	Ser	Phe	Glu	Asp	Trp	Ala	Ala	Ala	Pro	Thr	Leu	Tyr	
		35				40					45					
ggc	tat	aaa	ggc	ggc	gat	ctg	tgg	ggg	gta	atc	gaa	aga	ctc	gat	tac	192
Gly	Tyr	Lys	Gly	Gly	Asp	Leu	Trp	Gly	Val	Ile	Glu	Arg	Leu	Asp	Tyr	
	50				55				60							
ctg	tcg	gat	ttg	ggc	atc	aac	gcc	atc	tat	ttc	act	ccg	ata	ttt	caa	240
Leu	Ser	Asp	Leu	Gly	Ile	Asn	Ala	Ile	Tyr	Phe	Thr	Pro	Ile	Phe	Gln	
	65			70					75					80		
tcg	gcg	agt	aac	cac	cgc	tac	cat	acc	cac	gat	tac	tat	aga	gtc	gat	288
Ser	Ala	Ser	Asn	His	Arg	Tyr	His	Thr	His	Asp	Tyr	Tyr	Arg	Val	Asp	
			85					90					95			
ccg	ctg	ctg	gga	gga	aac	gag	gcg	ttc	aag	gca	ttg	ctc	gat	gcc	gcc	336
Pro	Leu	Leu	Gly	Gly	Asn	Glu	Ala	Phe	Lys	Ala	Leu	Leu	Asp	Ala	Ala	

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			100					105				110							
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His	Ala	Arg	Asp	Ile	Lys	Val	Val	Leu	Asp	Gly	Val	Phe	Asn	His	Ala				384
		115					120					125							
agc	cg	gg	ttt	ttc	ttc	ttc	cac	gac	atc	ctt	gaa	aat	ggg	caa	ctc				432
Ser	Arg	Gly	Phe	Phe	Phe	Phe	His	Asp	Ile	Leu	Glu	Asn	Gly	Gln	Leu				
	130					135					140								
tcc	ccg	tgg	ctc	gac	tgg	aag	atc	gaa	ggc	tgg	ccc	ctc	tcg	ccc					480
Ser	Pro	Trp	Leu	Asp	Trp	Phe	Lys	Ile	Glu	Gly	Trp	Pro	Leu	Ser	Pro				
145					150				155					160					
tac	aat	gtc	gag	cag	ccc	gcc	aac	tat	gcc	tgc	tgg	gac	aac	aac	cgt				528
Tyr	Asn	Val	Glu	Gln	Pro	Ala	Asn	Tyr	Ala	Cys	Trp	Asp	Asn	Asn	Arg				
			165					170					175						
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Ala	Leu	Pro	Gln	Phe	Asn	His	Ala	Asn	Pro	Met	Val	Arg	Glu	Tyr	Ile				
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atg	gag	att	gcc	gaa	tac	tgg	atc	aaa	gcg	ggg	atc	gac	ggc	tgg	cg				624
Met	Glu	Ile	Ala	Glu	Tyr	Trp	Ile	Lys	Ala	Gly	Ile	Asp	Gly	Trp	Arg				
		195					200					205							
ctc	gat	gtg	ccc	gcc	tgt	gta	gag	gcg	gaa	ggg	ttc	tgg	cag	gaa	ttt				672
Leu	Asp	Val	Pro	Ala	Cys	Val	Glu	Ala	Glu	Gly	Phe	Trp	Gln	Glu	Phe				
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cg	gag	cg	gtc	aag	gca	atc	aat	cct	gaa	gcc	tac	atc	gtc	ggc	gaa				720
Arg	Glu	Arg	Val	Lys	Ala	Ile	Asn	Pro	Glu	Ala	Tyr	Ile	Val	Gly	Glu				
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Ile	Trp	Glu	Asp	Ala	Arg	Gln	Trp	Leu	Asp	Gly	Thr	Gln	Phe	Asp	Gly				
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Asp	Arg	Val	Gln	Val	Gln	Tyr	Val	Gln	Asp	Arg	Ser	Tyr	Arg	Pro	Tyr				
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Ser	Ile	Tyr	Tyr	Gly	Asp	Glu	Val	Gly	Leu	Pro	Gly	Gly	Ile	Asp	Pro				
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gat	tcg	cg	cag	ggg	ttt	cct	ccc	gaa	tcg	cag	tgg	aac	ggc	gaa	ctg				1152
Asp	Ser	Arg	Gln	Gly	Phe	Pro	Pro	Glu	Ser	Gln	Trp	Asn	Gly	Glu	Leu				
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Ala	Gly	Thr	Glu	Pro	Ala	Arg	Val	Thr	Leu	Glu	Ala	Pro	Gly	Glu	Thr				
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Tyr	Pro	Arg	Lys	Val	Leu	Phe	Gly	Pro	Gly	Gln	Val	Glu	Ala	Ala	Glu				
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1443

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Ile Trp Glu Asp Ala Arg Gln Trp Leu Asp Gly Thr Gln Phe Asp Gly
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Val Met Asn Tyr Leu Phe Ala Ala Pro Thr Ile Ala Phe Thr Ala Gly
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Asp Arg Val Gln Val Gln Tyr Val Gln Asp Arg Ser Tyr Arg Pro Tyr
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Asp Ser Arg Gln Gly Phe Pro Pro Glu Ser Gln Trp Asn Gly Glu Leu
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Leu Ala Leu His Arg Asp Leu Ile Ala Leu Arg His Arg His Glu Ala
385      390      395      400
Leu Arg Ile Gly Lys Tyr Lys Ser Val Tyr Ala Ser Gly Gln Cys Tyr
      405      410      415
Val Phe Glu Arg Arg Leu Glu Ala Glu Val Leu Leu Val Ala Val Asn
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Ala Gly Thr Glu Pro Ala Arg Val Thr Leu Glu Ala Pro Gly Glu Thr
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Tyr Pro Arg Lys Val Leu Phe Gly Pro Gly Gln Val Glu Ala Ala Glu
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Arg Ser Phe Cys Asp Ser Asn Asn Asp Gly Ile Gly Asp Leu Asn Gly
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Ile Ile Ser Lys Leu Asp Tyr Leu Lys Thr Leu Gly Val Asn Val Leu
35 40 45
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Trp Leu Ser Pro Val Tyr Lys Ser Pro Met Asp Asn Gly Tyr Asp
50 55 60
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Ile Ser Asp Tyr Gln Asp Ile Ala Ala Glu Phe Gly Thr Met Ala Asp
65 70 75 80
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Met Asp Leu Val Val Asn His Thr Ser Asp Glu His Pro Trp Phe Val
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gaa gct cgt aaa tca aaa gac aac cct tat cgt gac tac tat att tgg 384
Glu Ala Arg Lys Ser Lys Asp Asn Pro Tyr Arg Asp Tyr Tyr Ile Trp
115 120 125
cgt gat gca aaa cca gat ggc agt gtg ccc gat gac caa ggt tcg att 432
Arg Asp Ala Lys Pro Asp Gly Ser Val Pro Asp Gln Gly Ser Ile
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Phe Gly Gly Ser Ala Trp Gln Trp Asp Glu Ala Thr Gln Gln Tyr Tyr
145 150 155 160
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Phe His Leu Phe Ser Lys Arg Gln Pro Asp Leu Asn Trp Glu Asn Pro
165 170 175
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Lys Val Gln Gln Glu Val His Lys Met Met Asn Trp Trp Ile Asp Gln
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Gly Ile Gly Gly Phe Arg Leu Asp Val Ile Asp Leu Ile Gly Lys Glu
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Gln Glu Met Asn Arg Ala Thr Phe Gly Asp Lys Asp Leu Leu Thr Val
225 230 235 240
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Gly Glu Thr Trp Gly Ala Thr Pro Glu Ile Ala Lys Leu Tyr Ser Asp
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cct gag cgt cat gaa ctc tcc atg gtg ttc caa ttt gag cac atc acg 816
Pro Glu Arg His Glu Leu Ser Met Val Phe Gln Phe Glu His Ile Thr
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Leu Thr Trp Gln His Gly Asp Lys Trp Asn Pro Ile Pro Leu Asp Leu
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<213> Vibrio vulnificus YJ016

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Phe	His	Leu	Phe	Ser	Lys	Arg	Gln	Pro	Asp	Leu	Asn	Trp	Glu	Asn	Pro
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Asp Thr Gly Val Asp Gly Phe Arg Leu Asp Ala Ile Pro Tyr Leu Cys
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Glu Arg Asp Gly Thr Asn Asn Glu Asn Leu Pro Glu Thr His Ala Val
225      230      235      240
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Gly Asp Gly Asp Glu Cys His Met Ala Tyr His Phe Pro Leu Met Pro
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Phe Leu Arg Asn His Asp Glu Leu Thr Leu Glu Met Val Thr Asp Val
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Arg	Ala	Val	Glu	Thr	Glu	Gln	Ser	Asn	745	Ser	Thr	Ala	Leu	Val	Asp	Gly	720	735
Asp	Tyr	Val	Val	Lys	Leu	Tyr	Arg	760	Arg	Leu	Gln	Ile	Gly	765	Ile	Asn	Pro	745
Glu	Leu	770	Glu	Met	Gly	Arg	Phe	775	Thr	Glu	Val	Ala	780	Gly	Tyr	Ala	Asn	760
Thr	Pro	Ala	Leu	Leu	Gly	Ser	Val	Glu	Leu	Ile	795	Glu	Gly	Asp	Lys	Thr	800	775
Ser	Ala	Val	Ala	Val	805	His	Glu	Phe	Ala	810	Arg	Asn	Gln	Gly	Asp	815	Gly	785
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Tyr	Leu	His	Phe	Met	Gln	Gln	855	Thr	Gly	Lys	Arg	Val	860	Ala	Glu	Met	His	835
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Ala	Asp	Arg	Met	Leu	Asp	Glu	Leu	Arg	905	Arg	Arg	Arg	Asp	Thr	910	Leu	Lys	880
Glu	Gly	Asp	915	Arg	Thr	Leu	Val	Asp	920	Glu	Leu	Leu	Ala	Ala	925	Arg	Asp	905
Leu	Met	Ser	Arg	Ile	His	Gly	935	Leu	Leu	Gly	Asp	Asp	940	Gly	Gly	Leu	Asn	920
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Asp	Glu	Arg	Arg	Ala	Lys	Ala	Pro	Ala	985	Ala	Arg	Asp	Val	Ala	990	Gly	Leu	960
Ile	Arg	Ser	995	Ile	Asp	Tyr	Ser	1000	Thr	Ala	Ala	Leu	Glu	1005	Arg	Ala	Leu	975
Lys	Ala	Ala	Ser	Asp	Glu	Pro	Gly	Arg	Leu	Thr	Glu							

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 Gln Ile Tyr Pro Arg Ser Phe Gln Asp Ser Asn Ser Asp Gly Ile Gly
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 Asp Leu Arg Gly Ile Ile Asp Arg Leu Gly Tyr Leu Ser Asp Leu Gly
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 Val Asp Ala Ile Trp Leu Ser Pro Ile Phe Pro Ser Pro Met Ala Asp
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 Phe Gly Tyr Asp Val Ala Asp Tyr Val Gly Ile Asp Pro Ile Phe Gly
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 Thr Met Asp Asp Phe Asp Ala Leu Val Leu Thr Ala His Ala Arg Gly
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 Leu Lys Val Ile Leu Asp Leu Val Pro Asn His Ser Ser Glu Gln His
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 Pro Trp Phe Ile Glu Ser Arg Ser Arg His Asn Pro Lys Arg Asp
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 Trp Tyr Ile Trp Arg Asp Pro Ala Pro Gly Gly Gly Pro Pro Thr Asn
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 Trp Leu Ser Glu Phe Gly Gly Ser Gly Trp Glu Tyr Asp Asp Ala Thr
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 Gly Gln Tyr Tyr Tyr His Ala Phe Leu Lys Gln Gln Pro Asp Leu Asn
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 Trp Arg Asn Pro Glu Val Arg Ala Ala Ile Tyr Asp Ala Met Arg Phe
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 Trp Leu Arg Lys Gly Val Asp Gly Phe Arg Val Asp Val Ile Trp His
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 Arg Pro Gly Met Pro Pro His Ala Ala Leu Ile Pro Ile Tyr Ser Ala
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Ala	Gln	Ser	Ile	Leu	Asn	Leu	Tyr	Arg	Ala	Leu	Leu	Arg	Leu	Arg	Arg	
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Gly	Glu	Leu	Leu	Leu	Tyr	Arg	Arg	His	His	Gln	Gly	Gln	Ser	Ile	Leu	
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Val	Ala	Leu	Asn	Leu	Gly	Pro	Asp	Pro	Ile	Ser	Ala	Ala	Ser	Asp	Ala	
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Ile	Gly	Leu	Asp	Gly	Glu	Val	Leu	Leu	Ser	Thr	Met	Leu	Asp	Arg	Ala	
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Gly	Glu	Arg	Ile	Gly	Ala	Thr	Leu	Asp	Leu	Arg	Gly	Asn	Glu	Gly	Ile	
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Val	Asp	Ala	Ile	Trp	Leu	Ser	Pro	Ile	Phe	Pro	Ser	Pro	Met	Ala	Asp
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Thr	Met	Asp	Asp	Phe	Asp	Ala	Leu	Val	Leu	Thr	Ala	His	Ala	Arg	Gly

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Trp	Tyr	Ile	115	Trp	Arg	Asp	Pro	120	Ala	Pro	Gly	Gly	Gly	Pro	125	Pro	Thr	Asn
Trp	145	Leu	Ser	Glu	Phe	Gly	Gly	Ser	Gly	Trp	Glu	155	Tyr	Asp	Asp	Ala	Thr	160
Gly	Gln	Tyr	Tyr	165	His	Ala	Phe	Leu	Lys	170	Gln	Gln	Pro	Asp	Leu	175	Arg	180
Trp	Arg	Asn	Pro	180	Glu	Val	Arg	Ala	Ala	185	Ile	Tyr	Asp	Ala	Met	190	Arg	Phe
Trp	Leu	Arg	Lys	Gly	Val	Asp	Gly	200	Phe	Arg	Val	Asp	Val	205	Ile	Trp	His	
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Asp	Arg	Pro	Glu	Thr	245	Leu	Glu	Val	Val	Ala	250	Glu	Leu	Arg	Arg	Val	255	Val
Asp	Glu	Phe	Asp	His	Arg	Leu	Leu	Ile	Gly	Glu	Ile	Tyr	Leu	Pro	Val			
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Pro	Phe	Asn	Phe	Ala	Leu	Leu	Ser	Thr	Pro	Trp	Arg	300	Ala	Arg	Glu	Ile		
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Pro	Asn	Trp	Val	Leu	Gly	Asn	His	Asp	Arg	330	Pro	Arg	Val	Ala	Ser	335	Arg	
Val	Gly	Pro	Ala	Gln	Ala	Arg	Val	Ala	Ala	Met	Leu	Leu	Leu	350	Thr	Leu		
Arg	Gly	Thr	Pro	Thr	Met	Tyr	Tyr	Gly	360	Val	Gln	Asp	Glu	Leu	Gly	365	Gln	
Val	Glu	Ile	Ala	Pro	Glu	Asp	375	Val	Gln	Asp	Pro	Phe	380	Glu	Lys	Asn	Val	
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Asp	Ala	Ser	Asp	Gln	Ala	Gly	Phe	Ser	Asp	410	Val	Arg	Pro	Trp	Leu	415	Pro	
Leu	Ala	Pro	Asn	Ala	Thr	Gln	Asp	Asn	Val	Ala	Asn	Leu	Arg	Ala	Asp			
Ala	Gln	Ser	Ile	Leu	Asn	Leu	Tyr	Arg	Ala	Leu	Leu	Arg	445	Leu	Arg	Arg		
Ala	Leu	Pro	Gln	Leu	Ala	Leu	Gly	Ala	Tyr	Gln	Pro	460	Leu	Ala	Ala	Glu		
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Ile	Gly	Leu	Asp	Gly	Glu	Val	Leu	Leu	Ser	Thr	Met	Leu	Asp	Arg	Ala			
Gly	Glu	Arg	Ile	Gly	Ala	Thr	Leu	Asp	Leu	Arg	Gly	Asn	525	Glu	Gly	Ile		
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Asn	Pro	Ser	Tyr	Asn	Thr	Leu	Arg	Glu	Phe	Arg	Glu	Phe	Leu	Arg	Glu	
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gcc	cat	gcc	cgc	cgc	atc	cgg	gtc	atc	acc	gag	ctg	gtc	ctc	aac	cac	336
Ala	His	Ala	Arg	Arg	Ile	Arg	Val	Ile	Thr	Glu	Leu	Val	Leu	Asn	His	
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Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Arg	Ala	Arg	Arg	Ala	Lys	Pro	
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Tyr	Arg	Glu	Thr	Arg	Ile	Ile	Phe	Gln	Asp	Phe	Glu	Thr	Ser	Asn	Trp	
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Pro	Glu	Asp	Ala	Val	Ala	Tyr	Phe	Gly	Glu	Gly	Asp	Glu	Cys	Asn	Met	
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Tyr	Ala	Ser	Asp	Pro	Lys	Ala	Arg	Ile	Asn	Leu	Gly	Ile	Arg	Arg	Arg	
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Ala	Asn	Pro	Gln	Arg	Leu	Phe	Leu	Pro	Val	Ile	Ile	Asp	Pro	Glu	Tyr	
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cac	tac	gaa	gcg	gta	aac	gtg	gac	atc	cag	gag	cgc	aac	ccc	acc	tcg	1344
His	Tyr	Glu	Ala	Val	Asn	Val	Asp	Ile	Gln	Glu	Arg	Asn	Pro	Thr	Ser	
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ctg	ctc	tgg	tgg	atg	cgg	cgc	atc	atc	gcc	gtg	cgc	cgc	cgc	tac	cgg	1392
Leu	Leu	Trp	Trp	Met	Arg	Arg	Ile	Ile	Ala	Val	Arg	Arg	Arg	Tyr	Arg	
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gcc	ttc	agc	cgc	ggc	gcc	atg	gag	atg	ctc	tat	ccg	gcc	aac	cac	aag	1440
Ala	Phe	Ser	Arg	Gly	Ala	Met	Glu	Met	Leu	Tyr	Pro	Ala	Asn	His	Lys	
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gtc	ctg	gcc	ttt	ctc	cgc	cgc	cac	gag	gat	gaa	gtg	atc	ctc	gtg	gtg	1488
Val	Leu	Ala	Phe	Leu	Arg	Arg	His	Glu	Asp	Glu	Val	Ile	Leu	Val	Val	
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gtc	aac	ctc	tcc	cgc	ttc	gcc	cag	gcc	atc	aac	ctg	gac	ctt	cag	gaa	1536
Val	Asn	Leu	Ser	Arg	Phe	Ala	Gln	Ala	Ile	Asn	Leu	Asp	Leu	Gln	Glu	
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ttc	gcc	ggc	ata	tcc	ccc	gaa	gac	ctc	ttc	agc	cgg	aat	cgc	ttc	ccg	1584
Phe	Ala	Gly	Ile	Ser	Pro	Glu	Asp	Leu	Phe	Ser	Arg	Asn	Arg	Phe	Pro	
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Val	Ile	Arg	Glu	Ala	Thr	Tyr	Pro	Leu	Thr	Leu	Gly	Pro	His	Asp	His	
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Phe	Trp	Phe	Leu	Leu	Arg	Arg	Arg	Glu	Ala	Pro	Leu	Gln	Ala	Glu	Glu	
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Glu	Leu	Pro	Arg	Ile	Arg	Leu	Arg	Gly	Glu	Leu	Pro	Trp	Trp	Glu	Thr	
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Leu	Arg	Gln	Thr	Arg	Gly	Asp	Ala	His	Leu	Glu	Arg	Val	Thr	Thr	Asp	
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Tyr	Leu	Lys	Arg	Ser	Gly	Trp	Phe	Arg	Gly	Lys	Ala	Arg	Ala	Ile	Ile	
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Val	Ser	Ala	Glu	Ser	Pro	Arg	Ala	Ala	Ile	Ala	Ala	Leu	Ser	Val	Gly	
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gac	gaa	gag	ggc	att	ctc	tgc	gat	gcg	gtc	cat	gac	cgg	gaa	ttc	agg	2064
Asp	Glu	Glu	Gly	Ile	Leu	Cys	Asp	Ala	Val	His	Asp	Arg	Glu	Phe	Arg	
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gac	gcg	ctc	ctt	gcc	ctg	gca	ctc	ggc	cgt	cgc	cgg	ctc	cat	ggc	gag	2112
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gaa	aac	agt	ctc	atc	gtg	ccg	gtt	cac	gcc	gga	gca	gga	cgc	atc	ggc	2160
Glu	Asn	Ser	Leu	Ile	Val	Pro	Val	His	Ala	Gly	Ala	Gly	Arg	Ile	Gly	
705					710					715					720	
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Ser	Arg	Glu	Glu	Met	Arg	His	Leu	Ala	Ser	Glu	Leu	Pro	Lys	Ala	Glu	
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tac Tyr	cgc Arg	aag Lys 755	gtg Val	gag Glu	ccg Pro	ggc Gly	atc Ile 760	aat Asn	tcc Ser	gag Glu	gtg Val 765	gag Glu	atg Met	gcg Ala	cgg Arg	2304
ttc Phe 770	ctc Leu	acc Thr	gca Ala	aaa Lys	tcg Ser	agc Ser 775	tac Tyr	ccc Pro	aac Asn	gtt Val	gcc Ala 780	ccc Pro	ttc Phe	cag Gln	ggg Gly	2352
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ctc Leu	cag Gln	gga Gly	tac Tyr	gta Val 805	cag Gln	aac Asn	cag Gln	ggc Gly	gac Asp 810	ggc Gly	tgg Trp	cga Arg	ctc Leu	tcc Ser 815	ctc Leu	2448
cac His	ctc Leu	ctg Leu	ggc Gly 820	cag Gln	tac Tyr	ttc Phe	gag Glu	cgg Arg 825	att Ile	ctc Leu	tcg Ser	tgc Cys	cgg Arg 830	ggc Gly	gag Glu	2496
ctg Leu	cca Pro	ccg Pro 835	ccg Pro	ccg Pro	tcg Ser	cgt Arg	ttt Phe 840	tcg Ser	agc Ser	ctc Leu	atg Met	gac Asp 845	ggc Gly	agc Ser	gcc Ala	2544
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ctc Leu	gcc Ala	gcc Ala	ggg Gly	gga Gly 885	aac Asn	gac Asp	ccg Pro	gct Ala	tgg Trp 890	cgg Arg	ccc Pro	gag Glu	gag Glu	tat Tyr 895	tcc Ser	2688
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tggt Trp	tat Tyr	cac His	gtg Val	agc Ser	tgc Cys	cgc Arg	tat Tyr	ctg Leu	gcc Ala	ggc Gly 1050	tac Tyr	ctg Leu	gag Glu	cag Gln	atg Met	3168
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ctc Leu	gcc Ala	aac Asn	cgc Arg	ccc Pro	gaa Glu	cgg Arg	gtt Val 1095	tcc Ser	tct Ser	tac Tyr	ctg Leu	cgc Arg	ggg Gly	gtc Val	gag Glu	3312

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 Ser Pro Leu Arg Asp Asp Gly Tyr Asp Ile Ala Asp Tyr Tyr Asn Val
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 Ala His Ala Arg Ile Arg Val Ile Thr Glu Leu Val Leu Asn His
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 Thr Ser Asp Gln His Pro Trp Phe Gln Arg Ala Arg Arg Ala Lys Pro
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 Gly Ser Val His Arg Asp Tyr Tyr Val Trp Ser Asp Thr Pro Asp Arg
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 Tyr Arg Glu Thr Arg Ile Phe Gln Asp Phe Glu Thr Ser Asn Trp
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 Ser Trp Asp Pro Val Ala Lys Ala Tyr Tyr Trp His Arg Phe Tyr Ser
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 His Gln Pro Asp Leu Asn Phe Asp Asn Pro Arg Val Gln Ser Glu Val
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 Pro Glu Asp Ala Val Ala Tyr Phe Gly Glu Gly Asp Glu Cys Asn Met
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 Leu Phe His Phe Pro Leu Met Pro Arg Met Tyr Met Ala Ile Glu Met
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 Pro Glu Gly Cys Gln Trp Ala Ile Phe Leu Arg Asn His Asp Glu Leu
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 Ala Leu Phe Ser Leu Pro Gly Thr Pro Val Ile Tyr Tyr Gly Asp
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 His Tyr Glu Ala Val Asn Val Asp Ile Gln Glu Arg Asn Pro Thr Ser
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 Leu Leu Trp Trp Met Arg Arg Ile Ile Ala Val Arg Arg Tyr Arg
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 Seite 240

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Phe	Trp	Phe	Leu	Leu	Arg	Arg	Arg	Glu	Ala	Pro	Leu	Gln	Ala	Glu	Glu				
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Tyr	Leu	Lys	Arg	Ser	Gly	Trp	Phe	Arg	Gly	Lys	Ala	Arg	Ala	Ile	Ile				
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Phe	Pro	Ile	Phe	Phe	Leu	Glu	Val	Arg	Tyr	Gln	Asp	Gly	Pro	Pro	Glu				
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Val	Ser	Ala	Glu	Ser	Pro	Arg	Ala	Ala	Ile	Ala	Ala	Leu	Ser	Val	Gly				
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Asp	Glu	Glu	Gly	Ile	Leu	Cys	Asp	Ala	Val	His	Asp	Arg	Glu	Phe	Arg				
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Gln	Thr	Asn	Ser	Ile	Ile	Thr	Tyr	Gly	Asp	Arg	His	Val	Leu	Lys	Leu				
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Leu	Gln	Gly	Tyr	Val	Gln	Asn	Gln	Gly	Asp	Gly	Trp	Arg	Leu	Ser	Leu				
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His	Leu	Leu	Gly	Gln	Tyr	Phe	Glu	Arg	Ile	Leu	Ser	Cys	Arg	Gly	Glu				
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Cys	Thr	Val	Pro	Glu	Pro	Ala	Ala	Glu	Leu	Ile	Gly	Gly	Phe	Tyr	Leu				
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Glu	Met	Ala	Gly	Leu	Leu	Gly	Arg	Arg	Thr	Ala	Glu	Leu	His	Leu	Ala				
865					870					875					880				
Leu	Ala	Ala	Gly	Gly	Asn	Asp	Pro	Ala	Trp	Arg	Pro	Glu	Glu	Tyr	Ser				
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Thr	Leu	Tyr	Gln	Arg	Ser	Val	Tyr	Gln	Ser	Met	Arg	Asn	Gln	Ala	Arg				
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Arg	Ser	Leu	Gln	Leu	Leu	Ala	Gln	His	His	Lys	Asp	Leu	Pro	Ala	Glu				
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Ala	Cys	Leu	Arg	Pro	Ile	Val	Gly	Arg	Arg	Ile	Gln	Ala	Met	Lys	Ser				
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Asp	Phe	Met	Ile	Ile	Asp	Leu	Glu	Gly	Glu	Pro	Asp	Arg	Pro	Leu	Gly				
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Glu	Arg	Arg	Ile	Lys	Arg	Ser	Pro	Leu	Arg	Asp	Val	Ala	Gly	Met	Ile				
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 Gly Thr Ser Pro Leu Val Pro Thr Glu Arg Ser Asp Leu Glu Thr Leu
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 Leu Arg Ser Phe Leu Leu Asp Asn Ala Leu His Glu Leu Gly Tyr Ala
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Trp Gln Val Tyr Pro Leu Gly Phe Val Gly Ala Tyr Pro Leu Pro Gln	
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Asp Trp Phe Asp His Ala Ile Glu Leu Gly Ala Ser Gly Ile Ala Leu	
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Gly Pro Ile Phe Ala Ser Arg Thr His Gly Tyr Asp Thr Thr Asp His	
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Tyr Arg Ile Asp Pro Arg Leu Gly Asp Thr Asp Phe Asp His Leu	
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Phe Asn His Val Gly Val Asp Phe Pro Arg Tyr Arg Ala Ala Ile Asp	
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Phe His Thr Phe Glu Gly His Asp Gly Leu Ile Thr Leu Asn His Asp	
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Asn Pro Glu Val Val Asp Tyr Thr Val Asp Val Met Ala His Trp Leu	
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Gly Arg Gly Ala Asp Gly Trp Arg Leu Asp Ala Ala Tyr Ala Val Pro	
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Glu Thr Phe Trp Ala Ala Thr Leu Pro Arg Val Arg Asp Arg Tyr Pro	
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Gln Ala Trp Phe Val Gly Glu Leu Ile His Gly Asp Tyr Ala Ala Val	
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Val Arg Ala Ala Gly Phe Asp Ser Ala Thr Gln Tyr Glu Leu Trp Lys	
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Arg Ser Gly Asp Glu Ala 390 Leu Leu Ile Val Leu 395 Asn Ile Gly Asp Glu	
ccg ctg cgg gtt tcg ctc cgc gag ctg ggc ggc cgg cgc ggg cgg gtg	1248
Pro Leu Arg Val Ser 405 Leu Arg Glu Leu 410 Gly Gly Arg Arg Gly Arg Val	
atc ggc ggc tcg gcg gcc cca ccg ccg gag gtg ctc gac acg gtg gtc	1296
Ile Gly Gly Ser 420 Ala Ala Pro Pro 425 Glu Val Leu Asp Thr 430 Val Val	
gtc gag ccg cag ggc tgg cgg atc ctg agc ccg att tag	1335
Val Glu Pro Gln Gly Trp Arg Ile 440 Leu Ser Pro Ile	

<210> 158

<211> 444

<212> PRT

<213> Mycobacterium avium subsp. paratuberculosis str. k10

<400> 158

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Ser Ser Glu Pro Pro Gln Pro Glu Gln His Arg Leu Arg Arg Leu Val	
35 40 45	
Asp Trp Phe Asp His Ala Ile Glu Leu Gly Ala Ser Gly Ile Ala Leu	
50 55 60	
Gly Pro Ile Phe Ala Ser Arg Thr His Gly Tyr Asp Thr Thr Asp His	
65 70 75 80	
Tyr Arg Ile Asp Pro Arg Leu Gly Asp Asp Thr Asp Phe Asp His Leu	
85 90 95	
Ile Ala Gln Ala His Arg Arg Gly Leu Arg Val Leu Leu Asp Gly Val	
100 105 110	
Phe Asn His Val Gly Val Asp Phe Pro Arg Tyr Arg Ala Ala Ile Asp	
115 120 125	
Ser Asp Asp His Ala Ala Ala Arg Trp Phe Arg Gly Ser Arg Gly Arg	
130 135 140	
Phe His Thr Phe Glu Gly His Asp Gly Leu Ile Thr Leu Asn His Asp	
145 150 155 160	
Asn Pro Glu Val Val Asp Tyr Thr Val Asp Val Met Ala His Trp Leu	
165 170 175	
Gly Arg Gly Ala Asp Gly Trp Arg Leu Asp Ala Ala Tyr Ala Val Pro	

			180					185					190		
Glu	Thr	Phe	Trp	Ala	Ala	Thr	Leu	Pro	Arg	Val	Arg	Asp	Arg	Tyr	Pro
		195					200					205			
Gln	Ala	Trp	Phe	Val	Gly	Glu	Leu	Ile	His	Gly	Asp	Tyr	Ala	Ala	Val
		210				215					220				
Val	Arg	Ala	Ala	Gly	Phe	Asp	Ser	Ala	Thr	Gln	Tyr	Glu	Leu	Trp	Lys
225					230					235					240
Ala	Ile	Trp	Ser	Ser	Leu	Asn	Asp	Gly	Asn	Phe	Tyr	Glu	Leu	Asp	Trp
			245						250					255	
Ala	Leu	Gln	Arg	His	Asn	Ala	Phe	Leu	Gly	Arg	Phe	Ser	Pro	Leu	Thr
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Phe	Ile	Gly	Asn	His	Asp	Val	Thr	Arg	Ile	Ala	Ser	Gln	Leu	Asn	Asn
		275					280					285			
Pro	Ala	His	Leu	Ala	His	Ala	Leu	Val	Leu	Leu	Leu	Thr	Val	Gly	Gly
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Val	Pro	Ser	Val	Tyr	Ala	Gly	Asp	Glu	Leu	Gly	Phe	Arg	Gly	Val	Lys
305					310					315					320
Glu	Glu	Arg	Phe	Gly	Gly	Asp	Asp	Ala	Val	Arg	Pro	Glu	Phe	Gly	Ser
			325					330						335	
Pro	Pro	Ile	Pro	Leu	Asp	Asp	Phe	Gly	Thr	Glu	Val	Trp	Arg	Leu	His
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Gln	Tyr	Leu	Ile	Gly	Leu	Arg	Arg	Arg	His	Pro	Trp	Leu	His	Gly	Ala
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Thr	Thr	Thr	Ala	Leu	Leu	Leu	Gln	Asn	Arg	His	Tyr	Val	Tyr	Glu	Thr
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Arg	Ser	Gly	Asp	Glu	Ala	Leu	Leu	Ile	Val	Leu	Asn	Ile	Gly	Asp	Glu
385					390					395					400
Pro	Leu	Arg	Val	Ser	Leu	Arg	Glu	Leu	Gly	Gly	Arg	Arg	Gly	Arg	Val
			405						410				415		
Ile	Gly	Gly	Ser	Ala	Ala	Pro	Pro	Pro	Glu	Val	Leu	Asp	Thr	Val	Val
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Val	Glu	Pro	Gln	Gly	Trp	Arg	Ile	Leu	Ser	Pro	Ile				
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<213> Mycobacterium avium subsp. paratuberculosis str. k10

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<223> trans1_table=11
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His	Val	Gln	Asp	Gly	Val	Val	Glu	His	Pro	Glu	Ala	Glu	Asp	Phe	Asp
			20					25					30		
aac	gcc	gcc	gcg	ctg	ccc	acc	gac	ccg	acg	tgg	ttc	aag	cac	gcc	gtg
Asn	Ala	Ala	Ala	Leu	Pro	Thr	Asp	Pro	Thr	Trp	Phe	Lys	His	Ala	Val
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ttc	tac	gag	gtg	ctg	gtc	cgc	gcg	ttc	ttc	gac	gcc	aac	gcc	gac	ggc
Phe	Tyr	Glu	Val	Leu	Val	Arg	Ala	Phe	Phe	Asp	Ala	Asn	Ala	Asp	Gly
	50					55					60				
gcc	ggc	gac	ctg	cgc	ggt	ctg	ctg	gcg	cag	ctg	gac	tac	ctg	cag	tgg
Ala	Gly	Asp	Leu	Arg	Gly	Leu	Leu	Ala	Gln	Leu	Asp	Tyr	Leu	Gln	Trp
65					70				75						80
ctg	ggc	atc	gac	tgc	atc	tgg	ctg	ccc	ccg	ttc	tac	gac	tcg	ccg	ctg
Leu	Gly	Ile	Asp	Cys	Ile	Trp	Leu	Pro	Pro	Phe	Tyr	Asp	Ser	Pro	Leu
				85					90					95	
cgc	gac	ggc	ggt	tac	gac	atc	cgg	gat	ttc	tac	aag	gtg	ctg	ccg	gag
Arg	Asp	Gly	Gly	Tyr	Asp	Ile	Arg	Asp	Phe	Tyr	Lys	Val	Leu	Pro	Glu
			100					105					110		
ttc	ggc	acg	gtc	gag	gat	ttc	gtg	gcg	ctg	ctc	aac	gcc	gcg	cac	gag
Phe	Gly	Thr	Val	Glu	Asp	Phe	Val	Ala	Leu	Leu	Asn	Ala	Ala	His	Glu
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tcg Ser 145	cac His	ccc Pro	tgg Trp	ttc Phe	cag Gln 150	gag Glu	tcc Ser	cgg Arg	cac His 155	gac Asp 155	ccc Pro	gac Asp	gga Gly	ccg Pro	tac Tyr 160	480
ggc Gly	gac Asp	ttc Phe	tac Tyr	gtg Val 165	tgg Trp	agc Ser	gac Asp	acc Thr	agc Ser 170	gac Asp	cgc Arg	tac Tyr	gcc Ala 175	gat Asp 175	gcc Ala	528
cgc Arg	atc Ile	atc Ile	ttc Phe 180	gtc Val	gac Asp	acc Thr	gag Glu	gag Glu 185	tcc Ser	aac Asn	tgg Trp	acg Thr	ttc Phe 190	gac Asp	ccg Pro	576
gtg Val	cgc Arg	cgc Arg 195	cag Gln	ttt Phe	tac Tyr	tgg Trp	cac His 200	cgg Arg	ttc Phe	ttc Phe	tcc Ser	cac His 205	cag Gln	ccc Pro	gac Asp	624
ctg Leu	aac Asn 210	tac Tyr	gac Asp	aac Asn	ccg Pro	gcc Ala 215	gtg Val	cag Gln	gaa Glu	gcc Ala 220	atg Met 220	atc Ile	gac Asp	gtg Val	atc Ile	672
cgg Arg 225	ttc Phe	tgg Trp	ctc Leu	ggg Gly 230	ctg Leu	gga Gly	atc Ile	gac Asp	ggg Gly	ttc Phe 235	cgg Arg	ctg Leu	gac Asp	gcg Ala	gtg Val 240	720
ccc Pro	tac Tyr	ctg Leu	ttc Phe	gag Glu 245	cgg Arg	gag Glu	ggc Gly	acc Thr	aac Asn 250	tgc Cys	gag Glu	aac Asn	ctg Leu	ccg Pro 255	gag Glu	768
acg Thr	cac His	gcc Ala	ttc Phe 260	ctc Leu	aag Lys	cgg Arg	gtc Val	cgc Arg 265	aag Lys	gtc Val	gtc Val	gac Asp	gac Asp 270	gag Glu	ttc Phe	816
ccg Pro	ggc Gly	cgg Arg 275	gtg Val	ttg Leu	ctg Leu	gcc Ala	gag Glu 280	gcc Ala	aac Asn	cag Gln	tgg Trp	ccg Pro 285	gcc Ala	gac Asp	gtg Val	864
gtc Val	gag Glu 290	tat Tyr	ttc Phe	ggc Gly	gac Asp	ccc Pro 295	agc Ser	acc Thr	ggc Gly	ggc Gly	gac Asp 300	gaa Glu	tgc Cys	cac His	atg Met	912
gcg Ala 305	ttc Phe	cac His	ttc Phe	ccg Pro	ctg Leu 310	atg Met	ccg Pro	cgc Arg	atc Ile	ttc Phe 315	atg Met	gcc Ala	gtg Val	cgc Arg	cgc Arg 320	960
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ccc Pro	gag Glu	atg Met	gcg Ala 340	cag Gln	tgg Trp	ggg Gly	atc Ile	ttc Phe 345	ctg Leu	cgc Arg	aac Asn	cac His	gac Asp 350	gag Glu	ttg Leu	1056
acg Thr	ctg Leu	gag Glu 355	atg Met	gtc Val	acc Thr	gac Asp	gaa Glu 360	gag Glu	cgc Arg	gac Asp	tac Tyr	atg Met 365	tac Tyr	gcc Ala	gag Glu	1104
tac Tyr	gcc Ala 370	aag Lys	gat Asp	ccg Pro	cgg Arg	atg Met 375	aag Lys	gcc Ala	aac Asn	gtc Val	ggc Gly 380	atc Ile	cgc Arg	cgc Arg	cgg Arg	1152
ctg Leu 385	gcg Ala	ccg Pro	ctg Leu	ctg Leu	gac Asp 390	aac Asn	gac Asp	cgc Arg	aac Asn	cag Gln 395	atc Ile	gag Glu	ctg Leu	ttc Phe	acc Thr 400	1200
gcc Ala	ctg Leu	ctg Leu	ctg Leu	tcc Ser 405	ctg Leu	ccc Pro	ggc Gly	tcg Ser	ccg Pro 410	gtg Val	ctc Leu	tac Tyr	tac Tyr	ggc Gly 415	gac Asp	1248
gag Glu	atc Ile	ggc Gly	atg Met 420	ggc Gly	gac Asp	gtg Val	atc Ile	tgg Trp 425	ctg Leu	ggg Gly	gat Asp	cgc Arg	gac Asp 430	ggg Gly	gtg Val	1296
cgc Arg	acg Thr 435	ccg Pro	atg Met	cag Gln	tgg Trp	acg Thr	ccg Pro 440	gac Asp	cgc Arg	aac Asn	gcc Ala 445	ggc Gly	ttc Phe	tcc Ser	aag Lys	1344
gcc Ala	aac Asn 450	ccc Pro	ggc Gly	cgg Arg	ctg Leu	tat Tyr 455	ctg Leu	cca Pro	ccc Pro	agc Ser	cag Gln 460	gac Asp	ccg Pro	gtg Val	tac Tyr	1392
ggc Gly 465	tac Tyr	cag Gln	gcg Ala	gtc Val	aac Asn 470	gtg Val	gag Glu	gcg Ala	caa Gln	cgc Arg 475	gac Asp	acc Thr	tcg Ser	acg Thr	tcg Ser 480	1440
ctg Leu	ctc Leu	aac Asn	ttc Phe	acc Thr 485	cgc Arg	acc Thr	atg Met	ctc Leu	gcc Ala 490	gtg Val	cgg Arg	cgc Arg	cgg Arg	cac His 495	gag Glu	1488

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gtg	ctg	gcg	ttc	gtg	cgg	cag	gtg	tcc	aac	gac	ggg	gac	acc	gtg	ctg	1584
Val	Leu	Ala	Phe	Val	Arg	Gln	Val	Ser	Asn	Asp	Gly	Asp	Thr	Val	Leu	
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tgc	gtc	aac	aac	ctg	tcg	cgg	ttc	ccg	cag	ccg	atc	gag	ctg	aat	ctg	1632
Cys	Val	Asn	Asn	Leu	Ser	Arg	Phe	Pro	Gln	Pro	Ile	Glu	Leu	Asn	Leu	
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cag	cac	tgg	agc	ggg	tgc	atc	ccg	gtc	gag	ctg	acc	ggg	cac	gtg	gaa	1680
Gln	His	Trp	Ser	Gly	Cys	Ile	Pro	Val	Glu	Leu	Thr	Gly	His	Val	Glu	
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ttc	ccc	cg	atc	ggg	cac	ctg	ccc	tac	ctg	acg	ctg	ccg	ggg	cac		1728
Phe	Pro	Arg	Ile	Gly	His	Leu	Pro	Tyr	Leu	Leu	Thr	Leu	Pro	Gly	His	
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ggt	ttc	tat	tgg	ttc	cag	ctg	acc	gca	tgc	gag	gag	gac	aca	tga		1773
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<210> 160

<211> 590

<212> PRT

<213> Mycobacterium avium subsp. paratuberculosis str. k10

<400> 160

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Asn	Ala	Ala	Ala	Leu	Pro	Thr	Asp	Pro	Thr	Trp	Phe	Lys	His	Ala	Val	
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Ala	Gly	Asp	Leu	Arg	Gly	Leu	Leu	Ala	Gln	Leu	Asp	Tyr	Leu	Gln	Trp	
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Leu	Gly	Ile	Asp	Cys	Ile	Trp	Leu	Pro	Pro	Phe	Tyr	Asp	Ser	Pro	Leu	
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Arg	Asp	Gly	Gly	Tyr	Asp	Ile	Arg	Asp	Phe	Tyr	Lys	Val	Leu	Pro	Glu	
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Phe	Gly	Thr	Val	Glu	Asp	Phe	Val	Ala	Leu	Leu	Asn	Ala	Ala	His	Glu	
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Arg	Gly	Ile	Arg	Val	Ile	Thr	Asp	Leu	Val	Met	Asn	His	Thr	Ser	Glu	
	130				135						140					
Ser	His	Pro	Trp	Phe	Gln	Glu	Ser	Arg	His	Asp	Pro	Asp	Gly	Pro	Tyr	
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Gly	Asp	Phe	Tyr	Val	Trp	Ser	Asp	Thr	Ser	Asp	Arg	Tyr	Ala	Asp	Ala	
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Arg	Ile	Ile	Phe	Val	Asp	Thr	Glu	Glu	Ser	Asn	Trp	Thr	Phe	Asp	Pro	
			180				185						190			
Val	Arg	Arg	Gln	Phe	Tyr	Trp	His	Arg	Phe	Phe	Ser	His	Gln	Pro	Asp	
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Leu	Asn	Tyr	Asp	Asn	Pro	Ala	Val	Gln	Glu	Ala	Met	Ile	Asp	Val	Ile	
	210					215					220					
Arg	Phe	Trp	Leu	Gly	Leu	Gly	Ile	Asp	Gly	Phe	Arg	Leu	Asp	Ala	Val	
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Pro	Tyr	Leu	Phe	Glu	Arg	Glu	Gly	Thr	Asn	Cys	Glu	Asn	Leu	Pro	Glu	
				245					250					255		
Thr	His	Ala	Phe	Leu	Lys	Arg	Val	Arg	Lys	Val	Val	Asp	Asp	Glu	Phe	
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Pro	Gly	Arg	Val	Leu	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	Ala	Asp	Val	
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Val	Glu	Tyr	Phe	Gly	Asp	Pro	Ser	Thr	Gly	Gly	Asp	Glu	Cys	His	Met	
	290					295					300					
Ala	Phe	His	Phe	Pro	Leu	Met	Pro	Arg	Ile	Phe	Met	Ala	Val	Arg	Arg	
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Glu	Ser	Arg	Phe	Pro	Ile	Ser	Glu	Ile	Leu	Ala	Gln	Thr	Pro	Gln	Ile	
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Pro	Glu	Met	Ala	Gln	Trp	Gly	Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	
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 Tyr Ala Lys Asp Pro Arg Met Lys Ala Asn Val Gly Ile Arg Arg Arg
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 385 390 395 400
 Ala Leu Leu Leu Ser Leu Pro Gly Ser Pro Val Leu Tyr Tyr Gly Asp
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 Glu Ile Gly Met Gly Asp Val Ile Trp Leu Gly Asp Arg Asp Gly Val
 420 425 430
 Arg Thr Pro Met Gln Trp Thr Pro Asp Arg Asn Ala Gly Phe Ser Lys
 435 440 445
 Ala Asn Pro Gly Arg Leu Tyr Leu Pro Pro Ser Gln Asp Pro Val Tyr
 450 455 460
 Gly Tyr Gln Ala Val Asn Val Glu Ala Gln Arg Asp Thr Ser Thr Ser
 465 470 475 480
 Leu Leu Asn Phe Thr Arg Thr Met Leu Ala Val Arg Arg Arg His Glu
 485 490 495
 Ala Phe Ala Ile Gly Thr Phe Glu Glu Leu Gly Gly Ser Asn Pro Ser
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 Val Leu Ala Phe Val Arg Gln Val Ser Asn Asp Gly Asp Thr Val Leu
 515 520 525
 Cys Val Asn Asn Leu Ser Arg Phe Pro Gln Pro Ile Glu Leu Asn Leu
 530 535 540
 Gln His Trp Ser Gly Cys Ile Pro Val Glu Leu Thr Gly His Val Glu
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 565 570 575
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<211> 1725

<212> DNA

<213> Lactobacillus johnsonii NCC 533

<220>

<221> CDS

<222> (1)..(1725)

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Val Ile Asp His Ser His Val Lys Ile Arg Leu His Thr Ala Lys Asp	
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gat gtg gaa aaa gta att gtt cat tac acg gat aac tat ctc cca cca	144
Asp Val Glu Lys Val Ile Val His Tyr Thr Asp Asn Tyr Leu Pro Pro	
35 40 45	
aaa caa gct aaa gaa ctt gaa atg gag aaa ata ggt agt ggt caa gtt	192
Lys Gln Ala Lys Glu Leu Glu Met Glu Lys Ile Gly Ser Gly Gln Val	
50 55 60	
aat gat tac tgg gga gca acc tta act gct cca tat cac cga att aaa	240
Asn Asp Tyr Trp Gly Ala Thr Leu Thr Ala Pro Tyr His Arg Ile Lys	
65 70 75 80	
tat act ttt gaa gtg ata ggc aaa gac gga agt cat gtg atc ttc ggt	288
Tyr Thr Phe Glu Val Ile Gly Lys Asp Gly Ser His Val Ile Phe Gly	
85 90 95	
gat cgt agt att gaa aaa ttt agc gat aaa aag tta aga gaa gat gga	336
Asp Arg Ser Ile Glu Lys Phe Ser Asp Lys Lys Leu Arg Glu Asp Gly	
100 105 110	
atg tat ttt aaa gtt ccg tac ttc cat gat att gat cgc atc aag act	384
Met Tyr Phe Lys Val Pro Tyr Phe His Asp Ile Asp Arg Ile Lys Thr	
115 120 125	
cca aaa tgg ctt aaa gat att gtt tgg tat caa att ttt cca gag cgt	432
Pro Lys Trp Leu Lys Asp Ile Val Trp Tyr Gln Ile Phe Pro Glu Arg	
130 135 140	

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aat Asn	cca Pro	gaa Glu	gat Asp	cat His 165	cca Pro	ggc Gly	aga Arg	gaa Glu	gat Asp 170	ttt Phe	tat Tyr	ggt Gly	gga Gly	gac Asp 175	tta Leu	528
cag Gln	gga Gly	ggt Val	tta Leu 180	gat Asp	cat His	cta Leu	gat Asp 185	cta Leu	cag Gln	aaa Lys	tta Leu	gga Gly 190	ggt Val	acg Thr		576
gga Gly	tta Leu	tat Tyr 195	ttc Phe	tgc Cys	cca Pro	att Ile	ttt Phe 200	aag Lys	gca Ala	agt Ser	tct Ser	aat Asn 205	cat His	aaa Lys	tat Tyr	624
gac Asp	aca Thr 210	att Ile	gat Asp	tat Tyr	tta Leu	caa Gln 215	gta Val	gat Asp	cca Pro	gct Ala	ttt Phe 220	gga Gly	gac Asp	aag Lys	gat Asp	672
ttg Leu 225	ttt Phe	gca Ala	aaa Lys	gta Val 230	ggt Val	aat Asn	gaa Glu	gca Ala	cat His	aag Lys 235	cgt Arg	ggg Gly	atg Met	aaa Lys	gtg Val 240	720
atg Met	ctt Leu	gat Asp	gct Ala	gta Val 245	ttt Phe	aat Asn	cac His	tta Leu	ggt Gly 250	gat Asp	caa Gln	tca Ser	atg Met	cag Gln 255	tgg Trp	768
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cac His	att Ile	aat Asn 275	tca Ser	tat Tyr	cct Pro	ggt Val	gaa Glu 280	cca Pro	tat Tyr	cgg Arg	gac Asp 285	cca Pro	agt Ser	aaa Lys	ggt Gly	864
gaa Glu	aat Asn 290	aat Asn	cca Pro	cca Pro	tat Tyr	gaa Glu 295	act Thr	ttt Phe	gcc Ala	ttc Phe	gaa Glu 300	aaa Lys	cat His	atg Met	cct Pro	912
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gcg Ala	acc Thr	tac Tyr	tgg Trp	gta Val 325	aaa Lys	tat Tyr	ttt Phe	gat Asp	att Ile 330	gat Asp	gct Ala	tgg Trp	cgg Arg	cta Leu 335	gat Asp	1008
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tta Leu	ggt Val	aaa Lys 355	ata Ile	aag Lys	cct Pro	gat Asp	ttt Phe 360	tat Tyr	att Ile	gct Ala	ggg Gly 365	gaa Glu	ata Ile	tgg Trp	cat His	1104
tca Ser	gct Ala 370	cgt Arg	cca Pro	tgg Trp	ctt Leu	cag Gln 375	ggg Gly	gat Asp	caa Gln	ttt Phe 380	aca Thr	ggt Gly	gta Val	atg Met	aat Asn	1152
tat Tyr 385	cca Pro	tat Tyr	act Thr	tta Leu	caa Gln 390	att Ile	gaa Glu	gac Asp	cac His	ttc Phe 395	ttt Phe	aaa Lys	cat His	aaa Lys	atg Met 400	1200
gat Asp	gct Ala	aaa Lys	gac Asp	ctt Leu 405	agt Ser	gaa Glu	cac His	cta Leu	act Thr 410	gat Asp	cag Gln	tta Leu	atg Met	atg Met 415	tat Tyr	1248
cca Pro	gat Asp	atg Met	ggt Val 420	gac Asp	cag Gln	gct Ala	atg Met	atg Met 425	aat Asn	atg Met	ctt Leu	gat Asp	tcc Ser 430	cac His	gat Asp	1296
acg Thr	gct Ala	aga Arg 435	att Ile	tta Leu	act Thr	tta Leu	gca Ala 440	aaa Lys	gac Asp	aat Asn	caa Gln	gat Asp 445	tta Leu	gct Ala	ttg Leu	1344
caa Gln	gca Ala 450	ggt Val	gcg Ala	tat Tyr	gaa Glu	ttt Phe 455	ggt Val	caa Gln	cct Pro	gga Gly	gtg Val 460	cca Pro	tgt Cys	att Ile	tac Tyr	1392
tat Tyr 465	gga Gly	aca Thr	gag Glu	atg Met	ggg Gly 470	atg Met	agc Ser	ggt Gly	gat Asp	aat Asn 475	gat Asp	ccg Pro	gat Asp	tgt Cys	cgt Arg 480	1440
aaa Lys	cca Pro	atg Met	gat Asp	tgg Trp 485	agt Ser	aag Lys	ata Ile	aat Asn	ggt Gly 490	ccg Pro	gta Val	tgg Trp	caa Gln	aga Arg 495	gtt Val	1488
cat His	gaa Glu	tta Leu	gtg Val 500	aaa Lys	ttc Phe	aga Arg	cta Leu	gat Asp 505	cat His	agt Ser	gat Asp	acc Thr	tta Leu 510	aat Asn	aaa Lys	1536

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ggt	act	ggt	aag	tta	acg	gta	aca	gaa	aaa	gga	ctt	cta	aaa	ggt	gaa	1584
Gly	Thr	Val	Lys	Leu	Thr	Val	Thr	Glu	Lys	Gly	Leu	Leu	Lys	Val	Glu	
		515					520					525				
cga	aca	ggc	aaa	gaa	aca	ata	aag	gcc	tac	tat	aat	acc	ggg	aaa	cat	1632
Arg	Thr	Gly	Lys	Glu	Thr	Ile	Lys	Ala	Tyr	Tyr	Asn	Thr	Gly	Lys	His	
	530					535					540					
aat	gta	aaa	att	gat	aaa	aca	gca	gct	ctt	agt	cag	aat	tat	aaa	gcg	1680
Asn	Val	Lys	Ile	Asp	Lys	Thr	Ala	Ala	Leu	Ser	Gln	Asn	Tyr	Lys	Ala	
545					550					555					560	
gga	gtg	tta	gcg	cca	aat	ggc	ttt	ttg	att	gag	ggt	aaa	gct	taa		1725
Gly	Val	Leu	Ala	Pro	Asn	Gly	Phe	Leu	Ile	Glu	Val	Lys	Ala			
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<210> 162

<211> 574

<212> PRT

<213> Lactobacillus johnsonii NCC 533

<400> 162

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Asp	Val	Glu	Lys	Val	Ile	Val	His	Tyr	Thr	Asp	Asn	Tyr	Leu	Pro	Pro	
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Lys	Gln	Ala	Lys	Glu	Leu	Glu	Met	Glu	Lys	Ile	Gly	Ser	Gly	Gln	Val	
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Asn	Asp	Tyr	Trp	Gly	Ala	Thr	Leu	Thr	Ala	Pro	Tyr	His	Arg	Ile	Lys	
65				70					75						80	
Tyr	Thr	Phe	Glu	Val	Ile	Gly	Lys	Asp	Gly	Ser	His	Val	Ile	Phe	Gly	
			85						90					95		
Asp	Arg	Ser	Ile	Glu	Lys	Phe	Ser	Asp	Lys	Lys	Leu	Arg	Glu	Asp	Gly	
			100					105					110			
Met	Tyr	Phe	Lys	Val	Pro	Tyr	Phe	His	Asp	Ile	Asp	Arg	Ile	Lys	Thr	
		115					120					125				
Pro	Lys	Trp	Leu	Lys	Asp	Ile	Val	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	
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Phe	Ala	Asn	Gly	Asp	Lys	Ser	Asn	Asp	Pro	Ala	Asn	Val	Lys	Glu	Trp	
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Asn	Pro	Glu	Asp	His	Pro	Gly	Arg	Glu	Asp	Phe	Tyr	Gly	Gly	Asp	Leu	
			165						170					175		
Gln	Gly	Val	Leu	Asp	His	Leu	Asp	Asp	Leu	Gln	Lys	Leu	Gly	Val	Thr	
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Gly	Leu	Tyr	Phe	Cys	Pro	Ile	Phe	Lys	Ala	Ser	Ser	Asn	His	Lys	Tyr	
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Asp	Thr	Ile	Asp	Tyr	Leu	Gln	Val	Asp	Pro	Ala	Phe	Gly	Asp	Lys	Asp	
	210					215					220					
Leu	Phe	Ala	Lys	Val	Val	Asn	Glu	Ala	His	Lys	Arg	Gly	Met	Lys	Val	
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Met	Leu	Asp	Ala	Val	Phe	Asn	His	Leu	Gly	Asp	Gln	Ser	Met	Gln	Trp	
			245						250					255		
Gln	Asp	Val	Val	Lys	Asn	Gly	Glu	Lys	Ser	Arg	Phe	Lys	Asp	Trp	Phe	
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His	Ile	Asn	Ser	Tyr	Pro	Val	Glu	Pro	Tyr	Arg	Asp	Pro	Ser	Lys	Gly	
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Glu	Asn	Asn	Pro	Pro	Tyr	Glu	Thr	Phe	Ala	Phe	Glu	Lys	His	Met	Pro	
	290					295					300					
Lys	Leu	Asn	Thr	Ala	Asn	Pro	Glu	Val	Gln	Asp	Phe	Leu	Leu	Glu	Ile	
					310					315					320	
Ala	Thr	Tyr	Trp	Val	Lys	Tyr	Phe	Asp	Ile	Asp	Ala	Trp	Arg	Leu	Asp	
			325						330					335		
Val	Ala	Asn	Glu	Val	Asp	His	His	Phe	Trp	Lys	Arg	Phe	His	Asp	Glu	
		340						345					350			
Leu	Val	Lys	Ile	Lys	Pro	Asp	Phe	Tyr	Ile	Ala	Gly	Glu	Ile	Trp	His	
		355					360					365				
Ser	Ala	Arg	Pro	Trp	Leu	Gln	Gly	Asp	Gln	Phe	Thr	Gly	Val	Met	Asn	
	370					375					380					
Tyr	Pro	Tyr	Thr	Leu	Gln	Ile	Glu	Asp	His	Phe	Phe	Lys	His	Lys	Met	
385					390					395					400	

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Asp Ala Lys Asp Leu Ser Glu His Leu Thr Asp Gln Leu Met Met Tyr
 405 410
 Pro Asp Met Val Asp Gln Ala Met Met Asn Met Leu Asp Ser His Asp
 420 425 430
 Thr Ala Arg Ile Leu Thr Leu Ala Lys Asp Asn Gln Asp Leu Ala Leu
 435 440 445
 Gln Ala Val Ala Tyr Glu Phe Val Gln Pro Gly Val Pro Cys Ile Tyr
 450 455 460
 Tyr Gly Thr Glu Met Gly Met Ser Gly Asp Asn Asp Pro Asp Cys Arg
 465 470 475 480
 Lys Pro Met Asp Trp Ser Lys Ile Asn Gly Pro Val Trp Gln Arg Val
 485 490 495
 His Glu Leu Val Lys Phe Arg Leu Asp His Ser Asp Thr Leu Asn Lys
 500 505 510
 Gly Thr Val Lys Leu Thr Val Thr Glu Lys Gly Leu Leu Lys Val Glu
 515 520 525
 Arg Thr Gly Lys Glu Thr Ile Lys Ala Tyr Tyr Asn Thr Gly Lys His
 530 535 540
 Asn Val Lys Ile Asp Lys Thr Ala Ala Leu Ser Gln Asn Tyr Lys Ala
 545 550 555 560
 Gly Val Leu Ala Pro Asn Gly Phe Leu Ile Glu Val Lys Ala
 565 570

<210> 163

<211> 1668

<212> DNA

<213> Lactobacillus johnsonii NCC 533

<220>

<221> CDS

<222> (1)..(1668)

<223> transl_table=11

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Ser Phe Lys Asp Ser Asn Gly Asp Gly Ile Gly Asp Ile Gln Gly Leu	
20 25 30	
ata gaa aag cta gac tat ata aaa aat tta ggt gcc aat gtt atc tgg	144
Ile Glu Lys Leu Asp Tyr Ile Lys Asn Leu Gly Ala Asn Val Ile Trp	
35 40 45	
tta act cca att ttt aaa tct cct tta gta gac aat ggt tat gat att	192
Leu Thr Pro Ile Phe Lys Ser Pro Leu Val Asp Asn Gly Tyr Asp Ile	
50 55 60	
gca gat tat cag gcc att aat cca att tat ggg aca atg gat gat ttt	240
Ala Asp Tyr Gln Ala Ile Asn Pro Ile Tyr Gly Thr Met Asp Asp Phe	
65 70 75 80	
aag aaa tta ttg agt aag gct cat gaa aaa ggg ttg aga att gtc ctg	288
Lys Lys Leu Leu Ser Lys Ala His Glu Lys Gly Leu Arg Ile Val Leu	
85 90 95	
gat ttg gtt gtt aat cat act tct gac caa cat aaa tgg ttt aaa gaa	336
Asp Leu Val Val Asn His Thr Ser Asp Gln His Lys Trp Phe Lys Glu	
100 105 110	
tcc caa aaa aac aaa gaa aat aag tat tct gat tat tat att tgg cgt	384
Ser Gln Lys Asn Lys Glu Asn Lys Tyr Ser Asp Tyr Tyr Ile Trp Arg	
115 120 125	
gat cca aaa gaa gat gga agt gca cct act aat tta ggc tca gct ttt	432
Asp Pro Lys Glu Asp Gly Ser Ala Pro Thr Asn Leu Gly Ser Ala Phe	
130 135 140	
ggt ggt tca gct tgg acc tat gtt cca gaa aga aat caa tat tat tta	480
Gly Gly Ser Ala Trp Thr Tyr Val Pro Glu Arg Asn Gln Tyr Tyr Leu	
145 150 155 160	
cac ctt ttt gca aaa caa cag cca gat ttg aac tgg gat aat cca gaa	528
His Leu Phe Ala Lys Gln Gln Pro Asp Leu Asn Trp Asp Asn Pro Glu	
165 170 175	
gta aga aat gat att tat aaa ata atg ttt tgg tta gac atg gga	576
Val Arg Asn Asp Ile Tyr Lys Ile Met Met Phe Trp Leu Asp Met Gly	

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			180					185					190					
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Val	Asp	Gly	Phe	Arg	Met	Asp	Ser	Ile	Ser	Phe	Ile	Ser	Lys	Pro	Ser			
			195						200									
aaa	ttt	gaa	gat	gcg	cct	tta	gaa	gat	aat	aaa	gag	tat	ggc	gct	tat	672		
Lys	Phe	Glu	Asp	Ala	Pro	Leu	Glu	Asp	Asn	Lys	Glu	Tyr	Gly	Ala	Tyr			
			210						215						220			
tac	tat	gga	tca	gct	aac	ggg	cca	cat	att	cat	caa	tat	tta	caa	gag	720		
Tyr	Tyr	Gly	Ser	Ala	Asn	Gly	Pro	His	Ile	His	Gln	Tyr	Leu	Gln	Glu			
			225						230						235			
atg	aac	aga	gaa	gta	cta	agt	aaa	tat	gat	gta	att	gct	att	gga	gaa	768		
Met	Asn	Arg	Glu	Val	Leu	Ser	Lys	Tyr	Asp	Val	Ile	Ala	Ile	Gly	Glu			
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acg	cca	cat	aca	agt	gct	aaa	gaa	gca	aga	tta	ttt	ggt	gaa	cct	gaa	816		
Thr	Pro	His	Thr	Ser	Ala	Lys	Glu	Ala	Arg	Leu	Phe	Val	Glu	Pro	Glu			
			260						265						270			
cga	cat	gaa	tta	gat	atg	gta	ttt	caa	ttt	gaa	cat	atg	cat	ggt	gat	864		
Arg	His	Glu	Leu	Asp	Met	Val	Phe	Gln	Phe	Glu	His	Met	His	Val	Asp			
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tat	gga	aaa	tat	gga	aga	tac	tct	gat	gta	act	ttt	aag	atg	agt	gat	912		
Tyr	Gly	Lys	Tyr	Gly	Arg	Tyr	Ser	Asp	Val	Thr	Phe	Lys	Met	Ser	Asp			
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ctg	cgc	aat	tct	atg	tcg	agt	tgg	caa	aat	agt	ctt	tct	tgg	aat	tca	960		
Leu	Arg	Asn	Ser	Met	Ser	Ser	Trp	Gln	Asn	Ser	Leu	Ser	Trp	Asn	Ser			
			305						310						315			
aat	tat	ctt	gga	aat	cat	gat	caa	ccc	aga	att	gtc	tct	aga	ttt	gga	1008		
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aat	gat	aat	aag	tat	cga	aaa	gaa	tca	gca	aaa	atg	ttg	gct	ata	gta	1056		
Asn	Asp	Asn	Lys	Tyr	Arg	Lys	Glu	Ser	Ala	Lys	Met	Leu	Ala	Ile	Val			
			340						345						350			
tct	tta	tta	caa	aag	ggg	act	cca	ttt	att	ttt	caa	ggg	gaa	gaa	att	1104		
Ser	Leu	Leu	Gln	Lys	Gly	Thr	Pro	Phe	Ile	Phe	Gln	Gly	Glu	Glu	Ile			
			355						360						365			
gga	atg	acc	aat	tta	cat	att	aag	aaa	ata	gat	gag	tta	aag	gac	ctt	1152		
Gly	Met	Thr	Asn	Leu	His	Ile	Lys	Lys	Ile	Asp	Glu	Leu	Lys	Asp	Leu			
			370						375						380			
gaa	gca	cat	aat	ata	tat	aat	ttt	tta	aga	tca	aaa	ggg	att	agt	gaa	1200		
Glu	Ala	His	Asn	Ile	Tyr	Asn	Phe	Leu	Arg	Ser	Lys	Gly	Ile	Ser	Glu			
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gat	gac	gca	ttg	aat	atg	gtc	aac	agg	aaa	act	aga	gat	aat	gcc	cgt	1248		
Asp	Asp	Ala	Leu	Asn	Met	Val	Asn	Arg	Lys	Thr	Arg	Asp	Asn	Ala	Arg			
			405						410						415			
aca	cca	atg	caa	tgg	gat	gaa	tcg	gaa	caa	ggg	ggg	ttt	tca	agt	gaa	1296		
Thr	Pro	Met	Gln	Trp	Asp	Glu	Ser	Glu	Gln	Gly	Gly	Phe	Ser	Ser	Glu			
			420						425						430			
acg	cca	tgg	atg	gaa	ggt	aat	cca	aat	tat	aaa	gaa	att	aat	gtg	aag	1344		
Thr	Pro	Trp	Met	Glu	Val	Asn	Pro	Asn	Tyr	Lys	Glu	Ile	Asn	Val	Lys			
			435						440						445			
aaa	gat	ttg	aaa	gat	cca	gac	tcg	ata	tat	cat	ttt	tat	caa	aag	att	1392		
Lys	Asp	Leu	Lys	Asp	Pro	Asp	Ser	Ile	Tyr	His	Phe	Tyr	Gln	Lys	Ile			
			450						455						460			
ttg	aaa	tta	aga	aat	aat	aat	caa	gta	ttg	tta	gat	gga	aag	tat	gag	1440		
Leu	Lys	Leu	Arg	Asn	Asn	Asn	Gln	Val	Leu	Leu	Asp	Gly	Lys	Tyr	Glu			
			465						470						475			
cta	ggt	tct	tct	gat	gat	tct	gca	ggt	ttt	gcc	tat	act	cga	agt	acg	1488		
Leu	Val	Ser	Ser	Asp	Asp	Ser	Ala	Val	Phe	Ala	Tyr	Thr	Arg	Ser	Thr			
			485						490						495			
ggg	aaa	gaa	aaa	ttg	gca	ggt	att	tgt	tct	ttt	gtc	cca	tat	aag	ggt	1536		
Gly	Lys	Glu	Lys	Leu	Ala	Val	Ile	Cys	Ser	Phe	Val	Pro	Tyr	Lys	Val			
			500						505						510			
aaa	tat	aat	ttg	cct	act	gat	ttt	gta	aat	aga	aat	gaa	ttg	ctt	tta	1584		
Lys	Tyr	Asn	Leu	Pro	Thr	Asp	Phe	Val	Asn	Arg	Asn	Glu	Leu	Leu	Leu			
			515						520						525			
tct	agc	tat	ggg	gac	aat	aaa	gca	aaa	gcc	tca	aat	ggt	atg	tat	tta	1632		
Ser	Ser	Tyr	Gly	Asp	Asn	Lys	Ala	Lys	Ala	Ser	Asn	Val	Met	Tyr	Leu			
			530						535						540			
agg	cct	tat	gaa	gga	ggt	gtg	att	aga	cgt	gag	tag					1668		
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550

555

<210> 164

<211> 555

<212> PRT

<213> Lactobacillus johnsonii NCC 533

<400> 164

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Ile Glu Lys Leu Asp Tyr Ile Lys Asn Leu Gly Ala Asn Val Ile Trp
35      40      45
Leu Thr Pro Ile Phe Lys Ser Pro Leu Val Asp Asn Gly Tyr Asp Ile
50      55      60
Ala Asp Tyr Gln Ala Ile Asn Pro Ile Tyr Gly Thr Met Asp Asp Phe
65      70      75      80
Lys Lys Leu Leu Ser Lys Ala His Glu Lys Gly Leu Arg Ile Val Leu
85      90      95
Asp Leu Val Val Asn His Thr Ser Asp Gln His Lys Trp Phe Lys Glu
100      105      110
Ser Gln Lys Asn Lys Glu Asn Lys Tyr Ser Asp Tyr Tyr Ile Trp Arg
115      120      125
Asp Pro Lys Glu Asp Gly Ser Ala Pro Thr Asn Leu Gly Ser Ala Phe
130      135      140
Gly Gly Ser Ala Trp Thr Tyr Val Pro Glu Arg Asn Gln Tyr Tyr Leu
145      150      155      160
His Leu Phe Ala Lys Gln Gln Pro Asp Leu Asn Trp Asp Asn Pro Glu
165      170      175
Val Arg Asn Asp Ile Tyr Lys Ile Met Met Phe Trp Leu Asp Met Gly
180      185      190
Val Asp Gly Phe Arg Met Asp Ser Ile Ser Phe Ile Ser Lys Pro Ser
195      200      205
Lys Phe Glu Asp Ala Pro Leu Glu Asp Asn Lys Glu Tyr Gly Ala Tyr
210      215      220
Tyr Tyr Gly Ser Ala Asn Gly Pro His Ile His Gln Tyr Leu Gln Glu
225      230      235      240
Met Asn Arg Glu Val Leu Ser Lys Tyr Asp Val Ile Ala Ile Gly Glu
245      250      255
Thr Pro His Thr Ser Ala Lys Glu Ala Arg Leu Phe Val Glu Pro Glu
260      265      270
Arg His Glu Leu Asp Met Val Phe Gln Phe Glu His Met His Val Asp
275      280      285
Tyr Gly Lys Tyr Gly Arg Tyr Ser Asp Val Thr Phe Lys Met Ser Asp
290      295      300
Leu Arg Asn Ser Met Ser Trp Gln Asn Ser Leu Ser Trp Asn Ser
305      310      315      320
Asn Tyr Leu Gly Asn His Asp Gln Pro Arg Ile Val Ser Arg Phe Gly
325      330      335
Asn Asp Asn Lys Tyr Arg Lys Glu Ser Ala Lys Met Leu Ala Ile Val
340      345      350
Ser Leu Leu Gln Lys Gly Thr Pro Phe Ile Phe Gln Gly Glu Glu Ile
355      360      365
Gly Met Thr Asn Leu His Ile Lys Lys Ile Asp Glu Leu Lys Asp Leu
370      375      380
Glu Ala His Asn Ile Tyr Asn Phe Leu Arg Ser Lys Gly Ile Ser Glu
385      390      395      400
Asp Asp Ala Leu Asn Met Val Asn Arg Lys Thr Arg Asp Asn Ala Arg
405      410      415
Thr Pro Met Gln Trp Asp Glu Ser Glu Gln Gly Gly Phe Ser Ser Glu
420      425      430
Thr Pro Trp Met Glu Val Asn Pro Asn Tyr Lys Glu Ile Asn Val Lys
435      440      445
Lys Asp Leu Lys Asp Pro Asp Ser Ile Tyr His Phe Tyr Gln Lys Ile
450      455      460
Leu Lys Leu Arg Asn Asn Asn Gln Val Leu Leu Asp Gly Lys Tyr Glu
465      470      475      480
Leu Val Ser Ser Asp Asp Ser Ala Val Phe Ala Tyr Thr Arg Ser Thr

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485 490 495
 Gly Lys Glu Lys Leu Ala Val Ile Cys Ser Phe Val Pro Tyr Lys Val
 500 505 510
 Lys Tyr Asn Leu Pro Thr Asp Phe Val Asn Arg Asn Glu Leu Leu Leu
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<210> 165

<211> 1665

<212> DNA

<213> Bacillus cereus ATCC 10987

<220>

<221> CDS

<222> (1)..(1665)

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Arg Ser Phe Met Asp Ser Asn Gly Asp Gly Ile Gly Asp Leu Gln Gly	
20 25 30	
att att gca aaa ctg gat tat tta aaa gat tta ggt ata gat gta att	144
Ile Ile Ala Lys Leu Asp Tyr Leu Lys Asp Leu Gly Ile Asp Val Ile	
35 40 45	
tgg att tgt cca atg tat aag tca cct aat gat gat aat ggt tat gac	192
Trp Ile Cys Pro Met Tyr Lys Ser Pro Asn Asp Asp Asn Gly Tyr Asp	
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att agt gat tat caa gat att atg gat gag ttt ggt acg atg gag gac	240
Ile Ser Asp Tyr Gln Asp Ile Met Asp Glu Phe Gly Thr Met Glu Asp	
65 70 75 80	
ttc gat gct tta cta gat gaa gtt cat aag cgt gat atg aag ctt att	288
Phe Asp Ala Leu Leu Asp Glu Val His Lys Arg Asp Met Lys Leu Ile	
85 90 95	
att gat tta gtt att aat cat aca agt gat gaa cat cca tgg ttt att	336
Ile Asp Leu Val Ile Asn His Thr Ser Asp Glu His Pro Trp Phe Ile	
100 105 110	
gag tct cgt tca tct aaa gac aat ccg aag cgt gat tgg tat att tgg	384
Glu Ser Arg Ser Ser Lys Asp Asn Pro Lys Arg Asp Trp Tyr Ile Trp	
115 120 125	
cat gat ggt aaa gat ggt gcg gaa cca aac aac tgg gaa agt att ttt	432
His Asp Gly Lys Asp Gly Ala Glu Pro Asn Asn Trp Glu Ser Ile Phe	
130 135 140	
aat ggt tcg gca tgg gaa tac gat gaa gta aca gga caa tat tat tta	480
Asn Gly Ser Ala Trp Glu Tyr Asp Glu Val Thr Gly Gln Tyr Tyr Leu	
145 150 155 160	
cac tta ttc tca cgt aaa cca cca gat tta aac tgg gag aat aaa gaa	528
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165 170 175	
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Val Arg Glu Val Leu Tyr Asp Thr Val Asn Trp Trp Leu Asp Lys Gly	
180 185 190	
att gat ggt ttc cgt gtg gat gcg atc agc cat att aaa gag gat	624
Ile Asp Gly Phe Arg Val Asp Ala Ile Ser His Ile Lys Lys Glu Asp	
195 200 205	
ggc ttt aaa gat atg cca aat cca aaa gaa cta aag tat gta cca tct	672
Gly Phe Lys Asp Met Pro Asn Pro Lys Glu Leu Lys Tyr Val Pro Ser	
210 215 220	
ttt gat aaa cat atg aat gtg gat ggt att caa cct tta tta gaa gag	720
Phe Asp Lys His Met Asn Val Asp Gly Ile Gln Pro Leu Leu Glu Glu	
225 230 235 240	
tta aaa gaa aat aca ttt tct aag tac gat att atg act gtc ggt gaa	768
Leu Lys Glu Asn Thr Phe Ser Lys Tyr Asp Ile Met Thr Val Gly Glu	
245 250 255	

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Ala	Asn	Gly	Val	Lys	Ile	Glu	Asp	Ala	Glu	Leu	Trp	Val	Gly	Glu	Glu	
			260					265					270			
caa	ggt	aag	ttc	aat	atg	gta	ttc	caa	ttc	gaa	cat	tta	agc	tta	tgg	864
Gln	Gly	Lys	Phe	Asn	Met	Val	Phe	Gln	Phe	Glu	His	Leu	Ser	Leu	Trp	
		275					280					285				
gat	gca	gaa	aag	aag	aaa	gat	ctt	gat	ggt	gta	ggg	ttg	aaa	aaa	gta	912
Asp	Ala	Glu	Lys	Lys	Lys	Asp	Leu	Asp	Val	Val	Gly	Leu	Lys	Lys	Val	
	290					295					300					
tta	acg	aaa	tgg	caa	aaa	ggt	cta	gaa	aat	aaa	ggg	tgg	aat	gct	tta	960
Leu	Thr	Lys	Trp	Gln	Lys	Gly	Leu	Glu	Asn	Lys	Gly	Trp	Asn	Ala	Leu	
305					310					315					320	
tat	att	gag	aat	cac	gat	aag	cca	cgt	atc	ggt	tca	act	tgg	gga	gat	1008
Tyr	Ile	Glu	Asn	His	Asp	Lys	Pro	Arg	Ile	Val	Ser	Thr	Trp	Gly	Asp	
				325					330					335		
gat	aaa	caa	tat	tgg	cgt	gaa	agt	gcg	aca	gct	ctt	gga	gcg	atg	tat	1056
Asp	Lys	Gln	Tyr	Trp	Arg	Glu	Ser	Ala	Thr	Ala	Leu	Gly	Ala	Met	Tyr	
			340					345					350			
ttc	ttt	atg	ggt	aca	ccg	ttt	att	att	caa	gga	caa	gaa	att	ggg		1104
Phe	Phe	Met	His	Gly	Thr	Pro	Phe	Ile	Tyr	Gln	Gly	Gln	Glu	Ile	Gly	
		355				360					365					
atg	aca	aat	ggt	caa	ttc	cca	aat	att	gaa	gat	tac	gat	gat	gta	gca	1152
Met	Thr	Asn	Val	Gln	Phe	Pro	Asn	Ile	Glu	Asp	Tyr	Asp	Asp	Val	Ala	
	370					375					380					
att	aaa	aat	tta	tat	cgt	gag	aaa	att	gca	gag	ggt	gta	tct	cat	caa	1200
Ile	Lys	Asn	Leu	Tyr	Arg	Glu	Lys	Ile	Ala	Glu	Gly	Val	Ser	His	Gln	
385					390					395					400	
gat	atg	atg	gag	att	ata	tgg	gct	tct	tgc	cgc	gat	aat	tca	cgt	aca	1248
Asp	Met	Met	Glu	Ile	Ile	Trp	Ala	Ser	Cys	Arg	Asp	Asn	Ser	Arg	Thr	
				405					410					415		
cct	atg	cag	tgg	aac	gat	gag	atg	aat	gct	ggc	ttc	aca	aca	ggt	gcc	1296
Pro	Met	Gln	Trp	Asn	Asp	Glu	Met	Asn	Ala	Gly	Phe	Thr	Thr	Gly	Ala	
			420					425					430			
cct	tgg	ttt	ggg	atg	aat	cca	aac	tat	aaa	gaa	att	aat	ggt	gaa	aag	1344
Pro	Trp	Phe	Gly	Met	Asn	Pro	Asn	Tyr	Lys	Glu	Ile	Asn	Val	Glu	Lys	
		435				440						445				
caa	aag	agt	gaa	gag	aac	tct	att	ttc	aat	ttc	tat	aag	aaa	atg	att	1392
Gln	Lys	Ser	Glu	Glu	Asn	Ser	Ile	Phe	Asn	Phe	Tyr	Lys	Lys	Met	Ile	
	450					455					460					
gct	ttg	aaa	aaa	gag	cac	gat	gta	ctg	aat	tat	ggt	acg	tac	gat	tta	1440
Ala	Leu	Lys	Lys	Glu	His	Asp	Val	Leu	Asn	Tyr	Gly	Thr	Tyr	Asp	Leu	
465					470					475					480	
ctt	tta	gaa	gat	gat	ccg	caa	att	tat	gca	tat	act	cgt	aca	tta	agc	1488
Leu	Leu	Glu	Asp	Asp	Pro	Gln	Ile	Tyr	Ala	Tyr	Thr	Arg	Thr	Leu	Ser	
				485					490					495		
gat	gaa	aaa	atc	ggt	gta	att	agt	aat	atc	tca	aaa	gag	gaa	gct	gta	1536
Asp	Glu	Lys	Ile	Val	Val	Ile	Ser	Asn	Ile	Ser	Lys	Glu	Glu	Ala	Val	
			500					505					510			
tat	aat	gag	ggt	tca	ttc	gcg	ata	gaa	cgc	aaa	cgt	ttg	ctt	tta	aat	1584
Tyr	Asn	Glu	Gly	Ser	Phe	Ala	Ile	Glu	Arg	Lys	Arg	Leu	Leu	Leu	Asn	
		515					520					525				
aac	tac	gaa	ggt	gcg	gaa	cat	gaa	caa	gta	act	aca	atc	acg	tta	aag	1632
Asn	Tyr	Glu	Val	Ala	Glu	His	Glu	Gln	Val	Thr	Thr	Ile	Thr	Leu	Lys	
	530					535					540					
cct	tat	gaa	aca	agg	ggt	tat	cgt	att	tca	taa						1665
Pro	Tyr	Glu	Thr	Arg	Val	Tyr	Arg	Ile	Ser							
545					550											

<210> 166

<211> 554

<212> PRT

<213> Bacillus cereus ATCC 10987

<400> 166

Met	Asn	Lys	Thr	Trp	Trp	Lys	Glu	Ala	Val	Ala	Tyr	Gln	Ile	Tyr	Pro
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Arg	Ser	Phe	Met	Asp	Ser	Asn	Gly	Asp	Gly	Ile	Gly	Asp	Leu	Gln	Gly
			20					25					30		
Ile	Ile	Ala	Lys	Leu	Asp	Tyr	Leu	Lys	Asp	Leu	Gly	Ile	Asp	Val	Ile

Trp Ile 35 Cys Pro Met Tyr Lys 40 Ser Pro Asn Asp Asp 45 Gly Tyr Asp
 50 55 60
 Ile Ser Asp Tyr Gln Asp Ile Met Asp Glu Phe Gly Thr Met Glu Asp
 65 70 75 80
 Phe Asp Ala Leu Leu 85 Asp Glu Val His Lys 90 Arg Asp Met Lys Leu Ile
 95
 Ile Asp Leu Val 100 Ile Asn His Thr Ser 105 Asp Glu His Pro Trp Phe Ile
 110
 Glu Ser Arg Ser Ser Lys Asp Asn 120 Pro Lys Arg Asp Trp Tyr Ile Trp
 115 125
 His Asp Gly Lys Asp Gly Ala 135 Glu Pro Asn Asn Trp Glu Ser Ile Phe
 130 140
 Asn Gly Ser Ala Trp Glu 150 Tyr Asp Glu Val Thr Gly Gln Tyr Tyr Leu
 145 155 160
 His Leu Phe Ser Arg 165 Lys Gln Pro Asp Leu Asn Trp Glu Asn Lys Glu
 170 175
 Val Arg Glu Val 180 Leu Tyr Asp Thr Val Asn Trp Trp Leu Asp Lys Gly
 185 190
 Ile Asp Gly Phe Arg Val Asp Ala 200 Ile Ser His Ile Lys Lys Glu Asp
 195 205
 Gly Phe Lys Asp Met Pro Asn 215 Pro Lys Glu Leu Lys Tyr Val Pro Ser
 210 220
 Phe Asp Lys His Met Asn 230 Val Asp Gly Ile Gln Pro Leu Leu Glu Glu
 225 235 240
 Leu Lys Glu Asn Thr 245 Phe Ser Lys Tyr Asp Ile Met Thr Val Gly Glu
 250 255
 Ala Asn Gly Val 260 Lys Ile Glu Asp Ala Glu Leu Trp Val Gly Glu Glu
 265 270
 Gln Gly Lys 275 Phe Asn Met Val Phe 280 Gln Phe Glu His Leu Ser Leu Trp
 285
 Asp Ala Glu Lys Lys Lys Asp 295 Leu Asp Val Val Gly Leu Lys Lys Val
 290 300
 Leu Thr Lys Trp Gln Lys 310 Gly Leu Glu Asn Lys Gly Trp Asn Ala Leu
 305 315 320
 Tyr Ile Glu Asn His 325 Asp Lys Pro Arg Ile Val Ser Thr Trp Gly Asp
 330 335
 Asp Lys Gln Tyr Trp Arg Glu Ser Ala Thr Ala Leu Gly Ala Met Tyr
 340 350
 Phe Phe Met 355 His Gly Thr Pro Phe 360 Ile Tyr Gln Gly Gln Glu Ile Gly
 365
 Met Thr Asn Val Gln Phe Pro Asn Ile Glu Asp Tyr Asp Asp Val Ala
 370 380
 Ile Lys Asn Leu Tyr Arg 390 Glu Lys Ile Ala Glu Gly Val Ser His Gln
 385 395 400
 Asp Met Met Glu Ile 405 Trp Ala Ser Cys 410 Arg Asp Asn Ser Arg Thr
 415
 Pro Met Gln Trp Asn Asp Glu Met Asn 425 Ala Gly Phe Thr Thr Gly Ala
 420 430
 Pro Trp Phe Gly Met Asn Pro Asn 440 Tyr Lys Glu Ile Asn Val Glu Lys
 435 445
 Gln Lys 450 Ser Glu Glu Asn Ser 455 Ile Phe Asn Phe Tyr Lys Lys Met Ile
 460
 Ala Leu Lys Lys Glu His 470 Asp Val Leu Asn Tyr Gly Thr Tyr Asp Leu
 465 475 480
 Leu Leu Glu Asp Asp 485 Pro Gln Ile Tyr Ala Tyr Thr Arg Thr Leu Ser
 490 495
 Asp Glu Lys Ile Val Val Ile Ser Asn 505 Ile Ser Lys Glu Glu Ala Val
 500 510
 Tyr Asn Glu Gly Ser Phe Ala Ile 520 Glu Arg Lys Arg Leu Leu Leu Asn
 515 525
 Asn Tyr Glu Val Ala Glu His 535 Glu Gln Val Thr Thr Ile Thr Leu Lys
 530 540
 Pro Tyr Glu Thr Arg Val 550 Tyr Arg Ile Ser
 545

<210> 167

<211> 1710

<212> DNA

<213> Anopheles gambiae str. PEST

<220>

<221> CDS

<222> (1)..(1710)

<400> 167

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Met Asp Trp Trp Gln Arg Thr Val Phe Tyr Gln Ile Tyr Pro Arg Ser	
1 5 10 15	
ttc atg gac tcg aac ggg gac ggg gtg ggc gat ctg cgc ggc ata acg	96
Phe Met Asp Ser Asn Gly Asp Gly Val Gly Asp Leu Arg Gly Ile Thr	
20 25 30	
agc cgg ttg gag cat ctg aag gat gcc ggc att ggt gcg acc tgg cta	144
Ser Arg Leu Glu His Leu Lys Asp Ala Gly Ile Gly Ala Thr Trp Leu	
35 40 45	
tcg ccc atc ttc cga tcg ccg atg gtt gac ttc ggg tac gac att gcg	192
Ser Pro Ile Phe Arg Ser Pro Met Val Asp Phe Gly Tyr Asp Ile Ala	
50 55 60	
gac tat acc gcc atc cag ccg gag tac ggg acg atg gag gac ttt gag	240
Asp Tyr Thr Ala Ile Gln Pro Glu Tyr Gly Thr Met Glu Asp Phe Glu	
65 70 75 80	
gcg ctg ctg gcg gaa gcg aag cgg ctc ggc atc aag atc atc ctg gac	288
Ala Leu Leu Ala Glu Ala Lys Arg Leu Gly Ile Lys Ile Ile Leu Asp	
85 90 95	
ttt gtg ccc aat cac acg agc gac cag tgc gaa tgg ttc cgg cgg tcg	336
Phe Val Pro Asn His Thr Ser Asp Gln Cys Glu Trp Phe Arg Arg Ser	
100 105 110	
gtg gcg cgc gaa cac ccg tac acc gat tac tac gtg tgg cag gat ggg	384
Val Ala Arg Glu His Pro Tyr Thr Asp Tyr Tyr Val Trp Gln Asp Gly	
115 120 125	
cgc gtc gac cca aac ggt aat ggg acg gcc cgt ttg cca ccg aac aat	432
Arg Val Asp Pro Asn Gly Asn Gly Thr Ala Arg Leu Pro Pro Asn Asn	
130 135 140	
tgg caa tcg gta ttc tac ggt tcc gcc tgg acg ctg cat ccg gac cgc	480
Trp Gln Ser Val Phe Tyr Gly Ser Ala Trp Thr Leu His Pro Asp Arg	
145 150 155 160	
ggt cag tac tat ttg cat cag ttt acc gcc cag cag ccg gat ctg aac	528
Gly Gln Tyr Tyr Leu His Gln Phe Thr Ala Gln Gln Pro Asp Leu Asn	
165 170 175	
ttt cgc aac ccg gcc gtg gtg gac gag atg cgc gag gtg ctg cgg ttc	576
Phe Arg Asn Pro Ala Val Val Asp Glu Met Arg Glu Val Leu Arg Phe	
180 185 190	
tgg ctg cgc aag ggt gtg gcc ggc ttt cgc atc gac gcc gtt aat cat	624
Trp Leu Arg Lys Gly Val Ala Gly Phe Arg Ile Asp Ala Val Asn His	
195 200 205	
ctg ttc gag gcg gac ggc ttt ccg gac gag ccg gaa acg ggc acg gac	672
Leu Phe Glu Ala Asp Gly Phe Pro Asp Glu Pro Glu Thr Gly Thr Asp	
210 215 220	
cgg gat cca ctg tcc tac ggc ttt acg cac cac atc tac acg aag gat	720
Arg Asp Pro Leu Ser Tyr Gly Phe Thr His His Ile Tyr Thr Lys Asp	
225 230 235 240	
ttg ctc gaa gac tac gac atg gtg tac cag tgg cga gcg ctg ctg gac	768
Leu Leu Glu Asp Tyr Asp Met Val Tyr Gln Trp Arg Ala Leu Leu Asp	
245 250 255	
gac tgg agc cgc gag cat gga ggc gac gct cgc atc ata atg acc gaa	816
Asp Trp Ser Arg Glu His Gly Gly Asp Ala Arg Ile Ile Met Thr Glu	
260 265 270	
gcg tac gcc aac att acc ttc acc atg aag tac tac cac gcg gag gag	864
Ala Tyr Ala Asn Ile Thr Phe Thr Met Lys Tyr Tyr His Ala Glu Glu	
275 280 285 290	
gac gac ggc gac cag ccg gac ggt caa ccg cga gcc gct gcg ggt tca	912
Asp Asp Gly Asp Gln Pro Asp Gly Gln Pro Arg Ala Ala Ala Gly Ser	
295 300 305	
cac atg ccc ttc aac ttt ctg ctc atc acc gac ctg aac cgt gac tcg	960
His Met Pro Phe Asn Phe Leu Leu Ile Thr Asp Leu Asn Arg Asp Ser	
310 315 320	
agt gcg cag gac ttt gtg tac acg ata cag aag tgg ctc acg tac atg	1008
Ser Ala Gln Asp Phe Val Tyr Thr Ile Gln Lys Trp Leu Thr Tyr Met	

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ccg	cgg	gtg	ggg	325	gcc	acc	gcc	aac	tgg	330	ctg	ggc	aat	cac	335	gat		1056
Pro	Arg	Val	Gly	340	Ala	Thr	Ala	Asn	Trp	345	Val	Leu	Gly	Asn	His	Asp	Gln	
ccg	cgc	tgg	ctg	aac	gcg	atg	ccg	gcc	ggc	gcc	cgg	gcg	aac	tgg	gtg		1104	
Pro	Arg	Trp	Leu	Asn	Ala	Met	Pro	Ala	Gly	Ala	Arg	Ala	Asn	Trp	Val			
ctg	ggc	aat	cac	gat	cgt	ccg	cgc	att	gcc	tcg	cgg	tac	ggg	cgc	gat		1152	
Leu	Gly	Asn	His	Asp	Arg	Pro	Arg	Ile	Ala	Ser	Arg	Tyr	Gly	Arg	Asp			
ctt	gcc	tcg	agc	ctg	gcc	gtg	ctg	gag	atg	aca	ctg	ccc	ggc	att	gcg		1200	
Leu	Ala	Ser	Ser	Leu	Ala	Val	Leu	Glu	Met	Thr	Leu	Pro	Gly	Ile	Ala			
gtc	gtg	tac	tat	ggg	gag	gag	atc	ggg	atg	gag	gac	aac	cgg	gac	att		1248	
Val	Val	Tyr	Tyr	Gly	Glu	Glu	Ile	Gly	Met	Glu	Asp	Asn	Arg	Asp	Ile			
acg	ttc	gag	gag	acg	cag	gac	ccg	cag	gcc	gcc	aac	acg	aac	ccg	gac		1296	
Thr	Phe	Glu	Thr	Thr	Gln	Asp	Pro	Gln	Ala	Ala	Asn	Thr	Asn	Pro	Asp			
gtg	tat	cag	cag	ttt	acg	cgc	gat	ccc	gtc	cgc	aca	ccg	ttc	cag	tgg		1344	
Val	Tyr	Gln	Gln	Phe	Thr	Arg	Asp	Pro	Val	Arg	Thr	Pro	Phe	Gln	Trp			
gat	gcg	acg	gcg	tac	gct	ggg	ttt	acc	gta	gct	agc	gcc	cag	aag	acg		1392	
Asp	Ala	Thr	Ala	Tyr	Ala	Gly	Phe	Thr	Val	Ala	Ser	Ala	Gln	Lys	Thr			
tgg	ctg	ccg	gta	cat	ccg	aac	tat	cgg	gag	gtg	aat	ctg	gcc	gcc	cag		1440	
Trp	Leu	Pro	Val	His	Pro	Asn	Tyr	Arg	Glu	Val	Asn	Leu	Ala	Ala	Gln			
aag	gcg	gcg	agc	aac	agt	atg	ttc	aag	ctg	tac	cag	cgg	ctg	atc	aag		1488	
Lys	Ala	Ala	Ser	Asn	Ser	Met	Phe	Lys	Leu	Tyr	Gln	Arg	Leu	Ile	Lys			
ctg	cgc	aag	gag	cac	acg	ttc	atg	cac	ggg	gat	ttc	gag	tcg	aag	gtg		1536	
Leu	Arg	Lys	Glu	His	Thr	Phe	Met	His	Gly	Asp	Phe	Glu	Ser	Lys	Val			
ctg	ctg	aac	aat	gtg	ttt	ggc	tat	acg	cgc	acg	ctc	gag	ggc	gag	cag		1584	
Leu	Leu	Asn	Asn	Val	Phe	Gly	Tyr	Thr	Arg	Thr	Leu	Glu	Gly	Glu	Gln			
tcg	tac	gcg	gtc	gtg	gtc	aat	ctg	aac	gat	aac	gat	gtg	aat	gtg	aac		1632	
Ser	Tyr	Ala	Val	Val	Val	Asn	Leu	Asn	Asp	Asn	Asp	Val	Asn	Val	Asn			
ctg	cag	gag	ctg	cac	gag	gac	att	gac	acg	gcc	cgg	gtg	gcg	ctt	acg		1680	
Leu	Gln	Glu	Leu	His	Glu	Asp	Ile	Asp	Thr	Ala	Arg	Val	Ala	Leu	Thr			
tcg	ctc	gac	gct	cgc	atg	aag	gag	ggc	tag								1710	
Ser	Leu	Asp	Ala	Arg	Met	Lys	Glu	Gly										

<210> 168

<211> 569

<212> PRT

<213> Anopheles gambiae str. PEST

<400> 168

Met	Asp	Trp	Trp	Gln	Arg	Thr	Val	Phe	Tyr	Gln	Ile	Tyr	Pro	Arg	Ser		
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Phe	Met	Asp	Ser	Asn	Gly	Asp	Gly	Val	Gly	Asp	Leu	Arg	Gly	Ile	Thr		
			20					25					30				
Ser	Arg	Leu	Glu	His	Leu	Lys	Asp	Ala	Gly	Ile	Gly	Ala	Thr	Trp	Leu		
		35					40					45					
Ser	Pro	Ile	Phe	Arg	Ser	Pro	Met	Val	Asp	Phe	Gly	Tyr	Asp	Ile	Ala		
		50				55				60							
Asp	Tyr	Thr	Ala	Ile	Gln	Pro	Glu	Tyr	Gly	Thr	Met	Glu	Asp	Phe	Glu		
65				70				75							80		
Ala	Leu	Leu	Ala	Glu	Ala	Lys	Arg	Leu	Gly	Ile	Lys	Ile	Ile	Leu	Asp		
			85					90						95			
Phe	Val	Pro	Asn	His	Thr	Ser	Asp	Gln	Cys	Glu	Trp	Phe	Arg	Arg	Ser		
			100					105					110				
Val	Ala	Arg	Glu	His	Pro	Tyr	Thr	Asp	Tyr	Tyr	Val	Trp	Gln	Asp	Gly		
		115					120					125					

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Arg Val Asp Pro Asn Gly Asn Gly Thr Ala Arg Leu Pro Pro Asn Asn
 130 135 140
 Trp Gln Ser Val Phe Tyr Gly Ser Ala Trp Thr Leu His Pro Asp Arg
 145 150 155 160
 Gly Gln Tyr Tyr Leu His Gln Phe Thr Ala Gln Gln Pro Asp Leu Asn
 165 170 175
 Phe Arg Asn Pro Ala Val Val Asp Glu Met Arg Glu Val Leu Arg Phe
 180 185 190
 Trp Leu Arg Lys Gly Val Ala Gly Phe Arg Ile Asp Ala Val Asn His
 195 200 205
 Leu Phe Glu Ala Asp Gly Phe Pro Asp Glu Pro Glu Thr Gly Thr Asp
 210 215 220
 Arg Asp Pro Leu Ser Tyr Gly Phe Thr His His Ile Tyr Thr Lys Asp
 225 230 235 240
 Leu Leu Glu Asp Tyr Asp Met Val Tyr Gln Trp Arg Ala Leu Leu Asp
 245 250 255
 Asp Trp Ser Arg Glu His Gly Gly Asp Ala Arg Ile Ile Met Thr Glu
 260 265 270
 Ala Tyr Ala Asn Ile Thr Phe Thr Met Lys Tyr Tyr His Ala Glu Glu
 275 280 285
 Asp Asp Gly Asp Gln Pro Asp Gly Gln Pro Arg Ala Ala Ala Gly Ser
 290 295 300
 His Met Pro Phe Asn Phe Leu Leu Ile Thr Asp Leu Asn Arg Asp Ser
 305 310 315 320
 Ser Ala Gln Asp Phe Val Tyr Thr Ile Gln Lys Trp Leu Thr Tyr Met
 325 330 335
 Pro Arg Val Gly Ala Thr Ala Asn Trp Val Leu Gly Asn His Asp Gln
 340 345 350
 Pro Arg Trp Leu Asn Ala Met Pro Ala Gly Ala Arg Ala Asn Trp Val
 355 360 365
 Leu Gly Asn His Asp Arg Pro Arg Ile Ala Ser Arg Tyr Gly Arg Asp
 370 375 380
 Leu Ala Ser Ser Leu Ala Val Leu Glu Met Thr Leu Pro Gly Ile Ala
 385 390 395 400
 Val Val Tyr Tyr Gly Glu Glu Ile Gly Met Glu Asp Asn Arg Asp Ile
 405 410 415
 Thr Phe Glu Glu Thr Gln Asp Pro Gln Ala Ala Asn Thr Asn Pro Asp
 420 425 430
 Val Tyr Gln Gln Phe Thr Arg Asp Pro Val Arg Thr Pro Phe Gln Trp
 435 440 445
 Asp Ala Thr Ala Tyr Ala Gly Phe Thr Val Ala Ser Ala Gln Lys Thr
 450 455 460
 Trp Leu Pro Val His Pro Asn Tyr Arg Glu Val Asn Leu Ala Ala Gln
 465 470 475 480
 Lys Ala Ala Ser Asn Ser Met Phe Lys Leu Tyr Gln Arg Leu Ile Lys
 485 490 495
 Leu Arg Lys Glu His Thr Phe Met His Gly Asp Phe Glu Ser Lys Val
 500 505 510
 Leu Leu Asn Asn Val Phe Gly Tyr Thr Arg Thr Leu Glu Gly Glu Gln
 515 520 525
 Ser Tyr Ala Val Val Val Asn Leu Asn Asp Asn Asp Val Asn Val Asn
 530 535 540
 Leu Gln Glu Leu His Glu Asp Ile Asp Thr Ala Arg Val Ala Leu Thr
 545 550 555 560
 Ser Leu Asp Ala Arg Met Lys Glu Gly

<210> 169

<211> 1800

<212> DNA

<213> Anopheles gambiae str. PEST

<220>

<221> CDS

<222> (1)..(1800)

<400> 169

atg gcc ctc tac tac tgg cta gct tta cta ctg ttg ggc tgg tct act
 Met Ala Leu Tyr Tyr Trp Leu Ala Leu Leu Leu Leu Gly Trp Ser Thr

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1	gtg	acc	gcc	cag	aag	gat	tgg	tgg	gaa	agt	gcg	agc	ttc	tat	caa	atc	96
	Val	Thr	Ala	Gln	Lys	Asp	Trp	Trp	Glu	Ser	Ala	Ser	Phe	Tyr	Gln	Ile	
				20					25				30				
	tat	ccg	cga	tcg	ttt	caa	gat	agt	aac	ggc	gat	gga	ata	ggc	gat	ctt	144
	Tyr	Pro	Arg	Ser	Phe	Gln	Asp	Ser	Asn	Gly	Asp	Gly	Ile	Gly	Asp	Leu	
			35					40					45				
	aat	ggc	atc	aaa	agt	cgg	ttg	ccg	tat	ctg	aag	tca	ctc	ggg	atg	act	192
	Asn	Gly	Ile	Lys	Ser	Arg	Leu	Pro	Tyr	Leu	Lys	Ser	Leu	Gly	Met	Thr	
		50					55					60					
	gca	ttt	tgg	ctt	tcc	ccg	atc	tac	cct	tcg	ccg	atg	gcc	gac	ttt	ggg	240
	Ala	Phe	Trp	Leu	Ser	Pro	Ile	Tyr	Pro	Ser	Pro	Met	Ala	Asp	Phe	Gly	
		65				70				75						80	
	tat	gat	atc	tcc	aac	ttt	atg	gac	att	cat	ccg	agc	ttt	gga	acg	ttg	288
	Tyr	Asp	Ile	Ser	Asn	Phe	Met	Asp	Ile	His	Pro	Ser	Phe	Gly	Thr	Leu	
					85				90						95		
	gct	gac	ttt	aag	cag	ctg	gtg	gaa	gaa	gcg	aaa	aaa	ctg	caa	tta	cgc	336
	Ala	Asp	Phe	Lys	Gln	Leu	Val	Glu	Glu	Ala	Lys	Lys	Leu	Gln	Leu	Arg	
				100				105						110			
	atc	atc	ctc	gac	ttc	gtg	cct	aac	cat	tcg	agc	gac	gag	cat	gag	tgg	384
	Ile	Ile	Leu	Asp	Phe	Val	Pro	Asn	His	Ser	Ser	Asp	Glu	His	Glu	Trp	
			115				120						125				
	ttc	aag	aaa	agc	gtt	cag	cga	gta	agt	ggg	tac	gaa	gac	tat	tac	gtg	432
	Phe	Lys	Lys	Ser	Val	Gln	Arg	Val	Ser	Gly	Tyr	Glu	Asp	Tyr	Tyr	Val	
		130					135					140					
	tgg	cag	gat	ccc	aaa	ccg	ggc	acg	gaa	cgc	gac	cct	cca	aac	aac	tgg	480
	Trp	Gln	Asp	Pro	Lys	Pro	Gly	Thr	Glu	Arg	Asp	Pro	Pro	Asn	Asn	Trp	
		145				150			155							160	
	gtt	gca	gca	tgg	tac	ggt	tcg	gcg	tgg	gaa	tgg	aat	gac	gaa	aga	aag	528
	Val	Ala	Ala	Trp	Tyr	Gly	Ser	Ala	Trp	Glu	Trp	Asn	Asp	Glu	Arg	Lys	
				165				170							175		
	caa	ttt	tat	ttg	cac	cag	ttt	cac	aag	aag	cag	ccc	gat	ctg	aac	tac	576
	Gln	Phe	Tyr	Leu	His	Gln	Phe	His	Lys	Lys	Gln	Pro	Asp	Leu	Asn	Tyr	
			180					185						190			
	cgc	aac	ccg	gcc	gtg	gtg	cag	gct	atg	aag	gat	gtg	ttg	cgc	ttc	tgg	624
	Arg	Asn	Pro	Ala	Val	Val	Gln	Ala	Met	Lys	Asp	Val	Leu	Arg	Phe	Trp	
			195					200					205				
	ttg	gac	cag	ggc	gtc	gac	ggc	ttc	cgt	att	gat	gcg	gtc	ccg	tgg	ctg	672
	Leu	Asp	Gln	Gly	Val	Asp	Gly	Phe	Arg	Ile	Asp	Ala	Val	Pro	Trp	Leu	
		210					215					220					
	ttc	gag	acg	gtg	ggt	ttc	gac	gaa	cct	gtt	agc	ggg	cat	tcc	acc		720
	Phe	Glu	Thr	Val	Gly	Phe	Pro	Glu	Pro	Val	Ser	Gly	His	Ser	Thr		
		225			230					235					240		
	gat	ccg	tta	agt	cag	aac	tac	ctt	acc	cac	att	tat	acg	ctc	gat	caa	768
	Asp	Pro	Leu	Ser	Gln	Asn	Tyr	Leu	Thr	His	Ile	Tyr	Thr	Leu	Asp	Gln	
					245				250						255		
	ccg	gaa	acc	gtt	gac	atg	gtg	tat	caa	tgg	cgg	gaa	ttg	atg	gat	cag	816
	Pro	Glu	Thr	Val	Asp	Met	Val	Tyr	Gln	Trp	Arg	Glu	Leu	Met	Asp	Gln	
				260				265						270			
	tac	aaa	caa	gag	cac	aat	acc	acc	acc	aaa	gtg	ctc	atg	acc	gag	gca	864
	Tyr	Lys	Gln	Glu	His	Asn	Thr	Thr	Lys	Val	Val	Leu	Met	Thr	Glu	Ala	
			275				280						285				
	tgg	tcc	tcg	ttg	gat	gtt	gta	aaa	acg	tac	ttc	aac	gac	agt	aac	aac	912
	Trp	Ser	Ser	Leu	Asp	Val	Val	Lys	Thr	Tyr	Phe	Asn	Asp	Ser	Asn	Asn	
		290				295						300					
	cgg	caa	gga	tcg	caa	atg	ccg	ttc	aac	ttc	cag	tta	atc	atg	cgg	ctg	960
	Arg	Gln	Gly	Ser	Gln	Met	Pro	Phe	Asn	Phe	Gln	Leu	Ile	Met	Arg	Leu	
					310					315						320	
	gat	caa	aat	tct	aaa	gca	tcc	gat	ttt	cag	acg	gtt	att	aac	tcg	tgg	1008
	Asp	Gln	Asn	Ser	Lys	Ala	Ser	Asp	Phe	Gln	Thr	Val	Ile	Asn	Ser	Trp	
				325					330						335		
	ctg	gat	atc	att	cct	cct	ggc	cac	acg	ccc	aac	tgg	gtg	ctt	ggg	aat	1056
	Leu	Asp	Ile	Ile	Pro	Pro	Gly	His	Thr	Pro	Asn	Trp	Val	Leu	Gly	Asn	
				340				345						350			
	cac	gac	aaa	cgt	cgt	gtt	tcg	tca	cga	atg	ggg	gga	gac	cat	atg	gta	1104
	His	Asp	Lys	Arg	Arg	Val	Ser	Ser	Arg	Met	Gly	Gly	Asp	His	Met	Val	
			355					360					365				
	gac	ata	atg	gct	atg	atc	gag	ctc	acc	tta	ccc	ggc	ata	acg	gtc	act	1152
	Asp	Ile	Met	Ala	Met	Ile	Glu	Leu	Thr	Leu	Pro	Gly	Ile	Thr	Val	Thr	

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370	tac	cag	gga	gaa	gaa	att	375	gga	atg	cat	gac	ggt	380	gat	atc	tcg	tgg	gcg	1200
	Tyr	Gln	Gly	Glu	Glu	Ile		Gly	Met	His	Asp	Val		Asp	Ile	Ser	Trp	Ala	
385	gac	act	caa	gat	cct	gct	390	gca	tgc	cag	ctg	acc	395	gaa	gag	acg	tat	cag	
	Asp	Thr	Gln	Asp	Pro	Ala		Ala	Cys	Gln	Leu	Thr		Glu	Glu	Thr	Tyr	Gln	1248
					405						410						415		
	gaa	ggt	aca	cg	gac	cca	gcc	aga	aca	ccg	ttc	cag	tgg	gat	tct	act			1296
	Glu	Gly	Thr	Arg	Asp	Pro	Ala	Arg	Thr	Pro	Phe	Gln	Trp	Asp	Ser	Thr			
				420					425								430		
	gca	aac	gca	ggt	ttt	acg	aac	gct	tct	gta	aaa	ccg	tgg	ctt	ccg	cta			1344
	Ala	Asn	Ala	Gly	Phe	Thr	Asn	Ala	Ser	Val	Lys	Pro	Trp	Leu	Pro	Leu			
				435				440					445						
	gct	acc	gat	tat	ccg	ctg	gtg	aac	gta	aaa	aca	caa	caa	gaa	tca	gcc			1392
	Ala	Thr	Asp	Tyr	Pro	Leu	Val	Asn	Val	Lys	Thr	Gln	Gln	Glu	Ser	Ala			
							450						460						
	caa	aac	agt	cat	ata	aag	gtg	ttc	aag	gag	ctg	atg	aac	tta	cg	ggc			1440
	Gln	Asn	Ser	His	Ile	Lys	Val	Phe	Lys	Glu	Leu	Met	Asn	Leu	Arg	Gly			
							470									480			
	acg	aac	acg	ctt	atc	tgg	ggc	tcg	ttt	aag	tca	ctg	gta	ctt	ggc	gaa			1488
	Thr	Asn	Thr	Leu	Ile	Trp	Gly	Ser	Phe	Lys	Ser	Leu	Val	Leu	Gly	Glu			
					485					490						495			
	aat	gtg	tac	gct	ata	ctg	cg	tct	ttc	ccc	aac	gac	aaa	cga	aca	tat			1536
	Asn	Val	Tyr	Ala	Ile	Leu	Arg	Ser	Phe	Pro	Asn	Asp	Lys	Arg	Thr	Tyr			
				500					505					510					
	gtc	gtg	ctg	gca	aac	att	ggc	tcc	aag	agc	gaa	ata	att	gac	gct	aca			1584
	Val	Val	Leu	Ala	Asn	Ile	Gly	Ser	Lys	Ser	Glu	Ile	Ile	Asp	Ala	Thr			
							515						525						
	aaa	ctg	gac	aac	agt	tta	ccg	aac	gag	ctt	gtg	ttt	cg	gtg	gta	agc			1632
	Lys	Leu	Asp	Asn	Ser	Leu	Pro	Asn	Glu	Leu	Val	Phe	Arg	Val	Val	Ser			
							530						540						
	gta	tcg	tca	aac	cat	atc	acc	gga	gaa	tcg	gtc	gca	aca	aac	aac	att			1680
	Val	Ser	Ser	Asn	His	Ile	Thr	Gly	Glu	Ser	Val	Ala	Thr	Asn	Asn	Ile			
							545						555			560			
	ctt	tta	cag	cct	tac	gaa	gcc	gta	gtt	ttg	gct	aac	cat	gca	att	cga			1728
	Leu	Leu	Gln	Pro	Tyr	Glu	Ala	Val	Val	Leu	Ala	Asn	His	Ala	Ile	Arg			
					565					570						575			
	ctg	gcg	cag	cag	ctt	tat	gta	ttg	atc	ggg	gct	ttt	ggg	atg	ttg	gtg			1776
	Leu	Ala	Gln	Gln	Leu	Tyr	Val	Leu	Ile	Gly	Ala	Phe	Gly	Met	Leu	Val			
				580					585					590					
	ggg	gtg	caa	ttg	ttt	aag	gcg	taa											1800
	Gly	Val	Gln	Leu	Phe	Lys	Ala												
			595																

<210> 170

<211> 599

<212> PRT

<213> Anopheles gambiae str. PEST

<400> 170

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1 Val Thr Ala Gln Lys Asp Trp Trp Glu Ser Ala Ser Phe Tyr Gln Ile
20 Tyr Pro Arg Ser Phe Gln Asp Ser Asn Gly Asp Gly Ile Gly Asp Leu
35 Asn Gly Ile Lys Ser Arg Leu Pro Tyr Leu Lys Ser Leu Gly Met Thr
50 Ala Phe Trp Leu Ser Pro Ile Tyr Pro Ser Pro Met Ala Asp Phe Gly
65 Tyr Asp Ile Ser Asn Phe Met Asp Ile His Pro Ser Phe Gly Thr Leu
80 Ala Asp Phe Lys Gln Leu Val Glu Glu Ala Lys Lys Leu Gln Leu Arg
100 Ile Ile Leu Asp Phe Val Pro Asn His Ser Ser Asp Glu His Glu Trp
115 Phe Lys Lys Ser Val Gln Arg Val Ser Gly Tyr Glu Asp Tyr Tyr Val
130 Trp Gln Asp Pro Lys Pro Gly Thr Glu Arg Asp Pro Asn Asn Trp

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145	Val	Ala	Ala	Trp	Tyr	150	Gly	Ser	Ala	Trp	Glu	155	Trp	Asn	Asp	Glu	Arg	160	Lys
	Gln	Phe	Tyr	Leu	His	165	Gln	Phe	His	Lys	170	Lys	Gln	Pro	Asp	Leu	Asn	175	Tyr
	Arg	Asn	Pro	Ala	Val	180	Val	Gln	Ala	Met	185	Lys	Asp	Val	Leu	Arg	Phe	190	Trp
	Leu	Asp	Gln	Gly	Val	195	Asp	Gly	Phe	Arg	200	Ile	Asp	Ala	Val	Pro	Trp	205	Leu
	Phe	Glu	Thr	Val	Gly	210	Phe	Pro	Asp	Glu	215	Pro	Val	Ser	Gly	His	Ser	220	Thr
225	Asp	Pro	Leu	Ser	Gln	230	Asn	Tyr	Leu	Thr	235	His	Ile	Tyr	Thr	Leu	Asp	240	Gln
	Pro	Glu	Thr	Val	Asp	245	Met	Val	Tyr	Gln	250	Trp	Arg	Glu	Leu	Met	Asp	255	Gln
	Tyr	Lys	Gln	Glu	His	260	Asn	Thr	Thr	Thr	265	Lys	Val	Leu	Met	Thr	Glu	270	Ala
	Trp	Ser	Ser	Leu	Asp	275	Val	Val	Lys	Thr	280	Tyr	Phe	Asn	Asp	Ser	Asn	285	Asn
	Arg	Gln	Gly	Ser	Gln	290	Met	Pro	Phe	Asn	295	Phe	Gln	Leu	Ile	Met	Arg	300	Leu
305	Asp	Gln	Asn	Ser	Lys	310	Ala	Ser	Asp	Phe	315	Gln	Thr	Val	Ile	Asn	Ser	320	Trp
	Leu	Asp	Ile	Ile	Pro	325	Pro	Gly	His	Thr	330	Pro	Asn	Trp	Val	Leu	Gly	335	Asn
	His	Asp	Lys	Arg	Arg	340	Val	Ser	Ser	Arg	345	Met	Gly	Gly	Asp	His	Met	350	Val
	Asp	Ile	Met	Ala	Met	355	Ile	Glu	Leu	Thr	360	Leu	Pro	Gly	Ile	Thr	Val	365	Thr
	Tyr	Gln	Gly	Glu	Glu	370	Ile	Gly	Met	His	375	Val	Asp	Val	Asp	Ile	Ser	380	Ala
385	Asp	Thr	Gln	Asp	Pro	390	Ala	Ala	Cys	Gln	395	Leu	Thr	Glu	Glu	Thr	Tyr	400	Gln
	Glu	Gly	Thr	Arg	Asp	405	Pro	Ala	Arg	Thr	410	Pro	Phe	Gln	Trp	Asp	Ser	415	Thr
	Ala	Asn	Ala	Gly	Phe	420	Thr	Asn	Ala	Ser	425	Val	Lys	Pro	Trp	Leu	Pro	430	Leu
	Ala	Thr	Asp	Tyr	Pro	435	Leu	Val	Asn	Val	440	Lys	Thr	Gln	Gln	Glu	Ser	445	Ala
	Gln	Asn	Ser	His	Ile	450	Val	Phe	Lys	Glu	455	Leu	Met	Asn	Leu	Arg	Gly	460	Gly
465	Thr	Asn	Thr	Leu	Ile	470	Trp	Gly	Ser	Phe	475	Lys	Ser	Leu	Val	Leu	Gly	480	Glu
	Asn	Val	Tyr	Ala	Ile	485	Leu	Arg	Ser	Phe	490	Pro	Asn	Asp	Lys	Arg	Thr	495	Tyr
	Val	Val	Leu	Ala	Asn	500	Ile	Gly	Ser	Lys	505	Ser	Glu	Ile	Ile	Asp	Ala	510	Thr
	Lys	Leu	Asp	Asn	Ser	515	Leu	Pro	Asn	Glu	520	Leu	Val	Phe	Arg	Val	Val	525	Ser
	Val	Ser	Ser	Asn	His	530	Ile	Thr	Gly	Glu	535	Val	Ala	Thr	Asn	Asn	Ile	540	Ile
545	Leu	Leu	Gln	Pro	Tyr	550	Glu	Ala	Val	Val	555	Leu	Ala	Asn	His	Ala	Ile	560	Arg
	Leu	Ala	Gln	Gln	Leu	565	Tyr	Val	Leu	Ile	570	Gly	Ala	Phe	Gly	Met	Leu	575	Val
	Gly	Val	Gln	Leu	Phe	580	Lys	Ala			585							590	
						595													

<210> 171

<211> 1509

<212> DNA

<213> Anopheles gambiae str. PEST

<220>

<221> CDS

<222> (1)..(1509)

<400> 171

atg ctt gct ggg gca ctc tct tta gtg gca tgt tta gat ctt acc gta
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Met 1	Leu	Ala	Gly	Ala 5	Leu	Ser	Leu	Val	Ala 10	Cys	Leu	Asp	Leu	Thr 15	Val	
cca Pro	acg Thr	tcc Ser	cgc Arg 20	gat Asp	tgg Trp	tgg Trp	gaa Glu	aag Lys 25	gct Ala	gcc Ala	ttc Phe	tat Tyr	caa Gln 30	atc Ile	tat Tyr	96
ccc Pro	cga Arg	tcg Ser 35	ttc Phe	atg Met	gac Asp	agt Ser	gat Asp 40	ggg Gly	gat Asp	ggg Gly	gtg Val	ggc Gly 45	gat Asp	ctt Leu	aac Asn	144
gga Gly	att Ile 50	gct Ala	tcg Ser	aag Lys	ctg Leu	ccg Pro 55	tac Tyr	ctg Leu	aag Lys	tcg Ser	atc Ile 60	gga Gly	gtg Val	aag Lys	gcg Ala	192
ttc Phe 65	tgg Trp	atg Met	tca Ser	ccg Pro	atc Ile 70	tac Tyr	aaa Lys	tca Ser	ccg Pro	atg Met 75	gtc Val	gat Asp	ttt Phe	ggc Gly	tat Tyr 80	240
gat Asp	att Ile	tct Ser	gac Asp	ttt Phe 85	cgg Arg	gac Asp	att Ile	cac His	gag Glu 90	gag Glu	ttt Phe	gga Gly	acg Thr	atg Met 95	gct Ala	288
gac Asp	ttt Phe	gag Glu	cgg Arg 100	ttg Leu	gtg Val	gag Glu	cag Gln	gcg Ala 105	cac His	ggg Gly	ctc Leu	ggc Gly	ctg Leu 110	aag Lys	gtg Val	336
atc Ile	atg Met	gac Asp 115	ttt Phe	gtg Val	ccg Pro	aac Asn	cat His 120	tcg Ser	agc Ser	aat Asn	ctg Leu	cac His 125	gag Glu	tgg Trp	ttc Phe	384
gta Val	aag Lys 130	tcg Ser	gaa Glu	cag Gln	cga Arg	gag Glu 135	ccg Pro	ggc Gly	tat Tyr	gag Glu	gac Asp 140	tat Tyr	tac Tyr	gtg Val	tgg Trp	432
cat His 145	gat Asp	ggg Gly	aag Lys	gtt Val	aat Asn 150	ccg Pro	gcg Ala	ggc Gly	ggt Gly	agg Arg 155	aac Asn	tta Leu	cca Pro	cca Pro	aac Asn 160	480
aat Asn	tgg Trp	att Ile	caa Gln	gcc Ala 165	ttc Phe	cgt Arg	ggc Gly	agt Ser	gca Ala 170	tgg Trp	cag Gln	tgg Trp	agt Ser	gat Asp 175	cag Gln	528
cgg Arg	caa Gln	cag Gln	tac Tyr 180	tac Tyr	cta Leu	cac His	cag Gln	ttc Phe 185	acc Thr	gtc Val	gag Glu	caa Gln	ccg Pro 190	gac Asp	tta Leu	576
aac Asn	tac Tyr	cga Arg 195	aat Asn	ccg Pro	acg Thr	gtc Val	gtt Val 200	cag Gln	gag Glu	atg Met	aaa Lys	gat Asp 205	gtg Val	ctg Leu	ctg Leu	624
ttc Phe	tgg Trp 210	ctg Leu	ggc Gly	aag Lys	ggc Gly	gtg Val 215	gac Asp	ggg Gly	ttc Phe	agg Arg	atc Ile 220	gat Asp	gcc Ala	gtg Val	ccg Pro	672
acg Thr 225	ctg Leu	tac Tyr	gaa Glu	gat Asp 230	acg Thr	cag Gln	ctg Leu	cgc Arg	gac Asp 235	gag Glu	cca Pro	gtg Val	agc Ser	ggg Gly	ctg Leu 240	720
acg Thr	gat Asp	gat Asp	ccc Pro	gaa Glu 245	gat Asp	acc Thr	aac Asn	tac Tyr 250	ctg Leu	cga Arg	cac His	atc Ile	tac Tyr	acg Thr 255	cag Gln	768
gat Asp	ctg Leu	cca Pro	gaa Glu 260	acg Thr	gtc Val	gag Glu	atg Met	gtg Val 265	tac Tyr	gaa Glu	tgg Trp	cgg Arg	gaa Glu 270	ctg Leu	atc Ile	816
gat Asp	gca Ala 275	ttc Phe	cag Gln	gca Ala	gag Glu	cat His	ggc Gly 280	ggc Gly	gag Glu	acg Thr	cgc Arg	gtc Val 285	atc Ile	atg Met	acg Thr	864
gag Glu	gcc Ala 290	tac Tyr	tca Ser	acg Thr	cta Leu	gat Asp 295	gtg Val	atc Ile	aag Lys	acg Thr	tat Tyr 300	tac Tyr	gcg Ala	agc Ser	agt Ser	912
aca Thr 305	gga Gly	cgg Arg	ttg Leu	gga Gly	tcc Ser 310	cat His	atg Met	ccg Pro	ttc Phe	aac Asn 315	ttt Phe	cga Arg	ctc Leu	att Ile	acc Thr 320	960
gaa Glu	gtg Val	gac Asp	aag Lys	caa Gln 325	tcg Ser	acg Thr	gct Ala	gcg Ala	gac Asp 330	tac Tyr	gtg Val	aag Lys	gtg Val	gtc Val 335	aag Lys	1008
gat Asp	tgg Trp	atg Met	agc Ser 340	ata Ile	ctg Leu	cct Pro	gcc Ala	gga Gly 345	cag Gln	gtg Val	cca Pro	aac Asn	tgg Trp 350	gtg Val	atg Met	1056
ggc Gly	aat Asn	cat His 355	gat Asp	cgt Arg	cca Pro	cgc Arg	gtt Val 360	gcc Ala	acg Thr	cgt Arg	ctc Leu	ggg Gly 365	gag Glu	gaa Glu	cga Arg	1104
att gac	gca	ctg	aac	atg	gtg	ctg	ctg	tcc	ctc	tcc	ggc	gca	agt	gtc		1152

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Ile	Asp	Ala	Leu	Asn	Met	Val	Leu	Leu	Ser	Leu	Ser	Gly	Ala	Ser	Val		
370	370					375				380							
aca	tac	caa	ggg	gaa	gag	att	ggc	atg	acc	gat	gtg	tac	atc	tcc	tgg	1200	
Thr	Tyr	Gln	Gly	Glu	Glu	Ile	Gly	Met	Thr	Asp	Val	Tyr	Ile	Ser	Trp		
385					390					395					400		
gag	gac	acc	gtc	gat	ccg	gcg	gcc	tgc	aat	gca	ggc	aaa	gac	cta	tac	1248	
Glu	Asp	Thr	Val	Asp	Pro	Ala	Ala	Cys	Asn	Ala	Gly	Lys	Asp	Leu	Tyr		
				405					410					415			
gcg	gaa	aag	tca	cg	gat	ccg	tgc	cg	aca	ccg	ttc	cag	tgg	gat	gat	1296	
Ala	Glu	Lys	Ser	Arg	Asp	Pro	Cys	Arg	Thr	Pro	Phe	Gln	Trp	Asp	Asp		
			420				425						430				
acg	gca	atg	gct	ggg	ttt	act	acc	ggc	tcc	aaa	acc	tgg	cta	ccc	gtc	1344	
Thr	Ala	Met	Ala	Gly	Phe	Thr	Thr	Gly	Ser	Lys	Thr	Trp	Leu	Pro	Val		
		435				440						445					
ggc	gac	cgg	tac	agg	gaa	gtg	aac	gtg	cag	gcg	caa	ctt	gcg	gcc	gaa	1392	
Gly	Asp	Arg	Tyr	Arg	Glu	Val	Asn	Val	Gln	Ala	Gln	Leu	Ala	Ala	Glu		
					455						460						
aaa	agt	cac	ctc	aaa	gtg	tac	caa	tcg	atg	atg	gaa	ttg	cg	aag	acg	1440	
Lys	Ser	His	Leu	Lys	Val	Tyr	Gln	Ser	Met	Met	Glu	Leu	Arg	Lys	Thr		
465					470					475					480		
aaa	act	tac	cag	ctc	gg	acg	gtg	aaa	gca	gtt	gcg	ctc	ggc	gat	tcc	1488	
Lys	Thr	Tyr	Gln	Leu	Gly	Thr	Val	Lys	Ala	Val	Ala	Leu	Gly	Asp	Ser		
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gtg	ctg	gcg	gtt	gtg	cga	tag										1509	
Val	Leu	Ala	Val	Val	Arg												
			500														

<210> 172

<211> 502

<212> PRT

<213> Anopheles gambiae str. PEST

<400> 172

Met	Leu	Ala	Gly	Ala	Leu	Ser	Leu	Val	Ala	Cys	Leu	Asp	Leu	Thr	Val		
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Pro	Thr	Ser	Arg	Asp	Trp	Trp	Glu	Lys	Ala	Ala	Phe	Tyr	Gln	Ile	Tyr		
			20					25					30				
Pro	Arg	Ser	Phe	Met	Asp	Ser	Asp	Gly	Asp	Gly	Val	Gly	Asp	Leu	Asn		
		35					40					45					
Gly	Ile	Ala	Ser	Lys	Leu	Pro	Tyr	Leu	Lys	Ser	Ile	Gly	Val	Lys	Ala		
		50				55					60						
Phe	Trp	Met	Ser	Pro	Ile	Tyr	Lys	Ser	Pro	Met	Val	Asp	Phe	Gly	Tyr		
65					70					75					80		
Asp	Ile	Ser	Asp	Phe	Arg	Asp	Ile	His	Glu	Glu	Phe	Gly	Thr	Met	Ala		
				85					90					95			
Asp	Phe	Glu	Arg	Leu	Val	Glu	Gln	Ala	His	Gly	Leu	Gly	Leu	Lys	Val		
			100					105					110				
Ile	Met	Asp	Phe	Val	Pro	Asn	His	Ser	Ser	Asn	Leu	His	Glu	Trp	Phe		
		115				120						125					
Val	Lys	Ser	Glu	Gln	Arg	Glu	Pro	Gly	Tyr	Glu	Asp	Tyr	Tyr	Val	Trp		
	130					135					140						
His	Asp	Gly	Lys	Val	Asn	Pro	Ala	Gly	Gly	Arg	Asn	Leu	Pro	Pro	Asn		
145					150					155					160		
Asn	Trp	Ile	Gln	Ala	Phe	Arg	Gly	Ser	Ala	Trp	Gln	Trp	Ser	Asp	Gln		
				165					170					175			
Arg	Gln	Gln	Tyr	Tyr	Leu	His	Gln	Phe	Thr	Val	Glu	Gln	Pro	Asp	Leu		
			180					185					190				
Asn	Tyr	Arg	Asn	Pro	Thr	Val	Val	Gln	Glu	Met	Lys	Asp	Val	Leu	Leu		
		195				200						205					
Phe	Trp	Leu	Gly	Lys	Gly	Val	Asp	Gly	Phe	Arg	Ile	Asp	Ala	Val	Pro		
	210					215					220						
Thr	Leu	Tyr	Glu	Asp	Thr	Gln	Leu	Arg	Asp	Glu	Pro	Val	Ser	Gly	Leu		
225					230					235					240		
Thr	Asp	Asp	Pro	Glu	Asp	Thr	Asn	Tyr	Leu	Arg	His	Ile	Tyr	Thr	Gln		
				245					250					255			
Asp	Leu	Pro	Glu	Thr	Val	Glu	Met	Val	Tyr	Glu	Trp	Arg	Glu	Leu	Ile		
			260					265					270				
Asp	Ala	Phe	Gln	Ala	Glu	His	Gly	Gly	Glu	Thr	Arg	Val	Ile	Met	Thr		
		275					280						285				

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Glu Ala Tyr Ser Thr Leu Asp Val Ile Lys Thr Tyr Ala Ser Ser
 290 300
 Thr Gly Arg Leu Gly Ser His Met Pro Phe Asn Phe Arg Leu Ile Thr
 305 310 315 320
 Glu Val Asp Lys Gln Ser Thr Ala Ala Asp Tyr Val Lys Val Val Lys
 325 330 335
 Asp Trp Met Ser Ile Leu Pro Ala Gly Gln Val Pro Asn Trp Val Met
 340 345 350
 Gly Asn His Asp Arg Pro Arg Val Ala Thr Arg Leu Gly Glu Glu Arg
 355 360 365
 Ile Asp Ala Leu Asn Met Val Leu Leu Ser Leu Ser Gly Ala Ser Val
 370 375 380
 Thr Tyr Gln Gly Glu Glu Ile Gly Met Thr Asp Val Tyr Ile Ser Trp
 385 390 395 400
 Glu Asp Thr Val Asp Pro Ala Ala Cys Asn Ala Gly Lys Asp Leu Tyr
 405 410 415
 Ala Glu Lys Ser Arg Asp Pro Cys Arg Thr Pro Phe Gln Trp Asp Asp
 420 425 430
 Thr Ala Met Ala Gly Phe Thr Thr Gly Ser Lys Thr Trp Leu Pro Val
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 Gly Asp Arg Tyr Arg Glu Val Asn Val Gln Ala Gln Leu Ala Ala Glu
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 Lys Ser His Leu Lys Val Tyr Gln Ser Met Met Glu Leu Arg Lys Thr
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<213> Gibberella zeae PH-1

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Val Tyr Gln Ile Tyr Pro Ala Ser Tyr Gln Asp Ser Thr Gly Ser Gly	
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Val Gly Asp Leu Lys Gly Ile Ile Ser Arg Val Asp Tyr Leu Lys Asp	
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Leu Gly Val Asp Ile Ile Trp Leu Ser Pro Ile Phe Lys Ser Pro Gln	
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Val Asp Met Gly Tyr Asp Ile Ser Asp Tyr Tyr Thr Val Asp Pro Pro	
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Tyr Gly Asn Val Ser Asp Val Asp Val Leu Lys Asp Lys Leu His Glu	
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cga gga atg aaa ctt gtt ctc gat ttg gtg atg aac cac acc agc gac	336
Arg Gly Met Lys Leu Val Leu Asp Leu Val Met Asn His Thr Ser Asp	
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Gln His Glu Trp Phe Lys Glu Ser Arg Lys Ser Lys Asp Asn Pro Tyr	
115 120 125	
cga gac tgg tat atc tgg aag cct gca aag tac gat gca gac gga aac	432
Arg Asp Trp Tyr Ile Trp Lys Pro Ala Lys Tyr Asp Ala Asp Gly Asn	
130 135 140	
aga cac ccc ccc aac aac tgg gat gct cac ttc cag gga agt gcc tgg	480
Arg His Pro Pro Asn Asn Trp Asp Ala His Phe Gln Gly Ser Ala Trp	
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cag Gln	cag Gln	cca Pro	gat Asp 180	ctc Leu	aac Asn	tgg Trp	gag Glu	aac Asn 185	cca Pro	gcg Ala	gtc Val	aga Arg	aaa Lys 190	cag Gln	gtc Val	576
cac His	cag Gln	gta Val 195	atg Met	cgc Arg	ttc Phe	tgg Trp	ctt Leu 200	gac Asp	cga Arg	ggc Gly	gtc Val	gat Asp 205	ggg Gly	ttc Phe	cgc Arg	624
atg Met	gac Asp 210	gtc Val	atc Ile	aac Asn	ttt Phe	gtc Val 215	agc Ser	aag Lys	gac Asp	caa Gln	gca Ala 220	ttc Phe	ccc Pro	gac Asp	tca Ser	672
gac Asp 225	aag Lys	act Thr	gtc Val	ctc Leu	cgt Arg 230	ggg Gly	aca Thr	gag Glu	tac Tyr	tat Tyr 235	gca Ala	tgt Cys	ggg Gly	cct Pro	agg Arg 240	720
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gcc Ala	ttt Phe	agt Ser	gtt Val 260	ggg Gly	gaa Glu	atg Met	cct Pro	tgt Cys 265	ggt Val	cat His	gat Asp	gag Glu	agg Arg 270	gag Glu	ttg Leu	816
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aga Arg 305	tcc Ser	tgg Trp	aaa Lys	cta Leu	tca Ser 310	gag Glu	ctg Leu	aag Lys	gct Ala 315	aca Thr	acc Thr	ctc Leu	aag Lys	tgg Trp	cag Gln 320	960
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cac His	gat Asp	cag Gln	cca Pro 340	cga Arg	gct Ala	gtc Val	agc Ser	cgc Arg 345	ttc Phe	gtc Val	cac His	gat Asp 350	gat Asp	cct Pro	gag Glu	1056
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tca Ser	ggc Gly 370	aca Thr	ccc Pro	ttc Phe	atc Ile	tac Tyr 375	caa Gln	ggc Gly	cag Gln	gag Glu	att Ile 380	ggg Gly	atg Met	acc Thr	aat Asn	1152
gtt Val 385	ccg Pro	aag Lys	gac Asp	tgg Trp	gac Asp 390	ttg Leu	gaa Glu	gag Glu	tac Tyr	aag Lys 395	gac Asp	ctt Leu	gac Asp	tgt Cys	ctt Leu 400	1200
aaa Lys	cat His	tgg Trp	gat Asp	ctt Leu 405	cac His	aag Lys	aat Asn	gat Asp 410	gat Val	ggt Val	gca Ala	gcc Ala	cag Gln	aat Asn 415	tcc Ser	1248
tac Tyr	aag Lys	gtc Val	gag Glu 420	tat Tyr	caa Gln	agg Arg	aag Lys	tct Ser 425	cgt Arg	gac Asp	aac Asn	gct Ala	cgt Arg 430	acc Thr	cct Pro	1296
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aac Asn	ccg Pro 450	tgg Trp	atg Met	cgc Arg	gtc Val	aac Asn 455	gac Asp	aac Asn	tat Tyr	acc Thr	gac Asp 460	atc Ile	aac Asn	gct Ala	gct Ala	1392
tca Ser 465	cag Gln	aca Thr	tca Ser	gat Asp 470	tcc Ser	aac Asn	tct Ser	gtg Val	tac Tyr	agc Ser	tgt Cys	tat Tyr	cgt Arg	caa Gln	gta Val 480	1440
ctt Leu	ggg Gly	aag Lys	cgc Arg	aag Lys 485	gag Glu	tac Tyr	aag Lys	gat Asp	atc Ile 490	ttt Phe	gtc Val	tat Tyr	ggg Gly	aac Asn 495	ttc Phe	1488
caa Gln	ctc Leu	gtg Val	gac Asp 500	gag Glu	tcc Ser	aac Asn	gac Asp 505	aag Lys	atc Ile	ttt Phe	gcg Ala	tac Tyr	tca Ser 510	cga Arg	cgg Arg	1536
gct Ala	gat Asp	agc Ser 515	ggg Gly	gag Glu	acg Thr	gct Ala	ctc Leu 520	gtc Val	gtg Val	tgc Cys	aac Asn	ttc Phe 525	tca Ser	gtg Val	gat Asp	1584

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Pro	Ala	Gly	Arg	Thr	Leu	Asn	Asp	Leu	Asn	Ser	Gly	Glu	Ile	Lys	Leu	
545					550					555					560	
gca	ccc	tgt	gag	gct	ttc	gct	gtc	ctc	ctg	aaa	tga					1716
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<212> PRT

<213> Gibberella zeae PH-1

<400> 174

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Leu	Gly	Val	Asp	Ile	Ile	Trp	Leu	Ser	Pro	Ile	Phe	Lys	Ser	Pro	Gln	
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Val	Asp	Met	Gly	Tyr	Asp	Ile	Ser	Asp	Tyr	Tyr	Thr	Val	Asp	Pro	Pro	
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Tyr	Gly	Asn	Val	Ser	Asp	Val	Asp	Val	Leu	Lys	Asp	Lys	Leu	His	Glu	
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Arg	Gly	Met	Lys	Leu	Val	Leu	Asp	Leu	Val	Met	Asn	His	Thr	Ser	Asp	
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Glu	Tyr	Asp	Glu	Ile	Thr	Asp	Glu	Tyr	Tyr	Leu	Cys	Leu	Phe	Cys	Lys	
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Gln	Gln	Pro	Asp	Leu	Asn	Trp	Glu	Asn	Pro	Ala	Val	Arg	Lys	Gln	Val	
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Ile	Lys	Ala	Val	His	Gly	Asp	Arg	Gly	Glu	Leu	Ser	Met	Ile	Phe	His	
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Phe	Glu	Leu	Met	Asp	Leu	Asp	His	Gly	Val	Glu	Gly	Lys	Phe	Thr	Pro	
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His	Asp	Gln	Pro	Arg	Ala	Val	Ser	Arg	Phe	Val	His	Asp	Asp	Pro	Glu	
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Val	Pro	Lys	Asp	Trp	Asp	Leu	Glu	Glu	Tyr	Lys	Asp	Leu	Asp	Cys	Leu	
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				405					410					415		
Tyr	Lys	Val	Glu	Tyr	Gln	Arg	Lys	Ser	Arg	Asp	Asn	Ala	Arg	Thr	Pro	

Met	Gln	Trp	Asp	Ala	Ser	Pro	Asn	Ala	Gly	Phe	Thr	Thr	Ala	Asp	Ala
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	450					455					460				
Ser	Gln	Thr	Ser	Asp	Ser	Asn	Ser	Val	Tyr	Ser	Cys	Tyr	Arg	Gln	Val
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Leu	Gly	Lys	Arg	Lys	Glu	Tyr	Lys	Asp	Ile	Phe	Val	Tyr	Gly	Asn	Phe
				485					490					495	
Gln	Leu	Val	Asp	Glu	Ser	Asn	Asp	Lys	Ile	Phe	Ala	Tyr	Ser	Arg	Arg
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<213> *Leptospira interrogans* serovar Copenhageni str. Fiocruz L1-130

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gac Asp	gga Gly 130	aga Arg	gga Gly	aaa Lys	aat Asn	aaa Lys 135	cct Pro	cct Pro	aat Asn	aat Asn	tgg Trp 140	agt Ser	tcg Ser	ttt Phe	gtg Val	432
aca Thr 145	ccc Pro	aag Lys	gcc Ala	tgg Trp	cat His 150	tat Tyr	gat Asp	tcc Ser	aat Asn	acg Thr 155	gat Asp	caa Gln	tgg Trp	tat Tyr	ctt Leu 160	480
gcg Ala	agt Ser	ttt Phe	cta Leu	gat Asp 165	ttt Phe	caa Gln	cca Pro	gac Asp	tta Leu 170	aat Asn	tat Tyr	tac Tyr	aat Asn	cca Pro 175	gaa Glu	528
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gta Val	gat Asp	ggt Gly	ttc Phe	cgt Arg	ttg Leu	gat Asp	att Ile	ttt Phe	cac His	gcg Ala	att Ile	tat Tyr	aag Lys	gat Asp	aaa Lys	624

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<212> PRT

<213> *Leptospira interrogans* serovar Copenhageni str. Fiocruz L1-130

<400> 176

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Ile Ser Pro Leu Tyr Lys Ser Pro Gln Met Asp His Gly Tyr Asp Val
50      55      60
Ser Asp Tyr Tyr Ser Ile Ala Pro Glu Tyr Gly Thr Ile Lys Asp Ala
65      70      75      80
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85      90      95
Asp Met Val Met Asn His Thr Ser Ile Glu His Asp Trp Phe Ile Gln
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Ser Arg Ser Ser Arg Asp Asn Pro Lys Arg Asp Trp Tyr Ile Trp Lys
115     120     125
Asp Gly Arg Gly Lys Asn Lys Pro Pro Asn Asn Trp Ser Ser Phe Val
130     135     140
Thr Pro Lys Ala Trp His Tyr Asp Ser Asn Thr Asp Gln Trp Tyr Leu
145     150     155     160
Ala Ser Phe Leu Asp Phe Gln Pro Asp Leu Asn Tyr Tyr Asn Pro Glu
165     170     175
Val Lys Lys Ala Met Phe Asp Val Leu Arg Phe Trp Leu Lys Lys Gly
180     185     190
Val Asp Gly Phe Arg Leu Asp Ile Phe His Ala Ile Tyr Lys Asp Lys
195     200     205
Tyr Phe Arg Asp Asn Pro Phe Arg Phe Lys Tyr Ile Val Ser Glu Asn
210     215     220
Asp His Asp Gly Tyr Phe Gln Ser Arg Val His Thr Val Asn His Pro
225     230     235     240
Asn Asn Phe Ala Phe Ala Lys Glu Leu Arg Ser Val Leu Asp Glu Phe
245     250     255
Asp Gly Asp Arg Phe Ala Val Gly Glu Val Ala Gly Asp Asp His Ile
260     265     270
Ile Lys Arg Tyr Leu Gly Glu Lys Asp Gly Leu Asn Leu Ile Phe
275     280     285
Leu Phe Glu Thr Leu Leu Leu Lys Phe Lys Thr Ser Phe Phe Lys Gly
290     295     300
Ile Val Lys Lys Met Glu Gln Val Tyr Pro Tyr Pro Asn Val Pro Thr
305     310     315     320
Tyr Val Phe Gly Asn His Asp Gln Arg Arg Tyr Met Met Lys Ile Asn
325     330     335
Asn Asn Leu Glu Lys Gly Lys Leu Ile Ala Leu Phe Gln Phe Thr Ala
340     345     350
Arg Gly Val Pro Val Thr Tyr Tyr Gly Glu Glu Ile Gly Met Thr Asn
355     360     365
Glu Thr Ile Lys Leu Thr Glu Ala Gln Asp Pro Leu Ala Arg Ile Tyr
370     375     380
Arg Trp Leu Gly Asp Ser Leu Ser Glu Leu Leu Gly Leu Ala Asp Val
385     390     395     400
Ile Ile Arg Asp Arg Ala Arg Ser Pro Met Gln Trp Asp Asp Ser Pro
405     410     415
Asn Ala Gly Phe Thr Val Gln Glu Ala Lys Pro Trp Ile Arg Val His
420     425     430
Gly Asn Tyr Arg Glu Arg Asn Val Leu Ile Glu Ser Glu Asp Ser Asp
435     440     445
Ser Leu Leu Asn Thr Tyr Lys Ser Val Leu Arg Ile Arg Asn Gly Ser
450     455     460
Phe Ala Leu Lys Glu Gly Ser Leu Arg Leu Ile Glu Glu Asn Val Pro
465     470     475     480
Lys Asp Met Leu Val Tyr Leu Arg Glu Phe Gly Lys Glu Arg Lys Leu
485     490     495
Ile Val Phe Asn Phe Gly Lys Lys Thr Lys Phe Phe Ser Asn Pro Thr
500     505     510

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 515 520
 Phe Asp Gln Phe Lys Ile Pro Cys Ser Gly Val Ile Leu Gly Asn
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<210> 177

<211> 1251

<212> DNA

<213> Thermus thermophilus HB27

<220>

<221> CDS

<222> (1)..(1251)

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acc	gcc	aac	cac	cgc	tac	cac	acc	gtg	gac	tac	ttc	cag	gta	gac	ccc	96
Thr	Ala	Asn	His	Arg	Tyr	His	Thr	Val	Asp	Tyr	Phe	Gln	Val	Asp	Pro	
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atc	ctg	ggg	gga	aac	gag	gcc	tta	agg	tac	ctc	ctg	gag	gtg	gcc	cac	144
Ile	Leu	Gly	Gly	Asn	Glu	Ala	Leu	Arg	Tyr	Leu	Leu	Glu	Val	Ala	His	
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gcc	cac	ggg	gtg	agg	gtc	atc	ctg	gac	ggg	gtc	ttc	aac	cac	acg	ggc	192
Ala	His	Gly	Val	Arg	Val	Ile	Leu	Asp	Gly	Val	Phe	Asn	His	Thr	Gly	
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cgg	ggc	ttc	ttc	gcc	ttc	cag	cac	ctc	atg	gaa	aac	ggc	gag	caa	agc	240
Arg	Gly	Phe	Phe	Ala	Phe	Gln	His	Leu	Met	Glu	Asn	Gly	Glu	Gln	Ser	
					70					75					80	
ccc	tac	cgg	gac	tgg	tac	cac	gtc	aag	ggc	ttc	ccc	cta	aag	gcc	tac	288
Pro	Tyr	Arg	Asp	Trp	Tyr	His	Val	Lys	Gly	Phe	Pro	Leu	Lys	Ala	Tyr	
				85				90						95		
acc	gcc	cac	ccc	aac	tac	gag	gcc	tgg	ggc	aac	ccc	gag	ctc	ccc		336
Thr	Ala	His	Pro	Asn	Tyr	Glu	Ala	Trp	Trp	Gly	Asn	Pro	Glu	Leu	Pro	
			100					105					110			
aag	ctc	aag	gtg	gag	acc	ccg	gcg	gtg	cgg	gaa	tac	ctc	ctc	gcc	gtg	384
Lys	Leu	Lys	Val	Glu	Thr	Pro	Ala	Val	Arg	Glu	Tyr	Leu	Leu	Ala	Val	
			115				120					125				
gcc	gag	cac	tgg	atc	cgc	ttc	gta	gac	ggc	tgg	cgt	ctg	gac	gtg		432
Ala	Glu	His	Trp	Ile	Arg	Phe	Gly	Val	Asp	Gly	Trp	Arg	Leu	Asp	Val	
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ccc	aac	gaa	atc	ccc	gac	ccc	acc	ttc	tgg	cgg	gag	ttc	cgc	caa	agg	480
Pro	Asn	Glu	Ile	Pro	Asp	Pro	Thr	Phe	Trp	Arg	Glu	Phe	Arg	Gln	Arg	
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gtc	aag	ggg	gca	aac	ccc	gag	gcc	tac	atc	gtg	ggg	gag	atc	tgg	gag	528
Val	Lys	Gly	Ala	Asn	Pro	Glu	Ala	Tyr	Ile	Val	Gly	Glu	Ile	Trp	Glu	
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gag	gcg	gac	cct	tgg	ctc	cag	ggg	gac	atg	ttt	gac	gcg	gtg	atg	aac	576
Glu	Ala	Asp	Pro	Trp	Leu	Gln	Gly	Asp	Met	Phe	Asp	Ala	Val	Met	Asn	
			180					185					190			
tac	ccc	ctc	gcc	cgg	gcc	gtc	ctg	ggc	ttc	gtg	ggc	ggg	gag	gcc	ctg	624
Tyr	Pro	Leu	Ala	Arg	Ala	Val	Leu	Gly	Phe	Val	Gly	Gly	Glu	Ala	Leu	
			195			200						205				
gac	cgg	gac	ctc	gcg	gcg	cag	acg	ggc	cta	ggc	cgc	ata	gaa	ccc	ctc	672
Asp	Arg	Asp	Leu	Ala	Ala	Gln	Thr	Gly	Leu	Gly	Arg	Ile	Glu	Pro	Leu	
			210			215						220				
cag	gct	ctg	gcc	ttc	agc	cat	cgg	ctg	gag	gac	ctc	ttc	ggc	cgc	tac	720
Gln	Ala	Leu	Ala	Phe	Ser	His	Arg	Leu	Glu	Asp	Leu	Phe	Gly	Arg	Tyr	
				230					235						240	
cgc	ccc	gag	gtg	gtc	cgg	gcc	cag	atg	aac	ctc	ctc	acc	tcc	cac	gac	768
Arg	Pro	Glu	Val	Arg	Ala	Gln	Met		Asn	Leu	Leu	Thr	Ser	His	Asp	
				245					250					255		
acc	ccc	agg	ctc	ctc	agc	ctg	atg	cgg	ggg	agc	gtg	gag	cgg	gcc	cgg	816
Thr	Pro	Arg	Leu	Leu	Ser	Leu	Met	Arg	Gly	Ser	Val	Glu	Arg	Ala	Arg	
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ctg	gcc	ctg	gcc	ctc	ctc	ttc	ctc	ctc	cgg	ggg	aac	ccc	acc	gtc	tac	864
Leu	Ala	Leu	Ala	Leu	Leu	Phe	Leu	Leu	Pro	Gly	Asn	Pro	Thr	Val	Tyr	

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<211> 416
<212> PRT
<213> Thermus thermophilus HB27

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Ile	Leu	Gly	Gly	Asn	Glu	Ala	Leu	Arg	Tyr	Leu	Leu	Glu	Val	Ala	His
		35					40					45			
Ala	His	Gly	Val	Arg	Val	Ile	Leu	Asp	Gly	Val	Phe	Asn	His	Thr	Gly
	50					55					60				
Arg	Gly	Phe	Phe	Ala	Phe	Gln	His	Leu	Met	Glu	Asn	Gly	Glu	Gln	Ser
65					70					75					80
Pro	Tyr	Arg	Asp	Trp	Tyr	His	Val	Lys	Gly	Phe	Pro	Leu	Lys	Ala	Tyr
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Thr	Ala	His	Pro	Asn	Tyr	Glu	Ala	Trp	Trp	Gly	Asn	Pro	Glu	Leu	Pro
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Lys	Leu	Lys	Val	Glu	Thr	Pro	Ala	Val	Arg	Glu	Tyr	Leu	Leu	Ala	Val
		115					120					125			
Ala	Glu	His	Trp	Ile	Arg	Phe	Gly	Val	Asp	Gly	Trp	Arg	Leu	Asp	Val
	130					135					140				
Pro	Asn	Glu	Ile	Pro	Asp	Pro	Thr	Phe	Trp	Arg	Glu	Phe	Arg	Gln	Arg
145					150					155				160	
Val	Lys	Gly	Ala	Asn	Pro	Glu	Ala	Tyr	Ile	Val	Gly	Glu	Ile	Trp	Glu
				165					170					175	
Glu	Ala	Asp	Pro	Trp	Leu	Gln	Gly	Asp	Met	Phe	Asp	Ala	Val	Met	Asn
			180					185					190		
Tyr	Pro	Leu	Ala	Arg	Ala	Val	Leu	Gly	Phe	Val	Gly	Gly	Glu	Ala	Leu
		195					200					205			
Asp	Arg	Asp	Leu	Ala	Ala	Gln	Thr	Gly	Leu	Gly	Arg	Ile	Glu	Pro	Leu
	210					215					220				
Gln	Ala	Leu	Ala	Phe	Ser	His	Arg	Leu	Glu	Asp	Leu	Phe	Gly	Arg	Tyr
225					230					235				240	
Arg	Pro	Glu	Val	Val	Arg	Ala	Gln	Met	Asn	Leu	Leu	Thr	Ser	His	Asp
				245					250					255	
Thr	Pro	Arg	Leu	Leu	Ser	Leu	Met	Arg	Gly	Ser	Val	Glu	Arg	Ala	Arg
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Leu Ala Leu Ala Leu Leu Phe Leu Leu Pro Gly Asn Pro Thr Val Tyr
 275 280 285
 Tyr Gly Glu Glu Val Gly Met Ala Gly Gly Lys Asp Pro Glu Asn Arg
 290 295 300
 Gly Gly Met Val Trp Glu Glu Ala Arg Trp Gln Lys Asp Leu Leu Glu
 305 310 315 320
 Thr Val Lys Arg Leu Ala Arg Leu Arg Lys Glu His Pro Ala Leu Arg
 325 330 335
 Thr Ala Pro Tyr Leu Arg Ile Tyr Ala Gln Asp Gly His Leu Ala Phe
 340 345 350
 Ala Arg Gly Pro His Leu Ala Val Val Asn Ala Ser Pro His Pro Phe
 355 360 365
 Arg Gln Asp Phe Pro Leu His Gly Val Phe Pro Arg Gly Gly Arg Ala
 370 375 380
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<210> 179

<211> 1662

<212> DNA

<213> *Listeria monocytogenes* str. 4b F2365

<220>

<221> CDS

<222> (1)..(1662)

<223> transl_table=11

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Pro	Lys	Ser	Phe	Asn	Asp	Ser	Asn	Gly	Asp	Gly	Val	Gly	Asp	Ile	Gln	
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gga	att	atc	gag	aaa	tta	gat	tat	tta	aaa	gag	cta	ggg	gtg	gac	gtt	144
Gly	Ile	Ile	Glu	Lys	Leu	Asp	Tyr	Leu	Lys	Glu	Leu	Gly	Val	Asp	Val	
			35				40					45				
atc	tgg	ttg	tcc	cca	gta	tac	gat	tcg	cct	caa	gat	gac	aat	ggg	tac	192
Ile	Trp	Leu	Ser	Pro	Val	Tyr	Asp	Ser	Pro	Gln	Asp	Asp	Asn	Gly	Tyr	
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gat	att	cgc	gat	tat	caa	aaa	att	tac	gaa	gag	tat	gga	gat	atg	gcg	240
Asp	Ile	Arg	Asp	Tyr	Gln	Lys	Ile	Tyr	Glu	Glu	Tyr	Gly	Asp	Met	Ala	
				70					75						80	
act	ttt	gat	caa	tta	ctt	caa	ggg	tta	cac	gac	cgc	gaa	atg	aaa	ctt	288
Thr	Phe	Asp	Gln	Leu	Leu	Gln	Gly	Leu	His	Asp	Arg	Glu	Met	Lys	Leu	
				85					90					95		
gta	atg	gat	ctt	gtt	gtt	aac	cat	act	tct	gat	gaa	cac	aag	tgg	ttt	336
Val	Met	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Glu	His	Lys	Trp	Phe	
			100					105					110			
gag	gaa	tcc	aga	aaa	tcc	aaa	gac	aac	ccg	tac	aga	gat	tac	tat	ttc	384
Glu	Glu	Ser	Arg	Lys	Ser	Lys	Asp	Asn	Pro	Tyr	Arg	Asp	Tyr	Tyr	Phe	
			115				120					125				
tgg	cgc	gag	gaa	aac	gaa	atc	aat	aac	tgg	ggc	tcg	att	ttc	agc	ggg	432
Trp	Arg	Glu	Glu	Asn	Glu	Ile	Asn	Asn	Trp	Gly	Ser	Ile	Phe	Ser	Gly	
			130			135					140					
cca	gca	tgg	gaa	ttg	gac	gaa	aaa	aca	ggg	gag	tac	tat	tta	cac	cta	480
Pro	Ala	Trp	Glu	Leu	Asp	Glu	Lys	Thr	Gly	Glu	Tyr	Tyr	Leu	His	Leu	
				150					155						160	
ttc	tcc	aaa	aaa	caa	cct	gat	tta	aac	tgg	gaa	aac	cct	aaa	tta	cgc	528
Phe	Ser	Lys	Lys	Gln	Pro	Asp	Leu	Asn	Trp	Glu	Asn	Pro	Lys	Leu	Arg	
				165					170					175		
caa	gat	gta	tat	aat	atg	atg	aaa	ttc	tgg	cta	gat	aaa	ggc	att	gat	576
Gln	Asp	Val	Tyr	Asn	Met	Met	Lys	Phe	Trp	Leu	Asp	Lys	Gly	Ile	Asp	
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ggc	ttc	cgc	atg	gat	gta	att	aat	ttt	att	tcc	aaa	aat	act	gat	ttc	624
Gly	Phe	Arg	Met	Asp	Val	Ile	Asn	Phe	Ile	Ser	Lys	Asn	Thr	Asp	Phe	
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Pro	Asp	Gly	Pro	Val	Pro	Asp	Gly	Gln	Ile	Tyr	Gly	Asp	Ala	Gly	Asn	
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gat	ttt	tgt	aat	gga	ccg	cgg	att	cat	gag	ttc	ttg	caa	gaa	atg	aac	720
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Gln	Glu	Val	Thr	Ser	Lys	Tyr	Asp	Val	Met	Thr	Val	Gly	Glu	Met	Pro	
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ggt	gct	agt	aca	acc	gac	gcg	caa	att	tac	acg	aat	cca	gca	aat	aat	816
Gly	Ala	Ser	Thr	Thr	Asp	Ala	Gln	Ile	Tyr	Thr	Asn	Pro	Ala	Asn	Asn	
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gaa	gtc	gat	atg	att	ttt	aca	ttt	gaa	cat	atg	aac	tta	gat	tcc	gat	864
Glu	Val	Asp	Met	Ile	Phe	Thr	Phe	Glu	His	Met	Asn	Leu	Asp	Ser	Asp	
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Gly	Asp	Asn	Lys	Trp	Asp	Leu	Lys	Pro	Ile	Tyr	Leu	Pro	Asp	Leu	Lys	
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gaa	aat	atg	tct	gaa	tgg	caa	gtg	gcg	ctt	caa	gaa	aac	ggt	tgg	aat	960
Glu	Asn	Met	Ser	Glu	Trp	Gln	Val	Ala	Leu	Gln	Glu	Asn	Gly	Trp	Asn	
305					310					315					320	
agc	tta	tat	tgg	aat	aat	cat	gac	caa	ccg	cgt	atc	ggt	tct	cgt	ttt	1008
Ser	Leu	Tyr	Trp	Asn	Asn	His	Asp	Gln	Pro	Arg	Ile	Val	Ser	Arg	Phe	
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Gly	Asn	Asp	Asn	Arg	Phe	Arg	Val	Arg	Ser	Ala	Lys	Met	Leu	Ala	Thr	
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Cys	Leu	His	Met	Met	Lys	Gly	Thr	Pro	Tyr	Ile	Tyr	Gln	Gly	Glu	Glu	
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Ile	Gly	Met	Thr	Asn	Val	His	Phe	Glu	Thr	Leu	Asp	Asp	Tyr	Arg	Asp	
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Ile	Glu	Thr	Leu	Asn	Met	Tyr	Lys	Glu	Arg	Lys	Glu	Gln	Gly	His	Ser	
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His	Glu	Ser	Ile	Met	Gln	Ser	Ile	Tyr	Thr	Lys	Gly	Arg	Asp	Asn	Ala	
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Arg	Thr	Pro	Tyr	Gln	Trp	Asp	Asn	Ser	Glu	Asn	Ala	Gly	Phe	Thr	Thr	
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gga	acg	cct	tgg	ctt	aaa	gtc	aac	ccg	cgc	tat	aca	gaa	atc	aac	aac	1344
Gly	Thr	Pro	Trp	Leu	Lys	Val	Asn	Pro	Arg	Tyr	Thr	Glu	Ile	Asn	Asn	
		435				440						445				
gaa	gaa	gcg	ctg	aaa	aac	cca	gat	tcc	att	ttc	tac	tac	tac	caa	aat	1392
Glu	Glu	Ala	Leu	Lys	Asn	Pro	Asp	Ser	Ile	Phe	Tyr	Tyr	Tyr	Gln	Asn	
		450				455					460					
ctt	att	aag	tta	cga	aaa	acg	act	gaa	atc	atc	aca	act	ggt	aat	tat	1440
Leu	Ile	Lys	Leu	Arg	Lys	Thr	Thr	Glu	Ile	Ile	Thr	Thr	Gly	Asn	Tyr	
465					470					475					480	
cgt	ttg	tta	tta	cct	aaa	gat	gaa	gcg	att	ttc	gca	tat	gaa	cgc	tac	1488
Arg	Leu	Leu	Leu	Pro	Lys	Asp	Glu	Ala	Ile	Phe	Ala	Tyr	Glu	Arg	Tyr	
				485					490					495		
aca	gaa	aat	gaa	aaa	tta	gtg	gtt	tta	tgt	aat	ttc	aca	gaa	gaa	gaa	1536
Thr	Glu	Asn	Glu	Lys	Leu	Val	Val	Leu	Cys	Asn	Phe	Thr	Glu	Glu	Glu	
			500					505					510			
caa	gtt	att	tct	gat	gaa	aac	att	ttg	aac	gaa	atc	caa	aaa	ggt	tcc	1584
Gln	Val	Ile	Ser	Asp	Glu	Asn	Ile	Leu	Asn	Glu	Ile	Gln	Lys	Gly	Ser	
		515					520					525				
gtg	ctt	gta	aac	aat	gtt	cct	aat	att	ata	gaa	gga	act	tta	cga	cct	1632
Val	Leu	Val	Asn	Asn	Val	Pro	Asn	Ile	Ile	Glu	Gly	Thr	Leu	Arg	Pro	
		530				535					540					
tac	gaa	gca	atc	gtt	tat	caa	atc	aag	taa							1662
Tyr	Glu	Ala	Ile	Val	Tyr	Gln	Ile	Lys								
545					550											

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<211> 553

<212> PRT

<213> *Listeria monocytogenes* str. 4b F2365

<400> 180

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Pro Lys Ser Phe Asn Asp Ser Asn Gly Asp Gly Val Gly Asp Ile Gln
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Gly Ile Ile Glu Lys Leu Asp Tyr Leu Lys Glu Leu Gly Val Asp Val
35      40      45
Ile Trp Leu Ser Pro Val Tyr Asp Ser Pro Gln Asp Asp Asn Gly Tyr
50      55      60
Asp Ile Arg Asp Tyr Gln Lys Ile Tyr Glu Glu Tyr Gly Asp Met Ala
65      70      75      80
Thr Phe Asp Gln Leu Leu Gln Gly Leu His Asp Arg Glu Met Lys Leu
85      90      95
Val Met Asp Leu Val Val Asn His Thr Ser Asp Glu His Lys Trp Phe
100      105      110
Glu Glu Ser Arg Lys Ser Lys Asp Asn Pro Tyr Arg Asp Tyr Tyr Phe
115      120      125
Trp Arg Glu Glu Asn Glu Ile Asn Asn Trp Gly Ser Ile Phe Ser Gly
130      135      140
Pro Ala Trp Glu Leu Asp Glu Lys Thr Gly Glu Tyr Tyr Leu His Leu
145      150      155      160
Phe Ser Lys Lys Gln Pro Asp Leu Asn Trp Glu Asn Pro Lys Leu Arg
165      170      175
Gln Asp Val Tyr Asn Met Met Lys Phe Trp Leu Asp Lys Gly Ile Asp
180      185      190
Gly Phe Arg Met Asp Val Ile Asn Phe Ile Ser Lys Asn Thr Asp Phe
195      200      205
Pro Asp Gly Pro Val Pro Asp Gly Gln Ile Tyr Gly Asp Ala Gly Asn
210      215      220
Asp Phe Cys Asn Gly Pro Arg Ile His Glu Phe Leu Gln Glu Met Asn
225      230      235      240
Gln Glu Val Thr Ser Lys Tyr Asp Val Met Thr Val Gly Glu Met Pro
245      250      255
Gly Ala Ser Thr Thr Asp Ala Gln Ile Tyr Thr Asn Pro Ala Asn Asn
260      265      270
Glu Val Asp Met Ile Phe Thr Phe Glu His Met Asn Leu Asp Ser Asp
275      280      285
Gly Asp Asn Lys Trp Asp Leu Lys Pro Ile Tyr Leu Pro Asp Leu Lys
290      295      300
Glu Asn Met Ser Glu Trp Gln Val Ala Leu Gln Glu Asn Gly Trp Asn
305      310      315      320
Ser Leu Tyr Trp Asn Asn His Asp Gln Pro Arg Ile Val Ser Arg Phe
325      330      335
Gly Asn Asp Asn Arg Phe Arg Val Arg Ser Ala Lys Met Leu Ala Thr
340      345      350
Cys Leu His Met Met Lys Gly Thr Pro Tyr Ile Tyr Gln Gly Glu Glu
355      360      365
Ile Gly Met Thr Asn Val His Phe Glu Thr Leu Asp Tyr Arg Asp
370      375      380
Ile Glu Thr Leu Asn Met Tyr Lys Glu Arg Lys Glu Gln Gly His Ser
385      390      395      400
His Glu Ser Ile Met Gln Ser Ile Tyr Thr Lys Gly Arg Asp Asn Ala
405      410      415
Arg Thr Pro Tyr Gln Trp Asp Asn Ser Glu Asn Ala Gly Phe Thr Thr
420      425      430
Gly Thr Pro Trp Leu Lys Val Asn Pro Arg Tyr Thr Glu Ile Asn Asn
435      440      445
Glu Glu Ala Leu Lys Asn Pro Asp Ser Ile Phe Tyr Tyr Tyr Gln Asn
450      455      460
Leu Ile Lys Leu Arg Lys Thr Thr Glu Ile Ile Thr Thr Gly Asn Tyr
465      470      475      480
Arg Leu Leu Leu Pro Lys Asp Glu Ala Ile Phe Ala Tyr Glu Arg Tyr
485      490      495
Thr Glu Asn Glu Lys Leu Val Val Leu Cys Asn Phe Thr Glu Glu Glu
500      505      510
Gln Val Ile Ser Asp Glu Asn Ile Leu Asn Glu Ile Gln Lys Gly Ser

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Val⁵¹⁵ Leu⁵³⁰ Val⁵³⁵ Asn⁵⁴⁰ Asn⁵⁴⁵ Val⁵⁵⁰ Pro⁵²⁰ Asn⁵²⁵ Ile⁵³⁰ Ile⁵³⁵ Glu⁵⁴⁰ Gly⁵⁴⁵ Thr⁵⁵⁰ Leu⁵⁵⁵ Arg⁵⁶⁰ Pro⁵⁶⁵
 Tyr⁵⁴⁵ Glu⁵⁵⁰ Ala⁵⁵⁵ Ile⁵⁶⁰ Val⁵⁶⁵ Tyr⁵⁷⁰ Gln⁵⁷⁵ Ile⁵⁸⁰ Lys⁵⁸⁵

<210> 181

<211> 1533

<212> DNA

<213> *Listeria monocytogenes* str. 4b F2365

<220>

<221> CDS

<222> (1)..(1533)

<223> transl_table=11

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Phe	Gln	Asp	Ser	Asn	Gly	Asp	Gly	Leu	Gly	Asp	Phe	Lys	Gly	Leu	Thr	
		20					25					30				
agc	aga	tta	gat	tat	cta	gtg	gat	ttg	gga	att	gat	ggg	att	tgg	ttg	144
Ser	Arg	Leu	Asp	Tyr	Leu	Val	Asp	Leu	Gly	Ile	Asp	Gly	Ile	Trp	Leu	
		35				40					45					
act	cca	ttt	tat	cct	tca	ccg	caa	gtg	gat	aat	ggg	tat	gat	gtg	tct	192
Thr	Pro	Phe	Tyr	Pro	Ser	Pro	Gln	Val	Asp	Asn	Gly	Tyr	Asp	Val	Ser	
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gat	tac	tgc	gat	att	aac	ccg	gat	tac	ggc	gat	atg	act	gat	ttt	cga	240
Asp	Tyr	Cys	Asp	Ile	Asn	Pro	Asp	Tyr	Gly	Asp	Met	Thr	Asp	Phe	Arg	
	65				70				75						80	
gtg	ttt	atg	aaa	gcg	gca	gat	gct	cga	gga	ata	aaa	ggt	att	atc	gac	288
Val	Phe	Met	Lys	Ala	Ala	Asp	Ala	Arg	Gly	Ile	Lys	Val	Ile	Ile	Asp	
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Leu	Val	Leu	Asn	His	Ser	Ser	Thr	Glu	His	Ala	Trp	Phe	Lys	Glu	Ser	
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cgt	agt	agt	aag	acg	aat	cct	aaa	cga	gat	tat	tat	att	tgg	cga	gaa	384
Arg	Ser	Ser	Lys	Thr	Asn	Pro	Lys	Arg	Asp	Tyr	Tyr	Ile	Trp	Arg	Glu	
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Lys	Pro	Asn	Asn	Trp	Glu	Ser	Phe	Phe	Gly	Gly	Ser	Ala	Trp	Glu	Met	
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Asp	Glu	Leu	Thr	Gly	Glu	Tyr	Tyr	Tyr	His	Ser	Phe	Ala	Lys	Glu	Gln	
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ggt	tta	gcg	ttt	tgg	ttg	aat	gag	gga	gtg	gcg	gga	ttc	agg	tta	gat	576
Val	Leu	Ala	Phe	Trp	Leu	Asn	Glu	Gly	Val	Ala	Gly	Phe	Arg	Leu	Asp	
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ggt	atc	aat	aat	tta	acg	ctc	gta	ctt	gaa	ttt	acg	gat	aat	cca	gtc	624
Val	Ile	Asn	Asn	Leu	Thr	Leu	Val	Leu	Glu	Phe	Thr	Asp	Asn	Pro	Val	
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Thr	Ser	Gly	Glu	Met	Glu	His	Val	Tyr	Asp	Arg	Asn	Gln	Ser	Gly	Leu	
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gaa	caa	gcg	tta	gag	gat	atc	gct	tcc	ttt	tgt	cga	aaa	gag	cgc	gac	720
Glu	Gln	Ala	Leu	Glu	Asp	Ile	Ala	Ser	Phe	Cys	Arg	Lys	Glu	Arg	Asp	
	225				230					235					240	
gtg	ttt	cta	gta	ggc	gaa	att	agc	tcg	gac	caa	tta	gct	gaa	att	gct	768
Val	Phe	Leu	Val	Gly	Glu	Ile	Ser	Ser	Asp	Gln	Leu	Ala	Glu	Ile	Ala	
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aga	tat	agc	tcg	aaa	aaa	atg	cta	gat	gtc	aca	ttt	aat	ttt	aat	ttt	816
Arg	Tyr	Ser	Ser	Lys	Lys	Met	Leu	Asp	Val	Thr	Phe	Asn	Phe	Asn	Phe	
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Glu	Met	Glu	Thr	Ala	Leu	Asn	Glu	Gly	Gln	Trp	Pro	Thr	Leu	Phe	Phe	
	290					295					300					
gga	agt	cat	gat	atg	agc	agg	ttc	aga	agt	cgc	ctc	gca	tct	gga	ggc	960
Gly	Ser	His	Asp	Met	Ser	Arg	Phe	Arg	Ser	Arg	Leu	Ala	Ser	Gly	Gly	
	305				310					315					320	
tta	gta	aag	acc	cag	ttg	ctc	gca	ttt	tta	atg	tta	act	gcg	aaa	ggc	1008
Leu	Val	Lys	Thr	Gln	Leu	Leu	Ala	Phe	Leu	Met	Leu	Thr	Ala	Lys	Gly	
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gtg	ccg	ttt	ata	tac	tac	gga	gaa	gag	gtg	ggt	atg	cct	gat	tta	acg	1056
Val	Pro	Phe	Ile	Tyr	Tyr	Gly	Glu	Glu	Val	Gly	Met	Pro	Asp	Leu	Thr	
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Phe	Ser	Ser	Val	Lys	Glu	Met	Arg	Asp	Ile	Gln	Gly	Thr	Ala	Ala	Tyr	
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Tyr	Gln	Ala	Leu	Gln	Thr	Gly	Thr	Asp	Glu	Lys	Gln	Ala	Leu	Glu	Ile	
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Ala	Ile	Glu	Lys	Thr	Arg	Asp	Lys	Ala	Arg	Gly	Pro	Met	Ile	Phe	Pro	
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Asp	Gly	Lys	Pro	Phe	Thr	Leu	Gly	Glu	Pro	Trp	Ile	Lys	Met	Ala	Thr	
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Leu	Pro	Glu	Lys	Glu	Ala	Arg	Thr	Met	Trp	Arg	Phe	Tyr	Gln	Gly	Leu	
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ctc	gca	ttt	cgt	aaa	gaa	aat	gat	ttt	aaa	gag	atg	gaa	tat	act	ttt	1344
Leu	Ala	Phe	Arg	Lys	Glu	Asn	Asp	Phe	Lys	Glu	Met	Glu	Tyr	Thr	Phe	
		435					440					445				
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Leu	Lys	Leu	Asp	Gly	Glu	Val	Leu	Ser	Tyr	Gln	Arg	Gly	Glu	Phe	Ile	
	450					455					460					
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Phe	Leu	Leu	His	Phe	Gly	Glu	Glu	Glu	Val	Thr	Tyr	Pro	Leu	Gln	Gly	
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Asn	Tyr	Gln	Leu	Val	Phe	Gly	Glu	Ala	Val	Met	Val	Gly	Asn	Gly	Ile	
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aga	atg	ggc	gcg	cat	act	gga	att	gcg	ctt	aga	gtg	gag	gaa	tag		1533
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<212> PRT

<213> Listeria monocytogenes str. 4b F2365

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Ser	Arg	Leu	Asp	Tyr	Leu	Val	Asp	Leu	Gly	Ile	Asp	Gly	Ile	Trp	Leu	
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Thr	Pro	Phe	Tyr	Pro	Ser	Pro	Gln	Val	Asp	Asn	Gly	Tyr	Asp	Val	Ser	
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Asp	Tyr	Cys	Asp	Ile	Asn	Pro	Asp	Tyr	Gly	Asp	Met	Thr	Asp	Phe	Arg	
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Val	Phe	Met	Lys	Ala	Ala	Asp	Ala	Arg	Gly	Ile	Lys	Val	Ile	Ile	Asp	
			85						90					95		
Leu	Val	Leu	Asn	His	Ser	Ser	Thr	Glu	His	Ala	Trp	Phe	Lys	Glu	Ser	
			100					105					110			
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Lys	Pro	Asn	Asn	Trp	Glu	Ser	Phe	Phe	Gly	Gly	Ser	Ala	Trp	Glu	Met	
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 145 150 155 160
 Ala Asp Leu Asn Trp Ala Asn Glu Ala Val Arg Ala Glu Met Glu Gln
 165 170 175
 Val Leu Ala Phe Trp Leu Asn Glu Gly Val Ala Gly Phe Arg Leu Asp
 180 185 190
 Val Ile Asn Asn Leu Thr Leu Val Leu Glu Phe Thr Asp Asn Pro Val
 195 200 205
 Thr Ser Gly Glu Met Glu His Val Tyr Asp Arg Asn Gln Ser Gly Leu
 210 215 220
 Glu Gln Ala Leu Glu Asp Ile Ala Ser Phe Cys Arg Lys Glu Arg Asp
 225 230 235 240
 Val Phe Leu Val Gly Glu Ile Ser Ser Asp Gln Leu Ala Glu Ile Ala
 245 250 255
 Arg Tyr Ser Ser Lys Lys Met Leu Asp Val Thr Phe Asn Phe Asn Phe
 260 265 270
 Gly Ser Val Asp Gln Leu Asp Ala Lys Ser Val Phe Thr Thr Leu Asn
 275 280 285
 Glu Met Glu Thr Ala Leu Asn Glu Gly Gln Trp Pro Thr Leu Phe Phe
 290 295 300
 Gly Ser His Asp Met Ser Arg Phe Arg Ser Arg Leu Ala Ser Gly Gly
 305 310 315 320
 Leu Val Lys Thr Gln Leu Leu Ala Phe Leu Met Leu Thr Ala Lys Gly
 325 330 335
 Val Pro Phe Ile Tyr Tyr Gly Glu Glu Val Gly Met Pro Asp Leu Thr
 340 345 350
 Phe Ser Ser Val Lys Glu Met Arg Asp Ile Gln Gly Thr Ala Ala Tyr
 355 360 365
 Tyr Gln Ala Leu Gln Thr Gly Thr Asp Glu Lys Gln Ala Leu Glu Ile
 370 375 380
 Ala Ile Glu Lys Thr Arg Asp Lys Ala Arg Gly Pro Met Ile Phe Pro
 385 390 395 400
 Asp Gly Lys Pro Phe Thr Leu Gly Glu Pro Trp Ile Lys Met Ala Thr
 405 410 415
 Leu Pro Glu Lys Glu Ala Arg Thr Met Trp Arg Phe Tyr Gln Gly Leu
 420 425 430
 Leu Ala Phe Arg Lys Glu Asn Asp Phe Lys Glu Met Glu Tyr Thr Phe
 435 440 445
 Leu Lys Leu Asp Gly Glu Val Leu Ser Tyr Gln Arg Gly Glu Phe Ile
 450 455 460
 Phe Leu Leu His Phe Gly Glu Glu Val Thr Tyr Pro Leu Gln Gly
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 Arg Met Gly Ala His Thr Gly Ile Ala Leu Arg Val Glu Glu
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<210> 183

<211> 1761

<212> DNA

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Ala	Tyr	Asp	Glu	Lys	Thr	Ile	His	Ile	Arg	Ile	Arg	Thr	Lys	Arg	Asp	
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gat	gtt	caa	agc	acc	act	ctt	att	tat	ggg	gat	cct	tat	gaa	tgg	aaa	144
Asp	Val	Gln	Ser	Thr	Thr	Leu	Ile	Tyr	Gly	Asp	Pro	Tyr	Glu	Trp	Lys	
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Asp	Gly	Lys	Trp	Ile	Ser	Ser	Ser	Thr	Pro	Met	Lys	Lys	Thr	Gly	Ser	

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	Arg	Leu	Arg	Tyr	Gly	Phe	Glu	Leu	Lys	Asn	Asp	Thr	Asp	Thr	Leu	Ile			
				85						90						95			
	tat	gca	gag	cga	gga	ttt	ttt	tct	acc	act	cca	aat	gat	gac	ggt	ggt			336
	Tyr	Ala	Glu	Arg	Gly	Phe	Phe	Ser	Thr	Thr	Pro	Asn	Asp	Asp	Val	Gly			
				100					105										
	aac	ttt	ttc	tgt	ttt	cca	ttt	att	cat	gca	aat	gat	gta	ttc	aaa	gca			384
	Asn	Phe	Phe	Cys	Phe	Pro	Phe	Ile	His	Ala	Asn	Asp	Val	Phe	Lys	Ala			
				115				120											
	cct	tct	tgg	att	aaa	gat	act	ggt	tgg	tat	caa	att	ttc	cca	gaa	cgg			432
	Pro	Ser	Trp	Ile	Lys	Asp	Thr	Val	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg			
				130			135						140						
	ttc	gct	aat	gga	gat	cat	acg	ctg	aat	cca	gaa	aac	acc	ctt	cct	tgg			480
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				145		150						155				160			
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	Gly	Ser	Ala	Glu	Pro	Thr	Pro	Thr	Asn	Phe	Phe	Gly	Gly	Asp	Phe	Ala			
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	ggt	att	att	caa	aac	ctt	gat	tac	ctt	ggt	aag	ctc	gga	att	tct	gga			576
	Gly	Ile	Ile	Gln	Asn	Leu	Asp	Tyr	Leu	Val	Lys	Leu	Gly	Ile	Ser	Gly			
				180					185							190			
	ata	tat	ttc	aca	cct	att	ttc	aaa	gca	cat	tca	aac	cat	aaa	tat	gac			624
	Ile	Tyr	Phe	Thr	Pro	Ile	Phe	Lys	Ala	His	Ser	Asn	His	Lys	Tyr	Asp			
				195				200					205						
	aca	att	aac	tac	atg	gaa	atc	gat	ccg	caa	ttt	ggc	aca	aaa	gaa	aca			672
	Thr	Ile	Asn	Tyr	Met	Glu	Ile	Asp	Pro	Gln	Phe	Gly	Thr	Lys	Glu	Thr			
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	ttc	aaa	gaa	ctc	ggt	cag	gca	tgt	cat	aca	cat	ggt	ata	aag	gta	atg			720
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				225		230					235					240			
	ctc	gat	gcc	gta	ttc	aat	cac	agt	gga	tac	ttt	ttc	gat	aaa	ttt	caa			768
	Leu	Asp	Ala	Val	Phe	Asn	His	Ser	Gly	Tyr	Phe	Phe	Asp	Lys	Phe	Gln			
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	gac	gta	cta	caa	aat	ggt	gag	cag	tca	gca	tat	aaa	gaa	tgg	ttc	cat			816
	Asp	Val	Leu	Gln	Asn	Gly	Glu	Gln	Ser	Ala	Tyr	Lys	Glu	Trp	Phe	His			
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	Ile	His	Glu	Phe	Pro	Ile	Arg	Thr	Glu	Pro	Leu	Pro	Asn	Tyr	Asp	Thr			
				275				280						285					
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	Phe	Ala	Phe	Thr	Pro	Tyr	Met	Pro	Lys	Leu	Asn	Thr	Ala	His	Pro	Asp			
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	gta	aaa	gaa	tac	tta	ctt	gaa	gta	ggg	cgt	tat	tgg	gtg	aga	gaa	ttc			960
	Val	Lys	Glu	Tyr	Leu	Leu	Glu	Val	Gly	Arg	Tyr	Trp	Val	Arg	Glu	Phe			
				305		310					315					320			
	aat	ata	gac	ggt	tgg	cgc	ctt	gat	gta	gca	aat	gaa	gtc	gac	cat	aac			1008
	Asn	Ile	Asp	Gly	Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Val	Asp	His	Asn			
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	tat	att	tta	gga	gaa	att	tgg	cac	gat	gca	ctt	cca	tgg	cta	caa	gga			1104
	Tyr	Ile	Leu	Gly	Glu	Ile	Trp	His	Asp	Ala	Leu	Pro	Trp	Leu	Gln	Gly			
				355				360						365					
	gat	caa	ttc	gat	gct	gtc	atg	agc	tat	cct	ggt	aca	aac	gcc	cta	ctg			1152
	Asp	Gln	Phe	Asp	Ala	Val	Met	Ser	Tyr	Pro	Val	Thr	Asn	Ala	Leu	Leu			
				370			375					380							
	tct	tac	ttt	gct	aac	gat	tcc	att	aag	gca	aat	gaa	ttt	atg	aaa	caa			1200
	Ser	Tyr	Phe	Ala	Asn	Asp	Ser	Ile	Lys	Ala	Asn	Glu	Phe	Met	Lys	Gln			
				385		390					395					400			
	att	aca	gaa	tct	cta	cat	tcc	tac	tct	atg	aat	gta	aat	gaa	gca	gca			1248
	Ile	Thr	Glu	Ser	Leu	His	Ser	Tyr	Ser	Met	Asn	Val	Asn	Glu	Ala	Ala			
				405						410					415				
	ttt	cat	tta	tta	gat	agc	cat	gat	aca	aga	att	ttg	aca	aca	tgt				1296
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Asn	Gly	Asp	Lys	Asn	Lys	Leu	Lys	Leu	Leu	Tyr	Val	Phe	His	Leu	Ser		
		435					440					445					
ttc	atc	ggc	tct	cct	tgt	att	tat	tat	gga	gac	gaa	att	ggg	atg	gac		1392
Phe	Ile	Gly	Ser	Pro	Cys	Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Asp		
	450					455					460						
ggc	ggg	atg	gat	cca	gat	tgt	cgc	aaa	tgt	atg	gtt	tgg	gat	acg	gaa		1440
Gly	Gly	Met	Asp	Pro	Asp	Cys	Arg	Lys	Cys	Met	Val	Trp	Asp	Thr	Glu		
465					470					475					480		
gaa	caa	gat	cat	aca	tta	ttt	aca	cat	gta	caa	aca	tta	att	tca	tta		1488
Glu	Gln	Asp	His	Thr	Leu	Phe	Thr	His	Val	Gln	Thr	Leu	Ile	Ser	Leu		
				485					490					495			
cga	aag	caa	tat	aaa	gca	ttt	gga	gga	cat	ggg	act	ttc	caa	ttc	att		1536
Arg	Lys	Gln	Tyr	Lys	Ala	Phe	Gly	Gly	His	Gly	Thr	Phe	Gln	Phe	Ile		
			500				505						510				
gaa	gca	aat	gat	gaa	tat	aat	tat	att	tct	tat	acg	aaa	aca	tat	gaa		1584
Glu	Ala	Asn	Asp	Glu	Tyr	Asn	Tyr	Ile	Ser	Tyr	Thr	Lys	Thr	Tyr	Glu		
		515					520					525					
gat	gaa	acg	atc	ttt	ttc	gtt	tta	aat	ccg	act	aat	agt	gat	att	aca		1632
Asp	Glu	Thr	Ile	Phe	Phe	Val	Leu	Asn	Pro	Thr	Asn	Ser	Asp	Ile	Thr		
	530					535					540						
gct	tca	ctc	cct	ctc	cat	gtt	act	gga	aag	aaa	atc	att	aat	att	tat		1680
Ala	Ser	Leu	Pro	Leu	His	Val	Thr	Gly	Lys	Lys	Ile	Ile	Asn	Ile	Tyr		
545					550					555					560		
aca	aac	gaa	gaa	ttt	tca	gcg	gaa	gca	agt	gta	tta	caa	gtt	aca	ctt		1728
Thr	Asn	Glu	Glu	Phe	Ser	Ala	Glu	Ala	Ser	Val	Leu	Gln	Val	Thr	Leu		
				565					570					575			
cct	cca	tat	gga	ttc	tcc	ata	tta	aaa	tgg	taa							1761
Pro	Pro	Tyr	Gly	Phe	Ser	Ile	Leu	Lys	Trp								
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<210> 184

<211> 586

<212> PRT

<213> Bacillus thuringiensis serovar konkukian str. 97-27

<400> 184

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			20					25					30		
Asp	Val	Gln	Ser	Thr	Thr	Leu	Ile	Tyr	Gly	Asp	Pro	Tyr	Glu	Trp	Lys
		35					40					45			
Asp	Gly	Lys	Trp	Ile	Ser	Ser	Ser	Thr	Pro	Met	Lys	Lys	Thr	Gly	Ser
	50					55					60				
Thr	Ala	Leu	Phe	Asp	Tyr	Trp	Phe	Ile	Ser	Ile	Glu	Pro	Lys	Phe	Lys
65					70				75						80
Arg	Leu	Arg	Tyr	Gly	Phe	Glu	Leu	Lys	Asn	Asp	Thr	Asp	Thr	Leu	Ile
				85					90					95	
Tyr	Ala	Glu	Arg	Gly	Phe	Phe	Ser	Thr	Pro	Asn	Asp	Asp	Val	Gly	
			100				105					110			
Asn	Phe	Phe	Cys	Phe	Pro	Phe	Ile	His	Ala	Asn	Asp	Val	Phe	Lys	Ala
		115					120					125			
Pro	Ser	Trp	Ile	Lys	Asp	Thr	Val	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg
	130					135					140				
Phe	Ala	Asn	Gly	Asp	His	Thr	Leu	Asn	Pro	Glu	Asn	Thr	Leu	Pro	Trp
145					150					155					160
Gly	Ser	Ala	Glu	Pro	Thr	Pro	Thr	Asn	Phe	Phe	Gly	Gly	Asp	Phe	Ala
				165					170					175	
Gly	Ile	Ile	Gln	Asn	Leu	Asp	Tyr	Leu	Val	Lys	Leu	Gly	Ile	Ser	Gly
			180					185					190		
Ile	Tyr	Phe	Thr	Pro	Ile	Phe	Lys	Ala	His	Ser	Asn	His	Lys	Tyr	Asp
		195					200					205			
Thr	Ile	Asn	Tyr	Met	Glu	Ile	Asp	Pro	Gln	Phe	Gly	Thr	Lys	Glu	Thr
	210					215					220				
Phe	Lys	Glu	Leu	Val	Gln	Ala	Cys	His	Thr	His	Gly	Ile	Lys	Val	Met
225					230					235					240
Leu	Asp	Ala	Val	Phe	Asn	His	Ser	Gly	Tyr	Phe	Phe	Asp	Lys	Phe	Gln

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245
 Asp Val Leu Gln Asn Gly Glu Gln Ser 250
 260 Ala Tyr Lys Glu Trp 255
 270 Phe His
 275 Ile His Glu Phe Pro Ile Arg Thr Glu Pro Leu Pro Asn Tyr Asp Thr
 285 Phe Ala Phe Thr Pro Tyr Met Pro Lys Leu Asn Thr Ala His Pro Asp
 290 300
 305 Val Lys Glu Tyr Leu Leu Glu Val Gly Arg Tyr Trp Val Arg Glu Phe
 310 315
 320 Asn Ile Asp Gly Trp Arg Leu Asp Val Ala Asn Glu Val Asp His Asn
 325 330
 335 Phe Trp Arg Glu Phe Arg Ser Glu Ile Lys Ala Leu Asn Ser Glu Val
 340 345
 350 Tyr Ile Leu Gly Glu Ile Trp His Asp Ala Leu Pro Trp Leu Gln Gly
 355 360
 365 Asp Gln Phe Asp Ala Val Met Ser Tyr Pro Val Thr Asn Ala Leu Leu
 370 375
 380 Ser Tyr Phe Ala Asn Asp Ser Ile Lys Ala Asn Glu Phe Met Lys Gln
 385 390
 400 Ile Thr Glu Ser Leu His Ser Tyr Ser Met Asn Val Asn Glu Ala Ala
 405 410
 415 Phe His Leu Leu Asp Ser His Asp Thr Pro Arg Ile Leu Thr Thr Cys
 420 425
 430 Asn Gly Asp Lys Asn Lys Leu Lys Leu Leu Tyr Val Phe His Leu Ser
 435 440
 445 Phe Ile Gly Ser Pro Cys Ile Tyr Tyr Gly Asp Glu Ile Gly Met Asp
 450 455
 460 Gly Gly Met Asp Pro Asp Cys Arg Lys Cys Met Val Trp Asp Thr Glu
 465 470
 480 Glu Gln Asp His Thr Leu Phe Thr His Val Gln Thr Leu Ile Ser Leu
 485 490
 495 Arg Lys Gln Tyr Lys Ala Phe Gly Gly His Gly Thr Phe Gln Phe Ile
 500 505
 510 Glu Ala Asn Asp Glu Tyr Asn Tyr Ile Ser Tyr Thr Lys Thr Tyr Glu
 515 520
 525 Asp Glu Thr Ile Phe Phe Val Leu Asn Pro Thr Asn Ser Asp Ile Thr
 530 535
 540 Ala Ser Leu Pro Leu His Val Thr Gly Lys Lys Ile Ile Asn Ile Tyr
 545 550
 560 Thr Asn Glu Glu Phe Ser Ala Glu Ala Ser Val Leu Gln Val Thr Leu
 565 570
 575 Pro Pro Tyr Gly Phe Ser Ile Leu Lys Trp
 580 585

<210> 185

<211> 1710

<212> DNA

<213> Leifsonia xyli subsp. xyli str. CTCB07

<220>

<221> CDS

<222> (1)..(1710)

<223> transl_table=11

<400> 185

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1				5				10						15		
cag	tgg	tat	cgc	cga	tcc	gtc	ttc	tac	gag	gtg	atg	gtc	cgc	tcc	ttc	96
Gln	Trp	Tyr	Arg	Arg	Ser	Val	Phe	Tyr	Glu	Val	Met	Val	Arg	Ser	Phe	
			20					25					30			
gtc	gac	agc	aac	ggc	gac	ggc	tcc	ggc	gat	ctc	gcg	ggt	ctg	acc	tcc	144
Val	Asp	Ser	Asn	Gly	Asp	Gly	Ser	Gly	Asp	Leu	Ala	Gly	Leu	Thr	Ser	
			35				40					45				
aaa	ctc	gac	tac	ctg	cag	tgg	ctc	ggc	atc	gac	gcg	ctc	tgg	ctc	ccg	192
Lys	Leu	Asp	Tyr	Leu	Gln	Trp	Leu	Gly	Ile	Asp	Ala	Leu	Trp	Leu	Pro	
			50			55					60					
ccg	ttc	ttc	cag	tcc	ccc	ctg	cgc	gac	ggc	ggc	tac	gac	gtg	agc	gac	240
Pro	Phe	Phe	Gln	Ser	Pro	Leu	Arg	Asp	Gly	Gly	Tyr	Asp	Val	Ser	Asp	

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65	ttc	cgc	gcg	atc	ctg	70	ccc	gag	ttc	gga	acc	75	atc	gac	gag	ttc	cgc	80
Phe	Arg	Ala	Ile	Leu	Pro	Glu	Phe	Gly	Thr	Ile	Asp	Glu	Phe	Arg	Asp			288
				85					90									
ctg	gtc	acc	aag	gcg	cac	gag	cgc	aac	atg	cgg	atc	atc	atc	gac	ctg			336
Leu	Val	Thr	Lys	Ala	His	Glu	Arg	Asn	Met	Arg	Ile	Ile	Ile	Asp	Leu			
			100					105					110					
ccg	atg	aac	cac	acc	tcc	gac	cag	cac	gag	tgg	ttc	cag	caa	tcg	cgg			384
Pro	Met	Asn	His	Thr	Ser	Asp	Gln	His	Glu	Trp	Phe	Gln	Gln	Ser	Arg			
		115					120					125						
tcc	aac	ccg	gaa	ggg	ccc	ttc	ggc	gat	ttc	tat	gtc	tgg	aac	gag	acc			432
Ser	Asn	Pro	Glu	Gly	Pro	Phe	Gly	Asp	Phe	Tyr	Val	Trp	Asn	Glu	Thr			
		130				135					140							
gac	gac	aag	tac	ccg	gac	atc	cgc	atc	atc	ttc	gtg	gac	acc	gag	gac			480
Asp	Asp	Lys	Tyr	Pro	Asp	Ile	Arg	Ile	Ile	Phe	Val	Asp	Thr	Glu	Asp			
					150					155					160			
tcc	aac	tgg	gcc	ttc	gac	gag	gcg	cgt	cgc	cag	tac	tac	ttt	cac	cgg			528
Ser	Asn	Trp	Ala	Phe	Asp	Glu	Ala	Arg	Gln	Tyr	Tyr	Tyr	Phe	His	Arg			
				165					170					175				
ttc	ttc	tcg	cac	cag	ccg	gac	ctc	aac	ttc	gag	aac	ccc	gcc	gta	cac			576
Phe	Phe	Ser	His	Gln	Pro	Asp	Leu	Asn	Phe	Glu	Asn	Pro	Ala	Val	His			
			180					185					190					
gac	gca	atg	ttc	gac	atc	gtc	cgg	ttc	tgg	ctc	gac	ctc	ggc	gtc	gac			624
Asp	Ala	Met	Phe	Asp	Ile	Val	Arg	Phe	Trp	Leu	Asp	Leu	Gly	Val	Asp			
		195				200						205						
ggc	ttc	cgg	ctc	gac	gct	atc	ccc	tac	ctc	tac	gag	tcg	gac	gag	ggc			672
Gly	Phe	Arg	Leu	Asp	Ala	Ile	Pro	Tyr	Leu	Tyr	Glu	Ser	Asp	Glu	Gly			
		210			215					220								
aac	ggc	gag	ggc	gag	ccg	ccc	acg	cac	gag	ttc	atc	aag	agg	ctc	cgc			720
Asn	Gly	Glu	Gly	Glu	Pro	Pro	Thr	His	Glu	Phe	Ile	Lys	Arg	Leu	Arg			
				230					235					240				
gag	gtg	gtc	gat	cgg	gag	tac	ccg	ggc	cgg	atg	atg	gtc	gcc	gag	gcc			768
Glu	Val	Val	Asp	Arg	Glu	Tyr	Pro	Gly	Arg	Met	Met	Val	Ala	Glu	Ala			
				245				250					255					
aac	cag	tgg	ccg	cgc	gaa	gtc	gct	gcc	ttc	ggc	agc	gag	gag	gag	gag			816
Asn	Gln	Trp	Pro	Arg	Glu	Val	Ala	Ala	Phe	Phe	Gly	Ser	Glu	Glu	Glu			
			260				265					270						
ccg	gag	tgt	cac	atg	gcc	ttc	gac	ttc	ccg	gtg	atg	ccg	cgt	atc	ttc			864
Pro	Glu	Cys	His	Met	Ala	Phe	Asp	Phe	Pro	Val	Met	Pro	Arg	Ile	Phe			
		275					280					285						
tac	gcg	ctc	cgc	tcg	caa	cag	gcc	tcc	gag	ctc	atc	cac	gtg	ctc	tcc			912
Tyr	Ala	Leu	Arg	Ser	Gln	Gln	Ala	Ser	Glu	Leu	Ile	His	Val	Leu	Ser			
		290			295					300								
gag	acc	acg	gac	gtg	ccc	gat	ggg	tac	gcc	tgg	ggc	gtg	ttc	ctg	cgc			960
Glu	Thr	Thr	Asp	Val	Pro	Asp	Gly	Tyr	Ala	Trp	Gly	Val	Phe	Leu	Arg			
				310				315						320				
aac	cac	gac	gag	ctg	acg	ctg	gaa	atg	gta	agc	gag	gag	tac	cgc	cag			1008
Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	Ser	Glu	Glu	Tyr	Arg	Gln			
				325				330					335					
gcc	atg	tac	ggc	tgg	tat	gcc	tac	gac	ccg	cgc	atg	cgc	gcc	aac	atc			1056
Ala	Met	Tyr	Gly	Trp	Tyr	Ala	Tyr	Asp	Pro	Arg	Met	Arg	Ala	Asn	Ile			
			340					345				350						
ggc	atc	cgc	cgg	cgg	ctc	gcg	ccg	ctc	ctg	gac	aac	tcg	cgc	gcc	gaa			1104
Gly	Ile	Arg	Arg	Arg	Leu	Ala	Pro	Leu	Leu	Asp	Asn	Ser	Arg	Ala	Glu			
		355					360					365						
ctc	gaa	ctc	gcc	cac	gcc	ctc	ctc	ttc	tcc	ctc	gcc	ggc	agc	ccg	ttt			1152
Leu	Glu	Leu	Ala	His	Ala	Leu	Leu	Phe	Ser	Leu	Ala	Gly	Ser	Pro	Phe			
		370			375					380								
ctc	tac	tac	ggc	gac	gag	atc	ggg	atg	ggc	gac	aac	atc	tgg	ctg	ccc			1200
Leu	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly	Asp	Asn	Ile	Trp	Leu	Pro			
				390				395						400				
gat	cgc	gac	agc	tcg	cgc	acg	ccg	atg	cag	tgg	acc	ccc	gac	cgc	aac			1248
Asp	Arg	Asp	Ser	Ser	Arg	Thr	Pro	Met	Gln	Trp	Thr	Pro	Asp	Arg	Asn			
				405				410						415				
gcc	ggt	ttc	tcc	agc	gcc	gac	ccg	ggc	aaa	ctc	ttc	ctc	ccg	gtc	gtc			1296
Ala	Gly	Phe	Ser	Ser	Ala	Asp	Pro	Gly	Lys	Leu	Phe	Leu	Pro	Val	Val			
			420					425					430					
cag	tcg	ctc	gtc	tat	cac	tac	aac	cag	gtg	aat	gtg	gag	gag	cag	ctc			1344
Gln	Ser	Leu	Val	Tyr	His	Tyr	Asn	Gln	Val	Asn	Val	Glu	Ala	Gln	Leu			

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gcg	cag	435	tcg	cg	tcg	ctg	ctg	440	cac	tg	tg	cg	aac	445	gtc	atc	cat	gtg	1392
Ala	Gln	Ser	Arg	Ser	Leu	Leu	Leu	His	Trp	Val	Arg	Asn	Val	Ile	His	Val			
450	aaa	gcg	cat	ccc	gtg	ttc	gg	ctg	ggc	gac	atg	cg	gtg	ctg	ccg				1440
Arg	Lys	Ala	His	Pro	Val	Phe	Gly	Leu	Gly	Asp	Met	Arg	Val	Leu	Pro				
465	aac	cac	gag	tcg	gtg	ctg	gcc	ttc	gtg	cg	acg	tac	gag	ggc	agc				1488
Thr	Asn	His	Glu	Ser	Val	Leu	Ala	Phe	Val	Arg	Thr	Tyr	Glu	Gly	Ser				
485	agg	agc	cac	ttc	ggc	gac	cag	ccg	gag	gat	gtg	ctg	tgc	gtg	ttc	tcg			1536
Gly	Ser	His	Phe	Gly	Asp	Gln	Pro	Glu	Asp	Val	Leu	Cys	Val	Phe	Ser				
500	ttc	gcg	cac	aac	ccg	gtc	tcc	gtc	acc	ctc	gaa	gcg	ccg	gag	ttc	gcc			1584
Phe	Ala	His	Asn	Pro	Val	Ser	Val	Thr	Leu	Glu	Ala	Pro	Glu	Phe	Ala				
515	gg	cg	aca	ctg	tac	gat	ctg	ttc	ggc	ggc	gca	gag	ttc	ccg	acc	gtc			1632
Gly	Arg	Thr	Leu	Tyr	Asp	Phe	Gly	Gly	Gly	Ala	Glu	Phe	Pro	Thr	Val				
530	gcc	gag	gac	ggc	cg	ttc	acc	ctg	acc	ctc	ggc	acc	cag	agc	ttc	tac			1680
Ala	Glu	Asp	Gly	Arg	Phe	Thr	Leu	Thr	Leu	Gly	Thr	Gln	Ser	Phe	Tyr				
545	tg	ctg	cac	atc	gaa	ccg	cg	cg	gat	taa									1710
Trp	Leu	His	Ile	Glu	Pro	Arg	Arg	Arg	Asp										
565																			

<210> 186

<211> 569

<212> PRT

<213> Leifsonia xyli subsp. xyli str. CTCB07

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20	Val	Asp	Ser	Asn	Gly	Asp	Gly	Ser	40	Gly	Asp	Leu	Ala	Gly	45	Leu	Thr	Ser	
35	Lys	Leu	Asp	Tyr	Leu	Gln	Trp	Leu	55	Gly	Ile	Asp	Ala	Leu	60	Trp	Leu	Pro	
50	Pro	Phe	Phe	Gln	Ser	Pro	Leu	Arg	70	Asp	Gly	Gly	Tyr	Asp	75	Val	Ser	Asp	
65	Phe	Arg	Ala	Ile	Leu	Pro	Glu	Phe	85	Gly	Thr	Ile	Asp	Glu	90	Phe	Arg	Asp	
80	Leu	Val	Thr	Lys	Ala	His	Glu	Arg	100	Asn	Met	Arg	Ile	Ile	105	Ile	Asp	Leu	
105	Pro	Met	Asn	His	Thr	Ser	Asp	Gln	115	His	Glu	Trp	Phe	Gln	120	Gln	Ser	Arg	
120	Ser	Asn	Pro	Glu	Gly	Pro	Phe	Gly	135	Asp	Phe	Tyr	Val	Trp	140	Asn	Glu	Thr	
135	Asp	Asp	Lys	Tyr	Pro	Asp	Ile	Arg	150	Ile	Ile	Phe	Val	Asp	155	Thr	Glu	Asp	
145	Ser	Asn	Trp	Ala	Phe	Asp	Glu	Ala	165	Arg	Arg	Gln	Tyr	Tyr	170	Phe	His	Arg	
165	Phe	Phe	Ser	His	Gln	Pro	Asp	Leu	180	Asn	Phe	Glu	Asn	Pro	185	Ala	Val	His	
180	Asp	Ala	Met	Phe	Asp	Ile	Val	Arg	195	Phe	Trp	Leu	Asp	Leu	200	Gly	Val	Asp	
195	Gly	Phe	Arg	Leu	Asp	Ala	Ile	Pro	210	Tyr	Leu	Tyr	Glu	Ser	215	Asp	Glu	Gly	
210	Asn	Gly	Glu	Gly	Glu	Pro	Pro	Thr	225	His	Glu	Phe	Ile	Lys	230	Arg	Leu	Arg	
225	Glu	Val	Val	Asp	Arg	Glu	Tyr	Pro	245	Gly	Arg	Met	Met	Val	250	Ala	Glu	Ala	
245	Asn	Gln	Trp	Pro	Arg	Glu	Val	Ala	260	Ala	Phe	Phe	Gly	Ser	265	Glu	Glu	Glu	
260	Pro	Glu	Cys	His	Met	Ala	Phe	Asp	275	Phe	Pro	Val	Met	Pro	280	Arg	Ile	Phe	
275	Tyr	Ala	Leu	Arg	Ser	Gln	Gln	Ala	285	Ser	Glu	Leu	Ile	His	290	Val	Leu	Ser	

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290 295 300
 Glu Thr Thr Asp Val Pro Asp Gly Tyr Ala Trp Gly Val Phe Leu Arg
 305 310 315 320
 Asn His Asp Glu Leu Thr Leu Glu Met Val Ser Glu Glu Tyr Arg Gln
 325 330 335
 Ala Met Tyr Gly Trp Tyr Ala Tyr Asp Pro Arg Met Arg Ala Asn Ile
 340 345 350
 Gly Ile Arg Arg Arg Leu Ala Pro Leu Leu Asp Asn Ser Arg Ala Glu
 355 360 365
 Leu Glu Leu Ala His Ala Leu Leu Phe Ser Leu Ala Gly Ser Pro Phe
 370 375 380
 Leu Tyr Tyr Gly Asp Glu Ile Gly Met Gly Asp Asn Ile Trp Leu Pro
 385 390 395 400
 Asp Arg Asp Ser Ser Arg Thr Pro Met Gln Trp Thr Pro Asp Arg Asn
 405 410 415
 Ala Gly Phe Ser Ser Ala Asp Pro Gly Lys Leu Phe Leu Pro Val Val
 420 425 430
 Gln Ser Leu Val Tyr His Tyr Asn Gln Val Asn Val Glu Ala Gln Leu
 435 440 445
 Ala Gln Ser Arg Ser Leu Leu His Trp Val Arg Asn Val Ile His Val
 450 455 460
 Arg Lys Ala His Pro Val Phe Gly Leu Gly Asp Met Arg Val Leu Pro
 465 470 475 480
 Thr Asn His Glu Ser Val Leu Ala Phe Val Arg Thr Tyr Glu Gly Ser
 485 490 495
 Gly Ser His Phe Gly Asp Gln Pro Glu Asp Val Leu Cys Val Phe Ser
 500 505 510
 Phe Ala His Asn Pro Val Ser Val Thr Leu Glu Ala Pro Glu Phe Ala
 515 520 525
 Gly Arg Thr Leu Tyr Asp Leu Phe Gly Gly Ala Glu Phe Pro Thr Val
 530 535 540
 Ala Glu Asp Gly Arg Phe Thr Leu Thr Leu Gly Thr Gln Ser Phe Tyr
 545 550 555 560
 Trp Leu His Ile Glu Pro Arg Arg Asp
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<210> 187

<211> 1683

<212> DNA

<213> Bacillus licheniformis ATCC 14580

<220>

<221> CDS

<222> (1)..(1683)

<223> transl_table=11

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Arg Ser Phe Met Asp Ser Asn Gly Asp Gly Val Gly Asp Ile Asn Gly	
20 25 30	
atc aga gag aag ctt ccg tat atc agg gag ctc ggg gca gat gcc att	144
Ile Arg Glu Lys Leu Pro Tyr Ile Arg Glu Leu Gly Ala Asp Ala Ile	
35 40 45	
tgg att tgt ccg gtc ttt gat tct ccc aat gca gat aac ggc tac gac	192
Trp Ile Cys Pro Val Phe Asp Ser Pro Asn Ala Asp Asn Gly Tyr Asp	
50 55 60	
atc agg gat tat caa agc atc atg ccg gaa ttt ggc acg atg gac gac	240
Ile Arg Asp Tyr Gln Ser Ile Met Pro Glu Phe Gly Thr Met Asp Asp	
65 70 75 80	
ttt gac gaa cta tta act gaa gcg cat cag ctc gga atg aaa ctg atc	288
Phe Asp Glu Leu Leu Thr Glu Ala His Gln Leu Gly Met Lys Leu Ile	
85 90 95	
atc gat ctt gtc atc aat cat acg agc gat gaa cat cct tgg ttt atc	336
Ile Asp Leu Val Ile Asn His Thr Ser Asp Glu His Pro Trp Phe Ile	
100 105 110	
gaa tca aga gca gag cgg aat tcc ggg aaa cgg gac tgg tat att tgg	384

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Glu	Ser	Arg	Ala	Glu	Arg	Asn	Ser	Gly	Lys	Arg	Asp	Trp	Tyr	Ile	Trp	
cat	gac	gga	aag	gac	gga	agc	gaa	ccg	aac	aac	tgg	gaa	agc	ata	ttc	432
His	Asp	Gly	Lys	Asp	Gly	Ser	Glu	Pro	Asn	Asn	Trp	Glu	Ser	Ile	Phe	
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Gln	Gln	His	Asp	Pro	Arg	Ser	Val	Tyr	His	Phe	Tyr	Lys	Arg	Leu	Ile	
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Ala	Ile	Arg	Lys	Arg	Tyr	Asp	Val	Phe	Ile	Asp	Gly	Ser	Tyr	Lys	Leu	
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Glu	Glu	Thr	Ala	Ile	Val	Ile	Val	Asn	Leu	Ser	Ala	Arg	Gln	Ala	Phe		
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Tyr	His	His	Pro	Ala	Tyr	Pro	Leu	Cys	Ser	Asn	Gly	Leu	Leu	Leu	Ser		
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aac	ttg	gat	atc	aac	gcg	cac	aag	cac	ctc	aca	tct	ttc	atg	atg	aga	1632	
Asn	Leu	Asp	Ile	Asn	Ala	His	Lys	His	Leu	Thr	Ser	Phe	Met	Met	Arg		
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ccc	tat	gag	gcg	cgc	gtt	tat	ttg	atc	aga	cag	gaa	atc	ggc	gat	ttg	1680	
Pro	Tyr	Glu	Ala	Arg	Val	Tyr	Leu	Ile	Arg	Gln	Glu	Ile	Gly	Asp	Leu		
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<212> PRT

<213> Bacillus licheniformis ATCC 14580

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Pro Trp Leu Arg Met Asn Glu Asn Tyr Lys Leu Ile Asn Val Val His
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Gln Gln His Asp Pro Arg Ser Val Tyr His Phe Tyr Lys Arg Leu Ile
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Glu Glu Thr Ala Ile Val Ile Val Asn Leu Ser Ala Arg Gln Ala Phe
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Tyr His His Pro Ala Tyr Pro Leu Cys Ser Asn Gly Leu Leu Leu Ser
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<212> DNA

<213> Bacillus licheniformis ATCC 14580

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Tyr Ser Tyr Asn Gly Arg Thr Leu His Ile Lys Ile Arg Thr Lys Lys
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gat gat gcc gaa cac gtc cgc ttg gtt tgg ggc gat cct tac gaa tac      144
Asp Asp Ala Glu His Val Arg Leu Val Trp Gly Asp Pro Tyr Glu Tyr
   35   40   45
acc ggc ggc aca tgg aaa gcg aac gag ctt gcg atg gcg aaa att gcc      192
Thr Gly Gly Thr Trp Lys Ala Asn Glu Leu Ala Met Ala Lys Ile Ala
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Ala Thr Ser Thr His Asp Tyr Trp Phe Ala Glu Val Ala Pro Pro Phe
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Arg Arg Leu Gln Tyr Gly Phe Ile Leu Thr Gly Ala Asp Asp Arg Asp
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Thr Phe Tyr Gly Ser Asn Gly Ala Cys Pro Phe Ala Gly Lys Ala Ala
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gat ata ggc aaa cac tgt ttt aaa ttt ccg ttt gtt cat gag gca gac      384
Asp Ile Gly Lys His Cys Phe Lys Phe Pro Phe Val His Glu Ala Asp
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acg ttt gat gca cct gac tgg gtc aaa tca acc gtc tgg tat caa att      432
Thr Phe Asp Ala Pro Asp Trp Val Lys Ser Thr Val Trp Tyr Gln Ile
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Lys	Leu	Val	Asp	Asp	Gln	Asn	Asp	Phe	Val	Ser	Phe	Ser	Arg	Thr	His	1584
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Gly Asp Glu Phe His Ser Val Met Asn Tyr Pro Phe Thr Glu Pro Met	
370 375 380	
Ile Asp Tyr Phe Ala Asp Gly Ser Ile Ser Ala Ser Gln Met Ala Ser	
385 390 395 400	
Arg Ile Asn Ser His Leu Met Ser Gly Met Lys Gln Val Asn Glu Val	
	405 410 415

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Cys	Gly	Gly	Asp	Asp	Lys	Lys	Val	Arg	Ser	Leu	Leu	Ala	Phe	Met	Phe
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Asp	Gly	Gly	Asp	Asp	Pro	Leu	Cys	Arg	Lys	Cys	Met	Val	Trp	Glu	Glu
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Glu	Lys	Gln	Asn	Gln	Glu	Met	Leu	Ala	Phe	Met	Lys	Arg	Leu	Ile	Ala
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Leu	Arg	Lys	Gln	Glu	Asn	Asp	Val	Leu	Thr	Tyr	Gly	Ala	Leu	Glu	Trp
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Lys	Leu	Val	Asp	Asp	Gln	Asn	Asp	Phe	Val	Ser	Phe	Ser	Arg	Thr	His
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Glu	Gly	Lys	Glu	Leu	Ile	Tyr	Phe	Phe	His	Gln	Gly	Ser	Glu	Val	Arg
	530					535					540				
Arg	Val	Arg	Leu	Arg	Asp	Leu	Lys	Ile	Ala	Ser	Asp	Lys	Arg	Ile	Tyr
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Asp	Ala	Trp	Thr	Glu	Ala	Leu	Gln	His	Asp	Asp	Val	Val	Asp	Ile	
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<210> 191

<211> 1620

<212> DNA

<213> Methylococcus capsulatus str. Bath

<220>

<221> CDS

<222> (1)..(1620)

<223> transl_table=11

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Tyr	Gln	Ile	Tyr	Pro	Leu	Ser	Phe	Gln	Asp	Ser	Asp	Gly	Asp	Gly	Arg	
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Gly	Asp	Leu	Pro	Gly	Ile	Leu	His	Arg	Leu	Asp	Tyr	Leu	Ala	Asp	Leu	
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Asn	Ile	Ala	Ala	Val	Trp	Leu	Ser	Pro	Val	Phe	Ala	Ser	Pro	Met	Arg	
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Asp	Phe	Gly	Tyr	Asp	Val	Ala	Asp	Tyr	Thr	Ser	Ile	His	Pro	Trp	Phe	
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gga	acc	ctg	agc	gat	ttc	gac	cgg	ctg	ctg	gcc	ggc	ttg	cac	ggc	cgt	288
Gly	Thr	Leu	Ser	Asp	Phe	Asp	Arg	Leu	Leu	Ala	Gly	Leu	His	Gly	Arg	
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ggc	atc	aag	ctg	atc	ctg	gac	ctg	gtg	ccg	aac	cac	acc	tcc	gac	cgg	336
Gly	Ile	Lys	Leu	Ile	Leu	Asp	Leu	Val	Pro	Asn	His	Thr	Ser	Asp	Arg	
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His	Pro	Trp	Phe	Leu	Glu	Ser	Arg	Ser	Ser	Arg	Asp	Asn	Pro	Arg	Arg	
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Asp	Trp	Tyr	Leu	Trp	Arg	Asp	Pro	Ala	Pro	Gly	Gly	Gly	Pro	Pro	Asn	
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Asn	Trp	Leu	Ser	Phe	Phe	Gly	Gly	Pro	Ala	Trp	Thr	Tyr	Asp	Glu	Thr	
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Thr	Gly	Gln	Tyr	Tyr	Leu	His	Gln	Phe	Thr	Pro	Glu	Gln	Pro	Glu	Leu	
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aac	ctg	cgc	cac	ccg	gcc	gtg	ctg	gag	gcg	atg	ctg	gag	gtg	atg	cgg	576
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ctg	ctg	atc	aaa	gac	gcc	ggg	ttc	cga	gac	gaa	cgg	gaa	aat	ccg	gcc				672
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Trp	Asp	Gly	Ile	Asp	Pro	His	Gly	Arg	Leu	Leu	His	Ile	His	Thr	Ala				
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His	Gln	Pro	Glu	Leu	His	Arg	Ile	Ile	Arg	Ala	Met	Arg	Ala	Val	Val				
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Asp	Gly	Tyr	Pro	Gly	Glu	Arg	Val	Leu	Ile	Gly	Glu	Thr	Asn	Val	Pro				
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Glu	Glu	Glu	Leu	Val	Lys	Tyr	Tyr	Gly	Ala	Ala	Arg	Asp	Glu	Phe	His				
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cta	ccc	ttc	aac	ttc	cgg	ctg	atc	cat	gcc	ccc	tgg	gac	gcg	cgg	aaa				912
Leu	Pro	Phe	Asn	Phe	Arg	Leu	Ile	His	Ala	Pro	Trp	Asp	Ala	Arg	Lys				
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Arg	Gln	Ala	Ala	Asp	Pro	Arg	Ser	Met	Leu	Ala	Leu	Phe	Arg	Ala	Leu				
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Thr	Arg	Leu	Arg	Gln	Cys	His	Pro	Ala	Leu	Ser	His	Gly	Ser	Tyr	Glu				
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Ser	Val	Asp	Thr	Lys	Ala	Asp	Gly	Val	Phe	Ala	Tyr	Lys	Arg	Thr	Ala				
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ggc	gcc	gaa	cgc	ctc	ctc	atc	gtg	ctc	gat	ttc	gcc	ggc	agt	gaa	cat				1488
Gly	Ala	Glu	Arg	Leu	Leu	Ile	Val	Leu	Asp	Phe	Ala	Gly	Ser	Glu	His				
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Leu	Leu	Asp	Ser	Gly	Glu	Leu	Ala	Asp	Gly	Ala	Glu	Ile	Leu	Leu	Ser				
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acc	ggc	atg	cgg	cgc	acc	ggc	cgg	gtc	gat	ctg	cgg	cgg	ctc	cgt	ttg				1584
Thr	Gly	Met	Arg	Arg	Thr	Gly	Arg	Val	Asp	Leu	Arg	Arg	Leu	Arg	Leu				
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ctc	tcc	aat	gaa	ggt	ctc	ata	ctg	aaa	ata	tct	tga								1620
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<212> PRT

<213> *Methylococcus capsulatus* str. Bath

<400> 192

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Gly Asp Leu Pro Gly Ile Leu His Arg Leu Asp Tyr Leu Ala Asp Leu
      35      40      45
Asn Ile Ala Ala Val Trp Leu Ser Pro Val Phe Ala Ser Pro Met Arg
      50      55      60
Asp Phe Gly Tyr Asp Val Ala Asp Tyr Thr Ser Ile His Pro Trp Phe
65      70      75      80
Gly Thr Leu Ser Asp Phe Asp Arg Leu Leu Ala Gly Leu His Gly Arg
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Gly Ile Lys Leu Ile Leu Asp Leu Val Pro Asn His Thr Ser Asp Arg
      100      105      110
His Pro Trp Phe Leu Glu Ser Arg Ser Ser Arg Asp Asn Pro Arg Arg
      115      120      125
Asp Trp Tyr Leu Trp Arg Asp Pro Ala Pro Gly Gly Gly Pro Pro Asn
130      135      140
Asn Trp Leu Ser Phe Phe Gly Gly Pro Ala Trp Thr Tyr Asp Glu Thr
145      150      155      160
Thr Gly Gln Tyr Tyr Leu His Gln Phe Thr Pro Glu Gln Pro Glu Leu
      165      170      175
Asn Leu Arg His Pro Ala Val Leu Glu Ala Met Leu Glu Val Met Arg
      180      185      190
Phe Trp Leu Asp Arg Gly Val Asp Gly Phe Arg Val Asp Val Pro Trp
195      200      205
Leu Leu Ile Lys Asp Ala Gly Phe Arg Asp Glu Pro Glu Asn Pro Ala
210      215      220
Trp Asp Gly Ile Asp Pro His Gly Arg Leu Leu His Ile His Thr Ala
225      230      235      240
His Gln Pro Glu Leu His Arg Ile Ile Arg Ala Met Arg Ala Val Val
      245      250      255
Asp Gly Tyr Pro Gly Glu Arg Val Leu Ile Gly Glu Thr Asn Val Pro
260      265      270
Glu Glu Glu Leu Val Lys Tyr Tyr Gly Ala Ala Arg Asp Glu Phe His
275      280      285
Leu Pro Phe Asn Phe Arg Leu Ile His Ala Pro Trp Asp Ala Arg Lys
290      295      300
Ile Arg Gln Met Val Glu Thr Tyr Glu Ala Ile Leu Pro Gln Arg Ala
305      310      315      320
Ser Pro Ala Trp Val Leu Gly Asn His Asp Gln Pro Arg Ile Ala Ser
      325      330      335
Arg Phe Gly Pro Asp Ala Ala Arg Val Ala Thr Met Leu Leu Leu Thr
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Leu Arg Gly Thr Pro Thr Cys Tyr Tyr Gly Asp Glu Leu Gly Met Glu
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Asn Gly Val Ile Pro Arg Asp Arg Ile Arg Asp Pro Gln Ala Leu Asn
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Gln Pro Gly Ile Ser Gly Val Phe Asn Arg Asp Glu Ala Arg Thr Pro
385      390      395      400
Leu Pro Trp Asp Thr Ser Pro Asn Ala Gly Phe Ala Pro Glu Gly Val
      405      410      415
Asp Pro Trp Leu Pro Leu Gly Glu Asp Trp Pro Met Arg Asn Val Ala
420      425      430
Arg Gln Ala Ala Asp Pro Arg Ser Met Leu Ala Leu Phe Arg Ala Leu
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Thr Arg Leu Arg Gln Cys His Pro Ala Leu Ser His Gly Ser Tyr Glu
450      455      460
Ser Val Asp Thr Lys Ala Asp Gly Val Phe Ala Tyr Lys Arg Thr Ala
465      470      475      480
Gly Ala Glu Arg Leu Leu Ile Val Leu Asp Phe Ala Gly Ser Glu His
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Leu Leu Asp Ser Gly Glu Leu Ala Asp Gly Ala Glu Ile Leu Leu Ser
500      505      510

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<211> 1866

<212> DNA

<213> Photobacterium profundum SS9

<220>

<221> CDS

<222> (1)..(1866)

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His	Gly	Lys	Leu	Pro	Phe	Asn	Ser	Asp	Lys	Asp	Thr	Thr	Phe	Tyr	Thr	
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Phe	Lys	Val	Met	Gln	Asn	Ser	Arg	Gln	Trp	Trp	Leu	His	Gly	Cys	Gly	
				85					90				95			
gtg	tca	ccg	cga	gta	ccg	ggt	aaa	gaa	aag	cac	ttc	aaa	ttc	aat	aac	336
Val	Ser	Pro	Arg	Val	Pro	Gly	Lys	Glu	Lys	His	Phe	Lys	Phe	Asn	Asn	
			100					105					110			
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Gln	His	Gln	Pro	Pro	Ala	Trp	Val	Lys	Glu	Gln	Ile	Phe	Tyr	Gln	Val	
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Phe	Pro	Asp	Arg	Phe	Ser	Asn	Ala	Asn	Pro	Ser	Ile	Ser	Val	Gln	Ser	
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Trp	Gly	Glu	Ser	Ala	Ser	Asn	His	Asp	Ser	Ser	Gly	Pro	Ser	Glu	Phe	
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Glu	Leu	Gly	Val	Thr	Ala	Leu	Tyr	Leu	Asn	Pro	Ile	Phe	Thr	Ala	Pro	
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ata	gat	gca	tgg	cgt	ttc	gat	gtt	atc	cat	atg	cta	ggt	gaa	ggc	aaa		1056
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Asn	Gln	Leu	Asp	Ser	His	Asp	Thr	Met	Arg	Phe	Leu	Thr	Met	Val	Asp		
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 $\langle 211 \rangle$ 621

<212> PRT

<213> Photobacterium profundum SS9

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 Leu Ile Ser₃₅ Ala Ile Phe Ile Arg₄₀ Cys Glu Pro Asp Asn₄₅ Glu Glu Leu
 Leu Ile Asp Met Glu Arg Gly₅₅ Arg Thr Gln Gly Arg₆₀ Leu Gln Tyr Trp
 His Gly Lys Leu Pro Phe₇₀ Asn Ser Asp Lys Asp₇₅ Thr Thr Phe Tyr Thr₈₀
 65 Phe Lys Val Met Gln₈₅ Asn Ser Arg Gln Trp₉₀ Trp Leu His Gly Cys₉₅ Gly
 Val Ser Pro Arg₁₀₀ Val Pro Gly Lys Glu Lys His Phe Lys Phe₁₁₀ Asn Asn
 Gln His Gln₁₁₅ Pro Pro Ala Trp Val₁₂₀ Lys Glu Gln Ile Phe₁₂₅ Tyr Gln Val
 Phe Pro₁₃₀ Asp Arg Phe Ser Asn₁₃₅ Ala Asn Pro Ser Ile₁₄₀ Ser Val Gln Ser
 Asn Glu Tyr Cys Leu Arg₁₅₀ Gly Thr Glu Lys Pro Thr Ile Ala Lys Ala₁₆₀
 145 Trp Gly Glu Ser Ala₁₆₅ Ser Asn His Asp Ser₁₇₀ Ser Gly Pro Ser Glu Phe
 Phe Gly Gly Asp₁₈₀ Leu Gln Gly Ile His₁₈₅ Asn Lys Ile Asp Tyr₁₉₀ Leu Gln
 Glu Leu Gly₁₉₅ Val Thr Ala Leu Tyr₂₀₀ Leu Asn Pro Ile Phe₂₀₅ Thr Ala Pro
 Ser Asn₂₁₀ His Lys Tyr Asp Thr₂₁₅ Thr Asp Tyr Leu Asn₂₂₀ Ile Asp Pro His
 Leu Gly Thr Asn Glu Gln₂₃₀ Phe Ala Asn Met Val₂₃₅ Ala Asp Leu His Gln₂₄₀
 225 Arg Asn Met Lys Ile₂₄₅ Met Leu Asp Ala Val₂₅₀ Tyr Asn His Thr Ser Val₂₅₅
 Asp His Pro Trp₂₆₀ Phe Asp Met Tyr Gln₂₆₅ Arg Asn Thr Ala Asp₂₇₀ Gln Ala
 Val Gly Ala Tyr Asp His Pro Asn₂₈₀ Ser Thr Tyr Arg Gln₂₈₅ Tyr Tyr Gln
 Phe Thr₂₉₀ Asp Asn Ser Asn Glu Tyr₂₉₅ Val Gly Trp Asn₃₀₀ Gly Ile Ser Thr
 Leu Pro Lys Leu Asn Phe₃₁₀ Ser Asn Pro Glu Val₃₁₅ Gln Asp Tyr Ile Tyr₃₂₀
 305 Ala Gly Asp Asp Ala Val Ile Lys His Trp₃₃₀ Leu Lys Pro Pro Tyr Asn₃₃₅
 Ile Asp Ala Trp₃₄₀ Arg Phe Asp Val Ile₃₄₅ His Met Leu Gly Glu₃₅₀ Gly Lys
 Gly Ala Arg₃₅₅ Asn Asn Ala His Phe₃₆₀ Val Lys Ser Phe Arg₃₆₅ Asn Ala Ala
 Lys Ser Val Asn Pro Glu Cys₃₇₅ Tyr Val Leu Gly Glu₃₈₀ His Phe Phe Glu
 Ala Ser Asn Trp Leu Gln₃₉₀ Gly Asp Gln Glu Asp₃₉₅ Gly Ala Met Asn Tyr₄₀₀
 385 Tyr Gly Phe Ala His₄₀₅ Pro Leu Arg Ala Phe₄₁₀ Phe Ser Gln Lys Asp Ile₄₁₅
 Ala Tyr His Ala₄₂₀ Cys Gln Ile Asn Ala Val Glu Leu Val Glu₄₃₀ Trp Leu
 Asn Glu Ala Arg Thr Lys Leu Pro₄₄₀ Trp Leu Asn Gln Leu Ser Gln Leu
 435 Asn Gln Leu Asp Ser His Asp₄₅₅ Thr Met Arg Phe Leu Thr Met Val Asp
 450 Asn Asn Thr Glu Thr Met₄₇₀ His Leu Ala Leu Met₄₇₅ Met Leu Phe Ala Tyr₄₈₀
 465 Val Gly Thr Pro Cys₄₈₅ Val Tyr Tyr Gly Thr₄₉₀ Glu Val Glu Leu Gln Gly
 Gly Gln Asp Pro₅₀₀ Asp Asn Arg Arg Cys₅₀₅ Phe Pro Trp Glu Arg Thr Glu
 500 Gln Glu Gln Lys Pro Gln Thr Phe₅₂₀ Ser Tyr Leu Gln Gln₅₂₅ Leu Ile Ala
 515 Val Arg Lys Ser Ser Thr Ala Leu Gln Ser Gly Ser Val Gln Trp Leu

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 Leu Ala Glu Asn Gln Tyr 535 Phe Ala Phe Ala Arg 540 Thr Thr Glu Thr Glu
 545 His Val Ile Cys Leu 550 Ile Asn Asn Ser Glu 555 Ser Ala Lys Thr Leu His
 Leu Pro Val Trp 565 Gln Leu Gly Ile Glu 570 Ser Gly Ser Leu Arg 575 Asp Leu
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<211> 1656

<212> DNA

<213> Thermus thermophilus HB8

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<221> CDS

<222> (1)..(1656)

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gag	cgg	gac	ggg	gag	tgt	cag	aaa	aag	ccc	atg	gcg	cct	tgg	gag	cgg	96
Glu	Arg	Asp	Gly	Glu	Leu	Gln	Lys	Lys	Pro	Met	Ala	Pro	Trp	Glu	Arg	
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ggc	cta	aag	gcg	cgg	gtg	ccc	gtc	cac	gcg	agc	ccc	ttc	cgc	tac	tgc	144
Gly	Leu	Lys	Ala	Arg	Val	Pro	Val	His	Ala	Ser	Pro	Phe	Arg	Tyr	Cys	
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ttc	cgc	ctc	ccc	caa	ggc	tac	ctg	ggc	agc	cac	ggc	ctg	gag	agg	acc	192
Phe	Arg	Leu	Pro	Gln	Gly	Tyr	Leu	Gly	Ser	His	Gly	Leu	Glu	Arg	Thr	
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ctg	ccc	cgc	tac	gac	cgc	ttc	tac	cac	ctc	ctc	gcc	aag	ccc	ctt	ccc	240
Leu	Pro	Arg	Tyr	Asp	Arg	Phe	Phe	His	Leu	Leu	Ala	Lys	Pro	Leu	Pro	
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Pro	Glu	Trp	Ala	Leu	Gly	Ala	Val	Phe	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	
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Phe	Arg	Gln	Gly	Arg	Pro	Glu	Leu	Ala	Pro	Lys	Glu	Gly	Ala	Trp	Leu	
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Tyr	Gly	Gly	Arg	Pro	Ile	Arg	Lys	Ala	Trp	His	Glu	Pro	Pro	Gly		
			115				120					125				
gag	gac	ggg	gcc	cgg	gag	ttc	tac	ggg	ggg	gac	ctc	ttt	ggg	gtc	ctc	432
Glu	Asp	Gly	Ala	Arg	Glu	Phe	Tyr	Gly	Gly	Asp	Leu	Phe	Gly	Val	Leu	
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				165					170					175		
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Tyr	His	Arg	Val	Asp	Pro	His	Leu	Gly	Gly	Glu	Glu	Ala	Leu	Arg	Ala	
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ctt	tac	gag	gcc	ctc	gag	gcc	cgg	ggg	atg	aag	ctc	atc	ctg	gac	ggg	624
Leu	Tyr	Glu	Ala	Leu	Glu	Ala	Arg	Gly	Met	Lys	Leu	Ile	Leu	Asp	Gly	
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gtc	ttc	aac	cac	gtg	ggg	gcg	acc	cac	ccc	tgg	ttc	cag	aag	gcc	ctt	672
Val	Phe	Asn	His	Val	Gly	Ala	Thr	His	Pro	Trp	Phe	Gln	Lys	Ala	Leu	
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Glu	Asp	Pro	Ser	Ser	Pro	Glu	Arg	Gly	Met	Phe	Thr	Phe	Tyr	Pro	Asp	
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ggg	agc	tac	gcc	agc	ttc	tgg	ggc	gtg	aag	cac	atg	ccc	aag	ctg	gac	768

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Tyr	Ala	Ser	Ala	Leu	Thr	Gln	Glu	Arg	Phe	Val	Phe	Gly	Lys	Glu	Ala	
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ccc	gtc	cgc	tac	tgg	atg	cgc	ctc	gcc	cat	ggc	tgg	cgg	ctg	gac	gtg	864
Pro	Val	Arg	Tyr	Trp	Met	Arg	Leu	Ala	His	Gly	Trp	Arg	Leu	Asp	Val	
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gcc	cac	tcc	atc	ggg	gaa	ggg	ggg	acg	aac	cgg	aag	aac	gcc	cgc	tgg	912
Ala	His	Ser	Ile	Gly	Glu	Gly	Gly	Thr	Asn	Arg	Lys	Asn	Ala	Arg	Trp	
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Leu	Arg	Ala	Leu	Ala	Arg	Ala	Ala	Lys	Glu	Glu	Arg	Glu	Asp	Ala	Leu	
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Val	Phe	Gly	Glu	Leu	Ser	Tyr	Asp	Thr	Val	Pro	Thr	Leu	Arg	Ala	His	
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Thr	Leu	Asp	Gly	Ala	Met	His	Tyr	Ala	Gly	Phe	Ala	His	Pro	Val	Met	
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Glu	Trp	Leu	Ser	Gly	Arg	Asp	Leu	His	Gly	Asn	Pro	Val	Glu	Leu	Glu	
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gcc	gag	gac	ctt	tgg	cgg	gcc	ctc	ttt	gac	cac	tac	gcc	ctt	ccc		1152
Ala	Glu	Asp	Leu	Trp	Arg	Ala	Leu	Phe	Asp	His	Tyr	Ala	Ala	Leu	Pro	
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Pro	Arg	Ala	Leu	Trp	Arg	Leu	Arg	Gly	Asp	Lys	Glu	Arg	Phe	Lys	Thr	
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Gly	Asp	Pro	Tyr	Cys	Arg	Ala	Pro	Phe	Pro	Trp	Asp	Glu	Ala	Leu	Trp	
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gac	aag	gac	ctc	ctc	gcc	ttc	ctc	cgg	cgc	ctc	atc	ctc	ctc	aag	aag	1440
Asp	Lys	Asp	Leu	Leu	Ala	Phe	Leu	Arg	Arg	Leu	Ile	Leu	Leu	Lys	Lys	
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acc	cac	ccc	gcc	ttg	agg	ctc	ggg	ggg	ctc	ccc	ctc	aag	gcc	cct		1488
Thr	His	Pro	Ala	Leu	Arg	Leu	Gly	Gly	Leu	Pro	Leu	Lys	Ala	Pro		
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ccg	ggg	gtc	ctg	gcc	ttc	agg	cgg	cgc	cac	cgg	ggg	agg	gag	gtc	tgg	1536
Pro	Gly	Val	Leu	Ala	Phe	Arg	Arg	Arg	His	Arg	Gly	Arg	Glu	Val	Trp	
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gcc	ttt	ttc	gcc	aag	gaa	gag	gtg	cgc	ctt	tcc	ctt	ccc	cgg	ggg	gtg	1584
Ala	Phe	Phe	Ala	Lys	Glu	Glu	Val	Arg	Leu	Ser	Leu	Pro	Arg	Gly	Val	
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gac	ctc	ctt	tcg	gga	agg	gag	gtg	gcg	ggg	gag	gtg	gag	gcg	cgg	tac	1632
Asp	Leu	Leu	Ser	Gly	Arg	Glu	Val	Ala	Gly	Glu	Val	Glu	Ala	Arg	Tyr	
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<212> PRT

<213> Thermus thermophilus HB8

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Phe	Arg	Leu	Pro	Gln	Gly	Tyr	Leu	Gly	Ser	His	Gly	Leu	Glu	Arg	Thr
Leu	Pro	Arg	Tyr	Asp	Arg	Phe	Phe	His	Leu	Leu	Ala	Lys	Pro	Leu	Pro
65	Pro	Glu	Trp	Ala	Leu	Gly	Ala	Val	Phe	Tyr	Gln	Ile	Phe	Pro	Asp
Pro	Arg	Gln	Gly	Arg	Pro	Glu	Leu	Ala	Pro	Lys	Glu	Gly	Ala	Trp	Leu
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Tyr	Gly	Gly	Arg	Pro	Ile	Arg	Lys	Lys	Ala	Trp	His	Glu	Pro	Pro	Gly
Glu	Asp	Gly	Ala	Arg	Glu	Phe	Tyr	Gly	Gly	Asp	Leu	Phe	Gly	Val	Leu
Glu	Ala	Leu	Pro	Tyr	Leu	Glu	Ala	Leu	Gly	Val	Glu	Ala	Leu	Tyr	Leu
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Thr	Pro	Ile	Phe	Gln	Ser	Pro	Ser	Ser	His	Arg	Tyr	Asp	Thr	Glu	Asp
Tyr	His	Arg	Val	Asp	Pro	His	Leu	Gly	Gly	Glu	Glu	Ala	Leu	Arg	Ala
Leu	Tyr	Glu	Ala	Leu	Glu	Ala	Arg	Gly	Met	Lys	Leu	Ile	Leu	Asp	Gly
Val	Phe	Asn	His	Val	Gly	Ala	Thr	His	Pro	Trp	Phe	Gln	Lys	Ala	Leu
Glu	Asp	Pro	Ser	Ser	Pro	Glu	Arg	Gly	Met	Phe	Thr	Phe	Tyr	Pro	Asp
225	Gly	Ser	Tyr	Ala	Ser	Phe	Trp	Gly	Val	Lys	His	Met	Pro	Lys	Leu
Gly	Ser	Tyr	Ala	Ser	Phe	Trp	Gly	Val	Lys	His	Met	Pro	Lys	Leu	Asp
Tyr	Ala	Ser	Ala	Leu	Thr	Gln	Glu	Arg	Phe	Val	Phe	Gly	Lys	Glu	Ala
Pro	Val	Arg	Tyr	Trp	Met	Arg	Leu	Ala	His	Gly	Trp	Arg	Leu	Asp	Val
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Val	Phe	Gly	Glu	Leu	Ser	Tyr	Asp	Thr	Val	Pro	Thr	Leu	Arg	Ala	His
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Ala	Glu	Asp	Leu	Trp	Arg	Ala	Leu	Phe	Asp	His	Tyr	Ala	Ala	Leu	Pro
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385	Pro	Arg	Ala	Leu	Trp	Arg	Leu	Arg	Gly	Asp	Lys	Glu	Arg	Phe	Thr
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Ala	Tyr	Ala	Leu	Leu	Phe	Ala	Phe	Pro	Pro	Gly	Ser	Pro	Ala	Val	Tyr
Gly	Asp	Glu	Val	Gly	Leu	Ser	Gln	Pro	Asn	Pro	Tyr	Glu	Val	Trp	Arg
Gly	Asp	Pro	Tyr	Cys	Arg	Ala	Pro	Phe	Pro	Trp	Asp	Glu	Ala	Leu	Trp
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465	Thr	His	Pro	Ala	Leu	Arg	Leu	Gly	Gly	Leu	Leu	Pro	Leu	Lys	Pro
Thr	His	Pro	Ala	Leu	Arg	Leu	Gly	Gly	Leu	Leu	Pro	Leu	Lys	Ala	Pro
Pro	Gly	Val	Leu	Ala	Phe	Arg	Arg	Arg	His	Arg	Gly	Arg	Glu	Val	Trp
Ala	Phe	Phe	Ala	Lys	Glu	Glu	Val	Arg	Leu	Ser	Leu	Pro	Arg	Gly	Val
Asp	Leu	Leu	Ser	Gly	Arg	Glu	Val	Ala	Gly	Glu	Val	Glu	Ala	Arg	Tyr
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Ala Tyr Asp Ser Glu Thr Leu His Leu Arg Leu Gln Thr Lys Lys His
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gat gtc gac cac gtc gag ctg ctt ttt ggc gac ccg tac gaa tgg cac     144
Asp Val Asp His Val Glu Leu Leu Phe Gly Asp Pro Tyr Glu Trp His
 35      40
gat ggc gcc tgg cag ttt caa acg atg ccg atg cgg aaa acg gga agc     192
Asp Gly Ala Trp Gln Phe Gln Thr Met Pro Met Arg Lys Thr Gly Ser
 50      55      60
gac ggg ttg ttt gac tat tgg ctc gcc gaa gtc aaa ccg cca tat cga     240
Asp Gly Leu Phe Asp Tyr Trp Leu Ala Glu Val Lys Pro Pro Tyr Arg
 65      70      75
cgg ctg cgc tat ggg ttt gtg ctt cga gct ggg ggc gag aaa ctg gtc     288
Arg Leu Arg Tyr Gly Phe Val Leu Arg Ala Gly Gly Glu Lys Leu Val
 85      90      95
tat acg gaa aaa gga ttt tac cat gaa gct ccg agc gac gac acc gct     336
Tyr Thr Glu Lys Gly Phe Tyr His Glu Ala Pro Ser Asp Asp Thr Ala
 100      105      110
tac tac ttt tgc ttc ccc ttt ctt cat cgg gtc gac cta ttc caa gcg     384
Tyr Tyr Phe Cys Phe Pro Phe Leu His Arg Val Asp Leu Phe Gln Ala
 115      120      125
ccg ggc tgg gta aaa gac aca gta tgg tat caa att ttc ccc gag cgg     432
Pro Gly Trp Val Lys Asp Thr Val Trp Tyr Gln Ile Phe Pro Glu Arg
 130      135      140
ttc gcc aac ggc aac ccg gcc atc agt ccg aaa ggg gcg cgg ccg tgg     480
Phe Ala Asn Gly Asn Pro Ala Ile Ser Pro Lys Gly Ala Arg Pro Trp
 145      150      155
gga agc gag gac ccg acg ccg acg agc ttt ttc ggc ggc gac ttg caa     528
Gly Ser Glu Asp Pro Thr Pro Thr Ser Phe Phe Gly Gly Asp Leu Gln
 165      170      175
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Gly Ile Ile Asp His Leu Asp Tyr Leu Ala Asp Leu Gly Ile Thr Gly
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Ile Tyr Leu Thr Pro Ile Phe Arg Ala Pro Ser Asn His Lys Tyr Asp
 195      200      205
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Thr Ala Asp Tyr Phe Glu Ile Asp Pro His Phe Gly Asp Lys Glu Thr
 210      215      220
ttg aaa aca ctt gtc aaa cgc tgc cat gaa aaa gga atc cgc gtc atg     720
Leu Lys Thr Leu Val Lys Arg Cys His Glu Lys Gly Ile Arg Val Met
 225      230      235
ctc gat gcg gtc ttc aat cat tgc ggc tat gag ttt ggc ccg ttt caa     768
Leu Asp Ala Val Phe Asn His Cys Gly Tyr Glu Phe Gly Pro Phe Gln
 245      250      255
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Asp Val Leu Lys Asn Gly Ala Ala Ser Arg Tyr Lys Asp Trp Phe His
 260      265      270
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 275      280      285
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Phe Ala Phe Val Pro Gln Met Pro Lys Leu Asn Thr Ala His Pro Glu
 290      295      300
gtg aag cgc tac ttg ctt gat gtc gcg acg tac tgg att cgc gag ttt     960
Val Lys Arg Tyr Leu Leu Asp Val Ala Thr Tyr Trp Ile Arg Glu Phe
  
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Asp	Ile	Asp	Gly	Trp	325	Arg	Leu	Asp	Val	Ala	Asn	Glu	Ile	Asp	His	Gln				1008
ttt	tgg	cg	gaa	ttc	cgt	cag	gcg	gtg	aag	gcg	cta	aag	ccc	gat	gtg					1056
Phe	Trp	Arg	Glu	Phe	Arg	Gln	Ala	Val	Lys	Ala	Leu	Lys	Pro	Asp	Val					
tac	att	ctc	ggc	gag	att	tgg	cat	gat	gcc	atg	cct	tgg	ctg	cg	ggc					1104
Tyr	Ile	Leu	Gly	Glu	Ile	Trp	His	Asp	Ala	Met	Pro	Trp	Leu	Arg	Gly					
gac	cag	ttt	gac	gcc	gtc	atg	aac	tac	ccg	ttg	gcg	gac	gcg	gcg	ctc					1152
Asp	Gln	Phe	Asp	Ala	Val	Met	Asn	Tyr	Pro	Leu	Ala	Asp	Ala	Ala	Leu					
cg	ttt	ttc	gcg	aaa	gag	gaa	atc	agc	gcc	cg	cag	ttt	gcc	gat	atc					1200
Arg	Phe	Phe	Ala	Lys	Glu	Glu	Ile	Ser	Ala	Arg	Gln	Phe	Ala	Asp	Ile					
atg	atc	cga	ctt	ctt	cat	tcg	tat	ccg	aaa	cag	gtg	aac	gaa	gcg	gca					1248
Met	Ile	Arg	Leu	Leu	His	Ser	Tyr	Pro	Lys	Gln	Val	Asn	Glu	Ala	Ala					
ttc	aac	ttg	ctt	ggc	agc	cat	gat	aca	cca	agg	ctg	ctc	act	gtt	tgc					1296
Phe	Asn	Leu	Leu	Gly	Ser	His	Asp	Thr	Pro	Arg	Leu	Leu	Thr	Val	Cys					
ggc	ggc	gac	gtc	cg	aaa	gtg	aag	ttg	ttg	ttt	ttg	ttc	cag	ctc	acg					1344
Gly	Gly	Asp	Val	Arg	Lys	Val	Lys	Leu	Leu	Phe	Leu	Phe	Gln	Leu	Thr					
ttc	act	ggt	tcg	ccg	tgt	att	tac	tat	ggc	gat	gag	atc	ggc	atg	acg					1392
Phe	Thr	Gly	Ser	Pro	Cys	Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Thr					
ggt	gga	aac	gat	ccg	gaa	tgc	cgg	aaa	tgt	atg	gtg	tgg	gat	ccg	gag					1440
Gly	Gly	Asn	Asp	Pro	Glu	Cys	Arg	Lys	Cys	Met	Val	Trp	Asp	Pro	Glu					
cac	caa	aac	cg	gaa	ctg	ttg	gcg	cat	gtc	aag	cgg	ctg	att	gcg	cta					1488
His	Gln	Asn	Arg	Glu	Leu	Leu	Ala	His	Val	Lys	Arg	Leu	Ile	Ala	Leu					
agg	aag	cag	cac	cgg	gcg	ctc	cgg	cg	gga	gat	gtc	tcc	ttt	ctt	tcc					1536
Arg	Lys	Gln	His	Arg	Ala	Leu	Arg	Arg	Gly	Asp	Val	Ser	Phe	Leu	Ser					
gcc	gac	gac	aac	cct	aac	cat	ctc	gtg	tat	gaa	aaa	att	gac	ggc	gct					1584
Ala	Asp	Asp	Asn	Pro	Asn	His	Leu	Val	Tyr	Glu	Lys	Ile	Asp	Gly	Ala					
gaa	acc	gtg	ctc	gtc	atc	atc	aac	cga	agc	aat	gat	gcc	gac	att						1632
Glu	Thr	Val	Leu	Val	Ile	Ile	Asn	Arg	Ser	Asn	Asp	Ala	Ala	Asp	Ile					
ccg	ctc	ccg	ctc	gac	ctt	cg	gga	aaa	tgg	ctt	ggt	gac	ctc	ttg	acc					1680
Pro	Leu	Pro	Leu	Asp	Leu	Arg	Gly	Lys	Trp	Leu	Val	Asp	Leu	Leu	Thr					
gga	gag	cgg	ttt	gcg	gcc	gag	gcg	gaa	acg	ctt	tgc	gcc	tct	ttg	cct					1728
Gly	Glu	Arg	Phe	Ala	Ala	Glu	Ala	Glu	Thr	Leu	Cys	Ala	Ser	Leu	Pro					
ccg	tat	ggg	ttt	gtg	ctc	tat	aaa	gtt	gaa	agc	tgg	taa								1767
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<211> 588

<212> PRT

<213> Geobacillus kaustophilus HTA426

<400> 198

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Asp	Val	Asp	His	Val	Glu	Leu	Leu	Phe	Gly	Asp	Pro	Tyr	Glu	Trp	His
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Asp	Gly	Ala	Trp	Gln	Phe	Gln	Thr	Met	Pro	Met	Arg	Lys	Thr	Gly	Ser
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Tyr	Thr	Glu	Lys ¹⁰⁰	Gly	Phe	Tyr	His	Glu ¹⁰⁵	Ala	Pro	Ser	Asp	Asp ¹¹⁰	Thr	Ala
Tyr	Tyr	Phe ¹¹⁵	Cys	Phe	Pro	Phe	Leu ¹²⁰	His	Arg	Val	Asp	Leu ¹²⁵	Phe	Gln	Ala
Pro	Gly ¹³⁰	Trp	Val	Lys	Asp	Thr ¹³⁵	Val	Trp	Tyr	Gln	Ile ¹⁴⁰	Phe	Pro	Glu	Arg
Phe ¹⁴⁵	Ala	Asn	Gly	Asn	Pro ¹⁵⁰	Ala	Ile	Ser	Pro	Lys ¹⁵⁵	Gly	Ala	Arg	Pro	Trp ¹⁶⁰
Gly	Ser	Glu	Asp	Pro ¹⁶⁵	Thr	Pro	Thr	Ser	Phe ¹⁷⁰	Phe	Gly	Gly	Asp	Leu ¹⁷⁵	Gln
Gly	Ile	Ile	Asp ¹⁸⁰	His	Leu	Asp	Tyr ¹⁸⁵	Leu	Ala	Asp	Leu	Gly	Ile ¹⁹⁰	Thr	Gly
Ile	Tyr ¹⁹⁵	Leu	Thr	Pro	Ile	Phe	Arg ²⁰⁰	Ala	Pro	Ser	Asn	His ²⁰⁵	Lys	Tyr	Asp
Thr	Ala ²¹⁰	Asp	Tyr	Phe	Glu	Ile ²¹⁵	Asp	Pro	His	Phe	Gly ²²⁰	Asp	Lys	Glu	Thr
Leu ²²⁵	Lys	Thr	Leu	Val	Lys ²³⁰	Arg	Cys	His	Glu	Lys ²³⁵	Gly	Ile	Arg	Val	Met ²⁴⁰
Leu	Asp	Ala	Val	Phe ²⁴⁵	Asn	His	Cys	Gly	Tyr ²⁵⁰	Glu	Phe	Gly	Pro	Phe ²⁵⁵	Gln
Asp	Val	Leu	Lys ²⁶⁰	Asn	Gly	Ala	Ala	Ser ²⁶⁵	Arg	Tyr	Lys	Asp	Trp ²⁷⁰	Phe	His
Ile	Arg	Glu ²⁷⁵	Phe	Pro	Leu	Gln	Thr ²⁸⁰	Glu	Pro	Arg	Pro	Asn ²⁸⁵	Tyr	Asp	Thr
Phe	Ala ²⁹⁰	Phe	Val	Pro	Gln	Met ²⁹⁵	Pro	Lys	Leu	Asn	Thr ³⁰⁰	Ala	His	Pro	Glu
Val ³⁰⁵	Lys	Arg	Tyr	Leu	Leu ³¹⁰	Asp	Val	Ala	Thr	Tyr ³¹⁵	Trp	Ile	Arg	Glu	Phe ³²⁰
Asp	Ile	Asp	Gly	Trp ³²⁵	Arg	Leu	Asp	Val	Ala ³³⁰	Asn	Glu	Ile	Asp	His ³³⁵	Gln
Phe	Trp	Arg	Glu ³⁴⁰	Phe	Arg	Gln	Ala	Val ³⁴⁵	Lys	Ala	Leu	Lys	Pro ³⁵⁰	Asp	Val
Tyr	Ile	Leu ³⁵⁵	Gly	Glu	Ile	Trp	His ³⁶⁰	Asp	Ala	Met	Pro	Trp ³⁶⁵	Leu	Arg	Gly
Asp	Gln ³⁷⁰	Phe	Asp	Ala	Val	Met ³⁷⁵	Asn	Tyr	Pro	Leu	Ala	Asp ³⁸⁰	Ala	Ala	Leu
Arg ³⁸⁵	Phe	Phe	Ala	Lys	Glu ³⁹⁰	Glu	Ile	Ser	Ala	Arg ³⁹⁵	Gln	Phe	Ala	Asp	Ile ⁴⁰⁰
Met	Ile	Arg	Leu	Leu ⁴⁰⁵	His	Ser	Tyr	Pro	Lys ⁴¹⁰	Gln	Val	Asn	Glu	Ala ⁴¹⁵	Ala
Phe	Asn	Leu	Leu ⁴²⁰	Gly	Ser	His	Asp	Thr ⁴²⁵	Pro	Arg	Leu	Leu	Thr ⁴³⁰	Val	Cys
Gly	Gly	Asp ⁴³⁵	Val	Arg	Lys	Val	Lys ⁴⁴⁰	Leu	Leu	Phe	Leu	Phe ⁴⁴⁵	Gln	Leu	Thr
Phe	Thr ⁴⁵⁰	Gly	Ser	Pro	Cys	Ile ⁴⁵⁵	Tyr	Tyr	Gly	Asp	Glu ⁴⁶⁰	Ile	Gly	Met	Thr
Gly ⁴⁶⁵	Gly	Asn	Asp	Pro	Glu ⁴⁷⁰	Cys	Arg	Lys	Cys	Met ⁴⁷⁵	Val	Trp	Asp	Pro	Glu ⁴⁸⁰
His	Gln	Asn	Arg	Glu ⁴⁸⁵	Leu	Leu	Ala	His	Val ⁴⁹⁰	Lys	Arg	Leu	Ile	Ala ⁴⁹⁵	Leu
Arg	Lys	Gln	His ⁵⁰⁰	Arg	Ala	Leu	Arg	Arg ⁵⁰⁵	Gly	Asp	Val	Ser	Phe ⁵¹⁰	Leu	Ser
Ala	Asp	Asp ⁵¹⁵	Asn	Pro	Asn	His	Leu ⁵²⁰	Val	Tyr	Glu	Lys	Ile ⁵²⁵	Asp	Gly	Ala
Glu	Thr ⁵³⁰	Val	Leu	Val	Ile	Ile ⁵³⁵	Asn	Arg	Ser	Asn	Asp ⁵⁴⁰	Ala	Ala	Asp	Ile
Pro ⁵⁴⁵	Leu	Pro	Leu	Asp	Leu ⁵⁵⁰	Arg	Gly	Lys	Trp	Leu	Val ⁵⁵⁵	Asp	Leu	Leu	Thr ⁵⁶⁰
Gly	Glu	Arg	Phe	Ala ⁵⁶⁵	Ala	Glu	Ala	Glu	Thr ⁵⁷⁰	Leu	Cys	Ala	Ser	Leu ⁵⁷⁵	Pro
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<211> 1542

<212> DNA

<213> Geobacillus kaustophilus HTA426

<220>

<221> CDS

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ctt ttt tat gcc tgg ccg gtg cag gcg gcg gaa aaa gaa gaa cgg acg	96
Leu Phe Tyr Ala Trp Pro Val Gln Ala Ala Glu Lys Glu Glu Arg Thr	
20 25 30	
tgg caa gat gaa gcc att tat ttc att atg gtc gac ccg ttt aac aat	144
Trp Gln Asp Glu Ala Ile Tyr Phe Ile Met Val Asp Arg Phe Asn Asn	
35 40 45	
atg gat ccg aca aac gac cag aac gtg aat gtg aac gat ccg aaa ggg	192
Met Asp Pro Thr Asn Asp Gln Asn Val Asn Val Asn Asp Pro Lys Gly	
50 55 60	
tat ttc ggc ggc gac ttg aaa ggg gtg acg gcg aaa ctc gat tac atc	240
Tyr Phe Gly Gly Asp Leu Lys Gly Val Thr Ala Lys Leu Asp Tyr Ile	
65 70 75 80	
aag gag atg gga ttt acc gcc att tgg ctg acg ccg att ttt aaa aac	288
Lys Glu Met Gly Phe Thr Ala Ile Trp Leu Thr Pro Ile Phe Lys Asn	
85 90 95	
atg ccg ggc ggt tat cat ggc tat tgg att gaa gat ttt tat caa gtc	336
Met Pro Gly Gly Tyr His Gly Tyr Trp Ile Glu Asp Phe Tyr Gln Val	
100 105 110	
gat ccg cac ttt ggc acg ctg ggc gat ttg aaa aca ctc gtc aaa gaa	384
Asp Pro His Phe Gly Thr Leu Gly Asp Leu Lys Thr Leu Val Lys Glu	
115 120 125	
gcg cat aag cgc gac atg aaa gtc att ttg gat ttt gtc gcc aac cat	432
Ala His Lys Arg Asp Met Lys Val Ile Leu Asp Phe Val Ala Asn His	
130 135 140	
gtc ggt tac aat cac cca tgg tta cat gac cca acg aaa aaa gat tgg	480
Val Gly Tyr Asn His Pro Trp Leu His Asp Pro Thr Lys Lys Asp Trp	
145 150 155 160	
ttt cac ccg aaa aaa gag att ttc gac tgg aac gac caa aca cag ctt	528
Phe His Pro Lys Lys Glu Ile Phe Asp Trp Asn Asp Gln Thr Gln Leu	
165 170 175	
gaa aac ggc tgg tat ggg ttg cct gat ttg gcg cag gaa aat cca	576
Glu Asn Gly Trp Val Tyr Gly Leu Pro Asp Leu Ala Gln Glu Asn Pro	
180 185 190	
gag gtc aaa acg tat tta att gac gct gcc aaa tgg tgg atc aaa gaa	624
Glu Val Lys Thr Tyr Leu Ile Asp Ala Ala Lys Trp Trp Ile Lys Glu	
195 200 205	
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Thr Asp Ile Asp Gly Tyr Arg Leu Asp Thr Val Arg His Val Pro Lys	
210 215 220	
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Ser Phe Trp Gln Glu Phe Ala Lys Glu Val Lys Ser Val Lys Gln Asp	
225 230 235 240	
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Phe Phe Leu Leu Gly Glu Val Trp Ser Asp Asp Pro Arg Tyr Ile Ala	
245 250 255	
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Glu Tyr Gly Gln Tyr Gly Ile Asp Gly Phe Val Asp Tyr Pro Leu Tyr	
260 265 270	
ggc gcg gtg aag cag tcg ctt gct agg cgc gat gcg tca ctg cgc ccg	864
Gly Ala Val Lys Gln Ser Leu Ala Arg Arg Asp Ala Ser Leu Arg Pro	
275 280 285	
ctg tat gac gtc tgg gaa tac aac aaa acg ttt tac gac cgc ccg tac	912
Leu Tyr Asp Val Trp Glu Tyr Asn Lys Thr Phe Tyr Asp Arg Pro Tyr	
290 295 300	
ttg ctc ggg acg ttt ttg gac aat cac gat acc gtg ccg ttt acg aaa	960
Leu Leu Gly Thr Phe Leu Asp Asn His Asp Thr Val Arg Phe Thr Lys	
305 310 315 320	
ctt tcg att gac aac cgc aac aat ccg att tca cgc atc aag ctg gcg	1008
Leu Ser Ile Asp Asn Arg Asn Asn Pro Ile Ser Arg Ile Lys Leu Ala	

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Gly	Pro	Leu	Arg	Gln	Gln	Leu	Pro	Ser	Leu	Arg	Arg	Gly	Asp	Phe	Thr		
ctc	ctg	tat	gaa	aaa	gac	ggc	atg	gcg	gtg	tgg	aaa	cgg	caa	tat	gaa	1248	
Leu	Leu	Tyr	Glu	Lys	Asp	Gly	Met	Ala	Val	Trp	Lys	Arg	Gln	Tyr	Glu		
gat	gaa	aca	acg	gtt	atc	gcc	atc	aac	aac	acg	ggc	gaa	acg	cag	cac	1296	
Asp	Glu	Thr	Thr	Val	Ile	Ala	Ile	Asn	Asn	Thr	Gly	Glu	Thr	Gln	His		
gtt	cac	cta	acg	aac	gac	cag	ctg	cca	aaa	aac	aag	gaa	ctg	cgc	ggc	1344	
Val	His	Leu	Thr	Asn	Asp	Gln	Leu	Pro	Lys	Asn	Lys	Glu	Leu	Arg	Gly		
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gtg	ctc	gac	cgc	gaa	acg	gcg	gaa	gtg	tac	aaa	ctg	ccg	gaa	aaa	aca	1440	
Val	Leu	Asp	Arg	Glu	Thr	Ala	Glu	Val	Tyr	Lys	Leu	Arg	Glu	Lys	Thr		
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Gly	Ile	Asn	Val	Pro	Phe	Ile	Ala	Ala	Ile	Val	Ser	Val	Tyr	Val	Leu		
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Phe	Leu	Leu	Phe	Leu	Tyr	Leu	Val	Lys	Lys	Arg	Ala	Lys	Arg	Met	Pro		
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<211> 513

<212> PRT

<213> Geobacillus kaustophilus HTA426

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Trp	Gln	Asp	Glu	Ala	Ile	Tyr	Phe	Ile	Met	Val	Asp	Arg	Phe	Asn	Asn	
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Tyr	Phe	Gly	Gly	Asp	Leu	Lys	Gly	Val	Thr	Ala	Lys	Leu	Asp	Tyr	Ile	
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Lys	Glu	Met	Gly	Phe	Thr	Ala	Ile	Trp	Leu	Thr	Pro	Ile	Phe	Lys	Asn	
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Asp	Pro	His	Phe	Gly	Thr	Leu	Gly	Asp	Leu	Lys	Thr	Leu	Val	Lys	Glu	
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Ala	His	Lys	Arg	Asp	Met	Lys	Val	Ile	Leu	Asp	Phe	Val	Ala	Asn	His	
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Val	Gly	Tyr	Asn	His	Pro	Trp	Leu	His	Asp	Pro	Thr	Lys	Lys	Asp	Trp	
145				150						155					160	
Phe	His	Pro	Lys	Lys	Glu	Ile	Phe	Asp	Trp	Asn	Asp	Gln	Thr	Gln	Leu	
			165						170					175		
Glu	Asn	Gly	Trp	Val	Tyr	Gly	Leu	Pro	Asp	Leu	Ala	Gln	Glu	Asn	Pro	
		180						185					190			
Glu	Val	Lys	Thr	Tyr	Leu	Ile	Asp	Ala	Lys	Trp	Trp	Ile	Lys	Glu		

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Gly	Ala	Val	Lys	Gln	Ser	Leu	Ala	Arg	Arg	Asp	Ala	Ser	Leu	Arg	Pro
	275						280					285			
Leu	Tyr	Asp	Val	Trp	Glu	Tyr	Asn	Lys	Thr	Phe	Tyr	Asp	Arg	Pro	Tyr
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Leu	Ser	Ile	Asp	Asn	Arg	Asn	Asn	Pro	Ile	Ser	Arg	Ile	Lys	Leu	Ala
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Met	Thr	Tyr	Leu	Phe	Thr	Ala	Pro	Gly	Ile	Pro	Ile	Met	Tyr	Tyr	Gly
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Thr	Glu	Ile	Ala	Met	Asn	Gly	Gly	Glu	Asp	Pro	Asp	Asn	Arg	Arg	Leu
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Met	Asp	Phe	Arg	Ala	Asp	Pro	Glu	Ile	Ile	Asp	Tyr	Leu	Lys	Lys	Ile
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385					390					395					400
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Val	His	Leu	Thr	Asn	Asp	Gln	Leu	Pro	Lys	Asn	Lys	Glu	Leu	Arg	Gly
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Phe	Leu	Leu	Asp	Asp	Leu	Val	Arg	Gly	Asp	Gly	Asp	Gly	Tyr	Asp	Leu
	450					455					460				
Val	Leu	Asp	Arg	Glu	Thr	Ala	Glu	Val	Tyr	Lys	Leu	Arg	Glu	Lys	Thr
465					470					475					480
Gly	Ile	Asn	Val	Pro	Phe	Ile	Ala	Ala	Ile	Val	Ser	Val	Tyr	Val	Leu
				485					490					495	
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Arg Met Leu Ser Leu Val Leu Ala Ser Val Leu Leu Leu Ala Leu Thr	
20 25 30	
cct ttc cag gcg gtt gcc gct gcg aac gag gca gga agt tct agc gct	144
Pro Phe Gln Ala Val Ala Ala Ala Asn Glu Ala Gly Ser Ser Ser Ala	
35 40 45	
cta ggg aat gga gcg cat cgg tgg acg gcc gaa tcc acg gcc tcg caa	192
Leu Gly Asn Gly Ala His Arg Trp Thr Ala Glu Ser Thr Ala Ser Gln	
50 55 60	
cca cgg acg atc acg ctc gtc ggc acg cta caa gat gaa ttg ggc cat	240
Pro Arg Thr Ile Thr Leu Val Gly Thr Leu Gln Asp Glu Leu Gly His	
65 70 75 80	
acg gcg gaa tgg gat ccg ggg gca ttg gcg acg agg atg cat gat gaa	288

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Thr	Ala	Glu	Trp	Asp 85	Pro	Gly	Ala	Leu	Ala 90	Thr	Arg	Met	His	Asp 95	Glu	
ggg Gly	aat Asn	ggg Gly	ctt Leu 100	tat Tyr	aca Thr	ttc Phe	acc Thr	ggg Gly 105	acg Thr	ctg Leu	ccg Pro	gct Ala	ggg Gly 110	acg Thr	tat Tyr	336
gag Glu	tac Tyr	aaa Lys 115	att Ile	gcg Ala	gtc Val	aat Asn	ggc Gly 120	agc Ser	tgg Trp	gat Asp	gaa Glu	aac Asn 125	tac Tyr	gga Gly	gcc Ala	384
ggc Gly 130	ggc Gly	cgc Arg	aat Asn	ggc Gly	gac Asp	aat Asn 135	ctg Leu	gtg Val	ttg Leu	aag Lys	ctg Leu 140	gat Asp	cgg Arg	caa Gln	acc Thr	432
gag Glu 145	gtg Val	acg Thr	ttt Phe	tat Tyr	tac Tyr 150	cat His	gac Asp	cgg Arg	acg Thr	cat His 155	gcg Ala	atc Ile	gcg Ala	gat Asp	tcg Ser 160	480
aca Thr	tgg Trp	tat Tyr	acg Thr	gcg Ala 165	att Ile	gcg Ala	aag Lys	gag Glu	aaa Lys 170	cag Gln	ccg Pro	cgc Arg	ctc Leu	gtc Val 175	ggg Gly	528
acg Thr	gtg Val	ctg Leu	ccg Pro 180	gcc Ala	atc Ile	ggc Gly	tat Tyr	gag Glu 185	ggg Gly	gag Glu	aac Asn	gat Asp	gga Gly 190	tgg Trp	acc Thr	576
ccg Pro	ggg Gly	aca Thr 195	tcg Ser	acg Thr	gcg Ala	ctg Leu	ttg Leu 200	acc Thr	gat Asp	gac Asp	gat Asp	ttc Phe 205	gac Asp	tcg Ser	gtg Val	624
tac Tyr	acg Thr 210	ttt Phe	acg Thr	gcg Ala	cag Gln	gtg Val 215	ccg Pro	aaa Lys	ggg Gly	tcg Ser	tat Tyr 220	gaa Glu	tat Tyr	aaa Lys	atc Ile	672
gtc Val 225	ctc Leu	gga Gly	aac Asn	aat Asn	tgg Trp 230	aac Asn	gag Glu	agc Ser	tac Tyr	cca Pro 235	caa Gln	gag Glu	aat Asn	gca Ala	cgc Arg 240	720
tta Leu	acc Thr	gtt Val	ttg Leu	gaa Glu 245	acg Thr	acc Thr	att Ile	aca Thr 250	ttc Phe	ttc Phe	ttc Phe	aat Asn	gcg Ala 255	aaa Lys		768
aca Thr	aaa Lys	gag Glu	gtg Val 260	tac Tyr	acc Thr	gac Asp	tac Tyr	aac Asn 265	ccc Pro	aat Asn	ggc Gly	tct Ser	gac Asp 270	ggt Gly	gtt Val	816
gtt Val	cag Gln	aaa Lys 275	gac Asp	cga Arg	tta Leu	aaa Lys	cac His 280	aat Asn	aca Thr	tgg Trp	gat Asp	acg Thr 285	ctg Leu	tac Tyr	cgc Arg	864
cag Gln	ccg Pro 290	ttt Phe	ggt Gly	gcg Ala	gtg Val	aaa Lys 295	gcg Ala	gga Gly	acg Thr	aag Lys	gtg Val 300	acg Thr	ctt Leu	cgt Arg	ctg Leu	912
gcg Ala 305	gcg Ala	aaa Lys	aaa Lys	ggc Gly	gat Asp 310	ttg Leu	acg Thr	aag Lys	gcg Ala	gat Asp 315	gtg Val	tat Tyr	gtg Val	aaa Lys	aat Asn 320	960
gcg Ala	acg Thr	acc Thr	gga Gly	acc Thr 325	gcc Ala	aaa Lys	gtc Val	tac Tyr	acg Thr 330	atg Met	gaa Glu	aaa Lys	gtc Val 335	agc Ser	gtg Val	1008
ctc Leu	ggg Gly	gat Asp	gat Asp 340	gaa Glu	tat Tyr	tgg Trp	gag Glu	gtg Val 345	gcg Ala	ttc Phe	acc Thr	cct Pro	tcg Ser 350	acg Thr	ccc Pro	1056
ggg Gly	gtg Val	tac Tyr 355	ggg Gly	tat Tyr	aaa Lys	ttt Phe	ata Ile 360	gcg Ala	caa Gln	gat Asp	gcc Ala	gga Gly 365	acg Thr	aaa Lys	gtg Val	1104
gaa Glu 370	tac Tyr	ggc Gly	gaa Glu	gat Asp	acg Thr	caa Gln 375	gaa Glu	ggg Gly	caa Gln	tgg Trp	ggg Gly 380	aaa Lys	gcg Ala	gtg Val	gac Asp	1152
agc Ser 385	cgc Arg	gcg Ala	gag Glu	ctg Leu	ttt Phe 390	caa Gln	ctg Leu	acg Thr	gtg Val	tat Tyr 395	gat Asp	ccg Pro	gat Asp	tac Tyr	agg Arg 400	1200
acg Thr	ccc Pro	gac Asp	tgg Trp	atg Met 405	aaa Lys	gaa Glu	gcg Ala	gtt Val	gtg Val 410	tat Tyr	caa Gln	att Ile	ttc Phe	ccg Pro 415	gat Asp	1248
cgg Arg	ttc Phe	ttt Phe	aat Asn 420	ggc Gly	aac Asn	cct Pro	tca Ser	aat Asn 425	gat Asp	aac Asn	agc Ser	aag Lys	cag Gln 430	cag Gln	gca Ala	1296
cgc Arg	ggg Gly	gcg Ala 435	cag Gln	ccg Pro	att Ile	gag Glu	cat His 440	cgc Arg	gat Asp	tgg Trp	tcg Ser	gat Asp 445	ttg Leu	ccc Pro	gat Asp	1344
aat	ccg	cgc	ctg	aaa	ggg	acg	agc	ggc	tac	gat	ggc	gac	ggc	gaa	tgg	1392

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Asn	Pro	Arg	Leu	Lys	Gly	Thr	Ser	Gly	Tyr	Asp	Gly	Asp	Gly	Glu	Trp	
450	450					455				460						
tcg	aat	gac	ttt	ttc	ggc	gga	gat	gtg	gcc	ggg	att	gaa	cag	aag	ttg	1440
Ser	Asn	Asp	Phe	Phe	Gly	Gly	Asp	Val	Ala	Gly	Ile	Glu	Gln	Lys	Leu	
465					470					475					480	
gat	tac	ttg	cag	tcg	ctt	ggg	gtg	aac	acg	att	tac	tta	aac	ccg	atc	1488
Asp	Tyr	Leu	Gln	Ser	Leu	Gly	Val	Asn	Thr	Ile	Tyr	Leu	Asn	Pro	Ile	
				485					490					495		
gcc	aat	gca	ccg	tca	aac	cat	aaa	tac	gat	gca	agc	aat	tac	aaa	gaa	1536
Ala	Asn	Ala	Pro	Ser	Asn	His	Lys	Tyr	Asp	Ala	Ser	Asn	Tyr	Lys	Glu	
			500					505					510			
ttg	gat	ccg	atg	ttt	ggg	tct	ccg	gaa	gag	ttt	caa	tca	ttt	gtt	cag	1584
Leu	Asp	Pro	Met	Phe	Gly	Ser	Pro	Glu	Glu	Phe	Gln	Ser	Phe	Val	Gln	
		515					520					525				
gaa	ctg	gcg	aaa	cgg	ggg	atg	cat	ctc	atc	tta	gac	ggc	gtg	ttc	aac	1632
Glu	Leu	Ala	Lys	Arg	Gly	Met	His	Leu	Ile	Leu	Asp	Gly	Val	Phe	Asn	
	530				535						540					
cac	gta	tcc	gat	gat	tcg	att	tac	ttt	gac	cgc	tat	cac	cgt	tat	ccg	1680
His	Val	Ser	Asp	Asp	Ser	Ile	Tyr	Phe	Asp	Arg	Tyr	His	Arg	Tyr	Pro	
					550					555					560	
acg	gtc	ggc	gcc	tat	gaa	tat	tgg	gaa	gcg	ggt	tac	gat	ttg	atg	aac	1728
Thr	Val	Gly	Ala	Tyr	Glu	Tyr	Trp	Glu	Ala	Val	Tyr	Asp	Leu	Met	Asn	
				565					570					575		
gaa	aaa	gga	ttg	agc	gag	gag	gaa	gcg	cgg	aaa	cag	gcg	gaa	gag	aag	1776
Glu	Lys	Gly	Leu	Ser	Glu	Glu	Glu	Ala	Arg	Lys	Gln	Ala	Glu	Glu	Lys	
			580					585					590			
ttc	aaa	caa	caa	gag	caa	acg	ttc	agc	ccg	tat	ggg	ttt	cat	ctt	tgg	1824
Phe	Lys	Gln	Gln	Glu	Gln	Thr	Phe	Ser	Pro	Tyr	Gly	Phe	His	Leu	Trp	
		595					600					605				
ttc	aat	att	gaa	aac	gaa	aaa	gtc	gat	ggt	cgt	tat	aag	tat	cag	tca	1872
Phe	Asn	Ile	Glu	Asn	Glu	Lys	Val	Asp	Gly	Arg	Tyr	Lys	Tyr	Gln	Ser	
	610					615					620					
tgg	tgg	ggc	tat	gac	agt	ctg	ccg	gag	ttt	aag	tcg	gtg	acg	ggg	gaa	1920
Trp	Trp	Gly	Tyr	Asp	Ser	Leu	Pro	Glu	Phe	Lys	Ser	Val	Thr	Gly	Glu	
					630					635					640	
aaa	gtg	ccg	aat	ccg	agt	gaa	ttg	aac	aac	gat	gcg	ctc	gca	aat	tac	1968
Lys	Val	Pro	Asn	Pro	Ser	Glu	Leu	Asn	Asn	Asp	Ala	Leu	Ala	Asn	Tyr	
				645					650					655		
att	ttc	cgt	gaa	tcg	gat	tcg	gtg	gcg	aaa	agc	tgg	att	gcc	cgc	ggc	2016
Ile	Phe	Arg	Glu	Ser	Asp	Ser	Val	Ala	Lys	Ser	Trp	Ile	Ala	Arg	Gly	
			660					665					670			
gcc	tct	ggg	tgg	cgg	ttg	gat	gta	gcg	aat	gag	gtg	gat	ccg	gcg	ttt	2064
Ala	Ser	Gly	Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Val	Asp	Pro	Ala	Phe	
		675					680					685				
tgg	cg	gag	ttt	cg	caa	gag	ttg	ctt	caa	gga	tcg	tac	gac	cg	ggc	2112
Trp	Arg	Glu	Phe	Arg	Gln	Glu	Leu	Leu	Gln	Gly	Ser	Tyr	Asp	Arg	Gly	
	690					695					700					
ccg	acg	tta	aaa	gaa	ggg	gag	cag	ccg	ctc	att	tta	ggg	gaa	att	tgg	2160
Pro	Thr	Leu	Lys	Glu	Gly	Glu	Gln	Pro	Leu	Ile	Leu	Gly	Glu	Ile	Trp	
				710					715						720	
gat	gac	gca	tcg	aaa	tat	ttt	cta	ggc	gac	cag	tac	gat	tcc	gtg	atg	2208
Asp	Asp	Ala	Ser	Lys	Tyr	Phe	Leu	Gly	Asp	Gln	Tyr	Asp	Ser	Val	Met	
				725					730					735		
aac	tac	cgg	ttc	cg	ggg	gcg	gtg	ctt	gac	ttt	ttg	cga	aat	ggg	aat	2256
Asn	Tyr	Arg	Phe	Arg	Gly	Ala	Val	Leu	Asp	Phe	Leu	Arg	Asn	Gly	Asn	
			740				745						750			
gca	gaa	gag	gcc	gat	cag	cga	ctg	acg	gcc	ata	agg	gaa	gac	tac	ccg	2304
Ala	Glu	Glu	Ala	Asp	Gln	Arg	Leu	Thr	Ala	Ile	Arg	Glu	Asp	Tyr	Pro	
		755					760					765				
agc	gaa	gcg	ttt	tat	gcg	ctg	atg	aat	ttg	atc	ggt	tcg	cat	gac	acg	2352
Ser	Glu	Ala	Phe	Tyr	Ala	Leu	Met	Asn	Leu	Ile	Gly	Ser	His	Asp	Thr	
	770				775						780					
gcg	cgg	gcg	gtc	ttt	ctg	ctt	ggg	aac	gga	acg	gat	tca	ttc	gag	cgg	2400
Ala	Arg	Ala	Val	Phe	Leu	Leu	Gly	Asn	Gly	Thr	Asp	Ser	Phe	Glu	Arg	
					790					795					800	
gcg	gag	ttt	gat	ccg	aat	tat	aat	gaa	gaa	ctt	gga	aaa	aag	cgg	ctc	2448
Ala	Glu	Phe	Asp	Pro	Asn	Tyr	Asn	Glu	Glu	Leu	Gly	Lys	Lys	Arg	Leu	
				805					810					815		
aag	cta	gcg	gcg	att	ttg	cag	atg	gga	tat	ccg	ggg	gcg	ccg	acg	att	2496

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Lys	Leu	Ala	Ala	Ile	Leu	Gln	Met	Gly	Tyr	Pro	Gly	Ala	Pro	Thr	Ile	
tat	tac	ggt	gat	gaa	gca	ggg	gta	agc	ggc	tcc	aaa	gat	ccg	gac	aac	2544
Tyr	Tyr	Gly	Asp	Glu	Ala	Gly	Val	Ser	Gly	Ser	Lys	Asp	Pro	Asp	Asn	
		835					840					845				
cgt	cgt	acg	tat	ccg	tgg	ggt	aaa	gaa	gat	caa	aat	ctg	ttg	gcg	cac	2592
Arg	Arg	Thr	Tyr	Pro	Trp	Gly	Lys	Glu	Asp	Gln	Asn	Leu	Leu	Ala	His	
		850				855					860					
tat	cgg	aaa	gtc	ggt	caa	att	cgc	cag	cac	cat	caa	acg	ctg	ttg	gcc	2640
Tyr	Arg	Lys	Val	Gly	Gln	Ile	Arg	Gln	His	His	Gln	Thr	Leu	Leu	Ala	
865				870					875						880	
cat	ggc	gac	atc	aag	acg	ttg	tat	gcg	caa	ggg	gat	gta	tac	gtc	ttt	2688
His	Gly	Asp	Ile	Lys	Thr	Leu	Tyr	Ala	Gln	Gly	Asp	Val	Tyr	Val	Phe	
				885					890					895		
gcc	cgc	caa	tac	ggt	cgt	gac	gtg	gcg	atc	att	gcc	gtc	aac	cgt	ggc	2736
Ala	Arg	Gln	Tyr	Gly	Arg	Asp	Val	Ala	Ile	Ile	Ala	Val	Asn	Arg	Gly	
			900					905					910			
aat	gag	gac	aga	acg	gtg	gcg	ctt	gac	gtc	gct	tcg	tgg	ctg	ccc	aac	2784
Asn	Glu	Asp	Arg	Thr	Val	Ala	Leu	Asp	Val	Ala	Ser	Trp	Leu	Pro	Asn	
		915					920					925				
ggc	acc	gtg	ctg	acg	gat	gag	ttg	cat	gat	ggc	ggg	aaa	gct	acg	gtc	2832
Gly	Thr	Val	Leu	Thr	Asp	Glu	Leu	His	Asp	Gly	Gly	Lys	Ala	Thr	Val	
		930				935					940					
gct	gac	gga	acg	ttg	acg	gtc	acg	att	ccg	gcc	ttg	gac	gga	cgg	atg	2880
Ala	Asp	Gly	Thr	Leu	Thr	Val	Thr	Ile	Pro	Ala	Leu	Asp	Gly	Arg	Met	
945				950					955						960	
atg	ttt	ggg	acg	gtg	acg	gca	gaa	atg	cct	gcc	gcg	gtc	aga	aat	ttg	2928
Met	Phe	Gly	Thr	Val	Thr	Ala	Glu	Met	Pro	Ala	Ala	Val	Arg	Asn	Leu	
				965					970					975		
cag	gca	agc	gcc	gtg	gtt	ggt	ggc	gtg	acg	ctt	act	tgg	gaa	ggg	caa	2976
Gln	Ala	Ser	Ala	Val	Val	Gly	Gly	Val	Thr	Leu	Thr	Trp	Glu	Gly	Gln	
			980					985					990			
gcg	tcg	aag	tat	cgg	gtg	tac	caa	tca	acc	att	caa	ggg	gct	ggt	tat	3024
Ala	Ser	Lys	Tyr	Arg	Val	Tyr	Gln	Ser	Thr	Ile	Gln	Gly	Ala	Gly	Tyr	
		995					1000					1005				
acg	tta	gcg	gcg	gaa	acg	aac	ggg	act	tcc	gtg	acg	atc	gat	tcg	ttg	3072
Thr	Leu	Ala	Ala	Glu	Thr	Asn	Gly	Thr	Ser	Val	Thr	Ile	Asp	Ser	Leu	
		1010				1015					1020					
gcg	aac	ggg	acc	gcg	tat	tac	ttt	gcc	gtt	acc	gcc	gtc	gat	gag	aac	3120
Ala	Asn	Gly	Thr	Ala	Tyr	Phe	Ala	Val	Thr	Ala	Val	Asp	Glu	Asn		
1025				1030				1035						1040		
ggg	aat	gag	tcg	cca	aag	gtg	gaa	acg	aat	cgc	gtc	gtt	cct	cat	tat	3168
Gly	Asn	Glu	Ser	Pro	Lys	Val	Glu	Thr	Asn	Arg	Val	Val	Pro	His	Tyr	
				1045					1050					1055		
ccg	ctg	acg	agc	gac	aat	gtc	cag	ttc	gtg	acc	acg	tta	agc	gat	gcc	3216
Pro	Leu	Thr	Ser	Asp	Asn	Val	Gln	Phe	Val	Thr	Thr	Leu	Ser	Asp	Ala	
			1060					1065					1070			
aca	ctc	gac	ttg	tcc	cag	ccg	caa	cca	atc	gat	gtc	aaa	gtg	aac	atc	3264
Thr	Leu	Asp	Leu	Ser	Gln	Pro	Gln	Pro	Ile	Asp	Val	Lys	Val	Asn	Ile	
		1075					1080					1085				
gac	ggt	gtg	aca	agc	aaa	gga	gca	gcc	gat	gga	ttg	caa	gcg	gtg	ttg	3312
Asp	Gly	Val	Thr	Ser	Lys	Gly	Ala	Ala	Asp	Gly	Leu	Gln	Ala	Val	Leu	
		1090				1095					1100					
caa	gtg	aaa	ggg	ccg	cat	gac	gaa	gca	tgg	aaa	gaa	tat	aga	gcg	gtt	3360
Gln	Val	Lys	Gly	Pro	His	Asp	Glu	Ala	Trp	Lys	Glu	Tyr	Arg	Ala	Val	
				1110					1115					1120		
tac	caa	ggg	caa	gat	ggc	gac	gct	aat	gtg	ttc	cgt	gcc	gcc	ttc	acc	3408
Tyr	Gln	Gly	Gln	Asp	Gly	Asp	Ala	Asn	Val	Phe	Arg	Ala	Ala	Phe	Thr	
				1125				1130						1135		
ccg	ctt	gtg	gca	ggg	acg	tat	acg	tat	cgc	tat	gcg	ctg	acg	acc	aac	3456
Pro	Leu	Val	Ala	Gly	Thr	Tyr	Thr	Tyr	Arg	Tyr	Ala	Leu	Thr	Thr	Asn	
			1140					1145					1150			
ctt	ggc	gag	gat	tgg	gtg	tat	acg	gaa	gcc	aaa	caa	gtg	acg	ttt	gcg	3504
Leu	Gly	Glu	Asp	Trp	Val	Tyr	Thr	Glu	Ala	Lys	Gln	Val	Thr	Phe	Ala	
		1155					1160					1165				
gcc	gac	tcc	agc	gac	caa	aaa	gcg	ccg	gcc	gag	gcg	att	gcg	ctg	acg	3552
Ala	Asp	Ser	Ser	Asp	Gln	Lys	Ala	Pro	Ala	Glu	Ala	Ile	Ala	Leu	Thr	
		1170				1175					1180					
ccg	ccg	cct	gtt	gag	tca	ggg	caa	gtt	cat	ttg	tca	tgg	cag	ttt	gta	3600

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Pro 1185	Pro aaa	Pro aat	Val gat	Glu gcg	Ser gat	Gly gca	Gln tac	Val ttg	His cta	Leu gtc	Ser atc	Trp gaa	Gln cgc	Phe aat	Val gga	
Gly	Lys	Asn	Asp	Ala	Asp	Ala	Tyr	Leu	Leu	Val	Ile	Glu	Arg	Asn	Gly	3648
				1205				1210						1215		
aca	gtc	att	cat	atg	acg	aca	tcc	atc	agc	aca	tcg	ttc	ggt	gat	tac	3696
Thr	Val	Ile	His	Met	Thr	Thr	Ser	Ile	Ser	Thr	Ser	Phe	Val	Asp	Tyr	
				1220				1225						1230		
ggg	gtc	gaa	aac	ggc	acc	gag	tat	gcg	tac	ggt	gtc	aag	ctg	tat	gac	3744
Gly	Val	Glu	Asn	Gly	Thr	Glu	Tyr	Ala	Tyr	Val	Val	Lys	Leu	Tyr	Asp	
				1235				1240						1245		
cgc	gct	gga	aat	gtc	acc	gcg	tcc	aac	acg	gtc	aaa	gtg	aag	ccg	gac	3792
Arg	Ala	Gly	Asn	Val	Thr	Ala	Ser	Asn	Thr	Val	Lys	Val	Lys	Pro	Asp	
				1250				1255						1260		
att	gtg	atg	gtg	aaa	gtc	att	ttt	aaa	gtc	aaa	gcc	cca	gac	tat	acg	3840
Ile	Val	Met	Val	Lys	Val	Ile	Phe	Lys	Val	Lys	Ala	Pro	Asp	Tyr	Thr	
				1265				1270						1275		
ccg	tta	gat	gcc	cga	att	acg	att	ccg	aac	agt	ttg	aac	ggc	tgg	aac	3888
Pro	Leu	Asp	Ala	Arg	Ile	Thr	Ile	Pro	Asn	Ser	Leu	Asn	Gly	Trp	Asn	
				1285				1290						1295		
aca	ggg	gca	tgg	gaa	atg	tcg	cgc	aat	gga	gcg	gtg	acg	cct	gat	tgg	3936
Thr	Gly	Ala	Trp	Glu	Met	Ser	Arg	Asn	Gly	Ala	Val	Thr	Pro	Asp	Trp	
				1300				1305						1310		
caa	ttt	aca	act	gaa	gtg	caa	gaa	ggg	gaa	acg	atc	acg	tat	aag	tat	3984
Gln	Phe	Thr	Thr	Glu	Val	Gln	Glu	Gly	Glu	Thr	Ile	Thr	Tyr	Lys	Tyr	
				1315				1320						1325		
gtg	aaa	ggc	ggg	tcg	tgg	gat	cag	gaa	ggg	ctg	gct	gat	cat	acg	cct	4032
Val	Lys	Gly	Gly	Ser	Trp	Asp	Gln	Glu	Gly	Leu	Ala	Asp	His	Thr	Pro	
				1330				1335						1340		
gca	gac	ggt	ggg	gat	gat	gac	agt	tat	tat	gga	tac	ggc	tcg	atc		4080
Ala	Asp	Val	Gly	Asp	Asp	Asp	Val	Ser	Tyr	Tyr	Gly	Tyr	Gly	Ser	Ile	
				1345				1350						1355		
ggc	acg	gat	ttg	aaa	gtg	acc	ggt	cac	aat	gaa	gga	aac	aat	acg	atg	4128
Gly	Thr	Asp	Leu	Lys	Val	Thr	Val	His	Asn	Glu	Gly	Asn	Asn	Thr	Met	
				1365				1370						1375		
gtt	gtg	gaa	gac	cgc	att	ttg	cgc	tgg	att	gat	atg	ccg	gtg	gtc	atc	4176
Val	Val	Glu	Asp	Arg	Ile	Leu	Arg	Trp	Ile	Asp	Met	Pro	Val	Val	Ile	
				1380				1385						1390		
gaa	gag	gtg	aaa	aaa	caa	ggg	agt	caa	gtg	acg	atc	aag	ggc	aat	gcc	4224
Glu	Glu	Val	Lys	Lys	Gln	Gly	Ser	Gln	Val	Thr	Ile	Lys	Gly	Asn	Ala	
				1395				1400						1405		
att	aaa	aat	ggc	ggt	ttg	acg	atc	aac	ggt	gag	cgg	gtg	ccg	att	gat	4272
Ile	Lys	Asn	Gly	Val	Leu	Thr	Ile	Asn	Gly	Glu	Arg	Val	Pro	Ile	Asp	
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 Leu Gly Glu Asp Trp Val Tyr Thr Glu Ala Lys Gln Val Thr Phe Ala
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Ala	Thr	Ala	Leu	Ala	Thr	Met	Tyr	Phe	Leu	Met	Gln	Gly	Thr	Pro	Phe		
		355					360				365						
atc	tac	cag	ggg	cag	gaa	ctc	ggc	atg	acg	aac	agc	cgc	ttt	gcg	gcg		1152
Ile	Tyr	Gln	Gly	Gln	Glu	Leu	Gly	Met	Thr	Asn	Ser	Arg	Phe	Ala	Ala		
		370				375				380							
ctc	gat	gat	ttc	aac	gac	gtc	ctg	acg	aaa	aat	cgc	ttc	gcg	tcg	atg		1200
Leu	Asp	Asp	Phe	Asn	Asp	Val	Leu	Thr	Lys	Asn	Arg	Phe	Ala	Ser	Met		
385					390					395					400		
aag	cgt	gaa	ggg	ctc	gcc	gag	ggc	gac	atc	atc	gac	ctg	ttg	tcg	atc		1248
Lys	Arg	Glu	Gly	Leu	Ala	Glu	Gly	Asp	Ile	Ile	Asp	Leu	Leu	Ser	Ile		
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gtc	tcg	cg	gac	aac	gca	cg	acg	ccg	atg	cag	tgg	gac	ggg	tcg	gcg		1296
Val	Ser	Arg	Asp	Asn	Ala	Arg	Thr	Pro	Met	Gln	Trp	Asp	Gly	Ser	Ala		
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aac	ggc	ggg	ttc	agc	tcc	ggc	acg	ccg	tgg	ctg	cgc	gtt	aat	ccg	aac		1344
Asn	Gly	Gly	Phe	Ser	Ser	Gly	Thr	Pro	Trp	Leu	Arg	Val	Asn	Pro	Asn		
		435				440					445						
ttc	aac	gag	atc	aac	gcc	gag	ctg	cag	gag	cgc	aac	tcc	gcg	tcg	gtg		1392
Phe	Asn	Glu	Ile	Asn	Ala	Glu	Leu	Gln	Glu	Arg	Asn	Ser	Ala	Ser	Val		
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ctg	aac	cat	tac	cg	cg	ctc	atc	gcg	ctg	cgc	aaa	cgc	gag	ccc	ggg		1440
Leu	Asn	His	Tyr	Arg	Arg	Leu	Ile	Ala	Leu	Arg	Lys	Arg	Glu	Pro	Gly		
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ctc	gtc	cat	ggc	cac	tgc	gag	ctg	ctg	atg	gag	gac	gac	gcg	cag	atc		1488
Leu	Val	His	Gly	His	Cys	Glu	Leu	Leu	Met	Glu	Asp	Asp	Ala	Gln	Ile		
				485					490					495			
tat	gcc	tac	agc	cga	acg	cat	ggt	tcg	cag	cgc	tac	gtg	atc	atc	acg		1536
Tyr	Ala	Tyr	Ser	Arg	Thr	His	Gly	Ser	Gln	Arg	Tyr	Val	Ile	Ile	Thr		
			500				505						510				
aac	atg	acg	cg	gac	gaa	gcc	cga	tac	cac	cag	ccg	gac	ctg	ctg	ctg		1584
Asn	Met	Thr	Arg	Asp	Glu	Ala	Arg	Tyr	His	Gln	Pro	Asp	Leu	Leu	Leu		

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Asp	Gly	Gly	Gly	Leu	Leu	Leu	Ala	Asn	Gln	Pro	Val	Glu	Pro	His	Thr		
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ccg	acc	gac	agt	ctg	ctg	ctc	gag	ccg	tac	gag	gcg	cgc	gtg	tac	cgt		1680
Pro	Thr	Asp	Ser	Leu	Leu	Leu	Glu	Pro	Tyr	Glu	Ala	Arg	Val	Tyr	Arg		
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Phe	Arg																

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<212> PRT
<213> Azoarcus sp. EbN1

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Asp	Gly	Ile	Gly	Asp	Leu	Asn	Gly	Ile	Thr	Val	Arg	Leu	Asp	Tyr	Leu	
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Lys	Ser	Leu	Gly	Val	Asp	Val	Ile	Trp	Ile	Cys	Pro	Val	Phe	Ser	Ser	
	50					55					60					
Pro	Asn	Asp	Asp	Asn	Gly	Tyr	Asp	Ile	Ser	Asp	Tyr	Arg	Ala	Ile	Met	
65					70					75					80	
Asp	Asp	Phe	Gly	Thr	Met	Ala	Asp	Phe	Asp	Cys	Leu	Leu	Ala	Glu	Val	
				85					90					95		
His	Arg	Arg	Gly	Met	Arg	Leu	Ile	Leu	Asp	Leu	Val	Ala	Asn	His	Thr	
			100					105					110			
Ser	Asp	Leu	His	Pro	Trp	Phe	Leu	Glu	Ser	Arg	Ala	Ser	Leu	Asn	Asn	
		115					120					125				
Pro	Lys	Arg	Asp	Trp	Tyr	Leu	Trp	Arg	Asp	Gly	Lys	Asp	Gly	Arg	Glu	
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Pro	Asn	Asn	Trp	Glu	Ser	Ile	Phe	Lys	Gly	Ser	Val	Trp	Lys	Tyr	Asp	
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Asp	Lys	Thr	Gly	Gln	Tyr	Phe	Leu	His	Leu	Phe	Ser	Glu	Arg	Gln	Pro	
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Asp	Leu	Asn	Trp	Asp	Asn	Pro	Glu	Val	Arg	Thr	Ala	Ile	Tyr	Glu	Met	
			180					185					190			
Val	Arg	Trp	Trp	Leu	Asp	Lys	Gly	Val	Asp	Gly	Phe	Arg	Leu	Asp	Ala	
		195					200					205				
Val	Ser	His	Lys	Lys	Lys	Glu	Pro	Gly	Leu	Pro	Asp	Met	Pro	Asn	Pro	
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His	Gly	Leu	Asp	Tyr	Val	Pro	Ser	Phe	Glu	Lys	His	Met	Asn	Val	Asp	
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Gly	Val	Leu	Asp	Tyr	Leu	Asp	Glu	Leu	Cys	Arg	His	Thr	Phe	Asp	His	
				245					250					255		
Tyr	Asp	Val	Met	Thr	Val	Gly	Glu	Ala	Asn	Gly	Val	Ser	Pro	Glu	Gln	
		260						265					270			
Ala	Arg	Ala	Trp	Val	Gly	Glu	Glu	His	Arg	Arg	Leu	Asn	Met	Ile	Phe	
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Gln	Phe	Glu	His	Ser	Ala	Leu	Trp	Lys	Lys	Ala	Pro	Arg	Asn	Gly	Leu	
	290					295					300					
Asp	Leu	Pro	Ala	Leu	Arg	Ala	Val	Leu	Thr	Lys	Trp	Gln	Lys	Ser	Leu	
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 Asn Gly Gly Phe Ser Ser Gly Thr 440 Pro Trp Leu Arg Val 445 Asn Pro Asn
 Phe Asn 450 Glu Ile Asn Ala Glu 455 Leu Gln Glu Arg Asn 460 Ser Ala Ser Val
 Leu 465 Asn His Tyr Arg Arg 470 Leu Ile Ala Leu Arg 475 Lys Arg Glu Pro Gly 480
 Leu Val His Gly His 485 Cys Glu Leu Leu Met 490 Glu Asp Asp Ala Gln 495 Ile Thr
 Tyr Ala Tyr Ser 500 Arg Thr His Gly Ser 505 Gln Arg Tyr Val Ile 510 Ile Thr
 Asn Met Thr 515 Arg Asp Glu Ala Arg 520 Tyr His Gln Pro Asp 525 Leu Leu Leu
 Asp Gly 530 Gly Gly Leu Leu Leu 535 Ala Asn Gln Pro Val 540 Glu Pro His Thr
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<211> 1770

<212> DNA

<213> Bacillus clausii KSM-K16

<220>

<221> CDS

<222> (1)..(1770)

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Tyr	Asp	Lys	Asp	Thr	Ile	His	Ile	Arg	Leu	Arg	Thr	Arg	Lys	Asp	Asp	
			20					25					30			
gct	cac	gag	gtc	atg	ctt	att	tat	gga	gat	cct	tac	gat	tgg	gcg	gga	144
Ala	His	Glu	Val	Met	Leu	Ile	Tyr	Gly	Asp	Pro	Tyr	Asp	Trp	Ala	Gly	
			35				40					45				
aac	gaa	tgg	gtg	act	gcc	aaa	aaa	aca	atg	aca	caa	gca	ggg	gcc	gat	192
Asn	Glu	Trp	Val	Thr	Ala	Lys	Lys	Thr	Met	Thr	Gln	Ala	Gly	Ala	Asp	
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gga	gaa	tat	gat	tat	tgg	ttt	gtg	gaa	gtg	aag	ccg	ccc	tac	cat	cgc	240
Gly	Glu	Tyr	Asp	Tyr	Trp	Phe	Val	Glu	Val	Lys	Pro	Pro	Tyr	His	Arg	
			65		70				75						80	
ctt	cgt	tac	ggg	ttc	gaa	att	aag	gca	aaa	gat	gag	acg	att	tac	tat	288
Leu	Arg	Tyr	Gly	Phe	Glu	Ile	Lys	Ala	Lys	Asp	Glu	Thr	Ile	Tyr	Tyr	
			85				90						95			
gga	gaa	agt	ggg	ttt	tgc	gat	acg	cct	gca	aaa	gac	att	agc	gat	tat	336
Gly	Glu	Ser	Gly	Phe	Cys	Asp	Thr	Pro	Ala	Lys	Asp	Ile	Ser	Asp	Tyr	
			100				105						110			
ttc	tgt	ttt	ccg	ttt	atg	aat	caa	gcc	gat	ttg	ttt	aca	ccg	cct	gaa	384
Phe	Cys	Phe	Pro	Phe	Met	Asn	Gln	Ala	Asp	Leu	Phe	Thr	Pro	Pro	Glu	
			115				120					125				
tgg	gtt	aaa	gaa	acg	atc	tgg	tat	caa	atc	ttt	cct	gaa	cgt	ttt	gcc	432
Trp	Val	Lys	Glu	Thr	Ile	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	Phe	Ala	
			130			135					140					
aat	ggc	gat	cat	tcc	cgt	gac	cct	gaa	aat	aca	ttg	gct	tgg	gga	agt	480
Asn	Gly	Asp	His	Ser	Arg	Asp	Pro	Glu	Asn	Thr	Leu	Ala	Trp	Gly	Ser	
					150					155					160	
gca	cca	ccg	act	gca	acc	aat	tat	ttc	ggc	ggt	gac	ctt	caa	ggg	att	528
Ala	Pro	Pro	Thr	Ala	Thr	Asn	Tyr	Phe	Gly	Gly	Asp	Leu	Gln	Gly	Ile	
				165					170					175		
gtc	gat	cat	ctt	gat	tat	ttg	cag	aag	cta	gga	att	aac	ggc	att	tat	576
Val	Asp	His	Leu	Asp	Tyr	Leu	Gln	Lys	Leu	Gly	Ile	Asn	Gly	Ile	Tyr	
			180					185					190			
tta	aca	cca	atc	ttt	aaa	gcg	ttt	tcc	aac	cat	aaa	tac	gat	acg	att	624

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Leu	Thr	Pro 195	Ile	Phe	Lys	Ala	Phe 200	Ser	Asn	His	Lys	Tyr 205	Asp	Thr	Ile		
gat	tat	tta	aaa	gta	gat	ccc	caa	ttt	gga	gat	gaa	acg	aca	ctt	aaa	672	
Asp	Tyr	Leu	Lys	Val	Asp	Pro 215	Gln	Phe	Gly	Asp	Glu	Thr	Thr	Leu	Lys		
ctg	ctt	gtc	gat	gaa	tgc	cat	aag	cgc	ggc	att	cgt	gtc	atg	ctt	gat	720	
Leu	Leu	Val	Asp	Glu	Cys 230	His	Lys	Arg	Gly	Ile	Arg	Val	Met	Leu	Asp 240		
gcc	gtc	ttc	aac	cat	gca	ggc	ctg	tat	ttt	cca	cct	ttt	caa	gat	gta	768	
Ala	Val	Phe	Asn	His 245	Ala	Gly	Leu	Tyr	Phe 250	Pro	Pro	Phe	Gln	Asp 255	Val		
cta	aaa	cac	cag	cag	gaa	tca	gaa	tat	agg	gat	tgg	ttt	cat	atc	cgc	816	
Leu	Lys	His	Gln 260	Gln	Glu	Ser	Glu	Tyr 265	Arg	Asp	Trp	Phe	His 270	Ile	Arg		
caa	ttt	cct	gtt	cga	gca	gag	gaa	cca	cct	aat	tac	gat	acg	ttc	gcc	864	
Gln	Phe	Pro 275	Val	Arg	Ala	Glu	Glu 280	Pro	Pro	Asn	Tyr	Asp 285	Thr	Phe	Ala		
ttc	acg	cct	tta	atg	ccg	aaa	cta	aat	aca	gca	aat	gaa	gca	gta	aag	912	
Phe	Thr 290	Pro	Leu	Met	Pro	Lys 295	Leu	Asn	Thr	Ala	Asn 300	Glu	Ala	Val	Lys		
gac	tat	tta	ttg	aac	gta	gct	acg	tat	tgg	att	aag	gag	ttt	gac	att	960	
Asp	Tyr	Leu	Leu	Asn	Val 310	Ala	Thr	Tyr	Trp	Ile 315	Lys	Glu	Phe	Asp	Ile 320		
gac	ggt	tgg	cgt	tta	gat	gtc	gcc	aat	gaa	gtc	gac	cat	gcc	ttc	tgg	1008	
Asp	Gly	Trp	Arg	Leu 325	Asp	Val	Ala	Asn	Glu 330	Val	Asp	His	Ala	Phe 335	Trp		
cgt	gag	ttt	cgc	aac	aga	gtc	aaa	gca	tta	aaa	cca	gat	ttg	tat	att	1056	
Arg	Glu	Phe	Arg 340	Asn	Arg	Val	Lys	Ala 345	Leu	Lys	Pro	Asp	Leu 350	Tyr	Ile		
ctc	ggt	gaa	ata	tgg	cat	aac	gct	tac	tgg	ctg	caa	ggc	gac	caa		1104	
Leu	Gly	Glu 355	Ile	Trp	His	Asn	Ala 360	Tyr	Pro	Trp	Leu	Gln 365	Gly	Asp	Gln		
ttc	gat	ggg	gtc	atg	aac	tac	ccg	ctc	act	gac	gcg	att	ttt	gac	ttt	1152	
Phe	Asp 370	Gly	Val	Met	Asn	Tyr 375	Pro	Leu	Thr	Asp	Ala 380	Ile	Phe	Asp	Phe		
gtc	caa	cac	ggc	aaa	agc	gca	acc	act	ttt	caa	tac	gcg	gtc	aca	aaa	1200	
Val	Gln	His	Gly	Lys	Ser 390	Ala	Thr	Thr	Phe	Gln 395	Tyr	Ala	Val	Thr	Lys 400		
cat	ttg	tac	agt	tac	cca	aaa	ttg	gtg	aac	gaa	gtc	cag	ttc	aat	ttg	1248	
His	Leu	Tyr	Ser	Tyr 405	Pro	Lys	Leu	Val	Asn 410	Glu	Val	Gln	Phe	Asn 415	Leu		
ctc	ggc	agc	cat	gac	aca	cca	aga	att	tta	act	gta	agt	ggg	ggc	aac	1296	
Leu	Gly	Ser	His 420	Asp	Thr	Pro	Arg	Ile 425	Leu	Thr	Val	Ser	Gly 430	Gly	Asn		
aaa	aaa	tta	gtc	aaa	ctt	tcc	tac	tta	ttg	ctg	ttt	tcc	ttt	cct	ggc	1344	
Lys	Lys	Leu 435	Val	Lys	Leu	Ser	Tyr 440	Leu	Leu	Leu	Phe	Ser 445	Phe	Pro	Gly		
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Ser	Pro 450	Cys	Ile	Tyr	Tyr	Gly 455	Asp	Glu	Ile	Gly	Met 460	Ala	Gly	Glu	Asn		
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Asp	Pro	Gly	Cys	Arg	Ala 470	Cys	Met	Val	Trp	Glu 475	Glu	Asp	Gln	Gln	Asp 480		
cag	gag	cta	ttc	caa	ttt	ctg	caa	aaa	cta	att	aag	atc	cgc	aaa	act	1488	
Gln	Glu	Leu	Phe 485	Gln	Phe	Leu	Gln	Lys	Leu 490	Ile	Lys	Ile	Arg	Lys 495	Thr		
cac	caa	gca	atg	ggc	acc	tat	aac	acc	tta	aaa	ttt	tat	gac	tct	ggc	1536	
His	Gln	Ala	Met 500	Gly	Thr	Tyr	Asn	Thr 505	Leu	Lys	Phe	Tyr	Asp 510	Ser	Gly		
act	gag	gat	gtg	ctg	ttg	tat	tcc	aca	tcc	gct	ggc	gga	gag	ctt	ctt	1584	
Thr	Glu	Asp 515	Val	Leu	Leu	Tyr	Ser 520	Thr	Ser	Ala	Gly	Gly 525	Glu	Leu	Leu		
tta	ttt	gcg	gtt	aac	cgc	agt	aaa	caa	gaa	gca	acg	gtc	aaa	ctc	cct	1632	
Leu	Phe 530	Ala	Val	Asn	Arg	Ser 535	Lys	Gln	Glu	Ala	Thr 540	Val	Lys	Leu	Pro		
gat	tca	cta	aag	agc	ctt	gca	ttt	gtc	gat	gtc	att	tgc	gaa	agc	cca	1680	
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Leu Gln Ser Glu Glu Leu His Val Glu Gly Glu Cys Phe Leu Phe Leu
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 His Ser Val Asp Ala Asn Lys Cys Gly Gln Val Asp Lys 585

1770

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<211> 589

<212> PRT

<213> *Bacillus clausii* KSM-K16

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 20 25 30
 Ala His Glu Val Met Leu Ile Tyr Gly Asp Pro Tyr Asp Trp Ala Gly
 35 40 45
 Asn Glu Trp Val Thr Ala Lys Lys Thr Met Thr Gln Ala Gly Ala Asp
 50 55 60
 Gly Glu Tyr Asp Tyr Trp Phe Val Glu Val Lys Pro Pro Tyr His Arg
 65 70 75 80
 Leu Arg Tyr Gly Phe Glu Ile Lys Ala Lys Asp Glu Thr Ile Tyr Tyr
 85 90 95
 Gly Glu Ser Gly Phe Cys Asp Thr Pro Ala Lys Asp Ile Ser Asp Tyr
 100 105 110
 Phe Cys Phe Pro Phe Met Asn Gln Ala Asp Leu Phe Thr Pro Pro Glu
 115 120 125
 Trp Val Lys Glu Thr Ile Trp Tyr Gln Ile Phe Pro Glu Arg Phe Ala
 130 135 140
 Asn Gly Asp His Ser Arg Asp Pro Glu Asn Thr Leu Ala Trp Gly Ser
 145 150 155 160
 Ala Pro Pro Thr Ala Thr Asn Tyr Phe Gly Gly Asp Leu Gln Gly Ile
 165 170 175
 Val Asp His Leu Asp Tyr Leu Gln Lys Leu Gly Ile Asn Gly Ile Tyr
 180 185 190
 Leu Thr Pro Ile Phe Lys Ala Phe Ser Asn His Lys Tyr Asp Thr Ile
 195 200 205
 Asp Tyr Leu Lys Val Asp Pro Gln Phe Gly Asp Glu Thr Thr Leu Lys
 210 215 220
 Leu Leu Val Asp Glu Cys His Lys Arg Gly Ile Arg Val Met Leu Asp
 225 230 235 240
 Ala Val Phe Asn His Ala Gly Leu Tyr Phe Pro Pro Phe Gln Asp Val
 245 250 255
 Leu Lys His Gln Gln Glu Ser Glu Tyr Arg Asp Trp Phe His Ile Arg
 260 265 270
 Gln Phe Pro Val Arg Ala Glu Glu Pro Pro Asn Tyr Asp Thr Phe Ala
 275 280 285
 Phe Thr Pro Leu Met Pro Lys Leu Asn Thr Ala Asn Glu Ala Val Lys
 290 295 300
 Asp Tyr Leu Leu Asn Val Ala Thr Tyr Trp Ile Lys Glu Phe Asp Ile
 305 310 315 320
 Asp Gly Trp Arg Leu Asp Val Ala Asn Glu Val Asp His Ala Phe Trp
 325 330 335
 Arg Glu Phe Arg Asn Arg Val Lys Ala Leu Lys Pro Asp Leu Tyr Ile
 340 345 350
 Leu Gly Glu Ile Trp His Asn Ala Tyr Pro Trp Leu Gln Gly Asp Gln
 355 360 365
 Phe Asp Gly Val Met Asn Tyr Pro Leu Thr Asp Ala Ile Phe Asp Phe
 370 375 380
 Val Gln His Gly Lys Ser Ala Thr Thr Phe Gln Tyr Ala Val Thr Lys
 385 390 395 400
 His Leu Tyr Ser Tyr Pro Lys Leu Val Asn Glu Val Gln Phe Asn Leu
 405 410 415
 Leu Gly Ser His Asp Thr Pro Arg Ile Leu Thr Val Ser Gly Gly Asn
 420 425 430
 Lys Lys Leu Val Lys Leu Ser Tyr Leu Leu Leu Phe Ser Phe Pro Gly
 435 440 445
 Ser Pro Cys Ile Tyr Tyr Gly Asp Glu Ile Gly Met Ala Gly Glu Asn

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450	Asp	Pro	Gly	Cys	Arg	Ala	455	Cys	Met	Val	Trp	Glu	460	Asp	Gln	Gln	Asp
465	Gln	Glu	Leu	Phe	Gln	Phe	470	Leu	Gln	Lys	Leu	475	Ile	Lys	Ile	Arg	Lys
				485	Gly	Thr	Tyr	Asn	Thr	490	Leu	Lys	Phe	Tyr	Asp	Ser	Gly
	His	Gln	Ala	Met	500	Val	Leu	Tyr	Ser	505	Thr	Ser	Ala	Gly	Gly	510	Leu
	Thr	Glu	Asp	Val	515	Leu	Leu	Arg	Ser	520	Gln	Glu	Ala	Thr	Val	Lys	Leu
	Leu	Phe	Ala	Val	530	Asn	Arg	Ser	Lys	535	Gln	Glu	Ala	Thr	Val	Lys	Leu
	Asp	Ser	Leu	Lys	545	Ser	Leu	Ala	Phe	550	Val	Asp	Val	Ile	Cys	Glu	Ser
	Leu	Gln	Ser	Glu	555	Glu	Leu	His	Val	565	Glu	Gly	Glu	Cys	Phe	Leu	Phe
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<211> 2298

<212> DNA

<213> Thermococcus kodakarensis KOD1

<220>

<221> CDS

<222> (1)..(2298)

<223> transl_table=11

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gcc	agc	gga	tgt	atc	tcg	gag	agc	aac	gaa	aat	caa	act	gca	acg	gct	96
Ala	Ser	Gly	Cys	Ile	Ser	Glu	Ser	Asn	Glu	Asn	Gln	Thr	Ala	Thr	Ala	
			20					25					30			
tcg	acc	gtt	cca	ccg	act	tca	gtg	aca	ccc	tca	cag	tct	tcc	act	ccc	144
Ser	Thr	Val	Pro	Pro	Thr	Ser	Val	Thr	Pro	Ser	Gln	Ser	Ser	Thr	Pro	
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aca	acc	tcg	acc	tcg	acg	tac	ggc	cct	tcc	gaa	aga	acg	gag	ctt	aaa	192
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tgt	ccc	tcc	gga	aga	gtc	ccg	gtg	aag	ttc	acg	tac	aac	ccc	gga	aac	288
Cys	Pro	Ser	Gly	Arg	Val	Pro	Val	Lys	Phe	Thr	Tyr	Asn	Pro	Gly	Asn	
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Glu	Trp	Pro	Met	Glu	Leu	Lys	Asn	Gly	Thr	Trp	Glu	Thr	Thr	Val	Cys	
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Val	Val	Glu	Gly	Arg	Glu	Ala	Phe	Tyr	Val	Glu	Phe	Asp	Pro	Arg	Asp	
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Pro	Ala	Tyr	Leu	Ser	Ile	Ala	Asp	Lys	Arg	Thr	Val	Val	Arg	Phe	Glu	
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Leu	Met	Pro	Arg	Met	Tyr	Met	Ala	Ile	Ala	Arg	Glu	Asp	Arg	Phe	Pro	
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Ile	Thr	Asp	Ile	Met	Arg	Gln	Thr	Pro	Glu	Ile	Pro	Glu	Ser	Cys	Gln	
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tgg	gcg	ata	ttc	ctg	cg	aac	cac	gat	gag	ttg	acc	ctg	gaa	atg	gtc	1152
Trp	Ala	Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	
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Arg	Ala	Arg	Ile	Asn	Leu	Gly	Ile	Arg	Arg	Arg	Leu	Ala	Pro	Leu	Leu	
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Glu	Arg	Asp	Arg	Arg	Arg	Ile	Glu	Leu	Met	Thr	Ser	Leu	Leu	Leu	Thr	
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Met	Pro	Gly	Thr	Pro	Val	Leu	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly	
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Asp	Asn	Ile	His	Leu	Gly	Asp	Arg	Asp	Gly	Val	Arg	Thr	Pro	Met	Gln	
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Asn	Val	Glu	Ala	Gln	Ile	Arg	Asp	Gln	His	Ser	Leu	Leu	Thr	Trp	Thr	
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Pro	Val	Asp	Ile	Ile	Gly	Gly	Ser	Phe	Pro	Pro	Ile	Gly	Arg	Leu		
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Val	Ser	Glu	Gly	Thr	Leu	Pro	Asp	Trp	His	Val	Pro	Ser	Pro	Val	Pro	
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Ala	Ala	Leu	Leu	Pro	His	Leu	Pro	Thr	Leu	Glu	Gly	Glu	Ile	Leu	Pro	
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Ala	Trp	Leu	Ser	Ala	Arg	Arg	Trp	Phe	Ser	Ala	Lys	Asp	Gln	Ala	Leu	
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Met	Thr	Leu	Leu	Glu	Leu	Glu	Val	Glu	Leu	Glu	Asp	Gly	Arg	Arg	Glu	
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Thr	Leu	Ala	Glu	Gln	Leu	Ala	Leu	Ala	Arg	Val	Arg	Gln	Gly	Arg	Glu	
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Val	Gly	Tyr	Leu	Thr	Asp	Ala	Phe	Ala	Leu	Lys	Pro	Met	Val	Arg	Gly	
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Glu	Glu	Ala	Ser	Gln	Gln	Gly	Gln	Val	Arg	Phe	Glu	Ala	Thr	Pro	Ala	
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Ala	Glu	Gln	Ser	Asn	Ser	Ser	Leu	Val	Ile	Ala	Asp	Lys	Ala	Val	Phe	
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Lys	Leu	Leu	Arg	His	Val	Ala	Val	Gly	Ala	Asn	Pro	Glu	Ile	Glu	Ile	
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Gly	Arg	Arg	Leu	Thr	Glu	Met	Gly	Tyr	Ala	Asn	Ala	Ala	Pro	Leu	Leu	
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Leu	Leu	Gln	Gly	Phe	Ile	Arg	Asn	Gln	Gly	Asp	Ala	Trp	Arg	Trp	Thr	
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Leu	Asp	His	Leu	Ala	Arg	Ser	Phe	Asp	Glu	Tyr	Val	Asp	Arg	Ala	Asp	
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aga	cga	agc	gcg	cgc	cga	agc	cgt	cgc	tgg	cta	tga					2724
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Val	His	Val	Lys	Ser	Phe	Phe	Asp	Ser	Asn	Asp	Asp	Gly	Ile	Gly	Asp	
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Phe	Asp	Asn	Pro	Ala	Val	Leu	Glu	Ala	Val	Leu	Glu	Val	Met	Arg	Phe
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Trp	Leu	Asp	Arg	Gly	Val	Asp	Gly	Leu	Arg	Leu	Asp	Ala	Val	Pro	Tyr
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Ala	Ile	Leu	Arg	Lys	Ile	Arg	Ala	Thr	Leu	Asp	Ala	Glu	Tyr	Pro	Asp
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Arg	Met	Leu	Leu	Ala	Glu	Ala	Asn	Met	Trp	Pro	Glu	Asp	Thr	Gln	Gln
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Leu	Met	Pro	Arg	Met	Tyr	Met	Ala	Ile	Ala	Arg	Glu	Asp	Arg	Phe	Pro
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Thr	Asp	Ser	Glu	Arg	Asp	Tyr	Leu	Trp	Gln	Thr	Tyr	Ala	Ala	Asp	Arg
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Pro	Val	Asp	Ile	Ile	Gly	Gly	Gly	Ser	Phe	Pro	Pro	Ile	Gly	Arg	Leu
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 Arg Tyr Met Leu Pro Val Gly Ile Val Trp Glu Arg Glu Gln Pro Ser
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 Thr Leu Ala Glu Gln Leu Ala Leu Ala Arg Val Arg Gln Gly Arg Glu
 725 730 735
 Val Gly Tyr Leu Thr Asp Ala Phe Ala Leu Lys Pro Met Val Arg Gly
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 Val Ile Asp Ala Leu Cys Ser Asn Ala Ala Leu Lys Phe Cys Asp Gly
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 Glu Glu Ala Ser Gln Gln Gly Gln Val Arg Phe Glu Ala Thr Pro Ala
 770 775 780
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 Lys Leu Leu Arg His Val Ala Val Gly Ala Asn Pro Glu Ile Glu Ile
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 Gly Arg Arg Leu Thr Glu Met Gly Tyr Ala Asn Ala Ala Pro Leu Leu
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 850 855 860
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Tyr Ala Tyr Asp Lys Asp Thr Leu His Leu Arg Ile Arg Thr Ala Lys	
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Gly Glu Val Asp Asn Ala Thr Leu Arg Ile Gly Asp Pro Tyr Asp Trp	
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Thr Phe Gly Gly Gly Gly Asn Leu Asn Ala Glu Asp Ala Ser Gly	
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Trp Thr Gly Gly Thr Asn Leu Pro Met Ile Lys Glu Cys Glu Thr Glu	
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Leu Phe Asp Tyr Trp Phe Cys Glu Ala Gln Pro Arg Phe Tyr Arg Ala	
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Arg Tyr Ala Phe Leu Leu Glu Gly Lys Asp Ser Glu Lys Leu Leu Val	
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Ser Glu Lys Leu Ile Thr Gln Ile Thr Asp Asp Ala Asp Pro Ile Leu	
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Ser Gln Leu Leu Asn Phe Tyr Cys Phe Pro Tyr Met Asn Pro Thr Asp	
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325				325				330						335			1056
cta	att	gaa	gtt	ggc	cgc	tac	tgg	gtg	aaa	aac	ttt	gac	att	gat	gca		
Leu	Ile	Glu	Val	Gly	Arg	Tyr	Trp	Val	Lys	Asn	Phe	Asp	Ile	Asp	Ala		
340			340					345				350					1104
tgg	cgt	tta	gat	gta	gca	aac	gaa	gtt	gat	caa	cgt	ttt	tgg	cga	cgc		
Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Val	Asp	Gln	Arg	Phe	Trp	Arg	Arg		
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35 40 45
Thr Phe Gly Gly Gly Gly Gly Asn Leu Asn Ala Glu Asp Ala Ser Gly
50 55 60
Trp Thr Gly Gly Thr Asn Leu Pro Met Ile Lys Glu Cys Glu Thr Glu
65 70 75 80

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Leu Phe Asp Tyr Trp Phe Cys Glu Ala Gln Pro Arg Phe Tyr Arg Ala
 85 90 95
 Arg Tyr Ala Phe Leu Leu Glu Gly Lys Asp Ser Glu Lys Leu Leu Val
 100 105 110
 Ser Glu Lys Leu Ile Thr Gln Ile Thr Asp Asp Ala Asp Pro Ile Leu
 115 120 125
 Ser Gln Leu Leu Asn Phe Tyr Cys Phe Pro Tyr Met Asn Pro Thr Asp
 130 135 140
 Val Phe Asn Ala Pro Glu Trp Val Lys Glu Thr Ile Trp Tyr Gln Ile
 145 150 155 160
 Phe Pro Glu Arg Phe Ala Asn Gly Asp Pro Ser Ile Ser Pro Lys Asn
 165 170 175
 Val Leu Pro Trp Gly Ser Glu Asp Pro Lys Thr Asn Ser Phe Phe Gly
 180 185 190
 Gly Asp Leu Gln Gly Val Ile Asp His Leu Asp Tyr Leu Gln Asp Leu
 195 200 205
 Gly Ile Thr Gly Ile Tyr Phe Thr Pro Ile Thr Gln Gly Glu Thr Asn
 210 215 220
 His Lys Tyr Asp Thr Thr Asp Tyr Leu Lys Val Asp Pro Ala Phe Gly
 225 230 235 240
 Ser Asp Glu Thr Val His Thr Leu Ile Asp Glu Ala His Lys Arg Gly
 245 250 255
 Met Lys Val Met Leu Asp Ala Val Phe Asn His Ile Gly Ala Asn Ser
 260 265 270
 Ile Gln Trp Gln Asp Val Ile Lys His Gly Lys Asp Ser Gln Tyr Ile
 275 280 285
 Asp Trp Phe Tyr Val Glu Gln Phe Pro Leu Ile Asp Glu Ser Lys Lys
 290 295 300
 Ala Tyr His Ser Lys Glu Gln Leu Asn Tyr Arg Ala Phe Ala Phe Ala
 305 310 315 320
 Gln Asn Met Pro Lys Leu Asn Thr Glu Asn Pro Glu Val Ile Glu Tyr
 325 330 335
 Leu Ile Glu Val Gly Arg Tyr Trp Val Lys Asn Phe Asp Ile Asp Ala
 340 345 350
 Trp Arg Leu Asp Val Ala Asn Glu Val Asp Gln Arg Phe Trp Arg Arg
 355 360 365
 Phe Arg Asp Glu Leu Lys Ala Ile Lys Pro Glu Leu Tyr Ile Leu Gly
 370 375 380
 Glu Val Trp His Asp Ser Met Asn Trp Leu Gly Gly Asp Gln Phe Asp
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 Gly Val Met Asn Tyr Pro Leu Ala Asp Ala Met Leu Gly Phe Phe Ala
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<210> 213

<211> 1815

<212> DNA

<213> Corynebacterium glutamicum ATCC 13032

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cct gat cac gcg gct cgc cca gtt ctt gat gcc cac ggc ttg atc gtt	96
Pro Asp His Ala Ala Arg Pro Val Leu Asp Ala His Gly Leu Ile Val	
20 25 30	
gag cac gaa tcg gaa gag ttt cca gtc ccc gca ccc gct ccc ggt gaa	144
Glu His Glu Ser Glu Glu Phe Pro Val Pro Ala Pro Ala Pro Gly Glu	
35 40 45	
cag ccc tgg gag aag aaa aac cgc gag tgg tac aaa gac gcc gtt ttc	192
Gln Pro Trp Glu Lys Lys Asn Arg Glu Trp Tyr Lys Asp Ala Val Phe	
50 55 60	
tac gaa gtg ctg gtt cgt gcc ttc tac gat cca gaa ggc aac gga gtc	240

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Tyr 65	Glu	Val	Leu	Val	Arg 70	Ala	Phe	Tyr	Asp	Pro 75	Glu	Gly	Asn	Gly	Val 80	
gga Gly	tgc Ser	tgt Leu	aaa Lys	ggc Gly	ctg Leu	acc Thr	gaa Glu	aaa Lys	ctg Leu	gat Asp	tac Tyr	atc Ile	cag Gln	tgg Trp	ctc Leu	288
ggc Gly	gtg Val	gat Asp	tgc Cys	att Ile	tgg Trp	atc Ile	cca Pro	ccg Pro	ttt Phe	tat Tyr	gat Asp	tcc Ser	cca Pro	ctg Leu	cgc Arg	336
gac Asp	ggc Gly	ggt Gly	tac Tyr	gat Asp	atc Ile	cgc Arg	aac Asn	ttc Phe	cgt Arg	gaa Glu	atc Ile	ctg Leu	ccc Pro	gaa Glu	ttc Phe	384
ggc Gly	acc Thr	gtc Val	gat Asp	gac Asp	ttc Phe	gtg Val	gaa Glu	ctc Leu	ggt Val	gac Asp	cac His	gcc Ala	cac His	cgc Arg	cgt Arg	432
ggc Gly	ctg Leu	cgt Arg	ggt Val	atc Ile	acc Thr	gac Asp	ttg Leu	gtc Val	atg Met	aat Asn	cac His	acc Thr	tcc Ser	gac Asp	cag Gln	480
cac His	gca Ala	tgg Trp	ttc Phe	caa Gln	gaa Glu	tcc Ser	cgg Arg	cgc Arg	gac Asp	cca Pro	acc Thr	ggc Gly	ccc Pro	tac Tyr	gga Gly	528
gat Asp	ttc Phe	tat Tyr	gtg Val	tgg Trp	agc Ser	gat Asp	gat Asp	ccc Pro	acc Thr	ctg Leu	tac Tyr	aac Asn	gaa Glu	gcc Ala	cgc Arg	576
atc Ile	atc Ile	ttt Phe	gta Val	gat Asp	aca Thr	gaa Glu	gaa Glu	tcc Ser	aac Asn	tgg Trp	acc Thr	tat Tyr	gat Asp	ccg Pro	gtg Val	624
cgt Arg	ggc Gly	cag Gln	tac Tyr	ttc Phe	tgg Trp	cac His	cgc Arg	ttc Phe	ttc Phe	tcc Ser	cac His	caa Gln	cca Pro	gac Asp	ctc Leu	672
aac Asn	tac Tyr	gac Asp	aac Asn	ccc Pro	gca Ala	gtc Val	caa Gln	gag Glu	gcc Ala	atg Met	cta Leu	gat Asp	gtc Val	ttg Leu	cgt Arg	720
ttc Phe	tgg Trp	ctg Leu	gac Asp	ctg Leu	gga Gly	ctt Leu	gat Asp	ggt Gly	ttc Phe	cga Arg	cta Leu	gat Asp	gcc Ala	ggt Val	cct Pro	768
tat Tyr	ctt Leu	ttt Phe	gaa Glu	cgc Arg	gaa Glu	ggc Gly	acc Thr	aac Asn	ggc Gly	gaa Glu	aac Asn	ctc Leu	aaa Lys	gaa Glu	acc Thr	816
cac His	gat Asp	ttc Phe	ctc Leu	aaa Lys	ctg Leu	tgt Cys	cgc Arg	tct Ser	gtc Val	att Ile	gag Glu	aag Lys	gaa Glu	tac Tyr	ccc Pro	864
ggc Gly	cga Arg	atc Ile	ctg Leu	ctc Leu	gca Ala	gaa Glu	gcc Ala	aac Asn	caa Gln	tgg Trp	ccc Pro	caa Gln	gat Asp	gtg Val	gtc Val	912
gaa Glu	tac Tyr	ttc Phe	ggt Gly	gaa Glu	aaa Lys	gac Asp	aaa Lys	ggc Gly	gat Asp	gaa Glu	tgc Cys	cac His	atg Met	gcc Ala	ttc Phe	960
cac His	ttc Phe	cct Pro	ttg Leu	atg Met	ccg Pro	cgc Arg	atc Ile	ttc Phe	atg Met	gga Gly	ggt Val	cgc Arg	caa Gln	ggt Gly	tca Ser	1008
cgc Arg	acc Thr	ccg Pro	atc Ile	agt Ser	gag Glu	atc Ile	ctg Leu	gcc Ala	aac Asn	acc Thr	ccg Pro	gag Glu	att Ile	ccc Pro	aag Lys	1056
act Thr	gcc Ala	caa Gln	tgg Trp	ggt Gly	att Ile	ttc Phe	ctg Leu	cgt Arg	aat Asn	cat His	gat Asp	gag Glu	ctc Leu	acc Thr	ctt Leu	1104
gaa Glu	atg Met	gtc Val	tcc Ser	gat Asp	gag Glu	gaa Glu	cgc Arg	agc Ser	tac Tyr	atg Met	tac Tyr	tcc Ser	caa Gln	ttc Phe	gcc Ala	1152
tcc Ser	gaa Glu	cct Pro	cgc Arg	atg Met	cgc Arg	gcc Ala	aac Asn	gta Val	gga Gly	atc Ile	cgc Arg	agg Arg	cgc Arg	ctt Leu	tcc Ser	1200
cca Pro	ctg Leu	ctt Leu	gaa Glu	ggc Gly	gac Asp	cgc Arg	aac Asn	cag Gln	ctg Leu	gaa Glu	ctc Leu	ctt Leu	cac His	ggt Gly	ttg Leu	1248
ttg Leu	ctg Leu	tct Ser	cta Leu	cct Pro	ggc Gly	tca Ser	ccc Pro	gtg Val	ttg Leu	tat Tyr	tac Tyr	ggt Gly	gat Asp	gaa Glu	att Ile	1296
ggc Gly	atg Gly	ggc Gly	gac Gly	aat Gly	atc Gly	tgg Gly	ctc Gly	cac Gly	cgc Gly	gac Gly	gga Gly	cgc Gly	acc Gly	acc Gly	acc Gly	1344

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Pro	Met	Gln	Trp	Ser	Asn	Asp	Arg	Asn	Gly	Gly	Phe	Ser	Lys	Ala	Asp	
450						455					460					
cct	gaa	cgc	ctg	tac	ctt	cca	gcg	atc	caa	aat	gat	caa	tac	ggc	tac	1440
Pro	Glu	Arg	Leu	Tyr	Leu	Pro	Ala	Ile	Gln	Asn	Asp	Gln	Tyr	Gly	Tyr	
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gcc	caa	gta	aac	gtg	gaa	agc	caa	ctc	aac	cgc	gaa	aac	tcc	ctg	ctg	1488
Ala	Gln	Val	Asn	Val	Glu	Ser	Gln	Leu	Asn	Arg	Glu	Asn	Ser	Leu	Leu	
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cgc	tgg	ctc	cga	aac	caa	atc	ctt	atc	cgc	aag	cag	tac	cgc	gca	ttt	1536
Arg	Trp	Leu	Arg	Asn	Gln	Ile	Leu	Ile	Arg	Lys	Gln	Tyr	Arg	Ala	Phe	
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Gly	Ala	Gly	Thr	Tyr	Arg	Glu	Val	Ser	Ser	Thr	Asn	Glu	Ser	Val	Leu	
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aca	ttt	tta	cga	gaa	cac	aag	ggc	caa	acc	att	ttg	tgt	gtc	aac	aac	1632
Thr	Phe	Leu	Arg	Glu	His	Lys	Gly	Gln	Thr	Ile	Leu	Cys	Val	Asn	Asn	
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atg	agc	aaa	tat	cct	cag	gca	gtc	tcg	ctt	gat	ttg	cgt	gaa	ttt	gca	1680
Met	Ser	Lys	Tyr	Pro	Gln	Ala	Val	Ser	Leu	Asp	Leu	Arg	Glu	Phe	Ala	
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gga	cac	acc	cct	cga	gag	atg	tcg	ggc	ggg	cag	ctg	ttc	cct	acc	att	1728
Gly	His	Thr	Pro	Arg	Glu	Met	Ser	Gly	Gly	Gln	Leu	Phe	Pro	Thr	Ile	
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gct	gaa	cgg	gag	tgg	att	gtc	act	tta	gcc	cct	cac	gga	ttc	ttc	tgg	1776
Ala	Glu	Arg	Glu	Trp	Ile	Val	Thr	Leu	Ala	Pro	His	Gly	Phe	Phe	Trp	
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ttt	gat	ctc	acc	gcc	gat	gaa	aag	gac	gat	atg	gaa	tga				1815
Phe	Asp	Leu	Thr	Ala	Asp	Glu	Lys	Asp	Asp	Met	Glu					
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<211> 604

<212> PRT

<213> Corynebacterium glutamicum ATCC 13032

<400> 214

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Glu	His	Glu	Ser	Glu	Glu	Phe	Pro	Val	Pro	Ala	Pro	Ala	Pro	Gly	Glu	
		35					40					45				
Gln	Pro	Trp	Glu	Lys	Lys	Asn	Arg	Glu	Trp	Tyr	Lys	Asp	Ala	Val	Phe	
	50					55					60					
Tyr	Glu	Val	Leu	Val	Arg	Ala	Phe	Tyr	Asp	Pro	Glu	Gly	Asn	Gly	Val	
65					70				75						80	
Gly	Ser	Leu	Lys	Gly	Leu	Thr	Glu	Lys	Leu	Asp	Tyr	Ile	Gln	Trp	Leu	
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Gly	Val	Asp	Cys	Ile	Trp	Ile	Pro	Pro	Phe	Tyr	Asp	Ser	Pro	Leu	Arg	
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Asp	Gly	Gly	Tyr	Asp	Ile	Arg	Asn	Phe	Arg	Glu	Ile	Leu	Pro	Glu	Phe	
		115					120					125				
Gly	Thr	Val	Asp	Asp	Phe	Val	Glu	Leu	Val	Asp	His	Ala	His	Arg	Arg	
	130					135					140					
Gly	Leu	Arg	Val	Ile	Thr	Asp	Leu	Val	Met	Asn	His	Thr	Ser	Asp	Gln	
145					150					155					160	
His	Ala	Trp	Phe	Gln	Glu	Ser	Arg	Arg	Asp	Pro	Thr	Gly	Pro	Tyr	Gly	
			165						170					175		
Asp	Phe	Tyr	Val	Trp	Ser	Asp	Asp	Pro	Thr	Leu	Tyr	Asn	Glu	Ala	Arg	
			180					185					190			
Ile	Ile	Phe	Val	Asp	Thr	Glu	Glu	Ser	Asn	Trp	Thr	Tyr	Asp	Pro	Val	
		195					200						205			
Arg	Gly	Gln	Tyr	Phe	Trp	His	Arg	Phe	Phe	Ser	His	Gln	Pro	Asp	Leu	
	210					215					220					
Asn	Tyr	Asp	Asn	Pro	Ala	Val	Gln	Glu	Ala	Met	Leu	Asp	Val	Leu	Arg	
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Phe Trp Leu Asp Leu Gly Leu Asp Gly Phe Arg Leu Asp Ala Val Pro
 245 250 255
 Tyr Leu Phe Glu Arg Glu Gly Thr Asn Gly Glu Asn Leu Lys Glu Thr
 260 265 270
 His Asp Phe Leu Lys Leu Cys Arg Ser Val Ile Glu Lys Glu Tyr Pro
 275 280 285
 Gly Arg Ile Leu Leu Ala Glu Ala Asn Gln Trp Pro Gln Asp Val Val
 290 295 300
 Glu Tyr Phe Gly Glu Lys Asp Lys Gly Asp Glu Cys His Met Ala Phe
 305 310 315 320
 His Phe Pro Leu Met Pro Arg Ile Phe Met Gly Val Arg Gln Gly Ser
 325 330 335
 Arg Thr Pro Ile Ser Glu Ile Leu Ala Asn Thr Pro Glu Ile Pro Lys
 340 345 350
 Thr Ala Gln Trp Gly Ile Phe Leu Arg Asn His Asp Glu Leu Thr Leu
 355 360 365
 Glu Met Val Ser Asp Glu Glu Arg Ser Tyr Met Tyr Ser Gln Phe Ala
 370 375 380
 Ser Glu Pro Arg Met Arg Ala Asn Val Gly Ile Arg Arg Arg Leu Ser
 385 390 395 400
 Pro Leu Leu Glu Gly Asp Arg Asn Gln Leu Glu Leu Leu His Gly Leu
 405 410 415
 Leu Leu Ser Leu Pro Gly Ser Pro Val Leu Tyr Tyr Gly Asp Glu Ile
 420 425 430
 Gly Met Gly Asp Asn Ile Trp Leu His Asp Arg Asp Gly Val Arg Thr
 435 440 445
 Pro Met Gln Trp Ser Asn Asp Arg Asn Gly Gly Phe Ser Lys Ala Asp
 450 455 460
 Pro Glu Arg Leu Tyr Leu Pro Ala Ile Gln Asn Asp Gln Tyr Gly Tyr
 465 470 475 480
 Ala Gln Val Asn Val Glu Ser Gln Leu Asn Arg Glu Asn Ser Leu Leu
 485 490 495
 Arg Trp Leu Arg Asn Gln Ile Leu Ile Arg Lys Gln Tyr Arg Ala Phe
 500 505 510
 Gly Ala Gly Thr Tyr Arg Glu Val Ser Ser Thr Asn Glu Ser Val Leu
 515 520 525
 Thr Phe Leu Arg Glu His Lys Gly Gln Thr Ile Leu Cys Val Asn Asn
 530 535 540
 Met Ser Lys Tyr Pro Gln Ala Val Ser Leu Asp Leu Arg Glu Phe Ala
 545 550 555 560
 Gly His Thr Pro Arg Glu Met Ser Gly Gly Gln Leu Phe Pro Thr Ile
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<211> 3327

<212> DNA

<213> Pseudomonas syringae pv. syringae B728a

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<221> CDS

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Tyr Lys Asp Ala Val Ile Tyr Gln Val His Val Lys Ser Phe Phe Asp	
20 25 30	
tcc aat aac gac gga atc ggc gat ttc gcg ggc ttg atc gaa aag ctc	144
Ser Asn Asn Asp Gly Ile Gly Asp Phe Ala Gly Leu Ile Glu Lys Leu	
35 40 45	
gac tac att gcc gcg ctg ggc gtc aac acc atc tgg ttg ttg ccg ttt	192
Asp Tyr Ile Ala Ala Leu Gly Val Asn Thr Ile Trp Leu Leu Pro Phe	
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Asp	Val	His	Ser	Asp	Tyr	Gly	Thr	Met	Ala	Asp	Ala	Lys	Arg	Phe	Ile	
				85					90					95		
gcc	cag	gca	cac	aag	cgc	ggc	ctg	cga	gtg	atc	agc	gag	ctg	gtc	atc	336
Ala	Gln	Ala	His	Lys	Arg	Gly	Leu	Arg	Val	Ile	Ser	Glu	Leu	Val	Ile	
			100					105					110			
aat	cat	act	tcc	gac	cag	cat	ccc	tgg	ttc	cag	aaa	gcc	cgc	aat	gcc	384
Asn	His	Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Lys	Ala	Arg	Asn	Ala	
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aag	ccc	ggt	tcc	aag	gcg	cgg	gac	ttc	tat	gtg	tgg	tcg	gac	acc	gat	432
Lys	Pro	Gly	Ser	Lys	Ala	Arg	Asp	Phe	Tyr	Val	Trp	Ser	Asp	Thr	Asp	
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Gln	Lys	Tyr	Asp	Gly	Thr	Arg	Ile	Ile	Phe	Leu	Asp	Thr	Glu	Thr	Ser	
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Asn	Trp	Thr	Trp	Asp	Pro	Val	Ala	Gly	Gln	Tyr	Phe	Trp	His	Arg	Phe	
				165				170						175		
tac	tcg	cac	cag	ccg	gat	ctg	aat	ttc	gac	aac	ccg	cac	gtg	ctg	gat	576
Tyr	Ser	His	Gln	Pro	Asp	Leu	Asn	Phe	Asp	Asn	Pro	His	Val	Leu	Asp	
			180					185					190			
gcg	gtt	ctg	gaa	gtc	atg	cgc	ttc	tgg	ctg	gat	ctg	ggc	atc	gac	ggt	624
Ala	Val	Leu	Glu	Val	Met	Arg	Phe	Trp	Leu	Asp	Leu	Gly	Ile	Asp	Gly	
		195					200					205				
ttg	cgt	ctg	gat	gcc	att	ccg	tat	ctc	atc	gag	cgg	gac	ggc	acc	aac	672
Leu	Arg	Leu	Asp	Ala	Ile	Pro	Tyr	Leu	Ile	Glu	Arg	Asp	Gly	Thr	Asn	
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Asn	Glu	Asn	Leu	Pro	Glu	Thr	His	Gln	Val	Leu	Lys	Arg	Ile	Arg	Ala	
225				230					235						240	
gag	atc	gac	gcg	aac	tat	ccg	gac	cgc	atg	ctg	ctg	gcc	gag	gcc	aac	768
Glu	Ile	Asp	Ala	Asn	Tyr	Pro	Asp	Arg	Met	Leu	Leu	Ala	Glu	Ala	Asn	
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caa	tgg	ccg	gaa	gat	acc	cag	ctg	tat	ttt	ggt	gac	agc	aaa	ggc	ccg	816
Gln	Trp	Pro	Glu	Asp	Thr	Gln	Leu	Tyr	Phe	Gly	Asp	Ser	Lys	Gly	Pro	
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gac	ggc	gat	gaa	tgc	cac	atg	gcc	ttt	cac	ttt	ccg	ttg	atg	cca	cgc	864
Asp	Gly	Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	Pro	Leu	Met	Pro	Arg	
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atg	tac	atg	gcg	ctg	gcc	cag	gaa	gat	cgt	ttt	ccg	atc	acc	gat	att	912
Met	Tyr	Met	Ala	Leu	Ala	Gln	Glu	Asp	Arg	Phe	Pro	Ile	Thr	Asp	Ile	
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Leu	Arg	Gln	Thr	Pro	Glu	Ile	Pro	Glu	Asn	Cys	Gln	Trp	Ala	Ile	Phe	
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ctg	cgc	aac	cac	gat	gaa	ctg	acc	ctg	gaa	atg	gtc	acc	gat	cgt	gag	1008
Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	Thr	Asp	Arg	Glu	
				325					330					335		
cgt	gat	tac	ctg	tggt	aat	tac	tac	gcg	gcc	gac	cgc	cgt	gca	cgg	atc	1056
Arg	Asp	Tyr	Leu	Trp	Asn	Tyr	Tyr	Ala	Ala	Asp	Arg	Arg	Ala	Arg	Ile	
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aac	ctg	ggc	atc	cgt	cgg	cgc	ctg	gca	ccc	ttg	gtg	gat	cgc	gat	cgt	1104
Asn	Leu	Gly	Ile	Arg	Arg	Arg	Leu	Ala	Pro	Leu	Val	Asp	Arg	Asp	Arg	
		355					360					365				
cgc	cgg	gtc	gag	ttg	ctg	aac	agc	atg	ctg	ttg	tcg	ccc	ggc	aca		1152
Arg	Arg	Val	Glu	Leu	Leu	Asn	Ser	Met	Leu	Leu	Ser	Met	Pro	Gly	Thr	
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ccg	acg	ctg	tat	tac	ggc	gac	gag	atc	ggc	atg	ggc	gat	aac	atc	tac	1200
Pro	Thr	Leu	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly	Asp	Asn	Ile	Tyr	
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Gln	Glu	Arg	Asp	Pro	His	Ser	Leu	Leu	Asn	Trp	Asn	Arg	Arg	Met	Leu	
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Ser	Ala	Ala	Gln	Ala	Ala	Glu	Leu	Glu	Leu	Ser	Ala	Tyr	Ala	Gly	Thr	
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Pro	Val	Leu	Leu	Ser	Glu	Ile	Glu	Val	Thr	Ala	Gly	Gly	Gln	Thr	Asp	
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Ala	Leu	Pro	Gln	Gln	Leu	Ala	Leu	Ala	Arg	Val	Arg	Arg	Asn	Arg	Asp	
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Phe	Ala	Val	Glu	Val	Thr	Ser	Ser	Gln	Asp	Ser	Lys	Ala	Ser	Gly	Val	
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Lys	Ala	Ala	Tyr	Glu	Val	Ile	Tyr	Glu	Ala	Glu	Asn	Arg	Pro	Ala	Trp	
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<400> 216

Met Ala Lys Lys Pro Gly Asp Ala Thr Phe Ile Lys Asp Pro Leu Trp

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5

10

15

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Tyr	Lys	Asp	Ala ₂₀	Val	Ile	Tyr	Gln	Val ₂₅	His	Val	Lys	Ser	Phe ₃₀	Phe	Asp
Ser	Asn	Asn ₃₅	Asp	Gly	Ile	Gly	Asp ₄₀	Phe	Ala	Gly	Leu	Ile ₄₅	Glu	Lys	Leu
Asp	Tyr ₅₀	Ile	Ala	Ala	Leu	Gly ₅₅	Val	Asn	Thr	Ile	Trp ₆₀	Leu	Leu	Pro	Phe
Tyr ₆₅	Pro	Ser	Pro	Arg	Arg ₇₀	Asp	Asp	Gly	Tyr	Asp ₇₅	Ile	Ser	Glu	Tyr	Arg ₈₀
Asp	Val	His	Ser	Asp ₈₅	Tyr	Gly	Thr	Met	Ala ₉₀	Asp	Ala	Lys	Arg	Phe ₉₅	Ile
Ala	Gln	Ala	His ₁₀₀	Lys	Arg	Gly	Leu	Arg ₁₀₅	Val	Ile	Ser	Glu	Leu ₁₁₀	Val	Ile
Asn	His	Thr ₁₁₅	Ser	Asp	Gln	His	Pro ₁₂₀	Trp	Phe	Gln	Lys	Ala ₁₂₅	Arg	Asn	Ala
Lys	Pro ₁₃₀	Gly	Ser	Lys	Ala	Arg ₁₃₅	Asp	Phe	Tyr	Val	Trp ₁₄₀	Ser	Asp	Thr	Asp
Gln ₁₄₅	Lys	Tyr	Asp	Gly	Thr ₁₅₀	Arg	Ile	Ile	Phe	Leu ₁₅₅	Asp	Thr	Glu	Thr	Ser ₁₆₀
Asn	Trp	Thr	Trp	Asp ₁₆₅	Pro	Val	Ala	Gly	Gln ₁₇₀	Tyr	Phe	Trp	His	Arg ₁₇₅	Phe
Tyr	Ser	His	Gln ₁₈₀	Pro	Asp	Leu	Asn	Phe ₁₈₅	Asp	Asn	Pro	His	Val ₁₉₀	Leu	Asp
Ala	Val	Leu ₁₉₅	Glu	Val	Met	Arg	Phe ₂₀₀	Trp	Leu	Asp	Leu	Gly ₂₀₅	Ile	Asp	Gly
Leu	Arg ₂₁₀	Leu	Asp	Ala	Ile	Pro ₂₁₅	Tyr	Leu	Ile	Glu	Arg ₂₂₀	Asp	Gly	Thr	Asn
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Glu	Ile	Asp	Ala	Asn ₂₄₅	Tyr	Pro	Asp	Arg	Met ₂₅₀	Leu	Leu	Ala	Glu	Ala ₂₅₅	Asn
Gln	Trp	Pro	Glu ₂₆₀	Asp	Thr	Gln	Leu	Tyr ₂₆₅	Phe	Gly	Asp	Ser	Lys ₂₇₀	Gly	Pro
Asp	Gly	Asp ₂₇₅	Glu	Cys	His	Met	Ala ₂₈₀	Phe	His	Phe	Pro	Leu ₂₈₅	Met	Pro	Arg
Met	Tyr ₂₉₀	Met	Ala	Leu	Ala	Gln ₂₉₅	Glu	Asp	Arg	Phe	Pro ₃₀₀	Ile	Thr	Asp	Ile
Leu	Arg	Gln	Thr	Pro	Glu ₃₁₀	Ile	Pro	Glu	Asn	Cys ₃₁₅	Gln	Trp	Ala	Ile	Phe ₃₂₀
Leu	Arg	Asn	His	Asp ₃₂₅	Glu	Leu	Thr	Leu	Glu ₃₃₀	Met	Val	Thr	Asp	Arg ₃₃₅	Glu
Arg	Asp	Tyr	Leu ₃₄₀	Trp	Asn	Tyr	Tyr	Ala ₃₄₅	Ala	Asp	Arg	Arg	Ala ₃₅₀	Arg	Ile
Asn	Leu	Gly ₃₅₅	Ile	Arg	Arg	Arg	Leu ₃₆₀	Ala	Pro	Leu	Val	Asp ₃₆₅	Arg	Asp	Arg
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Leu	Gly	Asp	Arg	Asp ₄₀₅	Gly	Val	Arg	Thr	Pro ₄₁₀	Met	Gln	Trp	Ser	Ile ₄₁₅	Asp
Arg	Asn	Gly	Gly ₄₂₀	Phe	Ser	Arg	Ala	Asp ₄₂₅	Pro	Ala	Ser	Leu	Val ₄₃₀	Leu	Pro
Pro	Ile	Met ₄₃₅	Asp	Pro	Met	Tyr	Gly ₄₄₀	Phe	Gln	Ser	Val	Asn ₄₄₅	Val	Glu	Ile
Gln	Glu ₄₅₀	Arg	Asp	Pro	His	Ser ₄₅₅	Leu	Leu	Asn	Trp	Asn ₄₆₀	Arg	Arg	Met	Leu
Ala	Val	Arg	Lys	Gln	Gln ₄₇₀	Lys	Ala	Phe	Gly	Arg ₄₇₅	Gly	Thr	Leu	Lys	Met ₄₈₀
Leu	Ser	Pro	Ser	Asn ₄₈₅	Arg	Arg	Ile	Leu	Ala ₄₉₀	Tyr	Thr	Arg	Glu	Tyr ₄₉₅	Thr
Ala	Pro	Asp	Gly ₅₀₀	His	Ser	Glu	Val	Val ₅₀₅	Leu	Cys	Val	Ala	Asn ₅₁₀	Val	Ser
Ser	Ala	Ala ₅₁₅	Gln	Ala	Ala	Glu	Leu ₅₂₀	Glu	Leu	Ser	Ala	Tyr ₅₂₅	Ala	Gly	Thr
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Leu	Ser	Tyr	Leu	Leu	Thr ₅₅₀	Leu	Pro	Pro	Tyr	Gly ₅₅₅	Phe	Tyr	Trp	Phe	Leu ₅₆₀
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Lys	Asp	Val	Ser	Gly	Val	Leu	Arg	Ser	Phe	Asp	Tyr	Ala	Ala	Ala	Met
		995					1000					1005			
Ala	Val	Arg	Ser	Ala	Gln	Ser	Val	Asp	Thr	Ser	Pro	Glu	Ala	Ala	Gly
	1010					1015					1020				
Ala	Arg	Lys	Arg	Val	Ala	Asp	Thr	Tyr	Leu	Ala	Gln	Ala	Arg	Glu	Thr
1025					1030					1035					1040
Phe	Ile	Glu	Gly	Tyr	Arg	Ser	Ala	Thr	Thr	Gly	Ile	Ala	His	Ala	Trp
				1045					1050					1055	
Lys	Asp	Ala	Lys	Gly	Glu	Asp	Ala	Ala	Leu	Glu	Leu	Phe	Thr	Leu	Glu
			1060					1065					1070		
Lys	Ala	Ala	Tyr	Glu	Val	Ile	Tyr	Glu	Ala	Glu	Asn	Arg	Pro	Ala	Trp
	1075						1080					1085			
Leu	Ala	Val	Pro	Leu	Gln	Gly	Leu	Arg	Gly	Leu	Leu	Gln	Pro	Ser	Asp
	1090					1095					1100				
Gly	Glu	Ser	Ile												
1105															

<210> 217
 <211> 1659
 <212> DNA
 <213> Lactobacillus gasseri

<220>
 <221> CDS
 <222> (1)..(1659)

<400> 217
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 Met Arg His Trp Tyr Asp Arg Ala Ile Ile Tyr Gln Ile Tyr Pro Lys
 1 5 10 15
 tcc ttc cag gat tct aac ggt gat ggt att ggc gac tta aat ggt att 96
 Ser Phe Gln Asp Ser Asn Gly Asp Gly Ile Gly Asp Leu Asn Gly Ile
 20 25 30
 aga aaa aga ata ccg tat ttg aag gaa cta gga gtt aat gct gtc tgg 144
 Arg Lys Arg Ile Pro Tyr Leu Lys Glu Leu Gly Val Asn Ala Val Trp
 35 40 45
 ctg aat cca gtc ttt gtt tca cca caa gtt gat aat ggc tat gat gta 192
 Leu Asn Pro Val Phe Val Ser Pro Gln Val Asp Asn Gly Tyr Asp Val
 50 55 60
 tca aac tat ttt gcc att gac ccc aaa atg gga acc atg gaa gat atg 240
 Ser Asn Tyr Phe Ala Ile Asp Pro Lys Met Gly Thr Met Glu Asp Met
 65 70 75 80
 gat gac tta atc aaa gaa atg cat gaa gct gga att cat gta att atg 288
 Asp Asp Leu Ile Lys Glu Met His Glu Ala Gly Ile His Val Ile Met
 85 90 95
 gat ttt gtt tta aac cat act tct gat caa cat ccg tgg ttt caa gat 336
 Asp Phe Val Leu Asn His Thr Ser Asp Gln His Pro Trp Phe Gln Asp
 100 105 110
 gca att aaa aac cct gat agt att tat cga gac tac tat att ttt gct 384
 Ala Ile Lys Asn Pro Asp Ser Ile Tyr Arg Asp Tyr Tyr Ile Phe Ala
 115 120 125
 ggt aaa aat aat cag aga cca aat aat tgg gga agt ttt ttt gga ggt 432
 Gly Lys Asn Asn Gln Arg Pro Asn Asn Trp Gly Ser Phe Phe Gly Gly
 130 135 140
 agt gtt tgg gag aaa gat cct gct gga aca ggg caa ttt tat ttt cat 480
 Ser Val Trp Glu Lys Asp Pro Ala Gly Thr Gln Phe Tyr Phe His
 145 150 155 160
 ctt ttt gat aaa aga atg ccc gat ttg aac tgg aaa aat cct gaa gtc 528
 Leu Phe Asp Lys Arg Met Pro Asp Leu Asn Trp Lys Asn Pro Glu Val
 165 170 175
 aga cat gca atg agt gaa att gca aaa tat tgg cta gaa aag gga att 576
 Arg His Ala Met Ser Glu Ile Ala Lys Tyr Trp Leu Glu Lys Gly Ile
 180 185 190
 gac ggc ttg aga tta gat gcc ttt atc cat att gct aaa gca gat tta 624
 Asp Gly Leu Arg Leu Asp Ala Phe Ile His Ile Ala Lys Ala Asp Leu
 195 200 205
 agg caa aat ttc cca gtt aat agt gaa aat gaa gaa ccc gtg ata gct 672
 Arg Gln Asn Phe Pro Val Asn Ser Glu Asn Glu Glu Pro Val Ile Ala
 210 215 220
 gag cca ttt ttt gca aac tta cca caa gta caa aaa tgg atg cga cct 720
 Glu Pro Phe Phe Ala Asn Leu Pro Gln Val Gln Lys Trp Met Arg Pro
 225 230 235 240
 ttc tgt gag gaa ata aag caa gat tat cct gat gca cta ttg tta gga 768
 Phe Cys Glu Glu Ile Lys Gln Asp Tyr Pro Asp Ala Leu Leu Leu Gly
 245 250 255
 gaa gca gca agc gcg aat gtt aat tta gca gtt gat tat aca aat aaa 816
 Glu Ala Ala Ser Ala Asn Val Asn Leu Ala Val Asp Tyr Thr Asn Lys
 260 265 270
 gat aat cac ttg atg gat agt gta att aca ttt aga tac ttt aca gag 864
 Asp Asn His Leu Met Asp Ser Val Ile Thr Phe Arg Tyr Phe Thr Glu
 275 280 285
 gat caa agt cag att gat cct agt ttt tca gct caa tac cag ccg aaa 912
 Asp Gln Ser Gln Ile Asp Pro Ser Phe Ser Ala Gln Tyr Gln Pro Lys
 290 295 300
 tca tta gat tta gta aaa ttt aag caa aat cag gct gtt tgg caa caa 960

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Ser 305	Leu	Asp	Leu	Val	Lys 310	Phe	Lys	Gln	Asn	Gln 315	Ala	Val	Trp	Gln	Gln 320	
act	tta	agt	ggt	gtt	tct	aag	cca	acc	ttg	tac	tg	aat	aat	cat	gat	1008
Thr	Leu	Ser	Gly	Val	Ser	Lys	Pro	Thr	Leu	Tyr	Trp	Asn	Asn	His	Asp	
				325					330					335		
atg	gct	aga	ata	gcg	act	aga	att	gct	aaa	aat	gat	att	caa	gct	cgg	1056
Met	Ala	Arg	Ile	Ala	Thr	Arg	Ile	Ala	Lys	Asn	Asp	Ile	Gln	Ala	Arg	
				340				345					350			
agc	tta	gcc	atg	ctc	atg	tat	tta	caa	aat	ggg	ttg	ccg	att	att	tat	1104
Ser	Leu	Ala	Met	Leu	Met	Tyr	Leu	Gln	Asn	Gly	Leu	Pro	Ile	Ile	Tyr	
				355			360					365				
tat	ggc	gaa	gaa	ctc	gga	atg	aaa	aat	ttg	gag	ttt	gaa	gac	gca	aca	1152
Tyr	Gly	Glu	Glu	Leu	Gly	Met	Lys	Asn	Leu	Glu	Phe	Glu	Asp	Ala	Thr	
	370					375					380					
caa	ttt	gaa	gat	gag	aca	gtt	aaa	gaa	ttt	att	gaa	agc	gcc	aaa	aaa	1200
Gln	Phe	Glu	Asp	Glu	Thr	Val	Lys	Glu	Phe	Ile	Glu	Ser	Ala	Lys	Lys	
385					390					395					400	
gct	gga	aaa	act	agt	caa	gaa	gca	tta	cta	atg	gca	agt	aaa	acc	cat	1248
Ala	Gly	Lys	Thr	Ser	Gln	Glu	Ala	Leu	Leu	Met	Ala	Ser	Lys	Thr	His	
				405				410						415		
aaa	ttg	cca	gct	aga	ggg	cca	atg	cca	tgg	aat	aat	gaa	aaa	aat	aat	1296
Lys	Leu	Pro	Ala	Arg	Gly	Pro	Met	Pro	Trp	Asn	Asn	Glu	Lys	Asn	Asn	
				420			425						430			
ggc	ttt	agt	gat	gga	aat	cct	tgg	ctt	aaa	gga	aag	aaa	ggt	gat	tat	1344
Gly	Phe	Ser	Asp	Gly	Asn	Pro	Trp	Leu	Lys	Gly	Lys	Lys	Val	Asp	Tyr	
		435				440						445				
gct	aat	gcg	gct	gat	gaa	ata	gca	gat	aac	cat	agc	atg	ttt	aat	ttc	1392
Ala	Asn	Ala	Ala	Asp	Glu	Ile	Ala	Asp	Asn	His	Ser	Met	Phe	Asn	Phe	
	450					455				460						
tac	aaa	aaa	ttg	atc	gcc	cta	aag	aaa	gaa	gca	ttg	ttt	gaa	gat	ggt	1440
Tyr	Lys	Lys	Leu	Ile	Ala	Leu	Lys	Lys	Glu	Ala	Leu	Phe	Glu	Asp	Gly	
465					470					475					480	
ggc	tac	tat	tta	tta	cca	acg	tca	aat	gac	agc	tat	ggt	tat	gag	cgt	1488
Gly	Tyr	Tyr	Leu	Leu	Pro	Thr	Ser	Asn	Asp	Ser	Tyr	Val	Tyr	Glu	Arg	
				485					490					495		
aat	tta	gaa	gat	caa	aaa	gca	tta	gtc	gct	ggt	tct	tta	agt	aaa	gat	1536
Asn	Leu	Glu	Asp	Gln	Lys	Ala	Leu	Val	Ala	Val	Ser	Leu	Ser	Lys	Asp	
				500				505					510			
cct	att	gag	ctt	gac	gta	gat	cct	gaa	ttt	aag	cag	gaa	aaa	tta	gta	1584
Pro	Ile	Glu	Leu	Asp	Val	Asp	Pro	Glu	Phe	Lys	Gln	Glu	Lys	Leu	Val	
		515					520					525				
gca	ggc	aac	tat	caa	ttg	aaa	gat	gga	aaa	tta	aaa	tta	gct	ccg	tat	1632
Ala	Gly	Asn	Tyr	Gln	Leu	Lys	Asp	Gly	Lys	Leu	Lys	Leu	Ala	Pro	Tyr	
	530				535						540					
gcg	gga	gta	gta	tta	gaa	aaa	gac	taa								1659
Ala	Gly	Val	Val	Leu	Glu	Lys	Asp									
545					550											

<210> 218

<211> 552

<212> PRT

<213> Lactobacillus gasseri

<400> 218

Met	Arg	His	Trp	Tyr	Asp	Arg	Ala	Ile	Ile	Tyr	Gln	Ile	Tyr	Pro	Lys	
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			20					25					30			
Arg	Lys	Arg	Ile	Pro	Tyr	Leu	Lys	Glu	Leu	Gly	Val	Asn	Ala	Val	Trp	
		35					40					45				
Leu	Asn	Pro	Val	Phe	Val	Ser	Pro	Gln	Val	Asp	Asn	Gly	Tyr	Asp	Val	
	50					55					60					
Ser	Asn	Tyr	Phe	Ala	Ile	Asp	Pro	Lys	Met	Gly	Thr	Met	Glu	Asp	Met	
65					70					75					80	
Asp	Asp	Leu	Ile	Lys	Glu	Met	His	Glu	Ala	Gly	Ile	His	Val	Ile	Met	
			85					90						95		
Asp	Phe	Val	Leu	Asn	His	Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Asp	
			100					105					110			
Ala	Ile	Lys	Asn	Pro	Asp	Ser	Ile	Tyr	Arg	Asp	Tyr	Tyr	Ile	Phe	Ala	

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Gly	Lys	115	Asn	Asn	Gln	Arg	Pro	120	Asn	Asn	Trp	Gly	Ser	125	Phe	Gly	Gly
Ser	Val	130	Trp	Glu	Lys	Asp	Pro	135	Ala	Gly	Thr	Gly	Gln	140	Phe	Tyr	Phe
145	Phe	Asp	Lys	Arg	150	Met	Pro	Asp	Leu	Asn	155	Trp	Lys	Asn	Pro	Glu	Val
Arg	His	Ala	Met	165	Ser	Glu	Ile	Ala	Lys	170	Tyr	Trp	Leu	Glu	Lys	175	Ile
Asp	Gly	Leu	Arg	180	Leu	Asp	Ala	Phe	Ile	185	His	Ile	Ala	Lys	190	Ala	Asp
Arg	Gln	Asn	Phe	195	Pro	Val	Asn	200	Ser	Glu	Asn	Glu	Glu	205	Pro	Val	Ile
210	Pro	Phe	Phe	Ala	Asn	215	Leu	Pro	Gln	Val	Gln	Lys	Trp	Met	Arg	Pro	240
225	Phe	Cys	Glu	Glu	Ile	Lys	Gln	Asp	Tyr	Pro	235	Asp	Ala	Leu	Leu	Leu	Gly
Glu	Ala	Ala	Ser	245	Ala	Asn	Val	Asn	Leu	250	Ala	Val	Asp	Tyr	Thr	Asn	Lys
Asp	Asn	His	Leu	260	Met	Asp	Ser	Val	Ile	265	Thr	Phe	Arg	Tyr	270	Phe	Thr
Asp	Gln	Ser	Gln	Ile	Asp	Pro	Ser	Phe	Ser	280	Ala	Gln	Tyr	Gln	Pro	Lys	285
Ser	Leu	Asp	Leu	Val	Lys	295	Phe	Lys	Gln	Asn	Gln	Ala	Val	Trp	Gln	Gln	300
305	Thr	Leu	Ser	Gly	Val	Ser	Lys	Pro	Thr	Leu	Tyr	Trp	Asn	Asn	His	Asp	315
Met	Ala	Arg	Ile	Ala	Thr	Arg	Ile	Ala	Lys	325	Asn	Asp	Ile	Gln	Ala	Arg	330
Ser	Leu	Ala	Met	Leu	Met	Tyr	Leu	Gln	Asn	335	Gly	Leu	Pro	Ile	Ile	Tyr	340
Tyr	Gly	Glu	Glu	Leu	Gly	Met	Lys	Asn	Leu	345	Glu	Phe	Glu	Asp	Ala	Thr	350
Gln	Phe	Glu	Asp	Glu	Thr	Val	Lys	Glu	Phe	355	Ile	Glu	Ser	Ala	Lys	Lys	360
365	Ala	Gly	Lys	Thr	Ser	Gln	Glu	Ala	Leu	365	Met	Ala	Ser	Lys	Thr	His	370
Lys	Leu	Pro	Ala	Arg	Gly	Pro	Met	Pro	Trp	375	Asn	Asn	Glu	Lys	Asn	Asn	380
Gly	Phe	Ser	Asp	Gly	Asn	Pro	Trp	Leu	Lys	385	Gly	Lys	Lys	Val	Asp	Tyr	390
Ala	Asn	Ala	Ala	Asp	Glu	Ile	Ala	Asp	Asn	395	His	Ser	Met	Phe	Asn	Phe	400
Tyr	Lys	Lys	Leu	Ile	Ala	Leu	Lys	Lys	Glu	405	Ala	Leu	Phe	Glu	Asp	Gly	410
415	Gly	Tyr	Tyr	Leu	Leu	Pro	Thr	Ser	Asn	415	Asp	Ser	Tyr	Val	Tyr	Glu	420
Asn	Leu	Glu	Asp	Gln	Lys	Ala	Leu	Val	Ala	425	Val	Ser	Leu	Ser	Lys	Asp	430
Pro	Ile	Glu	Leu	Asp	Val	Asp	Pro	Glu	Phe	435	Lys	Gln	Glu	Lys	Leu	Val	440
Ala	Gly	Asn	Tyr	Gln	Leu	Lys	Asp	Gly	Lys	445	Leu	Lys	Leu	Ala	Pro	Tyr	450
Ala	Gly	Val	Val	Leu	Glu	Lys	Asp			455							460
545																	550

<210> 219
 <211> 1467
 <212> DNA
 <213> Nostoc punctiforme PCC 73102

<220>
 <221> CDS
 <222> (1)..(1467)

<400> 219
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 Met Gln Ile Gln Thr Pro Asp Trp Val Lys His Ala Val Phe Tyr Gln
 1 5 10 15

BPS64510PC-2008083446

att	ttc	cca	gat	cgc	ttt	gcc	aga	agc	aaa	cag	ccg	cgc	aaa	cgg	tta	96
Ile	Phe	Pro	Asp	Arg	Phe	Ala	Arg	Ser	Lys	Gln	Pro	Arg	Lys	Arg	Leu	
			20					25					30			
ttg	caa	gaa	gcc	cgt	tgg	gaa	gat	tgg	gac	tct	atg	cca	acc	ctc	cag	144
Leu	Gln	Glu	Ala	Arg	Trp	Glu	Asp	Trp	Asp	Ser	Met	Pro	Thr	Leu	Gln	
		35					40					45				
ggt	tat	aaa	ggt	ggg	gat	tta	tgg	ggc	atc	atg	gag	gat	tta	gac	tac	192
Gly	Tyr	Lys	Gly	Gly	Asp	Leu	Trp	Gly	Ile	Met	Glu	Asp	Leu	Asp	Tyr	
	50					55					60					
atc	cag	aat	ttg	ggg	att	aac	gcg	att	tat	ttc	aca	ccc	atc	ttt	caa	240
Ile	Gln	Asn	Leu	Gly	Ile	Asn	Ala	Ile	Tyr	Phe	Thr	Pro	Ile	Phe	Gln	
	65				70					75					80	
tcc	gcc	agt	aat	cac	cgc	tat	cat	acc	cac	gat	tat	tat	caa	ggt	gac	288
Ser	Ala	Ser	Asn	His	Arg	Tyr	His	Thr	His	Asp	Tyr	Tyr	Gln	Val	Asp	
				85					90					95		
ccg	atg	tta	ggg	ggc	aac	gag	gct	ttt	aaa	gaa	ttg	ctt	gat	gca	gcc	336
Pro	Met	Leu	Gly	Gly	Asn	Glu	Ala	Phe	Lys	Glu	Leu	Leu	Asp	Ala	Ala	
			100					105					110			
cat	caa	cgg	aat	atc	aaa	gtc	gtt	ctg	gat	ggg	gtg	ttt	aac	cat	tcc	384
His	Gln	Arg	Asn	Ile	Lys	Val	Val	Leu	Asp	Gly	Val	Phe	Asn	His	Ser	
		115					120					125				
agc	cgt	ggc	ttt	ttc	ttt	ttc	cac	gac	gtt	tta	gaa	aat	ggc	ccc	cat	432
Ser	Arg	Gly	Phe	Phe	Phe	Phe	His	Asp	Val	Leu	Glu	Asn	Gly	Pro	His	
	130					135					140					
tca	cct	tgg	gta	aat	tgg	ttc	aaa	ata	gaa	ggc	tgg	ccc	ctt	tca	cct	480
Ser	Pro	Trp	Val	Asn	Trp	Phe	Lys	Ile	Glu	Gly	Trp	Pro	Leu	Ser	Pro	
	145				150					155					160	
tat	aac	ggt	gaa	ttc	cct	gca	aac	tac	gtg	ggt	tgg	gcg	gga	aat	cgc	528
Tyr	Asn	Gly	Glu	Phe	Pro	Ala	Asn	Tyr	Val	Gly	Trp	Ala	Gly	Asn	Arg	
				165					170					175		
gcc	ttg	cca	gaa	ttt	aac	cac	gat	aat	cca	gaa	gta	cga	gaa	tat	att	576
Ala	Leu	Pro	Glu	Phe	Asn	His	Asp	Asn	Pro	Glu	Val	Arg	Glu	Tyr	Ile	
			180					185					190			
atg	gaa	att	gcc	gaa	tat	tgg	ctt	aaa	ttc	ggc	atc	gac	ggt	tgg	cga	624
Met	Glu	Ile	Ala	Glu	Tyr	Trp	Leu	Lys	Phe	Gly	Ile	Asp	Gly	Trp	Arg	
		195					200					205				
tta	gat	gtc	cca	ttt	gaa	ata	aaa	act	ccg	ggt	ttt	tgg	cag	gaa	ttc	672
Leu	Asp	Val	Pro	Phe	Glu	Ile	Lys	Thr	Pro	Gly	Phe	Trp	Gln	Glu	Phe	
	210				215					220						
cgc	gat	cgc	act	aaa	gcc	atc	aat	ccc	gaa	gca	tat	att	gtg	ggc	gaa	720
Arg	Asp	Arg	Thr	Lys	Ala	Ile	Asn	Pro	Glu	Ala	Tyr	Ile	Val	Gly	Glu	
	225				230				235						240	
gtg	tgg	gga	gat	tcc	cgc	cag	tgg	ttg	gat	gga	acg	caa	ttt	gac	ggc	768
Val	Trp	Gly	Asp	Ser	Arg	Gln	Trp	Leu	Asp	Gly	Thr	Gln	Phe	Asp	Gly	
				245				250						255		
gta	atg	aat	tat	ttt	gct	ggg	ccg	aca	att	gct	ttt	gca	gct	ggc	ggc	816
Val	Met	Asn	Tyr	Leu	Phe	Ala	Gly	Pro	Thr	Ile	Ala	Phe	Ala	Ala	Gly	
			260				265					270				
gat	cgc	gta	gtc	tta	gaa	caa	gtc	caa	agc	cgc	gac	tat	caa	ccc	tac	864
Asp	Arg	Val	Val	Leu	Glu	Gln	Val	Gln	Ser	Arg	Asp	Tyr	Gln	Pro	Tyr	
		275					280					285				
cca	ccc	tta	ttt	gct	gcc	gag	gcc	acc	aaa	atc	caa	gaa	gta	ctg		912
Pro	Pro	Leu	Phe	Ala	Ala	Glu	Tyr	Ala	Lys	Ile	Gln	Glu	Val	Leu		
	290					295				300						
caa	ctt	tac	cct	tgg	gaa	att	cag	cta	act	caa	ctc	aat	ttg	tta	gca	960
Gln	Leu	Tyr	Pro	Trp	Glu	Ile	Gln	Leu	Thr	Gln	Leu	Asn	Leu	Leu	Ala	
	305				310					315					320	
agt	cac	gat	aca	gcc	cga	ttg	atg	acc	att	gca	ggc	ggt	gat	ata	gcg	1008
Ser	His	Asp	Thr	Ala	Arg	Leu	Met	Thr	Ile	Ala	Gly	Gly	Asp	Ile	Ala	
				325				330						335		
agt	gta	gaa	tta	tcg	act	tta	ctg	tta	ctc	acc	ttt	ccc	ggt	gcc	ccc	1056
Ser	Val	Glu	Leu	Ser	Thr	Leu	Leu	Leu	Leu	Thr	Phe	Pro	Gly	Ala	Pro	
			340				345						350			
agc	att	tac	tat	ggt	gat	gaa	gtc	ggt	tta	cct	ggt	ggc	ata	gat	ccc	1104
Ser	Ile	Tyr	Tyr	Gly	Asp	Glu	Val	Gly	Leu	Pro	Gly	Gly	Ile	Asp	Pro	
		355					360					365				
gac	tca	agg	cgt	ggc	ttt	cct	tta	gag	gct	aac	tgg	aat	caa	gaa	att	1152
Asp	Ser	Arg	Arg	Gly	Phe	Pro	Leu	Glu	Ala	Asn	Trp	Asn	Gln	Glu	Ile	
		370				375					380					

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ttc	aat	act	cat	cgt	caa	tta	att	acc	atc	cgc	caa	aca	tac	cca	gcc	1200
Phe	Asn	Thr	His	Arg	Gln	Leu	Ile	Thr	Ile	Arg	Gln	Thr	Tyr	Pro	Ala	
385					390					395					400	
ttg	cgt	aca	ggg	gat	tac	caa	gtc	ctc	tat	gct	caa	ggg	caa	ctt	tat	1248
Leu	Arg	Thr	Gly	Asp	Tyr	Gln	Val	Leu	Tyr	Ala	Gln	Gly	Gln	Leu	Tyr	
				405					410						415	
ctc	ttt	gca	cga	act	tta	ggc	aca	gaa	gaa	ttg	ata	att	gct	ata	aac	1296
Leu	Phe	Ala	Arg	Thr	Leu	Gly	Thr	Glu	Glu	Leu	Ile	Ile	Ala	Ile	Asn	
				420				425					430			
gct	ggc	aca	agt	tcg	gca	acc	gca	aat	gta	gat	gtg	gct	agt	ttg	cat	1344
Ala	Gly	Thr	Ser	Ser	Ala	Thr	Ala	Asn	Val	Asp	Val	Ala	Ser	Leu	His	
				435			440					445				
act	caa	ccc	aac	aag	ctg	tta	tat	ggg	act	gct	gaa	gct	gag	tgg	aat	1392
Thr	Gln	Pro	Asn	Lys	Leu	Leu	Tyr	Gly	Thr	Ala	Glu	Ala	Glu	Trp	Asn	
	450					455					460					
ggg	gaa	gaa	gga	act	cag	caa	ttg	tca	tta	act	ctt	ccc	gca	cgc	agt	1440
Gly	Glu	Glu	Gly	Thr	Gln	Gln	Leu	Ser	Leu	Thr	Leu	Pro	Ala	Arg	Ser	
465					470					475					480	
ggc	tgc	atc	ctg	ggg	act	ggg	gac	tag								1467
Gly	Cys	Ile	Leu	Gly	Thr	Gly	Asp									
				485												

<210> 220

<211> 488

<212> PRT

<213> Nostoc punctiforme PCC 73102

<400> 220

Met	Gln	Ile	Gln	Thr	Pro	Asp	Trp	Val	Lys	His	Ala	Val	Phe	Tyr	Gln	
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Ile	Phe	Pro	Asp	Arg	Phe	Ala	Arg	Ser	Lys	Gln	Pro	Arg	Lys	Arg	Leu	
			20					25					30			
Leu	Gln	Glu	Ala	Arg	Trp	Glu	Asp	Trp	Asp	Ser	Met	Pro	Thr	Leu	Gln	
		35					40				45					
Gly	Tyr	Lys	Gly	Gly	Asp	Leu	Trp	Gly	Ile	Met	Glu	Asp	Leu	Asp	Tyr	
	50					55				60						
Ile	Gln	Asn	Leu	Gly	Ile	Asn	Ala	Ile	Tyr	Phe	Thr	Pro	Ile	Phe	Gln	
65					70					75					80	
Ser	Ala	Ser	Asn	His	Arg	Tyr	His	Thr	His	Asp	Tyr	Tyr	Gln	Val	Asp	
			85						90					95		
Pro	Met	Leu	Gly	Gly	Asn	Glu	Ala	Phe	Lys	Glu	Leu	Leu	Asp	Ala	Ala	
		100						105					110			
His	Gln	Arg	Asn	Ile	Lys	Val	Val	Leu	Asp	Gly	Val	Phe	Asn	His	Ser	
		115					120					125				
Ser	Arg	Gly	Phe	Phe	Phe	Phe	His	Asp	Val	Leu	Glu	Asn	Gly	Pro	His	
	130					135					140					
Ser	Pro	Trp	Val	Asn	Trp	Phe	Lys	Ile	Glu	Gly	Trp	Pro	Leu	Ser	Pro	
145					150					155					160	
Tyr	Asn	Gly	Glu	Phe	Pro	Ala	Asn	Tyr	Val	Gly	Trp	Ala	Gly	Asn	Arg	
			165						170					175		
Ala	Leu	Pro	Glu	Phe	Asn	His	Asp	Asn	Pro	Glu	Val	Arg	Glu	Tyr	Ile	
		180						185					190			
Met	Glu	Ile	Ala	Glu	Tyr	Trp	Leu	Lys	Phe	Gly	Ile	Asp	Gly	Trp	Arg	
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Leu	Asp	Val	Pro	Phe	Glu	Ile	Lys	Thr	Pro	Gly	Phe	Trp	Gln	Glu	Phe	
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Arg	Asp	Arg	Thr	Lys	Ala	Ile	Asn	Pro	Glu	Ala	Tyr	Ile	Val	Gly	Glu	
225					230					235					240	
Val	Trp	Gly	Asp	Ser	Arg	Gln	Trp	Leu	Asp	Gly	Thr	Gln	Phe	Asp	Gly	
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Val	Met	Asn	Tyr	Leu	Phe	Ala	Gly	Pro	Thr	Ile	Ala	Phe	Ala	Ala	Gly	
			260					265					270			
Asp	Arg	Val	Val	Leu	Glu	Gln	Val	Gln	Ser	Arg	Asp	Tyr	Gln	Pro	Tyr	
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Pro	Pro	Leu	Phe	Ala	Ala	Glu	Tyr	Ala	Thr	Lys	Ile	Gln	Glu	Val	Leu	
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Gln	Leu	Tyr	Pro	Trp	Glu	Ile	Gln	Leu	Thr	Gln	Leu	Asn	Leu	Leu	Ala	
305					310					315					320	
Ser	His	Asp	Thr	Ala	Arg	Leu	Met	Thr	Ile	Ala	Gly	Gly	Asp	Ile	Ala	

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          325          330          335
Ser Val Glu Leu Ser Thr Leu Leu Leu Thr Phe Pro Gly Ala Pro
          340          345          350
Ser Ile Tyr Tyr Gly Asp Glu Val Gly Leu Pro Gly Gly Ile Asp Pro
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Asp Ser Arg Arg Gly Phe Pro Leu Glu Ala Asn Trp Asn Gln Glu Ile
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Phe Asn Thr His Arg Gln Leu Ile Thr Ile Arg Gln Thr Tyr Pro Ala
          385          390          395
Leu Arg Thr Gly Asp Tyr Gln Val Leu Tyr Ala Gln Gly Gln Leu Tyr
          400          405          410
Leu Phe Ala Arg Thr Leu Gly Thr Glu Glu Leu Ile Ile Ala Ile Asn
          415          420          425
Ala Gly Thr Ser Ser Ala Thr Ala Asn Val Asp Val Ala Ser Leu His
          430          435          440
Thr Gln Pro Asn Lys Leu Leu Tyr Gly Thr Ala Glu Ala Glu Trp Asn
          445          450          455
Gly Glu Glu Gly Thr Gln Gln Leu Ser Leu Thr Leu Pro Ala Arg Ser
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Gly Cys Ile Leu Gly Thr Gly Asp
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 <222> (1)..(1674)

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gca gct tta att ggg tct ttt tcg gat tgg aaa gaa att cca atg tct      96
Ala Ala Leu Ile Gly Ser Phe Ser Asp Trp Lys Glu Ile Pro Met Ser
          20          25          30
aaa agt gaa gat ggt tat ttt cgc act aaa atc aaa ctg gaa gac ggc      144
Lys Ser Glu Asp Gly Tyr Phe Arg Thr Lys Ile Lys Leu Glu Asp Gly
          35          40          45
gtt tat caa tat aaa ttt cgc att caa act aaa agt cca aat ttt gca      192
Val Tyr Gln Tyr Lys Phe Arg Ile Gln Thr Lys Ser Pro Asn Phe Ala
          50          55          60
cct gat gaa tgg atc gat gtc att gat cct aaa gca aca gaa gtt aat      240
Pro Asp Glu Trp Ile Asp Val Ile Asp Pro Lys Ala Thr Glu Val Asn
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gaa aca gaa aaa tat ggc ata gtt cgt att caa gat ggg caa cgc att      288
Glu Thr Glu Lys Tyr Gly Ile Val Arg Ile Gln Asp Gly Gln Arg Ile
          80          85          90
gtt gat agt tac ttt tgg caa cac gat gaa atg ccg ttg cct gat aac      336
Val Asp Ser Tyr Phe Trp Gln His Asp Glu Met Pro Leu Pro Asp Asn
          100          105          110
cgg gaa tta gtc ata tat gaa atg cac gtt gct gat ttt act ggt gat      384
Arg Glu Leu Val Ile Tyr Glu Met His Val Ala Asp Phe Thr Gly Asp
          115          120          125
gaa gtt gat tct aac gag cga ggc aaa tat cta ggg ata att gct aag      432
Glu Val Asp Ser Asn Glu Arg Gly Lys Tyr Leu Gly Ile Ile Ala Lys
          130          135          140
tta gat tat ctt tgc gaa ctg gga att aat gca att gaa tta atg cca      480
Leu Asp Tyr Leu Cys Glu Leu Gly Ile Asn Ala Ile Glu Leu Met Pro
          145          150          155
gtt aat gag tac cct ggt gat tat agc tgg ggc tat aaa gtt cgc cac      528
Val Asn Glu Tyr Pro Gly Asp Tyr Ser Trp Gly Tyr Lys Val Arg His
          160          165          170
ttc ttt gct aca gaa tct agt tac ggt tca aca gaa gat tta aag cga      576
Phe Phe Ala Thr Glu Ser Ser Tyr Gly Ser Thr Glu Asp Leu Lys Arg
          175          180          185
ttg att gac gag tgt cat ggt aga ggt att cgc gtc ttt atg gat gga      624

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Ile	Tyr	Asn	His	Thr	Asp	Glu 215	Glu	Cys	Pro	Leu	Ile 220	Leu	Ile	Asp	Arg	
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Asn	Tyr	Trp	Tyr	Tyr	Glu 230	His	Lys	His	Tyr	Pro 235	Glu	Asp	Pro	Ala	Asn 240	
tac	tgg	ggg	cca	gag	ttt	aac	tat	gat	ttt	tac	gac	aaa	aac	tta	aat	768
Tyr	Trp	Gly	Pro	Glu 245	Phe	Asn	Tyr	Asp	Phe 250	Tyr	Asp	Lys	Asn	Leu 255	Asn	
att	caa	cct	gca	tgg	gaa	tac	atc	ggc	gat	gtg	gta	agg	ttt	tgg	att	816
Ile	Gln	Pro	Ala 260	Trp	Glu	Tyr	Ile	Gly 265	Asp	Val	Val	Arg	Phe 270	Trp	Ile	
cag	gaa	tat	cac	att	gat	gga	att	cgc	ttt	gat	gca	gta	cgg	caa	ttg	864
Gln	Glu	Tyr 275	His	Ile	Asp	Gly	Ile 280	Arg	Phe	Asp	Ala	Val 285	Arg	Gln	Leu	
gct	aac	ttt	gaa	ttt	ctc	aac	tgg	ctg	act	aag	caa	gcg	aaa	aac	cat	912
Ala	Asn	Phe 290	Glu	Phe	Leu	Asn 295	Trp	Leu	Thr	Lys	Gln 300	Ala	Lys	Asn	His	
gct	gca	ccc	aag	cag	ttt	tac	aac	att	gct	gaa	cac	att	ccc	gat	aca	960
Ala	Ala	Pro	Lys	Gln 310	Phe	Tyr	Asn	Ile	Ala	Glu 315	His	Ile	Pro	Asp	Thr 320	
aac	act	gta	gtc	aag	cca	gat	ggg	cca	tta	gat	gct	tgt	tgg	cat	gag	1008
Asn	Thr	Val	Val	Lys 325	Pro	Asp	Gly	Pro	Leu 330	Asp	Ala	Cys	Trp	His 335	Glu	
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Ser	Phe	Arg	Tyr 340	Phe	Leu	Val	Pro	Tyr 345	Ile	Cys	Gly	Lys	Ser 350	Phe	Glu	
tta	gaa	caa	ctc	aag	caa	att	tta	gac	ccc	aaa	cag	cag	ggt	tat	gcg	1104
Leu	Glu	Gln 355	Leu	Lys	Gln	Ile	Leu 360	Asp	Pro	Lys	Gln 365	Gln	Gly	Tyr	Ala	
atc	gct	acc	aat	gtg	ata	aat	tat	ttg	gca	acc	cac	gat	cgc	gaa	cgt	1152
Ile	Ala	Thr 370	Asn	Val	Ile	Asn 375	Tyr	Leu	Ala	Thr	His 380	Asp	Arg	Glu	Arg	
cta	tta	cga	gaa	tta	ggc	aat	tgc	ggc	atc	ttt	gac	gca	gcc	gca	ttt	1200
Leu	Leu	Arg	Glu	Leu	Gly 390	Asn	Cys	Gly	Ile	Phe 395	Asp	Ala	Ala	Ala	Phe 400	
gaa	cga	gcc	aag	tta	gca	gct	gtt	ttg	tta	atg	aca	gcg	atg	ggt	ata	1248
Glu	Arg	Ala	Lys	Leu 405	Ala	Ala	Val	Leu 410	Met	Thr	Ala	Met	Gly 415	Ile		
ccg	atg	ctg	tgg	atg	gca	gaa	gag	ttt	ggc	gaa	tac	cag	caa	aaa	agt	1296
Pro	Met	Leu 420	Trp	Met	Ala	Glu	Glu	Phe 425	Gly	Glu	Tyr	Gln 430	Gln	Lys	Ser	
gaa	gat	gtg	act	aag	ccg	cag	aaa	att	act	tgg	tct	ttg	ttg	tta	gac	1344
Glu	Asp	Val 435	Thr	Lys	Pro	Gln	Lys 440	Ile	Thr	Trp	Ser	Leu 445	Leu	Leu	Asp	
gac	caa	aat	tat	gat	tta	ttt	gag	tat	tat	caa	aag	ctg	att	act	cta	1392
Asp	Gln 450	Asn	Tyr	Asp	Leu	Phe 455	Glu	Tyr	Tyr	Gln 460	Lys	Leu	Ile	Thr	Leu	
cgc	cag	caa	act	cca	gct	ttg	caa	agt	gac	aat	att	aag	ttt	ttc	tac	1440
Arg	Gln	Gln	Thr	Pro	Ala 470	Leu	Gln	Ser	Asp	Asn 475	Ile	Lys	Phe	Phe	Tyr 480	
gaa	aat	gca	gat	gat	aaa	gtg	ttg	gct	tac	agc	cgt	tgg	gat	gag	caa	1488
Glu	Asn	Ala	Asp	Asp 485	Lys	Val	Leu	Ala 490	Tyr	Ser	Arg	Trp	Asp	Glu 495	Gln	
aat	tct	cat	gtc	gtt	gtg	gta	aat	ttt	tcc	gat	cgg	agt	cta	aat		1536
Asn	Ser	His 500	Val	Val	Val	Val	Asn 505	Phe	Ser	Asp	Arg	Ser 510	Leu	Asn		
caa	tat	aaa	att	tcc	gac	ttc	cca	act	act	gaa	gat	tgg	cga	gat	tgg	1584
Gln	Tyr	Lys 515	Ile	Ser	Asp	Phe	Pro 520	Thr	Thr	Glu	Asp	Trp 525	Arg	Asp	Trp	
gtt	ggt	aat	cgg	gaa	gtg	aaa	tct	gga	gaa	gat	ggt	tta	gtc	act	gac	1632
Val	Gly 530	Asn	Arg	Glu	Val	Lys 535	Ser	Gly	Glu	Asp	Gly 540	Leu	Val	Thr	Asp	
ttg	cca	agc	tat	aca	gct	aaa	ata	ttt	gtt	ttg	caa	aca	tga			1674
Leu 545	Pro	Ser	Tyr	Thr	Ala 550	Lys	Ile	Phe	Val	Leu 555	Gln	Thr				

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 Lys Ser Glu Asp Gly Tyr Phe Arg Thr Lys Ile Lys Leu Glu Asp Gly
 35 40 45
 Val Tyr Gln Tyr Lys Phe Arg Ile Gln Thr Lys Ser Pro Asn Phe Ala
 50 55 60
 Pro Asp Glu Trp Ile Asp Val Ile Asp Pro Lys Ala Thr Glu Val Asn
 65 70 75 80
 Glu Thr Glu Lys Tyr Gly Ile Val Arg Ile Gln Asp Gly Gln Arg Ile
 85 90 95
 Val Asp Ser Tyr Phe Trp Gln His Asp Glu Met Pro Leu Pro Asp Asn
 100 105 110
 Arg Glu Leu Val Ile Tyr Glu Met His Val Ala Asp Phe Thr Gly Asp
 115 120 125
 Glu Val Asp Ser Asn Glu Arg Gly Lys Tyr Leu Gly Ile Ile Ala Lys
 130 135 140
 Leu Asp Tyr Leu Cys Glu Leu Gly Ile Asn Ala Ile Glu Leu Met Pro
 145 150 155 160
 Val Asn Glu Tyr Pro Gly Asp Tyr Ser Trp Gly Tyr Lys Val Arg His
 165 170 175
 Phe Phe Ala Thr Glu Ser Ser Tyr Gly Ser Thr Glu Asp Leu Lys Arg
 180 185 190
 Leu Ile Asp Glu Cys His Gly Arg Gly Ile Arg Val Phe Met Asp Gly
 195 200 205
 Ile Tyr Asn His Thr Asp Glu Glu Cys Pro Leu Ile Leu Ile Asp Arg
 210 215 220
 Asn Tyr Trp Tyr Tyr Glu His Lys His Tyr Pro Glu Asp Pro Ala Asn
 225 230 235 240
 Tyr Trp Gly Pro Glu Phe Asn Tyr Asp Phe Tyr Asp Lys Asn Leu Asn
 245 250 255
 Ile Gln Pro Ala Trp Glu Tyr Ile Gly Asp Val Val Arg Phe Trp Ile
 260 265 270
 Gln Glu Tyr His Ile Asp Gly Ile Arg Phe Asp Ala Val Arg Gln Leu
 275 280 285
 Ala Asn Phe Glu Phe Leu Asn Trp Leu Thr Lys Gln Ala Lys Asn His
 290 295 300
 Ala Ala Pro Lys Gln Phe Tyr Asn Ile Ala Glu His Ile Pro Asp Thr
 305 310 315 320
 Asn Thr Val Val Lys Pro Asp Gly Pro Leu Asp Ala Cys Trp His Glu
 325 330 335 340
 Ser Phe Arg Tyr Phe Leu Val Pro Tyr Ile Cys Gly Lys Ser Phe Glu
 345 350 355
 Leu Glu Gln Leu Lys Gln Ile Leu Asp Pro Lys Gln Gln Gly Tyr Ala
 360 365 370
 Ile Ala Thr Asn Val Ile Asn Tyr Leu Ala Thr His Asp Arg Glu Arg
 375 380 385
 Leu Leu Arg Glu Leu Gly Asn Cys Gly Ile Phe Asp Ala Ala Ala Phe
 390 395 400
 Glu Arg Ala Lys Leu Ala Ala Val Leu Leu Met Thr Ala Met Gly Ile
 405 410 415
 Pro Met Leu Trp Met Ala Glu Glu Phe Gly Glu Tyr Gln Gln Lys Ser
 420 425 430 435
 Glu Asp Val Thr Lys Pro Gln Lys Ile Thr Trp Ser Leu Leu Leu Asp
 440 445 450
 Asp Gln Asn Tyr Asp Leu Phe Glu Tyr Tyr Gln Lys Leu Ile Thr Leu
 455 460 465
 Arg Gln Gln Thr Pro Ala Leu Gln Ser Asp Asn Ile Lys Phe Phe Tyr
 470 475 480
 Glu Asn Ala Asp Lys Val Leu Ala Tyr Ser Arg Trp Asp Glu Gln
 485 490 495
 Asn Ser His Val Val Val Val Val Asn Phe Ser Asp Arg Ser Leu Asn

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500
 Gln Tyr Lys Ile Ser Asp Phe Pro Thr Thr Glu Asp Trp Arg Asp Trp
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Gly	Phe	Cys	Gly	Ala	Asp	Ile	Arg	Pro	Ala	Gly	Pro	Arg	Gln	Phe	His	
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ggc	cgc	ggc	ctt	gac	gcg	ata	att	ccc	tgg	ctg	gag	tac	gtg	cgc	gat	144
Gly	Arg	Gly	Leu	Asp	Ala	Ile	Ile	Pro	Trp	Leu	Glu	Tyr	Val	Arg	Asp	
			35				40					45				
cta	ggc	gcg	tcc	ggc	ctg	ctg	ctg	ggt	ccg	gtg	ttc	gag	tcg	gcg	acg	192
Leu	Gly	Ala	Ser	Gly	Leu	Leu	Leu	Gly	Pro	Val	Phe	Glu	Ser	Ala	Thr	
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cat	gga	tac	gac	acg	ctc	gac	cat	atg	cat	atc	gat	gtg	cga	ttg	ggc	240
His	Gly	Tyr	Asp	Thr	Leu	Asp	His	Met	His	Ile	Asp	Val	Arg	Leu	Gly	
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ggg	gat	gcc	gcg	ttc	gat	cag	ctt	gtc	gcg	gcc	tgc	cgg	gac	atg	gga	288
Gly	Asp	Ala	Ala	Phe	Asp	Gln	Leu	Val	Ala	Ala	Cys	Arg	Asp	Met	Gly	
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ttg	cag	gtg	atg	ctg	gat	ggc	gtg	ttc	aat	cat	gtg	agc	cgc	aat	cat	336
Leu	Gln	Val	Met	Leu	Asp	Gly	Val	Phe	Asn	His	Val	Ser	Arg	Asn	His	
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Pro	Ala	Val	Gln	Ala	Ala	Leu	Asp	Glu	Thr	Ala	Gly	Arg	Leu	Asn	Pro	
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gcc	gac	aac	ccg	tgg	cat	ggt	ctg	gtc	cgc	gcg	cat	gtc	ggt	gat	aat	432
Ala	Asp	Asn	Pro	Trp	His	Gly	Leu	Val	Arg	Ala	His	Val	Gly	Asp	Asn	
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Gly	Glu	Pro	Ala	Leu	Asp	Val	Phe	Glu	Gly	His	Gly	Asp	Leu	Val	Ala	
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ctg	gac	cat	tcg	gct	gac	gag	acc	gtt	gac	tat	gtg	gtc	cat	gtg	atg	528
Leu	Asp	His	Ser	Ala	Asp	Glu	Thr	Val	Asp	Tyr	Val	Val	His	Val	Met	
				165				170					175			
agc	cat	tgg	ctg	gat	cgc	gga	gtc	gcc	ggc	tgg	cgc	ctc	gac	gcc	gcg	576
Ser	His	Trp	Leu	Asp	Arg	Gly	Val	Ala	Gly	Trp	Arg	Leu	Asp	Ala	Ala	
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tat	gcc	gtg	ccg	agc	ccg	ttc	tgg	gcg	cgc	gtg	ttg	ccg	cag	gtc	aaa	624
Tyr	Ala	Val	Pro	Ser	Pro	Phe	Trp	Ala	Arg	Val	Leu	Pro	Gln	Val	Lys	
			195				200					205				
gcc	gca	cac	ccg	tat	tcg	tgg	att	ttc	ggc	gag	gtg	atc	cat	ggc	gat	672
Ala	Ala	His	Pro	Tyr	Ser	Trp	Ile	Phe	Gly	Glu	Val	Ile	His	Gly	Asp	
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tac	ccg	cgc	atc	atc	gag	gaa	tcc	acg	atg	gat	tcg	atc	acg	caa	tac	720
Tyr	Pro	Arg	Ile	Ile	Glu	Glu	Ser	Thr	Met	Asp	Ser	Ile	Thr	Gln	Tyr	
					230					235					240	
gag	cta	tgg	aag	tcg	atc	cag	cat	gcg	ctg	gag	acg	gag	aac	ttc	ttc	768
Glu	Leu	Trp	Lys	Ser	Ile	Gln	His	Ala	Leu	Glu	Thr	Glu	Asn	Phe	Phe	
				245				250						255		
gag	ctg	gat	tgg	aac	ttg	aag	cgg	cac	aac	gcg	ttc	ctg	gat	tcc	ttc	816
Glu	Leu	Asp	Trp	Asn	Leu	Lys	Arg	His	Asn	Ala	Phe	Leu	Asp	Ser	Phe	
			260					265					270			

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Val	Pro	Gln	Thr	Phe	Ile	Gly	Asn	His	Asp	Val	Thr	Arg	Ile	Ala	Ser	
		275					280					285				
cag	att	ggc	ccg	gcc	aag	gcg	gcg	ttg	gca	ttg	gcg	gtg	ctc	atg	acg	912
Gln	Ile	Gly	Pro	Ala	Lys	Ala	Ala	Leu	Ala	Leu	Ala	Val	Leu	Met	Thr	
	290					295					300					
gtc	ggc	ggc	gtg	cca	agc	atc	tat	tac	ggc	gac	gaa	cag	ggc	tat	gtg	960
Val	Gly	Gly	Val	Pro	Ser	Ile	Tyr	Tyr	Gly	Asp	Glu	Gln	Gly	Tyr	Val	
	305				310					315					320	
ggc	gtc	aag	cag	gag	cgt	ttc	ggc	ggc	gat	gac	gac	gta	cgt	ccg	aag	1008
Gly	Val	Lys	Gln	Glu	Arg	Phe	Gly	Gly	Asp	Asp	Asp	Val	Arg	Pro	Lys	
				325					330					335		
ttc	ccc	ggc	tcc	cct	gcc	gaa	ctg	tcc	acg	ctg	gga	gag	ccg	aca	tac	1056
Phe	Pro	Gly	Ser	Pro	Ala	Glu	Leu	Ser	Thr	Leu	Gly	Glu	Pro	Thr	Tyr	
			340					345					350			
cgg	ctg	cat	cag	gcg	ctg	atc	gcg	ctg	cgc	cgt	cgc	aac	cca	tgg	ctg	1104
Arg	Leu	His	Gln	Ala	Leu	Ile	Ala	Leu	Arg	Arg	Arg	Asn	Pro	Trp	Leu	
		355					360					365				
ctg	gat	gcg	cgt	acc	gag	gcc	gtg	aag	ctg	gaa	aac	aag	cac	ttc	gtc	1152
Leu	Asp	Ala	Arg	Thr	Glu	Ala	Val	Lys	Leu	Glu	Asn	Lys	His	Phe	Val	
	370					375					380					
tat	cgt	tcg	acg	agc	gcc	gac	gcc	cag	cat	tcc	ctg	acc	gtg	gac	ctc	1200
Tyr	Arg	Ser	Thr	Ser	Ala	Asp	Ala	Gln	His	Ser	Leu	Thr	Val	Asp	Leu	
	385				390					395					400	
aac	atc	gag	caa	tcc	ccc	act	ttc	acc	atc	cgc	aac	gcc	gat	ggc	agt	1248
Asn	Ile	Glu	Gln	Ser	Pro	Thr	Phe	Thr	Ile	Arg	Asn	Ala	Asp	Gly	Ser	
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Thr	Ala	Tyr	Gln	Trp												
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<211> 421

<212> PRT

<213> Bifidobacterium longum DJ010A

<400> 224

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 Gln Ile Gly Pro Ala Lys Ala Ala Leu Ala Leu Ala Val Leu Met Thr
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 Val Gly Gly Val Pro Ser Ile Tyr Tyr Gly Asp Glu Gln Gly Tyr Val
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 Gly Val Lys Gln Glu Arg Phe Gly Gly Asp Asp Asp Val Arg Pro Lys
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 Phe Pro Gly Ser Pro Ala Glu Leu Ser Thr Leu Gly Glu Pro Thr Tyr
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 Arg Leu His Gln Ala Leu Ile Ala Leu Arg Arg Arg Asn Pro Trp Leu
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 Leu Asp Ala Arg Thr Glu Ala Val Lys Leu Glu Asn Lys His Phe Val
 370 375 380
 Tyr Arg Ser Thr Ser Ala Asp Ala Gln His Ser Leu Thr Val Asp Leu
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Asp Ala Ile Ile Tyr 20 Glu Leu His Ile 25 Lys Ser Phe His Asp Ser Asp	
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Gly Asp 35 Met Gly Asp Met 40 Ala Gly Leu Ile Glu Lys 45 Leu Asp Tyr	
ctg cag gat ctc ggg gtc acg gcg ctg tgg ctg ctg ccc ttt tac ccc	192
Leu Gln Asp Leu Gly Val Thr 55 Ala Leu Trp Leu Leu Pro Phe Tyr Pro	
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Asn Pro Asp Tyr 85 Gly Ser Met Ala Asp Phe Arg Lys Leu Leu Arg Glu	
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Tyr Lys Asp Ala Arg Ile 150 Phe Lys Asp Phe Glu Pro Ser Asn Trp	
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Ser Trp Asp Pro Val 165 Ala Arg Ala Tyr 170 Tyr Trp His Arg Phe Tyr His	
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His Gln Pro Asp 180 Leu Asn Tyr Glu Asn 185 Pro Ala Val His 190 Lys Ala Met	

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Val 445	Leu 445	Ala 445	Tyr 445	Met 445	Arg 445	Ser 445	Ser 445	Gly 445	Glu 445	Glu 445	His 445	Val 445	Leu 445	Val 445	Val 445
Thr 450	Asn 450	Leu 450	Ser 450	Arg 450	His 450	Ala 450	Gln 450	Ala 450	Ala 450	Ser 450	Leu 450	Asp 450	Leu 450	Ser 450	Gly 450
Trp 455	Glu 455	Gly 455	Tyr 455	Arg 455	Pro 455	Val 455	Glu 455	Val 455	Phe 455	Ser 455	Asn 455	Thr 455	Arg 455	Phe 455	Pro 455
Ala 460	Val 460	Arg 460	Gln 460	Pro 460	Ala 460	Tyr 460	Thr 460	Ile 460	Thr 460	Leu 460	Asn 460	Pro 460	Tyr 460	Gly 460	Tyr 460
Tyr 465	Ile 465	Phe 465	His 465	Met 465	Arg 465	Arg 465	Glu 465	Glu 465	Ala 465	Ala 465	Glu 465	Ala 465	Leu 465	Thr 465	Gly 465
Leu 470	Phe 470	Ser 470	Pro 470	Pro 470	Met 470	Leu 470	Met 470	Pro 470	Val 470	Ser 470	Gly 470	Ala 470	Arg 470	Phe 470	Leu 470
Asp 475	Val 475	Glu 475	Val 475	Arg 475	Glu 475	Ala 475	Leu 475	Gln 475	Arg 475	Arg 475	Val 475	Leu 475	Pro 475	Gly 475	Tyr 475
Leu 480	Thr 480	Arg 480	Arg 480	Gly 480	Leu 480	Leu 480	Gly 480	Thr 480	Ser 480	Ala 480	Val 480	Gln 480	Leu 480	Arg 480	Glu 480
Ala 485	Val 485	Ile 485	Leu 485	Glu 485	Ala 485	Val 485	Pro 485	Val 485	Gly 485	Gly 485	Lys 485	Gly 485	Ala 485	Pro 485	Ser 485
Trp 490	Leu 490	Leu 490	Ile 490	Val 490	Glu 490	Ala 490	Arg 490	Tyr 490	Gln 490	Glu 490	Arg 490	Gln 490	Pro 490	Glu 490	Trp 490
Phe 495	Gly 495	Met 495	Leu 495	Val 495	Ser 495	Leu 495	Leu 495	Ala 495	Gly 495	Glu 495	Pro 495	Ala 495	Arg 495	Gln 495	Thr 495
Val 500	Arg 500	Glu 500	Ala 500	Pro 500	Val 500	His 500	Leu 500	Met 500	Cys 500	Thr 500	Phe 500	Gly 500	Glu 500	Asp 500	Ala 500
Pro 505	Glu 505	Ala 505	Val 505	Leu 505	Val 505	Glu 505	Ser 505	Phe 505	Asp 505	Ala 505	Ser 505	Cys 505	Arg 505	Cys 505	Gly 505
Ala 510	Leu 510	Leu 510	Gln 510	Leu 510	Val 510	Ser 510	Arg 510	Thr 510	Gln 510	Thr 510	Val 510	Lys 510	Gly 510	Arg 510	His 510
Gly 515	Glu 515	Leu 515	Ala 515	Val 515	Ala 515	Pro 515	Ala 515	Gly 515	Gly 515	Thr 515	Arg 515	Gly 515	Arg 515	Val 515	Arg 515
Ala 520	Ala 520	Cys 520	Ala 520	Glu 520	Asp 520	Ala 520	Pro 520	Ala 520	Leu 520	Trp 520	Lys 520	Pro 520	His 520	Ile 520	His 520
Ala 525	Thr 525	Ser 525	Val 525	Val 525	Cys 525	Gly 525	Glu 525	Ser 525	Val 525	Leu 525	Phe 525	Lys 525	Val 525	Tyr 525	Arg 525
Arg 530	Met 530	Asp 530	Glu 530	Gly 530	Val 530	Asn 530	Pro 530	Asp 530	Val 530	Glu 530	Leu 530	Leu 530	Arg 530	Phe 530	Leu 530

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Thr	Glu	755	Ala	Gly	Tyr	Pro	760	His	Val	Pro	Ala	Tyr	765	Met	Gly	Val	Val
770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855
Glu	Tyr	Arg	Arg	Ser	Arg	Thr	Ser	Ser	Met	Ala	Val	Ala	Met	Leu	His	800	805
Glu	Tyr	Val	Gln	Ala	Gln	Gly	Asp	Ala	Gln	Glu	Met	Cys	Arg	Asp	Met	810	815
Val	Arg	Arg	Phe	Phe	Asp	Arg	Val	Leu	Ala	Ala	Arg	Gly	Glu	Met	Asp	820	825
Ile	Arg	Pro	Arg	Leu	Tyr	Ala	Arg	Ser	Pro	Val	Glu	Ala	Ala	Gly	Arg	830	835
Pro	Leu	Pro	Gln	Glu	Tyr	Arg	Glu	Leu	Met	Gly	Asp	Met	Asp	Phe	Ala	840	845
Gly	Met	Gln	Leu	Leu	Gly	Arg	Arg	Val	Gly	Glu	Leu	His	Arg	Ala	Leu	850	855
Ala	Phe	Ser	Ser	Glu	Asp	Ser	Ala	Phe	Ala	Pro	Glu	Pro	Phe	Ser	Thr	860	865
Leu	Tyr	Gln	Arg	Ser	Val	Tyr	Gln	Gly	Met	Gln	Ser	Arg	Val	Lys	Gln	870	875
Val	Leu	Thr	Arg	Leu	Glu	Arg	Ser	Leu	Ala	Leu	Leu	Pro	Glu	Ser	Ala	880	885
Arg	Asp	Asp	Ala	Ala	Arg	Val	Leu	Glu	Leu	Arg	Glu	Glu	Ala	Leu	Arg	890	895
Arg	Met	Arg	Gly	Phe	Leu	Thr	Arg	Lys	Leu	Asp	Cys	Leu	Lys	Ile	Arg	900	905
Val	His	Gly	Asn	Leu	His	Leu	Gly	Asn	Val	Leu	Arg	Ser	Gly	Arg	Glu	910	915
Tyr	Val	Ile	Val	Asn	Phe	Glu	Gly	Arg	Pro	Asp	Lys	Ser	Leu	Ser	Glu	920	925
Arg	Arg	Leu	Lys	Arg	Ser	Pro	Leu	Arg	Asp	Val	Ala	Asp	Leu	Val	Arg	930	935
Ser	Val	His	Tyr	Thr	Val	Leu	Thr	Val	Leu	Met	His	Glu	Ser	Val	Leu	940	945
Arg	Pro	Glu	Asp	Arg	Ala	Phe	Leu	Glu	Pro	Trp	Ala	Asp	Leu	Trp	Arg	950	955
Ile	Glu	Ala	Ser	Gly	Ala	Phe	Met	Thr	Thr	Tyr	Leu	Glu	Ala	Val	Gly	960	965
Gly	Ser	Arg	Leu	Val	Pro	Glu	Asn	Glu	Gln	Gly	Val	Gln	Val	Leu	Leu	970	975
Glu	Ala	Phe	Leu	Leu	Glu	Lys	Ala	Phe	Met	Glu	Leu	Asp	Ala	Glu	Leu	980	985
Lys	Ala	Pro	Ser	Gly	Met	Val	Gly	Leu	Pro	Leu	Ala	Ala	Ile	Ile	Thr	990	995
Leu	Leu	Gly	Ala	Glu	Gly											1000	1005

<210> 227

<211> 1467

<212> DNA

<213> Anabaena variabilis ATCC 29413

<220>

<221> CDS

<222> (1)..(1467)

<400> 227

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Met	Gln	Ile	Gln	Thr	Pro	Asp	Trp	Val	Lys	Asn	Ala	Val	Phe	Tyr	Gln	
1				5				10					15			
atc	ttt	cca	gac	cgt	ttt	gct	ata	agt	aaa	cag	tcc	cgg	aag	cgg	ctg	96
Ile	Phe	Pro	Asp	Arg	Phe	Ala	Ile	Ser	Lys	Gln	Ser	Arg	Lys	Arg	Leu	
			20					25					30			
ttg	cgt	gat	gtg	cgt	tgg	gaa	gac	tgg	gac	gca	atg	cca	aca	ctg	caa	144
Leu	Arg	Asp	Val	Arg	Trp	Glu	Asp	Trp	Asp	Ala	Met	Pro	Thr	Leu	Gln	
			35				40					45				
gga	tac	aaa	ggc	ggt	gat	tta	tgg	ggc	att	atg	gag	cag	ttg	gac	tat	192
Gly	Tyr	Lys	Gly	Gly	Asp	Leu	Trp	Gly	Ile	Met	Glu	Gln	Leu	Asp	Tyr	
	50					55					60					
att	caa	gat	ttg	ggc	atc	gat	gcc	atc	tac	ttt	acg	ccc	atc	ttt	cag	240

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Ile 65	Gln	Asp	Leu	Gly	Ile 70	Asp	Ala	Ile	Tyr	Phe 75	Thr	Pro	Ile	Phe	Gln 80	
tct Ser	gcc Ala	agc Ser	aat Asn	cac His 85	cgc Arg	tat Tyr	cat His	acc Thr	cac His 90	gac Asp	tat Tyr	tat Tyr	caa Gln	gta Val 95	gac Asp	288
ccg Pro	atg Met	ttg Leu	ggg Gly 100	ggg Gly	aat Asn	gcc Ala	gct Ala	ttt Phe 105	aag Lys	gag Glu	tta Leu	cta Leu	gac Asp 110	gcg Ala	gcc Ala	336
cac His	gaa Glu	cgc Arg 115	aat Asn	att Ile	aaa Lys	gtt Val	gtc Val 120	ctc Leu	gat Asp	ggc Gly	gta Val	ttt Phe 125	aat Asn	cat His	tcc Ser	384
agt Ser	cga Arg 130	gga Gly	ttt Phe	ttc Phe	ttt Phe	ttc Phe 135	cat His	gac Asp	gtt Val	ttg Leu 140	gaa Glu	aat Asn	ggc Gly	ccc Pro	cat His	432
tct Ser 145	cct Pro	tgg Trp	gta Val	aat Asn	tgg Trp 150	ttc Phe	aaa Lys	ata Ile	gaa Glu	ggc Gly 155	tgg Trp	cct Pro	ctt Leu	gca Ala	cca Pro 160	480
tat Tyr	aca Thr	ggg Gly	gag Glu	tta Leu 165	ccg Pro	gca Ala	aat Asn	tac Tyr	gta Val 170	ggg Gly	tgg Trp	gct Ala	gat Asp	aat Asn 175	cgt Arg	528
gcc Ala	ttg Leu	ccc Pro	gta Val 180	ttt Phe	aat Asn	cac His	gat Asp	aac Asn 185	cca Pro	gac Asp	gta Val	cgg Arg	gaa Glu 190	tat Tyr	att Ile	576
atg Met	gaa Glu	att Ile 195	gcc Ala	gaa Glu	tat Tyr	tgg Trp 200	ctt Leu	aaa Lys	ttc Phe	ggc Gly	atc Ile	gac Asp 205	ggc Gly	tgg Trp	cga Arg	624
ttg Leu 210	gat Asp	gta Val	cca Pro	ttt Phe	gaa Glu	att Ile 215	aaa Lys	act Thr	cct Pro	ggc Gly	ttt Phe 220	tgg Trp	caa Gln	gaa Glu	ttc Phe	672
cgc Arg 225	gat Asp	cgc Arg	gtt Val	aaa Lys	gcc Ala 230	att Ile	aac Asn	ccc Pro	gaa Glu	gct Ala 235	tat Tyr	att Ile	gtg Val	ggg Gly	gaa Glu 240	720
gtg Val	tgg Trp	gga Gly	gat Asp	tcc Ser 245	cgt Arg	gag Glu	tgg Trp	cta Leu	gat Asp 250	ggg Gly	acg Thr	caa Gln	ttc Phe	gac Asp 255	ggc Gly	768
gtg Val	atg Met	aat Asn	tac Tyr 260	tta Leu	ttt Phe	gcc Ala	ggg Gly	ccg Pro 265	acc Thr	att Ile	gct Ala	ttt Phe 270	acc Thr	gca Ala	ggc Gly	816
gat Asp	cgc Arg	gta Val 275	gtc Val	tta Leu	gaa Glu	caa Gln	gtc Val 280	caa Gln	agc Ser	cgc Arg	gac Asp	tat Tyr 285	caa Gln	ccg Pro	tat Tyr	864
ccg Pro 290	ccc Pro	cta Leu	ttc Phe	gcc Ala	gcc Ala	gaa Glu 295	tac Tyr	gcc Ala	acc Thr	aaa Lys	att Ile 300	cag Gln	gaa Glu	gta Val	ctg Leu	912
caa Gln 305	ctt Leu	tat Tyr	cct Pro	tgg Trp	gaa Glu 310	att Ile	caa Gln	ctt Leu	acc Thr	caa Gln 315	ctc Leu	aac Asn	tta Leu	tta Leu	gcc Ala 320	960
agt Ser	cac His	gat Asp	aca Thr 325	gcc Ala	aga Arg	cta Leu	atg Met	acc Thr	att Ile 330	gct Ala	ggc Gly	ggg Gly	gat Asp	caa Gln 335	gcc Ala	1008
agt Ser	ata Ile	gaa Glu 340	tta Leu	gct Ala	acc Thr	cta Leu	tta Leu 345	cta Leu	ctt Leu	acc Thr	ttt Phe	cct Pro	ggg Gly 350	gcg Ala	ccg Pro	1056
agt Ser	atc Ile	tac Tyr 355	tac Tyr	ggg Gly	gat Asp	gaa Glu	gtg Val 360	ggg Gly	tta Leu	ccg Pro	gga Gly	ggg Gly 365	ata Ile	gac Asp	ccc Pro	1104
gat Asp	tct Ser 370	cgc Arg	cgg Arg	ggg Gly	ttt Phe	ccc Pro 375	tta Leu	gaa Glu	gcc Ala	aac Asn	tgg Trp 380	gat Asp	aga Arg	gaa Glu	att Ile	1152
tac Tyr 385	cag Gln	act Thr	cac His	cgt Arg	caa Gln 390	tta Leu	ata Ile	gcc Ala	tta Leu	cgc Arg 395	cac His	gct Ala	tac Tyr	cca Pro	gcc Ala 400	1200
tta Leu	cgc Arg	aca Thr	ggg Gly 405	gag Glu	tat Tyr	caa Gln	gtt Val	att Ile	tgg Trp 410	gag Glu	caa Gln	ggg Gly	gca Ala 415	ttg Leu	tat Tyr	1248
gta Val	ttt Phe	gcc Ala	cgt Arg 420	act Thr	tta Leu	ggg Gly	aag Lys	gaa Glu 425	gaa Glu	ctg Leu	att Ile	att Ile	gct Ala 430	gta Val	aat Asn	1296
gta	ggg	aca	gca	cca	gcc	cag	gct	aat	gta	gat	gtt	gct	agt	ttg	cag	1344

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Val	Gly	Thr	Ala	Pro	Ala	Gln	Ala	Asn	Val	Asp	Val	Ala	Ser	Leu	Gln	
		435					440					445				
act	cag	cca	gat	aaa	atc	ctg	tat	ggc	gaa	gca	gaa	ttt	agc	tgg	cac	1392
Thr	Gln	Pro	Asp	Lys	Ile	Leu	Tyr	Gly	Glu	Ala	Glu	Phe	Ser	Trp	His	
	450					455					460					
aat	aca	gaa	gaa	aca	aaa	caa	ctt	tcc	tta	aat	ctc	ccc	cca	cgt	agt	1440
Asn	Thr	Glu	Glu	Thr	Lys	Gln	Leu	Ser	Leu	Asn	Leu	Pro	Pro	Arg	Ser	
465					470					475					480	
ggc	tgc	att	ttg	ggg	ttt	ggg	gat	tag								1467
Gly	Cys	Ile	Leu	Gly	Leu	Gly	Asp									
				485												

<210> 228

<211> 488

<212> PRT

<213> *Anabaena variabilis* ATCC 29413

<400> 228

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Ile	Phe	Pro	Asp	Arg	Phe	Ala	Ile	Ser	Lys	Gln	Ser	Arg	Lys	Arg	Leu	
			20					25					30			
Leu	Arg	Asp	Val	Arg	Trp	Glu	Asp	Trp	Asp	Ala	Met	Pro	Thr	Leu	Gln	
		35					40					45				
Gly	Tyr	Lys	Gly	Gly	Asp	Leu	Trp	Gly	Ile	Met	Glu	Gln	Leu	Asp	Tyr	
	50					55					60					
Ile	Gln	Asp	Leu	Gly	Ile	Asp	Ala	Ile	Tyr	Phe	Thr	Pro	Ile	Phe	Gln	
65				70						75					80	
Ser	Ala	Ser	Asn	His	Arg	Tyr	His	Thr	His	Asp	Tyr	Tyr	Gln	Val	Asp	
			85					90					95			
Pro	Met	Leu	Gly	Gly	Asn	Ala	Ala	Phe	Lys	Glu	Leu	Leu	Asp	Ala	Ala	
			100					105					110			
His	Glu	Arg	Asn	Ile	Lys	Val	Val	Leu	Asp	Gly	Val	Phe	Asn	His	Ser	
		115					120					125				
Ser	Arg	Gly	Phe	Phe	Phe	Phe	His	Asp	Val	Leu	Glu	Asn	Gly	Pro	His	
	130					135					140					
Ser	Pro	Trp	Val	Asn	Trp	Phe	Lys	Ile	Glu	Gly	Trp	Pro	Leu	Ala	Pro	
145				150						155					160	
Tyr	Thr	Gly	Glu	Leu	Pro	Ala	Asn	Tyr	Val	Gly	Trp	Ala	Asp	Asn	Arg	
			165					170						175		
Ala	Leu	Pro	Val	Phe	Asn	His	Asp	Asn	Pro	Asp	Val	Arg	Glu	Tyr	Ile	
			180					185					190			
Met	Glu	Ile	Ala	Glu	Tyr	Trp	Leu	Lys	Phe	Gly	Ile	Asp	Gly	Trp	Arg	
	195						200					205				
Leu	Asp	Val	Pro	Phe	Glu	Ile	Lys	Thr	Pro	Gly	Phe	Trp	Gln	Glu	Phe	
	210					215					220					
Arg	Asp	Arg	Val	Lys	Ala	Ile	Asn	Pro	Glu	Ala	Tyr	Ile	Val	Gly	Glu	
225				230						235					240	
Val	Trp	Gly	Asp	Ser	Arg	Glu	Trp	Leu	Asp	Gly	Thr	Gln	Phe	Asp	Gly	
			245					250					255			
Val	Met	Asn	Tyr	Leu	Phe	Ala	Gly	Pro	Thr	Ile	Ala	Phe	Thr	Ala	Gly	
		260						265					270			
Asp	Arg	Val	Val	Leu	Glu	Gln	Val	Gln	Ser	Arg	Asp	Tyr	Gln	Pro	Tyr	
		275					280					285				
Pro	Pro	Leu	Phe	Ala	Ala	Glu	Tyr	Ala	Thr	Lys	Ile	Gln	Glu	Val	Leu	
	290					295					300					
Gln	Leu	Tyr	Pro	Trp	Glu	Ile	Gln	Leu	Thr	Gln	Leu	Asn	Leu	Leu	Ala	
305				310						315					320	
Ser	His	Asp	Thr	Ala	Arg	Leu	Met	Thr	Ile	Ala	Gly	Gly	Asp	Gln	Ala	
			325					330					335			
Ser	Ile	Glu	Leu	Ala	Thr	Leu	Leu	Leu	Leu	Thr	Phe	Pro	Gly	Ala	Pro	
		340					345						350			
Ser	Ile	Tyr	Tyr	Gly	Asp	Glu	Val	Gly	Leu	Pro	Gly	Gly	Ile	Asp	Pro	
	355					360						365				
Asp	Ser	Arg	Arg	Gly	Phe	Pro	Leu	Glu	Ala	Asn	Trp	Asp	Arg	Glu	Ile	
	370					375					380					
Tyr	Gln	Thr	His	Arg	Gln	Leu	Ile	Ala	Leu	Arg	His	Ala	Tyr	Pro	Ala	
385				390						395					400	
Leu	Arg	Thr	Gly	Glu	Tyr	Gln	Val	Ile	Trp	Ala	Gln	Gly	Ala	Leu	Tyr	

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Val Phe Ala Arg 405 Thr Leu Gly Lys Glu 410 Leu Ile Ile Ala 415 Val Asn
 Val Gly Thr Ala 420 Pro Ala Gln Ala 425 Val Asp Val Ala 430 Ser Leu Gln
 Thr Gln Pro Asp Lys Ile Leu 440 Tyr Gly Glu Ala 445 Phe Ser Trp His
 Asn 450 Thr Glu Glu Thr Lys 455 Gln Leu Ser Leu Asn 460 Pro Pro Arg Ser
 465 Gly Cys Ile Leu Gly 470 Leu Gly Asp 475 Leu 480
 Gly 485

<210> 229

<211> 3366

<212> DNA

<213> Ralstonia eutropha JMP134

<220>

<221> CDS

<222> (1)..(3366)

<400> 229

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Met	Lys	Arg	Leu	Thr	Glu	Pro	Ala	Asn	Ala	Leu	Leu	Leu	Asn	Ala	Asp	
1				5				10					15			
ccg	ctc	tgg	tac	aag	gac	gcg	gtg	gtc	tac	cag	ctt	cat	atc	aag	tcc	96
Pro	Leu	Trp	Tyr	Lys	Asp	Ala	Val	Val	Tyr	Gln	Leu	His	Ile	Lys	Ser	
			20					25					30			
ttc	tac	gac	gcg	aac	ggc	gac	ggc	gtg	ggg	gac	ttc	gcg	ggc	ctg	ctg	144
Phe	Tyr	Asp	Ala	Asn	Gly	Asp	Gly	Val	Gly	Asp	Phe	Ala	Gly	Leu	Leu	
			35				40					45				
gcc	aag	ctg	gac	tac	ctg	gtc	gac	ctc	ggc	att	gac	acg	atc	tgg	ctg	192
Ala	Lys	Leu	Asp	Tyr	Leu	Val	Asp	Leu	Gly	Ile	Asp	Thr	Ile	Trp	Leu	
			50			55					60					
ctg	ccg	ttc	tac	ccg	tct	ccg	cgg	cgc	gat	gac	ggc	tac	gac	att	gcg	240
Leu	Pro	Phe	Tyr	Pro	Ser	Pro	Arg	Arg	Asp	Asp	Gly	Tyr	Asp	Ile	Ala	
					70				75						80	
gat	tac	cgc	aac	gtg	cat	ccc	gac	tac	ggc	acg	ctc	gcc	gaa	gcc	cgc	288
Asp	Tyr	Arg	Asn	Val	His	Pro	Asp	Tyr	Gly	Thr	Leu	Ala	Glu	Ala	Arg	
				85					90					95		
cgc	ttc	gtc	ggg	gct	gcg	cat	gcg	cgc	ggc	atc	cgc	gtc	atc	acg	gaa	336
Arg	Phe	Val	Gly	Ala	Ala	His	Ala	Arg	Gly	Ile	Arg	Val	Ile	Thr	Glu	
			100					105					110			
ctg	gtc	atc	aac	cac	acc	tgc	gac	cag	cat	ccg	tgg	ttc	cag	cga	gcg	384
Leu	Val	Ile	Asn	His	Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Arg	Ala	
			115				120					125				
cgc	aag	gcc	aag	ccg	ggc	tcc	gcc	gcg	cgc	cgc	tac	tac	gtg	tgg	gcc	432
Arg	Lys	Ala	Lys	Pro	Gly	Ser	Ala	Ala	Arg	Arg	Tyr	Tyr	Val	Trp	Ala	
			130			135					140					
gac	aat	gac	cag	gcc	tat	gcc	ggc	acc	cgc	atc	atc	ttc	tgc	gac	acc	480
Asp	Asn	Asp	Gln	Ala	Tyr	Ala	Gly	Thr	Arg	Ile	Ile	Phe	Cys	Asp	Thr	
					150				155						160	
gag	aaa	tcg	aac	tgg	agc	tgg	gac	cct	gtc	gcc	ggc	gcg	tac	ttc	tgg	528
Glu	Lys	Ser	Asn	Trp	Ser	Trp	Asp	Pro	Val	Ala	Gly	Ala	Tyr	Phe	Trp	
				165					170					175		
cac	cgc	ttc	tat	tcg	cac	cag	ccc	gac	ctg	aac	ttc	gac	aac	ccg	cag	576
His	Arg	Phe	Tyr	Ser	His	Gln	Pro	Asp	Leu	Asn	Phe	Asp	Asn	Pro	Gln	
			180					185					190			
gtc	atg	aac	gag	gtg	ctg	tcg	gtc	atg	cgg	ttc	tgg	ctg	gac	atc	ggc	624
Val	Met	Asn	Glu	Val	Leu	Ser	Val	Met	Arg	Phe	Trp	Leu	Asp	Ile	Gly	
			195				200					205				
gtg	gac	ggg	ctg	cgg	ctg	gac	gct	gtg	cct	tac	ctc	gtc	gaa	cgc	gaa	672
Val	Asp	Gly	Leu	Arg	Leu	Asp	Ala	Val	Pro	Tyr	Leu	Val	Glu	Arg	Glu	
			210			215					220					
ggc	acc	acg	aac	gag	aac	ctg	ccc	gag	act	cat	acc	gcg	atc	cgg	cat	720
Gly	Thr	Thr	Asn	Glu	Asn	Leu	Pro	Glu	Thr	His	Thr	Ala	Ile	Arg	His	
					230					235					240	
atc	cgc	tcg	cat	ctc	gat	tcc	cac	tac	cag	gga	cgc	gtg	ctg	ctc	gcc	768
Ile	Arg	Ser	His	Leu	Asp	Ser	His	Tyr	Gln	Gly	Arg	Val	Leu	Leu	Ala	

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				245					250					255					
gag	gcc	aac	atg	tgg	cca	gaa	gat	gcg	cag	cag	tac	ttc	ggg	cgc	agc		816		
Glu	Ala	Asn	Met	Trp	Pro	Glu	Asp	Ala	Gln	Gln	Tyr	Phe	Gly	Arg	Ser				
				260					265					270					
agc	acc	ggc	gac	aag	ggc	gac	gaa	tgc	cat	atg	gcc	ttc	cac	ttc	ccg		864		
Ser	Thr	Gly	Asp	Lys	Gly	Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	Pro				
				275					280					285					
ctc	atg	ccg	cgc	atg	tac	atg	gcc	atc	gca	cgc	gaa	gac	cgc	ttc	ccg		912		
Leu	Met	Pro	Arg	Met	Tyr	Met	Ala	Ile	Ala	Arg	Glu	Asp	Arg	Phe	Pro				
				290					295					300					
atc	acc	gac	atc	atg	cgc	cag	acg	ccg	gag	ctg	acc	gac	tgc	cag		960			
Ile	Thr	Asp	Ile	Met	Arg	Gln	Thr	Pro	Glu	Leu	Pro	Thr	Asp	Cys	Gln				
				305					310					315					
tgg	gcg	atc	ttc	ctg	cgc	aac	cat	gac	gaa	ctg	acg	ctc	gag	atg	gtc		1008		
Trp	Ala	Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val				
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acc	agc	agt	gag	cgc	gac	tac	ctg	tgg	gaa	gtc	tat	gcg	tcg	gac	cgg		1056		
Thr	Ser	Ser	Glu	Arg	Asp	Tyr	Leu	Trp	Glu	Val	Tyr	Ala	Ser	Asp	Arg				
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cgc	gca	cgc	atc	aac	ctt	ggc	atc	cgg	cgc	agg	ctg	gcg	ccg	ctg	atg		1104		
Arg	Ala	Arg	Ile	Asn	Leu	Gly	Ile	Arg	Arg	Arg	Leu	Ala	Pro	Leu	Met				
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gaa	cgc	gac	cgg	cgt	cgc	atc	gaa	ctg	atg	aac	agc	ctg	ctg	ttt	tcc		1152		
Glu	Arg	Asp	Arg	Arg	Arg	Ile	Glu	Leu	Met	Asn	Ser	Leu	Leu	Phe	Ser				
				370					375					380					
atg	ccg	ggc	acg	cca	gtg	atc	tac	tac	ggc	gac	gag	atc	ggc	atg	ggc		1200		
Met	Pro	Gly	Thr	Pro	Val	Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly				
				385					390					395					
gac	aac	atc	cac	ctt	ggc	gac	cgg	gac	ggc	gtg	cgc	acg	ccg	atg	cag		1248		
Asp	Asn	Ile	His	Leu	Gly	Asp	Arg	Asp	Gly	Val	Arg	Thr	Pro	Met	Gln				
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tgg	tcg	ccc	gac	cgc	aat	ggc	ggc	ttc	tcg	cac	gcg	gac	ccc	gag	cgc		1296		
Trp	Ser	Pro	Asp	Arg	Asn	Gly	Gly	Phe	Ser	His	Ala	Asp	Pro	Glu	Arg				
				420					425					430					
ctg	gtg	ctg	ccg	ccg	ctg	cag	ggc	ccc	ctg	tac	ggc	tac	gag	gcc	gtc		1344		
Leu	Val	Leu	Pro	Pro	Leu	Gln	Gly	Pro	Leu	Tyr	Gly	Tyr	Glu	Ala	Val				
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aac	gtc	gaa	gcg	cag	gcg	cgc	gat	ccg	cat	tcg	ctg	ctc	aac	tgg	atg		1392		
Asn	Val	Glu	Ala	Gln	Ala	Arg	Asp	Pro	His	Ser	Leu	Leu	Asn	Trp	Met				
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cgc	cgc	atg	ctg	gcg	ctg	cgg	cgc	aag	cac	cgc	gcg	ttc	ggg	cgc	ggc		1440		
Arg	Arg	Met	Leu	Ala	Leu	Arg	Arg	Lys	His	Arg	Ala	Phe	Gly	Arg	Gly				
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acg	ctg	cgc	ttc	ctg	ttt	ccg	gga	aac	cgc	aag	atc	ctg	gcc	tat	ctg		1488		
Thr	Leu	Arg	Phe	Leu	Phe	Pro	Gly	Asn	Arg	Lys	Ile	Leu	Ala	Tyr	Leu				
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cgc	gag	tac	gaa	ggc	gag	cac	atc	ctg	tgc	gtc	gcg	aac	ctg	tcg	cgc		1536		
Arg	Glu	Tyr	Glu	Gly	Glu	His	Ile	Leu	Cys	Val	Ala	Asn	Leu	Ser	Arg				
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gcg	ccg	cag	gcc	gtg	gaa	ctc	gat	ctt	tcg	gcc	ttc	aac	ggg	cgc	gtg		1584		
Ala	Pro	Gln	Ala	Val	Glu	Leu	Asp	Leu	Ser	Ala	Phe	Asn	Gly	Arg	Val				
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ccg	gtg	gag	atg	atg	ggc	gcc	acg	ccg	ttc	ccc	gcg	atc	ggc	acg	ctg		1632		
Pro	Val	Glu	Met	Met	Gly	Ala	Thr	Pro	Phe	Pro	Ala	Ile	Gly	Thr	Leu				
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acc	tac	ctg	ctg	acg	ctg	ccc	ccc	tat	ggc	ttc	tac	tgg	ttc	gtg	ctc		1680		
Thr	Tyr	Leu	Leu	Thr	Leu	Pro	Pro	Tyr	Gly	Phe	Tyr	Trp	Phe	Val	Leu				
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agc	gag	gat	gcc	cat	ccg	cct	gcc	tgg	cac	gtc	tcg	gcc	ccg	gaa	cag		1728		
Ser	Glu	Asp	Ala	His	Pro	Pro	Ala	Trp	His	Val	Ser	Ala	Pro	Glu	Gln				
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atg	ccc	gac	cag	atc	acg	ctc	gtg	ctg	cag	aac	aag	ggg	cgc	ccc	gaa		1776		
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ctg	acg	gag	gcc	gcg	cgc	cgc	atg	ctc	aac	gat	gaa	gtg	ctg	ccg	ccc		1824		
Leu	Thr	Glu	Ala	Ala	Arg	Arg	Met	Leu	Asn	Asp	Glu	Val	Leu	Pro	Pro				
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Tyr	Ile	Arg	Arg	Arg	Arg	Trp	Phe	Gly	Ala	Lys	Asp	Asp	Ser	Ile	Gln				

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Glu Glu Ile Tyr Leu Gly Glu Val Glu Val Arg Leu Ser Gly Gly Arg	630	635		
acc gag cgc tac ctt ccg ctt ggg gtg ctg tgg gac cgc gag agt	645	650		
Thr Glu Arg Tyr Gln Leu Pro Leu Gly Val Leu Trp Asp Arg Glu Ser	645	650		
gcc gat agc gtg tcc cag ctg gcg cac ggg ctg tcg atg gcg cgc gta	660	665		
Ala Asp Ser Val Ser Gln Leu Ala His Gly Leu Ser Met Ala Arg Val	660	665		
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Arg Gln Gly Ser Arg Val Gly Leu Ala Thr Asp Gly Phe Val Leu Glu	675	680		
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Pro Phe Ala Arg Glu Val Ile Arg Ala Leu Arg Ala Asp Ala Glu Leu	690	695		
cag ggg cca cag gag acc atc ccg ttc ccg tcc gag ccc ggg ctg tcc	705	710		
Gln Gly Pro Gln Glu Thr Ile Arg Phe Arg Ser Glu Pro Gly Leu Ser	705	710		
gcg gta cag ccc gag cag gag gaa atc cag tgg atg tca gcg gag cag	715	720		
Ala Val Gln Pro Glu Gln Glu Ile Gln Trp Met Ser Ala Glu Gln	715	720		
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Ser Asn Ser Ser Leu Ala Tyr Asn Asn Thr Ala Val Leu Lys Leu Val	725	730		
cgg cgc ctc tcc ggc ggc aca cat ccg gaa gtg gag atg acg cgc tac	735	740		
Arg Arg Leu Ser Gly Gly Thr His Pro Glu Val Glu Met Thr Arg Tyr	735	740		
ctg acg gcg cag ggt tat ccg cat tcc cct ccc ctg ctg ggc gag gtg	745	750		
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Gly Tyr Ile Leu Asn Gln Gly Asn Gly Trp Asp Trp Thr Leu Asp Tyr	765	770		
ctc agt cgc gtg atc gat gac gcg ctg ccc gcg cag gaa agc gcg gac	775	780		
Leu Ser Arg Val Ile Asp Asp Ala Leu Pro Ala Gln Glu Ser Ala Asp	775	780		
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gat ccc gcc ttt gcc ccg cgg ccg gct acc gat gct gaa acg cgg cag	815	820		
Asp Pro Ala Phe Ala Pro Arg Pro Ala Thr Asp Ala Glu Thr Arg Gln	815	820		
tgg gcc gag cag gcc atg gcg gct atc acg cat gca ctg gca ttg ctg	825	830		
Trp Ala Glu Gln Ala Met Ala Ala Ile Thr His Ala Leu Ala Leu Leu	825	830		
gaa aag cgc gcg cag aac gac ccg aaa tcc gca agc aag cgc ttc atg	835	840		
Glu Lys Arg Ala Gln Asn Asp Pro Lys Ser Ala Ser Lys Arg Phe Met	835	840		
gcc gac gtc gat acg ctg ctg aag gcg ccg gac gcc ctg ccc gca ctg	845	850		
Ala Asp Val Asp Thr Leu Leu Lys Ala Arg Asp Ala Leu Pro Ala Leu	845	850		
gtc aac cgg ctt gcc gca gcc gcg ccc ggc agc ctg cag aca cga ttc	855	860		
Val Asn Arg Leu Ala Ala Ala Pro Gly Ser Leu Gln Thr Arg Phe	855	860		
cac ggc gac ttc cac ctg ggc cag gtg ctg att gcg cag aac gac acc	865	870		
His Gly Asp Phe His Leu Gly Gln Val Leu Ile Ala Gln Asn Asp Thr	865	870		
tac ctg gtg gat ttc gaa ggc gag ccg ggt cag cca ctc gac tgg cgc	875	880		
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Phe	Tyr	Asp	Ala	Asn	Gly	Asp	Gly	Val	Gly	Asp	Phe	Ala	Gly	Leu	Leu
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Asp	Tyr	Arg	Asn	Val	His	Pro	Asp	Tyr	Gly	Thr	Leu	Ala	Glu	Ala	Arg
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Arg	Phe	Val	Gly	Ala	Ala	His	Ala	Arg	Gly	Ile	Arg	Val	Ile	Thr	Glu
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Glu	Lys	Ser	Asn	Trp	Ser	Trp	Asp	Pro	Val	Ala	Gly	Ala	Tyr	Phe	Trp
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His	Arg	Phe	Tyr	Ser	His	Gln	Pro	Asp	Leu	Asn	Phe	Asp	Asn	Pro	Gln
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Val	Met	Asn	Glu	Val	Leu	Ser	Val	Met	Arg	Phe	Trp	Leu	Asp	Ile	Gly
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Val	Asp	Gly	Leu	Arg	Leu	Asp	Ala	Val	Pro	Tyr	Leu	Val	Glu	Arg	Glu
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Ile	Arg	Ser	His	Leu	Asp	Ser	His	Tyr	Gln	Gly	Arg	Val	Leu	Leu	Ala
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Ile	Thr	Asp	Ile	Met	Arg	Gln	Thr	Pro	Glu	Leu	Pro	Thr	Asp	Cys	Gln
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Trp	Ala	Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val
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Thr	Ser	Ser	Glu	Arg	Asp	Tyr	Leu	Trp	Glu	Val	Tyr	Ala	Ser	Asp	Arg
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Asp	Asn	Ile	His	Leu	Gly	Asp	Arg	Asp	Gly	Val	Arg	Thr	Pro	Met	Gln
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Trp	Ser	Pro	Asp	Arg	Asn	Gly	Gly	Phe	Ser	His	Ala	Asp	Pro	Glu	Arg
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Leu	Val	Leu	Pro	Pro	Leu	Gln	Gly	Pro	Leu	Tyr	Gly	Tyr	Glu	Ala	Val
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Asn	Val	Glu	Ala	Gln	Ala	Arg	Asp	Pro	His	Ser	Leu	Leu	Asn	Trp	Met
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Thr	Leu	Arg	Phe	Leu	Phe	Pro	Gly	Asn	Arg	Lys	Ile	Leu	Ala	Tyr	Leu
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Arg	Glu	Tyr	Glu	Gly	Glu	His	Ile	Leu	Cys	Val	Ala	Asn	Leu	Ser	Arg
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Pro	Val	Glu	Met	Met	Gly	Ala	Thr	Pro	Phe	Pro	Ala	Ile	Gly	Thr	Leu
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Thr	Tyr	Leu	Leu	Thr	Leu	Pro	Pro	Tyr	Gly	Phe	Tyr	Trp	Phe	Val	Leu
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Arg	Arg	Leu	Ser	Gly	Gly	Thr	His	Pro	Glu	Val	Glu	Met	Thr	Arg	Tyr
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Val	Arg	Thr	Gly	Ala	Asp	Gly	Val	Pro	His	Thr	Leu	Met	Met	Val	Gln
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 Gly Arg Arg Leu Ala Glu Leu His Ala Val Leu Ala Arg Pro Thr Asp
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 Glu Lys Arg Ala Gln Asn Asp Pro Lys Ser Ala Ser Lys Arg Phe Met
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 His Gly Asp Phe His Leu Gly Gln Val Leu Ile Ala Gln Asn Asp Thr
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 Ile Asp Tyr Ala Ala Ala Thr Val Gly Thr Asp Arg Gln Glu Arg Thr
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 Glu Tyr Glu Ala Ala Asn Arg Val Ala Trp Ile Asp Leu Pro Ala Ser
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 Asp Phe Ala Gly Leu Met Gln Arg Leu Asp Tyr Val Gln Ala Leu Gly
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 Val Thr Ala Ile Trp Leu Leu Pro Phe Tyr Pro Ser Pro Leu Arg Asp
 65 70 75 80
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Pro	Trp	Phe	Gln	Arg	Ala	Arg 135	Arg	Ala	Lys	Lys	Gly 140	Ser	Ala	Ala	Arg	
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Ala	Gly	Ala	Tyr 180	Tyr	Trp	His	Arg	Phe 185	Tyr	Ser	His	Gln	Pro	Asp	Leu	
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Asn	Phe	Asp 195	Asn	Pro	Arg	Val 200	Leu	Glu	Glu	Val	Leu	Lys 205	Ile	Met	Arg	
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Met	Trp	Leu	Glu	Met	Gly	Val 215	Asp	Gly	Leu	Arg	Leu	Asp	Ala	Ile	Pro	
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Asp	Arg	Met	Leu 260	Leu	Ala	Glu	Ala	Asn 265	Gln	Trp	Pro	Glu	Asp	Thr	Arg	
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Lys	Asn	Asp 370	Arg	Arg	Lys	Ile 375	Glu	Leu	Leu	Asn	Gln 380	Met	Leu	Met	Ser	
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ccg	gtc	gag	ctc	acg	ggc	cgg	tcg	gag	ttt	ccg	ccg	gtg	ggc	gat	ctg	1632
Pro	Val	Glu	Leu	Thr	Gly	Arg	Ser	Glu	Phe	Pro	Val	Gly	Gly	Asp	Leu	
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Ala	Leu	Thr	Gly	Arg	Glu	Thr	Arg	Gln	Leu	Glu	Ala	Asp	Val	Leu	Pro	
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Pro	Lys	Leu	Ser	Phe	Thr	Leu	Ala	Lys	Val	Arg	Arg	Gly	Pro	Gln	Val	
		675					680					685				
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Glu	Pro	Arg	Tyr	Leu	Gly	Ala	Glu	Gln	Ser	Asn	Ile	Ser	Ile	Ala	Phe	
			740					745					750			
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		755					760					765				
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Gln	Pro	Asp	Val	Glu	Val	Ala	Arg	Phe	Leu	Thr	Glu	Val	Ala	Gly	Tyr	
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 Lys Arg Ala Leu Met Lys Arg Gly Ser Ile Val His Pro
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2586

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<211> 861

<212> PRT

<213> Rhodobacter sphaeroides 2.4.1

<400> 232

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 35 40 45
 Asp Phe Ala Gly Leu Met Gln Arg Leu Asp Tyr Val Gln Ala Leu Gly
 50 55 60
 Val Thr Ala Ile Trp Leu Leu Pro Phe Tyr Pro Ser Pro Leu Arg Asp
 65 70 75 80
 Asp Gly Tyr Asp Ile Ser Asp Tyr Arg Ser Ile Asn Pro Ser Tyr Gly
 85 90 95
 Ala Met Arg Asp Phe Lys Leu Phe Val Gln Glu Ala His Lys Arg Gly
 100 105 110
 Leu Arg Val Ile Thr Glu Leu Val Ile Asn His Thr Ser Asp Gln His
 115 120 125
 Pro Trp Phe Gln Arg Ala Arg Arg Ala Lys Lys Gly Ser Ala Ala Arg
 130 135 140
 Asp Trp Tyr Val Trp Ser Asp Thr Asp Gln Lys Phe Pro Glu Thr Arg
 145 150 155 160
 Ile Ile Phe Leu Asp Thr Glu Lys Ser Asn Trp Thr Trp Asp Pro Val
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 Ala Gly Ala Tyr Trp Trp His Arg Phe Tyr Ser His Gln Pro Asp Leu
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 Asn Phe Asp Asn Pro Arg Val Leu Glu Glu Val Leu Lys Ile Met Arg
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 Met Trp Leu Glu Met Gly Val Asp Gly Leu Arg Leu Asp Ala Ile Pro
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 Tyr Leu Val Glu Arg Glu Gly Thr Asn Asn Glu Asn Leu Pro Glu Thr
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 His Asp Val Leu Lys Lys Ile Arg Ala Asn Leu Asp Gln His Phe Pro
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 Asp Arg Met Leu Leu Ala Glu Ala Asn Gln Trp Pro Glu Asp Thr Arg
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 Pro Tyr Phe Gly Glu Gly Asp Glu Cys His Met Gly Phe His Phe Pro
 275 280 285
 Leu Met Pro Arg Met Tyr Met Ala Leu Ala Gln Ala Asp Arg His Pro
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 Ile Thr Asp Ile Ile Arg Gln Thr Pro Glu Ile Pro Glu Gly Cys Gln
 305 310 315 320
 Trp Gly Ile Phe Leu Arg Asn His Asp Glu Leu Thr Leu Glu Met Val
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 Thr Ala Glu Glu Arg Asp Tyr Met Trp Arg Phe Tyr Ala Glu Asp Ser
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 Arg Ala Arg Ile Asn Leu Gly Ile Arg Arg Arg Leu Ala Pro Leu Met
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 Lys Asn Asp Arg Arg Lys Ile Glu Leu Leu Asn Gln Met Leu Met Ser
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 Met Pro Gly Thr Pro Ile Val Tyr Tyr Gly Asp Glu Ile Gly Met Gly
 385 390 395 400
 Asp Asn Tyr Tyr Leu Gly Asp Arg Asp Gly Val Arg Thr Pro Met Gln
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 Trp Ser Ala Asp Arg Asn Gly Gly Phe Ser Arg Cys Asn Pro Gln Gln
 420 425 430
 Leu Tyr Leu Pro Thr Ile Leu Asp Pro Val Tyr Gly His Gln Ala Ile
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	Pro	Val	Glu	515	Leu	Thr	520	Gly	Arg	Ser	Glu	Phe	525	Pro	Pro	Val	Gly	525	Asp
	Pro	Tyr	Met	530	Leu	Thr	535	Gly	Arg	Pro	Tyr	Gly	540	Phe	Tyr	Trp	Phe	540	Ile
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	Ala	Leu	Thr	580	Gly	Arg	585	Gln	Thr	Arg	Gln	Leu	590	Glu	Ala	Asp	Val	590	Leu
	Asn	Trp	Leu	595	Pro	Leu	600	Gln	Arg	Trp	Phe	Gly	605	Ala	Lys	Glu	Glu	605	Lys
	Ser	Ala	Val	610	Lys	Leu	615	Ala	Val	Leu	Gly	Ser	620	Leu	Ser	Ala	Asp	620	His
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	Leu	Pro	Ala	645	Ser	Ala	650	Leu	Trp	Gly	Glu	Glu	655	Gln	Leu	Arg	Ala	655	Gly
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705	Val	Val	Phe	710	Glu	Pro	715	Gly	Ser	Gly	Leu	Ala	720	Glu	Ile	Ala	Asp	720	Gly
	Glu	Pro	Arg	725	Tyr	Leu	730	Gly	Ala	Glu	Gln	Ser	735	Asn	Ile	Ser	Ile	735	Ala
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	Arg	Asp	Glu	820	Thr	Ala	825	Ser	Ala	Glu	Trp	Lys	830	Gly	Gly	Asn	Ile	830	Arg
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Ile	Ile	Tyr	Gln	Val	His	Val	Lys	Ser	Phe	Tyr	Asp	Ser	Asn	Asn	Asp	
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Gly	Ile	Gly	Asp	Phe	Pro	Gly	Leu	Ile	Ala	Lys	Leu	Asp	Tyr	Ile	Ala	
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cgc	cgc	gac	gac	ggc	tac	gac	atc	gcc	gat	tac	cgc	gac	gtg	cat	ccc	336
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Asp	Tyr	Gly	Thr	Leu	Ala	Asp	Val	Arg	Arg	Phe	Ile	Arg	Glu	Ala	His	
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Ala	Arg	Gly	Ile	Arg	Val	Ile	Thr	Glu	Leu	Val	Ile	Asn	His	Thr	Ser	
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Thr	His	Arg	Asp	Tyr	Tyr	Val	Trp	Ser	Asp	Thr	Asp	Thr	Lys	Tyr	Ala	
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ggc	acg	cgg	atc	atc	ttc	ctc	gat	acg	gaa	acg	tcg	aac	tgg	gcg	cac	576
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Pro	Asp	Leu	Asn	Phe	Asp	Asn	Pro	Ala	Val	Val	Arg	Glu	Val	Met	Gln	
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Ser	Asn	Gln	Trp	Ala	Val	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	
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Pro	Leu	Met	Glu	Arg	Asp	Arg	Arg	Arg	Ile	Glu	Leu	Ile	Asn	Ser	Leu	
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ctg	ctg	tcg	atg	ccg	ggc	acg	ccg	gtg	atc	tac	tac	ggc	gac	gaa	ctc	1248

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ccg Pro	ttc Phe	cag Gln 660	tat Tyr	gcg Ala	gag Glu	gcg Ala	tgg Trp 665	gtc Val	gaa Glu	tcc Ser	gat Asp	gag Glu	cca Pro 670	ggc Gly	gac Asp	2016
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Lys	Val	Ala	His	Gly	Val	His	Pro	Glu	Ala	Glu	Met	Ser	Arg	Tyr	Leu	
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acg	cgg	atc	ggc	tac	ccg	aac	acc	gcg	acg	ctc	gcc	ggg	gaa	gtc	gtg	2448
Thr	Arg	Ile	Gly	Tyr	Pro	Asn	Thr	Ala	Thr	Leu	Ala	Gly	Glu	Val	Val	
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cac	gtc	gat	ccg	gac	ggc	acg	ccg	cat	acg	gtc	gcg	atc	ctg	cag	cgc	2496
His	Val	Asp	Pro	Asp	Gly	Thr	Pro	His	Thr	Val	Ala	Ile	Leu	Gln	Arg	
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Tyr	Ala	Asp	Asn	Gln	Gly	Asp	Ala	Trp	Thr	Arg	Ser	Phe	Asp	Phe	Leu	
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cgc	cgc	gca	gtg	gac	gag	ctc	gcg	ctg	ccg	gcc	gcg	gac	gaa	gaa	gag	2592
Arg	Arg	Ala	Val	Asp	Glu	Leu	Ala	Leu	Pro	Ala	Ala	Asp	Glu	Glu	Glu	
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ccc	gac	gat	acg	gac	gag	gaa	ccc	gac	gcg	ctg	ctc	ggc	tat	gcg	gcg	2640
Pro	Asp	Asp	Thr	Asp	Glu	Glu	Pro	Asp	Ala	Leu	Leu	Gly	Tyr	Ala	Ala	
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Phe	Ala	Gly	Ile	Ile	Gly	Thr	Arg	Leu	Gly	Gln	Leu	His	Val	Ala	Leu	
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Ala	Gln	Pro	Ser	Asp	Asp	Pro	Ala	Phe	Ala	Pro	Glu	His	Ala	Thr	Pro	
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Glu	His	Val	Asp	Gly	Trp	Cys	Ala	Asp	Ala	Ile	Ala	Ser	Phe	Glu	His	
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gcg	ctc	gac	gtg	ctg	cac	acg	cgg	ctc	gat	gcg	ctc	gat	ccc	gcg	acg	2832
Ala	Leu	Asp	Val	Leu	His	Thr	Arg	Leu	Asp	Ala	Leu	Asp	Pro	Ala	Thr	
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cgc	gcg	gcg	gcc	gac	acg	ctg	ctc	gcg	tcg	cgc	gat	gcg	gcc	gtg	cgc	2880
Arg	Ala	Ala	Ala	Asp	Thr	Leu	Leu	Ala	Ser	Arg	Asp	Ala	Ala	Val	Arg	
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Ala	Leu	Gly	Glu	Leu	Val	Pro	Arg	Thr	Leu	Asp	Ala	Gln	Cys	Ile	Arg	
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Ala	Leu	Leu	Ile	Asp	Phe	Glu	Gly	Glu	Pro	Ala	Arg	Pro	Leu	Glu	Arg	
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Arg	Arg	Ala	Lys	Ser	His	Pro	Leu	Arg	Asp	Val	Ala	Gly	Leu	Leu	Arg	
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Ser	Leu	Ser	Tyr	Val	Ser	Ala	Ile	Ala	Gln	Phe	Ala	Ile	Glu	Lys	Ala	
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Pro	Pro	Gln	Ala	Ala	Gly	Arg	Lys	Arg	Ala	Leu	Phe	Asp	Arg	Phe	Gly	
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cag	gcc	gcc	gcc	gac	cgc	ttc	gtc	gac	tgc	tat	cgc	gcg	gcc	gcc	gaa	3216
Gln	Ala	Ala	Ala	Asp	Arg	Phe	Val	Asp	Cys	Tyr	Arg	Ala	Ala	Ala	Glu	
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ctc	gcc	ccc	gcg	cgt	ttc	gtc	gac	ccg	cgc	tac	gcc	tat	cgc	ctg	ctc	3264
Leu	Ala	Pro	Ala	Arg	Phe	Val	Asp	Pro	Arg	Tyr	Ala	Tyr	Arg	Leu	Leu	
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Ala	Leu	Phe	Leu	Ile	Asp	Lys	Ala	Ser	Tyr	Glu	Leu	Cys	Tyr	Glu	Ala	
	1090				1095					1100						
gcg	aac	cgg	ccc	gac	tgg	cta	agc	gtg	ccg	gtc	ggc	ggg	ctc	gcg	gcg	3360
Ala	Asn	Arg	Pro	Asp	Trp	Leu	Ser	Val	Pro	Val	Gly	Gly	Leu	Ala	Ala	
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Leu	Val	Glu	Arg	Leu	Leu	Asp	Gly	Gly	Ala	Ala	Ser	Asp	Asp	Gly	Asp	
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 Thr His Arg Asp Tyr Tyr Val Trp Ser Asp Thr Asp Thr Lys Tyr Ala
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 Gly Thr Arg Ile Ile Phe Leu Asp Thr Glu Thr Ser Asn Trp Ala His
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 Asp Pro Val Ala Gly Gln Tyr Tyr Trp His Arg Phe Tyr Ser His Gln
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 Val Met Arg Phe Trp Leu Asp Leu Gly Ile Asp Gly Leu Arg Leu Asp
 225 230 235 240
 Ala Val Pro Tyr Leu Val Ala Arg Glu Gly Thr Asn Asn Glu Asn Leu
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 Pro Glu Thr His Ala Ile Leu Lys Arg Ile Arg Ala Thr Ile Asp Ala
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 Glu Tyr Pro Asn Arg Met Leu Leu Ala Glu Ala Asn Gln Trp Pro Glu
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 Asp Val Gln Glu Tyr Phe Gly Asp Glu Asp Glu Cys His Met Ala Phe
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 His Phe Pro Leu Met Pro Arg Ile Tyr Met Ser Ile Ala Ser Glu Asp
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 Arg Phe Pro Ile Val Asp Ile Met Arg Gln Thr Pro Glu Leu Ala Pro
 325 330 335
 Ser Asn Gln Trp Ala Val Phe Leu Arg Asn His Asp Glu Leu Thr Leu
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 Glu Met Val Thr Asp Ser Glu Arg Asp Leu Leu Trp Gln Thr Tyr Ala
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 370 375 380
 Pro Leu Met Glu Arg Asp Arg Arg Arg Ile Glu Leu Ile Asn Ser Leu
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 420 425 430
 Pro Met Gln Trp Ser Ser Asp Arg Asn Gly Gly Phe Ser Arg Ala Asp
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 Asp Ala Val Asn Val Glu Ala Gln Thr Arg Asp Pro His Ser Leu Leu
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Ala	Tyr	Leu 515	Arg	Glu	Leu	Asp	Gly 520	Asp	Asp	Pro	Val	Leu 525	Cys	Val	Ala
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Ile	Gly	Gln	Leu	Pro 565	Tyr	Leu	Leu	Thr	Phe 570	Pro	Pro	Tyr	Gly	Phe 575	Leu
Trp	Phe	Val 580	Leu	Ala	Glu	His	Gly	Arg 585	Glu	Pro	Ser	Trp	Arg 590	Gln	Pro
His	Ala 595	Glu	Pro	Leu	Pro	Glu	Tyr 600	Val	Thr	Leu	Val	Met 605	Arg	Arg	Gly
Asp	Ala 610	Arg	Pro	Asp	Ile	Glu 615	Gln	Leu	His	Val	Leu 620	Ala	His	Asp	Ala
Leu 625	Pro	Ser	Trp	Leu	Ala 630	Arg	Arg	Arg	Trp	Phe 635	Ala	Ser	Lys	Asp	Arg 640
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Pro	Phe	Gln	Tyr 660	Ala	Glu	Ala	Trp	Val 665	Glu	Ser	Asp	Glu	Pro	Gly	Asp
Val	Glu	Arg 675	Tyr	Val	Val	Pro	Leu 680	Ala	Ala	Ala	Trp	Gly 685	Gly	Glu	Thr
Ser	Gln 690	Pro	Leu	Phe	Ala	Gln 695	Leu	Ala	Leu	Ala	Arg 700	Val	Arg	Arg	Gly
His 705	Ser	Val	Gly	Tyr	Leu 710	Thr	Asp	Ala	Phe	Ala 715	Leu	Pro	Ala	Phe	Ala 720
His	Gly	Met	Leu	Arg 725	Lys	Leu	Arg	Asp	Gly 730	Ala	Thr	Val	Pro	Thr 735	Ser
Asp	Asp	Gly	Arg 740	Leu	Ala	Phe	Leu	Pro 745	Glu	Asp	Ala	Leu	Ala 750	Ala	Leu
Asp	Pro	Gly 755	Asp	Asn	Ala	Asp	Val 760	Arg	Trp	Leu	Ala	Ala 765	Glu	Gln	Ser
Asn	Ser 770	Ser	Leu	Val	Ile	Gly 775	Asp	Ala	Ile	Val	Leu 780	Lys	Leu	Val	Arg
Lys 785	Val	Ala	His	Gly	Val 790	His	Pro	Glu	Ala	Glu 795	Met	Ser	Arg	Tyr	Leu 800
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His	Val	Asp	Pro 820	Asp	Gly	Thr	Pro	His 825	Thr	Val	Ala	Ile	Leu 830	Gln	Arg
Tyr	Ala	Asp 835	Asn	Gln	Gly	Asp	Ala 840	Trp	Thr	Arg	Ser	Phe 845	Asp	Phe	Leu
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Pro 865	Asp	Asp	Thr	Asp	Glu 870	Glu	Pro	Asp	Ala	Leu 875	Leu	Gly	Tyr	Ala	Ala 880
Phe	Ala	Gly	Ile	Ile 885	Gly	Thr	Arg	Leu	Gly 890	Gln	Leu	His	Val	Ala 895	Leu
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Glu	His	Val 915	Asp	Gly	Trp	Cys	Ala 920	Asp	Ala	Ile	Ala	Ser 925	Phe	Glu	His
Ala	Leu 930	Asp	Val	Leu	His	Thr 935	Arg	Leu	Asp	Ala	Leu 940	Asp	Pro	Ala	Thr
Arg 945	Ala	Ala	Ala	Asp	Thr 950	Leu	Leu	Ala	Ser	Arg 955	Asp	Ala	Ala	Val	Arg 960
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Ile	His	Gly	Asp 980	Phe	His	Leu	Gly	Gln 985	Val	Leu	Asp	Val	Gln 990	Gly	Asp
Ala	Leu 995	Leu	Ile	Asp	Phe	Glu	Gly 1000	Glu	Pro	Ala	Arg 1005	Pro	Leu	Glu	Arg
Arg	Arg 1010	Ala	Lys	Ser	His 1015	Pro	Leu	Arg	Asp	Val	Ala	Gly	Leu	Leu	Arg
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 Asp Ile Ser Glu Val Thr Leu Ala Ala Asp Pro Tyr Leu Trp Lys
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cgc Arg	att Ile	atg Met	tta Leu	gat Asp 245	gcg Ala	gtg Val	ttc Phe	aat Asn	cac His 250	att Ile	ggc Gly	gat Asp	act Thr	tca Ser 255	gca Ala	768
gag Glu	tgg Trp	caa Gln	gat Asp 260	gtt Val	gtc Val	tta Leu	aat Asn	gaa Glu 265	gaa Glu	aaa Lys	tct Ser	gca Ala	tat Tyr 270	cgt Arg	gat Asp	816
tgg Trp	ttc Phe	cac His 275	atc Ile	cat His	agt Ser	ttc Phe	cct Pro 280	gtt Val	cgt Arg	caa Gln	aat Asn	gaa Glu 285	aat Asn	ggc Gly	aat Asn	864
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cat His 305	atg Met	cca Pro	aaa Lys	tta Leu	aat Asn 310	acg Thr	gct Ala	aac Asn	cca Pro	gaa Glu 315	gtt Val	cag Gln	aag Lys	tat Tyr	cta Leu 320	960
ctg Leu	gat Asp	att Ile	gca Ala	act Thr 325	tac Tyr	tgg Trp	att Ile	cgc Arg	gaa Glu 330	ttt Phe	gac Asp	att Ile	gat Asp	ggg Gly 335	tgg Trp	1008
cgc Arg	tta Leu	gat Asp	gtt Val 340	gct Ala	aat Asn	gaa Glu	gta Val	gat Asp 345	cat His	gct Ala	ttc Phe	tgg Trp	aaa Lys 350	gaa Glu	ttt Phe	1056
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gta Val 385	atg Met	aac Asn	tat Tyr	cca Pro	ttt Phe 390	aca Thr	caa Gln	acg Thr	att Ile	att Ile 395	gag Glu	aac Asn	ttt Phe	att Ile	gaa Glu 400	1200
gaa Glu	aaa Lys	atc Ile	aca Thr	ccg Pro 405	gag Glu	caa Gln	atg Met	gtt Val	tct Ser 410	ggg Gly	att Ile	aat Asn	gaa Glu	caa Gln 415	tat Tyr	1248
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tgt Cys 465	att Ile	tat Tyr	tac Tyr	gga Gly	act Thr 470	gaa Glu	atc Ile	ggc Gly	atg Met	gac Asp 475	gga Gly	aat Asn	gac Asp	cca Pro 480	cca Pro	1440
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ttc Phe 545	ctt Leu	ttc Phe	aat Asn	caa Gln	gca Ala 550	aaa Lys	gaa Glu	gat Asp	aaa Lys	gat Asp 555	ttc Phe	aca Thr	att Ile	tca Ser	ttt Phe 560	1680
gaa Glu	aat Asn	aca Thr	gcg Ala	aca Thr 565	gat Asp	att Ile	tgg Trp	aac Asn	aac Asn 570	cga Arg	gct Ala	gta Val	aca Thr	gaa Glu 575	aat Asn	1728
ctt Leu	gtt Val	gtc Val	cca Pro 580	gca Ala	aaa Lys	gga Gly	ttt Phe	ctt Leu 585	gtt Val	gtt Val	aaa Lys	gaa Glu	aac Asn	agc Ser		1773

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130      135      140
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145      150      155      160
Leu Pro Trp Gly Ser Lys Asp Pro Asn Thr Thr Asp Phe Phe Gly Gly
165      170      175
Asp Ile Glu Gly Ile Ile Glu His Leu Asp Tyr Leu Ala Glu Leu Gly
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Ile Asn Gly Val Tyr Leu Thr Pro Val Phe Glu Ala Pro Thr Asn His
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Lys Tyr Asp Thr Val Asp Tyr Lys Lys Ile Asp Pro His Phe Gly Asp
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225      230      235      240
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Glu Trp Gln Asp Val Val Leu Asn Glu Glu Lys Ser Ala Tyr Arg Asp
260      265      270
Trp Phe His Ile His Ser Phe Pro Val Arg Gln Asn Glu Asn Gly Asn
275      280      285
Ile Glu Gly Glu Pro Thr Leu Ser Tyr Asp Thr Phe Ala Phe Thr Thr
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His Met Pro Lys Leu Asn Thr Ala Asn Pro Glu Val Gln Lys Tyr Leu
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Leu Asp Ile Ala Thr Tyr Trp Ile Arg Glu Phe Asp Ile Asp Gly Trp
325      330      335
Arg Leu Asp Val Ala Asn Glu Val Asp His Ala Phe Trp Lys Glu Phe
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Lys Lys Ala Val Gln Ala Glu Lys Glu Asp Ile Tyr Ile Leu Gly Glu
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Ile Trp His Asp Ser Trp Ile Trp Leu Leu Gly Asp Glu Phe His Ala
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Val Met Asn Tyr Pro Phe Thr Gln Thr Ile Ile Glu Asn Phe Ile Glu
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Glu Lys Ile Thr Pro Glu Gln Met Val Ser Gly Ile Asn Glu Gln Tyr
405      410      415
Met Arg Tyr Pro Asn Gln Val Asn Glu Val Met Phe Asn Met Leu Asp
420      425      430
Ser His Asp Thr Ala Arg Ile Leu Thr Arg Ala Asn Asn Asp Glu Asp
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Thr	Gly	Ile	Thr	Ala	Phe	Ser	Lys	Glu	Leu	Asn	Gly	Glu	Lys	Leu	His				
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Phe	Leu	Phe	Asn	Gln	Ala	Lys	Glu	Asp	Lys	Asp	Phe	Thr	Ile	Ser	Phe				
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Thr	Pro	Phe	Tyr	Pro	Ser	Pro	Gln	Val	Asp	Asn	Gly	Tyr	Asp	Val	Ser	
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Leu	Val	Leu	Asn	His	Ser	Ser	Thr	Glu	His	Ala	Trp	Phe	Lys	Glu	Ser	
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Arg	Ser	Ser	Lys	Thr	Asn	Ser	Lys	Arg	Asp	Tyr	Tyr	Ile	Trp	Arg	Glu	
			115				120					125				
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Lys	Pro	Asn	Asn	Trp	Glu	Ser	Phe	Phe	Gly	Gly	Ser	Ala	Trp	Glu	Met	
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Val	Ile	Asn	Asn	Leu	Thr	Leu	Ala	Leu	Glu	Phe	Pro	Asp	Asn	Pro	Val	
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<213> Listeria monocytogenes str. 1/2a F6854

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Arg	Ser	Ser 115	Lys	Thr	Asn	Ser	Lys 120	Arg	Asp	Tyr	Tyr	Ile 125	Trp	Arg	Glu
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<211> 1662

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atc Ile	tgg Trp 50	ttg Leu	tcc Ser	cct Pro	gta Val	tac Tyr 55	gat Asp	tcg Ser	cca Pro	caa Gln	gac Asp 60	gac Asp	aat Asn	ggg Gly	tac Tyr	192
gat Asp 65	att Ile	cgt Arg	gat Asp	tat Tyr	caa Gln 70	aaa Lys	att Ile	tac Tyr	gaa Glu	gaa Glu 75	tat Tyr	ggc Gly	gac Asp	atg Met	gcg Ala 80	240
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gta Val	atg Met	gac Asp	tta Leu 100	gtt Val	gta Val	aac Asn	cat His	act Thr 105	tct Ser	gat Asp	gaa Glu	cat His	aag Lys 110	tgg Trp	ttt Phe	336
gaa Glu	gaa Glu	tct Ser 115	cgg Arg	aaa Lys	tcc Ser	aaa Lys	gat Asp 120	aac Asn	cca Pro	tat Tyr	cgc Arg	gat Asp 125	tac Tyr	tat Tyr	ttc Phe	384
tgg Trp	cgc Arg 130	gag Glu	gaa Glu	aac Asn	gaa Glu	atc Ile 135	aac Asn	aac Asn	tgg Trp	ggg Gly	tcc Ser 140	att Ile	ttc Phe	agc Ser	ggg Gly	432
ccg Pro 145	gca Ala	tgg Trp	gaa Glu	tta Leu	gac Asp 150	gaa Glu	aaa Lys	aca Thr	ggc Gly	gag Glu 155	tac Tyr	tat Tyr	tta Leu	cac His	ctg Leu 160	480
ttc Phe	tcc Ser	aaa Lys	aaa Lys	caa Gln 165	cct Pro	gat Asp	tta Leu	aac Asn	tgg Trp 170	gaa Glu	aac Asn	cct Pro	aaa Lys 175	tta Leu	cgc Arg	528
caa Gln	gat Asp	gta Val	tat Tyr 180	aat Asn	atg Met	atg Met	aaa Lys	ttc Phe 185	tgg Trp	cta Leu	gat Asp	aaa Lys	ggc Gly 190	att Ile	gat Asp	576
ggg Gly	ttc Phe	cgc Arg 195	atg Met	gac Asp	gta Val	att Ile	aat Asn 200	ttt Phe	att Ile	tcc Ser	aaa Lys	aac Asn 205	acc Thr	gat Asp	ttc Phe	624
cca Pro	gat Asp 210	ggg Gly	cca Pro	gtg Val	cca Pro	gat Asp 215	ggg Gly	caa Gln	att Ile	tac Tyr	ggc Gly 220	gat Asp	gct Ala	ggc Gly	aat Asn	672
gat Asp 225	ttc Phe	tgc Cys	aat Asn	gga Gly	ccg Pro 230	cgg Arg	att Ile	cat His	gag Glu	ttc Phe 235	ttg Leu	caa Gln	gaa Glu	atg Met	aac Asn 240	720
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gaa Glu	gtc Val 275	gat Asp	atg Met	att Ile	ttt Phe	aca Thr 280	ttt Phe	gaa Glu	cat His	atg Met	aac Asn	tta Leu 285	gat Asp	tcc Ser	gat Asp	864
ggc Gly	gac Asp 290	aat Asn	aaa Lys	tgg Trp	gat Asp	ttg Leu 295	aaa Lys	cca Pro	att Ile	tac Tyr	tta Leu 300	cca Pro	gat Asp	tta Leu	aaa Lys	912
gaa Glu 305	aac Asn	atg Met	tcc Ser	gaa Glu	tgg Trp 310	caa Gln	gtg Val	gcg Ala	ctt Leu	caa Gln 315	gaa Glu	aat Asn	ggc Gly	tgg Trp	aac Asn 320	960
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aga	acc	cct	tat	cag	tgg	gat	aat	agc	gag	aat	gct	ggc	ttc	aca	acc		1296
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Glu	Glu	Ala	Leu	Lys	Asn	Pro	Asp	Ser	Ile	Phe	Tyr	Tyr	Tyr	Gln	Asn		
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Leu	Ile	Lys	Leu	Arg	Lys	Thr	Thr	Glu	Ile	Ile	Thr	Thr	Gly	Asn	Tyr		
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Arg	Leu	Leu	Leu	Pro	Lys	Asp	Glu	Ala	Ile	Phe	Ala	Tyr	Glu	Arg	Tyr		
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Thr	Glu	Asn	Glu	Lys	Leu	Val	Val	Leu	Cys	Asn	Phe	Thr	Glu	Glu	Glu		
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caa	gtt	att	ttt	gat	gaa	aac	att	ttg	aac	gaa	ctc	caa	aaa	ggg	tcc		1584
Gln	Val	Ile	Phe	Asp	Glu	Asn	Ile	Leu	Asn	Glu	Leu	Gln	Lys	Gly	Ser		
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Val	Leu	Val	Asn	Asn	Val	Pro	Asn	Ile	Ile	Glu	Gly	Thr	Leu	Arg	Pro		
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<212> PRT

<213> *Listeria monocytogenes* str. 1/2a F6854

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Ile	Trp	Leu	Ser	Pro	Val	Tyr	Asp	Ser	Pro	Gln	Asp	Asp	Asn	Gly	Tyr		
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Thr	Phe	Asp	Gln	Leu	Leu	Gln	Gly	Leu	His	Asp	Arg	Asp	Met	Lys	Leu		
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Val	Met	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Glu	His	Lys	Trp	Phe		
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Phe	Ser	Lys	Lys	Gln	Pro	Asp	Leu	Asn	Trp	Glu	Asn	Pro	Lys	Leu	Arg		
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Gln	Asp	Val	Tyr	Asn	Met	Met	Lys	Phe	Trp	Leu	Asp	Lys	Gly	Ile	Asp		
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210
 Asp Phe Cys Asn Gly Pro 215
 225 Gln Glu Val Thr Ser Lys Tyr Asp Val Met Thr Val Gly Glu Met Asn
 Gly Ala Ser Thr Thr Asp Ala Gln Ile Tyr Thr Asn Pro Ala Asn Asn
 Glu Val Asp Met Ile Phe Thr Phe Glu His Met Asn Leu Asp Ser Asp
 Gly Asp Asn Lys Trp Asp Leu Lys Pro Ile Tyr Leu Pro Asp Leu Lys
 Glu Asn Met Ser Glu Trp Gln Val Ala Leu Gln Glu Asn Gly Trp Asn
 305 Ser Leu Tyr Trp Asn His Asp Gln Pro Arg Ile Val Ser Arg Phe
 Gly Asn Asp Asn Arg Phe Arg Val Arg Ser Ala Lys Met Leu Ala Thr
 Cys Leu His Met Met Lys Gly Thr Pro Tyr Ile Tyr Gln Gly Glu Glu
 Ile Gly Met Thr Asn Val His Phe Glu Thr Leu Asp Asp Tyr Arg Asp
 Ile Glu Thr Leu Asn Met Tyr Lys Glu Arg Lys Glu Gln Gly His Ser
 385 His Glu Ser Ile Met Gln Ser Ile Tyr Thr Lys Gly Arg Asp Asn Ala
 Arg Thr Pro Tyr Gln Trp Asp Asn Ser Glu Asn Ala Gly Phe Thr Thr
 Gly Thr Pro Trp Leu Lys Val Asn Pro Arg Tyr Thr Glu Ile Asn Asn
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 Leu Ile Lys Leu Arg Lys Thr Thr Glu Ile Ile Thr Thr Gly Asn Tyr
 465 Arg Leu Leu Leu Pro Lys Asp Glu Ala Ile Phe Ala Tyr Glu Arg Tyr
 Thr Glu Asn Glu Lys Leu Val Val Leu Cys Asn Phe Thr Glu Glu Glu
 Gln Val Ile Phe Asp Glu Asn Ile Leu Asn Glu Leu Gln Lys Gly Ser
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Tyr Lys Asp Ala Val Ile Tyr Gln Val His Val Lys Ser Phe Phe Asp	
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tcg aat aac gac gga atc ggc gac ttt ccc ggc ctg atc gcc aaa ctc	144
Ser Asn Asn Asp Gly Ile Gly Asp Phe Pro Gly Leu Ile Ala Lys Leu	
35 40 45	
gat tac ata gcc gat ctt ggc gtc aac acc atc tgg ctg ttg ccg ttc	192
Asp Tyr Ile Ala Asp Leu Gly Val Asn Thr Ile Trp Leu Leu Pro Phe	
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tac ccc tcg cca cgc cgc gac gac ggt tac gac atc gcc gag tac cga	240
Tyr Pro Ser Pro Arg Arg Asp Asp Gly Tyr Asp Ile Ala Glu Tyr Arg	
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Gly	Val	His	Ser	Asp	Tyr	Gly	Thr	Met	Ala	Asp	Ala	Lys	Arg	Phe	Ile	
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gcc	gag	gcg	cat	aaa	cgc	ggg	ttg	agg	gtc	atc	acc	gag	ctg	gtc	atc	336
Ala	Glu	Ala	His	Lys	Arg	Gly	Leu	Arg	Val	Ile	Thr	Glu	Leu	Val	Ile	
			100				105						110			
aac	cac	acg	tcc	gat	cag	cac	ccg	tgg	ttt	cag	cgc	gcg	cgc	aag	gcc	384
Asn	His	Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Arg	Ala	Arg	Lys	Ala	
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Lys	Pro	Gly	Ser	Ala	Ala	Arg	Asp	Phe	Tyr	Val	Trp	Ser	Asp	Asp	Asp	
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Ala	Val	Leu	Ser	Val	Met	Arg	Tyr	Trp	Leu	Asp	Met	Gly	Ile	Asp	Gly	
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Leu	Arg	Leu	Asp	Ala	Ile	Pro	Tyr	Leu	Ile	Glu	Arg	Asp	Gly	Thr	Asn	
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Asn	Glu	Asn	Leu	Pro	Glu	Thr	His	Asp	Val	Leu	Lys	Gln	Ile	Arg	Ala	
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Glu	Ile	Asp	Ala	Asn	Tyr	Pro	Asp	Arg	Met	Leu	Leu	Ala	Glu	Ala	Asn	
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Gln	Trp	Pro	Glu	Asp	Thr	Gln	Leu	Tyr	Phe	Gly	Asp	Thr	Asp	Ala	Glu	
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Gly	Val	Asn	Gly	Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	Pro	Leu	Met	
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Pro	Arg	Met	Tyr	Met	Ala	Leu	Ala	Gln	Glu	Asp	Arg	Phe	Pro	Ile	Thr	
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Val	Ser	Arg	Ser	Ala	Gln	Ala	Val	Glu	Leu	Asp	Leu	Ser	Ala	Tyr	Val	
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Phe	Gly	Leu	Ala	Ala	Glu	Asn	Gln	Met	Pro	Ser	Trp	His	Val	Glu	Pro	
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Gln	His	Pro	Val	Leu	Phe	Ser	Glu	Ile	Glu	Val	Gln	Ser	Gly	Gly	Gln	
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Gly	Pro	Ala	Leu	Pro	Gln	Gln	Leu	Ala	Leu	Ala	Arg	Val	Arg	Arg	Val	
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cgt	cag	gtc	ggg	ttg	att	acc	gat	gcc	ttc	agt	ctt	gaa	gcg	ttt	att	2112
Arg	Gln	Val	Gly	Leu	Ile	Thr	Asp	Ala	Phe	Ser	Leu	Glu	Ala	Phe	Ile	
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Arg	Ala	Val	Leu	Gln	Gly	Met	Gln	Gly	Gly	Thr	Val	Leu	Glu	Ser	Ile	
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Glu	Gly	Glu	Ile	Arg	Phe	Glu	Ala	Thr	Pro	Gln	Leu	Glu	Lys	Leu	Gly	
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Leu	Gly	Ala	Glu	Ser	Glu	Val	Arg	Tyr	Leu	Ser	Ala	Glu	Gln	Ser	Asn	
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Ser	Ser	Val	Val	Ile	Gly	Asn	Ser	Leu	Val	Leu	Lys	Leu	Ile	Arg	Lys	
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gtc	gct	tct	ggc	gta	cac	ccg	gaa	ctg	gag	atg	agc	gct	tac	ctg	acc	2352
Val	Ala	Ser	Gly	Val	His	Pro	Glu	Leu	Glu	Met	Ser	Ala	Tyr	Leu	Thr	
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gct	gct	gga	ttt	gcc	aat	atc	tct	ccg	ctg	ctg	ggc	tcg	gtg	att	cgc	2400
Ala	Ala	Gly	Phe	Ala	Asn	Ile	Ser	Pro	Leu	Leu	Gly	Ser	Val	Ile	Arg	
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cgc	gac	ggg	aag	ggc	gag	gac	aac	ttg	ctg	atg	att	gcg	cag	ggc	tat	2448
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Arg	Ala	Leu	Arg	Asp	Glu	Leu	Ala	Asp	Ala	Val	Ser	Glu	Gln	Ala	Gln	
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cac	tac	aac	gcc	ttg	ggt	gaa	ctg	aag	gat	ttc	gcc	ggg	atg	ctc	ggc	2592
His	Tyr	Asn	Ala	Leu	Gly	Glu	Leu	Lys	Asp	Phe	Ala	Gly	Met	Leu	Gly	
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Gln	Arg	Leu	Gly	Glu	Met	His	Gln	Val	Leu	Ala	Ala	Pro	Ser	Asp	Asn	
	865				870					875					880	
cag	gac	ttc	gcg	ccg	caa	gtc	agt	tcg	gcc	aag	gat	gcg	cag	gcg	acg	2688
Gln	Asp	Phe	Ala	Pro	Gln	Val	Ser	Ser	Ala	Lys	Asp	Ala	Gln	Ala	Thr	
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ggt	aag	gat	gtc	gcg	gcg	cag	gtc	gag	cat	gcc	ctg	aag	ctg	ctc	aaa	2736
Gly	Lys	Asp	Val	Ala	Ala	Gln	Val	Glu	His	Ala	Leu	Lys	Leu	Leu	Lys	
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Gln	His	Gln	Gly	Glu	Leu	Asp	Ala	Ala	Asp	Gln	Lys	Leu	Val	Gly	Arg	
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Leu	Leu	Asp	His	Lys	Lys	Ala	Ile	Leu	Ala	His	Val	Gln	Glu	Leu	Ala	
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Lys	Gln	Ser	Ala	Gly	Gly	Leu	Arg	Ile	Arg	Val	His	Gly	Asp	Leu	His	
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Glu	Gly	Glu	Pro	Ala	Arg	Pro	Leu	Ala	Glu	Arg	Arg	Gly	Lys	His	Ser	
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Pro	Tyr	Lys	Asp	Val	Ser	Gly	Val	Leu	Arg	Ser	Phe	Asp	Tyr	Ala	Ala	
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Ala	Met	Ala	Leu	Asn	Val	His	Asn	Val	Asp	Asn	Ser	Pro	Glu	Ala	Glu	
	1010				1015						1020					
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Ala	Ala	Arg	Arg	Arg	Val	Thr	Glu	Arg	Tyr	Leu	Arg	Glu	Ala	Arg	Glu	
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Ala	Phe	Leu	Gln	Ala	Tyr	Arg	Gln	Ala	Ala	Ala	Ser	Leu	Asp	His	Ala	
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Trp	Gln	Asp	Pro	Glu	Gly	Ala	Asp	Ala	Ala	Leu	Ala	Leu	Phe	Gly	Leu	
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gag	aaa	gcg	gcc	tac	gaa	gtg	gcc	tat	gaa	gcc	gaa	aat	cgc	ccc	acc	3264
Glu	Lys	Ala	Ala	Tyr	Glu	Val	Ala	Tyr	Glu	Ala	Glu	Asn	Arg	Pro	Thr	
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Trp	Leu	Pro	Val	Pro	Leu	His	Gly	Leu	Tyr	Gly	Leu	Leu	Thr	Gly	Leu	
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<212> PRT

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<400> 242

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Tyr Lys Asp Ala Val Ile Tyr Gln Val His Val Lys Ser Phe Phe Asp

20 25 30

Ser Asn Asn Asp Gly Ile Gly Asp Phe Pro Gly Leu Ile Ala Lys Leu

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Asp 65	Tyr 50	35	Ala 5	Asp 10	Leu 20	Gly 55	40	Asn 15	Thr 25	Ile 35	Trp 60	45	Leu 10	Leu 15	Pro 20	Phe 25
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Ala 85	Glu 90	Ala 95	His 100	Lys 105	Arg 110	Gly 115	Leu 120	Arg 125	Val 130	Ile 135	Thr 140	Glu 145	Leu 150	Val 155	Ile 160	Ile 165
Asn 175	His 180	Thr 185	Ser 190	Asp 195	Gln 200	His 205	Pro 210	Trp 215	Phe 220	Gln 225	Arg 230	Ala 235	Arg 240	Lys 245	Ala 250	Ala 255
Lys 265	Pro 270	Gly 275	Ser 280	Ala 285	Ala 290	Arg 295	Asp 300	Phe 305	Tyr 310	Val 315	Trp 320	Ser 325	Asp 330	Asp 335	Asp 340	Asp 345
Gln 355	Lys 360	Tyr 365	Asp 370	Gly 375	Thr 380	Arg 385	Ile 390	Ile 395	Phe 400	Leu 405	Asp 410	Thr 415	Glu 420	Lys 425	Ser 430	Ser 435
Asn 445	Trp 450	Thr 455	Trp 460	Asp 465	Pro 470	Val 475	Ala 480	Gly 485	Gln 490	Tyr 495	Phe 500	Trp 505	His 510	His 515	Arg 520	Arg 525
Tyr 535	Ser 540	His 545	Gln 550	Pro 555	Asp 560	Leu 565	Asn 570	Phe 575	Asp 580	Asn 585	Pro 590	Gln 595	Val 600	Val 605	Met 610	Lys 615
Ala 625	Val 630	Leu 635	Ser 640	Val 645	Met 650	Arg 655	Tyr 660	Trp 665	Leu 670	Asp 675	Met 680	Gly 685	Ile 690	Asp 695	Gly 700	Gly 705
Leu 715	Arg 720	Leu 725	Asp 730	Ala 735	Ile 740	Pro 745	Thr 750	Leu 755	Ile 760	Glu 765	Arg 770	Leu 775	Asp 780	Gly 785	Thr 790	Asn 795
Asn 805	Glu 810	Asn 815	Leu 820	Pro 825	Glu 830	Thr 835	His 840	Asp 845	Val 850	Leu 855	Lys 860	Gln 865	Ile 870	Arg 875	Ala 880	Ala 885
Glu 895	Ile 900	Asp 905	Ala 910	Asn 915	Tyr 920	Pro 925	Asp 930	Arg 935	Met 940	Leu 945	Leu 950	Ala 955	Glu 960	Ala 965	Ala 970	Asn 975
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Gly 1075	Val 1080	Asn 1085	Gly 1090	Asp 1095	Glu 1100	Cys 1105	His 1110	Met 1115	Ala 1120	Phe 1125	His 1130	Phe 1135	Pro 1140	Leu 1145	Met 1150	Met 1155
Pro 1165	Arg 1170	Met 1175	Tyr 1180	Met 1185	Ala 1190	Leu 1195	Ala 1200	Gln 1205	Glu 1210	Asp 1215	Arg 1220	Phe 1225	Pro 1230	Ile 1235	Thr 1240	Thr 1245
Asp 1255	Ile 1260	Leu 1265	Arg 1270	Gln 1275	Thr 1280	Pro 1285	Glu 1290	Ile 1295	Pro 1300	Ala 1305	Asn 1310	Cys 1315	Gln 1320	Trp 1325	Ala 1330	Ala 1335
Ile 1345	Phe 1350	Leu 1355	Arg 1360	Asn 1365	His 1370	Asp 1375	Glu 1380	Leu 1385	Thr 1390	Leu 1395	Glu 1400	Met 1405	Val 1410	Thr 1415	Asp 1420	Asn 1425
Lys 1435	Glu 1440	Arg 1445	Asp 1450	Tyr 1455	Leu 1460	Trp 1465	Asn 1470	Tyr 1475	Tyr 1480	Ala 1485	Ala 1490	Asp 1495	Arg 1500	Arg 1505	Ala 1510	Ala 1515
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Asp 1615	Arg 1620	Arg 1625	Arg 1630	Ile 1635	Glu 1640	Leu 1645	Leu 1650	Asn 1655	Ser 1660	Leu 1665	Leu 1670	Leu 1675	Ser 1680	Met 1685	Pro 1690	Pro 169

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 Leu Pro Ser Trp Leu Gln Asn Arg Arg Trp Phe Ala Gly Lys Asp Ala
 610 615 620
 Asp Ile Glu Gln Val Lys Leu Ala Tyr Gly Val Arg Phe Gly Asp Ala
 625 630 635 640
 Gln His Pro Val Leu Phe Ser Glu Ile Glu Val Gln Ser Gly Gly Gln
 645 650 655
 Thr Ser Arg Tyr Gln Leu Pro Phe Gly Phe Ile Ser Glu Asp Gln Val
 660 665 670
 Gly Pro Ala Leu Pro Gln Gln Leu Ala Leu Ala Arg Val Arg Arg Val
 675 680 685
 Arg Gln Val Gly Leu Ile Thr Asp Ala Phe Ser Leu Glu Ala Phe Ile
 690 695 700
 Arg Ala Val Leu Gln Gly Met Gln Gly Gly Thr Val Leu Glu Ser Ile
 705 710 715 720
 Glu Gly Glu Ile Arg Phe Glu Ala Thr Pro Gln Leu Glu Lys Leu Gly
 725 730 735
 Leu Gly Ala Glu Ser Glu Val Arg Tyr Leu Ser Ala Glu Gln Ser Asn
 740 745 750
 Ser Ser Val Val Ile Gly Asn Ser Leu Val Leu Lys Leu Ile Arg Lys
 755 760 765
 Val Ala Ser Gly Val His Pro Glu Leu Glu Met Ser Ala Tyr Leu Thr
 770 775 780
 Ala Ala Gly Phe Ala Asn Ile Ser Pro Leu Leu Gly Ser Val Ile Arg
 785 790 795 800
 Arg Asp Gly Lys Gly Glu Asp Asn Leu Leu Met Ile Ala Gln Gly Tyr
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 Leu Ser Asn Gln Gly Asp Ala Trp Glu Trp Thr Gln Asn Asn Leu Glu
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 Arg Ala Leu Arg Asp Glu Leu Ala Asp Ala Val Ser Glu Gln Ala Gln
 835 840 845
 His Tyr Asn Ala Leu Gly Glu Leu Lys Asp Phe Ala Gly Met Leu Gly
 850 855 860
 Gln Arg Leu Gly Glu Met His Gln Val Leu Ala Ala Pro Ser Asp Asn
 865 870 875 880
 Gln Asp Phe Ala Pro Gln Val Ser Ser Ala Lys Asp Ala Gln Ala Thr
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 Gly Lys Asp Val Ala Ala Gln Val Glu His Ala Leu Lys Leu Leu Lys
 900 905 910
 Gln His Gln Gly Glu Leu Asp Ala Asp Gln Lys Leu Val Gly Arg
 915 920 925
 Leu Leu Asp His Lys Lys Ala Ile Leu Ala His Val Gln Glu Leu Ala
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 Lys Gln Ser Ala Gly Gly Leu Arg Ile Arg Val His Gly Asp Leu His
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 Leu Gly Gln Val Leu Val Ile Lys Gly Asp Ala Tyr Leu Ile Asp Phe
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 Glu Gly Glu Pro Ala Arg Pro Leu Ala Glu Arg Arg Gly Lys His Ser
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 Pro Tyr Lys Asp Val Ser Gly Val Leu Arg Ser Phe Asp Tyr Ala Ala
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<211> 1629

<212> DNA

<213> *Rhodospirillum rubrum*

<220>

<221> CDS

<222> (1)..(1629)

<400> 243

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Pro	Arg	Ser	Phe	Gln	Asp	Ala	Asp	Gly	Asp	Gly	Ile	Gly	Asp	Leu	Ala	
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Gly	Ile	Ala	Gln	Arg	Leu	Asp	Tyr	Leu	Ser	Trp	Leu	Gly	Val	Asp	Ala	
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Ile	Trp	Ile	Ser	Pro	Phe	Tyr	Thr	Ser	Pro	Met	Lys	Asp	Phe	Gly	Tyr	
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gac	att	caa	gac	tac	cgc	gat	gtc	gat	ccg	atc	ttc	ggc	acc	ctg	gcc	240
Asp	Ile	Gln	Asp	Tyr	Arg	Asp	Val	Asp	Pro	Ile	Phe	Gly	Thr	Leu	Ala	
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Asp	Phe	Asp	Ala	Leu	Ala	Ala	Arg	Ala	Arg	Ala	Leu	Gly	Leu	Lys	Leu	
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atc	ttg	gat	ttc	gtt	ccc	aac	cac	acc	tct	gat	cgg	cat	ccg	tgg	ttt	336
Ile	Leu	Asp	Phe	Val	Pro	Asn	His	Thr	Ser	Asp	Arg	His	Pro	Trp	Phe	
			100					105					110			
ctc	gaa	tcc	cgc	caa	tcg	ccc	gcc	agc	gcc	aag	cgc	gac	tgg	tac	atc	384
Leu	Glu	Ser	Arg	Gln	Ser	Pro	Ala	Ser	Ala	Lys	Arg	Asp	Trp	Tyr	Ile	
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Glu	Phe	Gly	Gly	Ser	Ala	Trp	Glu	Tyr	Asp	Glu	Ala	Ser	Gly	Gln	Tyr	
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Tyr	Tyr	His	Ala	Phe	Leu	Lys	Glu	Gln	Pro	Asp	Leu	Asn	Trp	Arg	Asn	
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Pro	Glu	Val	Arg	Ala	Ala	Met	Tyr	Asp	Ala	Met	Arg	Phe	Trp	Leu	Glu	
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Asp	Asp	Gln	Phe	Arg	Asp	Asn	Pro	Pro	Asn	Pro	Ala	Arg	Pro	Pro	Asn	
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Ala	Gly	Pro	Ala	Asn	Ala	Leu	Ile	Pro	Leu	Tyr	Thr	Ala	Asp	Arg	Pro	
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Glu	Val	His	Asp	Ile	Val	Arg	Glu	Met	Arg	Ala	Val	Val	Asp	Ala	Tyr	
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Pro	Glu	Arg	Val	Leu	Ile	Gly	Glu	Ile	Trp	Leu	Pro	Thr	Asp	Arg	Leu	
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Phe	Gln	Leu	Ile	Gly	Ala	Ala	Trp	Asp	Ala	Gly	Val	Ile	Lys	Glu	Ile	
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Arg	Gln	Ala	Arg	Leu	Ala	Met	Leu	Leu	Leu	Thr	Leu	Arg	Gly	Thr			
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ccc	acc	ctt	tac	tat	ggc	gac	gag	atc	gcc	atg	cgc	gac	gtg	ccg	atc	1104	
Pro	Thr	Leu	Tyr	Tyr	Gly	Asp	Glu	Ile	Ala	Met	Arg	Asp	Val	Pro	Ile		
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ccc	ccc	gac	cgg	gtc	tgc	gat	cct	tac	gaa	aag	aac	gtg	ccc	ggc	ctg	1152	
Pro	Pro	Asp	Arg	Val	Cys	Asp	Pro	Tyr	Glu	Lys	Asn	Val	Pro	Gly	Leu		
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Gly	Leu	Gly	Arg	Asp	Pro	Gln	Arg	Thr	Pro	Met	Gln	Trp	Glu	Asp	Ala		
						390				395					400		
ccc	cag	gcc	ggc	ttc	acc	cgc	gct	tcc	cga	tcc	tgg	ttg	ccg	atc	gcc	1248	
Pro	Gln	Ala	Gly	Phe	Thr	Arg	Ala	Ser	Arg	Ser	Trp	Leu	Pro	Ile	Ala		
				405				410						415			
gcc	gat	gcc	tca	acg	gtc	aat	gtc	gcc	caa	cgc	gcg	gcg	ccg	gcc		1296	
Ala	Asp	Ala	Ser	Thr	Val	Asn	Val	Ala	Gln	Arg	Ala	Ala	Pro	Ala			
							425					430					
tcg	atg	ctg	acc	ctc	gtc	cac	cgc	ctg	atc	gcc	ctg	cgc	aaa	gcc	gaa	1344	
Ser	Met	Leu	Thr	Leu	Val	His	Arg	Leu	Ile	Ala	Leu	Arg	Lys	Ala	Glu		
							440					445					
gcg	gcc	cta	act	atc	ggc	gat	tat	ggg	gcg	ctc	gac	gct	ccc	gag	cgg	1392	
Ala	Ala	Leu	Thr	Ile	Gly	Asp	Tyr	Gly	Ala	Leu	Asp	Ala	Pro	Glu	Arg		
						455					460						
gtg	gtg	atg	ttc	ctg	cgc	cgc	ggt	ccc	ggg	cgc	cgc	ctg	ctc	atc	gcc	1440	
Val	Val	Met	Phe	Leu	Arg	Arg	Val	Pro	Gly	Arg	Arg	Leu	Leu	Ile	Ala		
					470				475						480		
ctc	aat	ctg	ggg	gaa	agc	gcc	caa	agc	ctg	agc	ctg	ccc	ggc	gac	agc	1488	
Leu	Asn	Leu	Gly	Glu	Ser	Ala	Gln	Ser	Leu	Ser	Leu	Pro	Gly	Asp	Ser		
				485				490						495			
cgc	caa	gcc	acc	acc	ctg	ctg	tcc	acc	gac	ccg	gag	cgc	ccg	ctg	ggc	1536	
Arg	Gln	Ala	Thr	Thr	Leu	Leu	Ser	Thr	Asp	Pro	Glu	Arg	Pro	Leu	Gly		
							505						510				
gat	ctg	gcc	ccg	gcc	ttc	acc	ctt	ggc	ggc	gag	ggc	atc	gtc	gtt		1584	
Asp	Leu	Ala	Pro	Ala	Phe	Thr	Leu	Gly	Gly	Gly	Glu	Gly	Ile	Val	Val		
							520					525					
ttg	ctg	gcc	gac	cgg	gaa	acg	gcc	ccc	ccg	tcc	ccg	gcg	gcg	taa		1629	
Leu	Leu	Ala	Asp	Arg	Glu	Thr	Ala	Pro	Pro	Ser	Pro	Ala	Ala				
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<210> 244

<211> 542

<212> PRT

<213> Rhodospirillum rubrum

<400> 244

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			20					25					30				
Gly	Ile	Ala	Gln	Arg	Leu	Asp	Tyr	Leu	Ser	Trp	Leu	Gly	Val	Asp	Ala		
			35				40					45					
Ile	Trp	Ile	Ser	Pro	Phe	Tyr	Thr	Ser	Pro	Met	Lys	Asp	Phe	Gly	Tyr		
			50			55					60						
Asp	Ile	Gln	Asp	Tyr	Arg	Asp	Val	Asp	Pro	Ile	Phe	Gly	Thr	Leu	Ala		
					70					75					80		
Asp	Phe	Asp	Ala	Leu	Ala	Ala	Arg	Ala	Arg	Ala	Leu	Gly	Leu	Lys	Leu		
				85				90						95			
Ile	Leu	Asp	Phe	Val	Pro	Asn	His	Thr	Ser	Asp	Arg	His	Pro	Trp	Phe		
			100					105					110				
Leu	Glu	Ser	Arg	Gln	Ser	Pro	Ala	Ser	Ala	Lys	Arg	Asp	Trp	Tyr	Ile		
			115				120					125					
Trp	Arg	Asp	Pro	Ala	Ala	Asp	Gly	Gly	Pro	Pro	Thr	Asn	Trp	Leu	Ala		
			130			135					140						
Glu	Phe	Gly	Gly	Ser	Ala	Trp	Glu	Tyr	Asp	Glu	Ala	Ser	Gly	Gln	Tyr		
					150				155						160		
Tyr	Tyr	His	Ala	Phe	Leu	Lys	Glu	Gln	Pro	Asp	Leu	Asn	Trp	Arg	Asn		

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165 170 175
 Pro Glu Val Arg Ala Ala Met Tyr Asp Ala Met Arg Phe Trp Leu Glu
 180 185 190
 Arg Gly Val Asp Gly Phe Arg Val Asp Val Met Trp His Leu Ile Lys
 195 200 205
 Asp Asp Gln Phe Arg Asp Asn Pro Pro Asn Pro Ala Arg Pro Pro Asn
 210 215 220
 Ala Gly Pro Ala Asn Ala Leu Ile Pro Leu Tyr Thr Ala Asp Arg Pro
 225 230 235 240
 Glu Val His Asp Ile Val Arg Glu Met Arg Ala Val Val Asp Ala Tyr
 245 250 255
 Pro Glu Arg Val Leu Ile Gly Glu Ile Trp Leu Pro Thr Asp Arg Leu
 260 265 270
 Val Thr Tyr Tyr Gly His Asp Leu Arg Gly Ala His Leu Pro Phe Asn
 275 280 285
 Phe Gln Leu Ile Gly Ala Ala Trp Asp Ala Gly Val Ile Lys Glu Ile
 290 295 300
 Val Gly Asp Tyr Glu Lys Ala Leu Pro Arg Gly Gly Trp Pro Asn Trp
 305 310 315 320
 Val Met Gly Asn His Asp Lys Gly Arg Ile Ala Ser Arg Leu Gly Pro
 325 330 335
 Arg Gln Ala Arg Leu Ala Met Leu Leu Leu Thr Leu Arg Gly Thr
 340 345 350
 Pro Thr Leu Tyr Tyr Gly Asp Glu Ile Ala Met Arg Asp Val Pro Ile
 355 360 365
 Pro Pro Asp Arg Val Cys Asp Pro Tyr Glu Lys Asn Val Pro Gly Leu
 370 375 380
 Gly Leu Gly Arg Asp Pro Gln Arg Thr Pro Met Gln Trp Glu Asp Ala
 385 390 395 400
 Pro Gln Ala Gly Phe Thr Arg Ala Ser Arg Ser Trp Leu Pro Ile Ala
 405 410 415
 Ala Asp Ala Ser Thr Val Asn Val Ala Ala Gln Arg Ala Ala Pro Ala
 420 425 430
 Ser Met Leu Thr Leu Val His Arg Leu Ile Ala Leu Arg Lys Ala Glu
 435 440 445
 Ala Ala Leu Thr Ile Gly Asp Tyr Gly Ala Leu Asp Ala Pro Glu Arg
 450 455 460
 Val Val Met Phe Leu Arg Arg Val Pro Gly Arg Arg Leu Leu Ile Ala
 465 470 475 480
 Leu Asn Leu Gly Glu Ser Ala Gln Ser Leu Ser Leu Pro Gly Asp Ser
 485 490 495
 Arg Gln Ala Thr Thr Leu Leu Ser Thr Asp Pro Glu Arg Pro Leu Gly
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<210> 245

<211> 3303

<212> DNA

<213> Rhodospirillum rubrum

<220>

<221> CDS

<222> (1)..(3303)

<400> 245

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1				5				10					15			
gta	aaa	gcc	ttt	ttt	gat	tcg	aac	ggg	gac	ggg	ttc	ggc	gat	ttc	aag	96
Val	Lys	Ala	Phe	Phe	Asp	Ser	Asn	Gly	Asp	Gly	Phe	Gly	Asp	Phe	Lys	
			20					25					30			
ggg	ctg	acc	gaa	aag	ctg	gat	tac	ctc	tcc	gat	ctt	ggg	gtg	acg	gcg	144
Gly	Leu	Thr	Glu	Lys	Leu	Asp	Tyr	Leu	Ser	Asp	Leu	Gly	Val	Thr	Ala	
			35				40					45				
gtg	tgg	atc	ttg	ccg	ttc	tat	ccc	tcg	ccg	ctg	cgc	gat	gac	ggc	tat	192
Val	Trp	Ile	Leu	Pro	Phe	Tyr	Pro	Ser	Pro	Leu	Arg	Asp	Asp	Gly	Tyr	

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gat Asp	ttc Phe	cgc Arg	cgc Arg	ttc Phe 85	gtg Val	cgc Arg	gag Glu	gcc Ala	cat His 90	gag Glu	cgc Arg	ggg Gly	ttg Leu	aag Lys 95	gtc Val	288																
atc Ile	acc Thr	gaa Glu	ctg Leu 100	gtg Val	atc Ile	aat Asn	cac His	acc Thr 105	agc Ser	gat Asp	cag Gln	cac His	gcc Ala 110	tgg Trp	ttc Phe	336																
cag Gln	cgc Arg	gcc Ala 115	cgc Arg	gaa Glu	gcc Ala	aag Lys	ccc Pro 120	ggc Gly	agc Ser	aag Lys	gcc Ala 125	cgc Arg	gac Asp	atg Met	tac Tyr	384																
gtg Val	tgg Trp 130	tcc Ser	gac Asp	acc Thr	gac Asp	cag Gln 135	cgc Arg	tat Tyr	ttg Leu	gat Asp	acg Thr 140	cgc Arg	atc Ile	att Ile	ttc Phe	432																
acc Thr 145	gat Asp	acc Thr	gaa Glu	acc Thr	tcg Ser 150	tgg Asn	gcc Ala	tgg Trp	gat Asp 155	ccg Pro	ctg Leu	gcc Ala	aag Lys	gcc Ala 160	480																	
tat Tyr	tac Tyr	tgg Trp	cac His	cgc Arg 165	ttc Phe	ttc Phe	gcc Ala	cat His	cag Gln 170	ccc Pro	gat Asp	ctc Leu	aac Asn	tgg Trp 175	gac Asp	528																
aat Asn	ccg Pro	cga Arg	att Ile 180	ttc Phe	gag Glu	gag Glu	atc Ile	acc Thr 185	cgg Arg	gtg Val	atg Met	aag Lys	ttc Phe 190	tgg Trp	ctt Leu	576																
gat Asp	tgc Cys	ggc Gly 195	gtc Val	gat Asp	ggc Gly	atg Met	cgc Arg 200	ctg Leu	gac Asp	gcc Ala	att Ile	cct Pro 205	tat Tyr	ttg Leu	gtc Val	624																
gaa Glu	cgc Arg 210	gac Asp	ggc Gly	acg Thr	aat Asn	aac Asn 215	gaa Glu	aac Asn	ctg Leu	ccc Pro 220	gaa Glu 225	acc Thr	cat His	gtc Val	gtc Val	672																
ctc Leu 225	aag Lys	cgg Arg	ctg Leu	cgc Arg	gct Ala 230	tgg Trp	ctt Leu	gat Asp	gcc Ala 235	cat His 240	tat Tyr	gaa Glu	gac Asp	cgg Arg	atg Met 245	720																
ttc Phe	ctg Leu	gcc Ala	gag Glu	gcc Ala 245	aat Asn	caa Gln	tgg Trp	ccc Pro 250	gag Glu	gac Asp	gtg Val	cgc Arg	gag Glu	tat Tyr 255	ttc Phe	768																
ggc Gly	gaa Glu	gcc Ala	ggc Gly 260	gac Asp	gaa Glu	tgc Cys	cac His	atg Met 265	gcc Ala	ttc Phe	cac His	ttt Phe 270	ccg Pro	gtg Val	atg Met	816																
ccg Pro	cgc Arg	atc Ile 275	tat Tyr	atg Met	gcc Ala	gtg Val	gcc Ala 280	cag Gln	gaa Glu	gac Asp	cgc Arg	cat His 285	ccg Pro	atc Ile	acc Thr	864																
gat Asp	atc Ile 290	atg Met	cgc Arg	cag Gln	acc Thr	ccg Pro 295	gag Glu	atc Ile	cca Pro	gcg Ala	gct Ala 300	tgc Cys	caa Gln	tgg Trp	gcg Ala	912																
atc Ile 305	ttc Phe	ctg Leu	cgc Arg	aat Asn	cac His 310	gat Asp	gaa Glu	ctg Leu	acg Thr	ctc Leu 315	gaa Glu	atg Met	gtc Val	acc Thr	gac Asp 320	960																
cgc Arg	gag Glu	cgc Arg	gac Asp	tat Tyr 325	atg Met	aac Asn	acc Thr	ttc Phe	tat Tyr 330	gcc Ala	aat Asn	gat Asp	tcg Ser	cgg Arg 335	gcc Ala	1008																
cga Arg	atc Ile	aac Asn	gtc Val 340	ggc Gly	atc Ile	cgt Arg	cgg Arg	cgc Arg 345	ctg Leu	gcg Ala	cct Pro	ttg Leu 350	ctt Leu	gat Asp	aac Asn	1056																
gat Asp	cgc Arg	cgc Arg 355	aag Lys	atc Ile	gaa Glu	ttg Leu 360	ctc Asn	aac Ser	agc Leu	ctt Leu	ttg Leu 365	atg Met	tcg Ser	atg Met	ccg Pro	1104																
ggt Gly	acg Thr 370	ccg Pro	atc Ile	atc Ile	tat Tyr 375	tac Tyr	ggc Gly	gac Asp	gag Glu	atc Ile	ggc Gly 380	atg Met	ggc Gly	gac Asp	aat Asn	1152																
att Ile 385	ttc Phe	ctg Leu	ggc Gly	gat Asp	cgc Arg 390	gat Asp	ggc Gly	gtg Val	cgc Arg	acg Thr 395	ccc Pro	atg Met	caa Gln	tgg Trp	tcg Ser 400	1200																
ccc Pro	gac Asp	cgc Arg	aac Asn	ggc Gly 405	ggc Gly	ttt Phe	tcg Ser	cgg Arg	gcc Ala 410	gat Asp	ccc Pro	gcc Ala	tcg Ser	ctt Leu 415	tat Tyr	1248																
ctg Leu	ccg Pro	acg Thr	atc Ile	atg Met	gat Asp	gcg Ala	gtc Val	tat Tyr	ggc Gly	ttc Phe	ttc Phe	gcc Ala	gtc Val	aat Asn	gtc Val	1296																

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Glu	Ala	Gln	435	Ser	Arg	Ser	Pro	Ser	440	Ser	Leu	Leu	Asn	Trp	445	Met	Arg	Arg
ctg	atc	gcc	gtg	cgc	aag	cgc	cac	ccc	tcc	ttc	ggg	cgc	ggc	acc	ttg			1392
Leu	Ile	Ala	Val	Arg	Lys	Arg	His	Pro	Ser	Phe	Gly	Arg	Gly	Thr	Leu			
450						455					460							
cgc	ttt	ctc	tat	ccc	ggc	cgc	aag	atc	ctg	gct	tac	ttg	cgg	gaa				1440
Arg	Phe	Leu	Tyr	Pro	Gly	Asn	Arg	Lys	Ile	Leu	Ala	Tyr	Leu	Arg	Glu			
465					470					475					480			
ttc	gag	ggc	gag	gtg	atc	ttg	tgc	gtg	gcc	aat	ctg	tcg	cgt	gcc	ccg			1488
Phe	Glu	Gly	Glu	Val	Ile	Leu	Cys	Val	Ala	Asn	Leu	Ser	Arg	Ala	Pro			
				485					490					495				
cag	ccg	gcc	gaa	ttg	ggg	ctg	gcc	gag	ttt	tcc	ggg	cgg	gtt	ccg	gtc			1536
Gln	Pro	Ala	Glu	Leu	Gly	Leu	Ala	Glu	Phe	Ser	Gly	Arg	Val	Pro	Val			
			500					505					510					
gag	atg	ctg	ggc	aac	agc	gtc	ttt	ccg	ccg	atc	ggc	gag	ttg	cac	tat			1584
Glu	Met	Leu	Gly	Asn	Ser	Val	Phe	Pro	Pro	Ile	Gly	Glu	Leu	His	Tyr			
		515					520					525						
ttc	atc	acc	ctg	ccg	gcc	tat	ggc	ttc	tat	tgg	ttc	cgc	ctg	tcg	aag			1632
Phe	Ile	Thr	Leu	Pro	Ala	Tyr	Gly	Phe	Tyr	Trp	Phe	Arg	Leu	Ser	Lys			
	530					535					540							
ggc	gag	ggg	ccg	agc	tgg	cat	gaa	ccg	ccg	gtc	gag	ccc	ttg	ccc	gat			1680
Gly	Glu	Gly	Pro	Ser	Trp	His	Glu	Pro	Pro	Val	Glu	Pro	Leu	Pro	Asp			
545					550					555					560			
ctt	tcg	acc	ctg	gtt	ctt	ccc	cgt	atc	tgg	gac	agc	ctg	ggc	agc	gat			1728
Leu	Ser	Thr	Leu	Val	Leu	Pro	Arg	Ile	Trp	Asp	Ser	Leu	Gly	Ser	Asp			
				565					570					575				
ggg	ccc	ttg	cgc	cag	atc	cag	ggg	gat	atc	ctg	ccg	gcc	ttc	ctg	ccc			1776
Gly	Pro	Leu	Arg	Gln	Ile	Gln	Gly	Asp	Ile	Leu	Pro	Ala	Phe	Leu	Pro			
			580					585					590					
aag	caa	cgc	tgg	ttc	tct	ggc	aag	gag	cat	tcc	ctg	cgc	ggc	gtc	gag			1824
Lys	Gln	Arg	Trp	Phe	Ser	Gly	Lys	Glu	His	Ser	Leu	Arg	Gly	Val	Glu			
		595					600					605						
atg	acc	gac	cac	gcg	gtg	att	tcg	gcc	ccc	ggc	gcc	gct	tcg	ggc	tgg			1872
Met	Thr	Asp	His	Ala	Val	Ile	Ser	Ala	Pro	Gly	Ala	Ala	Ser	Gly	Trp			
		610				615					620							
atg	ctc	gcc	ctg	tgg	cgc	gcc	gat	tac	aag	gat	ggc	gcc	ccg	ggg	caa			1920
Met	Leu	Ala	Leu	Trp	Arg	Ala	Asp	Tyr	Lys	Asp	Gly	Ala	Pro	Gly	Gln			
625					630					635					640			
acc	ttc	caa	ttg	ccc	ctt	gat	atc	gcc	tgg	gaa	agt	cgc	gag	gac	gat			1968
Thr	Phe	Gln	Leu	Pro	Leu	Asp	Ile	Ala	Trp	Glu	Ser	Arg	Glu	Asp	Asp			
				645					650					655				
ccc	ttg	tcc	cgg	ctg	ctg	ccc	ttt	acc	ttg	gcc	cgg	gtg	cgg	cgg	gtc			2016
Pro	Leu	Ser	Arg	Leu	Leu	Pro	Phe	Thr	Leu	Ala	Arg	Val	Arg	Arg	Val			
			660					665					670					
aac	cgc	gtt	ggc	gcc	ctc	tat	gac	gcc	atg	gcc	ggc	ccg	gct	ttc	ccg			2064
Asn	Arg	Val	Gly	Ala	Leu	Tyr	Asp	Ala	Met	Ala	Gly	Pro	Ala	Phe	Pro			
		675					680					685						
ctc	gcc	ttg	gtg	cag	gcg	atg	gcc	gaa	ggc	gcg	aac	gtg	acg	acg	gcc			2112
Leu	Ala	Leu	Val	Gln	Ala	Met	Ala	Glu	Gly	Ala	Asn	Val	Thr	Thr	Ala			
		690				695					700							
aag	ggc	ggc	ggt	ttg	cgc	ttc	acc	cgg	acc	cag	gcc	ttc	ccc	gcc	ggc			2160
Lys	Gly	Gly	Gly	Leu	Arg	Phe	Thr	Arg	Thr	Gln	Ala	Phe	Pro	Ala	Gly			
705					710					715					720			
ccg	ctt	ccc	ggc	ccc	gaa	gcg	gtg	gcc	cgc	ctg	ggg	cgt	gag	caa	tcc			2208
Pro	Leu	Pro	Gly	Pro	Glu	Ala	Val	Ala	Arg	Leu	Gly	Arg	Glu	Gln	Ser			
				725					730					735				
aac	acc	tcg	atc	aaa	ctt	ggc	gag	gat	atg	gtt	ctc	aag	ctc	tat	cgc			2256
Asn	Thr	Ser	Ile	Lys	Leu	Gly	Glu	Asp	Met	Val	Leu	Lys	Leu	Tyr	Arg			
			740					745					750					
cgg	gtc	gag	gcc	ggg	att	cat	cca	gaa	atc	gaa	atc	ggc	cgc	ttc	ctg			2304
Arg	Val	Glu	Ala	Gly	Ile	His	Pro	Glu	Ile	Glu	Ile	Gly	Arg	Phe	Leu			
		755					760					765						
acc	gat	gtc	gcc	ggc	ttc	gcc	aac	gcc	ccg	ccg	ctg	ctt	ggc	gcg	ctc			2352
Thr	Asp	Val	Ala	Gly	Phe	Ala	Asn	Ala	Pro	Pro	Leu	Leu	Gly	Ala	Leu			
		770				775					780							
gag	cat	atc	gat	gct	aag	ggc	gcc	atc	tcg	gcc	ctg	gcg	gtg	ctg	cag			2400
Glu	His	Ile	Asp	Ala	Lys	Gly	Ala	Ile	Ser	Ala	Leu	Ala	Val	Leu	Gln			

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	ctc	gac	cgc	ttc	ctc	gac	gac	agg	gcc	cag	gcg	ccg	gcc	gag	gtc	ggc			2496
	Leu	Asp	Arg	Phe	Leu	Asp	Asp	Arg	Ala	Gln	Ala	Pro	Ala	Glu	Val	Gly			
				820					825						830				
	gag	ggc	ggc	ggg	ccg	gcc	ggc	tcg	ccc	cat	ggc	atc	atc	cac	gcc	cag			2544
	Glu	Gly	Gly	Gly	Pro	Ala	Gly	Ser	Pro	His	Gly	Ile	Ile	His	Ala	Gln			
				835				840						845					
	gcc	gat	atc	ctt	ggc	cag	cgc	gtc	gcc	gag	ctt	cac	cac	gcc	ttc	gcc			2592
	Ala	Asp	Ile	Leu	Gly	Gln	Arg	Val	Ala	Glu	Leu	His	His	Ala	Phe	Ala			
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	Thr	Pro	Thr	Glu	Asp	Pro	Ala	Phe	Ser	Ala	Glu	Ala	Val	Gly	Pro	Glu			
							870						875						
	gat	ctg	gcg	agc	tgg	cgc	gag	caa	gtg	cgc	acc	cag	gcg	gcc	cag	gcc			2688
	Asp	Leu	Ala	Ser	Trp	Arg	Glu	Gln	Val	Arg	Thr	Gln	Ala	Ala	Gln	Ala			
					885										895				
	cgt	cag	gcc	ctt	gac	acc	gcc	ttg	ccc	ggg	ctg	tcc	gca	gag	gtg	gcg			2736
	Arg	Gln	Ala	Leu	Asp	Thr	Ala	Leu	Pro	Gly	Leu	Ser	Ala	Glu	Val	Ala			
				900					905						910				
	ggg	ctg	gtc	acc	cga	ctg	ctg	gac	tgc	tgg	gag	cgg	atc	gac	gcc	cgc			2784
	Gly	Leu	Val	Thr	Arg	Leu	Leu	Asp	Cys	Trp	Glu	Arg	Ile	Asp	Ala	Arg			
				915				920						925					
	gtc	gac	gcg	ccg	att	tct	ttg	gcc	gag	ggg	ctg	gtc	aaa	acc	cgc	atc			2832
	Val	Asp	Ala	Pro	Ile	Ser	Leu	Ala	Glu	Gly	Leu	Val	Lys	Thr	Arg	Ile			
							935						940						
	cat	ggc	gac	ctt	cat	ctg	ggg	cag	gtg	gtg	gtg	gtg	cgc	gat	gac	ttc			2880
	His	Gly	Asp	Leu	His	Leu	Gly	Gln	Val	Val	Val	Val	Arg	Asp	Asp	Phe			
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	His	Ile	Leu	Asp	Phe	Glu	Gly	Glu	Pro	Val	Lys	Gly	Leu	Ser	Glu	Arg			
					965					970					975				
	cgc	gac	aaa	cac	tgc	ccg	ttg	aaa	gac	gtg	gcc	ggc	atg	ctt	cgc	tcg			2976
	Arg	Asp	Lys	His	Cys	Pro	Leu	Lys	Asp	Val	Ala	Gly	Met	Leu	Arg	Ser			
				980					985					990					
	ttc	gat	tac	gcg	gcg	tgg	tcg	gcg	gcg	ctg	agc	ttc	cgc	caa	acc	cat			3024
	Phe	Asp	Tyr	Ala	Ala	Trp	Ser	Ala	Ala	Leu	Ser	Phe	Arg	Gln	Thr	His			
							1000						1005						
	gcc	gag	gtg	cgg	atc	gac	gta	ctg	ccc	gcg	ctt	ggc	gtt	tgg	cag	gag			3072
	Ala	Glu	Val	Arg	Ile	Asp	Val	Leu	Pro	Ala	Leu	Gly	Val	Trp	Gln	Glu			
							1015						1020						
	gaa	atc	cgc	gag	gct	ttc	ctc	gcc	ggc	tat	gac	cgg	gcc	atc	gcc	gga			3120
	Glu	Ile	Arg	Glu	Ala	Phe	Leu	Ala	Gly	Tyr	Asp	Arg	Ala	Ile	Ala	Gly			
						1030						1035				1040			
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	Cys	Pro	Ser	Val	Pro	Ala	Leu	Glu	Glu	Gly	Arg	Arg	Asp	Leu	Leu	Ser			
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	Leu	Phe	Met	Leu	Glu	Lys	Ala	Leu	Tyr	Glu	Val	Ser	Tyr	Glu	Ala	Ala			
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	Asn	Arg	Pro	Asp	Trp	Leu	Arg	Ile	Pro	Ile	Gly	Gly	Val	Leu	Arg	Leu			
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<211> 1100

<212> PRT

<213> Rhodospirillum rubrum

<400> 246

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Asp	Ile	Ala	Asp	Tyr	Lys	Ala	Ile	His	Arg	Ala	Tyr	Gly	Thr	Met	Gly
Asp	Phe	Arg	Arg	Phe	Val	Arg	Glu	Ala	His	Glu	Arg	Gly	Leu	Lys	Val
Ile	Thr	Glu	Leu	Val	Ile	Asn	His	Thr	Ser	Asp	Gln	His	Ala	Trp	Phe
Gln	Arg	Ala	Arg	Glu	Ala	Lys	Pro	Gly	Ser	Lys	Ala	Arg	Asp	Met	Tyr
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Thr	Asp	Thr	Glu	Thr	Ser	Asn	Trp	Ala	Trp	Asp	Pro	Leu	Ala	Lys	Ala
Tyr	Tyr	Trp	His	Arg	Phe	Phe	Ala	His	Gln	Pro	Asp	Leu	Asn	Trp	Asp
Asn	Pro	Arg	Ile	Phe	Glu	Glu	Ile	Thr	Arg	Val	Met	Lys	Phe	Trp	Leu
Asp	Cys	Gly	Val	Asp	Gly	Met	Arg	Leu	Asp	Ala	Ile	Pro	Tyr	Leu	Val
Glu	Arg	Asp	Gly	Thr	Asn	Asn	Glu	Asn	Leu	Pro	Glu	Thr	His	Val	Val
Leu	Lys	Arg	Leu	Arg	Ala	Trp	Leu	Asp	Ala	His	Tyr	Glu	Asp	Arg	Met
Phe	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	Glu	Asp	Val	Arg	Glu	Tyr	Phe
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Pro	Arg	Ile	Tyr	Met	Ala	Val	Ala	Gln	Glu	Asp	Arg	His	Pro	Ile	Thr
Asp	Ile	Met	Arg	Gln	Thr	Pro	Glu	Ile	Pro	Ala	Ala	Cys	Gln	Trp	Ala
Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	Thr	Asp
Arg	Glu	Arg	Asp	Tyr	Met	Asn	Thr	Phe	Tyr	Ala	Asn	Asp	Ser	Arg	Ala
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Gly	Thr	Pro	Ile	Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly	Asp	Asn
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Pro	Asp	Arg	Asn	Gly	Gly	Phe	Ser	Arg	Ala	Asp	Pro	Ala	Ser	Leu	Tyr
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Glu	Ala	Gln	Ser	Arg	Ser	Pro	Ser	Leu	Leu	Asn	Trp	Met	Arg	Arg	
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 Met 610 Leu Ala Leu Trp Arg 615 Ala Asp Tyr Lys Asp 620 Gly Ala Pro Gly Gln
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 Pro Leu Ser Arg 645 Leu Leu Pro Phe Thr 650 Leu Ala Arg Val Arg Arg Val
 Asn Arg Val 660 Gly Ala Leu Tyr Asp 665 Ala Met Ala Gly Pro Ala Phe Pro
 Leu Ala 675 Leu Val Gln Ala Met 680 Glu Gly Ala Asn Val Thr Thr Ala
 Lys 690 Gly Gly Gly Leu Arg 695 Phe Thr Arg Thr Gln Ala Phe Pro Ala Gly
 705 Pro Leu Pro Gly Pro 710 Glu Ala Val Ala Arg 715 Leu Gly Arg Glu Gln Ser
 Asn Thr Ser Ile 725 Lys Leu Gly Glu Asp 730 Met Val Leu Lys Leu Tyr Arg
 Arg Val Glu 740 Ala Gly Ile His Pro 745 Glu Ile Glu Ile Gly Arg Phe Leu
 Thr Asp 755 Val Ala Gly Phe Ala 760 Asn Ala Pro Pro Leu Leu Gly Ala Leu
 Glu 770 His Ile Asp Ala Lys 775 Gly Ala Ile Ser Ala Leu Ala Val Leu Gln
 785 Gly Phe Val Arg Asn 790 Gln Gly Asp Gly Trp 795 Asp Tyr Met Leu Ala Tyr
 Leu Asp Arg Phe 805 Leu Asp Asp Arg Ala 810 Gln Ala Pro Ala Glu Val Gly
 Glu Gly Gly Gly 820 Pro Ala Gly Ser Pro His Gly Ile Ile His Ala Gln
 Ala Asp 835 Ile Leu Gly Gln Arg 840 Val Ala Glu Leu His Ala Phe Ala
 Thr 850 Pro Thr Glu Asp Pro 855 Ala Phe Ser Ala Glu Ala Val Gly Pro Glu
 865 Asp Leu Ala Ser Trp 870 Arg Glu Gln Val Arg Thr Gln Ala Ala Gln Ala
 Arg Gln Ala Leu Asp Thr Ala Leu Pro Gly Leu Ser Ala Glu Val Ala
 Gly Leu Val Thr Arg Leu Leu Asp Cys Trp Glu Arg Ile Asp Ala Arg
 Val Asp 915 Ala Pro Ile Ser Leu 920 Ala Glu Gly Leu Val Lys Thr Arg Ile
 His 930 Gly Asp Leu His Leu 935 Gly Gln Val Val Val Arg Asp Asp Phe
 945 His Ile Leu Asp Phe 950 Glu Gly Glu Pro Val Lys Gly Leu Ser Glu Arg
 Arg Asp Lys His 965 Cys Pro Leu Lys Asp Val Ala Gly Met Leu Arg Ser
 Phe Asp Tyr 980 Ala Trp Ser Ala 985 Leu Ser Phe Arg Gln Thr His
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 1010 Glu Ile Arg Glu Ala Phe 1015 Leu Ala Gly Tyr Asp Arg Ala Ile Ala Gly
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<213> Burkholderia fungorum LB400

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Ala Ala Thr Gly Gly Val Ala Lys Ala Arg Thr His Arg Arg Gly Lys	
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Pro Ala Ala Leu Ser Asp Asp Pro Leu Trp Tyr Lys Asp Ala Ile Ile	
35 40 45	
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Tyr Gln Val His Ile Lys Ser Phe Phe Asp Ala Asn Asn Asp Gly Val	
50 55 60	
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Gly Asp Phe Pro Gly Leu Ile Ala Lys Leu Asp Tyr Ile Ala Glu Leu	
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Asp Asp Gly Tyr Asp Ile Ala Asp Tyr Arg Asn Val His Pro Asp Tyr	
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115 120 125	
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Gly Ile Arg Val Ile Thr Glu Leu Val Ile Asn His Thr Ser Asp Gln	
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cat ccg tgg ttt cag cgc gcg cgc gcg aag ccg ggt tcg aac cac	480
His Pro Trp Phe Gln Arg Ala Arg Arg Ala Lys Pro Gly Ser Asn His	
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Arg Asn Tyr Tyr Val Trp Ser Asn Thr Asp Gln Lys Tyr Leu Glu Thr	
165 170 175	
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Arg Ile Ile Phe Ile Asp Ser Glu Pro Ser Asn Trp Thr His Asp Pro	
180 185 190	
gta gcg ggc gcg tat tac tgg cac cgc ttc tac tcg cat cag ccc gat	624
Val Ala Gly Ala Tyr Tyr Trp His Arg Phe Tyr Ser His Gln Pro Asp	
195 200 205	
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Leu Asn Phe Asp Asn Pro Ala Val Leu Arg Glu Val Leu Gln Val Met	
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Pro Tyr Leu Val Glu Arg Glu Gly Thr Asn Asn Glu Asn Leu Pro Glu	
245 250 255	
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Thr His Ala Val Leu Lys Lys Ile Arg Ala Thr Ile Asp Ala Glu Tyr	
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Lys Glu Tyr Phe Gly Asp Glu Asp Glu Cys His Met Ala Phe His Phe	
290 295 300 305	
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Pro Leu Met Pro Arg Ile Tyr Met Ser Ile Ala Ser Glu Asp Arg Phe	
310 315 320	
ccg atc acc gac atc atg cgg caa aca ccg gac ctc gcc gaa acg aac	1008
Pro Ile Thr Asp Ile Met Arg Gln Thr Pro Asp Leu Ala Glu Thr Asn	

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Met	Glu	Arg	Asp	Arg	Arg	Arg	Ile	Glu	Leu	Ile	Asn	Ser	Leu	Leu	Leu				
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Gln	Leu	Val	Leu	Pro	Pro	Val	Met	Gly	Ser	Leu	Tyr	Gly	Phe	Asp	Ala				
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Asn	Gln	Gly	Asp	Ala	Trp	Asn	Trp	Ser	Leu	Asp	Tyr	Leu	Arg	Arg	Ser		
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Pro	Thr	Asp	Asp	Pro	Ala	Phe	Ala	Pro	Glu	Pro	Ala	Ser	Ala	Glu	Gln		
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His	Gly	Asp	Phe	His	Leu	Gly	Gln	Val	Leu	Val	Ala	Gln	Gly	Asp	Ala		
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tat	ctg	atc	gac	ttt	gaa	ggc	gag	ccg	gca	cg	acg	ctc	gaa	caa	cgt	3024	
Tyr	Leu	Ile	Asp	Phe	Glu	Gly	Glu	Pro	Ala	Arg	Thr	Leu	Glu	Gln	Arg		
			995				1000					1005					
cgt	cag	aaa	tcg	agc	ccg	ttg	cg	gac	gtg	gcc	ggt	ctg	ctg	cg	tcg	3072	
Arg	Gln	Lys	Ser	Ser	Pro	Leu	Arg	Asp	Val	Ala	Gly	Leu	Leu	Arg	Ser		
			1010			1015					1020						
ctc	tca	tat	gcc	agc	gcg	gcc	gcg	caa	tcc	acc	acg	gaa	gcc	gcg	ccg	3120	
Leu	Ser	Tyr	Ala	Ser	Ala	Ala	Ala	Gln	Ser	Thr	Thr	Glu	Ala	Ala	Pro		
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caa	cag	acc	gcc	gat	cg	aag	cg	gcg	ctg	ttc	gac	cgt	ttc	cg	gcg	3168	
Gln	Gln	Thr	Ala	Asp	Arg	Lys	Arg	Ala	Leu	Phe	Asp	Arg	Phe	Arg	Ala		
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cat	gcc	gcg	gag	aag	ttc	ctc	aac	gag	tac	cg	gcg	gcc	gct	gcg	gaa	3216	
His	Ala	Ala	Glu	Lys	Phe	Leu	Asn	Glu	Tyr	Arg	Ala	Ala	Ala	Ala	Glu		

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gcg	gca	acg	ccg	ctc	gtc	gcg	ccc	gaa	gcc	gaa	cag	gcc	ttg	ctc	gat	3264						
Ala	Ala	Thr	Pro	Leu	Val	Ala	Pro	Glu	Ala	Glu	Gln	Ala	Leu	Leu	Asp							
	1075						1080						1085									
ctg	ttc	ctg	atc	gaa	aaa	gcc	gcg	tac	gaa	atc	cgt	tac	gaa	gcg	gcc	3312						
Leu	Phe	Leu	Ile	Glu	Lys	Ala	Ala	Tyr	Glu	Ile	Arg	Tyr	Glu	Ala	Ala							
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aac	cgc	ccg	acg	tgg	ctc	agc	ctg	ccg	gta	cgc	ggc	ctt	gcc	gcg	ctc	3360						
Asn	Arg	Pro	Thr	Trp	Leu	Ser	Leu	Pro	Val	Arg	Gly	Leu	Ala	Ala	Leu							
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acc	agc	cgc	ctg	ctc	ggc	gat	acc	ggc	gcg	ccg	ggc	cac	gat	tcc	tca	3408						
Thr	Ser	Arg	Leu	Leu	Gly	Asp	Thr	Gly	Ala	Pro	Gly	His	Asp	Ser	Ser							
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Asn	Gln	Ala	Pro	Gly	Ala	Ala	Thr	Pro	Pro	Asn	Pro	Ala	Glu	Gly	Asp							
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Pro	Ala	Ala	Leu	Ser	Asp	Asp	Pro	Leu	Trp	Tyr	Lys	Asp	Ala	Ile	Ile	
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Tyr	Gln	Val	His	Ile	Lys	Ser	Phe	Phe	Asp	Ala	Asn	Asn	Asp	Gly	Val	
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Gly	Asp	Phe	Pro	Gly	Leu	Ile	Ala	Lys	Leu	Asp	Tyr	Ile	Ala	Glu	Leu	
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Gly	Val	Asn	Ala	Ile	Trp	Leu	Leu	Pro	Phe	Tyr	Pro	Ser	Pro	Arg	Arg	
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Asp	Asp	Gly	Tyr	Asp	Ile	Ala	Asp	Tyr	Arg	Asn	Val	His	Pro	Asp	Tyr	
			100					105					110			
Gly	Asn	Leu	Ser	Asp	Val	Lys	Arg	Phe	Ile	Gln	Glu	Ala	His	Ala	Arg	
		115					120					125				
Gly	Ile	Arg	Val	Ile	Thr	Glu	Leu	Val	Ile	Asn	His	Thr	Ser	Asp	Gln	
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His	Pro	Trp	Phe	Gln	Arg	Ala	Arg	Arg	Ala	Lys	Pro	Gly	Ser	Asn	His	
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Arg	Ile	Ile	Phe	Ile	Asp	Ser	Glu	Pro	Ser	Asn	Trp	Thr	His	Asp	Pro	
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Val	Ala	Gly	Ala	Tyr	Tyr	Trp	His	Arg	Phe	Tyr	Ser	His	Gln	Pro	Asp	
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Leu	Asn	Phe	Asp	Asn	Pro	Ala	Val	Leu	Arg	Glu	Val	Leu	Gln	Val	Met	
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Pro	Tyr	Leu	Val	Glu	Arg	Glu	Gly	Thr	Asn	Glu	Asn	Leu	Pro	Glu		
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Thr	His	Ala	Val	Leu	Lys	Lys	Ile	Arg	Ala	Thr	Ile	Asp	Ala	Glu	Tyr	
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Pro	Asn	Arg	Met	Leu	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	Glu	Asp	Val	
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Lys	Glu	Tyr	Phe	Gly	Asp	Glu	Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	
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Pro	Leu	Met	Pro	Arg	Ile	Tyr	Met	Ser	Ile	Ala	Ser	Glu	Asp	Arg	Phe	
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Pro	Ile	Thr	Asp	Ile	Met	Arg	Gln	Thr	Pro	Asp	Leu	Ala	Glu	Thr	Asn	

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Arg	Arg	355	Ala	Arg	Leu	Asn	Leu	360	Gly	Ile	Arg	Arg	380	Leu	Ala	Pro	Leu	Asp
Met	Glu	Arg	Asp	Arg	Arg	390	Pro	Val	Ile	Tyr	410	Gly	Asp	Glu	Leu	Gly	Met	Leu
Ser	Met	Pro	Gly	Thr	405	Leu	Gly	Asp	Arg	425	Asp	Gly	Val	Arg	Thr	430	Pro	Met
Gly	Asp	Asn	Ile	420	His	Leu	Gly	Asp	Arg	440	Gly	Phe	Ser	Arg	Ala	Asp	Pro	Glu
Gln	Trp	Ser	Ser	Asp	Arg	Asn	Gly	440	Met	Gly	Ser	Leu	Tyr	460	Gly	Phe	Asp	Ala
Gln	Leu	Val	Leu	Pro	Pro	Val	455	Ser	Arg	Asp	Pro	His	Ser	Leu	Leu	Asn	Trp	480
Val	Asn	Val	Glu	Ala	Gln	470	Ser	Arg	Asp	Pro	His	475	Ser	Leu	Leu	Asn	Trp	480
Thr	Arg	Arg	Met	Leu	Ala	Thr	Arg	Arg	Ala	490	Lys	Gln	Thr	Phe	Gly	495	Arg	Asp
Gly	Thr	Ile	Arg	500	Phe	Leu	Lys	Pro	Glu	505	Asn	Arg	Lys	Ile	Leu	Ala	Tyr	Asp
Leu	Arg	Glu	Met	Pro	Gly	Glu	Pro	520	Glu	Leu	Asp	Leu	Ser	540	Glu	Phe	Asp	Gly
Ser	Arg	Ala	Pro	Gln	Ala	Val	535	Thr	Ala	Asp	Ser	Val	555	Phe	Pro	Pro	Ile	Gly
Ser	Val	Pro	Ile	Glu	Met	550	Leu	Thr	Phe	Pro	Pro	Tyr	Gly	Phe	Leu	Trp	Phe	560
Gln	Leu	Thr	Tyr	Leu	Leu	Thr	Phe	Pro	Pro	570	Thr	Trp	Ala	Gln	Ala	590	Pro	Ser
Met	Leu	Cys	Pro	580	Gly	Gly	Gln	Arg	Pro	585	Ile	Val	Ile	Arg	Glu	605	Gln	Val
Glu	Pro	Leu	Pro	Glu	Phe	Val	Thr	600	Arg	Leu	Leu	Glu	Ser	620	Glu	Val	Leu	Pro
Gly	Pro	Thr	Pro	Glu	Asn	Val	615	Arg	Leu	Leu	Glu	Ser	620	Glu	Val	Leu	Pro	Asp
Ser	Trp	Leu	Ser	Arg	Arg	630	Trp	Phe	Ala	Ser	635	Lys	Asp	Gln	Lys	Leu	640	Asp
Asn	Ala	Val	Arg	Leu	Ala	Ala	Leu	Thr	Thr	650	Gly	Lys	His	Thr	Glu	670	Arg	Tyr
Ala	Phe	Thr	Glu	Ile	Glu	Ala	Asp	Val	665	Gly	Gly	Glu	Thr	Thr	685	Phe	Pro	Leu
Val	Val	Pro	Ile	Ala	Ile	Thr	Trp	680	Arg	Val	Arg	Arg	Gly	Arg	Asn	Val	Gly	Asp
Phe	Lys	Gln	Leu	Ala	Leu	Ala	695	Arg	Val	Arg	Arg	Arg	Gly	Arg	Asn	Val	Gly	Asp
His	Leu	Thr	Asp	Ala	Phe	710	Ala	Leu	Pro	Ile	Phe	715	Ala	His	Gly	Val	Met	720
Arg	Lys	Leu	Arg	Glu	Arg	Ala	Val	Val	Pro	730	Thr	Val	Gln	Lys	Ser	735	Glu	Asp
Ile	Arg	Phe	Leu	Pro	Thr	Glu	Arg	Phe	745	Ala	Glu	Leu	Glu	Gly	Leu	Gly	Asp	Asp
Glu	Arg	Pro	Glu	Ile	Arg	Trp	Leu	760	Ala	Ala	Glu	Gln	Ser	765	Asn	Ser	Ser	Asp
Leu	Ile	Ile	Ala	Asp	Ala	Ala	Val	Leu	Lys	Leu	Val	Arg	Arg	Leu	Val	Asp	Val	Asp
Ser	Gly	Ile	His	Pro	Glu	Ala	Glu	Ile	Ser	Arg	795	Tyr	Leu	Thr	Gln	Leu	800	Asp
Gly	Tyr	Ala	Asn	Thr	805	Ala	Pro	Leu	Tyr	Gly	810	Glu	Val	Val	Arg	Val	815	Asp
Pro	Glu	Gly	Val	Pro	His	Thr	Leu	Cys	825	Ile	Leu	Gln	Gly	Tyr	830	Ile	Asp	Asp
Asn	Gln	Gly	Asp	Ala	Trp	Asn	Trp	840	Ser	Leu	Asp	Tyr	Leu	Arg	Arg	Ser	Ser	Asp
Val	Asp	Glu	Leu	Ala	Ile	Ala	Val	Asp	Thr	Glu	Thr	860	Gln	Ser	Val	Pro	Pro	Asp
Asp	Arg																	

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Pro Thr Asp Asp⁹⁰⁰ Pro Ala Phe Ala⁹⁰⁵ Pro Glu Pro Ala Ser⁹¹⁰ Ala Glu Gln
 Val Lys Ala⁹¹⁵ Trp Val Asp Gly Thr⁹²⁰ Gln Ala Met Leu Ala⁹²⁵ Ser Ala Leu
 Asp⁹³⁰ Leu Leu Ala Pro Arg Ile⁹³⁵ Glu Gln Met Ser⁹⁴⁰ Thr Glu Thr Arg
 Ala⁹⁴⁵ Leu Ala Gln Ser Leu⁹⁵⁰ Ile Asp Arg Arg Ala⁹⁵⁵ Leu Val Ala Ala⁹⁶⁰
 Val Asp Ser Leu⁹⁶⁵ Val Ser Ala Asn Ala⁹⁷⁰ Gly Ala Leu Arg Ile Arg⁹⁷⁵ Ile
 His Gly Asp Phe⁹⁸⁰ His Leu Gly Gln Val⁹⁸⁵ Leu Val Ala Gln Gly⁹⁹⁰ Asp Ala
 Tyr Leu Ile⁹⁹⁵ Asp Phe Glu Gly Glu¹⁰⁰⁰ Pro Ala Arg Thr¹⁰⁰⁵ Leu Glu Gln Arg
 Arg Gln Lys Ser Ser Pro Leu¹⁰¹⁵ Arg Asp Val Ala Gly¹⁰²⁰ Leu Leu Arg Ser
 Leu Ser Tyr Ala Ser¹⁰³⁰ Ala Ala Ala Gln Ser Thr¹⁰³⁵ Thr Glu Ala Ala Pro¹⁰⁴⁰
 Gln Gln Thr Ala¹⁰⁴⁵ Asp Arg Lys Arg Ala Leu Phe Asp Arg Phe Arg Ala¹⁰⁵⁵
 His Ala Ala Glu Lys Phe Leu Asn Glu Tyr Arg Ala Ala Ala¹⁰⁶⁰ Ala Glu
 Ala Ala Thr¹⁰⁷⁵ Pro Leu Val Ala Pro Glu Ala Glu Gln Ala¹⁰⁸⁰ Leu Leu Asp
 Leu Phe¹⁰⁹⁰ Leu Ile Glu Lys¹⁰⁹⁵ Ala Tyr Glu Ile Arg Tyr Glu Ala Ala
 Asn Arg Pro Thr Trp Leu¹¹¹⁰ Ser Leu Pro Val Arg Gly¹¹¹⁵ Leu Ala Ala Leu¹¹²⁰
 Thr Ser Arg Leu¹¹²⁵ Glu Asp Thr Gly Ala Pro Gly His Asp Ser Ser¹¹³⁵
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<212> DNA

<213> Thermobifida fusca

<220>

<221> CDS

<222> (1)..(1821)

<400> 249

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gtt ccc gac acg ttc acc cac gca aag ccg cgc gac ccc tac tgg tac	96
Val Pro Asp Thr Phe Thr His Ala Lys Pro Arg Asp Pro Tyr Trp Tyr	
20 25 30	
aag cac gcg gtg ttc tac gaa gtc ctc gtc cgc ggc ttc tac gac tcc	144
Lys His Ala Val Phe Tyr Glu Val Leu Val Arg Gly Phe Tyr Asp Ser	
35 40 45	
aac ggg gac ggc acc ggc gac ttg cgg ggc ctc atc gaa aaa ctg gac	192
Asn Gly Asp Gly Thr Gly Asp Leu Arg Gly Leu Ile Glu Lys Leu Asp	
50 55 60	
tac ctg cag tgg ctc ggc atc gac tgc ctc tgg ctg ctg ccg atc tac	240
Tyr Leu Gln Trp Leu Gly Ile Asp Cys Leu Trp Leu Leu Pro Ile Tyr	
65 70 75 80	
gag tcc ccg ctc cgc gac ggc ggc tac gac gtc tcc gac tac atg aag	288
Glu Ser Pro Leu Arg Asp Gly Gly Tyr Asp Val Ser Asp Tyr Met Lys	
85 90 95	
atc ctg ccc gag ttc ggc cgg atc tcc gac ttc gtg gaa ctc gtc gaa	336
Ile Leu Pro Glu Phe Gly Arg Ile Ser Asp Phe Val Glu Leu Val Glu	
100 105 110	
aaa gcc cac cag cgg ggc atc cgg gtc atc acc gac ctg gtc atg aac	384
Lys Ala His Gln Arg Gly Ile Arg Val Ile Thr Asp Leu Val Met Asn	
115 120 125	

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His	Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Ala	Ser	Arg	His	Asp	Pro	
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gac	gga	ccg	tac	ggc	aac	ttc	tac	gtc	tgg	tcg	gac	acc	acg	gaa	cgc	480
Asp	Gly	Pro	Tyr	Gly	Asn	Phe	Tyr	Val	Trp	Ser	Asp	Thr	Thr	Glu	Arg	
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tac	agc	gac	gcg	cgc	atc	ttc	atc	gac	acc	gag	cag	tcc	aac	tgg		528
Tyr	Ser	Asp	Ala	Arg	Ile	Ile	Phe	Ile	Asp	Thr	Glu	Gln	Ser	Asn	Trp	
				165					170					175		
acc	tac	gac	gaa	gtg	cgc	gga	cag	tac	tac	tgg	cac	cgc	ttc	ttc	tcc	576
Thr	Tyr	Asp	Glu	Val	Arg	Gly	Gln	Tyr	Tyr	Trp	His	Arg	Phe	Phe	Ser	
			180					185					190			
cac	cag	ccc	gac	ctc	aac	ttc	gag	aac	ccg	gac	gtc	cag	gac	gcc	atc	624
His	Gln	Pro	Asp	Leu	Asn	Phe	Glu	Asn	Pro	Asp	Val	Gln	Asp	Ala	Ile	
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ctc	gaa	gtg	atg	cgg	ttc	tgg	ctg	gac	ctt	ggc	atc	gac	ggg	ttc	cgc	672
Leu	Glu	Val	Met	Arg	Phe	Trp	Leu	Asp	Leu	Gly	Ile	Asp	Gly	Phe	Arg	
210						215					220					
ttg	gac	gcc	gtg	ccc	tac	ctg	tac	gag	cgg	gaa	ggc	acg	aac	tgc	gag	720
Leu	Asp	Ala	Val	Pro	Tyr	Leu	Tyr	Glu	Arg	Glu	Gly	Thr	Asn	Cys	Glu	
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aac	ctc	aag	gag	acc	cac	gag	ttc	ctc	aaa	cgc	atc	cgc	gcc	gaa	gtc	768
Asn	Leu	Lys	Glu	Thr	His	Glu	Phe	Leu	Lys	Arg	Ile	Arg	Ala	Glu	Val	
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gac	cgg	ctc	tac	ccc	gac	cgg	gtc	ctg	ctc	agc	gaa	gcc	aac	cag	tgg	816
Asp	Arg	Leu	Tyr	Pro	Asp	Arg	Val	Leu	Leu	Ser	Glu	Ala	Asn	Gln	Trp	
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ccc	gcc	gac	gtc	gtc	gac	tac	ttc	ggc	gac	tac	gaa	tcc	ggc	ggc	gac	864
Pro	Ala	Asp	Val	Val	Asp	Tyr	Phe	Gly	Asp	Tyr	Glu	Ser	Gly	Gly	Asp	
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gaa	tgc	cac	atg	aac	ttc	cac	ttc	ccg	ctg	atg	ccg	cgc	atg	ttc	atg	912
Glu	Cys	His	Met	Asn	Phe	His	Phe	Pro	Leu	Met	Pro	Arg	Met	Phe	Met	
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Ala	Val	Arg	Arg	Glu	Gln	Arg	Tyr	Pro	Ile	Ser	Glu	Ile	Leu	Ala	Gln	
305				310						315					320	
acc	ccg	cct	att	ccg	cgc	aac	tgc	cag	tgg	gcg	atc	ttc	ctg	cgc	aac	1008
Thr	Pro	Pro	Ile	Pro	Arg	Asn	Cys	Gln	Trp	Ala	Ile	Phe	Leu	Arg	Asn	
				325				330						335		
cac	gac	gag	ctg	acc	ttg	gag	atg	gtc	agc	gat	gaa	gag	cgg	gac	tac	1056
His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	Ser	Asp	Glu	Glu	Arg	Asp	Tyr	
			340					345					350			
atg	tac	tcc	gaa	tac	gcc	aaa	gac	ccg	cgg	atg	cgc	gcc	aac	atg	ggg	1104
Met	Tyr	Ser	Glu	Tyr	Ala	Lys	Asp	Pro	Arg	Met	Arg	Ala	Asn	Met	Gly	
		355					360					365				
atc	cgc	cgc	cgg	ctg	gca	ccc	ctc	ctg	gaa	aac	gac	ctc	aac	cag	atc	1152
Ile	Arg	Arg	Arg	Leu	Ala	Pro	Leu	Leu	Glu	Asn	Asp	Leu	Asn	Gln	Ile	
		370				375					380					
aaa	ctg	ttc	acc	gcg	ctg	ctg	ctg	tcg	ctg	ccc	ggc	tcc	ccg	gtg	ctc	1200
Lys	Leu	Phe	Thr	Ala	Leu	Leu	Leu	Ser	Leu	Pro	Gly	Ser	Pro	Val	Leu	
385				390						395				400		
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Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly	Asp	Asn	Ile	Trp	Leu	Gly	Asp	
				405					410					415		
gcg	gac	agc	gtg	cgc	acc	ccc	atg	cag	tgg	acc	ccg	gac	cgc	aac	gcc	1296
Arg	Asp	Ser	Val	Arg	Thr	Pro	Met	Gln	Trp	Thr	Pro	Asp	Arg	Asn	Ala	
			420					425					430			
gga	ttc	tcc	cgc	tgc	gac	ccg	ggc	cgc	ctc	tac	ctg	ccg	gtg	atc	atg	1344
Gly	Phe	Ser	Arg	Cys	Asp	Pro	Gly	Arg	Leu	Tyr	Leu	Pro	Val	Ile	Met	
		435					440					445				
gac	ccg	atc	tac	ggg	tac	cag	gcg	atc	aac	gtc	gaa	gca	cag	cag	aac	1392
Asp	Pro	Ile	Tyr	Gly	Tyr	Gln	Ala	Ile	Asn	Val	Glu	Ala	Gln	Gln	Asn	
		450				455					460					
aac	ccg	aac	tcg	ctg	ctg	aac	tgg	acc	cgc	aac	atg	atc	cag	atc	cgc	1440
Asn	Pro	Asn	Ser	Leu	Leu	Asn	Trp	Thr	Arg	Asn	Met	Ile	Gln	Ile	Arg	
465				470						475					480	
aag	cag	cac	ccg	gtg	ttc	ggg	acg	ggg	gac	ttc	acc	gaa	ctc	cac	gcg	1488
Lys	Gln	His	Pro	Val	Phe	Gly	Thr	Gly	Asp	Phe	Thr	Glu	Leu	His	Ala	
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atg	ctg	tgc	gtc	aac	aac	ctg	tcc	cgg	ttt	ccc	caa	ccg	gtg	gaa	ctg	1584
Met	Leu	Cys	Val	Asn	Asn	Leu	Ser	Arg	Phe	Pro	Gln	Pro	Val	Glu	Leu	
		515					520					525				
gac	ctc	cgc	cgc	ttc	gaa	ggg	atc	acc	ccg	atc	gaa	tgc	acg	ggg	gga	1632
Asp	Leu	Arg	Arg	Phe	Glu	Gly	Ile	Thr	Pro	Ile	Glu	Cys	Thr	Gly	Gly	
		530				535					540					
gtg	cac	ttc	ccg	ccc	atc	ggg	gaa	ctg	ccc	tac	ctg	ctg	act	ctc	ccc	1680
Val	His	Phe	Pro	Pro	Ile	Gly	Glu	Leu	Pro	Tyr	Leu	Leu	Thr	Leu	Pro	
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ggg	cac	ggc	ttc	tac	tgg	ttc	cag	ctt	ccg	ccc	gtc	gcc	gaa	gag	cag	1728
Gly	His	Gly	Phe	Tyr	Trp	Phe	Gln	Leu	Pro	Pro	Val	Ala	Glu	Glu	Gln	
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ccg	ctc	gcc	cag	ccc	gtc	acc	acc	gtc	ccc	gca	gcc	ccg	cag	cct	cct	1776
Pro	Leu	Ala	Gln	Pro	Val	Thr	Thr	Val	Pro	Ala	Ala	Pro	Gln	Pro	Pro	
			580					585					590			
gct	ccg	gca	gac	cg	ccc	g	tcc	gac	ccg	acc	cag	ccg	tcc	tga		1821
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<211> 606

<212> PRT

<213> Thermobifida fusca

<400> 250

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Val	Pro	Asp	Thr	Phe	Thr	His	Ala	Lys	Pro	Arg	Asp	Pro	Tyr	Trp	Tyr	
			20					25					30			
Lys	His	Ala	Val	Phe	Tyr	Glu	Val	Leu	Val	Arg	Gly	Phe	Tyr	Asp	Ser	
		35					40					45				
Asn	Gly	Asp	Gly	Thr	Gly	Asp	Leu	Arg	Gly	Leu	Ile	Glu	Lys	Leu	Asp	
	50					55					60					
Tyr	Leu	Gln	Trp	Leu	Gly	Ile	Asp	Cys	Leu	Trp	Leu	Leu	Pro	Ile	Tyr	
65				70					75					80		
Glu	Ser	Pro	Leu	Arg	Asp	Gly	Gly	Tyr	Asp	Val	Ser	Asp	Tyr	Met	Lys	
				85					90					95		
Ile	Leu	Pro	Glu	Phe	Gly	Arg	Ile	Ser	Asp	Phe	Val	Glu	Leu	Val	Glu	
			100					105					110			
Lys	Ala	His	Gln	Arg	Gly	Ile	Arg	Val	Ile	Thr	Asp	Leu	Val	Met	Asn	
		115					120					125				
His	Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Ala	Ser	Arg	His	Asp	Pro	
	130					135					140					
Asp	Gly	Pro	Tyr	Gly	Asn	Phe	Tyr	Val	Trp	Ser	Asp	Thr	Thr	Glu	Arg	
145					150					155					160	
Tyr	Ser	Asp	Ala	Arg	Ile	Ile	Phe	Ile	Asp	Thr	Glu	Gln	Ser	Asn	Trp	
			165						170					175		
Thr	Tyr	Asp	Glu	Val	Arg	Gly	Gln	Tyr	Trp	His	Arg	Phe	Phe	Ser		
			180					185					190			
His	Gln	Pro	Asp	Leu	Asn	Phe	Glu	Asn	Pro	Asp	Val	Gln	Asp	Ala	Ile	
		195					200					205				
Leu	Glu	Val	Met	Arg	Phe	Trp	Leu	Asp	Leu	Gly	Ile	Asp	Gly	Phe	Arg	
	210					215					220					
Leu	Asp	Ala	Val	Pro	Tyr	Leu	Tyr	Glu	Arg	Glu	Gly	Thr	Asn	Cys	Glu	
225					230					235					240	
Asn	Leu	Lys	Glu	Thr	His	Glu	Phe	Leu	Lys	Arg	Ile	Arg	Ala	Glu	Val	
			245						250					255		
Asp	Arg	Leu	Tyr	Pro	Asp	Arg	Val	Leu	Leu	Ser	Glu	Ala	Asn	Gln	Trp	
			260					265					270			
Pro	Ala	Asp	Val	Val	Asp	Tyr	Phe	Gly	Asp	Tyr	Glu	Ser	Gly	Gly	Asp	
		275					280					285				
Glu	Cys	His	Met	Asn	Phe	His	Phe	Pro	Leu	Met	Pro	Arg	Met	Phe	Met	
	290					295					300					
Ala	Val	Arg	Arg	Glu	Gln	Arg	Tyr	Pro	Ile	Ser	Glu	Ile	Leu	Ala	Gln	
305					310					315					320	
Thr	Pro	Pro	Ile	Pro	Arg	Asn	Cys	Gln	Trp	Ala	Ile	Phe	Leu	Arg	Asn	

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His Asp Glu Leu 325 Thr Leu Glu Met Val 330 Ser Asp Glu Glu Arg 335 Tyr
 Met Tyr Ser Glu 340 Tyr Ala Lys Asp 345 Pro Arg Met Arg Ala Asn Met Gly
 Ile Arg Arg Arg Leu Ala Pro 360 Leu Leu Glu Asn Asp 365 Leu Asn Gln Ile
 Lys 370 Phe Thr Ala Leu 375 Leu Leu Ser Leu Pro Gly Ser Pro Val Leu
 385 Tyr Tyr Gly Asp Glu 390 Ile Gly Met Gly Asp Asn Ile Trp Leu Gly Asp
 Arg Asp Ser Val 405 Arg Thr Pro Met Gln Trp Thr Pro Asp Arg Asn Ala
 Gly Phe Ser Arg Cys Asp Pro Gly 425 Arg Leu Tyr Leu Pro Val Ile Met
 Asp Pro Ile Tyr Gly Tyr Gln 440 Ala Ile Asn Val Glu Ala Gln Gln Asn
 450 Asn Pro Asn Ser Leu Leu 455 Asn Trp Thr Arg Asn Met Ile Gln Ile Arg
 465 Lys Gln His Pro Val 470 Phe Gly Thr Gly Asp Phe Thr Glu Leu His Ala
 Ser Asn Pro Ser 485 Val Phe Ala Phe Val 490 Arg Glu Tyr Gly Asp Asp Arg
 Met Leu Cys Val 500 Asn Asn Leu Ser 505 Arg Phe Pro Gln Pro Val Glu Leu
 Asp Leu Arg Arg Phe Glu Gly Ile Thr Pro Ile Glu Cys Thr Gly Gly
 530 Val His Phe Pro Pro Ile 535 Gly Glu Leu Pro Tyr Leu Leu Thr Leu Pro
 545 Gly His Gly Phe Tyr 550 Trp Phe Gln Leu Pro Pro Val Ala Glu Glu Gln
 Pro Leu Ala Gln Pro Val Thr Thr Val 570 Pro Ala Ala Pro Gln Pro Pro
 Ala Pro Ala Asp Arg Pro Ala Ser 585 Asp Pro Thr Gln Arg Ser
 595 600 605

<210> 251

<211> 1563

<212> DNA

<213> Microbulbifer degradans 2-40

<220>

<221> CDS

<222> (1)..(1563)

<400> 251

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Met	Asp	Thr	Asn	Ala	Asp	Gly	Val	Gly	Asp	Ile	Pro	Gly	Ile	Val	Gln	
1				5				10					15			
aag	ctc	gat	tac	ata	gcc	agt	tta	ggt	ggt	gat	gcg	ata	tgg	ata	tcg	96
Lys	Leu	Asp	Tyr	Ile	Ala	Ser	Leu	Gly	Val	Asp	Ala	Ile	Trp	Ile	Ser	
			20					25					30			
cca	ttt	ttt	aaa	tcg	cct	atg	cac	gac	ttt	ggc	tac	gac	att	agc	gac	144
Pro	Phe	Phe	Lys	Ser	Pro	Met	His	Asp	Phe	Gly	Tyr	Asp	Ile	Ser	Asp	
			35				40					45				
tat	cgc	gac	gta	gac	cca	tta	ttt	ggc	acc	ttg	gat	gac	ttc	gat	cta	192
Tyr	Arg	Asp	Val	Asp	Pro	Leu	Phe	Gly	Thr	Leu	Asp	Asp	Phe	Asp	Leu	
			50			55					60					
ctt	atc	gat	gaa	gcg	cat	aag	cgc	ggc	att	aaa	gta	atg	atc	gac	caa	240
Leu	Ile	Asp	Glu	Ala	His	Lys	Arg	Gly	Ile	Lys	Val	Met	Ile	Asp	Gln	
			65		70			75							80	
gtg	cta	agc	cac	act	tct	gcc	gag	cat	gaa	tgg	ttt	aaa	gag	agc	cgc	288
Val	Leu	Ser	His	Thr	Ser	Ala	Glu	His	Glu	Trp	Phe	Lys	Glu	Ser	Arg	
				85				90						95		
caa	tca	cgc	gat	aac	ccc	aaa	gcc	gat	tgg	tat	ggt	tgg	gcc	gac	cct	336
Gln	Ser	Arg	Asp	Asn	Pro	Lys	Ala	Asp	Trp	Tyr	Val	Trp	Ala	Asp	Pro	
			100					105					110			
aat	gaa	gat	ggc	acg	ccc	cct	aat	aac	tgg	ctc	gct	att	ttt	ggc	ggc	384
Asn	Glu	Asp	Gly	Thr	Pro	Pro	Asn	Asn	Trp	Leu	Ala	Ile	Phe	Gly	Gly	

120 125

Seite 400

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gcc	gca	gtg	agt	485	gcc	act	caa	atc	aca	490	tta	cct	cct	ttt	ggc	495	ttt	1536
Ala	Ala	Val	Ser	500	Ala	Thr	Gln	Ile	Thr	505	Leu	Pro	Pro	Phe	Gly	510	Gly	
ttc	gcc	aag	cag	gca	agc	aac	agt	tag										1563
Phe	Ala	Lys	Gln	Ala	Ser	Asn	Ser	520										
		515																

<210> 252

<211> 520

<212> PRT

<213> Microbulbifer degradans 2-40

<400> 252

Met	Asp	Thr	Asn	Ala	Asp	Gly	Val	Gly	Asp	Ile	Pro	Gly	Ile	Val	Gln			
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Lys	Leu	Asp	Tyr	Ile	Ala	Ser	Leu	Gly	Val	Asp	Ala	Ile	Trp	Ile	Ser			
			20					25					30					
Pro	Phe	Phe	Lys	Ser	Pro	Met	His	Asp	Phe	Gly	Tyr	Asp	Ile	Ser	Asp			
		35					40					45						
Tyr	Arg	Asp	Val	Asp	Pro	Leu	Phe	Gly	Thr	Leu	Asp	Asp	Phe	Asp	Leu			
	50					55					60							
Leu	Ile	Asp	Glu	Ala	His	Lys	Arg	Gly	Ile	Lys	Val	Met	Ile	Asp	Gln			
65					70					75					80			
Val	Leu	Ser	His	Thr	Ser	Ala	Glu	His	Glu	Trp	Phe	Lys	Glu	Ser	Arg			
			85						90					95				
Gln	Ser	Arg	Asp	Asn	Pro	Lys	Ala	Asp	Trp	Tyr	Val	Trp	Ala	Asp	Pro			
			100					105					110					
Asn	Glu	Asp	Gly	Thr	Pro	Pro	Asn	Asn	Trp	Leu	Ala	Ile	Phe	Gly	Gly			
		115					120					125						
Ser	Ala	Trp	Glu	Trp	Asp	Ser	Arg	Arg	Gly	Gln	Tyr	Tyr	Leu	His	Asn			
	130					135					140							
Phe	Leu	Lys	Ser	Gln	Pro	Asp	Leu	Asn	Phe	His	Cys	Glu	Asp	Val	Gln			
145					150					155					160			
Asn	Gln	Ile	Leu	Gln	Val	Glu	Phe	Trp	Leu	Lys	Arg	Gly	Val	Asp				
			165					170					175					
Gly	Leu	Arg	Leu	Asp	Ala	Ile	Asn	Phe	Cys	Phe	His	Asp	Lys	Gln	Leu			
			180					185					190					
Arg	Asn	Asn	Pro	Pro	Lys	Ser	Ala	Ser	Glu	Arg	Lys	Ala	Arg	Gly	Phe			
		195					200					205						
Ser	Glu	Asp	Asn	Pro	Tyr	Ala	Phe	Gln	Trp	His	Thr	Tyr	Asn	Asn	Thr			
	210					215					220							
Gln	Pro	Glu	Asn	Leu	Ala	Phe	Leu	Gln	Arg	Leu	Arg	Ser	Leu	Met	Asp			
225				230					235					240				
Lys	Tyr	Pro	Asn	Thr	Val	Thr	Leu	Gly	Glu	Ile	Ser	Ser	Asp	Asp	Ser			
			245					250					255					
Leu	Ala	Thr	Met	Ala	Glu	Tyr	Thr	Ala	Asp	Asn	Asp	Lys	Leu	His	Met			
			260					265					270					
Ala	Tyr	Ser	Phe	Glu	Leu	Leu	Ala	Asp	Glu	Phe	Ser	Ala	Ala	Tyr	Ile			
		275					280					285						
Arg	Glu	Thr	Val	Gly	Thr	Leu	Glu	Ser	Arg	Leu	Asn	Asp	Gly	Trp	Pro			
	290					295					300							
Cys	Trp	Ser	Ile	Gly	Asn	His	Asp	Val	Pro	Arg	Val	Ala	Ser	Arg	Trp			
305					310					315					320			
Gly	Lys	Glu	Asp	Ala	Cys	Asp	Ala	Leu	Ser	Ile	Val	Leu	Asn	Ala	Met			
			325						330				335					
Leu	Leu	Ser	Leu	Arg	Gly	Ser	Val	Cys	Tyr	Gln	Gly	Glu	Glu	Leu				
			340					345				350						
Gly	Leu	Lys	Glu	Ala	Glu	Leu	Thr	Phe	Glu	Gln	Leu	Gln	Asp	Pro	Tyr			
		355					360					365						
Gly	Ile	Thr	Phe	Trp	Pro	Lys	Phe	Lys	Gly	Arg	Asp	Gly	Cys	Arg	Thr			
	370					375					380							
Pro	Met	Pro	Trp	Asp	Ser	Gln	Gln	His	Ala	Gly	Phe	Ser	Asn	Gly	Ala			
385					390					395					400			
Pro	Trp	Leu	Pro	Val	Ala	Asp	Asp	His	Lys	Ala	Lys	Asn	Val	Thr	Val			
			405						410					415				
Gln	Gln	Gln	Ala	Asp	Leu	Ser	Val	Leu	Gln	Ala	Tyr	Lys	Gln	Phe	Ile			
			420					425					430					
Ala	Trp	Arg	Lys	Thr	Gln	Pro	Glu	Ile	Leu	Tyr	Gly	Asp	Ile	Ala	Phe			

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Leu	Ser	435	His	Glu	Ser	Thr	440	Leu	Ala	Phe	Thr	Arg	445	Ser	Tyr	Glu	Gly
450	Ser	Thr	Leu	Phe	Ala	Ala	455	Phe	Asn	Leu	Ser	Asn	460	Thr	Glu	Gln	Val
465	Asn	Leu	Pro	Ala	Gly	Glu	470	Trp	Thr	Ala	Leu	Glu	475	Gly	His	Gly	Leu
485	Ala	Ala	Val	Ser	Ala	Thr	Gln	Ile	Thr	490	Leu	Pro	Pro	Phe	Gly	495	Phe
500	Phe	Ala	Lys	Gln	Ala	Ser	Asn	Ser	505						510		
515								520									

<210> 253
 <211> 1671
 <212> DNA
 <213> Oenococcus oeni PSU-1

<220>
 <221> CDS
 <222> (1)..(1671)

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Met Ser Lys Lys Gln Trp Phe Lys Asp Thr Val Val Tyr Gln Val Tyr	
1 5 10 15	
cca atg agt ttc cag gat agc gat aac gat gga att ggc gac ctg ccg	96
Pro Met Ser Phe Gln Asp Ser Asp Asn Asp Gly Ile Gly Asp Leu Pro	
20 25 30	
ggg att aca aaa cga ctt gac tat atc aaa aaa cta ggt gcc gat gtc	144
Gly Ile Thr Lys Arg Leu Asp Tyr Ile Lys Lys Leu Gly Ala Asp Val	
35 40 45	
att tgg tta aac ccg att tat gag tca ccc aac aaa gac aac gga tat	192
Ile Trp Leu Asn Pro Ile Tyr Glu Ser Pro Asn Lys Asp Asn Gly Tyr	
50 55 60	
gat att gcc aat tat cga gct atc aac ccg gag tac gga tcg atg aat	240
Asp Ile Ala Asn Tyr Arg Ala Ile Asn Pro Glu Tyr Gly Ser Met Asn	
65 70 75 80	
gat ttt gat gat tta ctt aac aaa gct cac caa tta aac ctt aaa att	288
Asp Phe Asp Asp Leu Leu Asn Lys Ala His Gln Leu Asn Leu Lys Ile	
85 90 95	
atg atg gat cta gtc gtt aac cat act tcc gat caa cat cat tgg ttc	336
Met Met Asp Leu Val Val Asn His Thr Ser Asp Gln His His Trp Phe	
100 105 110	
cag gaa agt aaa aaa acc aaa gac aat ccg ttt tcc gat ttt tat att	384
Gln Glu Ser Lys Lys Thr Lys Asp Asn Pro Phe Ser Asp Phe Tyr Ile	
115 120 125	
tgg aga gat ccg gta gat ggt cac gaa cct aat aat tgg ttg gcc gca	432
Trp Arg Asp Pro Val Asp Gly His Glu Pro Asn Asn Trp Leu Ala Ala	
130 135 140	
ttt ggt ggt tca gca tgg act tat gtt ccg gaa cgc aaa caa tat tat	480
Phe Gly Gly Ser Ala Trp Thr Tyr Val Pro Glu Arg Lys Gln Tyr Tyr	
145 150 155 160	
ttg cat ttg ttt gca acc ggt caa ccg gat ctc aat tgg gag aat ccg	528
Leu His Leu Phe Ala Thr Gly Gln Pro Asp Leu Asn Trp Glu Asn Pro	
165 170 175	
gat gtt cgc caa gca gtc ttt gat ata gaa cgt ttt tgg ctc gat aaa	576
Asp Val Arg Gln Ala Val Phe Asp Ile Glu Arg Phe Trp Leu Asp Lys	
180 185 190	
ggg gtt gat ggt ttt aga atg gac gtt att aat ctt att tca aaa cca	624
Gly Val Asp Gly Phe Arg Met Asp Val Ile Asn Leu Ile Ser Lys Pro	
195 200 205	
aag ggt ctg cct gat gtt ccg gaa cct gcc acc gca gga aag acg atg	672
Lys Gly Leu Pro Asp Val Pro Glu Pro Ala Thr Ala Gly Lys Thr Met	
210 215 220	
gat ttc gta gcg gat ggg cat cgc cta aat gag ttt ttg agt caa atg	720
Asp Phe Val Ala Asp Gly His Arg Leu Asn Glu Phe Leu Ser Gln Met	
225 230 235 240	
aac agc gaa gta ttg tcc aaa tat gac act ata acg gtt ggt gaa atg	768
Asn Ser Glu Val Leu Ser Lys Tyr Asp Thr Ile Thr Val Gly Glu Met	

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cct	gga	tca	act	245	gaa	gac	gct	att	250	tac	acg	ggc	ctt	255	agc	816
Pro	Gly	Ser	Thr	260	Glu	Asp	Ala	Ile	265	Lys	Thr	Gly	Leu	270	Asn	Ser
cat	gaa	ctg	aat	atg	gta	ttt	cag	ttt	gag	cat	gtc	ggg	tta	agt	ccc	864
His	Glu	Leu	Asn	Met	Val	Phe	Gln	Phe	Glu	His	Val	Gly	Leu	Ser	Pro	
aat	ccg	gat	gtt	aga	ttg	gga	aag	tgg	aat	gac	cag	cct	gtt	aaa	ctg	912
Asn	Pro	Asp	Val	Arg	Leu	Gly	Lys	Trp	Asn	Asp	Gln	Pro	Val	Lys	Leu	
act	gaa	tta	aaa	gcc	tcg	ttg	aac	aga	tgg	caa	act	ggg	ctt	gac	ggc	960
Thr	Glu	Leu	Lys	Ala	Ser	Leu	Asn	Arg	Trp	Gln	Thr	Gly	Leu	Asp	Gly	
aaa	gga	tgg	aac	agc	ctt	tac	tgg	aac	aat	cac	gat	caa	cct	cgg	gca	1008
Lys	Gly	Trp	Asn	Ser	Leu	Tyr	Trp	Asn	Asn	His	Asp	Gln	Pro	Arg	Ala	
gta	tcc	cgt	ttt	gga	aat	gac	gat	cct	aag	tat	cgt	gtt	cta	tcg	gcc	1056
Val	Ser	Arg	Phe	Gly	Asn	Asp	Asp	Pro	Lys	Tyr	Arg	Val	Leu	Ser	Ala	
aaa	atg	ctg	gct	aca	act	ctt	cac	ttg	atg	cag	ggc	act	cct	tat	gta	1104
Lys	Met	Leu	Ala	Thr	Thr	Leu	His	Leu	Met	Gln	Gly	Thr	Pro	Tyr	Val	
tat	cag	ggg	gag	gag	ctt	gga	atg	aca	aat	gct	cac	ttc	aca	aaa	tta	1152
Tyr	Gln	Gly	Glu	Glu	Leu	Gly	Met	Thr	Asn	Ala	His	Phe	Thr	Lys	Leu	
aat	caa	tac	gag	gat	atc	gaa	tct	att	aat	ttt	tat	cat	gag	ttg	gtc	1200
Asn	Gln	Tyr	Glu	Asp	Ile	Glu	Ser	Ile	Asn	Phe	Tyr	His	Glu	Leu	Val	
gaa	caa	gaa	aaa	att	gtc	gat	ggg	cca	aca	atg	cta	aaa	tat	ctg	gca	1248
Glu	Gln	Glu	Lys	Ile	Val	Asp	Gly	Pro	Thr	Met	Leu	Lys	Tyr	Leu	Ala	
aat	att	tca	cgt	gat	aat	gcc	cgt	acg	cca	atg	caa	tgg	aac	gat	aaa	1296
Asn	Ile	Ser	Arg	Asp	Asn	Ala	Arg	Thr	Pro	Met	Gln	Trp	Asn	Asp	Lys	
aac	aat	gcc	gga	ttc	tca	agt	gca	aaa	cca	tgg	ttt	gcc	ctt	aac	cct	1344
Asn	Asn	Ala	Gly	Phe	Ser	Ser	Ala	Lys	Pro	Trp	Phe	Ala	Leu	Asn	Pro	
aat	tac	aaa	tca	att	aac	gtt	gag	gat	tca	ttg	gct	gac	aaa	aat	tcc	1392
Asn	Tyr	Lys	Ser	Ile	Asn	Val	Glu	Asp	Ser	Leu	Ala	Asp	Lys	Asn	Ser	
gta	ttc	tat	tat	tat	caa	aaa	tta	att	aag	ctt	cgt	cac	aat	aat	gaa	1440
Val	Phe	Tyr	Tyr	Tyr	Gln	Lys	Leu	Ile	Lys	Leu	Arg	His	Asn	Asn	Glu	
ata	atc	aaa	tat	gga	agc	ttc	gag	gaa	ata	gac	ccc	gat	gac	gat	caa	1488
Ile	Ile	Lys	Tyr	Gly	Ser	Phe	Glu	Glu	Ile	Asp	Pro	Asp	Asp	Asp	Gln	
gta	tac	gca	tat	cgt	cgt	cat	tac	gaa	gga	aaa	act	ttg	tta	ctt	ata	1536
Val	Tyr	Ala	Tyr	Arg	Arg	His	Tyr	Glu	Gly	Lys	Thr	Leu	Leu	Leu	Ile	
agc	aat	ttt	acc	gat	aaa	atc	gta	agt	cgc	gat	tac	ggg	caa	tcg	aac	1584
Ser	Asn	Phe	Thr	Asp	Lys	Ile	Val	Ser	Arg	Asp	Tyr	Gly	Gln	Ser	Asn	
gct	tca	agt	ttg	ctt	ata	gat	aat	tat	gaa	gat	gat	aaa	gta	aac	gag	1632
Ala	Ser	Ser	Leu	Leu	Ile	Asp	Asn	Tyr	Glu	Asp	Asp	Lys	Val	Asn	Glu	
tta	aga	ccg	tat	gag	gcg	aaa	gct	tat	cta	ttt	aaa	tga				1671
Leu	Arg	Pro	Tyr	Glu	Ala	Lys	Ala	Tyr	Leu	Phe	Lys					

<210> 254

<211> 556

<212> PRT

<213> Oenococcus oeni PSU-1

<400> 254

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Pro	Met	Ser	Phe	Gln	Asp	Ser	Asp	Asn	Asp	Gly	Ile	Gly	Asp	Leu	Pro
			20					25					30		

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Gly Ile Thr₃₅ Lys Arg Leu Asp Tyr₄₀ Ile Lys Lys Leu Gly₄₅ Ala Asp Val
 Ile Trp₅₀ Leu Asn Pro Ile Tyr₅₅ Glu Ser Pro Asn Lys₆₀ Asp Asn Gly Tyr
 Asp Ile Ala Asn Tyr Arg Ala Ile Asn Pro Glu Tyr Gly Ser Met Asn₈₀
 Asp Phe Asp Asp Leu₈₅ Leu Asn Lys Ala His₉₀ Gln Leu Asn Leu Lys₉₅ Ile
 Met Met Asp Leu₁₀₀ Val Val Asn His Thr₁₀₅ Ser Asp Gln His His Trp Phe
 Gln Glu Ser₁₁₅ Lys Lys Thr Lys Asp₁₂₀ Asn Pro Phe Ser Asp₁₂₅ Phe Tyr Ile
 Trp Arg₁₃₀ Asp Pro Val Asp Gly₁₃₅ His Glu Pro Asn Asn Trp Leu Ala Ala
 Phe Gly Gly Ser Ala Trp₁₅₀ Thr Tyr Val Pro Glu Arg Lys Gln Tyr Tyr₁₆₀
 Leu His Leu Phe Ala₁₆₅ Thr Gly Gln Pro Asp₁₇₀ Leu Asn Trp Glu Asn₁₇₅ Pro
 Asp Val Arg Gln₁₈₀ Ala Val Phe Asp Ile₁₈₅ Glu Arg Phe Trp Leu Asp Lys
 Gly Val Asp₁₉₅ Gly Phe Arg Met Asp Val Ile Asn Leu Ile Ser Lys Pro
 Lys Gly Leu Pro Asp Val Pro₂₁₅ Glu Pro Ala Thr Ala₂₂₀ Gly Lys Thr Met
 Asp Phe Val Ala Asp Gly₂₃₀ His Arg Leu Asn Glu Phe Leu Ser Gln Met₂₄₀
 Asn Ser Glu Val Leu₂₄₅ Ser Lys Tyr Asp Thr Ile Thr Val Gly Glu Met₂₅₅
 Pro Gly Ser Thr₂₆₀ Thr Glu Asp Ala Ile Lys Tyr Thr Gly Leu Asn Ser
 His Glu Leu Asn Met Val Phe Gln₂₈₀ Phe Glu His Val Gly Leu Ser Pro
 Asn Pro Asp Val Arg Leu Gly₂₉₅ Lys Trp Asn Asp Gln Pro Val Lys Leu
 Thr Glu Leu Lys Ala Ser₃₁₀ Leu Asn Arg Trp Gln Thr Gly Leu Asp Gly₃₂₀
 Lys Gly Trp Asn Ser Leu Tyr Trp Asn Asn His Asp Gln Pro Arg Ala₃₃₅
 Val Ser Arg Phe₃₄₀ Gly Asn Asp Asp Pro Lys Tyr Arg Val Leu Ser Ala
 Lys Met Leu₃₅₅ Ala Thr Thr Leu His₃₆₀ Leu Met Gln Gly Thr Pro Tyr Val
 Tyr Gln Gly Glu Glu Leu Gly₃₇₅ Met Thr Asn Ala His Phe Thr Lys Leu
 Asn Gln Tyr Glu Asp Ile Glu Ser Ile Asn Phe Tyr His Glu Leu Val₄₀₀
 Glu Gln Glu Lys Ile Val Asp Gly Pro Thr Met Leu Lys Tyr Leu Ala₄₁₅
 Asn Ile Ser Arg Asp Asn Ala Arg Thr Pro Met Gln Trp Asn Asp Lys
 Asn Asn Ala Gly Phe Ser Ser Ala Lys Pro Trp Phe Ala Leu Asn Pro
 Asn Tyr Lys Ser Ile Asn Val Glu Asp Ser Leu Ala Asp Lys Asn Ser
 Val Phe Tyr Tyr Tyr Gln Lys Leu Ile Lys Leu Arg His Asn Asn Glu₄₈₀
 Ile Ile Lys Tyr Gly₄₈₅ Ser Phe Glu Glu Ile Asp Pro Asp Asp Asp Gln
 Val Tyr Ala Tyr Arg Arg His Tyr Glu Gly Lys Thr Leu Leu Leu Ile
 Ser Asn Phe Thr Asp Lys Ile Val Ser Arg Asp Tyr Gly Gln Ser Asn
 Ala Ser Ser Leu Leu Ile Asp Asn Tyr Glu Asp Asp Lys Val Asn Glu
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<210> 255

<211> 1482

<212> DNA

<213> *Trichodesmium erythraeum* IMS101

<220>

<221> CDS

<222> (1)..(1482)

<400> 255

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1				5				10					15			
att	ttt	cca	gat	cgt	ttt	gct	aaa	gct	caa	cca	acg	act	gaa	act	gga	96
Ile	Phe	Pro	Asp	Arg	Phe	Ala	Lys	Ala	Gln	Pro	Thr	Thr	Glu	Thr	Gly	
			20					25					30			
aaa	gga	ata	gac	aaa	ggg	tgg	tat	ccc	agc	agt	cta	gaa	cct	tgg	gat	144
Lys	Gly	Ile	Asp	Lys	Gly	Trp	Tyr	Pro	Ser	Ser	Leu	Glu	Pro	Trp	Asp	
		35					40					45				
gaa	tat	cct	act	cct	caa	ggg	tat	aaa	gga	ggg	aac	ctc	tgg	ggg	gtc	192
Glu	Tyr	Pro	Thr	Pro	Gln	Gly	Tyr	Lys	Gly	Gly	Asn	Leu	Trp	Gly	Val	
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att	aaa	aaa	ctt	gac	tat	ctt	cag	gaa	ctt	ggg	atc	aca	gct	att	tac	240
Ile	Lys	Lys	Leu	Asp	Tyr	Leu	Gln	Glu	Leu	Gly	Ile	Thr	Ala	Ile	Tyr	
	65				70					75					80	
ttt	aca	cca	att	ttt	cag	tca	acc	tgt	aac	cac	cg	tat	cat	act	cat	288
Phe	Thr	Pro	Ile	Phe	Gln	Ser	Thr	Cys	Asn	His	Arg	Tyr	His	Thr	His	
				85					90					95		
gac	tat	tat	cga	gtc	gat	cca	att	tta	gga	ggg	aac	gag	gct	tta	agg	336
Asp	Tyr	Tyr	Arg	Val	Asp	Pro	Ile	Leu	Gly	Gly	Asn	Glu	Ala	Leu	Arg	
			100					105					110			
gta	tta	ata	gat	act	gct	cac	gat	cg	aac	att	aaa	gtg	ggt	ctt	gat	384
Val	Leu	Ile	Asp	Thr	Ala	His	Asp	Arg	Asn	Ile	Lys	Val	Val	Leu	Asp	
		115					120					125				
gga	ggt	ttc	aac	cac	gct	agc	cgg	ggg	ttt	tat	ttc	ttt	aac	gat	atc	432
Gly	Val	Phe	Asn	His	Ala	Ser	Arg	Gly	Phe	Tyr	Phe	Phe	Asn	Asp	Ile	
	130										140					
ctg	gaa	aac	ggg	cct	tat	tct	ccc	tgg	ttg	cat	tgg	ttc	aaa	ata	gaa	480
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	145				150					155					160	
aat	tgg	cct	ctg	tct	gct	tac	gat	ggg	agt	tta	cct	gct	aac	tat	gtg	528
Asn	Trp	Pro	Leu	Ser	Ala	Tyr	Asp	Gly	Ser	Leu	Pro	Ala	Asn	Tyr	Val	
				165					170					175		
ggg	tgg	tta	gat	aac	cgt	gct	tta	cct	ggt	ttt	aac	cat	gac	aac	cca	576
Gly	Trp	Leu	Asp	Asn	Arg	Ala	Leu	Pro	Val	Phe	Asn	His	Asp	Asn	Pro	
			180					185					190			
gag	gtc	aaa	gaa	tac	att	atg	gaa	att	gga	gaa	tat	tgg	tta	aaa	ttt	624
Glu	Val	Lys	Glu	Tyr	Ile	Met	Glu	Ile	Gly	Glu	Tyr	Trp	Leu	Lys	Phe	
		195					200					205				
ggg	att	gat	ggg	tgg	cgg	ttg	gat	gta	cct	ttt	gaa	gtg	aag	act	ccc	672
Gly	Ile	Asp	Gly	Trp	Arg	Leu	Asp	Val	Pro	Phe	Glu	Val	Lys	Thr	Pro	
	210				215						220					
ggg	ttt	tgg	caa	gaa	ttt	cg	gat	cg	ggt	aag	gct	att	aac	cca	gaa	720
Gly	Phe	Trp	Gln	Glu	Phe	Arg	Asp	Arg	Val	Lys	Ala	Ile	Asn	Pro	Glu	
	225				230					235					240	
gca	tat	att	gtg	ggg	gaa	gtc	tgg	agt	aac	tgc	gca	caa	tgg	ttg	gat	768
Ala	Tyr	Ile	Val	Gly	Glu	Val	Trp	Ser	Asn	Cys	Ala	Gln	Trp	Leu	Asp	
			245						250					255		
ggg	act	cag	ttt	gat	gga	gtg	atg	aac	tac	tta	ttt	act	ggg	cca	act	816
Gly	Thr	Gln	Phe	Asp	Gly	Val	Met	Asn	Tyr	Leu	Phe	Thr	Gly	Pro	Thr	
			260					265					270			
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Ile	Ala	Phe	Thr	Val	Gly	Asp	Arg	Val	Asp	Leu	Glu	Gln	Ile	Glu	Gly	
		275					280					285				
cgt	gac	tat	gta	gct	tat	ccg	gct	ata	tct	gct	ggt	gaa	tac	ggg	caa	912
Arg	Asp	Tyr	Val	Ala	Tyr	Pro	Ala	Ile	Ser	Ala	Val	Glu	Tyr	Gly	Gln	
	290					295					300					
aaa	atg	cag	gag	tta	ctg	caa	ctt	tac	cct	tgg	gaa	att	caa	tta	act	960
Lys	Met	Gln	Glu	Leu	Leu	Gln	Leu	Tyr	Pro	Trp	Glu	Ile	Gln	Leu	Thr	
	305				310					315					320	
caa	ctc	aac	tta	tta	gat	agt	cat	gat	aca	gct	aga	ggt	ttg	agt	att	1008

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Gln	Leu	Asn	Leu	Leu	Asp	Ser	His	Asp	Thr	Ala	Arg	Val	Leu	Ser	Ile		
				325					330					335			
gct	aaa	ggg	gat	aaa	gca	agt	ggt	gaa	tta	gcg	act	ctg	ttg	tta	atg		1056
Ala	Lys	Gly	Asp	Lys	Ala	Ser	Val	Glu	Leu	Ala	Thr	Leu	Leu	Leu	Met		
			340					345					350				
act	ttt	ccc	gga	gca	cca	agt	att	tat	tat	ggg	gat	gag	gta	ggg	tta		1104
Thr	Phe	Pro	Gly	Ala	Pro	Ser	Ile	Tyr	Tyr	Gly	Asp	Glu	Val	Gly	Leu		
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ccg	ggg	aag	ttt	gac	cct	gac	tgt	cgt	cgt	agt	ttt	cct	act	act	gaa		1152
Pro	Gly	Lys	Phe	Asp	Pro	Asp	Cys	Arg	Arg	Ser	Phe	Pro	Thr	Thr	Glu		
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aaa	tgg	gat	cgt	gaa	gtt	ctg	gaa	tat	cat	aaa	cag	tta	att	gct	att		1200
Lys	Trp	Asp	Arg	Glu	Val	Leu	Glu	Tyr	His	Lys	Gln	Leu	Ile	Ala	Ile		
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aga	aaa	gaa	tat	tca	gct	ttg	cgc	act	ggg	aat	tac	gaa	gtg	ttg	ttt		1248
Arg	Lys	Glu	Tyr	Ser	Ala	Leu	Arg	Thr	Gly	Asn	Tyr	Glu	Val	Leu	Phe		
			405					410					415				
gcc	gag	gga	aat	gtt	tat	att	ttt	gct	cgt	att	tta	gaa	gag	gaa	gaa		1296
Ala	Glu	Gly	Asn	Val	Tyr	Ile	Phe	Ala	Arg	Ile	Leu	Glu	Glu	Glu	Glu		
			420					425					430				
att	att	gta	gct	gtt	aac	att	ggg	ata	gaa	gca	gca	aaa	gta	aat	gtt		1344
Ile	Ile	Val	Ala	Val	Asn	Ile	Gly	Ile	Glu	Ala	Ala	Lys	Val	Asn	Val		
		435					440					445					
att	ttt	aat	aag	ctt	aaa	tct	caa	cct	aat	aaa	gtt	gtt	tat	ggg	agt		1392
Ile	Phe	Asn	Lys	Leu	Lys	Ser	Gln	Pro	Asn	Lys	Val	Val	Tyr	Gly	Ser		
	450					455					460						
tgt	aaa	att	tcc	tgg	caa	gga	gga	gat	gaa	gct	agt	aaa	tta	gag	tta		1440
Cys	Lys	Ile	Ser	Trp	Gln	Gly	Gly	Asp	Glu	Ala	Ser	Lys	Leu	Glu	Leu		
	465				470				475						480		
tat	ttg	cca	gga	aga	aaa	ggg	tgt	att	ttg	ggt	aaa	gat	taa				1482
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<210> 256

<211> 493

<212> PRT

<213> Trichodesmium erythraeum IMS101

<400> 256

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Lys	Gly	Ile	Asp	Lys	Gly	Trp	Tyr	Pro	Ser	Ser	Leu	Glu	Pro	Trp	Asp		
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Glu	Tyr	Pro	Thr	Pro	Gln	Gly	Tyr	Lys	Gly	Gly	Asn	Leu	Trp	Gly	Val		
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Ile	Lys	Lys	Leu	Asp	Tyr	Leu	Gln	Glu	Leu	Gly	Ile	Thr	Ala	Ile	Tyr		
	65				70					75					80		
Phe	Thr	Pro	Ile	Phe	Gln	Ser	Thr	Cys	Asn	His	Arg	Tyr	His	Thr	His		
				85					90					95			
Asp	Tyr	Tyr	Arg	Val	Asp	Pro	Ile	Leu	Gly	Gly	Asn	Glu	Ala	Leu	Arg		
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Val	Leu	Ile	Asp	Thr	Ala	His	Asp	Arg	Asn	Ile	Lys	Val	Val	Leu	Asp		
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Gly	Val	Phe	Asn	His	Ala	Ser	Arg	Gly	Phe	Tyr	Phe	Phe	Asn	Asp	Ile		
	130					135					140						
Leu	Glu	Asn	Gly	Pro	Tyr	Ser	Pro	Trp	Leu	His	Trp	Phe	Lys	Ile	Glu		
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Asn	Trp	Pro	Leu	Ser	Ala	Tyr	Asp	Gly	Ser	Leu	Pro	Ala	Asn	Tyr	Val		
			165					170						175			
Gly	Trp	Leu	Asp	Asn	Arg	Ala	Leu	Pro	Val	Phe	Asn	His	Asp	Asn	Pro		
		180						185					190				
Glu	Val	Lys	Glu	Tyr	Ile	Met	Glu	Ile	Gly	Glu	Tyr	Trp	Leu	Lys	Phe		
		195					200					205					
Gly	Ile	Asp	Gly	Trp	Arg	Leu	Asp	Val	Pro	Phe	Glu	Val	Lys	Thr	Pro		
	210					215					220						
Gly	Phe	Trp	Gln	Glu	Phe	Arg	Asp	Arg	Val	Lys	Ala	Ile	Asn	Pro	Glu		
	225				230					235					240		

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Ala Tyr Ile Val Gly Glu Val Trp Ser Asn Cys Ala Gln Trp Leu Asp
 245 250
 Gly Thr Gln Phe Asp Gly Val Met Asn Tyr Leu Phe Thr Gly Pro Thr
 260 265 270
 Ile Ala Phe Thr Val Gly Asp Arg Val Asp Leu Glu Gln Ile Glu Gly
 275 280 285
 Arg Asp Tyr Val Ala Tyr Pro Ala Ile Ser Ala Val Glu Tyr Gly Gln
 290 295 300
 Lys Met Gln Glu Leu Leu Gln Leu Tyr Pro Trp Glu Ile Gln Leu Thr
 305 310 315 320
 Gln Leu Asn Leu Leu Asp Ser His Asp Thr Ala Arg Val Leu Ser Ile
 325 330 335
 Ala Lys Gly Asp Lys Ala Ser Val Glu Leu Ala Thr Leu Leu Met
 340 345 350
 Thr Phe Pro Gly Ala Pro Ser Ile Tyr Tyr Gly Asp Glu Val Gly Leu
 355 360 365
 Pro Gly Lys Phe Asp Pro Asp Cys Arg Arg Ser Phe Pro Thr Thr Glu
 370 375 380
 Lys Trp Asp Arg Glu Val Leu Glu Tyr His Lys Gln Leu Ile Ala Ile
 385 390 395 400
 Arg Lys Glu Tyr Ser Ala Leu Arg Thr Gly Asn Tyr Glu Val Leu Phe
 405 410 415
 Ala Glu Gly Asn Val Tyr Ile Phe Ala Arg Ile Leu Glu Glu Glu
 420 425 430
 Ile Ile Val Ala Val Asn Ile Gly Ile Glu Ala Ala Lys Val Asn Val
 435 440 445
 Ile Phe Asn Lys Leu Lys Ser Gln Pro Asn Lys Val Val Tyr Gly Ser
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 Cys Lys Ile Ser Trp Gln Gly Gly Asp Glu Ala Ser Lys Leu Glu Leu
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 Tyr Leu Pro Gly Arg Lys Gly Cys Ile Leu Val Lys Asp
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<210> 257

<211> 3288

<212> DNA

<213> Thiobacillus denitrificans ATCC 25259

<220>

<221> CDS

<222> (1)..(3288)

<400> 257

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ctg cac gtc aag gcg ttc ttc gac gcc aac ggc gat ggc gcg ggc gac	96
Leu His Val Lys Ala Phe Phe Asp Ala Asn Gly Asp Gly Ala Gly Asp	
20 25 30	
ttc cgg ggc ctg atc agc aag ctc gac tat ctc cag gaa ctc ggc gtc	144
Phe Arg Gly Leu Ile Ser Lys Leu Asp Tyr Leu Gln Glu Leu Gly Val	
35 40 45	
aac gcg ctc tgg ctg ttg ccg ttc tac ccg tct ccg ggc cgc gac gac	192
Asn Ala Leu Trp Leu Leu Pro Phe Tyr Pro Ser Pro Gly Arg Asp Asp	
50 55 60	
ggc tac gac atc tcg gat tac cac aac ctc cac ccc tcg ttc ggc gac	240
Gly Tyr Asp Ile Ser Asp Tyr His Asn Leu His Pro Ser Phe Gly Asp	
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atg gcc gac ttc cgc agg ttc atc cgc gaa gcg cac cag cgc gga ctg	288
Met Ala Asp Phe Arg Arg Phe Ile Arg Glu Ala His Gln Arg Gly Leu	
85 90 95	
cgt gtc atc acc gag ctc gtc gtc aac cac acc tcc gac cag cat ccg	336
Arg Val Ile Thr Glu Leu Val Val Asn His Thr Ser Asp Gln His Pro	
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tgg ttc cag gcg gcg ccg cgc gcg ccg cct ggt tcg gtc aag cgc aac	384
Trp Phe Gln Ala Ala Arg Arg Ala Pro Pro Gly Ser Val Lys Arg Asn	
115 120 125	
tat tac gtg tgg agc gat acc acg cgc ttc agc gaa acg cgc atc	432
Tyr Tyr Val Trp Ser Asp Thr Asp Thr Arg Phe Ser Glu Thr Arg Ile	

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145	cag	gcc	tac	tac	tgg	cat	150	cg	ttc	ttc	tcc	cac	cag	ccc	gat	ctc	aac
Gln	Ala	Tyr	Tyr	Trp	His	Arg	Arg	Phe	Phe	Ser	His	Gln	Pro	Asp	Leu	Asn	528
				165						170					175		
ttc	aac	aac	ccg	cac	gtc	ttc	aag	gcc	atc	cg	acg	atg	cg	atg	cg	ttc	576
Phe	Asn	Asn	Pro	His	Val	Phe	Lys	Ala	Ile	Met	Arg	Thr	Met	Arg	Phe		
			180					185					190				
tgg	ttc	gat	gcg	ggc	gtc	gat	ggc	atg	cg	ctc	gac	gcc	ggt	ccc	tac		624
Trp	Phe	Asp	Ala	Gly	Val	Asp	Gly	Met	Arg	Leu	Asp	Ala	Val	Pro	Tyr		
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ctg	tgc	gag	cg	gac	ggc	acg	agc	aac	gaa	aat	ctg	ccc	gag	acg	cac		672
Leu	Cys	Glu	Arg	Asp	Gly	Thr	Ser	Asn	Glu	Asn	Leu	Pro	Glu	Thr	His		
	210					215					220						
gcg	gtc	atc	cga	agg	atg	cg	gcc	gaa	ctc	gac	gcg	cg	tac	agc	aac		720
Ala	Val	Ile	Arg	Arg	Met	Arg	Ala	Glu	Leu	Asp	Ala	Arg	Tyr	Ser	Asn		
	225				230					235					240		
cg	atg	ttc	ctc	gcc	gaa	gcc	aac	cag	tgg	ccc	gag	gac	gtg	cg	gag		768
Arg	Met	Phe	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	Glu	Asp	Val	Arg	Glu		
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tat	ttc	ggc	aac	ggc	gac	gag	tgc	cac	atg	gcc	tac	cac	ttc	ccg	ctg		816
Tyr	Phe	Gly	Asn	Gly	Asp	Glu	Cys	His	Met	Ala	Tyr	His	Phe	Pro	Leu		
			260					265					270				
atg	ccg	cg	atg	tac	atg	gcg	atc	gcg	cag	gag	gat	cg	cac	ccg	atc		864
Met	Pro	Arg	Met	Tyr	Met	Ala	Ile	Ala	Gln	Glu	Asp	Arg	His	Pro	Ile		
		275				280					285						
gtc	gaa	atc	atg	gaa	cag	aca	ccg	gac	atc	ccc	gac	ctt	tgc	cag	tgg		912
Val	Glu	Ile	Met	Glu	Gln	Thr	Pro	Asp	Ile	Pro	Asp	Leu	Cys	Gln	Trp		
	290					295				300							
gcc	gtg	ttt	ctg	cg	aac	cat	gac	gaa	ctg	acg	ctc	gag	atg	gtg	acc		960
Ala	Val	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	Thr		
	305				310			315							320		
gac	cg	gaa	cg	gac	tat	ctc	tat	cag	gcc	tac	gcg	agc	gac	ccg	cag		1008
Asp	Arg	Glu	Arg	Asp	Tyr	Leu	Tyr	Gln	Ala	Tyr	Ala	Ser	Asp	Pro	Gln		
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gcc	cg	ctc	aat	ctc	ggc	atc	cg	cg	cg	ctg	gcg	ccc	ttg	ctc	gac		1056
Ala	Arg	Leu	Asn	Leu	Gly	Ile	Arg	Arg	Arg	Leu	Ala	Pro	Leu	Leu	Asp		
			340				345					350					
aac	gac	cg	cac	cg	atc	gag	ttg	atg	aat	ctg	ctg	ctg	atg	acg	atg		1104
Asn	Asp	Arg	His	Arg	Ile	Glu	Leu	Met	Asn	Leu	Leu	Leu	Met	Thr	Met		
		355					360					365					
ccg	ggc	tcg	ccg	atc	gtc	tat	tac	ggc	gac	gag	atc	ggc	atg	ggc	gac		1152
Pro	Gly	Ser	Pro	Ile	Val	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly	Asp		
	370					375					380						
aac	ctc	ctg	ctc	ggc	gac	cg	aac	ggc	gtg	cg	acg	ccg	atg	caa	tgg		1200
Asn	Leu	Leu	Leu	Gly	Asp	Arg	Asn	Gly	Val	Arg	Thr	Pro	Met	Gln	Trp		
	385				390			395							400		
gac	ggc	ggc	ccc	aac	ggc	gga	ttc	tcg	tcc	gcg	ccg	acc	gag	cgt	ctg		1248
Asp	Gly	Gly	Pro	Asn	Gly	Gly	Phe	Ser	Ser	Ala	Pro	Thr	Glu	Arg	Leu		
				405				410						415			
ttc	ctg	ccg	ccg	atc	acc	gat	ccg	gtc	tac	ggc	tac	ggc	gcg	gta	aac		1296
Phe	Leu	Pro	Pro	Ile	Thr	Asp	Pro	Val	Tyr	Gly	Tyr	Gly	Ala	Val	Asn		
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gtc	gag	gcg	cag	cag	cg	aat	ccc	tcg	tcg	ctg	ctg	aac	tgg	acc	cg		1344
Val	Glu	Ala	Gln	Gln	Arg	Asn	Pro	Ser	Ser	Leu	Leu	Asn	Trp	Thr	Arg		
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cg	ctg	atc	gca	atg	cg	aag	gcg	cac	cg	gcg	ctc	ggt	cg	ggc	acg		1392
Arg	Leu	Ile	Ala	Met	Arg	Lys	Ala	His	Arg	Ala	Leu	Gly	Arg	Gly	Thr		
	450					455					460						
ctg	cg	ttc	ctg	cg	cct	ggc	aac	cg	aag	gtg	ctc	gcc	tat	ctc	cg		1440
Leu	Arg	Phe	Leu	Arg	Pro	Gly	Asn	Arg	Lys	Val	Leu	Ala	Tyr	Leu	Arg		
				470					475						480		
gaa	tac	gag	ggc	gag	acg	att	ctg	tgc	gtg	gcc	aac	gtc	gcg	cgt	gcg		1488
Glu	Tyr	Glu	Gly	Glu	Thr	Ile	Leu	Cys	Val	Ala	Asn	Val	Ala	Arg	Ala		
				485				490						495			
ccg	cag	gcc	gtc	gaa	ctc	gat	ctc	tcg	ccc	ttc	aag	gga	cac	gtg	ccg		1536
Pro	Gln	Ala	Val	Glu	Leu	Asp	Leu	Ser	Pro	Phe	Lys	Gly	His	Val	Pro		

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tat Tyr	ctg Leu 530	ctg Leu	acg Thr	ctc Leu	ggc Gly	gga Gly 535	tac Tyr	ggc Gly	tgt Cys	ttc Phe	gtg Val 540	ttc Phe	cgg Arg	ctc Leu	gcg Ala		1632		
acc Thr 545	gac Asp	gtc Val	gag Glu	gcg Ala	ccg Pro 550	gcc Ala	tgg Trp	cac His	gaa Glu	gaa Glu 555	agg Arg	ccg Pro	gtg Val	ccg Pro	ccc Pro 560		1680		
gat Asp	ctg Leu	ccc Pro	gtg Val	ctc Leu 565	gtt Val	ttg Leu	gtc Val	gac Asp	gcg Ala 570	ggc Gly	tgg Trp	cgc Arg	acg Thr	ctc Leu 575	ttc Phe		1728		
gcg Ala	cgg Arg	acc Thr	gac Asp 580	gaa Glu	ggc Gly	gtg Val	aac Asn	cag Gln 585	ctc Leu	atg Met	gtg Val	cgg Arg	cgt Arg 590	gca Ala	cgc Arg		1776		
gag Glu	cag Gln	ctc Leu 595	gag Glu	cgc Arg	cag Gln	atc Ile	att Ile 600	ccg Pro	cgc Arg	tac Tyr	ttc Phe	cgg Arg 605	acg Thr	cag Gln	ccg Pro		1824		
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ttg Leu 625	cgc Arg	gag Glu	tgg Trp	ggg Gly	acc Thr 630	gac Asp	agc Ser	gga Gly	acc Thr	tgg Trp 635	ctg Leu	ctc Leu	gcg Ala	acc Thr	gtc Val 640		1920		
acc Thr	gtc Val	acg Thr	ctc Leu	ctc Leu 645	gac Asp	ggc Gly	agc Ser	att Ile 650	tat Tyr	cac His	tac Tyr	gcg Ala	ctg Leu	ccg Pro 655	ctg Leu		1968		
ggc Gly	ctc Leu	gcc Ala 660	tgg Trp	gaa Glu	gac Asp	gaa Glu	gac Asp	gaa Glu 665	ggc Gly	cgc Arg	gtc Val	gcc Ala 670	gcc Ala	ctg Leu	ctg Leu		2016		
cac His	gtg Val	acg Thr 675	ctc Leu	gcc Ala	aag Lys	gtg Val	cgg Arg 680	cgg Arg	ctg Leu	gcg Ala	cgg Arg	gtc Val 685	ggc Gly	atc Ile	ctg Leu		2064		
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atg Met 705	gag Glu	cgc Arg	ggc Gly	gag Glu	acg Thr 710	ctt Leu	gcc Ala	tac Tyr	ggc Gly	gac Asp 715	ggc Gly	cac His	ctg Leu	acg Thr	ttc Phe 720		2160		
cgc Arg	acg Thr	gcc Ala	agc Ser 725	gcc Ala	tac Tyr	ccc Pro	gga Gly	ttc Phe	ttc Phe 730	tgt Cys	ccg Pro	ctt Leu	gtc Val 735	acg Thr	tcg Ser		2208		
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ggc Gly	agg Arg	cac His	tcc Ser	acg Thr 805	ctc Leu	gcg Ala	atc Ile	ctc Leu	gag Glu 810	cgc Arg	tat Tyr	gcg Ala	ccc Pro	aac Asn 815	cag Gln		2448		
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ctc Leu	agc Ser	cgc Arg 835	acg Thr	acg Thr	ggc Gly	gag Glu	cag Gln 840	gcg Ala	ccc Pro	gac Asp	ggc Gly	cgg Arg 845	cac His	ggt Gly	cgc Arg		2544		
tac Tyr	atg Met 850	ggg Gly	ctg Leu	atg Met	aag Lys	acg Thr 855	ctc Leu	ggc Gly	gag Glu	cgc Arg	acg Thr 860	gcc Ala	gag Glu	ttc Phe	cat His		2592		
cgc Arg	gcg Ala	ctc Leu	gcg Ala	acc Thr	ccg Pro	gat Asp	cgc Arg	tcg Ser	ggc Gly	gac Asp	ttc Phe	ggc Gly	agc Ser	gag Glu	ccg Pro		2640		

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Ile	Ala	Pro	Pro	Asp	Ile	Ile	Leu	Glu	Trp	Val	Asn	Lys	Val	Arg	His	gag		2688
				885														
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Met	Gly	Val	Met	Tyr	Glu	Leu	Leu	Glu	Arg	Ala	Leu	Pro	Ala	Leu	Pro			
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gag	ccc	gtg	gcc	gtc	gcc	gcg	cag	ctt	ttt	ctc	gtt	cgc	ccc	aag				2784
Glu	Pro	Val	Ala	Val	Ala	Ala	Gln	Gln	Leu	Phe	Leu	Val	Arg	Pro	Lys			
		915					920				925							
ctc	tac	cgg	cgc	gtc	atc	cgc	gcc	tcg	cgc	gtg	cgt	gtc	gac	gcg	agc			2832
Leu	Tyr	Arg	Arg	Val	Ile	Arg	Ala	Ser	Arg	Val	Arg	Val	Asp	Ala	Ser			
	930					935				940								
aag	acg	cgc	tgc	cac	gga	aac	tat	cac	ctc	ggt	cag	gtc	tgg	ctc	gtg			2880
Lys	Thr	Arg	Cys	His	Gly	Asn	Tyr	His	Leu	Gly	Gln	Val	Trp	Leu	Val			
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caa	aac	gat	ttc	ctg	atc	gcg	aat	tac	ggc	ggc	ata	ccc	ggc	cgc	agc			2928
Gln	Asn	Asp	Phe	Leu	Ile	Ala	Asn	Tyr	Gly	Gly	Ile	Pro	Gly	Arg	Ser			
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tgg	gaa	gaa	cgc	cgc	gca	aag	cac	gcg	ccg	ctg	cgc	gac	gtc	gct	agc			2976
Trp	Glu	Glu	Arg	Arg	Ala	Lys	His	Ala	Pro	Leu	Arg	Asp	Val	Ala	Ser			
			980					985				990						
atg	ctg	ctt	tcg	ctg	tcg	cag	gcg	ggc	gcg	gcc	gcg	ctc	gcg	cgt	gtc			3024
Met	Leu	Leu	Ser	Leu	Ser	Gln	Ala	Gly	Ala	Ala	Ala	Leu	Ala	Arg	Val			
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gcc	ggc	gac	tcc	gtc	gat	gtg	atg	gcg	gcc	ctg	cag	ccc	cat	gtc	gac			3072
Ala	Gly	Asp	Ser	Val	Asp	Val	Met	Ala	Ala	Leu	Gln	Pro	His	Val	Asp			
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gca	tgg	gag	ctg	gcg	gcg	cgc	aag	gcg	ttc	tac	cgc	ggt	tac	cgc	aag			3120
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Gly	Met	Asp	Gly	His	Ala	Ala	Tyr	Pro	Thr	Asp	Ala	Thr	Ala	Ala	Glu			
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gcc	ttg	ctg	act	ttg	ttc	ctg	gct	gaa	aaa	gcg	att	gcg	gag	ctg	acc			3216
Ala	Leu	Leu	Thr	Leu	Phe	Leu	Ala	Glu	Lys	Ala	Ile	Ala	Glu	Leu	Thr			
		1060					1065				1070							
gag	gcg	ctc	gaa	cgc	cgc	gcc	gtc	ggc	agc	gct	gct	gca	atg	cgt	cgg			3264
Glu	Ala	Leu	Glu	Arg	Arg	Ala	Val	Gly	Ser	Ala	Ala	Ala	Met	Arg	Arg			
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Leu	Val	Gln	Val	Thr	Arg	Arg												
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<210> 258

<211> 1095

<212> PRT

<213> Thiobacillus denitrificans ATCC 25259

<400> 258

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			20					25					30		
Phe	Arg	Gly	Leu	Ile	Ser	Lys	Leu	Asp	Tyr	Leu	Gln	Glu	Leu	Gly	Val
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Asn	Ala	Leu	Trp	Leu	Leu	Pro	Phe	Tyr	Pro	Ser	Pro	Gly	Arg	Asp	Asp
		50				55					60				
Gly	Tyr	Asp	Ile	Ser	Asp	Tyr	His	Asn	Leu	His	Pro	Ser	Phe	Gly	Asp
65					70					75				80	
Met	Ala	Asp	Phe	Arg	Arg	Phe	Ile	Arg	Glu	Ala	His	Gln	Arg	Gly	Leu
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Arg	Val	Ile	Thr	Glu	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Gln	His	Pro
		100						105					110		
Trp	Phe	Gln	Ala	Ala	Arg	Arg	Ala	Pro	Pro	Gly	Ser	Val	Lys	Arg	Asn
		115					120					125			
Tyr	Tyr	Val	Trp	Ser	Asp	Thr	Asp	Thr	Arg	Phe	Ser	Glu	Thr	Arg	Ile
	130					135					140				
Ile	Phe	Ser	Asp	Thr	Glu	Lys	Ser	Asn	Trp	Ala	Trp	Asp	Glu	Val	Ala

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145	Gln	Ala	Tyr	Tyr	Trp	150	His	Arg	Phe	Phe	Ser	155	His	Gln	Pro	Asp	Leu	160	Asn
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	Phe	Asn	Asn	Pro	His	Val	Phe	Lys	Ala	Ile	Met	Arg	Thr	Met	Arg	Phe			
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	Trp	Phe	Asp	Ala	Gly	Val	Asp	Gly	Met	Arg	Leu	Asp	Ala	Val	Pro	Tyr			
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	Leu	Cys	Glu	Arg	Asp	Gly	Thr	Ser	Asn	Glu	Asn	Leu	Pro	Glu	Thr	His			
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	Ala	Val	Ile	Arg	Arg	Met	Arg	Ala	Glu	Leu	Asp	Ala	Arg	Tyr	Ser	Asn			
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	Arg	Met	Phe	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	Glu	Asp	Val	Arg	Glu			
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	Tyr	Phe	Gly	Asn	Gly	Asp	Glu	Cys	His	Met	Ala	Tyr	His	Phe	Pro	Leu			
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	Met	Pro	Arg	Met	Tyr	Met	Ala	Ile	Ala	Gln	Glu	Asp	Arg	His	Pro	Ile			
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	Val	Glu	Ile	Met	Glu	Gln	Thr	Pro	Asp	Ile	Pro	Asp	Leu	Cys	Gln	Trp			
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	Ala	Val	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	Thr			
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	Asp	Arg	Glu	Arg	Asp	Tyr	Leu	Tyr	Gln	Ala	Tyr	Ala	Ser	Asp	Pro	Gln			
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	Ala	Arg	Leu	Asn	Leu	Gly	Ile	Arg	Arg	Leu	Ala	Pro	Leu	Leu	Leu	Asp			
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	Asn	Asp	Arg	His	Arg	Ile	Glu	Leu	Met	Asn	Leu	Leu	Leu	Met	Thr	Met			
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	Pro	Gly	Ser	Pro	Ile	Val	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly	Asp			
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	Asn	Leu	Leu	Leu	Gly	Asp	Arg	Asn	Gly	Val	Arg	Thr	Pro	Met	Gln	Trp			
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	Asp	Gly	Gly	Pro	Asn	Gly	Gly	Phe	Ser	Ser	Ala	Pro	Thr	Glu	Arg	Leu			
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	Phe	Leu	Pro	Pro	Ile	Thr	Asp	Pro	Val	Tyr	Gly	Tyr	Gly	Ala	Val	Asn			
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	Val	Glu	Ala	Gln	Gln	Arg	Asn	Pro	Ser	Ser	Leu	Leu	Asn	Trp	Thr	Arg			
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	Arg	Leu	Ile	Ala	Met	Arg	Lys	Ala	His	Arg	Ala	Leu	Gly	Arg	Gly	Thr			
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	Leu	Arg	Phe	Leu	Arg	Pro	Gly	Asn	Arg	Lys	Val	Leu	Ala	Tyr	Leu	Arg			
		465				470					475					480			
	Glu	Tyr	Glu	Gly	Glu	Thr	Ile	Leu	Cys	Val	Ala	Asn	Val	Ala	Arg	Ala			
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	Val	Glu	Leu	Met	Gly	Arg	Ser	Ser	Phe	Pro	Pro	Ile	Gly	Glu	Leu	Pro			
			515					520					525						
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		530				535						540							
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		545				550				555						560			
	Asp	Leu	Pro	Val	Leu	Val	Leu	Val	Asp	Ala	Gly	Trp	Arg	Thr	Leu	Phe			
				565					570						575				
	Ala	Arg	Thr	Asp	Glu	Gly	Val	Asn	Gln	Leu	Met	Val	Arg	Arg	Ala	Arg			
			580						585					590					
	Glu	Gln	Leu	Glu	Arg	Gln	Ile	Ile	Pro	Arg	Tyr	Phe	Arg	Thr	Gln	Pro			
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	Trp	Phe	Val	Tyr	Ser	Glu	Ala	Leu	Glu	Lys	Phe	Glu	Phe	Gly	Thr				
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	Leu	Arg	Glu	Trp	Gly	Thr	Asp	Ser	Gly	Thr	Trp	Leu	Leu	Ala	Thr	Val			
		625				630				635					640				
	Thr	Val	Thr	Leu	Leu	Asp	Gly	Ser	Ile	Tyr	His	Tyr	Ala	Leu	Pro	Leu			
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	Gly	Leu	Ala	Trp	Glu	Asp	Glu	Asp	Glu	Gly	Arg	Val	Ala	Ala	Leu	Leu			
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	His	Val	Thr	Leu	Ala	Lys	Val	Arg	Arg	Leu	Ala	Arg	Val	Gly	Ile	Leu			
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	Phe	Asp	Ala	Phe	Trp	Asp	Asp	Gly	Phe	Cys	Cys	Ala	Ile	Val	Ser	Ala			
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Arg Thr Ala Ser Ala Tyr Pro Gly Phe Phe Cys Pro Leu Val Thr Ser
Ser Ile Thr Arg Thr Val Ser Glu His Gly Arg Leu Arg Val Asn Leu
Asn Asp Gln Leu Val Leu Lys Ser Tyr Pro Arg Gln Met Gln Gly Thr
His Pro Glu Leu Glu Met Ser Arg Phe Leu Thr Glu Thr Ala Lys Phe
Ala His Ile Pro Gln Leu Gly Gly Thr Val Glu Tyr Val Ala Ser Ser
Gly Arg His Ser Thr Leu Ala Ile Leu Glu Arg Tyr Ala Pro Asn Gln
Gly Asp Ala Trp Ala Tyr Thr Leu Asn Tyr Leu Glu Arg Phe Leu Asp
Leu Ser Arg Thr Thr Gly Glu Gln Ala Pro Asp Gly Arg His Gly Arg
Tyr Met Gly Leu Met Lys Thr Leu Gly Glu Arg Thr Ala Glu Phe His
Arg Ala Leu Ala Thr Pro Asp Arg Ser Gly Asp Phe Gly Ser Glu Pro
Ile Ala Pro Pro Asp Ile Leu Glu Trp Val Asn Lys Val Arg His Glu
Met Gly Val Met Tyr Glu Leu Leu Glu Arg Ala Leu Pro Ala Leu Pro
Glu Pro Val Ala Val Ala Ala Gln Gln Leu Phe Leu Val Arg Pro Lys
Leu Tyr Arg Arg Val Ile Arg Ala Ser Arg Val Arg Val Asp Ala Ser
Lys Thr Arg Cys His Gly Asn Tyr His Leu Gly Gln Val Trp Leu Val
Gln Asn Asp Phe Leu Ile Ala Asn Tyr Gly Gly Ile Pro Gly Arg Ser
Trp Glu Glu Arg Ala Lys His Ala Pro Leu Arg Asp Val Ala Ser
Met Leu Leu Ser Leu Ser Gln Ala Gly Ala Ala Ala Leu Ala Arg Val
Ala Gly Asp Ser Val Asp Val Met Ala Ala Leu Gln Pro His Val Asp
Ala Trp Glu Leu Ala Ala Arg Lys Ala Phe Tyr Arg Gly Tyr Arg Lys
Gly Met Asp Gly His Ala Ala Tyr Pro Thr Asp Ala Thr Ala Ala Glu
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<210> 259

<211> 1815

<212> DNA

<213> Chloroflexus aurantiacus

<220>

<221> CDS

<222> (1)..(1815)

<400> 259

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Leu	Arg	Met	Ala	Ala	Asp	Ala	Pro	Val	Ser	Gly	Val	Phe	Leu	Arg	Thr	
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Cys	Pro	Asp	Gly	Glu	Gln	His	Phe	Thr	Pro	Leu	Arg	Asp	Leu	Gly	Val	

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Tyr	Ser	Ala	Gly	Gly	Ile	Thr	Arg	His	Tyr	Pro	Thr	Asp	Ala	Asn	Asp	
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ttc	gtg	gta	ctg	gcc	aac	tat	cac	gcg	cca	gcc	tgg	gta	cgt	gat	gcg	336
Phe	Val	Val	Leu	Ala	Asn	Tyr	His	Ala	Pro	Ala	Trp	Val	Arg	Asp	Ala	
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gtc	ttc	tac	cag	att	ttt	ccg	gat	cgg	ttt	gcc	gat	ggc	gac	ccg	acg	384
Val	Phe	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe	Ala	Asp	Gly	Asp	Pro	Thr	
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Phe	Tyr	Gly	Gly	Asp	Leu	Gln	Gly	Ile	Ala	Gln	Arg	Ile	Asp	Tyr	Leu	
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acc	gat	ctg	gga	gtc	tcg	gca	ctg	tat	ctc	aat	cct	atc	ttc	cga	gca	576
Thr	Asp	Leu	Gly	Val	Ser	Ala	Leu	Tyr	Leu	Asn	Pro	Ile	Phe	Arg	Ala	
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cca	tcg	aac	cac	aaa	tac	gat	gtc	gaa	gac	tat	acc	agc	att	gat	cca	624
Pro	Ser	Asn	His	Lys	Tyr	Asp	Val	Glu	Asp	Tyr	Thr	Ser	Ile	Asp	Pro	
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cac	ctg	gga	gg	gaa	gca	ggg	tta	ctc	cg	tta	cgt	gag	gta	ctc	gac	672
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Glu	Arg	Ala	Met	Lys	Leu	Val	Leu	Asp	Ile	Val	Pro	Asn	His	Cys	Gly	
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Val	Thr	His	Pro	Trp	Phe	Val	Ala	Ala	Gln	Ala	Asn	Pro	Arg	Ala	Pro	
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aca	gcc	gag	ttc	ttc	atg	ttc	cgt	cgt	cat	ccc	gac	gac	tac	gag	agc	816
Thr	Ala	Glu	Phe	Phe	Met	Phe	Arg	Arg	His	Pro	Asp	Asp	Tyr	Glu	Ser	
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tgg	ctg	ggg	gtc	aag	acc	ctg	ccc	aaa	ctc	aat	tac	cg	agt	gtc	cg	864
Trp	Leu	Gly	Val	Lys	Thr	Leu	Pro	Lys	Leu	Asn	Tyr	Arg	Ser	Val	Arg	
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ctc	cg	gac	gtg	atg	tac	gca	ggc	cag	gat	gcg	att	atg	cg	tac	tgg	912
Leu	Arg	Asp	Val	Met	Tyr	Ala	Gly	Gln	Asp	Ala	Ile	Met	Arg	Tyr	Trp	
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Leu	Arg	Pro	Pro	Tyr	Arg	Ile	Asp	Gly								

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cat	gac	acc	ccg	cgt	cta	cgg	aca	atc	gta	ggc	gat	gat	ctg	gcg	cga	1344
His	Asp	Thr	Pro	Arg	Leu	Arg	Thr	Ile	Val	Gly	Asp	Asp	Leu	Ala	Arg	
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gtg	cgg	gta	gcg	atg	acg	tta	ctc	ttc	tgc	tat	ccg	ggg	gtg	ccg	tgt	1392
Val	Arg	Val	Ala	Met	Thr	Leu	Leu	Phe	Cys	Tyr	Pro	Gly	Val	Pro	Cys	
	450					455					460					
atc	tac	tac	ggt	gac	gaa	att	gga	ctg	acg	ggc	ggc	ggt	gat	cct	gat	1440
Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Leu	Thr	Gly	Gly	Gly	Asp	Pro	Asp	
	465				470					475					480	
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Cys	Arg	Arg	Pro	Met	Pro	Trp	Asp	Glu	Arg	Glu	Trp	Asp	His	Asp	Leu	
			485						490					495		
cgg	gcg	ttc	gtg	caa	cgg	ctg	gca	cgc	tta	cgg	cgt	cag	tcg	ccg	gcg	1536
Arg	Ala	Phe	Val	Gln	Arg	Leu	Ala	Arg	Leu	Arg	Arg	Gln	Ser	Pro	Ala	
			500					505					510			
ttg	cgc	tgg	ggc	ggc	ttt	cag	cag	ctc	tac	gca	aac	ggg	gaa	acg	att	1584
Leu	Arg	Trp	Gly	Gly	Phe	Gln	Gln	Leu	Tyr	Ala	Asn	Gly	Glu	Thr	Ile	
		515				520						525				
gcc	ttc	cag	cgc	gaa	gca	cct	gag	gag	cgc	atg	atc	att	gtg	gta	cgg	1632
Ala	Phe	Gln	Arg	Glu	Ala	Pro	Glu	Glu	Arg	Met	Ile	Ile	Val	Val	Arg	
	530					535					540					
cgc	agt	gat	gat	ggg	caa	cgc	ctg	ctg	ccg	gtg	cgt	cac	ggc	ggg	ctg	1680
Arg	Ser	Asp	Asp	Gly	Gln	Arg	Leu	Leu	Pro	Val	Arg	His	Gly	Gly	Leu	
	545			550					555						560	
gct	gat	ggg	gtt	cac	ctg	cgg	gaa	ctc	ttc	agt	ggt	gcc	gag	acg	gtt	1728
Ala	Asp	Gly	Val	His	Leu	Arg	Glu	Leu	Phe	Ser	Gly	Ala	Glu	Thr	Val	
				565					570					575		
gta	cgc	aac	ggg	atg	ctg	gac	att	ggg	aat	ttg	ccg	gcc	acc	ggt	gcg	1776
Val	Arg	Asn	Gly	Met	Leu	Asp	Ile	Gly	Asn	Leu	Pro	Ala	Thr	Gly	Ala	
		580						585					590			
caa	atc	tgg	caa	acc	aca	gac	aaa	gac	aac	gtg	ttc	tga				1815
Gln	Ile	Trp	Gln	Thr	Thr	Asp	Lys	Asp	Asn	Val	Phe					
		595					600									

<210> 260

<211> 604

<212> PRT

<213> Chloroflexus aurantiacus

<400> 260

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Leu	Arg	Met	Ala	Ala	Asp	Ala	Pro	Val	Ser	Gly	Val	Phe	Leu	Arg	Thr
			20					25					30		
Cys	Pro	Asp	Gly	Glu	Gln	His	Phe	Thr	Pro	Leu	Arg	Asp	Leu	Gly	Val
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Arg	Gly	Val	Cys	Arg	Trp	Trp	Glu	Gly	Glu	Leu	Pro	Ile	Arg	Met	Leu
	50					55					60				
Arg	Thr	Asn	Tyr	Arg	Phe	Leu	Ile	Arg	Ala	Asp	Asp	Cys	Ser	Arg	Trp
65				70					75					80	
Tyr	Ser	Ala	Gly	Gly	Ile	Thr	Arg	His	Tyr	Pro	Thr	Asp	Ala	Asn	Asp
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Phe	Val	Val	Leu	Ala	Asn	Tyr	His	Ala	Pro	Ala	Trp	Val	Arg	Asp	Ala
			100					105					110		
Val	Phe	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe	Ala	Asp	Gly	Asp	Pro	Thr
		115					120					125			
Asn	Asn	Val	Arg	Asp	Gly	Ala	Tyr	Leu	Tyr	His	Gly	Arg	Pro	Val	Val
	130					135					140				
Ala	Arg	Arg	Trp	Asp	Glu	Arg	Pro	Asn	Arg	Ala	Thr	Gly	Ser	Ile	Glu
145					150					155					160
Phe	Tyr	Gly	Gly	Asp	Leu	Gln	Gly	Ile	Ala	Gln	Arg	Ile	Asp	Tyr	Leu
			165						170					175	
Thr	Asp	Leu	Gly	Val	Ser	Ala	Leu	Tyr	Leu	Asn	Pro	Ile	Phe	Arg	Ala
			180					185					190		
Pro	Ser	Asn	His	Lys	Tyr	Asp	Val	Glu	Asp	Tyr	Thr	Ser	Ile	Asp	Pro

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195
 His Leu Gly Gly Glu Ala Gly 200
 210 215
 Glu Arg Ala Met Lys Leu Val Leu Asp Ile Val Pro Asn His Cys Gly
 225 230 235 240
 Val Thr His Pro Trp Phe Val Ala Ala Gln Ala Asn Pro Arg Ala Pro
 245 250 255
 Thr Ala Glu Phe Phe Met Phe Arg Arg His Pro Asp Asp Tyr Glu Ser
 260 265 270
 Trp Leu Gly Val Lys Thr Leu Pro Lys Leu Asn Tyr Arg Ser Val Arg
 275 280 285
 Leu Arg Asp Val Met Tyr Ala Gly Gln Asp Ala Ile Met Arg Tyr Trp
 290 295 300
 Leu Arg Pro Pro Tyr Arg Ile Asp Gly Trp Arg Ile Asp Val Ala Asn
 305 310 315 320
 Met Leu Gly Arg Leu Gly Thr Asp Asn Leu Gly His Lys Ile Gly Arg
 325 330 335
 Gly Ile Trp Arg Ala Val Lys Ala Glu Gln Pro Glu Ala Tyr Glu Leu
 340 345 350
 Gly Glu His Phe Phe Asp Gly Thr Pro His Leu Gln Gly Glu Glu Leu
 355 360 365
 Asp Ala Thr Met Asn Tyr Gln Gly Phe Thr Phe Pro Ile Trp Arg Trp
 370 375 380
 Leu Gly Gly Phe Glu Phe Asn Pro Gln Arg Pro Glu Ala Asp Pro Arg
 385 390 395 400
 Pro Ile Ala Thr Glu Thr Val Val Ala Gln Trp Thr Ala Phe Arg Ala
 405 410 415
 Ala Ile Pro Trp Gln Ile Ala Ser Gln Gln Phe Asn Leu Leu Gly Ser
 420 425 430
 His Asp Thr Pro Arg Leu Arg Thr Ile Val Gly Asp Asp Leu Ala Arg
 435 440 445
 Val Arg Val Ala Met Thr Leu Leu Phe Cys Tyr Pro Gly Val Pro Cys
 450 455 460
 Ile Tyr Tyr Gly Asp Glu Ile Gly Leu Thr Gly Gly Asp Pro Asp
 465 470 475 480
 Cys Arg Arg Pro Met Pro Trp Asp Glu Arg Glu Trp Asp His Asp Leu
 485 490 495
 Arg Ala Phe Val Gln Arg Leu Ala Arg Leu Arg Arg Gln Ser Pro Ala
 500 505 510
 Leu Arg Trp Gly Gly Phe Gln Gln Leu Tyr Ala Asn Gly Glu Thr Ile
 515 520 525
 Ala Phe Gln Arg Glu Ala Pro Glu Glu Arg Met Ile Ile Val Val Arg
 530 535 540
 Arg Ser Asp Asp Gly Gln Arg Leu Leu Pro Val Arg His Gly Gly Leu
 545 550 555 560
 Ala Asp Gly Val His Leu Arg Glu Leu Phe Ser Gly Ala Glu Thr Val
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 Val Arg Asn Gly Met Leu Asp Ile Gly Asn Leu Pro Ala Thr Gly Ala
 580 585 590
 Gln Ile Trp Gln Thr Thr Asp Lys Asp Asn Val Phe
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<210> 261

<211> 4140

<212> DNA

<213> Chloroflexus aurantiacus

<220>

<221> CDS

<222> (1)..(4140)

<400> 261

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 ggt gca acg att gca cca ctc tcc tcg gtt gcg ttc gcc gat cac acg
 Gly Ala Thr Ile Ala Pro Leu Ser Ser Val Ala Phe Ala Asp His Thr
 20 25 30
 cca tta cca gcg tca gtt aac ctg gca ggt gat tta cag tcg gaa gcg
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48

96

144

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Thr	Gly	Gly	Ala	Cys	Gly	Asp	Trp	Asp	Pro	Gly	Cys	Ala	Ala	Ala	Ala	
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Phe	Ser	Ala	Gln	Gly	Asn	Gly	Val	Tyr	Leu	Phe	Val	Ser	Gln	Thr	Ile	
	65				70					75					80	
cca	gca	ggg	agc	tac	gaa	tac	aag	atc	gca	atg	ggg	agc	tgg	gct	gaa	288
Pro	Ala	Gly	Ser	Tyr	Glu	Tyr	Lys	Ile	Ala	Met	Gly	Ser	Trp	Ala	Glu	
				85					90					95		
aac	tat	ggg	gct	aat	ttt	cag	cag	aat	ggc	ccc	aac	atc	ccg	gtg	acg	336
Asn	Tyr	Gly	Ala	Asn	Phe	Gln	Gln	Asn	Gly	Pro	Asn	Ile	Pro	Val	Thr	
			100					105					110			
ctc	ggc	agt	gca	cag	agt	gta	cgg	ttc	tac	tac	gat	cac	aaa	acc	cat	384
Leu	Gly	Ser	Ala	Gln	Ser	Val	Arg	Phe	Tyr	Tyr	Asp	His	Lys	Thr	His	
		115					120					125				
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Tyr	Ile	Ala	Asp	Ser	Val	Arg	Asn	Thr	Ile	Tyr	Thr	Val	Pro	Gly	Asn	
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Phe	Asn	Asp	Glu	Ile	Gly	Cys	Ser	Gly	Asp	Trp	Gln	Pro	Asp	Cys	Leu	
	145				150					155					160	
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Arg	Thr	Phe	Met	Ser	Asp	Val	Asp	Gly	Asp	Gly	Val	Phe	Thr	Phe	Ala	
				165					170					175		
act	gac	gcc	att	cca	ccc	ggc	aat	tat	gag	ttc	aag	att	gcc	aca	aat	576
Thr	Asp	Ala	Ile	Pro	Pro	Gly	Asn	Tyr	Glu	Phe	Lys	Ile	Ala	Thr	Asn	
			180					185					190			
gag	agc	tgg	gca	aac	cca	aat	tat	ggc	gca	ttt	ggg	aac	aat	gtt	ccc	624
Glu	Ser	Trp	Ala	Asn	Pro	Asn	Tyr	Gly	Ala	Phe	Gly	Asn	Asn	Val	Pro	
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Phe	Thr	Val	Thr	Gly	Pro	Ala	Thr	Val	Ile	Phe	Ser	Phe	Asn	Thr	Ala	
	210					215					220					
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Thr	Thr	Tyr	Val	Gly	Val	Glu	Val	Arg	Ser	Ala	Leu	Pro	Gln	Pro	Asp	
	225				230					235					240	
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Tyr	Arg	Thr	Pro	Gly	Gly	Ala	Val	Pro	Ala	Gly	Thr	Pro	Val	Thr	Ile	
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cgg	ctc	cgc	acc	ttc	cac	aat	gat	gtc	acg	gcg	gta	acc	ctg	cgg	gtg	864
Arg	Leu	Arg	Thr	Phe	His	Asn	Asp	Val	Thr	Ala	Val	Thr	Leu	Arg	Val	
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tac	gat	gtc	aat	gcc	ggg	gca	cag	cgg	ttc	att	ccg	atg	agt	gtc	gtc	912
Tyr	Asp	Val	Asn	Ala	Gly	Ala	Gln	Arg	Phe	Ile	Pro	Met	Ser	Val	Val	
	290				295						300					
gct	gcc	aat	acc	gac	tgt	tac	ggc	gat	tat	ggg	cca	cgt	cgg	tgc	gat	960
Ala	Ala	Asn	Thr	Asp	Cys	Tyr	Gly	Asp	Tyr	Gly	Pro	Arg	Arg	Cys	Asp	
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Phe	Trp	Ala	Ala	Thr	Leu	Asn	Glu	Ala	Gln	Pro	Asn	Asn	Leu	Trp	Tyr	
				325					330					335		
cgc	ttt	att	gtc	acc	gat	ggc	agt	gat	acc	gac	tat	tac	gcc	gat	aac	1056
Arg	Phe	Ile	Val	Thr	Asp	Gly	Ser	Asp	Thr	Asp	Tyr	Tyr	Ala	Asp	Asn	
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Thr	Ala	Ala	Leu	Asp	Gly	Gly	Ser	Gly	Arg	Met	Thr	Asp	Asp	Val	Val	
			355				360					365				
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Asp	Phe	Ser	Tyr	Ala	Leu	Met	Phe	Tyr	Asp	Pro	Ala	Phe	Thr	Ser	Pro	
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Asn	Trp	Ala	Arg	Thr	Ala	Val	Ile	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe	
	385				390					395					400	
cgc	aat	ggc	gat	ccg	cat	aac	gat	ccg	caa	gac	ggt	gac	atc	cgg	tac	1248

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Asp	Asp	Pro	Val 420	Ile	Thr	Leu	Gly	Trp 425	Gly	Glu	Leu	Pro	Glu 430	Gly	Tyr		
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Cys	Arg	His 435	Tyr	Ala	Asp	Ala	Thr 440	Thr	Asn	Cys	Pro	Trp 445	Arg	Phe	Asp		
acg	acc	cca	ccg	gcc	tgg	agt	cca	act	atc	gaa	ggg	cca	cgg	gga	cgt	1392	
Thr	Thr	Pro	Pro	Ala	Trp	Ser 455	Pro	Thr	Ile	Glu	Gly 460	Pro	Arg	Gly	Arg		
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Asp	Tyr	Tyr	Gly	Gly	Asp 470	Leu	Ala	Gly	Val 475	Ile	Glu	Gln	Leu	Asp	Tyr 480		
ctc	cag	caa	tgt	ggc	atc	acg	acc	atc	tac	ttc	aat	ccc	atc	ttt	gcc	1488	
Leu	Gln	Gln	Leu 485	Gly	Ile	Thr	Thr	Ile	Tyr 490	Phe	Asn	Pro	Ile	Phe 495	Ala		
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Pro	Tyr	Leu 515	Gly	Asn	Asn	Gly	Thr 520	Phe	Ala	His	Leu	Val 525	Gln	Glu	Ala		
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Gly	Phe	Asp 595	Ser	Ile	Pro	Glu	Ile 600	Asn	Lys	Ser	Asn	Pro 605	Asp	Val	Gln		
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Pro	Ala	Gly	Tyr	Trp 645	Glu	Thr	Phe	Arg	Thr 650	Val	Val	Arg	Gln	Thr 655	Lys		
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Arg	Asp	Gly	Leu 660	Ile	Ile	Gly	Glu	Leu 665	Trp	Gln	Lys	Asp 670	Ser	Thr	Leu		
ctg	cgc	cac	ctc	cgt	ggg	cag	act	gcc	gat	aca	acg	atg	aac	tac	cgt	2064	
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Trp	Thr 755	Leu	Thr	Pro	Gly	Gln	Glu 760	Thr	Arg	Ala	Asp	Lys 765	Glu	Phe	Asn		
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gta Val	gga Gly	gtc Val	acc Thr	ggc Gly 805	gat Asp	gat Asp	cca Pro	gat Asp 810	gac Asp	cgc Arg	cgc Arg	acc Thr	tat Tyr 815	ccc Pro		2448
tgg Trp	cct Pro	gat Asp	cag Gln 820	ggg Gly	ggg Gly	aca Thr	ccc Pro	gac Asp 825	acc Thr	aac Asn	ctt Leu	ctg Leu	aac Asn 830	cat His	tac Tyr	2496
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acg Thr	gta Val	cag Gln 915	gtc Val	gtg Val	aac Asn	ggg Gly	agc Ser 920	atc Ile	cag Gln	atc Ile	acg Thr 925	ctg Leu	aac Asn	ccg Pro	ctg Leu	2784
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acc Thr 1010	tac Tyr	tac Tyr	ttc Phe	gtt Val	gtc Val	cgt Arg 1015	gcg Ala	ctt Leu	gac Asp	gcc Ala 1020	gtc Val	ggg Gly	aac Asn	gaa Glu	ggg Gly	3072
cca Pro 1025	gct Ala	tcg Ser	gcg Ala	gaa Glu 1030	gtg Val	agc Ser	gct Ala	ctg Leu	ccg Pro	cac His 1035	tac Tyr	cgg Arg	att Ile	ggg Gly	tgg Trp 1040	3120
gcc Ala	aat Asn	ttg Leu	caa Gln 1045	tgg Trp	cca Pro	ccg Pro	gcg Ala	atc Ile 1050	tca Ser	cac His	acc Thr	gtg Val	tcg Ser	gcc Ala 1055	atc Ile	3168
aac Asn	acc Thr	acc Thr 1060	ccg Pro	gat Asp	att Ile	tac Tyr	ggg Gly 1065	cag Gln	gtc Val	tgg Trp	atc Ile	gac Asp 1070	ggg Gly	gta Val	acc Thr	3216
agt Ser	cag Gln 1075	ccc Pro	ggc Gly	gcg Ala	aca Thr	cct Pro	ggc Gly 1080	ctg Leu	cgt Arg	gct Ala	cag Gln 1085	gtg Val	gga Gly	tac Tyr	ggc Gly	3264
ccg Pro	cag Gln 1090	ggc Gly	agt Ser	gat Asp	ccc Pro	cgt Arg 1095	ggg Gly	agc Ser	aac Asn	tgg Trp 1100	gtg Val	tgg Trp	gtg Val	gag Glu	gct Ala	3312
acc Thr 1105	ttc Phe	aac Asn	gtt Val	gat Asp 1110	gcc Ala	ggc Gly	aac Asn	aac Asn	gac Asp 1115	gaa Glu	ttc Phe	aag Lys	gcg Ala	caa Gln 1120	ctc Leu	3360
cag Gln	ccc Pro	gaa Glu	acg Thr 1125	gtt Val	ggc Gly	acc Thr	ttc Phe	gat Asp 1130	tac Tyr	gtc Val	ttc Phe	cgc Arg	tac Tyr 1135	agc Ser	acc Thr	3408
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Gly	Leu	Pro	Pro	Gln	Pro	Gly	Val	Leu	Thr	Val	Leu	Ser	Ser	Gly	Asp		
		1155				1160					1165						
aca	aca	ccg	ccg	gca	gtc	cca	acc	ggc	ctg	caa	gtg	atc	agc	gcg	tcc		3552
Thr	Thr	Pro	Pro	Ala	Val	Thr	Gly	Leu	Gln	Val	Ile	Ser	Ala	Ser			
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Pro	Ala	Gly	Ile	Val	Leu	Ser	Trp	Asn	Ala	Val	Gly	Asp	Ala	Tyr	Ala		
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Tyr	Glu	Val	Arg	Arg	Ile	Asp	Gly	Asn	Gly	Asn	Glu	Leu	Ile	Phe	Ala		
			1205					1210					1215				
cgt	aca	act	gca	acc	acc	ttc	acc	gac	acc	ggg	gtc	atg	cag	ggg	gca		3696
Arg	Thr	Thr	Ala	Thr	Thr	Phe	Thr	Asp	Thr	Gly	Val	Met	Gln	Gly	Ala		
		1220				1225					1230						
acg	tac	acc	tat	gac	gtg	cgt	tct	tta	gac	atc	tcc	ttc	aac	cgt	tca		3744
Thr	Tyr	Thr	Tyr	Asp	Val	Arg	Ser	Leu	Asp	Ile	Ser	Phe	Asn	Arg	Ser		
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gcc	ttc	agc	gca	ccg	gta	acg	gct	acc	gcc	gaa	ctc	cgc	acg	ggt	acg		3792
Ala	Phe	Ser	Ala	Pro	Val	Thr	Ala	Thr	Ala	Glu	Leu	Arg	Thr	Val	Thr		
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ctg	gtg	atg	aat	gtg	acg	gta	ccg	acc	ccg	gtt	gaa	gac	gcg	att	ggg		3840
Leu	Val	Met	Asn	Val	Thr	Val	Pro	Thr	Pro	Val	Glu	Asp	Ala	Ile	Gly		
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cgc	agc	gtc	tac	att	gcc	ggc	ttc	ctt	gac	cgg	ctc	gac	ggg	ggg	tta		3888
Arg	Ser	Val	Tyr	Ile	Ala	Gly	Phe	Leu	Asp	Arg	Leu	Asp	Gly	Gly	Leu		
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Pro	Gln	Trp	Asn	Pro	Gly	Gly	Val	Val	Met	Thr	Gln	Val	Ser	Ala	Thr		
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cag	tgg	aca	atc	acc	ttc	acc	gga	cgc	gag	ggc	acg	caa	ctc	gaa	tac		3984
Gln	Trp	Thr	Ile	Thr	Phe	Thr	Gly	Arg	Glu	Gly	Thr	Gln	Leu	Glu	Tyr		
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Lys	Tyr	Thr	Leu	Gly	Ser	Trp	Asp	Tyr	Val	Glu	Lys	Gly	Ala	Thr	Cys		
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gaa	gag	ctg	gcc	aac	cgg	caa	ttg	acg	ctg	acc	tac	ggg	acg	agt	ggc		4080
Glu	Glu	Leu	Ala	Asn	Arg	Gln	Leu	Thr	Leu	Thr	Tyr	Gly	Thr	Ser	Gly		
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<212> PRT

<213> Chloroflexus aurantiacus

<400> 262

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Pro	Leu	Pro	Ala	Ser	Val	Asn	Leu	Ala	Gly	Asp	Leu	Gln	Ser	Glu	Ala		
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Thr	Gly	Gly	Ala	Cys	Gly	Asp	Trp	Asp	Pro	Gly	Cys	Ala	Ala	Ala	Ala		
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Phe	Ser	Ala	Gln	Gly	Asn	Gly	Val	Tyr	Leu	Phe	Val	Ser	Gln	Thr	Ile		
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Pro	Ala	Gly	Ser	Tyr	Glu	Tyr	Lys	Ile	Ala	Met	Gly	Ser	Trp	Ala	Glu		
			85					90					95				
Asn	Tyr	Gly	Ala	Asn	Phe	Gln	Gln	Asn	Gly	Pro	Asn	Ile	Pro	Val	Thr		
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Leu	Gly	Ser	Ala	Gln	Ser	Val	Arg	Phe	Tyr	Tyr	Asp	His	Lys	Thr	His		

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Phe	130	Asp	Glu	Ile	Gly	Cys	Ser	Gly	Asp	Trp	140	Gln	Pro	Asp	Cys
Arg	145	Thr	Phe	Met	Ser	150	Val	Asp	Gly	Asp	155	Gly	Val	Phe	Thr
Thr	Asp	Ala	Ile	Pro	Pro	Gly	Asn	Tyr	Glu	Phe	Lys	Ile	Ala	Thr	Asn
Glu	Ser	Trp	Ala	Asn	Pro	Asn	Tyr	Gly	Ala	Phe	Gly	Asn	Asn	Val	Pro
Phe	Thr	Val	Thr	Gly	Pro	Ala	Thr	Val	Ile	Phe	Ser	Phe	Asn	Thr	Ala
Thr	Thr	Tyr	Val	Gly	Val	Glu	Val	Arg	Ser	Ala	Leu	Pro	Gln	Pro	Asp
Asn	Asn	Val	Glu	Trp	Asp	Gly	Val	Tyr	His	Asn	Ser	Arg	Asp	Pro	Leu
Tyr	Arg	Thr	Pro	Gly	Gly	Ala	Val	Pro	Ala	Gly	Thr	Pro	Val	Thr	Ile
Arg	Leu	Arg	Thr	Phe	His	Asn	Asp	Val	Thr	Ala	Val	Thr	Leu	Arg	Val
Tyr	Asp	Val	Asn	Ala	Gly	Ala	Gln	Arg	Phe	Ile	Pro	Met	Ser	Val	Val
Ala	Ala	Asn	Thr	Asp	Cys	Tyr	Gly	Asp	Tyr	Gly	Pro	Arg	Arg	Cys	Asp
Phe	Trp	Ala	Ala	Thr	Leu	Asn	Glu	Ala	Gln	Pro	Asn	Asn	Leu	Trp	Tyr
Arg	Phe	Ile	Val	Thr	Asp	Gly	Ser	Asp	Thr	Asp	Tyr	Tyr	Ala	Asp	Asn
Thr	Ala	Ala	Leu	Asp	Gly	Gly	Ser	Gly	Arg	Met	Thr	Asp	Asp	Val	Val
Asp	Phe	Ser	Tyr	Ala	Leu	Met	Phe	Tyr	Asp	Pro	Ala	Phe	Thr	Ser	Pro
Asn	Trp	Ala	Arg	Thr	Ala	Val	Ile	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe
Arg	Asn	Gly	Asp	Pro	His	Asn	Asp	Pro	Gln	Asp	Gly	Asp	Ile	Arg	Tyr
Asp	Asp	Pro	Val	Ile	Thr	Leu	Gly	Trp	Gly	Glu	Leu	Pro	Glu	Gly	Tyr
Cys	Arg	His	Tyr	Ala	Asp	Ala	Thr	Thr	Asn	Cys	Pro	Trp	Arg	Phe	Asp
Thr	Thr	Pro	Pro	Ala	Trp	Ser	Pro	Thr	Ile	Glu	Gly	Pro	Arg	Gly	Arg
Asp	Tyr	Tyr	Gly	Gly	Asp	Leu	Ala	Gly	Val	Ile	Glu	Gln	Leu	Asp	Tyr
Leu	Gln	Gln	Leu	Gly	Ile	Thr	Thr	Ile	Tyr	Phe	Asn	Pro	Ile	Phe	Ala
Ala	Gly	Ser	Asn	His	Arg	Tyr	Asp	Thr	Arg	Asp	Tyr	Tyr	Arg	Ile	Asp
Pro	Tyr	Leu	Gly	Asn	Asn	Gly	Thr	Phe	Ala	His	Leu	Val	Gln	Glu	Ala
Arg	Arg	Arg	Gly	Met	Arg	Val	Ile	Leu	Asp	Ser	Val	Phe	Asn	His	Met
Ser	Ser	Asp	Ser	Pro	Phe	Phe	Asp	Arg	Tyr	Ser	His	Tyr	Thr	Thr	Leu
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Gly	Phe	Asp	Ser	Ile	Pro	Glu	Ile	Asn	Lys	Ser	Asn	Pro	Asp	Val	Gln
Ser	Tyr	Phe	Leu	Thr	Gly	Ala	Asn	Ser	Val	Thr	Arg	Phe	Trp	Leu	Arg
Arg	Gly	Ala	Ala	Gly	Trp	Arg	Leu	Asp	Val	Met	Gly	Asp	Ala	Ser	Phe
Pro	Ala	Gly	Tyr	Trp	Glu	Thr	Phe	Arg	Thr	Val	Val	Arg	Gln	Thr	Lys
Arg	Asp	Gly	Leu	Ile	Ile	Gly	Glu	Leu	Trp	Gln	Lys	Asp	Ser	Thr	Leu

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 675 680 685
 Leu Arg Asp Ala Val Ile Gly Leu Leu Pro Gly Thr Phe Asp
 690 695 700
 Ser Lys Gly Phe Gly Asp Ser Gly Arg Val Ile Ser Pro Ser Glu Phe
 705 710 715 720
 Leu Ser Arg Leu Ala Ser Ile Arg Glu Asp Tyr Pro Asp Ala Ala Tyr
 725 730 735
 Tyr Thr Leu Met Asn Leu Leu Gly Ser His Asp Thr Glu Arg Ile Leu
 740 745 750
 Trp Thr Leu Thr Pro Gly Gln Glu Thr Arg Ala Asp Lys Glu Phe Asn
 755 760 765
 Ala Ala Asn Leu Ala Glu Gly Lys Arg Arg Val Gln Leu Ala Ser Leu
 770 775 780
 Ile Gln Phe Thr Val Pro Gly Ala Pro Thr Val Tyr Tyr Gly Asp Glu
 785 790 795 800
 Val Gly Val Thr Gly Asp Asp Asp Pro Asp Asp Arg Arg Thr Tyr Pro
 805 810 815
 Trp Pro Asp Gln Gly Gly Thr Pro Asp Thr Asn Leu Leu Asn His Tyr
 820 825 830
 Arg Ser Leu Thr Glu Leu Arg Asn Arg Tyr Pro Val Leu Ala Lys Gly
 835 840 845
 Asp Phe Thr Pro Leu Leu Ala Asp Asp Ala Ala Gly Val Val Ala Tyr
 850 855 860
 Gly Arg Lys Tyr Arg Asn Lys Ala Ala Leu Val Leu Ile Asn Arg Ser
 865 870 875 880
 Ser Thr Thr Gln Thr Ile Thr Val Pro Val Gln Gly Phe Leu Pro Asn
 885 890 895
 Gly Val Glu Leu Cys Ala Leu Phe Thr Val Gly Asn Gln Leu Asp Glu
 900 905 910
 Thr Val Gln Val Val Asn Gly Ser Ile Gln Ile Thr Leu Asn Pro Leu
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 Ser Gly Thr Val Leu Ile Ser Glu Pro Gly Ala Asp Leu Thr Pro Pro
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 Ala Ala Pro Thr Asn Leu Gln Val Thr Glu Glu Gly Asp Arg Ser Val
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 Ser Leu Ser Trp Gln Arg Pro Ser Gly Gly Ala Gln Ala Tyr Asn Ile
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 Tyr Arg Ser Pro Val Ser Gly Gly Gly Trp Val Lys Val Asn Thr Ala
 980 985 990
 Pro Val Ser Gly Leu Ser Phe Thr Asp Thr Thr Val Glu Asn Gly Arg
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 Thr Tyr Tyr Phe Val Val Arg Ala Leu Asp Ala Val Gly Asn Glu Gly
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 Ala Asn Leu Gln Trp Pro Pro Ala Ile Ser His Thr Val Ser Ala Ile
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 Pro Gln Gly Ser Asp Pro Arg Gly Ser Asn Trp Val Trp Val Glu Ala
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 Thr Phe Asn Val Asp Ala Gly Asn Asn Asp Glu Phe Lys Ala Gln Leu
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 Gln Pro Glu Thr Val Gly Thr Phe Asp Tyr Val Phe Arg Tyr Ser Thr
 1125 1130 1135
 Thr Asn Gly Arg Asp Trp Leu Tyr Ala Asp Ser Ser Gly Pro Phe Ser
 1140 1145 1150
 Gly Leu Pro Pro Gln Pro Gly Val Leu Thr Val Leu Ser Ser Gly Asp
 1155 1160 1165
 Thr Thr Pro Pro Ala Val Pro Thr Gly Leu Gln Val Ile Ser Ala Ser
 1170 1175 1180
 Pro Ala Gly Ile Val Leu Ser Trp Asn Ala Val Gly Asp Ala Tyr Ala
 1185 1190 1195 1200
 Tyr Glu Val Arg Arg Ile Asp Gly Asn Gly Asn Glu Leu Ile Phe Ala
 1205 1210 1215
 Arg Thr Thr Ala Thr Thr Phe Thr Asp Thr Gly Val Met Gln Gly Ala

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1220 Thr Tyr Thr Tyr Asp Val Arg Ser Leu Asp Ile Ser Phe Asn Arg Ser
 1235 Ala Phe Ser Ala Pro Val Thr Ala Thr Ala Glu Leu Arg Thr Val Thr
 1250 Leu Val Met Asn Val Thr Val Pro Thr Pro Val Glu Asp Ala Ile Gly
 1265 Arg Ser Val Tyr Ile Ala Gly Phe Leu Asp Arg Leu Asp Gly Gly Leu
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<212> DNA

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Pro Leu Trp Tyr Lys Asp Ala Val Ile Tyr Glu Leu His Val Arg Ala	
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Phe Cys Asp Ser Asn Gly Asp Gly Ile Gly Asp Phe Pro Gly Leu Thr	
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Ser Lys Leu Asp Tyr Leu Gln Asp Leu Gly Val Thr Ala Ile Trp Leu	
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Leu Pro Phe Tyr Pro Ser Pro Leu Arg Asp Asp Gly Tyr Asp Ile Ala	
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gat tat acg aac att cat ccc aat tac ggc acg ctg gcc gat ttt aag	288
Asp Tyr Thr Asn Ile His Pro Asn Tyr Gly Thr Leu Ala Asp Phe Lys	
85 90 95	
gtg ttt att cgc gaa gcc cat cgg cgt ggg ctg cgc gtc atc acc gag	336
Val Phe Ile Arg Glu Ala His Arg Arg Gly Leu Arg Val Ile Thr Glu	
100 105 110	
ctt gtc tgt aac cac acc tct gac cag cac ccc tgg ttt caa cgt gcc	384
Leu Val Cys Asn His Thr Ser Asp Gln His Pro Trp Phe Gln Arg Ala	
115 120 125	
cgg cgg gct aag ccc ggt act tca gcc cgc aac ttt tat gtc tgg tcg	432
Arg Arg Ala Lys Pro Gly Thr Ser Ala Arg Asn Phe Tyr Val Trp Ser	
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gat aca ccc gac cgc tac aag gac gcc cgg atc atc ttc aaa gat ttt	480
Asp Thr Pro Asp Arg Tyr Lys Asp Ala Arg Ile Ile Phe Lys Asp Phe	
145 150 155 160	
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Glu Thr Ser Asn Trp Thr Trp Asp Pro Val Ala Gln Ala Tyr Tyr Trp	
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His Arg Phe Tyr Ser His Gln Pro Asp Leu Asn Phe Glu Asn Pro Ala	
180 185 190	
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Val	Asp 210	Gly	Met	Arg	Leu	Asp 215	Ala	Ile	Pro	Tyr	Leu 220	Tyr	Glu	Ala	Glu	
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Asp	Glu	Cys 275	His	Met	Ala	Phe	His 280	Phe	Pro	Val	Met	Pro 285	Arg	Leu	Phe	
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Ile	Tyr	Tyr	Gly	Asp	Glu 390	Ile	Gly	Met	Gly	Asp 395	Asn	Ile	Tyr	Leu 400	Gly	
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Ala	Gly	Phe 420	Ser	Arg	Ala	Asn	Pro	Gln 425	Gln	Leu	Tyr	Leu 430	Pro	Val	Ile	
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Ile	Leu	Leu	Ala 500	Val	Phe	Asn	Leu	Ser 505	Arg	Phe	Val	Gln 510	Gly	Val	Glu	
ctc	gat	ctc	tcg	ccg	tac	cgt	ggc	ctg	atg	ccg	ggt	gag	cta	ttc	ggt	1584
Leu	Asp	Leu 515	Ser	Pro	Tyr	Arg	Gly 520	Leu	Met	Pro	Val	Glu 525	Leu	Phe	Gly	
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Gln	Val 530	Glu	Phe	Pro	Pro	Ile 535	Gly	Asp	Gln	Pro	Tyr 540	Phe	Leu	Thr	Leu	
ggc	cca	cac	agc	ttc	tac	tgg	ttt	acg	cta	aca	ccg	caa	cgg	att	gaa	1680
Gly	Pro	His	Ser	Phe	Tyr 550	Trp	Phe	Thr	Leu 555	Thr	Pro	Gln	Arg	Ile	Glu 560	
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Gly	Val	Arg	Leu	Pro 565	Thr	Pro	Gln	Pro	Glu 570	Thr	Glu	Leu	Val	Glu 575	Ile	
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Pro	Val	Asp	Ala 580	Ile	Glu	Trp	Asp	Ala 585	Ile	Phe	Tyr	Asp	Gly 590	Arg	Gln	
gcg	cgg	ctt	gag	cga	gtc	tta	ccc	gat	tac	ctg	cgt	tat	cgg	cgc	tgg	1824
Ala	Arg	Leu 595	Glu	Arg	Val	Leu	Pro 600	Asp	Tyr	Leu	Arg	Tyr 605	Arg	Arg	Trp	
ttt	ggg	gcc	aaa	aca	cgc	aag	atc	aaa	cag	gtg	cag	gta	agc	gag	ttt	1872
Phe	Gly 610	Ala	Lys	Thr	Arg	Lys 615	Ile	Lys	Gln	Val	Gln 620	Val	Ser	Glu	Phe	
gcc	cgt	ctc	gat	tat	gcc	ggt	ggc	cca	gcc	tac	ctg	aca	ctg	ttg	cag	1920
Ala	Arg	Leu	Asp	Tyr	Ala 630	Gly	Gly	Pro	Ala	Tyr 635	Leu	Thr	Leu	Leu	Gln 640	
gtc	acc	tat	gtt	gaa	ggc	gcc	cca	gaa	acc	tac	ttg	ttg	ccg	atg	gcg	1968
Val	Thr	Tyr	Val	Glu 645	Gly	Ala	Pro	Glu	Thr 650	Tyr	Leu	Leu	Pro	Met 655	Ala	
tat	gcc	gaa	ggc	gag	cgc	gcc	gac	cag	ata	ctg	gcc	gat	caa	cgc	cac	2016
Tyr	Ala	Glu	Gly 660	Glu	Arg	Ala	Asp	Gln 665	Ile	Leu	Ala	Asp	Gln 670	Arg	His	
atg	gtg	att	gcc	cgc	cta	cgg	gtt	ggc	cgt	cga	cct	gaa	gcc	ggt	atc	2064
Met	Val	Ile 675	Ala	Arg	Leu	Arg	Val 680	Gly	Arg	Arg	Pro	Glu 685	Ala	Gly	Ile	
ctg	tac	gac	cca	ctc	ggt	gag	cgt	cgc	ttt	gcg	tcg	gcg	ctc	ctg	gaa	2112
Leu	Tyr 690	Asp	Pro	Leu	Gly	Glu 695	Arg	Arg	Phe	Ala	Ser 700	Ala	Leu	Leu	Glu	
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Leu	Ile	Ile	Gly	Arg	Arg 710	Arg	Leu	Arg	Gly	Glu 715	Ala	Gly	Gly	Glu	Leu 720	
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Val	Gly	Gly	Thr 725	Thr	Arg	Ala	Leu	Arg	Lys 730	Leu	Leu	Gly	Gly	Ser 735	Asp	
ggc	ctg	gaa	ccg	agt	ttg	atg	cgt	ggc	gag	cag	agc	aat	tca	tcg	atc	2256
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ggg	ttc	ccc	cat	aca	cca	cgg	gta	gcc	ggc	tac	att	gaa	tat	ctg	cgc	2400
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aac	gaa	ggt	gat	gcc	ttc	gat	tac	gcg	ctc	gat	gtc	gtg	cgc	cgc	tac	2496
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Tyr	Asp	Thr 835	Val	Leu	Thr	Arg	Thr 840	Asp	Val	Val	Pro	Pro 845	Val	Val	Lys	
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Ala	Ser 850	Val	Ala	Gly	Met	Leu 855	Ala	Ala	Ala	His	Gln 860	Pro	Pro	Pro	Ala	
ctg	gtt	gag	gaa	ttg	atc	ggt	tac	ctc	gag	gta	tcg	gca	cgc	ctg	ctc	2640
Leu	Val	Glu	Glu	Leu	Ile 870	Gly	Gly	Tyr	Leu	Glu 875	Ser	Ala	Arg	Leu	Leu 880	
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Pro	Ala	Met	Ala 900	Pro	Glu	Pro	Phe	Ser 905	Thr	Leu	Tyr	Gln 910	Arg	Ser	Ile	
tac	cag	agt	att	cgg	agt	ctg	atc	ggg	caa	acc	ctg	caa	gat	ttg	cgg	2784
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aaa	ctg	ctg	ccg	tcg	ttg	ccg	gca	acc	gtt	cgt	ccg	gca	gag	cgt		2832

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Lys	Leu	Leu	Pro	Ser	Leu	Pro	Ala	Thr	Val	Arg	Pro	Ala	Ala	Glu	Arg	
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gtt	acc	cag	agt	gaa	gag	gcg	ctc	ctg	gcg	cgg	ttg	caa	cgg	att	acc	2880
Val	Thr	Gln	Ser	Glu	Glu	Ala	Leu	Leu	Ala	Arg	Leu	Gln	Arg	Ile	Thr	
945					950					955					960	
ggt	gac	aag	atc	gag	acg	gtg	cgt	att	cgc	att	cac	ggt	gac	tac	cat	2928
Gly	Asp	Lys	Ile	Glu	Thr	Val	Arg	Ile	Arg	Ile	His	Gly	Asp	Tyr	His	
				965						970					975	
ctc	gaa	cag	gtg	ctc	ttc	acc	ggc	aaa	gat	tac	atg	att	atc	gac	ttc	2976
Leu	Glu	Gln	Val	Leu	Phe	Thr	Gly	Lys	Asp	Tyr	Met	Ile	Ile	Asp	Phe	
			980					985					990			
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Glu	Gly	Glu	Pro	Leu	Arg	Pro	Ile	Ser	Glu	Arg	Arg	Ile	Lys	Arg	Ser	
			995			1000						1005				
ccg	ttg	cgt	gat	gtg	gcc	ggc	atg	ttg	cgc	tca	tac	cag	tat	gtc	gcc	3072
Pro	Leu	Arg	Asp	Val	Ala	Gly	Met	Leu	Arg	Ser	Tyr	Gln	Tyr	Val	Ala	
1010					1015						1020					
tat	gcc	gct	cta	tat	gcc	cat	aat	ggt	gca	agc	aga	agc	gct	gaa	gag	3120
Tyr	Ala	Ala	Leu	Tyr	Ala	His	Asn	Gly	Ala	Ser	Arg	Ser	Ala	Glu	Glu	
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atc	gag	cga	ctt	cag	cgc	tgg	gct	gat	atg	tgg	agt	ttc	tgg	gtc	tgt	3168
Ile	Glu	Arg	Leu	Gln	Arg	Trp	Ala	Asp	Met	Trp	Ser	Phe	Trp	Val	Cys	
				1045					1050				1055			
gca	gcc	ttt	ctt	aat	ggc	tat	ctg	acc	aca	gcc	ggc	cat	gaa	gca	ttc	3216
Ala	Ala	Phe	Leu	Asn	Gly	Tyr	Leu	Thr	Thr	Ala	Gly	His	Glu	Ala	Phe	
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gtc	ccc	cag	gat	cag	gcc	gat	ctc	gaa	gcc	ctg	ctc	gag	acg	ttt	gtc	3264
Val	Pro	Gln	Asp	Gln	Ala	Asp	Leu	Glu	Ala	Leu	Leu	Glu	Thr	Phe	Val	
		1075				1080					1085					
gtc	gaa	aaa	gcc	gtc	tac	gaa	ctg	ggt	tac	gag	atg	aac	aat	cgc	cct	3312
Val	Glu	Lys	Ala	Val	Tyr	Glu	Leu	Gly	Tyr	Glu	Met	Asn	Asn	Arg	Pro	
	1090				1095					1100						
gac	tgg	ctg	ccg	atc	ccg	atc	aac	ggc	atc	tta	cgc	cag	att	gaa	gaa	3360
Asp	Trp	Leu	Pro	Ile	Pro	Ile	Asn	Gly	Ile	Leu	Arg	Gln	Ile	Glu	Glu	
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<211> 1120

<212> PRT

<213> Chloroflexus aurantiacus

<400> 264

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			20					25				30				
Phe	Cys	Asp	Ser	Asn	Gly	Asp	Gly	Ile	Gly	Asp	Phe	Pro	Gly	Leu	Thr	
		35				40					45					
Ser	Lys	Leu	Asp	Tyr	Leu	Gln	Asp	Leu	Gly	Val	Thr	Ala	Ile	Trp	Leu	
	50				55					60						
Leu	Pro	Phe	Tyr	Pro	Ser	Pro	Leu	Arg	Asp	Asp	Gly	Tyr	Asp	Ile	Ala	
65				70					75				80			
Asp	Tyr	Thr	Asn	Ile	His	Pro	Asn	Tyr	Gly	Thr	Leu	Ala	Asp	Phe	Lys	
			85					90					95			
Val	Phe	Ile	Arg	Glu	Ala	His	Arg	Arg	Gly	Leu	Arg	Val	Ile	Thr	Glu	
		100					105					110				
Leu	Val	Cys	Asn	His	Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Arg	Ala	
		115				120					125					
Arg	Arg	Ala	Lys	Pro	Gly	Thr	Ser	Ala	Arg	Asn	Phe	Tyr	Val	Trp	Ser	
	130				135					140						
Asp	Thr	Pro	Asp	Arg	Tyr	Lys	Asp	Ala	Arg	Ile	Ile	Phe	Lys	Asp	Phe	
145				150					155					160		
Glu	Thr	Ser	Asn	Trp	Thr	Trp	Asp	Pro	Val	Ala	Gln	Ala	Tyr	Tyr	Trp	
			165					170					175			
His	Arg	Phe	Tyr	Ser	His	Gln	Pro	Asp	Leu	Asn	Phe	Glu	Asn	Pro	Ala	
			180				185					190				

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Val	Gln	Arg	Ala	Val	Phe	Lys	Ala	Met	Glu	Phe	Trp	Leu	Asp	Leu	Gly
		195					200					205			
Val	Asp	Gly	Met	Arg	Leu	Asp	Ala	Ile	Pro	Tyr	Leu	Tyr	Glu	Ala	Glu
	210					215					220				
Gly	Thr	Asn	Cys	Glu	Asn	Leu	Pro	Glu	Thr	His	Ala	Phe	Leu	Lys	Arg
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Leu	Arg	Lys	His	Met	Asp	Glu	Lys	Tyr	Gln	Gly	Arg	Met	Phe	Leu	Ala
				245					250					255	
Glu	Ala	Asn	Gln	Trp	Pro	Glu	Asp	Ala	Val	Ala	Tyr	Phe	Gly	Asp	Gly
			260					265					270		
Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	Pro	Val	Met	Pro	Arg	Leu	Phe
		275					280					285			
Met	Ser	Val	His	Leu	Glu	Asn	Arg	Tyr	Pro	Ile	Ile	Asp	Ile	Met	Arg
	290					295					300				
Gln	Thr	Pro	Pro	Ile	Pro	Asp	Asn	Cys	Gln	Trp	Ala	Ile	Phe	Leu	Arg
	305				310					315					320
Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	Thr	Asp	Glu	Glu	Arg	Asp
				325					330					335	
Tyr	Met	Tyr	Arg	Val	Tyr	Ala	Arg	Asp	Pro	Gln	Ala	Arg	Ile	Asn	Leu
			340					345					350		
Gly	Ile	Arg	Arg	Arg	Leu	Ala	Pro	Leu	Leu	Gly	Asn	His	Arg	Arg	Lys
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Ile	Glu	Leu	Met	Asn	Gly	Leu	Leu	Phe	Ser	Leu	Pro	Gly	Thr	Pro	Val
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Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly	Asp	Asn	Ile	Tyr	Leu	Gly
	385				390					395					400
Asp	Arg	Asn	Gly	Val	Arg	Thr	Pro	Met	Gln	Trp	Ser	Gly	Asp	Arg	Asn
				405					410					415	
Ala	Gly	Phe	Ser	Arg	Ala	Asn	Pro	Gln	Gln	Leu	Tyr	Leu	Pro	Val	Ile
			420					425					430		
Thr	Asp	Pro	Glu	Tyr	His	Tyr	Glu	Thr	Val	Asn	Val	Glu	Thr	Gln	Ser
		435					440					445			
Ala	Asn	Gln	His	Ser	Leu	Leu	Trp	Trp	Thr	Lys	Arg	Leu	Ile	Ala	Leu
	450					455					460				
Arg	Lys	Arg	Tyr	Ala	Ala	Phe	Gly	Arg	Gly	Thr	Leu	Glu	Phe	Leu	Tyr
	465				470					475					480
Pro	Glu	Asn	Arg	Lys	Val	Leu	Cys	Phe	Leu	Arg	Lys	Thr	Glu	Asp	Gln
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Ile	Leu	Leu	Ala	Val	Phe	Asn	Leu	Ser	Arg	Phe	Val	Gln	Gly	Val	Glu
			500					505					510		
Leu	Asp	Leu	Ser	Pro	Tyr	Arg	Gly	Leu	Met	Pro	Val	Glu	Leu	Phe	Gly
		515					520					525			
Gln	Val	Glu	Phe	Pro	Pro	Ile	Gly	Asp	Gln	Pro	Tyr	Phe	Leu	Thr	Leu
	530					535					540				
Gly	Pro	His	Ser	Phe	Tyr	Trp	Phe	Thr	Leu	Thr	Pro	Gln	Arg	Ile	Glu
	545				550					555					560
Gly	Val	Arg	Leu	Pro	Thr	Pro	Gln	Pro	Glu	Thr	Glu	Leu	Val	Glu	Ile
				565					570					575	
Pro	Val	Asp	Ala	Ile	Glu	Trp	Asp	Ala	Ile	Phe	Tyr	Asp	Gly	Arg	Gln
			580					585					590		
Ala	Arg	Leu	Glu	Arg	Val	Leu	Pro	Asp	Tyr	Leu	Arg	Tyr	Arg	Arg	Trp
		595					600					605			
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	610					615					620				
Ala	Arg	Leu	Asp	Tyr	Ala	Gly	Gly	Pro	Ala	Tyr	Leu	Thr	Leu	Leu	Gln
	625				630					635					640
Val	Thr	Tyr	Val	Glu	Gly	Ala	Pro	Glu	Thr	Tyr	Leu	Leu	Pro	Met	Ala
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Tyr	Ala	Glu	Gly	Glu	Arg	Ala	Asp	Gln	Ile	Leu	Ala	Asp	Gln	Arg	His
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Met	Val	Ile	Ala	Arg	Leu	Arg	Val	Gly	Arg	Arg	Pro	Glu	Ala	Gly	Ile
		675					680					685			
Leu	Tyr	Asp	Pro	Leu	Gly	Glu	Arg	Arg	Phe	Ala	Ser	Ala	Leu	Leu	Glu
	690					695					700				
Leu	Ile	Ile	Gly	Arg	Arg	Arg	Leu	Arg	Gly	Glu	Ala	Gly	Gly	Glu	Leu
	705				710					715					720
Val	Gly	Gly	Thr	Thr	Arg	Ala	Leu	Arg	Lys	Leu	Leu	Gly	Gly	Ser	Asp
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 Asn Phe Gly Arg Leu Ile Met Lys Leu Phe Arg Lys Ile Glu Leu
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 Gly Arg Asn Pro Asp Leu Glu Leu Gly Arg Phe Leu Thr Glu Glu Val
 770 775 780
 Gly Phe Pro His Thr Pro Pro Val Ala Gly Tyr Ile Glu Tyr Leu Arg
 785 790 795 800
 Gly Lys Asp Glu Pro Thr Leu Ala Ile Val Gln Gly Tyr Val Gln
 805 810 815
 Asn Glu Gly Asp Ala Phe Asp Tyr Ala Leu Asp Val Val Arg Arg Tyr
 820 825 830
 Tyr Asp Thr Val Leu Thr Arg Thr Asp Val Val Pro Pro Val Val Lys
 835 840 845
 Ala Ser Val Ala Gly Met Leu Ala Ala Ala His Gln Pro Pro Pro Ala
 850 855 860
 Leu Val Glu Glu Leu Ile Gly Gly Tyr Leu Glu Ser Ala Arg Leu Leu
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 Gly Gln Arg Thr Ala Glu Met His Gln Ala Leu Ala Lys Gly Ser Gly
 885 890 895
 Pro Ala Met Ala Pro Glu Pro Phe Ser Thr Leu Tyr Gln Arg Ser Ile
 900 905 910
 Tyr Gln Ser Ile Arg Ser Leu Ile Gly Gln Thr Leu Gln Asp Leu Arg
 915 920 925
 Lys Leu Leu Pro Ser Leu Pro Ala Thr Val Arg Pro Ala Ala Glu Arg
 930 935 940
 Val Thr Gln Ser Glu Glu Ala Leu Leu Ala Arg Leu Gln Arg Ile Thr
 945 950 955 960
 Gly Asp Lys Ile Glu Thr Val Arg Ile Arg Ile His Gly Asp Tyr His
 965 970 975
 Leu Glu Gln Val Leu Phe Thr Gly Lys Asp Tyr Met Ile Ile Asp Phe
 980 985 990
 Glu Gly Glu Pro Leu Arg Pro Ile Ser Glu Arg Arg Ile Lys Arg Ser
 995 1000 1005
 Pro Leu Arg Asp Val Ala Gly Met Leu Arg Ser Tyr Gln Tyr Val Ala
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 Tyr Ala Ala Leu Tyr Ala His Asn Gly Ala Ser Arg Ser Ala Glu Glu
 1025 1030 1035 1040
 Ile Glu Arg Leu Gln Arg Trp Ala Asp Met Trp Ser Phe Trp Val Cys
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 Val Pro Gln Asp Gln Ala Asp Leu Glu Ala Leu Leu Glu Thr Phe Val
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 Val Glu Lys Ala Val Tyr Glu Leu Gly Tyr Glu Met Asn Asn Arg Pro
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<211> 1803

<212> DNA

<213> Lactococcus lactis subsp. cremoris SK11

<220>

<221> CDS

<222> (1)..(1803)

<400> 265

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Tyr	Glu	Phe	Leu	Met	Ser	Arg	Asp	Glu	Ser	Gly	Phe	Phe	Thr	Val	Thr	

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65	ttg	gag	ggc	tca	gat	tgg	70	gaa	caa	aac	75	ttt	tat	ggg	agt
Leu	Glu	Gly	Ser	Asp	Trp	Glu	Gln	Asn	Lys	Arg	Arg	Phe	Tyr	Gly	Ser
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Gly	Ile	Gly	Gly	Glu	Gly	Leu	Leu	Tyr	Thr	Asn	Glu	Asn	Asp	Ile	Lys
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Pro	Tyr	Gln	Leu	Thr	Val	Phe	Gln	Lys	Glu	Asp	Lys	Ala	Pro	Ala	Trp
115	tat	cgt	gac	gct	ggt	ttt	tac	cag	att	ttt	cct	gat	cgt	ttc	cat
Tyr	Arg	Asp	Ala	Val	Phe	Tyr	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe	His
130	gga	aat	gaa	aat	ggg	caa	gtc	agc	cat	cca	aaa	ccg	aat	tct	ttt
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Tyr	Gly	Thr	Lys	Ser	Asp	Thr	Thr	Pro	Phe	Tyr	Val	Lys	Glu	Glu	Asn
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Asp	Ile	Ala	Arg	Trp	Asp	Phe	Phe	Gly	Gly	Asn	Leu	Arg	Arg	Gly	Ile
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Asn	Lys	Ile	Ser	Tyr	Leu	Lys	Lys	Glu	Leu	Gly	Ile	Asn	Ala	Ile	Tyr
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210	tat	cta	aaa	ata	gat	tcc	atg	tta	gga	act	caa	gaa	gat	ttt	caa
Tyr	Leu	Lys	Ile	Asp	Ser	Met	Met	Leu	Gly	Thr	Gln	Glu	Asp	Phe	Gln
225	tta	atc	aat	tta	ctt	cat	caa	gaa	caa	atg	cat	tta	ggt	ttg	gac
Leu	Ile	Asn	Leu	Leu	His	His	Gln	Glu	Gln	Met	His	Leu	Val	Leu	Asp
245	gtc	ttt	tca	cat	gta	ggt	aaa	aat	tca	ctt	tac	ttc	aat	atc	aat
Val	Phe	Ser	His	Val	Gly	Lys	Lys	Asn	Ser	Leu	Tyr	Phe	Asn	Ile	Asn
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Asp	Tyr	Gly	Asp	Asp	Asp	Glu	Gly	Ala	Ala	Lys	Asn	Pro	Asp	Ser	Pro
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Phe	Asp	Trp	Phe	Lys	Phe	Gln	Glu	Asn	Tyr	Pro	Phe	Asp	Tyr	Lys	Ser
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Trp	Gly	Ile	Lys	Asp	Leu	Pro	Pro	Glu	Ile	Asp	Lys	Asp	Asn	Glu	Ser
305	cgt	gat	ttt	att	tat	ggt	agg	aaa	aac	tct	ggt	tta	tca	aag	tgg
Arg	Asp	Phe	Ile	Tyr	Gly	Arg	Arg	Lys	Asn	Ser	Val	Leu	Ser	Lys	Trp
325	gac	ttg	gga	ata	gat	ggt	tgg	cga	tta	gat	ggt	gct	gat	gaa	ttg
Asp	Leu	Gly	Ile	Asp	Gly	Trp	Trp	Arg	Leu	Asp	Val	Ala	Asp	Glu	Leu
340	gat	tca	ttt	att	aaa	ggg	att	cgt	gag	aat	ctt	gac	cgt	tat	tca
Asp	Ser	Phe	Ile	Lys	Gly	Ile	Ile	Arg	Glu	Asn	Leu	Asp	Arg	Tyr	Ser
355	aaa	att	cta	ata	gga	gaa	att	tgg	gag	gat	gct	tct	aat	aag	att
Lys	Ile	Leu	Ile	Gly	Glu	Ile	Trp	Trp	Glu	Asp	Ala	Ser	Asn	Lys	Ile
370	tat	gga	aca	aga	cgc	aaa	tat	att	ctt	ggc	ggg	agc	tta	cag	gct
Tyr	Gly	Thr	Arg	Arg	Lys	Tyr	Ile	Ile	Leu	Gly	Gly	Ser	Leu	Gln	Ala
385	atg	aac	tat	ccg	ttt	cgt	gat	tta	atc	atc	aat	tta	tta	aac	gga
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405	cgc	tca	tgt	cag	gat	gta	gct	cat	caa	ttg	atg	act	ttg	cag	gaa
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<210> 266
<211> 600
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<213> Lactococcus lactis subsp. cremoris SK11
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Thr	Gln	Val	Glu	Val	Lys	Cys	Ile	Ile	Arg	Arg	Asp	Phe	Gly	Lys	Arg	
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Tyr	Glu	Phe	Leu	Met	Ser	Arg	Asp	Glu	Ser	Gly	Phe	Phe	Thr	Val	Thr	
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	130					135					140					
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Asn	Lys	Ile	Ser	Tyr	Leu	Lys	Glu	Leu	Gly	Ile	Asn	Ala	Ile	Tyr	Leu	
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Asn	Pro	Val	Phe	Ser	Gly	Thr	Ser	Asn	His	Arg	Tyr	Asp	Thr	Asn	Asp	
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Tyr 225 Leu Ile Lys Ile Asp 230 Ser Met Leu Gly Thr Gln 235 Glu Asp Phe Gln Glu 240
 Leu 245 Ile Asn Leu Leu 245 His Gln Glu Gln Met 250 His Leu Val Leu 255 Asp Gly
 Val 260 Phe Ser His Val Gly Lys Asn Ser 265 Leu Tyr Phe Asn Ile 270 Asn Gly
 Asp 275 Tyr Gly Asp Asp Glu Gly Ala 280 Ala Lys Asn Pro Asp 285 Ser Pro Tyr
 Phe 290 Asp Trp Phe Lys Phe Glu 295 Asn Tyr Pro Phe Asp 300 Tyr Lys Ser Trp
 Trp 305 Gly Ile Lys Asp Leu 310 Pro Glu Ile Asp Lys 315 Asp Asn Glu Ser Phe 320
 Arg 325 Asp Phe Ile Tyr Gly Arg Lys Asn Ser 330 Val Leu Ser Lys Trp 335 Asn
 Asp 340 Leu Gly Ile Asp Gly Trp Arg Leu 345 Asp Val Ala Asp Glu 350 Leu Pro
 Asp 355 Ser Phe Ile Lys Gly Ile Arg 360 Glu Asn Leu Asp Arg 365 Tyr Ser Glu
 Lys 370 Ile Leu Ile Gly Glu Ile 375 Trp Glu Asp Ala Ser 380 Asn Lys Ile Ser
 Tyr 385 Gly Thr Arg Arg Lys 390 Tyr Ile Leu Gly Gly 395 Ser Leu Gln Ala Cys 400
 Met 405 Asn Tyr Pro Phe Arg Asp Leu Ile Ile 410 Asn Leu Leu Asn Gly 415 Asn
 Arg 420 Ser Cys Gln Asp Val Ala His Gln 425 Leu Met Thr Leu Gln 430 Glu Asn
 Tyr 435 Pro Lys Asp Ile Phe Tyr Asn 440 Asn Leu Asn Asn Leu 445 Gly Thr His
 Asp 450 Thr Glu Arg Ile Leu Thr 455 Met Val Gly Lys Glu 460 Asn Leu Pro Leu
 Ala 465 Val Ser Leu Leu Phe 470 Val Leu Pro Gly Ile 475 Pro Cys Ile Tyr Tyr 480
 Gly 485 Asp Glu Ala Gly Leu Ser Gly Gly Lys 490 Asp Pro Glu Asn Arg 495 Lys
 Tyr 500 Phe Pro Trp Asp Asp Ile Ser Pro 505 Glu Ile Tyr Asp Tyr 510 Tyr Lys
 Ser 515 Trp Thr Lys Lys Arg Leu Leu 520 Glu Asn Ser Leu Lys 525 Glu Gly Glu
 Phe 530 Ser Ser Phe Tyr Ser Asp 535 Arg Leu Leu Gly Ile 540 Leu Arg Tyr Thr
 Asp 545 Ser Glu Val Phe Val 550 Glu Val Ile Asn Pro 555 Ser Glu Asp Glu Ile 560
 Lys 565 Ile Asp Tyr Ser Glu Ile Thr Phe Leu Gln Lys Phe Asp 575 Phe Met
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<211> 1755

<212> DNA

<213> Lactococcus lactis subsp. cremoris SK11

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<221> CDS

<222> (1)..(1755)

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20 25 30	
gat gtg gaa aaa gtc gaa tta ttt tat ggc gat cct tat tcg tgg gaa	144
Asp Val Glu Lys Val Glu Leu Phe Tyr Gly Asp Pro Tyr Ser Trp Glu	
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ggg ctt gac aac cct gaa aca cag tat tgg gct agt caa aaa gta gag	192

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Met	Lys	Lys	Tyr	Leu	Ser	Thr	Asn	Ile	Ser	Asp	Tyr	Phe	Glu	Ala	Glu	
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Ile	Thr	Val	Ala	Thr	Lys	Arg	Val	Asp	Tyr	Leu	Phe	Val	Ile	Thr	Gly	
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ttg	gat	gga	gaa	aaa	gta	ggt	tac	aca	gac	caa	gga	atg	ttt	gat	tat	336
Leu	Asp	Gly	Glu	Lys	Val	Val	Tyr	Thr	Asp	Gln	Gly	Met	Phe	Asp	Tyr	
			100					105					110			
gat	gag	agc	ttg	gtg	act	aaa	aaa	tat	ggg	gct	ttc	cgt	ttg	cct	tat	384
Asp	Glu	Ser	Leu	Val	Thr	Lys	Lys	Tyr	Gly	Ala	Phe	Arg	Leu	Pro	Tyr	
			115				120					125				
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Phe	His	Glu	Ser	Asp	Arg	Phe	Lys	Ala	Pro	Glu	Trp	Val	Lys	Glu	Thr	
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ggt	tgg	tat	caa	att	ttc	cct	gaa	cgt	ttt	gcc	aat	ggg	gat	aca	agc	480
Val	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	Phe	Ala	Asn	Gly	Asp	Thr	Ser	
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Asn	Asp	Pro	Glu	Gly	Thr	Lys	Ala	Trp	Asn	Thr	Gln	Asp	Val	Pro	Asp	
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cgt	caa	gat	ttt	tat	ggg	gga	gat	ttg	caa	ggg	gtg	att	gat	cat	ctg	576
Arg	Gln	Asp	Phe	Tyr	Gly	Gly	Asp	Leu	Gln	Gly	Val	Ile	Asp	His	Leu	
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Glu	His	Leu	Thr	Glu	Leu	Gly	Val	Asn	Gly	Ile	Tyr	Phe	Thr	Pro	Ile	
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Phe	Gln	Ala	Phe	Ser	Asn	His	Lys	Tyr	Asp	Thr	Glu	Asp	Tyr	Met	Glu	
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Ile	Asp	Lys	Gln	Phe	Gly	Asp	Lys	Glu	Leu	Phe	Lys	Thr	Leu	Val	Lys	
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gaa	gca	cat	gcg	cgt	ggt	att	aaa	gtc	atg	tta	gat	gcg	gtc	ttt	aat	768
Glu	Ala	His	Ala	Arg	Gly	Ile	Lys	Val	Met	Leu	Asp	Ala	Val	Phe	Asn	
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cac	atc	gga	gat	acg	tct	gct	caa	tgg	caa	gat	gta	ttg	aaa	aat	caa	816
His	Ile	Gly	Asp	Thr	Ser	Ala	Gln	Trp	Gln	Asp	Val	Leu	Lys	Asn	Gln	
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gaa	aaa	tca	aaa	ttt	gcg	gat	tgg	ttc	cat	ggt	aat	agt	tgg	cca	gca	864
Glu	Lys	Ser	Lys	Phe	Ala	Asp	Trp	Phe	His	Val	Asn	Ser	Trp	Pro	Ala	
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Thr	Tyr	Thr	Pro	Thr	Asp	Asp	Phe	Glu	Asn	Ala	Glu	Asn	Ala	Thr	Tyr	
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Asp	Thr	Phe	Ala	Phe	Thr	Pro	His	Met	Pro	Lys	Leu	Asn	Thr	Ala	Asn	
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cca	gag	ggt	gaa	gct	tat	ctt	ttg	aaa	gta	gct	gat	tat	tgg	att	tct	1008
Pro	Glu	Val	Glu	Ala	Tyr	Leu	Leu	Lys	Val	Ala	Asp	Tyr	Trp	Ile	Ser	
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gag	ttt	gat	att	gat	gca	tgg	cgt	ttg	gat	gtg	gcg	gat	gaa	gtg	gat	1056
Glu	Phe	Asp	Ile	Asp	Ala	Trp	Arg	Leu	Asp	Val	Ala	Asp	Glu	Val	Asp	
			340				345						350			
cat	act	ttc	tgg	aaa	aaa	ttc	cgc	aca	act	tgt	gat	gcg	gaa	aaa	gat	1104
His	Thr	Phe	Trp	Lys	Lys	Phe	Arg	Thr	Thr	Cys	Asp	Ala	Glu	Lys	Asp	
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Asp	Phe	Tyr	Ile	Leu	Gly	Glu	Val	Trp	His	Ser	Ala	Gln	Pro	Trp	Leu	
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Val	Gly	Asp	Glu	Phe	Ser	Ala	Val	Met	Asn	Tyr	Ala	Tyr	Thr	Asp	Ala	
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Ile	Lys	Asp	Gly	Leu	Ile	Thr	Lys	Lys	Ile	Ser	Leu	Glu	Gln	Met	Val	
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Ser	Asn	Ile	Asn	Thr	Gln	Leu	Thr	Leu	Tyr	Arg	Lys	Gln	Val	Asn	Gln		
ctg	atg	ttt	aat	gtt	tta	gat	tct	cat	gat	aca	ccc	aga	att	ttg	act		1344
Leu	Met	Phe	Asn	Val	Leu	Asp	Ser	His	Asp	Thr	Pro	Arg	Ile	Leu	Thr		
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Val	Ala	Lys	Asn	Asn	Lys	Asn	Leu	Met	Lys	Leu	Val	Glu	Thr	Phe	Thr		
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Phe	Met	Gln	Pro	Gly	Val	Pro	Cys	Ile	Tyr	Tyr	Gly	Asp	Glu	Tyr	Ala		
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Leu	Thr	Gly	Gly	Met	Asp	Pro	Glu	Cys	Arg	Lys	Val	Met	Pro	Trp	Glu		
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gaa	aaa	gat	caa	gat	tta	gag	atg	ttt	gac	ttc	ttt	aaa	aat	ctg	att		1536
Glu	Lys	Asp	Gln	Asp	Leu	Glu	Met	Phe	Asp	Phe	Phe	Lys	Asn	Leu	Ile		
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gct	cta	cg	aaa	caa	tat	caa	gga	att	tta	agt	gat	tca	gaa	gta	gaa		1584
Ala	Leu	Arg	Lys	Gln	Tyr	Gln	Gly	Ile	Leu	Ser	Asp	Ser	Glu	Val	Glu		
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tggt	aaa	atc	gta	gat	tca	gaa	aat	ggc	att	gtg	aaa	ttt	gaa	cgt	gga		1632
Trp	Lys	Ile	Val	Asp	Ser	Glu	Asn	Gly	Ile	Val	Lys	Phe	Glu	Arg	Gly		
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Ser	Leu	Lys	Ala	Ile	Phe	Asn	Ile	Gly	Glu	Lys	Pro	Ala	Tyr	Phe	Ser		
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<211> 584

<212> PRT

<213> Lactococcus lactis subsp. cremoris SK11

<400> 268

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		50				55					60						
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Ile	Thr	Val	Ala	Thr	Lys	Arg	Val	Asp	Tyr	Leu	Phe	Val	Ile	Thr	Gly		
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Asp	Glu	Ser	Leu	Val	Thr	Lys	Lys	Tyr	Gly	Ala	Phe	Arg	Leu	Pro	Tyr		
		115					120					125					
Phe	His	Glu	Ser	Asp	Arg	Phe	Lys	Ala	Pro	Glu	Trp	Val	Lys	Glu	Thr		
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Val	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	Phe	Ala	Asn	Gly	Asp	Thr	Ser		
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Glu	His	Leu	Thr	Glu	Leu	Gly	Val	Asn	Gly	Ile	Tyr	Phe	Thr	Pro	Ile		
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 His Ile Gly Asp Thr Ser Ala Gln Trp Gln Asp Val Leu Lys Asn Gln
 260 265 270
 Glu Lys Ser Lys Phe Ala Asp Trp Phe His Val Asn Ser Trp Pro Ala
 275 280 285
 Thr Tyr Thr Pro Thr Asp Asp Phe Glu Asn Ala Glu Asn Ala Thr Tyr
 290 295 300
 Asp Thr Phe Ala Phe Thr Pro His Met Pro Lys Leu Asn Thr Ala Asn
 305 310 315 320
 Pro Glu Val Glu Ala Tyr Leu Leu Lys Val Ala Asp Tyr Trp Ile Ser
 325 330 335
 Glu Phe Asp Ile Asp Ala Trp Arg Leu Asp Val Ala Asp Glu Val Asp
 340 345 350
 His Thr Phe Trp Lys Lys Phe Arg Thr Thr Cys Asp Ala Glu Lys Asp
 355 360 365
 Asp Phe Tyr Ile Leu Gly Glu Val Trp His Ser Ala Gln Pro Trp Leu
 370 375 380
 Val Gly Asp Glu Phe Ser Ala Val Met Asn Tyr Ala Tyr Thr Asp Ala
 385 390 395 400
 Ile Lys Asp Gly Leu Ile Thr Lys Lys Ile Ser Leu Glu Gln Met Val
 405 410 415
 Ser Asn Ile Asn Thr Gln Leu Thr Leu Tyr Arg Lys Gln Val Asn Gln
 420 425 430
 Leu Met Phe Asn Val Leu Asp Ser His Asp Thr Pro Arg Ile Leu Thr
 435 440 445
 Val Ala Lys Asn Asn Lys Asn Leu Met Lys Leu Val Glu Thr Phe Thr
 450 455 460
 Phe Met Gln Pro Gly Val Pro Cys Ile Tyr Tyr Gly Asp Glu Tyr Ala
 465 470 475 480
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 485 490 495
 Glu Lys Asp Gln Asp Leu Glu Met Phe Asp Phe Phe Lys Asn Leu Ile
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<211> 1695

<212> DNA

<213> Lactobacillus casei ATCC 334

<220>

<221> CDS

<222> (1)..(1695)

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Gln Val Tyr Pro Lys Ser Phe Asn Asp Ser Asn Gly Asp Gly Val Gly	
20 25 30	
gac tta aat ggt atc agt gaa aaa ttg gat tat tta gcc gat ttg ggc	144
Asp Leu Asn Gly Ile Ser Glu Lys Leu Asp Tyr Leu Ala Asp Leu Gly	
35 40 45	
gta gat gtg ctc tgg ctg aat ccg att tac cga tcg cca cag gtt gat	192
Val Asp Val Leu Trp Leu Asn Pro Ile Tyr Arg Ser Pro Gln Val Asp	
50 55 60	
aac ggc tac gat att tcg aat tat cgc gat gtt gaa cca caa tta ggg	240
Asn Gly Tyr Asp Ile Ser Asn Tyr Arg Asp Val Glu Pro Gln Leu Gly	

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65	aca	atg	gcc	gat	ttt	70	gaa	cac	ttg	ttg	75	gca	cat	gat	cga	80	
Thr	Met	Ala	Asp	Phe	85	Glu	His	Leu	Leu	Gln	90	Ala	His	Asp	Arg	His	288
cta	aag	att	atc	ttg	gac	ttg	ggt	gtg	aat	cac	acg	tct	gat	caa	cat		336
Leu	Lys	Ile	Ile	Leu	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Gln	His		
ccg	tgg	ttc	aaa	gcc	gcc	aaa	tca	gtg	agc	gat	ccg	cat	ccg	cat	gat		384
Pro	Trp	Phe	Lys	Ala	Ala	Lys	Ser	Ser	Val	Ser	Asp	Pro	His	His	Asp		
tac	tac	atc	tgg	aag	aag	cca	ggt	gac	gat	cat	gag	cct	aat	aat	tgg		432
Tyr	Tyr	Ile	Trp	Lys	Lys	Pro	Val	Asp	Asp	His	Glu	Pro	Asn	Asn	Trp		
ggc	tca	agc	ttt	ggt	ggt	tca	gct	tgg	gaa	tac	aaa	aaa	gat	ctg	ggc		480
Gly	Ser	Ser	Phe	Gly	Gly	Ser	Ala	Trp	Glu	Tyr	Lys	Lys	Asp	Leu	Gly		
145				150					155					160			
gag	tat	tac	ctg	cat	ctt	ttt	gcc	aag	caa	caa	ccg	gat	ctc	aac	tgg		528
Glu	Tyr	Tyr	Leu	His	Leu	Phe	Ala	Lys	Gln	Gln	Pro	Asp	Leu	Asn	Trp		
				165					170					175			
gaa	aat	cct	aag	gta	cgc	caa	gaa	ggt	tat	gat	ctc	atg	cgc	ttt	tgg		576
Glu	Asn	Pro	Lys	Val	Arg	Gln	Glu	Val	Tyr	Asp	Leu	Met	Arg	Phe	Trp		
			180					185					190				
cta	gat	aag	gga	ggt	gat	ggc	ttc	cgg	atg	gat	gtc	ata	tca	ctg	att		624
Leu	Asp	Lys	Gly	Val	Asp	Gly	Phe	Arg	Met	Asp	Val	Ile	Ser	Leu	Ile		
			195				200					205					
tct	aaa	gat	ccg	gct	tat	cca	gat	ggc	ccg	ctc	att	caa	ggc	aag	gca		672
Ser	Lys	Asp	Pro	Ala	Tyr	Pro	Asp	Gly	Pro	Leu	Ile	Gln	Gly	Lys	Ala		
			210			215					220						
tac	ggt	agt	tat	tat	gcc	gga	gcg	gca	aat	ggc	cct	aag	ggt	cat	gat		720
Tyr	Gly	Ser	Tyr	Tyr	Ala	Gly	Ala	Ala	Asn	Gly	Pro	Lys	Val	His	Asp		
225					230				235					240			
tac	ttg	cag	gaa	atg	cac	gag	caa	gtg	ttg	tcg	cac	tac	aat	atc	atg		768
Tyr	Leu	Gln	Glu	Met	His	Glu	Gln	Val	Leu	Ser	His	Tyr	Asn	Ile	Met		
				245				250						255			
acg	gtc	ggc	gag	acg	ccc	cat	aca	acg	gca	cag	cag	gcg	caa	tta	tac		816
Thr	Val	Gly	Glu	Thr	Pro	His	Thr	Thr	Ala	Gln	Gln	Ala	Gln	Leu	Tyr		
			260					265					270				
acg	gcg	gca	gat	cgt	cac	gag	ttg	gat	atg	ggt	ttt	cat	ttt	gac	cat		864
Thr	Ala	Ala	Asp	Arg	His	Glu	Leu	Asp	Met	Val	Phe	His	Phe	Asp	His		
			275				280					285					
atg	cat	ctt	gac	tat	ggc	caa	tat	ggc	aag	ttc	tcg	aca	aat	cga	ttt		912
Met	His	Leu	Asp	Tyr	Gly	Gln	Tyr	Gly	Lys	Phe	Ser	Thr	Asn	Arg	Phe		
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aaa	tta	ggt	gat	ctc	aaa	gaa	gtc	ttg	gca	cgt	tgg	gag	aac	aca	tta		960
Lys	Leu	Val	Asp	Leu	Lys	Glu	Val	Leu	Ala	Arg	Trp	Glu	Asn	Thr	Leu		
305				310					315					320			
gcg	caa	gtc	gat	ggc	tgg	aac	agc	ctt	tac	tgg	agc	aac	cac	gat	cag		1008
Ala	Gln	Val	Asp	Gly	Trp	Asn	Ser	Leu	Tyr	Trp	Ser	Asn	His	Asp	Gln		
				325				330						335			
cca	cgg	cct	gtg	aca	cga	ttt	gga	gat	gaa	ggc	cag	tat	cga	att	cga		1056
Pro	Arg	Pro	Val	Thr	Arg	Phe	Gly	Asp	Glu	Gly	Gln	Tyr	Arg	Ile	Arg		
			340					345					350				
tca	gcc	aaa	atg	ctg	ggg	act	gtg	ctg	cac	atg	ttg	cag	gga	acg	cct		1104
Ser	Ala	Lys	Met	Leu	Gly	Thr	Val	Leu	His	Met	Leu	Gln	Gly	Thr	Pro		
			355				360					365					
tat	att	ttt	gag	gga	gaa	gaa	ctc	ggt	ctg	aag	aat	ggt	cat	ttt	gat		1152
Tyr	Ile	Phe	Glu	Gly	Glu	Glu	Leu	Gly	Leu	Lys	Asn	Val	His	Phe	Asp		
			370			375					380						
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Gln	Leu	Ser	Asp	Tyr	Asn	Asp	Leu	Glu	Thr	Lys	Asn	Ile	Phe	Lys	Glu		
385				390					395					400			
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Leu	Thr	Gln	Gln	His	His	Glu	Ser	Pro	Glu	Ala	Ala	Met	Lys	Ala	Ile		
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tat	ctg	cat	tcg	cgc	gat	aat	gct	cgt	acg	ccg	atg	cct	tgg	gat	ggc		1296
Tyr	Leu	His	Ser	Arg	Asp	Asn	Ala	Arg	Thr	Pro	Met	Pro	Trp	Asp	Gly		
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agt	gaa	aaa	ggt	ggt	ttc	acc	acc	gga	caa	cca	tgg	ctg	gga	cta	aat		1344
Ser	Glu	Lys	Gly	Gly	Phe	Thr	Thr	Gly	Gln	Pro	Trp	Leu	Gly	Leu	Asn		

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cca	gat	435	aaa	gac	att	aat	440	gca	gct	gaa	gac	ttg	gca	gat	agt	gac	1392
Pro	Asp	His	Lys	Asp	Ile	Asn	445	Ala	Ala	Glu	Asp	Leu	Ala	Asp	Ser	Asp	
	450						455					460					
ggt	ggt	tac	cac	tat	tat	caa	cac	ctg	att	aaa	tta	cga	cat	gaa	gag		1440
Gly	Val	Tyr	His	Tyr	Tyr	Gln	His	Leu	Ile	Lys	Leu	Arg	His	Glu	Glu		
465					470					475					480		
cca	ttg	att	acc	act	ggt	gta	ttt	gag	cta	ctt	gct	cct	gat	gat	ccg		1488
Pro	Leu	Ile	Thr	Thr	Gly	Val	Phe	Glu	Leu	Leu	Ala	Pro	Asp	Asp	Pro		
				485				490						495			
aac	ttg	ttt	att	tac	ctg	cgc	aaa	ggg	gaa	cat	gag	acc	ttg	ctg	gtg		1536
Asn	Leu	Phe	Ile	Tyr	Leu	Arg	Lys	Gly	Glu	His	Glu	Thr	Leu	Leu	Val		
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gca	ggt	aac	ttc	tca	agt	gag	gaa	cgc	aca	tgg	tca	gtg	ccg	gat	gac		1584
Ala	Gly	Asn	Phe	Ser	Ser	Glu	Glu	Arg	Thr	Trp	Ser	Val	Pro	Asp	Asp		
		515					520					525					
ttg	caa	gct	aag	gat	gtg	gat	gtg	ttg	att	cgg	aat	agt	gaa	att	tcc		1632
Leu	Gln	Ala	Lys	Asp	Val	Asp	Val	Leu	Ile	Arg	Asn	Ser	Glu	Ile	Ser		
	530					535					540						
gat	tca	cta	gag	aaa	aca	ctg	aca	tta	cca	cca	ttt	ggc	gca	gtg	gtg		1680
Asp	Ser	Leu	Glu	Lys	Thr	Leu	Thr	Leu	Pro	Pro	Phe	Gly	Ala	Val	Val		
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tac	aag	ctt	caa	tag													1695
Tyr	Lys	Leu	Gln														

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<211> 564

<212> PRT

<213> Lactobacillus casei ATCC 334

<400> 270

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			20					25					30				
Asp	Leu	Asn	Gly	Ile	Ser	Glu	Lys	Leu	Asp	Tyr	Leu	Ala	Asp	Leu	Gly		
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Val	Asp	Val	Leu	Trp	Leu	Asn	Pro	Ile	Tyr	Arg	Ser	Pro	Gln	Val	Asp		
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Asn	Gly	Tyr	Asp	Ile	Ser	Asn	Tyr	Arg	Asp	Val	Glu	Pro	Gln	Leu	Gly		
65					70					75					80		
Thr	Met	Ala	Asp	Phe	Glu	His	Leu	Leu	Gln	Ala	Ala	His	Asp	Arg	His		
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Leu	Lys	Ile	Ile	Leu	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Gln	His		
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Pro	Trp	Phe	Lys	Ala	Ala	Lys	Ser	Val	Ser	Asp	Pro	His	His	Asp			
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Tyr	Tyr	Ile	Trp	Lys	Lys	Pro	Val	Asp	Asp	His	Glu	Pro	Asn	Asn	Trp		
	130					135					140						
Gly	Ser	Ser	Phe	Gly	Gly	Ser	Ala	Trp	Glu	Tyr	Lys	Lys	Asp	Leu	Gly		
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Glu	Tyr	Tyr	Leu	His	Leu	Phe	Ala	Lys	Gln	Gln	Pro	Asp	Leu	Asn	Trp		
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Glu	Asn	Pro	Lys	Val	Arg	Gln	Glu	Val	Tyr	Asp	Leu	Met	Arg	Phe	Trp		
			180					185					190				
Leu	Asp	Lys	Gly	Val	Asp	Gly	Phe	Arg	Met	Asp	Val	Ile	Ser	Leu	Ile		
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Ser	Lys	Asp	Pro	Ala	Tyr	Pro	Asp	Gly	Pro	Leu	Ile	Gln	Gly	Lys	Ala		
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Tyr	Gly	Ser	Tyr	Tyr	Ala	Gly	Ala	Ala	Asn	Gly	Pro	Lys	Val	His	Asp		
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Tyr	Leu	Gln	Glu	Met	His	Glu	Gln	Val	Leu	Ser	His	Tyr	Asn	Ile	Met		
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Thr	Val	Gly	Glu	Thr	Pro	His	Thr	Thr	Ala	Gln	Gln	Ala	Gln	Leu	Tyr		
			260					265					270				
Thr	Ala	Ala	Asp	Arg	His	Glu	Leu	Asp	Met	Val	Phe	His	Phe	Asp	His		
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Met	His	Leu	Asp	Tyr	Gly	Gln	Tyr	Gly	Lys	Phe	Ser	Thr	Asn	Arg	Phe		

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290
 Lys 305 Val Asp Leu 295
 310 Glu Val Leu Ala Arg 300
 315 Trp Glu Asn Thr Leu
 320 Ala Gln Val Asp Gly Trp Asn Ser Leu Tyr Trp Ser Asn His Asp Gln
 325 Thr Arg Phe Gly Asp 330
 335 Gly Gln Tyr Arg Ile Arg
 340 Pro Arg Pro Val Thr Arg Phe Gly Asp 345
 350 Leu His Met Leu Gln Gly Thr Pro
 355 Ser Ala Lys Met Leu Gly Thr Val 360
 365 Tyr Ile Phe Glu Gly Glu Glu Leu Gly Leu Lys Asn Val His Phe Asp
 370 Gln Leu Ser Asp Tyr Asn Asp Leu Glu Thr Lys Asn Ile Phe Lys Glu
 385 380 390 395 400
 Leu Thr Gln Gln His His Glu Ser Pro Glu Ala Ala Met Lys Ala Ile
 405 Tyr Leu His Ser Arg Asp Asn Ala Arg Thr Pro Met Pro Trp Asp Gly
 415 420 425 430 435
 Ser Glu Lys Gly Gly Phe Thr Thr Gly Gln Pro Trp Leu Gly Leu Asn
 440 445
 Pro Asp His Lys Asp Ile Asn Ala Ala Glu Asp Leu Ala Asp Ser Asp
 450 455 460
 Gly Val Tyr His Tyr Tyr Gln His Leu Ile Lys Leu Arg His Glu Glu
 465 470 475 480
 Pro Leu Ile Thr Thr Gly Val Phe Glu Leu Ala Pro Asp Asp Pro
 485 490 495
 Asn Leu Phe Ile Tyr Leu Arg Lys Gly Glu His Glu Thr Leu Leu Val
 500 505 510
 Ala Gly Asn Phe Ser Ser Glu Glu Arg Thr Trp Ser Val Pro Asp Asp
 515 520 525
 Leu Gln Ala Lys Asp Val Asp Val Leu Ile Arg Asn Ser Glu Ile Ser
 530 535 540
 Asp Ser Leu Glu Lys Thr Leu Thr Leu Pro Pro Phe Gly Ala Val Val
 545 550 555 560
 Tyr Lys Leu Gln

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<211> 1779

<212> DNA

<213> Lactobacillus casei ATCC 334

<220>

<221> CDS

<222> (1)..(1779)

<400> 271

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caa	aaa	ggc	acg	gct	gtc	aca	ttg	acg	gca	cag	gct	gat	ggg	gcg	gtg	96
Gln	Lys	Gly	Thr	Ala	Val	Thr	Leu	Thr	Ala	Gln	Ala	Asp	Gly	Ala	Val	
			20					25					30			
aca	caa	gcc	aca	ctt	gtc	att	atg	cca	gat	gaa	cat	tgc	gat	caa	acg	144
Thr	Gln	Ala	Thr	Leu	Val	Ile	Met	Pro	Asp	Glu	His	Cys	Asp	Gln	Thr	
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cag	tcc	ttg	ccg	atg	acg	aaa	agc	cct	aac	ggc	tac	aca	gtg	acg	ttt	192
Gln	Ser	Leu	Pro	Met	Thr	Lys	Ser	Pro	Asn	Gly	Tyr	Thr	Val	Thr	Phe	
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acg	cct	cct	aat	gcc	ggg	ctt	tgg	ttt	tat	cat	ttt	gag	ttg	caa	agc	240
Thr	Pro	Pro	Asn	Ala	Gly	Leu	Trp	Phe	Tyr	His	Phe	Glu	Leu	Gln	Ser	
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gac	aat	ggc	cgc	gaa	cgc	ttt	ggg	gcg	gtc	ggc	ggg	ggg	ttt	ggc	ggg	288
Asp	Asn	Gly	Arg	Glu	Arg	Phe	Gly	Ala	Val	Gly	Gly	Gly	Phe	Gly	Gly	
				85				90						95		
cta	ggg	cag	ctt	tac	cct	gaa	aat	gtg	gat	gtg	ggt	aat	tat	cag	atg	336
Leu	Gly	Gln	Leu	Tyr	Pro	Glu	Asn	Val	Asp	Val	Val	Asn	Tyr	Gln	Met	
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Arg	Phe	Tyr	His	Ile	Phe	Val	Asp	Arg	Arg	Phe	Asn	Asn	Gly	Asn	Ala	Asp	
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Thr	Asp	Arg	Pro	Met	Tyr	Ile	Arg	Gly	Asn	Asp	Gly	Glu	Ile	Ile	Arg		
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Trp	Asp	Phe	Tyr	Gly	Gly	Asn	Leu	Thr	Gly	Ile	Gln	Gln	Lys	Leu	Pro		
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		195					200					205					
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Gln	Ala	Arg	Ser	Asn	His	Arg	Tyr	Asp	Thr	Gly	Asp	Tyr	Phe	Ala	Ile		
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Asp	Glu	Val	Leu	Gly	Ser	Leu	His	Asp	Phe	Lys	Gln	Phe	Leu	Ala	Ala		
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Val	Gly	Ala	Asp	Ser	Arg	Tyr	Phe	Asn	Ala	Val	Asn	Glu	Tyr	Ser	Asp		
		260					265					270					
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Leu	Pro	Ala	Ile	Asn	Lys	Asp	Asn	Gln	Asp	Phe	His	Asp	Phe	Ile	Ala		
305				310						315					320		
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Ala	Lys	Lys	Gly	Ser	Val	Ile	Ser	Tyr	Trp	Thr	Asp	Leu	Gly	Val	Asp		
			325					330					335				
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Glu	Val	Trp	Glu	Asp	Ala	Ser	Asn	Lys	Gln	Ala	Tyr	Gly	Lys	Arg	Arg		
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Gln	Tyr	Phe	Glu	Gly	Gly	Glu	Leu	Asn	Ala	Val	Met	Asn	Tyr	Pro	Leu		
385				390						395					400		
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Phe	Val	Arg	Gln	Leu	Met	Thr	Leu	Lys	Glu	Asn	Tyr	Pro	Thr	Asn	Ala		
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Phe	Ala	Phe	Asn	Phe	Asn	Asn	Ile	Gly	Ser	His	Asp	Thr	Pro	Arg	Ile		
		435				440					445						
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	450				455					460							
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465				470					475						480		
gcc	ggg	tta	act	ggc	ggt	aaa	gac	ccg	gat	aac	cgc	gcc	ttt	tat	cca	1488	
Ala	Gly	Leu	Thr	Gly	Gly	Lys	Asp	Pro	Asp	Asn	Arg	Ala	Phe	Tyr	Pro		

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Trp Gly His Glu Asp Gln Ala Val Leu Asp Ile Tyr Gln Ile Ala Leu			
500	505	510	
cag acc cgc atc gac cag ccc gcc tta gca gcc ggc gcc gct ttt ttc			1584
Gln Thr Arg Ile Asp Gln Pro Ala Leu Ala Ala Gly Ala Ala Phe Phe			
515	520	525	
cca ttt acg ttt gaa gac agt ttt ggc ttc gtc cgc caa aat gat acc			1632
Pro Phe Thr Phe Glu Asp Ser Phe Gly Phe Val Arg Gln Asn Asp Thr			
530	535	540	
caa acg ctg gtg gtt ctg gcc aat cca act gga tca cca caa gtg tta			1680
Gln Thr Leu Val Val Leu Ala Asn Pro Thr Gly Ser Pro Gln Val Leu			
545	550	555	
cag gat ccg cat gct gaa tta gtg cca aaa agt ttg cgc gct tta ttg			1728
Gln Asp Pro His Ala Glu Leu Val Pro Lys Ser Leu Arg Ala Leu Leu			
565	570	575	
cca gta ggc acg atg gta ccg gca ggc ggt gtg att tgg cag cag att			1776
Pro Val Gly Thr Met Val Pro Ala Gly Gly Val Ile Trp Gln Gln Ile			
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<210> 272

<211> 592

<212> PRT

<213> Lactobacillus casei ATCC 334

<400> 272

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Thr Gln Ala Thr Leu Val Ile Met Pro Asp Glu His Cys Asp Gln Thr	
35 40 45	
Gln Ser Leu Pro Met Thr Lys Ser Pro Asn Gly Tyr Thr Val Thr Phe	
50 55 60	
Thr Pro Pro Asn Ala Gly Leu Trp Phe Tyr His Phe Glu Leu Gln Ser	
65 70 75 80	
Asp Asn Gly Arg Glu Arg Phe Gly Ala Val Gly Gly Gly Phe Gly Gly	
85 90 95	
Leu Gly Gln Leu Tyr Pro Glu Asn Val Asp Val Val Asn Tyr Gln Met	
100 105 110	
Thr Val Val Thr Ala Phe Asp Pro Val Pro Ala Trp Tyr Gln Asn Ala	
115 120 125	
Arg Phe Tyr His Ile Phe Val Asp Arg Phe Asn Asn Gly Asn Ala Asp	
130 135 140	
Gly His Val Asn Ala Pro Lys Glu Asn Ser Phe Leu Tyr Gly Arg Lys	
145 150 155 160	
Thr Asp Arg Pro Met Tyr Ile Arg Gly Asn Asp Gly Glu Ile Ile Arg	
165 170 175	
Trp Asp Phe Tyr Gly Gly Asn Leu Thr Gly Ile Gln Gln Lys Leu Pro	
180 185 190	
Leu Leu Ala Ala Arg Gly Ile Asn Ala Leu Tyr Leu Ser Pro Ile Phe	
195 200 205	
Gln Ala Arg Ser Asn His Arg Tyr Asp Thr Gly Asp Tyr Phe Ala Ile	
210 215 220	
Asp Glu Val Leu Gly Ser Leu His Asp Phe Lys Gln Phe Leu Ala Ala	
225 230 235 240	
Ala His Gln Leu Gly Met His Val Ile Leu Asp Gly Val Phe Asn His	
245 250 255	
Val Gly Ala Asp Ser Arg Tyr Phe Asn Ala Val Asn Glu Tyr Ser Asp	
260 265 270	
Val Gly Ala Ala Asn Ser Leu Asp Ser Pro Tyr Ala Ser Trp Phe Ser	
275 280 285	
Phe Lys Arg Phe Pro Asp Asp Tyr Asn Ser Trp Trp Gly Val Lys Asp	
290 295 300	
Leu Pro Ala Ile Asn Lys Asp Asn Gln Asp Phe His Asp Phe Ile Ala	
305 310 315 320	

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Ala Lys Lys Gly Ser Val Ile Ser Tyr Trp Thr Asp Leu Gly Val Asp
 325 330 335
 Gly Trp Arg Leu Asp Val Ala Asp Glu Leu Met Asp Asp Phe Ile Arg
 340 345 350
 Gln Ile Arg Ser Thr Leu Asp Gln Phe Pro Glu Arg Val Leu Ile Gly
 355 360 365
 Glu Val Trp Glu Asp Ala Ser Asn Lys Gln Ala Tyr Gly Lys Arg Arg
 370 375 380
 Gln Tyr Phe Glu Gly Gly Glu Leu Asn Ala Val Met Asn Tyr Pro Leu
 385 390 395 400
 Arg Ser Met Leu Ile Asp Leu Thr Asn Gly Gln Leu Asn Ala Ala Gly
 405 415
 Phe Val Arg Gln Leu Met Thr Leu Lys Glu Asn Tyr Pro Thr Asn Ala
 420 425 430
 Phe Ala Phe Asn Phe Asn Asn Ile Gly Ser His Asp Thr Pro Arg Ile
 435 440 445
 Leu Thr Met Leu Asp Gly Asp Arg Arg Lys Leu Gln Phe Ile Val Ser
 450 455 460
 Leu Phe Tyr Trp Leu Pro Gly Val Pro Cys Leu Tyr Tyr Gly Asp Glu
 465 470 475 480
 Ala Gly Leu Thr Gly Gly Lys Asp Pro Asp Asn Arg Ala Phe Tyr Pro
 485 490 495
 Trp Gly His Glu Asp Gln Ala Val Leu Asp Ile Tyr Gln Ile Ala Leu
 500 505 510
 Gln Thr Arg Ile Asp Gln Pro Ala Leu Ala Ala Gly Ala Phe Phe
 515 520 525
 Pro Phe Thr Phe Glu Asp Ser Phe Gly Phe Val Arg Gln Asn Asp Thr
 530 535 540
 Gln Thr Leu Val Val Leu Ala Asn Pro Thr Gly Ser Pro Gln Val Leu
 545 550 555 560
 Gln Asp Pro His Ala Glu Leu Val Pro Lys Ser Leu Arg Ala Leu Leu
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 Pro Val Gly Thr Met Val Pro Ala Gly Gly Val Ile Trp Gln Gln Ile
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<210> 273

<211> 1668

<212> DNA

<213> Lactobacillus casei ATCC 334

<220>

<221> CDS

<222> (1)..(1668)

<400> 273

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caa atc tat ccg gcc tca ttc aaa gat agc aat aat gac ggc ata ggc	96
Gln Ile Tyr Pro Ala Ser Phe Lys Asp Ser Asn Asn Asp Gly Ile Gly	
20 25 30	
gat ctg cct ggc atc act gcc gaa tta ccg aag tta aaa gaa tta ggc	144
Asp Leu Pro Gly Ile Thr Ala Glu Leu Pro Lys Leu Lys Glu Leu Gly	
35 40 45	
att acc acg att tgg tta tcg ccg gtt tat aag agc ccc atg gtt gac	192
Ile Thr Thr Ile Trp Leu Ser Pro Val Tyr Lys Ser Pro Met Val Asp	
50 55 60	
aat ggt tat gac att gcc gac tat cag gcg att gat ccg cgc ttt ggg	240
Asn Gly Tyr Asp Ile Ala Asp Tyr Gln Ala Ile Asp Pro Arg Phe Gly	
65 70 75 80	
acc atg act gac ttt gat cag ctc atg gca act gcc aaa gat ctc ggt	288
Thr Met Thr Asp Phe Asp Gln Leu Met Ala Thr Ala Lys Asp Leu Gly	
85 90 95	
atc aaa gtg gta atg gat ttg gtg gtc aac cat acg tcc gat cag cac	336
Ile Lys Val Val Met Asp Leu Val Val Asn His Thr Ser Asp Gln His	
100 105 110	
cgg tgg ttt caa gcg gcg ctc aag aat ccg gcc tca cca tat cgg gac	384
Arg Trp Phe Gln Ala Ala Leu Lys Asn Pro Ala Ser Tyr Arg Asp	
115 120 125	

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Phe	Tyr	Ile	Phe	Arg	Gln	Gly	His	Asp	Gly	Gln	Pro	Pro	Asn	Asn	Trp		
	130					135					140						
cgc	tca	aac	ttc	ggc	gct	ggc	tcg	tca	tgg	acg	gcg	ggt	ccc	ggt	gag	480	
Arg	Ser	Asn	Phe	Gly	Ala	Gly	Ser	Ser	Trp	Thr	Ala	Val	Pro	Gly	Glu		
145				150						155					160		
ccc	aac	acc	tat	tat	cac	cac	gtc	ttt	tcc	cca	caa	caa	ccg	gac	ctg	528	
Pro	Asn	Thr	Tyr	Tyr	His	His	Val	Phe	Ser	Pro	Gln	Gln	Pro	Asp	Leu		
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aat	tgg	gaa	aat	ccg	aag	ttg	cgg	caa	gcc	att	tat	agc	atg	atc	aac	576	
Asn	Trp	Glu	Asn	Pro	Lys	Leu	Arg	Gln	Ala	Ile	Tyr	Ser	Met	Ile	Asn		
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tgg	tgg	cta	gcc	aaa	ggc	ctc	gcc	ggg	ttc	cgg	ggt	gac	gcc	att	acg	624	
Trp	Trp	Leu	Ala	Lys	Gly	Leu	Ala	Gly	Phe	Arg	Val	Asp	Ala	Ile	Thr		
		195					200					205					
ttt	atc	aaa	aag	gat	cag	gat	ttt	gct	tcc	atc	acg	cca	gat	ggc	agc	672	
Phe	Ile	Lys	Lys	Asp	Gln	Asp	Phe	Ala	Ser	Ile	Thr	Pro	Asp	Gly	Ser		
	210					215					220						
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Asp	Gly	Leu	Gly	Lys	Val	Lys	Arg	Lys	Lys	Thr	Glu	Asn	Arg	Pro	Gly	Leu	
225					230					235						240	
gat	caa	ttt	ctc	aaa	gag	ttg	aac	ggt	gcc	acc	ttt	aag	ccg	gcc	aat	768	
Asp	Gln	Phe	Leu	Lys	Glu	Leu	Asn	Val	Ala	Thr	Phe	Lys	Pro	Ala	Asn		
				245					250					255			
gcc	gtc	acg	atc	ggg	gaa	gcg	tct	ggc	ggt	gca	tac	gat	caa	ctc	ggc	816	
Ala	Val	Thr	Ile	Gly	Glu	Ala	Ser	Gly	Val	Ala	Tyr	Asp	Gln	Leu	Gly		
			260					265					270				
gac	ttc	att	ggc	gaa	aac	ggc	tac	ttc	tca	atg	att	ttt	gat	ttt	cat	864	
Asp	Phe	Ile	Gly	Glu	Asn	Gly	Tyr	Phe	Ser	Met	Ile	Phe	Asp	Phe	His		
		275					280					285					
tac	gcc	gac	att	gac	gtc	gct	tct	ggg	tct	gag	tgg	ttc	aag	caa	acc	912	
Tyr	Ala	Asp	Ile	Asp	Val	Ala	Ser	Gly	Ser	Glu	Trp	Phe	Lys	Gln	Thr		
	290				295					300							
aac	tgg	acg	cca	aaa	atg	ctt	ggc	aag	gcg	att	gcc	aaa	agc	cag	ctg	960	
Asn	Trp	Thr	Pro	Lys	Met	Leu	Gly	Lys	Ala	Ile	Ala	Lys	Ser	Gln	Leu		
305					310					315					320		
gca	att	caa	aaa	ggt	ggc	tgg	ggg	gct	aat	ttc	ctt	gaa	aat	cat	gat	1008	
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caa	ccg	cga	agc	cta	agc	aag	tat	atc	cgt	gag	ccg	caa	tat	cgc	aat	1056	
Gln	Pro	Arg	Ser	Leu	Ser	Lys	Tyr	Ile	Arg	Glu	Pro	Gln	Tyr	Arg	Asn		
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gcg	atc	ggg	gca	aaa	gca	tta	gca	ctg	tta	tac	ttc	ggt	tta	cgt	ggc	1104	
Ala	Ile	Gly	Ala	Lys	Ala	Leu	Ala	Leu	Leu	Tyr	Phe	Gly	Leu	Arg	Gly		
		355				360						365					
tgc	ccg	ttt	atc	tat	caa	ggc	caa	gaa	ctc	ggc	atg	gtc	aat	gcg	gtg	1152	
Cys	Pro	Phe	Ile	Tyr	Gln	Gly	Gln	Glu	Leu	Gly	Met	Val	Asn	Ala	Val		
	370					375					380						
cga	acc	aac	att	gat	caa	ttc	aac	gac	ctt	tcc	gcg	cac	gac	aac	tat	1200	
Arg	Thr	Asn	Ile	Asp	Gln	Phe	Asn	Asp	Leu	Ser	Ala	His	Asp	Asn	Tyr		
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cgc	cgt	gca	ttg	gca	gaa	ggt	tac	tcc	gaa	gct	gat	gcc	ctt	gct	tgt	1248	
Arg	Arg	Ala	Leu	Ala	Glu	Gly	Tyr	Ser	Glu	Ala	Asp	Ala	Leu	Ala	Cys		
				405					410					415			
gtc	aac	cga	cgc	tca	cgt	gac	aat	gcc	cgt	acg	cca	tac	cca	tgg	gac	1296	
Val	Asn	Arg	Arg	Ser	Arg	Asp	Asn	Ala	Arg	Thr	Pro	Tyr	Pro	Trp	Asp		
			420					425					430				
gac	agc	caa	aat	ggc	ggc	ttc	aac	gct	ggt	cat	gaa	cct	tgg	tta	ccg	1344	
Asp	Ser	Gln	Asn	Gly	Gly	Phe	Asn	Ala	Gly	His	Glu	Pro	Trp	Leu	Pro		
		435				440					445						
ctg	gcc	aag	caa	gct	gct	ggc	gtg	aac	tgg	cag	gca	gaa	cac	gat	gat	1392	
Leu	Ala	Lys	Gln	Ala	Ala	Gly	Val	Asn	Trp	Gln	Ala	Glu	His	Asp	Asp		
	450				455						460						
ccc	aat	tcg	gtc	tgg	acg	ttt	tat	caa	acg	ctc	tgc	cgc	ctg	cgg	aat	1440	
Pro	Asn	Ser	Val	Trp	Thr	Phe	Tyr	Gln	Thr	Leu	Cys	Arg	Leu	Arg	Asn		
465				470						475					480		
gca	tca	cca	ttg	cgc	gcc	gat	ttg	atc	gaa	ggc	gac	ttt	gcc	ccg	ctg	1488	
Ala	Ser	Pro	Leu	Arg	Ala	Asp	Leu	Ile	Glu	Gly	Asp	Phe	Ala	Pro	Leu		
				485					490					495			

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gat	gca	cac	aac	gac	aac	gtg	att	gcc	tat	gcc	cgc	ggg	caa	cat	gtc	1536
Asp	Ala	His	Asn	Asp	Asn	Val	Ile	Ala	Tyr	Ala	Arg	Gly	Gln	His	Val	
			500					505					510			
caa	att	ttt	gtg	aat	ctt	agc	tcg	aag	cca	gcc	gca	gtt	gac	tta	cca	1584
Gln	Ile	Phe	Val	Asn	Leu	Ser	Ser	Lys	Pro	Ala	Ala	Val	Asp	Leu	Pro	
		515					520					525				
gcc	ggt	cac	gtt	tgg	ctg	aac	aat	tac	tcg	gat	gtt	gga	acg	agc	tta	1632
Ala	Gly	His	Val	Trp	Leu	Asn	Asn	Tyr	Ser	Asp	Val	Gly	Thr	Ser	Leu	
		530				535					540					
caa	ccc	tat	caa	gcg	att	ctt	att	gag	gtg	aaa	tga					1668
Gln	Pro	Tyr	Gln	Ala	Ile	Leu	Ile	Glu	Val	Lys						
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<210> 274

<211> 555

<212> PRT

<213> Lactobacillus casei ATCC 334

<400> 274

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			20					25					30			
Asp	Leu	Pro	Gly	Ile	Thr	Ala	Glu	Leu	Pro	Lys	Leu	Lys	Glu	Leu	Gly	
		35					40					45				
Ile	Thr	Thr	Ile	Trp	Leu	Ser	Pro	Val	Tyr	Lys	Ser	Pro	Met	Val	Asp	
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Asn	Gly	Tyr	Asp	Ile	Ala	Asp	Tyr	Gln	Ala	Ile	Asp	Pro	Arg	Phe	Gly	
65				70					75						80	
Thr	Met	Thr	Asp	Phe	Asp	Gln	Leu	Met	Ala	Thr	Ala	Lys	Asp	Leu	Gly	
				85				90						95		
Ile	Lys	Val	Val	Met	Asp	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Gln	His	
		100						105					110			
Arg	Trp	Phe	Gln	Ala	Ala	Leu	Lys	Asn	Pro	Ala	Ser	Pro	Tyr	Arg	Asp	
		115					120					125				
Phe	Tyr	Ile	Phe	Arg	Gln	Gly	His	Asp	Gly	Gln	Pro	Pro	Asn	Asn	Trp	
	130					135					140					
Arg	Ser	Asn	Phe	Gly	Ala	Gly	Ser	Ser	Trp	Thr	Ala	Val	Pro	Gly	Glu	
145				150					155					160		
Pro	Asn	Thr	Tyr	Tyr	His	His	Val	Phe	Ser	Pro	Gln	Gln	Pro	Asp	Leu	
			165					170					175			
Asn	Trp	Glu	Asn	Pro	Lys	Leu	Arg	Gln	Ala	Ile	Tyr	Ser	Met	Ile	Asn	
		180						185					190			
Trp	Trp	Leu	Ala	Lys	Gly	Leu	Ala	Gly	Phe	Arg	Val	Asp	Ala	Ile	Thr	
		195					200					205				
Phe	Ile	Lys	Lys	Asp	Gln	Asp	Phe	Ala	Ser	Ile	Thr	Pro	Asp	Gly	Ser	
	210					215					220					
Asp	Gly	Leu	Gly	Lys	Val	Lys	Arg	Lys	Thr	Glu	Asn	Arg	Pro	Gly	Leu	
225				230					235					240		
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			245						250					255		
Ala	Val	Thr	Ile	Gly	Glu	Ala	Ser	Gly	Val	Ala	Tyr	Asp	Gln	Leu	Gly	
		260						265					270			
Asp	Phe	Ile	Gly	Glu	Asn	Gly	Tyr	Phe	Ser	Met	Ile	Phe	Asp	Phe	His	
		275					280					285				
Tyr	Ala	Asp	Ile	Asp	Val	Ala	Ser	Gly	Ser	Glu	Trp	Phe	Lys	Gln	Thr	
	290					295					300					
Asn	Trp	Thr	Pro	Lys	Met	Leu	Gly	Lys	Ala	Ile	Ala	Lys	Ser	Gln	Leu	
				310						315					320	
Ala	Ile	Gln	Lys	Val	Gly	Trp	Gly	Ala	Asn	Phe	Leu	Glu	Asn	His	Asp	
			325						330					335		
Gln	Pro	Arg	Ser	Leu	Ser	Lys	Tyr	Ile	Arg	Glu	Pro	Gln	Tyr	Arg	Asn	
			340					345					350			
Ala	Ile	Gly	Ala	Lys	Ala	Leu	Ala	Leu	Leu	Tyr	Phe	Gly	Leu	Arg	Gly	
		355					360					365				
Cys	Pro	Phe	Ile	Tyr	Gln	Gly	Gln	Glu	Leu	Gly	Met	Val	Asn	Ala	Val	
	370					375					380					
Arg	Thr	Asn	Ile	Asp	Gln	Phe	Asn	Asp	Leu	Ser	Ala	His	Asp	Asn	Tyr	
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Arg Arg Ala Leu Ala Glu Gly Tyr Ser Glu Ala Asp Ala Leu Ala Cys
 Val Asn Arg Arg Ser Arg Asp Asn Ala Arg Thr Pro Tyr Pro Trp Asp
 Asp Ser Gln Asn Gly Gly Phe Asn Ala Gly His Glu Pro Trp Leu Pro
 Leu Ala Lys Gln Ala Ala Gly Val Asn Trp Gln Ala Glu His Asp Asp
 Pro Asn Ser Val Trp Thr Phe Tyr Gln Thr Leu Cys Arg Leu Arg Asn
 Ala Ser Pro Leu Arg Ala Asp Leu Ile Glu Gly Asp Phe Ala Pro Leu
 Asp Ala His Asn Asp Asn Val Ile Ala Tyr Ala Arg Gly Gln His Val
 Gln Ile Phe Val Asn Leu Ser Ser Lys Pro Ala Ala Val Asp Leu Pro
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<210> 275

<211> 570

<212> DNA

<213> Lactobacillus delbrueckii subsp. bulgaricus ATCC BAA-365

<220>

<221> CDS

<222> (1)..(570)

<400> 275

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ggg gag atc cag ggc cgc aag aag gac agt ttc atc tac gcg acc aag	96
Gly Glu Ile Gln Gly Arg Lys Lys Asp Ser Phe Ile Tyr Ala Thr Lys	
20 25 30	
gaa gac agt cct tac tat att aag gat gag cat ggc gat ata gcc cgc	144
Glu Asp Ser Pro Tyr Tyr Ile Lys Asp Glu His Gly Asp Ile Ala Arg	
35 40 45	
tgg gac ttt ttt ggc ggc aac ctc gaa ggt atc cgg caa aag att ccc	192
Trp Asp Phe Phe Gly Gly Asn Leu Glu Gly Ile Arg Gln Lys Ile Pro	
50 55 60	
tat tta aag gat ttg gga gtg acg gcc atc tac ttg aac ccg atc ttc	240
Tyr Leu Lys Asp Leu Gly Val Thr Ala Ile Tyr Leu Asn Pro Ile Phe	
65 70 75 80	
cag gct tcc agc aac cac cgc tat gac acc cag gac ttc atg aag atc	288
Gln Ala Ser Ser Asn His Arg Tyr Asp Thr Gln Asp Phe Met Lys Ile	
85 90 95	
gac ccc atg ctg ggc acc gag gag gac ttc aag aac ttg atc aag gac	336
Asp Pro Met Leu Gly Thr Glu Glu Asp Phe Lys Asn Leu Ile Lys Asp	
100 105 110	
ctg cac aaa aac agg att gcc ttg atc tta gac ggc gtc ttc aac cat	384
Leu His Lys Asn Arg Ile Ala Leu Ile Leu Asp Gly Val Phe Asn His	
115 120 125	
gtc ggc gcc gac agc aag tac ttc ttg agc gcg gtc act gac aag acg	432
Val Gly Ala Asp Ser Lys Tyr Phe Leu Ser Ala Val Thr Asp Lys Thr	
130 135 140	
ggc cct tac tac tcc tgg ttc aac ttc atc aat tat ccg act aag tac	480
Gly Pro Tyr Tyr Ser Trp Phe Asn Phe Ile Asn Tyr Pro Thr Lys Tyr	
145 150 155 160	
cag tcc tgg tgg ggc gaa cca cgc ttc ctg aag tca aca aga gta atg	528
Gln Ser Trp Trp Gly Glu Pro Arg Phe Leu Lys Ser Thr Arg Val Met	
165 170 175	
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Leu Thr Thr Arg Thr Ser Ser Ala Gly Pro Thr Ala Phe	
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<210> 276

<211> 189

<212> PRT

<213> *Lactobacillus delbrueckii* subsp. *bulgaricus* ATCC BAA-365

<400> 276

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Glu Asp Ser Pro Tyr Tyr Ile Lys Asp Glu His Gly Asp Ile Ala Arg
35      40      45
Trp Asp Phe Phe Gly Gly Asn Leu Glu Gly Ile Arg Gln Lys Ile Pro
50      55      60
Tyr Leu Lys Asp Leu Gly Val Thr Ala Ile Tyr Leu Asn Pro Ile Phe
65      70      75      80
Gln Ala Ser Ser Asn His Arg Tyr Asp Thr Gln Asp Phe Met Lys Ile
85      90      95
Asp Pro Met Leu Gly Thr Glu Glu Asp Phe Lys Asn Leu Ile Lys Asp
100     105     110
Leu His Lys Asn Arg Ile Ala Leu Ile Leu Asp Gly Val Phe Asn His
115     120     125
Val Gly Ala Asp Ser Lys Tyr Phe Leu Ser Ala Val Thr Asp Lys Thr
130     135     140
Gly Pro Tyr Tyr Ser Trp Phe Asn Phe Ile Asn Tyr Pro Thr Lys Tyr
145     150     155     160
Gln Ser Trp Trp Gly Glu Pro Arg Phe Leu Lys Ser Thr Arg Val Met
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Leu Thr Thr Arg Thr Ser Ser Ala Gly Pro Thr Ala Phe
180     185

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<210> 277

<211> 1827

<212> DNA

<213> *Deinococcus geothermalis* DSM 11300

<220>

<221> CDS

<222> (1)..(1827)

<223> transl_table=11

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gcc tac acc tct cgg ctc ggt gcc gct gtg ggt gag ctg gtg acg ctg      96
Ala Tyr Thr Ser Arg Leu Gly Ala Ala Val Gly Glu Leu Val Thr Leu
20      25      30
cgc ctc aag acg acg ctg ccg gtg atc gca gtg ttt ctc aaa ctg ctc      144
Arg Leu Lys Thr Thr Leu Pro Val Ile Ala Val Phe Leu Lys Leu Leu
35      40      45
gaa cac ggt gaa atc acg acc cac cct gcc cgc gag atc ggg ccg ctc      192
Glu His Gly Glu Ile Thr Thr His Pro Ala Arg Glu Ile Gly Pro Leu
50      55      60
gac ggc gag ggc cgc tgg ttc gag ttc gac ctg cgc ctg cac gcc cgc      240
Asp Gly Glu Gly Arg Trp Phe Glu Phe Asp Leu Arg Leu His Ala Arg
65      70      75      80
cgg gtg cat tat gcc tgg caa ctc cag acc gct gaa gac aac tgg cac      288
Arg Val His Tyr Ala Trp Gln Leu Gln Thr Ala Glu Asp Asn Trp His
85      90      95
ttc acc atg gcg ggc ctg cac cac acc cgc cga ccc tac cgc gac tgg      336
Phe Thr Met Ala Gly Leu His His Thr Arg Arg Pro Tyr Arg Asp Trp
100     105     110
ttt cac tac gtg gcg gac tac cag gcg ccc acc tgg gtc tgg aaa agc      384
Phe His Tyr Val Ala Asp Tyr Gln Ala Pro Thr Trp Val Trp Lys Ser
115     120     125
gtc ttc tat cag atc ttt ccc gac cgc ttc cgc aac gga aac cct gca      432
Val Phe Tyr Gln Ile Phe Pro Asp Arg Phe Arg Asn Gly Asn Pro Ala
130     135     140
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His	Val	Pro	Trp	Asp 165	Val	Pro	Pro	Thr	Arg 170	Glu	Leu	Asp	Ile	His 175	Ala	
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His	Tyr	Gly	Gly 180	Asp	Leu	Glu	Gly	Val 185	Ala	Gln	Ala	Met	Pro 190	Tyr	Leu	
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Ala	Asp	Leu 195	Gly	Val	Asn	Ala	Leu 200	Trp	Leu	Thr	Pro	Ile 205	Phe	Val	Ser	
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Pro	Ser 210	Ala	His	Arg	Tyr	Asp 215	Ile	Thr	Asp	Tyr	Arg 220	Thr	Ile	Asp	Pro	
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His	Leu	Gly	Gly 225	Glu	Ala 230	Ala	Phe	Gly	Glu	Met 235	Leu	Arg	Ala	Ala	Asn 240	
gca	tac	ggg	atc	cgg	atc	gtg	ttg	gac	ggc	gtg	ttt	aac	cat	acc	ggc	768
Ala	Tyr	Gly	Ile	Arg 245	Ile	Val	Leu	Asp	Gly 250	Val	Phe	Asn	His	Thr 255	Gly	
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Ser	Glu	His	Ala 260	Leu	Phe	Gln	Arg	Ala 265	Leu	His	Asp	Ala	Ser 270	Ala	Pro	
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Glu	Arg	Glu 275	Leu	Phe	Thr	Phe	Arg 280	Glu	Ala	Thr	Gly	Gly 285	Lys	Pro	Pro	
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Tyr	Ala 290	Ala	Phe	Phe	Asp	Val 295	Pro	Thr	Leu	Pro	Lys 300	Ile	Asp	Tyr	Arg	
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Arg	Phe	Trp	Leu	Arg 325	Arg	Gly	Ala	Ala	Gly 330	Trp	Arg	Leu	Asp	Val 335	Ala	
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Gln	Gln	Ile	Gly 340	Arg	Gly	Gly	Thr	Asp 345	Glu	Gly	Asn	Leu	Glu 350	Leu	His	
cgc	cag	ctt	aag	cag	gcc	gcc	cgc	gag	gaa	cgg	cct	gac	gcc	tac	atc	1104
Arg	Gln	Leu 355	Lys	Gln	Ala	Ala	Arg 360	Glu	Glu	Arg	Pro	Asp 365	Ala	Tyr	Ile	
ttc	gga	gag	cgc	ttc	ttt	gat	tca	gaa	gcg	gcg	ctg	acc	ggc	gag	ggc	1152
Phe	Gly 370	Glu	Arg	Phe	Phe	Asp 375	Ser	Glu	Ala	Ala	Leu	Thr 380	Gly	Glu	Gly	
gag	gac	ggc	gtg	atg	aat	tat	cac	ggt	ttc	ggc	ctg	ccg	ctg	atg	gag	1200
Glu	Asp	Gly	Val	Met	Asn 390	Tyr	His	Gly	Phe	Gly 395	Leu	Pro	Leu	Met	Glu	
tgg	ttt	gca	ggc	gaa	cat	tac	ctg	ggc	ttt	cgc	tcg	cgc	atg	acg	acg	1248
Trp	Phe	Ala	Gly 405	Glu	His	Tyr	Leu	Gly	Phe 410	Arg	Ser	Arg	Met	Thr 415	Thr	
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Ala	Glu	Leu 420	Leu	Asp	Leu	Leu	Trp	Asp 425	Ala	Tyr	His	Val 430	Leu	Ala	Pro	
cag	ctg	gcg	ctg	aac	cag	ttc	aac	ctg	ctc	gac	tcg	cac	gac	atc	ccg	1344
Gln	Leu	Ala 435	Leu	Asn	Gln	Phe	Asn 440	Leu	Leu	Asp	Ser	His 445	Asp	Ile	Pro	
cgt	gcc	ctc	tcg	cgg	ctg	ggg	gag	aac	aag	acc	aag	ctg	cgc	gcc	gcc	1392
Arg	Ala 450	Leu	Ser	Arg	Leu	Gly 455	Glu	Asn	Lys	Thr	Lys 460	Leu	Arg	Ala	Ala	
ctc	acg	ctg	ctg	atg	ggt	tat	ccc	ggc	gtg	ccc	tgc	ctc	tac	tac	ggc	1440
Leu	Thr	Leu	Leu	Met	Gly 470	Tyr	Pro	Gly	Val 475	Pro	Cys	Leu	Tyr	Tyr	Gly 480	
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Thr	Glu	Ile	Gly 485	Leu	Ser	Gln	Leu	Glu	Arg 490	Gly	Leu	Met	Pro	Phe 495	Asn	
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Arg	Ala	Pro 500	Met	Pro	Trp	Asp	Glu	Thr 505	Arg	Trp	Asp	Leu	Asp 510	Leu	Arg	
ggc	ttt	gtg	cag	gcc	ctg	atc	cgg	gtt	cgc	cgc	tcc	gca	cgg	gtc	ttg	1584

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Gln	Glu	Gly	Ala	Leu	Arg	Phe	Leu	Leu	Glu	Glu	Ser	Asp	Ala	Leu	Gly		
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tat	ctg	cga	gcc	tac	acc	cac	cct	gac	gga	cgg	cgt	gaa	ctg	gcc	gcc	1680	
Tyr	Leu	Arg	Ala	Tyr	Thr	His	Pro	Asp	Gly	Arg	Arg	Glu	Leu	Ala	Ala		
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gtg	ctg	ggc	agc	cgc	cga	ggg	agc	cag	cac	gag	gtc	acc	gtc	aca	ttg	1728	
Val	Leu	Gly	Ser	Arg	Arg	Gly	Ser	Gln	His	Glu	Val	Thr	Val	Thr	Leu		
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cct	cgg	ggt	gac	tgg	cgg	gac	gcg	ctg	acc	ggc	gag	ctt	gtc	tcc	cgg	1776	
Pro	Arg	Gly	Asp	Trp	Arg	Asp	Ala	Leu	Thr	Gly	Glu	Leu	Val	Ser	Arg		
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ggc	ggt	gag	acg	cgg	ctc	gac	gtg	gcc	cag	ggg	cgg	ttg	ctg	ttg	gcc	1824	
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<210> 278

<211> 608

<212> PRT

<213> *Deinococcus geothermalis* DSM 11300

<400> 278

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Arg	Leu	Lys	Thr	Thr	Leu	Pro	Val	Ile	Ala	Val	Phe	Leu	Lys	Leu	Leu		
		35					40					45					
Glu	His	Gly	Glu	Ile	Thr	Thr	His	Pro	Ala	Arg	Glu	Ile	Gly	Pro	Leu		
	50				55						60						
Asp	Gly	Glu	Gly	Arg	Trp	Phe	Glu	Phe	Asp	Leu	Arg	Leu	His	Ala	Arg		
65				70				75							80		
Arg	Val	His	Tyr	Ala	Trp	Gln	Leu	Gln	Thr	Ala	Glu	Asp	Asn	Trp	His		
				85				90						95			
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			100					105					110				
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	130					135					140						
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His	Val	Pro	Trp	Asp	Val	Pro	Pro	Thr	Arg	Glu	Leu	Asp	Ile	His	Ala		
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His	Tyr	Gly	Gly	Asp	Leu	Glu	Gly	Val	Ala	Gln	Ala	Met	Pro	Tyr	Leu		
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Ala	Asp	Leu	Gly	Val	Asn	Ala	Leu	Trp	Leu	Thr	Pro	Ile	Phe	Val	Ser		
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Pro	Ser	Ala	His	Arg	Tyr	Asp	Ile	Thr	Asp	Tyr	Arg	Thr	Ile	Asp	Pro		
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His	Leu	Gly	Gly	Glu	Ala	Ala	Phe	Gly	Glu	Met	Leu	Arg	Ala	Ala	Asn		
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Ala	Tyr	Gly	Ile	Arg	Ile	Val	Leu	Asp	Gly	Val	Phe	Asn	His	Thr	Gly		
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Glu	Arg	Glu	Leu	Phe	Thr	Phe	Arg	Glu	Ala	Thr	Gly	Gly	Lys	Pro	Pro		
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Tyr	Ala	Ala	Phe	Phe	Asp	Val	Pro	Thr	Leu	Pro	Lys	Ile	Asp	Tyr	Arg		
	290				295						300						
Ser	Ala	Val	Ala	Val	Asn	Glu	Phe	Leu	Ala	Gly	Glu	Glu	Ser	Val	Val		
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Arg	Phe	Trp	Leu	Arg	Arg	Gly	Ala	Ala	Gly	Trp	Arg	Leu	Asp	Val	Ala		
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 Arg Gln Leu Lys Gln Ala Ala Arg Glu Glu Arg Pro Asp Ala Tyr Ile
 355 360 365
 Phe Gly Glu Arg Phe Phe Asp Ser Glu Ala Ala Leu Thr Gly Glu Gly
 370 375 380
 Glu Asp Gly Val Met Asn Tyr His Gly Phe Gly Leu Pro Leu Met Glu
 385 390 400
 Trp Phe Ala Gly Glu His Tyr Leu Gly Phe Arg Ser Arg Met Thr Thr
 405 410 415
 Ala Glu Leu Leu Asp Leu Leu Trp Asp Ala Tyr His Val Leu Ala Pro
 420 425 430
 Gln Leu Ala Leu Asn Gln Phe Asn Leu Leu Asp Ser His Asp Ile Pro
 435 440 445
 Arg Ala Leu Ser Arg Leu Gly Glu Asn Lys Thr Lys Leu Arg Ala Ala
 450 455 460
 Leu Thr Leu Leu Met Gly Tyr Pro Gly Val Pro Cys Leu Tyr Tyr Gly
 465 470 475 480
 Thr Glu Ile Gly Leu Ser Gln Leu Glu Arg Gly Leu Met Pro Phe Asn
 485 490 495
 Arg Ala Pro Met Pro Trp Asp Glu Thr Arg Trp Asp Leu Asp Leu Arg
 500 505 510
 Gly Phe Val Gln Ala Leu Ile Arg Val Arg Arg Ser Ala Arg Val Leu
 515 520 525
 Gln Glu Gly Ala Leu Arg Phe Leu Leu Glu Glu Ser Asp Ala Leu Gly
 530 535 540
 Tyr Leu Arg Ala Tyr Thr His Pro Asp Gly Arg Arg Glu Leu Ala Ala
 545 550 555 560
 Val Leu Gly Ser Arg Gly Ser Gln His Glu Val Thr Val Thr Leu
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 Gly Gly Glu Thr Arg Leu Asp Val Ala Gln Gly Arg Leu Leu Ala
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<211> 1491

<212> DNA

<213> Deinococcus geothermalis DSM 11300

<220>

<221> CDS

<222> (1)..(1491)

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tgg	gtc	gcg	gac	gcc	gtc	ttc	tat	cag	att	ttc	ccc	gac	cgg	ttc	gca	96
Trp	Val	Ala	Asp	Ala	Val	Phe	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe	Ala	
			20					25					30			
cgc	agc	ggg	cga	gtg	ccg	ggc	ctg	aac	ctt	cag	ccc	tgg	ggc	agc	ccg	144
Arg	Ser	Gly	Arg	Val	Pro	Gly	Leu	Asn	Leu	Gln	Pro	Trp	Gly	Ser	Pro	
		35				40					45					
ccg	cag	gtg	cac	ggg	tat	atg	ggc	ggc	gac	ctg	tgg	ggg	gtc	acc	cag	192
Pro	Gln	Val	His	Gly	Tyr	Met	Gly	Gly	Asp	Leu	Trp	Gly	Val	Thr	Gln	
	50					55					60					
cat	ctg	gac	cac	atc	ggg	gca	ctg	ggg	gta	aac	gcg	atc	tac	ttt	tgc	240
His	Leu	Asp	His	Ile	Gly	Ala	Leu	Gly	Val	Asn	Ala	Ile	Tyr	Phe	Cys	
	65			70		75					80					
ccg	gta	ttt	cag	tcg	gct	tcc	aac	cac	cgc	tac	cac	acc	cac	gac	tac	288
Pro	Val	Phe	Gln	Ser	Ala	Ser	Asn	His	Arg	Tyr	His	Thr	His	Asp	Tyr	
			85					90						95		
tac	cgg	gta	gat	ccc	atg	ctg	ggg	ggc	aac	gag	gcg	ctg	cgg	gcg	ctg	336
Tyr	Arg	Val	Asp	Pro	Met	Leu	Gly	Gly	Asn	Glu	Ala	Leu	Arg	Ala	Leu	
			100				105					110				
atc	gag	gcg	gcg	cat	gcg	cgg	ggc	atc	cgc	atc	gtg	ctg	gac	ggc	gtc	384
Ile	Glu	Ala	Ala	His	Ala	Arg	Gly	Ile	Arg	Ile	Val	Leu	Asp	Gly	Val	

120

Seite 447

tga

<210> 280

<211> 496

<212> PRT

<213> *Deinococcus geothermalis* DSM 11300

<400> 280

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      35      40      45
Pro Gln Val His Gly Tyr Met Gly Gly Asp Leu Trp Gly Val Thr Gln
      50      55      60
His Leu Asp His Ile Gly Ala Leu Gly Val Asn Ala Ile Tyr Phe Cys
65      70      75      80
Pro Val Phe Gln Ser Ala Ser Asn His Arg Tyr His Thr His Asp Tyr
      85      90      95
Tyr Arg Val Asp Pro Met Leu Gly Gly Asn Glu Ala Leu Arg Ala Leu
      100      105      110
Ile Glu Ala Ala His Ala Arg Gly Ile Arg Ile Val Leu Asp Gly Val
      115      120      125
Phe Asn His Ala Ser Arg Gly Phe Phe Gln Phe Asn Asp Leu Leu Glu
130      135      140
Gln Gly Glu Ala Ser Ala Tyr Arg Asp Trp Phe His Val Glu Gly Trp
145      150      155      160
Pro Leu His Ala Tyr Asp Asp Thr Arg Pro Ala Asn Tyr Gln Ala Trp
      165      170      175
Trp Gly Leu Arg Ala Leu Pro Lys Phe Asn Thr Gly Asn Pro Ala Val
      180      185      190
Arg Glu Phe Leu Trp Asp Val Gly Thr Tyr Trp Met Glu Phe Gly Ile
      195      200      205
Asp Gly Trp Arg Leu Asp Val Pro Asn Glu Ile Asp Asp Asp Glu Phe
210      215      220
Trp Arg Glu Phe Arg Arg Val Lys Ala Ile Asn Pro Asp Ala Tyr
225      230      235      240
Ile Val Gly Glu Ile Trp Gly Asp Ala His Arg Trp Leu Ala Gly Asp
      245      250      255
Gln Phe Asp Ala Val Met Asn Tyr His Phe Thr Arg Pro Cys Leu Ala
      260      265      270
Phe Phe Ala Ala Arg Thr Leu Ala Gln Ala Ala Asn Glu Ser Thr Gly
      275      280      285
Leu Gly Arg Val Glu Pro Leu Asp Ala Ala Ala Phe Ala Arg Arg Met
290      295      300
Thr Glu Ile Thr Ala Leu Tyr His Pro Glu Ile Val Arg Ala Gln Leu
305      310      315      320
Asn Leu Leu Asp Ser His Asp Thr Ala Arg Phe Leu Thr Ala Ala Gly
      325      330      335
Gly Asp Ala Thr Ala Phe Arg Leu Ala Ser Ile Phe Gln Met Thr Tyr
      340      345      350
Val Gly Ala Pro Cys Ile Tyr Tyr Gly Asp Glu Ile Gly Leu Pro Gly
      355      360      365
Gly Pro Asp Pro Asp Cys Arg Ala Phe Pro Trp His Asp Glu Ala
370      375      380
Ser Trp Asp Lys Glu Thr Leu Ser Leu Leu Gln Lys Leu Thr Ala Thr
385      390      395      400
Arg His Ala Thr Pro Ala Leu Arg Arg Gly Ala Phe Arg Phe Thr His
      405      410      415
Ala Glu Gly Glu Ala Leu Val Tyr Val Arg Glu His Ala Ala Gly Asn
      420      425      430
Ala Tyr Ile Ala Ile Asn Ala Ala Gln Ala Pro Ala Arg Leu Pro Leu
      435      440      445
Ser Asp Val Gln Pro Gly Arg Tyr Arg Asp Ala Leu Ser Gly Gln Arg
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 Val Val Leu Val Arg Ala Glu Glu Asp Ser Arg His Thr Ala Arg His
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<210> 281

<211> 2097

<212> DNA

<213> *Deinococcus geothermalis* DSM 11300

<220>

<221> CDS

<222> (1)..(2097)

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cag cgc ctt ccg cgt ccg acg caa gcg gct cgg gcc aag cct cga ctt	96
Gln Arg Leu Pro Arg Pro Thr Gln Ala Ala Arg Ala Lys Pro Arg Leu	
20 25 30	
cgg aag ttt ctt tct gtt ctt cgg cat ctc ggg aac cga cga ggg ccg	144
Arg Lys Phe Leu Ser Val Leu Arg His Leu Gly Asn Arg Arg Gly Pro	
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ggg aga acg cct gca aaa acg ctt cga ggg cga gta cta ccg cca cct	192
Gly Arg Thr Pro Ala Lys Thr Leu Arg Gly Arg Val Leu Pro Pro Pro	
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cgt gac gct gaa gct ctc ggg gag cgt ccc gcc ggg ccg gta ctg gtt	240
Arg Asp Ala Glu Ala Leu Gly Glu Arg Pro Ala Gly Pro Val Leu Val	
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gcg cga cct gac gga gga agc gaa caa acg ggg ctg gac ggt tcg ggc	288
Ala Arg Pro Asp Gly Gly Ser Glu Gln Thr Gly Leu Asp Gly Ser Gly	
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gga cgg cag agc cac cag cga cct gag cga cga ggg tct ccg cga cct	336
Gly Arg Gln Ser His Gln Arg Pro Glu Arg Arg Gly Ser Pro Arg Pro	
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gaa cac ctg gct ggc gag tgg cgc gcg cca ggt tca cct gga ccc gct	384
Glu His Leu Ala Gly Glu Trp Arg Ala Pro Gly Ser Pro Gly Pro Ala	
115 120 125	
gaa cga gtc atc ccc gcg ccg ata agg cac ggc ctt cgc ccg agg ccg	432
Glu Arg Val Ile Pro Ala Pro Ile Arg His Gly Leu Arg Arg Arg Pro	
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tcg ggg aac cga tcg gga act gaa tcg att cag tcg cct gct ttt cct	480
Ser Gly Asn Arg Ser Gly Thr Glu Ser Ile Gln Ser Pro Ala Phe Pro	
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gct acg ctt tca ggt atg acc cag ccc agc gaa ctg aag tgg tgg cag	528
Ala Thr Leu Ser Gly Met Thr Gln Pro Ser Glu Leu Lys Trp Trp Gln	
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Arg Gly Ile Ile Tyr Gln Ile Tyr Pro Arg Ser Phe Gln Asp Ala Ser	
180 185 190	
gga gac gga gta ggg gac ctg cgc ggg atc acc tcc agg ctg ccc tac	624
Gly Asp Gly Val Gly Asp Leu Arg Gly Ile Thr Ser Arg Leu Pro Tyr	
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gtg gcg ggc ctg ggg gtg gag gcg gtg tgg ctc tcc ccc atc ttc cgc	672
Val Ala Gly Leu Gly Val Glu Ala Val Trp Leu Ser Pro Ile Phe Arg	
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Asp Pro Leu Phe Gly Thr Leu Glu Asp Phe Asp Ala Leu Val Ala Glu	
245 250 255	
gcg cac cgg ttg ggg ctg aag gtg atg ctc gac tac gtg ccc aac cac	816
Ala His Arg Leu Gly Leu Lys Val Met Leu Asp Tyr Val Pro Asn His	
260 265 270	
acc tcc tca gac cat ccc tgg ttc cag gag gcc ctt gcg ggc aag gac	864
Thr Ser Ser Asp His Pro Trp Phe Gln Glu Ala Leu Ala Gly Lys Asp	

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ctc	ctg	agc	agc	665	cgg	aat	gac	tcc	ccg	gca	agc	acc	gct	ccc	ctg	cgc	2064	
Leu	Leu	Ser	Ser	675	Arg	Asn	Asp	Ser	Pro	Ala	Ser	Thr	Ala	Pro	Leu	Arg		
ccc	aat	gag	gcg	680	cgc	atc	atc	cgc	cag	tag							2097	
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<211> 698

<212> PRT

<213> Deinococcus geothermalis DSM 11300

<400> 282

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		50				55					60					
Arg	Asp	Ala	Glu	Ala	Leu	Gly	Glu	Arg	Pro	Ala	Gly	Pro	Val	Leu	Val	
65					70					75					80	
Ala	Arg	Pro	Asp	Gly	Gly	Ser	Glu	Gln	Thr	Gly	Leu	Asp	Gly	Ser	Gly	
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Gly	Arg	Gln	Ser	His	Gln	Arg	Pro	Glu	Arg	Arg	Gly	Ser	Pro	Arg	Pro	
			100					105					110			
Glu	His	Leu	Ala	Gly	Glu	Trp	Arg	Ala	Pro	Gly	Ser	Pro	Gly	Pro	Ala	
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Glu	Arg	Val	Ile	Pro	Ala	Pro	Ile	Arg	His	Gly	Leu	Arg	Arg	Arg	Pro	
		130				135					140					
Ser	Gly	Asn	Arg	Ser	Gly	Thr	Glu	Ser	Ile	Gln	Ser	Pro	Ala	Phe	Pro	
145					150					155					160	
Ala	Thr	Leu	Ser	Gly	Met	Thr	Gln	Pro	Ser	Glu	Leu	Lys	Trp	Trp	Gln	
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Arg	Gly	Ile	Ile	Tyr	Gln	Ile	Tyr	Pro	Arg	Ser	Phe	Gln	Asp	Ala	Ser	
			180					185					190			
Gly	Asp	Gly	Val	Gly	Asp	Leu	Arg	Gly	Ile	Thr	Ser	Arg	Leu	Pro	Tyr	
		195					200					205				
Val	Ala	Gly	Leu	Gly	Val	Glu	Ala	Val	Trp	Leu	Ser	Pro	Ile	Phe	Arg	
		210				215					220					
Ser	Pro	Met	Arg	Asp	Phe	Gly	Tyr	Asp	Val	Ala	Asp	Tyr	Cys	Asp	Ile	
225					230					235					240	
Asp	Pro	Leu	Phe	Gly	Thr	Leu	Glu	Asp	Phe	Asp	Ala	Leu	Val	Ala	Glu	
				245					250					255		
Ala	His	Arg	Leu	Gly	Leu	Lys	Val	Met	Leu	Asp	Tyr	Val	Pro	Asn	His	
			260					265					270			
Thr	Ser	Ser	Asp	His	Pro	Trp	Phe	Gln	Glu	Ala	Leu	Ala	Gly	Lys	Asp	
		275					280					285				
Ser	Pro	Lys	Arg	Asp	Trp	Tyr	Val	Trp	Arg	Asp	Pro	Ala	Pro	Asp	Gly	
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Phe	Asp	Pro	His	Ser	Gly	Gln	Tyr	Tyr	Leu	His	Gln	Phe	Leu	Pro	Gly	
				325					330					335		
Gln	Pro	Asp	Leu	Asn	Trp	Arg	Asn	Pro	Glu	Val	Arg	Ala	Ala	Met	Ala	
			340					345					350			
Asp	Val	Leu	Arg	Phe	Trp	Met	Arg	Arg	Gly	Val	Asp	Gly	Phe	Arg	Val	
		355					360					365				
Asp	Val	Ile	Trp	Leu	Leu	Ala	Glu	Asp	Ala	Glu	Phe	Arg	Asp	Glu	Pro	
		370				375					380					
Glu	Asn	Pro	Glu	Trp	Gln	Pro	Gly	Gln	Ile	Glu	His	Ala	Arg	Leu	Leu	
385					390					395					400	
His	Ile	Tyr	Thr	Gln	Asp	Gln	Pro	Glu	Thr	His	Thr	Tyr	Ile	Arg	Glu	
				405					410					415		

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Leu Arg Gln Val Leu Asp Glu Phe Asp Asp Arg Met Met Val Gly Glu
 420 425 430
 Ile Tyr Leu Pro Leu Lys Gln Leu Pro Tyr Ala Gly Thr Pro Asp
 435 440 445
 Ala Pro Met Val His Leu Pro Phe Asn Phe His Leu Ile Leu Leu Pro
 450 455 460
 Trp Asp Ala Arg Glu Ile Arg Ala Phe Ala Asp Glu Tyr Asp Ala Ala
 465 470 475 480
 Cys Arg Ala Ala Gly Thr Trp Pro Asn Trp Val Leu Gly Asn His Asp
 485 490 495
 Gln Pro Arg Phe Lys Ser Arg Val Gly Ala Asp Gln Tyr Arg Val Ala
 500 505 510
 Gln Thr Leu Leu Thr Leu Arg Gly Thr Pro Thr Ala Tyr Tyr Gly
 515 520 525
 Asp Glu Ile Gly Met His Asp Val Pro Ile Pro Pro Glu Arg Arg Met
 530 535 540
 Asp Pro Ala Gly Leu Gln Gln Pro Asp Val Pro Ser Ala Gly Arg Asp
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 Pro Glu Arg Thr Pro Met Gln Trp Asp Ser Gly Pro Asn Ala Gly Phe
 565 570 575
 Thr Ala Pro Asp Val Gln Pro Trp Leu Pro Leu Ala Asp Asp Ala Asp
 580 585 590
 Arg Val Asn Val Gln Val Glu Glu Ala Asp Pro Thr Ser Asp Leu Asn
 595 600 605
 Tyr Phe Arg Ala Leu Thr Ala Leu Arg Arg Ala His Pro Ala Leu Val
 610 615 620
 Ala Gly Asp Tyr Arg Ser Leu Asp Thr Glu His Ala Asp Val Phe Ala
 625 630 635 640
 Phe Glu Arg Thr Leu Ala Gly Glu Gln Leu Val Val Leu Leu Asn Phe
 645 650 655
 Gly Gly Glu Glu Arg Ala Leu Gly Pro Leu Val Gly Glu Gly Gln Thr
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 Pro Asn Glu Ala Arg Ile Ile Arg Arg Gln
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<210> 283

<211> 1662

<212> DNA

<213> Anaeromyxobacter dehalogenans 2CP-C

<220>

<221> CDS

<222> (1)..(1662)

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gac gcg gtc atc tac gag acg cac gtg aag tcg ttc tac gac tcc aac	96
Asp Ala Val Ile Tyr Glu Thr His Val Lys Ser Phe Tyr Asp Ser Asn	
20 25 30	
ggc gac ggc gtg ggc gac ctg cgc ggg ctc gtg gag aag ctc gac tac	144
Gly Asp Gly Val Gly Asp Leu Arg Gly Leu Val Glu Lys Leu Asp Tyr	
35 40 45	
ctc cag gac ctc ggc atc acc tgc ctg tgg ctg ctg ccg ttc ttc ccg	192
Leu Gln Asp Leu Gly Ile Thr Cys Leu Trp Leu Leu Pro Phe Phe Pro	
50 55 60	
tcg ccg ctg cgc gac gac ggc tac gac atc gcc gac tac aag ggc atc	240
Ser Pro Leu Arg Asp Asp Gly Tyr Asp Ile Ala Asp Tyr Lys Gly Ile	
65 70 75 80	
cac ccc gac tac ggc acg gtg gac gac ttc cgc cag ctg gtc gcg gcg	288
His Pro Asp Tyr Gly Thr Val Asp Asp Phe Arg Gln Leu Val Ala Ala	
85 90 95	
gcc cac gcc cgc ggc atc cgg gtg gtg gtg gag ctg gtg gtg aac cac	336
Ala His Ala Arg Gly Ile Arg Val Val Val Glu Leu Val Val Asn His	
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Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Arg	Ala	Arg	Ala	Pro	Ala	
115							120				125				
ggc	tcc	ccg	gag	cgc	gcc	tac	tac	gtg	tgg	agc	gac	acc	gac	cgc	432
Gly	Ser	Pro	Glu	Arg	Ala	Tyr	Tyr	Val	Trp	Ser	Asp	Thr	Asp	Arg	
130						135					140				
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Tyr	Arg	Asp	Ala	Arg	Ile	Ile	Phe	Thr	Asp	Thr	Glu	Lys	Ser	Asn	
145					150					155				160	
acc	tgg	gac	ccc	gag	gcc	aag	cag	tac	tac	tgg	cac	cgc	ttc	ttc	528
Thr	Trp	Asp	Pro	Glu	Ala	Lys	Gln	Tyr	Tyr	Trp	His	Arg	Phe	Phe	
165									170					175	
cac	cag	ccg	gac	ctc	aac	ttc	gag	aac	gcg	gtg	gtg	ctg	ggc	gag	576
His	Gln	Pro	Asp	Leu	Asn	Phe	Glu	Asn	Ala	Val	Val	Leu	Gly	Glu	
180								185					190		
ctg	gac	gcg	ctg	cgc	ttc	tgg	gcg	gag	atg	ggc	gtg	gac	ggc	ttc	624
Leu	Asp	Ala	Leu	Arg	Phe	Trp	Ala	Glu	Met	Gly	Val	Asp	Gly	Phe	
195							200					205			
ctc	gac	gcg	gtg	ccg	tac	ctg	atc	gag	cag	gac	ggg	acg	agc	tgc	672
Leu	Asp	Ala	Val	Pro	Tyr	Leu	Ile	Glu	Gln	Asp	Gly	Thr	Ser	Cys	
210						215					220				
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Asn	Leu	Pro	Gly	Thr	His	Glu	Val	Ile	Arg	Lys	Ile	Arg	Ala	Tyr	
225					230					235				240	
gac	cag	cac	ttc	ccc	ggg	cgc	atg	ctg	ctc	gcc	gag	gcg	aac	cag	768
Asp	Gln	His	Phe	Pro	Gly	Arg	Met	Leu	Leu	Ala	Glu	Ala	Asn	Gln	
245									250					255	
ccg	gcc	gac	gtg	cgc	ccc	tac	ttc	ggc	gag	ggc	gac	gag	tgc	cac	816
Pro	Ala	Asp	Val	Arg	Pro	Tyr	Phe	Gly	Glu	Gly	Asp	Glu	Cys	His	
260								265					270		
gcg	ttc	cac	ttc	ccg	ctc	atg	ccg	cgc	atc	ttc	atg	gcg	ctg	cgg	864
Ala	Phe	His	Phe	Pro	Leu	Met	Pro	Arg	Ile	Phe	Met	Ala	Leu	Arg	
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gag	gac	gtg	gag	ccg	atc	gtc	gag	atc	atg	cgg	cgc	acc	ccg	gcc	912
Glu	Asp	Val	Glu	Pro	Ile	Val	Glu	Ile	Met	Arg	Arg	Thr	Pro	Ala	
290						295					300				
ccg	gac	acc	tgc	cag	tgg	gcg	ctg	ttc	ctg	cgc	aac	cac	gac	gag	960
Pro	Asp	Thr	Cys	Gln	Trp	Ala	Leu	Phe	Leu	Arg	Asn	His	Asp	Glu	
305					310					315				320	
acg	ctg	gag	atg	gtg	acc	gcc	gac	gag	cgc	gac	tac	atg	tac	ctc	1008
Thr	Leu	Glu	Met	Val	Thr	Ala	Asp	Glu	Arg	Asp	Tyr	Met	Tyr	Leu	
325									330					335	
tac	agc	cag	gat	ccg	cgc	atg	aag	ctg	aac	gtc	ggg	atc	cgg	cgc	1056
Tyr	Ser	Gln	Asp	Pro	Arg	Met	Lys	Leu	Asn	Val	Gly	Ile	Arg	Arg	
340								345					350		
ctc	gcg	ccg	ctg	gtg	gac	aac	agc	cgc	cgg	cgc	atg	gag	ctg	ctc	1104
Leu	Ala	Pro	Leu	Val	Asp	Asn	Ser	Arg	Arg	Arg	Met	Glu	Leu	Leu	
355						360						365			
tcg	ctc	ctg	ttc	tcc	ttc	ccc	ggg	acg	ccc	atc	gtc	tac	tac	ggc	1152
Ser	Leu	Leu	Phe	Ser	Phe	Pro	Gly	Thr	Pro	Ile	Val	Tyr	Tyr	Gly	
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Glu	Leu	Gly	Met	Gly	Asp	Asn	Ile	Tyr	Leu	His	Asp	Arg	Asn	Gly	
385					390					395				400	
cgc	acg	ccc	atg	cag	tgg	agc	ccg	gac	cgc	aac	gcc	ggc	ttc	tcc	1248
Arg	Thr	Pro	Met	Gln	Trp	Ser	Pro	Asp	Arg	Asn	Ala	Gly	Phe	Ser	
405									410					415	
gcc	gac	ccc	ggc	cgc	ctc	tac	tcc	gcg	ccc	atc	tcc	gac	gcg	gtg	1296
Ala	Asp	Pro	Gly	Arg	Leu	Tyr	Ser	Ala	Pro	Ile	Ser	Asp	Ala	Val	
420								425					430		
ggc	tac	cag	gcg	gtg	aac	gtc	gag	gcc	cag	ctc	cgc	gac	ccc	tcc	1344
Gly	Tyr	Gln	Ala	Val	Asn	Val	Glu	Ala	Gln	Leu	Arg	Asp	Pro	Ser	
435							440					445			
ctg	ctg	cac	tgg	atg	cgc	aac	acc	atc	gcg	ctg	cgc	aag	ctg	ttc	1392
Leu	Leu	His	Trp	Met	Arg	Asn	Thr	Ile	Ala	Leu	Arg	Lys	Leu	Phe	
450						455					460				
gcg	ttc	ggg	cgg	ggc	acc	atg	gag	ttc	ctg	ccg	gtg	cag	aac	cgc	1440
Ala	Phe	Gly	Arg	Gly	Thr	Met	Glu	Phe	Leu	Pro	Val	Gln	Asn	Arg	
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Val	Leu	Ala	Tyr	Val	Arg	Arg	His	Asp	Glu	Asp	Val	Ile	Leu	Cys	Val	
				485					490					495		
gcg	aac	gtg	tcg	cgc	ttc	gcg	cag	ccg	gcg	cag	ctc	gac	ctc	tcc	cac	1536
Ala	Asn	Val	Ser	Arg	Phe	Ala	Gln	Pro	Ala	Gln	Leu	Asp	Leu	Ser	His	
			500					505					510			
ctc	gag	ggc	tac	gtg	ccg	gtg	gag	atg	gtc	ggc	tac	acc	gag	ttc	ccg	1584
Leu	Glu	Gly	Tyr	Val	Pro	Val	Glu	Met	Val	Gly	Tyr	Thr	Glu	Phe	Pro	
		515					520					525				
cgc	atc	ggg	cgg	cag	ccc	tac	gcg	ctc	acg	ctc	gcg	ccc	tac	ggc	tac	1632
Arg	Ile	Gly	Arg	Gln	Pro	Tyr	Ala	Leu	Thr	Leu	Ala	Pro	Tyr	Gly	Tyr	
	530					535					540					
ttc	tgg	ttc	gag	ctg	cgc	aag	ccc	gcc	tga							1662
Phe	Trp	Phe	Glu	Leu	Arg	Lys	Pro	Ala								
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<211> 553

<212> PRT

<213> Anaeromyxobacter dehalogenans 2CP-C

<400> 284

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			20					25					30			
Gly	Asp	Gly	Val	Gly	Asp	Leu	Arg	Gly	Leu	Val	Glu	Lys	Leu	Asp	Tyr	
		35					40					45				
Leu	Gln	Asp	Leu	Gly	Ile	Thr	Cys	Leu	Trp	Leu	Leu	Pro	Phe	Phe	Pro	
	50					55				60						
Ser	Pro	Leu	Arg	Asp	Asp	Gly	Tyr	Asp	Ile	Ala	Asp	Tyr	Lys	Gly	Ile	
65				70					75						80	
His	Pro	Asp	Tyr	Gly	Thr	Val	Asp	Asp	Phe	Arg	Gln	Leu	Val	Ala	Ala	
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Ala	His	Ala	Arg	Gly	Ile	Arg	Val	Val	Val	Glu	Leu	Val	Val	Asn	His	
		100						105					110			
Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Arg	Ala	Arg	Arg	Ala	Pro	Ala	
		115					120					125				
Gly	Ser	Pro	Glu	Arg	Ala	Tyr	Tyr	Val	Trp	Ser	Asp	Thr	Asp	Glu	Arg	
	130					135					140					
Tyr	Arg	Asp	Ala	Arg	Ile	Phe	Thr	Asp	Thr	Glu	Lys	Ser	Asn	Trp		
145				150					155					160		
Thr	Trp	Asp	Pro	Glu	Ala	Lys	Gln	Tyr	Tyr	Trp	His	Arg	Phe	Phe	Ser	
			165					170						175		
His	Gln	Pro	Asp	Leu	Asn	Phe	Glu	Asn	Ala	Val	Val	Leu	Gly	Glu	Val	
		180						185					190			
Leu	Asp	Ala	Leu	Arg	Phe	Trp	Ala	Glu	Met	Gly	Val	Asp	Gly	Phe	Arg	
		195					200					205				
Leu	Asp	Ala	Val	Pro	Tyr	Leu	Ile	Glu	Gln	Asp	Gly	Thr	Ser	Cys	Glu	
	210					215					220					
Asn	Leu	Pro	Gly	Thr	His	Glu	Val	Ile	Arg	Lys	Ile	Arg	Ala	Tyr	Val	
225				230					235						240	
Asp	Gln	His	Phe	Pro	Gly	Arg	Met	Leu	Leu	Ala	Glu	Ala	Asn	Gln	Trp	
			245						250					255		
Pro	Ala	Asp	Val	Arg	Pro	Tyr	Phe	Gly	Glu	Gly	Asp	Glu	Cys	His	Met	
		260						265					270			
Ala	Phe	His	Phe	Pro	Leu	Met	Pro	Arg	Ile	Phe	Met	Ala	Leu	Arg	Leu	
		275					280					285				
Glu	Asp	Val	Glu	Pro	Ile	Val	Glu	Ile	Met	Arg	Arg	Thr	Pro	Ala	Ile	
	290					295					300					
Pro	Asp	Thr	Cys	Gln	Trp	Ala	Leu	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	
305				310					315						320	
Thr	Leu	Glu	Met	Val	Thr	Ala	Asp	Glu	Arg	Asp	Tyr	Met	Tyr	Leu	Ala	
			325					330						335		
Tyr	Ser	Gln	Asp	Pro	Arg	Met	Lys	Leu	Asn	Val	Gly	Ile	Arg	Arg	Arg	
		340						345					350			
Leu	Ala	Pro	Leu	Val	Asp	Asn	Ser	Arg	Arg	Arg	Met	Glu	Leu	Leu	Asn	
		355					360					365				
Ser	Leu	Leu	Phe	Ser	Phe	Pro	Gly	Thr	Pro	Ile	Val	Tyr	Tyr	Gly	Asp	

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	Ala	Asp	Pro	Gly	Arg	Leu	Tyr	Ser	Ala	Pro	Ile	Ser	Asp	Ala	Val	Tyr
	Gly	Tyr	Gln	Ala	Val	Asn	Val	Glu	Ala	Gln	Leu	Arg	Asp	Pro	Ser	Ser
	Leu	Leu	His	Trp	Met	Arg	Asn	Thr	Ile	Ala	Leu	Arg	Lys	Leu	Phe	Arg
	Ala	Phe	Gly	Arg	Gly	Thr	Met	Glu	Phe	Leu	Pro	Val	Gln	Asn	Arg	Lys
	Val	Leu	Ala	Tyr	Val	Arg	Arg	His	Asp	Glu	Asp	Val	Ile	Leu	Cys	Val
	Ala	Asn	Val	Ser	Arg	Phe	Ala	Gln	Pro	Ala	Gln	Leu	Asp	Leu	Ser	His
	Leu	Glu	Gly	Tyr	Val	Pro	Val	Glu	Met	Val	Gly	Tyr	Thr	Glu	Phe	Pro
	Arg	Ile	Gly	Arg	Gln	Pro	Tyr	Ala	Leu	Thr	Leu	Ala	Pro	Tyr	Gly	Tyr
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<210> 285

<211> 1638

<212> DNA

<213> Anaeromyxobacter dehalogenans 2CP-C

<220>

<221> CDS

<222> (1)..(1638)

<223> transl_table=11

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gtc	gcc	ctc	gcc	gcg	ctc	gcc	tgc	gcg	cat	gcg	ccc	gcc	ggc	ccc	ccg	96
Val	Ala	Leu	Ala	Ala	Leu	Ala	Cys	Ala	His	Ala	Pro	Ala	Gly	Pro	Pro	
			20				25						30			
gcc	gcc	ggc	ggc	gcg	cgg	gcg	gcc	tcc	gca	ccg	gcg	gcg	ccc	tgg	tgg	144
Ala	Ala	Gly	Gly	Ala	Arg	Ala	Ala	Ser	Ala	Pro	Ala	Ala	Pro	Trp	Trp	
		35				40					45					
aag	ggc	gcg	gtc	ttc	tac	gag	gtg	ttc	gtg	cgc	agc	ttc	gcg	gac	tcc	192
Lys	Gly	Ala	Val	Phe	Tyr	Glu	Val	Phe	Val	Arg	Ser	Phe	Ala	Asp	Ser	
	50					55				60						
gac	ggc	gac	ggg	aag	ggc	gac	ctc	cgc	ggc	ctc	acc	gcg	aag	ctc	gac	240
Asp	Gly	Asp	Gly	Lys	Gly	Asp	Leu	Arg	Gly	Leu	Thr	Ala	Lys	Leu	Asp	
	65			70					75					80		
tac	ctg	aac	gac	ggc	gac	ccg	gcc	acc	tcc	acc	gac	ctc	ggc	gtg	gac	288
Tyr	Leu	Asn	Asp	Gly	Asp	Pro	Ala	Thr	Ser	Thr	Asp	Leu	Gly	Val	Asp	
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gcg	ctc	tgg	ctc	atg	ccg	gtg	ttc	gcc	tcg	ccg	agc	tac	cac	ggc	tac	336
Ala	Leu	Trp	Leu	Met	Pro	Val	Phe	Ala	Ser	Pro	Ser	Tyr	His	Gly	Tyr	
			100				105						110			
gac	gtc	acc	gat	tac	ctg	aag	gtc	aac	ccc	gac	tac	ggc	acc	gag	gcc	384
Asp	Val	Thr	Asp	Tyr	Leu	Lys	Val	Asn	Pro	Asp	Tyr	Gly	Thr	Glu	Ala	
		115					120					125				
gac	ctc	gac	cgg	ctc	gtc	gcc	gag	gcg	cac	cgg	cgc	ggc	gtc	cgc	gtg	432
Asp	Leu	Asp	Arg	Leu	Val	Ala	Glu	Ala	His	Arg	Arg	Gly	Val	Arg	Val	
	130					135				140						
gtc	ctc	gac	ctc	gtc	ctc	aac	cac	acc	tcc	gac	cag	cac	ccc	tgg	ttc	480
Val	Leu	Asp	Leu	Val	Leu	Asn	His	Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	
	145				150				155						160	
cgc	gag	tcg	gcg	tcg	tcg	cgc	acc	tcg	ccg	cgc	cgc	gac	tgg	tac	gtg	528
Arg	Glu	Ser	Ala	Ser	Ser	Arg	Thr	Ser	Pro	Arg	Arg	Asp	Trp	Tyr	Val	
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tgg	cgc	cag	gac	gac	ccg	ggc	tgg	acg	cag	ccg	tgg	aac	ccg	gcg	cag	576

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Trp	Arg	Gln	Asp 180	Asp	Pro	Gly	Trp	Thr 185	Gln	Pro	Trp	Asn	Pro 190	Ala	Gln		
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Gly	Thr	Trp 195	Tyr	Arg	Arg	Gly	Gly	Glu	Trp	Tyr	Tyr	Ala 205	Val	Phe	Trp		
agc	ggg	atg	ccg	gac	ctg	aac	tac	cgg	aac	ccg	gcg	gtg	cgc	gag	gag		672
Ser	Gly	Met	Pro	Asp	Leu	Asn 215	Tyr	Arg	Asn	Pro	Ala 220	Val	Arg	Glu	Glu		
gcg	aag	cgg	atc	gcg	gcg	cgc	tgg	ctg	gcg	aag	ggc	gtg	gac	ggg	ttc		720
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Gln	Ser	Gly	Ser 260	Ala	Glu	Asn	His	Val 265	Phe	Leu	Arg	Glu	Phe 270	Ala	Ala		
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Ala	Val	Trp 275	Ala	Ala	Lys	Pro	Asp 280	Ala	Val	Leu	Val	Gly 285	Glu	Val	Trp		
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Ala	Ala	Ala	Tyr 340	Pro	Gly	Ala	Val 345	Asp	Ala	Pro	Phe	Leu 350	Thr	Asn			
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Gly	Phe	Thr	Thr 420	Gly	Asp	Pro	Trp	Met 425	Pro	Leu	Ala	Pro	Gly 430	His	Glu		
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Ser	Ala	Asn 435	Val	Ala	Ala	Glu	Ala 440	Gly	Asp	Pro	Ala	Ser 445	Leu	Leu	Ser		
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Arg	Tyr	Arg	Ala	Leu	Val	Arg 455	Ala	Arg	Arg	Ala	Ser 460	Ala	Ala	Leu	Ser		
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Val	Arg	Arg	Ala	Glu 485	Gly	Glu	Thr	Val	Leu 490	Val	Val	His	Asn 495	Met	Gly		
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Ala	Ala	Pro	Leu 500	Glu	Leu	Gly	Gly	Leu 505	Glu	Ala	Pro	Gly 510	Ala	Ala	Ala		
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Glu	Ala	Val 515	Phe	Val	Asp	Ala	Gly 520	Ala	Val	Ala	Val	Arg 525	Glu	Ala	Gly		
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Arg
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<210> 286

<211> 545

<212> PRT

<213> Anaeromyxobacter dehalogenans 2CP-C

<400> 286

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Lys Gly Ala Val Phe Tyr Glu Val Phe Val Arg Ser Phe Ala Asp Ser
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Asp Gly Asp Gly Lys Gly Asp Leu Arg Gly Leu Thr Ala Lys Leu Asp
65      70      75      80
Tyr Leu Asn Asp Gly Asp Pro Ala Thr Ser Thr Asp Leu Gly Val Asp
85      90      95
Ala Leu Trp Leu Met Pro Val Phe Ala Ser Pro Ser Tyr His Gly Tyr
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Asp Val Thr Asp Tyr Leu Lys Val Asn Pro Asp Tyr Gly Thr Glu Ala
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Asp Leu Asp Arg Leu Val Ala Glu Ala His Arg Arg Gly Val Arg Val
130     135     140
Val Leu Asp Leu Val Leu Asn His Thr Ser Asp Gln His Pro Trp Phe
145     150     155     160
Arg Glu Ser Ala Ser Ser Arg Thr Ser Pro Arg Arg Asp Trp Tyr Val
165     170     175
Trp Arg Gln Asp Asp Pro Gly Trp Thr Gln Pro Trp Asn Pro Ala Gln
180     185     190
Gly Thr Trp Tyr Arg Arg Gly Gly Glu Trp Tyr Tyr Ala Val Phe Trp
195     200     205
Ser Gly Met Pro Asp Leu Asn Tyr Arg Asn Pro Ala Val Arg Glu Glu
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Ala Lys Arg Ile Ala Ala Arg Trp Leu Ala Lys Gly Val Asp Gly Phe
225     230     235     240
Arg Leu Asp Ala Ile Arg His Leu Ile Glu Thr Gly Pro Gly Ala Gly
245     250     255
Gln Ser Gly Ser Ala Glu Asn His Val Phe Leu Arg Glu Phe Ala Ala
260     265     270
Ala Val Trp Ala Ala Lys Pro Asp Ala Val Leu Val Gly Glu Val Trp
275     280     285
Ser Glu Thr Asp Asp Ile Ala Arg Tyr Tyr Gly Asp Gly Lys Asp Glu
290     295     300
Leu Gln Leu Leu Phe Asp Phe Pro Leu Ala Lys Ala Ile Val Glu Gly
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Val Asp Ala Gly Asp Gly Gly Phe Thr Ala His Val Leu Arg Glu Val
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340     345     350
His Asp Gln Phe Arg Val Ala Thr Gln Leu Ala Asn Asp Ala Gly Lys
355     360     365
Leu Arg Leu Ala Ala Ala Ile Leu Leu Thr Leu Pro Gly Ala Pro Phe
370     375     380
Val Tyr Tyr Gly Glu Glu Leu Gly Met Gln Asn Gly Pro Gly Arg Glu
385     390     395     400
Asp Glu Trp Lys Arg Thr Pro Met Pro Trp Asp Arg Ser Glu His Gly
405     410     415
Gly Phe Thr Thr Gly Asp Pro Trp Met Pro Leu Ala Pro Gly His Glu
420     425     430
Ser Ala Asn Val Ala Ala Glu Ala Gly Asp Pro Ala Ser Leu Leu Ser
435     440     445
Arg Tyr Arg Ala Leu Val Arg Ala Arg Arg Ala Ser Ala Ala Leu Ser
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Arg Gly Asp Ala Val Pro Leu Ser Thr Pro Gly Ala Ala Leu Ala Tyr
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 Gly Trp Arg Val Val Leu Pro Arg Ala Ser Gly Val Trp Arg Val
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<210> 287

<211> 1602

<212> DNA

<213> Anaeromyxobacter dehalogenans 2CP-C

<220>

<221> CDS

<222> (1)..(1602)

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Ala	Ala	Cys	Ala	Pro	Arg	Ala	Pro	Ser	Gly	Pro	Pro	Ala	Gly	Ala	Ala	
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Ala	Ala	Ala	Ala	Leu	Ala	Glu	Ala	Pro	Pro	Arg	Pro	Leu	Pro	Pro	Arg	
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Pro	Trp	Gln	Asp	Glu	Val	Leu	Tyr	Phe	Val	Leu	Val	Asp	Arg	Phe	Ala	
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Asp	Gly	Asp	Arg	Gly	Asn	Asp	Gln	Asp	Val	Asp	Leu	Ala	Gly	Lys	Gly	
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Thr	Phe	His	Gly	Gly	Asp	Leu	Arg	Gly	Leu	Thr	Ala	His	Leu	Asp	Asp	
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ctc	gcc	gcg	ctg	ggc	gtg	acc	gcg	atc	tgg	gtg	aac	ccg	ctg	gtg	cgc	384
Leu	Ala	Ala	Leu	Gly	Val	Thr	Ala	Ile	Trp	Val	Asn	Pro	Leu	Val	Arg	
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Asn	Ile	Pro	Gly	Tyr	Val	Ser	Gly	Ala	Gly	Phe	Pro	Asp	Trp	Ala	Tyr	
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Ser	Glu	Ala	Asp	Leu	Ala	Ala	Phe	Val	Asn	Ala	Cys	His	Ala	Arg	Gly	
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Val	Gly	Asp	Cys	Gly	Asp	Asp	Leu	Thr	Ser	Cys	Leu	Ala	Gly	Leu		
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Trp	Gly	Gly	Asp	Arg	Glu	Ser	Leu	Asp	Pro	Tyr	Phe	Ala	Ala	Asp	Thr		
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Arg	His	Lys	Val	Arg	Pro	Gly	His	Leu	Leu	Ala	His	Tyr	Leu	Ser	Ser		
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Leu	Pro	Gly	His	Gly	Ala	Arg	Val	Val	Val	Ala	Arg	Pro	Ala	Pro	Gly		
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<211> 533

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<213> Anaeromyxobacter dehalogenans 2CP-C

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<211> 1188

<212> DNA

<213> Streptococcus pneumoniae TIGR4

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<221> CDS

<222> (1)..(1188)

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Phe	Asn	Leu	Leu	Asp	Ser	His	Asp	Thr	Glu	Arg	Ile	Leu	Trp	Thr	Ala	
				245					250					255		
aat	gaa	gat	ggt	caa	ctg	ggt	aaa	tca	gcc	tta	gcc	ttt	ctc	ttt	tta	816
Asn	Glu	Asp	Val	Gln	Leu	Val	Lys	Ser	Ala	Leu	Ala	Phe	Leu	Phe	Leu	
			260					265					270			
caa	aaa	gga	aca	ccg	tgc	att	tat	tac	gga	acc	gag	cta	gcc	ttg	act	864
Gln	Lys	Gly	Thr	Pro	Cys	Ile	Tyr	Tyr	Gly	Thr	Glu	Leu	Ala	Leu	Thr	
		275					280					285				
gga	gga	cca	gat	cca	gat	tgt	cgt	cgt	tgt	atg	cct	tgg	gaa	cgt	gta	912
Gly	Gly	Pro	Asp	Pro	Asp	Cys	Arg	Arg	Cys	Met	Pro	Trp	Glu	Arg	Val	
	290					295					300					
tca	agt	gac	aat	gat	atg	ctg	aac	ttt	atg	aag	agg	ctg	att	aaa	att	960
Ser	Ser	Asp	Asn	Asp	Met	Leu	Asn	Phe	Met	Lys	Arg	Leu	Ile	Lys	Ile	
	305				310				315						320	
cgg	aaa	tac	gcg	tca	gta	atc	att	tcg	cat	ggc	aag	tat	agc	ctt	caa	1008
Arg	Lys	Tyr	Ala	Ser	Val	Ile	Ile	Ser	His	Gly	Lys	Tyr	Ser	Leu	Gln	
				325					330					335		
gaa	atc	aac	tct	gat	cta	gta	gct	ctg	gaa	tgg	aaa	tac	gaa	gga	cgg	1056
Glu	Ile	Asn	Ser	Asp	Leu	Val	Ala	Leu	Glu	Trp	Lys	Tyr	Glu	Gly	Arg	
			340					345					350			

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atc	ctc	aaa	gca	ata	ttc	aac	caa	tca	aca	gaa	gat	tat	ctt	tta	gag	1104
Ile	Leu	Lys	Ala	Ile	Phe	Asn	Gln	Ser	Thr	Glu	Asp	Tyr	Leu	Leu	Glu	
		355					360					365				
aaa	gaa	gca	gta	gca	cta	gca	agc	aat	tgc	caa	gaa	ttg	gat	aat	cag	1152
Lys	Glu	Ala	Val	Ala	Leu	Ala	Ser	Asn	Cys	Gln	Glu	Leu	Asp	Asn	Gln	
		370				375					380					
ctt	gtc	atc	tct	cca	gat	gga	ttt	atg	att	ttc	taa					1188
Leu	Val	Ile	Ser	Pro	Asp	Gly	Phe	Met	Ile	Phe						
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<210> 290

<211> 395

<212> PRT

<213> Streptococcus pneumoniae TIGR4

<400> 290

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			20					25					30		
Glu	Ile	Asp	Arg	His	Phe	Gly	Asp	Lys	Glu	Thr	Phe	Arg	Glu	Leu	Val
		35					40					45			
Asp	Gln	Ala	His	His	Arg	Gly	Met	Lys	Val	Met	Leu	Asp	Ala	Val	Phe
	50					55					60				
Asn	His	Ile	Gly	Ser	Gln	Ser	Leu	Gln	Trp	Lys	Asn	Val	Val	Lys	Asn
65					70					75					80
Gly	Glu	Gln	Ser	Ala	Tyr	Lys	Asp	Trp	Phe	His	Ile	Gln	Gln	Phe	Pro
			85						90					95	
Val	Thr	Thr	Glu	Lys	Leu	Val	Asn	Lys	Arg	Asp	Leu	Pro	Tyr	His	Val
			100					105					110		
Phe	Gly	Phe	Glu	Asp	Tyr	Met	Pro	Lys	Leu	Asn	Thr	Ala	Asn	Pro	Glu
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Val	Lys	Asn	Tyr	Leu	Leu	Lys	Val	Ala	Thr	Tyr	Trp	Ile	Glu	Glu	Phe
	130					135					140				
Asn	Ile	Asp	Ala	Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Ile	Asp	His	Gln
145					150					155					160
Phe	Trp	Lys	Asp	Phe	Arg	Lys	Ala	Val	Leu	Ala	Lys	Asn	Pro	Asp	Leu
			165						170					175	
Tyr	Ile	Leu	Gly	Glu	Val	Trp	His	Thr	Ser	Gln	Pro	Trp	Leu	Asn	Gly
			180					185					190		
Asp	Glu	Phe	His	Ala	Val	Met	Asn	Tyr	Pro	Leu	Ser	Asp	Ser	Ile	Lys
		195					200					205			
Asp	Tyr	Phe	Leu	Arg	Gly	Ile	Lys	Lys	Thr	Asp	Gln	Phe	Ile	Asp	Glu
	210					215					220				
Ile	Asn	Gly	Glu	Ser	Met	Tyr	Tyr	Lys	Gln	Gln	Ile	Ser	Glu	Val	Met
225					230					235					240
Phe	Asn	Leu	Leu	Asp	Ser	His	Asp	Thr	Glu	Arg	Ile	Leu	Trp	Thr	Ala
			245						250					255	
Asn	Glu	Asp	Val	Gln	Leu	Val	Lys	Ser	Ala	Leu	Ala	Phe	Leu	Phe	Leu
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Gln	Lys	Gly	Thr	Pro	Cys	Ile	Tyr	Tyr	Gly	Thr	Glu	Leu	Ala	Leu	Thr
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Gly	Gly	Pro	Asp	Pro	Asp	Cys	Arg	Arg	Cys	Met	Pro	Trp	Glu	Arg	Val
	290					295					300				
Ser	Ser	Asp	Asn	Asp	Met	Leu	Asn	Phe	Met	Lys	Arg	Leu	Ile	Lys	Ile
305					310					315					320
Arg	Lys	Tyr	Ala	Ser	Val	Ile	Ile	Ser	His	Gly	Lys	Tyr	Ser	Leu	Gln
			325						330					335	
Glu	Ile	Asn	Ser	Asp	Leu	Val	Ala	Leu	Glu	Trp	Lys	Tyr	Glu	Gly	Arg
			340					345					350		
Ile	Leu	Lys	Ala	Ile	Phe	Asn	Gln	Ser	Thr	Glu	Asp	Tyr	Leu	Leu	Glu
		355					360					365			
Lys	Glu	Ala	Val	Ala	Leu	Ala	Ser	Asn	Cys	Gln	Glu	Leu	Asp	Asn	Gln
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Leu	Val	Ile	Ser	Pro	Asp	Gly	Phe	Met	Ile	Phe					
385					390					395					

<210> 291

<211> 1407

<212> DNA

<213> *Arthrobacter* sp. FB24

<220>

<221> CDS

<222> (1)..(1407)

<223> transl_table=11

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1				5					10					15		
ccg	atc	ggc	ttt	gtc	ggc	gcg	gag	cag	gct	gcc	gct	gaa	cgg	gcg	tcc	96
Pro	Ile	Gly	Phe	Val	Gly	Ala	Glu	Gln	Ala	Ala	Ala	Glu	Arg	Ala	Ser	
			20					25					30			
aag	gcg	ccg	acg	tcc	gag	gcg	ccg	ggc	cag	act	gtg	gcc	cat	cgg	ctg	144
Lys	Ala	Pro	Thr	Ser	Glu	Ala	Pro	Gly	Gln	Thr	Val	Ala	His	Arg	Leu	
		35					40					45				
ggg	cag	ctg	gtt	ccc	tgg	ctt	gac	tac	gtg	ctg	gaa	ctc	ggc	gcg	tcc	192
Gly	Gln	Leu	Val	Pro	Trp	Leu	Asp	Tyr	Val	Leu	Glu	Leu	Gly	Ala	Ser	
	50					55					60					
ggg	ctc	gcg	ctg	ggg	ccc	gtc	ttc	gcc	tcg	gaa	acc	cac	ggc	tat	gac	240
Gly	Leu	Ala	Leu	Gly	Pro	Val	Phe	Ala	Ser	Glu	Thr	His	Gly	Tyr	Asp	
	65				70					75					80	
acc	acg	gac	tac	ttc	agg	atc	gat	ccc	cgg	ctg	ggc	gat	gac	gcg	gac	288
Thr	Thr	Asp	Tyr	Phe	Arg	Ile	Asp	Pro	Arg	Leu	Gly	Asp	Asp	Ala	Asp	
				85					90					95		
ttt	gac	gag	ctc	atc	gcc	cag	tgc	cac	gcc	cgc	gga	ctg	aaa	gtc	ctg	336
Phe	Asp	Glu	Leu	Ile	Ala	Gln	Cys	His	Ala	Arg	Gly	Leu	Lys	Val	Leu	
			100					105					110			
ctg	gac	ggc	gtc	ttc	aac	cac	gtg	ggg	cgc	agc	ttc	ggg	gcg	ttc	cag	384
Leu	Asp	Gly	Val	Phe	Asn	His	Val	Gly	Arg	Ser	Phe	Gly	Ala	Phe	Gln	
		115					120					125				
ggt	gtg	ctc	acg	gac	ggt	ccc	ggg	tct	cct	gcc	gcc	tcc	tgg	ttc	cgc	432
Gly	Val	Leu	Thr	Asp	Gly	Pro	Gly	Ser	Pro	Ala	Ala	Ser	Trp	Phe	Arg	
	130					135					140					
ctg	cgg	tgg	ccg	gag	tcc	gga	tgg	gcg	ccg	ggg	acc	gaa	ccg	ggc	tac	480
Leu	Arg	Trp	Pro	Glu	Ser	Gly	Trp	Ala	Pro	Gly	Thr	Glu	Pro	Gly	Tyr	
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gag	gat	ttt	gag	ggc	cat	cat	cac	ctg	gtg	gcg	ctc	aac	cac	gat	gaa	528
Glu	Asp	Phe	Glu	Gly	His	His	His	Leu	Val	Ala	Leu	Asn	His	Asp	Glu	
				165					170					175		
ccg	gca	gtt	gcc	gcc	ctg	gtc	acg	gac	gtg	atg	aag	cac	tgg	cta	ggc	576
Pro	Ala	Val	Ala	Ala	Leu	Val	Thr	Asp	Val	Met	Lys	His	Trp	Leu	Gly	
			180					185					190			
cgg	gga	gcg	gac	ggc	tgg	cgg	ctg	gac	gcg	gcg	tac	gct	gtg	ccg	gcg	624
Arg	Gly	Ala	Asp	Gly	Trp	Arg	Leu	Asp	Ala	Ala	Tyr	Ala	Val	Pro	Ala	
		195					200					205				
tcg	ttc	tgg	gcc	ccg	gtg	ctg	gct	gag	gtg	cgc	cgc	gag	tat	ccg	gac	672
Ser	Phe	Trp	Ala	Pro	Val	Leu	Ala	Glu	Val	Arg	Arg	Glu	Tyr	Pro	Asp	
	210					215					220					
tcc	tat	ttc	gtg	ggc	gag	tac	atc	cac	ggc	gac	ttc	gcc	gag	gag	gtg	720
Ser	Tyr	Phe	Val	Gly	Glu	Tyr	Ile	His	Gly	Asp	Phe	Ala	Glu	Glu	Val	
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gag	cgg	agc	acg	ctc	gac	tcg	gtc	acg	cag	tac	gaa	ctg	tgg	aag	gcc	768
Glu	Arg	Ser	Thr	Leu	Asp	Ser	Val	Thr	Gln	Tyr	Glu	Leu	Trp	Lys	Ala	
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gtc	tgg	agt	tca	ctc	aac	gat	gcc	aac	ttc	tac	gaa	ctc	gca	tcc	gcg	816
Val	Trp	Ser	Ser	Leu	Asn	Asp	Ala	Asn	Phe	Tyr	Glu	Leu	Ala	Ser	Ala	
			260					265					270			
ctc	gag	cgg	cac	aac	ggg	ttc	ctg	gac	acc	ttc	gtg	ccg	ctc	acg	ttc	864
Leu	Glu	Arg	His	Asn	Gly	Phe	Leu	Asp	Thr	Phe	Val	Pro	Leu	Thr	Phe	
		275					280					285				
gtg	ggc	aac	cac	gac	gtc	acc	cgc	ctg	gcc	agc	aag	ctg	acg	aac	ccg	912
Val	Gly	Asn	His	Asp	Val	Thr	Arg	Leu	Ala	Ser	Lys	Leu	Thr	Asn	Pro	
	290					295					300					
gac	cag	ctg	gcg	ctt	gcg	ctc	aca	gtc	ctc	ctg	acc	gtg	ggc	ggg	acg	960
Asp	Gln	Leu	Ala	Leu	Ala	Leu	Thr	Val	Leu	Leu	Thr	Val	Gly	Gly	Thr	
					310					315					320	

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ccc	tgc	atc	tac	tac	gga	gac	gag	cag	gct	ttc	cgc	ggc	gtc	aag	gag	1008
Pro	Cys	Ile	Tyr	Tyr	Gly	Asp	Glu	Gln	Ala	Phe	Arg	Gly	Val	Lys	Glu	
				325					330					335		
gac	cgg	gcc	ggc	gga	gat	gac	gcc	gtc	cgt	ccg	gcg	ttc	ccc	gcg	ggg	1056
Asp	Arg	Ala	Gly	Gly	Asp	Asp	Ala	Val	Arg	Pro	Ala	Phe	Pro	Ala	Gly	
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ccc	gca	gaa	ctg	gcg	gag	gac	ggc	tgg	tcc	gtc	tac	cac	ctg	cac	cag	1104
Pro	Ala		Leu	Ala	Glu	Asp	Gly	Trp	Ser	Val	Tyr	His	Leu	His	Gln	
		355					360					365				
gaa	ctg	atc	agc	ctc	cga	cgg	cgg	cat	gcc	tgg	ctg	cac	cgg	gcc	cgc	1152
Glu	Leu	Ile	Ser	Leu	Arg	Arg	Arg	His	Ala	Trp	Leu	His	Arg	Ala	Arg	
	370					375					380					
acc	acg	gtc	ctg	gcg	ctc	agc	aac	gaa	cac	ctc	gtt	tac	cag	gtc	cgc	1200
Thr	Thr	Val	Leu	Ala	Leu	Ser	Asn	Glu	His	Leu	Val	Tyr	Gln	Val	Arg	
385					390					395					400	
ggc	gac	ggt	aag	gca	gca	gca	ggt	agc	aca	gag	gag	ggc	ggc	gca	ggc	1248
Gly	Asp	Gly	Lys	Ala	Ala	Ala	Gly	Ser	Thr	Glu	Glu	Gly	Gly	Ala	Gly	
				405					410					415		
gcc	gcg	ctg	aca	gtc	gcg	ctg	aac	ctt	tcc	ggc	acg	ccg	gcg	gac	ctg	1296
Ala	Ala	Leu	Thr	Val	Ala	Leu	Asn	Leu	Ser	Gly	Thr	Pro	Ala	Asp	Leu	
			420					425					430			
ccc	gta	ccg	tcc	ggg	tca	ggc	ggc	ctc	ctg	gcc	ggg	cgg	gcc	cac	cgg	1344
Pro	Val	Pro	Ser	Gly	Ser	Gly	Gly	Leu	Leu	Ala	Gly	Arg	Ala	His	Arg	
		435					440					445				
cat	ccg	gat	cgg	gat	gcc	gtg	ggc	ctg	ccc	ggt	tac	ggg	tgg	gca	gtg	1392
His	Pro	Asp	Arg	Asp	Ala	Val	Gly	Leu	Pro	Gly	Tyr	Gly	Trp	Ala	Val	
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Leu	Gly	Asn	Ser													
465																

<210> 292

<211> 468

<212> PRT

<213> Arthrobacter sp. FB24

<400> 292

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			20					25					30			
Lys	Ala	Pro	Thr	Ser	Glu	Ala	Pro	Gly	Gln	Thr	Val	Ala	His	Arg	Leu	
		35					40					45				
Gly	Gln	Leu	Val	Pro	Trp	Leu	Asp	Tyr	Val	Leu	Glu	Leu	Gly	Ala	Ser	
	50					55				60						
Gly	Leu	Ala	Leu	Gly	Pro	Val	Phe	Ala	Ser	Glu	Thr	His	Gly	Tyr	Asp	
65				70					75						80	
Thr	Thr	Asp	Tyr	Phe	Arg	Ile	Asp	Pro	Arg	Leu	Gly	Asp	Asp	Ala	Asp	
				85				90						95		
Phe	Asp	Glu	Leu	Ile	Ala	Gln	Cys	His	Ala	Arg	Gly	Leu	Lys	Val	Leu	
			100					105					110			
Leu	Asp	Gly	Val	Phe	Asn	His	Val	Gly	Arg	Ser	Phe	Gly	Ala	Phe	Gln	
		115					120					125				
Gly	Val	Leu	Thr	Asp	Gly	Pro	Gly	Ser	Pro	Ala	Ala	Ser	Trp	Phe	Arg	
	130				135					140						
Leu	Arg	Trp	Pro	Glu	Ser	Gly	Trp	Ala	Pro	Gly	Thr	Glu	Pro	Gly	Tyr	
145				150					155						160	
Glu	Asp	Phe	Glu	Gly	His	His	His	Leu	Val	Ala	Leu	Asn	His	Asp	Glu	
			165					170						175		
Pro	Ala	Val	Ala	Ala	Leu	Val	Thr	Asp	Val	Met	Lys	His	Trp	Leu	Gly	
			180					185					190			
Arg	Gly	Ala	Asp	Gly	Trp	Arg	Leu	Asp	Ala	Ala	Tyr	Ala	Val	Pro	Ala	
		195					200					205				
Ser	Phe	Trp	Ala	Pro	Val	Leu	Ala	Glu	Val	Arg	Arg	Glu	Tyr	Pro	Asp	
	210					215					220					
Ser	Tyr	Phe	Val	Gly	Glu	Tyr	Ile	His	Gly	Asp	Phe	Ala	Glu	Glu	Val	
225				230					235						240	
Glu	Arg	Ser	Thr	Leu	Asp	Ser	Val	Thr	Gln	Tyr	Glu	Leu	Trp	Lys	Ala	
				245					250					255		

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Val Trp Ser Ser Leu Asn Asp Ala Asn Phe Tyr Glu Leu Ala Ser Ala
 260 265 270
 Leu Glu Arg His Asn Gly Phe Leu Asp Thr Phe Val Pro Leu Thr Phe
 275 280 285
 Val Gly Asn His Asp Val Thr Arg Leu Ala Ser Lys Leu Thr Asn Pro
 290 295 300
 Asp Gln Leu Ala Leu Ala Leu Thr Val Leu Thr Val Gly Gly Thr
 305 310 315 320
 Pro Cys Ile Tyr Tyr Gly Asp Glu Gln Ala Phe Arg Gly Val Lys Glu
 325 330 335
 Asp Arg Ala Gly Gly Asp Asp Ala Val Arg Pro Ala Phe Pro Ala Gly
 340 345 350
 Pro Ala Glu Leu Ala Glu Asp Gly Trp Ser Val Tyr His Leu His Gln
 355 360 365
 Glu Leu Ile Ser Leu Arg Arg Arg His Ala Trp Leu His Arg Ala Arg
 370 375 380
 Thr Thr Val Leu Ala Leu Ser Asn Glu His Leu Val Tyr Gln Val Arg
 385 390 395 400
 Gly Asp Gly Lys Ala Ala Gly Ser Thr Thr Glu Gly Gly Ala Gly
 405 410 415
 Ala Ala Leu Thr Val Ala Leu Asn Leu Ser Gly Thr Pro Ala Asp Leu
 420 425 430
 Pro Val Pro Ser Gly Ser Gly Gly Leu Leu Ala Gly Arg Ala His Arg
 435 440 445
 His Pro Asp Arg Asp Ala Val Gly Leu Pro Gly Tyr Gly Trp Ala Val
 450 455 460
 Leu Gly Asn Ser
 465

<210> 293

<211> 1968

<212> DNA

<213> Arthrobacter sp. FB24

<220>

<221> CDS

<222> (1)..(1968)

<223> transl_table=11

<400> 293

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ccg ctt cat gtg cct cgg cgc gcc ggc ctc ggc gat gat gcc ggg ctc	96
Pro Leu His Val Pro Arg Arg Ala Gly Leu Gly Asp Asp Ala Gly Leu	
20 25 30	
tgc gtg cgg ata ccc gcg gca tgg ggc cgt gcc gcc cgg gtc tgg gtg	144
Cys Val Arg Ile Pro Ala Ala Trp Gly Arg Ala Ala Arg Val Trp Val	
35 40 45	
cgg tcg gtc cag gac ggt gaa ccc cgg tac gac gcc gcg cgc agc ctg	192
Arg Ser Val Gln Asp Gly Glu Pro Arg Tyr Asp Ala Ala Arg Ser Leu	
50 55 60	
ggg gag ctt gac ggc tgg gtt tgg tgg gaa gcg gaa atg acc gtc acc	240
Gly Glu Leu Asp Gly Trp Val Trp Trp Glu Ala Glu Met Thr Val Thr	
65 70 75 80	
aac ccg gtg gcc cgg tac cgc ttc ctg ctg gaa gtc gcg gat agc gag	288
Asn Pro Val Ala Arg Tyr Arg Phe Leu Leu Glu Val Ala Asp Ser Glu	
85 90 95	
cac gac ggc ggt act ccc ggc agc gga cag acg ggt agt gga cat ggg	336
His Asp Gly Gly Thr Pro Gly Ser Gly Gln Thr Gly Ser Gly His Gly	
100 105 110	
ggc agc acc ccg ggg tac tgg agc ctc aac gcc cag ggc ctg ttc cgc	384
Gly Ser Thr Pro Gly Tyr Trp Ser Leu Asn Ala Gln Gly Leu Phe Arg	
115 120 125	
cgc gac gtc tcc gac tac gcg gac ttc cgc ctg acc acc ttc ccg gca	432
Arg Asp Val Ser Asp Tyr Ala Asp Phe Arg Leu Thr Thr Phe Pro Ala	
130 135 140	
gcg ccg cag tgg ctg cgc cgg gga acg atg tac cag gtg ttt ccg gac	480
Ala Pro Gln Trp Leu Arg Arg Gly Thr Met Tyr Gln Val Phe Pro Asp	

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145	cgc	ttc	gcg	cgc	tcc	150	gcc	gac	gcc	ggt	tcg	155	cgt	ccg	gtg	cct	gac	160	
Arg	Phe	Ala	Arg	Ser	165	Ala	Asp	Ala	Gly	Ser	170	Arg	Pro	Val	Pro	Asp	175	tgg	528
gcc	ata	ccg	tcc	gca	tgg	gac	cac	acg	ccc	gtg	gag	gga	acc	gga	ccg			576	
Ala	Ile	Pro	Ser	Ala	Trp	Asp	His	Thr	Pro	Val	Glu	Gly	Thr	Gly	Pro				
gcc	acg	ccg	ttc	cag	ttc	tac	ggc	ggc	gac	ctc	aac	ggg	gtg	gcc	gaa			624	
Ala	Thr	Pro	Phe	Gln	Phe	Tyr	Gly	Gly	Asp	Leu	Asn	Gly	Val	Ala	Glu				
aaa	ctg	gac	cat	atc	cag	caa	ctc	ggc	gcc	gac	gtc	atc	tac	ctg	aca			672	
Lys	Leu	Asp	His	Ile	Gln	Gln	Leu	Gly	Ala	Asp	Val	Ile	Tyr	Leu	Thr				
ccc	ttc	ttc	ccg	gca	cgc	tcc	aat	cac	cgc	tac	gat	gcc	tcc	acc	ttc			720	
Pro	Phe	Phe	Pro	Ala	Arg	Ser	Asn	His	Arg	Tyr	Asp	Ala	Ser	Thr	Phe				
225																			
aac	gca	gtg	gat	ccg	ctc	ctg	ggc	ggc	gat	gat	gcc	ctc	gtg	acg	ctg			768	
Asn	Ala	Val	Asp	Pro	Leu	Leu	Gly	Gly	Asp	Asp	Ala	Leu	Val	Thr	Leu				
gtg	gaa	gcg	gcc	cat	gcc	cgc	ggg	atc	aaa	gtg	atg	ggc	gac	ctc	acg			816	
Val	Glu	Ala	Ala	His	Ala	Arg	Gly	Ile	Lys	Val	Met	Gly	Asp	Leu	Thr				
gcc	aac	cat	tcc	ggc	gat	gcc	cac	gag	tgg	ttc	cgg	cag	gcg	ctg	gcc			864	
Ala	Asn	His	Ser	Gly	Asp	Ala	His	Glu	Trp	Phe	Arg	Gln	Ala	Leu	Ala				
gat	ccc	gca	tcc	gcc	gag	gcc	ggc	tac	tac	tac	ttc	aca	ggg	acc	ggg			912	
Asp	Pro	Ala	Ser	Ala	Glu	Ala	Gly	Tyr	Tyr	Tyr	Phe	Thr	Gly	Thr	Gly				
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Lys	Gln	Gly	Ala	Thr	Glu	Ala	Gly	Ala	Arg	Ala	Tyr	Glu	Ser	Trp	Tyr				
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Ala	Asp	Arg	Val	Arg	Asp	Ile	Asn	Pro	Glu	Ala	Ala	Leu	Leu	Ala	Glu				
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gcc	acc	aac	gat	gcc	gcg	ccg	gac	ttc	acc	ggc	gaa	cac	tgg	cac	ggg			1248	
Ala	Thr	Asn	Asp	Ala	Ala	Pro	Asp	Phe	Thr	Gly	Glu	His	Trp	His	Gly				
gcc	atg	acc	tac	gcc	aac	ttc	acc	cgc	ccg	ctg	tgg	tcc	tgg	ctg	gca			1296	
Ala	Met	Thr	Tyr	Ala	Asn	Phe	Thr	Arg	Pro	Leu	Trp	Ser	Trp	Leu	Ala				
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Gly	Asp	Ala	Ala	His	Val	Asn	Phe	Phe	Gly	Thr	Pro	Leu	Ala	Gly	Pro				
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Asn	Arg	Met	Gly	Ala	Glu	Asp	Phe	Leu	Ala	Thr	His	Leu	Asp	Leu	Ala				
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Ser	Ala	Phe	Ser	Trp	Asp	Leu	Arg	Leu	Gln	Asn	Met	Asn	Ala	Leu	Asn				
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Ser	His	Asp	Thr	Ala	Arg	Ala	Ala	Thr	Val	Met	Ile	Asp	Gly	Gly	Gln				
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Leu	Leu	Gly	Ala	Val	Met	Met	Phe	Thr	Ile	Pro	Gly	Val	Pro	Val	Val				
ttc	gcc	gga	gac	gag	ttt	ggc	ctc	aag	ggg	tac	aac	ggc	gaa	gac	tcc			1584	
Phe	Ala	Gly	Asp	Glu	Phe	Gly	Leu	Lys	Gly	Tyr	Asn	Gly	Glu	Asp	Ser				

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Arg	Ala	Ser	Tyr	Ser	Ala	Met	Ala	Ala	Leu	Arg	Arg	Lys	Gln	Pro	Ala					
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Leu	Thr	Gly	Gly	Gly	Ile	Arg	Trp	Leu	His	Ala	Asp	Gly	Asp	Ala	Leu					
gcc	tat	atc	cgc	gag	aca	gca	gag	agc	gcg	gtc	ctg	gtg	ttc	gtg	gcc					1776
Ala	Tyr	Ile	Arg	Glu	Thr	Ala	Glu	Ser	Ala	Val	Leu	Val	Phe	Val	Ala					
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Arg	Ala	Pro	Ala	Arg	Ala	Asp	Leu	Ala	Ala	Gly	Ala	Leu	Ser	Pro	Ala					
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Gln	Phe	Ser	Ala	Leu	Ala	Ala	Asp	Pro	Ala	Phe	Cys	Thr	Ala	Asp	Val					
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Arg	Thr	Asp	Ala	Ala	Ala	Arg	Arg	Ser	Ala	Gly	Thr	Arg	Ile	Ser	Ala	Gly				
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<210> 294

<211> 655

<212> PRT

<213> *Arthrobacter* sp. FB24

<400> 294

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Cys	Val	Arg	Ile	Pro	Ala	Ala	Trp	Gly	Arg	Ala	Ala	Arg	Val	Trp	Val					
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Arg	Ser	Val	Gln	Asp	Gly	Glu	Pro	Arg	Tyr	Asp	Ala	Ala	Arg	Ser	Leu					
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Lys	Leu	Asp	His	Ile	Gln	Gln	Leu	Gly	Ala	Asp	Val	Ile	Tyr	Leu	Thr					
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 Asp Pro Ala Ser Ala Glu Ala Gly Tyr Tyr Tyr Phe Thr Gly Thr Gly
 290 295 300
 Lys Gln Gly Ala Thr Glu Ala Gly Ala Arg Ala Tyr Glu Ser Trp Tyr
 305 310 315 320
 Gly Val Ala Ser Leu Pro Lys Leu Asn Trp Ser Ser Gly Gly Leu Thr
 325 330 335
 Asp Lys Phe Val Leu Asp Asp Asp Ser Pro Val Ala Arg Trp Leu Arg
 340 345 350
 Pro Pro Phe Asn Leu Asp Gly Trp Arg Ile Asp Val Gly Asn Met Thr
 355 360 365
 Gly Arg Leu Gly Ala Thr Asp Leu Asn Arg Glu Val Ala Cys Leu Ile
 370 375 380
 Ala Asp Arg Val Arg Asp Ile Asn Pro Glu Ala Ala Leu Leu Ala Glu
 385 390 395 400
 Ala Thr Asn Asp Ala Ala Pro Asp Phe Thr Gly Glu His Trp His Gly
 405 410 415
 Ala Met Thr Tyr Ala Asn Phe Thr Arg Pro Leu Trp Ser Trp Leu Ala
 420 425 430
 Gly Asp Ala Ala His Val Asn Phe Phe Gly Thr Pro Leu Ala Gly Pro
 435 440 445
 Asn Arg Met Gly Ala Glu Asp Phe Leu Ala Thr His Leu Asp Leu Ala
 450 455 460
 Ser Ala Phe Ser Trp Asp Leu Arg Leu Gln Asn Met Asn Ala Leu Asn
 465 470 475 480
 Ser His Asp Thr Ala Arg Ala Ala Thr Val Met Ile Asp Gly Gly Gln
 485 490 495
 Leu Leu Gly Ala Val Met Met Phe Thr Ile Pro Gly Val Pro Val Val
 500 505 510
 Phe Ala Gly Asp Glu Phe Gly Leu Lys Gly Tyr Asn Gly Glu Asp Ser
 515 520 525
 Arg Thr Pro Met Pro Trp Asn Asp Pro Ser Arg Ile Gly Ala Asp Leu
 530 535 540
 Arg Ala Ser Tyr Ser Ala Met Ala Ala Leu Arg Arg Lys Gln Pro Ala
 545 550 555 560
 Leu Thr Gly Gly Gly Ile Arg Trp Leu His Ala Asp Gly Asp Ala Leu
 565 570 575
 Ala Tyr Ile Arg Glu Thr Ala Glu Ser Ala Val Leu Val Phe Val Ala
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 Arg Ala Pro Ala Arg Ala Asp Leu Ala Ala Gly Ala Leu Ser Pro Ala
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 Gln Phe Ser Ala Leu Ala Ala Asp Pro Ala Phe Cys Thr Ala Asp Val
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<211> 1797

<212> DNA

<213> Arthrobacter sp. FB24

<220>

<221> CDS

<222> (1)..(1797)

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acg	ttt	gag	ctc	aac	gcc	ccc	ggc	ctg	caa	cac	gat	ccc	gtc	tgg	tac	96
Thr	Phe	Glu	Leu	Asn	Ala	Pro	Gly	Leu	Gln	His	Asp	Pro	Val	Trp	Tyr	
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cgc	aaa	gca	gtg	ttc	tac	gaa	gtc	ctg	gtt	cgc	ggc	ttt	gcg	gac	gga	144
Arg	Lys	Ala	Val	Phe	Tyr	Glu	Val	Leu	Val	Arg	Gly	Phe	Ala	Asp	Gly	
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Tyr	Leu	Gln	Trp	Leu	Gly	Val	Asp	Cys	Leu	Trp	Leu	Pro	Pro	Phe	Phe	
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Gln	Ser	Pro	Leu	Arg	Asp	Gly	Gly	Tyr	Asp	Ile	Ser	Asp	Tyr	Asn	Ser	
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gag	gcc	cat	gcc	cgc	ggc	gtc	cgc	gta	atc	atc	gac	ctg	ccg	ctg	aac	384
Glu	Ala	His	Ala	Arg	Gly	Val	Arg	Val	Ile	Ile	Asp	Leu	Pro	Leu	Asn	
		115					120					125				
cac	acc	tcg	gac	cag	cac	ccg	tgg	ttc	cag	gag	tcc	cgc	aag	gac	ccg	432
His	Thr	Ser	Asp	Gln	His	Pro	Trp	Phe	Gln	Glu	Ser	Arg	Lys	Asp	Pro	
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gac	gga	ccg	ttc	ggc	gac	ttc	tac	gtc	tgg	agc	gat	acc	gac	gag	aag	480
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Tyr	Gln	Asp	Ala	Arg	Ile	Ile	Phe	Val	Asp	Thr	Glu	Glu	Ser	Asn	Trp	
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Thr	Phe	Asp	Pro	Ile	Arg	Arg	Gln	Phe	Phe	Trp	His	Arg	Phe	Phe	Ser	
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Phe	Asp	Val	Val	Arg	Phe	Trp	Leu	Asp	Gln	Gly	Ile	Asp	Gly	Phe	Arg	
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Asn	Leu	Pro	Ala	Thr	His	Asp	Phe	Leu	Arg	Lys	Leu	Arg	Lys	Met	Val	
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His	Met	Ala	Phe	His	Phe	Pro	Ile	Met	Pro	Arg	Leu	Tyr	Tyr	Ala	Leu	
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Arg	Asp	Gln	Lys	Ala	Ala	Pro	Ile	Ile	Glu	Thr	Met	Lys	Asp	Thr	Pro	
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Arg	Arg	Leu	Ala	Pro	Leu	Leu	Asp	Asn	Ser	Arg	Ser	Glu	Ile	Glu	Leu	
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atc	aat	gcc	ctg	ctg	ctt	tct	ctg	ccg	ggg	agc	ccg	ttc	ctg	tac	tac	1200
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Val	Tyr	Asn	Tyr	Gly	Met	Ala	Asn	Val	Glu	Ala	Glu	Ala	Ala	His	Ser	
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gac	gtc	gtg	ctt	gct	tac	ctg	cgg	gaa	ctg	gcc	ccg	gac	aat	gcg	gcg	1536
Asp	Val	Val	Leu	Ala	Tyr	Leu	Arg	Glu	Leu	Ala	Pro	Asp	Asn	Ala	Ala	
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Pro	Val	Ala	Thr	Thr	Leu	Arg	Ile	Pro	Gln	Tyr	Ala	Gly	Arg	Gly	Leu	
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Arg	Leu	Thr	Leu	Thr	Leu	Gly	Ser	His	Asp	Phe	Phe	Trp	Leu	Arg	Ile	
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Arg	Ser	Ala	Ala	Ser	Asn	Pro	Ala	Ser	Pro	Phe	Thr	Gln	Ala	Met	Pro	
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<212> PRT

<213> Arthrobacter sp. FB24

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Tyr	Leu	Gln	Trp	Leu	Gly	Val	Asp	Cys	Leu	Trp	Leu	Pro	Pro	Phe	Phe	
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Tyr	Gln	Asp	Ala	Arg	Ile	Ile	Phe	Val	Asp	Thr	Glu	Glu	Ser	Asn	Trp	
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Thr	Phe	Asp	Pro	Ile	Arg	Arg	Gln	Phe	Phe	Trp	His	Arg	Phe	Phe	Ser	
			180					185					190			
His	Gln	Pro	Asp	Leu	Asn	Phe	Glu	Asn	Pro	Lys	Val	Ile	Asp	Ala	Leu	
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 Ala Asp Ala Ile Pro Tyr Leu Tyr Glu Glu Glu Gly Thr Asn Cys Glu
 225 230 235 240
 Asn Leu Pro Ala Thr His Asp Phe Leu Arg Lys Leu Arg Lys Met Val
 245 250 255
 Asp Glu Asn Tyr Pro Gly Arg Val Ile Ala Glu Ala Asn Gln Pro
 260 265 270
 Pro Val Glu Val Val Glu Tyr Phe Gly Thr Glu Glu Glu Pro Glu Cys
 275 280 285
 His Met Ala Phe His Phe Pro Ile Met Pro Arg Leu Tyr Tyr Ala Leu
 290 295 300
 Arg Asp Gln Lys Ala Ala Pro Ile Ile Glu Thr Met Lys Asp Thr Pro
 305 310 315 320
 Asp Ile Pro Glu Gly Ala Gln Trp Gly Thr Phe Leu Arg Asn His Asp
 325 330 335
 Glu Leu Thr Leu Glu Met Val Thr Ala Asp Glu Arg Ala Ala Met Leu
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 Gly Trp Tyr Ala Pro Asp Pro Arg Met Arg Ala Asn Ile Gly Ile Arg
 355 360 365
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 Ile Asn Ala Leu Leu Leu Ser Leu Pro Gly Ser Pro Phe Leu Tyr Tyr
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 Gly Asp Glu Ile Gly Met Gly Asp Asn Ile Trp Leu Glu Asp Arg Asp
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 Ala Val Arg Thr Pro Met Gln Trp Asn Pro Asp Arg Asn Ala Gly Phe
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 Ser His Ala Asp Pro Gly Lys Leu Tyr Leu Pro Val Ile Gln Ser Leu
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 Val Tyr Asn Tyr Gly Met Ala Asn Val Glu Ala Glu Ala Ala His Ser
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 Gly Ser Leu Leu Arg Trp Thr Arg Gln Ile Leu Ser Val Arg Lys Asn
 465 470 475 480
 His Pro Val Phe Gly Leu Gly Thr Phe Lys His Val Glu Ala Asp His
 485 490 495
 Asp Val Val Leu Ala Tyr Leu Arg Glu Leu Ala Pro Asp Asn Ala Ala
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 Gly Glu Asp Ala Glu Ser Ile Leu Cys Ala Phe Asn Leu Ser Gln His
 515 520 525
 Pro Val Ala Thr Thr Leu Arg Ile Pro Gln Tyr Ala Gly Arg Gly Leu
 530 535 540
 Arg Asp Val Phe Gly Gly Gln Pro Phe Pro Ala Ile Gly Asp Asp Gly
 545 550 555 560
 Arg Leu Thr Leu Thr Leu Gly Ser His Asp Phe Phe Trp Leu Arg Ile
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 Val Leu Ser Ile Glu Gly
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<212> DNA

<213> Azotobacter vinelandii AvOP

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 Tyr Lys Asp Ala Val Ile Tyr Gln Val His Val Lys Ser Phe Phe Asp
 20 25 30
 tcg aac aac gac ggc atc ggt gat ttc ccg ggg ctg atc gcc aag ctg
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48

96

144

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Ser	Asn	Asn ₃₅	Asp	Gly	Ile	Gly	Asp ₄₀	Phe	Pro	Gly	Leu	Ile ₄₅	Ala	Lys	Leu	
gac	tac	atc	gcc	gac	ctg	ggg	gtc	aac	acc	atc	tgg	ctg	ctg	ccg	ttc	192
Asp	Tyr ₅₀	Ile	Ala	Asp	Leu	Gly ₅₅	Val	Asn	Thr	Ile	Trp ₆₀	Leu	Leu	Pro	Phe	
tac	cct	tcg	ccg	cgt	cgc	gac	gac	ggc	tac	gac	atc	gcc	gaa	tac	cgc	240
Tyr ₆₅	Pro	Ser	Pro	Arg	Arg ₇₀	Asp	Asp	Gly	Tyr	Asp ₇₅	Ile	Ala	Glu	Tyr	Arg ₈₀	
ggc	gtg	cat	cca	gac	tac	ggc	agc	ctc	gcc	gac	gtg	cga	cgc	ctc	atc	288
Gly	Val	His	Pro	Asp ₈₅	Tyr	Gly	Ser	Leu	Ala ₉₀	Asp	Val	Arg	Arg	Leu ₉₅	Ile	
gcc	gag	gcg	cac	cgg	cgc	ggc	ctg	cgg	ttg	atc	acc	gaa	ctg	gtg	atc	336
Ala	Glu	Ala	His ₁₀₀	Arg	Arg	Gly	Leu	Arg ₁₀₅	Leu	Ile	Thr	Glu	Leu ₁₁₀	Val	Ile	
aac	cac	acc	tcc	gac	cag	cat	ccc	tgg	ttc	cag	cgg	gcg	cgg	cag	gcc	384
Asn	His	Thr ₁₁₅	Ser	Asp	Gln	His	Pro ₁₂₀	Trp	Phe	Gln	Arg	Ala ₁₂₅	Arg	Gln	Ala	
agg	aag	ggc	tcg	gcg	gcg	cgc	aac	ttc	tac	gtc	tgg	tcg	gat	agc	gac	432
Arg	Lys ₁₃₀	Gly	Ser	Ala	Ala	Arg ₁₃₅	Asn	Phe	Tyr	Val	Trp ₁₄₀	Ser	Asp	Ser	Asp	
gac	aag	tac	cgg	gac	acc	cgg	atc	atc	ttc	ctc	gat	acc	gag	aag	tcc	480
Asp	Lys	Tyr	Arg	Asp	Thr ₁₅₀	Arg	Ile	Ile	Phe	Leu ₁₅₅	Asp	Thr	Glu	Lys	Ser ₁₆₀	
aac	tgg	acc	tgg	gac	ccg	gtg	gcc	ggc	cag	tac	ttc	tgg	cac	cgc	ttc	528
Asn	Trp	Thr	Trp	Asp ₁₆₅	Pro	Val	Ala	Gly ₁₇₀	Gln	Tyr	Phe	Trp	His	Arg ₁₇₅	Phe	
tat	tcg	cac	cag	ccg	gat	ctc	aac	ttc	gac	aac	ccg	cag	gtg	atg	aag	576
Tyr	Ser	His	Gln ₁₈₀	Pro	Asp	Leu	Asn	Phe ₁₈₅	Asp	Asn	Pro	Gln ₁₉₀	Val	Met	Lys	
gcg	gtg	ctc	ggc	atc	atg	cgc	tac	tgg	ctc	gat	ctg	ggc	gtc	gac	ggg	624
Ala	Val	Leu ₁₉₅	Gly	Ile	Met	Arg	Tyr ₂₀₀	Trp	Leu	Asp	Leu	Gly ₂₀₅	Val	Asp	Gly	
ctg	cgc	ctg	gac	gcc	att	ccc	tac	ctg	atc	gag	cgc	gac	ggc	acc	aat	672
Leu	Arg ₂₁₀	Leu	Asp	Ala	Ile	Pro ₂₁₅	Tyr	Leu	Ile	Glu	Arg ₂₂₀	Asp	Gly	Thr	Asn	
aac	gag	aac	ctg	ccc	gag	acc	cac	cag	gtg	ctc	aag	cgc	atc	cgc	gcc	720
Asn	Glu	Asn	Leu	Pro	Glu ₂₃₀	Thr	His	Gln	Val	Leu ₂₃₅	Lys	Arg	Ile	Arg	Ala ₂₄₀	
gag	ctg	gat	gcc	cgc	tat	ccg	gac	cgc	atg	ctg	ctg	gcc	gag	gcc	aac	768
Glu	Leu	Asp	Ala	Arg ₂₄₅	Tyr	Pro	Asp	Arg	Met ₂₅₀	Leu	Leu	Ala	Glu	Ala ₂₅₅	Asn	
cag	tgg	ccg	gag	gac	act	cag	ctc	tac	ttc	ggc	ggc	gcc	ccg	gag	ggg	816
Gln	Trp	Pro	Glu ₂₆₀	Asp	Thr	Gln	Leu	Tyr ₂₆₅	Phe	Gly	Gly	Ala ₂₇₀	Pro	Glu	Gly	
aag	ggc	gac	gaa	tgc	cac	atg	gcc	ttc	cac	ttc	ccg	ctg	atg	ccg	cgc	864
Lys	Gly	Asp ₂₇₅	Glu	Cys	His	Met	Ala ₂₈₀	Phe	His	Phe	Pro	Leu ₂₈₅	Met	Pro	Arg	
atg	tac	atg	gcc	atc	gcc	cag	gaa	gac	cgc	ttc	ccg	atg	acc	gac	atc	912
Met	Tyr ₂₉₀	Met	Ala	Ile	Ala	Gln ₂₉₅	Glu	Asp	Arg	Phe	Pro ₃₀₀	Met	Thr	Asp	Ile	
ctg	cgc	cag	acc	ccg	gac	atc	ccg	tcc	gac	tgc	cag	tgg	gcg	atc	ttc	960
Leu	Arg	Gln	Thr	Pro	Asp ₃₁₀	Ile	Pro	Ser	Asp	Cys ₃₁₅	Gln	Trp	Ala	Ile	Phe ₃₂₀	
ctg	cgc	aac	cac	gac	gaa	ctg	acc	ctg	gag	atg	gtc	acc	gac	cgc	gag	1008
Leu	Arg	Asn	His	Asp ₃₂₅	Glu	Leu	Thr	Leu	Glu ₃₃₀	Met	Val	Thr	Asp	Arg ₃₃₅	Glu	
cgc	gac	tac	ctg	tgg	aac	ttc	tac	gcc	gac	cgc	cgc	cgc	gcg	cgc	atc	1056
Arg	Asp	Tyr	Leu ₃₄₀	Trp	Asn	Phe	Tyr	Ala ₃₄₅	Ala	Asp	Arg	Arg	Ala ₃₅₀	Arg	Ile	
aac	ctg	ggg	ata	cgc	cgg	cgc	ctg	gcg	ccg	ctg	ctg	gag	cgc	gac	cgg	1104
Asn	Leu	Gly ₃₅₅	Ile	Arg	Arg	Arg	Leu ₃₆₀	Ala	Pro	Leu	Leu	Glu ₃₆₅	Arg	Asp	Arg	
cgg	cgc	atc	gaa	ctg	ctc	aac	agc	ctg	ctg	ctg	tcg	atg	cca	ggg	acg	1152
Arg	Arg ₃₇₀	Ile	Glu	Leu	Leu	Asn ₃₇₅	Ser	Leu	Leu	Leu	Ser ₃₈₀	Met	Pro	Gly	Thr	
ccg	gtg	atc	tac	tac	ggc	gac	gag	atc	ggc	atg	ggc	gac	aac	atc	tac	1200
Pro	Val	Ile	Tyr	Tyr	Gly ₃₉₀	Asp	Glu	Ile	Gly	Met ₃₉₅	Gly	Asp	Asn	Ile	Tyr ₄₀₀	
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Leu	Gly	Asp	Arg	Asp 405	Gly	Val	Arg	Thr	Pro 410	Met	Gln	Trp	Ser	Thr 415	Asp	
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ccg Pro	atc Ile	atg Met 435	gac Asp	ccg Pro	ctg Leu	tac Tyr	ggc Gly	ttc Phe	cag Gln	agc Ser	gtc Val	aac Asn 445	gtc Val	gaa Glu	gcc Ala	1344
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ctg Leu	gcg Ala	ccg Pro	gcc Ala	aac Asn 485	cgc Arg	cgc Arg	atc Ile	ttc Phe	gcc Ala	tac Tyr	ctg Leu	cgc Arg	gaa Glu	tac Tyr	cat His	1488
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cgc Arg	tcg Ser	gcc Ala 515	cag Gln	gag Ala	gtg Val	gaa Glu	ctg Leu	gaa Glu	ctg Leu	ccc Pro	cag Gln	ttc Phe 525	gcc Ala	gac Asp	atg Met	1584
gtg Val	ccg Pro 530	gtg Val	gag Glu	atg Met	acc Thr	ggc Gly	ggc Gly	agc Ser	gcc Ala	ttc Phe	ccg Pro	ccg Pro	atc Ile	ggc Gly	cag Gln	1632
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ctg Leu	gcg Ala	ccc Pro	gag Ala	tcg Ser	cag Gln	atg Met	ccc Pro	agt Ser	tgg Trp	cac His	atc Ile	aag Lys	ccc Pro	acc Thr	gaa Glu	1728
ggc Gly	atg Met	ccg Pro	gaa Glu	ttc Phe	cag Gln	acc Thr	ctg Leu	gtg Val	ctg Leu	cgc Arg	cgt Arg	ctc Leu	gac Asp	gat Asp	ctg Leu	1776
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tac Tyr	ctg Leu	ccc Pro	aag Lys	cgt Arg	cgt Arg	tgg Trp	ttc Phe	gcc Ala	ggc Gly	aag Lys	ggc Gly	gag Ala	ccc Pro	tcg Ser	ggc Gly	1872
aac Asn 625	gtg Val	cac His	atc Ile	gcc Ala	tat Tyr	acg Thr	gtg Val	acc Thr	ttc Phe	ggc Gly	aac Asn	ctg Leu	ccg Pro	cgc Arg	ccc Pro	1920
gtg Val	ctg Leu	ctc Leu	agc Ser	gag Glu	atc Ile	gag Glu	gtc Val	ggc Gly	ggc Gly	gag Glu	ggc Gly	ggc Gly	ccg Pro	cag Gln	cgc Arg	1968
tac Tyr	cag Gln	ttg Leu	ccg Pro	ctg Leu	ggt Gly	ttt Phe	ctc Leu	ccc Pro	gag Glu	gag Glu	gag Glu	ttc Phe	ggc Gly	agc Ser	gcc Ala	2016
ttg Leu	ccc Pro	cag Gln	caa Gln	ctg Leu	gcc Ala	atg Met	acc Thr	cgc Arg	gtg Val	cgc Arg	cgt Arg	ggc Gly	cgc Arg	cgc Arg	gtg Val	2064
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Phe	Ala	Asn	Ile	Ala	Ser	Val	Leu	Gly	Glu	Val	Cys	Arg	Val	Asp	Ala	
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cag	ggc	ggc	tgc	acc	gtg	ctg	atg	atc	ctg	cag	cgc	tac	ctg	gag	aac	2448
Gln	Gly	Gly	Cys	Thr	Val	Leu	Met	Ile	Leu	Gln	Arg	Tyr	Leu	Glu	Asn	
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cag	ggc	gac	gcc	tgg	gag	tgg	acg	cag	aac	acc	ctc	gac	cgg	gcc	atc	2496
Gln	Gly	Asp	Ala	Trp	Glu	Trp	Thr	Gln	Asn	Thr	Leu	Asp	Arg	Ala	Ile	
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cgc	gac	gaa	ctg	gcc	ggc	ggc	gag	tcg	acc	ctg	gag	agc	cag	tac	agc	2544
Arg	Asp	Glu	Leu	Ala	Gly	Gly	Glu	Ser	Thr	Leu	Glu	Ser	Gln	Tyr	Ser	
		835					840					845				
gcg	ctg	cac	gag	ctg	gag	agc	ttt	tcc	cgc	cag	ctc	ggc	cag	cgc	ctc	2592
Ala	Leu	His	Glu	Leu	Glu	Ser	Phe	Ser	Arg	Gln	Leu	Gly	Gln	Arg	Leu	
	850					855					860					
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Gly	Glu	Met	His	Met	Ala	Leu	Ala	Ala	Pro	Thr	Glu	Asp	Pro	Asp	Phe	
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gct	cgc	gaa	acc	gcc	ggt	ccc	gag	caa	gcg	gcg	cag	tgg	acc	gag	agc	2688
Ala	Arg	Glu	Thr	Ala	Gly	Pro	Glu	Gln	Ala	Ala	Gln	Trp	Thr	Glu	Ser	
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atc	ggc	gcg	caa	ctg	ggg	cgg	gcc	ctg	gaa	atc	ctc	gcc	cag	cgc	cag	2736
Ile	Gly	Ala	Gln	Leu	Gly	Arg	Ala	Leu	Glu	Ile	Leu	Ala	Gln	Arg	Gln	
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gcg	acg	ctg	gcc	gag	gag	gaa	cgg	gcc	gcc	gtc	gag	cag	ttg	ctg	ctg	2784
Ala	Thr	Leu	Ala	Glu	Glu	Glu	Arg	Ala	Ala	Val	Glu	Gln	Leu	Leu	Leu	
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cag	cgt	gat	gcc	ctg	ctg	gag	aaa	gtc	ggc	gaa	ctg	gcc	ggg	gcc	tgc	2832
Gln	Arg	Asp	Ala	Leu	Leu	Glu	Lys	Val	Gly	Glu	Leu	Ala	Gly	Ala	Cys	
	930					935					940					
gtc	ggc	agc	ctg	cgc	atc	cgc	gtg	cat	ggc	gat	ctg	cac	ctc	ggc	cag	2880
Val	Gly	Ser	Leu	Arg	Ile	Arg	Val	His	Gly	Asp	Leu	His	Leu	Gly	Gln	
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gtg	ctg	gtg	gtg	cag	ggc	gac	gcc	tat	ctg	atc	gac	ttc	gag	ggc	gag	2928
Val	Leu	Val	Val	Gln	Gly	Asp	Ala	Tyr	Leu	Ile	Asp	Phe	Glu	Gly	Glu	
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ccg	tcg	cgg	ccg	ctc	gcc	gcg	cgc	cgc	gcc	aag	cac	agc	cct	tac	aag	2976
Pro	Ser	Arg	Pro	Leu	Ala	Ala	Arg	Arg	Ala	Lys	His	Ser	Pro	Tyr	Lys	
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Asp	Val	Ser	Gly	Val	Leu	Arg	Ser	Ile	Gly	Tyr	Ala	Ala	Asp	Met	Ala	
		995					1000				1005					
atg	cgc	aac	gcg	cag	agt	gtc	gac	agc	tcc	gag	gcg	gcc	gac	cag	gcc	3072
Met	Arg	Asn	Ala	Gln	Ser	Val	Asp	Ser	Ser	Glu	Ala	Ala	Asp	Gln	Ala	
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Arg	Arg	Arg	Ile	Ala	Ser	Leu	Tyr	Gln	Ala	Asn	Ala	Arg	Gln	Ala	Phe	
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ctc	gcc	gcc	tac	cgc	cag	gcg	gcg	gcc	gag	atc	ggc	cat	gcc	tgg	gcc	3168
Leu	Ala	Ala	Tyr	Arg	Gln	Ala	Ala	Ala	Glu	Ile	Gly	His	Ala	Trp	Ala	
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gtg	ccg	gac	ggc	gag	gag	gcc	gcg	ctg	gcg	ctg	ttc	agc	ctg	gaa	aag	3216
Val	Pro	Asp	Gly	Glu	Glu	Ala	Ala	Leu	Ala	Leu	Phe	Ser	Leu	Glu	Lys	
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acc	gcc	tac	gaa	atc	gcc	tac	gag	gcc	gaa	aac	cgc	ccc	gcc	tgg	ctg	3264
Thr	Ala	Tyr	Glu	Ile	Ala	Tyr	Glu	Ala	Glu	Asn	Arg	Pro	Ala	Trp	Leu	
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gcc	gta	ccg	ctg	cgg	ggc	ctg	gcg	aat	ctg	gcg	caa	cag	cta	ctg	gat	3312
Ala	Val	Pro	Leu	Arg	Gly	Leu	Ala	Asn	Leu	Ala	Gln	Gln	Leu	Leu	Asp	
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 Tyr Pro Ser Pro Arg Arg Asp Asp Gly Tyr Asp Ile Ala Glu Tyr Arg
 65 70 75 80
 Gly Val His Pro Asp Tyr Gly Ser Leu Ala Asp Val Arg Arg Leu Ile
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 Asn His Thr Ser Asp Gln His Pro Trp Phe Gln Arg Ala Arg Gln Ala
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 Arg Lys Gly Ser Ala Ala Arg Asn Phe Tyr Val Trp Ser Asp Ser Asp
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 Asp Lys Tyr Arg Asp Thr Arg Ile Ile Phe Leu Asp Thr Glu Lys Ser
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 Asn Trp Thr Trp Asp Pro Val Ala Gly Gln Tyr Phe Trp His Arg Phe
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 Tyr Ser His Gln Pro Asp Leu Asn Phe Asp Asn Pro Gln Val Met Lys
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 225 230 235 240
 Glu Leu Asp Ala Arg Tyr Pro Asp Arg Met Leu Leu Ala Glu Ala Asn
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 Gln Trp Pro Glu Asp Thr Gln Leu Tyr Phe Gly Gly Ala Pro Glu Gly
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 Lys Gly Asp Glu Cys His Met Ala Phe His Phe Pro Leu Met Pro Arg
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 Met Tyr Met Ala Ile Ala Gln Glu Asp Arg Phe Pro Met Thr Asp Ile
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 305 310 315 320
 Leu Arg Asn His Asp Glu Leu Thr Leu Glu Met Val Thr Asp Arg Glu
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 Arg Asp Tyr Leu Trp Asn Phe Tyr Ala Ala Asp Arg Arg Ala Arg Ile
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 Asn Leu Gly Ile Arg Arg Arg Leu Ala Pro Leu Leu Glu Arg Asp Arg
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 Arg Arg Ile Glu Leu Leu Asn Ser Leu Leu Leu Ser Met Pro Gly Thr
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 Pro Val Ile Tyr Tyr Gly Asp Glu Ile Gly Met Gly Asp Asn Ile Tyr
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 Gly Ala Asp Gly Ser Ser Glu Thr Ile Leu Cys Val Ala Asn Val Ser
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 Arg Ser Ala Gln Ala Val Glu Leu Glu Leu Pro Gln Phe Ala Asp Met
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Leu	Ala	Pro	Ala	Ser	Gln	Met	Pro	Ser	Trp	His	Ile	Lys	Pro	Thr
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Gly	Met	Pro	Glu	Phe	Gln	Thr	Leu	Val	Leu	Arg	Arg	Leu	Asp	Leu
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Tyr	Leu	Pro	Lys	Arg	Arg	Trp	Phe	Ala	Gly	Lys	Gly	Ala	Pro	Ser
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Asn	Val	His	Ile	Ala	Tyr	Thr	Val	Thr	Phe	Gly	Asn	Leu	Pro	Arg
625					630					635				640
Val	Leu	Leu	Ser	Glu	Ile	Glu	Val	Gly	Gly	Glu	Gly	Gly	Pro	Gln
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Tyr	Gln	Leu	Pro	Leu	Gly	Phe	Leu	Pro	Glu	Glu	Glu	Phe	Gly	Ser
			660					665					670	
Leu	Pro	Gln	Gln	Leu	Ala	Met	Thr	Arg	Val	Arg	Arg	Gly	Arg	Val
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Gly	Val	His	Pro	Glu	Leu	Glu	Met	Gly	Leu	His	Leu	Thr	Gly	Tyr
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Gln	Gly	Gly	Cys	Thr	Val	Leu	Met	Ile	Leu	Gln	Arg	Tyr	Leu	Glu
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Ala	Arg	Glu	Thr	Ala	Gly	Pro	Glu	Gln	Ala	Ala	Gln	Trp	Thr	Glu
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Gln	Arg	Asp	Ala	Leu	Leu	Glu	Lys	Val	Gly	Glu	Leu	Ala	Gly	Ala
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Val	Gly	Ser	Leu	Arg	Ile	Arg	Val	His	Gly	Asp	Leu	His	Leu	Gly
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Val	Leu	Val	Val	Gln	Gly	Asp	Ala	Tyr	Leu	Ile	Asp	Phe	Glu	Gly
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Pro	Ser	Arg	Pro	Leu	Ala	Ala	Arg	Arg	Ala	Lys	His	Ser	Pro	Tyr
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Asp	Val	Ser	Gly	Val	Leu	Arg	Ser	Ile	Gly	Tyr	Ala	Ala	Asp	Met
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Met	Arg	Asn	Ala	Gln	Ser	Val	Asp	Ser	Ser	Glu	Ala	Ala	Asp	Gln
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Arg	Arg	Arg	Ile	Ala	Ser	Leu	Tyr	Gln	Ala	Asn	Ala	Arg	Gln	Ala
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Leu	Ala	Ala	Tyr	Arg	Gln	Ala	Ala	Ala	Glu	Ile	Gly	His	Ala	Trp
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Val	Pro	Asp	Gly	Glu	Glu	Ala	Ala	Leu	Ala	Leu	Phe	Ser	Leu	Glu
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Thr	Ala	Tyr	Glu	Ile	Ala	Tyr	Glu	Ala	Glu	Asn	Arg	Pro	Ala	Trp
														Leu

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 Arg Glu Pro Ala Leu Ser Thr Asp Asp Pro Leu Trp Tyr Lys Asp Ala
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 Ile Ile Tyr Gln Val His Val Lys Ser Phe Tyr Asp Ser Asn Asn Asp
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 Glu Leu Gly Val Asp Thr Ile Trp Leu Leu Pro Phe Tyr Pro Ser Pro
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 Asp Gln His Pro Trp Phe Gln Arg Ala Arg Arg Ala Lys Pro Gly Ser
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 Thr His Arg Asp Tyr Tyr Val Trp Ser Asp Thr Asp Thr Lys Tyr Ala
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 Asp Pro Val Ala Gly Gln Tyr Tyr Trp His Arg Phe Tyr Ser His Gln
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 Pro Asp Leu Asn Phe Asp Asn Pro Ala Val Val Arg Glu Val Ile Gln
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Asp	Val	Gln	Glu	Tyr	Phe	Gly	Asn	Glu	Asp	Glu	Cys	His	Met	Ala	Phe	
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His	Phe	Pro	Leu	Met	Pro	Arg	Ile	Tyr	Met	Ser	Ile	Ala	Ser	Glu	Asp	
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Arg	Phe	Pro	Ile	Leu	Asp	Ile	Met	Arg	Gln	Thr	Pro	Ala	Leu	Ala	Pro	
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Glu	Met	Val	Thr	Asp	Ser	Glu	Arg	Asp	Leu	Leu	Trp	Gln	Thr	Tyr	Ala	
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Ser	Asp	Arg	Arg	Ala	Arg	Leu	Asn	Leu	Gly	Ile	Arg	Arg	Arg	Leu	Ala	
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Pro	Met	Gln	Trp	Ser	Ser	Asp	Arg	Asn	Gly	Gly	Phe	Ser	Arg	Ala	Asp	
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Pro	Glu	Leu	Leu	Val	Leu	Pro	Pro	Val	Met	Gly	Ser	Leu	Tyr	Gly	Tyr	
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Asp	Ala	Ile	Asn	Val	Glu	Ala	Gln	Thr	Arg	Asp	Pro	His	Ser	Leu	Leu	
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Asn	Trp	Thr	Arg	Arg	Ile	Leu	Ala	Thr	Arg	Arg	Ala	Thr	Gln	Val	Phe	
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Ala	Tyr	Leu	Arg	Glu	Leu	Asp	Gly	His	Glu	Pro	Val	Leu	Cys	Val	Ala	
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Asn	Leu	Ser	Arg	Ala	Ser	Gln	Ala	Val	Glu	Leu	Asp	Leu	Ser	Glu	Phe	
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Ala	Gly	Arg	Val	Pro	Ile	Glu	Met	Thr	Ser	Asp	Ser	Pro	Phe	Pro	Pro	
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Ile	Gly	Gln	Leu	Thr	Tyr	Leu	Leu	Thr	Phe	Pro	Pro	Tyr	Gly	Phe	Leu	
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Gln	Ala	Glu	Pro	Leu	Pro	Glu	Tyr	Val	Thr	Ile	Val	Met	Arg	Arg	Gly	
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Glu	Gln	Arg	Pro	Asp	Val	Gly	Gln	Leu	His	Thr	Leu	Ala	His	Asp	Ala	
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Leu	Ser	Ser	Trp	Leu	Thr	Arg	Arg	Arg	Trp	Phe	Ala	Ser	Lys	Asp	Arg	
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Pro	Gln	Ala	Ala	Gly	Arg	Lys	Arg	Ala	Leu	Phe	Asp	Arg	Phe	Gly	Gln		
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<213> Burkholderia vietnamiensis G4

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885      890      895
Gln Pro Ser Asp Ala Ala Phe Ala Pro Glu Arg Ala Thr Pro Glu
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His Val Asp Gly Trp Cys Val Asp Ala Ile Ala Ser Phe Gly His Ala
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Leu Asp Val Leu Ala Thr Arg Leu Asp Ala Leu Asp Pro Ser Ala Arg
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Asp Ala Ala Glu Thr Leu Ala Ser Arg Asp Ala Ala Val Gln Ala
945      950      955
Leu Gly Ala Leu Val Pro Arg Thr Leu Asp Ala Val Cys Thr Arg Ile
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Arg Glu Pro Ala Leu Cys Ala Asp Asp Pro Leu Trp Tyr Lys Asp Ala
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Ile Ile Tyr Gln Val His Val Lys Ser Phe Tyr Asp Ser Asn Asn Asp
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Ala	Ala	Ala	Asp	Arg	Phe	Val	Glu	Cys	Tyr	Arg	Ala	Ala	Ala	Asp	Leu	
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Gly ₆₅	Ile	Gly	Asp	Phe	Pro ₇₀	Gly	Leu	Ile	Ala	Lys ₇₅	Leu	Asp	Tyr	Ile	Ala ₈₀
Glu	Leu	Gly	Val	Asp ₈₅	Thr	Ile	Trp	Leu	Leu ₉₀	Pro	Phe	Tyr	Pro	Ser ₉₅	Pro
Arg	Arg	Asp	Asp ₁₀₀	Gly	Tyr	Asp	Ile	Ala ₁₀₅	Asp	Tyr	Arg	Asp	Val ₁₁₀	His	Pro
Asp	Tyr	Gly ₁₁₅	Thr	Leu	Ala	Asp	Val ₁₂₀	Arg	Arg	Phe	Ile	Arg ₁₂₅	Glu	Ala	His
Ala	Arg ₁₃₀	Gly	Ile	Arg	Val	Ile ₁₃₅	Ala	Glu	Leu	Val	Ile ₁₄₀	Asn	His	Thr	Ser
Asp ₁₄₅	Gln	His	Pro	Trp	Phe ₁₅₀	Gln	Arg	Ala	Arg	Arg ₁₅₅	Ala	Lys	Pro	Gly	Ser ₁₆₀
Thr	His	Arg	Asp	Tyr ₁₆₅	Tyr	Val	Trp	Ser	Asp ₁₇₀	Thr	Asp	Thr	Lys	Tyr ₁₇₅	Ala
Gly	Thr	Arg	Ile ₁₈₀	Ile	Phe	Leu	Asp	Thr ₁₈₅	Glu	Thr	Ser	Asn	Trp ₁₉₀	Thr	His
Asp	Pro	Val ₁₉₅	Ala	Gly	Gln	Tyr	Tyr ₂₀₀	Trp	His	Arg	Phe	Tyr ₂₀₅	Ser	His	Gln
Pro	Asp ₂₁₀	Leu	Asn	Phe	Asp	Asn ₂₁₅	Pro	Ala	Val	Val	Arg ₂₂₀	Glu	Val	Ile	Gln
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Asp	Val ₂₉₀	Gln	Glu	Tyr	Phe	Gly ₂₉₅	Asn	Glu	Asp	Glu	Cys ₃₀₀	His	Met	Ala	Phe
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Ser	Asp ₃₇₀	Arg	Arg	Ala	Arg	Leu ₃₇₅	Asn	Leu	Gly	Ile	Arg ₃₈₀	Arg	Arg	Leu	Ala
Pro ₃₈₅	Leu	Met	Glu	Arg	Asp ₃₉₀	Arg	Arg	Arg	Ile	Glu ₃₉₅	Leu	Ile	Asn	Ser	Leu ₄₀₀
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Lys	Ile	Gly	Asp	625 Ala	Trp	Leu	Asn	Val	630 Val	Thr	Pro	Ile	Pro	Asp	Glu
Pro	Phe	Gln	Tyr	645 Ala	Glu	Ala	Trp	Val	650 Ser	Ala	Ser	Asp	Gly	Gly	Val
Glu	Arg	Tyr	Val	660 Val	Pro	Leu	Ala	Thr	665 Ala	Trp	Gly	Gly	Glu	Thr	Ser
His	Pro	Leu	Phe	675 Ala	Gln	Leu	Ala	Leu	680 Ala	Arg	Val	Arg	Arg	Gly	His
Thr	Val	Gly	Tyr	690 Leu	Thr	Asp	Ala	Phe	695 Ala	Leu	Pro	Ala	Phe	Ala	Arg
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Arg	Ile	Gly	Tyr	785 Ala	Asn	Thr	Ala	Thr	790 Leu	Val	Gly	Glu	Val	Val	His
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Pro	Gln	Ala	Ala	1025 Gly	Arg	Lys	Arg	Ala	1030 Leu	Phe	Asp	Arg	Phe	Gly	Gln
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Leu	Phe	Leu	Ile	1075 Asp	Lys	Ala	Ser	Tyr	1080 Glu	Leu	Cys	Tyr	Glu	Ala	Ala
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Asp	Gly	Cys	Arg	Thr	Pro	Met	Pro	Trp	His	Asp	Gly	Ile	His	Gly	Gly				
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Phe	Ser	Arg	Val	Glu	Pro	Trp	Leu	Pro	Val	Asp	Ala	Arg	His	Leu	Gln				
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Glu	Gly	Glu	Pro	Ala	Arg	Pro	Leu	Glu	Gln	Arg	Arg	Ala	Gln	Ser	His	
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Pro	Leu	Arg	Asp	Val	Ala	Gly	Phe	Leu	Arg	Ser	Leu	Ser	Tyr	Ala	Ser	
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Ala	Ala	Ala	Gln	Phe	Thr	Ile	Glu	Lys	Ala	Pro	Gln	Gln	Ala	Ala	Glu	
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cgc	aag	cgc	gcg	ctg	ttc	gag	cgc	ttc	ggg	cag	gcg	gcc	gcg	gac	cgc	3168
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Phe	Val	Ala	Gln	Tyr	Arg	Glu	Ala	Leu	Ser	Ala	Ala	Ser	Arg	Glu	Phe	
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Val	Glu	Pro	Arg	Tyr	Ala	Asp	Arg	Leu	Leu	Ala	Leu	Phe	Leu	Ile	Glu	
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Lys	Ala	Ser	Tyr	Glu	Leu	Cys	Tyr	Glu	Ala	Ala	Asn	Arg	Pro	Asp	Trp	
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ctg	agc	gtg	ccc	gca	aac	ggc	ctc	gcc	gcg	ctc	gtc	gcg	cgc	ctg	atc	3360
Leu	Ser	Val	Pro	Ala	Asn	Gly	Leu	Ala	Ala	Leu	Val	Ala	Arg	Leu	Ile	
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 Gly Val Ala Asp Thr Pro Leu Trp Tyr Lys Asp Ala Ile Ile Tyr Gln
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 Leu His Val Lys Ser Phe Phe Asp Ala Asn Asn Asp Gly Val Gly Asp
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 Phe Ala Gly Leu Ile Ala Lys Leu Asp Tyr Ile Ala Glu Leu Gly Val
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 Asp Thr Val Trp Leu Leu Pro Phe Tyr Pro Ser Pro Arg Arg Asp Asp
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 Gly Tyr Asp Ile Ala Asp Tyr Arg Gly Val His Pro Asp Tyr Gly Thr
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 Leu Ala Asp Val Arg Arg Phe Ile Arg Glu Ala His Ala Arg Gly Leu
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 Trp Phe Gln Arg Ala Arg Ala Lys Arg Gly Ser Val His Arg Asp
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 Tyr Tyr Val Trp Ser Asp Thr Asp Leu Lys Tyr Ala Gly Thr Arg Ile
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 Ile Phe Leu Asp Thr Glu Thr Ser Asn Trp Thr His Asp Pro Val Ala
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 Gly Gln Tyr Tyr Trp His Arg Phe Tyr Ser His Gln Pro Asp Leu Asn
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 Phe Asp Asn Pro Ala Val Val Arg Glu Val Leu Gln Ile Met Arg Phe
 210 215 220
 Trp Leu Asp Leu Gly Ile Asp Gly Leu Arg Leu Asp Ala Val Pro Tyr
 225 230 235 240
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 Tyr Phe Gly Asp Glu Asp Glu Cys His Met Ala Phe His Phe Pro Leu
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 Ile Asp Ile Met Arg Gln Thr Pro Ala Leu Ala Pro Ser Asn Gln Trp
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 Asp Ser Glu Arg Asp Leu Leu Trp Gln Ala Tyr Ala Ser Glu Arg Arg
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 Pro Gly Thr Pro Val Ile Tyr Tyr Gly Asp Glu Leu Gly Met Gly Asp
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 Asn Leu His Leu Gly Asp Arg Asp Gly Val Arg Thr Pro Met Gln Trp
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 Ser Ser Asp Arg Asn Gly Gly Phe Ser Arg Ala Asp Pro Glu Leu Leu
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 Val Leu Pro Pro Val Met Gly Thr Leu Tyr Gly Tyr Asp Ala Ile Asn
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 Val Glu Ala Gln Thr Arg Asp Pro His Ser Leu Leu Asn Trp Thr Arg

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Pro	Thr	Glu	Met	Thr	Ser	Asp	Ser	Pro	Phe	Pro	Pro	Ile	Gly	Gln	Leu				
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Pro	Tyr	Leu	Leu	Thr	Phe	Pro	Pro	Tyr	Gly	Phe	Leu	Trp	Phe	Ala	Leu				
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Ser	Glu	His	Gly	Arg	Glu	Pro	Ala	Trp	His	Gln	Gln	Tyr	Ala	Glu	Pro				
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Leu	Pro	Glu	Tyr	Leu	Thr	Leu	Val	Met	Arg	Arg	Gly	Glu	Thr	Gln	Pro				
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Ala	Glu	Ala	Arg	Val	Ala	Val	Asp	Gly	Arg	Glu	Glu	Arg	Tyr	Val	Val				
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Pro	Leu	Ala	Ser	Ala	Trp	Gly	Ser	Glu	Thr	Pro	Gln	Pro	Leu	Phe	Ala				
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Gln	Leu	Ala	Leu	Ala	Arg	Val	Arg	Arg	Gly	His	Thr	Val	Gly	Leu	Leu				
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Lys	Arg	Leu	Gly	Glu	Leu	His	Ala	Ala	Leu	Ala	Gln	Pro	Ser	Asp	Asp				
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Pro	Arg	Glu	Leu	Asp	Gly	Cys	Cys	Ile	Arg	Ile	His	Gly	Asp	Phe	His				
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Glu	Gly	Glu	Pro	Ala	Arg	Pro	Leu	Glu	Gln	Arg	Arg	Ala	Gln	Ser	His				
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 Arg Lys Arg Ala Leu Phe Glu Arg Phe Gly Gln Ala Ala Ala Asp Arg
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 Phe Val Ala Gln Tyr Arg Glu Ala Leu Ser Ala Ala Ser Arg Glu Phe
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 Val Glu Pro Arg Tyr Ala Asp Arg Leu Leu Ala Leu Phe Leu Ile Glu
 1075 1080 1085
 Lys Ala Ser Tyr Glu Leu Cys Tyr Glu Ala Ala Asn Arg Pro Asp Trp
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Asp	Val	Asn	Thr	Cys	Ile	Leu	Ile	Tyr	His	Glu	Lys	Tyr	Asp	Thr	Ser	
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Gly	Phe	Phe	Asp	Tyr	Met	Pro	Gln	Trp	Gly	His	Phe	Thr	Tyr	Ser	Tyr	
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Tyr	Leu	Asn	Pro	Ile	Phe	Lys	Ser	Glu	Ser	Tyr	His	Arg	Tyr	Asp	Val	
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Val	Asp	Tyr	Tyr	Glu	Ile	Asp	Pro	Met	Phe	Gly	Ser	Lys	Glu	Glu	Leu	
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Gly Phe Phe Asp Tyr Met Pro Gln Trp Gly His Phe Thr Tyr Ser Tyr
100      105      110
Ile Cys Lys Asp Asp Ile Phe His Glu Val Glu Trp Phe Arg Asn Ser
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Thr Ile Tyr Gln Ile Phe Pro Asp Arg Phe Ala Lys Phe Pro Pro Asp
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145      150      155      160
Ile Ile Asp Arg Phe Asp His Leu Val Lys Leu Gly Val Asp Val Val
165      170      175
Tyr Leu Asn Pro Ile Phe Lys Ser Glu Ser Tyr His Arg Tyr Asp Val
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Val Asp Tyr Tyr Glu Ile Asp Pro Met Phe Gly Ser Lys Glu Glu Leu
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Asp Gly Val Phe Asn His Ser Gly Asp Lys Phe Phe Ala Phe Arg Asp
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Val Val Glu Lys Gly Glu Lys Ser Lys Tyr Ala Asn Trp Tyr Phe Ile
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Asn Ser Phe Pro Val Gln Gly Tyr Pro Arg Pro Asn Tyr Glu Cys Phe
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Ser Phe Tyr Gly Gly Met Pro Lys Leu Asn Thr Gly Asn Pro Glu Thr
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Ala Lys Tyr Phe Leu Asp Val Val Lys Tyr Trp Thr Val Glu Phe Gly
290      295      300
Val Asp Gly Trp Arg Leu Asp Ala Ala Asp Glu Val Asp Arg Lys Phe
305      310      315      320
Trp Arg Lys Leu Arg Asp Met Leu Lys Asp Leu Asn Lys Asp Val Val
325      330      335
Leu Ile Gly Glu Ile Phe Asp Glu Ala Ser Ser Trp Leu Trp Gly Asp
340      345      350
Gln Phe Asp Ser Val Ile Asn Tyr Pro Leu Lys Ala Met Ile Asn Asp
355      360      365
Leu Phe Ala Tyr Arg Ser Ile Asp Val Glu Thr Phe Arg Asn Arg Ile
370      375      380
Ser Gly Tyr Ile Met Lys Phe Asn Lys Lys Val Leu Ser Ser Leu Val
385      390      395      400
Asn Ile Ile Ser Thr His Asp Thr Pro Arg Phe Leu Thr Leu Cys Asn
405      410      415
Gly Asp Glu Lys Arg Phe Glu Met Ala Val Val Phe Gln Phe Thr Phe
420      425      430
Pro Gly Val Pro Leu Ile Tyr Tyr Gly Asp Glu Ile Gly Met Glu Gly
435      440      445
Glu Gly Asp Pro Asp Cys Arg Arg Pro Met Ile Trp Asp Glu Ala Lys
450      455      460
Trp Asn Lys Lys Thr Leu Glu Leu Tyr Lys Phe Leu Ile Gly Leu Arg
465      470      475      480
Lys Arg Phe Asp Ala Leu Arg Thr Gly Glu Tyr Gly Glu Leu Pro Val
485      490      495
Thr Gly Cys Asn Gly Ile Leu Ala Tyr Arg Arg Gly Arg Gly Glu Asn

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500 505 510
 Gly Ile Ile Val Ala Met Asn Thr Leu Asp Arg Lys Glu Asn Val Val
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 Lys Asp Glu Glu Arg Leu Asn Val Asp Lys Lys Arg Ile Asn Ile Cys
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 Leu Asn Pro Phe Glu Trp Arg Ile Tyr Lys Ala Cys Gly Glu Leu
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<212> DNA

<213> Crocosphaera watsonii WH 8501

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Ile	Tyr	Pro	Asp	Thr	Phe	Ala	Arg	Lys	Val	Pro	Asp	Arg	Gln	Lys	Trp	
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Leu	Leu	Asp	Val	Pro	Leu	Glu	Asp	Trp	Glu	Ala	Pro	Pro	Thr	Ser	Gln	
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Gly	Tyr	Lys	Gly	Gly	Asn	Leu	Trp	Gly	Val	Ile	Asp	Lys	Leu	Asp	Tyr	
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tta	caa	gat	tta	ggg	ggt	gat	gct	ctc	tat	ttg	acc	cct	att	ttt	cgc	240
Leu	Gln	Asp	Leu	Gly	Val	Asp	Ala	Leu	Tyr	Leu	Thr	Pro	Ile	Phe	Arg	
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tct	gct	tgt	aac	cat	cg	cat	act	caa	gat	tat	tat	g	atc	gat		288
Ser	Ala	Cys	Asn	His	Arg	Tyr	His	Thr	Gln	Asp	Tyr	Tyr	Ala	Ile	Asp	
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Pro	Leu	Leu	Gly	Asp	Arg	Glu	Ala	Phe	Asp	His	Leu	Leu	Lys	Thr	Ala	
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cat	gat	aaa	ggg	ttt	aag	gtg	ggt	tta	gat	ggg	gta	ttt	aat	cac	gct	384
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Ser	Arg	Gly	Phe	Phe	Phe	Phe	Asn	Asp	Ile	Leu	Glu	Asn	Gly	Pro	Asn	
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Tyr	Asp	Gly	Ser	Arg	Pro	Ala	Asn	Tyr	Val	Ser	Trp	Ile	Asp	Tyr	Arg	
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Ala	Leu	Pro	Gln	Phe	Asn	His	Asp	Asn	Pro	Ala	Val	Arg	Glu	Tyr	Ile	
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Met	Gln	Val	Gly	Glu	Tyr	Trp	Leu	Gln	Gln	Gly	Ile	Asp	Gly	Trp	Arg	
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tta	gat	gta	ccc	aac	tgt	gtt	gaa	gca	gag	ggt	ttc	tgg	gag	gaa	ttt	672
Leu	Asp	Val	Pro	Asn	Cys	Val	Glu	Ala	Glu	Gly	Phe	Trp	Glu	Glu	Phe	
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cga	gaa	cgg	gtt	aaa	gct	gtc	aac	cct	gaa	gcc	tat	atc	gtc	gga	gaa	720
Arg	Glu	Arg	Val	Lys	Ala	Val	Asn	Pro	Glu	Ala	Tyr	Ile	Val	Gly	Glu	
	225				230				235					240		
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Ile	Val	Ser	Asp	Ala	Thr	Gln	Trp	Leu	Asp	Gly	Lys	Gln	Phe	Asp	Gly	
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Val	Met	Asn	Tyr	Pro	Phe	Ala	Arg	Leu	Thr	Ala	Cys	Phe	Val	Ile	Gly	
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Asp	Arg	Leu	Asp	Lys	Glu	Thr	Ile	Pro	Ser	Phe	Tyr	Lys	Pro	Tyr	Glu	
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Thr	Leu	Asp	Ala	Ala	Glu	Tyr	Ala	Lys	Gly	Leu	Glu	Glu	Leu	Leu	Ala	
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cac	gat	act	tct	cgt	ttt	cta	act	atg	gca	gga	ggc	gat	cgc	act	tcc	1008
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Leu	Gln	Leu	Ala	Thr	Leu	Leu	Leu	Phe	Thr	Phe	Pro	Gly	Thr	Pro	Asn	
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Gly	Arg	Lys	Gly	Phe	Pro	Thr	Glu	Glu	Lys	Trp	Glu	Gln	Glu	Thr	Leu	
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acc	tat	cat	aaa	caa	tta	atc	caa	atc	agg	aaa	aaa	tac	acg	gct	tta	1200
Thr	Tyr	His	Lys	Gln	Leu	Ile	Gln	Ile	Arg	Lys	Lys	Tyr	Thr	Ala	Leu	
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cgg	aca	gga	gaa	tat	aga	gtt	atc	act	gct	caa	gaa	aat	gtc	tat	gtc	1248
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ttt	gcc	cgt	att	tta	gga	gaa	gaa	ggg	ttg	att	att	gca	gtt	aat	aat	1296
Phe	Ala	Arg	Ile	Leu	Gly	Glu	Glu	Gly	Leu	Ile	Ile	Ala	Val	Asn	Asn	
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Gly	Glu	Asp	Lys	Thr	Glu	Ile	Gln	Ile	Asp	Lys	Phe	Asp	Lys	Val	Ser	
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Ser	Ile	Leu	Gln	Thr	Lys	Pro	Ser	Gln	Ile	Ile	Tyr	Gly	Glu	Gly	Ser	
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<212> PRT

<213> Crocosphaera watsonii WH 8501

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Leu	Leu	Asp	Val	Pro	Leu	Glu	Asp	Trp	Glu	Ala	Pro	Pro	Thr	Ser	Gln	
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Gly	Tyr	Lys	Gly	Gly	Asn	Leu	Trp	Gly	Val	Ile	Asp	Lys	Leu	Asp	Tyr	
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Ser	Ala	Cys	Asn	His	Arg	Tyr	His	Thr	Gln	Asp	Tyr	Tyr	Ala	Ile	Asp	
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His	Asp	Lys	Gly	Phe	Lys	Val	Val	Leu	Asp	Gly	Val	Phe	Asn	His	Ala	
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Ser	Arg	Gly	Phe	Phe	Phe	Phe	Asn	Asp	Ile	Leu	Glu	Asn	Gly	Pro	Asn	

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 Tyr Asp Gly Ser Arg Pro Ala Asn Tyr Val Ser Trp Ile Asp Tyr Arg
 165 170 175
 Ala Leu Pro Gln Phe Asn His Asp Asn Pro Ala Val Arg Glu Tyr Ile
 180 185 190
 Met Gln Val Gly Glu Tyr Trp Leu Gln Gln Gly Ile Asp Gly Trp Arg
 195 200 205
 Leu Asp Val Pro Asn Cys Val Glu Ala Glu Gly Phe Trp Glu Glu Phe
 210 215 220
 Arg Glu Arg Val Lys Ala Val Asn Pro Glu Ala Tyr Ile Val Gly Glu
 225 230 235 240
 Ile Val Ser Asp Ala Thr Gln Trp Leu Asp Gly Lys Gln Phe Asp Gly
 245 250 255
 Val Met Asn Tyr Pro Phe Ala Arg Leu Thr Ala Cys Phe Val Ile Gly
 260 265 270
 Asp Arg Leu Asp Lys Glu Thr Ile Pro Ser Phe Tyr Lys Pro Tyr Glu
 275 280 285
 Thr Leu Asp Ala Ala Glu Tyr Ala Lys Gly Leu Glu Glu Leu Leu Ala
 290 295 300
 Arg His Pro Trp Glu Ile Gln Leu Thr Gln Leu Asn Leu Leu Asp Ser
 305 310 315 320
 His Asp Thr Ser Arg Phe Leu Thr Met Ala Gly Gly Asp Arg Thr Ser
 325 330 335
 Leu Gln Leu Ala Thr Leu Leu Leu Phe Thr Phe Pro Gly Thr Pro Asn
 340 345 350
 Ile Phe Tyr Gly Asp Glu Ile Gly Ile Glu Gly Gly Lys Asp Pro Asp
 355 360 365
 Gly Arg Lys Gly Phe Pro Thr Glu Glu Lys Trp Glu Gln Glu Thr Leu
 370 375 380
 Thr Tyr His Lys Gln Leu Ile Gln Ile Arg Lys Lys Tyr Thr Ala Leu
 385 390 395 400
 Arg Thr Gly Glu Tyr Arg Val Ile Thr Ala Gln Glu Asn Val Tyr Val
 405 410 415
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 Gly Glu Asp Lys Thr Glu Ile Gln Ile Asp Lys Phe Asp Lys Val Ser
 435 440 445
 Ser Ile Leu Gln Thr Lys Pro Ser Gln Ile Ile Tyr Gly Glu Gly Ser
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Asp	Ala	Ile	Ile	Tyr	Glu	Ala	His	Val	Lys	Thr	Phe	Phe	Asp	Ser	Asn	
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Asn	Asp	Gly	Val	Gly	Asp	Phe	Glu	Gly	Leu	Arg	Gln	Lys	Leu	Pro	Tyr	
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ctg	gaa	agt	ctc	ggg	ata	acc	gca	atc	tgg	ctg	ctt	cct	ttt	tat	cct	192
Leu	Glu	Ser	Leu	Gly	Ile	Thr	Ala	Ile	Trp	Leu	Leu	Pro	Phe	Tyr	Pro	
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gcg Ala	cat His	aag Lys	ctc Leu 100	gga Gly	ctg Leu	aag Lys	gtg Val	att Ile 105	acc Thr	gag Glu	ctt Leu	gtc Val	atc Ile 110	aac Asn	cat His	336
acg Thr	tcc Ser	gat Asp 115	cag Gln	cac His	gca Ala	tgg Trp	ttc Phe 120	cag Gln	agg Arg	gcc Ala	aga Arg	cag Gln 125	gca Ala	gag Glu	ccg Pro	384
gga Gly	tcg Ser 130	gtc Val	gaa Glu	cgg Arg	gat Asp	ttt Phe 135	tac Tyr	atg Met	tgg Trp	agc Ser	agt Ser 140	gat Asp	ccc Pro	aag Lys	aaa Lys	432
tac Tyr 145	tcc Ser	ggc Gly	gtc Val	cg Arg	atc Ile 150	att Ile	ttc Phe	cag Gln	gat Asp	ttc Phe 155	gag Glu	gcc Ala	tcg Ser	aac Asn	tgg Trp 160	480
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cat His	cag Gln	cct Pro	gat Asp 180	ctg Leu	aac Asn	ttc Phe	gaa Glu	aat Asn 185	ccc Pro	gag Ala	gtt Val	gaa Glu	aaa Lys 190	gcc Ala	att Ile	576
tac Tyr	aag Lys	gtg Val 195	ctt Leu	gat Asp	tac Tyr	tgg Trp	ctg Leu 200	gag Glu	atg Met	ggc Gly	gtc Val	gac Asp 205	ggg Gly	ttg Leu	cgg Arg	624
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aac Asn 225	ctt Leu	ccc Pro	cg Arg	acg Thr	cac His 230	aag Lys	ttt Phe	ctg Leu	cag Gln	agg Arg 235	ctg Leu	cg Arg	aag Lys	cat His	gta Val 240	720
gac Asp	ggc Gly	aag Lys	ttc Phe	ccg Pro 245	aac Asn	cgt Arg	atg Met	ctt Leu	ctt Leu 250	gcc Ala	gag Glu	gca Ala	aat Asn	cag Gln 255	tgg Trp	768
ccg Pro	gaa Glu	gat Asp	gcc Ala 260	gcc Ala	gag Glu	tat Tyr	ttc Phe	ggc Gly 265	gaa Glu	ggc Gly	gac Asp	gaa Glu	tgt Cys 270	cat His	atg Met	816
aat Asn	ttc Phe 275	cat His	ttc Phe	cct Pro	ctg Leu	atg Met	ccg Pro 280	agg Arg	atg Met	tac Tyr	atg Met	gag Ala 285	ctg Leu	gaa Glu	atg Met	864
gaa Glu 290	gat Asp	cgt Arg	ttt Phe	ccg Pro	atc Ile	ata Ile 295	gat Asp	att Ile	ctc Leu	gac Asp	cag Gln 300	aca Thr	ccc Pro	ggg Gly	att Ile	912
ccg Pro 305	gaa Glu	gag Glu	tgc Cys	cag Gln	tgg Trp 310	gct Ala	tcc Ser	ttc Phe	ctt Leu	cg Arg 315	aat Asn	cat His	gat Asp	gaa Glu	ctt Leu 320	960
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tac Tyr	gag Ala	cat His	gat Asp 340	ccg Pro	aag Lys	gag Ala	cg Arg	atc Ile 345	aat Asn	ctc Leu	ggc Gly	ata Ile	cg Arg	cg Arg	cg Arg	1056
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cgt Arg	act Thr	ccc Pro	atg Met	cag Gln 405	tgg Trp	aac Asn	ggc Gly	gac Asp 410	cg Arg	aat Asn	gca Ala	ggc Gly	ttt Phe	tcc Ser 415	aga Arg	1248
gcc Ala	aat Asn	ccc Pro	cag Gln 420	cag Gln	ttg Leu	cag Gln	ctg Leu	ccg Pro 425	gtg Val	atc Ile	att Ile	gat Asp	ccg Pro 430	gaa Glu	tac Tyr	1296

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gcc Ala 465	ctc Leu	agt Ser	cgc Arg	ggg Gly	gat Asp 470	att Ile	atc Ile	ttt Phe	att Ile	cag Gln 475	tct Ser	cag Gln	aat Asn	cct Pro	cag Gln 480	1440
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tac Tyr	gaa Glu	gga Gly 515	tat Tyr	att Ile	cct Pro	gaa Glu	gag Glu 520	gtg Val	ttc Phe	agc Ser	ctc Leu	agt Ser 525	cat His	ttt Phe	ccc Pro	1584
ggg Gly 530	atc Ile	tct Ser	gca Ala	agg Arg	ccg Pro	tat Tyr 535	acg Thr	ggt Val	acg Thr	ctg Leu	ggt Gly 540	cct Pro	tac Tyr	gga Gly	tat Tyr	1632
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tcc Ser	ggc Gly	aag Lys	gtt Val 580	ctt Leu	gac Asp	cgt Arg	ctt Leu	gaa Glu 585	tcc Ser	aga Arg	gtg Val	ctg Leu	cct Pro 590	cag Gln	tat Tyr	1776
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gtc Val	agc Ser 610	gtc Val	aac Asn	gat Asp	agc Ser	att Ile 615	cct Pro	gtg Val	cca Pro	gcc Ala	tgt Cys 620	caa Gln	aac Asn	acg Thr	gtc Val	1872
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cgg Arg 705	gag Glu	agc Ser	ctc Leu	gtc Val	gta Val 710	ccg Pro	ctc Leu	cat His	ggg Gly	aga Arg 715	gga Gly	ggc Gly	cac His	gcc Ala	gaa Glu 720	2160
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gag Glu	gcg Ala	agc Ser 740	agt Ser	gtc Val	atc Ile	ctc Leu	tat Tyr	ggc Gly 745	gat Asp	cgg Arg	cac His	gtg Val	ttc Phe 750	aag Lys	ctg Leu	2256
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gaa Glu 865	atg Met	gcg Ala	gga Gly	ctt Leu 870	ctc Leu	ggg Gly	cgt Arg	aga Arg	acc Thr	gcc Ala 875	gaa Glu	ctc Leu	cac His	ctg Leu	gcc Ala 880	2640
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cgc Arg 1010	tcc Ser	ttc Phe	cac His	gct Ala	gcc Ala 1015	acg Thr	ctg Leu	act Thr	gcc Ala	ctc Leu	gca Ala 1020	cgg Arg	cat His	ggg Gly	aac Asn	3072
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Gly	Asn	Ser	Pro	Leu	Val	Pro	Ala	Asp	Arg	Asn	Asp	Leu	Ala	Thr	Leu	
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<212> PRT

<213> Geobacter metallireducens GS-15

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Pro	Glu	Asp	Ala	Ile	Ala	Tyr	Phe	Gly	Glu	Gly	Asp	Glu	Cys	Asn	Met	
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Thr	Leu	Glu	Met	Val	Thr	Asp	Glu	Glu	Arg	Asp	Tyr	Met	Tyr	Arg	Ile	
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Ala	Asn	Pro	Gln	Arg	Leu	Tyr	Leu	Pro	Val	Ile	Ile	Asp	Pro	Glu
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His	Tyr	Glu	Ala	Val	Asn	Val	Glu	Ile	Gln	Glu	Arg	Asn	Pro	Thr
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Ala	Phe	Ser	Ser	Gly	Thr	Leu	Glu	Met	Leu	Tyr	Pro	Ala	Asn	His
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Val	Leu	Ala	Phe	Leu	Arg	Arg	His	Glu	Asp	Glu	Val	Ile	Leu	Val
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Gly	Asn	Leu	Ser	Arg	Phe	Ala	Gln	Ala	Val	Ser	Leu	Asp	Leu	Lys
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Phe	Ala	Gly	Ile	Ser	Pro	Ala	Asp	Leu	Phe	Ser	Arg	Asn	Arg	Phe
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Val	Ile	Arg	Glu	Ile	Pro	Tyr	Pro	Leu	Thr	Leu	Gly	Pro	His	Asp
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Phe	Trp	Phe	Ile	Leu	Ser	Arg	Ala	Glu	Ser	Pro	Arg	Leu	Pro	Glu
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Tyr	Leu	Asn	Arg	Ser	Gly	Trp	Phe	Arg	Gly	Lys	Ala	Arg	Ala	Ile
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Gly	Tyr	Ala	Leu	Arg	Asp	Thr	Val	Leu	Leu	Arg	Thr	Ser	Asp	Gln
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Phe	Pro	Leu	Phe	Phe	Leu	Glu	Val	Arg	Tyr	Gln	Asn	Gly	Ala	Pro
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Thr	Tyr	Leu	Ile	Pro	Val	Ala	Phe	Leu	Arg	Gly	Pro	Gly	Ala	Arg
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Val	Asp	Ala	Glu	Ser	Pro	Gln	Ala	Ala	Ile	Ala	Ser	Leu	Ser	Val
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Gly	Met	Arg	Glu	Thr	Glu	His	Leu	Ile	Ser	Glu	Leu	Val	Thr	Gly
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Glu	Ala	Ser	Ser	Val	Ile	Leu	Tyr	Gly	Asp	Arg	His	Val	Phe	Lys
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Tyr	Arg	Thr	Val	Glu	Pro	Gly	Val	Asn	Ser	Glu	Val	Glu	Leu	Val
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Ser	Leu	Glu	Leu	Arg	His	Pro	Gly	Thr	Glu	Pro	Cys	Thr	Ile	Gly
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Val	Gln	Glu	Tyr	Val	Lys	Asn	Gln	Gly	Asn	Gly	Trp	Arg	Leu	Ala
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His	Leu	Leu	Gly	Gln	Tyr	Phe	Glu	Arg	Ile	Leu	Ser	Arg	Arg	Gly
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Ile	Pro	Pro	Pro	Lys	Arg	Phe	Ser	Ser	Leu	Ile	Asp	Gly	Ser	Ala
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Cys	Thr	Val	Pro	Glu	Pro	Val	Ala	Asn	Leu	Ile	Gly	Gly	Phe	Tyr
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Glu	Met	Ala	Gly	Leu	Leu	Gly	Arg	Arg	Thr	Ala	Glu	Leu	His	Leu
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Leu	Ala	Ala	Gly	Gly	Asn	Asp	Pro	Ala	Trp	Lys	Pro	Glu	Ala	Tyr
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Thr	Ile	Tyr	Gln	Arg	Ser	Val	Tyr	Gln	Ser	Met	Arg	Asn	Gln	Ala
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Arg	Thr	Leu	Gln	Leu	Leu	Ser	Gln	Asn	Arg	Asn	Leu	Leu	Pro	Ile
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 Arg Ile His Gly Asn Phe His Leu Gly Lys Val Leu Phe Thr Gly Lys
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 980 985 990
 Glu Arg Arg Ile Lys Arg Ser Pro Leu Arg Asp Val Ala Ser Met Ile
 995 1000 1005
 Arg Ser Phe His Ala Ala Thr Leu Thr Ala Leu Ala Arg His Gly Asn
 1010 1015 1020
 Gly Arg Ser Gly Asp Val Gln Leu Leu Glu Pro Trp Ala Asp Ala Cys
 1025 1030 1035 1040
 Tyr Tyr His Val Ser Cys Arg Tyr Leu Ala Gly Tyr Leu Glu Arg Met
 1045 1050 1055
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 Leu Arg Ser Phe Leu Leu Asp Arg Ala Leu Arg Asp Leu Gly Phe Ala
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Asp Leu Asp Arg Ile Glu Leu Ile His Gly Asp Pro Tyr Glu Trp Asp	
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Ala Glu Lys Glu Glu Asp Arg Asp Trp Asn Phe Asp Pro Asp Lys Glu	
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Thr Glu Arg Gly Trp Tyr Asp Glu Val Pro Leu Asp His Pro Gly Tyr	
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Tyr Phe Ala Val Pro Tyr Met Asn Ala Val Asp Val Phe Asp Ala Pro	
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Ser Trp Val Lys Asp Thr Val Trp Tyr Gln Ile Phe Pro Asp Arg Phe	
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Ala Asn Gly Asp Leu Thr Asn Asp Arg Pro Gly Thr Ile Ala Trp Gly	
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gtg Val	att Ile	gat Asp 195	cat His	atc Ile	gat Asp	tac Tyr	tta Leu 200	aaa Lys	gag Glu	ctg Leu	ggg Gly	att Ile 205	acc Thr	gga Gly	att Ile	624
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gcc Ala 305	ttt Phe	gaa Glu	ggg Gly	aat Asn	atg Met 310	ccg Pro	aaa Lys	ctt Leu	aat Asn	acg Thr 315	gcg Ala	cat His	cct Pro	gat Asp	gta Val 320	960
aaa Lys	gag Glu	tac Tyr	ttg Leu	tta Leu 325	aaa Lys	gtt Val	ggg Gly	cgt Arg	tac Tyr 330	tgg Trp	gtg Val	gaa Glu	gag Glu	ttc Phe 335	cac His	1008
gtc Val	gac Asp	gga Gly	tgg Trp 340	cga Arg	ctg Leu	gat Asp	gtc Val	gcg Ala 345	agt Ser	gaa Glu	gtg Val	gat Asp	cat His 350	gct Ala	ttt Phe	1056
tgg Trp	cgt Arg	gag Glu 355	ttc Phe	cgg Arg	cgt Arg	gaa Glu	gtc Val 360	cgg Arg	gca Ala	gcg Ala	aat Asn	ccg Pro 365	gaa Glu	gcc Ala	tat Tyr	1104
att Ile 370	gtc Val	ggc Gly	gag Glu	tgt Cys	tgg Trp	aca Thr 375	gat Asp	tca Ser	caa Gln	ccg Pro	tgg Trp 380	ttg Leu	ctc Leu	ggc Gly	gat Asp	1152
cag Gln 385	ttt Phe	gat Asp	gcg Ala	gtc Val	atg Met 390	aac Asn	tac Tyr	gga Gly	ttg Leu	acg Thr 395	gaa Glu	gct Ala	ttc Phe	tta Leu	aca Thr 400	1200
ttt Phe	ttt Phe	gcg Ala	acg Thr	aat Asn 405	gaa Glu	agt Ser	acg Thr	gcg Ala	tct Ser 410	gaa Glu	ttc Phe	agt Ser	cat His	gca Ala 415	atc Ile	1248
gtc Val	agg Arg	aat Asn	ctg Leu 420	aac Asn	agc Ser	aat Asn	acg Thr 425	atg Met	aat Asn	gtc Val	aac Asn	gaa Glu	gtg Val 430	atg Met	ttc Phe	1296
aat Asn	ctg Leu	gtg Val 435	gat Asp	tcg Ser	cat His	gat Asp	aca Thr 440	ccc Pro	cgt Arg	gcc Ala	ttg Leu	acg Thr 445	cgg Arg	gcg Ala	aat Asn	1344
ggg Gly	gac Asp 450	cgt Arg	gat Asp	cgg Arg	atg Met	aaa Lys 455	ctg Leu	ttg Leu	atg Met	ctg Leu	tca Ser 460	ctg Leu	aca Thr	ttc Phe		1392
acg Thr 465	gga Gly	agt Ser	ccg Pro	gtc Val	atc Ile 470	tat Tyr	tac Tyr	gga Gly	gat Asp	gaa Glu 475	atc Ile	ggt Gly	atg Met	aca Thr	ggc Gly 480	1440
ggt Gly	cag Gln	gat Asp	ccg Pro	gat Asp 485	aac Asn	cgg Arg	aag Lys	tgt Cys	atg Met 490	gtc Val	tgg Trp	gat Asp	cag Gln	gcg Ala 495	gaa Glu	1488
cag Gln	gac Asp	agg Arg	gat Asp 500	ctc Leu	ttg Leu	gcg Ala	tat Tyr	atc Ile 505	aca Thr	aag Lys	ttg Leu	gtt Val	gat Asp 510	tta Leu	cgg Arg	1536
aaa Lys	tcg Ser	cac His 515	ccc Pro	gct Ala	ctc Leu	gcc Ala	aac Asn 520	gcg Ala	agc Ser	ggc Gly	tat Tyr	caa Gln	ttc Phe	gaa Glu	caa Gln	1584
atg Met	gat Asp 530	gat Asp	gag Glu	acg Thr	gca Ala	agt Ser 535	ttc Phe	ctc Leu	gtt Val	cgt Arg	cgt Arg 540	cag Gln	tct Ser	gat Asp	gaa Glu	1632

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gcg acc tat ttg att gga ttt aac aat ggt tca gaa gaa atc cgc ttt	1680
Ala Thr Tyr Leu Ile Gly Phe Asn Asn Gly Ser Glu Glu Ile Arg Phe	
545 550 555 560	
gac ttg gac aaa gca gcg gtt gat tta atg gac gga caa cgg tat ttg	1728
Asp Leu Asp Lys Ala Ala Val Asp Leu Met Asp Gly Gln Arg Tyr Leu	
565 570 575	
gga acc gtc acc gta cgt ccg ttg tcc gga aaa att ctc cgg gtg gaa	1776
Gly Thr Val Thr Val Arg Pro Leu Ser Gly Lys Ile Leu Arg Val Glu	
580 585 590	
aca aca taa	1785
Thr Thr	

<210> 316

<211> 594

<212> PRT

<213> Exiguobacterium sp. 255-15

<400> 316

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Thr Tyr Asp Gln Glu Ala Val His Ile Arg Leu Met Ser Ala Lys Gly	
20 25 30	
Asp Leu Asp Arg Ile Glu Leu Ile His Gly Asp Pro Tyr Glu Trp Asp	
35 40 45	
Ala Glu Lys Glu Glu Asp Arg Asp Trp Asn Phe Asp Pro Asp Lys Glu	
50 55 60	
Lys Phe Trp Lys Thr Glu Thr Thr Asp Met Thr Phe Ala Gly Ser Asp	
65 70 75 80	
Ala Thr His Asp Phe Trp Phe Val Ala Ile Arg Pro Pro Lys Lys Arg	
85 90 95	
Val Arg Tyr Gly Phe Asn Val His Ala Asn Gly Glu Ser Ala Val Tyr	
100 105 110	
Thr Glu Arg Gly Trp Tyr Asp Glu Val Pro Leu Asp His Pro Gly Tyr	
115 120 125	
Tyr Phe Ala Val Pro Tyr Met Asn Ala Val Asp Val Phe Asp Ala Pro	
130 135 140	
Ser Trp Val Lys Asp Thr Val Trp Tyr Gln Ile Phe Pro Asp Arg Phe	
145 150 155 160	
Ala Asn Gly Asp Leu Thr Asn Asp Arg Pro Gly Thr Ile Ala Trp Gly	
165 170 175	
Ala Glu Ala Pro Ala Phe Asp Asn His Phe Gly Gly Asp Phe Gln Gly	
180 185 190	
Val Ile Asp His Ile Asp Tyr Leu Lys Glu Leu Gly Ile Thr Gly Ile	
195 200 205	
Tyr Phe Cys Pro Val Phe Val Ala Pro Ser Asn His Lys Tyr Asp Thr	
210 215 220	
Leu Asp Tyr Leu Arg Leu Asp Pro Ala Phe Gly Thr Glu Glu Thr Phe	
225 230 235 240	
Arg Glu Met Ile His Leu Leu His Gln Asn Gly Ile Arg Ile Leu Leu	
245 250 255	
Asp Ala Val Phe Asn His Val Ser Val Asp His Pro Ala Phe Gln Asp	
260 265 270	
Val Ile Ala His Gly Asn Glu Ser Gln Tyr Ala Asn Trp Phe Met Met	
275 280 285	
Asp Ser Phe Pro Val Gln Ser Thr Pro Val Pro Asn Tyr Glu Val Phe	
290 295 300	
Ala Phe Glu Gly Asn Met Pro Lys Leu Asn Thr Ala His Pro Asp Val	
305 310 315 320	
Lys Glu Tyr Leu Leu Lys Val Gly Arg Tyr Trp Val Glu Glu Phe His	
325 330 335	
Val Asp Gly Trp Arg Leu Asp Val Ala Ser Glu Val Asp His Ala Phe	
340 345 350	
Trp Arg Glu Phe Arg Arg Glu Val Arg Ala Ala Asn Pro Glu Ala Tyr	
355 360 365	
Ile Val Gly Glu Cys Trp Thr Asp Ser Gln Pro Trp Leu Leu Gly Asp	
370 375 380	
Gln Phe Asp Ala Val Met Asn Tyr Gly Leu Thr Glu Ala Phe Leu Thr	
385 390 395 400	

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Phe Phe Ala Thr Asn Glu Ser Thr Ala Ser Glu Phe Ser His Ala Ile
 405 410 415
 Val Arg Asn Leu Asn Ser Asn Thr Met Asn Val Asn Glu Val Met Phe
 420 425 430
 Asn Leu Val Asp Ser His Asp Thr Pro Arg Ala Leu Thr Arg Ala Asn
 435 440 445
 Gly Asp Arg Asp Arg Met Lys Leu Leu Met Leu Ser Leu Leu Thr Phe
 450 455 460
 Thr Gly Ser Pro Val Ile Tyr Tyr Gly Asp Glu Ile Gly Met Thr Gly
 465 470 475 480
 Gly Gln Asp Pro Asp Asn Arg Lys Cys Met Val Trp Asp Gln Ala Glu
 485 490 495
 Gln Asp Arg Asp Leu Leu Ala Tyr Ile Thr Lys Leu Val Asp Leu Arg
 500 505 510
 Lys Ser His Pro Ala Leu Ala Asn Ala Ser Gly Tyr Gln Phe Glu Gln
 515 520 525
 Met Asp Asp Glu Thr Ala Ser Phe Leu Val Arg Arg Gln Ser Asp Glu
 530 535 540
 Ala Thr Tyr Leu Ile Gly Phe Asn Asn Gly Ser Glu Ile Arg Phe
 545 550 555 560
 Asp Leu Asp Lys Ala Ala Val Asp Leu Met Asp Gly Gln Arg Tyr Leu
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 Gly Thr Val Thr Val Arg Pro Leu Ser Gly Lys Ile Leu Arg Val Glu
 580 585 590
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<210> 317

<211> 1674

<212> DNA

<213> Exiguobacterium sp. 255-15

<220>

<221> CDS

<222> (1)..(1674)

<223> transl_table=11

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cgg agt ttc aat gat tca aac gga gac gga atc ggg gat ctc gtc ggt	96
Arg Ser Phe Asn Asp Ser Asn Gly Asp Gly Ile Gly Asp Leu Val Gly	
20 25 30	
atc att gaa aaa ctg gat tac tta aaa gaa ctt gga att gat gtt att	144
Ile Ile Glu Lys Leu Asp Tyr Leu Lys Glu Leu Gly Ile Asp Val Ile	
35 40 45	
tgg ctg agt ccg gtc tat gac tca cca aat gat gat aac gga tat gat	192
Trp Leu Ser Pro Val Tyr Asp Ser Pro Asn Asp Asp Asn Gly Tyr Asp	
50 55 60	
att cgg gat tat gaa gcc atc atg agc gaa ttc gga acg atg gcg gac	240
Ile Arg Asp Tyr Glu Ala Ile Met Ser Glu Phe Gly Thr Met Ala Asp	
65 70 75 80	
ttt gat cgt ctg ctc gat cag gcg cat gag cgg gga atc aaa atc gta	288
Phe Asp Arg Leu Leu Asp Gln Ala His Glu Arg Gly Ile Lys Ile Val	
85 90 95	
atg gat ttg gtc atc aac cat tcg tcg gag cac gcc tgg ttt gca	336
Met Asp Leu Val Ile Asn His Ser Ser Asp Glu His Ala Trp Phe Ala	
100 105 110	
gag tca cga aag agt aag gac aat cca tac cgg gac tat tac att tgg	384
Glu Ser Arg Lys Ser Lys Asp Asn Pro Tyr Arg Asp Tyr Tyr Ile Trp	
115 120 125	
aga agc gcc aat gaa gac ggg acc ctc ccg aac aac tgg ggc tcg att	432
Arg Ser Ala Asn Glu Asp Gly Thr Leu Pro Asn Asn Trp Gly Ser Ile	
130 135 140	
ttt tcc gga ccg gct tgg gaa ctg gat gag gcg aca aac gaa tat tac	480
Phe Ser Gly Pro Ala Trp Glu Leu Asp Glu Ala Thr Asn Glu Tyr Tyr	
145 150 155 160	
ttg cac ctg ttt tct aaa aag caa cct gat ctg aac tgg gaa aac gaa	528

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Leu	His	Leu	Phe	Ser 165	Lys	Lys	Gln	Pro	Asp 170	Leu	Asn	Trp	Glu	Asn 175	Glu	
aaa Lys	ctg Leu	cgt Arg	caa Gln 180	gaa Glu	gtc Val	tat Tyr	cag Gln	atg Met 185	att Ile	acg Thr	cgc Arg	tgg Trp	ttg Leu 190	gat Asp	cgc Arg	576
ggg Gly	att Ile	gac Asp 195	ggt Gly	ttc Phe	cgg Arg	atg Met	gac Asp 200	gtc Val	atc Ile	aac Asn	tta Leu 205	atc Ser	tcg Ile	aag Lys	aca Thr	624
ccc Pro	ggt Gly 210	ctt Leu	ccg Pro	gat Asp	gcg Ala	acg Thr 215	gtt Val	cct Pro	ccc Pro	ggt Gly 220	gct Ala 220	cta Leu	tac Tyr	ggg Gly	gac Asp	672
ggc Gly 225	gga Gly	caa Gln	cat His	tat Tyr	att Ile 230	aac Asn	gga Gly	cca Pro	aga Arg	atc Ile 235	cat His	gag Glu	ttt Phe	tta Leu	aaa Lys 240	720
gaa Glu	atg Met	aat Asn	gat Asp	gct Ala 245	tct Ser	ttt Phe	ggt Gly	aat Asn	tat Tyr 250	gat Asp	gtc Val	ttg Leu	acg Thr	ggt Val 255	ggt Gly	768
gaa Glu	atg Met	ccg Pro	ggg Gly 260	gcg Ala	aca Thr	act Thr	gac Asp	gac Asp 265	gcc Ala	att Ile	ctt Leu	tat Tyr	aca Thr 270	gat Asp	cca Pro	816
gaa Glu	cgc Arg	aaa Lys 275	gaa Glu	gtc Val	aac Asn	atg Met	gtg Val 280	ttt Phe	acg Thr	ttc Phe	gaa Glu	cat His 285	atg Met	gac Asp	ttg Leu	864
gat Asp	tcc Ser 290	ggt Gly	ccg Pro	ggt Gly	ggg Gly	aaa Lys 295	tgg Trp	gat Asp	gta Val	aaa Lys	cca Pro 300	ttt Phe	gac Asp	ctt Leu	cag Gln	912
aaa Lys 305	ctg Leu	aaa Lys	gaa Glu	aac Asn	ttc Phe 310	acg Thr	aaa Lys	tgg Trp	caa Gln	gtc Val 315	gcc Ala	tta Leu	cac His	gaa Glu	aaa Lys 320	960
ggg Gly	ttg Trp	aac Asn	tcg Ser	ctg Leu 325	ttg Tyr	aat Trp	aat Asn	cac His 330	gac Asp	cag Gln	cca Pro	cgc Arg	ggt Val 335	gtc Val		1008
agc Ser	cga Arg	ttc Phe	gga Gly 340	aat Asn	gat Asp	acg Thr	acg Thr	tat Tyr 345	cgc Arg	gtc Val	gaa Glu	tcc Ser	gct Ala 350	aaa Lys	atg Met	1056
tta Leu	gcg Ala	act Thr 355	ctg Leu	ctc Leu	cac His	ttg Leu	tta Leu 360	aaa Lys	gga Gly	act Thr	ccc Pro	tac Tyr 365	att Ile	tat Tyr	caa Gln	1104
ggg Gly	gaa Glu 370	gaa Glu	atc Ile	ggc Gly	atg Met	acg Thr 375	aac Asn	gtg Val	gcc Ala	ttt Phe	gaa Glu 380	tcg Ser	att Ile	gag Glu	gac Asp	1152
tat Tyr 385	gag Glu	gat Asp	atc Ile	gaa Glu	atc Ile 390	cgt Arg	aat Asn	atg Met	tgg Trp	aaa Lys 395	gaa Glu	cgg Arg	acc Thr	gag Glu	caa Gln 400	1200
ggg Gly	gct Ala	tca Ser	ccg Pro	gca Ala 405	gag Glu	tta Leu	ttg Leu	cgt Arg	gct Ala 410	gtc Val	cat His	gtg Val	aag Lys	gga Gly 415	cgg Arg	1248
gac Asp	aat Asn	gcc Ala 420	cgg Arg	aca Thr	cca Pro	att Ile	caa Gln	tgg Trp 425	gat Asp	gcg Ala	acg Thr	gag Glu	cat His 430	gcc Ala	gga Gly	1296
ttt Phe	acg Thr 435	acg Thr	ggt Gly	aca Thr	ccc Pro	tgg Trp	tta Leu 440	aaa Lys	ggt Val	aat Asn	ccg Pro 445	aac Asn	tat Tyr	ccg Pro	acc Thr	1344
atc Ile 450	aat Asn	gtc Val	gaa Glu	cag Gln	gcc Ala	ttg Leu 455	gag Glu	gat Asp	ccg Pro	gat Asp	tcc Ser 460	atc Ile	ttc Phe	tat Tyr	tac Tyr	1392
tat Tyr 465	aaa Lys	cag Gln	ctg Leu	att Ile	gcg Ala 470	tta Leu	cgt Arg	cat His	cag Gln	cac His 475	gat Asp	gta Val	atc Ile	gta Val	tac Tyr 480	1440
ggt Gly	gaa Glu	tat Tyr	gcc Ala 485	ttg Leu	att Ile	tta Leu	gaa Glu	gag Glu 490	gaa Glu	acg Thr	gac Asp	atc Ile	tat Tyr	gcg Ala 495	tac Tyr	1488
aca Thr	aga Arg	aca Thr	tat Tyr 500	gaa Glu	aat Asn	gaa Glu	aca Thr	tgg Trp 505	tac Tyr	att Ile	tac Tyr	tgc Cys	tcc Ser 510	ttc Phe	agt Ser	1536
cag Gln	gaa Glu	gaa Glu 515	gta Val	acg Thr	gtt Val	ccg Pro	ctg Leu 520	tct Ser	cac His	gat Asp	act Thr	tct Ser 525	gat Asp	ccg Pro	gtc Val	1584
atc	gga	aat	tac	agt	gaa	tca	ccg	gca	gga	tca	aaa	gaa	gaa	ttg	gtt	1632

Ile	Gly	Asn	Tyr	Ser	Glu	Ser	Pro	Ala	Gly	Ser	Lys	Glu	Glu	Leu	Val
530	530					535					540				
ctt	cga	ccg	tat	gaa	gca	atc	gtc	tac	cgg	acg	acg	cgg	taa		
Leu	Arg	Pro	Tyr	Glu	Ala	Ile	Val	Tyr	Arg	Thr	Thr	Arg			
545					550					555					

1674

<210> 318

<211> 557

<212> PRT

<213> Exiguobacterium sp. 255-15

<400> 318

Met	Glu	Arg	Lys	Trp	Trp	His	Asp	Ser	Val	Val	Tyr	Gln	Ile	Tyr	Pro
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Arg	Ser	Phe	Asn	Asp	Ser	Asn	Gly	Asp	Gly	Ile	Gly	Asp	Leu	Val	Gly
			20					25					30		
Ile	Ile	Glu	Lys	Leu	Asp	Tyr	Leu	Lys	Glu	Leu	Gly	Ile	Asp	Val	Ile
		35					40					45			
Trp	Leu	Ser	Pro	Val	Tyr	Asp	Ser	Pro	Asn	Asp	Asp	Asn	Gly	Tyr	Asp
	50					55					60				
Ile	Arg	Asp	Tyr	Glu	Ala	Ile	Met	Ser	Glu	Phe	Gly	Thr	Met	Ala	Asp
65					70					75				80	
Phe	Asp	Arg	Leu	Leu	Asp	Gln	Ala	His	Glu	Arg	Gly	Ile	Lys	Ile	Val
				85					90					95	
Met	Asp	Leu	Val	Ile	Asn	His	Ser	Ser	Asp	Glu	His	Ala	Trp	Phe	Ala
			100					105					110		
Glu	Ser	Arg	Lys	Ser	Lys	Asp	Asn	Pro	Tyr	Arg	Asp	Tyr	Tyr	Ile	Trp
		115					120					125			
Arg	Ser	Ala	Asn	Glu	Asp	Gly	Thr	Leu	Pro	Asn	Asn	Trp	Gly	Ser	Ile
	130					135					140				
Phe	Ser	Gly	Pro	Ala	Trp	Glu	Leu	Asp	Glu	Ala	Thr	Asn	Glu	Tyr	Tyr
145					150					155					160
Leu	His	Leu	Phe	Ser	Lys	Lys	Gln	Pro	Asp	Leu	Asn	Trp	Glu	Asn	Glu
				165					170					175	
Lys	Leu	Arg	Gln	Glu	Val	Tyr	Gln	Met	Ile	Thr	Arg	Trp	Leu	Asp	Arg
			180					185					190		
Gly	Ile	Asp	Gly	Phe	Arg	Met	Asp	Val	Ile	Asn	Leu	Ile	Ser	Lys	Thr
		195					200					205			
Pro	Gly	Leu	Pro	Asp	Ala	Thr	Val	Pro	Pro	Gly	Ala	Leu	Tyr	Gly	Asp
	210					215					220				
Gly	Gly	Gln	His	Tyr	Ile	Asn	Gly	Pro	Arg	Ile	His	Glu	Phe	Leu	Lys
225					230					235					240
Glu	Met	Asn	Asp	Ala	Ser	Phe	Gly	Asn	Tyr	Asp	Val	Leu	Thr	Val	Gly
				245					250					255	
Glu	Met	Pro	Gly	Ala	Thr	Thr	Asp	Asp	Ala	Ile	Leu	Tyr	Thr	Asp	Pro
			260					265					270		
Glu	Arg	Lys	Glu	Val	Asn	Met	Val	Phe	Thr	Phe	Glu	His	Met	Asp	Leu
		275					280					285			
Asp	Ser	Gly	Pro	Gly	Gly	Lys	Trp	Asp	Val	Lys	Pro	Phe	Asp	Leu	Gln
	290					295					300				
Lys	Leu	Lys	Glu	Asn	Phe	Thr	Lys	Trp	Gln	Val	Ala	Leu	His	Glu	Lys
305					310					315					320
Gly	Trp	Asn	Ser	Leu	Tyr	Trp	Asn	Asn	His	Asp	Gln	Pro	Arg	Val	Val
				325					330					335	
Ser	Arg	Phe	Gly	Asn	Asp	Thr	Thr	Tyr	Arg	Val	Glu	Ser	Ala	Lys	Met
			340					345					350		
Leu	Ala	Thr	Leu	Leu	His	Leu	Leu	Lys	Gly	Thr	Pro	Tyr	Ile	Tyr	Gln
		355					360					365			
Gly	Glu	Glu	Ile	Gly	Met	Thr	Asn	Val	Ala	Phe	Glu	Ser	Ile	Glu	Asp
						375					380				
Tyr	Glu	Asp	Ile	Glu	Ile	Arg	Asn	Met	Trp	Lys	Glu	Arg	Thr	Glu	Gln
385					390					395					400
Gly	Ala	Ser	Pro	Ala	Glu	Leu	Leu	Arg	Ala	Val	His	Val	Lys	Gly	Arg
				405					410					415	
Asp	Asn	Ala	Arg	Thr	Pro	Ile	Gln	Trp	Asp	Ala	Thr	Glu	His	Ala	Gly
			420					425					430		
Phe	Thr	Thr	Gly	Thr	Pro	Trp	Leu	Lys	Val	Asn	Pro	Asn	Tyr	Pro	Thr
		435					440					445			
Ile	Asn	Val	Glu	Gln	Ala	Leu	Glu	Asp	Pro	Asp	Ser	Ile	Phe	Tyr	Tyr

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      450      455      460
Tyr Lys Gln Leu Ile Ala Leu Arg His Gln His Asp Val Ile Val Tyr
465 Gly Glu Tyr Ala Leu Ile Leu Glu Glu Thr Asp Ile Tyr Ala Tyr
      485      490      495
Thr Arg Thr Tyr Glu Asn Glu Thr Trp Tyr Ile Tyr Cys Ser Phe Ser
500 Gln Glu Glu Val Thr Val Pro Leu Ser His Asp Thr Ser Asp Pro Val
515 Ile Gly Asn Tyr Ser Glu Ser Pro Ala Gly Ser Lys Glu Glu Leu Val
530 Leu Arg Pro Tyr Glu Ala Ile Val Tyr Arg Thr Thr Arg
545      550      555

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<210> 319
 <211> 1611
 <212> DNA
 <213> Exiguobacterium sp. 255-15

<220>
 <221> CDS
 <222> (1)..(1611)
 <223> transl_table=11

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1      5      10      15
cgc agt ttt aaa gat tcg aac gga gac ggg atg ggc gat tta cgc gga      96
Arg Ser Phe Lys Asp Ser Asn Gly Asp Gly Met Gly Asp Leu Arg Gly
20      25      30
gta att gaa aaa ctc gat tac atc gct tcc ctg gat gtc gat atc atc      144
Val Ile Glu Lys Leu Asp Tyr Ile Ala Ser Leu Asp Val Asp Ile Ile
35      40      45
tgg tta aat ccc tgt tat aca ccg gat gtc gat aac gga tac gac      192
Trp Leu Asn Pro Cys Tyr Thr Ser Pro Asp Val Asp Asn Gly Tyr Asp
50      55      60
att tcg gat tat tac tcg att atg ccg aag gcg gga acg atg tcg gat      240
Ile Ser Asp Tyr Tyr Ser Ile Met Pro Lys Ala Gly Thr Met Ser Asp
65      70      75      80
ctg gaa gaa ctg att gcg tcc gcc cat gaa cga gga ctg aaa ctg att      288
Leu Glu Glu Leu Ile Ala Ser Ala His Glu Arg Gly Leu Lys Leu Ile
85      90      95
ctt gat ttg gtc gtc aat cat acg agt gat caa cat acg tgg ttt aaa      336
Leu Asp Leu Val Val Asn His Thr Ser Asp Gln His Thr Trp Phe Lys
100      105      110
gaa tcc cgc agc agt cgg acg aac gag aaa gcc gat tgg tac att tgg      384
Glu Ser Arg Ser Ser Arg Thr Asn Glu Lys Ala Asp Trp Tyr Ile Trp
115      120      125
cgg gac ggg gtc aaa gga acg ccg ccg aac aat tgg cgg tcg tat ttc      432
Arg Asp Gly Val Lys Gly Thr Pro Pro Asn Asn Trp Arg Ser Tyr Phe
130      135      140
gcg ccg agt ccc tgg acg tgg gat gag aca cgc gag cag tat tat ttc      480
Ala Pro Ser Pro Trp Thr Trp Asp Glu Thr Arg Glu Gln Tyr Tyr Phe
145      150      155      160
cat tcc ttt gca tcg gag caa ccg gac ttg aac tgg gag cat cct gct      528
His Ser Phe Ala Ser Glu Gln Pro Asp Leu Asn Trp Glu His Pro Ala
165      170      175
gtc cgg cag gcc gta tat acg atg atg cgg tgg tgg gcc gat aaa gga      576
Val Arg Gln Ala Val Tyr Thr Met Met Arg Trp Trp Ala Asp Lys Gly
180      185      190
atc gac ggc ttc cgg atg gat gtc atc aat ctg atc aag aaa cgg gcg      624
Ile Asp Gly Phe Arg Met Asp Val Ile Asn Leu Ile Lys Lys Arg Ala
195      200      205
acg tat gat gat gtc gca gat cct ttg gaa tta tcc tac tta ggg aat      672
Thr Tyr Asp Asp Val Ala Asp Pro Leu Glu Leu Ser Tyr Leu Gly Asn
210      215      220
caa ccg ggc att cac gag ttc tta cag gag atg cac caa gaa gta ctg      720
Gln Pro Gly Ile His Glu Phe Leu Gln Glu Met His Gln Glu Val Leu

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225	gcg	gga	acc	gat	ctc	230	ttt	acc	gtc	ggg	gag	235	att	ccg	ttt	gtc	ggc	240		
Ala	Gly	Thr	Asp	Leu	245	Phe	Thr	Val	Gly	Glu	Ile	Pro	Phe	Val	Gly	Pro			768	
	gaa	gac	ggg	ttg	ctg	tat	gtc	ggg	gag	gaa	ccg	aat	gag	ctg	cga	acg			816	
	Glu	Asp	Gly	Leu	Leu	Tyr	Val	Gly	Glu	Glu	Arg	Asn	Glu	Leu	Arg	Thr				
				260					265					270						
	ctg	ttt	cac	ttc	gaa	gtc	gcg	gac	atg	gag	acg	atg	gat	tta	ccg			864		
	Leu	Phe	His	Phe	Glu	Val	Ala	Asp	Met	Glu	Thr	Met	Asp	Leu	Pro					
			275					280				285								
	cgc	ttt	aaa	caa	atc	cag	aag	cgt	tgg	tat	gag	gcg	ctt	tat	ccg	agc			912	
	Arg	Phe	Lys	Gln	Ile	Gln	Lys	Arg	Trp	Tyr	Glu	Ala	Leu	Tyr	Pro	Ser				
			290				295					300								
	ggg	gtc	gcg	tcc	caa	ttc	ttg	aat	aac	cat	gac	cac	acc	cgt	cag	gtg			960	
	Gly	Val	Ala	Ser	Gln	Phe	Leu	Asn	Asn	His	Asp	His	Thr	Arg	Gln	Val				
	305					310					315					320				
	acc	cgg	ttc	gga	agc	gaa	cgg	tat	cgc	gtc	gaa	agt	gcc	aag	tta	ctg			1008	
	Thr	Arg	Phe	Gly	Ser	Glu	Arg	Tyr	Arg	Val	Glu	Ser	Ala	Lys	Leu					
					325					330					335					
	ggg	ttg	atg	ctc	cac	acg	tta	ccg	ggc	att	ccg	tac	att	tat	cag	ggc			1056	
	Gly	Leu	Met	Leu	His	Thr	Leu	Pro	Gly	Ile	Pro	Tyr	Ile	Tyr	Gln	Gly				
				340					345					350						
	gaa	gaa	atc	ggg	atg	acc	ggc	att	cgt	ttt	tct	gat	ccg	gag	tcc	tat			1104	
	Glu	Glu	Ile	Gly	Met	Thr	Gly	Ile	Arg	Phe	Ser	Asp	Pro	Glu	Ser	Tyr				
			355					360					365							
	cag	gac	gtt	gcg	ttt	cga	aat	cag	tac	gcc	gaa	cgg	att	gcg	gcc	ggg			1152	
	Gln	Asp	Val	Ala	Phe	Arg	Asn	Gln	Tyr	Ala	Glu	Arg	Ile	Ala	Ala	Gly				
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	gaa	tca	ccc	gga	acg	gtc	ctg	tca	tcg	atg	cag	ttg	cgg	gcg	cgt	gac			1200	
	Glu	Ser	Pro	Gly	Thr	Val	Leu	Ser	Ser	Met	Gln	Leu	Arg	Ala	Arg	Asp				
	385					390						395				400				
	aac	tca	cga	aca	ccg	atg	cag	tgg	aat	acg	gac	caa	tca	gcc	gga	ttt			1248	
	Asn	Ser	Arg	Thr	Pro	Met	Gln	Trp	Asn	Thr	Asp	Gln	Ser	Ala	Gly	Phe				
				405					410						415					
	act	ata	ggg	aca	cca	tgg	atg	gcg	gtc	aat	ccg	aac	tac	cgt	gac	att			1296	
	Thr	Ile	Gly	Thr	Pro	Trp	Met	Ala	Val	Asn	Pro	Asn	Tyr	Arg	Asp	Ile				
				420					425					430						
	aac	gtc	gaa	gca	gcg	gaa	cag	gat	ccg	cat	tcc	gtg	ctg	gct	ttt	tac			1344	
	Asn	Val	Glu	Ala	Ala	Glu	Gln	Asp	Pro	His	Ser	Val	Leu	Ala	Phe	Tyr				
			435					440					445							
	cgg	caa	ctg	att	gat	tta	cgg	aag	act	cat	ccg	gtc	atg	gtt	tac	ggg			1392	
	Arg	Gln	Leu	Ile	Asp	Leu	Arg	Lys	Thr	His	Pro	Val	Met	Val	Tyr	Gly				
			450				455					460								
	gtt	tat	cgt	gat	ttg	gcg	att	caa	gat	ccg	tac	ctg	tat	gtc	tat	gaa			1440	
	Val	Tyr	Arg	Asp	Leu	Ala	Ile	Gln	Asp	Pro	Tyr	Leu	Tyr	Val	Tyr	Glu				
	465					470					475					480				
	agg	gtc	cta	gac	gga	gtg	gtt	tgg	cgg	att	gtc	tta	aac	gtc	cat	gat			1488	
	Arg	Val	Leu	Asp	Gly	Val	Val	Trp	Arg	Ile	Val	Leu	Asn	Val	His	Asp				
				485					490						495					
	gaa	ccg	gtg	acg	acg	acg	ttc	ggg	tta	ccg	gaa	gaa	cag	ttg	att	ttg			1536	
	Glu	Pro	Val	Thr	Thr	Phe	Gly	Leu	Pro	Glu	Glu	Gln	Leu	Ile	Leu					
				500				505						510						
	acg	aat	tat	gag	acg	gcg	gac	atc	aat	cga	ttg	gca	ccg	tac	gaa	gcc			1584	
	Thr	Asn	Tyr	Glu	Thr	Ala	Asp	Ile	Asn	Arg	Leu	Ala	Pro	Tyr	Glu	Ala				
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	cgg	ttg	tac	caa	tac	gag	atg	cct	taa										1611	
	Arg	Leu	Tyr	Gln	Tyr	Glu	Met	Pro												
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<211> 536

<212> PRT

<213> Exiguobacterium sp. 255-15

<400> 320

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Val Ile Glu Lys Leu Asp Tyr Ile Ala Ser Leu Asp Val Asp Ile Ile
 35 40 45
 Trp Leu Asn Pro Cys Tyr Thr Ser Pro Asp Val Asp Asn Gly Tyr Asp
 50 55 60
 Ile Ser Asp Tyr Tyr Ser Ile Met Pro Lys Ala Gly Thr Met Ser Asp
 65 70 75 80
 Leu Glu Glu Leu Ile Ala Ser Ala His Glu Arg Gly Leu Lys Leu Ile
 85 90 95
 Leu Asp Leu Val Val Asn His Thr Ser Asp Gln His Thr Trp Phe Lys
 100 105 110
 Glu Ser Arg Ser Ser Arg Thr Asn Glu Lys Ala Asp Trp Tyr Ile Trp
 115 120 125
 Arg Asp Gly Val Lys Gly Thr Pro Pro Asn Asn Trp Arg Ser Tyr Phe
 130 135 140
 Ala Pro Ser Pro Trp Thr Trp Asp Glu Thr Arg Glu Gln Tyr Tyr Phe
 145 150 155 160
 His Ser Phe Ala Ser Glu Gln Pro Asp Leu Asn Trp Glu His Pro Ala
 165 170 175
 Val Arg Gln Ala Val Tyr Thr Met Met Arg Trp Trp Ala Asp Lys Gly
 180 185 190
 Ile Asp Gly Phe Arg Met Asp Val Ile Asn Leu Ile Lys Lys Arg Ala
 195 200 205
 Thr Tyr Asp Asp Val Ala Asp Pro Leu Glu Leu Ser Tyr Leu Gly Asn
 210 215 220
 Gln Pro Gly Ile His Glu Phe Leu Gln Glu Met His Gln Glu Val Leu
 225 230 235 240
 Ala Gly Thr Asp Leu Phe Thr Val Gly Glu Ile Pro Phe Val Gly Pro
 245 250 255
 Glu Asp Gly Leu Leu Tyr Val Gly Glu Arg Asn Glu Leu Arg Thr
 260 265 270
 Leu Phe His Phe Glu Val Ala Asp Asp Met Glu Thr Met Asp Leu Pro
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 Arg Phe Lys Gln Ile Gln Lys Arg Trp Tyr Glu Ala Leu Tyr Pro Ser
 290 295 300
 Gly Val Ala Ser Gln Phe Leu Asn Asn His Asp His Thr Arg Gln Val
 305 310 315 320
 Thr Arg Phe Gly Ser Glu Arg Tyr Arg Val Glu Ser Ala Lys Leu Leu
 325 330 335
 Gly Leu Met Leu His Thr Leu Pro Gly Ile Pro Tyr Ile Tyr Gln Gly
 340 345 350
 Glu Glu Ile Gly Met Thr Gly Ile Arg Phe Ser Asp Pro Glu Ser Tyr
 355 360 365
 Gln Asp Val Ala Phe Arg Asn Gln Tyr Ala Glu Arg Ile Ala Ala Gly
 370 375 380
 Glu Ser Pro Gly Thr Val Leu Ser Ser Met Gln Leu Arg Ala Arg Asp
 385 390 395 400
 Asn Ser Arg Thr Pro Met Gln Trp Asn Thr Asp Gln Ser Ala Gly Phe
 405 410 415
 Thr Ile Gly Thr Pro Trp Met Ala Val Asn Pro Asn Tyr Arg Asp Ile
 420 425 430
 Asn Val Glu Ala Ala Glu Gln Asp Pro His Ser Val Leu Ala Phe Tyr
 435 440 445
 Arg Gln Leu Ile Asp Leu Arg Lys Thr His Pro Val Met Val Tyr Gly
 450 455 460
 Val Tyr Arg Asp Leu Ala Ile Gln Asp Pro Tyr Leu Tyr Val Tyr Glu
 465 470 475 480
 Arg Val Leu Asp Gly Val Val Trp Arg Ile Val Leu Asn Val His Asp
 485 490 495
 Glu Pro Val Thr Thr Thr Phe Gly Leu Pro Glu Glu Gln Leu Ile Leu
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<211> 1788

<212> DNA

<213> Exiguobacterium sp. 255-15

<220>
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 Lys Tyr Asp Asp Lys Thr Ile His Val Arg Leu Gln Thr Lys Lys Asn
 20 25 30
 gac gtc gac cat gtt gat ctt att tgg gga gat ccg tac gac tgg cat 144
 Asp Val Asp His Val Asp Leu Ile Trp Gly Asp Pro Tyr Asp Trp His
 35 40 45
 acc gaa aac ccg gat gat gcc gat tgg aac ttt gat ccg tcc aaa tca 192
 Thr Glu Asn Pro Asp Asp Ala Asp Trp Asn Phe Asp Pro Ser Lys Ser
 50 55 60
 aac tat tgg aat act ttc gaa acc cct atg aaa cgg agc ggg tca gat 240
 Asn Tyr Trp Asn Thr Phe Glu Thr Pro Met Lys Arg Ser Gly Ser Asp
 65 70 75 80
 gag tta ttc gat tat tgg ttc atc gat gtc gtt cct cct ttc cgc cga 288
 Glu Leu Phe Asp Tyr Trp Phe Ile Asp Val Pro Pro Phe Arg Arg
 85 90 95
 ctt cgt tac gga ttc cgg ctt cac gac gga cat tcg agt caa gtc ttt 336
 Leu Arg Tyr Gly Phe Arg Leu His Asp Gly His Ser Ser Gln Val Phe
 100 105 110
 acc gaa cgt ggc tgg ttt gat gaa aag ccg cta gat gat acc gga tac 384
 Thr Glu Arg Gly Trp Phe Asp Glu Lys Pro Leu Asp Thr Gly Tyr
 115 120 125
 tac ttc tgt gtt cct ttt tta aac aaa gtg gat gtg ttc cat gct ccg 432
 Tyr Phe Cys Val Pro Phe Leu Asn Lys Val Asp Val Phe His Ala Pro
 130 135 140
 gac tgg gtg aag gat aca gta tgg tat caa atc ttc ccc gac cgc ttt 480
 Asp Trp Val Lys Asp Thr Val Trp Tyr Gln Ile Phe Pro Asp Arg Phe
 145 150 155 160
 gcc aac gga gat tcg acg aat gat ccg gcc ggt acc ctt cca tgg aat 528
 Ala Asn Gly Asp Ser Thr Asn Asp Pro Ala Gly Thr Leu Pro Trp Asn
 165 170 175
 agt acg gca cct aca acg aca aat ctg ttc ggc ggt gat ttt caa ggc 576
 Ser Thr Ala Pro Thr Thr Thr Asn Leu Phe Gly Gly Asp Phe Gln Gly
 180 185 190
 gtc att gat aaa atc gat tac tta gtg gat ctc ggc atc aca ggc att 624
 Val Ile Asp Lys Ile Asp Tyr Leu Val Asp Leu Gly Ile Thr Gly Ile
 195 200 205
 tac ttc tgt cca att ttc gaa gcc aag tcc aat cat aaa tac gac acg 672
 Tyr Phe Cys Pro Ile Phe Glu Ala Lys Ser Asn His Lys Tyr Asp Thr
 210 215 220
 att gat tat ttg gaa att gat ccg cag ttc gga act aaa gaa aag ttt 720
 Ile Asp Tyr Leu Glu Ile Asp Pro Gln Phe Gly Thr Lys Glu Lys Phe
 225 230 235 240
 aag gaa atg gtt gat tta ctg cat gca aat gga att cgc atc atg ctg 768
 Lys Glu Met Val Asp Leu Leu His Ala Asn Gly Ile Arg Ile Met Leu
 245 250 255
 gat gcc gtc ttt aat cat gcc ggt ttc cac cat aaa gca ttc gcc gac 816
 Asp Ala Val Phe Asn His Ala Gly Phe His His Lys Ala Phe Ala Asp
 260 265 270
 att cgg gaa cac ggc agc aat tct tct tac cgg gat tgg ttc cac ctc 864
 Ile Arg Glu His Gly Ser Asn Ser Ser Tyr Arg Asp Trp Phe His Leu
 275 280 285
 cgg aac ttc cct ctc gta acc gag ccg atg ccg aac tat gac acg ttt 912
 Arg Asn Phe Pro Leu Val Thr Glu Pro Met Pro Asn Tyr Asp Thr Phe
 290 295 300
 gcg ttt gtt ccg gaa atg ccg aag ttc aat acg gaa aat ccg gaa gta 960
 Ala Phe Val Pro Glu Met Pro Lys Phe Asn Thr Glu Asn Pro Glu Val
 305 310 315 320
 aaa gaa tac tta ctt cat gtc gcc cgt tac tgg gtc gaa gaa ttc ggg 1008
 Lys Glu Tyr Leu Leu His Val Ala Arg Tyr Trp Val Glu Glu Phe Gly

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tgg	cgt	gac	ttc	cgt	tct	gtc	gtc	aag	gaa	gcg	gat	ccg	gag	acg	tat	
Trp	Arg	Asp	Phe	Arg	Ser	Val	Val	Lys	Glu	Ala	Asp	Pro	Glu	Thr	Tyr	
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Ile	Leu	Gly	Glu	Ile	Trp	His	Asp	Ser	Gln	Glu	Trp	Leu	Leu	Gly	Asp	
	370					375				380						
caa	ttt	gat	gcc	ggt	atg	aac	tat	ccg	ttc	acg	aat	gct	gca	ctt	aat	
Gln	Phe	Asp	Ala	Val	Met	Asn	Tyr	Pro	Phe	Thr	Asn	Ala	Ala	Leu	Asn	
	385				390					395					400	
ttc	ttt	gca	ctc	gat	aag	aca	tct	gct	tcc	acc	tat	gcc	aat	gac	atg	
Phe	Phe	Ala	Leu	Asp	Lys	Thr	Ser	Ala	Ser	Thr	Tyr	Ala	Asn	Asp	Met	
			405					410						415		
tcg	cat	gtc	tta	ttc	tca	aac	acg	gtc	aac	gtc	aac	gaa	gta	tcg	ttt	
Ser	His	Val	Leu	Phe	Ser	Asn	Thr	Val	Asn	Val	Asn	Glu	Val	Ser	Phe	
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aac	tta	atc	ggt	tca	cac	gat	acg	ccg	cgt	gcc	ttg	acc	cgt	gcc	gga	
Asn	Leu	Ile	Gly	Ser	His	Asp	Thr	Pro	Arg	Ala	Leu	Thr	Arg	Ala	Gly	
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aac	gac	aaa	aac	aag	atg	cgt	ctg	ctg	ctg	tta	tcc	atg	ctg	acc	ttc	
Asn	Asp	Lys	Asn	Lys	Met	Arg	Leu	Leu	Leu	Leu	Ser	Met	Leu	Thr	Phe	
	450				455					460						
tcc	gga	agt	ccg	ggt	atc	tat	tac	gga	gat	gaa	atc	gga	ctc	gac	ggt	
Ser	Gly	Ser	Pro	Val	Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Leu	Asp	Gly	
	465			470				475						480		
gat	cag	gat	ccg	ggt	tgc	cgg	aaa	tgt	atg	ccg	tgg	aat	ccg	gaa	gag	
Asp	Gln	Asp	Pro	Gly	Cys	Arg	Lys	Cys	Met	Pro	Trp	Asn	Pro	Glu	Glu	
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cag	gat	ttg	aat	ctg	ttg	atg	tac	acg	aaa	cat	ctg	ctt	cag	tta	cga	
Gln	Asp	Leu	Asn	Leu	Leu	Met	Tyr	Thr	Lys	His	Leu	Leu	Gln	Leu	Arg	
			500					505					510			
aag	cag	cac	agg	aca	ctt	gcc	aat	cac	gga	cag	att	tca	ttc	gtc	cat	
Lys	Gln	His	Arg	Thr	Leu	Ala	Asn	His	Gly	Gln	Ile	Ser	Phe	Val	His	
	515					520					525					
gcc	gac	gat	gaa	acc	aat	acc	atc	gtc	atg	cgt	cgt	atg	agt	cag	gat	
Ala	Asp	Asp	Glu	Thr	Asn	Thr	Ile	Val	Met	Arg	Arg	Met	Ser	Gln	Asp	
	530				535					540						
ggg	acg	tat	tac	gtc	tat	ttc	aat	aac	tcg	aat	cat	cag	gcg	aca	atc	
Gly	Thr	Tyr	Tyr	Val	Tyr	Phe	Asn	Asn	Ser	Asn	His	Gln	Ala	Thr	Ile	
	545			550				555							560	
ccg	gct	cct	cag	tcc	ggc	caa	gga	atg	gat	ctc	ttt	tcg	aac	aca	cca	
Pro	Ala	Pro	Gln	Ser	Gly	Gln	Gly	Met	Asp	Leu	Phe	Ser	Asn	Thr	Pro	
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ctt	cct	tca	tta	gaa	gtg	acg	ctc	gct	ccg	tat	aca	gga	act	atc	att	
Leu	Pro	Ser	Leu	Glu	Val	Thr	Leu	Ala	Pro	Tyr	Thr	Gly	Thr	Ile	Ile	
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caa	gtg	att	tga													
Gln	Val	Ile														
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<211> 595

<212> PRT

<213> Exiguobacterium sp. 255-15

<400> 322

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			20					25					30			
Asp	Val	Asp	His	Val	Asp	Leu	Ile	Trp	Gly	Asp	Pro	Tyr	Asp	Trp	His	
		35				40						45				
Thr	Glu	Asn	Pro	Asp	Asp	Ala	Asp	Trp	Asn	Phe	Asp	Pro	Ser	Lys	Ser	
	50					55					60					
Asn	Tyr	Trp	Asn	Thr	Phe	Glu	Thr	Pro	Met	Lys	Arg	Ser	Gly	Ser	Asp	
65					70				75						80	

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Leu	Arg	Tyr	Gly ¹⁰⁰	Phe	Arg	Leu	His	Asp ¹⁰⁵	Gly	His	Ser	Ser	Gln ¹¹⁰	Val	Phe
Thr	Glu	Arg ¹¹⁵	Gly	Trp	Phe	Asp	Glu ¹²⁰	Lys	Pro	Leu	Asp	Asp ¹²⁵	Thr	Gly	Tyr
Tyr	Phe ¹³⁰	Cys	Val	Pro	Phe	Leu ¹³⁵	Asn	Lys	Val	Asp	Val ¹⁴⁰	Phe	His	Ala	Pro
Asp ¹⁴⁵	Trp	Val	Lys	Asp	Thr ¹⁵⁰	Val	Trp	Tyr	Gln	Ile ¹⁵⁵	Phe	Pro	Asp	Arg	Phe ¹⁶⁰
Ala	Asn	Gly	Asp	Ser ¹⁶⁵	Thr	Asn	Asp	Pro	Ala ¹⁷⁰	Gly	Thr	Leu	Pro	Trp ¹⁷⁵	Asn
Ser	Thr	Ala	Pro ¹⁸⁰	Thr	Thr	Thr	Asn	Leu ¹⁸⁵	Phe	Gly	Gly	Asp	Phe ¹⁹⁰	Gln	Gly
Val	Ile	Asp ¹⁹⁵	Lys	Ile	Asp	Tyr	Leu ²⁰⁰	Val	Asp	Leu	Gly	Ile ²⁰⁵	Thr	Gly	Ile
Tyr	Phe ²¹⁰	Cys	Pro	Ile	Phe	Glu ²¹⁵	Ala	Lys	Ser	Asn	His ²²⁰	Lys	Tyr	Asp	Thr
Ile ²²⁵	Asp	Tyr	Leu	Glu	Ile ²³⁰	Asp	Pro	Gln	Phe	Gly ²³⁵	Thr	Lys	Glu	Lys	Phe ²⁴⁰
Lys	Glu	Met	Val	Asp ²⁴⁵	Leu	Leu	His	Ala	Asn ²⁵⁰	Gly	Ile	Arg	Ile	Met ²⁵⁵	Leu
Asp	Ala	Val	Phe ²⁶⁰	Asn	His	Ala	Gly	Phe ²⁶⁵	His	His	Lys	Ala	Phe ²⁷⁰	Ala	Asp
Ile	Arg	Glu ²⁷⁵	His	Gly	Ser	Asn	Ser ²⁸⁰	Tyr	Arg	Asp	Trp ²⁸⁵	Phe	His	Leu	
Arg	Asn ²⁹⁰	Phe	Pro	Leu	Val	Thr ²⁹⁵	Glu	Pro	Met	Pro	Asn ³⁰⁰	Tyr	Asp	Thr	Phe
Ala ³⁰⁵	Phe	Val	Pro	Glu	Met ³¹⁰	Pro	Lys	Phe	Asn	Thr ³¹⁵	Glu	Asn	Pro	Glu	Val ³²⁰
Lys	Glu	Tyr	Leu	Leu ³²⁵	His	Val	Ala	Arg	Tyr ³³⁰	Trp	Val	Glu	Glu	Phe ³³⁵	Gly
Ile	Asp	Gly	Trp ³⁴⁰	Arg	Leu	Asp	Val	Ala ³⁴⁵	Asn	Glu	Val	Asp	His ³⁵⁰	Ala	Phe
Trp	Arg	Asp ³⁵⁵	Phe	Arg	Ser	Val	Val ³⁶⁰	Lys	Glu	Ala	Asp	Pro ³⁶⁵	Glu	Thr	Tyr
Ile	Leu	Gly	Glu	Ile	Trp	His ³⁷⁵	Asp	Ser	Gln	Glu	Trp ³⁸⁰	Leu	Leu	Gly	Asp
Gln ³⁸⁵	Phe	Asp	Ala	Val	Met ³⁹⁰	Asn	Tyr	Pro	Phe	Thr ³⁹⁵	Asn	Ala	Ala	Leu	Asn ⁴⁰⁰
Phe	Phe	Ala	Leu	Asp ⁴⁰⁵	Lys	Thr	Ser	Ala	Ser ⁴¹⁰	Thr	Tyr	Ala	Asn	Asp ⁴¹⁵	Met
Ser	His	Val	Leu ⁴²⁰	Phe	Ser	Asn	Thr	Val ⁴²⁵	Asn	Val	Asn	Glu	Val ⁴³⁰	Ser	Phe
Asn	Leu	Ile ⁴³⁵	Gly	Ser	His	Asp	Thr ⁴⁴⁰	Pro	Arg	Ala	Leu	Thr ⁴⁴⁵	Arg	Ala	Gly
Asn	Asp ⁴⁵⁰	Lys	Asn	Lys	Met	Arg ⁴⁵⁵	Leu	Leu	Leu	Ser ⁴⁶⁰	Met	Leu	Thr	Phe	
Ser ⁴⁶⁵	Gly	Ser	Pro	Val	Ile ⁴⁷⁰	Tyr	Tyr	Gly	Asp	Glu ⁴⁷⁵	Ile	Gly	Leu	Asp	Gly ⁴⁸⁰
Asp	Gln	Asp	Pro	Gly ⁴⁸⁵	Cys	Arg	Lys	Cys	Met ⁴⁹⁰	Pro	Trp	Asn	Pro	Glu	Glu ⁴⁹⁵
Gln	Asp	Leu	Asn ⁵⁰⁰	Leu	Leu	Met	Tyr	Thr ⁵⁰⁵	Lys	His	Leu	Leu	Gln ⁵¹⁰	Leu	Arg
Lys	Gln	His ⁵¹⁵	Arg	Thr	Leu	Ala	Asn ⁵²⁰	His	Gly	Gln	Ile	Ser ⁵²⁵	Phe	Val	His
Ala	Asp ⁵³⁰	Asp	Glu	Thr	Asn	Thr ⁵³⁵	Ile	Val	Met	Arg	Arg ⁵⁴⁰	Met	Ser	Gln	Asp
Gly ⁵⁴⁵	Thr	Tyr	Tyr	Val	Tyr ⁵⁵⁰	Phe	Asn	Asn	Ser	Asn ⁵⁵⁵	His	Gln	Ala	Thr	Ile ⁵⁶⁰
Pro	Ala	Pro	Gln	Ser ⁵⁶⁵	Gly	Gln	Gly	Met	Asp ⁵⁷⁰	Leu	Phe	Ser	Asn	Thr ⁵⁷⁵	Pro
Leu	Pro	Ser	Leu ⁵⁸⁰	Glu	Val	Thr	Leu	Ala ⁵⁸⁵	Pro	Tyr	Thr	Gly	Thr ⁵⁹⁰	Ile	Ile
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<211> 1803

<212> DNA

<213> *Frankia* sp. CcI3

<220>

<221> CDS

<222> (1)..(1803)

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gca cgt ctt cgc tgt gcg ggc ccg gtc atg gat tct gag cct ctc	96
Ala Arg Leu Arg Cys Ala Gly Pro Val Val Met Asp Ser Glu Pro Leu	
20 25 30	
agc gaa ccg atc ggc gac cac acc ccc ggc ccg gcc ccc gcc atg ccg	144
Ser Glu Pro Ile Gly Asp His Thr Pro Gly Pro Ala Pro Ala Met Pro	
35 40 45	
gtc ggg ggg act tta cgc gac cca cac tgg ttc aag cga gcc gtg ttc	192
Val Gly Gly Thr Leu Arg Asp Pro His Trp Phe Lys Arg Ala Val Phe	
50 55 60	
tac gag gtg ctc atc cgc ggc ttc gcg gac tcc aac ggc gac ggc acg	240
Tyr Glu Val Leu Ile Arg Gly Phe Ala Asp Ser Asn Gly Asp Gly Thr	
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Gly Asp Ile Arg Gly Leu Ile Ser Arg Leu Asp Tyr Leu Glu Trp Leu	
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Gly Val Asp Cys Leu Trp Leu Leu Pro Ile Tyr Ser Ser Pro Leu Arg	
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Asp Gly Gly Tyr Asp Ile Ser Asp Tyr Phe Gln Ile Leu Pro Glu Phe	
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Gly Asp Leu Gly Asp Phe Val Ser Leu Val Asp Glu Ala His Arg Arg	
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Gly Ile Arg Ile Ile Ala Asp Leu Val Met Asn His Thr Ser Asp Ala	
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His Pro Trp Phe Gln Ala Ser Arg Ser Pro Asp Gly Pro Phe Gly	
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Asp Phe Tyr Val Trp Ser Asp Ser Asp Glu Leu Tyr Pro Asp Ala Arg	
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Ile Ile Phe Val Asp Thr Glu Lys Ser Asn Trp Ser Trp Asp Pro Val	
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Arg Gly Gln Tyr Tyr Trp His Arg Phe Phe Ser His Gln Pro Asp Leu	
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Asn Tyr Asp Asn Pro Glu Val Gln Glu Ala Met Leu Glu Val Leu Arg	
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Phe Trp Leu Asp Leu Gly Ile Asp Gly Phe Arg Leu Asp Ala Val Pro	
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Tyr Leu Tyr Val Arg Glu Asn Thr Asn Gly Glu Asn Leu Pro Glu Thr	
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His Glu Tyr Leu Lys Arg Val Arg Lys Glu Val Asp Ala Lys Tyr Ala	
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Glu Tyr Phe Gly Asn Asp Glu Cys His Met Ala Phe His Phe Pro	
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Ile Ser Glu Ile Leu Ala Gln Thr Pro 345 Gln Ile Pro Pro Asn 350 Cys Gln	
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Trp Gly 355 Ile Phe Leu Arg Asn 360 His 360 Asp Glu Leu Thr 365 Glu Met Val	
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Thr Asp Glu Glu Arg Asp Tyr 375 Met Trp Ala Glu Tyr 380 Ala Lys Asp Pro	
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Arg Met Lys Ala Asn 390 Ile Gly Ile Arg Arg Arg 395 Leu Ala Pro Leu 400	
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Asp Asn Ser Arg Asp 405 Gln Met Glu Leu Phe 410 Thr Ala Leu Leu 415 Leu Ser	
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Leu Pro Gly Ser 420 Pro Val Leu Tyr 425 Gly Asp Glu Ile 430 Gly Met Gly	
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Asp Asn Ile 435 Tyr Leu Gly Asp Arg 440 Asp Ser Val Arg 445 Thr Pro Met Gln	
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Trp Ser Pro Asp Arg Asn Ala 455 Gly Phe Ser Thr Ala 460 Asp Pro Ala Arg	
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Asp Tyr Thr Glu Leu Gly Ala Ser 520 Asn Pro Ser Ile Phe 525 Ala Phe Val	
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Arg Glu Phe Gly Asp Asp Arg 535 Val Leu Cys Val Ala Asn Leu Ser Arg	
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Phe Ala Gln Pro Val Glu 550 Leu Asp Leu Arg Arg 555 Phe Glu Gly Met Val 560	
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Pro Val Glu Leu 565 Gly Arg Val His 570 Phe Pro Pro Ile Gly Glu 575 Leu	
ccc tac ctg ctg aca ctg cca ggt cac gga cat tac tgg ttc gcg gtg	1776
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<213> Frankia sp. CcI3

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Val Gly 50 Thr Leu Arg Asp 55 Pro His Trp Phe Lys 60 Arg Ala Val Phe				

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Gly	Val	Asp	Cys 100	Leu	Trp	Leu	Leu	Pro 105	Ile	Tyr	Ser	Ser	Pro 110	Leu	Arg
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Asp	Phe	Tyr	Val 180	Trp	Ser	Asp	Ser	Asp 185	Glu	Leu	Tyr	Pro	Asp 190	Ala	Arg
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Arg	Gly 210	Gln	Tyr	Tyr	Trp	His 215	Arg	Phe	Phe	Ser	His 220	Gln	Pro	Asp	Leu
Asn 225	Tyr	Asp	Asn	Pro	Glu 230	Val	Gln	Glu	Ala	Met 235	Leu	Glu	Val	Leu	Arg 240
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Tyr	Leu	Tyr	Val 260	Arg	Glu	Asn	Thr	Asn 265	Gly	Glu	Asn	Leu	Pro 270	Glu	Thr
His	Glu	Tyr 275	Leu	Lys	Arg	Val	Arg 280	Lys	Glu	Val	Asp	Ala 285	Lys	Tyr	Ala
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Thr	Asp 370	Glu	Glu	Arg	Asp	Tyr 375	Met	Trp	Ala	Glu	Tyr 380	Ala	Lys	Asp	Pro
Arg 385	Met	Lys	Ala	Asn	Ile 390	Gly	Ile	Arg	Arg	Arg 395	Leu	Ala	Pro	Leu	Leu 400
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Leu	Pro	Gly	Ser 420	Pro	Val	Leu	Tyr	Tyr 425	Gly	Asp	Glu	Ile	Gly 430	Met	Gly
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Lys	Arg	Met	Ile 500	Glu	Val	Arg	Lys	Arg 505	His	Pro	Val	Phe	Gly 510	Leu	Gly
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Phe 545	Ala	Gln	Pro	Val	Glu 550	Leu	Asp	Leu	Arg	Arg 555	Phe	Glu	Gly	Met	Val 560
Pro	Val	Glu	Leu	Leu 565	Gly	Arg	Val	His	Phe 570	Pro	Pro	Ile	Gly	Glu 575	Leu
Pro	Tyr	Leu	Leu 580	Thr	Leu	Pro	Gly	His 585	Gly	His	Tyr	Trp	Phe 590	Ala	Val
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Gln Pro Glu Asp Ser Ser Gly Ala Gly Ser Pro Val Gln Glu Cys Phe
35      40      45
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Leu Arg Leu Trp Val Gln Asp Arg Glu Glu Arg Leu Pro Met Leu Arg
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Val Glu Glu Pro Ile Leu Trp Glu Ile Asn Arg Glu Gly Thr Val Thr
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ggg gaa gag gct att aca ggg gaa ggg gtc ctt acg gga gaa gga gtc      288
Gly Glu Glu Ala Ile Thr Gly Glu Gly Val Leu Thr Gly Glu Gly Val
85      90      95
gtt tat gag gtg gaa tat cct ctt ccc cat gaa ccg gga atc atc tgg      336
Val Tyr Glu Val Glu Tyr Pro Leu Pro His Glu Pro Gly Ile Ile Trp
100      105      110
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Tyr Tyr Phe Ile Phe Arg Ala Gly Gly Glu Thr Cys Phe Tyr Gly Asn
115      120      125
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Asn Gln Glu Glu Leu Gly Gly Val Gly Glu Leu Arg Ser Ser Glu Pro
130      135      140
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Pro Gly Tyr Gln Ile Thr Val Tyr Arg Pro Met Ala Leu Pro Gly Trp
145      150      155      160
tac acc cag ggc atc atg tat cag atc tat gtg gat cgc ttc ttt aac      528
Tyr Thr Gln Gly Ile Met Tyr Gln Ile Tyr Val Asp Arg Phe Phe Asn
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180      185      190
cat ggg gac tgg tct gat acc ccc ttc tat att aaa aat gaa aag ggc      624
His Gly Asp Trp Ser Asp Thr Pro Phe Tyr Ile Lys Asn Glu Lys Gly
195      200      205
gaa gtc cta cgc tgg gat ttt ttc ggc ggc aac ctt gcc ggt gtg atc      672
Glu Val Leu Arg Trp Asp Phe Phe Gly Gly Asn Leu Ala Gly Val Ile
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Lys Lys Leu Pro Tyr Leu Lys Glu Leu Gly Val Ser Ile Leu Tyr Leu
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Ser	Gln	Pro	Gly	Thr	Lys	Gly	Tyr	Leu	Asp	Pro	Gln	Gly	Tyr	Asp	Arg	
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ttt	ata	gaa	gag	aat	cag	gac	tgg	ctg	caa	gac	tac	gct	ctc	tat	aag	2592
Phe	Ile	Glu	Glu	Asn	Gln	Asp	Trp	Leu	Gln	Asp	Tyr	Ala	Leu	Tyr	Lys	
	850					855					860					
tgt	tta	aag	ctt	aag	ttc	ccc	ggc	aag	gcg	tgg	cac	caa	tgg	gaa	gaa	2640
Cys	Leu	Lys	Leu	Lys	Phe	Pro	Gly	Lys	Ala	Trp	His	Gln	Trp	Glu	Glu	
865					870					875					880	
agc	tat	cgc	ttg	cgg	aag	cct	gag	gcc	ctg	gag	gct	gtg	act	gaa	gat	2688
Ser	Tyr	Arg	Leu	Arg	Lys	Pro	Glu	Ala	Leu	Glu	Ala	Val	Thr	Glu	Asp	
				885					890					895		
tat	gcc	gag	gag	ata	aac	tat	att	ttc	ttt	gtt	caa	tat	act	ttc	gct	2736
Tyr	Ala	Glu	Glu	Ile	Asn	Tyr	Ile	Phe	Phe	Val	Gln	Tyr	Thr	Phe	Ala	
			900				905						910			
gat	cag	tgg	caa	agg	ctg	aag	gac	tat	gct	cag	gaa	aaa	ggg	gta	aaa	2784
Asp	Gln	Trp	Gln	Arg	Leu	Lys	Asp	Tyr	Ala	Gln	Glu	Lys	Gly	Val	Lys	
		915					920					925				
ata	atc	ggc	gat	ctg	ccc	att	tat	gtg	gcc	tat	gac	agt	tgc	gac	acc	2832
Ile	Ile	Gly	Asp	Leu	Pro	Ile	Tyr	Val	Ala	Tyr	Asp	Ser	Cys	Asp	Thr	
		930				935					940					
tgg	gct	aac	cgg	gag	tgc	ttt	gct	ctg	gat	gaa	aat	aat	gct	ccc	gca	2880
Trp	Ala	Asn	Arg	Glu	Cys	Phe	Ala	Leu	Asp	Glu	Asn	Asn	Ala	Pro	Ala	
945					950					955					960	
gga	acc	gct	ggg	gtg	ccc	ccc	gac	tat	ttc	aac	cct	gaa	ggg	cag	aac	2928
Gly	Thr	Ala	Gly	Val	Pro	Pro	Asp	Tyr	Phe	Asn	Pro	Glu	Gly	Gln	Asn	
				965					970					975		
tgg	gga	aat	ccc	tta	tac	gat	tgg	gat	gct	ctc	cgg	gcc	gcc	gat	tat	2976
Trp	Gly	Asn	Pro	Leu	Tyr	Asp	Trp	Asp	Ala	Leu	Arg	Ala	Ala	Asp	Tyr	
			980					985					990			
gcc	tgg	tgg	aag	ctg	cgt	ttc	cgg	caa	ggg	ctg	gag	cgc	ttt	gat	gcc	3024
Ala	Trp	Trp	Lys	Leu	Arg	Phe	Arg	Gln	Gly	Leu	Glu	Arg	Phe	Asp	Ala	
		995					1000					1005				
tta	aga	ctg	gat	cat	ttc	cgt	ggc	ttt	gag	ggc	tat	tgg	gaa	gtt	ccc	3072
Leu	Arg	Leu	Asp	His	Phe	Arg	Gly	Phe	Glu	Gly	Tyr	Trp	Glu	Val	Pro	
		1010				1015					1020					
cct	cag	gcc	ggg	agc	gcc	aag	gaa	ggc	cgc	tgg	ctg	aaa	ggg	ccg	ggg	3120
Pro	Gln	Ala	Gly	Ser	Ala	Lys	Glu	Gly	Arg	Trp	Leu	Lys	Gly	Pro	Gly	
				1030					1035					1040		
aaa	gaa	ttt	ttc	gaa	agc	ctg	gtc	cgt	gaa	ttg	ggg	cct	ctg	ccc	gtc	3168

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Lys Glu Phe Phe Glu Ser Leu Val Arg Glu Leu Gly Pro Leu Pro Val
 1045 1050 1055
 atc gct gag gat tta ggg tgc att acc cct gaa gtc aat acc ctg aga 3216
 Ile Ala Glu Asp Leu Gly Cys Ile Thr Pro Glu Val Asn Thr Leu Arg
 1060 1065 1070
 gct att tta gga ttt ccg ggg atg agg gtg acg cag ttt tca ccc ttg 3264
 Ala Ile Leu Gly Phe Pro Gly Met Arg Val Thr Gln Phe Ser Pro Leu
 1075 1080 1085
 cag caa gaa ggg aat tat gtt gat tat tcc gga acc cat gat aac gat 3312
 Gln Gln Glu Gly Asn Tyr Val Asp Tyr Ser Gly Thr His Asp Asn Asp
 1090 1095 1100
 acc ctg ttg ggc tgg tat cgc tcc caa ggc tat agc gat aag gat tcc 3360
 Thr Leu Leu Gly Trp Tyr Arg Ser Gln Gly Tyr Ser Asp Lys Asp Ser
 1105 1110 1115 1120
 ctg gcg caa gtg gaa agg act atc gag gag ctt tat cag ggg aat ggt 3408
 Leu Ala Gln Val Glu Arg Thr Ile Glu Glu Leu Tyr Gln Gly Asn Gly
 1125 1130 1135
 atc tgg gtc att ttc ccc ctt cag gac att ctt aaa ctg gat tcc cgg 3456
 Ile Trp Val Ile Phe Pro Leu Gln Asp Ile Leu Lys Leu Asp Ser Arg
 1140 1145 1150
 gcg agg atg aat act ccc ggc aca att aaa ggg aat tgg cag tgg cgt 3504
 Ala Arg Met Asn Thr Pro Gly Thr Ile Lys Gly Asn Trp Gln Trp Arg
 1155 1160 1165
 gta gaa aga gga acc tta act cag gag gtt tgt gcg cga tta agg ggt 3552
 Val Glu Arg Gly Thr Leu Thr Gln Glu Val Cys Ala Arg Leu Arg Gly
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 Leu Ala Glu Lys Tyr Gly Arg Leu Ser
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 35 40 45
 Leu Arg Leu Trp Val Gln Asp Arg Glu Glu Arg Leu Pro Met Leu Arg
 50 55 60
 Val Glu Glu Pro Ile Leu Trp Glu Ile Asn Arg Glu Gly Thr Val Thr
 65 70 75 80
 Gly Glu Glu Ala Ile Thr Gly Glu Gly Val Leu Thr Gly Glu Gly Val
 85 90 95
 Val Tyr Glu Val Glu Tyr Pro Leu Pro His Glu Pro Gly Ile Ile Trp
 100 105 110
 Tyr Tyr Phe Ile Phe Arg Ala Gly Glu Thr Cys Phe Tyr Gly Asn
 115 120 125
 Asn Gln Glu Glu Leu Gly Gly Val Gly Glu Leu Arg Ser Ser Glu Pro
 130 135 140
 Pro Gly Tyr Gln Ile Thr Val Tyr Arg Pro Met Ala Leu Pro Gly Trp
 145 150 155 160
 Tyr Thr Gln Gly Ile Met Tyr Gln Ile Tyr Val Asp Arg Phe Phe Asn
 165 170 175
 Gly Asp Glu Gln Gly Lys Val Leu Asn Pro Arg Pro Arg Ser Leu Ile
 180 185 190
 His Gly Asp Trp Ser Asp Thr Pro Phe Tyr Ile Lys Asn Glu Lys Gly
 195 200 205
 Glu Val Leu Arg Trp Asp Phe Phe Gly Gly Asn Leu Ala Gly Val Ile
 210 215 220
 Lys Lys Leu Pro Tyr Leu Lys Glu Leu Gly Val Ser Ile Leu Tyr Leu
 225 230 235 240
 Asn Pro Ile Phe Asp Ser Ser Ser Asn His Lys Tyr Asp Thr Gly Asp
 245 250 255
 Tyr Leu Thr Leu Asp Pro Met Tyr Gly Asp Glu Glu Ile Phe Ala Gln

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Leu	Ile	Lys	260 Glu	Ala	Gln	Ser	Leu	265 Gly	Ile	Ala	Ile	Ile	270 Leu	Asp	Gly
Val	Phe	Ser	275 His	Thr	Gly	Asp	280 Asp	Ser	Ile	Tyr	Phe	285 Asn	Arg	Tyr	Gly
Arg	Tyr	Pro	Gly	Leu	Gly	Ala	Tyr	Gln	Ser	Pro	Asp	Ser	Pro	Tyr	Tyr
305 Ser	Trp	Tyr	Gln	Cys	His	Gly	Glu	Gly	Gln	Glu	Lys	Glu	Tyr	Ser	Cys
			325 Ser	Thr	Leu		Pro	Glu	Val	Trp	Glu	Met	Glu	Pro	Ser
Trp	Trp	Gly	340 Phe	Ile	Ile	His	Ser	Pro	Gln	Gly	Val	Leu	Gln	Ser	Trp
Tyr	Arg	Glu	355 Gly	Ile	Lys	Gly	Trp	Arg	Leu	Asp	Val	Ala	Asp	Glu	Leu
Met	Lys	Arg	Glu	Phe	Ile	Gln	Glu	Phe	Arg	Gln	Met	Lys	Thr	Met	Asp
370 Pro	Asp	Glu	Phe	Ile	Gln	390 Ile	Gly	Glu	Val	Trp	Glu	Asp	Pro	Thr	His
385 Pro	Glu	Gly	Val	Leu	Ile	Gly	Glu	Val	Trp	Glu	Asp	Pro	Thr	His	Lys
			405 Gly	Lys	Leu	Arg	Gln	Tyr	Phe	Trp	Gly	Glu	Glu	Leu	Asp
Phe	Ser	Tyr	420 Asn	Tyr	Pro	Leu	Arg	425 Asn	Ile	Phe	Leu	Gln	Tyr	Phe	Leu
Ala	Thr	Met	435 Ile	Asp	Ala	Gly	Gln	Ala	His	Lys	Arg	Ile	Met	Asn	Tyr
Gly	Gln	Ile	Asp	Ala	Gly	Gln	Ala	His	Lys	Arg	Ile	Met	Asn	Leu	Tyr
Glu	Asn	Tyr	Pro	Arg	Glu	Asn	Phe	Phe	Gly	Gln	Met	Asn	Leu	Ile	Gly
465 Ser	His	Asp	Arg	Ala	Arg	Ile	Leu	Thr	Leu	Gly	Glu	Glu	Ala	Pro	Pro
			485 Ser	Ala	Arg	Ile	Leu	Thr	Leu	Gly	Glu	Glu	Ala	Pro	Pro
Pro	Glu	Gln	Leu	Ser	Ala	Val	Glu	Gln	Glu	Gln	Tyr	Arg	Leu	Pro	Ala
			500 Asp	Leu	Ala	Val	Gln	Arg	Leu	Lys	Leu	Leu	Thr	Leu	Leu
Pro	Ala	Arg	Asp	Leu	Ala	Val	Gln	Arg	Leu	Lys	Leu	Leu	Thr	Leu	Leu
			515 Ser	Phe	Pro	Gly	Val	Cys	Leu	Tyr	Tyr	Gly	Asp	Glu	Ala
Gln	Met	Ser	Phe	Pro	Gly	Val	535 Asp	Pro	Tyr	Asn	Arg	Gly	Thr	Tyr	Pro
Gly	Cys	Glu	Gly	Tyr	Pro	Asp	Pro	Tyr	Asn	Arg	Gly	Thr	Tyr	Pro	Trp
545 Gly	Arg	Glu	Asp	Gln	Glu	Ile	Leu	Gln	Trp	Phe	Lys	Arg	Val	Leu	Arg
			565 Tyr	Gln	Glu	Ile	Leu	Gln	Trp	Phe	Lys	Arg	Val	Leu	Arg
Tyr	Arg	Arg	Glu	Tyr	Glu	Val	Leu	Arg	Gln	Gly	Glu	Phe	Ser	Ser	Trp
			580 Lys	Tyr	Glu	Val	Leu	Arg	Gln	Gly	Glu	Phe	Ser	Ser	Trp
Phe	Glu	Gly	Lys	Glu	Ile	Tyr	Val	Leu	Gln	Arg	Lys	Gly	Glu	Lys	Glu
			595 Ile	Tyr	Glu	Val	Leu	Arg	Gln	Arg	Lys	Gly	Glu	Lys	Glu
Glu	Ile	Ile	Val	Leu	Val	Asn	Arg	Ser	Ala	Glu	Glu	Ser	Thr	Glu	Met
Thr	Leu	Lys	Leu	Glu	Gln	Asn	Val	Gly	Gln	Val	Ile	Asp	Ile	Phe	Ala
625 Gly	Glu	Val	Leu	His	Ser	Leu	Ser	Leu	Ile	Leu	Pro	Pro	Leu	Ser	Ala
			645 Phe	Tyr	Gln	Lys	Tyr	Glu	Arg	Gly	His	Tyr	Phe	Lys	Gln
Lys	Ala	Leu	Phe	Tyr	Gln	Lys	Tyr	Glu	Arg	Gly	His	Tyr	Phe	Lys	Gln
			660 Thr	Arg	Ala	Cys	Gly	Ile	Leu	Met	His	Ile	Ser	Ser	Leu
Glu	Ile	Met	Thr	Arg	Ala	Cys	Gly	Ile	Leu	Met	His	Ile	Ser	Ser	Leu
			675 Pro	Arg	Ala	Cys	Gly	Ile	Leu	Met	His	Ile	Ser	Ser	Leu
Pro	Ser	Pro	Trp	Gly	Ile	Gly	Asp	Leu	Gly	Glu	Glu	Ala	Tyr	Ala	Phe
			690 Asp	Gly	Ile	Gly	Asp	Leu	Gly						

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Glu Lys Leu Pro Arg Tyr Pro Leu Asp Leu Ser Ser Pro Glu Gly Gly
 820 825 830
 Ser Gln Pro Gly Thr Lys Gly Tyr Leu Asp Pro Gln Gly Tyr Asp Arg
 835 840 845
 Phe Ile Glu Glu Asn Gln Asp Trp Leu Gln Asp Tyr Ala Leu Tyr Lys
 850 855 860
 Cys Leu Lys Leu Lys Phe Pro Gly Lys Ala Trp His Gln Trp Glu Glu
 865 870 875 880
 Ser Tyr Arg Leu Arg Lys Pro Glu Ala Leu Glu Ala Val Thr Glu Asp
 885 890 895
 Tyr Ala Glu Glu Ile Asn Tyr Ile Phe Phe Val Gln Tyr Thr Phe Ala
 900 905 910
 Asp Gln Trp Gln Arg Leu Lys Asp Tyr Ala Gln Glu Lys Gly Val Lys
 915 920 925
 Ile Ile Gly Asp Leu Pro Ile Tyr Val Ala Tyr Asp Ser Cys Asp Thr
 930 935 940
 Trp Ala Asn Arg Glu Cys Phe Ala Leu Asp Glu Asn Asn Ala Pro Ala
 945 950 955 960
 Gly Thr Ala Gly Val Pro Pro Asp Tyr Phe Asn Pro Glu Gly Gln Asn
 965 970 975
 Trp Gly Asn Pro Leu Tyr Asp Trp Asp Ala Leu Arg Ala Ala Asp Tyr
 980 985 990
 Ala Trp Trp Lys Leu Arg Phe Arg Gln Gly Leu Glu Arg Phe Asp Ala
 995 1000 1005
 Leu Arg Leu Asp His Phe Arg Gly Phe Glu Gly Tyr Trp Glu Val Pro
 1010 1015 1020
 Pro Gln Ala Gly Ser Ala Lys Glu Gly Arg Trp Leu Lys Gly Pro Gly
 1025 1030 1035 1040
 Lys Glu Phe Phe Glu Ser Leu Val Arg Glu Leu Gly Pro Leu Pro Val
 1045 1050 1055
 Ile Ala Glu Asp Leu Gly Cys Ile Thr Pro Glu Val Asn Thr Leu Arg
 1060 1065 1070
 Ala Ile Leu Gly Phe Pro Gly Met Arg Val Thr Gln Phe Ser Pro Leu
 1075 1080 1085
 Gln Gln Glu Gly Asn Tyr Val Asp Tyr Ser Gly Thr His Asp Asn Asp
 1090 1095 1100
 Thr Leu Leu Gly Trp Tyr Arg Ser Gln Gly Tyr Ser Asp Lys Asp Ser
 1105 1110 1115 1120
 Leu Ala Gln Val Glu Arg Thr Ile Glu Glu Leu Tyr Gln Gly Asn Gly
 1125 1130 1135
 Ile Trp Val Ile Phe Pro Leu Gln Asp Ile Leu Lys Leu Asp Ser Arg
 1140 1145 1150
 Ala Arg Met Asn Thr Pro Gly Thr Ile Lys Gly Asn Trp Gln Trp Arg
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 Ala Glu Gly Gly Asp Thr Gly Thr Ser Gln Asp Pro Leu Trp Phe Lys
 20 25 30
 cgg gcc gtg ttc tac gag gtc ctc gtc cgc ggc ttc gcc gac tcc aac
 Arg Ala Val Phe Tyr Glu Val Leu Val Arg Gly Phe Ala Asp Ser Asn
 35 40 45

48

96

144

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Gly	Asp	Gly	Thr	Gly	Asp	Leu	Ala	Gly	Leu	Val	Ser	Lys	Leu	Asp	Tyr	
	50					55					60					
ctc	gag	tgg	ctc	ggc	gtg	gac	tgc	ctg	tgg	ctg	ctg	ccc	atc	tac	tcc	240
Leu	Glu	Trp	Leu	Gly	Val	Asp	Cys	Leu	Trp	Leu	Leu	Pro	Ile	Tyr	Ser	
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tcg	ccg	ctg	cgc	gac	ggc	ggg	tac	gac	atc	agc	gac	tac	ttc	cag	atc	288
Ser	Pro	Leu	Arg	Asp	Gly	Gly	Tyr	Asp	Ile	Ser	Asp	Tyr	Phe	Gln	Ile	
				85				90						95		
ctc	ccc	gag	ttc	ggg	gac	ctg	ggc	gac	ttc	atc	aac	ctc	gtc	gac	gag	336
Leu	Pro	Glu	Phe	Gly	Asp	Leu	Gly	Asp	Phe	Ile	Asn	Leu	Val	Asp	Glu	
			100				105					110				
gcg	cac	cgg	cgc	ggg	cta	cgg	atc	atc	gcc	gac	ctg	gtg	atg	aac	cac	384
Ala	His	Arg	Arg	Gly	Leu	Arg	Ile	Ile	Ala	Asp	Leu	Val	Met	Asn	His	
		115					120					125				
acc	tcc	gac	gag	cac	ccg	tgg	ttc	cag	gcg	tcg	cgc	tcg	gac	ccg	gac	432
Thr	Ser	Asp	Glu	His	Pro	Trp	Phe	Gln	Ala	Ser	Arg	Ser	Asp	Pro	Asp	
	130					135					140					
ggg	ccg	tac	ggc	gac	ttc	gtc	tgg	tcc	gac	acc	gac	gag	aag	tac		480
Gly	Pro	Tyr	Gly	Asp	Phe	Tyr	Val	Trp	Ser	Asp	Thr	Asp	Glu	Lys	Tyr	
145				150					155						160	
ccc	gac	gcc	cgg	atc	atc	ttc	gtc	gac	acc	gag	aag	tcg	aac	tgg	acc	528
Pro	Asp	Ala	Arg	Ile	Ile	Phe	Val	Asp	Thr	Glu	Lys	Ser	Asn	Trp	Thr	
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tgg	gac	ccg	gtg	cgc	ggg	cag	tac	tac	tgg	cac	cgg	ttc	ttc	tcc	cac	576
Trp	Asp	Pro	Val	Arg	Gly	Gln	Tyr	Tyr	Trp	His	Arg	Phe	Phe	Ser	His	
			180				185					190				
cag	ccc	gac	ctc	aac	tac	gac	aac	ccg	gac	gtc	cag	gag	gcg	atg	ctg	624
Gln	Pro	Asp	Leu	Asn	Tyr	Asp	Asn	Pro	Asp	Val	Gln	Glu	Ala	Met	Leu	
		195					200					205				
gag	gtc	ctg	cgc	ttc	tgg	ctc	gac	ctc	ggc	ctc	gac	ggg	ttc	cgc	ctg	672
Glu	Val	Leu	Arg	Phe	Trp	Leu	Asp	Leu	Gly	Leu	Asp	Gly	Phe	Arg	Leu	
	210				215						220					
gac	gcc	gtt	ccc	tac	ctg	tac	gtg	cgc	gag	ggc	acg	aac	ggg	gag	aac	720
Asp	Ala	Val	Pro	Tyr	Leu	Tyr	Val	Arg	Glu	Gly	Thr	Asn	Gly	Glu	Asn	
225				230					235					240		
ctg	ccg	gag	acg	cac	gag	tac	ctg	cgc	cgg	gtc	cgc	aag	gag	atc	gac	768
Leu	Pro	Glu	Thr	His	Glu	Tyr	Leu	Arg	Arg	Val	Arg	Lys	Glu	Ile	Asp	
				245				250						255		
gcc	aag	tac	gcc	gac	agg	gtc	atg	ctg	gcc	gag	gcg	aac	cag	tgg	ccc	816
Ala	Lys	Tyr	Ala	Asp	Arg	Val	Met	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	
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tcg	gac	gtc	gtc	cag	tac	ttc	ggc	aac	gac	gac	gag	tgc	cac	atg	gcc	864
Ser	Asp	Val	Val	Gln	Tyr	Phe	Gly	Asn	Asp	Asp	Glu	Cys	His	Met	Ala	
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Phe	His	Phe	Pro	Leu	Met	Pro	Arg	Ile	Phe	Met	Ala	Val	Arg	Arg	Glu	
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Ser	Arg	Tyr	Pro	Ile	Ser	Glu	Ile	Leu	Ala	Gln	Thr	Pro	Glu	Ile	Pro	
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ccg	aac	tgc	cag	tgg	ggc	atc	ttc	ctg	cgc	aac	cac	gac	gag	ctg	acc	1008
Pro	Asn	Cys	Gln	Trp	Gly	Ile	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	
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ctg	gag	atg	gtc	acc	gac	gag	gag	cgg	gac	tac	atg	tac	gcc	gag	tac	1056
Leu	Glu	Met	Val	Thr	Asp	Glu	Glu	Arg	Asp	Tyr	Met	Tyr	Ala	Glu	Tyr	
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gcg	aag	gac	ccg	cgt	atg	aag	gcg	aac	atc	ggg	atc	cgc	cga	cgc	ctc	1104
Ala	Lys	Asp	Pro	Arg	Met	Lys	Ala	Asn	Ile	Gly	Ile	Arg	Arg	Arg	Leu	
		355					360					365				
gcc	ccg	ctg	ctg	gac	aac	agc	cgc	gac	cag	atg	gag	ctg	ttt	acc	gcc	1152
Ala	Pro	Leu	Leu	Asp	Asn	Ser	Arg	Asp	Gln	Met	Glu	Leu	Phe	Thr	Ala	
		370				375					380					
ctg	ctg	ctc	tcc	ctg	ccc	ggc	agt	ccc	gtg	ctc	tac	tac	ggc	gac	gag	1200
Leu	Leu	Leu	Ser	Leu	Pro	Gly	Ser	Pro	Val	Leu	Tyr	Tyr	Gly	Asp	Glu	
385				390					395						400	
atc	ggt	atg	ggc	gac	aac	atc	tat	ctc	ggt	gac	cgc	gac	ggc	gtg	cgc	1248
Ile	Gly	Met	Gly	Asp	Asn	Ile	Tyr	Leu	Gly	Asp	Arg	Asp	Gly	Val	Arg	
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Thr	Pro	Met	Gln	Trp	Ser	Pro	Asp	Arg	Asn	Ala	Gly	Phe	Ser	Thr	Thr	
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gac	ccg	gcc	cgg	ctg	tac	ctg	ccg	gtg	atc	atg	gac	ccg	gtg	tac	ggc	1344
Asp	Pro	Ala	Arg	Leu	Tyr	Leu	Pro	Val	Ile	Met	Asp	Pro	Val	Tyr	Gly	
		435					440					445				
tac	cag	gcg	ctg	aac	gtc	gag	gcc	gag	cag	cgg	atg	ccg	acg	tcg	ttc	1392
Tyr	Gln	Ala	Leu	Asn	Val	Glu	Ala	Glu	Gln	Arg	Met	Pro	Thr	Ser	Phe	
	450					455					460					
ctg	tct	tgg	acc	agg	cgg	atg	atc	gag	gtc	cgc	aag	cgg	cat	ccc	gtc	1440
Leu	Ser	Trp	Thr	Arg	Arg	Met	Ile	Glu	Val	Arg	Lys	Arg	His	Pro	Val	
465				470						475					480	
ttc	ggg	ctc	ggc	acc	tac	gag	gag	ctc	ggc	gcg	tcg	aat	ccg	tcg	gtc	1488
Phe	Gly	Leu	Gly	Thr	Tyr	Glu	Glu	Leu	Gly	Ala	Ser	Asn	Pro	Ser	Val	
				485					490					495		
ttc	gcg	tat	gtc	cgg	gag	ttc	ggt	gac	gac	agg	gtg	ctc	tgc	gtc	gcg	1536
Phe	Ala	Tyr	Val	Arg	Glu	Phe	Gly	Asp	Asp	Arg	Val	Leu	Cys	Val	Ala	
			500					505					510			
aac	ctc	tcc	cgg	ttc	gcc	cag	ccc	gtc	gag	ctt	gac	ctg	cgg	aga	ttc	1584
Asn	Leu	Ser	Arg	Phe	Ala	Gln	Pro	Val	Glu	Leu	Asp	Leu	Arg	Arg	Phe	
		515					520					525				
gcc	ggc	ctg	gtg	ccg	gtg	gag	ctg	ctc	ggc	cgg	gtc	cat	ttc	cca	ccg	1632
Ala	Gly	Leu	Val	Pro	Val	Glu	Leu	Leu	Gly	Arg	Val	His	Phe	Pro	Pro	
	530					535					540					
gtc	ggc	gag	ctt	ccg	tac	ctg	ctg	aca	ctg	ccc	ggt	cac	gga	cac	tac	1680
Val	Gly	Glu	Leu	Pro	Tyr	Leu	Leu	Thr	Leu	Pro	Gly	His	Gly	His	Tyr	
545					550					555					560	
tgg	ttc	gct	ctg	tcc	aat	ccg	ggg	gaa	ttc	act	cag	tag				1719
Trp	Phe	Ala	Leu	Ser	Asn	Pro	Gly	Glu	Phe	Thr	Gln					
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<210> 328

<211> 572

<212> PRT

<213> Frankia sp. EAN1pec

<400> 328

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Ala	Glu	Gly	Gly	Asp	Thr	Gly	Thr	Ser	Gln	Asp	Pro	Leu	Trp	Phe	Lys	
			20					25					30			
Arg	Ala	Val	Phe	Tyr	Glu	Val	Leu	Val	Arg	Gly	Phe	Ala	Asp	Ser	Asn	
		35					40					45				
Gly	Asp	Gly	Thr	Gly	Asp	Leu	Ala	Gly	Leu	Val	Ser	Lys	Leu	Asp	Tyr	
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Leu	Glu	Trp	Leu	Gly	Val	Asp	Cys	Leu	Trp	Leu	Pro	Ile	Tyr	Ser		
65				70					75					80		
Ser	Pro	Leu	Arg	Asp	Gly	Gly	Tyr	Asp	Ile	Ser	Asp	Tyr	Phe	Gln	Ile	
			85					90						95		
Leu	Pro	Glu	Phe	Gly	Asp	Leu	Gly	Asp	Phe	Ile	Asn	Leu	Val	Asp	Glu	
			100					105					110			
Ala	His	Arg	Arg	Gly	Leu	Arg	Ile	Ile	Ala	Asp	Leu	Val	Met	Asn	His	
		115					120					125				
Thr	Ser	Asp	Glu	His	Pro	Trp	Phe	Gln	Ala	Ser	Arg	Ser	Asp	Pro	Asp	
	130					135					140					
Gly	Pro	Tyr	Gly	Asp	Phe	Tyr	Val	Trp	Ser	Asp	Thr	Asp	Glu	Lys	Tyr	
145				150					155						160	
Pro	Asp	Ala	Arg	Ile	Ile	Phe	Val	Asp	Thr	Glu	Lys	Ser	Asn	Trp	Thr	
			165					170						175		
Trp	Asp	Pro	Val	Arg	Gly	Gln	Tyr	Tyr	Trp	His	Arg	Phe	Phe	Ser	His	
			180				185						190			
Gln	Pro	Asp	Leu	Asn	Tyr	Asp	Asn	Pro	Asp	Val	Gln	Glu	Ala	Met	Leu	
		195					200					205				
Glu	Val	Leu	Arg	Phe	Trp	Leu	Asp	Leu	Gly	Leu	Asp	Gly	Phe	Arg	Leu	
	210					215					220					
Asp	Ala	Val	Pro	Tyr	Leu	Tyr	Val	Arg	Glu	Gly	Thr	Asn	Gly	Glu	Asn	
225				230					235					240		
Leu	Pro	Glu	Thr	His	Glu	Tyr	Leu	Arg	Arg	Val	Arg	Lys	Glu	Ile	Asp	
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Ala Lys Tyr Ala Asp Arg Val Met Leu Ala Glu Ala Asn Gln Trp Pro
 260 265 270
 Ser Asp Val Val Gln Tyr Phe Gly Asn Asp Asp Glu Cys His Met Ala
 275 280 285
 Phe His Phe Pro Leu Met Pro Arg Ile Phe Met Ala Val Arg Arg Glu
 290 295 300
 Ser Arg Tyr Pro Ile Ser Glu Ile Leu Ala Gln Thr Pro Glu Ile Pro
 305 310 315 320
 Pro Asn Cys Gln Trp Gly Ile Phe Leu Arg Asn His Asp Glu Leu Thr
 325 330 335
 Leu Glu Met Val Thr Asp Glu Glu Arg Asp Tyr Met Tyr Ala Glu Tyr
 340 345 350
 Ala Lys Asp Pro Arg Met Lys Ala Asn Ile Gly Ile Arg Arg Arg Leu
 355 360 365
 Ala Pro Leu Leu Asp Asn Ser Arg Asp Gln Met Glu Leu Phe Thr Ala
 370 375 380
 Leu Leu Leu Ser Leu Pro Gly Ser Pro Val Leu Tyr Tyr Gly Asp Glu
 385 390 395 400
 Ile Gly Met Gly Asp Asn Ile Tyr Leu Gly Asp Arg Asp Gly Val Arg
 405 410 415
 Thr Pro Met Gln Trp Ser Pro Asp Arg Asn Ala Gly Phe Ser Thr Thr
 420 425 430
 Asp Pro Ala Arg Leu Tyr Leu Pro Val Ile Met Asp Pro Val Tyr Gly
 435 440 445
 Tyr Gln Ala Leu Asn Val Glu Ala Glu Gln Arg Met Pro Thr Ser Phe
 450 455 460
 Leu Ser Trp Thr Arg Arg Met Ile Glu Val Arg Lys Arg His Pro Val
 465 470 475 480
 Phe Gly Leu Gly Thr Tyr Glu Glu Leu Gly Ala Ser Asn Pro Ser Val
 485 490 495
 Phe Ala Tyr Val Arg Glu Phe Gly Asp Asp Arg Val Leu Cys Val Ala
 500 505 510
 Asn Leu Ser Arg Phe Ala Gln Pro Val Glu Leu Asp Leu Arg Arg Phe
 515 520 525
 Ala Gly Leu Val Pro Val Glu Leu Leu Gly Arg Val His Phe Pro Pro
 530 535 540
 Val Gly Glu Leu Pro Tyr Leu Leu Thr Leu Pro Gly His Gly His Tyr
 545 550 555 560
 Trp Phe Ala Leu Ser Asn Pro Gly Glu Phe Thr Gln
 565 570

<210> 329

<211> 1761

<212> DNA

<213> Moorella thermoacetica ATCC 39073

<220>

<221> CDS

<222> (1)..(1761)

<223> transl_table=11

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1				5				10						15		
gac	cgg	ctc	ctc	ctg	cgc	tta	aaa	att	ggc	cgc	cgg	gaa	cag	caa	agc	96
Asp	Arg	Leu	Leu	Leu	Arg	Leu	Lys	Ile	Gly	Arg	Arg	Glu	Gln	Gln	Ser	
				20				25					30			
tgc	cag	gta	atc	tat	gaa	gac	cgg	ggc	ctt	aaa	acg	gcc	ccc	atg	cat	144
Cys	Gln	Val	Ile	Tyr	Glu	Asp	Arg	Gly	Leu	Lys	Thr	Ala	Pro	Met	His	
				35			40					45				
gcc	tat	gcc	cga	aca	ccc	cgt	tac	ctt	tat	tac	cag	gct	gag	atc	agc	192
Ala	Tyr	Ala	Arg	Thr	Pro	Arg	Tyr	Leu	Tyr	Tyr	Gln	Ala	Glu	Ile	Ser	
				50		55					60					
ctc	tcc	cgt	ccc	tgg	cgc	tgc	cgt	tat	ttt	ttc	cgg	ctg	cgg	gaa	ggg	240
Leu	Ser	Arg	Pro	Trp	Arg	Cys	Arg	Tyr	Phe	Phe	Arg	Leu	Arg	Glu	Gly	
				65		70				75					80	
gat	ggg	gat	gac	cgc	tat	atc	ttt	gcc	ggg	acc	ggc	caa	cag	ggc		288
Asp	Gly	Asp	Asp	Arg	Tyr	Ile	Phe	Ala	Gly	Gly	Thr	Gly	Gln	Gln	Gly	

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				85					90					95					
cgc Arg	ccc Pro	ttt Phe	acc Thr 100	tat Tyr	cag Gln	tgg Trp	acc Thr	ccg Pro 105	gca Ala	gat Asp	atc Ile	ttt Phe	acc Thr 110	gtt Val	ccc Pro	336			
gac Asp	tgg Trp	atc Ile 115	tac Tyr	gac Asp	gcc Ala	gtt Val	tcc Ser 120	tat Tyr	caa Gln	ata Ile	ttt Phe	ccc Pro 125	gat Asp	cgc Arg	ttt Phe	384			
tac Tyr	aac Asn 130	ggc Gly	aac Asn	ccg Pro	gcc Ala	aac Asn 135	gac Asp	ccg Pro	ccg Pro	gga Gly	acc Thr 140	agg Arg	ccc Pro	tgg Trp	agc Ser	432			
gaa Glu 145	gcc Ala	cct Pro	acc Thr	agg Arg	gaa Glu 150	aac Asn	ttc Phe	ttc Phe	ggc Gly	ggc Gly 155	gac Asp	ctg Leu	gag Glu	ggg Gly	atc Ile 160	480			
cag Gln	gcg Ala	aag Lys	ata Ile	ccc Pro 165	tat Tyr	cta Leu	aag Lys	ttt Phe 170	ctg Leu	ggg Gly	gtc Val	aat Asn	gtc Val	ctg Leu 175	tgg Trp	528			
ctc Leu	aac Asn	ccc Pro	att Ile 180	ttt Phe	gcc Ala	gcc Ala	tcc Ser	tcc Ser 185	aac Asn	cat His	cgc Arg	tat Tyr	aac Asn 190	acc Thr	cgc Arg	576			
gat Asp	tac Tyr	ctg Leu 195	gcc Ala	gtg Val	gac Asp	ccg Pro	gcc Ala 200	ctg Leu	gga Gly	gat Asp	acc Thr	gat Asp 205	acc Thr	ctg Leu	cgc Arg	624			
cgc Arg	ctg Leu 210	gtg Val	gca Ala	tcc Ser	ctc Leu	cat His 215	ggc Gly	gcc Ala	ggc Gly	ata Ile	cgc Arg 220	atc Ile	atc Ile	ctg Leu	gat Asp	672			
ggg Gly 225	gtc Val	ttc Phe	aac Asn	cat His	acg Thr 230	ggg Gly	acc Thr	gat Asp	ttc Phe	ttt Phe 235	gct Ala	ttt Phe	aaa Lys	gac Asp	gtg Val 240	720			
gtc Val	gcc Ala	cgg Arg	gga Gly	gcc Ala 245	ggg Gly	tcc Ser	ccg Pro	tat Tyr	aag Lys 250	gac Asp	tgg Trp	tac Tyr	tac Tyr	ttc Phe 255	tat Tyr	768			
gac Asp	ttc Phe	ccg Pro	gta Val 260	cgg Arg	agt Ser	gaa Glu	ccc Pro	cgg Arg 265	gcc Ala	aat Asn	tat Tyr	gcc Ala	tgc Cys 270	tgg Trp	tgg Trp	816			
gat Asp	atc Ile	ccc Pro 275	agc Ser	ctg Leu	ccc Pro	aag Lys	ctc Leu 280	aac Asn	gtc Val	aga Arg	aac Asn	ccc Pro 285	gag Glu	gtt Val	cgt Arg	864			
aat Asn	tac Tyr 290	ctt Leu	ctt Leu	cac His	gtg Val	gcg Ala 295	acc Thr	tac Tyr	tgg Trp	ctg Leu	tgg Trp 300	gat Asp	gcc Ala	ggg Gly	acc Thr	912			
gac Asp 305	ggc Gly	tgg Trp	cgc Arg	ctt Leu	gac Asp 310	gtg Val	ccc Pro	aat Asn	gag Glu	atc Ile 315	gag Glu	ccg Pro	ccc Pro	ttc Phe	tgg Trp 320	960			
cgg Arg	gag Glu	ttt Phe	tac Tyr	cag Gln 325	cag Gln	gtt Val	aaa Lys	ggg Gly	acc Thr 330	aat Asn	ccg Pro	gaa Glu	gcc Ala	tac Tyr 335	att Ile	1008			
gtc Val	ggc Gly	gag Glu	atc Ile 340	tgg Trp	cgc Arg	gac Asp	gcc Ala	cgt Arg 345	ttc Phe	tgg Trp	ctg Leu	aac Asn	ggc Gly 350	cgt Arg	tac Tyr	1056			
ttt Phe	gac Asp	ggg Gly 355	gtg Val	atg Met	aat Asn	tac Tyr	ctc Leu 360	ttc Phe	cgg Arg	gac Asp	ctg Leu	gtc Val 365	ctt Leu	gca Ala	tac Tyr	1104			
ttc Phe	gcc Ala 370	cgg Arg	agg Arg	ctt Leu	ttt Phe	ccc Pro 375	att Ile	tcc Ser	acc Thr	ctg Leu	gat Asp 380	atg Met	ctc Leu	ctg Leu	ggc Gly	1152			
ctg Leu 385	gtg Val	cgc Arg	ctg Leu	cgc Arg	tac Tyr 390	cct Pro	gag Glu	gcg Ala	gcc Ala	aat Asn 395	ttc Phe	gcc Ala	ctg Leu	tta Leu	aac Asn 400	1200			
ctc Leu	ctg Leu	ggc Gly	agc Ser	cat His 405	gac Asp	acg Thr	gcg Ala	cga Arg	att Ile 410	atc Ile	acc Thr	gcc Ala	ttc Phe	cag Gln 415	gaa Glu	1248			
ggg Gly	ttg Leu	gcc Ala	ggc Gly 420	gtt Val	ccc Pro	gga Gly	cac His	tcc Ser 425	ggc Gly	agc Ser	tac Tyr	gcc Ala	gag Glu 430	gcc Ala	gta Val	1296			
gcc Ala	cac His	ctg Leu 435	cga Arg	ccg Pro	gcc Ala	ctc Leu	atc Ile 440	ctg Leu	cag Gln	ctc Leu	acc Thr	tat Tyr 445	ccc Pro	ggg Gly	gcg Ala	1344			
ccc Pro	ctg Leu	atc Ile	tac Tyr	tac Tyr	ggc Gly	gac Asp	gag Glu	gta Val	ggc Gly	ctc Leu	acc Thr	ggc Gly	ggc Gly	ccg Pro	gac Asp	1392			

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450	ccc gac tgc cgc cgg acc	455	atg Met	460	ccc tgg gaa ccc cgg gac tgg gac cgg	1440
Pro Asp Cys Arg Arg	Thr	Pro Trp Glu	Pro Arg Asp Trp Asp Arg			
465	gat ctc ctg aac ttt tac	470	cgg tgc ctg ata agg ttg cgg cac cag ttg	475	agg ttg cgg cac cag ttg	1488
Asp Leu Leu Asn Phe Tyr	Tyr Arg Cys Leu	Ile Arg Leu Arg His Gln Leu				
485	cgg cct ttg cga cgg gga ttt ttc	490	cag ccc ctt ttt acc gac gac cag	495	gac gac cag	1536
Arg Pro Leu Arg Arg Gly Phe Phe	Gln Pro Leu Phe Thr Asp Asp Gln					
500	gcc gag gtc tac gcc tat gcc	505	cgg cgc ctg gag gga gag aag gta att	510	gag aag gta att	1584
Ala Glu Val Tyr Ala Tyr Ala	Arg Arg Leu Glu Gly Glu Lys Val Ile					
515	ata att ctc aat gcc agc gac ctc	520	ccc cag acg gtt acc ctg gcg gca	525	acc ctg gcg gca	1632
Ile Ile Leu Asn Ala Ser Asp	Leu Pro Gln Thr Val Thr Leu Ala Ala					
530	gcc gtc gcg gga ctg gct gag	535	gat agt acc tgg cgg gac ggc ctg agc	540	gac ggc ctg agc	1680
Ala Val Ala Gly Leu Ala Glu	Asp Ser Thr Trp Arg Asp Gly Leu Ser					
545	aac cgc ctc ctg gag gtg aag ggc ggc	550	cag atc agc ctg ccc ctg gac	555	agc ctg ccc ctg gac	1728
Asn Arg Leu Leu Glu Val Lys Gly Gly	Gln Ile Ser Leu Pro Leu Asp					
565	gcc aat tcc ggg gcc gtt ctc tac	570	cag gag taa	575		1761
Ala Asn Ser Gly Ala Val Leu Tyr	Gln Glu					
580		585				

<210> 330

<211> 586

<212> PRT

<213> Moorella thermoacetica ATCC 39073

<400> 330

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Cys Gln Val Ile Tyr Glu Asp Arg Gly Leu Lys Thr Ala Pro Met His	35	40	45	
Ala Tyr Ala Arg Thr Pro Arg Tyr Leu Tyr Tyr Gln Ala Glu Ile Ser	50	55	60	
Leu Ser Arg Pro Trp Arg Cys Arg Tyr Phe Phe Arg Leu Arg Glu Gly	65	70	75	80
Asp Gly Asp Asp Arg Tyr Ile Phe Ala Gly Gly Thr Gly Gln Gln Gly	85	90	95	
Arg Pro Phe Thr Tyr Gln Trp Thr Pro Ala Asp Ile Phe Thr Val Pro	100	105	110	
Asp Trp Ile Tyr Asp Ala Val Ser Tyr Gln Ile Phe Pro Asp Arg Phe	115	120	125	
Tyr Asn Gly Asn Pro Ala Asn Asp Pro Pro Gly Thr Arg Pro Trp Ser	130	135	140	
Glu Ala Pro Thr Arg Glu Asn Phe Phe Gly Gly Asp Leu Glu Gly Ile	145	150	155	160
Gln Ala Lys Ile Pro Tyr Leu Lys Phe Leu Gly Val Asn Val Leu Trp	165	170	175	
Leu Asn Pro Ile Phe Ala Ala Ser Ser Asn His Arg Tyr Asn Thr Arg	180	185	190	
Asp Tyr Leu Ala Val Asp Pro Ala Leu Gly Asp Thr Asp Thr Leu Arg	195	200	205	
Arg Leu Val Ala Ser Leu His Gly Ala Gly Ile Arg Ile Ile Leu Asp	210	215	220	
Gly Val Phe Asn His Thr Gly Thr Asp Phe Phe Ala Phe Lys Asp Val	225	230	235	240
Val Ala Arg Gly Ala Gly Ser Pro Tyr Lys Asp Trp Tyr Tyr Phe Tyr	245	250	255	
Asp Phe Pro Val Arg Ser Glu Pro Arg Ala Asn Tyr Ala Cys Trp Trp	260	265	270	
Asp Ile Pro Ser Leu Pro Lys Leu Asn Val Arg Asn Pro Glu Val Arg	275	280	285	
Asn Tyr Leu Leu His Val Ala Thr Tyr Trp Leu Trp Asp Ala Gly Thr				

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290 295 300
 Asp Gly Trp Arg Leu Asp Val Pro Asn Glu Ile Glu Pro Pro Phe Trp
 305 310 315 320
 Arg Glu Phe Tyr Gln Gln Val Lys Gly Thr Asn Pro Glu Ala Tyr Ile
 325 330 335
 Val Gly Glu Ile Trp Arg Asp Ala Arg Phe Trp Leu Asn Gly Arg Tyr
 340 345 350
 Phe Asp Gly Val Met Asn Tyr Leu Phe Arg Asp Leu Val Ala Tyr
 355 360 365
 Phe Ala Arg Arg Leu Phe Pro Ile Ser Thr Leu Asp Met Leu Leu Gly
 370 375 380
 Leu Val Arg Leu Arg Tyr Pro Glu Ala Ala Asn Phe Ala Leu Leu Asn
 385 390 395 400
 Leu Leu Gly Ser His Asp Thr Ala Arg Ile Ile Thr Ala Phe Gln Glu
 405 410 415
 Gly Leu Ala Gly Val Pro Gly His Ser Gly Ser Tyr Ala Glu Ala Val
 420 425 430
 Ala His Leu Arg Pro Ala Leu Ile Leu Gln Leu Thr Tyr Pro Gly Ala
 435 440 445
 Pro Leu Ile Tyr Tyr Gly Asp Glu Val Gly Leu Thr Gly Gly Pro Asp
 450 455 460
 Pro Asp Cys Arg Arg Thr Met Pro Trp Glu Pro Arg Asp Trp Asp Arg
 465 470 475 480
 Asp Leu Leu Asn Phe Tyr Arg Cys Leu Ile Arg Leu Arg His Gln Leu
 485 490 495
 Arg Pro Leu Arg Arg Gly Phe Phe Gln Pro Leu Phe Thr Asp Asp Gln
 500 505 510
 Ala Glu Val Tyr Ala Tyr Ala Arg Arg Leu Glu Gly Glu Lys Val Ile
 515 520 525
 Ile Ile Leu Asn Ala Ser Asp Leu Pro Gln Thr Val Thr Leu Ala Ala
 530 535 540
 Ala Val Ala Gly Leu Ala Glu Asp Ser Thr Trp Arg Asp Gly Leu Ser
 545 550 555 560
 Asn Arg Leu Leu Glu Val Lys Gly Gly Gln Ile Ser Leu Pro Leu Asp
 565 570 575
 Ala Asn Ser Gly Ala Val Leu Tyr Gln Glu
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<210> 331

<211> 1623

<212> DNA

<213> Shewanella baltica OS155

<220>

<221> CDS

<222> (1)..(1623)

<223> transl_table=11

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ccg cgt agc ctt tta gat acg aat ggt gat ggc gtt ggt gat ttg cgt	96
Pro Arg Ser Leu Leu Asp Thr Asn Gly Asp Gly Val Gly Asp Leu Arg	
20 25 30	
ggc att atc act aag ctg gac tac att gcg agc ctc aat gtc gat gcc	144
Gly Ile Ile Thr Lys Leu Asp Tyr Ile Ala Ser Leu Asn Val Asp Ala	
35 40 45	
atc tgg att tca cct ttc ttt aaa tcg cct atg gca gat ttt ggc tac	192
Ile Trp Ile Ser Pro Phe Phe Lys Ser Pro Met Ala Asp Phe Gly Tyr	
50 55 60	
gac atc agt gat tac cgc gaa gtt gac cct ctt ttt ggc act atg cat	240
Asp Ile Ser Asp Tyr Arg Glu Val Asp Pro Leu Phe Gly Thr Met His	
65 70 75 80	
gat ttc gat gaa ttg att gaa aaa gcc cac ggc tta ggc att aag gtc	288
Asp Phe Asp Glu Leu Ile Glu Lys Ala His Gly Leu Gly Ile Lys Val	
85 90 95	
att atc gat caa gta tta agt cat acc tct gat cag cat gcg tgg ttt	336
Ile Ile Asp Gln Val Leu Ser His Thr Ser Asp Gln His Ala Trp Phe	

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tgg Trp	gcc Ala 130	gat Asp	cct Pro	aag Lys	gaa Glu	gac Asp 135	ggc Gly	act Thr	gcg Ala	cct Pro	aac Asn 140	aac Asn	tgg Trp	ctc Leu	gcg Ala		432		
att Ile 145	ttt Phe	ggc Gly	ggt Gly	tgt Cys	gct Ala 150	tgg Trp	gaa Glu	tgg Trp	gaa Glu	ccg Pro 155	gcg Arg	aga Arg	caa Gln	caa Gln	tac Tyr 160		480		
tat Tyr	tta Leu	cat His	aac Asn	ttc Phe 165	ctg Leu	cgt Arg	agc Ser	cag Gln	ccc Pro 170	gat Asp	atc Ile	aac Asn	ttc Phe	cat His 175	aat Asn		528		
cct Pro	gac Asp	gtg Val	cgc Arg 180	caa Gln	gct Ala	gtg Val	ctg Leu	gat Asp 185	aat Asn	gtc Val	gag Glu	ttc Phe	tgg Trp 190	ctt Leu	aaa Lys		576		
aaa Lys	ggc Gly	gtt Val 195	gat Asp	ggc Gly	ttt Phe	cgc Arg	tta Leu 200	gat Asp	gcg Ala	att Ile	acc Thr 205	ttc Phe	tgt Cys	tat Tyr	cac His		624		
gat Asp	gaa Glu 210	cag Gln	ctc Leu	agg Arg	gac Asp	aat Asn 215	ccg Pro	gca Ala	aaa Lys	cct Pro	aag Lys 220	gat Asp	aaa Lys	cgt Arg	cag Gln		672		
ggc Gly 225	cga Arg	ggt Gly	ttc Phe	agc Ser	gaa Glu 230	gat Asp	aac Asn	ccc Pro	tac Tyr	gcc Ala 235	tat Tyr	caa Gln	tat Tyr	cat His	tac Tyr 240		720		
tac Tyr	aat Asn	aat Asn	gac Asp 245	cgt Arg	ccg Pro	caa Gln	act Thr	atc Ile	gcg Ala 250	ttt Phe	atc Ile	gaa Glu	gac Asp	tta Leu 255	cgc Arg		768		
caa Gln	ctc Leu	att Ile	aat Asn 260	cgt Arg	tat Tyr	cct Pro	ggt Gly 265	gcg Ala	gtg Val	acc Thr	tta Leu	ggt Gly 270	gaa Glu	gtg Val	tct Ser		816		
gca Ala	gaa Glu	gac Asp 275	tct Ser	tta Leu	gct Ala	gtg Val	atg Met 280	gcg Ala	gct Ala	tac Tyr	act Thr 285	aag Lys	ggt Gly	gaa Glu	gat Asp		864		
cgc Arg	ctg Leu 290	cac His	atg Met	gcc Ala	tac Tyr	agt Ser 295	ttt Phe	gag Glu	cta Leu	tta Leu	acc Thr 300	gac Asp	gat Asp	tac Tyr	agt Ser		912		
gct Ala 305	gct Ala	tat Tyr	att Ile	cgc Arg	caa Gln 310	acc Thr	gta Val	gaa Glu	gca Ala	tta Leu 315	gaa Glu	gcg Ala	agc Ser	ata Ile	ggt Gly 320		960		
gat Asp	ggg Gly	tgg Trp	cct Pro	tgt Cys 325	tgg Trp	gct Ala	atc Ile	ggt Gly 330	aat Asn	cat His	gat Asp	gtg Val	cag Gln 335	cgc Arg	gtg Val		1008		
gcg Ala	agt Ser	cgt Arg	tgg Trp 340	ggg Gly	cag Gln	ggc Gly	aaa Lys	cag Gln 345	aat Asn	tca Ser	gac Asp	atg Met	gtc Val 350	aaa Lys	ata Ile		1056		
ctc Leu	aat Asn	gcc Ala 355	atg Met	cta Leu	agt Ser	tca Ser	ctg Leu 360	gcg Arg	ggt Gly	agt Ser	gtg Val 365	tgt Cys	agt Ser	tat Tyr	caa Gln		1104		
ggt Gly	gaa Glu 370	gaa Glu	ctt Leu	ggt Gly	tta Leu	acc Thr 375	gaa Glu	gcg Ala	ccg Pro	att Ile	gaa Glu 380	tac Tyr	cat His	gag Glu	ttg Leu		1152		
caa Gln 385	gat Asp	ccc Pro	ttt Phe	ggc Gly 390	aaa Lys	acc Thr	ttc Phe	tgg Trp	cct Pro	atg Met 395	ttt Phe	aaa Lys	ggc Gly	cgt Arg	gat Asp 400		1200		
ggt Gly	tgc Cys	cgt Arg	acg Thr	cca Pro 405	atg Met	cca Pro	tgg Trp	caa Gln	caa Gln 410	ggc Gly	gcc Ala	gat Asp	ttt Phe	agc Ser 415	ggt Gly		1248		
ttt Phe	agt Ser	gag Glu	gtt Val 420	tca Ser	ccc Pro	tgg Trp	ttg Leu	ccg Pro 425	atc Ile	gcc Ala	cct Pro	gcg Ala	cat His 430	caa Gln	gcg Ala		1296		
tta Leu	gcg Ala	gtg Val 435	gat Asp	gta Val	caa Gln	gaa Glu	tca Ser 440	gat Asp	gca Ala	gat Asp	tcc Ser	atg Met 445	ctt Leu	aac Asn	ggt Gly		1344		
tat Tyr	cga Arg 450	cgt Arg	ttt Phe	ctt Leu	gct Ala	tgg Trp 455	cgt Arg	aaa Lys	tta Leu	cat His	cca Pro 460	gtg Val	ttg Leu	gtt Val	gaa Glu		1392		
ggc Gly	gat Asp	atc Ile	caa Gln	ttt Phe	gtg Val	gat Asp	acc Thr	aac Asn	gag Glu	ccc Pro	atc Ile	ttg Leu	gcc Ala	ttc Phe	atc Ile		1440		

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465	cgc	acc	tta	gga	gag	470	ctc	aaa	ata	ttc	gtc	475	gga	ttc	aac	tta	ggc	480	gat	1488
	Arg	Thr	Leu	Gly	Glu	Leu	Lys	Ile	Phe	Val	Gly	Phe	Asn	Leu	Gly	Asp				
					485						490						495			
	acc	aat	gtt	gag	ttg	gat	tta	tca	cag	ttg	gaa	ttg	ggt	gaa	ata	tta			1536	
	Thr	Asn	Val	Glu	Leu	Asp	Leu	Ser	Gln	Leu	Glu	Leu	Gly	Glu	Ile	Leu				
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	acg	gga	cac	ggc	ctg	aaa	atc	gca	caa	ata	gaa	aac	aat	cag	ctg	aag			1584	
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<211> 540

<212> PRT

<213> Shewanella baltica OS155

<400> 332

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Gly	Ile	Ile	Thr	Lys	Leu	Asp	Tyr	Ile	Ala	Ser	Leu	Asn	Val	Asp	Ala				
		35					40					45							
Ile	Trp	Ile	Ser	Pro	Phe	Phe	Lys	Ser	Pro	Met	Ala	Asp	Phe	Gly	Tyr				
	50				55				60										
Asp	Ile	Ser	Asp	Tyr	Arg	Glu	Val	Asp	Pro	Leu	Phe	Gly	Thr	Met	His				
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Asp	Phe	Asp	Glu	Leu	Ile	Glu	Lys	Ala	His	Gly	Leu	Gly	Ile	Lys	Val				
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Ile	Ile	Asp	Gln	Val	Leu	Ser	His	Thr	Ser	Asp	Gln	His	Ala	Trp	Phe				
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Val	Glu	Ser	Arg	Glu	Ser	Arg	Thr	Asn	Pro	Lys	Ala	Asp	Trp	Tyr	Val				
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Trp	Ala	Asp	Pro	Lys	Glu	Asp	Gly	Thr	Ala	Pro	Asn	Asn	Trp	Leu	Ala				
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Ile	Phe	Gly	Gly	Cys	Ala	Trp	Glu	Trp	Glu	Pro	Arg	Arg	Gln	Gln	Tyr				
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Tyr	Leu	His	Asn	Phe	Leu	Arg	Ser	Gln	Pro	Asp	Ile	Asn	Phe	His	Asn				
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Pro	Asp	Val	Arg	Gln	Ala	Val	Leu	Asp	Asn	Val	Glu	Phe	Trp	Leu	Lys				
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Lys	Gly	Val	Asp	Gly	Phe	Arg	Leu	Asp	Ala	Ile	Thr	Phe	Cys	Tyr	His				
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Gln	Leu	Ile	Asn	Arg	Tyr	Pro	Gly	Ala	Val	Thr	Leu	Gly	Glu	Val	Ser				
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Gly	Glu	Glu	Leu	Gly	Leu	Thr	Glu	Ala	Pro	Ile	Glu	Tyr	His	Glu	Leu				
	370				375						380								
Gln	Asp	Pro	Phe	Gly	Lys	Thr	Phe	Trp	Pro	Met	Phe	Lys	Gly	Arg	Asp				

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	Leu	Ala	Val	Asp	Val	Gln	Glu	Ser	Asp	Ala	Asp	Ser	Met	Leu	Asn	Gly			
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	465					470					475					480			
	Arg	Thr	Leu	Gly	Glu	Leu	Lys	Ile	Phe	Val	Gly	Phe	Asn	Leu	Gly	Asp			
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	Thr	Asn	Val	Glu	Leu	Asp	Leu	Ser	Gln	Leu	Glu	Leu	Gly	Glu	Ile	Leu			
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<211> 1635

<212> DNA

<213> Shewanella amazonensis SB2B

<220>

<221> CDS

<222> (1)..(1635)

<223> transl_table=11

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Pro	Arg	Ser	Leu	Lys	Asp	Ser	Asn	Gly	Asp	Gly	Ile	Gly	Asp	Leu	Gln	
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Gly	Ile	Ile	Glu	Arg	Leu	Asp	Tyr	Ile	Ala	Ser	Leu	Asn	Val	Asp	Ala	
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Asp	Ile	Ser	Asp	Tyr	Leu	Asp	Val	Asp	Pro	Met	Phe	Gly	Thr	Met	Asp	
	65				70					75				80		
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Val	Ile	Asp	Gln	Val	Leu	Ser	His	Thr	Ser	Asp	Glu	His	Ala	Trp	Phe	
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Ala	Glu	Ser	Arg	Gln	Ser	Arg	Asp	Asn	Pro	Lys	Ala	Asp	Trp	Tyr	Val	
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Trp	Ala	Asp	Pro	Arg	Glu	Asp	Gly	Thr	Pro	Pro	Asn	Trp	Leu	Ala		
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Tyr	Leu	His	Asn	Phe	Leu	Lys	Ser	Gln	Pro	Asp	Leu	Asn	Phe	His	Cys	
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Lys	Gly	Val	Asp	Gly	Phe	Arg	Leu	Asp	Ala	Ile	Thr	Phe	Cys	Phe	His	

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Tyr	Asn	Asn	Glu	Arg	Pro	Glu	Thr	Leu	Gly	Phe	Ile	Glu	Asp	Leu	Arg
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Ala	Leu	Ile	Asp	Arg	Tyr	Pro	Gly	Ala	Val	Thr	Leu	Gly	Glu	Val	Ser
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Ser	Glu	Asp	Ser	Leu	Ala	Thr	Met	Ala	Glu	Tyr	Thr	Arg	Gly	Asp	Asn
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Arg	Leu	His	Met	Ala	Tyr	Ser	Phe	Glu	Leu	Leu	Thr	Lys	Asp	Tyr	Ser
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Asp	Gly	Trp	Pro	Cys	Trp	Ala	Ile	Gly	Asn	His	Asp	Val	Glu	Arg	Val
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Gln	Asp	Pro	Phe	Gly	Ile	Ala	Phe	Trp	Pro	Asn	Phe	Lys	Gly	Arg	Asp
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ttc	ggt	gcg	aca	gcc	tct	ggt	gcc	atg	ccc	tgg	tta	ccg	ctg	cca	gaa
Phe	Gly	Ala	Thr	Ala	Ser	Gly	Ala	Met	Pro	Trp	Leu	Pro	Leu	Pro	Glu
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Glu	His	Arg	Ala	Leu	Asn	Val	Ala	Ala	Gln	Ser	Ala	Asn	Pro	Asp	Ser
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Val	Leu	Asn	Gln	Phe	Ser	Arg	Phe	Met	Ala	Trp	Arg	Arg	Thr	Gln	Pro
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Ala	Leu	Val	Thr	Gly	Glu	Ile	Lys	Phe	Ile	Asp	Ser	Lys	Glu	Pro	Val
465					470					475					480
ctg	gcg	ttt	gaa	cgt	gtg	agc	tct	gat	aaa	aaa	gtg	ctt	tgt	gtg	ttc
Leu	Ala	Phe	Glu	Arg	Val	Ser	Ser	Asp	Lys	Lys	Val	Leu	Cys	Val	Phe
				485				490						495	
aat	tta	tct	gat	aag	ccg	caa	acg	atg	act	gtt	cct	ggc	agt	gag	cca
Asn	Leu	Ser	Asp	Lys	Pro	Gln	Thr	Met	Thr	Val	Pro	Gly	Ser	Glu	Pro
			500					505					510		
tgg	aag	ctc	ctt	gaa	ggc	cat	ggg	ctt	gaa	ggt	ggt	agt	ctg	gac	ggc
Trp	Lys	Leu	Leu	Glu	Gly	His	Gly	Leu	Glu	Gly	Gly	Ser	Leu	Asp	Gly
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gct	ggc	act	gtt	cgc	ctt	gca	ccc	cac	ggg	gct	ctg	tta	ctg	ggc	aac
Ala	Gly	Thr	Val	Arg	Leu	Ala	Pro	His	Gly	Ala	Leu	Leu	Leu	Gly	Asn
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<211> 544

<212> PRT

<213> *Shewanella amazonensis* SB2B

<400> 334

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Gly Ile Ile Glu Arg Leu Asp Tyr Ile Ala Ser Leu Asn Val Asp Ala
35      40      45
Ile Trp Ile Ser Pro Phe Phe Arg Ser Pro Met Lys Asp Phe Gly Tyr
50      55      60
Asp Ile Ser Asp Tyr Leu Asp Val Asp Pro Met Phe Gly Thr Met Asp
65      70      75      80
Asp Phe Asp Glu Leu Ile Ala Lys Ala His Ser Leu Gly Leu Lys Val
85      90      95
Val Ile Asp Gln Val Leu Ser His Thr Ser Asp Glu His Ala Trp Phe
100     105     110
Ala Glu Ser Arg Gln Ser Arg Asp Asn Pro Lys Ala Asp Trp Tyr Val
115     120     125
Trp Ala Asp Pro Arg Glu Asp Gly Thr Pro Pro Asn Asn Trp Leu Ala
130     135     140
Ile Phe Gly Gly Cys Ala Trp Glu Trp Glu Pro Arg Arg Gln Gln Tyr
145     150     155     160
Tyr Leu His Asn Phe Leu Lys Ser Gln Pro Asp Leu Asn Phe His Cys
165     170     175
Glu Ala Val Arg Gln Ala Val Leu Asn Asn Val Glu Phe Trp Leu Lys
180     185     190
Lys Gly Val Asp Gly Phe Arg Leu Asp Ala Ile Thr Phe Cys Phe His
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Asp Lys Ala Leu Arg Asp Asn Pro Ala Lys Pro Ala Asp Lys Arg Gln
210     215     220
Gly Arg Gly Phe Ser Glu Asp Asn Pro Tyr Ala Tyr Gln Tyr His Trp
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Tyr Asn Asn Glu Arg Pro Glu Thr Leu Gly Phe Ile Glu Asp Leu Arg
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Ala Leu Ile Asp Arg Tyr Pro Gly Ala Val Thr Leu Gly Glu Val Ser
260     265     270
Ser Glu Asp Ser Leu Ala Thr Met Ala Glu Tyr Thr Arg Gly Asp Asn
275     280     285
Arg Leu His Met Ala Tyr Ser Phe Glu Leu Leu Thr Lys Asp Tyr Ser
290     295     300
Ala Gly Tyr Ile Arg Ser Thr Val Glu Ala Leu Glu Gly Ala Ile Gly
305     310     315     320
Asp Gly Trp Pro Cys Trp Ala Ile Gly Asn His Asp Val Glu Arg Val
325     330     335
Ile Ser Arg Trp Gly Gln Gly Lys Gly Thr Pro Gln Met Ala Lys Met
340     345     350
Leu Ser Ala Met Leu Gly Cys Leu Arg Gly Ser Leu Cys Val Tyr Gln
355     360     365
Gly Glu Glu Leu Gly Leu Thr Glu Ala Asp Ile Pro Phe Asp Ala Leu
370     375     380
Gln Asp Pro Phe Gly Ile Ala Phe Trp Pro Asn Phe Lys Gly Arg Asp
385     390     395     400
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Phe Gly Ala Thr Ala Ser Gly Ala Met Pro Trp Leu Pro Leu Pro Glu
420     425     430
Glu His Arg Ala Leu Asn Val Ala Ala Gln Ser Ala Asn Pro Asp Ser
435     440     445
Val Leu Asn Gln Phe Ser Arg Phe Met Ala Trp Arg Thr Gln Pro
450     455     460
Ala Leu Val Thr Gly Glu Ile Lys Phe Ile Asp Ser Lys Glu Pro Val
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<211> 3297

<212> DNA

<213> Pelodictyon phaeoclathratiforme BU-1

<220>

<221> CDS

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Met	Glu	Asp	Phe	Arg	Glu	Phe	Ile	Glu	Glu	Ala	His	Ser	Leu	Gly	Ile	
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aag	gtg	att	acc	gag	ctg	gtc	gtg	aac	cac	act	tcc	gac	caa	cat	gcc	336
Lys	Val	Ile	Thr	Glu	Leu	Val	Val	Asn	His	Thr	Ser	Asp	Gln	His	Ala	
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Trp	Phe	Gln	Arg	Ala	Arg	Lys	Ala	Pro	Ala	Gly	Ser	Pro	Glu	Arg	Asn	
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Phe	Tyr	Val	Trp	Ser	Asp	Asp	Ser	Ser	Lys	Tyr	Ser	Glu	Ala	Arg	Ile	
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Ile	Phe	Gln	Asp	Phe	Glu	Ala	Ser	Asn	Trp	Thr	Trp	Asp	Pro	Val	Ala	
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Gly	Gln	Tyr	Phe	Trp	His	Arg	Phe	Tyr	His	His	Gln	Pro	Asp	Leu	Asn	
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Phe	Glu	Asn	Pro	Glu	Val	His	Lys	Ala	Leu	Leu	Gly	Val	Leu	Asp	Phe	
			180					185					190			
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Trp	Leu	Gly	Met	Gly	Val	Asp	Gly	Leu	Arg	Leu	Asp	Ala	Val	Pro	Tyr	
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Leu	Tyr	Glu	Glu	Glu	Gly	Ser	Asn	Cys	Glu	Asn	Leu	Pro	Arg	Thr	Tyr	
	210					215					220					
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Glu	Tyr	Leu	Arg	Ala	Leu	Arg	Ser	Tyr	Val	Asp	Glu	His	Tyr	Pro	Asn	
	225				230					235					240	
cgg	atg	ctg	ctt	gcc	gaa	gcc	aac	cag	tgg	cct	gaa	gat	tct	gca	gcc	768
Arg	Met	Leu	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	Glu	Asp	Ser	Ala	Ala	
				245					250					255		
tat	ttt	ggg	acc	ggg	gac	ctc	tgt	cac	atg	aac	ttc	cac	ttt	ccc	ctg	816
Tyr	Phe	Gly	Thr	Gly	Asp	Leu	Cys	His	Met	Asn	Phe	His	Phe	Pro	Leu	
			260					265					270			
atg	ccg	cgc	atg	tat	atg	gcg	ctt	gct	acc	gaa	gat	cgt	ttt	ccc	att	864
Met	Pro	Arg	Met	Tyr	Met	Ala	Leu	Ala	Thr	Glu	Asp	Arg	Phe	Pro	Ile	

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ctc	gat	275	ctg	gaa	cag	aca	280	gaa	att	ccg	gag	285	tgc	cag	tgg	912
Leu	Asp	att	Ile	Leu	Glu	Gln	Thr	Glu	Ile	Pro	Glu	Ile	Cys	Gln	Trp	
	290						295					300				
gct	tcg	ttc	ctt	cg	aat	cat	gat	gag	ctg	acg	ctt	gaa	atg	ggt	act	960
Ala	Ser	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	Thr	
305					310					315					320	
gac	gag	gag	cg	gac	tac	atg	cg	agg	gtc	tat	gcc	aac	gat	ccc	aag	1008
Asp	Glu	Glu	Arg	Asp	Tyr	Met	Arg	Arg	Val	Tyr	Ala	Asn	Asp	Pro	Lys	
				325					330					335		
gcc	cgt	atc	aat	ctt	ggt	atc	cg	cg	cgt	ctt	gca	ccg	ctc	atg	gcc	1056
Ala	Arg	Ile	Asn	Leu	Gly	Ile	Arg	Arg	Arg	Leu	Ala	Pro	Leu	Met	Ala	
			340					345					350			
aat	gat	cg	cg	aag	att	gaa	ctg	atg	aac	atc	atg	ctg	ctc	tca	ctg	1104
Asn	Asp	Arg	Arg	Lys	Ile	Glu	Leu	Met	Asn	Ile	Met	Leu	Leu	Ser	Leu	
		355					360					365				
ccc	gga	act	ccg	gta	ctc	tac	tac	ggt	gac	gaa	att	ggc	atg	ggc	gat	1152
Pro	Gly	Thr	Pro	Val	Leu	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly	Asp	
	370					375					380					
aac	ttt	tat	ctt	ggt	gat	cga	gat	gga	gta	cgt	aca	ccc	atg	cag	tgg	1200
Asn	Phe	Tyr	Leu	Gly	Asp	Arg	Asp	Gly	Val	Arg	Thr	Pro	Met	Gln	Trp	
385				390				395							400	
aac	tct	gac	cgt	aat	gca	ggg	ttt	tcg	cgt	gcc	aat	ccc	cag	cg	ctg	1248
Asn	Ser	Asp	Arg	Asn	Ala	Gly	Phe	Ser	Arg	Ala	Asn	Pro	Gln	Arg	Leu	
				405				410						415		
cag	ctc	ccg	gtc	atc	atc	gat	ccg	gaa	tat	cat	tat	gag	gcg	gtc	aac	1296
Gln	Leu	Pro	Val	Ile	Ile	Asp	Pro	Glu	Tyr	His	Tyr	Glu	Ala	Val	Asn	
			420					425					430			
gta	gag	gtg	cag	gag	agc	aat	gtc	aac	tcc	ctg	ctc	tgg	tgg	atg	cg	1344
Val	Glu	Val	Gln	Glu	Ser	Asn	Val	Asn	Ser	Leu	Leu	Trp	Trp	Met	Arg	
		435					440					445				
cat	acc	ata	tca	act	gct	cat	cg	tac	aaa	tcg	ctc	agc	cgt	ggt	acc	1392
His	Thr	Ile	Ser	Thr	Ala	His	Arg	Tyr	Lys	Ser	Leu	Ser	Arg	Gly	Thr	
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att	gag	ttc	ctg	cag	gtg	agc	aac	ccc	aaa	gtg	ctg	att	ttt	att	cgt	1440
Ile	Glu	Phe	Leu	Gln	Val	Ser	Asn	Pro	Lys	Val	Leu	Ile	Phe	Ile	Arg	
465					470					475					480	
cag	ttc	gag	gat	gaa	acc	atg	ctt	agt	gtg	atc	aac	ctc	tca	aga	aat	1488
Gln	Phe	Glu	Asp	Glu	Thr	Met	Leu	Ser	Val	Ile	Asn	Leu	Ser	Arg	Asn	
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gcc	cag	gcg	gtg	att	gat	cta	tcc	cg	ttt	gac	ggc	tat	atc	cct		1536
Ala	Gln	Ala	Val	Met	Ile	Asp	Leu	Ser	Arg	Phe	Asp	Gly	Tyr	Ile	Pro	
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gaa	gag	gtg	ttc	agc	atg	aac	cgt	ttt	ccg	aaa	atc	agg	aaa	att	ccc	1584
Glu	Glu	Val	Phe	Ser	Met	Asn	Arg	Phe	Pro	Lys	Ile	Arg	Lys	Ile	Pro	
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tac	atg	gtg	gcc	ctg	gga	tcc	tat	gga	tat	ttc	tgg	ttg	cag	ttg	gtc	1632
Tyr	Met	Val	Ala	Leu	Gly	Ser	Tyr	Gly	Tyr	Phe	Trp	Leu	Gln	Leu	Val	
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aag	gat	acc	gaa	aat	acg	gat	ggt	cgt	cca	tac	ctc	gac	aaa	cct	ttt	1680
Lys	Asp	Thr	Glu	Asn	Thr	Asp	Gly	Arg	Pro	Tyr	Leu	Asp	Lys	Pro	Phe	
	545				550					555					560	
gcg	aca	ccc	tct	cg	tgg	caa	agc	ctc	ttt	acc	ggc	aaa	agc	cg	gaa	1728
Ala	Thr	Pro	Ser	Arg	Trp	Gln	Ser	Leu	Phe	Thr	Gly	Lys	Ser	Arg	Glu	
			565					570						575		
cgg	ctt	gaa	aca	gag	att	ctg	ccc	cag	tac	ttc	aag	gta	agc	cg	tgg	1776
Arg	Leu	Glu	Thr	Glu	Ile	Leu	Pro	Gln	Tyr	Phe	Lys	Val	Ser	Arg	Trp	
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ttt	ggc	ggc	aag	gtg	cgt	cat	atc	atg	cgt	atc	tcc	atc	gtc	gat	acc	1824
Phe	Gly	Gly	Lys	Val	Arg	His	Ile	Met	Arg	Ile	Ser	Ile	Val	Asp	Thr	
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Ile	Pro	Val	Ala	Gly	Met	Ala	Lys	Ala	Lys	Leu	Leu	Val	Thr	Glu	Val	
	610					615					620					
cg	tat	tca	agt	ggt	gag	aat	gaa	cg	tat	caa	ctc	ccg	gta	tgc	ttt	1920
Arg	Tyr	Ser	Ser	Gly	Glu	Asn	Glu	Arg	Tyr	Gln	Leu	Pro	Val	Cys	Phe	
	625				630					635					640	
tct	ccg	ctt	tcc	ctg	gtt	tct	ctc	cag	gat	aat	ttc	tac	aag	cg		1968
Ser	Pro	Leu	Ser	Leu	Val	Ser	Leu	Gln	Asp	Asp	Asn	Phe	Tyr	Lys	Arg	

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				645					650					655					
gtt	att	gca	agg	gtc	gtt	att	ggc	gat	gaa	gag	ggt	tat	ctg	tgc	gac		2016		
Val	Ile	Ala	Arg	Val	Val	Ile	Gly	Asp	Glu	Glu	Gly	Tyr	Leu	Cys	Asp				
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gcc	acc	ttt	gat	ggg	cgt	ttc	ctg	aac	cat	ctc	tat	cag	ctt	gtt	acc		2064		
Ala	Thr	Phe	Asp	Gly	Arg	Phe	Leu	Asn	His	Leu	Tyr	Gln	Leu	Val	Thr				
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ggc	aag	gag	agt	tgg	cag	ggg	aaa	gag	ggc	act	ggt	tcc	gga	atg	aag		2112		
Gly	Lys	Glu	Ser	Trp	Gln	Gly	Lys	Glu	Gly	Thr	Val	Ser	Gly	Met	Lys				
				690					695					700					
tcc	atg	aag	atg	gat	gct	gtt	gcg	gaa	gag	gga	atg	gag	cat	gag	ccc		2160		
Ser	Met	Lys	Met	Asp	Ala	Val	Ala	Glu	Glu	Gly	Met	Glu	His	Glu	Pro				
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ctc	ctg	atg	ggg	gtc	gaa	caa	tcg	aat	acc	tca	att	cg	ttc	aat	aat		2208		
Leu	Leu	Met	Gly	Val	Glu	Gln	Ser	Asn	Thr	Ser	Ile	Arg	Phe	Asn	Asn				
				725					730					735					
gat	ctc	tgc	ctg	aag	ctc	tat	cg	cg	att	gaa	atc	gga	atc	tct	ccc		2256		
Asp	Leu	Cys	Leu	Lys	Leu	Tyr	Arg	Arg	Ile	Glu	Ile	Gly	Ile	Ser	Pro				
				740					745					750					
gaa	gtg	gag	atg	tgc	cgt	gcg	ctg	agt	gag	cat	act	tcg	ttc	aaa	aac		2304		
Glu	Val	Glu	Met	Cys	Arg	Ala	Leu	Ser	Glu	His	Thr	Ser	Phe	Lys	Asn				
				755					760					765					
ctg	ccg	ggc	tat	ctt	ggg	tca	ctg	aac	tat	gag	cag	agt	cg	acc	aac		2352		
Leu	Pro	Gly	Tyr	Leu	Gly	Ser	Leu	Asn	Tyr	Glu	Gln	Ser	Arg	Thr	Asn				
				770					775					780					
ggc	tat	tct	ctc	ggg	att	ttg	cag	cat	ttt	gtg	aaa	aac	gaa	ggg	gat		2400		
Gly	Tyr	Ser	Leu	Gly	Ile	Leu	Gln	His	Phe	Val	Lys	Asn	Glu	Gly	Asp				
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gcc	tgg	cag	ctt	tcg	ctt	agt	cag	gtg	aaa	cg	tat	tat	gat	gat	atc		2448		
Ala	Trp	Gln	Leu	Ser	Leu	Ser	Gln	Val	Lys	Arg	Tyr	Tyr	Asp	Asp	Ile				
				805					810					815					
ctt	gca	aaa	atc	aac	tcc	ggc	atg	gta	ttg	cct	gcg	ttg	ccg	aaa	ctc		2496		
Leu	Ala	Lys	Ile	Asn	Ser	Gly	Met	Val	Leu	Pro	Ala	Leu	Pro	Lys	Leu				
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agt	ggg	gat	ccc	gtg	cag	ctt	ccc	gaa	atc	atg	cat	gaa	ctg	att	ggg		2544		
Ser	Gly	Asp	Pro	Val	Gln	Leu	Pro	Glu	Ile	Met	His	Glu	Leu	Ile	Gly				
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gaa	gcc	tat	ctt	ggc	atg	ctt	gaa	aag	ctt	gca	gaa	cg	act	gct	gaa		2592		
Glu	Ala	Tyr	Leu	Gly	Met	Leu	Glu	Lys	Leu	Ala	Glu	Arg	Thr	Ala	Glu				
				850					855					860					
atg	cac	ctc	tcc	ctt	gct	tcg	ctc	gac	agc	gat	ccg	gca	ttt	gcg	cca		2640		
Met	His	Leu	Ser	Leu	Ala	Ser	Leu	Asp	Ser	Asp	Pro	Ala	Phe	Ala	Pro				
				865					870					875					
gag	gct	ttt	act	aca	ctc	tat	cag	cgt	tct	atc	tac	cag	gcg	atg	tgc		2688		
Glu	Ala	Phe	Thr	Thr	Leu	Tyr	Gln	Arg	Ser	Ile	Tyr	Gln	Ala	Met	Cys				
				885					890					895					
gaa	cag	gtg	aag	cg	gcg	gtt	ctt	ctt	atc	cgt	gaa	atc	atg	cat	cag		2736		
Glu	Gln	Val	Lys	Arg	Ala	Val	Leu	Leu	Ile	Arg	Glu	Ile	Met	His	Gln				
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atg	gct	ccg	gag	cag	cag	cag	ctt	gca	tct	ctt	ttt	gtg	cag	agg	cag		2784		
Met	Ala	Pro	Glu	Gln	Gln	Gln	Leu	Ala	Ser	Leu	Phe	Val	Gln	Arg	Gln				
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aaa	cag	att	ttg	cag	cag	ttt	gat	ccc	atc	agg	ata	gag	aaa	atc	gat		2832		
Lys	Gln	Ile	Leu	Gln	Gln	Phe	Asp	Pro	Ile	Arg	Ile	Glu	Lys	Ile	Asp				
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aca	ctc	aaa	atc	agg	att	cac	ggc	gat	ttt	cat	ctt	ggc	cag	gta	ctc		2880		
Thr	Leu	Lys	Ile	Arg	Ile	His	Gly	Asp	Phe	His	Leu	Gly	Gln	Val	Leu				
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ttt	acc	ggc	aag	gat	ttt	gtg	att	atc	gat	ttt	gag	gga	gag	cct	gcc		2928		
Phe	Thr	Gly	Lys	Asp	Phe	Val	Ile	Ile	Asp	Phe	Glu	Gly	Glu	Pro	Ala				
				965					970					975					
cg	ccc	ctc	tcc	gaa	cg	aaa	atc	aaa	cg	tcg	gtt	ttc	cg	gat	att		2976		
Arg	Pro	Leu	Ser	Glu	Arg	Lys	Ile	Lys	Arg	Ser	Val	Phe	Arg	Asp	Ile				
				980					985					990					
tca	ggc	atg	ttg	cg	tcc	ttc	gac	tat	gcg	gcc	ttt	aat	gtg	ctg	cag		3024		
Ser	Gly	Met	Leu	Arg	Ser	Phe	Asp	Tyr	Ala	Ala	Phe	Asn	Val	Leu	Gln				
				995					1000					1005					
cag	gac	aac	acc	ctc	ttc	cgt	ccg	gaa	gag	cg	ctt	gcc	ctt	gag	cct		3072		
Gln	Asp	Asn	Thr	Leu	Phe	Arg	Pro	Glu	Glu	Arg	Leu	Ala	Leu	Glu	Pro				

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1010	1015	1020	
tgg gct gac cgc tgg agt ttc tat gct ggc cag tac ttt ctc gac agc			3120
Trp Ala Asp Arg Trp Ser Phe Tyr Ala Gly Gln Tyr Phe Leu Asp Ser			
1025	1030	1035	1040
tat ttt gca aag acc gga ggc agt aat att gtt ccg gca gat ccg aag			3168
Tyr Phe Ala Lys Thr Gly Gly Ser Asn Ile Val Pro Ala Asp Pro Lys			
1045	1050	1055	
cag cgt gaa cat ctg atg cgg gcc tat ttg atg aac aag gcg gtc tac			3216
Gln Arg Glu His Leu Met Arg Ala Tyr Leu Met Asn Lys Ala Val Tyr			
1060	1065	1070	
gaa ctc aat tat gag ctc aac aat cgt cct gac tgg gcc tcc ata ccg			3264
Glu Leu Asn Tyr Glu Leu Asn Asn Arg Pro Asp Trp Ala Ser Ile Pro			
1075	1080	1085	
ctt cgg ggt att atg aag att ctg gag tcg taa			3297
Leu Arg Gly Ile Met Lys Ile Leu Glu Ser			
1090	1095		

<210> 336

<211> 1098

<212> PRT

<213> Pelodictyon phaeoclathratiforme BU-1

<400> 336

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Ala His Val Lys Thr Phe Tyr Asp Ser Asn Asn Asp Gly Val Gly Asp	
	20
Phe Gln Gly Leu Arg Gln Lys Leu Gly Tyr Leu Gln Ser Leu Gly Val	
	35
Thr Ala Ile Trp Leu Leu Pro Phe Tyr Pro Ser Pro Leu Arg Asp Asp	
	50
Gly Tyr Asp Ile Ala Asp Tyr Met Ser Val Asn Pro Asp Tyr Gly Thr	
65	70
Met Glu Asp Phe Arg Glu Phe Ile Glu Glu Ala His Ser Leu Gly Ile	
	85
Lys Val Ile Thr Glu Leu Val Val Asn His Thr Ser Asp Gln His Ala	
	100
Trp Phe Gln Arg Ala Arg Lys Ala Pro Ala Gly Ser Pro Glu Arg Asn	
	115
Phe Tyr Val Trp Ser Asp Asp Ser Ser Lys Tyr Ser Glu Ala Arg Ile	
	130
Ile Phe Gln Asp Phe Glu Ala Ser Asn Trp Thr Trp Asp Pro Val Ala	
145	150
Gly Gln Tyr Phe Trp His Arg Phe Tyr His His Gln Pro Asp Leu Asn	
	165
Phe Glu Asn Pro Glu Val His Lys Ala Leu Leu Gly Val Leu Asp Phe	
	180
Trp Leu Gly Met Gly Val Asp Gly Leu Arg Leu Asp Ala Val Pro Tyr	
	195
Leu Tyr Glu Glu Glu Gly Ser Asn Cys Glu Asn Leu Pro Arg Thr Tyr	
	210
Glu Tyr Leu Arg Ala Leu Arg Ser Tyr Val Asp Glu His Tyr Pro Asn	
225	230
Arg Met Leu Leu Ala Glu Ala Asn Gln Trp Pro Glu Asp Ser Ala Ala	
	245
Tyr Phe Gly Thr Gly Asp Leu Cys His Met Asn Phe His Phe Pro Leu	
	260
Met Pro Arg Met Tyr Met Ala Leu Ala Thr Glu Asp Arg Phe Pro Ile	
	275
Leu Asp Ile Leu Glu Gln Thr Pro Glu Ile Pro Glu Ile Cys Gln Trp	
	290
Ala Ser Phe Leu Arg Asn His Asp Glu Leu Thr Leu Glu Met Val Thr	
305	310
Asp Glu Glu Arg Asp Tyr Met Arg Arg Val Tyr Ala Asn Asp Pro Lys	
	325
Ala Arg Ile Asn Leu Gly Ile Arg Arg Arg Leu Ala Pro Leu Met Ala	
	340
Asn Asp Arg Arg Lys Ile Glu Leu Met Asn Ile Met Leu Ser Leu	
	355
	360
	365

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Pro	Gly	Thr	Pro	Val	Leu	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Gly	Asp
370	370					375					380				
Asn	Phe	Tyr	Leu	Gly	Asp	Arg	Asp	Gly	Val	Arg	Thr	Pro	Met	Gln	Trp
385					390					395					400
Asn	Ser	Asp	Arg	Asn	Ala	Gly	Phe	Ser	Arg	Ala	Asn	Pro	Gln	Arg	Leu
				405					410					415	
Gln	Leu	Pro	Val	Ile	Ile	Asp	Pro	Glu	Tyr	His	Tyr	Glu	Ala	Val	Asn
			420					425					430		
Val	Glu	Val	Gln	Glu	Ser	Asn	Val	Asn	Ser	Leu	Leu	Trp	Trp	Met	Arg
		435					440					445			
His	Thr	Ile	Ser	Thr	Ala	His	Arg	Tyr	Lys	Ser	Leu	Ser	Arg	Gly	Thr
	450					455					460				
Ile	Glu	Phe	Leu	Gln	Val	Ser	Asn	Pro	Lys	Val	Leu	Ile	Phe	Ile	Arg
465					470					475					480
Gln	Phe	Glu	Asp	Glu	Thr	Met	Leu	Ser	Val	Ile	Asn	Leu	Ser	Arg	Asn
				485					490					495	
Ala	Gln	Ala	Val	Met	Ile	Asp	Leu	Ser	Arg	Phe	Asp	Gly	Tyr	Ile	Pro
			500					505					510		
Glu	Glu	Val	Phe	Ser	Met	Asn	Arg	Phe	Pro	Lys	Ile	Arg	Lys	Ile	Pro
		515					520					525			
Tyr	Met	Val	Ala	Leu	Gly	Ser	Tyr	Gly	Tyr	Phe	Trp	Leu	Gln	Leu	Val
	530					535					540				
Lys	Asp	Thr	Glu	Asn	Thr	Asp	Gly	Arg	Pro	Tyr	Leu	Asp	Lys	Pro	Phe
545					550					555					560
Ala	Thr	Pro	Ser	Arg	Trp	Gln	Ser	Leu	Phe	Thr	Gly	Lys	Ser	Arg	Glu
				565					570					575	
Arg	Leu	Glu	Thr	Glu	Ile	Leu	Pro	Gln	Tyr	Phe	Lys	Val	Ser	Arg	Trp
			580					585					590		
Phe	Gly	Gly	Lys	Val	Arg	His	Ile	Met	Arg	Ile	Ser	Ile	Val	Asp	Thr
		595					600					605			
Ile	Pro	Val	Ala	Gly	Met	Ala	Lys	Ala	Lys	Leu	Leu	Val	Thr	Glu	Val
	610					615					620				
Arg	Tyr	Ser	Ser	Gly	Glu	Asn	Glu	Arg	Tyr	Gln	Leu	Pro	Val	Cys	Phe
625					630					635					640
Ser	Pro	Leu	Ser	Leu	Val	Ser	Leu	Gln	Asp	Asn	Phe	Tyr	Lys	Arg	
				645					650				655		
Val	Ile	Ala	Arg	Val	Val	Ile	Gly	Asp	Glu	Glu	Gly	Tyr	Leu	Cys	Asp
			660					665					670		
Ala	Thr	Phe	Asp	Gly	Arg	Phe	Leu	Asn	His	Leu	Tyr	Gln	Leu	Val	Thr
		675					680					685			
Gly	Lys	Glu	Ser	Trp	Gln	Gly	Lys	Glu	Gly	Thr	Val	Ser	Gly	Met	Lys
	690					695					700				
Ser	Met	Lys	Met	Asp	Ala	Val	Ala	Glu	Glu	Gly	Met	Glu	His	Glu	Pro
705					710					715					720
Leu	Leu	Met	Gly	Val	Glu	Gln	Ser	Asn	Thr	Ser	Ile	Arg	Phe	Asn	Asn
				725					730					735	
Asp	Leu	Cys	Leu	Lys	Leu	Tyr	Arg	Arg	Ile	Glu	Ile	Gly	Ile	Ser	Pro
			740					745					750		
Glu	Val	Glu	Met	Cys	Arg	Ala	Leu	Ser	Glu	His	Thr	Ser	Phe	Lys	Asn
		755					760					765			
Leu	Pro	Gly	Tyr	Leu	Gly	Ser	Leu	Asn	Tyr	Glu	Gln	Ser	Arg	Thr	Asn
	770					775					780				
Gly	Tyr	Ser	Leu	Gly	Ile	Leu	Gln	His	Phe	Val	Lys	Asn	Glu	Gly	Asp
785					790					795					800
Ala	Trp	Gln	Leu	Ser	Leu	Ser	Gln	Val	Lys	Arg	Tyr	Tyr	Asp	Asp	Ile
				805					810					815	
Leu	Ala	Lys	Ile	Asn	Ser	Gly	Met	Val	Leu	Pro	Ala	Leu	Pro	Lys	Leu
			820					825					830		
Ser	Gly	Asp	Pro	Val	Gln	Leu	Pro	Glu	Ile	Met	His	Glu	Leu	Ile	Gly
		835					840					845			
Glu	Ala	Tyr	Leu	Gly	Met	Leu	Glu	Lys	Leu	Ala	Glu	Arg	Thr	Ala	Glu
	850					855					860				
Met	His	Leu	Ser	Leu	Ala	Ser	Leu	Asp	Ser	Asp	Pro	Ala	Phe	Ala	Pro
865					870					875					880
Glu	Ala	Phe	Thr	Thr	Leu	Tyr	Gln	Arg	Ser	Ile	Tyr	Gln	Ala	Met	Cys
				885					890					895	
Glu	Gln	Val	Lys	Arg	Ala	Val	Leu	Leu	Ile	Arg	Glu	Ile	Met	His	Gln
			900					905					910		
Met	Ala	Pro	Glu	Gln	Gln	Gln	Leu	Ala	Ser	Leu	Phe	Val	Gln	Arg	Gln

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Lys Gln⁹¹⁵ Leu Gln Gln Phe⁹²⁰ Asp Pro Ile Arg Ile⁹²⁵ Glu Lys Ile Asp
 930 Thr Leu Lys Ile Arg Ile His⁹³⁵ Gly Asp Phe His⁹⁴⁰ Leu Gly Gln Val Leu
 945 Phe Thr Gly Lys Asp⁹⁵⁰ Phe Val Ile Ile Asp⁹⁵⁵ Phe Glu Gly Glu Pro Ala
 Arg Pro Leu Ser⁹⁶⁵ Glu Arg Lys Ile Lys⁹⁷⁰ Arg Ser Val Phe Arg⁹⁷⁵ Asp Ile
 Ser Gly Met⁹⁸⁰ Leu Arg Ser Phe Asp Tyr Ala Ala Phe Asn⁹⁹⁰ Val Leu Gln
 995 Gln Asp Asn Thr Leu Phe Arg Pro Glu Glu Arg Leu Ala Leu Glu Pro
 1010 Trp Ala Asp Arg Trp Ser¹⁰¹⁵ Phe Tyr Ala Gly Gln Tyr Phe Leu Asp Ser
 1025 Tyr Phe Ala Lys Thr¹⁰³⁰ Gly Gly Ser Asn Ile Val Pro Ala Asp Pro Lys
 Gln Arg Glu His¹⁰⁴⁵ Leu Met Arg Ala Tyr¹⁰⁵⁰ Leu Met Asn Lys Ala Val Tyr
 1060 Glu Leu Asn Tyr Glu Leu Asn Asn¹⁰⁶⁵ Arg Pro Asp Trp Ala Ser Ile Pro
 1075 Leu Arg Gly Ile Met Lys Ile¹⁰⁸⁰ Leu Glu Ser
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ata ttt tta acg ttc ttc ttc att cat aat tat ttt tat cgg gat ttt	96
Ile Phe Leu Thr Phe Phe Phe Ile His Asn Tyr Phe Tyr Arg Asp Phe	
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atg ccg aaa aca cgc aca acc ggc cag cct gag ccg caa tgg tac aag	144
Met Pro Lys Thr Arg Thr Thr Gly Gln Pro Glu Pro Gln Trp Tyr Lys	
35 40 45	
gat gcc atc att tat gaa gcg cat gtc aaa aca ttt ttt gac agc aac	192
Asp Ala Ile Ile Tyr Glu Ala His Val Lys Thr Phe Phe Asp Ser Asn	
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aat gac ggt gtc ggt gat ttt gag ggg ctt cgt cag aag ctg ccc tat	240
Asn Asp Gly Val Gly Asp Phe Glu Gly Leu Arg Gln Lys Leu Pro Tyr	
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Leu Glu Ser Leu Gly Ile Thr Ala Ile Trp Leu Leu Pro Phe Tyr Pro	
85 90 95	
tct ccg ctg aga gat gat ggg tat gat att gcc gat tat atg gat atc	336
Ser Pro Leu Arg Asp Asp Gly Tyr Asp Ile Ala Asp Tyr Met Asp Ile	
100 105 110	
aat ccc gat tac ggt acg atc gac gat ttt aga gca ttt ctc aat gaa	384
Asn Pro Asp Tyr Gly Thr Ile Asp Asp Phe Arg Ala Phe Leu Asn Glu	
115 120 125	
gcg cat gag cgc ggg ctg aaa gtt att acc gag ctg gtt atc aac cat	432
Ala His Glu Arg Gly Leu Lys Val Ile Thr Glu Leu Val Ile Asn His	
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acc tcc gat cag cat gca tgg ttt cag agg gcc cgt gca gaa cag	480
Thr Ser Asp Gln His Ala Trp Phe Gln Arg Ala Arg Arg Ala Glu Gln	
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ggc tcc gac gag cgc aat ttc tat gtg tgg act gac gat ccg aaa aag	528
Gly Ser Asp Glu Arg Asn Phe Tyr Val Trp Thr Asp Asp Pro Lys Lys	
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tat tcg gaa aca cgg att att ttc cag gac ttc gag tcg tca aac tgg	576

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Tyr	Ser	Glu	Thr	Arg	Ile	Ile	Phe	Gln	Asp	Phe	Glu	Ser	Ser	Asn	Trp	
act	tgg	gac	ccg	atc	gcc	gga	cag	tat	ttc	tgg	cat	cgt	ttc	tac	cac	624
Thr	Trp	Asp	Pro	Ile	Ala	Gly	Gln	Tyr	Phe	Trp	His	Arg	Phe	Tyr	His	
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cat	cag	ccc	gat	ctt	aat	ttt	gag	aac	ccc	tcg	gtt	gaa	aag	gcg	ctc	672
His	Gln	Pro	Asp	Leu	Asn	Phe	Glu	Asn	Pro	Ser	Val	Glu	Lys	Ala	Leu	
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tac	aag	gtg	ctt	gac	tac	tgg	ctg	gag	atg	ggg	gtg	gac	ggg	ttg	cgc	720
Tyr	Lys	Val	Leu	Asp	Tyr	Trp	Leu	Glu	Met	Gly	Val	Asp	Gly	Leu	Arg	
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Leu	Asp	Ala	Val	Pro	Tyr	Leu	Tyr	Glu	Glu	Glu	Gly	Ser	Asn	Cys	Glu	
				245					250					255		
aac	ctg	ccg	cgt	acg	cat	gag	ttt	ttg	aag	cgt	ctt	cgc	aag	cat	gtc	816
Asn	Leu	Pro	Arg	Thr	His	Glu	Phe	Leu	Lys	Arg	Leu	Arg	Lys	His	Val	
			260					265					270			
gac	gac	aag	ttc	cct	aac	cgg	atg	ctt	gcc	gag	gca	aac	cag	tgg		864
Asp	Asp	Lys	Phe	Pro	Asn	Arg	Met	Leu	Leu	Ala	Glu	Ala	Asn	Gln	Trp	
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cct	gaa	gat	gct	gcc	gag	tat	ttc	ggg	gat	ggc	gac	gag	tgc	cat	atg	912
Pro	Glu	Asp	Ala	Ala	Glu	Tyr	Phe	Gly	Asp	Gly	Asp	Glu	Cys	His	Met	
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aat	ttt	cat	ttt	ccg	ctc	atg	ccg	agg	atg	tat	atg	gcc	ctg	gaa	atg	960
Asn	Phe	His	Phe	Pro	Leu	Met	Pro	Arg	Met	Tyr	Met	Ala	Leu	Glu	Met	
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Glu	Asp	Arg	Phe	Pro	Ile	Ile	Asp	Ile	Leu	Asp	Gln	Thr	Pro	Glu	Ile	
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gcc	gaa	acc	tgc	cag	tgg	gct	tcg	ttc	ctg	cgt	aac	cac	gat	gag	ctt	1056
Ala	Glu	Thr	Cys	Gln	Trp	Ala	Ser	Phe	Leu	Arg	Asn	His	Asp	Glu	Leu	
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acc	ctc	gaa	atg	gtg	acc	gat	gag	gag	cgc	gac	tac	atg	agg	cgg	gtc	1104
Thr	Leu	Glu	Met	Val	Thr	Asp	Glu	Glu	Arg	Asp	Tyr	Met	Arg	Arg	Val	
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ctt	gcg	ccc	ctg	atg	tcg	aac	gac	cgg	cgc	aag	atc	gaa	ctg	atg	aac	1200
Leu	Ala	Pro	Leu	Met	Ser	Asn	Asp	Arg	Arg	Lys	Ile	Glu	Leu	Met	Asn	
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atc	atg	ctg	ctt	tcc	ttg	ccg	gga	aca	ccg	gta	ctc	tat	tac	ggg	gac	1248
Ile	Met	Leu	Leu	Ser	Leu	Pro	Gly	Thr	Pro	Val	Leu	Tyr	Tyr	Gly	Asp	
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gag	atc	ggc	atg	ggg	gat	aac	ttc	tac	ctt	gga	gac	cgt	gat	ggg	gtg	1296
Glu	Ile	Gly	Met	Gly	Asp	Asn	Phe	Tyr	Leu	Gly	Asp	Arg	Asp	Gly	Val	
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cgg	acc	ccc	atg	cag	tgg	aac	ggg	gac	cgc	aat	gcc	ggg	ttt	tcg	cgg	1344
Arg	Thr	Pro	Met	Gln	Trp	Asn	Gly	Asp	Arg	Asn	Ala	Gly	Phe	Ser	Arg	
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gcc	aat	ccg	caa	cag	ctg	cag	ctg	ccc	gtt	att	atc	gac	ccc	gag	tat	1392
Ala	Asn	Pro	Gln	Gln	Leu	Gln	Leu	Pro	Val	Ile	Ile	Asp	Pro	Glu	Tyr	
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His	Tyr	Glu	Ala	Thr	Asn	Val	Glu	Val	Gln	Asp	Ser	Asn	Ile	Asn	Ser	
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Leu	Leu	Trp	Trp	Thr	Arg	His	Met	Leu	Ser	Thr	Ser	Arg	Arg	Tyr	Lys	
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Ala	Leu	Ser	Arg	Gly	Asp	Ile	Arg	Phe	Ile	Ala	Cys	Gln	Asn	Pro	Gln	
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Ile	Leu	Ile	Phe	Ser	Arg	Thr	Phe	Glu	Asp	Glu	Thr	Met	Leu	Cys	Ile	
		515					520					525				
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Ile	Asn	Leu	Ser	Arg	Asn	Ala	Gln	Ala	Ala	Thr	Val	Asp	Leu	Ser	Glu	
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ttc Phe	tgg Trp	ttc Phe	aag Lys	ctc Leu	atc Ile	agg Arg	acc Thr	gaa Glu	gag Glu	gag Glu	atc Ile	ggc Gly	tca Ser	cgc Arg	cgc Arg	1776
tat Tyr	gtt Val	gac Asp	aag Lys	ccc Pro	ttt Phe	gct Ala	cag Gln	ggt Val	gct Ala	tct Ser	ctg Leu	aag Lys	gac Asp	ctt Leu	ttc Phe	1824
gcc Ala	ggg Gly	aaa Lys	gcc Ala	ctc Leu	gaa Glu	cgt Arg	ctt Leu	gaa Glu	acg Thr	aaa Lys	ggt Val	ctt Leu	cct Pro	gaa Glu	tat Tyr	1872
atc Ile	agg Arg	ggg Gly	tgc Cys	agg Arg	tgg Trp	ttc Phe	ggg Gly	ggc Gly	aaa Lys	gcg Ala	cgc Arg	aag Lys	att Ile	gtc Val	aga Arg	1920
gtg Val	agt Ser	gtc Val	gaa Glu	gag Glu	cat His	att Ile	cct Pro	gtg Val	acg Thr	gca Ala	tgc Cys	gac Asp	aac Asn	acg Thr	gtc Val	1968
tac Tyr	atg Met	att Ile	gtc Val	gaa Glu	gta Val	cgt Arg	tat Tyr	ccc Pro	agc Ser	ggg Gly	tgc Ser	aac Asn	gat Asp	acc Thr	tat Tyr	2016
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gac Asp	tac Tyr	ttt Phe	ctc Leu	aag Lys	cag Gln	gtc Val	gtc Val	tgc Cys	agc Ser	gta Val	aaa Lys	ata Ile	ggg Gly	gat Asp	gag Glu	2112
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ctg Leu	ctc Leu	gat Asp	acc Thr	att Ile	gtc Val	agc Ser	agt Ser	aag Lys	ggg Gly	ctg Leu	aaa Lys	gga Gly	tcg Ser	acc Thr	ggg Gly	2208
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aca Thr	gaa Glu	aag Lys	aca Thr	tcg Ser	ttc Phe	gaa Glu	agt Ser	tcg Ser	ccc Pro	gag Ala	tat Tyr	ctt Leu	ggg Gly	gcc Ala	ctt Leu	2448
cat His	ttt Phe	acc Thr	cgg Arg	agc Ser	cgt Arg	aaa Lys	gac Asp	cag Gln	tgc Cys	tcc Ser	ctc Leu	ggg Gly	att Ile	ctg Leu	cag Gln	2496
aat Asn	ttc Phe	att Ile	ccg Pro	aac Asn	gag Glu	ggg Gly	gat Asp	gca Ala	tgg Trp	agc Ser	cag Gln	acg Thr	ctg Leu	cat His	ttc Phe	2544
gtg Val	cat His	cgt Arg	tat Tyr	tac Tyr	gaa Glu	gat Asp	gtg Val	ctc Leu	gtc Val	atg Met	ctg Leu	ccg Pro	cag Gln	att Ile	tca Ser	2592
gag Glu	gta Val	ccc Pro	gtc Val	ctc Leu	cca Pro	tct Ser	acc Thr	gga Gly	gga Gly	gag Glu	tct Ser	gtc Val	gaa Glu	atg Met	ccg Pro	2640
gaa Glu	att Ile	att Ile	cat His	ggc Gly	ctt Leu	atc Ile	gga Gly	gaa Glu	cct Pro	tac Tyr	ctc Leu	gag Glu	atg Met	gtg Val	tcg Ser	2688
aga Arg	ctg Leu	gct Ala	gaa Glu	agg Arg	act Thr	gcc Ala	gga Gly	atg Met	cac His	ctt Leu	gca Ala	ctg Leu	gcc Ala	tca Ser	ccg Pro	2736
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Tyr	Ser	Glu	Thr 180	Arg	Ile	Ile	Phe	Gln 185	Asp	Phe	Glu	Ser	Ser 190	Asn	Trp
Thr	Trp	Asp 195	Pro	Ile	Ala	Gly	Gln 200	Tyr	Phe	Trp	His	Arg 205	Phe	Tyr	His
His	Gln 210	Pro	Asp	Leu	Asn	Phe 215	Glu	Asn	Pro	Ser	Val 220	Glu	Lys	Ala	Leu
Tyr 225	Lys	Val	Leu	Asp 230	Tyr	Trp	Leu	Glu	Met	Gly 235	Val	Asp	Gly	Leu	Arg 240
Leu	Asp	Ala	Val	Pro 245	Tyr	Leu	Tyr	Glu	Glu 250	Glu	Gly	Ser	Asn	Cys 255	Glu
Asn	Leu	Pro	Arg 260	Thr	His	Glu	Phe	Leu 265	Lys	Arg	Leu	Arg	Lys 270	His	Val
Asp	Asp	Lys 275	Phe	Pro	Asn	Arg	Met 280	Leu	Leu	Ala	Glu	Ala 285	Asn	Gln	Trp
Pro	Glu 290	Asp	Ala	Ala	Glu	Tyr 295	Phe	Gly	Asp	Gly	Asp 300	Glu	Cys	His	Met
Asn 305	Phe	His	Phe	Pro	Leu 310	Met	Pro	Arg	Met	Tyr 315	Met	Ala	Leu	Glu	Met 320
Glu	Asp	Arg	Phe	Pro 325	Ile	Ile	Asp	Ile	Leu 330	Asp	Gln	Thr	Pro	Glu 335	Ile
Ala	Glu	Thr	Cys 340	Gln	Trp	Ala	Ser	Phe 345	Leu	Arg	Asn	His	Asp 350	Glu	Leu
Thr	Leu	Glu 355	Met	Val	Thr	Asp	Glu 360	Glu	Arg	Asp	Tyr	Met 365	Arg	Arg	Val
Tyr	Ala 370	His	Asp	Pro	Lys	Ala 375	Arg	Ile	Asn	Leu	Gly 380	Ile	Arg	Arg	Arg
Leu 385	Ala	Pro	Leu	Met	Ser 390	Asn	Asp	Arg	Arg	Lys 395	Ile	Glu	Leu	Met	Asn 400
Ile	Met	Leu	Leu	Ser 405	Leu	Pro	Gly	Thr	Pro 410	Val	Leu	Tyr	Tyr	Gly 415	Asp
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His 465	Tyr	Glu	Ala	Thr	Asn 470	Val	Glu	Val	Gln	Asp 475	Ser	Asn	Ile	Asn	Ser 480
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Ala	Leu	Ser	Arg 500	Gly	Asp	Ile	Arg	Phe 505	Ile	Ala	Cys	Gln	Asn 510	Pro	Gln
Ile	Leu	Ile 515	Phe	Ser	Arg	Thr	Phe 520	Glu	Asp	Glu	Thr	Met 525	Leu	Cys	Ile
Ile	Asn 530	Leu	Ser	Arg	Asn	Ala 535	Gln	Ala	Ala	Thr	Val 540	Asp	Leu	Ser	Glu
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Phe	Trp	Phe	Lys 580	Leu	Ile	Arg	Thr	Glu 585	Glu	Glu	Ile	Gly	Ser 590	Arg	Arg
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Ala	Gly 610	Lys	Ala	Leu	Glu	Arg 615	Leu	Glu	Thr	Lys	Val 620	Leu	Pro	Glu	Tyr
Ile 625	Arg	Gly	Cys	Arg	Trp 630	Phe	Gly	Gly	Lys	Ala 635	Arg	Lys	Ile	Val	Arg 640
Val	Ser	Val	Glu	Glu 645	His	Ile	Pro	Val	Thr 650	Ala	Cys	Asp	Asn	Thr 655	Val
Tyr	Met	Ile	Val 660	Glu	Val	Arg	Tyr	Pro 665	Ser	Gly	Ser	Asn	Asp 670	Thr	Tyr
Gln	Leu	Pro 675	Val	Thr	Phe	Leu	Pro 680	Ala	Gly	Glu	Phe	Asn 685	Pro	Asp	Asp
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 740 745 750
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 Asp Tyr His Leu Gly Gln Val Leu Trp Thr Gly Lys Asp Phe Val Ile
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cac His	atc Ile	tac Tyr 20	ccc Pro	cgc Arg	agc Ser	ttc Phe	gcc Ala 25	gac Asp 25	gcg Ala	agc Ser	ggc Gly	gac Asp 30	ggg Gly 30	gtg Val 30	ggc Gly	96
gac Asp	ctc Leu	gag Glu 35	ggc Gly	atc Ile	gcc Ala	tcc Ser	cgc Arg 40	ctg Leu	gac Asp	tac Tyr	ctg Leu 45	gag Glu 45	tgg Trp 45	ctc Leu	ggg Gly	144
gtc Val 50	gac Asp 50	gcc Ala	atc Ile	tgg Trp	ctc Leu	tcc Ser 55	ccc Pro	ttc Phe	tac Tyr	ccc Pro	tcc Ser 60	ccc Pro	atg Met	gcg Ala	gac Asp	192
ttc Phe 65	ggc Gly	tac Tyr	gac Asp	atc Ile 70	tcc Ser 70	gac Asp	cac His	tgc Cys	gcc Ala 75	gtg Val 75	gac Asp	ccc Pro	ctc Leu	ttc Phe 80	ggc Gly 80	240
acg Thr	ctc Leu	gcg Ala	gac Asp 85	ttc Phe 85	gac Asp	gag Glu	ctg Leu	gtc Val 90	gcg Ala 90	gag Glu	acg Thr	cac His	cgg Arg 95	agg Arg 95	ggc Gly	288
atg Met	cgc Arg	ctc Leu 100	atc Ile 100	gtc Val	gac Asp	tac Tyr	gtc Val 105	ccc Pro 105	aac Asn	cac His	acc Thr	tcg Ser 110	gac Asp 110	gag Glu	cac His	336
ccg Pro	tgg Trp 115	ttt Phe 115	ttg Leu	gag Glu	tcc Ser	cgc Arg	gcc Ala 120	tcg Ser	cgc Arg	gag Glu	agc Ser 125	ccg Pro 125	agg Arg	cgc Arg	gac Asp	384
tgg Trp 130	tac Tyr	atc Ile	tgg Trp	gcc Ala	gac Asp 135	ccg Pro 135	aag Lys	ccc Pro	gac Asp	ggc Gly 140	tcg Ser 140	ccc Pro	aac Asn	aac Asn		432
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ctc Leu 210	gta Val 210	aaa Lys	gac Asp	gag Glu	aag Lys 215	ctc Leu 215	cgg Arg	gac Asp	aac Asn	ccg Pro 220	ccc Pro 220	aac Asn	ccg Pro	gcc Ala	tac Tyr	672
gag Glu 225	gag Glu	ggt Gly	cgg Arg	ccc Pro	tcc Ser 230	tac Tyr	gag Glu	gcc Ala	cat His 235	ctc Leu 235	ccc Pro	gtc Val	tac Tyr	acc Thr 240	acc Thr 240	720
gac Asp	cgc Arg	ccg Pro	gag Glu 245	gtg Val 245	cac His	cgg Arg	atg Met	atc Ile 250	tcc Ser 250	ggg Gly	atg Met	cgc Arg	cgc Arg	gtc Val 255	ctc Leu	768
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ttc Phe	gac Asp 275	agg Arg	ctc Leu	gtg Val	ctc Leu	tac Tyr 280	tac Tyr 280	ggg Gly	gag Glu	ggg Gly	ggg Gly 285	cgc Arg 285	ggg Gly	gtc Val	cac His	864
ctg Leu 290	ccg Pro	acg Thr	aac Asn	atg Met	cac His	ctc Leu 295	atc Ile	acg Thr	acg Thr	ccc Pro	tgg Trp 300	agc Ser	gcc Ala	ccc Pro	tcc Ser	912
ctc Leu 305	gcc Ala	gcc Ala	ctc Leu	atc Ile	tcc Ser 310	gag Glu	tac Tyr	gag Glu	gcg Ala	gcc Ala 315	ctc Leu	ccc Pro	ccg Pro	cac His	ggc Gly 320	960
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cgg Arg	gtc Val	ggc Gly	ccg Pro 340	gag Glu	agg Arg	gcg Ala	cgg Arg	gcg Ala 345	gcc Ala	gcc Ala	gtg Val 350	ctg Leu	ctc Leu	ctc Leu	acc Thr	1056
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Pro	Leu	Ser	Pro	Asp	Arg	Arg	His	Arg	Asn	Val	Ala	Ala	Gln	Arg	Glu	
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Ser	Arg	Gly	Ser	Leu	Leu	Cys	Leu	Tyr	Arg	Arg	Leu	Leu	Arg	Leu	Arg	
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cgc	tcg	gag	ccc	gcc	ctc	tcc	gtg	ggc	tcc	tac	gag	ccg	ctc	gag	gcc	1392
Arg	Ser	Glu	Pro	Ala	Leu	Ser	Val	Gly	Ser	Tyr	Glu	Pro	Leu	Glu	Ala	
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ggg	ggc	tcc	ctg	ctg	gcc	tac	gcc	cgc	agc	cac	gcc	ggg	cgc	cgc	ctc	1440
Gly	Gly	Ser	Leu	Leu	Ala	Tyr	Ala	Arg	Ser	His	Ala	Gly	Arg	Arg	Leu	
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Leu	Val	Ala	Leu	Asn	Leu	Gly	Glu	Ala	Pro	Glu	Pro	Leu	Pro	Pro	Val	
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ctc	cgg	ggg	cgc	gtc	ctg	ctc	tcc	acc	tct	ccc	ggg	cag	gag	ggc	gga	1536
Leu	Arg	Gly	Arg	Val	Leu	Leu	Ser	Thr	Ser	Pro	Gly	Gln	Glu	Gly	Gly	
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gac	ctc	cgc	ccc	ccc	gcc	cgg	ctc	ggc	ccc	ggc	gag	gcc	ctc	gtc	gtg	1584
Asp	Leu	Arg	Pro	Pro	Ala	Arg	Leu	Gly	Pro	Gly	Glu	Ala	Leu	Val	Val	
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Val	Asp	Ala	Ile	Trp	Leu	Ser	Pro	Phe	Tyr	Pro	Ser	Pro	Met	Ala	Asp	
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Phe	Gly	Tyr	Asp	Ile	Ser	Asp	His	Cys	Ala	Val	Asp	Pro	Leu	Phe	Gly	
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Thr	Leu	Ala	Asp	Phe	Asp	Glu	Leu	Val	Ala	Glu	Thr	His	Arg	Arg	Gly	
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Met	Arg	Leu	Ile	Val	Asp	Tyr	Val	Pro	Asn	His	Thr	Ser	Asp	Glu	His	
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Pro	Trp	Phe	Leu	Glu	Ser	Arg	Ala	Ser	Arg	Glu	Ser	Pro	Arg	Arg	Asp	
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Trp	Tyr	Ile	Trp	Ala	Asp	Pro	Lys	Pro	Asp	Gly	Ser	Pro	Pro	Asn	Asn	
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Trp	Arg	Ser	Val	Phe	Gly	Gly	Ser	Ala	Trp	Glu	Trp	Asp	Glu	Arg	Thr	
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Gly	Gln	Tyr	Tyr	Tyr	His	Ala	Phe	His	Arg	Lys	Gln	Pro	Asp	Leu	Asn	
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Trp	Arg	Asn	Pro	Ala	Val	Arg	Glu	Ala	Met	His	Gly	Val	Met	Arg	Phe	
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Trp	Leu	Glu	Arg	Gly	Val	Asp	Gly	Phe	Arg	Val	Asp	Ala	Leu	Arg	His	
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Leu	Val	Lys	Asp	Glu	Lys	Leu	Arg	Asp	Asn	Pro	Pro	Asn	Pro	Ala	Tyr	
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Glu	Glu	Gly	Arg	Pro	Ser	Tyr	Glu	Ala	His	Leu	Pro	Val	Tyr	Thr	Thr	

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225 Asp Arg Pro Glu Val 230 His Arg Met Ile Ser 235 Gly Met Arg Arg Val 240 Leu
 245 Gly Glu Arg Val Met Ile Gly Glu Leu Tyr Leu Pro
 260 Phe Asp Arg Leu Val Leu Tyr Tyr Gly Glu Gly Gly Arg Gly Val His
 275 Leu Pro Thr Asn Met His Leu Ile Thr Thr Pro Trp Ser Ala Pro Ser
 290 Leu Ala Ala Leu Ile Ser Glu Tyr Glu Ala Ala Leu Pro Pro His Gly
 305 Trp Pro Asn Trp Val Leu Ser Asn His Asp Asn Pro Arg Val Ala Thr
 325 Arg Val Gly Pro Glu Arg Ala Arg Ala Ala Val Leu Leu Thr
 340 Leu Arg Gly Thr Pro Thr Val Tyr Tyr Gly Asp Glu Ile Gly Met Val
 355 Asp Gly Lys Ile Pro Pro Glu Arg Leu Arg Asp Pro Ala Gly Ser Gln
 370 Asn Pro Arg Leu Ser Arg Asp Pro Ala Arg Thr Pro Met Gln Trp Asp
 385 Ala Ser Pro Asn Ala Gly Phe Cys Pro Pro Asp Ala Glu Pro Trp Leu
 405 Pro Leu Ser Pro Asp Arg Arg His Arg Asn Val Ala Ala Gln Arg Glu
 420 Ser Arg Gly Ser Leu Leu Cys Leu Tyr Arg Arg Leu Leu Arg Leu Arg
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 450 Gly Gly Ser Leu Leu Ala Tyr Ala Arg Ser His Ala Gly Arg Arg Leu
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 His His Arg Gly Arg Leu Pro Gly Ala Gly Leu Arg Pro Leu Pro His
 20 caa gcg gga ggt cgg cga ccg gct gga ggt gtg ggc cga cat ctt caa 144
 Gln Ala Gly Gly Arg Arg Pro Ala Gly Gly Val Gly Arg His Leu Gln
 35 gga cgg gca cga tgc cgt ctc ggc ggt cgt ccg gta ccg gga gag ggg 192
 Gly Arg Ala Arg Cys Arg Leu Gly Gly Arg Pro Val Pro Gly Glu Gly
 50 ggc gcg ccg ctg gtc cga ggt gcc cat gcg cca cca cga gaa cga ccg 240
 Gly Ala Pro Leu Val Arg Gly Ala His Ala Pro Pro Arg Glu Arg Pro
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 Leu Asp Arg Glu Leu Pro Ala His Gln Glu His Ala Leu Pro Val His
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gaa	gaa	gct	cga	ggc	cgg	gca	gcg	ggt	gga	ggt	gga	gct	gct	gga	ggg	384
Glu	Glu	Ala	Arg	Gly	Arg	Ala	Ala	Gly	Gly	Gly	Gly	Ala	Ala	Gly	Gly	
		115						120					125			
gcg	cga	gat	cct	cga	gcg	ggc	cta	ctc	gcg	ctc	gaa	gga	cgg	gcg	cct	432
Ala	Arg	Asp	Pro	Arg	Ala	Gly	Leu	Leu	Ala	Leu	Glu	Gly	Arg	Ala	Pro	
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Pro	Ala	Asp	Ala	Arg	Arg	Leu	Arg	Arg	Arg	Arg	Val	Arg	Gly	Ala	Ala	
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Arg	Ala	Ala	Ala	Leu	Arg	Gly	Gly	Ala	Arg	Ala	Asp	Ala	Arg	Ala	Pro	
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Gln	Gly	Ala	Pro	Arg	Val	Val	Gln	Ala	Ala	Ala	Arg	Arg	His	His	Lys	
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His	Arg	Ala	His	His	Gly	Leu	Ala	Gln	Gly	Val	His	Ala	Pro	Gln	Leu	
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gcg Ala	gcc Ala	cgc Arg	ctt Leu	cat His 485	gat Asp	gcg Ala	gct Ala	ggg Gly 490	gct Ala	cgc Arg	ggc Gly	cac His	cct Pro	ctc Leu 495	ccc Pro	1488
cag Gln	cta Leu	cgg Arg	cat His 500	cta Leu	cag Gln	cgg Arg	gta Val	cga Arg 505	gct Ala	gtg Val	cga Arg	gaa Glu	cac His 510	ccc Pro	gcg Ala	1536
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ccc Pro	gca Ala	caa Gln 595	ccc Pro	cca Pro	cga Arg	cac His	cca Pro 600	cgt Arg	gca Ala	gtt Val	ccc Pro 605	gct Ala	gtg Val	gga Gly	gct Ala	1824
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gac Asp	ccg Pro	ctc Leu 675	tgg Trp	tac Tyr	aag Lys	gac Asp	gcc Ala 680	atc Ile	tac Ile	tac Tyr	cag Gln	ctg Leu 685	cac His	gta Val	aag Lys	2064
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cgc Arg	aac Asn	ttc Phe 755	gtg Val	cgc Arg	cgg Arg	gcg Ala	cac His 760	gcc Ala	ctg Leu	ggc Gly	ctc Leu	aag Lys 765	gtc Val	ata Ile	acc Thr	2304
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acc Thr	gag Glu	acc Thr	tcc Ser 820	aac Asn	tgg Trp	acc Thr	tgg Trp	gac Asp 825	ccg Pro	gtc Val	gcc Ala	cag Gln	cag Gln 830	tac Tyr	tac Tyr	2496

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Trp	His	Arg	Phe	Phe	Ser	His	Gln	Pro	Asp	Leu	Asn	His	Asp	Asn	Pro	
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Gly	Asp	Glu	Cys	His	Met	Ala	Phe	His	Phe	Pro	Leu	Met	Pro	Arg	Ile	
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Tyr	Met	Ala	Val	Ala	Gln	Glu	Asp	Arg	His	Pro	Ile	Val	Glu	Ile	Met	
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Asp	Tyr	Met	Tyr	Gln	Thr	Tyr	Ala	Ala	Asp	Pro	Arg	Ala	Arg	Ile	Asn	
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Leu	Gly	Ile	Arg	Arg	Arg	Leu	Ala	Pro	Leu	Met	Glu	Asn	Asp	Arg	Ala	
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<213> Rubrobacter xylanophilus DSM 9941

<400> 342

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 50 55 60
 Gly Ala Pro Leu Val Arg Gly Ala His Ala Pro Arg Glu Arg Pro
 65 70 75 80
 Leu Asp Arg Glu Leu Pro Ala His Gln Glu His Ala Leu Pro Val His
 85 90 95
 His Arg Gly Leu Ala Gly Arg Val Arg Asp Leu Ala Leu Arg Gly Gly
 100 105 110
 Glu Glu Ala Arg Gly Arg Ala Ala Gly Gly Gly Gly Ala Ala Gly Gly
 115 120 125
 Ala Arg Asp Pro Arg Ala Gly Leu Leu Ala Leu Glu Gly Arg Ala Pro
 130 135 140
 Pro Ala Asp Ala Arg Arg Leu Arg Arg Arg Arg Val Arg Gly Ala Ala
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Ala	Ala	Arg	Leu	His	Asp	Ala	Ala	Gly	Ala	Arg	Gly	His	Pro	Leu	Pro
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Gln	Leu	Arg	His	Leu	Gln	Arg	Val	Arg	Ala	Val	Arg	Glu	His	Pro	Ala
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Ser	Glu	Tyr	Lys	740	Arg	Arg	Ala	His	745	Ala	Leu	Gly	Leu	Lys	750	Val	Ile	Thr	
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Glu	Leu	770	Val	Ile	Asn	His	775	Val	Trp	Arg	Asn	780	Phe	Tyr	Val	Trp			
Ala	Arg	Lys	Ala	Pro	Arg	Asn	790	Ser	Val	Trp	Arg	795	Ile	Ile	Phe	Thr	800		
785	Ser	Asp	Thr	Asp	Lys	Tyr	Ala	Asp	Ala	Arg	Ile	810	Val	Ala	Gln	Gln	815	Tyr	
Thr	Glu	Thr	820	Ser	Asn	Trp	Thr	Trp	Asp	825	Pro	Val	Ala	Gln	830	Tyr	835	Tyr	
Trp	His	835	Arg	Phe	Phe	Ser	His	Gln	840	Pro	Asp	Leu	Asn	His	845	Asp	Asn	Pro	
Arg	Val	850	Phe	Asp	Ala	Ile	Met	855	Arg	Val	Met	Arg	Phe	860	Trp	Leu	Asp	Ala	
Gly	Val	865	Asp	Gly	Leu	Arg	Leu	870	Asp	Ala	Ile	Pro	Tyr	875	Leu	Ile	Glu	Arg	
Glu	Gly	Thr	Asp	Cys	885	Glu	Asn	Leu	Pro	Glu	890	Thr	His	Glu	Ile	Leu	895	Arg	
Arg	Met	Arg	Ala	Glu	Leu	Asp	Ala	Arg	905	Tyr	Gln	Asn	Arg	Ile	910	Phe	Leu		
Ala	Glu	Ala	Asn	Gln	Trp	Pro	Glu	920	Asp	Val	Leu	Pro	Tyr	925	Phe	Gly	Lys		
Gly	Asp	930	Glu	Cys	His	Met	Ala	935	Phe	His	Phe	Pro	Leu	940	Met	Pro	Arg	Ile	
Tyr	945	Met	Ala	Val	Ala	Gln	950	Glu	Asp	Arg	His	Pro	Ile	955	Val	Glu	Ile	Met	
Gln	Gln	Thr	Pro	Glu	Ile	Pro	Glu	965	Val	Cys	Gln	Trp	Ala	Ile	975	Phe	Leu		
Arg	Asn	His	Asp	Glu	Leu	Thr	Leu	980	Glu	Met	Val	Thr	Asp	990	Arg	Glu	Arg		
Asp	Tyr	Met	995	Tyr	Gln	Thr	Tyr	1000	Ala	Asp	Pro	Arg	Ala	1005	Arg	Ile	Asn		
Leu	Gly	Ile	Arg	Arg	Arg	Leu	Ala	1010	Pro	Leu	Met	Glu	Asn	1015	Asp	Arg	Ala		
Arg	Ile	Glu	Leu	Leu	Asn	Ser	Leu	1025	Leu	Met	Ser	Met	Pro	1030	Gly	Thr	Pro		
Ile	Ile	Tyr	Tyr	Gly	1035	Asp	Glu	Ile	Gly	Met	Gly	Asp	Asn	1040	Val	Phe	Leu		
Gly	Asp	Arg	Asn	Ala	1045	Val	Arg	Thr	Pro	Met	Gln	Trp	Thr	1050	Ser	Asp	Arg		
Asn	Ala	Gly	Phe	Ser	Arg	Ala	Asp	1060	Pro	His	Ser	Leu	Tyr	1065	Leu	Pro	Pro		
Ile	Met	Asp	Pro	Val	Tyr	Gly	Tyr	1075	Glu	Ala	Leu	Asn	Val	1080	Glu	Ala	Gln		
1090	Ser	Arg	Ser	Pro	Gly	Ser	Leu	1095	Leu	Asn	Trp	Met	Lys	1100	Arg	Ile	Ile		
1105	Val	Arg	Lys	Ala	His	Lys	Ala	1110	Phe	Gly	Arg	Gly	Thr	1115	Leu	Glu	Phe		
Val	Arg	Lys	Ala	His	1125	Lys	Ala	Phe	Gly	Arg	Gly	Thr	Leu	1130	Glu	Phe	Leu		
His	Pro	Gly	Asn	Arg	Lys	Val	Leu	Ala	Tyr	Leu	Arg	Glu	Tyr	1135	Gly	Asp			
Glu	Thr	Ile	Leu	Cys	Val	Ala	Asn	1140	Leu	Ser	Arg	Ser	Ala	1145	Gln	Pro	Val		
Glu	Leu	Asp	Leu	Ser	Arg	Phe	Ser	1155	Gly	Arg	Val	Pro	Val	1160	Glu	Met	Ile		
Gly	Gly	Ser	Ser	Phe	Pro	Pro	Ile	1175	Gly	Ser	Leu	Pro	Tyr	1180	Phe	Leu	Thr		
1185	Leu	Pro	Gly	His	Ser	Phe	Tyr	1190	Trp	Phe	Asn	Leu	Thr	1195	Thr	Glu	Ala		
Ala	Pro	Ser	Trp	His	Gln	Glu	Ser	1205	Pro	Arg	Phe	Phe	Glu	1210	Pro	Pro	Val		
Val	Val	Leu	Pro	Ala	Gly	Arg	Gln	1220	Thr	Ala	Arg	Asp	Ile	1225	Arg	Arg	Leu		
Pro	Leu	Arg	Leu	Gln	His	Arg	Gln	1235	Val	Ala	Gln	Leu	Glu	1240	Gln	Glu	Ala		
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 1265 1270 1275 1280
 Glu Ile Glu Arg Val Ser Leu Leu Ala Arg Ala Glu Phe Gly Pro Asp
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 1300 1305 1310
 Tyr Phe Leu Pro Leu Ala Ala Ala Trp Glu Asp Glu Asp Gly Glu Arg
 1315 1320 1325
 Val Ser Gly Leu Met Pro His Ala Leu Ala Lys Ile Arg Arg Arg Tyr
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 Arg Val Gly Val Leu Phe Asp Ala Leu Ala Asp Glu Gly Phe Cys Arg
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 Glu Val Val Ala Ala Met Ala Gly Gly Arg Glu Leu Glu Met Gly Glu
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 Gly Glu Pro Val Gly Glu Leu Ala Val Arg Arg Ala Ser Val Glu Gln
 1395 1400 1405
 Ser Asn Thr Ser Val Ile Leu Gly Glu Arg Leu Val Leu Lys Ala Tyr
 1410 1415 1420
 Arg Arg Leu Gln Pro Gly Val Asn Pro Glu Leu Glu Ile Gly Arg Tyr
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 Leu Thr Glu Val Arg Phe Pro Asn Thr Pro Pro Leu Ala Gly Ala
 1445 1450 1455
 Val Glu Tyr Glu Asp Pro Arg Ser Gly Thr Val Ser Leu Ala Leu Leu
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 Gln Gly Phe Val Pro Ser Gln Gly Asp Gly Trp Ser Tyr Val Leu Gly
 1475 1480 1485
 Tyr Leu Asp Arg Tyr Leu Glu Arg Arg Leu Leu Ser Ala Ser Trp Ser
 1490 1495 1500
 Pro Glu Glu Glu Gly Pro Ala Glu Pro Pro Gly Gln Glu Gly Gln Glu
 1505 1510 1515 1520
 Ala Asp Glu Gly Phe Phe Met Glu Leu Met Arg Thr Leu Gly Val Arg
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 Thr Gly Glu Leu His Ala Ala Leu Ala Ala Pro Thr Asp Asp Pro Ser
 1540 1545 1550
 Phe Ser Pro Glu Pro Ala Pro Pro Ala Glu Val Ser Arg Trp Val Glu
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 Ala Val Leu Asp Asp Leu Arg Leu Thr Leu Ser Leu Leu Glu Arg Arg
 1570 1575 1580
 Arg Ser Gly Leu Pro Glu Val Arg Pro Glu Val Asp Arg Leu Leu
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 Arg Met Glu Ala Arg Ala Phe Asp Arg Leu Glu Ala Ile Ser Ala Arg
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 Gly Ile Arg Ala Val Lys Thr Arg His Gly Asp Tyr His Leu Gly
 1620 1625 1630
 Gln Val Leu Val Ala Gly Asn Asp Phe Gln Ile Ile Asp Phe Glu Gly
 1635 1640 1645
 Glu Pro Ala Arg Thr Leu Glu Glu Arg Arg Arg Lys His Ser Pro Leu
 1650 1655 1660
 Arg Asp Val Ala Gly Met Leu Arg Ser Phe Asp Tyr Ala Ala Gln Thr
 1665 1670 1675 1680
 Ala Leu Met Asn Leu Gly Ala Asp Arg Ala Val Gly Glu Asp Pro Glu
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 Pro Val Val Arg Arg Trp Glu Arg Ser Val Arg Glu Ala Phe Leu Gly
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 Gly Tyr Ala Glu Gly Val Arg Gly Ala Gly Val Leu Pro Gly Glu Gly
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 Glu Glu Ala Ala Ala Leu Val Glu Leu Phe Ala Leu Glu Lys Ala Leu
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 Tyr Glu Ile Arg Tyr Glu Leu Asp Asn Arg Pro Asp Trp Ile Gly Ile
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<211> 1755

<212> DNA

<213> Mesorhizobium sp. BNC1

<220>

<221> CDS

<222> (1)..(1755)

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tcg	ccg	att	tgc	gca	gcg	gaa	cat	aag	cga	ctt	gcg	tgt	ggt	cac	cgc	96
Ser	Pro	Ile	Cys	Ala	Ala	Glu	His	Lys	Arg	Leu	Ala	Cys	Val	His	Arg	
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gtc	atg	ggg	aac	cca	gga	cca	gcg	cgg	aag	gag	ctc	atg	aaa	ggc	aca	144
Val	Met	Gly	Asn	Pro	Gly	Pro	Ala	Arg	Lys	Glu	Leu	Met	Lys	Gly	Thr	
		35					40					45				
agc	cct	gac	gtt	gag	gtg	cac	tca	tcg	caa	gag	cca	tgg	tgg	cgg	cgc	192
Ser	Pro	Asp	Val	Glu	Val	His	Ser	Ser	Gln	Glu	Pro	Trp	Trp	Arg	Arg	
	50					55					60					
ggc	gtc	atc	tac	caa	atc	tat	ccg	cgc	tcc	ttt	cag	gac	agc	aat	ggc	240
Gly	Val	Ile	Tyr	Gln	Ile	Tyr	Pro	Arg	Ser	Phe	Gln	Asp	Ser	Asn	Gly	
				70						75					80	
gac	ggc	atc	ggc	gac	atc	cgc	ggc	atc	ata	gat	cgc	ctg	gac	tac	ctc	288
Asp	Gly	Ile	Gly	Asp	Ile	Arg	Gly	Ile	Ile	Asp	Arg	Leu	Asp	Tyr	Leu	
				85					90					95		
gtc	tgg	ctc	ggg	ata	gat	gcc	gtc	tgg	att	tcg	ccg	atc	ttc	ttc	tcg	336
Val	Trp	Leu	Gly	Ile	Asp	Ala	Val	Trp	Ile	Ser	Pro	Ile	Phe	Phe	Ser	
			100					105					110			
cca	atg	gcc	gat	ttc	ggc	tat	gac	atc	gcg	gat	tat	cgc	aag	atc	gac	384
Pro	Met	Ala	Asp	Phe	Gly	Tyr	Asp	Ile	Ala	Asp	Tyr	Arg	Lys	Ile	Asp	
		115					120					125				
cct	ctt	ttc	ggt	acg	ctc	acg	gat	ttc	gac	cag	ctc	att	gaa	gcc	gcg	432
Pro	Leu	Phe	Gly	Thr	Leu	Thr	Asp	Phe	Asp	Gln	Leu	Ile	Glu	Ala	Ala	
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cat	cgg	cgt	gga	att	cgg	ata	ttg	ctc	gac	tat	gtg	ccg	aac	cac	tcc	480
His	Arg	Arg	Gly	Ile	Arg	Ile	Leu	Leu	Asp	Tyr	Val	Pro	Asn	His	Ser	
					150					155					160	
tca	gac	cgt	cat	caa	tgg	ttt	ctg	gag	gcg	cgc	agc	tcc	cgc	gat	aat	528
Ser	Asp	Arg	His	Gln	Trp	Phe	Leu	Glu	Ala	Arg	Ser	Ser	Arg	Asp	Asn	
				165					170					175		
cct	cgg	cgc	gat	ttc	tac	ata	tgg	cgg	gat	gcg	gcg	ccg	gac	ggg	gga	576
Pro	Arg	Arg	Asp	Phe	Tyr	Ile	Trp	Arg	Asp	Ala	Ala	Pro	Asp	Gly	Gly	
			180					185					190			
ccg	cca	aac	aac	tgg	caa	agc	gaa	ttc	ggc	ggc	agc	gca	tgg	gaa	ctg	624
Pro	Pro	Asn	Asn	Trp	Gln	Ser	Glu	Phe	Gly	Gly	Ser	Ala	Trp	Glu	Leu	
		195					200					205				
gat	gcc	gca	acc	ggc	caa	tat	tac	tac	cat	gcc	ttc	ctg	aaa	gag	cag	672
Asp	Ala	Ala	Thr	Gly	Gln	Tyr	Tyr	Tyr	His	Ala	Phe	Leu	Lys	Glu	Gln	
						215					220					
ccc	gat	cta	aac	tgg	cgc	aat	cca	gaa	gtg	cgc	cgt	gaa	atg	tac	gac	720
Pro	Asp	Leu	Asn	Trp	Arg	Asn	Pro	Glu	Val	Arg	Arg	Glu	Met	Tyr	Asp	
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gtg	ctc	cgc	ttc	tgg	ctg	gac	cgg	ggc	gtc	gac	ggt	ttt	cgc	gtc	gat	768
Val	Leu	Arg	Phe	Trp	Leu	Asp	Arg	Gly	Val	Asp	Gly	Phe	Arg	Val	Asp	
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gtc	atg	tgg	cat	ctc	atc	aag	gac	gcg	gag	ttt	cgc	gac	aat	ccg	cag	816
Val	Met	Trp	His	Leu	Ile	Lys	Asp	Ala	Glu	Phe	Arg	Asp	Asn	Pro	Gln	
				260				265					270			
aac	ccc	gac	tgg	acc	gaa	gac	atg	ccg	ccg	cac	aag	tcg	gtg	ctt	tcg	864
Asn	Pro	Asp	Trp	Thr	Glu	Asp	Met	Pro	Pro	His	Lys	Ser	Val	Leu	Ser	
		275					280					285				
atc	tat	tcc	tgc	gat	cag	gag	gtg	cac	gac	gta	gtc	tcc	gaa	atg		912
Ile	Tyr	Ser	Cys	Asp	Gln	Glu	Glu	Val	His	Asp	Val	Val	Ser	Glu	Met	
						295					300					
cgc	gcc	gtg	ctg	gac	gaa	tac	ggg	ggc	gac	cgg	ctg	ctt	atc	gga	gaa	960
Arg	Ala	Val	Leu	Asp	Glu	Tyr	Gly	Gly	Asp	Arg	Leu	Leu	Ile	Gly	Glu	
					310					315					320	
ata	tat	ctg	ccg	att	gcc	cgg	ctc	gtc	gcc	tat	tat	ggc	cgg	gat	ctt	1008
Ile	Tyr	Leu	Pro	Ile	Ala	Arg	Leu	Val	Ala	Tyr	Tyr	Gly	Arg	Asp	Leu	

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cg	ggt	g	cac	325	ccg	t	a	t	330	ctt	a	g	g	335	t		
Arg	Gly	Ala	His	ctg	Pro	Phe	Asn	Phe	Arg	Leu	Ile	Glu	Ala	Gln	Trp		1056
			340					345					350				
gac	gct	cg	cac	atc	gag	cg	g	att	gtc	gaa	tac	gag	gcc	gct	ctg		1104
Asp	Ala	Arg	His	Ile	Glu	Arg	Gln	Ile	Val	Glu	Tyr	Glu	Ala	Ala	Leu		
		355					360					365					
ccg	gag	ggc	ggc	tgg	ccg	aac	tgg	gtt	ttg	agc	aat	cac	gat	aag	ccg		1152
Pro	Glu	Gly	Gly	Trp	Pro	Asn	Trp	Val	Leu	Ser	Asn	His	Asp	Lys	Pro		
	370					375					380						
cgt	atc	gcc	tcc	cgt	gtc	ggc	cg	gac	cag	g	cgt	gtt	gcc	gcc	atg		1200
Arg	Ile	Ala	Ser	Arg	Val	Gly	Arg	Asp	Gln	Ala	Arg	Val	Ala	Ala	Met		
	385				390				395						400		
atg	cta	ctt	acg	t	cg	ggc	acg	cca	acc	atc	tat	tat	ggc	gac	gag		1248
Met	Leu	Leu	Thr	Leu	Arg	Gly	Thr	Pro	Thr	Ile	Tyr	Tyr	Gly	Asp	Glu		
			405						410					415			
atc	ggg	atg	aac	gac	gct	ccc	att	ccg	cct	gag	cg	gtg	cag	gac	ccg		1296
Ile	Gly	Met	Asn	Asp	Ala	Pro	Ile	Pro	Pro	Glu	Arg	Val	Gln	Asp	Pro		
			420					425					430				
t	gag	ctg	cg	gtt	ccc	gga	cg	ggt	t	ggg	cgt	gat	ccc	caa	cg		1344
Phe	Glu	Leu	Arg	Val	Pro	Gly	Arg	Gly	Phe	Gly	Arg	Asp	Pro	Gln	Arg		
	435					440						445					
acg	cct	atg	cag	tgg	gac	a	acg	gtg	a	gca	ggc	t	agc	acc	ggc		1392
Thr	Pro	Met	Gln	Trp	Asp	Asn	Thr	Val	Asn	Ala	Gly	Phe	Ser	Thr	Gly		
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tcg	cct	tgg	ctt	cct	ctt	gcc	ccg	gac	aag	gac	agc	t	a	gtg	gag		1440
Ser	Pro	Trp	Leu	Pro	Leu	Ala	Pro	Asp	Lys	Asp	Ser	Phe	Asn	Val	Glu		
	465			470					475						480		
gcg	gaa	cg	agc	gat	ccg	cac	tca	atg	ctg	tcg	ctc	tat	cg	agg	ctg		1488
Ala	Glu	Arg	Ser	Asp	Pro	His	Ser	Met	Leu	Ser	Leu	Tyr	Arg	Arg	Leu		
			485						490					495			
att	gca	t	cg	cga	gaa	a	gat	gcg	ctg	aac	ctt	ggc	cgt	tac	gcc		1536
Ile	Ala	Phe	Arg	Arg	Glu	Asn	Asp	Ala	Leu	Asn	Leu	Gly	Arg	Tyr	Ala		
	500							505				510					
tcc	gtc	gag	gca	gac	agc	tgc	gtg	ctc	gct	tac	ctc	cg	gag	acg	gag		1584
Ser	Val	Glu	Ala	Asp	Ser	Cys	Val	Leu	Ala	Tyr	Leu	Arg	Glu	Thr	Glu		
	515					520						525					
a	gat	cg	tat	t	att	gca	ctt	a	ctc	ggg	ccc	gag	ccg	gcg	gtg		1632
Asn	Asp	Arg	Tyr	Leu	Ile	Ala	Leu	Asn	Leu	Gly	Pro	Glu	Pro	Ala	Val		
	530					535				540							
ctg	gaa	aca	ccc	ggg	caa	tgc	cg	att	gtg	atc	agc	acg	gaa	ggc	aag		1680
Leu	Glu	Thr	Pro	Gly	Gln	Cys	Arg	Ile	Val	Ile	Ser	Thr	Glu	Gly	Lys		
	545			550					555					560			
gcg	gaa	ggc	gag	att	gtc	gag	gaa	aag	ctc	cac	ctg	caa	ggc	a	gag		1728
Ala	Glu	Gly	Glu	Ile	Val	Glu	Glu	Lys	Leu	His	Leu	Gln	Gly	Asn	Glu		
			565						570				575				
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Gly	Val	Leu	Ala	Glu	Met	Met	Ser										
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<212> PRT

<213> Mesorhizobium sp. BNC1

<400> 344

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Val	Met	Gly	Asn	Pro	Gly	Pro	Ala	Arg	Lys	Glu	Leu	Met	Lys	Gly	Thr		
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Ser	Pro	Asp	Val	Glu	Val	His	Ser	Ser	Gln	Glu	Pro	Trp	Trp	Arg	Arg		
	50					55				60							
Gly	Val	Ile	Tyr	Gln	Ile	Tyr	Pro	Arg	Ser	Phe	Gln	Asp	Ser	Asn	Gly		
	65			70				75						80			
Asp	Gly	Ile	Gly	Asp	Ile	Arg	Gly	Ile	Ile	Asp	Arg	Leu	Asp	Tyr	Leu		
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Val	Trp	Leu	Gly	Ile	Asp	Ala	Val	Trp	Ile	Ser	Pro	Ile	Phe	Phe	Ser		

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 His Arg Arg Gly Ile Arg Ile Leu Leu Asp Tyr Val Pro Asn His Ser
 145 150 155 160
 Ser Asp Arg His Gln Trp Phe Leu Glu Ala Arg Ser Ser Arg Asp Asn
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 Pro Arg Arg Asp Phe Tyr Ile Trp Arg Asp Ala Ala Pro Asp Gly Gly
 180 185 190
 Pro Pro Asn Asn Trp Gln Ser Glu Phe Gly Gly Ser Ala Trp Glu Leu
 195 200 205
 Asp Ala Ala Thr Gly Gln Tyr Tyr His Ala Phe Leu Lys Glu Gln
 210 215 220
 Pro Asp Leu Asn Trp Arg Asn Pro Glu Val Arg Arg Glu Met Tyr Asp
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 Val Leu Arg Phe Trp Leu Asp Arg Gly Val Asp Gly Phe Arg Val Asp
 245 250 255
 Val Met Trp His Leu Ile Lys Asp Ala Glu Phe Arg Asp Asn Pro Gln
 260 265 270
 Asn Pro Asp Trp Thr Glu Asp Met Pro Pro His Lys Ser Val Leu Ser
 275 280 285
 Ile Tyr Ser Cys Asp Gln Glu Val His Asp Val Val Ser Glu Met
 290 295 300
 Arg Ala Val Leu Asp Glu Tyr Gly Gly Asp Arg Leu Leu Ile Gly Glu
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 Ile Tyr Leu Pro Ile Ala Arg Leu Val Ala Tyr Tyr Gly Arg Asp Leu
 325 330 335
 Arg Gly Ala His Leu Pro Phe Asn Phe Arg Leu Ile Glu Ala Gln Trp
 340 345 350
 Asp Ala Arg His Ile Glu Arg Gln Ile Val Glu Tyr Glu Ala Ala Leu
 355 360 365
 Pro Glu Gly Gly Trp Pro Asn Trp Val Leu Ser Asn His Asp Lys Pro
 370 375 380
 Arg Ile Ala Ser Arg Val Gly Arg Asp Gln Ala Arg Val Ala Ala Met
 385 390 395 400
 Met Leu Leu Thr Leu Arg Gly Thr Pro Thr Ile Tyr Tyr Gly Asp Glu
 405 410 415
 Ile Gly Met Asn Asp Ala Pro Ile Pro Pro Glu Arg Val Gln Asp Pro
 420 425 430
 Phe Glu Leu Arg Val Pro Gly Arg Gly Phe Gly Arg Asp Pro Gln Arg
 435 440 445
 Thr Pro Met Gln Trp Asp Asn Thr Val Asn Ala Gly Phe Ser Thr Gly
 450 455 460
 Ser Pro Trp Leu Pro Leu Ala Pro Asp Lys Asp Ser Phe Asn Val Glu
 465 470 475 480
 Ala Glu Arg Ser Asp Pro His Ser Met Leu Ser Leu Tyr Arg Arg Leu
 485 490 495
 Ile Ala Phe Arg Arg Glu Asn Asp Ala Leu Asn Leu Gly Arg Tyr Ala
 500 505 510
 Ser Val Glu Ala Asp Ser Cys Val Leu Ala Tyr Leu Arg Glu Thr Glu
 515 520 525
 Asn Asp Arg Tyr Leu Ile Ala Leu Asn Leu Gly Pro Glu Pro Ala Val
 530 535 540
 Leu Glu Thr Pro Gly Gln Cys Arg Ile Val Ile Ser Thr Glu Gly Lys
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<211> 3348

<212> DNA

<213> Mesorhizobium sp. BNC1

<220>

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<222> (1)..(3348)

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Ala Glu Ala Val Gln Val Val Pro Pro Ala Gly Pro Arg Pro Pro Asp	
20 25 30	
tgg tat aag gac gcg gtc atc tat cag ctc cac atc aag gcc ttc cac	144
Trp Tyr Lys Asp Ala Val Ile Tyr Gln Leu His Ile Lys Ala Phe His	
35 40 45	
gat tcc aat ggc gat gga atg ggg gat ttc aat ggc ctg atg cag cgg	192
Asp Ser Asn Gly Asp Gly Met Gly Asp Phe Asn Gly Leu Met Gln Arg	
50 55 60	
ctc gat tat gtc gaa cgg ctg ggc gtc aac acc ata tgg ctt ctg ccg	240
Leu Asp Tyr Val Glu Arg Leu Gly Val Asn Thr Ile Trp Leu Leu Pro	
65 70 75 80	
ttc tat ccc tca ccg ctc cgg gat gac ggt tac gac atc gcg gat tac	288
Phe Tyr Pro Ser Pro Leu Arg Asp Asp Gly Tyr Asp Ile Ala Asp Tyr	
85 90 95	
cgc tcc atc aat cct tcc tac ggc acc atg cgc gat ttt cgc cgc ttc	336
Arg Ser Ile Asn Pro Ser Tyr Gly Thr Met Arg Asp Phe Arg Arg Phe	
100 105 110	
gtg gcc gaa gcg cac cgg cgc ggc atc cgg gtg atc acg gaa ctg gtc	384
Val Ala Glu Ala His Arg Arg Gly Ile Arg Val Ile Thr Glu Leu Val	
115 120 125	
atc aac cac acc tcc gac cag cat ccc tgg ttc cag cgg gca agg cac	432
Ile Asn His Thr Ser Asp Gln His Pro Trp Phe Gln Arg Ala Arg His	
130 135 140	
gcc aag aag ggt tcc gcc gcg cgg caa ttc tat gtc tgg aac gac gat	480
Ala Lys Lys Gly Ser Ala Ala Arg Gln Phe Tyr Val Trp Asn Asp Asp	
145 150 155 160	
gac gag cgc tat ccc gag aca cgc atc atc ttc ctg gat acg gaa aaa	528
Asp Glu Arg Tyr Pro Glu Thr Arg Ile Ile Phe Leu Asp Thr Glu Lys	
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tcc aac tgg acc tgg gat ccg gtc gcc ggc caa ttc ttc tgg cac cgc	576
Ser Asn Trp Thr Trp Asp Pro Val Ala Gly Gln Phe Phe Trp His Arg	
180 185 190	
ttc tat tcg cac cag ccg gat ctc ttt gat aat ccc cgg gtg ctc	624
Phe Tyr Ser His Gln Pro Asp Leu Asn Phe Asp Asn Pro Arg Val Leu	
195 200 205	
gac gct gtc atc agg atc atg cgt ttc tgg ctg gat atg ggg gtg gac	672
Asp Ala Val Ile Arg Ile Met Arg Phe Trp Leu Asp Met Gly Val Asp	
210 215 220	
ggg ctg agg ctc gac gcg att ccg tat ctc gtc gag cgc gac ggg acg	720
Gly Leu Arg Leu Asp Ala Ile Pro Tyr Leu Val Glu Arg Asp Gly Thr	
225 230 235 240	
aac aac gag aac ctg ccc gag acg cat gag atc ctg aag aaa ata cga	768
Asn Asn Glu Asn Leu Pro Glu Thr His Glu Ile Leu Lys Lys Ile Arg	
245 250 255	
aag gcg ctg gac gag aaa tat ccc gac cgg atg ctg ctt gcc gaa gcc	816
Lys Ala Leu Asp Glu Lys Tyr Pro Asp Arg Met Leu Leu Ala Glu Ala	
260 265 270	
aat cag tgg ccg gag gac acg cgc ccc tat ttc ggc gag ggg gac gag	864
Asn Gln Trp Pro Glu Asp Thr Arg Pro Tyr Phe Gly Glu Gly Asp Glu	
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Cys His Met Ala Phe His Phe Pro Leu Met Pro Arg Ile Tyr Met Ala	
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Leu Ala Gln Glu Asp Arg His Pro Ile Ser Asp Ile Met Arg Gln Thr	
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ccg gaa atc ccg gaa tca tgc caa tgg gcg att ttc ctg cgc aac cac	1008
Pro Glu Ile Pro Glu Ser Cys Gln Trp Ala Ile Phe Leu Arg Asn His	
325 330 335	
gac gaa ctg acg ctt gaa atg gtg acc gac cgc gag cgc gac tac ctt	1056
Asp Glu Leu Thr Leu Glu Met Val Thr Asp Arg Glu Arg Asp Tyr Leu	

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tgg	cg	acc	340	tat	gcg	gag	gac	gtg	345	cg	gcg	atc	aat	350	ctc	ggc	atc	1104
Trp	Arg	Thr	Tyr	Ala	Glu	Asp	Val	Arg	Ala	Arg	Ile	Asn	Leu	Gly	Ile			
		355					360					365						
cg	cg	cg	ctt	gcg	ccg	ctg	atg	cag	aac	gac	cg	cg	aag	atc	gag			1152
Arg	Arg	Arg	Leu	Ala	Pro	Leu	Met	Gln	Asn	Asp	Arg	Arg	Lys	Ile	Glu			
		370				375					380							
ctg	atg	aat	gcg	ctg	ctc	ttc	atg	cct	ggc	acg	ccg	atc	gtc	tat				1200
Leu	Met	Asn	Ala	Leu	Leu	Phe	Ser	Met	Gly	Thr	Pro	Ile	Val	Tyr				
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tat	ggc	gac	gag	ctc	ggc	atg	ggc	gac	aat	atc	tat	ctc	ggc	gac	cg			1248
Tyr	Gly	Asp	Glu	Leu	Gly	Met	Gly	Asp	Asn	Ile	Tyr	Leu	Gly	Asp	Arg			
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gac	ggg	gtg	cg	aca	ccc	atg	cag	tgg	gcg	ccc	gac	cg	aat	ggc	ggc			1296
Asp	Gly	Val	Arg	Thr	Pro	Met	Gln	Trp	Ala	Pro	Asp	Arg	Asn	Gly	Gly			
			420					425					430					
ttc	tca	cg	gcc	aac	ccg	caa	atg	ctt	tac	ctg	ccg	ccc	atc	atg	gac			1344
Phe	Ser	Arg	Ala	Asn	Pro	Gln	Met	Leu	Tyr	Leu	Pro	Pro	Ile	Met	Asp			
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ccg	gtc	tac	ggt	tac	cag	acc	atc	aat	gtg	gag	gcg	cag	gag	gca	gat			1392
Pro	Val	Tyr	Gly	Tyr	Gln	Thr	Ile	Asn	Val	Glu	Ala	Gln	Glu	Ala	Asp			
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cca	tcg	tcg	ctt	ctc	aac	tgg	gtg	cg	cgt	gtg	atc	ggc	gtg	cg	aag			1440
Pro	Ser	Ser	Leu	Leu	Asn	Trp	Val	Arg	Arg	Val	Ile	Gly	Val	Arg	Lys			
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Gln	His	Ser	Ala	Phe	Gly	Arg	Gly	Asp	Phe	Thr	Met	Leu	Tyr	Pro	Arg			
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aac	cg	cg	atc	ctt	gcc	tat	acg	cg	agc	gat	gca	aac	gag	acg	atc			1536
Asn	Arg	Arg	Ile	Leu	Ala	Tyr	Thr	Arg	Ser	Asp	Ala	Asn	Glu	Thr	Ile			
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ctg	tgc	gtg	gcc	aat	ctc	tcg	cg	tcg	cct	cag	gca	gtg	gaa	ctg	gat			1584
Leu	Cys	Val	Ala	Asn	Leu	Ser	Arg	Ser	Pro	Gln	Ala	Val	Glu	Leu	Asp			
		515					520					525						
ctt	tcg	aaa	tac	cg	aat	tgc	gtg	ccg	atc	gaa	ctt	gtc	agc	cag	tcg			1632
Leu	Ser	Lys	Tyr	Arg	Asn	Cys	Val	Pro	Ile	Glu	Leu	Val	Ser	Gln	Ser			
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Pro	Phe	Pro	Pro	Ile	Gly	Asp	Leu	Pro	Tyr	Met	Leu	Thr	Leu	Thr	Gly			
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tat	ggt	acc	ttc	tgg	gtg	ctc	gcg	agc	gag	gcg	cag	gcg	ccc	gaa				1728
Tyr	Gly	Thr	Phe	Trp	Phe	Val	Leu	Ala	Ser	Glu	Ala	Gln	Ala	Pro	Glu			
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tgg	cac	aac	aat	gtg	ccg	gag	cct	tgg	cct	gaa	ttc	ata	acg	ctt	acc			1776
Trp	His	Asn	Asn	Val	Pro	Glu	Pro	Leu	Pro	Glu	Phe	Ile	Thr	Leu	Thr			
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atg	gtg	gac	ggg	cg	atc	gag	cg	gcg	ctg	gaa	ggg	cg	gag	cg	cg			1824
Met	Val	Asp	Gly	Arg	Ile	Glu	Arg	Ala	Leu	Glu	Gly	Arg	Glu	Arg	Arg			
		595					600					605						
cag	ctc	gaa	cag	gat	gtt	ctg	ccg	caa	ttc	atg	cag	cg	caa	cg	tgg			1872
Gln	Leu	Glu	Gln	Asp	Val	Leu	Pro	Gln	Phe	Met	Gln	Arg	Gln	Arg	Trp			
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tat	ggc	gcc	aag	ggc	gag	ggg	ata	cg	tcc	gcc	ggg	ata	agt	gat	atc			1920
Tyr	Gly	Ala	Lys	Gly	Glu	Gly	Ile	Arg	Ser	Ala	Gly	Ile	Ser	Asp	Ile			
625					630					635					640			
gcc	aaa	ctg	ggt	gat	gaa	ggg	ggg	ctt	ctc	acc	atc	gtg	gat	gtc	gat			1968
Ala	Lys	Leu	Gly	Asp	Glu	Gly	Gly	Leu	Leu	Thr	Ile	Val	Asp	Val	Asp			
				645					650					655				
ctg	tcc	gtc	tcg	ggc	agg	cag	cg	tac	ctc	ctg	ccg	ctt	acc	gtc	ctc			2016
Leu	Ser	Val	Ser	Gly	Arg	Gln	Arg	Tyr	Leu	Leu	Pro	Leu	Thr	Val	Leu			
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tgg	ggc	gaa	gaa	aac	gtg	cag	ttc	ggg	gcg	ccc	aaa	ctt	tcc	gta	acg			2064
Trp	Gly	Glu	Glu	Asn	Val	Gln	Phe	Gly	Ala	Pro	Lys	Leu	Ser	Val	Thr			
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ctg	gca	cgt	gtg	cg	aaa	ggt	tcg	cgt	ctc	ggc	gcc	ctg	atc	gac	ggc			2112
Leu	Ala	Arg	Val	Arg	Lys	Gly	Ser	Arg	Leu	Gly	Ala	Leu	Ile	Asp	Gly			
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gcc	tat	gac	gac	cg	ttc	gcc	tcg	gag	ctg	atg	cg	cg	atg	cag	gaa			2160
Ala	Tyr	Asp	Asp	Arg	Phe	Ala	Ser	Glu	Leu	Met	Arg	Arg	Met	Gln	Glu			

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Glu	Gln	Leu	Thr	Ala	Met	His	Phe	Glu	Glu	Thr	Pro	Ser	Pro	Leu	Met						
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Lys	Ile	Phe	Arg	Arg	Leu	Arg	Pro	Gly	Asp	Gln	Pro	Glu	Val	Glu	Val						
	770					775					780										
gcg	cgc	ttc	ctg	acg	gag	gtc	gcg	ggc	ttc	agg	aat	acg	ccc	gcc	ttt						2400
Ala	Arg	Phe	Leu	Thr	Glu	Val	Ala	Gly	Phe	Arg	Asn	Thr	Pro	Ala	Phe						
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Leu	Gly	Met	Val	Glu	Tyr	Glu	Glu	Gln	Gly	Ala	Arg	Thr	Val	Leu	Ala						
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Ser	Val	Ser	Gly	Phe	Val	Glu	Asn	Gln	Gly	Asp	Ala	Trp	Gly	Val	Phe						
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gtg	cac	gcg	ctg	gag	cgg	cag	atc	gaa	gac	gaa	acc	ctt	gca	ccg	cct						2544
Val	His	Ala	Leu	Glu	Arg	Gln	Ile	Glu	Asp	Glu	Thr	Ala	Pro	Pro							
		835					840						845								
gcc	ccg	gcc	ggc	gcc	acg	ccg	gct	gag	ggg	acc	acg	gca	cag	ctc	ctc						2592
Ala	Pro	Ala	Gly	Ala	Thr	Pro	Ala	Glu	Gly	Thr	Thr	Ala	Gln	Leu	Leu						
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Tyr	Pro	Leu	Asp	Leu	Leu	Arg	Arg	Leu	Gly	Glu	Arg	Thr	Gly	Glu	Met						
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cac	gct	gcc	ctc	gcg	att	gaa	acc	gac	atg	gag	gct	ttc	cgg	tgc	gag						2688
His	Ala	Ala	Leu	Ala	Ile	Glu	Thr	Asp	Met	Glu	Ala	Phe	Arg	Cys	Glu						
				885				890						895							
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Pro	Ile	Arg	Arg	Ala	Asp	Ile	Ala	Ser	Trp	Val	Lys	Asp	Leu	Lys	Gln						
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Gln	Ala	Ala	Ser	Ala	Arg	Ala	Ala	Leu	Glu	Arg	Asn	Lys	Asp	Arg	Leu						
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ccc	ctc	aac	ata	agg	gaa	agc	gtg	gag	cac	ctt	ctg	tct	ctg	aga	caa						2832
Pro	Leu	Asn	Ile	Arg	Glu	Ser	Val	Glu	His	Leu	Leu	Ser	Leu	Arg	Gln						
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Lys	Lys	Ser	Arg	Ile	His	Gly	Asp	Tyr	His	Leu	Gly	Gln	Val	Leu	Val						
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Ser	Lys	Gln	Asp	Leu	Tyr	Ile	Ile	Asp	Phe	Glu	Gly	Glu	Pro	Arg	Arg						
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Arg	Gln	Trp	Arg	Glu	Arg	Met	Ser	Ala	Glu	Phe	Leu	Glu	Gly	Tyr	Arg						
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gaa	gcc	ctg	ctc	gaa	ctt	ttc	ctg	ttg	cag	aag	ggt	ttc	tac	gaa	atc						3264
Glu	Ala	Leu	Leu	Glu	Leu	Phe	Leu	Leu	Gln	Lys	Gly	Phe	Tyr	Glu	Ile						

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<212> PRT

<213> Mesorhizobium sp. BNC1

<400> 346

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 Ala Glu Ala Val Gln Val Val Pro Pro Ala Gly Pro Arg Pro Pro Asp
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 Trp Tyr Lys Asp Ala Val Ile Tyr Gln Leu His Ile Lys Ala Phe His
 35 40 45
 Asp Ser Asn Gly Asp Gly Met Gly Asp Phe Asn Gly Leu Met Gln Arg
 50 55 60
 Leu Asp Tyr Val Glu Arg Leu Gly Val Asn Thr Ile Trp Leu Leu Pro
 65 70 75 80
 Phe Tyr Pro Ser Pro Leu Arg Asp Asp Gly Tyr Asp Ile Ala Asp Tyr
 85 90 95
 Arg Ser Ile Asn Pro Ser Tyr Gly Thr Met Arg Asp Phe Arg Arg Phe
 100 105 110
 Val Ala Glu Ala His Arg Arg Gly Ile Arg Val Ile Thr Glu Leu Val
 115 120 125
 Ile Asn His Thr Ser Asp Gln His Pro Trp Phe Gln Arg Ala Arg His
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 Ala Lys Lys Gly Ser Ala Ala Arg Gln Phe Tyr Val Trp Asn Asp Asp
 145 150 155 160
 Asp Glu Arg Tyr Pro Glu Thr Arg Ile Ile Phe Leu Asp Thr Glu Lys
 165 170 175
 Ser Asn Trp Thr Trp Asp Pro Val Ala Gly Gln Phe Phe Trp His Arg
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 Phe Tyr Ser His Gln Pro Asp Leu Asn Phe Asp Asn Pro Arg Val Leu
 195 200 205
 Asp Ala Val Ile Arg Ile Met Arg Phe Trp Leu Asp Met Gly Val Asp
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 Gly Leu Arg Leu Asp Ala Ile Pro Tyr Leu Val Glu Arg Asp Gly Thr
 225 230 235 240
 Asn Asn Glu Asn Leu Pro Glu Thr His Glu Ile Leu Lys Lys Ile Arg
 245 250 255
 Lys Ala Leu Asp Glu Lys Tyr Pro Asp Arg Met Leu Leu Ala Glu Ala
 260 265 270
 Asn Gln Trp Pro Glu Asp Thr Arg Pro Tyr Phe Gly Glu Gly Asp Glu
 275 280 285
 Cys His Met Ala Phe His Phe Pro Leu Met Pro Arg Ile Tyr Met Ala
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 Leu Ala Gln Glu Asp Arg His Pro Ile Ser Asp Ile Met Arg Gln Thr
 305 310 315 320
 Pro Glu Ile Pro Glu Ser Cys Gln Trp Ala Ile Phe Leu Arg Asn His
 325 330 335
 Asp Glu Leu Thr Leu Glu Met Val Thr Asp Arg Glu Arg Asp Tyr Leu
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 Trp Arg Thr Tyr Ala Glu Asp Val Arg Ala Arg Ile Asn Leu Gly Ile
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 Arg Arg Arg Leu Ala Pro Leu Met Gln Asn Asp Arg Arg Lys Ile Glu
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 Leu Met Asn Ala Leu Leu Phe Ser Met Pro Gly Thr Pro Ile Val Tyr
 385 390 395 400
 Tyr Gly Asp Glu Leu Gly Met Gly Asp Asn Ile Tyr Leu Gly Asp Arg
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 Asp Gly Val Arg Thr Pro Met Gln Trp Ala Pro Asp Arg Asn Gly Gly
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Gln 435	His 450	Ser 465	Ala 485	Phe 500	Gly 515	Arg 530	Gly 545	Asp 565	Phe 575	Thr 590	Met 605	Leu 620	Tyr 635	Leu 650	Arg 665
Asn 435	Arg 450	Arg 465	Ile 485	Leu 500	Ala 515	Tyr 530	Thr 545	Arg 565	Ser 575	Asp 590	Ala 605	Asn 620	Glu 635	Asn 650	Ile 665
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Pro 545	Phe 555	Pro 570	Pro 585	Ile 595	Gly 610	Asp 625	Leu 635	Pro 650	Tyr 665	Met 680	Leu 695	Thr 710	Leu 725	Thr 740	Gly 755
Tyr 545	Gly 555	Thr 570	Phe 585	Trp 595	Phe 610	Val 625	Leu 635	Ala 650	Ser 665	Glu 680	Ala 695	Gln 710	Ala 725	Pro 740	Glu 755
Trp 545	His 555	Asn 570	Asn 585	Val 595	Pro 610	Glu 625	Pro 635	Leu 650	Pro 665	Glu 680	Phe 695	Ile 710	Thr 725	Thr 740	Thr 755
Met 545	Val 555	Asp 570	Gly 585	Arg 595	Ile 610	Glu 625	Arg 635	Ala 650	Leu 665	Glu 680	Gly 695	Arg 710	Gly 725	Arg 740	Arg 755
Gln 545	Leu 555	Glu 570	Gln 585	Asp 595	Val 610	Leu 625	Pro 635	Gln 650	Phe 665	Met 680	Gln 695	Arg 710	Gln 725	Gln 740	Trp 755
Tyr 625	Gly 635	Ala 650	Lys 665	Gly 680	Glu 695	Gly 710	Ile 725	Arg 740	Ser 755	Ala 770	Gly 785	Ile 800	Val 815	Ser 830	Ala 845
Ala 625	Lys 635	Leu 650	Gly 665	Asp 680	Glu 695	Gly 710	Gly 725	Leu 740	Leu 755	Thr 770	Ile 785	Val 800	Asp 815	Val 830	Val 845
Leu 625	Ser 635	Val 650	Ser 665	Gly 680	Arg 695	Gln 710	Arg 725	Tyr 740	Leu 755	Pro 770	Leu 785	Thr 800	Pro 815	Thr 830	Leu 845
Trp 625	Gly 635	Glu 650	Glu 665	Asn 680	Val 695	Gln 710	Phe 725	Gly 740	Ala 755	Pro 770	Lys 785	Leu 800	Ser 815	Val 830	Thr 845
Leu 625	Ala 635	Arg 650	Val 665	Arg 680	Lys 695	Gly 710	Ser 725	Arg 740	Leu 755	Gly 770	Ala 785	Leu 800	Ile 815	Asp 830	Gly 845
Ala 705	Tyr 715	Asp 730	Asp 740	Arg 755	Phe 770	Ala 785	Ser 800	Glu 815	Leu 830	Met 845	Arg 860	Arg 875	Met 890	Gln 905	Glu 920
Asn 705	Gln 715	Glu 730	Met 740	Gln 755	Val 770	Pro 785	Gly 800	Gly 815	Thr 830	Leu 845	Arg 860	Phe 875	Tyr 890	Gly 905	Asn 920
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Lys 785	Ile 795	Phe 810	Arg 820	Arg 835	Leu 850	Arg 865	Pro 880	Gly 895	Asp 910	Gln 925	Pro 940	Glu 955	Val 970	Glu 985	Val 995
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 1010 1015 1020
 Val Ala Ala Arg Leu Pro Asp Gln Thr Arg Asp Gly Ser Ser Leu Ala
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 Arg Gln Trp Arg Glu Arg Met Ser Ala Glu Phe Leu Glu Gly Tyr Arg
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 Ala Ala Ala Ser Val Ala Gln Asn Gln Pro Ala Asp Gly Ala Thr Trp
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 Glu Ala Leu Leu Glu Leu Phe Leu Leu Gln Lys Gly Phe Tyr Glu Ile
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ccg gat tgg tgg cgc ggt gcg gtg atc tac cag att tat ccg cgc agc	96
Pro Asp Trp Trp Arg Gly Ala Val Ile Tyr Gln Ile Tyr Pro Arg Ser	
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tac caa gac agc aat ggc gac ggc gat ctg cag ggt atc acg	144
Tyr Gln Asp Ser Asn Gly Asp Gly Ile Gly Asp Leu Gln Gly Ile Thr	
35 40 45	
tca cgt ctg gac cac atc gcc tct ctt ggg gtg gat gcc atc tgg att	192
Ser Arg Leu Asp His Ile Ala Ser Leu Gly Val Asp Ala Ile Trp Ile	
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tcg ccc ttt ttc acg tca ccg atg aaa gac tat ggc tac gat gtc agc	240
Ser Pro Phe Phe Thr Ser Pro Met Lys Asp Tyr Gly Tyr Asp Val Ser	
65 70 75 80	
gac tac tgc gat gtt gat ccg atg ttt ggc aac ctc gca gat ttt gac	288
Asp Tyr Cys Asp Val Asp Pro Met Phe Gly Asn Leu Ala Asp Phe Asp	
85 90 95	
gcg ctg gtg gcg cgg gcg cat gat ctc ggc ctg cgg gtg atg atc gat	336
Ala Leu Val Ala Arg Ala His Asp Leu Gly Leu Arg Val Met Ile Asp	
100 105 110	
ctg gtg ctg tcg cat agt tcg gat cag cac cct tgg ttc gcc gag agc	384
Leu Val Leu Ser His Ser Ser Asp Gln His Pro Trp Phe Ala Glu Ser	
115 120 125	
cgt cag agc cgc gac aac cca aag gcc gac tgg tac gtc tgg gcc gat	432
Arg Gln Ser Arg Asp Asn Pro Lys Ala Asp Trp Tyr Val Trp Ala Asp	
130 135 140	
ccc caa gaa gac ggc acg ccg ccg aac aac tgg ctg tcg atc ttt ggc	480
Pro Gln Glu Asp Gly Thr Pro Pro Asn Asn Trp Leu Ser Ile Phe Gly	
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Gly Ser Ala Trp His Trp Asp Ala Arg Arg Glu Gln Tyr Tyr Leu His	
165 170 175	
aat ttt ctg gtc tcg cag cct gac cta aat ttc cat tgt ccg gac gtg	576
Asn Phe Leu Val Ser Gln Pro Asp Leu Asn Phe His Cys Pro Asp Val	
180 185 190	
cag aat gcg ctt ttg gat gtg acc cgc ttc tgg ctc gag cgg gga gtc	624
Gln Asn Ala Leu Leu Asp Val Thr Arg Phe Trp Leu Glu Arg Gly Val	
195 200 205	
gat ggg ttc cgc ttg gac acc atc aat ttc tac atc cac gac aag gag	672
Asp Gly Phe Arg Leu Asp Thr Ile Asn Phe Tyr Ile His Asp Lys Glu	

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Leu	Arg	Ser	Asn	Pro	Ala	Leu	Pro	Lys	Asp	Gln	Arg	Asn	Ala	Asn	Ile	240			
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Ala	Pro	Ser	Val	Asn	Pro	Tyr	Asn	His	Gln	Glu	His	Leu	Tyr	Ser	Lys	255			
	aac	cag	ccg	gaa	aac	ctc	gat	ttt	ctc	gcg	cgg	ttc	cgt	gcg	ctt	ttg		816	
Asn	Gln	Pro	Glu	Asn	Leu	Asp	Phe	Leu	Ala	Arg	Phe	Arg	Ala	Leu	Leu	270			
	gac	gaa	tac	ccg	gcc	aag	acc	gcg	ggt	ggc	gaa	gtc	ggc	gat	gcg	cag		864	
Asp	Glu	Tyr	Pro	Ala	Lys	Thr	Ala	Val	Gly	Glu	Val	Gly	Asp	Ala	Gln	285			
	cgc	ggg	ctg	gaa	cta	ttg	gga	cag	tac	acg	gcc	ggc	aac	acc	ggt	gtc		912	
Arg	Gly	Leu	Glu	Leu	Leu	Gly	Gln	Tyr	Thr	Ala	Gly	Asn	Thr	Gly	Val	300			
	cac	atg	tgc	tat	gcc	ttc	gag	ttc	ctg	gcc	aaa	gat	ccg	cta	acc	gcc		960	
His	Met	Cys	Tyr	Ala	Phe	Glu	Phe	Leu	Ala	Lys	Asp	Pro	Leu	Thr	Ala	320			
305	gcg	cg	gtg	gct	gag	ggt	ttt	gag	cg	aca	gat	gag	gta	gca	gcc	gat		1008	
Ala	Arg	Val	Ala	Glu	Val	Phe	Glu	Arg	Thr	Asp	Glu	Val	Ala	Ala	Asp	335			
	ggt	tgg	gcc	tgt	tgg	gcc	ttc	tcc	aac	cat	gat	ggt	cag	cg	cac	gtc		1056	
Gly	Trp	Ala	Cys	Trp	Ala	Phe	Ser	Asn	His	Asp	Val	Gln	Arg	His	Val	350			
	agc	cga	tgg	ggg	ttg	tcg	gac	gct	gcg	ctg	cg	ctc	cat	gcg	act	ttg		1104	
Ser	Arg	Trp	Gly	Leu	Ser	Asp	Ala	Ala	Leu	Arg	Leu	His	Ala	Thr	Leu	365			
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Gly	Ile	Glu	Phe	Trp	Pro	Glu	Phe	Lys	Gly	Arg	Asp	Gly	Cys	Arg	Thr	415			
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Pro	Met	Val	Trp	Arg	Ser	Asp	Asn	Thr	His	Gly	Gly	Phe	Ser	Glu	Ala	430			
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Arg	Pro	Trp	Leu	Pro	Val	Ser	Leu	Glu	His	Ala	Ala	Ala	Leu	Ser	Val	Ala	445		
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Glu	Gln	Glu	Ala	Asn	Pro	Asp	Ala	Leu	Leu	His	His	Tyr	Arg	Arg	Val	460			
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Ile	Ala	Leu	Arg	Arg	Ala	His	Ala	Ala	Ala	Leu	Ser	His	Gly	Thr	His	Asp	480		
465	aag	gtc	gtg	gca	agc	ggg	tct	gtc	gtt	cat	ttt	ctg	cg	agc	gcc	gag		1488	
Lys	Val	Val	Ala	Ser	Gly	Ser	Val	Val	His	Phe	Leu	Arg	Ser	Ala	Glu	495			
	tcc	gag	gac	atc	ttc	tgt	gcc	ttc	aat	ctt	ggc	gag	gcg	gcg	gca	gag		1536	
Ser	Glu	Asp	Ile	Phe	Cys	Ala	Phe	Asn	Leu	Gly	Glu	Ala	Ala	Ala	Glu	510			
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Val	Ser	Leu	Pro	Ala	Gly	Thr	Trp	Glu	Gln	Leu	Gly	Ala	Asp	Ile	Gly	525			
	act	gcc	gaa	atc	aat	ggt	gat	ctg	gtg	aaa	ctt	ggc	cct	tgg	caa	gcc		1632	
Thr	Ala	Glu	Ile	Asn	Gly	Asp	Leu	Val	Lys	Leu	Gly	Pro	Trp	Gln	Ala	540			
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Cys	Leu	Val	Arg	Arg	Val												550		
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<212> PRT

<213> silicibacter sp. TM1040

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 35 40 45
 Ser Arg Leu Asp His Ile Ala Ser Leu Gly Val Asp Ala Ile Trp Ile
 50 55 60
 Ser Pro Phe Phe Thr Ser Pro Met Lys Asp Tyr Gly Tyr Asp Val Ser
 65 70 75 80
 Asp Tyr Cys Asp Val Asp Pro Met Phe Gly Asn Leu Ala Asp Phe Asp
 85 90 95
 Ala Leu Val Ala Arg Ala His Asp Leu Gly Leu Arg Val Met Ile Asp
 100 105 110
 Leu Val Leu Ser His Ser Ser Asp Gln His Pro Trp Phe Ala Glu Ser
 115 120 125
 Arg Gln Ser Arg Asp Asn Pro Lys Ala Asp Trp Tyr Val Trp Ala Asp
 130 135 140
 Pro Gln Glu Asp Gly Thr Pro Pro Asn Asn Trp Leu Ser Ile Phe Gly
 145 150 155 160
 Gly Ser Ala Trp His Trp Asp Ala Arg Arg Glu Gln Tyr Tyr Leu His
 165 170 175
 Asn Phe Leu Val Ser Gln Pro Asp Leu Asn Phe His Cys Pro Asp Val
 180 185 190
 Gln Asn Ala Leu Leu Asp Val Thr Arg Phe Trp Leu Glu Arg Gly Val
 195 200 205
 Asp Gly Phe Arg Leu Asp Thr Ile Asn Phe Tyr Ile His Asp Lys Glu
 210 215 220
 Leu Arg Ser Asn Pro Ala Leu Pro Lys Asp Gln Arg Asn Ala Asn Ile
 225 230 235 240
 Ala Pro Ser Val Asn Pro Tyr Asn His Gln Glu His Leu Tyr Ser Lys
 245 250 255
 Asn Gln Pro Glu Asn Leu Asp Phe Leu Ala Arg Phe Arg Ala Leu Leu
 260 265 270
 Asp Glu Tyr Pro Ala Lys Thr Ala Val Gly Glu Val Gly Asp Ala Gln
 275 280 285
 Arg Gly Leu Glu Leu Leu Gly Gln Tyr Thr Ala Gly Asn Thr Gly Val
 290 295 300
 His Met Cys Tyr Ala Phe Glu Phe Leu Ala Lys Asp Pro Leu Thr Ala
 305 310 315 320
 Ala Arg Val Ala Glu Val Phe Glu Arg Thr Asp Glu Val Ala Ala Asp
 325 330 335
 Gly Trp Ala Cys Trp Ala Phe Ser Asn His Asp Val Gln Arg His Val
 340 345 350
 Ser Arg Trp Gly Leu Ser Asp Ala Ala Leu Arg Leu His Ala Thr Leu
 355 360 365
 Ile Met Cys Leu Arg Gly Ser Val Cys Ile Tyr Gln Gly Glu Glu Leu
 370 375 380
 Gly Leu Pro Glu Ala Asp Ile Ser Phe Glu Asp Leu Gln Asp Pro Tyr
 385 390 395 400
 Gly Ile Glu Phe Trp Pro Glu Phe Lys Gly Arg Asp Gly Cys Arg Thr
 405 410 415
 Pro Met Val Trp Arg Ser Asp Asn Thr His Gly Gly Phe Ser Glu Ala
 420 425 430
 Arg Pro Trp Leu Pro Val Ser Leu Glu His Ala Ala Leu Ser Val Ala
 435 440 445
 Glu Gln Glu Ala Asn Pro Asp Ala Leu Leu His His Tyr Arg Arg Val
 450 455 460
 Ile Ala Leu Arg Arg Ala His Ala Ala Leu Ser His Gly Thr His Asp
 465 470 475 480
 Lys Val Val Ala Ser Gly Ser Val Val His Phe Leu Arg Ser Ala Glu
 485 490 495
 Ser Glu Asp Ile Phe Cys Ala Phe Asn Leu Gly Glu Ala Ala Ala Glu
 500 505 510
 Val Ser Leu Pro Ala Gly Thr Trp Glu Gln Leu Gly Ala Asp Ile Gly
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535

540

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Asp Leu Trp Tyr Lys Asp Ala Ile Ile Tyr Gln Leu His Val Lys Ala
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ttc gcc gac agc aac aac gat ggc atc ggc gac ttc gcc ggg ctg acc 144
Phe Ala Asp Ser Asn Asn Asp Gly Ile Gly Asp Phe Ala Gly Leu Thr
35 40 45
aac aag ctt gac tac ctt cag gaa ctg ggc gtt acg acg ctg tgg ctg 192
Asn Lys Leu Asp Tyr Leu Gln Glu Leu Gly Val Thr Thr Leu Trp Leu
50 55 60
ctg ccg ttc tat ccg tcc ccg gga cgc gac gat gga tac gac atc gcc 240
Leu Pro Phe Tyr Pro Ser Pro Gly Arg Asp Asp Gly Tyr Asp Ile Ala
65 70 75 80
gat tac ggt tcg gtc aac ccc gac ttc ggc acg atg aag gat ttc cgt 288
Asp Tyr Gly Ser Val Asn Pro Asp Phe Gly Thr Met Lys Asp Phe Arg
85 90 95
cgc ttc atc tcc gag gcg cgg cgg cgc ggc ctt cgg gtg atc acg gaa 336
Arg Phe Ile Ser Glu Ala Arg Arg Arg Gly Leu Arg Val Ile Thr Glu
100 105 110
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Leu Val Ile Asn His Thr Ser Asp Gln His Arg Trp Phe Lys Arg Ala
115 120 125
cag cgc agc ccg ccc gga tcg agc gca cgc aac tgg tat gtc tgg agc 432
Gln Arg Ser Pro Pro Gly Ser Ala Arg Asn Trp Tyr Val Trp Ser
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gac acc gac aaa aaa tac cag gac acg cgg atc att ttc acc gac acg 480
Asp Thr Asp Lys Lys Tyr Gln Asp Thr Arg Ile Ile Phe Thr Asp Thr
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Glu Lys Ser Asn Trp Ala Trp Asp Ala Glu Ala Lys Ala Tyr Tyr Trp
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cat cgt ttc ttc acg cat cag ccg gac ctc aat ttc gac aat ccg cgc 576
His Arg Phe Phe Thr His Gln Pro Asp Leu Asn Phe Asp Asn Pro Arg
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Val Asp Gly Phe Arg Leu Asp Ala Ile Pro Tyr Leu Cys Glu Arg Asp
210 215 220
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Ile Arg Ala Glu Leu Asp Ala Tyr Ala Lys Gly Lys Val Leu Leu Ala
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Glu Ala Asn Gln Trp Pro Glu Asp Val Gln Ser Tyr Phe Gly Asp Gly
260 265 270
gac gag tgc cat atg gcc tat cat ttc ccg ctg atg ccg cgc atc tat 864
Asp Glu Cys His Met Ala Tyr His Phe Pro Leu Met Pro Arg Ile Tyr
275 280 285

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Gln	Thr	Pro	Asp	Ile	Pro	Pro	Asn	Cys	Gln	Trp	Ala	Met	Phe	Leu	Arg	
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Asn	His	Asp	Glu	Leu	Thr	Leu	Glu	Met	Val	Thr	Asp	Ile	Glu	Arg	Asp	
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Tyr	Leu	Trp	Ser	Ile	Tyr	Ala	Ala	Asp	Pro	Arg	Ala	Arg	Ile	Asn	Leu	
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Gly	Ile	Arg	Arg	Leu	Ala	Pro	Leu	Met	Asp	Asn	Asp	Arg	Arg	Lys		
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Gly	Gly	Phe	Ser	Arg	Cys	Asp	Pro	Ala	Arg	Leu	Tyr	Ala	Pro	Pro	Val	
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Met	Asp	Ala	Val	Tyr	Gly	Tyr	Glu	Ser	Val	Asn	Val	Glu	Ala	Gln	Ser	
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Arg	Ser	Leu	Phe	Ser	Leu	Leu	Asn	Trp	Met	Lys	Lys	Leu	Ile	Ser	Val	
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cg	aaa	tcg	agc	cac	gtc	ttc	ggc	cgt	ggc	acc	atg	tcc	ttc	gtg	cg	1440
Arg	Lys	Ser	Ser	His	Val	Phe	Gly	Arg	Gly	Thr	Met	Ser	Phe	Val	Arg	
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Ser	Ser	Asn	Arg	Ser	Val	Leu	Ala	Tyr	Val	Arg	Lys	Asn	Asn	Asp	Glu	
				485					490					495		
gtc	gtg	ctc	tgc	gtc	gcc	aac	ctg	tcg	cga	tcg	gca	cag	gct	tcc	gaa	1536
Val	Val	Leu	Cys	Val	Ala	Asn	Leu	Ser	Arg	Ser	Ala	Gln	Ala	Ser	Glu	
			500					505					510			
ctc	gat	ctg	tcg	cac	tgg	aaa	ggc	cg	tcg	ccg	atc	gaa	atg	ctg	gga	1584
Leu	Asp	Leu	Ser	His	Trp	Lys	Gly	Arg	Ser	Pro	Ile	Glu	Met	Leu	Gly	
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cga	acg	acg	ttt	ccc	gat	atc	ggc	gaa	ctg	cct	tat	ctg	atc	acg	ctc	1632
Arg	Thr	Thr	Phe	Pro	Asp	Ile	Gly	Glu	Leu	Pro	Tyr	Leu	Ile	Thr	Leu	
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gcg	cct	tac	ggt	ttc	tac	tgg	ttc	cg	ctg	acc	gaa	aag	ccg	ccg	tcg	1680
Ala	Pro	Tyr	Gly	Phe	Tyr	Trp	Phe	Arg	Leu	Thr	Glu	Lys	Pro	Pro	Ser	
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Pro	Asn	Val	Ala	Ala	Val	Ile	Val	Pro	Asp	Tyr	Glu	Thr	Leu	Val	Val	
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Pro	Leu	Gly	Ala	Thr	Trp	Met	Ser	Leu	Ala	Arg	Thr	Arg	Ser	Ile	Phe	
			580					585					590			
gag	cg	gat	gtc	ctg	cct	tcg	cat	ctc	gcc	cg	tcg	cg	tgg	ttc	ccc	1824
Glu	Arg	Asp	Val	Leu	Pro	Ser	His	Leu	Ala	Arg	Ser	Arg	Trp	Phe	Pro	
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gag	cg	tcg	gcc	agc	gcc	atc	gcc	gcg	cgt	gtc	ccg	gca	gcg	ata	ccg	1872
Glu	Arg	Ser	Ala	Ser	Ala	Ile	Ala	Ala	Arg	Val	Pro	Ala	Ala	Ile	Pro	
		610				615					620					
ctc	atg	aaa	gac	cag	gtt	tca	cg	cca	tgg	ctg	gtg	atc	ttc	gac	gtc	1920
Leu	Met	Lys	Asp	Gln	Val	Ser	Arg	Pro	Trp	Leu	Val	Ile	Phe	Asp	Val	
				630						635					640	
acc	cat	cg	ggg	cag	tcg	ggg	cga	tac	gcg	atg	ccg	atc	cga	atc	cga	1968
Thr	His	Arg	Gly	Gln	Ser	Gly	Arg	Tyr	Ala	Met	Pro	Ile	Arg	Ile	Arg	
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Val	Arg	Gln	Gly	Ser	Arg	Glu	Gly	Thr	Leu	Ile	Asp	Ala	Ala	Tyr	Glu	
		675					680					685				
aac	gac	ctg	atc	gcc	ggc	atc	atc	gac	ggg	ctg	cgc	cac	cgg	acg	acc	2112
Asn	Asp	Leu	Ile	Ala	Gly	Ile	Ile	Asp	Gly	Leu	Arg	His	Arg	Thr	Thr	
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Phe	Glu	Glu	Gly	Glu	Leu	Arg	Leu	Ala	Tyr	His	Pro	Thr	Glu	Arg	Leu	
705					710					715					720	
gcc	tcg	att	gca	gag	gag	ccg	att	ggc	aac	gtg	cgc	gcg	gtg	cag	acc	2208
Ala	Ser	Ile	Ala	Glu	Glu	Pro	Ile	Gly	Asn	Val	Arg	Ala	Val	Gln	Thr	
				725					730					735		
gaa	caa	tcg	aac	agc	acc	gcg	ctg	gta	gac	cag	agg	ttc	gtc	gtc	aaa	2256
Glu	Gln	Ser	Asn	Ser	Thr	Ala	Leu	Val	Asp	Gln	Arg	Phe	Val	Val	Lys	
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Ile	Tyr	Arg	Lys	Leu	Glu	Asn	Gly	Ile	Asn	Pro	Glu	Val	Glu	Val	Gly	
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cgc	ttc	ctg	acg	gac	gtc	gcc	gga	ttc	gcc	aat	acg	ccc	gcc	ctg	ctc	2352
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ggc	agc	gcc	gaa	ctg	acc	ggc	ccc	gat	gtc	cag	gcc	ggt	gcc	att		2400
Gly	Ser	Ala	Glu	Leu	Thr	Gly	Pro	Asp	Val	Gln	Ala	Ala	Val	Ala	Ile	
785				790						795				800		
gtc	cat	gcc	ttt	gtc	ggc	aac	cag	ggg	gac	gca	tgg	acc	gtc	agc	aac	2448
Val	His	Ala	Phe	Val	Gly	Asn	Gln	Gly	Asp	Ala	Trp	Thr	Val	Ser	Asn	
				805					810					815		
gct	gca	ctg	gat	cgc	ttt	atc	gac	gag	cag	cgg	ctg	gtc	ggc	gct	agc	2496
Ala	Ala	Leu	Asp	Arg	Phe	Ile	Asp	Glu	Gln	Arg	Leu	Val	Gly	Ala	Ser	
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gat	tcg	gct	ccg	gcg	ctt	gaa	gag	aag	gcg	gcg	tat	cag	cgc	tcg	atg	2544
Asp	Ser	Ala	Pro	Ala	Leu	Glu	Glu	Lys	Ala	Ala	Tyr	Gln	Arg	Ser	Met	
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aag	cag	atc	ggc	aag	cgc	gtc	gcg	gaa	atg	cac	gtc	gcg	ctg	gcc	agc	2592
Lys	Gln	Ile	Gly	Lys	Arg	Val	Ala	Glu	Met	His	Val	Ala	Leu	Ala	Ser	
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cgc	aac	gac	atc	gcg	aat	ttc	cgt	ccc	gaa	cct	gta	acg	cct	tcg	gac	2640
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ctc	gcg	cac	ctc	atc	gat	cgt	ttg	atg	atg	cgc	gcc	ggg	caa	acg	ttc	2688
Leu	Ala	His	Leu	Ile	Asp	Arg	Leu	Met	Met	Arg	Ala	Gly	Gln	Thr	Phe	
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Asp	Arg	Leu	Ala	Gln	Val	Lys	Leu	Ala	Asp	Ser	Asp	Arg	Leu	Leu	Ala	
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Asp	Glu	Ile	Leu	Ser	Ile	Arg	Pro	Thr	Leu	His	Gly	Arg	Leu	Thr	Glu	
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Phe	His	Leu	Gly	Gln	Ile	Leu	Val	Val	Arg	Asp	Asp	Val	Phe	Ile	Ile	
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Asp	Phe	Glu	Gly	Glu	Pro	Arg	Arg	Ser	Leu	Pro	Glu	Arg	Arg	Leu	Lys	
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gcg	ccg	gcg	gcc	cgc	gat	gtc	gcc	ggg	ctg	atc	cgg	tcc	atc	gac	tat	2976
Ala	Pro	Ala	Ala	Arg	Asp	Val	Ala	Gly	Leu	Ile	Arg	Ser	Ile	Asp	Tyr	
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tcc	gtc	acc	aca	gcg	caa	gag	cgc	gtc	ctc	aag	acc	gga	acg	gac	gac	3024
Ser	Val	Thr	Thr	Ala	Gln	Glu	Arg	Val	Leu	Lys	Thr	Gly	Thr	Asp	Asp	
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Asp	Gly	Arg	Leu	Ala	Glu	Glu	Leu	Ser	Ala	Trp	Arg	Asn	Glu	Ala	Thr	
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Gln Thr Phe Leu Thr Ala Tyr Arg Glu Ala Met Ser Asp Pro Arg Leu	
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tgg ccg cag gat aac gac cac gcc gac agg acg ctg cgg ttc ttc ctg	3168
Trp Pro Gln Asp Asn Asp His Ala Asp Arg Thr Leu Arg Phe Phe Leu	
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ctc gaa aag gcg ttc tat gaa atc gac tac gag ctc gcg cat cgc ccg	3216
Leu Glu Lys Ala Phe Tyr Glu Ile Asp Tyr Glu Leu Ala His Arg Pro	
1060 1065 1070	
gac tgg ctt cgt gtc gca ttg ggc ggc gca ctt cgc gtg ctg cgc aaa	3264
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Phe Ala Asp Ser Asn Asn Asp Gly Ile Gly Asp Phe Ala Gly Leu Thr	
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Asn Lys Leu Asp Tyr Leu Gln Glu Leu Gly Val Thr Leu Trp Leu	
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Leu Pro Phe Tyr Pro Ser Pro Gly Arg Asp Asp Gly Tyr Asp Ile Ala	
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Asp Tyr Gly Ser Val Asn Pro Asp Phe Gly Thr Met Lys Asp Phe Arg	
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Arg Phe Ile Ser Glu Ala Arg Arg Arg Gly Leu Arg Val Ile Thr Glu	
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Leu Val Ile Asn His Thr Ser Asp Gln His Arg Trp Phe Lys Arg Ala	
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Gln Arg Ser Pro Pro Gly Ser Ser Ala Arg Asn Trp Tyr Val Trp Ser	
130 135 140	
Asp Thr Asp Lys Lys Tyr Gln Asp Thr Arg Ile Ile Phe Thr Asp Thr	
145 150 155 160	
Glu Lys Ser Asn Trp Ala Trp Asp Ala Glu Ala Lys Ala Tyr Tyr Trp	
165 170 175	
His Arg Phe Phe Thr His Gln Pro Asp Leu Asn Phe Asp Asn Pro Arg	
180 185 190	
Val Val Arg Ala Val Ile Gln Val Met Lys Arg Trp Leu Asp Ala Gly	
195 200 205	
Val Asp Gly Phe Arg Leu Asp Ala Ile Pro Tyr Leu Cys Glu Arg Asp	
210 215 220	
Gly Thr Asn Asn Glu Asn Leu Pro Glu Thr His Ala Val Ile Lys His	
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Ile Arg Ala Glu Leu Asp Ala Tyr Ala Lys Gly Lys Val Leu Leu Ala	
245 250 255	
Glu Ala Asn Gln Trp Pro Glu Asp Val Gln Ser Tyr Phe Gly Asp Gly	
260 265 270	
Asp Glu Cys His Met Ala Tyr His Phe Pro Leu Met Pro Arg Ile Tyr	
275 280 285	
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290 295 300	
Gln Thr Pro Asp Ile Pro Pro Asn Cys Gln Trp Ala Met Phe Leu Arg	
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Asn His Asp Glu Leu Thr Leu Glu Met Val Thr Asp Ile Glu Arg Asp	
325 330 335	
Tyr Leu Trp Ser Ile Tyr Ala Ala Asp Pro Arg Ala Arg Ile Asn Leu	
340 345 350	
Gly Ile Arg Arg Arg Leu Ala Pro Leu Met Asp Asn Asp Arg Arg Lys	
355 360 365	
Ile Glu Leu Met Asn Ser Leu Leu Met Ser Phe Pro Gly Thr Pro Ile	

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Asp	Arg	Asn	Gly	Val 405	Arg	Thr	Pro	Met	Gln 410	Trp	Thr	Pro	Asp	Arg	Asn 415
Gly	Gly	Phe	Ser 420	Arg	Cys	Asp	Pro	Ala 425	Arg	Leu	Tyr	Ala	Pro 430	Pro	Val
Met	Asp	Ala 435	Val	Tyr	Gly	Tyr	Glu 440	Ser	Val	Asn	Val	Glu 445	Ala	Gln	Ser
Arg	Ser 450	Leu	Phe	Ser	Leu	Leu 455	Asn	Trp	Met	Lys	Lys 460	Leu	Ile	Ser	Val
Arg 465	Lys	Ser	Ser	His	Val 470	Phe	Gly	Arg	Gly	Thr 475	Met	Ser	Phe	Val	Arg 480
Ser	Ser	Asn	Arg	Ser 485	Val	Leu	Ala	Tyr	Val 490	Arg	Lys	Asn	Asn	Asp 495	Glu
Val	Val	Leu	Cys 500	Val	Ala	Asn	Leu	Ser 505	Arg	Ser	Ala	Gln	Ala 510	Ser	Glu
Leu	Asp	Leu 515	Ser	His	Trp	Lys	Gly 520	Arg	Ser	Pro	Ile	Glu 525	Met	Leu	Gly
Arg	Thr 530	Thr	Phe	Pro	Asp	Ile 535	Gly	Glu	Leu	Pro	Tyr 540	Leu	Ile	Thr	Leu
Ala 545	Pro	Tyr	Gly	Phe	Tyr 550	Trp	Phe	Arg	Leu	Thr 555	Glu	Lys	Pro	Pro	Ser 560
Pro	Asn	Val	Ala	Ala 565	Val	Ile	Val	Pro	Asp 570	Tyr	Glu	Thr	Leu	Val 575	Val
Pro	Leu	Gly	Ala 580	Thr	Trp	Met	Ser	Leu 585	Ala	Arg	Thr	Arg	Ser	Ile 590	Phe
Glu	Arg	Asp 595	Val	Leu	Pro	Ser	His 600	Leu	Ala	Arg	Ser	Arg 605	Trp	Phe	Pro
Glu 610	Arg	Ser	Ala	Ser	Ala	Ile 615	Ala	Ala	Arg	Val	Pro 620	Ala	Ala	Ile	Pro
Leu 625	Met	Lys	Asp	Gln	Val 630	Ser	Arg	Pro	Trp	Leu 635	Val	Ile	Phe	Asp	Val 640
Thr	His	Arg	Gly	Gln 645	Ser	Gly	Arg	Tyr	Ala 650	Met	Pro	Ile	Arg	Ile 655	Arg
Trp	Asp	Arg	Leu 660	Asp	Arg	Arg	Asn	Tyr 665	Asp	Ala	Lys	Asn	Ile 670	Ala	Ala
Val	Arg	Gln 675	Gly	Ser	Arg	Glu	Gly 680	Thr	Leu	Ile	Asp	Ala 685	Ala	Tyr	Glu
Asn	Asp 690	Leu	Ile	Ala	Gly	Ile 695	Ile	Asp	Gly	Leu	Arg 700	His	Arg	Thr	Thr
Phe 705	Glu	Glu	Gly	Glu	Leu 710	Arg	Leu	Ala	Tyr	His 715	Pro	Thr	Glu	Arg	Leu 720
Ala	Ser	Ile	Ala	Glu 725	Glu	Pro	Ile	Gly	Asn 730	Val	Arg	Ala	Val	Gln 735	Thr
Glu	Gln	Ser	Asn 740	Ser	Thr	Ala	Leu	Val 745	Asp	Gln	Arg	Phe	Val 750	Val	Lys
Ile	Tyr	Arg 755	Lys	Leu	Glu	Asn	Gly 760	Ile	Asn	Pro	Glu	Val 765	Glu	Val	Gly
Arg	Phe 770	Leu	Thr	Asp	Val	Ala 775	Gly	Phe	Ala	Asn	Thr 780	Pro	Ala	Leu	Leu
Gly 785	Ser	Ala	Glu	Leu	Thr 790	Gly	Pro	Asp	Val	Gln 795	Ala	Ala	Val	Ala	Ile 800
Val	His	Ala	Phe	Val 805	Gly	Asn	Gln	Gly	Asp 810	Ala	Trp	Thr	Val	Ser	Asn 815
Ala	Ala	Leu	Asp 820	Arg	Phe	Ile	Asp	Glu 825	Gln	Arg	Leu	Val	Gly 830	Ala	Ser
Asp	Ser	Ala 835	Pro	Ala	Leu	Glu	Glu 840	Lys	Ala	Ala	Tyr	Gln 845	Arg	Ser	Met
Lys	Gln 850	Ile	Gly	Lys	Arg	Val 855	Ala	Glu	Met	His	Val 860	Ala	Leu	Ala	Ser
Arg 865	Asn	Asp	Ile	Ala	Asn 870	Phe	Arg	Pro	Glu	Pro 875	Val	Thr	Pro	Ser	Asp 880
Leu	Ala	His	Leu	Ile 885	Asp	Arg	Leu	Met	Met 890	Arg	Ala	Gly	Gln	Thr 895	Phe
Asp	Arg	Leu	Ala 900	Gln	Val	Lys	Leu	Ala 905	Asp	Ser	Asp	Arg	Leu 910	Leu	Ala
Asp	Glu	Ile 915	Leu	Ser	Ile	Arg	Pro 920	Thr	Leu	His	Gly	Arg 925	Leu	Thr	Glu

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Leu 930 Pro Pro Ser Ile Gln Met Tyr Asn Ile Arg His His Gly Asp
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 Asp Phe Glu Gly Glu Pro Arg Arg Ser Leu Pro Glu Arg Arg Leu Lys
 Ala Pro Ala Ala Arg Asp Val Ala Gly Leu Ile Arg Ser Ile Asp Tyr
 Ser Val Thr Thr Ala Gln Glu Arg Val Leu Lys Thr Gly Thr Asp Asp
 Asp Gly Arg Leu Ala Glu Ala Leu Ser Ala Trp Arg Asn Glu Ala Thr
 Gln Thr Phe Leu Thr Ala Tyr Arg Glu Ala Met Ser Asp Pro Arg Leu
 Trp Pro Gln Asp Asn Asp His Ala Asp Arg Thr Leu Arg Phe Phe Leu
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 Met Asn Leu Ala Ile Ala Ala Gln Ser Pro Ser Ser Phe Thr Ile Asn
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 Ala Glu Pro Met Phe Trp Trp Ala Gly Met Glu Asn Ser Gln Leu Glu
 35 40 45
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 Leu Leu Ile Glu Gly Asp Asn Val Ala Ala Leu Thr Pro Lys Leu Ser
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 Gln Gln Gln Gly Ile Thr Leu Val Lys Thr Glu Arg Ser Thr Ser Pro
 65 70 75 80
 aac cat ttg ttt gtt act ctg gat ctg cat caa gcc cag ccg caa aca 288
 Asn His Leu Phe Val Thr Leu Asp Leu His Gln Ala Gln Pro Gln Thr
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 tta acc att gat ttt tat gaa tta aac aat cct aaa aaa ccc gct aca 336
 Leu Thr Ile Asp Phe Tyr Glu Leu Asn Asn Pro Lys Lys Pro Ala Thr
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 Ala Thr Leu Ala Tyr Gln Leu Lys Pro Arg Thr Ser Asp Ser Lys Gln
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 180 185 190
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acc	aca	gtg	caa	gac	ccc	tat	gcc	gcg	agc	acc	gac	acc	caa	gcc	ttc	912	
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Pro	His	Phe	Ala	Thr	Tyr	Leu	Ile	Gln	Asn	Ser	Ile	Trp	Trp	Val	Glu		
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Val	Pro	Ser	Met	Met	Asp	Phe	Pro	Leu	Tyr	Glu	Lys	Leu	Ile	Ala	Ser		
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Leu	Thr	Gln	Val	Glu	Gly	Trp	Asp	Thr	Gly	Leu	Val	Asn	Leu	Tyr	Glu		
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Asp	Leu	Ala	Leu	Phe	Lys	Met	Ala	Met	Ala	Tyr	Val	Leu	Thr	Ser	Asn		
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Arg	Ile	Pro	Gln	Ile	Phe	Tyr	Gly	Thr	Glu	Val	Leu	Met	Thr	Ser	Pro		
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Trp	Gln	Gly	Asp	Ser	Gln	Asn	Ala	Ile	Thr	Gly	Asp	Asn	Leu	Ser	Pro		
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Ala	Gln	Ile	Glu	Ala	Gln	His	Phe	Ile	Lys	Thr	Leu	Leu	Asn	Tyr	Arg		
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Lys	His	Ser	Asp	Ala	Ile	Ile	Asn	Gly	Thr	Leu	Ser	His	Tyr	Ala	Pro		
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Met	Ser	Ile	Tyr 580	Asn	Lys	Asn	Ser	Ala 585	Pro	Val	Asn	Leu	Ala 590	Leu	Gly		
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Arg	Phe	Ala 595	Glu	His	Ile	Gly	Lys 600	His	Thr	Gln	Ala	Ser 605	Asn	Ile	Leu		
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Glu	His	Thr	Glu	Phe	Asp	Leu 615	Asn	Asp	Ser	Ile	Ser 620	Leu	Thr	Lys	Lys		
610																	
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Gly	Val	Thr	Leu	Leu	Lys 630	Leu	Ser	Thr	Leu	Lys 635	Leu	Ser	Thr	His	Lys 640		
625																	
ccc	tag																1926
Pro																	

<210> 352

<211> 641

<212> PRT

<213> Shewanella denitrificans OS-217

<400> 352

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			20					25				30					
Ala	Glu	Pro	Met	Phe	Trp	Trp	Ala	Gly	Met	Glu	Asn	Ser	Gln	Leu	Glu		
		35					40				45						
Leu	Leu	Ile	Glu	Gly	Asp	Asn	Val	Ala	Ala	Leu	Thr	Pro	Lys	Leu	Ser		
	50				55						60						
Gln	Gln	Gln	Gly	Ile	Thr	Leu	Val	Lys	Thr	Glu	Arg	Ser	Thr	Ser	Pro		
65				70					75					80			
Asn	His	Leu	Phe	Val	Thr	Leu	Asp	Leu	His	Gln	Ala	Gln	Pro	Gln	Thr		
			85						90					95			
Leu	Thr	Ile	Asp	Phe	Tyr	Glu	Leu	Asn	Asn	Pro	Lys	Lys	Pro	Ala	Thr		
			100					105					110				
Ala	Thr	Leu	Ala	Tyr	Gln	Leu	Lys	Pro	Arg	Thr	Ser	Asp	Ser	Lys	Gln		
		115					120					125					
Arg	Gln	Gly	Phe	Ser	Asn	Lys	Asp	Val	Ile	Tyr	Leu	Ile	Thr	Pro	Asp		
	130					135					140						
Arg	Phe	Ala	Asn	Gly	Asn	Pro	Asp	Asn	Asp	Asn	His	Thr	Thr	Met	Leu		
145				150				155						160			
Glu	Lys	Val	Asn	Arg	Ser	Asp	Lys	Asp	Gly	Arg	His	Gly	Gly	Asp	Ile		
			165					170					175				
Gln	Gly	Ile	Ile	Glu	Ala	Leu	Pro	Tyr	Leu	Ala	Asp	Leu	Gly	Val	Thr		
			180					185					190				
Gln	Leu	Trp	Ile	Asn	Pro	Leu	Leu	Glu	Asn	Asn	Gln	Glu	Lys	Tyr	Ser		
		195				200					205						
Tyr	His	Gly	Tyr	Ser	Ile	Thr	Asn	Phe	Tyr	Arg	Ile	Asp	Pro	Arg	Phe		
	210					215				220							
Gly	Ser	Asn	Gln	Asp	Tyr	Val	Asn	Leu	Val	Gln	Gln	Ala	Asn	Lys	Leu		
225				230					235					240			
Gly	Ile	Gly	Val	Ile	Lys	Asp	Ile	Val	Val	Asn	His	Met	Gly	Ser	Gly		
			245					250					255				
His	Pro	Trp	Met	Thr	Asn	Phe	Pro	Ser	Ala	Thr	Trp	Val	Asn	Gly	Gln		
		260						265					270				
Ala	Ser	Leu	Gln	Gln	Gln	Leu	Pro	Leu	Asp	Phe	Thr	Asn	His	Arg	Arg		
		275					280					285					
Thr	Thr	Val	Gln	Asp	Pro	Tyr	Ala	Ala	Ser	Thr	Asp	Thr	Gln	Ala	Phe		
	290					295					300						
Ser	Asp	Gly	Trp	Phe	Thr	Asp	Thr	Met	Pro	Asp	Met	Asn	Gln	Thr	Asp		
305				310					315					320			
Pro	His	Phe	Ala	Thr	Tyr	Leu	Ile	Gln	Asn	Ser	Ile	Trp	Trp	Val	Glu		
			325					330					335				
Tyr	Ala	Gly	Leu	Ser	Gly	Ile	Arg	Glu	Asp	Thr	Tyr	Ser	Tyr	Ala	Asp		
		340						345				350					
Lys	Ala	Phe	Leu	Thr	Gln	Trp	Ser	Lys	Ala	Ile	Met	Thr	Glu	Tyr	Pro		

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Lys Phe 355 Ile Val Gly Glu 360 Trp Ser Pro Asn 365 Ile Thr Val
 Ser Tyr 370 Trp Gln Ala Gly Lys 375 His Asn Lys Asp Gly Tyr Val Ser His
 Val 385 Pro Ser Met Met 390 Asp Phe Pro Leu Tyr 395 Glu Lys Leu Ile Ala Ser
 Leu Thr Gln Val 405 Glu Gly Trp Asp Thr 410 Gly Leu Val Asn Leu Tyr Glu
 Met Leu Ala Asn Asp Val Val Tyr Ala Glu Pro Thr Gln Leu Val Leu
 Phe Glu Gly Asn His Asp Thr 425 Asn Arg Leu Tyr Ser 430 Leu Met Asn Glu
 Asp 435 Ala Leu Phe Lys 440 Met Ala Tyr Val Leu Thr Ser Asn
 Arg 450 Ile Pro Gln Ile Phe Tyr Gly Thr Glu Val Leu Met Thr Ser Pro
 Thr Lys Asp Arg 465 Asn Asp Gly Leu Val Arg Ser Asp Phe Pro Gly Gly
 Trp Gln Gly Asp Ser Gln Asn Ala Ile Thr Gly Asp Asn Leu Ser Pro
 Ala Gln Ile Glu Ala Gln His 475 Phe Ile Lys Thr Leu Leu Asn Tyr Arg
 Lys 480 His Ser Asp Ala Ile 485 Asn Gly Thr Leu Ser His Tyr Ala Pro
 Gln 490 Asp Gly Val Tyr Val Gln Phe Arg Gln Ala Gly Asp Glu Thr Leu
 Met Ser Ile Tyr 500 Asn Lys Asn Ser Ala Pro Val Asn Leu Ala Leu Gly
 Arg Phe Ala Glu His Ile Gly Lys 505 His Thr Gln Ala Ser Asn Ile Leu
 Glu His Thr Glu Phe Asp Leu 510 Asn Asp Ser Ile Ser Leu Thr Lys Lys
 Gly Val Thr Leu Leu Lys 515 Leu Ser Thr Leu Lys Leu Ser Thr His Lys
 Pro 520

<210> 353
 <211> 1419
 <212> DNA
 <213> Thermotoga neapolitana

<220>
 <221> CDS
 <222> (1)..(1419)
 <223> transl_table=11

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 ttc ccg gac agg ttt ttc atc ggc aaa gga aag acc gtc gag gac aaa 96
 Phe Pro Asp Arg Phe Phe Ile Gly Lys 25 Gly Lys Thr Val Glu Asp Lys 30
 aaa gat ctt tat ctg aaa cga ggg gga acc atc gaa aaa tgg ggg gtt 144
 Lys Asp Leu Tyr Leu Lys Arg Gly 40 Gly Thr Ile Glu Lys Trp Gly Val 45
 cct cct cga aaa ctt ccc ggt gct cag cac gtg aag gtc ttc tac gga 192
 Pro Pro Arg Lys Leu Pro Gly 55 Ala Gln His Val Lys Val Phe Tyr Gly 60
 gga gat cta tgg gga ata gca gag aag atc gat tac tta gaa gaa ctc 240
 Gly Asp Leu Trp Gly 70 Ala Glu Lys Ile Asp Tyr Leu Glu Glu Leu 80
 gga gtt aac gca gtt tac ctc act cct atc ttt ctt tcc gat aca aat 288
 Gly Val Asn Ala Val Tyr Leu Thr Pro Ile Phe Leu Ser Asp Thr Asn 95
 cac aaa tac gat acg ata gat tat ttc aag atc gat cca cag ttc gga 336
 His Lys Tyr Asp Thr Ile Asp Tyr Phe Lys Ile Asp Pro Gln Phe Gly

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gga	aaa	cga	100	gcc	ttt	gta	cac	ctt	105	aaa	ggt	ctt	cac	110	agg	aac	384
Gly	Lys	Arg	115	Ala	Phe	Val	His	Leu	120	Lys	Val	Leu	His	125	Ser	Arg	Asn
atc	aaa	ctc	att	ctg	gac	ggt	gtg	ttc	aac	cac	ggt	gga	agt	cag	cat		432
Ile	Lys	Leu	Ile	Leu	Asp	Gly	Val	Phe	Asn	His	Val	Gly	Ser	Gln	His		
ccc	tgg	ttc	aaa	aag	gca	agg	aaa	gat	cct	gaa	tac	gtg	aac	cgt			480
Pro	Trp	Phe	Lys	Lys	Ala	Arg	Lys	Lys	Asp	Pro	Glu	Tyr	Val	Asn	Arg		
145					150				155					160			
ttc	ttt	ctt	tac	aga	gac	agg	cac	aga	tct	tgg	ttc	gac	gtg	gga	agt		528
Phe	Phe	Leu	Tyr	Arg	Asp	Arg	His	Arg	Ser	Trp	Phe	Asp	Val	Gly	Ser		
				165					170					175			
ttg	ccc	gaa	ctg	aac	gtg	gaa	ggt	gaa	gag	gtg	aga	gaa	tac	ata	ttg		576
Leu	Pro	Glu	Leu	Asn	Val	Glu	Val	Glu	Glu	Val	Arg	Glu	Tyr	Ile	Leu		
			180					185						190			
aaa	gtc	gtt	caa	cac	tac	ctg	gaa	gtg	ggt	gtg	gac	ggc	tgg	agg	ctc		624
Lys	Val	Val	Gln	His	Tyr	Leu	Glu	Val	Gly	Val	Asp	Gly	Trp	Arg	Leu		
			195				200					205					
gac	tgt	ggt	cac	gac	ctt	gga	cct	ctg	gtc	aac	ctg	tgg	atc	aac	atg		672
Asp	Cys	Gly	His	Asp	Leu	Gly	Pro	Leu	Val	Asn	Leu	Trp	Ile	Asn	Met		
	210					215					220						
aaa	gta	aag	gaa	ttc	tct	tct	gaa	aag	tat	ctt	gtg	agc	gag	ata	tgg		720
Lys	Val	Lys	Glu	Phe	Ser	Ser	Glu	Lys	Tyr	Leu	Val	Ser	Glu	Ile	Trp		
225					230				235						240		
acc	tac	ccg	gca	gga	tgg	gaa	atg	gtc	gat	gga	ttg	atg	aac	tac	aat		768
Thr	Tyr	Pro	Ala	Gly	Trp	Glu	Met	Val	Asp	Gly	Leu	Met	Asn	Tyr	Asn		
			245					250						255			
ttc	agg	agc	ctt	gtt	ttg	agc	tat	gtg	aac	gga	gaa	acg	gat	tct	ata		816
Phe	Arg	Ser	Leu	Val	Leu	Ser	Tyr	Val	Asn	Gly	Glu	Thr	Asp	Ser	Ile		
			260					265					270				
ggg	aca	gaa	ctc	gaa	agg	gct	tac	aga	gaa	aca	aag	aac	atc	ttc	ggg		864
Gly	Thr	Glu	Leu	Glu	Arg	Ala	Tyr	Arg	Glu	Thr	Lys	Asn	Ile	Phe	Gly		
			275				280					285					
tgc	tgg	aac	atg	cta	gac	agc	cac	gat	act	cca	agg	ctt	gca	acg	acg		912
Cys	Trp	Asn	Met	Leu	Asp	Ser	His	Asp	Thr	Pro	Arg	Leu	Ala	Thr	Thr		
	290					295					300						
gtc	cca	gtc	aaa	gat	ctc	aga	aaa	ctc	gct	ata	gtg	ctt	cag	ttc	aca		960
Val	Pro	Val	Lys	Asp	Leu	Arg	Lys	Leu	Ala	Ile	Val	Leu	Gln	Phe	Thr		
305					310				315						320		
tat	ccg	ggc	gtt	ccg	ctc	gtc	tat	tac	gga	aca	gag	ata	ggc	ctc	aca		1008
Tyr	Pro	Gly	Val	Pro	Leu	Val	Tyr	Tyr	Gly	Thr	Glu	Ile	Gly	Leu	Thr		
				325					330					335			
ggt	gga	gaa	gat	ccg	gag	tgt	cga	gcc	acc	atg	gaa	tgg	aac	agg	gaa		1056
Gly	Gly	Glu	Asp	Pro	Glu	Cys	Arg	Ala	Thr	Met	Glu	Trp	Asn	Arg	Glu		
			340					345					350				
aag	tgg	gac	atg	gag	ttg	ttt	gag	ttt	tac	aag	aag	atg	atc	agg	ttc		1104
Lys	Trp	Asp	Met	Glu	Leu	Phe	Glu	Phe	Tyr	Lys	Lys	Met	Ile	Arg	Phe		
		355					360					365					
agg	aga	acc	gat	cct	ggt	ttg	agg	ttt	ggc	gag	ttc	ata	ctt	ttg	aaa		1152
Arg	Arg	Thr	Asp	Pro	Gly	Leu	Arg	Phe	Gly	Glu	Phe	Ile	Leu	Leu	Lys		
						375					380						
gaa	aag	cca	ctt	gcc	ttc	atg	agg	aaa	gcc	ccg	cat	cct	ctt	caa	gac		1200
Glu	Lys	Pro	Leu	Ala	Phe	Met	Arg	Lys	Ala	Pro	His	Pro	Leu	Gln	Asp		
385					390				395						400		
acg	atc	gtt	gtg	gtg	aat	cct	gaa	gag	gaa	aaa	aac	gtt	gtt	ctc	tcc		1248
Thr	Ile	Val	Val	Val	Asn	Pro	Glu	Glu	Glu	Lys	Asn	Val	Val	Leu	Ser		
				405				410						415			
ctt	ccg	gat	gga	aag	atc	atg	aac	gca	act	cct	ctt	ttc	gac	atc	ttc		1296
Leu	Pro	Asp	Gly	Lys	Ile	Met	Asn	Ala	Thr	Pro	Leu	Phe	Asp	Ile	Phe		
			420					425					430				
acc	ggt	gag	aag	ttc	cat	gtg	gat	gga	gga	gtc	gtg	aag	gtg	ccc	gtt		1344
Thr	Gly	Glu	Lys	Phe	His	Val	Asp	Gly	Gly	Val	Val	Lys	Val	Pro	Val		
			435				440					445					
gga	aga	aga	tcg	ttc	agg	atc	tta	aag	ccg	atc	gac	ctc	aga	gtt	gga		1392
Gly	Arg	Arg	Ser	Phe	Arg	Ile	Leu	Lys	Pro	Ile	Asp	Leu	Arg	Val	Gly		
	450					455					460						
agg	tac	aga	ttg	tac	aag	aga	gtg	tga									1419
Arg	Tyr	Arg	Leu	Tyr	Lys	Arg	Val										

465

470

<210> 354

<211> 472

<212> PRT

<213> Thermotoga neapolitana

<400> 354

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Met Tyr Pro Ile Pro Ser Trp Val Tyr Asp Ser Val Val Tyr Gln Ile
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Phe Pro Asp Arg Phe Phe Ile Gly Lys Gly Lys Thr Val Glu Asp Lys
      20      25      30
Lys Asp Leu Tyr Leu Lys Arg Gly Gly Thr Ile Glu Lys Trp Gly Val
      35      40      45
Pro Pro Arg Lys Leu Pro Gly Ala Gln His Val Lys Val Phe Tyr Gly
      50      55      60
Gly Asp Leu Trp Gly Ile Ala Glu Lys Ile Asp Tyr Leu Glu Glu Leu
65      70      75      80
Gly Val Asn Ala Val Tyr Leu Thr Pro Ile Phe Leu Ser Asp Thr Asn
      85      90      95
His Lys Tyr Asp Thr Ile Asp Tyr Phe Lys Ile Asp Pro Gln Phe Gly
      100      105      110
Gly Lys Arg Ala Phe Val His Leu Leu Lys Val Leu His Ser Arg Asn
      115      120      125
Ile Lys Leu Ile Leu Asp Gly Val Phe Asn His Val Gly Ser Gln His
130      135      140
Pro Trp Phe Lys Lys Ala Arg Lys Lys Asp Pro Glu Tyr Val Asn Arg
145      150      155      160
Phe Phe Leu Tyr Arg Asp Arg His Arg Ser Trp Phe Asp Val Gly Ser
      165      170      175
Leu Pro Glu Leu Asn Val Glu Val Glu Glu Val Arg Glu Tyr Ile Leu
      180      185      190
Lys Val Val Gln His Tyr Leu Glu Val Gly Val Asp Gly Trp Arg Leu
195      200      205
Asp Cys Gly His Asp Leu Gly Pro Leu Val Asn Leu Trp Ile Asn Met
210      215      220
Lys Val Lys Glu Phe Ser Ser Glu Lys Tyr Leu Val Ser Glu Ile Trp
225      230      235      240
Thr Tyr Pro Ala Gly Trp Glu Met Val Asp Gly Leu Met Asn Tyr Asn
      245      250      255
Phe Arg Ser Leu Val Leu Ser Tyr Val Asn Gly Glu Thr Asp Ser Ile
      260      265      270
Gly Thr Glu Leu Glu Arg Ala Tyr Arg Glu Thr Lys Asn Ile Phe Gly
      275      280      285
Cys Trp Asn Met Leu Asp Ser His Asp Thr Pro Arg Leu Ala Thr Thr
290      295      300
Val Pro Val Lys Asp Leu Arg Lys Leu Ala Ile Val Leu Gln Phe Thr
305      310      315      320
Tyr Pro Gly Val Pro Leu Val Tyr Tyr Gly Thr Glu Ile Gly Leu Thr
      325      330      335
Gly Gly Glu Asp Pro Glu Cys Arg Ala Thr Met Glu Trp Asn Arg Glu
      340      345      350
Lys Trp Asp Met Glu Leu Phe Glu Phe Tyr Lys Lys Met Ile Arg Phe
      355      360      365
Arg Arg Thr Asp Pro Gly Leu Arg Phe Gly Glu Phe Ile Leu Leu Lys
      370      375      380
Glu Lys Pro Leu Ala Phe Met Arg Lys Ala Pro His Pro Leu Gln Asp
385      390      395      400
Thr Ile Val Val Val Asn Pro Glu Glu Glu Lys Asn Val Val Leu Ser
      405      410      415
Leu Pro Asp Gly Lys Ile Met Asn Ala Thr Pro Leu Phe Asp Ile Phe
      420      425      430
Thr Gly Glu Lys Phe His Val Asp Gly Gly Val Val Lys Val Pro Val
      435      440      445
Gly Arg Arg Ser Phe Arg Ile Leu Lys Pro Ile Asp Leu Arg Val Gly
450      455      460
Arg Tyr Arg Leu Tyr Lys Arg Val
465      470

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<210> 355
 <211> 1701
 <212> DNA
 <213> Bacteroides thetaiotaomicron

<220>
 <221> CDS
 <222> (1)..(1701)
 <223> transl_table=11

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<400> 355
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  1      5      10
ctt cac cag gta ttc gca aca agc act ata aag aaa gta gcc ccg acc      96
Leu His Gln Val Phe Ala Thr Ser Thr Ile Lys Lys Val Ala Pro Thr
      20      25      30
ttt tgg tgg gca gga atg aag aat ccc gaa ttg cag ata cta tta tat      144
Phe Trp Ala Gly Met Lys Asn Pro Glu Leu Gln Ile Leu Leu Tyr
      35      40      45
ggg gac cgc ata tca tcc gca gac gtc agt ctt tct gcc gat aat atc      192
Gly Asp Arg Ile Ser Ser Ala Asp Val Ser Leu Ser Ala Asp Asn Ile
      50      55      60
acg ctg caa gaa gtg gtg aag gag aat cct aat tat ctg gtt ctg      240
Thr Leu Gln Glu Val Val Lys Gln Glu Asn Pro Asn Tyr Leu Val Leu
      65      70      75
tat tta gac ctt tcg aag gct gct cca cag aac ttt gac atc atc ctg      288
Tyr Leu Asp Leu Ser Lys Ala Ala Pro Gln Asn Phe Asp Ile Ile Leu
      85      90      95
aaa caa ggc aaa aag cag ata aaa atc cct tac gag ctt aaa cag cgc      336
Lys Gln Gly Lys Lys Gln Ile Lys Ile Pro Tyr Glu Leu Lys Gln Arg
      100      105      110
cgg ccg aat gct tcg gca gta gaa ggt ttt gat tcg agc gac gtg ctt      384
Arg Pro Asn Ala Ser Ala Val Glu Gly Phe Asp Ser Ser Asp Val Leu
      115      120      125
tat ctt att atg ccg gac cgt ttt gcc aat ggc aac ccc tcc aac gac      432
Tyr Leu Ile Met Pro Asp Arg Phe Ala Asn Gly Asn Pro Ser Asn Asp
      130      135      140
atc att ccc gga atg ctg gaa gga aat gta gac cgt aat gag cct ttc      480
Ile Ile Pro Gly Met Leu Glu Gly Asn Val Asp Arg Asn Glu Pro Phe
      145      150      155
gca cgt cat ggc ggt gat ttg aaa gga ata gag aat cat ctg gat tac      528
Ala Arg His Gly Gly Asp Leu Lys Gly Ile Glu Asn His Leu Asp Tyr
      165      170      175
ata gca gac ctc gga gtc acc agt ata tgg ctc aac ccg att cag gaa      576
Ile Ala Asp Leu Gly Val Thr Ser Ile Trp Leu Asn Pro Ile Gln Glu
      180      185      190
aat gac atg aaa gaa gga tcg tat cac ggt tat gcc att acc gat tat      624
Asn Asp Met Lys Glu Gly Ser Tyr His Gly Tyr Ala Ile Thr Asp Tyr
      195      200      205
tat cag gta gac cgc cgc ttc ggc agt aac gaa gag ttc cgc aaa ctt      672
Tyr Gln Val Asp Arg Arg Phe Gly Ser Asn Glu Glu Phe Arg Lys Leu
      210      215      220
act cag gaa gct aat gcc aaa ggg ctg aaa gtc gta atg gac atg atc      720
Thr Gln Glu Ala Asn Ala Lys Gly Leu Lys Val Val Met Asp Met Ile
      225      230      235
ttc aac cat tgc ggt tcg gac aac tat ctg ttt aaa gat atg ccc tcc      768
Phe Asn His Cys Gly Ser Asp Asn Tyr Leu Phe Lys Asp Met Pro Ser
      245      250      255
aaa gac tgg ttt aac ttt gaa ggc aac tac gtg cag acc agc ttc aag      816
Lys Asp Trp Phe Asn Phe Glu Gly Asn Tyr Val Gln Thr Ser Phe Lys
      260      265      270
act gcc act caa atg gac ccg tat gct tcc gat tac gaa aag aaa atc      864
Thr Ala Thr Gln Met Asp Pro Tyr Ala Ser Asp Tyr Glu Lys Lys Ile
      275      280      285
gct atc gac ggt tgg ttc aca ctg acc atg ccg gac ttc aac caa aga      912
Ala Ile Asp Gly Trp Phe Thr Leu Thr Met Pro Asp Phe Asn Gln Arg
      290      295      300
aac cgt cat gta gct act tat ctg ata cag agc agt atc tgg tgg att      960

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Asn 305	Arg	His	Val	Ala	Thr 310	Tyr	Leu	Ile	Gln	Ser 315	Ser	Ile	Trp	Trp	Ile 320	
gaa Glu	tac Tyr	gcc Ala	ggt Gly	atc Ile 325	aac Asn	ggc Gly	atc Ile	cgt Arg	cag Gln 330	gat Asp	aca Thr	cac His	cct Pro	tat Tyr 335	gcc Ala	1008
gac Asp	ttc Phe	gat Asp	atg Met 340	atg Met	gca Ala	cgc Arg	tgg Trp	tcc Ser 345	aaa Lys	gcg Ala	gtc Val	aat Asn	gaa Glu 350	gaa Glu	tat Tyr	1056
ccc Pro	aag Lys	ttc Phe 355	aac Asn	att Ile	gta Val	ggc Gly	gaa Glu 360	aca Thr	tgg Trp	ctg Leu	ggc Gly 365	aac Asn	aat Asn	gta Val	ctc Leu	1104
atc Ile 370	tcc Ser	tac Tyr	tgg Trp	cag Gln	aaa Lys	gac Asp 375	agc Ser	aga Arg	ctc Leu	gct Ala 380	tat Tyr	ccg Pro	aag Lys	aac Asn	agc Ser	1152
aat Asn 385	ctc Leu	ccg Pro	act Thr	gtc Val 390	atg Met	gac Asp	ttc Phe	ccg Pro	cta Leu 395	atg Met	gaa Glu	gag Glu	atg Met	aac Asn	aag Lys 400	1200
gct Ala	ttc Phe	gac Asp	gaa Glu 405	gag Glu 405	act Thr	acc Thr	gaa Glu	tgg Trp	aac Asn 410	gga Gly	gga Gly	ctt Leu	ttc Phe	aga Arg 415	ctc Leu	1248
tac Tyr	gaa Glu	tat Tyr	cta Leu 420	tca Ser	cag Gln	gac Asp	atc Ile	gtc Val 425	tac Tyr	agc Ser	cat His	cca Pro	atg Met 430	agc Ser	ctg Leu	1296
ctg Leu	acc Thr	ttc Phe 435	ctc Leu	gac Asp	aat Asn	cac His	gat Asp 440	act Thr	tcc Ser	cgc Arg	ttc Phe 445	tac Tyr	cgt Arg	tcg Ser	gaa Glu	1344
gca Ala 450	gat Asp	aca Thr	aag Lys	aat Asn	ctg Leu	gac Asp 455	cga Arg	tac Tyr	aag Lys	caa Gln 460	gcc Ala	ctg Leu	acg Thr	ttc Phe	tta Leu	1392
ctg Leu 465	aca Thr	acc Thr	cgc Arg	gga Gly 470	ata Ile	ccg Pro	cag Gln	ata Ile	tat Tyr 475	tat Tyr	gga Gly	act Thr	gaa Glu	atc Ile	ctg Leu 480	1440
atg Met	gca Ala	gcc Ala	gac Asp	aag Lys 485	gcg Ala	aat Asn	gga Gly	gac Asp	ggc Gly 490	ctg Leu	ctc Leu	cgc Arg	tgc Cys	gac Asp 495	ttc Phe	1488
ccc Pro	gga Gly	ggc Gly	tgg Trp 500	ccg Pro	aac Asn	gat Asp	aca Thr	aaa Lys 505	tgc Cys	ttt Phe	gac Asp	gca Ala 510	gcc Ala	aac Asn		1536
cgc Arg	act Thr	cca Pro 515	cag Gln	caa Gln	aat Asn	gaa Glu	gca Ala 520	ttc Phe	tcc Ser	ttt Phe	atc Ile 525	aaa Lys	aac Asn	tgc Cys	tcc Ser	1584
aat Asn 530	gga Gly	gaa Glu	aag Lys	gaa Glu	acg Thr	aag Lys 535	tca Ser	ttg Leu	cca Pro	aag Lys	gtc Val 540	agc Ser	tca Ser	aac Asn	att Ile	1632
tcg Ser 545	cac His	cga Arg	ata Ile	aag Lys	gtg Val 550	tct Ser	acg Thr	ttt Phe	acg Thr	aac Asn 555	cca Pro	aat Asn	acg Thr	gtg Val	ata Ile 560	1680
aat Asn	cag Gln	tcg Ser	ttg Leu	ttt Phe 565	tcc Ser	tga										1701

<210> 356

<211> 566

<212> PRT

<213> Bacteroides thetaiotaomicron

<400> 356

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<212> DNA

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<220>

<221> CDS

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Gln	Trp	Tyr	Lys	Val	Gln	Asn	Gly	Gly	Ile	Thr	Leu	Thr	Leu	Gln	Ser	
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caa	aag	cag	gat	tta	gag	ttt	aag	tca	ttt	att	aaa	gat	ctt	att	cta	1584
Gln	Lys	Gln	Asp	Leu	Glu	Phe	Lys	Ser	Phe	Ile	Lys	Asp	Leu	Ile	Leu	
		515					520					525				
tgg	agg	aaa	aaa	cat	tcc	gaa	tgg	aat	gat	cct	aaa	ata	cac	tgg	aat	1632
Trp	Arg	Lys	Lys	His	Ser	Glu	Trp	Asn	Asp	Pro	Lys	Ile	His	Trp	Asn	
		530				535					540					
aat	gtc	gac	cat	ccg	gca	ggt	gtc	gct	ttt	agc	aga	gga	gaa	gta	cat	1680
Asn	Val	Asp	His	Pro	Ala	Val	Val	Ala	Phe	Ser	Arg	Gly	Glu	Val	His	
					550					555					560	
ttc	ctc	ctt	aat	aat	agt	gat	gaa	tct	tta	gct	att	aat	tat	cag	ggc	1728
Phe	Leu	Leu	Asn	Asn	Ser	Asp	Glu	Ser	Leu	Ala	Ile	Asn	Tyr	Gln	Gly	
				565					570					575		
aga	aca	cta	tct	ctg	aca	cct	ttt	ggg	ttt	tat	att	atc	ggt	ctg	gac	1776
Arg	Thr	Leu	Ser	Leu	Thr	Pro	Phe	Gly	Phe	Tyr	Ile	Ile	Gly	Leu	Asp	
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<210> 360

<211> 598

<212> PRT

<213> Klebsiella oxytoca

<400> 360

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 Gly Glu Val₃₅ Ala Lys Val Ser Leu₄₀ Trp Ile Gly Asp₄₅ Pro Tyr Gln Trp
 Glu Glu₅₀ Gly Gly Leu Asp Gly₅₅ Glu Asn Leu Gly₆₀ Gly Ser Asp Ala His
 Gly Trp Ser Gly Gly Asn₇₀ Glu Val His Met Glu₇₅ Lys Glu Gly Gln Ser₈₀
 Glu Ser Tyr Asp His₈₅ Trp Phe Ala Ala₉₀ Phe Thr Pro Cys Lys Arg₉₅ Arg
 Ser Arg Tyr Gly₁₀₀ Phe Ile Leu Tyr Gly₁₀₅ Asn Asn Gly Glu Lys₁₁₀ Leu Leu
 Phe Gly Glu₁₁₅ Arg Arg Cys Val Asp₁₂₀ Ile Ser Lys Pro Pro₁₂₅ Val Ala Glu
 Thr Glu₁₃₀ Leu Ser Asn Leu Ser₁₃₅ Asn Phe Phe Cys Phe₁₄₀ Pro Tyr Ile Asn
 Pro Gly Asp Val Leu Ser₁₅₀ Thr Pro Glu Trp Val₁₅₅ Lys Lys Thr Ile Trp
 Tyr Gln Ile Phe Pro₁₆₅ Glu Arg Phe Cys Asn₁₇₀ Gly Asp Pro Ser Ile Ser₁₇₅
 Pro Glu Asn Val₁₈₀ Gln Pro Trp Gly Thr₁₈₅ Pro Pro Asp Ser Lys₁₉₀ Asn Phe
 Met Gly Gly₁₉₅ Asp Leu Gln Gly Ile₂₀₀ Ile Asn Lys Leu Asp Tyr Leu Gln
 Asp Leu₂₁₀ Gly Val Asn Gly Leu₂₁₅ Tyr Leu Cys Pro Ile₂₂₀ Phe Thr Ala Asn
 Ala Ser His Lys Tyr Asp₂₃₀ Thr Val Asp Tyr Phe₂₃₅ Asn Val Asp Pro His₂₄₀
 Phe Gly Gly Asn Asp₂₄₅ Arg Phe Lys Glu Leu₂₅₀ Val Gln Lys Ala His₂₅₅ Gln
 Arg Gly Met Lys₂₆₀ Val Met Leu Asp Ala₂₆₅ Val Phe Asn His Ile₂₇₀ Gly Asn
 Gln Ser Pro₂₇₅ Leu Trp Leu Asp Val₂₈₀ Lys Asn Gly Asp₂₈₅ Lys Ser Pro
 Tyr Ala Asp Trp Phe Trp Ile₂₉₅ Lys Lys Phe Pro Val₃₀₀ Tyr Pro Ser Gly
 Asp Lys Asn Glu Trp Asp₃₁₀ Phe Arg Asn Phe Asn₃₁₅ Tyr Glu Thr Phe Gly₃₂₀
 Asn Val Ile Glu Met₃₂₅ Pro Lys Leu Asn Thr₃₃₀ Glu Asn Pro Ala Cys₃₃₅ Arg
 Asp Tyr Leu Leu₃₄₀ Gln Val Ala Arg Tyr₃₄₅ Trp Ile Glu Glu Phe₃₅₀ Asp Ile
 Asp Gly Trp Arg Leu Asp Val₃₆₀ Ala Asn Glu Val Asp His₃₆₅ Glu Phe Trp
 Arg Ala Phe Arg Arg Thr Val₃₇₅ Lys Ser Ile Lys Pro Asp Cys Tyr Ile
 Leu Gly Glu Ile Trp His₃₉₀ Glu Gly Met Pro Trp₃₉₅ Leu Arg Gly Asp Gln₄₀₀
 Phe Asp Ser Leu Met₄₀₅ Asn Tyr Pro Leu Met₄₁₀ Gln Ala Thr Thr Asp Tyr
 Phe Ala Leu Gln₄₂₀ Ala Tyr Asp Lys Lys₄₂₅ Thr Phe Ile Asp Ile Val Thr
 His Ala Tyr₄₃₅ Leu Cys Tyr Pro Arg₄₄₀ Asn Val Asn Glu Val₄₄₅ Met Phe Asn
 Leu Leu Glu Ser His Asp Thr₄₅₅ Ser Arg Leu Leu Ser₄₆₀ Leu Cys Gly Asn
 Asp Lys Arg Lys Ala Arg₄₇₀ Leu Ala Tyr Leu Phe₄₇₅ Met Phe Ser Gln Val
 Gly Ser Pro Cys Ile₄₈₅ Tyr Tyr Gly Ser Glu₄₉₀ Val Gly Met Asn Gly Ser
 Arg Ala Met Gly₅₀₀ Ser Glu Asp Asn Arg₅₀₅ Lys Cys Met Ile Trp Asp Glu
 Gln Lys Gln₅₁₅ Asp Leu Glu Phe Lys₅₂₀ Ser Phe Ile Lys Asp₅₂₅ Leu Ile Leu
 Trp Arg Lys Lys His Ser Glu₅₃₅ Trp Asn Asp Pro Lys₅₄₀ Ile His Trp Asn

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Asn Val Asp His Pro Ala Val Val Ala Phe Ser Arg Gly Glu Val His
 545 550 555 560
 Phe Leu Leu Asn Asn Ser Asp Glu Ser Leu Ala Ile Asn Tyr Gln Gly
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 Arg Thr Leu Ser Leu Thr Pro Phe Gly Phe Tyr Ile Ile Gly Leu Asp
 580 585 590
 His Lys Asp Ile Ile Ser
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<210> 361

<211> 1581

<212> DNA

<213> Bacillus sp

<220>

<221> CDS

<222> (1)..(1581)

<223> transl_table=11

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Phe	Val	Asn	Ala	Leu	Ile	Leu	Asn	Pro	Leu	Asn	Gly	Ala	Ala	Ala	Glu	
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acc	gta	cat	aaa	ggt	aaa	tct	cca	gct	gca	gat	aaa	aac	ggt	gta	ttt	144
Thr	Val	His	Lys	Gly	Lys	Ser	Pro	Ala	Ala	Asp	Lys	Asn	Gly	Val	Phe	
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tat	gag	gtg	tat	gta	aac	tct	ttt	tac	gat	gca	aat	aaa	gat	gga	cat	192
Tyr	Glu	Val	Tyr	Val	Asn	Ser	Phe	Tyr	Asp	Ala	Asn	Lys	Asp	Gly	His	
	50				55						60					
ggt	gat	tta	aaa	ggt	ctt	aca	caa	aag	ctg	gac	tat	tta	aat	gat	ggc	240
Gly	Asp	Leu	Lys	Gly	Leu	Thr	Gln	Lys	Leu	Asp	Tyr	Leu	Asn	Asp	Gly	
65				70					75						80	
aat	tct	cat	aca	aag	aat	gat	ctt	caa	gta	aac	ggg	att	tgg	atg	atg	288
Asn	Ser	His	Thr	Lys	Asn	Asp	Leu	Gln	Val	Asn	Gly	Ile	Trp	Met	Met	
				85					90					95		
ccg	gtc	aac	cct	tct	cct	agc	tat	cat	aaa	tat	gat	gta	acg	gac	tat	336
Pro	Val	Asn	Pro	Ser	Pro	Ser	Tyr	His	Lys	Tyr	Asp	Val	Thr	Asp	Tyr	
			100					105					110			
tat	aac	att	gat	cct	cag	tat	gga	aat	ctg	caa	gat	ttt	cgc	aaa	cta	384
Tyr	Asn	Ile	Asp	Pro	Gln	Tyr	Gly	Asn	Leu	Gln	Asp	Phe	Arg	Lys	Leu	
			115				120					125				
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Met	Lys	Glu	Ala	Asp	Lys	Arg	Asp	Val	Lys	Val	Ile	Met	Asp	Leu	Val	
	130					135					140					
gtg	aat	cat	acg	agc	agt	gaa	cac	cct	tgg	ttt	caa	gct	gcg	tta	aaa	480
Val	Asn	His	Thr	Ser	Ser	Glu	His	Pro	Trp	Phe	Gln	Ala	Ala	Leu	Lys	
145				150				155						160		
gat	aaa	aac	agc	aag	tac	aga	gat	tac	tat	att	tgg	gct	gat	aaa	gat	528
Asp	Lys	Asn	Ser	Lys	Tyr	Arg	Asp	Tyr	Tyr	Ile	Trp	Ala	Asp	Lys	Asp	
				165				170						175		
acc	gac	ttg	aat	gaa	aaa	gga	tct	tgg	ggg	cag	caa	gta	tcg	cat	aaa	576
Thr	Asp	Leu	Asn	Glu	Lys	Gly	Ser	Trp	Gly	Gln	Gln	Val	Ser	His	Lys	
			180				185						190			
gct	cca	aac	gga	gag	tat	ttt	tat	gga	acg	ttc	tgg	gaa	gga	atg	cct	624
Ala	Pro	Asn	Gly	Glu	Tyr	Phe	Tyr	Gly	Thr	Phe	Trp	Glu	Gly	Met	Pro	
		195					200					205				
gac	tta	aat	tac	gat	aac	cct	gaa	gta	aga	aaa	gaa	atg	att	aac	gtc	672
Asp	Leu	Asn	Tyr	Asp	Asn	Pro	Glu	Val	Arg	Lys	Glu	Met	Ile	Asn	Val	
			210			215					220					
gga	aag	ttt	tgg	cta	aag	caa	ggc	gtt	gac	ggc	ttc	cgc	tta	gat	gct	720
Gly	Lys	Phe	Trp	Leu	Lys	Gln	Gly	Val	Asp	Gly	Phe	Arg	Leu	Asp	Ala	
225				230			235								240	
gcc	ctc	cat	atc	ttt	aaa	ggt	caa	aca	cct	gaa	ggc	gct	aag	aaa	aat	768
Ala	Leu	His	Ile	Phe	Lys	Gly	Gln	Thr	Pro	Glu	Gly	Ala	Lys	Lys	Asn	
				245					250					255		
ctc	ctg	tgg	tgg	aat	gag	ttt	aga	gat	gca	atg	aaa	aaa	gaa	aac	cct	816

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Asn	Val	Tyr	Leu	Thr	Gly	Glu	Val	Trp	Asp	Gln	Pro	Glu	Val	Val	Ala		
	275						280					285					
cct	tat	tat	cag	tcg	ctt	gat	tcc	cta	ttt	aac	ttt	gat	tta	gca	gga		912
Pro	Tyr	Tyr	Gln	Ser	Leu	Asp	Ser	Leu	Phe	Asn	Phe	Asp	Leu	Ala	Gly		
	290						295				300						
aaa	att	gtc	agc	tct	gta	aaa	gca	gga	aat	gat	caa	gga	atc	gct	act		960
Lys	Ile	Val	Ser	Ser	Val	Lys	Ala	Gly	Asn	Asp	Gln	Gly	Ile	Ala	Thr		
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gca	gct	gcg	gca	aca	gat	gaa	ctg	ttc	aaa	tca	tac	aat	cca	aat	aaa		1008
Ala	Ala	Ala	Ala	Thr	Asp	Glu	Leu	Phe	Lys	Ser	Tyr	Asn	Pro	Asn	Lys		
				325					330					335			
att	gac	ggc	att	ttc	tta	acc	aat	cat	gac	caa	aat	cgc	gtc	atg	agt		1056
Ile	Asp	Gly	Ile	Phe	Leu	Thr	Asn	His	Asp	Gln	Asn	Arg	Val	Met	Ser		
			340					345					350				
gag	tta	agc	gga	gat	gtc	aat	aaa	gca	aag	tca	gct	gcc	tct	atc	tta		1104
Glu	Leu	Ser	Gly	Asp	Val	Asn	Lys	Ala	Lys	Ser	Ala	Ala	Ser	Ile	Leu		
		355					360					365					
ctt	acg	ctt	cct	gga	aat	ccg	tat	att	tat	tac	ggg	gaa	gaa	atc	ggc		1152
Leu	Thr	Leu	Pro	Gly	Asn	Pro	Tyr	Ile	Tyr	Tyr	Gly	Glu	Glu	Ile	Gly		
	370					375					380						
atg	acc	ggg	gaa	aag	cct	gat	gaa	tta	atc	cgt	gaa	cca	ttc	cgc	tgg		1200
Met	Thr	Gly	Glu	Lys	Pro	Asp	Glu	Leu	Ile	Arg	Glu	Pro	Phe	Arg	Trp		
385					390					395					400		
tac	gaa	gga	aac	gga	ctt	gga	caa	act	agt	tgg	gaa	aca	cct	gta	tac		1248
Tyr	Glu	Gly	Asn	Gly	Leu	Gly	Gln	Thr	Ser	Trp	Glu	Thr	Pro	Val	Tyr		
			405					410						415			
aat	aaa	ggc	ggc	aac	ggc	gtg	tct	gta	gaa	gca	caa	acc	aaa	caa	aag		1296
Asn	Lys	Gly	Gly	Asn	Gly	Val	Ser	Val	Glu	Ala	Gln	Thr	Lys	Gln	Lys		
			420					425					430				
gac	tct	ttg	tta	aat	cat	tat	cgt	gaa	atg	att	cgc	gtg	cgt	cag	cag		1344
Asp	Ser	Leu	Leu	Asn	His	Tyr	Arg	Glu	Met	Ile	Arg	Val	Arg	Gln	Gln		
		435					440					445					
cac	gaa	gag	tta	gta	aaa	gga	acg	ctt	caa	tct	att	tca	gta	gac	agt		1392
His	Glu	Glu	Leu	Val	Lys	Gly	Thr	Leu	Gln	Ser	Ile	Ser	Val	Asp	Ser		
	450					455					460						
aaa	gaa	gtt	gtt	gct	tat	agc	cgt	acg	tat	aaa	ggc	aac	tcc	att	agt		1440
Lys	Glu	Val	Val	Ala	Tyr	Ser	Arg	Thr	Tyr	Lys	Gly	Asn	Ser	Ile	Ser		
465					470					475					480		
gtg	tat	cat	aat	att	tca	aat	caa	cct	gta	aaa	gta	tct	gta	gca	gcg		1488
Val	Tyr	His	Asn	Ile	Ser	Asn	Gln	Pro	Val	Lys	Val	Ser	Val	Ala	Ala		
				485				490						495			
aaa	ggt	aaa	ttg	att	ttt	gct	agt	gaa	aaa	ggt	gct	aag	aaa	gtc	aag		1536
Lys	Gly	Lys	Leu	Ile	Phe	Ala	Ser	Glu	Lys	Gly	Ala	Lys	Lys	Val	Lys		
			500					505					510				
aat	cag	ctt	gta	att	ccg	gcg	aat	aca	tcg	gtt	ttg	ata	aaa	taa			1581
Asn	Gln	Leu	Val	Ile	Pro	Ala	Asn	Thr	Ser	Val	Leu	Ile	Lys				
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<211> 526

<212> PRT

<213> Bacillus sp

<400> 362

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			20					25					30				
Thr	Val	His	Lys	Gly	Lys	Ser	Pro	Ala	Ala	Asp	Lys	Asn	Gly	Val	Phe		
		35					40					45					
Tyr	Glu	Val	Tyr	Val	Asn	Ser	Phe	Tyr	Asp	Ala	Asn	Lys	Asp	Gly	His		
	50					55					60						
Gly	Asp	Leu	Lys	Gly	Leu	Thr	Gln	Lys	Leu	Asp	Tyr	Leu	Asn	Asp	Gly		
65					70				75						80		
Asn	Ser	His	Thr	Lys	Asn	Asp	Leu	Gln	Val	Asn	Gly	Ile	Trp	Met	Met		
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		115					120					125			
Met	Lys	Glu	Ala	Asp	Lys	Arg	Asp	Val	Lys	Val	Ile	Met	Asp	Leu	Val
	130					135					140				
Val	Asn	His	Thr	Ser	Ser	Glu	His	Pro	Trp	Phe	Gln	Ala	Ala	Leu	Lys
145					150					155				160	
Asp	Lys	Asn	Ser	Lys	Tyr	Arg	Asp	Tyr	Tyr	Ile	Trp	Ala	Asp	Lys	Asp
				165					170					175	
Thr	Asp	Leu	Asn	Glu	Lys	Gly	Ser	Trp	Gly	Gln	Gln	Val	Ser	His	Lys
			180					185					190		
Ala	Pro	Asn	Gly	Glu	Tyr	Phe	Tyr	Gly	Thr	Phe	Trp	Glu	Gly	Met	Pro
		195					200					205			
Asp	Leu	Asn	Tyr	Asp	Asn	Pro	Glu	Val	Arg	Lys	Glu	Met	Ile	Asn	Val
	210					215					220				
Gly	Lys	Phe	Trp	Leu	Lys	Gln	Gly	Val	Asp	Gly	Phe	Arg	Leu	Asp	Ala
225					230					235					240
Ala	Leu	His	Ile	Phe	Lys	Gly	Gln	Thr	Pro	Glu	Gly	Ala	Lys	Lys	Asn
				245					250					255	
Leu	Leu	Trp	Trp	Asn	Glu	Phe	Arg	Asp	Ala	Met	Lys	Lys	Glu	Asn	Pro
			260					265					270		
Asn	Val	Tyr	Leu	Thr	Gly	Glu	Val	Trp	Asp	Gln	Pro	Glu	Val	Val	Ala
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Pro	Tyr	Tyr	Gln	Ser	Leu	Asp	Ser	Leu	Phe	Asn	Phe	Asp	Leu	Ala	Gly
	290					295					300				
Lys	Ile	Val	Ser	Ser	Val	Lys	Ala	Gly	Asn	Asp	Gln	Gly	Ile	Ala	Thr
305					310					315					320
Ala	Ala	Ala	Ala	Thr	Asp	Glu	Leu	Phe	Lys	Ser	Tyr	Asn	Pro	Asn	Lys
				325					330					335	
Ile	Asp	Gly	Ile	Phe	Leu	Thr	Asn	His	Asp	Gln	Asn	Arg	Val	Met	Ser
			340					345					350		
Glu	Leu	Ser	Gly	Asp	Val	Asn	Lys	Ala	Lys	Ser	Ala	Ala	Ser	Ile	Leu
		355					360					365			
Leu	Thr	Leu	Pro	Gly	Asn	Pro	Tyr	Ile	Tyr	Tyr	Gly	Glu	Glu	Ile	Gly
	370					375					380				
Met	Thr	Gly	Glu	Lys	Pro	Asp	Glu	Leu	Ile	Arg	Glu	Pro	Phe	Arg	Trp
385					390					395					400
Tyr	Glu	Gly	Asn	Gly	Leu	Gly	Gln	Thr	Ser	Trp	Glu	Thr	Pro	Val	Tyr
				405					410					415	
Asn	Lys	Gly	Gly	Asn	Gly	Val	Ser	Val	Glu	Ala	Gln	Thr	Lys	Gln	Lys
			420					425					430		
Asp	Ser	Leu	Leu	Asn	His	Tyr	Arg	Glu	Met	Ile	Arg	Val	Arg	Gln	Gln
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His	Glu	Glu	Leu	Val	Lys	Gly	Thr	Leu	Gln	Ser	Ile	Ser	Val	Asp	Ser
	450					455					460				
Lys	Glu	Val	Val	Ala	Tyr	Ser	Arg	Thr	Tyr	Lys	Gly	Asn	Ser	Ile	Ser
465					470					475					480
Val	Tyr	His	Asn	Ile	Ser	Asn	Gln	Pro	Val	Lys	Val	Ser	Val	Ala	Ala
				485					490					495	
Lys	Gly	Lys	Leu	Ile	Phe	Ala	Ser	Glu	Lys	Gly	Ala	Lys	Lys	Val	Lys
			500					505					510		
Asn	Gln	Leu	Val	Ile	Pro	Ala	Asn	Thr	Ser	Val	Leu	Ile	Lys		
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<211> 1761

<212> DNA

<213> Anoxybacillus flavithermus

<220>

<221> CDS

<222> (1)..(1761)

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Ala	Tyr	Asp	Asp	Lys	Thr	Leu	His	Ile	Arg	Leu	Arg	Thr	Lys	Lys	Ser	
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gat	gtt	cat	gct	gtg	tcc	ctt	ttg	cat	ggt	gat	ccg	tat	tgt	tgg	gaa	144
Asp	Val	His	Ala	Val	Ser	Leu	Leu	His	Gly	Asp	Pro	Tyr	Cys	Trp	Glu	
		35				40						45				
gat	agg	caa	tgg	cag	ttt	aca	aaa	aca	gag	atg	aca	aaa	agc	gga	tca	192
Asp	Arg	Gln	Trp	Gln	Phe	Thr	Lys	Thr	Glu	Met	Thr	Lys	Ser	Gly	Ser	
	50				55						60					
gat	gcc	ttg	ttt	gac	tat	tgg	tgg	gtc	gcc	ata	tca	ccg	cca	tat	cgc	240
Asp	Ala	Leu	Phe	Asp	Tyr	Trp	Trp	Val	Ala	Ile	Ser	Pro	Pro	Tyr	Arg	
	65				70				75						80	
cgt	ctc	cgc	tac	ggg	ttt	gag	ctt	gtg	tca	gga	aac	gag	aga	tgc	gtt	288
Arg	Leu	Arg	Tyr	Gly	Phe	Glu	Leu	Val	Ser	Gly	Asn	Glu	Arg	Cys	Val	
				85					90					95		
tat	acg	gaa	aaa	ggg	ttt	ttt	cat	gaa	gca	cct	att	gat	gat	atc	gct	336
Tyr	Thr	Glu	Lys	Gly	Phe	Phe	His	Glu	Ala	Pro	Ile	Asp	Asp	Ile	Ala	
			100					105					110			
tat	tat	ttc	tgc	ttc	cca	ttt	tta	aat	cga	atc	gac	gta	ttt	cac	gcg	384
Tyr	Tyr	Phe	Cys	Phe	Pro	Phe	Leu	Asn	Arg	Ile	Asp	Val	Phe	His	Ala	
		115					120					125				
cca	aca	tgg	gtg	aaa	gat	acc	gtt	tgg	tat	caa	att	ttc	cct	gag	cgg	432
Pro	Thr	Trp	Val	Lys	Asp	Thr	Val	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	
	130					135					140					
ttc	gca	aat	ggg	gat	ccg	tcc	ttg	aac	ccg	aaa	gga	acg	atc	ccg	tgg	480
Phe	Ala	Asn	Gly	Asp	Pro	Ser	Leu	Asn	Pro	Lys	Gly	Thr	Ile	Pro	Trp	
	145				150					155					160	
gga	agt	gcc	gat	ccg	act	ccg	acg	agc	ttt	ttt	ggt	ggt	gat	ttt	gct	528
Gly	Ser	Ala	Asp	Pro	Thr	Pro	Thr	Ser	Phe	Phe	Gly	Gly	Asp	Phe	Ala	
				165					170					175		
ggc	att	atg	gag	cgg	ctt	gat	tat	tta	gtc	gag	cta	gga	att	aac	ggg	576
Gly	Ile	Met	Glu	Arg	Leu	Asp	Tyr	Leu	Val	Glu	Leu	Gly	Ile	Asn	Gly	
			180					185					190			
att	tat	ttc	act	ccg	att	ttt	aaa	gca	tgc	tcc	aat	cat	aaa	tac	gat	624
Ile	Tyr	Phe	Thr	Pro	Ile	Phe	Lys	Ala	Ser	Ser	Asn	His	Lys	Tyr	Asp	
		195					200					205				
aca	att	gat	tat	ttc	gag	att	gat	cca	caa	ttt	ggt	gac	aaa	cca	aca	672
Thr	Ile	Asp	Tyr	Phe	Glu	Ile	Asp	Pro	Gln	Phe	Gly	Asp	Lys	Pro	Thr	
	210					215					220					
ttt	aag	cga	ctt	gtc	gag	cgt	tgc	cac	caa	aaa	ggc	att	cgc	gtt	atg	720
Phe	Lys	Arg	Leu	Val	Glu	Arg	Cys	His	Gln	Lys	Gly	Ile	Arg	Val	Met	
	225				230					235					240	
ctt	gat	gcg	gta	ttt	aat	cat	agt	ggg	cat	ttt	ttc	gct	cca	ttt	caa	768
Leu	Asp	Ala	Val	Phe	Asn	His	Ser	Gly	His	Phe	Phe	Ala	Pro	Phe	Gln	
				245					250					255		
gat	gtg	ctg	aaa	cat	gga	gaa	aaa	tca	aaa	tat	aaa	gat	tgg	ttc	cat	816
Asp	Val	Leu	Lys	His	Gly	Glu	Lys	Ser	Lys	Tyr	Lys	Asp	Trp	Phe	His	
			260					265					270			
att	cac	gag	ttt	cca	tta	caa	acc	gaa	ccg	tta	ccg	aac	tac	gat	aca	864
Ile	His	Glu	Phe	Pro	Leu	Gln	Thr	Glu	Pro	Leu	Pro	Asn	Tyr	Asp	Thr	
		275					280					285				
ttt	gcc	ttc	gtg	cca	act	atg	cca	aaa	tta	aat	acg	gaa	aat	caa	gaa	912
Phe	Ala	Phe	Val	Pro	Thr	Met	Pro	Lys	Leu	Asn	Thr	Glu	Asn	Gln	Glu	
	290					295					300					
gtg	aaa	caa	tat	cta	tta	gat	gta	gca	aca	tat	tgg	att	cgc	gaa	ttt	960
Val	Lys	Gln	Tyr	Leu	Leu	Asp	Val	Ala	Thr	Tyr	Trp	Ile	Arg	Glu	Phe	
	305				310					315					320	
gat	att	gac	ggt	tgg	cgt	tta	gat	gtc	gca	aat	gaa	gtc	gat	cat	caa	1008
Asp	Ile	Asp	Gly	Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Val	Asp	His	Gln	
				325					330					335		
ttt	tgg	cgc	gag	ttt	cgt	caa	gca	gtg	aaa	gcg	gtg	aaa	caa	gac	gta	1056
Phe	Trp	Arg	Glu	Phe	Arg	Gln	Ala	Val	Lys	Ala	Val	Lys	Gln	Asp	Val	
				340				345					350			
tat	att	ctt	ggg	gaa	att	tgg	cac	gat	gca	atg	cct	tgg	tta	cgc	ggc	1104
Tyr	Ile	Leu	Gly	Glu	Ile	Trp	His	Asp	Ala	Met	Pro	Trp	Leu	Arg	Gly	
		355					360					365				
gat	cag	ttt	gat	gcg	gtg	atg	aat	tat	cca	ttt	aca	aat	ggg	gta	ttg	1152
Asp	Gln	Phe	Asp	Ala	Val	Met	Asn	Tyr	Pro	Phe	Thr	Asn	Gly	Val	Leu	
	370					375					380					

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Arg	Tyr	Phe	Ala	Lys	Ser	Glu	Met	Lys	Ala	Ser	Glu	Phe	Ala	His	Ser	
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att	aca	aac	gtg	ctc	cat	tcg	tat	cca	aac	aac	gta	aat	gaa	gta	gca	1248
Ile	Thr	Asn	Val	Leu	His	Ser	Tyr	Pro	Asn	Asn	Val	Asn	Glu	Val	Ala	
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ttc	cat	tta	ctt	ggc	agc	cac	gac	act	ccg	cgc	att	tta	acg	gaa	tgt	1296
Phe	His	Leu	Leu	Gly	Ser	His	Asp	Thr	Pro	Arg	Ile	Leu	Thr	Glu	Cys	
			420					425					430			
ggg	gaa	aat	aag	gaa	aaa	gta	aaa	ctg	atg	ttt	act	ttc	caa	ttt	tcg	1344
Gly	Glu	Asn	Lys	Glu	Lys	Val	Lys	Leu	Met	Phe	Thr	Phe	Gln	Phe	Ser	
		435					440					445				
ttc	aca	ggg	act	ccg	tgc	att	tat	ggc	gat	gaa	att	ggg	cta	act		1392
Phe	Thr	Gly	Thr	Pro	Cys	Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Leu	Thr	
		450				455					460					
ggc	gga	caa	gac	ccg	ctt	tgc	cgc	aaa	tgc	atg	gtc	tgg	gag	gaa	gaa	1440
Gly	Gly	Gln	Asp	Pro	Leu	Cys	Arg	Lys	Cys	Met	Val	Trp	Glu	Glu	Glu	
				470					475						480	
aaa	caa	gac	ctc	gag	tta	ttc	gca	cac	gtg	caa	aaa	tta	att	tca	ttg	1488
Lys	Gln	Asp	Leu	Glu	Leu	Phe	Ala	His	Val	Gln	Lys	Leu	Ile	Ser	Leu	
			485						490					495		
cgc	cgc	aag	tac	cgc	tct	ttg	tct	cgt	ggc	gaa	cta	cac	ttt	cta	gaa	1536
Arg	Arg	Lys	Tyr	Arg	Ser	Leu	Ser	Arg	Gly	Glu	Leu	His	Phe	Leu	Glu	
			500					505					510			
acg	aat	gac	gaa	aca	aac	cat	ctt	gtc	tat	act	aaa	aca	tat	gaa	caa	1584
Thr	Asn	Asp	Glu	Thr	Asn	His	Leu	Val	Tyr	Thr	Lys	Thr	Tyr	Glu	Gln	
		515					520					525				
gaa	acg	gta	ata	ttc	ctt	ctt	aac	aat	agc	aac	cga	aag	ctt	gac	atc	1632
Glu	Thr	Val	Ile	Phe	Leu	Leu	Asn	Asn	Ser	Asn	Arg	Lys	Leu	Asp	Ile	
		530				535					540					
aca	ttg	ccg	ctt	tcg	gta	aaa	aga	aaa	aag	ctt	act	gat	tta	tgg	aca	1680
Thr	Leu	Pro	Leu	Ser	Val	Lys	Arg	Lys	Lys	Leu	Thr	Asp	Leu	Trp	Thr	
				550					555						560	
aat	aag	caa	ttt	gtg	tca	gaa	gaa	aac	gaa	tgg	acc	gta	acg	ctt	gcg	1728
Asn	Lys	Gln	Phe	Val	Ser	Glu	Glu	Asn	Glu	Trp	Thr	Val	Thr	Leu	Ala	
			565					570						575		
cca	tac	gga	ttt	ctt	atg	ttc	tta	gtt	gaa	taa						1761
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<210> 364

<211> 586

<212> PRT

<213> Anoxybacillus flavithermus

<400> 364

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			20					25					30			
Asp	Val	His	Ala	Val	Ser	Leu	Leu	His	Gly	Asp	Pro	Tyr	Cys	Trp	Glu	
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Asp	Arg	Gln	Trp	Gln	Phe	Thr	Lys	Thr	Glu	Met	Thr	Lys	Ser	Gly	Ser	
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Asp	Ala	Leu	Phe	Asp	Tyr	Trp	Trp	Val	Ala	Ile	Ser	Pro	Pro	Tyr	Arg	
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Arg	Leu	Arg	Tyr	Gly	Phe	Glu	Leu	Val	Ser	Gly	Asn	Glu	Arg	Cys	Val	
				85					90					95		
Tyr	Thr	Glu	Lys	Gly	Phe	Phe	His	Glu	Ala	Pro	Ile	Asp	Asp	Ile	Ala	
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Tyr	Tyr	Phe	Cys	Phe	Pro	Phe	Leu	Asn	Arg	Ile	Asp	Val	Phe	His	Ala	
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Pro	Thr	Trp	Val	Lys	Asp	Thr	Val	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	
		130				135					140					
Phe	Ala	Asn	Gly	Asp	Pro	Ser	Leu	Asn	Pro	Lys	Gly	Thr	Ile	Pro	Trp	
145					150				155						160	
Gly	Ser	Ala	Asp	Pro	Thr	Pro	Thr	Ser	Phe	Phe	Gly	Gly	Asp	Phe	Ala	
			165						170					175		
Gly	Ile	Met	Glu	Arg	Leu	Asp	Tyr	Leu	Val	Glu	Leu	Gly	Ile	Asn	Gly	

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180 185 190
 Ile Tyr Phe Thr Pro Ile Phe Lys Ala Ser Ser Asn His Lys Tyr Asp
 195 200 205
 Thr Ile Asp Tyr Phe Glu Ile Asp Pro Gln Phe Gly Asp Lys Pro Thr
 210 215 220
 Phe Lys Arg Leu Val Glu Arg Cys His Gln Lys Gly Ile Arg Val Met
 225 230 235 240
 Leu Asp Ala Val Phe Asn His Ser Gly His Phe Phe Ala Pro Phe Gln
 245 250 255
 Asp Val Leu Lys His Gly Glu Lys Ser Lys Tyr Lys Asp Trp Phe His
 260 265 270
 Ile His Glu Phe Pro Leu Gln Thr Glu Pro Leu Pro Asn Tyr Asp Thr
 275 280 285
 Phe Ala Phe Val Pro Thr Met Pro Lys Leu Asn Thr Glu Asn Gln Glu
 290 295 300
 Val Lys Gln Tyr Leu Leu Asp Val Ala Thr Tyr Trp Ile Arg Glu Phe
 305 310 315 320
 Asp Ile Asp Gly Trp Arg Leu Asp Val Ala Asn Glu Val Asp His Gln
 325 330 335
 Phe Trp Arg Glu Phe Arg Gln Ala Val Lys Ala Val Lys Gln Asp Val
 340 345 350
 Tyr Ile Leu Gly Glu Ile Trp His Asp Ala Met Pro Trp Leu Arg Gly
 355 360 365
 Asp Gln Phe Asp Ala Val Met Asn Tyr Pro Phe Thr Asn Gly Val Leu
 370 375 380
 Arg Tyr Phe Ala Lys Ser Glu Met Lys Ala Ser Glu Phe Ala His Ser
 385 390 395 400
 Ile Thr Asn Val Leu His Ser Tyr Pro Asn Asn Val Asn Glu Val Ala
 405 410 415
 Phe His Leu Leu Gly Ser His Asp Thr Pro Arg Ile Leu Thr Glu Cys
 420 425 430
 Gly Glu Asn Lys Glu Lys Val Lys Leu Met Phe Thr Phe Gln Phe Ser
 435 440 445
 Phe Thr Gly Thr Pro Cys Ile Tyr Tyr Gly Asp Glu Ile Gly Leu Thr
 450 455 460
 Gly Gly Gln Asp Pro Leu Cys Arg Lys Cys Met Val Trp Glu Glu Glu
 465 470 475 480
 Lys Gln Asp Leu Glu Leu Phe Ala His Val Gln Lys Leu Ile Ser Leu
 485 490 495
 Arg Arg Lys Tyr Arg Ser Leu Ser Arg Gly Glu Leu His Phe Leu Glu
 500 505 510
 Thr Asn Asp Glu Thr Asn His Leu Val Tyr Thr Lys Thr Tyr Glu Gln
 515 520 525
 Glu Thr Val Ile Phe Leu Leu Asn Asn Ser Asn Arg Lys Leu Asp Ile
 530 535 540
 Thr Leu Pro Leu Ser Val Lys Arg Lys Lys Leu Thr Asp Leu Trp Thr
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 Pro Tyr Gly Phe Leu Met Phe Leu Val Glu

<210> 365

<211> 1749

<212> DNA

<213> Thermoactinomyces thalpophilus

<220>

<221> CDS

<222> (1)..(1749)

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 ccg gaa aat ttg cat tcc ctc agg gtg cga ctg cgt gcc ggg aaa gga
 Pro Glu Asn Leu His Ser Leu Arg Val Arg Leu Arg Ala Gly Lys Gly
 20 25 30

48

96

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Glu	Ile	Ala	Arg	Cys	Leu	Val	Leu	His	Ala	Asp	Arg	Tyr	Glu	Leu	Leu	
		35					40					45				
gat	tcc	tgt	ttt	cag	cag	acg	gaa	gcg	gaa	tgg	atg	gcc	tcg	gac	cag	192
Asp	Ser	Cys	Phe	Gln	Gln	Thr	Glu	Ala	Glu	Trp	Met	Ala	Ser	Asp	Gln	
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cgg	ttt	gat	tat	ttt	gaa	gct	ttg	ctg	gag	tgc	act	gca	aaa	cgc	ctg	240
Arg	Phe	Asp	Tyr	Phe	Glu	Ala	Leu	Leu	Glu	Cys	Thr	Ala	Lys	Arg	Leu	
	65				70					75					80	
caa	tat	gta	ttt	ctc	ctg	gaa	gga	aaa	aaa	gga	gag	cgg	gtt	tat	ttc	288
Gln	Tyr	Val	Phe	Leu	Leu	Glu	Gly	Lys	Lys	Gly	Glu	Arg	Val	Tyr	Phe	
				85					90					95		
gga	gaa	tcg	gga	gtg	tca	aag	gaa	cgg	aac	cgg	gca	gga	gtt	ttc	cag	336
Gly	Glu	Ser	Gly	Val	Ser	Lys	Glu	Arg	Asn	Arg	Ala	Gly	Val	Phe	Gln	
			100					105					110			
tat	gcc	tat	atc	cat	gaa	tca	gcc	ttg	ttt	gtg	acc	ccg	gag	tgg	gcc	384
Tyr	Ala	Tyr	Ile	His	Glu	Ser	Ala	Leu	Phe	Val	Thr	Pro	Glu	Trp	Ala	
		115					120					125				
agg	gat	gcg	gtg	gtt	tat	cag	att	ttt	ccg	gac	agg	ttt	gcc	aat	ggg	432
Arg	Asp	Ala	Val	Val	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe	Ala	Asn	Gly	
	130					135				140						
gac	aag	gag	aac	gac	ccg	ccc	cgg	acg	gaa	gat	tgg	agc	aag	gat	gca	480
Asp	Lys	Glu	Asn	Asp	Pro	Pro	Arg	Thr	Glu	Asp	Trp	Ser	Lys	Asp	Ala	
	145				150					155					160	
cgg	ccc	gga	agg	gac	agt	ttt	tac	ggc	ggg	gac	ttg	gag	ggg	gtg	atc	528
Arg	Pro	Gly	Arg	Asp	Ser	Phe	Tyr	Gly	Gly	Asp	Leu	Glu	Gly	Val	Ile	
				165				170						175		
cat	tcc	ctc	ccc	tat	ttg	cgc	aaa	ctg	ggg	gtt	aat	gcg	ctc	tat	ttc	576
His	Ser	Leu	Pro	Tyr	Leu	Arg	Lys	Leu	Gly	Val	Asn	Ala	Leu	Tyr	Phe	
			180					185					190			
act	ccc	att	ttt	gcc	tcc	cca	tcc	aat	cac	aag	tac	gat	aca	gcg	gat	624
Thr	Pro	Ile	Phe	Ala	Ser	Pro	Ser	Asn	His	Lys	Tyr	Asp	Thr	Ala	Asp	
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tat	ctg	aga	att	gat	ccc	cag	ttt	ggc	aat	ctg	gac	acg	ttt	aag	cgc	672
Tyr	Leu	Arg	Ile	Asp	Pro	Gln	Phe	Gly	Asn	Leu	Asp	Thr	Phe	Lys	Arg	
	210					215					220					
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Leu	Ile	Arg	Glu	Ala	His	Arg	His	Gly	Met	Arg	Ile	Ile	Leu	Asp	Ala	
	225				230			235						240		
gtg	ttc	aac	cat	tcg	ggg	gac	cgg	ttt	ttt	gct	ttt	cgc	gat	gta	ctg	768
Val	Phe	Asn	His	Ser	Gly	Asp	Arg	Phe	Phe	Ala	Phe	Arg	Asp	Val	Leu	
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gaa	aag	gga	gcg	gac	tcg	caa	tac	aga	gac	tgg	ttt	ttc	atc	gag	cag	816
Glu	Lys	Gly	Ala	Asp	Ser	Gln	Tyr	Arg	Asp	Trp	Phe	Phe	Ile	Glu	Gln	
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Phe	Pro	Val	Val	Gln	Thr	Pro	Gln	Pro	Asn	Tyr	Glu	Thr	Phe	Ala	Val	
		275					280					285				
aat	gtt	cct	gtc	atg	ccg	aag	ctg	cgc	acg	gaa	aac	agg	gag	gta	aaa	912
Asn	Val	Pro	Val	Met	Pro	Lys	Leu	Arg	Thr	Glu	Asn	Arg	Glu	Val	Lys	
	290					295				300						
gaa	tat	ttg	ttc	cag	gtc	gtc	tac	tgg	aca	gaa	atg	ggg	atc	gac		960
Glu	Tyr	Leu	Phe	Gln	Val	Val	Arg	Tyr	Thr	Glu	Met	Gly	Ile	Asp		
	305				310				315					320		
ggg	tgg	cgg	ctg	gat	gtg	gcc	aat	gag	gtg	gat	cat	gcc	ttt	tgg	cgt	1008
Gly	Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Val	Asp	His	Ala	Phe	Trp	Arg	
				325				330						335		
gat	ttc	cga	tct	ttt	gtg	aag	atg	ctg	aat	ccg	gaa	gcc	ctc	atc	atc	1056
Asp	Phe	Arg	Ser	Phe	Val	Lys	Met	Leu	Asn	Pro	Glu	Ala	Leu	Ile	Ile	
			340					345					350			
ggc	gaa	gta	tgg	cat	aat	gcg	gta	aaa	tgg	ctg	gaa	ggg	gat	cag	ttt	1104
Gly	Glu	Val	Trp	His	Asn	Ala	Val	Lys	Trp	Leu	Glu	Gly	Asp	Gln	Phe	
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gat	tcg	gtc	atg	aat	tat	ttg	ttt	cgc	gac	tgc	gtt	tat	cgt	ttt	ttt	1152
Asp	Ser	Val	Met	Asn	Tyr	Leu	Phe	Arg	Asp	Cys	Val	Tyr	Arg	Phe	Phe	
	370					375					380					
gca	gag	caa	aca	tca	gat	gcc	agc	gag	ttt	gat	gcc	gaa	ttg	acc	aca	1200
Ala	Glu	Gln	Thr	Ser	Asp	Ala	Ser	Glu	Phe	Asp	Ala	Glu	Leu	Thr	Thr	
	385				390					395					400	

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				405					410					415		
ctt	gat	tcc	cat	gat	acc	gag	cg	ttt	ttg	acc	tct	tgc	ggg	gaa	aag	1296
Leu	Asp	Ser	His	Asp	Thr	Glu	Arg	Phe	Leu	Thr	Ser	Cys	Gly	Glu	Lys	
			420					425					430			
gaa	gaa	cg	ttc	cg	ctg	gcc	gtc	ttg	ttt	cag	atg	acc	tat	gtg	ggg	1344
Glu	Glu	Arg	Phe	Arg	Leu	Ala	Val	Leu	Phe	Gln	Met	Thr	Tyr	Val	Gly	
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acg	ccg	ttg	att	tat	tac	ggg	gat	gaa	ata	ggc	atg	acc	gga	gag	aca	1392
Thr	Pro	Leu	Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Thr	Gly	Glu	Thr	
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gat	cct	gat	tgc	cg	ccg	atg	ttg	tgg	gat	aaa	gag	gag	caa	aat		1440
Asp	Pro	Asp	Cys	Arg	Arg	Pro	Met	Leu	Trp	Asp	Lys	Glu	Glu	Gln	Asn	
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cag	gcg	ctt	ttc	tcc	tat	tat	caa	cg	ctc	atc	cg	att	cg	cg	agt	1488
Gln	Ala	Leu	Phe	Ser	Tyr	Tyr	Gln	Arg	Leu	Ile	Arg	Ile	Arg	Arg	Ser	
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tgt	gct	ccg	ttg	cg	agg	ggg	agt	ttc	cg	aca	tgg	ttg	gct	gat	cca	1536
Cys	Ala	Pro	Leu	Arg	Arg	Gly	Ser	Phe	Arg	Thr	Trp	Leu	Ala	Asp	Pro	
			500					505					510			
ggg	tcc	cct	gtc	tat	gcc	ttt	gtg	cg	tca	tgg	caa	ggg	gaa	aat	gca	1584
Gly	Ser	Pro	Val	Tyr	Ala	Phe	Val	Arg	Ser	Trp	Gln	Gly	Glu	Asn	Ala	
			515				520					525				
gga	att	gtc	ctg	aat	aac	agc	gac	agc	tgg	caa	aat	ggt	tcc	ttg	ccg	1632
Gly	Ile	Val	Leu	Asn	Asn	Ser	Asp	Ser	Trp	Gln	Asn	Val	Ser	Leu	Pro	
			530			535					540					
ctg	gat	aca	tgg	gca	aaa	agg	aat	tgg	acc	gat	ttg	ttg	acg	ggg	gaa	1680
Leu	Asp	Thr	Trp	Ala	Lys	Arg	Asn	Trp	Thr	Asp	Leu	Leu	Thr	Gly	Glu	
					550					555					560	
aaa	ggc	cag	gca	tca	gga	aac	cg	atg	gag	ttg	att	ctt	tcc	cct	tat	1728
Lys	Gly	Gln	Ala	Ser	Gly	Asn	Arg	Met	Glu	Leu	Ile	Leu	Ser	Pro	Tyr	
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cag	gga	ata	gtg	ctg	gtt	tga										1749
Gln	Gly	Ile	Val	Leu	Val											
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<211> 582

<212> PRT

<213> Thermoactinomyces thalpophilus

<400> 366

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Glu	Ile	Ala	Arg	Cys	Leu	Val	Leu	His	Ala	Asp	Arg	Tyr	Glu	Leu	Leu	
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Arg	Phe	Asp	Tyr	Phe	Glu	Ala	Leu	Leu	Glu	Cys	Thr	Ala	Lys	Arg	Leu	
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Gln	Tyr	Val	Phe	Leu	Leu	Glu	Gly	Lys	Lys	Gly	Glu	Arg	Val	Tyr	Phe	
			85					90					95			
Gly	Glu	Ser	Gly	Val	Ser	Lys	Glu	Arg	Asn	Arg	Ala	Gly	Val	Phe	Gln	
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Tyr	Ala	Tyr	Ile	His	Glu	Ser	Ala	Leu	Phe	Val	Thr	Pro	Glu	Trp	Ala	
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Arg	Asp	Ala	Val	Val	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe	Ala	Asn	Gly	
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Arg	Pro	Gly	Arg	Asp	Ser	Phe	Tyr	Gly	Gly	Asp	Leu	Glu	Gly	Val	Ile	
			165					170						175		
His	Ser	Leu	Pro	Tyr	Leu	Arg	Lys	Leu	Gly	Val	Asn	Ala	Leu	Tyr	Phe	
			180					185					190			
Thr	Pro	Ile	Phe	Ala	Ser	Pro	Ser	Asn	His	Lys	Tyr	Asp	Thr	Ala	Asp	
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Tyr Leu Arg Ile Asp Pro Gln Phe Gly Asn Leu Asp Thr Phe Lys Arg
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 Leu Ile Arg Glu Ala His Arg His Gly Met Arg Ile Ile Leu Asp Ala
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 Val Phe Asn His Ser Gly Asp Arg Phe Phe Ala Phe Arg Asp Val Leu
 245 250 255
 Glu Lys Gly Ala Asp Ser Gln Tyr Arg Asp Trp Phe Phe Ile Glu Gln
 260 265 270
 Phe Pro Val Val Gln Thr Pro Gln Pro Asn Tyr Glu Thr Phe Ala Val
 275 280 285
 Asn Val Pro Val Met Pro Lys Leu Arg Thr Glu Asn Arg Glu Val Lys
 290 295 300
 Glu Tyr Leu Phe Gln Val Val Arg Tyr Trp Thr Glu Met Gly Ile Asp
 305 310 315 320
 Gly Trp Arg Leu Asp Val Ala Asn Glu Val Asp His Ala Phe Trp Arg
 325 330 335
 Asp Phe Arg Ser Phe Val Lys Met Leu Asn Pro Glu Ala Leu Ile Ile
 340 345 350
 Gly Glu Val Trp His Asn Ala Val Lys Trp Leu Glu Gly Asp Gln Phe
 355 360 365
 Asp Ser Val Met Asn Tyr Leu Phe Arg Asp Cys Val Tyr Arg Phe Phe
 370 375 380
 Ala Glu Gln Thr Ser Asp Ala Ser Glu Phe Asp Ala Glu Leu Thr Thr
 385 390 395 400
 Ala Arg Ile Ser Tyr Pro Asp Gln Ala Leu Gln Val Ala Trp Asn Leu
 405 410 415
 Leu Asp Ser His Asp Thr Glu Arg Phe Leu Thr Ser Cys Gly Glu Lys
 420 425 430
 Glu Glu Arg Phe Arg Leu Ala Val Leu Phe Gln Met Thr Tyr Val Gly
 435 440 445
 Thr Pro Leu Ile Tyr Tyr Gly Asp Glu Ile Gly Met Thr Gly Glu Thr
 450 455 460
 Asp Pro Asp Cys Arg Arg Pro Met Leu Trp Asp Lys Glu Glu Gln Asn
 465 470 475 480
 Gln Ala Leu Phe Ser Tyr Tyr Gln Arg Leu Ile Arg Ile Arg Arg Ser
 485 490 495
 Cys Ala Pro Leu Arg Arg Gly Ser Phe Arg Thr Trp Leu Ala Asp Pro
 500 505 510
 Gly Ser Pro Val Tyr Ala Phe Val Arg Ser Trp Gln Gly Glu Asn Ala
 515 520 525
 Gly Ile Val Leu Asn Asn Ser Asp Ser Trp Gln Asn Val Ser Leu Pro
 530 535 540
 Leu Asp Thr Trp Ala Lys Arg Asn Trp Thr Asp Leu Leu Thr Gly Glu
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<212> DNA

<213> Anaerobranca gottschalkii

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Gly	Ile	Lys	Asp	Lys	Glu	Phe	Asp	Asp	Ile	Asp	Lys	Ser	His	Pro	Arg	
			20					25					30			
aaa	ttc	cat	gga	gga	gat	atc	aaa	ggg	ata	ata	gaa	aaa	tta	gac	tat	144
Lys	Phe	His	Gly	Gly	Asp	Ile	Lys	Gly	Ile	Ile	Glu	Lys	Leu	Asp	Tyr	
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Val	Asp	Pro	His	Phe	Gly	Ile	Leu	Glu	Asp	Phe	Lys	Glu	Leu	Val	Gln	
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aaa	gcc	cat	aga	aaa	ggg	tta	aag	gtg	att	tta	gat	ata	gta	gta	aat	336
Lys	Ala	His	Arg	Lys	Gly	Leu	Lys	Val	Ile	Leu	Asp	Ile	Val	Val	Asn	
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His	Thr	Gly	Lys	Thr	His	Pro	Leu	Leu	Lys	Glu	Lys	Pro	His	Trp	Phe	
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His	Pro	Leu	Val	Pro	Ile	Lys	Asp	Trp	Asp	Asn	Gln	Lys	Glu	Val	Glu	
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gaa	aag	tgt	tta	ggg	atg	cca	gat	ttg	aac	cag	gat	tta	ccg	gaa		480
Glu	Lys	Cys	Leu	Gly	Met	Leu	Pro	Asp	Leu	Asn	Gln	Asp	Leu	Pro	Glu	
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Val	Ser	Ser	Tyr	Leu	Ile	Asn	Met	Cys	Lys	Trp	Trp	Ile	Val	Gln	Thr	
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Gly	Leu	Asp	Gly	Phe	Arg	Ile	Asp	Thr	Val	Lys	His	Val	Pro	Arg	Glu	
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Phe	Trp	Arg	Lys	Phe	Cys	Gln	Glu	Met	Lys	Gly	Val	Lys	Glu	Asp	Ile	
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Ser	Ile	Leu	Leu	Gln	Asp	His	Leu	Tyr	Gln	Asn	Pro	Tyr	Leu	Leu	Gly	
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Thr	Phe	Ile	Asp	Asn	His	Asp	Val	Pro	Arg	Phe	Leu	Ser	Val	Val	Lys	
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Asp	Arg	Gly	Lys	Glu	Arg	Leu	Lys	Leu	Ala	Leu	Asp	Phe	Leu	Phe	Ser	
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Gly	Gly	Asp	Asp	Pro	His	Asn	Arg	Lys	Asp	Met	Asp	Phe	Glu	Gly	Asp	
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Leu	Glu	Leu	Arg	Lys	Tyr	Val	Lys	Asp	Leu	Ile	Thr	Leu	Arg	Lys	Lys	
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Asp	Gly	Met	Val	Phe	Ile	Arg	Glu	Cys	Gly	Glu	Gln	Val	Val	Val	Ile	
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Phe	Ile	Asn	Asn	Ser	Phe	Asp	Ser	Gln	Thr	Phe	Val	Val	Arg	Leu	Pro	
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Asp	Glu	Leu	Gln	Arg	Lys	Ser	Trp	Lys	Leu	Val	Trp	Gly	Lys	Gly	Thr	
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tct	gcc	tat	ttt	caa	tta	ttt	gcc	cct	gaa	aaa	taa					1332
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<212> PRT

<213> Anaerobranca gottschalkii

<400> 368

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Lys	Phe	His	Gly	Gly	Asp	Ile	Lys	Gly	Ile	Ile	Glu	Lys	Leu	Asp	Tyr	
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Val	Asp	Pro	His	Phe	Gly	Ile	Leu	Glu	Asp	Phe	Lys	Glu	Leu	Val	Gln	
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Lys	Ala	His	Arg	Lys	Gly	Leu	Lys	Val	Ile	Leu	Asp	Ile	Val	Val	Asn	
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His	Thr	Gly	Lys	Thr	His	Pro	Leu	Leu	Lys	Glu	Lys	Pro	His	Trp	Phe	
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His	Pro	Leu	Val	Pro	Ile	Lys	Asp	Trp	Asp	Asn	Gln	Lys	Glu	Val	Glu	
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Glu	Lys	Cys	Leu	Gly	Met	Leu	Pro	Asp	Leu	Asn	Gln	Asp	Leu	Pro	Glu	
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Val	Ser	Ser	Tyr	Leu	Ile	Asn	Met	Cys	Lys	Trp	Trp	Ile	Val	Gln	Thr	
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Gly	Leu	Asp	Gly	Phe	Arg	Ile	Asp	Thr	Val	Lys	His	Val	Pro	Arg	Glu	
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Phe	Trp	Arg	Lys	Phe	Cys	Gln	Glu	Met	Lys	Gly	Val	Lys	Glu	Asp	Ile	
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Ile	Leu	Gly	Glu	Val	Trp	His	Pro	Asp	Pro	Cys	Tyr	Leu	Ala	Pro		
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Tyr	Gln	Lys	Asp	Gly	Ile	Asn	Ser	Leu	Val	Asp	Phe	Pro	Leu	Tyr	Tyr	
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Ala	Ile	Thr	Lys	Val	Phe	Ala	Lys	Asp	Glu	Pro	Met	Asp	Lys	Ile	Ser	
				245					250					255		
Ser	Ile	Leu	Leu	Gln	Asp	His	Leu	Tyr	Gln	Asn	Pro	Tyr	Leu	Leu	Gly	
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Thr	Phe	Ile	Asp	Asn	His	Asp	Val	Pro	Arg	Phe	Leu	Ser	Val	Val	Lys	
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Asp	Arg	Gly	Lys	Glu	Arg	Leu	Lys	Leu	Ala	Leu	Asp	Phe	Leu	Phe	Ser	
	290					295					300					
Val	Arg	Gly	Val	Pro	Ile	Tyr	Tyr	Gly	Thr	Glu	Thr	Gly	Met	Asp		
305					310				315					320		
Gly	Gly	Asp	Asp	Pro	His	Asn	Arg	Lys	Asp	Met	Asp	Phe	Glu	Gly	Asp	
				325					330					335		
Leu	Glu	Leu	Arg	Lys	Tyr	Val	Lys	Asp	Leu	Ile	Thr	Leu	Arg	Lys	Lys	
			340					345					350			
Tyr	Leu	Ser	Leu	Ser	Leu	Gly	Ser	Leu	Lys	Val	Leu	Lys	Val	Thr	Asp	
		355					360					365				
Asp	Gly	Met	Val	Phe	Ile	Arg	Glu	Cys	Gly	Glu	Glu	Gln	Val	Val	Ile	
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Phe	Ile	Asn	Asn	Ser	Phe	Asp	Ser	Gln	Thr	Phe	Val	Val	Arg	Leu	Pro	
385					390					395					400	
Asp	Glu	Leu	Gln	Arg	Lys	Ser	Trp	Lys	Leu	Val	Trp	Gly	Lys	Gly	Thr	
			405						410					415		
Tyr	Gln	Tyr	Ser	Tyr	Glu	Ile	Ala	Ser	Cys	Ile	Ile	Pro	Pro	Lys	Ser	
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Ser	Ala	Tyr	Phe	Gln	Leu	Phe	Ala	Pro	Glu	Lys						
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 Thr Ala Leu Asp Trp Trp Glu His Gly Asn Phe Tyr Gln Val Tyr Pro
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 cga tcc ttc aag gat tcc gat ggt gac gga att ggt gat ctg gat gga 144
 Arg Ser Phe Lys Asp Ser Asp Gly Asp Gly Ile Gly Asp Leu Asp Gly
 35 40 45
 atc acc gaa aag ctg caa tat cta aag gac atc ggc atg gac gga gtt 192
 Ile Thr Glu Lys Leu Gln Tyr Leu Lys Asp Ile Gly Met Asp Gly Val
 50 55 60
 tgg ttg tca ccg atc ttc tct tca ccg atg gct gat ttt ggc tac gac 240
 Trp Leu Ser Pro Ile Phe Ser Ser Pro Met Ala Asp Phe Gly Tyr Asp
 65 70 75 80
 att tca aac ttc cgt cag att cag acc gaa tac gga gat ctg gat gct 288
 Ile Ser Asn Phe Arg Gln Ile Gln Thr Glu Tyr Gly Asp Leu Asp Ala
 85 90 95
 ttc cag cgc ttg tcc gac aag tgt aag gaa ctg ggc ttg cat ctg atc 336
 Phe Gln Arg Leu Ser Asp Lys Cys Lys Glu Leu Gly Leu His Leu Ile
 100 105 110
 ttg gat ttc gtc ccg aac cat act agc gat cag cac gaa tac ttc att 384
 Leu Asp Phe Val Pro Asn His Thr Ser Asp Gln His Glu Tyr Phe Ile
 115 120 125
 aag tct gtg gaa aaa gac gag acc tac aag gat ttc tac gtc tgg cac 432
 Lys Ser Val Glu Lys Asp Glu Thr Tyr Lys Asp Phe Tyr Val Trp His
 130 135 140
 cca ggt gta gat gga cca aac aac acc aag gtt ccg cca tcg aac tgg 480
 Pro Gly Val Asp Gly Pro Asn Asn Thr Lys Val Pro Pro Ser Asn Trp
 145 150 155 160
 atc agc gtg ttc cgt gga tct tcc tgg gaa tgg aat gag cag cgc ggg 528
 Ile Ser Val Phe Arg Gly Ser Ser Trp Glu Trp Asn Glu Gln Arg Gly
 165 170 175
 gag ttt tac ctg cat caa ttt ttg aag gag caa ccg gat ctt aac tat 576
 Glu Phe Tyr Leu His Gln Phe Leu Lys Glu Gln Pro Asp Leu Asn Tyr
 180 185 190
 cgc aat cct gcc gta gtt gaa gag atg aag aac gtg ctg cgg tat tgg 624
 Arg Asn Pro Ala Val Val Glu Glu Met Lys Asn Val Leu Arg Tyr Trp
 195 200 205
 ttg gat cgt gga gtt tct ggg ttc aga att gat gcc gtg ccg tat ctg 672
 Leu Asp Arg Gly Val Ser Gly Phe Arg Ile Asp Ala Val Pro Tyr Leu
 210 215 220
 ttt gaa agt ggc gag tcc gac gga cgt tat cgc aat gaa cca gag agt 720
 Phe Glu Ser Gly Glu Ser Asp Gly Arg Tyr Arg Asn Glu Pro Glu Ser
 225 230 235 240
 cga gcc acc gac gat ccc gag aat cca gct tac ctg acc cat acg caa 768
 Arg Ala Thr Asp Pro Glu Asn Pro Ala Tyr Leu Thr His Thr Gln
 245 250 255
 acc atg gat cag ccg gaa acc tac gac atg atc tat caa tgg cgc gca 816
 Thr Met Asp Gln Pro Glu Thr Tyr Asp Met Ile Tyr Gln Trp Arg Ala
 260 265 270
 gtt ttg gac gaa tat tcc cag aaa gac aac aga act cgt atc atg atg 864
 Val Leu Asp Glu Tyr Ser Gln Lys Asp Asn Arg Thr Arg Ile Met Met
 275 280 285
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 Thr Glu Gly Tyr Thr Ser Leu Pro Lys Ile Ile Glu Phe Phe Gly Asn
 290 295 300
 gct acc gca aac ggg gca cag att ccg ttc aac ttc gaa gtg atc agt 960

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Asn	Ile	Lys	Lys	Thr 325	Ser	Thr	Gly	Ala	Asp 330	Phe	Ala	Lys	Tyr	Val 335	Lys	
aac	tgg	ctg	gat	gcc	aaa	cca	gcg	aac	aga	cgt	tcc	aac	tgg	gtg	ctt	1056
Asn	Trp	Leu	Asp 340	Ala	Lys	Pro	Ala	Asn 345	Arg	Arg	Ser	Asn	Trp 350	Val	Leu	
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gcg	gat	aac	tat	aag	acc	ctc	aac	gtc	aag	gtt	cag	gac	cgc	gcc	cgc	1392
Ala	Asp 450	Asn	Tyr	Lys	Thr	Leu 455	Asn	Val	Lys	Val	Gln 460	Asp	Arg	Ala	Arg	
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Lys	Ser	His	Leu	Lys	Ile 470	Phe	Lys	Lys	Leu	Thr 475	Lys	Tyr	Arg	Lys	Arg 480	
caa	att	ctg	acc	gaa	gga	gac	ctg	gac	atc	cag	gtg	tcc	ggg	gag	aat	1488
Gln	Ile	Leu	Thr	Glu 485	Gly	Asp	Leu	Asp	Ile 490	Gln	Val	Ser	Gly	Glu 495	Asn	
cta	ctc	gtg	tac	aaa	cgg	aag	gtc	gac	aag	gtg	ggc	tac	gtg	gtt	gtg	1536
Leu	Leu	Val	Tyr 500	Lys	Arg	Lys	Val	Asp 505	Lys	Val	Gly	Tyr	Val	Val	Val	
gcg	cta	aac	ttt	ggc	acg	gaa	ccg	gtt	gcg	ctg	ggg	ctg	acc	agt	ttg	1584
Ala	Leu	Asn 515	Phe	Gly	Thr	Glu	Pro 520	Val	Ala	Leu	Gly	Leu	Thr	Ser	Leu	
tac	gat	gga	gtt	gat	aaa	cga	atg	caa	gtg	gtg	gta	tct	tct	aac	aga	1632
Tyr	Asp 530	Gly	Val	Asp	Lys	Arg 535	Met	Gln	Val	Val	Val	Ser	Ser	Asn	Arg	
gtg	acc	act	gct	gat	aac	gcc	tgg	gtg	gat	gcg	gac	aaa	tac	cga	ttg	1680
Val	Thr	Thr	Ala	Asp 550	Asn	Ala	Trp	Val	Asp	Ala	Asp	Lys	Tyr	Arg	Leu 560	
att	gga	gag	agc	ggg	atc	gtt	ctt	caa	tac	ctt	tgg	ggg	aag	aat	cca	1728
Ile	Gly	Glu	Ser	Gly 565	Ile	Val	Leu	Gln	Tyr 570	Leu	Trp	Gly	Lys	Asn 575	Pro	
att	gtt	tcc	taa													1740
Ile	Val	Ser														

<210> 370

<211> 579

<212> PRT

<213> Aedes albopictus

<400> 370

Met 1	Lys	Ile	Phe	Ile 5	Pro	Leu	Leu	Thr	Thr 10	Leu	Leu	Val	Gly	Leu 15	Thr
Thr	Ala	Leu	Asp 20	Trp	Trp	Glu	His	Gly 25	Asn	Phe	Tyr	Gln	Val 30	Tyr	Pro
Arg	Ser	Phe 35	Lys	Asp	Ser	Asp	Gly 40	Asp	Gly	Ile	Gly	Asp 45	Leu	Asp	Gly
Ile	Thr 50	Glu	Lys	Leu	Gln	Tyr 55	Leu	Lys	Asp	Ile	Gly 60	Met	Asp	Gly	Val
Trp	Leu	Ser	Pro	Ile	Phe	Ser	Ser	Pro	Met	Ala	Asp	Phe	Gly	Tyr	Asp

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65	Ile	Ser	Asn	Phe	Arg	70	Gln	Ile	Gln	Thr	Glu	75	Tyr	Gly	Asp	Leu	Asp	80	Ala
					85						90						95		
	Phe	Gln	Arg	Leu	Ser	Asp	Lys	Cys	Lys	Glu	Leu	Gly	Leu	His	Leu	Ile			
				100					105						110				
	Leu	Asp	Phe	Val	Pro	Asn	His	Thr	Ser	Asp	Gln	His	Glu	Tyr	Phe	Ile			
			115					120						125					
	Lys	Ser	Val	Glu	Lys	Asp	Glu	Thr	Tyr	Lys	Asp	Phe	Tyr	Val	Trp	His			
		130					135					140							
	Pro	Gly	Val	Asp	Gly	Pro	Asn	Asn	Thr	Lys	Val	Pro	Pro	Ser	Asn	Trp			
145						150					155					160			
	Ile	Ser	Val	Phe	Arg	Gly	Ser	Ser	Trp	Glu	Trp	Asn	Glu	Gln	Arg	Gly			
				165						170					175				
	Glu	Phe	Tyr	Leu	His	Gln	Phe	Leu	Lys	Glu	Gln	Pro	Asp	Leu	Asn	Tyr			
				180					185					190					
	Arg	Asn	Pro	Ala	Val	Val	Glu	Glu	Met	Lys	Asn	Val	Leu	Arg	Tyr	Trp			
			195					200					205						
	Leu	Asp	Arg	Gly	Val	Ser	Gly	Phe	Arg	Ile	Asp	Ala	Val	Pro	Tyr	Leu			
		210					215					220							
	Phe	Glu	Ser	Gly	Glu	Ser	Asp	Gly	Arg	Tyr	Arg	Asn	Glu	Pro	Glu	Ser			
225						230					235					240			
	Arg	Ala	Thr	Asp	Asp	Pro	Glu	Asn	Pro	Ala	Tyr	Leu	Thr	His	Thr	Gln			
				245						250					255				
	Thr	Met	Asp	Gln	Pro	Glu	Thr	Tyr	Asp	Met	Ile	Tyr	Gln	Trp	Arg	Ala			
			260						265					270					
	Val	Leu	Asp	Glu	Tyr	Ser	Gln	Lys	Asp	Asn	Arg	Thr	Arg	Ile	Met	Met			
			275					280					285						
	Thr	Glu	Gly	Tyr	Thr	Ser	Leu	Pro	Lys	Ile	Ile	Glu	Phe	Phe	Gly	Asn			
		290					295					300							
	Ala	Thr	Ala	Asn	Gly	Ala	Gln	Ile	Pro	Phe	Asn	Phe	Glu	Val	Ile	Ser			
305					310						315					320			
	Asn	Ile	Lys	Lys	Thr	Ser	Thr	Gly	Ala	Asp	Phe	Ala	Lys	Tyr	Val	Lys			
				325						330					335				
	Asn	Trp	Leu	Asp	Ala	Lys	Pro	Ala	Asn	Arg	Arg	Ser	Asn	Trp	Val	Leu			
			340						345					350					
	Gly	Asn	His	Asp	Asn	Pro	Arg	Ile	Gly	Ser	Arg	Leu	Gly	Glu	Asn	Lys			
			355					360					365						
	Ile	Asp	Leu	Tyr	Asn	Ile	Ala	Leu	Gln	Thr	Leu	Pro	Asp	Ile	Ala	Val			
		370					375					380							
	Thr	Tyr	Tyr	Gly	Glu	Glu	Ile	Gly	Met	Leu	Asp	Gln	Trp	Ile	Pro	Trp			
385					390						395					400			
	Asn	Glu	Thr	Val	Asp	Pro	Ala	Ala	Cys	Arg	Ser	Asp	Glu	Ala	Thr	Tyr			
				405					410						415				
	Thr	Ala	Tyr	Ser	Arg	Asp	Pro	Val	Arg	Thr	Pro	Met	Gln	Trp	Asp	Asn			
			420						425					430					
	Glu	Lys	Asn	Ala	Gly	Phe	Ser	Thr	Ala	Ala	Lys	Thr	Trp	Leu	Gln	Val			
			435					440					445						
	Ala	Asp	Asn	Tyr	Lys	Thr	Leu	Asn	Val	Lys	Val	Gln	Asp	Arg	Ala	Arg			
		450					455					460							
	Lys	Ser	His	Leu	Lys	Ile	Phe	Lys	Lys	Leu	Thr	Lys	Tyr	Arg	Lys	Arg			
465					470						475					480			
	Gln	Ile	Leu	Thr	Glu	Gly	Asp	Leu	Asp	Ile	Gln	Val	Ser	Gly	Glu	Asn			
				485						490					495				
	Leu	Leu	Val	Tyr	Lys	Arg	Lys	Val	Asp	Lys	Val	Gly	Tyr	Val	Val	Val			
			500						505					510					
	Ala	Leu	Asn	Phe	Gly	Thr	Glu	Pro	Val	Ala	Leu	Gly	Leu	Thr	Ser	Leu			
			515					520					525						
	Tyr	Asp	Gly	Val	Asp	Lys	Arg	Met	Gln	Val	Val	Val	Ser	Ser	Asn	Arg			
		530					535					540							
	Val	Thr	Thr	Ala	Asp	Asn	Ala	Trp	Val	Asp	Ala	Asp	Lys	Tyr	Arg	Leu			
545					550						555					560			
	Ile	Gly	Glu	Ser	Gly	Ile	Val	Leu	Gln	Tyr	Leu	Trp	Gly	Lys	Asn	Pro			
				565					570						575				
	Ile	Val	Ser																

<210> 371
 <211> 1170
 <212> DNA

<213> Aeromonas hydrophila

<220>

<221> CDS

<222> (1)..(1170)

<223> transl_table=11

<220>

<221> misc_feature

<222> (866)..(866)

<223> n i s a , g , c o r t

<400> 371

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Met	Arg	Ile	Trp	Ala	Pro	Thr	Pro	Asn	Ser	Ala	Glu	Leu	Thr	Arg	Asn	
1				5				10					15			
ctg	cac	cag	cgc	ggc	atg	aag	atc	atc	ctg	gat	gcg	gtg	gtc	aac	cac	96
Leu	His	Gln	Arg	Gly	Met	Lys	Ile	Ile	Leu	Asp	Ala	Val	Val	Asn	His	
			20				25						30			
acc	tcc	acc	gaa	cac	ccc	tgg	ttc	tgc	ccg	ccg	ctg	ggg	gcc	cag	cgc	144
Thr	Ser	Thr	Glu	His	Pro	Trp	Phe	Cys	Pro	Pro	Leu	Gly	Ala	Gln	Arg	
			35				40					45				
aac	ccg	gac	tcg	ccg	tgg	cgc	agc	ttc	tac	acc	ttt	gac	aac	gaa	ggg	192
Asn	Pro	Asp	Ser	Pro	Trp	Arg	Ser	Phe	Tyr	Thr	Phe	Asp	Asn	Glu	Gly	
	50					55					60					
gat	tac	gtc	agc	tgg	aag	ggc	atc	cgc	agc	ctg	ccc	aag	ctc	gac	ttc	240
Asp	Tyr	Val	Ser	Trp	Lys	Gly	Ile	Arg	Ser	Leu	Pro	Lys	Leu	Asp	Phe	
					70					75					80	
tcc	agc	gaa	cag	gtg	cag	gac	gcc	gtc	tat	cgc	gcc	gat	gac	gcc	atc	288
Ser	Ser	Glu	Gln	Val	Gln	Asp	Ala	Val	Tyr	Arg	Ala	Asp	Asp	Ala	Ile	
				85					90					95		
ctg	cgc	tac	tgg	atg	cgc	gcc	ccc	tac	cag	atc	gac	ggc	tgg	cgc	ttc	336
Leu	Arg	Tyr	Trp	Met	Arg	Ala	Pro	Tyr	Gln	Ile	Asp	Gly	Trp	Arg	Phe	
			100					105					110			
gac	gtc	atc	cac	atg	ctg	ggg	gag	cgc	ggc	acc	gcc	gag	ggc	aac	cgc	384
Asp	Val	Ile	His	Met	Leu	Gly	Glu	Arg	Gly	Thr	Ala	Glu	Gly	Asn	Arg	
		115				120						125				
ggc	cac	gtg	cgc	gcc	att	cgc	ggc	gcg	gtg	aag	cag	gag	aac	ccg	gac	432
Gly	His	Val	Arg	Ala	Ile	Arg	Gly	Ala	Val	Lys	Gln	Glu	Asn	Pro	Asp	
						135					140					
gcc	tat	gta	ctg	ggc	gag	cac	ttc	ttc	gag	gcg	agc	cag	tgg	ttg	cag	480
Ala	Tyr	Val	Leu	Gly	Glu	His	Phe	Phe	Glu	Ala	Ser	Gln	Trp	Leu	Gln	
					150					155					160	
ggg	gat	cag	gag	gat	ggc	gcc	atg	aac	tac	tac	ggc	ttc	gcc	cac	ccg	528
Gly	Asp	Gln	Glu	Asp	Gly	Ala	Met	Asn	Tyr	Tyr	Gly	Phe	Ala	His	Pro	
				165					170					175		
atc	cgc	gcc	ttc	ctg	gcg	ggc	cag	gac	atc	gcc	tac	cac	ccc	atc	aag	576
Ile	Arg	Ala	Phe	Leu	Ala	Gly	Gln	Asp	Ile	Ala	Tyr	His	Pro	Ile	Lys	
			180					185					190			
atc	agc	gcc	gag	gag	ctg	gat	cgc	tgg	ctc	aag	ctg	gcg	cgg	gcc	cac	624
Ile	Ser	Ala	Glu	Glu	Leu	Asp	Arg	Trp	Leu	Lys	Leu	Ala	Arg	Ala	His	
			195				200					205				
atc	ccg	ttc	aag	aat	cag	ctg	gca	cag	ttc	aac	ctg	ctg	gac	agc	cac	672
Ile	Pro	Phe	Lys	Asn	Gln	Leu	Ala	Gln	Phe	Asn	Leu	Leu	Asp	Ser	His	
						215					220					
gac	acc	gcc	cgc	ttc	ctc	cat	ctg	ctg	ggg	gag	gac	aag	cag	cgg	atg	720
Asp	Thr	Ala	Arg	Phe	Leu	His	Leu	Leu	Gly	Glu	Asp	Lys	Gln	Arg	Met	
					230					235					240	
cgg	ctc	gcc	gcc	acc	ctg	ctg	ctc	acc	tac	atc	ggc	gta	ccc	tcc	atc	768
Arg	Leu	Ala	Ala	Thr	Leu	Leu	Leu	Thr	Tyr	Ile	Gly	Val	Pro	Ser	Ile	
				245					250					255		
tac	tac	ggc	gat	gaa	gtg	ggg	ctc	tct	ggc	ggc	aac	gat	ccg	gac	tgc	816
Tyr	Tyr	Gly	Asp	Glu	Val	Gly	Leu	Ser	Gly	Gly	Asn	Asp	Pro	Asp	Cys	
			260					265					270			
cgc	cgc	tgc	ttc	ccg	tgg	gag	acc	acc	gcc	tgg	gat	cac	gtt	ctg	cac	864
Arg	Arg	Cys	Phe	Pro	Trp	Glu	Thr	Thr	Ala	Trp	Asp	His	Val	Leu	His	
			275				280					285				
gnc	cac	tac	cgc	cgg	ttg	atc	cag	atc	cgc	cgg	caa	cgt	ccg	gct	ctg	912
Xaa	His	Tyr	Arg	Arg	Leu	Ile	Gln	Ile	Arg	Arg	Gln	Arg	Pro	Ala	Leu	

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290	295	300		
cgc cgc ggc gac atc cag acc ctc tat gcc ggc ccg cac agc tat gtg	960			
Arg Arg Gly Asp Ile Gln Thr Leu Tyr Ala Gly Pro His Ser Tyr Val				
305	310	315		320
ttc gcc cgc acc ctg caa agc gat cag gtg gtg gta gcc tgc aac cgt	1008			
Phe Ala Arg Thr Leu Gln Ser Asp Gln Val Val Val Ala Cys Asn Arg				
325	330	335		
cac ccc agc gag ccg cgc acc atc agt ctg ccc ctg tgg cag acc gcc	1056			
His Pro Ser Glu Pro Arg Thr Ile Ser Leu Pro Leu Trp Gln Thr Ala				
340	345	350		
agt ccc gcc agc cgc ttc aca gac gcc ttg aac ggc gac aag ttc gaa	1104			
Ser Pro Ala Ser Arg Phe Thr Asp Ala Leu Asn Gly Asp Lys Phe Glu				
355	360	365		
gta gtg cag ggc gag ata cag ctc acc atc ccc gcc aac tcg gcc aga	1152			
Val Val Gln Gly Glu Ile Gln Leu Thr Ile Pro Ala Asn Ser Ala Arg				
370	375	380		
gtg ctg ctc tcc agc tag	1170			
Val Leu Leu Ser Ser				
385				

<210> 372

<211> 389

<212> PRT

<213> Aeromonas hydrophila

<220>

<221> misc_feature

<222> (289)..(289)

<223> The Xaa at location 289 stands for Ala, Asp, Gly, or Val.

<400> 372

Met Arg Ile Trp Ala Pro Thr Pro Asn Ser Ala Glu Leu Thr Arg Asn	
1 5 10 15	
Leu His Gln Arg Gly Met Lys Ile Ile Leu Asp Ala Val Val Asn His	
20 25 30	
Thr Ser Thr Glu His Pro Trp Phe Cys Pro Pro Leu Gly Ala Gln Arg	
35 40 45	
Asn Pro Asp Ser Pro Trp Arg Ser Phe Tyr Thr Phe Asp Asn Glu Gly	
50 55 60	
Asp Tyr Val Ser Trp Lys Gly Ile Arg Ser Leu Pro Lys Leu Asp Phe	
65 70 75 80	
Ser Ser Glu Gln Val Gln Asp Ala Val Tyr Arg Ala Asp Asp Ala Ile	
85 90 95	
Leu Arg Tyr Trp Met Arg Ala Pro Tyr Gln Ile Asp Gly Trp Arg Phe	
100 105 110	
Asp Val Ile His Met Leu Gly Glu Arg Gly Thr Ala Glu Gly Asn Arg	
115 120 125	
Gly His Val Arg Ala Ile Arg Gly Ala Val Lys Gln Glu Asn Pro Asp	
130 135 140	
Ala Tyr Val Leu Gly Glu His Phe Phe Glu Ala Ser Gln Trp Leu Gln	
145 150 155 160	
Gly Asp Gln Glu Asp Gly Ala Met Asn Tyr Tyr Gly Phe Ala His Pro	
165 170 175	
Ile Arg Ala Phe Leu Ala Gly Gln Asp Ile Ala Tyr His Pro Ile Lys	
180 185 190	
Ile Ser Ala Glu Glu Leu Asp Arg Trp Leu Lys Leu Ala Arg Ala His	
195 200 205	
Ile Pro Phe Lys Asn Gln Leu Ala Gln Phe Asn Leu Leu Asp Ser His	
210 215 220	
Asp Thr Ala Arg Phe Leu His Leu Leu Gly Glu Asp Lys Gln Arg Met	
225 230 235 240	
Arg Leu Ala Ala Thr Leu Leu Leu Thr Tyr Ile Gly Val Pro Ser Ile	
245 250 255	
Tyr Tyr Gly Asp Glu Val Gly Leu Ser Gly Gly Asn Asp Pro Asp Cys	
260 265 270	
Arg Arg Cys Phe Pro Trp Glu Thr Thr Ala Trp Asp His Val Leu His	
275 280 285	
Xaa His Tyr Arg Arg Leu Ile Gln Ile Arg Arg Gln Arg Pro Ala Leu	
290 295 300	

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Arg Arg Gly Asp Ile Gln Thr Leu Tyr Ala Gly Pro His Ser Tyr Val
 305 310 315 320
 Phe Ala Arg Thr Leu Gln Ser Asp Gln Val Val Val Ala Cys Asn Arg
 325 330 335
 His Pro Ser Glu Pro Arg Thr Ile Ser Leu Pro Leu Trp Gln Thr Ala
 340 345 350
 Ser Pro Ala Ser Arg Phe Thr Asp Ala Leu Asn Gly Asp Lys Phe Glu
 355 360 365
 Val Val Gln Gly Glu Ile Gln Leu Thr Ile Pro Ala Asn Ser Ala Arg
 370 375 380
 Val Leu Leu Ser Ser
 385

<210> 373

<211> 1449

<212> DNA

<213> Thermoactinomyces vulgaris

<220>

<221> CDS

<222> (1)..(1449)

<223> transl_table=11

<400> 373

atg	aaa	aag	gga	gct	ttg	ctc	agt	ggg	ttg	gtg	tgt	tta	ttg	tcg	gct	48
Met	Lys	Lys	Gly	Ala	Leu	Leu	Ser	Gly	Leu	Val	Cys	Leu	Leu	Ser	Ala	
1				5					10					15		
gtg	ctg	atg	ttt	gct	tct	acc	gca	ccc	aca	gcc	gtg	gcg	ctt	tct	cct	96
Val	Leu	Met	Phe	Ala	Ser	Thr	Ala	Pro	Thr	Ala	Val	Ala	Leu	Ser	Pro	
			20					25					30			
gcg	gat	tgg	caa	gag	aaa	agc	atc	tat	ttt	att	atg	acc	gac	cgg	ttt	144
Ala	Asp	Trp	Gln	Glu	Lys	Ser	Ile	Tyr	Phe	Ile	Met	Thr	Asp	Arg	Phe	
			35				40					45				
gac	aat	ggt	gac	ccc	agc	aat	gac	aat	tat	ggc	ggt	ttt	aac	gct	gac	192
Asp	Asn	Gly	Asp	Pro	Ser	Asn	Asp	Asn	Tyr	Gly	Gly	Phe	Asn	Ala	Asp	
			50				55				60					
aaa	agc	gat	ccg	cg	aag	tat	cat	ggt	ggg	gat	ttt	caa	ggg	att	atc	240
Lys	Ser	Asp	Pro	Arg	Lys	Tyr	His	Gly	Gly	Asp	Phe	Gln	Gly	Ile	Ile	
					70				75					80		
aat	cg	ttg	gac	tac	atc	aag	aat	atg	ggg	ttc	acg	gcc	att	tgg	att	288
Asn	Arg	Leu	Asp	Tyr	Ile	Lys	Asn	Met	Gly	Phe	Thr	Ala	Ile	Trp	Ile	
				85					90					95		
act	ccc	gtc	acg	atg	caa	aag	agc	gct	aat	gca	tat	cat	ggt	tat	tgg	336
Thr	Pro	Val	Thr	Met	Gln	Lys	Ser	Ala	Asn	Ala	Tyr	His	Gly	Tyr	Trp	
			100					105					110			
acc	tat	gat	ttt	tac	agc	gta	gac	ggt	cat	ctg	ggc	tcc	atg	gct	aag	384
Thr	Tyr	Asp	Phe	Tyr	Ser	Val	Asp	Gly	His	Leu	Gly	Ser	Met	Ala	Lys	
			115				120					125				
ctg	caa	gaa	ttg	gtg	cg	g	g	cat	g	aaa	ggg	ata	tcg	gtg	atg	432
Leu	Gln	Glu	Leu	Val	Arg	Ala	Ala	His	Ala	Lys	Gly	Ile	Ser	Val	Met	
			130			135					140					
ctg	gat	gta	gtc	gcc	aat	cat	aca	ggg	gat	ttc	caa	cct	tcg	agc	ttc	480
Leu	Asp	Val	Val	Ala	Asn	His	Thr	Gly	Asp	Phe	Gln	Pro	Ser	Ser	Phe	
					150				155						160	
gcc	aaa	gct	ccg	ttt	gac	aag	gca	gat	tgg	tac	cat	cat	tat	ggc	gac	528
Ala	Lys	Ala	Pro	Phe	Asp	Lys	Ala	Asp	Trp	Tyr	His	His	Tyr	Gly	Asp	
				165					170					175		
act	caa	gac	tgg	aac	gat	caa	tgg	tgg	gtg	gag	aat	gga	gat	att	gcc	576
Thr	Gln	Asp	Trp	Asn	Asp	Gln	Trp	Trp	Val	Glu	Asn	Gly	Asp	Ile	Ala	
			180					185					190			
ggc	ttg	gat	gat	tta	aac	caa	gat	aat	ccg	gca	gtg	gca	acg	gaa	ttg	624
Gly	Leu	Asp	Asp	Leu	Asn	Gln	Asp	Asn	Pro	Ala	Val	Ala	Thr	Glu	Leu	
			195				200					205				
aag	aat	tgg	atc	gca	tgg	ctt	gtg	caa	acg	acc	gga	gtg	gat	ggg	ttg	672
Lys	Asn	Trp	Ile	Ala	Trp	Leu	Val	Gln	Thr	Thr	Gly	Val	Asp	Gly	Leu	
			210			215					220					
cg	gtt	gat	acg	gtg	aaa	cac	gtt	cca	aag	tgg	ttc	tgg	cg	gaa	ttt	720
Arg	Val	Asp	Thr	Val	Lys	His	Val	Pro	Lys	Trp	Phe	Trp	Arg	Glu	Phe	
					230					235					240	

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gac	ggg	gca	gcc	aat	acc	ttt	acc	ctt	ggc	gaa	gtg	ttt	cat	ggg	gac	768
Asp	Gly	Ala	Ala	Asn	Thr	Phe	Thr	Leu	Gly	Glu	Val	Phe	His	Gly	Asp	
				245					250					255		
ccc	gca	tat	gta	ggc	gat	tac	acc	aat	tat	ttg	gat	gcg	gtg	ctc	gat	816
Pro	Ala	Tyr	Val	Gly	Asp	Tyr	Thr	Asn	Tyr	Leu	Asp	Ala	Val	Leu	Asp	
			260					265					270			
ttc	ccg	atg	tac	tac	acc	atc	aaa	aat	gtg	ttt	ggc	caa	gac	cag	tcg	864
Phe	Pro	Met	Tyr	Tyr	Thr	Ile	Lys	Asn	Val	Phe	Gly	Gln	Asp	Gln	Ser	
		275					280					285				
atg	aga	acg	att	gcg	gat	cgt	tac	gcg	caa	gac	tat	cga	tat	aaa	aat	912
Met	Arg	Thr	Ile	Ala	Asp	Arg	Tyr	Ala	Gln	Asp	Tyr	Arg	Tyr	Lys	Asn	
	290					295					300					
ccg	atg	act	aac	ggc	ttg	ttt	ata	gac	aac	cat	gac	gtg	ccg	cgc	ttt	960
Pro	Met	Thr	Asn	Gly	Leu	Phe	Ile	Asp	Asn	His	Asp	Val	Pro	Arg	Phe	
305					310					315					320	
ttg	aat	gaa	gct	tca	ggc	aag	cct	ggc	gct	tcc	tgg	gac	aag	tgg	ccg	1008
Leu	Asn	Glu	Ala	Ser	Gly	Lys	Pro	Gly	Ala	Ser	Trp	Asp	Lys	Trp	Pro	
				325				330						335		
caa	tta	aaa	gca	gca	ttg	ggc	ttc	atg	ttt	act	acc	cgt	ggg	atc	ccg	1056
Gln	Leu	Lys	Ala	Ala	Leu	Gly	Phe	Met	Phe	Thr	Thr	Arg	Gly	Ile	Pro	
			340				345						350			
att	ctg	tat	caa	ggc	aca	gag	cag	gga	ttt	agc	ggg	ggc	gct	gat	cct	1104
Ile	Leu	Tyr	Gln	Gly	Thr	Glu	Gln	Gly	Phe	Ser	Gly	Gly	Ala	Asp	Pro	
		355					360					365				
tac	aac	cgg	gat	gat	atg	gtc	ttt	aac	gac	aag	cat	gag	ctc	tac	ggg	1152
Tyr	Asn	Arg	Asp	Asp	Met	Val	Phe	Asn	Asp	Lys	His	Glu	Leu	Tyr	Gly	
	370				375						380					
tat	atc	gcc	aag	cta	aat	tat	att	cgt	aac	act	cat	ggt	gct	ttg	cgc	1200
Tyr	Ile	Ala	Lys	Leu	Asn	Tyr	Ile	Arg	Asn	Thr	His	Val	Ala	Leu	Arg	
385					390					395					400	
aaa	gga	aca	cag	gct	gaa	aag	tgg	gtg	gat	gac	aca	ttt	tac	gct	ttt	1248
Lys	Gly	Thr	Gln	Ala	Glu	Lys	Trp	Val	Asp	Asp	Thr	Phe	Tyr	Ala	Phe	
			405					410						415		
cag	cgt	tcg	tat	aac	ggc	gat	gag	gtg	gtg	gtg	atg	atc	aat	aat	tct	1296
Gln	Arg	Ser	Tyr	Asn	Gly	Asp	Glu	Val	Val	Val	Met	Ile	Asn	Asn	Ser	
			420				425						430			
tgg	aac	agc	cag	acg	cgc	aca	gtg	ccc	aac	atc	gat	cga	gtc	gcc	aat	1344
Trp	Asn	Ser	Gln	Thr	Arg	Thr	Val	Pro	Asn	Ile	Asp	Arg	Val	Ala	Asn	
		435					440					445				
ggg	caa	acc	ctg	tac	aat	cgg	atg	ggg	acg	gac	aaa	gta	aca	gtg	aac	1392
Gly	Gln	Thr	Leu	Tyr	Asn	Arg	Met	Gly	Thr	Asp	Lys	Val	Thr	Val	Asn	
	450					455					460					
aat	ggg	tcg	att	act	gcc	aca	ctc	ggc	ccc	aaa	gaa	gta	aag	ata	ttt	1440
Asn	Gly	Ser	Ile	Thr	Ala	Thr	Leu	Gly	Pro	Lys	Glu	Val	Lys	Ile	Phe	
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Thr	Lys															

<210> 374

<211> 482

<212> PRT

<213> Thermoactinomyces vulgaris

<400> 374

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Val	Leu	Met	Phe	Ala	Ser	Thr	Ala	Pro	Thr	Ala	Val	Ala	Leu	Ser	Pro
			20					25					30		
Ala	Asp	Trp	Gln	Glu	Lys	Ser	Ile	Tyr	Phe	Ile	Met	Thr	Asp	Arg	Phe
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Asp	Asn	Gly	Asp	Pro	Ser	Asn	Asp	Asn	Tyr	Gly	Gly	Phe	Asn	Ala	Asp
	50					55					60				
Lys	Ser	Asp	Pro	Arg	Lys	Tyr	His	Gly	Gly	Asp	Phe	Gln	Gly	Ile	Ile
65					70					75				80	
Asn	Arg	Leu	Asp	Tyr	Ile	Lys	Asn	Met	Gly	Phe	Thr	Ala	Ile	Trp	Ile
				85					90					95	
Thr	Pro	Val	Thr	Met	Gln	Lys	Ser	Ala	Asn	Ala	Tyr	His	Gly	Tyr	Trp
			100					105					110		

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Thr Tyr Asp Phe Tyr Ser Val Asp Gly His Leu Gly Ser Met Ala Lys
 115 120 125
 Leu Gln Glu Leu Val Arg Ala His Ala Lys Gly Ile Ser Val Met
 130 135 140
 Leu Asp Val Val Ala Asn His Thr Gly Asp Phe Gln Pro Ser Ser Phe
 145 150 155 160
 Ala Lys Ala Pro Phe Asp Lys Ala Asp Trp Tyr His His Tyr Gly Asp
 165 170 175
 Thr Gln Asp Trp Asn Asp Gln Trp Trp Val Glu Asn Gly Asp Ile Ala
 180 185 190
 Gly Leu Asp Asp Leu Asn Gln Asp Asn Pro Ala Val Ala Thr Glu Leu
 195 200 205
 Lys Asn Trp Ile Ala Trp Leu Val Gln Thr Thr Gly Val Asp Gly Leu
 210 215 220
 Arg Val Asp Thr Val Lys His Val Pro Lys Trp Phe Trp Arg Glu Phe
 225 230 235 240
 Asp Gly Ala Ala Asn Thr Phe Thr Leu Gly Glu Val Phe His Gly Asp
 245 250 255
 Pro Ala Tyr Val Gly Asp Tyr Thr Asn Tyr Leu Asp Ala Val Leu Asp
 260 265 270
 Phe Pro Met Tyr Tyr Thr Ile Lys Asn Val Phe Gly Gln Asp Gln Ser
 275 280 285
 Met Arg Thr Ile Ala Asp Arg Tyr Ala Gln Asp Tyr Arg Tyr Lys Asn
 290 295 300
 Pro Met Thr Asn Gly Leu Phe Ile Asp Asn His Asp Val Pro Arg Phe
 305 310 315 320
 Leu Asn Glu Ala Ser Gly Lys Pro Gly Ala Ser Trp Asp Lys Trp Pro
 325 330 335
 Gln Leu Lys Ala Ala Leu Gly Phe Met Phe Thr Thr Arg Gly Ile Pro
 340 345 350
 Ile Leu Tyr Gln Gly Thr Glu Gln Gly Phe Ser Gly Gly Ala Asp Pro
 355 360 365
 Tyr Asn Arg Asp Asp Met Val Phe Asn Asp Lys His Glu Leu Tyr Gly
 370 375 380
 Tyr Ile Ala Lys Leu Asn Tyr Ile Arg Asn Thr His Val Ala Leu Arg
 385 390 395 400
 Lys Gly Thr Gln Ala Glu Lys Trp Val Asp Asp Thr Phe Tyr Ala Phe
 405 410 415
 Gln Arg Ser Tyr Asn Gly Asp Glu Val Val Val Met Ile Asn Asn Ser
 420 425 430
 Trp Asn Ser Gln Thr Arg Thr Val Pro Asn Ile Asp Arg Val Ala Asn
 435 440 445
 Gly Gln Thr Leu Tyr Asn Arg Met Gly Thr Asp Lys Val Thr Val Asn
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 Asn Gly Ser Ile Thr Ala Thr Leu Gly Pro Lys Glu Val Lys Ile Phe
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<210> 375

<211> 1581

<212> DNA

<213> Xanthomonas campestris

<220>

<221> CDS

<222> (1)..(1581)

<223> transl_table=11

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gcg	ctc	ggc	gca	tcc	gcg	gcg	ttc	gcg	ccg	tcc	gtg	cat	gcc	gcc	gat	96
Ala	Leu	Gly	Ala	Ser	Ala	Ala	Phe	Ala	Pro	Ser	Val	His	Ala	Ala	Asp	
			20					25					30			

gcc	gcg	cct	gcc	act	ccg	cgg	tcc	gaa	ggc	tcc	ggc	gtg	tgg	tac	gag	144
Ala	Ala	Pro	Ala	Thr	Pro	Arg	Ser	Glu	Gly	Ser	Gly	Val	Trp	Tyr	Glu	
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atc	ttc	gtg	cgc	gcc	tgg	tac	gac	acc	gac	ggt	gac	ggc	atc	ggc	gat	192
Ile	Phe	Val	Arg	Ala	Trp	Tyr	Asp	Thr	Asp	Gly	Asp	Gly	Ile	Gly	Asp	
	50					55					60					
ctc	aac	ggc	gtc	acc	gcc	aag	ctc	gac	tac	ctg	caa	tcg	ctc	ggc	gtc	240
Leu	Asn	Gly	Val	Thr	Ala	Lys	Leu	Asp	Tyr	Leu	Gln	Ser	Leu	Gly	Val	
65					70					75					80	
agc	ggc	atc	tgg	ctg	atg	ccg	atc	aat	ccg	tcg	ccc	agc	tac	cac	ggc	288
Ser	Gly	Ile	Trp	Leu	Met	Pro	Ile	Asn	Pro	Ser	Pro	Ser	Tyr	His	Gly	
				85					90					95		
tac	gac	atc	acc	gac	tac	gag	ggg	atc	aac	ccg	cag	tac	ggc	acg	atg	336
Tyr	Asp	Ile	Thr	Asp	Tyr	Glu	Gly	Ile	Asn	Pro	Gln	Tyr	Gly	Thr	Met	
			100				105						110			
gcc	gac	ttc	gag	aag	ctg	gtg	agc	gaa	gcg	cac	aag	cgc	ggc	atc	gag	384
Ala	Asp	Phe	Glu	Lys	Leu	Val	Ser	Glu	Ala	His	Lys	Arg	Gly	Ile	Glu	
		115					120					125				
gtg	atc	ctc	gac	ctg	gtg	atc	aac	cac	acc	agc	gac	cag	cat	cca	tgg	432
Val	Ile	Leu	Asp	Leu	Val	Ile	Asn	His	Thr	Ser	Asp	Gln	His	Pro	Trp	
	130					135					140					
ttc	aag	gcg	gcg	ctg	gat	aag	gac	gcg	cat	cgt	tcc	tgg	tac	acc		480
Phe	Lys	Ala	Ala	Leu	Asp	Pro	Lys	Asp	Ala	His	Arg	Ser	Trp	Tyr	Thr	
145				150					155					160		
tgg	gca	ggc	ccg	ggt	acg	aac	ctg	aag	gcg	gtc	agc	gcg	gtg	ggc	ggc	528
Trp	Ala	Gly	Pro	Gly	Thr	Asn	Leu	Lys	Ala	Val	Ser	Ala	Val	Gly	Gly	
				165				170						175		
ccg	gcg	tgg	cat	gcc	aac	ggc	aag	cag	cac	tac	ctg	ggc	gat	ttc	acc	576
Pro	Ala	Trp	His	Ala	Asn	Gly	Lys	Gln	His	Tyr	Leu	Gly	Asp	Phe	Thr	
			180					185					190			
ggc	gcc	atg	ccg	gac	ctc	aac	tac	gac	gag	cca	gcg	gtg	cgc	cgc	gag	624
Gly	Ala	Met	Pro	Asp	Leu	Asn	Tyr	Asp	Glu	Pro	Ala	Val	Arg	Arg	Glu	
		195					200					205				
atg	atc	gcg	gtc	ggc	aag	ttc	tgg	ctg	gac	aag	ggc	gcc	gat	ggc	ttc	672
Met	Ile	Ala	Val	Gly	Lys	Phe	Trp	Leu	Asp	Lys	Gly	Ala	Asp	Gly	Phe	
	210					215					220					
cgc	ctg	gat	gcc	gcg	cgc	cac	atc	tat	gac	gat	ctg	gaa	agc	gac	aac	720
Arg	Leu	Asp	Ala	Ala	Arg	His	Ile	Tyr	Asp	Asp	Leu	Glu	Ser	Asp	Asn	
225				230					235					240		
ggc	cag	ccc	gcc	gtg	atc	gcc	agg	aat	gcc	cag	tgg	tgg	aac	gag	ttc	768
Gly	Gln	Pro	Ala	Val	Ile	Ala	Arg	Asn	Ala	Gln	Trp	Trp	Asn	Glu	Phe	
			245					250						255		
cgc	cag	ggt	ttg	cgg	cag	gtc	cgt	ccg	gac	gtc	tat	ctg	gtc	ggc	gag	816
Arg	Gln	Gly	Leu	Arg	Gln	Val	Arg	Pro	Asp	Val	Tyr	Leu	Val	Gly	Glu	
			260				265						270			
gtc	tcg	gcc	aag	cag	ccg	ggc	gag	ctg	gcg	ccg	tat	ctg	ccg	gca	ctg	864
Val	Ser	Ala	Lys	Gln	Pro	Gly	Glu	Leu	Ala	Pro	Tyr	Leu	Pro	Ala	Leu	
		275				280						285				
ggc	tcg	gtg	ttc	gac	ttt	ccg	ctg	gcc	gag	cag	ctg	atc	gcc	agc	gcc	912
Gly	Ser	Val	Phe	Asp	Phe	Pro	Leu	Ala	Glu	Gln	Leu	Ile	Ala	Ser	Ala	
	290					295					300					
ggg	cag	gaa	aag	gcc	ggc	aag	ctg	ccg	gcg	ctg	ctc	acc	gaa	acg	tac	960
Gly	Gln	Glu	Lys	Ala	Gly	Lys	Leu	Pro	Ala	Leu	Leu	Thr	Glu	Thr	Tyr	
305				310					315						320	
gcg	gcc	ttc	cgt	gcc	gcc	gcg	ggc	gac	gac	tac	ggc	gac	gcg	ccg	ttc	1008
Ala	Ala	Phe	Arg	Ala	Ala	Ala	Gly	Asp	Asp	Tyr	Ala	Asp	Ala	Pro	Phe	
				325				330						335		
ctt	tcc	aac	cac	gat	cag	gag	cgt	gtg	ctc	agc	cag	ctc	ggc	ggc	gat	1056
Leu	Ser	Asn	His	Asp	Gln	Glu	Arg	Val	Leu	Ser	Gln	Leu	Gly	Gly	Asp	
			340					345					350			
ctg	cgc	cac	atg	cgc	acg	gcg	gcg	gcg	atg	ctg	ctg	acc	ttg	ccc	ggc	1104
Leu	Arg	His	Met	Arg	Thr	Ala	Ala	Ala	Met	Leu	Leu	Thr	Leu	Pro	Gly	
		355				360						365				
cgg	ccg	tac	ctc	tac	tac	ggc	gaa	gag	atc	ggc	atg	ctc	ggc	cgc	aag	1152
Arg	Pro	Tyr	Leu	Tyr	Tyr	Gly	Glu	Glu	Ile	Gly	Met	Leu	Gly	Arg	Lys	
		370				375					380					
ccg	gac	gag	aac	ctg	cgc	gaa	ccc	atg	cgc	tgg	cag	cgc	cag	gcc	ggc	1200
Pro	Asp	Glu	Asn	Leu	Arg	Glu	Pro	Met	Arg	Trp	Gln	Arg	Gln	Ala	Gly	
385				390					395					400		
gcg	ccg	ggc	gac	agc	cgc	tgg	aag	ccg	tac	agc	gtg	aag	cag	ggc	ggc	1248
Ala	Pro	Gly	Asp	Ser	Arg	Trp	Lys	Pro	Tyr	Ser	Val	Lys	Gln	Gly	Gly	
				405					410					415		

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gaa	gtg	tcg	gtg	cag	gcc	gag	cag	gat	cgg	ccc	gat	tcg	ctc	ctg	agc	1296
Glu	Val	Ser	Val	Gln	Ala	Glu	Gln	Asp	Arg	Pro	Asp	Ser	Leu	Leu	Ser	
			420					425					430			
ttc	tac	cgg	acg	ctg	atc	cat	tgg	cgc	gtg	gag	gtg	ccg	gcg	ctg	cgc	1344
Phe	Tyr	Arg	Thr	Leu	Ile	His	Trp	Arg	Val	Glu	Val	Pro	Ala	Leu	Arg	
		435					440					445				
gac	ggc	gcg	ctg	cgc	gtg	gtc	gat	acc	ggc	gcc	ccg	gcg	ctg	gtg	gcc	1392
Asp	Gly	Ala	Leu	Arg	Val	Val	Asp	Thr	Gly	Ala	Pro	Ala	Leu	Val	Ala	
	450					455				460						
tac	gag	cgc	gtc	acg	gcg	gac	agc	cgc	gcg	ctg	gtg	gtg	cac	aac	ctc	1440
Tyr	Glu	Arg	Val	Thr	Ala	Asp	Ser	Arg	Ala	Leu	Val	Val	His	Asn	Leu	
465					470					475					480	
tcg	ggc	aag	ccg	gcg	agc	atg	aag	ctc	ggc	gac	cgc	gcc	aag	gcc		1488
Ser	Gly	Lys	Pro	Ala	Ser	Met	Lys	Leu	Gly	Ala	Asp	Arg	Ala	Lys	Ala	
				485					490					495		
ttc	gcc	gcc	atc	cgc	ctg	cac	agt	gcg	cct	ggc	gcg	acg	ctg	acg	gag	1536
Phe	Ala	Ala	Ile	Arg	Leu	His	Ser	Ala	Pro	Gly	Ala	Thr	Leu	Thr	Glu	
			500					505					510			
ggc	cgg	ctc	gtg	ccg	gcg	tac	gcc	acc	gtg	gtg	ttg	cag	tga			1581
Gly	Arg	Leu	Thr	Val	Pro	Ala	Tyr	Ala	Thr	Val	Val	Leu	Gln			
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<210> 376

<211> 526

<212> PRT

<213> Xanthomonas campestris

<400> 376

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			20					25					30			
Ala	Ala	Pro	Ala	Thr	Pro	Arg	Ser	Glu	Gly	Ser	Gly	Val	Trp	Tyr	Glu	
		35					40					45				
Ile	Phe	Val	Arg	Ala	Trp	Tyr	Asp	Thr	Asp	Gly	Asp	Gly	Ile	Gly	Asp	
	50					55					60					
Leu	Asn	Gly	Val	Thr	Ala	Lys	Leu	Asp	Tyr	Leu	Gln	Ser	Leu	Gly	Val	
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Ser	Gly	Ile	Trp	Leu	Met	Pro	Ile	Asn	Pro	Ser	Pro	Ser	Tyr	His	Gly	
				85					90					95		
Tyr	Asp	Ile	Thr	Asp	Tyr	Glu	Gly	Ile	Asn	Pro	Gln	Tyr	Gly	Thr	Met	
		100						105					110			
Ala	Asp	Phe	Glu	Lys	Leu	Val	Ser	Glu	Ala	His	Lys	Arg	Gly	Ile	Glu	
		115					120					125				
Val	Ile	Leu	Asp	Leu	Val	Ile	Asn	His	Thr	Ser	Asp	Gln	His	Pro	Trp	
	130					135					140					
Phe	Lys	Ala	Ala	Leu	Asp	Pro	Lys	Asp	Ala	His	Arg	Ser	Trp	Tyr	Thr	
145					150					155					160	
Trp	Ala	Gly	Pro	Gly	Thr	Asn	Leu	Lys	Ala	Val	Ser	Ala	Val	Gly	Gly	
			165						170					175		
Pro	Ala	Trp	His	Ala	Asn	Gly	Lys	Gln	His	Tyr	Leu	Gly	Asp	Phe	Thr	
			180					185					190			
Gly	Ala	Met	Pro	Asp	Leu	Asn	Tyr	Asp	Glu	Pro	Ala	Val	Arg	Arg	Glu	
		195					200					205				
Met	Ile	Ala	Val	Gly	Lys	Phe	Trp	Leu	Asp	Lys	Gly	Ala	Asp	Gly	Phe	
	210					215					220					
Arg	Leu	Asp	Ala	Ala	Arg	His	Ile	Tyr	Asp	Asp	Leu	Glu	Ser	Asp	Asn	
225					230					235					240	
Gly	Gln	Pro	Ala	Val	Ile	Ala	Arg	Asn	Ala	Gln	Trp	Trp	Asn	Glu	Phe	
			245						250					255		
Arg	Gln	Gly	Leu	Arg	Gln	Val	Arg	Pro	Asp	Val	Tyr	Leu	Val	Gly	Glu	
			260					265					270			
Val	Ser	Ala	Lys	Gln	Pro	Gly	Glu	Leu	Ala	Pro	Tyr	Leu	Pro	Ala	Leu	
		275					280					285				
Gly	Ser	Val	Phe	Asp	Phe	Pro	Leu	Ala	Glu	Gln	Leu	Ile	Ala	Ser	Ala	
	290					295					300					
Gly	Gln	Glu	Lys	Ala	Gly	Lys	Leu	Pro	Ala	Leu	Thr	Glu	Thr	Tyr		
305					310					315				320		
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 Leu Ser Asn His Asp Gln Glu Arg Val Leu Ser Gln Leu Gly Gly Asp
 340 345 350
 Leu Arg His Met Arg Thr Ala Ala Met Leu Leu Thr Leu Pro Gly
 355 360 365
 Arg Pro Tyr Leu Tyr Tyr Gly Glu Glu Ile Gly Met Leu Gly Arg Lys
 370 375 380
 Pro Asp Glu Asn Leu Arg Glu Pro Met Arg Trp Gln Arg Gln Ala Gly
 385 390 395 400
 Ala Pro Gly Asp Ser Arg Trp Lys Pro Tyr Ser Val Lys Gln Gly Gly
 405 410 415
 Glu Val Ser Val Gln Ala Glu Gln Asp Arg Pro Asp Ser Leu Leu Ser
 420 425 430
 Phe Tyr Arg Thr Leu Ile His Trp Arg Val Glu Val Pro Ala Leu Arg
 435 440 445
 Asp Gly Ala Leu Arg Val Val Asp Thr Gly Ala Pro Ala Leu Val Ala
 450 455 460
 Tyr Glu Arg Val Thr Ala Asp Ser Arg Ala Leu Val Val His Asn Leu
 465 470 475 480
 Ser Gly Lys Pro Ala Ser Met Lys Leu Gly Ala Asp Arg Ala Lys Ala
 485 490 495
 Phe Ala Ala Ile Arg Leu His Ser Ala Pro Gly Ala Thr Leu Thr Glu
 500 505 510
 Gly Arg Leu Thr Val Pro Ala Tyr Ala Thr Val Val Leu Gln
 515 520 525

<210> 377

<211> 3309

<212> DNA

<213> Rhodobacter sphaeroides f

<220>

<221> CDS

<222> (1)..(3309)

<223> transl_table=11

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ggc atc gat cgc agc cag acc gac tgg tac aag gat gcg atc atc tac	96
Gly Ile Asp Arg Ser Gln Thr Asp Trp Tyr Lys Asp Ala Ile Ile Tyr	
20 25 30	
cag ttg cac atc aag gcg ttc cag gac gcc aat ggc gac ggg atc ggt	144
Gln Leu His Ile Lys Ala Phe Gln Asp Ala Asn Gly Asp Gly Ile Gly	
35 40 45	
gac ttc gcg ggc ctg atg cag ccg ctg gat tat gtg cag gcg ctg ggc	192
Asp Phe Ala Gly Leu Met Gln Arg Leu Asp Tyr Val Gln Ala Leu Gly	
50 55 60	
gtg acc gcg atc tgg ctg ctg ccg ttc tac cct tcg ccg ctc cgc gac	240
Val Thr Ala Ile Trp Leu Leu Pro Phe Tyr Pro Ser Pro Leu Arg Asp	
65 70 75 80	
gac ggc tac gac atc tcg gat tac cgc tcg atc aac ccg tcc tac ggc	288
Asp Gly Tyr Asp Ile Ser Asp Tyr Arg Ser Ile Asn Pro Ser Tyr Gly	
85 90 95	
gcg atg cgc gac ttc aag ctg ttc gtg cag gaa gcg cac aag cgc ggg	336
Ala Met Arg Asp Phe Lys Leu Phe Val Gln Glu Ala His Lys Arg Gly	
100 105 110	
ctg cgc gtc atc acc gag ctt gtc atc aac cat acc tcc gac cag cac	384
Leu Arg Val Ile Thr Glu Leu Val Ile Asn His Thr Ser Asp Gln His	
115 120 125	
ccc tgg ttc cag cgg gcc cgg cgg gcg aag aag ggc tcg gcc gcc cgc	432
Pro Trp Phe Gln Arg Ala Arg Ala Lys Lys Gly Ser Ala Ala Arg	
130 135 140	
gac tgg tat gtc tgg agc gac acc gac cag aaa ttc ccc gaa acg cgg	480
Asp Trp Tyr Val Trp Ser Asp Thr Asp Gln Lys Phe Pro Glu Thr Arg	
145 150 155 160	
atc atc ttt ctc gat acg gaa aag tcg aac tgg acc tgg gat ccg gtg	528
Ile Ile Phe Leu Asp Thr Glu Lys Ser Asn Trp Thr Trp Asp Pro Val	

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Ala	Gly	Ala	Tyr	Tyr	Trp	His	Arg	Phe	Tyr	Ser	His	Gln	Pro	Asp	Leu	
aac	ttc	gac	aat	ccc	cgc	gtg	ctc	gag	gaa	gtc	ctc	aag	atc	atg	cgc	624
Asn	Phe	Asp	Asn	Pro	Arg	Val	Leu	Glu	Glu	Val	Leu	Lys	Ile	Met	Arg	
atg	tgg	ctc	gag	atg	ggc	gtc	gac	ggg	ctc	agg	ctc	gac	gag	atc	ccc	672
Met	Trp	Leu	Glu	Met	Gly	Val	Asp	Gly	Leu	Arg	Leu	Asp	Ala	Ile	Pro	
tat	ctg	gtc	gag	cgc	gag	ggc	acc	aac	aac	gag	aac	ctc	ccc	gag	acg	720
Tyr	Leu	Val	Glu	Arg	Glu	Gly	Thr	Asn	Asn	Glu	Asn	Leu	Pro	Glu	Thr	
225					230				235						240	
cat	gac	gtg	ctc	aag	aag	atc	cgg	gcc	aat	ctc	gac	cag	cat	ttc	ccc	768
His	Asp	Val	Leu	Lys	Lys	Ile	Arg	Ala	Asn	Leu	Asp	Gln	His	Phe	Pro	
				245					250					255		
gac	agg	atg	ctg	ctt	gcc	gag	gag	aac	caa	tgg	ccg	gag	gac	acg	cgc	816
Asp	Arg	Met	Leu	Leu	Ala	Glu	Ala	Asn	Gln	Trp	Pro	Glu	Asp	Thr	Arg	
				260				265						270		
ccc	tat	ttc	ggc	gag	ggc	gac	gaa	tgc	cac	atg	ggc	ttt	cat	ttc	ccg	864
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Arg Lys Asn Gln Asn Asp Glu Ser Ser Met Lys Arg Ala Gln Gly Asp	
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gcg gtc tct acg cta gca aag tcg agg ctg ccc ttg gat gag agg aac	144
Ala Val Ser Thr Leu Ala Lys Ser Arg Leu Pro Leu Asp Glu Arg Asn	
35 40 45	
acc gtc gcc gcc cca aag ctg aaa aag att acc gag atg gcc ccg caa	192
Thr Val Ala Ala Pro Lys Leu Lys Lys Ile Thr Glu Met Ala Pro Gln	
50 55 60	
aca ccc ttt gca tcg cct ctg agc cgc ccg cta ccg tct acg ccg tgc	240
Thr Pro Phe Ala Ser Pro Leu Ser Arg Pro Leu Pro Ser Thr Pro Cys	

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65	gga	aat	ggt	cgt	gaa	tta	att	ctt	caa	gga	75	aat	tgg	gag	tcg	80	
Gly	Asn	Gly	Arg	Glu	Leu	Ile	Leu	Gln	Gly	Phe	Asn	Trp	Glu	Ser	Tgc	Cys	288
				85					90						95		
caa	cac	gca	gaa	aaa	atg	ggc	gcg	tct	tgg	tac	gcg	cac	ctg	act	gag		336
Gln	His	Ala	Glu	Lys	Met	Gly	Ala	Ser	Trp	Tyr	Ala	His	Leu	Thr	Glu		
			100					105					110				
atg	acc	cct	caa	atc	gcc	gaa	gcc	ggt	ttc	aca	tcc	gtg	tgg	ttg	ccg		384
Met	Thr	Pro	Gln	Ile	Ala	Glu	Ala	Gly	Phe	Thr	Ser	Val	Trp	Leu	Pro		
		115					120					125					
ccg	ccg	acg	aaa	tct	gtg	agt	aaa	caa	gga	tat	cta	ccg	acg	gat	ttg		432
Pro	Pro	Thr	Lys	Ser	Val	Ser	Lys	Gln	Gly	Tyr	Leu	Pro	Thr	Asp	Leu		
		130				135					140						
tac	aat	ctg	aac	tca	ttc	tat	ggg	tct	gaa	gat	gag	ctg	agg	tct	tgt		480
Tyr	Asn	Leu	Asn	Ser	Phe	Tyr	Gly	Ser	Glu	Asp	Glu	Leu	Arg	Ser	Cys		
145					150					155					160		
gtc	gcg	cg	ctg	cgt	gag	tac	aac	atc	acc	cca	gtg	gcg	gac	att	gtc		528
Val	Ala	Arg	Leu	Arg	Glu	Tyr	Asn	Ile	Thr	Pro	Val	Ala	Asp	Ile	Val		
				165					170					175			
atc	aat	cat	aga	tgc	gcc	gag	gca	aag	gat	gac	gcc	ggt	cgg	tgg	aac		576
Ile	Asn	His	Arg	Cys	Ala	Glu	Ala	Lys	Asp	Asp	Ala	Gly	Arg	Trp	Asn		
			180					185					190				
aag	tac	acc	ggg	aag	cta	gat	tgg	gat	gag	cg	g	atc	acg	tgt	gag		624
Lys	Tyr	Thr	Gly	Lys	Leu	Asp	Trp	Asp	Glu	Arg	Ala	Ile	Thr	Cys	Glu		
		195					200					205					
aac	ccc	gcc	ttt	ggc	ggc	cg	ggg	gca	cat	aag	act	ggc	gag	gat	tat		672
Asn	Pro	Ala	Phe	Gly	Gly	Arg	Gly	Ala	His	Lys	Thr	Gly	Glu	Asp	Tyr		
		210				215					220						
ctc	ccc	g	ccg	aat	atc	gat	cac	acg	caa	gag	ttt	gtt	cga	cg	gat		720
Leu	Pro	Ala	Pro	Asn	Ile	Asp	His	Thr	Gln	Glu	Phe	Val	Arg	Arg	Asp		
225					230					235					240		
ttg	acc	cag	tgg	ctc	gaa	tgg	ttg	cgt	agc	gac	gtc	ggt	ttc	cg	ggt		768
Leu	Thr	Gln	Trp	Leu	Glu	Trp	Leu	Arg	Ser	Asp	Val	Gly	Phe	Arg	Gly		
			245						250					255			
tgg	agg	ttt	gac	ttc	gtc	aag	ggt	tac	agt	ggc	gcc	ttc	acg	gga	gag		816
Trp	Arg	Phe	Asp	Phe	Val	Lys	Gly	Tyr	Ser	Gly	Ala	Phe	Thr	Gly	Glu		
			260					265					270				
tac	gtc	gaa	gct	acg	cga	ccg	ttt	ttg	gcc	ttt	ggc	gag	ttc	tgg	gac		864
Tyr	Val	Glu	Ala	Thr	Arg	Pro	Phe	Leu	Ala	Phe	Gly	Glu	Phe	Trp	Asp		
		275					280					285					
gag	tgt	gga	tac	agg	gat	gga	gtc	ttg	gat	tat	aac	caa	gac	gct	cac		912
Glu	Cys	Gly	Tyr	Arg	Asp	Gly	Val	Leu	Asp	Tyr	Asn	Gln	Asp	Ala	His		
	290					295					300						
cg	cag	cg	acg	tgc	aac	tgg	gtc	gac	tcc	acg	acc	ggt	aac	acc	gcc		960
Arg	Gln	Arg	Thr	Cys	Asn	Trp	Val	Asp	Ser	Thr	Thr	Gly	Asn	Thr	Ala		
305					310					315					320		
gcg	ttc	gac	ttc	acg	acg	aag	gga	att	ttg	caa	gaa	gcc	gtc	tca	cg		1008
Ala	Phe	Asp	Phe	Thr	Thr	Lys	Gly	Ile	Leu	Gln	Glu	Ala	Val	Ser	Arg		
				325					330					335			
acc	gag	tac	tgg	cga	ttg	atc	gac	aac	aaa	ggt	cg	cca	ccg	gga	ttc		1056
Thr	Glu	Tyr	Trp	Arg	Leu	Ile	Asp	Asn	Lys	Gly	Arg	Pro	Pro	Gly	Phe		
			340					345					350				
tta	ggc	atc	tgg	cct	tct	cg	gcc	gtg	acc	ttc	ata	gaa	aat	cac	gac		1104
Leu	Gly	Ile	Trp	Pro	Ser	Arg	Ala	Val	Thr	Phe	Ile	Glu	Asn	His	Asp		
		355					360					365					
act	ggg	tct	acg	ctc	cag	cac	tgg	cct	ttc	cca	tgg	gac	aag	gtc	ctg		1152
Thr	Gly	Ser	Thr	Leu	Gln	His	Trp	Pro	Phe	Pro	Trp	Asp	Lys	Val	Leu		
	370					375					380						
caa	ggt	tac	tgc	tac	atc	ttg	acg	cat	cct	gga	acg	cct	acg	gtg	ttc		1200
Gln	Gly	Tyr	Cys	Tyr	Ile	Leu	Thr	His	Pro	Gly	Thr	Pro	Thr	Val	Phe		
385					390					395					400		
ttt	gat	cac	tgg	gtc	gat	cca	gtt	ttc	aag	cca	tcc	att	gac	gcg	atg		1248
Phe	Asp	His	Trp	Val	Asp	Pro	Val	Phe	Lys	Pro	Ser	Ile	Asp	Ala	Met		
				405					410					415			
ctt	gaa	gtt	cgt	aag	cg	aac	cgt	ctc	tcg	tcc	aag	gac	gcg	gcg	att		1296
Leu	Glu	Val	Arg	Lys	Arg	Asn	Arg	Leu	Ser	Ser	Lys	Asp	Ala	Ala	Ile		
			420					425					430				
cac	att	gag	cg	gcc	acc	gcg	gga	gtc	tac	gcc	gca	cac	gta	ggc	cac		1344
His	Ile	Glu	Arg	Ala	Thr	Ala	Gly	Val	Tyr	Ala	Ala	His	Val	Gly	His		

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gag	aag	435	gag	gca	tac	acc	gaa	440	ggg	ctg	tgt	acc	gat	gtc	gac	gtc	acg	1392
Ala	Lys	450	Glu	Ala	Tyr	Thr	Glu	455	Gly	Leu	Cys	Thr	Asp	Val	Asp	Val	Thr	
cag	cca	tcg	att	tgc	atg	aag	atc	ggg	cat	gaa	gcc	tgg	tcg	ccg	aac		1440	
Gln	Pro	Ser	Ile	Cys	Met	Lys	Ile	Gly	His	Glu	Ala	Trp	Ser	Pro	Asn	480		
465	caa	aaa	gtt	gga	aac	cta	tct	tgg	cag	tgc	acc	gct	agc	ggc	gac		1488	
Ala	Gln	Lys	Val	Gly	Asn	Leu	Ser	Trp	Gln	Cys	Thr	Ala	Ser	Gly	Asp	495		
485	ggc	tgg	gcg	gtc	tgg	gaa	gat	aag	gcc	cat	ctc	gtc	gat	gcc	gag	aag	1536	
Gly	Trp	Ala	Val	Trp	Glu	Asp	Lys	Ala	His	Leu	Val	Asp	Ala	Glu	Lys	510		
500	atg	acc	aga	tag													1548	
Met	Thr	Arg																
515																		

<210> 380

<211> 515

<212> PRT

<213> *Ostreococcus tauri*

<400> 380

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Arg	Lys	Asn	Gln	Asn	Asp	Glu	Ser	Ser	Met	Lys	Arg	Ala	Gln	Gly	Asp		
		20						25					30				
Ala	Val	Ser	Thr	Leu	Ala	Lys	Ser	Arg	Leu	Pro	Leu	Asp	Glu	Arg	Asn		
		35					40					45					
Thr	Val	Ala	Ala	Pro	Lys	Leu	Lys	Lys	Ile	Thr	Glu	Met	Ala	Pro	Gln		
	50					55					60						
Thr	Pro	Phe	Ala	Ser	Pro	Leu	Ser	Arg	Pro	Leu	Pro	Ser	Thr	Pro	Cys		
65				70						75					80		
Gly	Asn	Gly	Arg	Glu	Leu	Ile	Leu	Gln	Gly	Phe	Asn	Trp	Glu	Ser	Cys		
				85					90					95			
Gln	His	Ala	Glu	Lys	Met	Gly	Ala	Ser	Trp	Tyr	Ala	His	Leu	Thr	Glu		
			100					105					110				
Met	Thr	Pro	Gln	Ile	Ala	Glu	Ala	Gly	Phe	Thr	Ser	Val	Trp	Leu	Pro		
		115					120					125					
Pro	Pro	Thr	Lys	Ser	Val	Ser	Lys	Gln	Gly	Tyr	Leu	Pro	Thr	Asp	Leu		
	130					135					140						
Tyr	Asn	Leu	Asn	Ser	Phe	Tyr	Gly	Ser	Glu	Asp	Glu	Leu	Arg	Ser	Cys		
145				150						155					160		
Val	Ala	Arg	Leu	Arg	Glu	Tyr	Asn	Ile	Thr	Pro	Val	Ala	Asp	Ile	Val		
				165					170					175			
Ile	Asn	His	Arg	Cys	Ala	Glu	Ala	Lys	Asp	Asp	Ala	Gly	Arg	Trp	Asn		
			180					185					190				
Lys	Tyr	Thr	Gly	Lys	Leu	Asp	Trp	Asp	Glu	Arg	Ala	Ile	Thr	Cys	Glu		
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Asn	Pro	Ala	Phe	Gly	Gly	Arg	Gly	Ala	His	Lys	Thr	Gly	Glu	Asp	Tyr		
	210					215					220						
Leu	Pro	Ala	Pro	Asn	Ile	Asp	His	Thr	Gln	Glu	Phe	Val	Arg	Arg	Asp		
225				230						235					240		
Leu	Thr	Gln	Trp	Leu	Glu	Trp	Leu	Arg	Ser	Asp	Val	Gly	Phe	Arg	Gly		
				245					250					255			
Trp	Arg	Phe	Asp	Phe	Val	Lys	Gly	Tyr	Ser	Gly	Ala	Phe	Thr	Gly	Glu		
			260					265					270				
Tyr	Val	Glu	Ala	Thr	Arg	Pro	Phe	Leu	Ala	Phe	Gly	Glu	Phe	Trp	Asp		
		275					280					285					
Glu	Cys	Gly	Tyr	Arg	Asp	Gly	Val	Leu	Asp	Tyr	Asn	Gln	Asp	Ala	His		
	290					295					300						
Arg	Gln	Arg	Thr	Cys	Asn	Trp	Val	Asp	Ser	Thr	Thr	Gly	Asn	Thr	Ala		
305				310						315					320		
Ala	Phe	Asp	Phe	Thr	Thr	Lys	Gly	Ile	Leu	Gln	Glu	Ala	Val	Ser	Arg		
				325					330					335			
Thr	Glu	Tyr	Trp	Arg	Leu	Ile	Asp	Asn	Lys	Gly	Arg	Pro	Pro	Gly	Phe		
			340					345					350				
Leu	Gly	Ile	Trp	Pro	Ser	Arg	Ala	Val	Thr	Phe	Ile	Glu	Asn	His	Asp		
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Thr Gly Ser Thr Leu Gln His Trp Pro Phe Pro Trp Asp Lys Val Leu
 370 380
 Gln Gly Tyr Cys Tyr Ile Leu Thr His Pro Gly Thr Pro Thr Val Phe
 385 390 400
 Phe Asp His Trp Val Asp Pro Val Phe Lys Pro Ser Ile Asp Ala Met
 405 415
 Leu Glu Val Arg Lys Arg Asn Arg Leu Ser Ser Lys Asp Ala Ile
 420 425 430
 His Ile Glu Arg Ala Thr Ala Gly Val Tyr Ala Ala His Val Gly His
 435 440 445
 Ala Lys Glu Ala Tyr Thr Glu Gly Leu Cys Thr Asp Val Asp Val Thr
 450 455 460
 Gln Pro Ser Ile Cys Met Lys Ile Gly His Glu Ala Trp Ser Pro Asn
 465 470 475 480
 Ala Gln Lys Val Gly Asn Leu Ser Trp Gln Cys Thr Ala Ser Gly Asp
 485 490 495
 Gly Trp Ala Val Trp Glu Asp Lys Ala His Leu Val Asp Ala Glu Lys
 500 505 510
 Met Thr Arg
 515

<210> 381

<211> 1554

<212> DNA

<213> uncultured bacterium

<220>

<221> CDS

<222> (1)..(1554)

<400> 381

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1				5				10						15		
tct	tcc	tg	gaa	aaa	aag	cct	gct	ccg	gaa	gtc	aaa	aac	tat	tg	cct	96
Ser	Ser	Cys	Glu	Lys	Lys	Pro	Ala	Pro	Glu	Val	Lys	Asn	Tyr	Trp	Pro	
			20					25					30			
caa	gca	gga	gtg	acc	tat	gag	att	ttt	gtt	caa	tct	ttt	tat	gat	tct	144
Gln	Ala	Gly	Val	Thr	Tyr	Glu	Ile	Phe	Val	Gln	Ser	Phe	Tyr	Asp	Ser	
			35				40					45				
aac	gga	gac	agt	att	ggg	gat	ttt	aat	ggg	gtc	act	caa	aaa	ctg	gac	192
Asn	Gly	Asp	Ser	Ile	Gly	Asp	Phe	Asn	Gly	Val	Thr	Gln	Lys	Leu	Asp	
	50				55					60						
tat	gtg	aag	gag	ttg	ggg	gcc	aat	gcc	att	tg	ttt	atg	ccg	att	atg	240
Tyr	Val	Lys	Glu	Leu	Gly	Ala	Asn	Ala	Ile	Trp	Phe	Met	Pro	Ile	Met	
	65			70					75					80		
cct	tcg	cca	act	tac	cat	aag	tac	gat	gtg	acg	gac	tac	aag	gcg	gtt	288
Pro	Ser	Pro	Thr	Tyr	His	Lys	Tyr	Asp	Val	Thr	Asp	Tyr	Lys	Ala	Val	
			85					90					95			
cat	cca	gat	tac	ggt	acg	ctg	gat	gat	ttc	aaa	aag	ctt	ttg	gac	gaa	336
His	Pro	Asp	Tyr	Gly	Thr	Leu	Asp	Asp	Phe	Lys	Lys	Leu	Leu	Asp	Glu	
			100				105						110			
gct	cac	aag	cgg	gac	atc	aag	att	gtg	atc	gat	ttg	atc	atc	aat	cac	384
Ala	His	Lys	Arg	Asp	Ile	Lys	Ile	Val	Ile	Asp	Leu	Ile	Ile	Asn	His	
			115				120					125				
acc	agc	aac	gaa	cat	ccg	tg	ttt	ttg	gaa	gca	aaa	tcc	ggt	agg	gat	432
Thr	Ser	Asn	Glu	His	Pro	Trp	Phe	Leu	Glu	Ala	Lys	Ser	Gly	Arg	Asp	
	130				135					140						
aat	ccc	tat	cg	gat	tac	tac	gtg	tg	gcg	caa	aag	gac	acc	att	gct	480
Asn	Pro	Tyr	Arg	Asp	Tyr	Tyr	Val	Trp	Ala	Gln	Lys	Asp	Thr	Ile	Ala	
	145			150					155					160		
gat	ttt	ttg	aac	aaa	aag	acc	atc	acg	ttt	gat	ttg	gat	aat	atc	cgt	528
Asp	Phe	Leu	Asn	Lys	Lys	Thr	Ile	Thr	Phe	Asp	Leu	Asp	Asn	Ile	Arg	
			165					170					175			
caa	tg	cat	gac	ccg	gga	cag	gga	gaa	gat	ttt	tac	tac	ggg	ttt	ttc	576
Gln	Trp	His	Asp	Pro	Gly	Gln	Gly	Glu	Asp	Phe	Tyr	Tyr	Gly	Phe	Phe	
			180				185						190			
tg	ggt	gga	atg	cct	gat	ctg	aac	ttt	gac	aat	cct	aag	gta	aga	gag	624
Trp	Gly	Gly	Met	Pro	Asp	Leu	Asn	Phe	Asp	Asn	Pro	Lys	Val	Arg	Glu	

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gaa	atc	195	tat	gaa	atc	gga	cga	200	ttc	tgg	ttg	gaa	gaa	205	ggt	gtg	gac	
Glu	Ile	Tyr	Glu	Ile	Gly	Arg	Arg	Phe	Trp	Leu	Glu	Glu	Val	Gly	Val	Asp	672	
	210					215							220					
gga	ttt	cgg	ttg	gac	gct	gcc	aag	cat	att	ttt	ccc	gat	gac	cga	cct		720	
Gly	Phe	Arg	Leu	Asp	Ala	Ala	Lys	His	Ile	Phe	Pro	Asp	Asp	Arg	Pro			
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ttg	gat	aat	cat	gcc	ttt	tgg	aaa	gaa	ttc	cgg	gca	aaa	atg	gaa	gtc		768	
Leu	Asp	Asn	His	Ala	Phe	Trp	Lys	Glu	Phe	Arg	Ala	Lys	Met	Glu	Val			
				245					250					255				
ata	aag	ccg	gat	ggt	tac	ttg	gta	gga	gag	gtg	tat	gac	aaa	aaa	gaa		816	
Ile	Lys	Pro	Asp	Val	Tyr	Leu	Val	Gly	Glu	Val	Tyr	Asp	Lys	Lys	Glu			
			260					265					270					
gtc	gtg	gct	cct	tat	ctt	cct	ggg	ttg	cca	gcc	ttg	ttc	aac	ttt	gat		864	
Val	Val	Ala	Pro	Tyr	Leu	Pro	Gly	Leu	Pro	Ala	Leu	Phe	Asn	Phe	Asp			
		275					280					285						
ttt	cat	tac	act	ctg	ctt	gag	acc	atg	aat	acc	ggg	gac	ggg	atg	ctt		912	
Phe	His	Tyr	Thr	Leu	Leu	Glu	Thr	Met	Asn	Thr	Gly	Asp	Gly	Met	Leu			
	290					295					300							
ttg	gcc	aag	aag	cag	aag	gag	att	ttg	gac	ttt	tat	cag	gga	atc	aca		960	
Leu	Ala	Lys	Lys	Gln	Lys	Glu	Ile	Leu	Asp	Phe	Tyr	Gln	Gly	Ile	Thr			
305				310						315				320				
tca	agc	ttt	atc	gat	gcg	acc	att	tct	tct	aac	cat	gat	cag	ccc	cgt		1008	
Ser	Ser	Phe	Ile	Asp	Ala	Thr	Ile	Ser	Ser	Asn	His	Asp	Gln	Pro	Arg			
				325				330						335				
ctg	ctg	aat	gaa	ttg	gga	tct	gat	ccg	gcc	aaa	tac	aag	cag	gcc	atc		1056	
Leu	Leu	Asn	Glu	Leu	Gly	Ser	Asp	Pro	Ala	Lys	Tyr	Lys	Gln	Ala	Ile			
			340					345					350					
gca	gtg	atg	ctc	agc	atg	ccg	gga	gcg	cca	tat	ttg	tat	tat	ggg	gaa		1104	
Ala	Val	Met	Leu	Ser	Met	Pro	Gly	Ala	Pro	Tyr	Leu	Tyr	Tyr	Gly	Glu			
		355				360						365						
gag	atc	ggg	atg	ctg	ggt	ctc	aag	ccg	gac	gag	cat	atc	cgg	gag	cct		1152	
Glu	Ile	Gly	Met	Leu	Gly	Leu	Lys	Pro	Asp	Glu	His	Ile	Arg	Glu	Pro			
	370				375						380							
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Phe	Leu	Trp	Asp	Glu	Lys	Ser	Lys	Asp	Thr	Gly	Arg	Thr	Lys	Trp	Ile			
385					390					395					400			
aaa	ccc	aaa	tac	agc	aaa	gac	tca	aca	gta	acc	tca	ttg	gag	gtc	caa		1248	
Lys	Pro	Lys	Tyr	Ser	Lys	Asp	Ser	Thr	Val	Thr	Ser	Leu	Glu	Val	Gln			
				405				410						415				
aag	aaa	gat	tcc	agc	tat	ttc	aat	cat	tac	aaa	aac	tta	att	gct			1296	
Lys	Lys	Asp	Ser	Asn	Ser	Tyr	Phe	Asn	His	Tyr	Lys	Asn	Leu	Ile	Ala			
			420				425					430						
ctt	cgt	aat	tct	tat	cct	gct	ttg	gct	att	ggt	tct	ttg	gaa	ctt	cca		1344	
Leu	Arg	Asn	Ser	Tyr	Pro	Ala	Leu	Ala	Ile	Gly	Ser	Leu	Glu	Leu	Pro			
		435					440					445						
gct	gag	gaa	tta	cct	aaa	agt	gta	atg	gca	tat	ttc	aga	aag	tct	gga		1392	
Ala	Glu	Glu	Leu	Pro	Lys	Ser	Val	Met	Ala	Tyr	Phe	Arg	Lys	Ser	Gly			
		450				455					460							
gat	cag	gaa	atc	ttt	gtg	ggt	cac	aat	gtg	gac	aag	gag	gaa	gtt	gac		1440	
Asp	Gln	Glu	Ile	Phe	Val	Val	His	Asn	Val	Asp	Lys	Glu	Glu	Val	Asp			
465					470					475					480			
att	cag	ctt	cca	gag	gga	ttt	gaa	gaa	ggt	att	ttc	tat	ttg	ggt	gag		1488	
Ile	Gln	Leu	Pro	Glu	Gly	Phe	Glu	Glu	Val	Ile	Phe	Tyr	Leu	Gly	Glu			
				485				490						495				
ggg	aaa	aac	agt	tca	gga	aaa	ctt	cag	cta	aaa	ggc	aac	tcg	agt	atg		1536	
Gly	Lys	Asn	Ser	Ser	Gly	Lys	Leu	Gln	Leu	Lys	Gly	Asn	Ser	Ser	Met			
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ggt	ttt	ttg	aag	gat	tag												1554	
Val	Phe	Leu	Lys	Asp														
		515																

<210> 382

<211> 517

<212> PRT

<213> uncultured bacterium

<400> 382

Met Lys Lys Ser Ile Leu Thr Thr Ser Ile Phe Ala Leu Val Ala Phe

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			20					25					30		
Gln	Ala	Gly	Val	Thr	Tyr	Glu	Ile	Phe	Val	Gln	Ser	Phe	Tyr	Asp	Ser
			35					40					45		
Asn	Gly	Asp	Ser	Ile	Gly	Asp	Phe	Asn	Gly	Val	Thr	Gln	Lys	Leu	Asp
			50					55				60			
Tyr	Val	Lys	Glu	Leu	Gly	Ala	Asn	Ala	Ile	Trp	Phe	Met	Pro	Ile	Met
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Asp	Phe	Leu	Asn	Lys	Lys	Thr	Ile	Thr	Phe	Asp	Leu	Asp	Asn	Ile	Arg
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Gln	Trp	His	Asp	Pro	Gly	Gln	Gly	Glu	Asp	Phe	Tyr	Tyr	Gly	Phe	Phe
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Val	Val	Ala	Pro	Tyr	Leu	Pro	Gly	Leu	Pro	Ala	Leu	Phe	Asn	Phe	Asp
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Ser	Ser	Phe	Ile	Asp	Ala	Thr	Ile	Ser	Ser	Asn	His	Asp	Gln	Pro	Arg
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<213> Chlamydomonas reinhardtii

<220>

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Ser	Gly	Gln	Pro	Ala	Ser	Thr	Ala	Tyr	Gly	Pro	Ala	Leu	Thr	Gly	Arg	
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cca	gct	cct	ttg	ggc	gcc	agc	atc	gac	gct	gac	acg	ggc	gcc	atc	aac	336
Pro	Ala	Pro	Leu	Gly	Ala	Ser	Ile	Asp	Ala	Asp	Thr	Gly	Ala	Ile	Asn	
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Phe	Ser	Val	Phe	Ser	Ser	Ser	Ala	Glu	Ser	Val	Ser	Leu	Val	Leu	Phe	
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Gln	Glu	Glu	Asp	Lys	Asp	Tyr	Pro	Gly	Met	Arg	His	Asp	Lys	Arg	Arg	
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Val	Met	Pro	Thr	Trp	Pro	Gln	Ala	Ala	Ala	Ala	Leu	Pro	Ala	Ala	Arg	
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Gly	Ser	Ala	Phe	Asp	Trp	Glu	Gly	Asp	Thr	Pro	Leu	Asn	Leu	Pro	Met	
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Ile	Leu	Asp	Cys	Leu	Lys	His	Trp	Val	Thr	Glu	Tyr	His	Val	Asp	Gly	
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Phe	Arg	Phe	Asp	Leu	Ala	Ser	Ile	Leu	Thr	Arg	Ala	His	Ser	Ala	Trp	
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Ile	Ser	Glu	Asp	Pro	Val	Leu	Arg	Asn	Thr	Lys	Met	Ile	Ala	Glu	Ala	
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Pro	His	Ala	Ser	Ile	Asn	Phe	Val	Ala	Ala	His	Asp	Gly	Phe	Thr	Leu	
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Gly	Leu	Tyr	Val	Ala	Phe	Asn	Thr	Ser	His	Leu	Pro	Lys	Leu	Leu	Gln		
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Lys	Val	Ala	Pro	Tyr	Asp	Phe	Leu	Ala	Val	Asp	Gly	Val	Leu	Ser	Ala		
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Pro	Glu	Asp	Pro	Ala	Ala	Thr	Ser	Met	Ile	Lys							
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Ser	Asp	Gln	Tyr	Arg 325	Phe	Asn	Phe	Trp	Gly 330	Tyr	Ser	Thr	Val	Asn 335	Tyr
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Ile	Leu	Asp 435	Cys	Leu	Lys	His	Trp 440	Val	Thr	Glu	Tyr	His 445	Val	Asp	Gly
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Ile	Ser 515	Glu	Asp	Pro	Val	Leu	Arg 520	Asn	Thr	Lys	Met	Ile 525	Ala	Glu	Ala
Trp	Asp 530	Cys	Asp	Gly	Leu	Asn 535	Gln	Val	Gly	Ala	Phe 540	Pro	His	Tyr	Gly
Gly 545	Arg	Trp	Ser	Glu	Trp 550	Asn	Gly	Lys	Phe	Arg 555	Asp	Val	Val	Arg	Asn 560
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Ile	Cys	Gly	Ser 580	Pro	Asn	Ile	Tyr	Ala 585	Asn	Asn	Thr	Pro	His 590	Glu	Thr
Asp	Trp	Trp 595	Ala	Asn	Asn	Gly	Gly 600	Arg	Gln	Trp	Lys	Gly 605	Gly	Arg	Gly
Pro	His 610	Ala	Ser	Ile	Asn	Phe 615	Val	Ala	Ala	His	Asp 620	Gly	Phe	Thr	Leu
Ala 625	Asp	Met	Val	Ala	Tyr 630	Asn	Asn	Lys	His	Asn 635	Glu	Ala	Asn	Gly	Glu 640
Asn	Asn	Arg	Asp	Gly 645	Glu	Gln	His	Asn	Asn 650	Ser	Trp	Asn	Cys	Gly 655	Glu
Glu	Gly	Pro	Thr 660	Thr	Lys	Trp	Glu	Val 665	Asn	Arg	Leu	Arg	Gln 670	Arg	Gln
Met	Arg 675	Asn	Leu	Thr	Gly	Ala	Leu 680	Leu	Leu	Ser	Cys	Gly 685	Val	Pro	Met
Ile	Asn 690	Met	Gly	Asp	Glu	Tyr 695	Gly	His	Ser	Lys	Asn	Gly	Asn	Asn	Asn
Thr 705	Tyr	Cys	His	Asp	Ser 710	Glu	Leu	Asn	Tyr	Leu 715	Arg	Trp	Asp	Gln	Leu 720
Ala	Glu	Asp	Pro	His 725	Gly	Phe	Asn	Arg	Phe 730	Val	Arg	Leu	Leu	Ile 735	His
Phe	Arg	Arg	Ala 740	Thr	Pro	Ala	Leu	Gln 745	Arg	Thr	Thr	Phe	Val 750	Asn	Asp
Lys	Asp 755	Ile	Gln	Trp	His	Gly	Glu 760	Leu	Pro	Asn	Thr	Pro	Asp	Trp	Thr
Asp	Thr	Ser	Arg	Leu	Val	Ala	Phe	Thr	Leu	His	Asp	Gly	Lys	Gly	Gly

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 Gly Leu Tyr Val Ala Phe Asn Thr Ser His Leu Pro Lys Leu Leu Gln
 785 790 800
 Leu Pro Lys Trp Gly Gly Arg Val Trp Gln Pro Leu Val Asp Thr Ser
 805 810 815
 Lys Val Ala Pro Tyr Asp Phe Leu Ala Val Asp Gly Val Leu Ser Ala
 820 825 830
 Glu Asp Val Ala Ala Ala Arg Arg Gln Met Ala Met Trp Thr Ala Asp
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 His Thr Tyr Pro Val Leu Pro Trp Ser Cys Ile Val Leu Gln Ser Ala
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 Pro Glu Asp Pro Ala Ala Thr Ser Met Ile Lys
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<211> 1962

<212> DNA

<213> Paenibacillus sp

<220>

<221> CDS

<222> (1)..(1962)

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Asp	Met	Thr	Ala	Val	Tyr	Ala	Leu	Ala	Gly	Asp	Lys	Tyr	Met	Trp	Asp	
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cac	acg	atg	gag	tat	gtc	ccg	atg	acc	aag	ctg	gcg	aca	gac	gag	ctg	192
His	Thr	Met	Glu	Tyr	Val	Pro	Met	Thr	Lys	Leu	Ala	Thr	Asp	Glu	Leu	
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Phe	Asp	Tyr	Trp	Glu	Cys	Glu	Val	Thr	Pro	Pro	Tyr	Arg	Arg	Val	Lys	
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tac	ggg	ttt	ctg	ctg	cag	cag	ggg	cat	gag	aag	cgc	tgg	atg	acc	gag	288
Tyr	Gly	Phe	Leu	Leu	Gln	Gln	Gly	His	Glu	Lys	Arg	Trp	Met	Thr	Glu	
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tat	gat	ttt	ctg	acc	gag	ccg	ccg	gcc	aat	ccc	gac	cga	ctg	ttt	gag	336
Tyr	Asp	Phe	Leu	Thr	Glu	Pro	Pro	Ala	Asn	Pro	Asp	Arg	Leu	Phe	Glu	
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Tyr	Pro	Phe	Ile	Asn	Pro	Val	Asp	Val	Phe	Gln	Pro	Pro	Ala	Trp	Val	
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Lys	Asp	Ala	Ile	Phe	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	Phe	Ala	Asn	Gly	
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Pro	Thr	Pro	Ser	Cys	Phe	Phe	Gly	Gly	Asp	Leu	Gln	Gly	Val	Ile	Asp	
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His	Leu	Asp	His	Leu	Ser	Lys	Leu	Gly	Val	Asn	Ala	Val	Tyr	Phe	Thr	
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ccg	ctc	ttt	aag	gcg	acc	acc	aac	cat	aag	tac	gat	acg	gag	gat	tat	624
Pro	Leu	Phe	Lys	Ala	Thr	Thr	Asn	His	Lys	Tyr	Asp	Thr	Glu	Asp	Tyr	
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Phe	Gln	Ile	Asp	Pro	Gln	Phe	Gly	Asp	Lys	Asp	Thr	Leu	Lys	Lys	Leu	
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gtc	gat	ctg	tgc	cat	gag	gga	att	cgc	gtc	ctg	ctg	gac	gcc	gtg		720
Val	Asp	Leu	Cys	His	Glu	Arg	Gly	Ile	Arg	Val	Leu	Leu	Asp	Ala	Val	

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	Pro	Leu	Glu	Val	Val	Asp	Gly	Ile	Pro	Thr	Tyr	Asp	Thr	Phe	Ala	Phe					
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	Glu	Pro	Leu	Met	Pro	Lys	Leu	Asn	Thr	Glu	His	Pro	Glu	Val	Lys	Glu					
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	Glu	Phe	Arg	Arg	Val	Val	Lys	Gln	Ala	Asn	Pro	Asp	Ala	Tyr	Ile	Leu					
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	gat	gcg	gtg	atg	aac	tat	ccg	ttc	acc	aac	gcc	gtc	ctt	gat	ttc	ttc					1152
	Asp	Ala	Val	Met	Asn	Tyr	Pro	Phe	Thr	Asn	Ala	Val	Leu	Asp	Phe	Phe					
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	Gln	Leu	Ala	Gly	Tyr	Pro	Arg	Gln	Ala	Ser	Glu	Val	Met	Phe	Asn	Leu					
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	Leu	Asp	Ser	His	Asp	Thr	Ala	Arg	Leu	Thr	Gln	Ala	Asp	Gly	Asp						
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	Lys	Arg	Lys	Met	Lys	Leu	Ala	Val	Leu	Phe	Gln	Phe	Thr	Tyr	Phe	Gly					
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	acc	ccg	tgc	atc	tat	tat	ggg	gac	gag	gtc	ggc	ctt	gat	ggc	ggg	cat					1392
	Thr	Pro	Cys	Ile	Tyr	Tyr	Gly	Asp	Glu	Val	Gly	Leu	Asp	Gly	Gly	His					
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	Asp	Pro	Gly	Cys	Arg	Lys	Cys	Met	Glu	Trp	Asp	Glu	Thr	Lys	His	Asp					
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	Lys	Asp	Leu	Phe	Ala	Phe	Tyr	Gln	Thr	Val	Ile	Arg	Leu	Arg	Gln	Ala					
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	His	Ala	Ala	Leu	Arg	Thr	Gly	Thr	Phe	Lys	Phe	Leu	Thr	Ala	Glu	Lys					
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	aac	agc	cgg	cag	att	gct	tac	ctg	cgt	gag	gac	gac	caa	gat	acg	atc					1584
	Asn	Ser	Arg	Gln	Ile	Ala	Tyr	Leu	Arg	Glu	Asp	Asp	Gln	Asp	Thr	Ile					
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	Leu	Val	Val	Met	Asn	Asn	Asp	Lys	Ala	Gly	His	Thr	Leu	Thr	Leu	Pro					
		530				535						540									
	gtc	cgg	cat	gca	cag	tgg	acc	cat	ctg	tgg	aac	gac	gat	gtc	ctg	acc					1680
	Val	Arg	His	Ala	Gln	Trp	Thr	His	Leu	Trp	Asn	Asp	Asp	Val	Leu	Thr					
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	gct	gct	cac	gga	cag	ttg	acc	gtg	aag	ctc	ccg	gct	tac	ggc	ttt	gcc					1728
	Ala	Ala	His	Gly	Gln	Leu	Thr	Val	Lys	Leu	Pro	Ala	Tyr	Gly	Phe	Ala					
			565					570						575							
	gtg	ctg	aag	gcc	tca	tcc	gat	tgg	tca	tca	tgg	ggg	cgc	cct	ccg	ttc					1776
	Val	Leu	Lys	Ala	Ser	Ser	Asp	Trp	Ser	Ser	Trp	Gly	Arg	Pro	Pro	Phe					
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	act	ggc	gaa	cac	gcc	agc	ccg	agc	aag	cgg	ggc	gcc	tct	ttt	tgt	cgc					1824
	Thr	Gly	Glu	His	Ala	Ser	Pro	Ser	Lys	Arg	Gly	Ala	Ser	Phe	Cys	Arg					

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Ser	Pro	Ser	Phe	Pro	Leu	Thr	Ser	Ser	His	Trp	Leu	Asp	Pro	Val	Ser	
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Phe	Asp	Tyr	Trp	Glu	Cys	Glu	Val	Thr	Pro	Pro	Tyr	Arg	Arg	Val	Lys	
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Tyr	Asp	Phe	Leu	Thr	Glu	Pro	Pro	Ala	Asn	Pro	Asp	Arg	Leu	Phe	Glu	
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Lys	Asp	Ala	Ile	Phe	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	Phe	Ala	Asn	Gly	
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His	Leu	Asp	His	Leu	Ser	Lys	Leu	Gly	Val	Asn	Ala	Val	Tyr	Phe	Thr	
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Pro	Leu	Phe	Lys	Ala	Thr	Thr	Asn	His	Lys	Tyr	Asp	Thr	Glu	Asp	Tyr	
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Phe	Gln	Ile	Asp	Pro	Gln	Phe	Gly	Asp	Lys	Asp	Thr	Leu	Lys	Lys	Leu	
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Val	Asp	Leu	Cys	His	Glu	Arg	Gly	Ile	Arg	Val	Leu	Leu	Asp	Ala	Val	
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Phe	Asn	His	Ser	Gly	Arg	Thr	Phe	Pro	Pro	Phe	Val	Asp	Val	Leu	Lys	
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Asn	Gly	Glu	Lys	Ser	Lys	Tyr	Lys	Asp	Trp	Phe	His	Ile	Arg	Ser	Leu	
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Pro	Leu	Glu	Val	Val	Asp	Gly	Ile	Pro	Thr	Tyr	Asp	Thr	Phe	Ala	Phe	
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	290					295					300					
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Gly	Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Val	Ser	His	Gln	Phe	Trp	Arg	
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 Lys Arg Lys Met Lys Leu Ala Val Leu Phe Gln Phe Thr Tyr Phe Gly
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 450 455 460
 Asp Pro Gly Cys Arg Lys Cys Met Glu Trp Asp Glu Thr Lys His Asp
 465 470 475 480
 Lys Asp Leu Phe Ala Phe Tyr Gln Thr Val Ile Arg Leu Arg Gln Ala
 485 490 495
 His Ala Ala Leu Arg Thr Gly Thr Phe Lys Phe Leu Thr Ala Glu Lys
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 Asn Ser Arg Gln Ile Ala Tyr Leu Arg Glu Asp Asp Gln Asp Thr Ile
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 Val Arg His Ala Gln Trp Thr His Leu Trp Asn Asp Asp Val Leu Thr
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 Ala Ala His Gly Gln Leu Thr Val Lys Leu Pro Ala Tyr Gly Phe Ala
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 Val Leu Lys Ala Ser Ser Asp Trp Ser Ser Trp Gly Arg Pro Pro Phe
 580 585 590
 Thr Gly Glu His Ala Ser Pro Ser Lys Arg Gly Ala Ser Phe Cys Arg
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 Ser Pro Ser Phe Pro Leu Thr Ser Ser His Trp Leu Asp Pro Val Ser
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<211> 1548

<212> DNA

<213> Halothermothrix orenii

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Phe Ile Ser Val Phe Pro Val Tyr Ala Asn Asp Phe Glu Lys His Gly	
20 25 30	
aca tat tat gaa att ttt gtc agg tct ttt tat gac tct gat ggt gac	144
Thr Tyr Tyr Glu Ile Phe Val Arg Ser Phe Tyr Asp Ser Asp Gly Asp	
35 40 45	
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Gly Ile Gly Asp Leu Lys Gly Ile Ile Glu Lys Leu Asp Tyr Leu Asn	
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gat gga gac cct gaa acc att gct gat ctg ggg gtt aat ggt atc tgg	240
Asp Gly Asp Pro Glu Thr Ile Ala Asp Leu Gly Val Asn Gly Ile Trp	
65 70 75 80	
tta atg cct atc ttt aaa tct ccc tcc tat cat ggc tat gat gta acc	288
Leu Met Pro Ile Phe Lys Ser Pro Ser Tyr His Gly Tyr Asp Val Thr	
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Asp Tyr Tyr Lys Ile Asn Pro Asp Tyr Gly Thr Leu Glu Asp Phe His	
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aag ctt gtt gag gct gcc cat caa agg gga atc aag gtt ata att gat	384
Lys Leu Val Glu Ala Ala His Gln Arg Gly Ile Lys Val Ile Ile Asp	
115 120 125	
tta ccc atc aat cat acc agt gaa aga cat ccc tgg ttt ctc aag gct	432
Leu Pro Ile Asn His Thr Ser Glu Arg His Pro Trp Phe Leu Lys Ala	
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cat His	tat Tyr	tcc Ser	ccg Pro 180	acc Thr	ggc Gly	atg Met	tat Tyr	tat Tyr 185	ggg Gly	tat Tyr	ttc Phe	tgg Trp	agt Ser 190	ggc Gly	atg Met	576
cct Pro	gat Asp	tta Leu 195	aac Asn	tat Tyr	aat Asn	aac Asn	cct Pro 200	gaa Glu	ggt Val	cag Gln	gaa Glu	aag Lys 205	ggt Val	att Ile	ggg Gly	624
ata Ile 210	gca Ala	aaa Lys	tac Tyr	tgg Trp	tta Leu	aaa Lys 215	cag Gln	ggg Gly	ggt Val	gat Asp	ggt Gly 220	ttc Phe	agg Arg	ctt Leu	gat Asp	672
gga Gly 225	gcc Ala	atg Met	cat His	atc Ile	ttc Phe 230	cca Pro	ccg Pro	gcc Ala	cag Gln	tat Tyr 235	gat Asp	aaa Lys	aac Asn	ttt Phe	acc Thr 240	720
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ctg Leu	gtg Val	ggt Gly	gag Glu 260	gtc Val	tgg Trp	gat Asp	att Ile	tcg Ser 265	gaa Glu	acg Thr	gta Val	gct Ala	cct Pro 270	tac Tyr	ttc Phe	816
aaa Lys	tat Tyr	ggt Gly 275	ttt Phe	gat Asp	tct Ser	acc Thr	ttt Phe 280	aac Asn	ttt Phe	aaa Lys	ctg Leu	gca Ala 285	gag Glu	gca Ala	ggt Val	864
atc Ile	gct Ala 290	acg Thr	gct Ala	aaa Lys	gct Ala	gga Gly 295	ttt Phe	ccc Pro	ttt Phe	ggt Gly 300	ttt Phe	aat Asn	aaa Lys	aag Lys	gca Ala	912
aaa Lys 305	cat His	att Ile	tac Tyr	ggg Gly 310	gta Val 310	tat Tyr	gac Asp	agg Arg	gag Glu	ggt Val 315	gga Gly	ttt Phe	ggg Gly	aat Asn	tat Tyr 320	960
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cag Gln	ctt Leu	ggg Gly	cag Gln 340	gat Asp	cgt Arg	aat Asn	aag Lys	gcc Ala 345	agg Arg	ggt Val	gct Ala	gcc Ala	agt Ser 350	att Ile	tat Tyr	1056
ttg Leu	acc Thr	ttg Leu 355	cct Pro	ggt Gly	aat Asn	ccc Pro	ttt Phe 360	att Ile	tac Tyr	tat Tyr	ggt Gly 365	gaa Glu	gaa Glu	atc Ile	ggt Gly	1104
atg Met 370	agg Arg	ggg Gly	cag Gln	ggg Gly	ccc Pro	cat His 375	gaa Glu	ggt Val	atc Ile	agg Arg	gag Glu 380	ccc Pro	ttc Phe	cag Gln	tgg Trp	1152
tat Tyr 385	aat Asn	gga Gly	tcc Ser	ggg Gly	gag Glu 390	gga Gly	gaa Glu	aca Thr	tac Tyr	tgg Trp 395	gag Glu	cca Pro	gcc Ala	atg Met	tat Tyr 400	1200
aat Asn	gat Asp	ggc Gly	ttt Phe	act Thr 405	tct Ser	ggt Val	gaa Glu	cag Gln	gaa Glu 410	gaa Glu	aag Lys	aat Asn	ctc Leu	gat Asp 415	tcc Ser	1248
ctc Leu	tta Leu	aat Asn	cac His 420	agg Tyr	agg Arg	tta Leu	atc Ile 425	cat His	ttc Phe	cgg Arg	aac Asn	gaa Glu 430	aat Asn	cct Pro		1296
gtc Val	ttt Phe	tat Tyr 435	acc Thr	ggt Gly	aag Lys	att Ile	gag Glu 440	att Ile	ata Ile	aat Asn	gga Gly	gga Gly 445	tta Leu	aat Asn	gta Val	1344
ggt Val	gca Ala 450	ttt Phe	aga Arg	aga Arg	tat Tyr	aat Asn 455	gat Asp	aag Lys	agg Arg	gat Asp	tta Leu 460	tat Tyr	gtc Val	tac Tyr	cat His	1392
aac Asn 465	ctg Leu	gta Val	aac Asn	aga Arg	ccg Pro 470	ggt Val	aaa Lys	ata Ile	aaa Lys	gtg Val 475	gct Ala	agt Ser	ggt Gly	aac Asn	tgg Trp 480	1440
acc Thr	tta Leu	ttg Leu	ttt Phe	aat Asn 485	tca Ser	ggt Gly	gat Asp	aag Lys	gaa Glu 490	att Ile	acc Thr	cct Pro	ggt Val	gaa Glu 495	gat Asp	1488
aat Asn	aat Asn	aaa Lys	ctt Leu 500	atg Met	tat Tyr	act Thr	atc Ile	cct Pro 505	gct Ala	tat Tyr	act Thr	acc Thr	att Ile 510	ggt Val	ctg Leu	1536

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Glu Lys Glu
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<212> PRT
<213> Halothermothrix orenii

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35 40 45
Gly Ile Gly Asp Leu Lys Gly Ile Ile Glu Lys Leu Asp Tyr Leu Asn
50 55 60
Asp Gly Asp Pro Glu Thr Ile Ala Asp Leu Gly Val Asn Gly Ile Trp
65 70 75 80
Leu Met Pro Ile Phe Lys Ser Pro Ser Tyr His Gly Tyr Asp Val Thr
85 90 95
Asp Tyr Tyr Lys Ile Asn Pro Asp Tyr Gly Thr Leu Glu Asp Phe His
100 105 110
Lys Leu Val Glu Ala Ala His Gln Arg Gly Ile Lys Val Ile Ile Asp
115 120 125
Leu Pro Ile Asn His Thr Ser Glu Arg His Pro Trp Phe Leu Lys Ala
130 135 140
Ser Arg Asp Lys Asn Ser Glu Tyr Arg Asp Tyr Val Trp Ala Gly
145 150 155 160
Pro Asp Thr Asp Thr Lys Glu Thr Lys Leu Asp Gly Gly Arg Val Trp
165 170 175
His Tyr Ser Pro Thr Gly Met Tyr Tyr Gly Tyr Phe Trp Ser Gly Met
180 185 190
Pro Asp Leu Asn Tyr Asn Asn Pro Glu Val Gln Glu Lys Val Ile Gly
195 200 205
Ile Ala Lys Tyr Trp Leu Lys Gln Gly Val Asp Gly Phe Arg Leu Asp
210 215 220
Gly Ala Met His Ile Phe Pro Pro Ala Gln Tyr Asp Lys Asn Phe Thr
225 230 235 240
Trp Trp Glu Lys Phe Arg Gln Glu Ile Glu Glu Val Lys Pro Val Tyr
245 250 255
Leu Val Gly Glu Val Trp Asp Ile Ser Glu Thr Val Ala Pro Tyr Phe
260 265 270
Lys Tyr Gly Phe Asp Ser Thr Phe Asn Phe Lys Leu Ala Glu Ala Val
275 280 285
Ile Ala Thr Ala Lys Ala Gly Phe Pro Phe Gly Phe Asn Lys Lys Ala
290 295 300
Lys His Ile Tyr Gly Val Tyr Asp Arg Glu Val Gly Phe Gly Asn Tyr
305 310 315 320
Ile Asp Ala Pro Phe Leu Thr Asn His Asp Gln Asn Arg Ile Leu Asp
325 330 335
Gln Leu Gly Gln Asp Arg Asn Lys Ala Arg Val Ala Ala Ser Ile Tyr
340 345 350
Leu Thr Leu Pro Gly Asn Pro Phe Ile Tyr Tyr Gly Glu Glu Ile Gly
355 360 365
Met Arg Gly Gln Gly Pro His Glu Val Ile Arg Glu Pro Phe Gln Trp
370 375 380
Tyr Asn Gly Ser Gly Glu Gly Glu Thr Tyr Trp Glu Pro Ala Met Tyr
385 390 395 400
Asn Asp Gly Phe Thr Ser Val Glu Gln Glu Glu Lys Asn Leu Asp Ser
405 410 415
Leu Leu Asn His Tyr Arg Arg Leu Ile His Phe Arg Asn Glu Asn Pro
420 425 430
Val Phe Tyr Thr Gly Lys Ile Glu Ile Ile Asn Gly Gly Leu Asn Val
435 440 445
Val Ala Phe Arg Arg Tyr Asn Asp Lys Arg Asp Leu Tyr Val Tyr His
450 455 460
Asn Leu Val Asn Arg Pro Val Lys Ile Lys Val Ala Ser Gly Asn Trp
Seite 641

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465 Thr Leu Leu Phe Asn 470 Ser Gly Asp Lys Glu 475 Ile Thr Pro Val Glu 480
 Asn Asn Lys Leu 485 Met Tyr Thr Ile Pro 490 Ala Tyr Thr Thr Ile 495 Val Leu
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<211> 1533

<212> DNA

<213> Paenibacillus sp

<220>

<221> CDS

<222> (1)..(1533)

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Gly	His	Lys	Pro	Pro	Asn	Ser	Val	Gly	Ser	Gly	Val	Phe	Tyr	Glu	Ile	
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tat	att	aat	tct	ttt	tat	gat	tcg	aat	ggg	gac	gga	cac	ggt	gat	ttg	144
Tyr	Ile	Asn	Ser	Phe	Tyr	Asp	Ser	Asn	Gly	Asp	Gly	His	Gly	Asp	Leu	
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aaa	ggg	att	aca	caa	aag	ctt	gat	tac	tta	aac	gac	ggc	aac	ccc	cgt	192
Lys	Gly	Ile	Thr	Gln	Lys	Leu	Asp	Tyr	Leu	Asn	Asp	Gly	Asn	Pro	Arg	
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tcg	ggc	aag	gat	ttg	cag	ggt	agt	ggc	ctc	tgg	ctc	atg	ccc	atg	aat	240
Ser	Gly	Lys	Asp	Leu	Gln	Val	Ser	Gly	Leu	Trp	Leu	Met	Pro	Met	Asn	
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cca	tct	cca	agc	tac	cat	aaa	tat	gat	ggt	acc	gac	tat	tat	cag	gtg	288
Pro	Ser	Pro	Ser	Tyr	His	Lys	Tyr	Asp	Val	Thr	Asp	Tyr	Tyr	Gln	Val	
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gac	ccc	cag	tat	ggg	aat	ctg	aat	gat	ttc	cgc	acc	ttg	acg	aaa	gaa	336
Asp	Pro	Gln	Tyr	Gly	Asn	Leu	Asn	Asp	Phe	Arg	Thr	Leu	Thr	Lys	Glu	
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gcc	aaa	cgg	aag	ggt	gtc	aag	gtg	atc	ata	gac	ctt	ggt	atc	aac	cat	384
Ala	Lys	Arg	Lys	Gly	Val	Lys	Val	Ile	Ile	Asp	Leu	Val	Ile	Asn	His	
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Ser	Ser	Ser	Glu	His	Pro	Trp	Phe	Lys	Glu	Ala	Ser	Thr	Asn	Pro	Gln	
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agc	aaa	tac	cat	gac	tat	tac	gta	tgg	gca	aat	gag	aag	aca	aat	ctg	480
Ser	Lys	Tyr	His	Asp	Tyr	Tyr	Val	Trp	Ala	Asn	Glu	Lys	Thr	Asn	Leu	
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gat	gaa	aag	gga	tca	tgg	ggc	cag	cag	gta	tgg	cat	aag	aat	ccg	aat	528
Asp	Glu	Lys	Gly	Ser	Trp	Gly	Gln	Gln	Val	Trp	His	Lys	Asn	Pro	Asn	
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ggc	gaa	ggg	tat	ttc	tat	ggt	acc	ttc	tgg	tcg	ggg	atg	cca	gat	ctg	576
Gly	Glu	Gly	Tyr	Phe	Tyr	Gly	Thr	Phe	Trp	Ser	Gly	Met	Pro	Asp	Leu	
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aac	ttt	gac	aat	cca	gaa	gtc	cgt	aag	gaa	atg	att	aaa	gtc	ggt	aag	624
Asn	Phe	Asp	Asn	Pro	Glu	Val	Arg	Lys	Glu	Met	Ile	Lys	Val	Gly	Lys	
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Tyr	Trp	Leu	Gln	Gln	Gly	Ala	Asp	Gly	Phe	Arg	Leu	Asp	Ala	Ala	Met	
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Trp	Trp	Asn	Glu	Phe	Arg	Ser	Glu	Met	Glu	Lys	Ile	Asn	Pro	Asn	Val	
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ttg Leu	aac Asn 290	tct Ser	gtg Val	aaa Lys	aac Asn	ggc Gly 295	gat Arg	cag Gln	ggt Gly	atc Ile 300	gca Ala	aca Thr	ttc Phe	gct Ala			912
gag Glu 305	aaa Lys	aca Thr	ctg Leu	aag Lys	ctg Leu 310	tac Tyr	aaa Lys	tca Ser	cac His	aat Asn 315	aaa Lys	gcg Ala	gca Ala	ctt Leu	gat Asp 320		960
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ggt Gly	ggg Gly	gat Asp	gtg Val 340	cga Arg	aaa Lys	gcc Ala	aag Lys	ctg Leu 345	cct Pro	gca Ala	tcc Ser	att Ile	ctt Leu 350	ttg Leu	acg Thr		1056
ctg Leu	cca Pro	ggt Gly 355	cag Gln	ccg Pro	ttt Phe	ctc Leu	tat Tyr 360	ggt Gly	gaa Glu	gag Glu	atc Ile 365	ggc Gly	atg Met	aaa Lys			1104
ggg Gly	gag Glu 370	aag Lys	cct Pro	gat Asp	gag Glu	tat Tyr 375	ctt Leu	cga Arg	gag Glu	cct Pro	atg Met 380	cg Arg	tgg Trp	tac Tyr	aaa Lys		1152
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ggc Gly	gaa Glu	gta Val	tcg Ser	gta Val 405	gaa Glu	gcg Ala	cag Gln	atg Met	cg Arg	gac Asp	aat Asn	gat Asp	tcc Ser	ctg Leu 415	cta Leu		1248
caa Gln	agc Ser	tac Tyr	cg Arg 420	acg Thr	ctc Leu	atc Ile	cg Arg	ttg Leu 425	agg Arg	gaa Glu	gaa Glu	cat His 430	gaa Glu	gct Ala	ctt Leu		1296
cg Arg	agc Ser	cat His 435	aat Asn	cta Leu	gaa Glu	cca Pro	atc Ile 440	caa Gln	gca Ala	ggt Gly	tct Ser	gcc Ala 445	aac Asn	gtg Val	gcg Ala		1344
gca Ala	tac Tyr 450	caa Gln	cg Arg	tct Ser	tct Ser	ggc Gly 455	aaa Lys	gaa Glu	aca Thr	ttg Leu	tat Tyr 460	gta Val	tat Tyr	cac His	aac Asn		1392
ctg Leu 465	tca Ser	ggg Gly	aag Lys	ccg Pro	gtt Val 470	acg Thr	ctc Leu	cag Gln	atg Met	aaa Lys 475	gat Asp	gcg Ala	gat Asp	aag Lys	cag Gln 480		1440
aag Lys	agg Arg	aaa Lys	gtg Val	gtc Val 485	ttt Phe	tcc Ser	agc Ser	tcc Ser	aag Lys 490	ggt Gly	gta Val	aaa Lys	ata Ile	aag Lys 495	aaa Lys		1488
aat Asn	gcg Ala	gtg Val	acg Thr 500	att Ile	ccc Pro	gca Ala	tac Tyr	agc Ser 505	tct Ser	cta Leu	atc Ile	acc Thr	aaa Lys 510	tag			1533

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<213> Paenibacillus sp

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Tyr	Ile	Asn	Ser	Phe	Tyr	Asp	Ser	Asn	Gly	Asp	Gly	His	Gly	Asp	Leu	
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Lys	Gly	Ile	Thr	Gln	Lys	Leu	Asp	Tyr	Leu	Asn	Asp	Gly	Asn	Pro	Arg	
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				85					90					95		
Asp	Pro	Gln	Tyr	Gly	Asn	Leu	Asn	Asp	Phe	Arg	Thr	Leu	Thr	Lys	Glu	
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 145 150 155 160
 Asp Glu Lys Gly Ser Trp Gly Gln Gln Val Trp His Lys Asn Pro Asn
 165 170 175
 Gly Glu Gly Tyr Phe Tyr Gly Thr Phe Trp Ser Gly Met Pro Asp Leu
 180 185 190
 Asn Phe Asp Asn Pro Glu Val Arg Lys Glu Met Ile Lys Val Gly Lys
 195 200 205
 Tyr Trp Leu Gln Gln Gly Ala Asp Gly Phe Arg Leu Asp Ala Ala Met
 210 215 220
 His Ile Phe Lys Gly Gln Thr Lys Asp Gly Ala Asp Lys Asn Ile Ala
 225 230 235 240
 Trp Trp Asn Glu Phe Arg Ser Glu Met Glu Lys Ile Asn Pro Asn Val
 245 250 255
 Tyr Leu Ala Gly Glu Val Trp Asp Lys Pro Glu Thr Ile Ala Pro Tyr
 260 265 270
 Tyr Glu Ser Leu His Ser Leu Phe Asn Phe Asp Leu Gly Lys Ile
 275 280 285
 Leu Asn Ser Val Lys Asn Gly Arg Asp Gln Gly Ile Ala Thr Phe Ala
 290 295 300
 Glu Lys Thr Leu Lys Leu Tyr Lys Ser His Asn Lys Ala Ala Leu Asp
 305 310 315 320
 Ala Pro Phe Leu Ser Asn His Asp Gln Thr Arg Val Met Ser Glu Leu
 325 330 335
 Gly Gly Asp Val Arg Lys Ala Lys Leu Pro Ala Ser Ile Leu Leu Thr
 340 345 350
 Leu Pro Gly Gln Pro Phe Leu Tyr Trp Gly Glu Glu Ile Gly Met Lys
 355 360 365
 Gly Glu Lys Pro Asp Glu Tyr Leu Arg Glu Pro Met Arg Trp Tyr Lys
 370 375 380
 Gly Glu Gly Arg Gly Gln Thr Thr Trp Glu Val Pro Lys Tyr Asn Arg
 385 390 395 400
 Gly Glu Val Ser Val Glu Ala Gln Met Arg Asp Asn Asp Ser Leu Leu
 405 410 415
 Gln Ser Tyr Arg Thr Leu Ile Arg Leu Arg Glu Glu His Glu Ala Leu
 420 425 430
 Arg Ser His Asn Leu Glu Pro Ile Gln Ala Gly Ser Ala Asn Val Ala
 435 440 445
 Ala Tyr Gln Arg Ser Ser Gly Lys Glu Thr Leu Tyr Val Tyr His Asn
 450 455 460
 Leu Ser Gly Lys Pro Val Thr Leu Gln Met Lys Asp Ala Asp Lys Gln
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<210> 391

<211> 1767

<212> DNA

<213> Bacillus stearothermophilus

<220>

<221> CDS

<222> (1)..(1767)

<223> transl_table=11

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Ala	Tyr	Asp	Ser	Glu	Thr	Leu	His	Leu	Arg	Leu	Gln	Thr	Lys	Lys	His	
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gat	gtc	gac	cac	gtc	gag	ctg	ctt	ttt	ggc	gac	ccg	tac	gaa	tgg	cac	144
Asp	Val	Asp	His	Val	Glu	Leu	Leu	Phe	Gly	Asp	Pro	Tyr	Glu	Trp	His	
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Arg	Leu	Arg	Tyr	Gly	Phe	Val	Leu	Arg	Ala	Gly	Asp	Glu	Lys	Leu	Val	
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tat	acg	gaa	aaa	gga	ttt	tac	cat	gaa	gct	ccg	agc	gac	gac	acc	gct	336
Tyr	Thr	Glu	Lys	Gly	Phe	Tyr	His	Glu	Ala	Pro	Ser	Asp	Asp	Thr	Ala	
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Tyr	Tyr	Phe	Cys	Phe	Pro	Phe	Leu	His	Arg	Val	Asp	Leu	Phe	Gln	Ala	
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Pro	Asp	Trp	Val	Lys	Asp	Thr	Val	Trp	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	
130						135					140					
ttc	gcc	aac	ggc	aac	ccg	gac	atc	agt	ccg	aaa	ggg	gac	gag	ccg	tgg	480
Phe	Ala	Asn	Gly	Asn	Pro	Ala	Ile	Ser	Pro	Lys	Gly	Ala	Arg	Pro	Trp	
145					150					155					160	
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Gly	Ser	Glu	Asp	Pro	Thr	Pro	Thr	Ser	Phe	Phe	Gly	Gly	Asp	Leu	Gln	
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gga	atc	atc	gat	cac	ctt	gac	tat	ttg	gct	gat	ctc	ggc	atc	acc	ggc	576
Gly	Ile	Ile	Asp	His	Leu	Asp	Tyr	Leu	Ala	Asp	Leu	Gly	Ile	Thr	Gly	
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Ile	Tyr	Leu	Thr	Pro	Ile	Phe	Arg	Ala	Pro	Ser	Asn	His	Lys	Tyr	Asp	
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Thr	Ala	Asp	Tyr	Phe	Glu	Ile	Asp	Pro	His	Phe	Gly	Asp	Lys	Glu	Thr	
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Leu	Lys	Thr	Leu	Val	Lys	Arg	Cys	His	Glu	Lys	Gly	Ile	Arg	Val	Met	
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ctc	gat	gca	gtc	ttc	aat	cat	tgc	ggc	tat	gag	ttt	gcc	ccg	ttt	caa	768
Leu	Asp	Ala	Val	Phe	Asn	His	Cys	Gly	Tyr	Glu	Phe	Ala	Pro	Phe	Gln	
				245					250					255		
gat	gtg	tta	aaa	aac	ggt	gca	gcg	tct	agg	tat	aaa	gat	tgg	ttc	cat	816
Asp	Val	Leu	Lys	Asn	Gly	Ala	Ala	Ser	Arg	Tyr	Lys	Asp	Trp	Phe	His	
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Ile	Arg	Glu	Phe	Pro	Leu	Gln	Thr	Glu	Pro	Arg	Pro	Asn	Tyr	Asp	Thr	
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Asp	Ile	Asp	Gly	Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Ile	Asp	His	Gln	
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Phe	Trp	Arg	Glu	Phe	Arg	Gln	Ala	Val	Lys	Ala	Leu	Lys	Pro	Asp	Val	
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Tyr	Ile	Leu	Gly	Glu	Ile	Trp	His	Asp	Ala	Met	Pro	Trp	Leu	Arg	Gly	
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Lys	Gln	Asn	Lys	Glu	Leu	Tyr	Glu	His	Val	Lys	Gln	Leu	Ile	Ala	Leu	
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Pro	Met	Pro	Ile	Asp	Ala	Arg	Gly	Lys	Trp	Leu	Val	Asn	Leu	Leu	Thr	
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Asp Gly Ala Trp Gln Phe Gln Thr Met Pro Met Arg Lys Thr Gly Ser
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Asp Gly Leu Phe Asp Tyr Trp Leu Ala Glu Val Lys Pro Pro Tyr Arg
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Arg Leu Arg Tyr Gly Phe Val Leu Arg Ala Gly Asp Glu Lys Leu Val
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Tyr Thr Glu Lys Gly Phe Tyr His Glu Ala Pro Ser Asp Asp Thr Ala
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Tyr Tyr Phe Cys Phe Pro Phe Leu His Arg Val Asp Leu Phe Gln Ala
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Pro Asp Trp Val Lys Asp Thr Val Trp Tyr Gln Ile Phe Pro Glu Arg
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Phe Ala Asn Gly Asn Pro Ala Ile Ser Pro Lys Gly Ala Arg Pro Trp
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Gly Ser Glu Asp Pro Thr Pro Thr Ser Phe Phe Gly Gly Asp Leu Gln
165 170 175
Gly Ile Ile Asp His Leu Asp Tyr Leu Ala Asp Leu Gly Ile Thr Gly
180 185 190
Ile Tyr Leu Thr Pro Ile Phe Arg Ala Pro Ser Asn His Lys Tyr Asp
195 200 205
Thr Ala Asp Tyr Phe Glu Ile Asp Pro His Phe Gly Asp Lys Glu Thr
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Leu Lys Thr Leu Val Lys Arg Cys His Glu Lys Gly Ile Arg Val Met

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Asp Val Leu Lys Asn Gly Ala Ala Ser Arg Tyr Lys Asp Trp Phe His
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Ile Arg Glu Phe Pro Leu Gln Thr Glu Pro Arg Pro Asn Tyr Asp Thr
275
Phe Ala Phe Val Pro Gln Met Lys Leu Asn Thr Ala His Pro Glu
290
Val Lys Arg Tyr Leu Leu Asp Val Ala Thr Tyr Trp Ile Arg Glu Phe
305
Asp Ile Asp Gly Trp Arg Leu Asp Val Ala Asn Glu Ile Asp His Gln
325
Phe Trp Arg Glu Phe Arg Gln Ala Val Lys Ala Leu Lys Pro Asp Val
340
Tyr Ile Leu Gly Glu Ile Trp His Asp Ala Met Pro Trp Leu Arg Gly
355
Asp Gln Phe Asp Ala Val Met Asn Tyr Pro Phe Thr Asp Gly Ala Leu
370
Arg Phe Phe Ala Lys Glu Glu Ile Ser Ala Arg Gln Phe Ala Asp Ile
385
Met Val Arg Leu Leu His Ser Tyr Pro Lys His Val Asn Glu Ala Ala
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Phe Asn Leu Leu Gly Ser His Asp Thr Pro Arg Leu Leu Thr Val Cys
420
Gly Gly Asp Val Arg Lys Ala Lys Leu Leu Phe Leu Phe Gln Leu Thr
435
Phe Thr Gly Ser Pro Cys Ile Tyr Tyr Gly Asp Glu Ile Gly Met Thr
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Lys Gln Asn Lys Glu Leu Tyr Glu His Val Lys Gln Leu Ile Ala Leu
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Ala Asp Asp Glu Ala Asn His Leu Val Tyr Glu Lys Thr Asp Gly Asn
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Glu Thr Val Met Ile Ile Ile Asn Arg Ser Asn Glu Ala Ala Glu Ile
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Pro Met Pro Ile Asp Ala Arg Gly Lys Trp Leu Val Asn Leu Leu Thr
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gaa tcg gtg caa agc cct gtt gtg aac gga aac gat gtg acg ttt cgc      144
Glu Ser Val Gln Ser Pro Val Val Asn Gly Asn Asp Val Thr Phe Arg
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tac gtt gga aca ggg gaa gag cag tct gtt ttg ctc gct gga tcg ttt      192
Tyr Val Gly Thr Gly Glu Glu Gln Ser Val Leu Leu Ala Gly Ser Phe
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atg Met	tac Tyr	aaa Lys	ttc Phe 100	ggt Val	gta Val	gac Asp	gga Gly	aat Asn 105	tgg Trp	atg Met	aca Thr	gat Asp	cca Pro	tta Leu	aat Asn	336
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Ala	Lys	Gly	Asp	Val	Tyr	Val	Phe	Ala	Arg	Gln	Tyr	Gly	Lys	Asp	Val	
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Asp	Val	Ser	Ser	Ile	Ile	Pro	Asn	Gly	Thr	Ser	Phe	Val	Asp	Glu	Leu	
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His	Gly	Glu	Tyr	Glu	Val	Thr	Val	Ser	Asn	Gly	Lys	Val	Gln	Leu	Asn	
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Ile	Pro	Ala	Phe	Asp	Gly	Arg	Met	Leu	Phe	Gly	Lys	Val	Thr	Val	Asn	
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Met	Pro	Asn	Glu	Val	Thr	Asn	Val	Gln	Ala	Thr	Ala	Gly	Val	Gly	Gln	
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Ser	Thr	Leu	Lys	Gly	Ala	Gly	Tyr	Thr	Leu	Val	Lys	Glu	Thr	Asn	Glu	
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Lys	Glu	Ala	Val	Ile	Gly	Gly	Leu	Lys	Asn	Gly	Thr	Ala	Tyr	Tyr	Phe	
	1090				1095					1100						
gct	ggt	aca	gct	ggt	gat	gaa	aac	gga	aat	gag	tcg	gct	aaa	gta	gaa	3360
Ala	Val	Thr	Ala	Val	Asp	Glu	Asn	Gly	Asn	Glu	Ser	Ala	Lys	Val	Glu	
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Thr	Asn	Arg	Val	Val	Pro	His	Tyr	Pro	Leu	Asp	Glu	Gln	His	Ile	Val	
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His	Val	Asp	Ile	Val	Ser	Asp	Asp	Val	Leu	Asp	Leu	Ala	Lys	Ala	Ile	
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ggt	ggt	gag	gcg	aaa	gtg	cgc	att	gat	gat	gta	aca	aag	cac	ggc	tta	3504
Val	Val	Glu	Ala	Lys	Val	Arg	Ile	Asp	Asp	Val	Thr	Lys	His	Gly	Leu	
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Ala Asp Gly Leu Gln Ala Val Leu Gln Val Lys Arg Pro Asn His Glu	
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aag tgg gaa aac gtg caa gcg gca tac gaa cgt caa gac ggt gaa gat	3600
Lys Trp Glu Asn Val Gln Ala Ala Tyr Glu Arg Gln Asp Gly Glu Asp	
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Asn Val Phe Arg Ala Ser Phe Ile Pro Leu Ala Ser Gly Thr Tyr Thr	
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Tyr Arg Tyr Gly Phe Thr Thr Asn Leu Gly Asp Ser Trp Val Tyr Thr	
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Glu Glu Lys Thr Phe Thr Leu Ala Ala Asn Glu Ala Asp Gln Gln Ala	
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Pro Ala Lys Gly Ile Gln Leu Val Gln Pro Asp Val Glu Ser Gly Gln	
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Val Asn Leu Ser Trp Ser Phe Val Glu Arg Asp Asp His Asp Ala Tyr	
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Met Val Val Ile Glu Arg Asp Gly Gln Val Ile Tyr Thr Thr Thr Thr	
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Thr Tyr Val Val Lys Leu Tyr Asp Arg Ala Gly Asn Val Val Glu Ser	
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Asn Ala Val Glu Val Thr Pro Asn Ile Val Met Val Gln Val Thr Phe	
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Phe Thr Pro Asn Ala Asn Gln Lys Glu Val Ala Ile His Ile Glu Pro	
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Lys	Gly	Ala	Val	Val	Val	Glu	Pro	Lys	Val	Glu	Val	Lys	Glu	Arg	Asp	
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<211> 2018

<212> PRT

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 Ser Asp His Ile Trp Ser Val Thr Lys Thr Leu Pro Asp Gly Thr Tyr
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 Met Tyr Lys Phe Val Val Asp Gly Asn Trp Met Thr Asp Pro Leu Asn
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 Thr Ala Thr Val Met Lys His Glu Gly Asn Gly Leu Tyr Thr Phe Thr
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 Gly Val Leu Pro Ala Gly Thr Tyr Glu Tyr Lys Ile Ala Ile Asn Gly
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 Ser Phe Thr Leu Glu Lys Glu Thr Glu Val Thr Phe Tyr Tyr His Asp
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 Ser Thr His Ala Ile Ala Asp Ser Thr Trp Tyr Thr Pro Ile Pro Lys
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 Glu Lys Glu Val Asp Gly Trp Thr Pro Glu Thr Ser Ser Ala Phe Leu
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 Lys Gly Asn Tyr Glu Phe Lys Val Thr Leu Gly Asn Ser Trp Asp Glu
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Ser	Pro	Thr	Gly 340	Ser	Asp	Gly	Asn	Val 345	Gln	Lys	Asp	Arg	Leu 350	Lys	His
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Tyr	Ala	Met	Ser	Lys 405	Val	Gly	Val	Ile	Gly 410	Asp	Asp	Glu	Tyr	Trp 415	Glu
Ala	Thr	Phe	Thr 420	Pro	Glu	Glu	Lys	Gly 425	Leu	Tyr	Gly	Tyr	Lys 430	Phe	Ile
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Ile 545	Ala	Gly	Ile	Glu	Gln 550	Lys	Leu	Asp	Tyr	Leu 555	Gln	Ser	Leu	Gly	Val 560
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Tyr	Asp	Ala	His 580	Asp	Tyr	Lys	Ala	Ile 585	Asp	Pro	Met	Phe	Gly 590	Thr	Pro
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Ala	Asn	Glu 755	Val	Asp	Thr	Glu	Phe 760	Trp	Arg	Glu	Phe	Arg 765	Lys	Glu	Leu
Leu	Gln 770	Gly	Asp	Tyr	Asp	Arg 775	Gly	Pro	Thr	Leu	Lys 780	Ser	Gly	Gln	Gln
Pro 785	Leu	Ile	Leu	Gly	Glu 790	Ile	Trp	Asp	Asp	Ala 795	Ser	Lys	Tyr	Phe	Leu 800
Gly	Asp	Gln	Tyr	Asp 805	Ser	Val	Met	Asn	Tyr 810	Arg	Phe	Arg	Gly	Ala 815	Val
Leu	Asp	Phe	Leu 820	Arg	Asn	Gly	Lys	Ala 825	Glu	Glu	Ile	Asp	Ala 830	Arg	Leu
Thr	Ala	Ile 835	Arg	Glu	Asp	Tyr	Pro 840	Glu	Glu	Ala	Phe	Tyr 845	Ala	Leu	Met
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 Asn Gly Thr Asp Ser Tyr Glu Arg Ala Glu Leu Asp Pro Asn Tyr Asn
 865 870 875 880
 Glu Gln Leu Gly Lys Lys Arg Leu Lys Leu Ala Ala Ile Leu Gln Met
 885 890 895
 Gly Tyr Pro Gly Ala Pro Thr Ile Tyr Tyr Gly Asp Glu Ala Gly Val
 900 905 910
 Thr Gly Ser Lys Asp Pro Asp Arg Arg Thr Tyr Pro Trp Gly Ser
 915 920 925
 Glu Asp Thr Glu Leu Ile Ala His Tyr Gln Lys Val Gly Thr Val Arg
 930 935 940
 Thr Glu His Gln Asp Val Leu Ala Lys Gly Thr Ile Glu Thr Val Tyr
 945 950 955 960
 Ala Lys Gly Asp Val Tyr Val Phe Ala Arg Gln Tyr Gly Lys Asp Val
 965 970 975 980
 Ala Leu Ile Ala Ile Asn Arg Gly Asn Ser Ala Gln Thr Val Gln Leu
 985 990
 Asp Val Ser Ser Ile Ile Pro Asn Gly Thr Ser Phe Val Asp Glu Leu
 995 1000 1005
 His Gly Glu Tyr Glu Val Thr Val Ser Asn Gly Lys Val Gln Leu Asn
 1010 1015 1020
 Ile Pro Ala Phe Asp Gly Arg Met Leu Phe Gly Lys Val Thr Val Asn
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 Met Pro Asn Glu Val Thr Asn Val Gln Ala Thr Ala Gly Val Gly Gln
 1045 1050 1055
 Val Thr Leu Thr Trp Glu Gly Asp Ala Pro Thr Tyr Arg Ile Tyr Gln
 1060 1065 1070
 Ser Thr Leu Lys Gly Ala Gly Tyr Thr Leu Val Lys Glu Thr Asn Glu
 1075 1080 1085
 Lys Glu Ala Val Ile Gly Gly Leu Lys Asn Gly Thr Ala Tyr Tyr Phe
 1090 1095 1100
 Ala Val Thr Ala Val Asp Glu Asn Gly Asn Glu Ser Ala Lys Val Glu
 1105 1110 1115 1120
 Thr Asn Arg Val Val Pro His Tyr Pro Leu Asp Glu Gln His Ile Val
 1125 1130 1135
 His Val Asp Ile Val Ser Asp Asp Val Leu Asp Leu Ala Lys Ala Ile
 1140 1145 1150
 Val Val Glu Ala Lys Val Arg Ile Asp Asp Val Thr Lys His Gly Leu
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 Ala Asp Gly Leu Gln Ala Val Leu Gln Val Lys Arg Pro Asn His Glu
 1170 1175 1180
 Lys Trp Glu Asn Val Gln Ala Ala Tyr Glu Arg Gln Asp Gly Glu Asp
 1185 1190 1195 1200
 Asn Val Phe Arg Ala Ser Phe Ile Pro Leu Ala Ser Gly Thr Tyr Thr
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 Tyr Arg Tyr Gly Phe Thr Thr Asn Leu Gly Asp Ser Trp Val Tyr Thr
 1220 1225 1230
 Glu Glu Lys Thr Phe Thr Leu Ala Ala Asn Glu Ala Asp Gln Gln Ala
 1235 1240 1245
 Pro Ala Lys Gly Ile Gln Leu Val Gln Pro Asp Val Glu Ser Gly Gln
 1250 1255 1260
 Val Asn Leu Ser Trp Ser Phe Val Glu Arg Asp Asp His Asp Ala Tyr
 1265 1270 1275 1280
 Met Val Val Ile Glu Arg Asp Gly Gln Val Ile Tyr Thr Thr Thr
 1285 1290 1295
 Ile Ser Thr Ser Phe Thr Asp Tyr Asp Val Glu Asn Gly Lys Thr Tyr
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 Thr Tyr Val Val Lys Leu Tyr Asp Arg Ala Gly Asn Val Val Glu Ser
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 Asn Ala Val Glu Val Thr Pro Asn Ile Val Met Val Gln Val Thr Phe
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 Lys Val Arg Ala Pro Ser Tyr Thr Pro Leu Asp Thr Arg Ile Thr Ile
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 Pro Asn Ser Leu Asn Gly Trp Asn Thr Gly Ala Trp Glu Met Thr Arg
 1365 1370 1375
 Gly Gly Ala Val Thr Ser Asp Trp Glu Phe Thr Thr Glu Leu Gln Glu
 1380 1385 1390
 Gly Glu Thr Ile Ile Tyr Lys Tyr Val Lys Gly Ala Ser Trp Asp Gln
 1395 1400 1405

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Glu Gly Leu Ala Asp His Thr Arg Asp Asp Gln Thr Asp Asp Asp Val
 1410 1415 1420
 Ser Tyr Tyr Gly Tyr Gly Ala Ile Gly Thr Asp Leu Lys Ile Thr Val
 1425 1430 1435 1440
 Gln Asn Gln Gly Asn Asn Lys Met Ile Ile Gln Asp Tyr Ile Leu Arg
 1445 1450 1455
 Trp Ile Asp Met Pro Val Val Ile Glu Val Lys Lys Asp Gly Asp
 1460 1465 1470
 Arg Val Thr Ile Lys Gly Asn Ala Ile Lys Gly Gly Val Leu Thr Ile
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 Asn Lys Glu Arg Val Thr Ile His Asp Asp Met Ser Phe Thr Tyr Thr
 1490 1495 1500
 Phe Thr Pro Asn Ala Asn Gln Lys Glu Val Ala Ile His Ile Glu Pro
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 Ser Glu Glu Ser Lys Ala Asn Ile Phe Lys Asn Asp Gly Gly Ala Ile
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 Ala Lys Asn Thr Lys Asn Tyr Val Leu Asn Ile Glu Thr Lys Gln Leu
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 Arg Glu Gly Val Leu Thr Glu Gln Pro Asp Ser Gly Thr Thr Pro Gly
 1555 1560 1565
 Ser Gly Thr Thr Pro Gly Ser Gly Thr Thr Pro Gly Ser Gly Thr Thr
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 Pro Gly Ser Gly Thr Thr Pro Gly Ser Gly Thr Thr Pro Gly Ser Gly
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 Thr Thr Pro Gly Ser Gly Thr Thr Pro Gly Ser Gly Thr Thr Pro Glu
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 Lys Gly Ala Val Val Val Glu Pro Lys Val Glu Val Lys Glu Arg Asp
 1620 1625 1630
 Gly Lys Val Val Glu Lys Val Ala Ala Val Ser Ser Asn Asp Ile Ala
 1635 1640 1645
 Thr Ile Val Asn Glu Leu Ser Asn Glu Lys Lys Gln Val Val Ile Ser
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 Thr Gly Ser Leu Val Lys Asp Val Ala Thr Lys Val Asp Val Pro Ala
 1665 1670 1675 1680
 Ser Leu Phe Val Gln Ala Ala Asn Lys Gln Ser Asp Ala Thr Ile Val
 1685 1690 1695
 Ser Ala Ser Glu Gln Ala Val Tyr Lys Leu Pro Ala Lys Glu Val Lys
 1700 1705 1710
 Gln Ala Val Asp Gln Val Ala Lys Gln Leu Gly Thr Thr Val Asp Gln
 1715 1720 1725
 Val Ser Ile Ser Ile Glu Met Lys Val Lys Asp Ala Pro Gln Leu Pro
 1730 1735 1740
 Val Lys Thr Leu Ser Asp Ala Val Gln Phe His Val Val Ala Lys Ala
 1745 1750 1755 1760
 Asn Gly Lys Glu Gln Ala Ile Asp Arg Phe Thr Gln Tyr Val Glu Arg
 1765 1770 1775
 Glu Ile Ala Leu Lys Gln Pro Val Gln Pro Asn Arg Ala Val Val Val
 1780 1785 1790
 Arg Val Asn Asp Asp Gly Ser Leu Thr Pro Val Pro Thr Thr Phe Val
 1795 1800 1805
 Asp Gln Lys Ala Val Ala Lys Ser Leu Thr Asn Ser Thr Tyr Val Val
 1810 1815 1820
 Val Glu Gly Thr Thr Thr Phe Ala Asp Ile Val Gln His Trp Ala Lys
 1825 1830 1835 1840
 Pro Tyr Ile Asp Ser Leu Ala Ala Lys Gln Leu Val Arg Gly Val Thr
 1845 1850 1855
 Glu Thr Ala Tyr Arg Pro Asn Glu Pro Met Thr Arg Ala Gln Phe Ala
 1860 1865 1870
 Val Leu Leu Val Arg Ala Leu Ala Leu Pro Ser Glu Thr Tyr Asp Gly
 1875 1880 1885
 Arg Phe Ala Asp Val Lys Gly Thr Glu Trp Phe Asn Gln His Gly Glu
 1890 1895 1900
 Leu Ala Ala Ala Val Lys Tyr Gly Val Ile Gln Gly Lys Thr Pro Ser
 1905 1910 1915 1920
 Thr Phe Ala Pro Asn Glu Pro Ile Thr Arg Ala Gln Ala Ala Val Met
 1925 1930 1935
 Ile Glu Arg Ala Leu Asn Leu Ser Phe Val Asn Phe Asp Lys Ala Ala
 1940 1945 1950
 Lys Asp Gln Thr Lys Lys Leu Ala Asp Phe Arg Asp Ala Asn Gln Leu

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1955 1960 1965
 Pro Ala Trp Ser Lys Gln Ala Ile Glu Ala Ile Tyr Gln Ala Gly Ile
 1970 1975 1980
 Val Gln Gly His Pro Asp Gly Thr Phe Ala Pro Ala Gly Arg Met Thr
 1985 1990 1995 2000
 Arg Ala Glu Met Ala Lys Val Leu Ala Glu Phe Leu Ala Lys Ala Lys
 2005 2010 2015
 Leu Met

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<211> 1983

<212> DNA

<213> Thermococcus sp

<220>

<221> CDS

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Gly	Ile	Thr	Glu	Phe	Ser	Ile	Pro	Lys	Ser	Gly	Ser	Tyr	Ala	Tyr	Leu	
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tta	gga	aat	ttt	aat	gca	ttc	aat	gaa	gga	agc	ttt	aga	atg	agg	gaa	144
Leu	Gly	Asn	Phe	Asn	Ala	Phe	Asn	Glu	Gly	Ser	Phe	Arg	Met	Arg	Glu	
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Lys	Gly	Asp	Arg	Trp	Tyr	Ile	Lys	Val	Glu	Leu	Pro	Glu	Gly	Ile	Trp	
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Tyr	Tyr	Thr	Phe	Ser	Val	Asp	Gly	Asn	Leu	Ile	Leu	Asp	Phe	Glu	Asn	
			65		70					75					80	
aat	gaa	aaa	act	gtg	tat	aga	agg	ctt	tca	tat	aaa	ttt	gaa	aaa	act	288
Asn	Glu	Lys	Thr	Val	Tyr	Arg	Arg	Leu	Ser	Tyr	Lys	Phe	Glu	Lys	Thr	
			85					90						95		
gtt	aat	gtt	gct	aaa	atc	ttc	tcg	gga	gag	aaa	ttt	tac	cat	tat	ccc	336
Val	Asn	Val	Ala	Lys	Ile	Phe	Ser	Gly	Glu	Lys	Phe	Tyr	His	Tyr	Pro	
			100					105					110			
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Ser	Leu	Val	Tyr	Ala	Tyr	Ser	Leu	Gly	Asp	Ser	Thr	Tyr	Ile	Arg	Phe	
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Arg	Ala	Met	Lys	Gly	Val	Ala	Lys	Arg	Val	Phe	Leu	Ile	Ser	Asp	Gln	
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Lys	Tyr	Glu	Met	Arg	Lys	Lys	Ala	Gln	Asp	Glu	Leu	Phe	Glu	Tyr	Phe	
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gaa	gca	gtt	cta	ccc	aga	aaa	gaa	gga	ctt	gag	tat	tat	ttt	gag	att	528
Glu	Ala	Val	Leu	Pro	Arg	Lys	Glu	Gly	Leu	Glu	Tyr	Tyr	Phe	Glu	Ile	
			165					170						175		
cat	gaa	gca	gat	gaa	att	att	gat	tat	gga	gac	ttt	aag	gta	gat	ttt	576
His	Glu	Ala	Asp	Glu	Ile	Ile	Asp	Tyr	Gly	Asp	Phe	Lys	Val	Asp	Phe	
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Asn	Glu	Gln	Lys	Glu	Arg	Phe	Lys	Pro	Pro	Ala	Trp	Val	Phe	Glu	Arg	
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Val	Phe	Tyr	Gln	Ile	Met	Pro	Asp	Arg	Phe	Ala	Asn	Gly	Asn	Pro	Glu	
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Asn	Asp	Pro	His	Asn	Cys	Ile	Glu	Phe	Lys	Thr	Ile	Thr	His	His	Gly	
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ggg	gat	ctt	gag	ggg	att	ata	gag	aaa	ctt	gac	tac	att	gag	gaa	ctc	768
Gly	Asp	Leu	Glu	Gly	Ile	Ile	Glu	Lys	Leu	Asp	Tyr	Ile	Glu	Glu	Leu	
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ggt Gly	ggt Val	aat Asn	gca Ala 260	ctt Leu	tac Tyr	cta Leu	acc Thr	ccg Pro 265	atc Ile	ttc Phe	gag Glu	tca Ser	atg Met 270	aca Thr	tat Tyr	816
cac His	ggg Gly	tat Tyr 275	gac Asp	ata Ile	gtg Val	gac Asp	tac Tyr 280	tat Tyr	cat His	ggt Val	gct Ala	cgg Arg 285	aaa Lys	ttc Phe	ggg Gly	864
gga Gly	gat Asp 290	gaa Glu	gct Ala	ttt Phe	gaa Glu	aaa Lys 295	tta Leu	atg Met	caa Gln	aag Lys	ctg Leu 300	aag Lys	aaa Lys	cgg Arg	gat Asp	912
ata Ile 305	aag Lys	ctt Leu	att Ile	tta Leu	gat Asp 310	gga Gly	ggt Val	ttt Phe	cat His	cat His 315	acc Thr	agc Ser	ttt Phe	ttt Phe	cat His 320	960
ccc Pro	tac Tyr	ttt Phe	caa Gln	gat Asp 325	gta Val	gtg Val	aaa Lys	aat Asn	ggg Gly 330	aaa Lys	aac Asn	agt Ser	aag Lys	tac Tyr 335	aaa Lys	1008
gat Asp	ttt Phe	tat Tyr	cgt Arg 340	ata Ile	atc Ile	agt Ser	ttt Phe	cca Pro 345	ggt Val	ggt Val	cca Pro	gag Glu	gag Glu 350	ttt Phe	ttc Phe	1056
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cct Pro 385	cgt Arg	tta Leu	aac Asn	cac His	gac Asp 390	agc Ser	aaa Lys	gga Gly	gta Val	aga Arg 395	gaa Glu	ttc Phe	att Ile	agg Arg	aat Asn 400	1200
ata Ile	atg Met	gag Glu	tac Tyr	tgg Trp 405	att Ile	aaa Lys	aaa Lys	ggc Gly	gcc Ala 410	gat Asp	ggc Gly	tgg Trp	agg Arg	ttg Leu 415	gat Asp	1248
ggt Val	gct Ala	cat His	gga Gly 420	ggt Val	cca Pro	cct Pro	gaa Glu	gta Val 425	tgg Trp	gaa Glu	gaa Glu	att Ile	aga Arg 430	gaa Glu	aag Lys	1296
ttg Leu	ccc Pro	agt Ser 435	aat Asn	gtg Val	tat Tyr	cta Leu	ggt Val 440	gga Gly	gaa Glu	gtg Val	atg Met	gac Asp 445	gat Asp	gct Ala	agg Arg	1344
ttg Leu	tgg Trp 450	ata Ile	ttc Phe	aac Asn	aag Lys	ttc Phe 455	cat His	gga Gly	acc Thr	atg Met	aac Asn 460	tat Tyr	cca Pro	ttg Leu	tat Tyr	1392
gag Glu 465	gca Ala	att Ile	ttg Leu	aga Arg	ttt Phe 470	ttt Phe	gta Val	aca Thr	aga Arg	gaa Glu 475	att Ile	aac Asn	gca Ala	gag Glu	caa Gln 480	1440
ttc Phe	ttg Leu	aac Asn	tgg Trp	ctt Leu 485	gaa Glu	ctt Leu	ttg Leu	agc Ser	ttc Phe 490	tac Tyr	tac Tyr	ggc Gly	cct Pro	gct Ala 495	gag Glu	1488
tac Tyr	gtg Val	atg Met	tat Tyr 500	aat Asn	ttc Phe	tta Leu	gat Asp	aac Asn 505	cat His	gat Asp	gtg Val	gat Asp	aga Arg 510	atg Met	ctt Leu	1536
agc Ser	ctg Leu	ctt Leu 515	gga Gly	gac Asp	aag Lys	aga Arg	aaa Lys 520	tat Tyr	ctc Leu	tgc Cys	gcc Ala 525	ttg Leu	ggt Val	ttt Phe	ctt Leu	1584
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atg Met 545	aaa Lys	aat Asn	ata Ile	gag Glu	gct Ala 550	cct Pro	ttt Phe	atg Met	gag Glu	cgt Arg 555	tca Ser	agg Arg	gca Ala	cct Pro	atg Met 560	1680
gaa Glu	tgg Trp	aat Asn	aag Lys	aag Lys 565	aaa Lys	tgg Trp	gat Asp	aaa Lys	gaa Glu 570	atc Ile	ctt Leu	aaa Lys	act Thr	aca Thr 575	aaa Lys	1728
gag Glu	ttg Leu	ata Ile	aag Lys 580	ttg Leu	aga Arg	agg Arg	aga Arg	agc Ser 585	aaa Lys	gct Ala	ttg Leu	caa Gln	aaa Lys 590	ggt Gly	att Ile	1776
ttt Phe	aaa Lys	cca Pro 595	ggt Val	aaa Lys	ttc Phe	aaa Lys	gac Asp 600	aaa Lys	tta Leu	ttg Leu	gtc Val	tat Tyr 605	aaa Lys	aga Arg	gtg Val	1824
tta Leu	aat Asn 610	aac Asn	gaa Glu	aac Asn	atc Ile	tta Leu 615	gta Val	gca Ala	atc Ile	aac Asn	tat Tyr 620	tca Ser	aag Lys	aaa Lys	gaa Glu	1872

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625					630					635					640	
tca	ttc	gac	aga	gtg	aat	atc	cga	tta	aaa	cca	ttt	tcc	agt	att	att	1968
Ser	Phe	Asp	Arg	Val	Asn	Ile	Arg	Leu	Lys	Pro	Phe	Ser	Ser	Ile	Ile	
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gct	aaa	aag	ttg	tag												1983
Ala	Lys	Lys	Leu													
			660													

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<211> 660

<212> PRT

<213> Thermococcus sp

<400> 396

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Leu	Gly	Asn	Phe	Asn	Ala	Phe	Asn	Glu	Gly	Ser	Phe	Arg	Met	Arg	Glu	
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Tyr	Tyr	Thr	Phe	Ser	Val	Asp	Gly	Asn	Leu	Ile	Leu	Asp	Phe	Glu	Asn	
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Asn	Glu	Lys	Thr	Val	Tyr	Arg	Arg	Leu	Ser	Tyr	Lys	Phe	Glu	Lys	Thr	
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Val	Asn	Val	Ala	Lys	Ile	Phe	Ser	Gly	Glu	Lys	Phe	Tyr	His	Tyr	Pro	
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Ser	Leu	Val	Tyr	Ala	Tyr	Ser	Leu	Gly	Asp	Ser	Thr	Tyr	Ile	Arg	Phe	
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Arg	Ala	Met	Lys	Gly	Val	Ala	Lys	Arg	Val	Phe	Leu	Ile	Ser	Asp	Gln	
	130					135					140					
Lys	Tyr	Glu	Met	Arg	Lys	Lys	Ala	Gln	Asp	Glu	Leu	Phe	Glu	Tyr	Phe	
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Glu	Ala	Val	Leu	Pro	Arg	Lys	Glu	Gly	Leu	Glu	Tyr	Tyr	Phe	Glu	Ile	
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His	Glu	Ala	Asp	Glu	Ile	Ile	Asp	Tyr	Gly	Asp	Phe	Lys	Val	Asp	Phe	
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Val	Phe	Tyr	Gln	Ile	Met	Pro	Asp	Arg	Phe	Ala	Asn	Gly	Asn	Pro	Glu	
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Asn	Asp	Pro	His	Asn	Cys	Ile	Glu	Phe	Lys	Thr	Ile	Thr	His	His	Gly	
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Gly	Asp	Leu	Glu	Gly	Ile	Ile	Glu	Lys	Leu	Asp	Tyr	Ile	Glu	Glu	Leu	
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Gly	Val	Asn	Ala	Leu	Tyr	Leu	Thr	Pro	Ile	Phe	Glu	Ser	Met	Thr	Tyr	
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Asp	Phe	Tyr	Arg	Ile	Ile	Ser	Phe	Pro	Val	Val	Pro	Glu	Glu	Phe	Phe	
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Glu	Ile	Leu	Asn	Ser	Lys	Leu	Pro	Trp	Asp	Glu	Lys	Tyr	Arg	Arg	Leu	
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Lys	Ser	Leu	Lys	Trp	Asn	Tyr	Glu	Ser	Phe	Tyr	Ser	Val	Trp	Leu	Met	
	370				375						380					
Pro	Arg	Leu	Asn	His	Asp	Ser	Lys	Gly	Val	Arg	Glu	Phe	Ile	Arg	Asn	
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Ile	Met	Glu	Tyr	Trp	Ile	Lys	Lys	Gly	Ala	Asp	Gly	Trp	Arg	Leu	Asp	
			405						410					415		
Val	Ala	His	Gly	Val	Pro	Pro	Glu	Val	Trp	Glu	Glu	Ile	Arg	Glu	Lys	

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420
 Leu Pro Ser Asn Val Tyr Leu Val Gly Glu Val Met Asp Asp Ala Arg
 435
 Leu Trp Ile Phe Asn Lys Phe His Gly Thr Met Asn Tyr Pro Leu Tyr
 450
 Glu Ala Ile Leu Arg Phe Phe Val Thr Arg Glu Ile Asn Ala Glu Gln
 465
 Phe Leu Asn Trp Leu Glu Leu Leu Ser Phe Tyr Tyr Gly Pro Ala Glu
 485
 Tyr Val Met Tyr Asn Phe Leu Asp Asn His Asp Val Asp Arg Met Leu
 500
 Ser Leu Leu Gly Asp Lys Arg Lys Tyr Leu Cys Ala Leu Val Phe Leu
 515
 Phe Thr Tyr Lys Gly Val Pro Ser Ile Tyr Tyr Gly Asn Glu Ile Gly
 530
 Met Lys Asn Ile Glu Ala Pro Phe Met Glu Arg Ser Arg Ala Pro Met
 545
 Glu Trp Asn Lys Lys Lys Trp Asp Lys Glu Ile Leu Lys Thr Thr Lys
 565
 Glu Leu Ile Lys Leu Arg Arg Arg Ser Lys Ala Leu Gln Lys Gly Ile
 580
 Phe Lys Pro Val Lys Phe Lys Asp Lys Leu Leu Val Tyr Lys Arg Val
 595
 Leu Asn Asn Glu Asn Ile Leu Val Ala Ile Asn Tyr Ser Lys Lys Glu
 610
 Lys His Leu Asp Leu Pro Pro Ser Phe Glu Ile Leu Phe Gln Ser Gly
 625
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<210> 397

<211> 2181

<212> DNA

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<400> 397

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Ile	Ile	Ala	Ser	Gly	Cys	Leu	Gln	Ser	Pro	Thr	Thr	Gln	Glu	Leu	Lys	
			20					25					30			
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Leu	Pro	Ser	Gly	Asn	Tyr	Pro	Pro	Ile	Tyr	Ile	Asn	Glu	Lys	Ser	Gln	
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Asn	Met	Cys	Pro	Pro	Gly	Lys	Val	Pro	Val	Thr	Phe	Arg	Tyr	Gln	Pro	
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Cys	Leu	Asn	Pro	Gly	Arg	Tyr	Glu	Tyr	Lys	Phe	Phe	Val	Asp	Gly	Glu	
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agt Ser	ttg Leu	ccc Pro 435	aag Lys	ctc Leu	aac Asn	aca Thr	gcc Ala 440	aat Asn	cca Pro	gag Glu	gtc Val	aag Lys 445	gaa Glu	tat Tyr	tta Leu	1344
ata Ile 450	ggt Gly	gcc Ala	gca Ala	ctg Leu	cac His	tgg Trp 455	ctt Leu	gac Asp	ttt Phe	ggc Gly	ttt Phe 460	ggc Gly	att Ile	agg Arg		1392
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cta Leu	agg Arg	aaa Lys	gcc Ala	atc Ile 485	aag Lys	gaa Glu	aag Lys	cac His	ccc Pro 490	gat Asp	gca Ala	tac Tyr	ata Ile	gtg Val 495	ggc Gly	1488
gaa Glu	ata Ile	tgg Trp	gag Glu 500	ctt Leu	tct Ser	ccg Pro	aga Arg	tgg Trp 505	gtg Val	cag Gln	gga Gly	aac Asn	atg Met 510	ttc Phe	gac Asp	1536

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Lys	Ser	Leu	Ala	Asp	Leu	Arg	Lys	Ser	Val	Pro	Ala	Leu	Thr	Ser	Ser	
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Arg	Gln	Leu	Trp	Trp	Gly	Ser	Gly	Glu	Val	Trp	Arg	Val	Glu	Ile	Gln
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Gly	Ile	Asn	Arg	Phe	Pro	Gln	Val	Glu	Trp	Val	Ser	Lys	Gly	Ile	Gly
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Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe	Asn	Asn	Gly	Asp	Pro	Ser	Asn	Asp
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Ala	Leu	Ala	Leu	Gln	Thr	Asp	Glu	Phe	Trp	Phe	Asn	Glu	Leu	Ile	Asn
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Cys	Cys	His	Gln	Tyr	Phe	Gly	Gly	Asp	Ile	Lys	Gly	Ile	Leu	Glu	Lys
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Lys	Ser	Leu	Ala	Asp	Leu	Arg	Lys	Ser	Val	Pro	Ala	Leu	Thr	Ser	Ser
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Tyr Pro Ala Gly Asp Pro Gln Thr Trp Val Ile Tyr Gln Ile Val Ile
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			420				425						430			
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Phe	Lys	Leu	Ile	Lys	Thr	Leu	Ala	Ser	Leu	Arg	Arg	Tyr	Asn	Pro	Ala	
		435					440					445				
tta	gct	tat	gga	ttg	atc	gcg	aca	agg	tat	gta	agc	gat	gac	att	tac	1392
Leu	Ala	Tyr	Gly	Leu	Ile	Ala	Thr	Arg	Tyr	Val	Ser	Asp	Asp	Ile	Tyr	
	450				455					460						
atc	ttt	gaa	aga	aag	ttc	ttt	gat	aac	gtt	gtt	ctc	gta	gca	ata	aat	1440
Ile	Phe	Glu	Arg	Lys	Phe	Phe	Asp	Asn	Val	Val	Leu	Val	Ala	Ile	Asn	
465					470				475					480		
cgc	aat	tta	aat	tct	cca	tat	gtg	gtc	tct	aac	gtt	tac	acc	tcc	cta	1488
Arg	Asn	Leu	Asn	Ser	Pro	Tyr	Val	Val	Ser	Asn	Val	Tyr	Thr	Ser	Leu	
				485				490						495		
cca	gat	gga	agt	tac	aat	gac	tac	ctt	gga	gga	ctt	ttg	aac	gga	gtt	1536
Pro	Asp	Gly	Ser	Tyr	Asn	Asp	Tyr	Leu	Gly	Gly	Leu	Leu	Asn	Gly	Val	
			500					505					510			
gga	ata	acg	gtt	tca	tct	ggt	aca	ttc	tct	gta	gag	tta	cct	gca	ggt	1584
Gly	Ile	Thr	Val	Ser	Ser	Gly	Thr	Phe	Ser	Val	Glu	Leu	Pro	Ala	Gly	
		515				520						525				
tca	gta	tca	gta	tgg	cag	tac	aaa	gca	acg	ccg	act	gat	cca	tgg	gta	1632
Ser	Val	Ser	Val	Trp	Gln	Tyr	Lys	Ala	Thr	Pro	Thr	Asp	Pro	Trp	Val	
	530				535						540					
gga	gca	att	gat	cca	gtt	atg	gga	aga	gct	gga	aac	att	gtc	aca	gtt	1680
Gly	Ala	Ile	Asp	Pro	Val	Met	Gly	Arg	Ala	Gly	Asn	Ile	Val	Thr	Val	
545				550						555					560	
agt	gga	gaa	ggg	ttt	ggg	gat	gtt	ccg	gga	aga	gtc	tta	ata	aca	aat	1728
Ser	Gly	Glu	Gly	Phe	Gly	Asp	Val	Pro	Gly	Arg	Val	Leu	Ile	Thr	Asn	
				565					570					575		
gga	caa	gat	tac	tgg	act	gca	gaa	gtt	aca	tat	tgg	agc	gat	aaa	agc	1776
Gly	Gln	Asp	Tyr	Trp	Thr	Ala	Glu	Val	Thr	Tyr	Trp	Ser	Asp	Lys	Ser	
			580					585					590			
gta	gag	ttc	ata	gtt	cct	tca	gga	ata	act	acc	caa	cta	aac	gaa	aat	1824
Val	Glu	Phe	Ile	Val	Pro	Ser	Gly	Ile	Thr	Thr	Gln	Leu	Asn	Glu	Asn	
		595					600					605				
cat	gtt	gaa	gtc	aga	att	gaa	agg	gct	gat	ggg	gct	aca	tca	aat	gga	1872
His	Val	Glu	Val	Arg	Ile	Glu	Arg	Ala	Asp	Gly	Ala	Thr	Ser	Asn	Gly	
	610					615					620					
ata	gcc	ttt	gaa	tat	cta	acg	aac	aaa	caa	att	cca	gct	att	ttt	gaa	1920
Ile	Ala	Phe	Glu	Tyr	Leu	Thr	Asn	Lys	Gln	Ile	Pro	Ala	Ile	Phe	Glu	
625					630					635					640	
gtt	agg	aac	act	caa	ggt	aca	aat	tta	gaa	acc	caa	gtt	gga	gaa	ttt	1968
Val	Arg	Asn	Thr	Gln	Gly	Thr	Asn	Leu	Glu	Thr	Gln	Val	Gly	Glu	Phe	
				645					650					655		

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tta	tgg	cta	aca	ggt	agt	ggt	cca	gag	ttg	agc	tat	tgg	agt	cca	gaa	2016
Leu	Trp	Leu	Thr	Gly	Ser	Val	Pro	Glu	Leu	Ser	Tyr	Trp	Ser	Pro	Glu	
			660					665					670			
aca	ata	aaa	gct	ggt	gga	cca	atg	ttg	tgt	cca	gga	tgg	cct	gat	tgg	2064
Thr	Ile	Lys	Ala	Val	Gly	Pro	Met	Leu	Cys	Pro	Gly	Trp	Pro	Asp	Trp	
		675					680					685				
ttt	ggt	gta	gca	agt	gtc	ccg	gcg	gat	acc	tat	ata	gag	ttc	aag	ttc	2112
Phe	Val	Val	Ala	Ser	Val	Pro	Ala	Asp	Thr	Tyr	Ile	Glu	Phe	Lys	Phe	
	690					695					700					
tta	aag	gca	ccg	ctt	gga	ggc	act	gga	atc	tgg	gaa	gta	gga	agc	aat	2160
Leu	Lys	Ala	Pro	Leu	Gly	Gly	Thr	Gly	Ile	Trp	Glu	Val	Gly	Ser	Asn	
705					710					715					720	
cac	gca	tac	cta	aca	cct	tca	agc	gga	ata	ggg	gaa	ggt	tca	ggt	gaa	2208
His	Ala	Tyr	Leu	Thr	Pro	Ser	Ser	Gly	Ile	Gly	Glu	Val	Ser	Val	Glu	
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gcc	aac	cgt	tga													2220
Ala	Asn	Arg														

<210> 400

<211> 739

<212> PRT

<213> Thermococcus sp

<400> 400

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Gly	Phe	Ser	Glu	Gln	Ile	Ser	Thr	Val	Ala	Ala	Gly	Val	Ser	Pro	Ser	
			20					25					30			
Tyr	Pro	Ala	Gly	Asp	Pro	Gln	Thr	Trp	Val	Ile	Tyr	Gln	Ile	Val	Ile	
		35				40						45				
Asp	Arg	Phe	Tyr	Asp	Gly	Asn	Thr	Ser	Asn	Asn	Asp	Pro	Leu	Lys	Ser	
	50					55					60					
Pro	Gly	Leu	Tyr	Asp	Pro	Asn	Lys	Glu	Asn	Trp	Lys	Leu	Tyr	Trp	Gly	
65				70						75					80	
Gly	Asp	Leu	Glu	Gly	Ile	Ile	Ala	Lys	Leu	Pro	Tyr	Leu	Tyr	Glu	Leu	
				85					90					95		
Gly	Val	Ser	Ala	Ile	Trp	Ile	Ser	Pro	Val	Phe	Asp	Asn	Ile	Asp	Val	
			100					105					110			
Pro	Ile	Asn	Gly	Ser	Asn	Gly	Leu	Glu	Ala	Gly	Tyr	His	Gly	Tyr	Trp	
		115					120					125				
Pro	Lys	Asp	Phe	Lys	Val	Ile	Glu	Glu	His	Phe	Gly	Thr	Trp	Glu	Ile	
	130					135					140					
Phe	Arg	Arg	Leu	Ser	Gln	Glu	Ala	Ala	Lys	Tyr	Asn	Ile	Thr	Ile	Ile	
145				150						155					160	
Ile	Asp	Phe	Val	Pro	Asn	His	Ser	Asn	Pro	Asn	Asp	Ala	Gly	Glu	Tyr	
				165					170					175		
Gly	Ala	Leu	Tyr	Asp	Asn	Gly	Thr	Phe	Val	Ile	Asp	Tyr	Pro	Thr	Asp	
			180					185					190			
Ala	Asn	Tyr	Ala	Thr	Val	His	Pro	Ile	Thr	Lys	Ser	Leu	Ser	Tyr	Ile	
		195					200					205				
Tyr	Asn	His	Asn	Gly	Gly	Ile	Thr	Asn	Trp	Asn	Asp	Arg	Trp	Glu	Val	
	210					215					220					
Arg	Tyr	Lys	Asn	Leu	Phe	Asn	Leu	Ala	Asp	Leu	Asn	Gln	Leu	Asn	Pro	
225				230						235					240	
Trp	Val	Asp	Asn	Tyr	Leu	Lys	Glu	Ser	Thr	Val	Ser	Tyr	Leu	Glu	Ala	
				245					250					255		
Gly	Ile	Gly	Gly	Ile	Arg	Ile	Asp	Ala	Val	Lys	His	Leu	Glu	Pro	Gly	
			260					265					270			
Trp	Leu	Lys	Thr	Tyr	Ala	Asp	Tyr	Val	Tyr	Ala	Arg	Lys	Asn	Val	Phe	
		275					280					285				
Met	Phe	Gly	Glu	Trp	Tyr	Gln	Gly	Phe	Asn	Asp	Glu	Met	Tyr	Trp	Asp	
	290					295					300					
Met	Val	Lys	Phe	Ala	Asn	Tyr	Thr	Gly	Ile	Gly	Leu	Ile	Asn	Ile	Pro	
305					310					315					320	
Leu	Gln	Gln	Val	Leu	Val	Asp	Val	Phe	Ala	Tyr	Asp	Thr	Lys	Thr	Met	
				325					330					335		
Trp	Asp	Leu	Glu	Ser	Ala	Val	Asn	Lys	Tyr	Thr	Ile	Asp	Phe	Met	Trp	
			340					345					350			

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Gln Asn Lys Leu Thr Ile Phe Val Asp Ser His Asp Val Pro Arg Phe
 355 360 365
 Leu Ser Leu Arg Asn Asp Leu Ile Arg Phe His Gln Ala Leu Ala Phe
 370 375 380
 Val Leu Thr Ala Pro Gly Ile Pro Ile Ile Tyr Tyr Gly Asp Glu Gln
 385 390 395 400
 Tyr Leu His Asn Asp Thr Val Asn Asp Phe Gly Gln Val Gly Gly Asp
 405 410 415
 Pro Tyr Asn Arg Pro Met Met Lys Thr Trp Asn Thr Ser Thr Thr Ala
 420 425 430
 Phe Lys Leu Ile Lys Thr Leu Ala Ser Leu Arg Arg Tyr Asn Pro Ala
 435 440 445
 Leu Ala Tyr Gly Leu Ile Ala Thr Arg Tyr Val Ser Asp Asp Ile Tyr
 450 455 460
 Ile Phe Glu Arg Lys Phe Phe Asp Asn Val Val Leu Val Ala Ile Asn
 465 470 475 480
 Arg Asn Leu Asn Ser Pro Tyr Val Val Ser Asn Val Tyr Thr Ser Leu
 485 490 495
 Pro Asp Gly Ser Tyr Asn Asp Tyr Leu Gly Gly Leu Leu Asn Gly Val
 500 505 510
 Gly Ile Thr Val Ser Ser Gly Thr Phe Ser Val Glu Leu Pro Ala Gly
 515 520 525
 Ser Val Ser Val Trp Gln Tyr Lys Ala Thr Pro Thr Asp Pro Trp Val
 530 535 540
 Gly Ala Ile Asp Pro Val Met Gly Arg Ala Gly Asn Ile Val Thr Val
 545 550 555 560
 Ser Gly Glu Gly Phe Gly Asp Val Pro Gly Arg Val Leu Ile Thr Asn
 565 570 575
 Gly Gln Asp Tyr Trp Thr Ala Glu Val Thr Tyr Trp Ser Asp Lys Ser
 580 585 590
 Val Glu Phe Ile Val Pro Ser Gly Ile Thr Thr Gln Leu Asn Glu Asn
 595 600 605
 His Val Glu Val Arg Ile Glu Arg Ala Asp Gly Ala Thr Ser Asn Gly
 610 615 620
 Ile Ala Phe Glu Tyr Leu Thr Asn Lys Gln Ile Pro Ala Ile Phe Glu
 625 630 635 640
 Val Arg Asn Thr Gln Gly Thr Asn Leu Glu Thr Gln Val Gly Glu Phe
 645 650 655
 Leu Trp Leu Thr Gly Ser Val Pro Glu Leu Ser Tyr Trp Ser Pro Glu
 660 665 670
 Thr Ile Lys Ala Val Gly Pro Met Leu Cys Pro Gly Trp Pro Asp Trp
 675 680 685
 Phe Val Val Ala Ser Val Pro Ala Asp Thr Tyr Ile Glu Phe Lys Phe
 690 695 700
 Leu Lys Ala Pro Leu Gly Gly Thr Gly Ile Trp Glu Val Gly Ser Asn
 705 710 715 720
 His Ala Tyr Leu Thr Pro Ser Ser Gly Ile Gly Glu Val Ser Val Glu
 725 730 735
 Ala Asn Arg

<210> 401

<211> 1737

<212> DNA

<213> Alicyclobacillus acidocaldarius

<220>

<221> CDS

<222> (1)..(1737)

<223> transl_table=11

<400> 401

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Met	Glu	Leu	Val	Trp	Gln	His	Arg	Trp	Ala	Ala	Asp	Ala	Tyr	Pro	Leu	
1				5				10						15		
gac	tgt	tca	acc	atg	gtt	ctt	gtg	tgt	cgc	gtt	gcg	cga	tgc	aca	ccc	96
Asp	Leu	Ser	Thr	Met	Val	Leu	Val	Leu	Arg	Val	Ala	Arg	Cys	Thr	Pro	
			20					25					30			
gca	cag	cgg	gtg	cgg	gtg	cac	ttt	gga	gat	cgg	tac	gaa	cct	gac	ttt	144

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Ala	Gln	Arg ₃₅	Val	Arg	Val	His	Phe ₄₀	Gly	Asp	Arg	Tyr	Glu ₄₅	Pro	Asp	Phe
cag	aat	tca	agt	gag	gct	cga	aga	tac	gga	tcg	gac	gga	aca	ttt	gac
Gln	Asn	Ser	Ser	Glu	Ala	Arg ₅₅	Arg	Tyr	Gly	Ser	Asp ₆₀	Gly	Thr	Phe	Asp
240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
288	288	288	288	288	288	288	288	288	288	288	288	288	288	288	288
336	336	336	336	336	336	336	336	336	336	336	336	336	336	336	336
384	384	384	384	384	384	384	384	384	384	384	384	384	384	384	384
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480	480	480	480	480	480	480	480	480	480	480	480	480	480	480	480
528	528	528	528	528	528	528	528	528	528	528	528	528	528	528	528
576	576	576	576	576	576	576	576	576	576	576	576	576	576	576	576
624	624	624	624	624	624	624	624	624	624	624	624	624	624	624	624
672	672	672	672	672	672	672	672	672	672	672	672	672	672	672	672
720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
768	768	768	768	768	768	768	768	768	768	768	768	768	768	768	768
816	816	816	816	816	816	816	816	816	816	816	816	816	816	816	816
864	864	864	864	864	864	864	864	864	864	864	864	864	864	864	864
912	912	912	912	912	912	912	912	912	912	912	912	912	912	912	912
960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960
1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008
1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056
1104	1104	1104	1104	1104	1104	1104	1104	1104	1104	1104	1104	1104	1104	1104	1104
1152	1152	1152	1152	1152	1152	1152	1152	1152	1152	1152	1152	1152	1152	1152	1152
1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
1248	1248	1248	1248	1248	1248	1248	1248	1248	1248	1248	1248	1248	1248	1248	1248

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Arg	Pro	Ala	Trp	Arg	Ala	Met	Trp	Asn	Leu	Leu	Gly	Ser	His	Asp	Thr		
				405					410					415			
gaa	cg	gc	ctt	acg	cg	gca	cg	ggt	cat	gtt	ccc	tct	gtt	gtg	ttg		1296
Glu	Arg	Ala	Leu	Thr	Arg	Ala	Arg	Gly	His	Val	Pro	Ser	Val	Val	Leu		
			420					425					430				
gcg	ttt	gca	atg	ctt	ttc	acg	cta	ccc	gga	att	ccc	atg	gtg	tat	tat		1344
Ala	Phe	Ala	Met	Leu	Phe	Thr	Leu	Pro	Gly	Ile	Pro	Met	Val	Tyr	Tyr		
			435				440					445					
ggg	gac	gag	atc	ggc	atg	gaa	ggt	gga	acc	gat	ccg	gat	tgc	cgt	cgg		1392
Gly	Asp	Glu	Ile	Gly	Met	Glu	Gly	Gly	Thr	Asp	Pro	Asp	Cys	Arg	Arg		
			450			455					460						
ggc	atg	atc	tgg	gac	gcg	aac	tta	tgg	cag	ctt	gat	ctt	cg	gaa	gcc		1440
Gly	Met	Ile	Trp	Asp	Ala	Asn	Leu	Trp	Gln	Leu	Asp	Leu	Arg	Glu	Ala		
					470					475					480		
gtg	cg	caa	ctc	gca	tgg	ctc	aag	cga	acc	cat	ccc	gcg	ctt	gca	gga		1488
Val	Arg	Gln	Leu	Ala	Trp	Leu	Lys	Arg	Thr	His	Pro	Ala	Leu	Ala	Gly		
				485				490						495			
gat	aca	atg	gag	att	cg	gat	gcg	aac	tct	ggc	gtg	ctg	cat	tat	gta		1536
Asp	Thr	Met	Glu	Ile	Arg	Asp	Ala	Asn	Ser	Gly	Val	Leu	His	Tyr	Val		
			500					505					510				
cg	cta	aac	ggc	aca	ggt	ccg	cat	ctt	cac	att	gct	gtt	tgc	aaa	cgt		1584
Arg	Leu	Asn	Gly	Thr	Gly	Pro	His	Leu	His	Ile	Ala	Val	Cys	Lys	Arg		
			515				520					525					
cga	gac	ttc	ggc	gcg	gaa	gtg	gac	tcc	cca	cta	ttc	gcg	tgg	gat	gtg		1632
Arg	Asp	Phe	Gly	Ala	Glu	Val	Asp	Ser	Pro	Leu	Phe	Ala	Trp	Asp	Val		
			530			535					540						
cca	tct	cg	aca	tcg	ggc	gag	gaa	cga	aag	atc	ctg	ata	tgg	gaa	tgc		1680
Pro	Ser	Arg	Thr	Ser	Gly	Glu	Glu	Arg	Lys	Ile	Leu	Ile	Trp	Glu	Cys		
				550					555					560			
gat	tca	act	gag	ggg	tgt	ggg	cat	gat	tca	gca	gac	gga	ttt	cac			1728
Asp	Ser	Thr	Glu	Gly	Cys	Gly	His	Asp	Ser	Arg	Ala	Asp	Gly	Phe	His		
				565					570					575			
aac	cag	tga															1737
Asn	Gln																

<210> 402

<211> 578

<212> PRT

<213> Alicyclobacillus acidocaldarius

<400> 402

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Asp	Leu	Ser	Thr	Met	Val	Leu	Val	Leu	Arg	Val	Ala	Arg	Cys	Thr	Pro		
			20					25					30				
Ala	Gln	Arg	Val	Arg	Val	His	Phe	Gly	Asp	Arg	Tyr	Glu	Pro	Asp	Phe		
			35				40					45					
Gln	Asn	Ser	Ser	Glu	Ala	Arg	Arg	Tyr	Gly	Ser	Asp	Gly	Thr	Phe	Asp		
			50			55					60						
Trp	Phe	Thr	Cys	Arg	Val	Ala	Ala	Pro	Thr	Arg	Arg	Leu	Lys	Tyr	Ala		
65				70					75						80		
Phe	Glu	Val	Leu	Ser	Ser	Thr	Gly	Arg	Ala	Val	Tyr	Leu	Gly	Glu	Gly		
			85						90					95			
Gly	Leu	Ala	Asp	Thr	Leu	Asp	Ala	Val	Gln	Pro	Phe	Gln	Tyr	Pro	Tyr		
			100					105					110				
Ile	His	Pro	Ser	Arg	Val	Leu	Ala	Val	Pro	Asp	Trp	Val	Gly	His	Ala		
			115				120					125					
Val	Ala	Tyr	Gln	Ile	Phe	Pro	Asp	Arg	Phe	Ala	Val	Gly	Glu	Gln	Gln		
			130			135				140							
Leu	Val	Arg	Pro	Thr	Asp	Pro	Trp	Asp	Ala	Arg	Pro	Thr	Pro	Asp	Ser		
145				150					155					160			
Val	Phe	Gly	Gly	Asn	Leu	Arg	Gly	Ile	Val	Asp	Lys	Leu	Pro	Tyr	Leu		
				165				170						175			
Ser	Asp	Leu	Gly	Val	Asn	Leu	Met	Tyr	Leu	Thr	Pro	Ile	Phe	Gln	Ala		
			180				185						190				
Pro	Ser	Asn	His	Lys	Tyr	Asp	Thr	Gln	Asp	Tyr	Phe	Ala	Val	Asp	Pro		
			195			200						205					
Ala	Phe	Gly	Thr	Leu	Gly	Asp	Leu	Gln	Leu	Leu	Val	Arg	Glu	Ala	His		

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210 Arg Leu Gly Ile Arg Val 215 Val Leu Asp Ala Val 220 Phe Asn His Ser Gly
 225 Phe Gln Phe Ala Pro Phe 230 Phe Gln Asp Val Ile Ala Arg Gly Thr Ala Ser
 Pro Tyr Trp Ser 245 Phe Phe Val Gln Gly Asp Arg Val Asp Val Glu
 Ser Val Asn 260 Tyr Glu Thr Phe Ala 280 Thr Arg Leu Arg His 285 Met Pro Lys
 Leu Asn 275 Leu Ala Glu Pro Ala 295 Ala Glu Glu Tyr Phe Leu Gln Val Ala
 Lys 290 His Tyr Val Leu Glu 310 Cys Asp Ile Asp Gly Trp Arg Phe Asp Val
 305 Ala Asn Glu Ile Asp 325 Pro His Phe Trp Ser Arg Leu Arg Ser Glu 335 Leu
 Arg Ala Leu Lys 340 Pro Asp Ile Leu Leu Ile Gly Glu Ile Trp His Asp
 Ser Leu Pro 355 Trp Leu Met Gly Asp Ala Phe Asp Gly Val Met Asn Tyr
 Pro Leu Arg Glu Leu Val Met 375 Arg Tyr Ala Met Asp Glu Ser Ile Asp
 Glu 385 Pro Ala Phe Ala Glu 390 Ala Trp Val Arg Leu Tyr Leu Gln Tyr Pro
 Arg Pro Ala Trp Arg 405 Ala Met Trp Asn Leu Leu Gly Ser His Asp Thr
 Glu Arg Ala Leu Thr Arg Ala Arg Gly His Val Pro Ser Val Val Leu
 Ala Phe Ala 420 Met Leu Phe Thr Leu 440 Pro Gly Ile Pro Met Val Tyr Tyr
 Gly Asp Glu Ile Gly Met Glu 455 Gly Gly Thr Asp Pro Asp Cys Arg Arg
 Gly 465 Met Ile Trp Asp Ala Asn Leu Trp Gln Leu Asp Leu Arg Glu Ala
 Val Arg Gln Leu Ala 485 Trp Leu Lys Arg Thr His Pro Ala Leu Ala Gly
 Asp Thr Met Glu 500 Ile Arg Asp Ala Asn 505 Ser Gly Val Leu His Tyr Val
 Arg Leu Asn Gly Thr Gly Pro His 520 Leu His Ile Ala Val Cys Lys Arg
 Arg Asp Phe Gly Ala Glu Val 535 Asp Ser Pro Leu Phe Ala Trp Asp Val
 Pro 545 Ser Arg Thr Ser Gly Glu Glu Arg Lys Ile Leu Ile Trp Glu Cys
 Asp Ser Thr Glu Gly 565 Cys Gly His Asp Ser 570 Arg Ala Asp Gly Phe His
 Asn Gln

<210> 403

<211> 1548

<212> DNA

<213> Paenibacillus polymyxa

<220>

<221> CDS

<222> (1)..(1548)

<223> transl_table=11

<400> 403

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Met	Leu	Thr	Met	Phe	Ala	Ser	Ser	Ala	Met	Ala	Glu	Gln	Asp	Met	Asn	
1				5				10						15		
ggg	cat	aag	cct	ccg	aat	tct	gct	gga	agc	ggc	gtg	ttt	tac	gaa	att	96
Gly	His	Lys	Pro	Pro	Asn	Ser	Ala	Gly	Ser	Gly	Val	Phe	Tyr	Glu	Ile	
			20					25				30				
tat	atc	aat	tct	ttt	tat	gat	tcg	aac	ggg	gac	gga	cat	ggt	gat	tta	144
Tyr	Ile	Asn	Ser	Phe	Tyr	Asp	Ser	Asn	Gly	Asp	Gly	His	Gly	Asp	Leu	
			35				40					45				
aaa	ggt	att	acg	caa	aag	ctt	gat	tac	tta	aac	gac	ggc	aat	ccc	cgt	192

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Lys	Gly ₅₀	Ile	Thr	Gln	Lys	Leu ₅₅	Asp	Tyr	Leu	Asn	Asp ₆₀	Gly	Asn	Pro	Arg	
tcg	ggt	aag	gat	tgg	cag	gtc	agc	ggc	ctc	tgg	ctc	atg	cca	ctg	aat	240
Ser ₆₅	Gly	Lys	Asp	Leu	Gln ₇₀	Val	Ser	Gly	Leu	Trp ₇₅	Leu	Met	Pro	Leu	Asn ₈₀	
ccg	tct	cca	agc	tac	cat	aaa	tat	gat	gta	act	gac	tac	tat	caa	gtg	288
Pro	Ser	Pro	Ser	Tyr ₈₅	His	Lys	Tyr	Asp	Val ₉₀	Thr	Asp	Tyr	Tyr	Gln ₉₅	Val	
gac	ccg	cag	tac	ggg	aat	ctg	aat	gat	ttc	cgc	acc	ttg	acg	aaa	gaa	336
Asp	Pro	Gln	Tyr ₁₀₀	Gly	Asn	Leu	Asn	Asp ₁₀₅	Phe	Arg	Thr	Leu	Thr ₁₁₀	Lys	Glu	
gca	aaa	aga	aaa	ggt	gtc	aag	gtg	atc	att	gac	ctt	gtt	atc	aat	cat	384
Ala	Lys	Arg ₁₁₅	Lys	Gly	Val	Lys	Val ₁₂₀	Ile	Ile	Asp	Leu	Val ₁₂₅	Ile	Asn	His	
tca	agt	agc	gag	cac	cct	tgg	ttc	aag	gag	gct	agt	gcc	aac	ccg	caa	432
Ser ₁₃₀	Ser	Ser	Glu	His	Pro	Trp ₁₃₅	Phe	Lys	Glu	Ala	Ser ₁₄₀	Ala	Asn	Pro	Gln	
agc	aaa	tac	cat	gac	tat	tac	gta	tgg	gct	gat	gag	aat	aca	aac	ctg	480
Ser ₁₄₅	Lys	Tyr	His	Asp	Tyr ₁₅₀	Tyr	Val	Trp	Ala	Asp ₁₅₅	Glu	Asn	Thr	Asn	Leu ₁₆₀	
gat	gaa	aag	gga	tca	tgg	ggc	cag	cag	gta	tgg	cat	aag	aat	ccg	aat	528
Asp	Glu	Lys	Gly	Ser ₁₆₅	Trp	Gly	Gln	Gln	Val ₁₇₀	Trp	His	Lys	Asn	Pro ₁₇₅	Asn	
ggc	gaa	ggg	tat	ttt	tac	ggt	acc	ttc	tgg	tcc	ggg	atg	ccg	gat	ctg	576
Gly	Glu	Gly	Tyr ₁₈₀	Phe	Tyr	Gly	Thr	Phe ₁₈₅	Trp	Ser	Gly	Met	Pro ₁₉₀	Asp	Leu	
aat	ttt	gat	aat	ccc	aaa	gtc	cgc	aag	gaa	atg	atc	aaa	gtc	ggt	aag	624
Asn	Phe ₁₉₅	Asp	Asn	Pro	Lys	Val	Arg ₂₀₀	Lys	Glu	Met	Ile	Lys ₂₀₅	Val	Gly	Lys	
tat	tgg	cta	cag	caa	ggt	gca	gac	ggc	ttc	cgg	ctt	gat	gcg	gcg	atg	672
Tyr ₂₁₀	Trp	Leu	Gln	Gln	Gly	Ala ₂₁₅	Asp	Gly	Phe	Arg	Leu ₂₂₀	Asp	Ala	Ala	Met	
cat	att	ttt	aaa	ggg	caa	acg	aag	gac	ggt	gcc	gat	aaa	aac	att	acg	720
His ₂₂₅	Ile	Phe	Lys	Gly	Gln ₂₃₀	Thr	Lys	Asp	Gly	Ala ₂₃₅	Asp	Lys	Asn	Ile	Thr ₂₄₀	
tgg	tgg	aat	gaa	ttc	cgt	tcc	gag	atg	gaa	aag	ata	aat	cca	aac	gta	768
Trp	Trp	Asn	Glu	Phe ₂₄₅	Arg	Ser	Glu	Met	Glu ₂₅₀	Lys	Ile	Asn	Pro ₂₅₅	Asn	Val	
tat	ctg	gca	gga	gag	gta	tgg	gat	aaa	ccg	gag	aca	ata	gct	cct	tat	816
Tyr	Leu	Ala	Gly ₂₆₀	Glu	Val	Trp	Asp	Lys ₂₆₅	Pro	Glu	Thr	Ile	Ala ₂₇₀	Pro	Tyr	
tac	gaa	tcg	ctc	cac	tct	ctg	ttt	aat	ttt	gac	ctg	ggc	gga	acg	ata	864
Tyr	Glu	Ser ₂₇₅	Leu	His	Ser	Leu	Phe ₂₈₀	Asn	Phe	Asp	Leu	Gly ₂₈₅	Gly	Thr	Ile	
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Leu	Asn ₂₉₀	Ser	Val	Lys	Asn	Gly ₂₉₅	Arg	Asp	Gln	Gly	Ile ₃₀₀	Ala	Thr	Phe	Ser	
gag	aaa	acg	ctg	aag	ctg	tac	aaa	tca	tac	aat	aag	gcg	gca	ctc	gat	960
Glu ₃₀₅	Lys	Thr	Leu	Lys	Leu ₃₁₀	Tyr	Lys	Ser	Tyr	Asn ₃₁₅	Lys	Ala	Ala	Leu	Asp ₃₂₀	
gct	cca	ttt	tta	agc	aat	cat	gac	caa	acc	cga	gtt	atg	agc	gag	ctg	1008
Ala	Pro	Phe	Leu	Ser ₃₂₅	Asn	His	Asp	Gln	Thr ₃₃₀	Arg	Val	Met	Ser	Glu ₃₃₅	Leu	
ggc	ggg	gat	gta	cga	aaa	gcc	aag	ctg	gct	gca	tcc	att	ctt	ttg	acg	1056
Gly	Gly	Asp	Val ₃₄₀	Arg	Lys	Ala	Lys	Leu ₃₄₅	Ala	Ala	Ser	Ile	Leu ₃₅₀	Leu	Thr	
ttg	ccg	ggt	cag	ccg	ttt	ctc	tat	tat	ggg	gaa	gag	atc	ggc	atg	aag	1104
Leu	Pro	Gly ₃₅₅	Gln	Pro	Phe	Leu	Tyr ₃₆₀	Tyr	Gly	Glu	Glu	Ile ₃₆₅	Gly	Met	Lys	
gga	gag	aag	ccc	gat	gag	tat	ctt	cga	gag	cct	atg	cgc	tgg	tac	aag	1152
Gly ₃₇₀	Glu	Lys	Pro	Asp	Glu	Tyr ₃₇₅	Leu	Arg	Glu	Pro	Met ₃₈₀	Arg	Trp	Tyr	Lys	
gga	gaa	ggc	ctc	ggt	caa	aca	aag	tgg	gag	gaa	ccc	aaa	tac	aac	aaa	1200
Gly ₃₈₅	Glu	Gly	Leu	Gly	Gln ₃₉₀	Thr	Lys	Trp	Glu	Glu ₃₉₅	Pro	Lys	Tyr	Asn	Lys ₄₀₀	
ggc	gaa	gta	tcg	gtg	gaa	gcg	cag	ttg	cgg	gac	aat	gat	tct	ctg	ctg	1248
Gly	Glu	Val	Ser	Val ₄₀₅	Glu	Ala	Gln	Leu	Arg ₄₁₀	Asp	Asn	Asp	Ser	Leu ₄₁₅	Leu	
gaa	agc	tac	cgc	acg	ctt	atc	cgt	ctg	agg	gaa	gaa	cat	gag	gct	ctt	1296

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Glu	Ser	Tyr	Arg	Thr	Leu	Ile	Arg	Leu	Arg	Glu	Glu	His	Glu	Ala	Leu		
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Arg	Ser	Asp	Ser	Leu	Glu	Pro	Ile	Gln	Ala	Gly	Ser	Ala	Ser	Val	Thr		
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gca	tac	gaa	cgt	tct	tca	ggc	aaa	gaa	aca	ttg	tat	gta	tat	cat	aat		1392
Ala	Tyr	Glu	Arg	Ser	Ser	Gly	Lys	Glu	Thr	Leu	Tyr	Val	Tyr	His	Asn		
	450					455					460						
ctg	tca	gga	gag	ccg	ggt	acc	atc	cag	atg	aaa	gat	cga	gat	aag	gaa		1440
Leu	Ser	Gly	Glu	Pro	Val	Thr	Ile	Gln	Met	Lys	Asp	Arg	Asp	Lys	Glu		
465					470					475					480		
aag	cgg	aaa	gtg	ggt	ttc	tct	acc	tca	aag	gat	gct	aaa	gta	agg	aaa		1488
Lys	Arg	Lys	Val	Val	Phe	Ser	Thr	Ser	Lys	Asp	Ala	Lys	Val	Arg	Lys		
				485					490					495			
gaa	acg	gtg	acg	att	ccc	gct	tac	agt	tct	tta	att	acc	caa	gaa	gat		1536
Glu	Thr	Val	Thr	Ile	Pro	Ala	Tyr	Ser	Ser	Leu	Ile	Thr	Gln	Glu	Asp		
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Arg	Lys	Ser															
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<210> 404

<211> 515

<212> PRT

<213> Paenibacillus polymyxa

<400> 404

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			20					25					30				
Tyr	Ile	Asn	Ser	Phe	Tyr	Asp	Ser	Asn	Gly	Asp	Gly	His	Gly	Asp	Leu		
		35					40					45					
Lys	Gly	Ile	Thr	Gln	Lys	Leu	Asp	Tyr	Leu	Asn	Asp	Gly	Asn	Pro	Arg		
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Ser	Gly	Lys	Asp	Leu	Gln	Val	Ser	Gly	Leu	Trp	Leu	Met	Pro	Leu	Asn		
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Asp	Pro	Gln	Tyr	Gly	Asn	Leu	Asn	Asp	Phe	Arg	Thr	Leu	Thr	Lys	Glu		
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Ala	Lys	Arg	Lys	Gly	Val	Lys	Val	Ile	Ile	Asp	Leu	Val	Ile	Asn	His		
		115					120					125					
Ser	Ser	Ser	Glu	His	Pro	Trp	Phe	Lys	Glu	Ala	Ser	Ala	Asn	Pro	Gln		
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Ser	Lys	Tyr	His	Asp	Tyr	Tyr	Val	Trp	Ala	Asp	Glu	Asn	Thr	Asn	Leu		
	145				150				155						160		
Asp	Glu	Lys	Gly	Ser	Trp	Gly	Gln	Gln	Val	Trp	His	Lys	Asn	Pro	Asn		
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Gly	Glu	Gly	Tyr	Phe	Tyr	Gly	Thr	Phe	Trp	Ser	Gly	Met	Pro	Asp	Leu		
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Asn	Phe	Asp	Asn	Pro	Lys	Val	Arg	Lys	Glu	Met	Ile	Lys	Val	Gly	Lys		
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Tyr	Trp	Leu	Gln	Gln	Gly	Ala	Asp	Gly	Phe	Arg	Leu	Asp	Ala	Ala	Met		
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His	Ile	Phe	Lys	Gly	Gln	Thr	Lys	Asp	Gly	Ala	Asp	Lys	Asn	Ile	Thr		
	225				230					235					240		
Trp	Trp	Asn	Glu	Phe	Arg	Ser	Glu	Met	Glu	Lys	Ile	Asn	Pro	Asn	Val		
				245					250					255			
Tyr	Leu	Ala	Gly	Glu	Val	Trp	Asp	Lys	Pro	Glu	Thr	Ile	Ala	Pro	Tyr		
		260						265					270				
Tyr	Glu	Ser	Leu	His	Ser	Leu	Phe	Asn	Phe	Asp	Leu	Gly	Gly	Thr	Ile		
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Leu	Asn	Ser	Val	Lys	Asn	Gly	Arg	Asp	Gln	Gly	Ile	Ala	Thr	Phe	Ser		
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Glu	Lys	Thr	Leu	Lys	Leu	Tyr	Lys	Ser	Tyr	Asn	Lys	Ala	Ala	Leu	Asp		
	305				310					315					320		
Ala	Pro	Phe	Leu	Ser	Asn	His	Asp	Gln	Thr	Arg	Val	Met	Ser	Glu	Leu		
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Gly Gly Asp Val Arg Lys Ala Lys Leu Ala Ala Ser Ile Leu Leu Thr
 340 345 350
 Leu Pro Gly Gln Pro Phe Leu Tyr Tyr Gly Glu Glu Ile Gly Met Lys
 355 360 365
 Gly Glu Lys Pro Asp Glu Tyr Leu Arg Glu Pro Met Arg Trp Tyr Lys
 370 375 380
 Gly Glu Gly Leu Gly Gln Thr Lys Trp Glu Glu Pro Lys Tyr Asn Lys
 385 390 400
 Gly Glu Val Ser Val Glu Ala Gln Leu Arg Asp Asn Asp Ser Leu Leu
 405 410 415
 Glu Ser Tyr Arg Thr Leu Ile Arg Leu Arg Glu Glu His Glu Ala Leu
 420 425 430
 Arg Ser Asp Ser Leu Glu Pro Ile Gln Ala Gly Ser Ala Ser Val Thr
 435 440 445
 Ala Tyr Glu Arg Ser Ser Gly Lys Glu Thr Leu Tyr Val Tyr His Asn
 450 455 460
 Leu Ser Gly Glu Pro Val Thr Ile Gln Met Lys Asp Arg Asp Lys Glu
 465 470 480
 Lys Arg Lys Val Val Phe Ser Thr Ser Lys Asp Ala Lys Val Arg Lys
 485 490 495
 Glu Thr Val Thr Ile Pro Ala Tyr Ser Ser Leu Ile Thr Gln Glu Asp
 500 505 510
 Arg Lys Ser
 515

<210> 405

<211> 1689

<212> DNA

<213> Dictyoglomus thermophilum

<220>

<221> CDS

<222> (1)..(1689)

<223> transl_table=11

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tta	gta	gaa	aga	gaa	gtt	aaa	aaa	ctt	gaa	gaa	ata	tat	tta	gaa	gag	96
Leu	Val	Glu	Arg	Glu	Val	Lys	Lys	Leu	Glu	Glu	Ile	Tyr	Leu	Glu	Glu	
			20					25					30			
gtt	tta	cca	gaa	gat	cct	aag	cct	gaa	gat	gaa	ata	gaa	ttt	act	ttt	144
Val	Leu	Pro	Glu	Asp	Pro	Lys	Pro	Glu	Asp	Glu	Ile	Glu	Phe	Thr	Phe	
			35				40					45				
aac	tgt	cca	tta	aag	ttt	cac	att	act	tca	gga	aaa	att	gtc	aaa	gat	192
Asn	Cys	Pro	Leu	Lys	Phe	His	Ile	Thr	Ser	Gly	Lys	Ile	Val	Lys	Asp	
	50					55					60					
aac	aga	gaa	ata	tat	acc	ttt	aat	ata	cag	gaa	aga	aaa	act	caa	tgg	240
Asn	Arg	Glu	Ile	Tyr	Thr	Phe	Asn	Ile	Gln	Glu	Arg	Lys	Thr	Gln	Trp	
	65				70				75					80		
aat	gat	agc	ata	ttt	aac	ttt	agc	gaa	att	atc	aaa	ata	aaa	ata	cct	288
Asn	Asp	Ser	Ile	Phe	Asn	Phe	Ser	Glu	Ile	Ile	Lys	Ile	Lys	Ile	Pro	
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cct	tta	aag	gaa	aat	ggt	cta	tat	caa	atc	cac	ctt	tat	gag	atg	aat	336
Pro	Leu	Lys	Glu	Asn	Gly	Leu	Tyr	Gln	Ile	His	Leu	Tyr	Glu	Met	Asn	
			100					105					110			
gaa	aaa	atc	tat	gag	caa	tat	ctc	tca	ata	gac	agt	ttt	gaa	gca	ccc	384
Glu	Lys	Ile	Tyr	Glu	Gln	Tyr	Leu	Ser	Ile	Asp	Ser	Phe	Glu	Ala	Pro	
			115				120					125				
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Leu	Trp	Ser	Glu	Glu	Ser	Ile	Ile	Tyr	His	Ile	Phe	Ile	Asp	Arg	Phe	
	130					135					140					
gct	aaa	gat	gaa	aaa	gaa	gta	gaa	tat	tct	gaa	aac	ctc	aaa	gag	aaa	480
Ala	Lys	Asp	Glu	Lys	Glu	Val	Glu	Tyr	Ser	Glu	Asn	Leu	Lys	Glu	Lys	
	145				150				155					160		
tta	gga	gga	aac	ctg	aag	ggg	ata	cta	agc	cgt	ttg	gat	tat	ata	gaa	528
Leu	Gly	Gly	Asn	Leu	Lys	Gly	Ile	Leu	Ser	Arg	Leu	Asp	Tyr	Ile	Glu	
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tca Ser	tat Tyr	cat His 195	ggg Gly	tat Tyr	gat Asp	att Ile	gag Glu 200	gat Asp	tac Tyr	ttt Phe	gaa Glu 205	att Ile 205	gat Asp	cct Pro	att Ile	624
tgg Trp	gga Gly 210	aca Thr	aaa Lys	gaa Glu	gat Asp	tta Leu 215	aaa Lys	aaa Lys	ctt Leu	gta Val 220	agg Arg 220	gaa Glu	gcc Ala	ttc Phe	aat Asn	672
aga Arg 225	ggc Gly	ata Ile	aga Arg	ata Ile	atc Ile 230	tta Leu	gac Asp	ttt Phe	gta Val 235	cca Pro 235	aat Asn	cat His	atg Met	tca Ser	tat Tyr 240	720
aaa Lys	aat Asn	cct Pro	ata Ile	ttt Phe 245	cag Gln	aaa Lys	gct Ala	tta Leu	aaa Lys 250	gac Asp	aaa Lys	aac Asn	agt Ser	aat Asn 255	cta Leu	768
aga Arg	agt Ser	tgg Trp	ttt Phe 260	ata Ile	ttt Phe	aaa Lys	gga Gly	gaa Glu 265	gat Asp	tat Tyr	gaa Glu	acc Thr	ttt Phe 270	ttc Phe	ggg Gly	816
gta Val	aag Lys	tca Ser 275	atg Met	ccc Pro	aaa Lys	ata Ile	aac Asn 280	ctt Leu	aaa Lys	aat Asn	aag Lys	gaa Glu 285	gag Ala	ata Ile	gat Asp	864
tat Tyr	ata Ile 290	ata Ile	aat Asn	gct Ala	gcc Ala	aaa Lys 295	tac Tyr	tgg Trp	ata Ile	aga Arg	gaa Glu 300	ttt Phe	gga Gly	att Ile	tct Ser	912
gga Gly 305	tat Tyr	aga Arg	atg Met	gat Asp	cat His 310	gct Ala	aca Thr	ggg Gly	cct Pro	gac Asp 315	att Ile	aat Asn	ttt Phe	tgg Trp	agt Ser 320	960
att Ile	ttt Phe	tat Tyr	tat Tyr	aat Asn 325	ttg Leu	aaa Lys	tct Ser	gaa Glu	ttt Phe 330	cca Pro	gaa Glu	act Thr	ttc Phe	tat Tyr 335	ttt Phe	1008
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ttg Leu 385	gaa Glu	gaa Glu	aaa Lys	ttc Phe	tat Tyr 390	gga Gly	aat Asn	aaa Lys	ttc Phe	aag Lys 395	aga Arg	att Ile	tct Ser	ttt Phe	ctc Leu 400	1200
gaa Glu	aat Asn	cac His	gat Asp	tca Ser 405	aat Asn	aga Arg	ttt Phe	cta Leu	tgg Trp 410	gtt Val	gct Ala	aaa Lys	gat Asp	aag Lys 415	aaa Lys	1248
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ata Ile	atc Ile	tac Tyr 435	aat Asn	gga Gly	caa Gln	gaa Glu	atg Met 440	gga Gly	tgt Cys	agt Ser	cag Gln	tac Tyr 445	aga Arg	gat Asp	ata Ile	1344
ctt Leu	gag Glu 450	gga Gly	aat Asn	aga Arg	act Thr	cta Leu 455	cac His	gaa Glu	cat His	gca Ala	aga Arg 460	ctt Leu	cct Pro	ata Ile	ccc Pro	1392
tgg Trp 465	agt Ser	gat Asp	gac Asp	aaa Lys	caa Gln 470	gac Asp	aaa Lys	gaa Glu	ctt Leu	ata Ile 475	gat Asp	ttt Phe	tac Tyr	agg Arg	caa Gln 480	1440
tta Leu	gtt Val	aaa Lys	atc Ile	aga Arg	aaa Lys	agt Ser	cat His	cca Pro	gag Ala 490	ctt Leu	tac Tyr	aaa Lys	ggg Gly 495	acg Thr	ttt Phe	1488
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gaa Glu	tcc Ser	ata Ile 515	ctt Leu	gta Val	ctt Leu	ata Ile	aat Asn 520	ata Ile	gag Glu	gat Asp	aaa Lys	gaa Glu 525	gaa Glu	atc Ile	ttt Phe	1584
aat Asn	ctg Leu 530	aac Asn	ggg Gly	acg Thr	tac Tyr	aga Arg 535	gat Asp	cta Leu	ttt Phe	agc Ser	gga Gly 540	aat Asn	att Ile	tac Tyr	act Thr	1632

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<210> 406

<211> 562

<212> PRT

<213> Dictyoglomus thermophilum

<400> 406

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Asn	Asp	Ser	Ile	Phe	Asn	Phe	Ser	Glu	Ile	Ile	Lys	Ile	Lys	Ile	Pro	
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Pro	Leu	Lys	Glu	Asn	Gly	Leu	Tyr	Gln	Ile	His	Leu	Tyr	Glu	Met	Asn	
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Glu	Lys	Ile	Tyr	Glu	Gln	Tyr	Leu	Ser	Ile	Asp	Ser	Phe	Glu	Ala	Pro	
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Leu	Trp	Ser	Glu	Glu	Ser	Ile	Ile	Tyr	His	Ile	Phe	Ile	Asp	Arg	Phe	
	130					135					140					
Ala	Lys	Asp	Glu	Lys	Glu	Val	Glu	Tyr	Ser	Glu	Asn	Leu	Lys	Glu	Lys	
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Leu	Gly	Gly	Asn	Leu	Lys	Gly	Ile	Leu	Ser	Arg	Leu	Asp	Tyr	Ile	Glu	
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Asn	Leu	Gly	Ile	Asn	Thr	Ile	Trp	Ile	Ser	Pro	Ile	Phe	Lys	Ser	Thr	
			180					185					190			
Ser	Tyr	His	Gly	Tyr	Asp	Ile	Glu	Asp	Tyr	Phe	Glu	Ile	Asp	Pro	Ile	
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Trp	Gly	Thr	Lys	Glu	Asp	Leu	Lys	Lys	Leu	Val	Arg	Glu	Ala	Phe	Asn	
	210					215					220					
Arg	Gly	Ile	Arg	Ile	Ile	Leu	Asp	Phe	Val	Pro	Asn	His	Met	Ser	Tyr	
225					230					235					240	
Lys	Asn	Pro	Ile	Phe	Gln	Lys	Ala	Leu	Lys	Asp	Lys	Asn	Ser	Asn	Leu	
				245					250					255		
Arg	Ser	Trp	Phe	Ile	Phe	Lys	Gly	Glu	Asp	Tyr	Glu	Thr	Phe	Phe	Gly	
			260					265					270			
Val	Lys	Ser	Met	Pro	Lys	Ile	Asn	Leu	Lys	Asn	Lys	Glu	Ala	Ile	Asp	
		275					280					285				
Tyr	Ile	Ile	Asn	Ala	Ala	Lys	Tyr	Trp	Ile	Arg	Glu	Phe	Gly	Ile	Ser	
	290					295					300					
Gly	Tyr	Arg	Met	Asp	His	Ala	Thr	Gly	Pro	Asp	Ile	Asn	Phe	Trp	Ser	
305					310					315					320	
Ile	Phe	Tyr	Tyr	Asn	Leu	Lys	Ser	Glu	Phe	Pro	Glu	Thr	Phe	Tyr	Phe	
				325					330					335		
Gly	Glu	Ile	Val	Glu	Thr	Pro	Lys	Glu	Thr	Lys	Lys	Tyr	Val	Gly	Lys	
			340					345					350			
Phe	Asp	Gly	Thr	Leu	Asp	Phe	Tyr	Leu	Phe	Lys	Ile	Ile	Arg	Asp	Phe	
		355					360					365				
Phe	Ile	Gly	Lys	Arg	Trp	Ser	Thr	Lys	Glu	Phe	Val	Lys	Met	Ile	Asp	
	370					375					380					
Leu	Glu	Glu	Lys	Phe	Tyr	Gly	Asn	Lys	Phe	Lys	Arg	Ile	Ser	Phe	Leu	
385					390					395					400	
Glu	Asn	His	Asp	Ser	Asn	Arg	Phe	Leu	Trp	Val	Ala	Lys	Asp	Lys	Lys	
				405					410					415		
Leu	Leu	Arg	Leu	Ala	Ser	Ile	Phe	Gln	Phe	Ser	Ile	Asn	Ala	Ile	Pro	
			420					425					430			
Ile	Ile	Tyr	Asn	Gly	Gln	Glu	Met	Gly	Cys	Ser	Gln	Tyr	Arg	Asp	Ile	
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Leu Glu Gly Asn Arg Thr Leu His Glu His Ala Arg Leu Pro Ile Pro
 450 455 460
 Trp Ser Asp Asp Lys Gln Asp Lys Glu Leu Ile Asp Phe Tyr Arg Gln
 465 470 475 480
 Leu Val Lys Ile Arg Lys Ser His Pro Ala Leu Tyr Lys Gly Thr Phe
 485 490 495
 Ile Pro Ile Phe Ser Asp Met Ile Ser Phe Ile Lys Glu Thr Gln Glu
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 Glu Ser Ile Leu Val Leu Ile Asn Ile Glu Asp Lys Glu Glu Ile Phe
 515 520 525
 Asn Leu Asn Gly Thr Tyr Arg Asp Leu Phe Ser Gly Asn Ile Tyr Thr
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 Asp His

<210> 407

<211> 1497

<212> DNA

<213> Dictyoglomus thermophilum

<220>

<221> CDS

<222> (1)..(1497)

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tta gtt act ttt cta act tat att cat gga tat aat gag cca tgg tat	96
Leu Val Thr Phe Leu Thr Tyr Ile His Gly Tyr Asn Glu Pro Trp Tyr	
20 25 30	
aaa aac gcg att ttt tat gaa gtc ttt gta aga tct ttt gca gat agc	144
Lys Asn Ala Ile Phe Tyr Glu Val Phe Val Arg Ser Phe Ala Asp Ser	
35 40 45	
gac ggg gat aga gta gga gat tta aat gga ctt ata gac aaa tta gat	192
Asp Gly Asp Arg Val Gly Asp Leu Asn Gly Leu Ile Asp Lys Leu Asp	
50 55 60	
tac ttt aaa aat cta aat att act gct cta tgg cta atg cct atc ttc	240
Tyr Phe Lys Asn Leu Asn Ile Thr Ala Leu Trp Leu Met Pro Ile Phe	
65 70 75 80	
ccc tca gtg agt tat cat gga tat gat gtc aca gac tat tat gat atc	288
Pro Ser Val Ser Tyr His Gly Tyr Asp Val Thr Asp Tyr Tyr Asp Ile	
85 90 95	
cat cca ggt tat ggt acc atg gag gac ttt gaa aac cta ata aga aaa	336
His Pro Gly Tyr Gly Thr Met Glu Asp Phe Glu Asn Leu Ile Arg Lys	
100 105 110	
gcc cat gaa aaa aat att aaa ata att ctt gat ttg gta gta aac cac	384
Ala His Glu Lys Asn Ile Lys Ile Ile Leu Asp Leu Val Asn His	
115 120 125	
acc tct tca agg cat cca tgg ttt gtt tct tct gcc tct tct tac aat	432
Thr Ser Ser Arg His Pro Trp Phe Val Ser Ser Ala Ser Ser Tyr Asn	
130 135 140	
tct ccg tat cgc gat tat tat ata tgg agt act gaa aaa cct gaa aaa	480
Ser Pro Tyr Arg Asp Tyr Tyr Ile Trp Ser Thr Glu Lys Pro Glu Lys	
145 150 155 160	
aat tct aat tta tgg tat aaa aaa cct aca gga tac tac tat gca tta	528
Asn Ser Asn Leu Trp Tyr Lys Lys Pro Thr Gly Tyr Tyr Tyr Ala Leu	
165 170 175	
ttc tgg tca gaa atg ccc gat cta aac ttt gat aat cca aaa gta aga	576
Phe Trp Ser Glu Met Pro Asp Leu Asn Phe Asp Asn Pro Lys Val Arg	
180 185 190	
gaa gag gtc aaa aaa att gca aaa ttt tgg ata gaa aaa ggt gtt gac	624
Glu Glu Val Lys Lys Ile Ala Lys Phe Trp Ile Glu Lys Gly Val Asp	
195 200 205	
gga ttt aga ctc gac gca gca aag cat att tat gat gat gac tct aaa	672
Gly Phe Arg Leu Asp Ala Ala Lys His Ile Tyr Asp Asp Asp Ser Lys	

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210	aac att cag tgg tgg	215	aaa gaa ttt tac tca tat	220	tta aag agt ata aaa	720
Asn Ile Gln Trp Trp	Lys Glu Phe Tyr Ser Tyr	Leu Lys Ser Ile Lys				
225	ccc gat gta tac ctt gtt ggt gaa gtt tgg gat aac gag tat aag ata	230	Val Glu Gly Glu Val Trp Asp Asn Glu Tyr Lys Ile	235	240	768
Pro Asp Val Tyr Leu Val	Gly Glu Val Trp Asp Asn Glu Tyr Lys Ile	245	gca gaa tac tat aaa gga tta ccc tca aac ttt aat ttt cct ctt tct	250	255	816
Ala Glu Tyr Tyr Lys Gly Leu Pro Ser Asn Phe Asn Phe Pro Leu Ser	260	265	270			
gac aaa ata atg aac tcc agt agc aaa tca aaa aga ctt agg aat tat	275	280	285	290	295	864
Asp Lys Ile Met Asn Ser Ser Ser Lys Ser Lys Arg Leu Arg Asn Tyr	300	305	310	315	320	
aga att tct cga ttg aag aga ctt ttt ggg gaa aac aat aca gac ttt	325	330	335	340	345	912
Arg Ile Ser Arg Leu Lys Arg Leu Phe Gly Glu Asn Asn Thr Asp Phe	345	350	355	360	365	960
gct gat gcc ata ttt tta aga aac cac gat caa gta aga gtt agg aca	370	375	380	385	390	1008
Ala Asp Ala Ile Phe Leu Arg Asn His Asp Gln Val Arg Val Arg Thr	390	395	400	405	410	
ttc ttt ggt gga agc ata gat aaa agt att ttg gca gga tct att tac	415	420	425	430	435	1056
Phe Phe Gly Gly Ser Ile Asp Lys Ser Ile Leu Ala Gly Ser Ile Tyr	435	440	445	450	455	
tta act ttg gcc ggg aat acc ttc ata tac tac gga gaa gaa ata gga	460	465	470	475	480	1104
Leu Thr Leu Ala Gly Asn Thr Phe Ile Tyr Tyr Gly Glu Glu Ile Gly	480	485	490	495	500	
atg gaa gga tca aaa cct gac gaa tat ata aga gaa ccg ttt aag tgg	505	510	515	520	525	1152
Met Glu Gly Ser Lys Pro Asp Glu Tyr Ile Arg Glu Pro Phe Lys Trp	525	530	535	540	545	
act gac gat atg aaa tct aaa tac caa acc tat tgg att att cca cga	550	555	560	565	570	1200
Thr Asp Asp Met Lys Ser Tyr Gln Thr Tyr Trp Ile Ile Pro Arg	570	575	580	585	590	
tat aac tta cca gga aat ggt ata gcc ctc gat acc gaa gaa aaa gat	595	600	605	610	615	1248
Tyr Asn Leu Pro Gly Asn Gly Ile Ala Leu Asp Thr Glu Glu Lys Asp	615	620	625	630	635	
cca aat agc ata tac aat cac tat aaa aaa ctc tta gaa ata aga gtc	640	645	650	655	660	1296
Pro Asn Ser Ile Tyr Asn His Tyr Lys Leu Leu Glu Ile Arg Val	660	665	670	675	680	
aaa tgc aga gct tta tct aat gga aaa ata gag aga ata aag act caa	685	690	695	700	705	1344
Lys Cys Arg Ala Leu Ser Asn Gly Lys Ile Glu Arg Ile Lys Thr Gln	705	710	715	720	725	
gat aga tct ata ctt gcc tat aag tta gaa tta gag gat gaa aaa ata	730	735	740	745	750	1392
Asp Arg Ser Ile Leu Ala Tyr Lys Leu Glu Leu Glu Asp Glu Lys Ile	750	755	760	765	770	
atg gta gtc cac aat cta aat agg att gaa aat acc ttt aac ttt aac	775	780	785	790	795	1440
Met Val Val His Asn Leu Asn Arg Ile Glu Asn Thr Phe Asn Phe Asn	795	800	805	810	815	
aac gag ata aaa gaa aaa gac ata cta tat att aga aac gct aaa act	820	825	830	835	840	1488
Asn Glu Ile Lys Glu Lys Asp Ile Leu Tyr Ile Arg Asn Ala Lys Thr	840	845	850	855	860	
gaa aaa aat aaa ata atc tta gga cct tat agc act gtt ata gtc aaa	865	870	875	880	885	1497
Glu Lys Asn Lys Ile Ile Leu Gly Pro Tyr Ser Thr Val Ile Val Lys	885	890	895	900	905	
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Ile Pro						

<210> 408

<211> 498

<212> PRT

<213> Dictyoglomus thermophilum

<400> 408

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Leu Val Thr Phe Leu Thr Tyr Ile His Gly Tyr Asn Glu Pro Trp Tyr	20	25	30	35
Lys Asn Ala Ile Phe Tyr Glu Val Phe Val Arg Ser Phe Ala Asp Ser	40	45	50	55
Asp Gly Asp Arg Val Gly Asp Leu Asn Gly Leu Ile Asp Lys Leu Asp	60	65	70	75

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Tyr 65	Phe	Lys	Asn	Leu	Asn 70	Ile 55	Thr	Ala	Leu	Trp 75	Leu 60	Met	Pro	Ile 80
Pro	Ser	Val	Ser	Tyr 85	His 70	Gly 55	Tyr	Asp	Val 90	Thr 75	Asp	Tyr	Tyr	Asp 95
His	Pro	Gly	Tyr 100	Gly	Thr	Met	Glu	Asp 105	Phe 90	Glu	Asn	Leu	Ile 110	Arg 95
Ala	His	Glu 115	Lys	Asn	Ile	Lys	Ile 120	Ile 105	Leu	Asp	Leu	Val 125	Val	Asn 110
Thr	Ser 130	Ser	Arg	His	Pro	Trp 135	Phe 120	Val	Ser	Ser	Ala 140	Ser	Ser	Tyr 125
Ser 145	Pro	Tyr	Arg	Asp	Tyr 150	Tyr	Ile	Trp	Ser	Thr 155	Glu	Lys	Pro	Glu 160
Asn	Ser	Asn	Leu	Trp 165	Tyr	Lys	Lys	Pro	Thr 170	Gly	Tyr	Tyr	Tyr	Ala 175
Phe	Trp	Ser	Glu 180	Met	Pro	Asp	Leu	Asn 185	Phe	Asp	Asn	Pro	Lys 190	Val 175
Glu	Glu	Val 195	Lys	Lys	Ile	Ala	Lys 200	Phe 185	Trp	Ile	Glu	Lys 205	Gly	Val 190
Gly	Phe 210	Arg	Leu	Asp	Ala	Ala 215	Lys	His	Ile	Tyr	Asp 220	Asp	Asp	Ser 205
Asn 225	Ile	Gln	Trp	Trp	Lys 230	Glu	Phe	Tyr	Ser	Tyr 235	Leu	Lys	Ser	Ile 220
Pro	Asp	Val	Tyr	Leu 245	Val	Gly	Glu	Val	Trp 250	Asp	Asn	Glu	Tyr	Lys 240
Ala	Glu	Tyr	Tyr 260	Lys	Gly	Leu	Pro	Ser 265	Asn	Phe	Asn	Phe	Pro 270	Leu 255
Asp	Lys	Ile 275	Met	Asn	Ser	Ser	Ser 280	Lys	Ser	Lys	Arg	Leu 285	Arg	Asn 270
Arg	Ile 290	Ser	Arg	Leu	Lys	Arg 295	Leu	Phe	Gly	Glu	Asn 300	Asn	Thr	Asp 285
Ala 305	Asp	Ala	Ile	Phe	Leu	Arg 310	Asn	His	Asp	Gln 315	Val	Arg	Val	Arg 300
Phe	Phe	Gly	Gly	Ser 325	Ile	Asp	Lys	Ser	Ile 330	Leu	Ala	Gly	Ser	Ile 315
Leu	Thr	Leu	Ala 340	Gly	Asn	Thr	Phe	Ile 345	Tyr	Tyr	Gly	Glu	Glu 350	Ile 335
Met	Glu	Gly 355	Ser	Lys	Pro	Asp	Glu 360	Tyr	Ile	Arg	Glu	Pro 365	Phe	Lys 340
Thr	Asp 370	Asp	Met	Lys	Ser	Lys 375	Tyr	Gln	Thr	Tyr	Trp 380	Ile	Ile	Pro 365
Tyr 385	Asn	Leu	Pro	Gly	Asn 390	Gly	Ile	Ala	Leu	Asp 395	Thr	Glu	Glu	Lys 380
Pro	Asn	Ser	Ile	Tyr 405	Asn	His	Tyr	Lys	Lys 410	Leu	Leu	Glu	Ile	Arg 400
Lys	Cys	Arg	Ala 420	Leu	Ser	Asn	Gly	Lys 425	Ile	Glu	Arg	Ile	Lys 430	Thr 415
Asp	Arg	Ser	Ile 435	Leu	Ala	Tyr	Lys 440	Leu	Glu	Leu	Glu	Asp 445	Glu	Lys 430
Met	Val 450	Val	His	Asn	Leu	Asn 455	Arg	Ile	Glu	Asn	Thr 460	Phe	Asn	Phe 445
Asn 465	Glu	Ile	Lys	Glu	Lys 470	Asp	Ile	Leu	Tyr	Ile 475	Arg	Asn	Ala	Lys 460
Glu	Lys	Asn	Lys	Ile 485	Ile	Leu	Gly	Pro	Tyr 490	Ser	Thr	Val	Ile	Val 480
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 <222> (1)..(1242)

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Cys	Leu	Ala	Ser 20	Ser	Leu	Ala	Gln	Ala 25	Gln	Ile	Leu	Phe	Gln 30	Gly	Phe	
aat	tgg	gaa	tcg	tgg	aag	aca	caa	ggc	ggg	tgg	tac	aag	ttc	atg	caa	144
Asn	Trp	Glu 35	Ser	Trp	Lys	Thr	Gln 40	Gly	Gly	Trp	Tyr	Lys 45	Phe	Met	Gln	
ggg	aag	gtg	gag	gag	atc	gcc	agc	acc	ggc	gcc	acc	cac	gtc	tgg	ctc	192
Gly	Lys 50	Val	Glu	Glu	Ile	Ala 55	Ser	Thr	Gly	Ala	Thr 60	His	Val	Trp	Leu	
ccc	ccg	ccg	tcg	caa	tcc	gtg	tcg	ccg	gag	ggc	tat	ctg	ccg	ggg	cag	240
Pro 65	Pro	Pro	Ser	Gln	Ser 70	Val	Ser	Pro	Glu	Gly 75	Tyr	Leu	Pro	Gly	Gln 80	
ctc	tac	aac	ctc	aac	tcc	aag	tac	ggc	agc	ggg	gcc	gac	ctc	aag	tcg	288
Leu	Tyr	Asn	Leu	Asn 85	Ser	Lys	Tyr	Gly	Ser 90	Gly	Ala	Asp	Leu	Lys 95	Ser	
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Leu	Ile	Gln	Ala 100	Phe	Arg	Gly	Lys	Asn 105	Ile	Ser	Cys	Val	Ala 110	Asp	Ile	
gtc	atc	aac	cac	cgc	tgc	gcc	gac	aag	aag	gac	ggc	cgc	ggc	gtc	tac	384
Val	Ile	Asn 115	His	Arg	Cys	Ala	Asp 120	Lys	Lys	Asp	Gly	Arg 125	Gly	Val	Tyr	
tgc	atc	ttc	gag	ggc	ggg	acg	tcc	gac	aac	cgc	ctc	gac	tgg	ggc	ccc	432
Cys	Ile 130	Phe	Glu	Gly	Gly	Thr 135	Ser	Asp	Asn	Arg	Leu 140	Asp	Trp	Gly	Pro	
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Arg	Asp	Thr	Gly 165	Gly	Gly	Phe	Asp	Ala	Ala 170	Pro	Asp	Ile	Asp	His 175	Leu	
aac	ccg	cgg	gtc	cag	agg	gag	ctc	tcc	gcc	tgg	ctc	aac	tgg	ctc	aaa	576
Asn	Pro	Arg	Val 180	Gln	Arg	Glu	Leu	Ser 185	Ala	Trp	Leu	Asn 190	Trp	Leu	Lys	
acc	gac	ctc	ggc	ttc	gac	gga	tgg	cgc	ctc	gac	ttc	gcc	aag	gga	tac	624
Thr	Asp	Leu 195	Gly	Phe	Asp	Gly	Trp 200	Arg	Leu	Asp	Phe	Ala 205	Lys	Gly	Tyr	
tcc	gcg	gcc	atg	gcc	aag	atc	tac	gtc	gac	aac	agc	aag	ccg	gcg	ttc	672
Ser	Ala 210	Ala	Met	Ala	Lys	Ile 215	Tyr	Val	Asp	Asn	Ser 220	Lys	Pro	Ala	Phe	
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Val 225	Val	Gly	Glu	Leu	Tyr 230	Asp	Arg	Asp	Arg	Gln 235	Leu	Leu	Ala	Asn 240	Trp	
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Val	Arg	Gly	Val 245	Gly	Gly	Pro	Ala	Thr	Ala 250	Phe	Asp	Phe	Pro	Thr 255	Lys	
ggc	gtt	ctc	cag	gag	gcc	gtc	cag	ggc	gat	ctg	ggg	agg	atg	cgc	ggc	816
Gly	Val	Leu 260	Gln	Glu	Ala	Val	Gln	Gly 265	Asp	Leu	Gly	Arg	Met 270	Arg	Gly	
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Ser	Asp 275	Gly	Lys	Ala	Pro	Gly	Met 280	Ile	Gly	Trp	Met 285	Pro	Glu	Lys	Thr	
gtc	acg	ttc	atc	gac	aac	cac	gac	act	ggg	tcg	acg	cag	agg	ctg	tgg	912
Val 290	Thr	Phe	Ile	Asp	Asn	His 295	Asp	Thr	Gly	Ser	Thr 300	Gln	Arg	Leu	Trp	
cca	ttc	ccc	tcg	gac	aag	gtc	atg	cag	ggc	tac	gcc	tac	atc	ctc	aca	960
Pro 305	Phe	Pro	Ser	Asp	Lys 310	Val	Met	Gln	Gly	Tyr 315	Ala	Tyr	Ile	Leu	Thr 320	
cac	ccg	ggc	ata	cca	tgc	atc	ttc	tac	gac	cat	gtg	ttc	gac	tgg	aaa	1008
His	Pro	Gly	Ile 325	Pro	Cys	Ile	Phe	Tyr	Asp 330	His	Val	Phe	Asp	Trp 335	Lys	
ctg	aag	cag	gag	atc	acc	gca	ctg	gct	acg	gtc	agg	tca	agg	aac	ggg	1056
Leu	Lys	Gln 340	Glu	Ile	Thr	Ala	Leu	Ala 345	Thr	Val	Arg	Ser	Arg 350	Asn	Gly	
atc	cat	ccg	ggt	agc	aca	ctg	gat	atc	ctc	aaa	gcc	gag	ggc	gat	ctc	1104
Ile	His 355	Pro	Gly	Ser	Thr	Leu	Asp 360	Ile	Leu	Lys	Ala 365	Glu	Gly	Asp	Leu	
tat	gtt	gcc	aag	att	ggg	ggc	aag	gtt	ata	acc	aag	atc	ggg	tca	aga	1152

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Tyr	Val	Ala	Lys	Ile	Gly	Gly	Lys	Val	Ile	Thr	Lys	Ile	Gly	Ser	Arg		
370						375					380						
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Tyr	Asn	Ile	Gly	Asp	Asn	Val	Ile	Pro	Ser	Gly	Phe	Lys	Ile	Ala	Ala		
385					390					395					400		
aaa	ggc	aac	aac	tat	tgt	gtc	tgg	gag	aag	agc	ggc	ctc	tga				1242
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<211> 413

<212> PRT

<213> Triticum aestivum

<400> 410

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			20					25					30				
Asn	Trp	Glu	Ser	Trp	Lys	Thr	Gln	Gly	Gly	Trp	Tyr	Lys	Phe	Met	Gln		
		35					40					45					
Gly	Lys	Val	Glu	Glu	Ile	Ala	Ser	Thr	Gly	Ala	Thr	His	Val	Trp	Leu		
	50					55					60						
Pro	Pro	Pro	Ser	Gln	Ser	Val	Ser	Pro	Glu	Gly	Tyr	Leu	Pro	Gly	Gln		
65				70					75						80		
Leu	Tyr	Asn	Leu	Asn	Ser	Lys	Tyr	Gly	Ser	Gly	Ala	Asp	Leu	Lys	Ser		
				85					90					95			
Leu	Ile	Gln	Ala	Phe	Arg	Gly	Lys	Asn	Ile	Ser	Cys	Val	Ala	Asp	Ile		
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Val	Ile	Asn	His	Arg	Cys	Ala	Asp	Lys	Lys	Asp	Gly	Arg	Gly	Val	Tyr		
		115					120					125					
Cys	Ile	Phe	Glu	Gly	Gly	Thr	Ser	Asp	Asn	Arg	Leu	Asp	Trp	Gly	Pro		
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Asp	Glu	Ile	Cys	Ser	Asp	Asp	Thr	Lys	Tyr	Ser	Asn	Gly	Arg	Gly	His		
145					150					155					160		
Arg	Asp	Thr	Gly	Gly	Gly	Phe	Asp	Ala	Ala	Pro	Asp	Ile	Asp	His	Leu		
			165						170					175			
Asn	Pro	Arg	Val	Gln	Arg	Glu	Leu	Ser	Ala	Trp	Leu	Asn	Trp	Leu	Lys		
			180					185					190				
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gat atg aaa gag gta aca ctt gtt tac gga gac act tat gaa ttt gat      144
Asp Met Lys Glu Val Thr Leu Val Tyr Gly Asp Thr Tyr Glu Phe Asp
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Asp Asn Lys Trp Thr Tyr Ser Thr Ala His Met Lys Lys Thr Gly Ser
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Arg Leu Arg Tyr Gly Phe Ile Val Asn Asp Arg Lys Asp Ser Thr Cys
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ttt act gaa aaa ggg ttt tac ccg gag gcc cca gta aat gac att tcc      336
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Tyr Tyr Phe Ser Phe Pro Tyr Val Asn Gln Ala Asp Ile Phe Gln Ala
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ccc gaa tgg gta aag gac acc gtc tgg tat caa att ttc cct gaa cgc      432
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gga gtc att gaa cat att gac tat ctc aaa gaa ttg ggc att ggc ggt      576
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ata tac ttt acc cct ata ttt aag gca cac tcc aac cat aaa tac gat      624
Ile Tyr Phe Thr Pro Ile Phe Lys Ala His Ser Asn His Lys Tyr Asp
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Phe Gly Phe Thr Ser Ser Met Pro Lys Phe Lys Thr Glu Asn Pro Glu
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Leu ²²⁵	Lys	Lys	Leu	Ile	Asp ²³⁰	Val	Cys	His	Lys	Asn ²³⁵	Gly	Ile	Lys	Val	Met ²⁴⁰
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Ile	Arg	Glu ²⁷⁵	Phe	Pro	Leu	Val	Met ²⁸⁰	Glu	Pro	Arg	Pro	Asn ²⁸⁵	Tyr	Asp	Thr
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          20          25          30
gct cca aca gca gat aaa aac ggt gtc ttt tat gag gta tat gta aac      144
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          50          55          60
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gat ctt caa gta aac ggg att tgg atg atg ccg gtc aac cct tct cct      288
Asp Leu Gln Val Asn Gly Ile Trp Met Met Pro Val Asn Pro Ser Pro
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Ser Tyr His Lys Tyr Asp Val Thr Asp Tyr Tyr Asn Ile Asp Pro Gln
          100          105          110
tat gga aat ctg caa gat ttt cgc aaa ctt atg aaa gaa gca gat aaa      384
Tyr Gly Asn Leu Gln Asp Phe Arg Lys Leu Met Lys Glu Ala Asp Lys
          115          120          125
cga gac gta aaa gtc att atg gac ctt gtt gtg aat cat acg agc agt      432
Arg Asp Val Lys Val Ile Met Asp Leu Val Val Asn His Thr Ser Ser
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gaa cac cct tgg ttt caa gct gcg ttg aaa gat aaa aac agc aag tac      480
Glu His Pro Trp Phe Gln Ala Leu Lys Asp Lys Asn Ser Lys Tyr
          145          150          155          160
aga gat tac tat att tgg gct gat aaa aat act gac ttg aat gaa aaa      528
Arg Asp Tyr Tyr Ile Trp Ala Asp Lys Asn Thr Asp Leu Asn Glu Lys
          165          170          175
gga tct tgg gga gaa caa gta tgg cat aaa gct cca aac gga gag tat      576
Gly Ser Trp Gly Gln Gln Val Trp His Lys Ala Pro Asn Gly Glu Tyr
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ttt tac gga acg ttc tgg gaa gga atg cct gac tta aat tac gat aac      624
Phe Tyr Gly Thr Phe Trp Glu Gly Met Pro Asp Leu Asn Tyr Asp Asn
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cct gaa gta aga aaa gaa atg att aac gtc gga aag ttt tgg cta aaa      672
Pro Glu Val Arg Lys Glu Met Ile Asn Val Gly Lys Phe Trp Leu Lys
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caa ggc gtt gac ggc ttc cgc tta gat gct gcc ctt cat att ttt aaa      720
Gln Gly Val Asp Gly Phe Arg Leu Asp Ala Ala Leu His Ile Phe Lys
          225          230          235          240
ggt caa acg cct gaa ggc gct aag aaa aac att cta tgg tgg aat gag      768
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ttt aga gat gcg atg aaa aaa gaa aac ccg aac gta tat cta acg ggt      816
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Arg	Asp	Tyr	Tyr	Ile 165	Trp	Ala	Asp	Lys	Asn 170	Thr	Asp	Leu	Asn	Glu 175	Lys
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260      265      270
Glu Val Trp Asp Gln Pro Glu Val Val Ala Pro Tyr Tyr Gln Ser Leu
275      280      285
Asp Ser Leu Phe Asn Phe Asp Leu Ala Gly Lys Ile Val Ser Ser Val
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Lys Ala Gly Asn Asp Gln Gly Ile Ala Thr Ala Ala Ala Thr Asp
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Glu Leu Phe Lys Ser Tyr Asn Pro Asn Lys Ile Asp Gly Ile Phe Leu
325      330      335
Thr Asn His Asp Gln Asn Arg Val Met Ser Glu Leu Ser Gly Asp Val
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Asn Lys Ala Lys Ser Ala Ala Ser Ile Leu Leu Thr Leu Pro Gly Asn
355      360      365
Pro Tyr Ile Tyr Tyr Gly Glu Glu Ile Gly Met Thr Gly Glu Lys Pro
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Asp Glu Leu Ile Arg Glu Pro Phe Arg Trp Tyr Glu Gly Asn Gly Ile
385      390      395
Gly Gln Thr Ser Trp Glu Thr Pro Val Tyr Asn Lys Gly Gly Asn Gly
405      410      415
Val Ser Val Glu Ala Gln Thr Lys Gln Lys Asp Ser Leu Leu Asn His
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Tyr Arg Glu Met Ile Arg Val Arg Gln Gln His Glu Glu Leu Val Lys
435      440      445
Gly Thr Leu Gln Ser Ile Ser Val Asp Ser Lys Glu Val Val Ala Tyr
450      455      460
Ser Arg Thr Tyr Lys Gly Lys Ser Ile Ser Val Tyr His Asn Ile Ser
465      470      475
Asn Gln Pro Val Lys Val Ser Val Ala Ala Lys Gly Asn Leu Ile Phe
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ttt aca gca gta ttt ggc tca atg cct atg gaa ttt gca aag gct gag      96
Phe Thr Ala Val Phe Gly Ser Met Pro Met Glu Phe Ala Lys Ala Glu
20      25      30
aca gat aca gcg cca gcg ata gcc aat gtt gtt ggc aat ttt caa tcc      144
Thr Asp Thr Ala Pro Ala Ile Ala Asn Val Val Gly Asn Phe Gln Ser
35      40      45
aaa ctt gga gat tct gac tgg aat ata aac agt gac aaa acg ata atg      192
Lys Leu Gly Asp Ser Asp Trp Asn Ile Asn Ser Asp Lys Thr Ile Met
50      55      60
aca tat aaa ggt aat ggc ttt tat gaa ttt act acc cca gtt gcg tta      240
Thr Tyr Lys Gly Asn Gly Phe Tyr Glu Phe Thr Thr Pro Val Ala Leu
65      70      75
cct gca ggt gat tat gag tat aaa gtt gct ctt aat cat tca tgg gaa      288

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gat Asp	tct Ser	gta Val ¹¹⁵	gtg Val	act Thr	ttt Phe	tat Tyr	tac Tyr ¹²⁰	aat Asn	tac Tyr	aac Asn	act Thr	tca Ser ¹²⁵	agt Ser	att Ile	acc Thr	384
gat Asp	tcc Ser ¹³⁰	aca Thr	aaa Lys	tat Tyr	aca Thr	cca Pro ¹³⁵	att Ile	ccc Pro	gaa Glu	gac Asp	aag Lys ¹⁴⁰	ctt Leu	cca Pro	aga Arg	ctt Leu	432
gta Val ¹⁴⁵	ggg Gly	act Thr	ata Ile	cag Gln	cct Pro ¹⁵⁰	gca Ala	ata Ile	gga Gly	gca Ala ¹⁵⁵	ggt Gly	gat Asp	gat Asp	tgg Trp	aaa Lys	cct Pro ¹⁶⁰	480
gaa Glu	aca Thr	tcg Ser	act Thr	gct Ala ¹⁶⁵	ata Ile	atg Met	aga Arg	gac Asp	tat Tyr ¹⁷⁰	aag Lys	ttt Phe	aat Asn	aat Asn	ggt Val ¹⁷⁵	tac Tyr	528
gaa Glu	tac Tyr	act Thr	gca Ala ¹⁸⁰	aat Asn	gtt Val	cca Pro	aaa Lys	ggg Gly ¹⁸⁵	aat Asn	tat Tyr	gag Glu	ttt Phe ¹⁹⁰	aaa Lys	gtg Val	act Thr	576
tta Leu	ggg Gly ¹⁹⁵	ccc Pro	tca Ser	tgg Trp	gat Asp	ata Ile	aat Asn ²⁰⁰	tat Tyr	ggc Gly	tta Leu	aat Asn	ggt Gly ²⁰⁵	gaa Glu	caa Gln	aat Asn	624
ggg Gly ²¹⁰	cca Pro	aat Asn	att Ile	cct Pro	ttg Leu	aat Asn ²¹⁵	gta Val	gcc Ala	tat Tyr	gat Asp	act Thr ²²⁰	aag Lys	att Ile	aca Thr	ttt Phe	672
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acc Thr	cat His	gac Asp	cca Pro ²⁶⁰	ttc Phe	ttc Phe	cgc Arg	tcg Ser	cct Pro ²⁶⁵	ttc Phe	ggt Gly	gca Ala	ata Ile ²⁷⁰	aaa Lys	acg Thr	gga Gly	816
gat Asp	act Thr	gtg Val ²⁷⁵	aca Thr	tta Leu	aga Arg	ata Ile	caa Gln ²⁸⁰	gca Ala	aaa Lys	aat Asn	cat His	gac Asp ²⁸⁵	att Ile	gag Glu	tca Ser	864
gct Ala	aaa Lys ²⁹⁰	att Ile	tct Ser	tat Tyr	tgg Trp	gat Asp ²⁹⁵	gat Asp	att Ile	aaa Lys	aaa Lys	aca Thr ³⁰⁰	aga Arg	ata Ile	gaa Glu	gtc Val	912
cct Pro ³⁰⁵	atg Met	tac Tyr	aga Arg	att Ile	ggt Gly ³¹⁰	caa Gln	agt Ser	cct Pro	gac Asp ³¹⁵	ggg Gly	aaa Lys	tat Tyr	gaa Glu	tac Tyr	tgg Trp ³²⁰	960
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ata Ile	ctt Leu	aaa Lys	gac Asp ³⁴⁰	ggg Gly	acc Thr	aaa Lys	act Thr	gct Ala ³⁴⁵	tat Tyr	tac Tyr	gga Gly	gat Asp ³⁵⁰	aac Asn	gat Asp	gaa Glu	1056
caa Gln	tta Leu	ggt Gly ³⁵⁵	ggc Gly	gta Val	ggt Gly	aaa Lys	gcc Ala ³⁶⁰	aca Thr	gat Asp	aca Thr	gaa Glu	aat Asn ³⁶⁵	aag Lys	gac Asp	ttc Phe	1104
gaa Glu	ctt Leu ³⁷⁰	act Thr	gtc Val	tac Tyr	gat Asp	aaa Lys ³⁷⁵	aac Asn	tta Leu	gac Asp	acc Thr	cct Pro ³⁸⁰	gat Asp	tgg Trp	atg Met	aaa Lys	1152
ggg Gly ³⁸⁵	tca Ser	gta Val	atg Met	tat Tyr	caa Gln ³⁹⁰	ata Ile	ttc Phe	cct Pro	gat Asp ³⁹⁵	agg Arg	ttt Phe	aat Asn	ggg Gly	gat Asp ⁴⁰⁰		1200
tct Ser	tca Ser	aat Asn	gac Asp	cat His ⁴⁰⁵	cta Leu	aag Lys	aaa Lys	tac Tyr ⁴¹⁰	agc Ser	aga Arg	ggt Gly	ttt Phe	gat Asp ⁴¹⁵	cct Pro	gtt Val	1248
gaa Glu	tat Tyr	cat His ⁴²⁰	agc Ser	aac Asn	tgg Trp	tac Tyr	gag Glu ⁴²⁵	ctt Leu	cca Pro	gat Asp	aat Asn	ccg Pro ⁴³⁰	aat Asn	gat Asp	aaa Lys	1296
aat Asn	aaa Lys ⁴³⁵	cta Leu	gga Gly	tat Tyr	aca Thr	ggg Gly	gat Asp ⁴⁴⁰	ggc Gly	ata Ile	tgg Trp	tca Ser	aat Asn ⁴⁴⁵	gac Asp	ttc Phe	ttt Phe	1344
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Tyr Tyr Lys Val Val Ala Val Asp Thr Ser Tyr Asn Arg Thr Ala Ser
1235      1240      1245
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aaa gct ggt tct aac acc tat agt att aca ctt act tta aat gag ggt
Lys Ala Gly Ser Asn Thr Tyr Ser Ile Thr Leu Thr Leu Asn Glu Gly
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Thr Gln Ile Glu Tyr Lys Tyr Ala Arg Gly Ser Trp Asp Lys Val Glu
1315      1320      1325
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aga gat gtg cca ata tat atc tat tct cca aaa gac aag act att gtt
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Asp Ala Asn Thr Ser Glu Ile Glu Ile Lys Gly Asn Thr Tyr Lys Gly
1380      1385      1390
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Ala Lys Val Thr Ile Asn Asp Glu Ser Phe Val Gln Gln Glu Asn Gly
1395      1400      1405
gta ttt aca aaa gta gtt ccc ttg gaa tat ggt gta aat act atc aaa
Val Phe Thr Lys Val Val Pro Leu Glu Tyr Gly Val Asn Thr Ile Lys
1410      1415      1420
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Ile His Val Glu Pro Ser Gly Asp Lys Asn Asn Glu Leu Thr Lys Asp
1425      1430      1435
ata aca ata act gtt aca aga gag aag ccg gcc agg aga cag aac cta
Ile Thr Ile Thr Val Thr Arg Glu Lys Pro Ala Arg Arg Gln Asn Leu
1445      1450      1455
ctc cta ctc cac caa cag aaa caa caa aac cat ctc aag aag tat cac
Leu Leu Leu His Gln Gln Lys Gln Gln Asn His Leu Lys Lys Tyr His
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1475

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<210> 418

<211> 591

<212> PRT

<213> Bacillus sphaericus

<400> 418

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Asp	Asn	Val	Pro	Arg	Ile	Asp	Leu	His	Cys	Gly	Glu	Lys	Tyr	Asp	Pro	
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Glu	Lys	Tyr	Lys	Glu	Thr	Ile	Pro	Met	Glu	Arg	Met	Ala	Ser	Asp	Gly	
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Leu	Phe	Asp	Tyr	Trp	Gln	Ala	Ala	Val	Gln	Pro	Arg	Tyr	Arg	Arg	Leu	
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Val	Tyr	Tyr	Phe	Ala	Leu	His	Ser	Asp	Asn	Gly	Asp	Ala	Val	Tyr	Phe	
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Met	Glu	Lys	Gly	Phe	Phe	Asp	Gln	Pro	Pro	Lys	Val	Met	Tyr	Glu	Gly	
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Ala	Trp	Val	Lys	Glu	Ala	Ile	Phe	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	Phe	
	130					135					140					
Ala	Asn	Gly	Asp	Pro	Ser	Asn	Asp	Pro	Glu	Gly	Val	Gln	Glu	Trp	Gly	
145					150					155					160	
Gly	Thr	Pro	Ser	Ala	Gly	Asn	Phe	Phe	Gly	Gly	Asp	Leu	Gln	Gly	Val	
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Ile	Asp	His	Leu	Asp	Tyr	Leu	Ser	Asp	Leu	Gly	Val	Asn	Ala	Leu	Tyr	
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Phe	Asn	Pro	Leu	Phe	Ala	Ala	Thr	Asn	His	Lys	Tyr	Asp	Thr	Ala		
		195					200					205				
Asp	Tyr	Met	Lys	Ile	Asp	Pro	Gln	Phe	Gly	Thr	Asn	Glu	Lys	Leu	Lys	
	210					215					220					
Glu	Leu	Val	Asp	Ala	Cys	His	Ala	Arg	Gly	Met	Arg	Val	Leu	Leu	Asp	
225					230					235					240	
Ala	Val	Phe	Asn	His	Cys	Gly	His	Thr	Phe	Pro	Pro	Phe	Val	Asp	Val	
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Leu Asn Asn Gly Leu Asn Ser Arg Tyr Ala Asp Trp Phe His Val Arg
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 Glu Trp Pro Leu Arg Val Val Asp Gly Ile Pro Thr Tyr Asp Thr Phe
 275 280 285
 Ala Phe Glu Pro Ile Met Pro Lys Leu Asn Thr Gly Asn Glu Glu Val
 290 295 300
 Lys Ala Tyr Leu Leu Asn Val Gly Arg Tyr Trp Leu Glu Glu Met Gly
 305 310 315 320
 Leu Asp Gly Trp Arg Leu Asp Val Ala Asn Glu Val Asp His Gln Phe
 325 330 335
 Trp Arg Glu Phe Arg Ser Glu Ile Lys Arg Ile Asn Pro Ser Ala Tyr
 340 345 350
 Ile Leu Gly Glu Ile Met His Asp Ser Met Pro Trp Leu Gln Gly Asp
 355 360 365
 Gln Phe Asp Ala Val Met Asn Tyr Pro Phe Thr Asn Ile Leu Leu Asn
 370 375 380
 Phe Phe Ala Arg Arg Leu Thr Asn Ala Ala Glu Phe Ala Gln Ala Ile
 385 390 395 400
 Gly Thr Gln Leu Ala Gly Tyr Pro Gln Gln Val Thr Glu Val Ser Phe
 405 410 415
 Asn Leu Leu Gly Ser His Asp Thr Thr Arg Leu Leu Thr Leu Cys Ser
 420 425 430
 Gly Asn Val Glu Arg Met Lys Leu Ala Thr Leu Phe Gln Leu Thr Tyr
 435 440 445
 Gln Gly Thr Pro Cys Ile Tyr Tyr Gly Asp Glu Ile Gly Met Asp Gly
 450 455 460
 Glu Tyr Asp Pro Leu Asn Arg Lys Cys Met Glu Trp Asp Lys Ser Lys
 465 470 475 480
 Gln Asn Thr Glu Leu Ala Phe Phe Arg Ser Met Ile Ser Leu Arg
 485 490 495
 Lys Ala His Pro Ala Leu Arg Gly Ser Gly Leu Arg Phe Leu Pro Val
 500 505 510
 Leu Glu His Pro Gln Leu Leu Val Tyr Glu Arg Trp Asp Asp Asn Glu
 515 520 525
 Arg Phe Leu Ile Met Leu Asn Asn Glu Asp Ala Pro Val Asn Val Val
 530 535 540
 Ile Pro Ala Ala Gln Pro Gly Ala Ser Trp Arg Thr Val Asn Gly Glu
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 Pro Cys Ala Val Val Glu Glu Ser Ser Ile Gln Ala Ala Leu Pro Pro
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<210> 419

<211> 1725

<212> DNA

<213> Thermoanaerobacter ethanolicus

<220>

<221> CDS

<222> (1)..(1725)

<223> transl_table=11

<400> 419

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Pro	Leu	Asn	Glu	Asn	Gln	Leu	Lys	Ile	Val	Leu	Arg	Thr	Ala	Val	Phe	
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gat	gta	gat	agg	gtg	tat	gtt	tta	tac	aaa	gac	aga	tac	gat	tgg	ctg	144
Asp	Val	Asp	Arg	Val	Tyr	Val	Leu	Tyr	Lys	Asp	Arg	Tyr	Asp	Trp	Leu	
			35				40					45				
gga	aaa	ttc	aaa	ata	aaa	cca	atg	gta	tta	act	cat	acc	aac	gag	tta	192
Gly	Lys	Phe	Lys	Ile	Lys	Pro	Met	Val	Leu	Thr	His	Thr	Asn	Glu	Leu	
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Phe	Asp	Tyr	Tyr	Glu	Thr	Thr	Leu	Glu	Leu	Asn	Lys	Lys	Phe	Val	Tyr	
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Phe	Phe	Tyr	Leu	Val	Ser	Asp	Gly	Gly	Glu	Lys	Leu	Tyr	Tyr	Thr	Glu	
				85					90					95		
gca	gga	ttt	tac	aaa	aaa	agg	cca	gaa	aat	cat	ttt	tgg	gga	ttt	ttc	336
Ala	Gly	Phe	Tyr	Lys	Lys	Arg	Pro	Glu	Asn	His	Phe	Trp	Gly	Phe	Phe	
			100					105					110			
cat	tac	ccg	tat	ata	gga	gaa	aag	gat	gtc	ttt	ttt	gct	cca	gag	tgg	384
His	Tyr	Pro	Tyr	Ile	Gly	Glu	Lys	Asp	Val	Phe	Phe	Ala	Pro	Glu	Trp	
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Thr	Ser	Asp	Cys	Met	Val	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	Phe	Asn	Asn	
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Gly	Asp	Lys	Ser	Asn	Asp	Pro	Glu	Asn	Val	Lys	Pro	Trp	Gly	Glu	Lys	
145					150					155					160	
cct	act	gca	gat	tct	ttc	ttt	gga	gga	gat	ttg	caa	gga	ata	ata	gat	528
Pro	Thr	Ala	Asp	Ser	Phe	Phe	Gly	Gly	Asp	Leu	Gln	Gly	Ile	Ile	Asp	
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aaa	ata	gat	tat	tta	aag	gat	ttg	ggt	ata	aat	gcc	att	tat	tta	acc	576
Lys	Ile	Asp	Tyr	Leu	Lys	Asp	Leu	Gly	Ile	Asn	Ala	Ile	Tyr	Leu	Thr	
			180					185					190			
ccc	ata	ttt	tta	tcg	cat	tcc	acc	cac	aaa	tat	gat	act	act	gat	tat	624
Pro	Ile	Phe	Leu	Ser	His	Ser	Thr	His	Lys	Tyr	Asp	Thr	Thr	Asp	Tyr	
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Tyr	Thr	Ile	Asp	Pro	His	Phe	Gly	Asp	Thr	Gln	Lys	Ala	Arg	Glu	Leu	
	210					215					220					
gtg	caa	aaa	tgt	cat	gac	aat	ggc	ata	aaa	ggt	ata	ttt	gat	gcc	gtt	720
Val	Gln	Lys	Cys	His	Asp	Asn	Gly	Ile	Lys	Val	Ile	Phe	Asp	Ala	Val	
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Phe	Asn	His	Cys	Gly	Tyr	Asp	Phe	Phe	Ala	Phe	Gln	Asp	Val	Ile	Lys	
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aat	ggt	aaa	aaa	tca	aaa	tac	tgg	gat	tgg	ttt	aat	ata	tac	gaa	tgg	816
Asn	Gly	Lys	Lys	Ser	Lys	Tyr	Trp	Asp	Trp	Phe	Asn	Ile	Tyr	Glu	Trp	
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cca	att	aaa	act	cat	gga	aaa	cct	tcc	tat	gaa	gct	ttt	gca	gat	act	864
Pro	Ile	Lys	Thr	His	Gly	Lys	Pro	Ser	Tyr	Glu	Ala	Phe	Ala	Asp	Thr	
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gta	tgg	aga	atg	cca	aaa	ctt	atg	aca	aaa	aat	cca	gaa	gta	cag	aag	912
Val	Trp	Arg	Met	Pro	Lys	Leu	Met	Thr	Lys	Asn	Pro	Glu	Val	Gln	Lys	
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Gly	Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Ile	Asp	His	His	Phe	Trp	Arg	
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aag	ttt	aga	gaa	ggt	gta	aag	gca	gct	aaa	ccg	gag	gcc	ata	att	gta	1056
Lys	Phe	Arg	Glu	Val	Val	Lys	Ala	Ala	Lys	Pro	Glu	Ala	Ile	Ile	Val	
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Gly	Glu	Val	Trp	His	Asp	Ala	Ser	Pro	Trp	Leu	Arg	Gly	Asp	Gln	Phe	
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gac	agt	gta	atg	aac	tat	cct	ttt	aga	aat	gcg	ggt	gtg	gac	ttt	ttt	1152
Asp	Ser	Val	Met	Asn	Tyr	Pro	Phe	Arg	Asn	Ala	Val	Val	Asp	Phe	Phe	
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gca	aaa	agg	aaa	ata	agt	gct	tct	cgc	ttt	aat	aca	atg	att	aca	gag	1200
Ala	Lys	Arg	Lys	Ile	Ser	Ala	Ser	Arg	Phe	Asn	Thr	Met	Ile	Thr	Glu	
385					390					395					400	
caa	ctt	atg	agg	cat	atg	gat	agt	gta	aat	agg	ggt	atg	ttt	aat	tta	1248
Gln	Leu	Met	Arg	His	Met	Asp	Ser	Val	Asn	Arg	Val	Met	Phe	Asn	Leu	
				405					410					415		
ata	gga	agt	cat	gat	act	gag	agg	ttt	ttg	act	tta	gct	aat	ggc	atg	1296
Ile	Gly	Ser	His	Asp	Thr	Glu	Arg	Phe	Leu	Thr	Leu	Ala	Asn	Gly	Met	
			420					425					430			
gtt	gcg	aga	atg	aag	tta	gca	tta	gtg	ttt	caa	ttt	acc	ttt	gtt	gga	1344
Val	Ala	Arg	Met	Lys	Leu	Ala	Leu	Val	Phe	Gln	Phe	Thr	Phe	Val	Gly	
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gac	cct	gat	tgc	aga	aga	tgc	atg	ata	tgg	gag	gag	gaa	aag	caa	aat	1440
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Lys	Ser	Ile	Phe	Asn	Phe	Tyr	Lys	Lys	Leu	Ile	Ser	Ile	Arg	Arg	Glu	
				485					490					495		
aat	gag	gag	ctc	aaa	tac	gga	agt	ttc	tgt	act	tta	tat	gct	ata	gga	1536
Asn	Glu	Glu	Leu	Lys	Tyr	Gly	Ser	Phe	Cys	Thr	Leu	Tyr	Ala	Ile	Gly	
			500					505					510			
aga	gtg	ttt	gct	ttt	aag	agg	gaa	tac	aaa	ggg	aaa	tca	ata	att	gtt	1584
Arg	Val	Phe	Ala	Phe	Lys	Arg	Glu	Tyr	Lys	Gly	Lys	Ser	Ile	Ile	Val	
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gta	cta	aat	aac	agt	agc	aag	cag	gaa	gtg	ata	ttt	ttg	aat	gaa	gta	1632
Val	Leu	Asn	Asn	Ser	Ser	Lys	Gln	Glu	Val	Ile	Phe	Leu	Asn	Glu	Val	
	530					535					540					
gaa	gga	aaa	gaa	gat	att	tta	aag	atg	aag	gaa	tta	aaa	aga	agt	gga	1680
Glu	Gly	Lys	Glu	Asp	Ile	Leu	Lys	Met	Lys	Glu	Leu	Lys	Arg	Ser	Gly	
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aat	ctc	ctt	tac	ttg	caa	cct	aac	tct	gcc	tat	att	tta	aag	taa		1725
Asn	Leu	Leu	Tyr	Leu	Gln	Pro	Asn	Ser	Ala	Tyr	Ile	Leu	Lys			
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<210> 420

<211> 574

<212> PRT

<213> Thermoanaerobacter ethanolicus

<400> 420

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Asp	Val	Asp	Arg	Val	Tyr	Val	Leu	Tyr	Lys	Asp	Arg	Tyr	Asp	Trp	Leu	
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Gly	Lys	Phe	Lys	Ile	Lys	Pro	Met	Val	Leu	Thr	His	Thr	Asn	Glu	Leu	
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Phe	Asp	Tyr	Tyr	Glu	Thr	Leu	Glu	Leu	Asn	Lys	Lys	Phe	Val	Tyr		
65				70					75					80		
Phe	Phe	Tyr	Leu	Val	Ser	Asp	Gly	Gly	Glu	Lys	Leu	Tyr	Tyr	Thr	Glu	
			85						90					95		
Ala	Gly	Phe	Tyr	Lys	Lys	Arg	Pro	Glu	Asn	His	Phe	Trp	Gly	Phe	Phe	
		100						105					110			
His	Tyr	Pro	Tyr	Ile	Gly	Glu	Lys	Asp	Val	Phe	Phe	Ala	Pro	Glu	Trp	
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Thr	Ser	Asp	Cys	Met	Val	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	Phe	Asn	Asn	
	130					135					140					
Gly	Asp	Lys	Ser	Asn	Asp	Pro	Glu	Asn	Val	Lys	Pro	Trp	Gly	Glu	Lys	
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Pro	Thr	Ala	Asp	Ser	Phe	Phe	Gly	Gly	Asp	Leu	Gln	Gly	Ile	Ile	Asp	
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Lys	Ile	Asp	Tyr	Leu	Lys	Asp	Leu	Gly	Ile	Asn	Ala	Ile	Tyr	Leu	Thr	
		180						185					190			
Pro	Ile	Phe	Leu	Ser	His	Ser	Thr	His	Lys	Tyr	Asp	Thr	Thr	Asp	Tyr	
		195					200					205				
Tyr	Thr	Ile	Asp	Pro	His	Phe	Gly	Asp	Thr	Gln	Lys	Ala	Arg	Glu	Leu	
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Val	Gln	Lys	Cys	His	Asp	Asn	Gly	Ile	Lys	Val	Ile	Phe	Asp	Ala	Val	
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Phe	Asn	His	Cys	Gly	Tyr	Asp	Phe	Phe	Ala	Phe	Gln	Asp	Val	Ile	Lys	
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Asn	Gly	Lys	Lys	Ser	Lys	Tyr	Trp	Asp	Trp	Phe	Asn	Ile	Tyr	Glu	Trp	
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Pro	Ile	Lys	Thr	His	Gly	Lys	Pro	Ser	Tyr	Glu	Ala	Phe	Ala	Asp	Thr	
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Val	Trp	Arg	Met	Pro	Lys	Leu	Met	Thr	Lys	Asn	Pro	Glu	Val	Gln	Lys	
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 Lys 340 Phe 340 Arg 340 Glu 340 Val 340 Val 340 Lys 340 Ala 345 Ala 345 Lys 345 Pro 345 Glu 345 Ala 350 Ile 350 Ile 350 Val 350
 Gly 355 Glu 355 Val 355 Trp 355 His 355 Asp 355 Ala 355 Ser 360 Pro 360 Trp 360 Leu 360 Arg 365 Gly 365 Asp 365 Gln 365 Phe 365
 Asp 370 Ser 370 Val 370 Met 370 Asn 370 Tyr 375 Pro 375 Phe 375 Arg 375 Asn 375 Ala 380 Val 380 Val 380 Asp 380 Phe 380 Phe 380
 Ala 385 Lys 385 Arg 385 Lys 385 Ile 385 Ser 390 Ala 390 Ser 390 Arg 390 Phe 395 Asn 395 Thr 395 Met 395 Ile 395 Thr 395 Glu 400
 Gln 405 Leu 405 Met 405 Arg 405 His 405 Met 405 Asp 405 Ser 410 Val 410 Asn 410 Arg 410 Val 410 Met 415 Phe 415 Asn 415 Leu 415
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 Val 435 Ala 435 Arg 435 Met 435 Lys 435 Leu 440 Ala 440 Leu 440 Val 440 Phe 445 Gln 445 Phe 445 Thr 445 Phe 445 Val 445 Gly 445
 Ile 450 Pro 450 Tyr 450 Ile 450 Tyr 450 Tyr 455 Gly 455 Asp 455 Glu 455 Val 455 Gly 460 Met 460 Val 460 Gly 460 Asp 460 Tyr 460
 Asp 465 Pro 465 Asp 465 Cys 465 Arg 470 Arg 470 Cys 470 Met 470 Ile 470 Trp 475 Glu 475 Glu 475 Glu 475 Lys 475 Gln 475 Asn 480
 Lys 485 Ser 485 Ile 485 Phe 485 Asn 485 Phe 485 Tyr 485 Lys 485 Lys 485 Leu 490 Ile 490 Ser 490 Ile 490 Arg 495 Arg 495 Glu 495
 Asn 495 Glu 495 Glu 495 Leu 500 Lys 495 Tyr 495 Gly 495 Ser 495 Phe 505 Cys 495 Thr 495 Leu 495 Tyr 495 Ala 510 Ile 495 Gly 495
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 Val 530 Leu 530 Asn 530 Asn 530 Ser 530 Ser 535 Lys 535 Gln 535 Glu 535 Val 535 Ile 535 Phe 540 Leu 535 Asn 535 Glu 535 Val 535
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<210> 421

<211> 1761

<212> DNA

<213> *Drosophila virilis*

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<222> (1)..(1761)

<400> 421

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gtg	gct	tcg	tca	gaa	tta	aaa	aag	cat	aag	cca	aac	gag	ttg	gac	gac	96
Val	Ala	Ser	Ser	Glu	Leu	Lys	Lys	His	Lys	Pro	Asn	Glu	Leu	Asp	Asp	
			20					25					30			
aat	att	aat	tgg	tgg	cga	cac	gag	gtc	ttt	tat	cag	att	tat	cct	agg	144
Asn	Ile	Asn	Trp	Trp	Arg	His	Glu	Val	Phe	Tyr	Gln	Ile	Tyr	Pro	Arg	
		35					40				45					
tcc	ttt	aag	gac	agc	gat	ggc	gat	ggc	att	ggc	gat	ctt	aag	ggc	atc	192
Ser	Phe	Lys	Asp	Ser	Asp	Gly	Asp	Gly	Ile	Gly	Asp	Leu	Lys	Gly	Ile	
	50					55			60							
acc	tcc	aag	ctg	cag	tac	ttt	gtg	gac	act	ggc	atc	acg	gcc	atc	tgg	240
Thr	Ser	Lys	Leu	Gln	Tyr	Phe	Val	Asp	Thr	Gly	Ile	Thr	Ala	Ile	Trp	
	65			70				75						80		
cta	agt	ccc	att	tac	aag	tca	ccc	atg	gtt	gac	ttt	ggg	tac	gat	ata	288
Leu	Ser	Pro	Ile	Tyr	Lys	Ser	Pro	Met	Val	Asp	Phe	Gly	Tyr	Asp	Ile	
			85					90						95		
tcc	gac	tac	agg	gac	atc	cag	ccg	gag	tat	ggc	acc	ctg	gag	gac	ttt	336
Ser	Asp	Tyr	Arg	Asp	Ile	Gln	Pro	Glu	Tyr	Gly	Thr	Leu	Glu	Asp	Phe	
			100					105				110				
gat	gcg	ctg	atc	gcc	aag	gcc	aat	caa	ctg	ggc	atc	aag	gtc	att	ttg	384
Asp	Ala	Leu	Ile	Ala	Lys	Ala	Asn	Gln	Leu	Gly	Ile	Lys	Val	Ile	Leu	
		115					120					125				

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tcc Ser 145	gct Ala	gct Ala	aga Arg	gag Glu	cct Pro 150	ggc Gly	tat Tyr	gag Glu	gat Asp	ttc Phe 155	tat Tyr	gtg Val	tgg Trp	gag Glu	gac Asp 160	480
ggc Gly	ata Ile	cct Pro	ggg Gly	gat Asp 165	aat Asn	gaa Glu	act Thr	cgc Arg	tta Leu 170	ccg Pro	cca Pro	aac Asn	aac Asn	tgg Trp 175	gta Val	528
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caa Gln 225	aag Lys	ggc Gly	gtg Val	gct Ala	ggc Gly 230	cgc Phe	atc Arg	gat Ile	gcc Ala 235	gtt Val	atc Ile	tat Tyr	ata Ile	tat Tyr 240		720
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ccg Pro	aac Asn	tca Ser	gtt Val 260	gat Asp	tat Tyr	ctg Leu	gag Glu	cac His 265	atc Ile	tac Tyr	aca Thr	agg Arg	aac Asn	ctg Leu	ccg Pro	816
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acg Thr 290	gcc Ala	gat Asp	aat Asn	ccg Pro	gga Gly	cca Pro 295	gtg Val	cgc Arg	att Ile	atg Met	atg Met 300	acc Thr	gag Glu	ggc Gly	tat Tyr	912
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cag Gln	ggc Gly	gcc Ala	cac His	ttt Phe 325	ccc Pro	ttt Phe	aat Asn	ttt Phe	gat Asp 330	ttt Phe	att Ile	acc Thr	gag Glu	ctg Leu 335	aat Asn	1008
gca Ala	aac Asn	tca Ser	gcg Ala 340	gct Ala	ccg Pro	gac Asp	ttt Phe	gta Val 345	tac Tyr	ttc Phe	att Ile	caa Gln 350	aga Arg	tgg Trp 350	ctg Leu	1056
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gat Asp	aat Asn 370	ccg Pro	cgc Arg	gtt Val	gca Ala	tct Ser 375	cgg Arg	tat Tyr	ggc Gly	gtt Val	ggc Gly 380	act Thr	gtg Val	gat Asp	gcc Ala	1152
atg Met 385	aac Asn	atg Met	ctg Leu	atg Met	atg Met 390	act Thr	ttg Leu	ccg Pro	ggc Gly	atc Ile 395	ggc Gly	att Ile	acc Thr	tac Tyr	tat Tyr 400	1200
ggc Gly	gag Glu	gaa Glu	ctc Leu	ggc Gly 405	atg Met	gta Val	gac Asp	tat Tyr	cgt Arg 410	gac Asp	att Ile	agc Ser	tgg Trp	aac Asn 415	gat Asp	1248
aca Thr	gtg Val	gat Asp	cag Gln 420	ccc Pro	gcc Ala	tgt Cys	gat Asp	gct Ala 425	ggt Gly	ctt Leu	gac Asp	aat Asn	tac Tyr 430	aag Lys	tgg Trp	1296
gtc Val	tct Ser	cgc Arg	gac Asp	ccc Pro	gaa Glu	cgc Arg	acg Thr 440	cca Pro	atg Met	cag Gln	tgg Trp	agt Ser 445	gat Asp	gag Glu	aag Lys	1344
aat Asn 450	gct Ala	ggt Gly	ttc Phe	tcc Ser	acg Thr	gga Gly 455	gat Asp	tcc Ser	acc Thr	tgg Trp	ttg Leu 460	cca Pro	gtg Val	cac His	ccg Pro	1392
aat Asn 465	tat Tyr	cag Gln	gag Glu	ctt Leu	aat Asn 470	ctg Leu	ctc Leu	acc Thr	cag Gln	caa Gln 475	gaa Glu	gcc Ala	act Thr	tac Tyr	agc Ser 480	1440
cat His	tat Tyr	aag Lys	gtc Val	tat Tyr 485	cag Gln	tcg Ser	ctg Leu	atc Ile	aag Lys 490	ctg Leu	aga Arg	caa Gln	tcg Ser	cga Arg 495	gtc Val	1488

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Leu	Arg	Asp	Gly	Ser	Phe	Thr	Ala	Gln	Ala	Leu	Asn	Arg	Asn	Val	Phe	
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Ala	Ile	Lys	Arg	Glu	Leu	Arg	Gly	Gln	Pro	Thr	Leu	Leu	Thr	Val	Ile	
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Leu	Pro	Asn	Arg	Leu	Thr	Leu	Leu	Val	Val	Gly	Val	Cys	Ser	Gln	His	
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Arg	Val	Ser	Glu	Arg	Leu	Lys	Pro	Ala	Glu	Val	Lys	Leu	Ser	Pro	His	
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gag	ggg	cta	gtt	ata	cag	ctc	aaa	gct	cgc	tag						1761
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<211> 586

<212> PRT

<213> *Drosophila virilis*

<400> 422

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Asn	Ile	Asn	Trp	Trp	Arg	His	Glu	Val	Phe	Tyr	Gln	Ile	Tyr	Pro	Arg	
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Ser	Phe	Lys	Asp	Ser	Asp	Gly	Asp	Gly	Ile	Gly	Asp	Leu	Lys	Gly	Ile	
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Thr	Ser	Lys	Leu	Gln	Tyr	Phe	Val	Asp	Thr	Gly	Ile	Thr	Ala	Ile	Trp	
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Leu	Ser	Pro	Ile	Tyr	Lys	Ser	Pro	Met	Val	Asp	Phe	Gly	Tyr	Asp	Ile	
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Ser	Asp	Tyr	Arg	Asp	Ile	Gln	Pro	Glu	Tyr	Gly	Thr	Leu	Glu	Asp	Phe	
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Ser	Ala	Ala	Arg	Glu	Pro	Gly	Tyr	Glu	Asp	Phe	Tyr	Val	Trp	Glu	Asp	
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Gly	Ile	Pro	Gly	Asp	Asn	Glu	Thr	Arg	Leu	Pro	Pro	Asn	Asn	Trp	Val	
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Ser	Val	Phe	Ser	Gly	Ser	Ala	Trp	Gln	Trp	His	Glu	Glu	Arg	Gln	Gln	
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Phe	Tyr	Leu	Arg	Gln	Phe	Thr	Lys	Gly	Gln	Pro	Asp	Leu	Asn	Tyr	Arg	
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Gln	Lys	Gly	Val	Ala	Gly	Phe	Arg	Ile	Asp	Ala	Val	Ile	Tyr	Ile	Tyr	
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Thr	Ala	Asp	Asn	Pro	Gly	Pro	Val	Arg	Ile	Met	Met	Thr	Glu	Gly	Tyr	
	290					295					300					
Ala	Asp	Leu	Ser	Leu	Leu	Met	Asn	Tyr	Tyr	Glu	Asp	Glu	Asp	Gly	Val	
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Gln	Gly	Ala	His	Phe	Pro	Phe	Asn	Phe	Asp	Phe	Ile	Thr	Glu	Leu	Asn	
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Ala	Asn	Ser	Ala	Ala	Pro	Asp	Phe	Val	Tyr	Phe	Ile	Gln	Arg	Trp	Leu	
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Met	Asn	Met	Leu	Met	Met	Thr	Leu	Pro	Gly	Ile	Gly	Ile	Thr	Tyr	Tyr
385					390					395					400
Gly	Glu	Glu	Leu	Gly	Met	Val	Asp	Tyr	Arg	Asp	Ile	Ser	Trp	Asn	Asp
				405					410					415	
Thr	Val	Asp	Gln	Pro	Ala	Cys	Asp	Ala	Gly	Leu	Asp	Asn	Tyr	Lys	Trp
			420					425					430		
Val	Ser	Arg	Asp	Pro	Glu	Arg	Thr	Pro	Met	Gln	Trp	Ser	Asp	Glu	Lys
		435					440					445			
Asn	Ala	Gly	Phe	Ser	Thr	Gly	Asp	Ser	Thr	Trp	Leu	Pro	Val	His	Pro
	450					455					460				
Asn	Tyr	Gln	Glu	Leu	Asn	Leu	Leu	Thr	Gln	Gln	Glu	Ala	Thr	Tyr	Ser
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His	Tyr	Lys	Val	Tyr	Gln	Ser	Leu	Ile	Lys	Leu	Arg	Gln	Ser	Arg	Val
				485					490					495	
Leu	Arg	Asp	Gly	Ser	Phe	Thr	Ala	Gln	Ala	Leu	Asn	Arg	Asn	Val	Phe
			500					505					510		
Ala	Ile	Lys	Arg	Glu	Leu	Arg	Gly	Gln	Pro	Thr	Leu	Leu	Thr	Val	Ile
		515					520					525			
Asn	Val	Ser	Asn	Arg	Thr	Gln	Gln	Val	Asp	Val	Ser	Asn	Phe	Ile	Asp
	530					535					540				
Leu	Pro	Asn	Arg	Leu	Thr	Leu	Leu	Val	Val	Gly	Val	Cys	Ser	Gln	His
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Arg	Val	Ser	Glu	Arg	Leu	Lys	Pro	Ala	Glu	Val	Lys	Leu	Ser	Pro	His
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<210> 423

<211> 1329

<212> DNA

<213> Thermotoga neapolitana

<220>

<221> CDS

<222> (1)..(1329)

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gat	ggg	gtg	ggg	gat	ttc	aaa	gga	ttg	aaa	ggg	gcg	att	tcc	tac	ctg	96
Asp	Gly	Val	Gly	Asp	Phe	Lys	Gly	Leu	Lys	Gly	Ala	Ile	Ser	Tyr	Leu	
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aaa	gaa	ctg	ggg	ggt	gat	ttt	gtc	tgg	ctc	atg	ccc	gtc	ttt	tcc	tcc	144
Lys	Glu	Leu	Gly	Val	Asp	Phe	Val	Trp	Leu	Met	Pro	Val	Phe	Ser	Ser	
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Ile	Ser	Phe	His	Gly	Tyr	Asp	Val	Val	Asp	Phe	Tyr	Ser	Phe	Lys	Ala	
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gag	tac	gga	gac	gag	aaa	gac	ttt	aga	gag	atg	atc	gag	gcg	ttc	cac	240
Glu	Tyr	Gly	Asp	Glu	Lys	Asp	Phe	Arg	Glu	Met	Ile	Glu	Ala	Phe	His	
			65			70				75					80	
gac	aac	ggg	ata	aaa	gtc	ggt	ctc	gat	ctt	ccc	atc	cat	cat	act	ggg	288
Asp	Asn	Gly	Ile	Lys	Val	Val	Leu	Asp	Leu	Pro	Ile	His	His	Thr	Gly	
				85					90					95		
ttc	ctc	cac	acg	tgg	ttt	cag	aaa	gcc	ctg	aaa	gga	gat	cca	cac	tac	336
Phe	Leu	His	Thr	Trp	Phe	Gln	Lys	Ala	Leu	Lys	Gly	Asp	Pro	His	Tyr	
			100					105					110			
agg	gat	tat	tac	gta	tgg	gcg	agt	gaa	aaa	acg	gat	ctg	gac	gaa	aga	384
Arg	Asp	Tyr	Tyr	Val	Trp	Ala	Ser	Glu	Lys	Thr	Asp	Leu	Asp	Glu	Arg	
			115				120					125				
aga	gag	tgg	gac	aac	gaa	agg	atc	tgg	cat	cct	ctg	gag	gac	gga	agg	432
Arg	Glu	Trp	Asp	Asn	Glu	Arg	Ile	Trp	His	Pro	Leu	Glu	Asp	Gly	Arg	
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aac	ccg	cag	gtt	ttt	gaa	gag	atg	aag	aag	gtg	gtt	tat	cac	ctt	ctt	528
Asn	Pro	Gln	Val	Phe	Glu	Glu	Met	Lys	Lys	Val	Val	Tyr	His	Leu	Leu	
				165						170				175		
gaa	atg	gga	gtg	gac	gga	ttc	aga	ttc	gac	gca	gca	aag	cac	atg	aga	576
Glu	Met	Gly	Val	Asp	Gly	Phe	Arg	Phe	Asp	Ala	Ala	Lys	His	Met	Arg	
				180										190		
gat	act	ctg	gaa	cag	aac	gtt	cgc	ttt	tgg	agg	tat	ttc	ctc	tcc	gat	624
Asp	Thr	Leu	Glu	Gln	Asn	Val	Arg	Phe	Trp	Arg	Tyr	Phe	Leu	Ser	Asp	
				195			200					205				
att	gag	gga	ata	ttc	ctt	gcg	gaa	atc	tgg	gca	gaa	tcc	aaa	gtt	gtg	672
Ile	Glu	Gly	Ile	Phe	Leu	Ala	Glu	Ile	Trp	Ala	Glu	Ser	Lys	Val	Val	
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cac	tgt	att	aag	gaa	gcg	gtg	tgg	aag	gaa	aac	ttc	aaa	gtg	ttg	atc	768
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Glu	Ser	Ile	Glu	Arg	Ala	Leu	Val	Gly	Lys	Asp	Tyr	Leu	Pro	Val	Asn	
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Phe	Thr	Ser	Asn	His	Asp	Met	Ser	Arg	Leu	Ala	Ser	Phe	Glu	Gly	Gly	
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Leu	Ser	Glu	Glu	Lys	Val	Lys	Leu	Ser	Leu	Ser	Ile	Leu	Phe	Thr	Leu	
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ccc	ggg	gtt	cct	ctc	ata	ttc	tac	gga	gac	gaa	ctg	gga	atg	aaa	gga	960
Pro	Gly	Val	Pro	Leu	Ile	Phe	Tyr	Gly	Asp	Glu	Leu	Gly	Met	Lys	Gly	
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atc	tat	cga	aaa	ccg	aac	acg	gaa	gtg	gtt	ctg	gat	ccg	ttc	ccc	tgg	1008
Ile	Tyr	Arg	Lys	Pro	Asn	Thr	Glu	Val	Val	Leu	Asp	Pro	Phe	Pro	Trp	
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Ser	Glu	Asn	Ile	Ser	Leu	Glu	Gly	Gln	Thr	Phe	Trp	Lys	Trp	Pro	Ala	
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Tyr	Asn	Ser	Pro	Phe	Ser	Gly	Val	Ser	Val	Glu	Tyr	Gln	Lys	Lys	Lys	
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cgt	gat	tcg	atc	ctc	tta	cac	att	atg	aag	tgg	aca	gga	ttc	aga	aag	1152
Arg	Asp	Ser	Ile	Leu	Leu	His	Ile	Met	Lys	Trp	Thr	Gly	Phe	Arg	Lys	
				370		375					380					
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Glu	Lys	Leu	Leu	His	Val	Tyr	Arg	Leu	Val	Asp	Glu	Gly	Arg	Ser	Leu	
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aaa	gtg	ata	cac	aac	ctg	tcg	aat	ggt	gaa	atg	gtg	ttt	gag	gga	gtg	1296
Lys	Val	Ile	His	Asn	Leu	Ser	Asn	Gly	Glu	Met	Val	Phe	Glu	Gly	Val	
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cgc	gta	caa	ccc	tac	agc	acg	gag	gtg	att	tga						1329
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<211> 442

<212> PRT

<213> Thermotoga neapolitana

<400> 424

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Glu Tyr Gly Asp Glu Lys Asp Phe Arg Glu Met Ile Glu Ala Phe His
65 70 75 80
Asp Asn Gly Ile Lys Val Val Leu Asp Leu Pro Ile His His Thr Gly
85 90 95
Phe Leu His Thr Trp Phe Gln Lys Ala Leu Lys Gly Asp Pro His Tyr
100 105 110
Arg Asp Tyr Tyr Val Trp Ala Ser Glu Lys Thr Asp Leu Asp Glu Arg
115 120 125
Arg Glu Trp Asp Asn Glu Arg Ile Trp His Pro Leu Glu Asp Gly Arg
130 135 140
Phe Tyr Arg Gly Leu Phe Gly Pro Leu Ser Pro Asp Leu Asn Tyr Asp
145 150 155 160
Asn Pro Gln Val Phe Glu Glu Met Lys Lys Val Val Tyr His Leu Leu
165 170 175
Glu Met Gly Val Asp Gly Phe Arg Phe Asp Ala Ala Lys His Met Arg
180 185 190
Asp Thr Leu Glu Gln Asn Val Arg Phe Trp Arg Tyr Phe Leu Ser Asp
195 200 205
Ile Glu Gly Ile Phe Leu Ala Glu Ile Trp Ala Glu Ser Lys Val Val
210 215 220
Asp Glu His Gly Arg Ile Phe Gly Tyr Met Leu Asn Phe Asp Thr Ser
225 230 235 240
His Cys Ile Lys Glu Ala Val Trp Lys Glu Asn Phe Lys Val Leu Ile
245 250 255
Glu Ser Ile Glu Arg Ala Leu Val Gly Lys Asp Tyr Leu Pro Val Asn
260 265 270
Phe Thr Ser Asn His Asp Met Ser Arg Leu Ala Ser Phe Glu Gly Gly
275 280 285
Leu Ser Glu Glu Lys Val Lys Leu Ser Leu Ser Ile Leu Phe Thr Leu
290 295 300
Pro Gly Val Pro Leu Ile Phe Tyr Gly Asp Glu Leu Gly Met Lys Gly
305 310 315 320
Ile Tyr Arg Lys Pro Asn Thr Glu Val Val Leu Asp Pro Phe Pro Trp
325 330 335
Ser Glu Asn Ile Ser Leu Glu Gly Gln Thr Phe Trp Lys Trp Pro Ala
340 345 350
Tyr Asn Ser Pro Phe Ser Gly Val Ser Val Glu Tyr Gln Lys Lys Lys
355 360 365
Arg Asp Ser Ile Leu Leu His Ile Met Lys Trp Thr Gly Phe Arg Lys
370 375 380
Glu Asn His Trp Leu Asp Arg Ala Asn Ile Glu Phe Leu Cys Lys Glu
385 390 395 400
Glu Lys Leu Leu His Val Tyr Arg Leu Val Asp Glu Gly Arg Ser Leu
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<211> 2001

<212> DNA

<213> Thermoactinomyces vulgaris

<220>

<221> CDS

<222> (1)..(2001)

<223> transl_table=11

<400> 425

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att ctc tca ttt tct ttt cca ttt ccc acg gca aag gcg gcc gcc aat
Ile Leu Ser Phe Ser Phe Pro Phe Pro Thr Ala Lys Ala Ala Ala Asn
20 25 30

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48

96

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gcc	acg	ggg	gag	atc	cat	gcc	gaa	aga	ttt	gac	gcc	gaa	ctt	acc	cgg					1200
Ala	Thr	Gly	Glu	Ile	His	Ala	Glu	Arg	Phe	Asp	Ala	Glu	Leu	Thr	Arg					
385					390					395					400					
gcc	agg	atg	ctt	tat	ccg	gaa	cag	gcg	gca	caa	ggg	tta	tgg	aac	ctc					1248
Ala	Arg	Met	Leu	Tyr	Pro	Glu	Gln	Ala	Ala	Gln	Gly	Leu	Trp	Asn	Leu					
				405				410					415							
ctc	gac	tca	cac	gat	acg	gaa	cgt	ttt	ttg	aca	tcg	tgt	ggg	ggg	aat					1296
Leu	Asp	Ser	His	Asp	Thr	Glu	Arg	Phe	Leu	Thr	Ser	Cys	Gly	Gly	Asn					
			420				425					430								
gag	gcg	aaa	ttc	cgc	ctg	gct	gtt	ttg	ttt	cag	atg	aca	tac	ctg	ggg					1344
Glu	Ala	Lys	Phe	Arg	Leu	Ala	Val	Leu	Phe	Gln	Met	Thr	Tyr	Leu	Gly					
		435				440					445									
acg	ccg	ctg	att	tat	tac	ggt	gat	gag	atc	ggg	atg	gcc	gga	gcg	acg					1392
Thr	Pro	Leu	Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Ala	Gly	Ala	Thr					
	450					455				460										
gac	ccg	gat	tgc	cgg	cgc	ccg	atg	ata	tgg	gag	gaa	aaa	gag	cag	aac					1440
Asp	Pro	Asp	Cys	Arg	Arg	Pro	Met	Ile	Trp	Glu	Glu	Lys	Glu	Gln	Asn					
				470						475					480					
cgc	ggc	ttg	ttt	gag	ttt	tat	aag	gaa	ttg	att	cgc	ttg	cgc	cat	cgg					1488
Arg	Gly	Leu	Phe	Glu	Phe	Tyr	Lys	Glu	Leu	Ile	Arg	Leu	Arg	His	Arg					
				485				490						495						
ctg	gca	tcg	ctc	acc	agg	gga	aat	gtc	cgg	tct	tgg	cat	gcc	gac	aaa					1536
Leu	Ala	Ser	Leu	Thr	Arg	Gly	Asn	Val	Arg	Ser	Trp	His	Ala	Asp	Lys					
			500					505					510							
caa	gcc	aat	ctt	tat	gct	ttt	gtg	cgc	acg	gtt	caa	gac	caa	cat	gtc					1584
Gln	Ala	Asn	Leu	Tyr	Ala	Phe	Val	Arg	Thr	Val	Gln	Asp	Gln	His	Val					
		515					520					525								
ggt	gtg	gtt	ctc	aat	aat	cgt	ggc	gag	aag	caa	acc	gtt	ttg	cta	cag					1632
Gly	Val	Val	Leu	Asn	Asn	Arg	Gly	Glu	Lys	Gln	Thr	Val	Leu	Leu	Gln					
		530				535					540									
gtg	ccg	gaa	tcg	ggc	gga	aaa	act	tgg	ctg	gat	tgt	ttg	acc	gga	gaa					1680
Val	Pro	Glu	Ser	Gly	Gly	Lys	Thr	Trp	Leu	Asp	Cys	Leu	Thr	Gly	Glu					
				550						555					560					
gaa	gtg	cat	ggc	aaa	caa	ggg	caa	ctg	aag	ctg	aca	ctt	cgc	cct	tac					1728
Glu	Val	His	Gly	Lys	Gln	Gly	Gln	Leu	Lys	Leu	Thr	Leu	Arg	Pro	Tyr					
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cag	gga	atg	att	ctc	tgg	aat	ggc	cgg	tag											1758
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<212> PRT

<213> Thermoactinomyces vulgaris

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Arg	Phe	Asp	Tyr	Phe	Glu	Ala	Leu	Leu	Glu	Cys	Ser	Thr	Lys	Arg	Val
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Lys	Tyr	Val	Phe	Leu	Leu	Thr	Gly	Pro	Gln	Gly	Glu	Ala	Val	Tyr	Phe
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Gly	Glu	Thr	Gly	Phe	Ser	Ala	Glu	Arg	Ser	Lys	Ala	Gly	Val	Phe	Gln
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Tyr	Ala	Tyr	Ile	His	Arg	Ser	Glu	Val	Phe	Thr	Thr	Pro	Glu	Trp	Ala
		115					120					125			
Lys	Glu	Ala	Val	Ile	Tyr	Gln	Ile	Phe	Pro	Glu	Arg	Phe	Ala	Asn	Gly
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Arg	Pro	Arg	His	Asp	Ser	Phe	Tyr	Gly	Gly	Asp	Leu	Lys	Gly	Val	Ile
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Asp	Arg	Leu	Pro	Tyr	Leu	Glu	Glu	Leu	Gly	Val	Thr	Ala	Leu	Tyr	Phe
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Thr	Pro	Ile	Phe	Ala	Ser	Pro	Ser	His	His	Lys	Tyr	Asp	Thr	Ala	Asp
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Tyr	Leu	Ala	Ile	Asp	Pro	Gln	Phe	Gly	Asp	Leu	Pro	Thr	Phe	Arg	Arg
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Val	Phe	Asn	His	Ala	Gly	Asp	Gln	Phe	Phe	Ala	Phe	Arg	Asp	Val	Leu
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Gln	Lys	Gly	Glu	Gln	Ser	Arg	Tyr	Lys	Asp	Trp	Phe	Phe	Ile	Glu	Asp
			260					265					270		
Phe	Pro	Val	Ser	Lys	Thr	Ser	Arg	Thr	Asn	Tyr	Glu	Thr	Phe	Ala	Val
		275					280					285			
Gln	Val	Pro	Ala	Met	Pro	Lys	Leu	Arg	Thr	Glu	Asn	Pro	Glu	Val	Lys
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Glu	Tyr	Leu	Phe	Asp	Val	Ala	Arg	Phe	Trp	Met	Glu	Gln	Gly	Ile	Asp
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Gly	Trp	Arg	Leu	Asp	Val	Ala	Asn	Glu	Val	Asp	His	Ala	Phe	Trp	Arg
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Glu	Phe	Arg	Arg	Leu	Val	Lys	Ser	Leu	Asn	Pro	Asp	Ala	Leu	Ile	Val
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Ala	Arg	Met	Leu	Tyr	Pro	Glu	Gln	Ala	Ala	Gln	Gly	Leu	Trp	Asn	Leu
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Thr	Pro	Leu	Ile	Tyr	Tyr	Gly	Asp	Glu	Ile	Gly	Met	Ala	Gly	Ala	Thr
	450					455					460				
Asp	Pro	Asp	Cys	Arg	Arg	Pro	Met	Ile	Trp	Glu	Glu	Lys	Glu	Gln	Asn
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Arg	Gly	Leu	Phe	Glu	Phe	Tyr	Lys	Glu	Leu	Ile	Arg	Leu	Arg	His	Arg
				485					490					495	
Leu	Ala	Ser	Leu	Thr	Arg	Gly	Asn	Val	Arg	Ser	Trp	His	Ala	Asp	Lys
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Gln	Ala	Asn	Leu	Tyr	Ala	Phe	Val	Arg	Thr	Val	Gln	Asp	Gln	His	Val
		515					520					525			
Gly	Val	Val	Leu	Asn	Asn	Arg	Gly	Glu	Lys	Gln	Thr	Val	Leu	Leu	Gln
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Glu	Val	His	Gly	Lys	Gln	Gly	Gln	Leu	Lys	Leu	Thr	Leu	Arg	Pro	Tyr
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24

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 20 25 30
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 65 70 75 80
 Xaa Xaa Xaa Gly Asp Xaa Xaa Gly Xaa Xaa Xaa Xaa Leu Xaa Tyr Xaa
 85 90 95
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 100 105 110
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 115 120 125
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 130 135 140
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr Asp Xaa Xaa Asp Tyr Xaa Xaa
 145 150 155 160
 Xaa Xaa Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 165 170 175

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Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
	210					215				220				
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225					230					235				240
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
				245				250					255	
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
			260					265					270	
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
		275					280				285			
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
	290					295				300				
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305					310					315				320
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
				325				330					335	
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
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			420					425					430	
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	450					455				460				
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465					470					475				480
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				485				490					495	
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545					550					555				560
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				565				570					575	
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625					630					635				640
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
				645				650					655	
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				740					745					750			
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				755					760					765			
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				770					775					780			
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 <223> Xaa in position 3 is Ile, Leu or Val

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 <223> Xaa in position 4 to 7 is any amino acid

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 Tyr Xaa Xaa Xaa Xaa Xaa Phe
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<210> 433
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 <223> Xaa in position 2 to 12 is any amino acid

<220>
 <221> Variant
 <222> (14)..(16)
 <223> Xaa in position 14 to 16 is any amino acid

<220>
 <221> Variant
 <222> (17)..(17)
 <223> Xaa in position 17 is Phe, Ile, Leu, Met or Val

<220>
 <221> Variant
 <222> (18)..(18)
 <223> Xaa in position 18 is Trp or Tyr

<220>
 <221> Variant

<222> (19)..(19)
<223> Xaa in position 19 is Phe, Ile, Leu, Met or Val

<220>
<221> Variant
<222> (20)..(20)
<223> Xaa in position 20 is any amino acid

<220>
<221> Variant
<222> (22)..(30)
<223> Xaa in position 22 to 30 is any amino acid

<220>
<221> Variant
<222> (31)..(31)
<223> Xaa in position 31 is any or no amino acid

<220>
<221> Variant
<222> (33)..(35)
<223> Xaa in position 33 to 35 is any amino acid

<220>
<221> Variant
<222> (36)..(36)
<223> Xaa in position 36 is Asp, Glu, Asn or Thr

<220>
<221> Variant
<222> (37)..(39)
<223> Xaa in position 37 to 39 is any amino acid

<220>
<221> Variant
<222> (40)..(40)
<223> Xaa in position 40 is Phe, Ile, Leu or Val

<220>
<221> Variant
<222> (41)..(44)
<223> Xaa in position 41 to 44 is any amino acid

<220>
<221> Variant
<222> (46)..(52)
<223> Xaa in position 46 to 52 is any amino acid

<220>
<221> Variant
<222> (53)..(53)
<223> Xaa in position 53 is Phe, Leu, Met or Val

<220>
<221> Variant
<222> (54)..(61)
<223> Xaa in position 54 to 61 is any amino acid

<220>
<221> Variant
<222> (62)..(62)
<223> Xaa in position 62 is Phe, Ile, Leu, Met or Val

<220>
<221> Variant
<222> (63)..(63)
<223> Xaa in position 63 is any amino acid

<220>

<221> Variant
 <222> (64)..(64)
 <223> Xaa in position 64 is Ile, Leu or Val

<220>
 <221> Variant
 <222> (65)..(66)
 <223> Xaa in position 65 to 66 is any amino acid

<220>
 <221> Variant
 <222> (67)..(67)
 <223> Xaa in position 67 is Asp or Glu

<220>
 <221> Variant
 <222> (68)..(71)
 <223> Xaa in position 68 to 71 is any amino acid

<400> 433
 Gly Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Xaa Xaa Xaa
 1 5 10 15
 Xaa Xaa Xaa Xaa Pro Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr
 20 25 30
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Xaa Xaa Xaa
 35 40 45
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 50 55 60
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa His
 65 70

<210> 434
 <211> 14
 <212> PRT
 <213> Artificial sequence

<220>
 <223> protein pattern

<220>
 <221> Variant
 <222> (2)..(6)
 <223> Xaa in position 2 to 6 is any amino acid

<220>
 <221> Variant
 <222> (7)..(8)
 <223> Xaa in position 7 to 8 is any or no amino acid

<220>
 <221> Variant
 <222> (10)..(10)
 <223> Xaa in position 10 is Ala or Gly

<220>
 <221> Variant
 <222> (11)..(11)
 <223> Xaa in position 11 is any amino acid

<220>
 <221> Variant
 <222> (13)..(13)
 <223> Xaa in position 13 is Phe, Ile, Leu, Met or Val

<400> 434
 Trp Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asp Xaa Xaa Arg Xaa Asp
 1 5 10

<210> 435
 <211> 12
 <212> PRT
 <213> Artificial sequence

<220>
 <223> protein pattern

<220>
 <221> Variant
 <222> (2)..(2)
 <223> Xaa in position 2 is any amino acid

<220>
 <221> Variant
 <222> (3)..(3)
 <223> Xaa in position 3 is Ala, Ile, Pro or Val

<220>
 <221> Variant
 <222> (4)..(5)
 <223> Xaa in position 4 to 5 is any amino acid

<220>
 <221> Variant
 <222> (7)..(7)
 <223> Xaa in position 7 is any amino acid

<220>
 <221> Variant
 <222> (9)..(9)
 <223> Xaa in position 9 is Asp, Glu, Gly, Asn, Gln, Ser or Thr

<220>
 <221> Variant
 <222> (11)..(11)
 <223> Xaa in position 11 is any amino acid

<400> 435
 Gly Xaa Xaa Xaa Xaa Tyr Xaa Gly Xaa Glu Xaa Gly
 1 5 10

<210> 436
 <211> 276
 <212> DNA
 <213> Escherichia coli K12

<220>
 <221> CDS
 <222> (1)..(276)
 <223> transl_table=11

<400> 436
 atg aaa gta aac tta ata ctt ttc agc tta ttt tta ttg gtc tct att 48
 Met Lys Val Asn Leu Ile Leu Phe Ser Leu Phe Leu Leu Val Ser Ile
 1 5 10 15
 atg gca tgc aat gtt ttt gca ttt tcc att tcg ggt ggt gga agt gag 96
 Met Ala Cys Asn Val Phe Ala Phe Ser Ile Ser Gly Gly Gly Ser Glu
 20 25 30
 agg agc tat aaa gag act gaa aaa aca tca gcg atg acg acc aca cac 144
 Arg Ser Tyr Lys Glu Thr Glu Lys Thr Ser Ala Met Thr Thr His
 35 40 45
 tct aca aaa ctt cag cca tca cag gcg att ttg ttt aag atg aga gaa 192
 Ser Thr Lys Leu Gln Pro Ser Gln Ala Ile Leu Phe Lys Met Arg Glu
 50 55 60
 gat gcg cca cca tta aac ctc aca gaa gaa atg ccg ccc cct ttt ccg 240
 Asp Ala Pro Pro Leu Asn Leu Thr Glu Glu Met Pro Pro Pro Phe Pro
 65 70 75 80

aca aag gcg aat tat ctt att cat cct gtg cga tag
 Thr Lys Ala Asn Tyr Leu Ile His Pro Val Arg
 85 90

<210> 437
 <211> 91
 <212> PRT
 <213> Escherichia coli K12

<400> 437
 Met Lys Val Asn Leu Ile Leu Phe Ser Leu Phe Leu Leu Val Ser Ile
 1 5 10 15
 Met Ala Cys Asn Val Phe Ala Phe Ser Ile Ser Gly Gly Gly Ser Glu
 20 25 30
 Arg Ser Tyr Lys Glu Thr Glu Lys Thr Ser Ala Met Thr Thr Thr His
 35 40 45
 Ser Thr Lys Leu Gln Pro Ser Gln Ala Ile Leu Phe Lys Met Arg Glu
 50 55 60
 Asp Ala Pro Pro Leu Asn Leu Thr Glu Glu Met Pro Pro Pro Phe Pro
 65 70 75 80
 Thr Lys Ala Asn Tyr Leu Ile His Pro Val Arg
 85 90

<210> 438
 <211> 276
 <212> DNA
 <213> Escherichia coli O157:H7 EDL933

<220>
 <221> CDS
 <222> (1)..(276)
 <223> transl_table=11

<400> 438
 atg aaa gta aac tta ata ctt ttt agc tta ttt tta ttg gtc tct att
 Met Lys Val Asn Leu Ile Leu Phe Ser Leu Phe Leu Leu Val Ser Ile
 1 5 10 15
 atg gca tgc aat gtt ttt gca ttt tct aat tct ggt ggt ggt agt gag
 Met Ala Cys Asn Val Phe Ala Phe Ser Asn Ser Gly Gly Gly Ser Glu
 20 25 30
 acg agc tat aaa gag cca gaa aaa acg tca gcg atg acg aca act cac
 Thr Ser Tyr Lys Glu Pro Glu Lys Thr Ser Ala Met Thr Thr Thr His
 35 40 45
 tct aca aaa ttt cag cca tca cag gcg att ttg ttt aag atg aga gaa
 Ser Thr Lys Phe Gln Pro Ser Gln Ala Ile Leu Phe Lys Met Arg Glu
 50 55 60
 gat gca cca cca tta aac ctc aca gaa gaa acc acg ccc cct ttt ccg
 Asp Ala Pro Pro Leu Asn Leu Thr Glu Glu Thr Thr Pro Pro Phe Pro
 65 70 75 80
 aca aag gcg aat tat ctt att cat cct gtg cga tag
 Thr Lys Ala Asn Tyr Leu Ile His Pro Val Arg
 85 90

48
96
144
192
240
276

<210> 439
 <211> 91
 <212> PRT
 <213> Escherichia coli O157:H7 EDL933

<400> 439
 Met Lys Val Asn Leu Ile Leu Phe Ser Leu Phe Leu Leu Val Ser Ile
 1 5 10 15
 Met Ala Cys Asn Val Phe Ala Phe Ser Asn Ser Gly Gly Gly Ser Glu
 20 25 30
 Thr Ser Tyr Lys Glu Pro Glu Lys Thr Ser Ala Met Thr Thr Thr His
 35 40 45
 Ser Thr Lys Phe Gln Pro Ser Gln Ala Ile Leu Phe Lys Met Arg Glu
 50 55 60
 Asp Ala Pro Pro Leu Asn Leu Thr Glu Glu Thr Thr Pro Pro Phe Pro
 65 70 75 80

Thr Lys Ala Asn Tyr Leu Ile His Pro Val Arg
 85 90

<210> 440
 <211> 276
 <212> DNA
 <213> Escherichia coli CFT073

<220>
 <221> CDS
 <222> (1)..(276)
 <223> transl_table=11

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<400> 440
atg aaa gta aac tta atg ctt ttt agc tta ttt tta ttt gtc tct att      48
Met Lys Val Asn Leu Met Leu Phe Ser Leu Phe Leu Phe Val Ser Ile
  1               5               10               15
atg gca tgc aat gtt ttt gca ttt tct att tct ggt ggt ggt agt gag      96
Met Ala Cys Asn Val Phe Ala Phe Ser Ile Ser Gly Gly Gly Ser Glu
                20               25               30
gcg agc tat aaa gag aca gaa aaa acg tca gtg atg acg aca acg cat      144
Ala Ser Tyr Lys Glu Thr Glu Lys Thr Ser Val Met Thr Thr Thr His
                35               40               45
tct aca aaa ctt cag cca tca cag gcg att ttg ttt aag atg aga gaa      192
Ser Thr Lys Leu Gln Pro Ser Gln Ala Ile Leu Phe Lys Met Arg Glu
                50               55               60
gat gca cca cca tta aac ctc aca gaa gac atc acg cct act tat ccg      240
Asp Ala Pro Pro Leu Asn Leu Thr Glu Asp Ile Thr Pro Thr Tyr Pro
  65               70               75               80
aca aag gcg aat tat ctc att cat cct ttg cga tag      276
Thr Lys Ala Asn Tyr Leu Ile His Pro Leu Arg
                85               90

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<210> 441
 <211> 91
 <212> PRT
 <213> Escherichia coli CFT073

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<400> 441
Met Lys Val Asn Leu Met Leu Phe Ser Leu Phe Leu Phe Val Ser Ile
  1               5               10               15
Met Ala Cys Asn Val Phe Ala Phe Ser Ile Ser Gly Gly Gly Ser Glu
                20               25               30
Ala Ser Tyr Lys Glu Thr Glu Lys Thr Ser Val Met Thr Thr Thr His
                35               40               45
Ser Thr Lys Leu Gln Pro Ser Gln Ala Ile Leu Phe Lys Met Arg Glu
                50               55               60
Asp Ala Pro Pro Leu Asn Leu Thr Glu Asp Ile Thr Pro Thr Tyr Pro
  65               70               75               80
Thr Lys Ala Asn Tyr Leu Ile His Pro Leu Arg
                85               90

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<210> 442
 <211> 276
 <212> DNA
 <213> Shigella flexneri 2a str. 2457T

<220>
 <221> CDS
 <222> (1)..(276)
 <223> transl_table=11

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<400> 442
atg aaa gta aac tta ata ctt ttc agc tta ttt tta ttg gtc tct att      48
Met Lys Val Asn Leu Ile Leu Phe Ser Leu Phe Leu Leu Val Ser Ile
  1               5               10               15
atg gca tgc aat gtt ttt gca ttt tcc att tct ggt ggt gta agt gag      96
Met Ala Cys Asn Val Phe Ala Phe Ser Ile Ser Gly Gly Val Ser Glu
                20               25               30

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BPS64510PC-2008083446

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agg agc tat aaa gag act gaa aaa aca tca gcg atg acg acc aca cac      144
Arg Ser Tyr 35 Lys Glu Thr Glu Lys 40 Thr Ser Ala Met Thr Thr His
tct aca aaa ctt cag cca tca cag gcg att ttg ttt aag atg aga gaa      192
Ser Thr Lys Leu Gln Pro Ser 55 Gln Ala Ile Leu Phe Lys Met Arg Glu
gat gtg cca cca tta aac ctc aca gaa gaa atc acg cct act tat ccg      240
Asp Val Pro Pro Leu Asn 70 Leu Thr Glu Glu Ile Thr Pro Thr Tyr Pro
aca aag gcg aat tat ctt att cat cct gtg cga tag      276
Thr Lys Ala Asn Tyr 85 Leu Ile His Pro Val 90 Arg

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<210> 443

<211> 91

<212> PRT

<213> Shigella flexneri 2a str. 2457T

<400> 443

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Met Lys Val Asn Leu Ile Leu Phe Ser Leu Phe Leu Leu Val Ser Ile
1 5 10 15
Met Ala Cys Asn Val Phe Ala Phe Ser Ile Ser Gly Gly Val Ser Glu
20 25 30
Arg Ser Tyr Lys Glu Thr Glu Lys Thr Ser Ala Met Thr Thr His
35 40 45
Ser Thr Lys Leu Gln Pro Ser Gln Ala Ile Leu Phe Lys Met Arg Glu
50 55 60
Asp Val Pro Pro Leu Asn Leu Thr Glu Glu Ile Thr Pro Thr Tyr Pro
65 70 75 80
Thr Lys Ala Asn Tyr 85 Leu Ile His Pro Val 90 Arg

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<210> 444

<211> 276

<212> DNA

<213> Shigella sonnei ss046

<220>

<221> CDS

<222> (1)..(276)

<223> transl_table=11

<400> 444

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atg aaa gta aac tta ata ctt ttc agc tta ttt tta ttg gtc tct att      48
Met Lys Val Asn Leu Ile Leu Phe Ser Leu Phe Leu Leu Val Ser Ile
1 5 10 15
atg gca tgc aat gtt ttt gca ttt tcc att tct ggt ggt gta agt gag      96
Met Ala Cys Asn Val Phe Ala Phe Ser Ile Ser Gly Gly Val Ser Glu
20 25 30
agg agc tat aaa gag act gaa aaa aca tca gcg atg aca acc aca cac      144
Arg Ser Tyr 35 Lys Glu Thr Glu Lys 40 Thr Ser Ala Met Thr Thr His
tct aca aaa ctt cag cca tca cag gcg att ttg ttt aag atg aga gaa      192
Ser Thr Lys Leu Gln Pro Ser 55 Gln Ala Ile Leu Phe Lys Met Arg Glu
gat gcg cca cca tta aac ctc aca gaa gaa atc acg cct act tat ccg      240
Asp Ala Pro Pro Leu Asn 70 Leu Thr Glu Glu Ile Thr Pro Thr Tyr Pro
65 70 75 80
aca aag gcg aat tat ctt att cat cct gtg cga tag      276
Thr Lys Ala Asn Tyr 85 Leu Ile His Pro Val 90 Arg

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<210> 445

<211> 91

<212> PRT

<213> Shigella sonnei ss046

<400> 445

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Met Lys Val Asn Leu Ile Leu Phe Ser Leu Phe Leu Leu Val Ser Ile

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BPS64510PC-2008083446

1 5 10 15
Met Ala Cys Asn Val Phe Ala Phe Ser Ile Ser Gly Gly Val Ser Glu
20 25 30
Arg Ser Tyr Lys Glu Thr Glu Lys Thr Ser Ala Met Thr Thr Thr His
35 40 45
Ser Thr Lys Leu Gln Pro Ser Gln Ala Ile Leu Phe Lys Met Arg Glu
50 55 60
Asp Ala Pro Pro Leu Asn Leu Thr Glu Glu Ile Thr Pro Thr Tyr Pro
65 70 75 80
Thr Lys Ala Asn Tyr Leu Ile His Pro Val Arg
85 90

<210> 446
<211> 27
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 446
atgaaagtaa acttaatact tttcagc

27

<210> 447
<211> 27
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 447
ttatcgaca ggatgaataa gataatt

27

<210> 448
<211> 91
<212> PRT
<213> Artificial sequence

<220>
<223> consensus sequence

<220>
<221> Variant
<222> (6)..(6)
<223> Xaa in position 6 is any amino acid

<220>
<221> Variant
<222> (13)..(13)
<223> Xaa in position 13 is any amino acid

<220>
<221> Variant
<222> (26)..(26)
<223> Xaa in position 26 is any amino acid

<220>
<221> Variant
<222> (30)..(30)
<223> Xaa in position 30 is any amino acid

<220>
<221> Variant
<222> (33)..(33)
<223> Xaa in position 33 is any amino acid

<220>

<221> Variant
 <222> (38)..(38)
 <223> Xaa in position 38 is any amino acid

<220>
 <221> Variant
 <222> (43)..(43)
 <223> Xaa in position 43 is any amino acid

<220>
 <221> Variant
 <222> (52)..(52)
 <223> Xaa in position 52 is any amino acid

<220>
 <221> Variant
 <222> (66)..(66)
 <223> Xaa in position 66 is any amino acid

<220>
 <221> Variant
 <222> (74)..(76)
 <223> Xaa in position 74 to 76 is any amino acid

<220>
 <221> Variant
 <222> (78)..(79)
 <223> Xaa in position 78 to 79 is any amino acid

<220>
 <221> Variant
 <222> (90)..(90)
 <223> Xaa in position 90 is any amino acid

<400> 448
 Met Lys Val Asn Leu Xaa Leu Phe Ser Leu Phe Leu Xaa Val Ser Ile
 1 5 10 15
 Met Ala Cys Asn Val Phe Ala Phe Ser Xaa Ser Gly Gly Xaa Ser Glu
 20 25 30
 Xaa Ser Tyr Lys Glu Xaa Glu Lys Thr Ser Xaa Met Thr Thr His
 35 40 45
 Ser Thr Lys Xaa Gln Pro Ser Gln Ala Ile Leu Phe Lys Met Arg Glu
 50 55 60
 Asp Xaa Pro Pro Leu Asn Leu Thr Glu Xaa Xaa Xaa Pro Xaa Xaa Pro
 65 70 75 80
 Thr Lys Ala Asn Tyr Leu Ile His Pro Xaa Arg
 85 90

<210> 449
 <211> 91
 <212> PRT
 <213> Artificial sequence

<220>
 <223> protein pattern

<220>
 <221> Variant
 <222> (6)..(6)
 <223> Xaa in position 6 is Ile or Met

<220>
 <221> Variant
 <222> (13)..(13)
 <223> Xaa in position 13 is Phe or Leu

<220>
 <221> Variant

<222> (26)..(26)
 <223> Xaa in position 26 is any amino acid

<220>
 <221> Variant
 <222> (30)..(30)
 <223> Xaa in position 30 is Gly or Val

<220>
 <221> Variant
 <222> (33)..(33)
 <223> Xaa in position 33 is any amino acid

<220>
 <221> Variant
 <222> (38)..(38)
 <223> Xaa in position 38 is Pro or Thr

<220>
 <221> Variant
 <222> (43)..(43)
 <223> Xaa in position 43 is Ala or Val

<220>
 <221> Variant
 <222> (52)..(52)
 <223> Xaa in position 52 is Phe or Leu

<220>
 <221> Variant
 <222> (66)..(66)
 <223> Xaa in position 66 is Ala or Val

<220>
 <221> Variant
 <222> (74)..(74)
 <223> Xaa in position 74 is Asp or Glu

<220>
 <221> Variant
 <222> (75)..(75)
 <223> Xaa in position 75 is any amino acid

<220>
 <221> Variant
 <222> (76)..(76)
 <223> Xaa in position 76 is Pro or Thr

<220>
 <221> Variant
 <222> (78)..(78)
 <223> Xaa in position 78 is Pro or Thr

<220>
 <221> Variant
 <222> (79)..(79)
 <223> Xaa in position 79 is Phe or Tyr

<220>
 <221> Variant
 <222> (90)..(90)
 <223> Xaa in position 90 is Leu or Val

<400> 449
 Met Lys Val Asn Leu Xaa Leu Phe Ser Leu Phe Leu Xaa Val Ser Ile
 1 5 10 15
 Met Ala Cys Asn Val Phe Ala Phe Ser Xaa Ser Gly Gly Xaa Ser Glu
 20 25 30
 Xaa Ser Tyr Lys Glu Xaa Glu Lys Thr Ser Xaa Met Thr Thr Thr His
 Seite 725

35
 Ser Thr Lys Xaa Gln Pro Ser 40 Gln Ala Ile Leu Phe 45 Met Arg Glu
 50
 Asp Xaa Pro Pro Leu Asn 55 Leu Thr Glu Xaa Xaa 60 Xaa Pro Xaa Xaa Pro
 65
 Thr Lys Ala Asn Tyr 70 Leu Ile His Pro Xaa 75 Arg
 85 90

<210> 450

<211> 927

<212> DNA

<213> Escherichia coli K12

<220>

<221> CDS

<222> (1)..(927)

<400> 450

atg	tct	gag	cag	ttt	ttg	tat	ttc	ttg	cag	cag	atg	ttt	aac	ggc	gtc	48
Met	Ser	Glu	Gln	Phe	Leu	Tyr	Phe	Leu	Gln	Gln	Met	Phe	Asn	Gly	Val	
1				5				10					15			
acg	ctg	ggc	agt	act	tac	gcg	ctg	att	gcc	atc	ggc	tac	acc	atg	gtt	96
Thr	Leu	Gly	Ser	Thr	Tyr	Ala	Leu	Ile	Ala	Ile	Gly	Tyr	Thr	Met	Val	
			20					25					30			
tac	ggc	att	atc	ggc	atg	atc	aac	ttc	gcc	cac	ggc	gag	ggt	tac	atg	144
Tyr	Gly	Ile	Ile	Gly	Met	Ile	Asn	Phe	Ala	His	Gly	Glu	Val	Tyr	Met	
			35				40					45				
atc	ggc	agc	tac	gtc	tca	ttt	atg	atc	atc	gcc	gca	ctg	atg	atg	atg	192
Ile	Gly	Ser	Tyr	Val	Ser	Phe	Met	Ile	Ile	Ala	Ala	Leu	Met	Met	Met	
			50			55					60					
ggc	att	gat	acc	ggc	tgg	ctg	ctg	gta	gcg	gcg	gga	ttc	gtc	ggc	gca	240
Gly	Ile	Asp	Thr	Gly	Trp	Leu	Leu	Val	Ala	Ala	Gly	Phe	Val	Gly	Ala	
65				70				75						80		
atc	gtc	att	gcc	agc	gcc	tac	ggc	tgg	agt	atc	gaa	cgg	gtg	gct	tac	288
Ile	Val	Ile	Ala	Ser	Ala	Tyr	Gly	Trp	Ser	Ile	Glu	Arg	Val	Ala	Tyr	
				85				90					95			
cgc	ccg	gtg	cgt	aac	tct	aag	cgc	ctg	att	gca	ctc	atc	tcg	gca	atc	336
Arg	Pro	Val	Arg	Asn	Ser	Lys	Arg	Leu	Ile	Ala	Leu	Ile	Ser	Ala	Ile	
			100				105					110				
ggt	atg	tcc	atc	ttc	ctg	caa	aac	tac	gtc	agc	ctg	act	gaa	ggt	tcg	384
Gly	Met	Ser	Ile	Phe	Leu	Gln	Asn	Tyr	Val	Ser	Leu	Thr	Glu	Gly	Ser	
			115				120					125				
cgc	gac	gtg	gcg	ctg	ccc	agc	ttg	ttt	aat	ggt	cag	tgg	gta	gtg	ggt	432
Arg	Asp	Val	Ala	Leu	Pro	Ser	Leu	Phe	Asn	Gly	Gln	Trp	Val	Val	Gly	
			130			135				140						
cat	agc	gaa	aac	ttc	tct	gcc	att	acc	acc	atg	cag	gcg	gtg	atc		480
His	Ser	Glu	Asn	Phe	Ser	Ala	Ser	Ile	Thr	Thr	Met	Gln	Ala	Val	Ile	
145				150				155						160		
tgg	att	gtc	acc	ttc	ctc	gcc	atg	ctg	gcg	ctg	acg	att	ttc	att	cgt	528
Trp	Ile	Val	Thr	Phe	Leu	Ala	Met	Leu	Ala	Leu	Thr	Ile	Phe	Ile	Arg	
				165				170					175			
tat	tcc	cgt	atg	ggg	gcg	gcc	tgc	cgt	gcc	tgc	gaa	gat	ctg	aaa		576
Tyr	Ser	Arg	Met	Gly	Arg	Ala	Cys	Arg	Ala	Cys	Ala	Glu	Asp	Leu	Lys	
			180				185					190				
atg	gcg	agc	ctg	ctt	ggc	att	aac	acc	gac	cgg	gtg	att	gct	ttg	acc	624
Met	Ala	Ser	Leu	Leu	Gly	Ile	Asn	Thr	Asp	Arg	Val	Ile	Ala	Leu	Thr	
			195				200					205				
ttt	gtg	att	ggc	gcg	gcg	atg	gcg	gcg	gtg	gcg	ggc	gta	ctg	ctc	ggt	672
Phe	Val	Ile	Gly	Ala	Ala	Met	Ala	Ala	Val	Ala	Gly	Val	Leu	Leu	Gly	
			210			215					220					
cag	ttc	tac	ggc	gtc	att	aac	ccc	tat	atc	ggc	ttt	atg	gcc	ggg	atg	720
Gln	Phe	Tyr	Gly	Val	Ile	Asn	Pro	Tyr	Ile	Gly	Phe	Met	Ala	Gly	Met	
225				230						235				240		
aaa	gcc	ttt	acc	gct	gcg	gtg	ctc	ggt	ggg	att	ggc	agc	att	ccg	gga	768
Lys	Ala	Phe	Thr	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ser	Ile	Pro	Gly	
				245				250					255			
gcg	atg	att	ggc	ggg	ctg	att	ctg	ggg	att	gcg	gag	gcg	ctc	tct	tct	816
Ala	Met	Ile	Gly	Gly	Leu	Ile	Leu	Gly	Ile	Ala	Glu	Ala	Leu	Ser	Ser	
			260					265					270			

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gcc tac ctg agt acg gaa tat aaa gat gtg gtc tca ttc gcc ctg ctg 864
 Ala Tyr 275 Leu Ser Thr Glu Tyr 280 Lys Asp Val Val Ser 285 Phe Ala Leu Leu
 att ctg gtg ctg ctg gtg atg ccg acc ggt att ctg ggt cgc ccg gag 912
 Ile Leu Val Leu Leu Val Met 295 Pro Thr Gly Ile Leu Gly Arg Pro Glu
 290
 gta gag aaa gta tga 927
 Val Glu Lys Val
 305

<210> 451

<211> 308

<212> PRT

<213> Escherichia coli K12

<400> 451

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 Thr Leu Gly Ser Thr Tyr Ala Leu Ile Ala Ile Gly Tyr Thr Met Val
 20 25 30
 Tyr Gly Ile Ile Gly Met Ile Asn Phe Ala His Gly Glu Val Tyr Met
 35 40 45
 Ile Gly Ser Tyr Val Ser Phe Met Ile Ile Ala Ala Leu Met Met Met
 50 55 60
 Gly Ile Asp Thr Gly Trp Leu Val Ala Ala Gly Phe Val Gly Ala
 65 70 75 80
 Ile Val Ile Ala Ser Ala Tyr Gly Trp Ser Ile Glu Arg Val Ala Tyr
 85 90 95
 Arg Pro Val Arg Asn Ser Lys Arg Leu Ile Ala Leu Ile Ser Ala Ile
 100 105 110
 Gly Met Ser Ile Phe Leu Gln Asn Tyr Val Ser Leu Thr Glu Gly Ser
 115 120 125
 Arg Asp Val Ala Leu Pro Ser Leu Phe Asn Gly Gln Trp Val Val Gly
 130 135 140
 His Ser Glu Asn Phe Ser Ala Ser Ile Thr Thr Met Gln Ala Val Ile
 145 150 155 160
 Trp Ile Val Thr Phe Leu Ala Met Leu Ala Leu Thr Ile Phe Ile Arg
 165 170 175
 Tyr Ser Arg Met Gly Arg Ala Cys Arg Ala Cys Ala Glu Asp Leu Lys
 180 185 190
 Met Ala Ser Leu Leu Gly Ile Asn Thr Asp Arg Val Ile Ala Leu Thr
 195 200 205
 Phe Val Ile Gly Ala Ala Met Ala Ala Val Ala Gly Val Leu Leu Gly
 210 215 220
 Gln Phe Tyr Gly Val Ile Asn Pro Tyr Ile Gly Phe Met Ala Gly Met
 225 230 235 240
 Lys Ala Phe Thr Ala Val Leu Gly Gly Ile Gly Ser Ile Pro Gly
 245 250 255
 Ala Met Ile Gly Gly Leu Ile Leu Gly Ile Ala Glu Ala Leu Ser Ser
 260 265 270
 Ala Tyr Leu Ser Thr Glu Tyr Lys Asp Val Val Ser Phe Ala Leu Leu
 275 280 285
 Ile Leu Val Leu Leu Val Met Pro Thr Gly Ile Leu Gly Arg Pro Glu
 290 295 300
 Val Glu Lys Val
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<210> 452

<211> 1017

<212> DNA

<213> Archaeoglobus fulgidus

<220>

<221> CDS

<222> (1)..(1017)

<400> 452

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 Met Val Arg Val Arg Asp Ala Ser Asn Asp Arg Gly Asp Ser Asn Cys
 Seite 727

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1	caa	gcc	aac	ggg	tct	ggt	cgg	ggt	gga	aga	atg	agg	ata	aca	agg	gcc	96
	Gln	Ala	Asn	Gly	Ser	Val	Arg	Gly	Gly	Arg	Met	Arg	Ile	Thr	Arg	Ala	
				20					25					30			
	ttt	aac	gcg	ctg	gct	ttg	att	gtc	gct	gcg	gtc	atg	ccg	ttc	att	ctt	144
	Phe	Asn	Ala	Leu	Ala	Leu	Ile	Val	Ala	Ala	Val	Met	Pro	Phe	Ile	Leu	
			35					40					45				
	ccg	gag	gcg	tac	ctt	tac	atc	ctc	ggc	ctc	gcg	tac	att	ttc	gca	ata	192
	Pro	Glu	Ala	Tyr	Leu	Tyr	Ile	Leu	Gly	Leu	Ala	Tyr	Ile	Phe	Ala	Ile	
		50					55					60					
	atg	ggt	atc	agc	tgg	gac	ctc	atg	gta	ggc	tac	acg	ggg	cag	gtg	aac	240
	Met	Val	Ile	Ser	Trp	Asp	Leu	Met	Val	Gly	Tyr	Thr	Gly	Gln	Val	Asn	
		65				70					75					80	
	ctg	ggc	cac	aca	acc	ttt	gtg	ggg	ctt	gga	gct	tac	ggt	gca	gca	att	288
	Leu	Gly	His	Thr	Thr	Phe	Val	Gly	Leu	Gly	Ala	Tyr	Val	Ala	Ala	Ile	
					85					90					95		
	ctg	cag	act	cct	ata	agg	gcg	ggg	ctg	tcg	ctg	cat	ccg	gca	ttg	gca	336
	Leu	Gln	Thr	Pro	Ile	Arg	Ala	Gly	Leu	Ser	Leu	His	Pro	Ala	Leu	Ala	
				100					105					110			
	ata	ata	acc	ggc	ggt	ggt	ggt	gcg	gca	gga	ggt	ggg	ctt	tca	att	ggt	384
	Ile	Ile	Thr	Gly	Gly	Val	Val	Ala	Ala	Gly	Val	Gly	Leu	Ser	Ile	Gly	
			115					120					125				
	att	atc	acg	ctc	aga	ctc	aga	ggc	tac	tac	ttt	tcc	ctg	ggt	acg	gca	432
	Ile	Ile	Thr	Leu	Arg	Leu	Arg	Gly	Tyr	Tyr	Phe	Ser	Leu	Val	Thr	Ala	
		130					135					140					
	ata	ctt	ccg	ctc	gtc	ttc	atg	cag	acg	gtc	ttc	atc	tgg	agg	gag	ctt	480
	Ile	Leu	Pro	Leu	Val	Phe	Met	Gln	Thr	Val	Phe	Ile	Trp	Arg	Glu	Leu	
		145				150					155				160		
	ttt	ggt	ggt	gag	gaa	gga	ttt	gcg	ata	gag	aac	acg	atg	ctc	aca	aca	528
	Phe	Gly	Gly	Glu	Glu	Gly	Phe	Ala	Ile	Glu	Asn	Thr	Met	Leu	Thr	Thr	
				165						170					175		
	acc	gtg	gag	aag	tac	tac	ttc	agc	ctt	gca	ggt	ctc	gtc	gtg	tcc	tta	576
	Thr	Val	Glu	Lys	Tyr	Tyr	Phe	Ser	Leu	Ala	Val	Leu	Val	Val	Ser	Leu	
			180						185					190			
	gtc	gta	atg	aag	gtg	gtg	gac	agc	agg	att	ggg	ctg	agg	ttt	atg		624
	Val	Val	Met	Lys	Lys	Val	Val	Asp	Arg	Ile	Gly	Leu	Arg	Phe	Met		
			195					200				205					
	gct	ttg	agg	gac	agc	gag	gag	ctt	gcc	gag	agt	ctg	gga	ata	aac	gcg	672
	Ala	Leu	Arg	Asp	Ser	Glu	Glu	Leu	Ala	Glu	Ser	Leu	Gly	Ile	Asn	Ala	
		210				215						220					
	acc	aaa	tac	aag	ggt	ctc	gac	ttc	gcg	cta	agc	tcc	ttc	ttt	gcg	gga	720
	Thr	Lys	Tyr	Lys	Val	Leu	Ala	Phe	Ala	Leu	Ser	Ser	Phe	Phe	Ala	Gly	
		225				230					235				240		
	att	gct	gga	gcg	atg	gtc	ggt	aac	tac	cgc	ggt	acc	gta	agt	ccg	gag	768
	Ile	Ala	Gly	Ala	Met	Val	Val	Asn	Tyr	Arg	Val	Thr	Val	Ser	Pro	Glu	
				245						250				255			
	ctt	tac	gga	gta	cct	ttg	atg	ctg	ctg	ata	atc	ctc	tca	gcc	ggt	ctc	816
	Leu	Tyr	Gly	Val	Pro	Leu	Met	Leu	Leu	Ile	Ile	Leu	Ser	Ala	Val	Leu	
				260					265					270			
	gga	gga	ctg	ggg	act	ctt	tac	ggc	cct	ctt	gct	gga	gcc	ata	gta	att	864
	Gly	Gly	Leu	Gly	Thr	Leu	Tyr	Gly	Pro	Leu	Ala	Gly	Ala	Ile	Val	Ile	
			275					280					285				
	tac	ctt	gcg	aag	aac	tgg	tgg	ctc	gga	cag	atc	att	cga	acg	ctc	tct	912
	Tyr	Leu	Ala	Lys	Asn	Trp	Trp	Leu	Gly	Gln	Ile	Ile	Arg	Thr	Leu	Ser	
		290				295						300					
	ctc	cct	ata	aac	gac	gac	atc	gtc	ctc	tac	gcc	ctt	ctg	ata	gcc	gtc	960
	Leu	Pro	Ile	Asn	Asp	Asp	Ile	Val	Leu	Tyr	Ala	Leu	Leu	Ile	Ala	Val	
		305				310					315					320	
	gga	att	ctg	atg	ccg	gaa	ggt	ctt	tac	cac	aag	gta	aaa	gtc	aat	aag	1008
	Gly	Ile	Leu	Met	Pro	Glu	Gly	Leu	Tyr	His	Lys	Val	Lys	Val	Asn	Lys	
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	cag	aag	taa														1017
	Gln	Lys															

<210> 453

<211> 338

<212> PRT

<213> Archaeoglobus fulgidus

<400> 453

Met Val Arg Val Arg Asp Ala Ser Asn Asp Arg Gly Asp Ser Asn Cys
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 Gln Ala Asn Gly Ser Val Arg Gly Gly Arg Met Arg Ile Thr Arg Ala
 20 25 30
 Phe Asn Ala Leu Ala Leu Ile Val Ala Ala Val Met Pro Phe Ile Leu
 35 40 45
 Pro Glu Ala Tyr Leu Tyr Ile Leu Gly Leu Ala Tyr Ile Phe Ala Ile
 50 55 60
 Met Val Ile Ser Trp Asp Leu Met Val Gly Tyr Thr Gly Gln Val Asn
 65 70 75 80
 Leu Gly His Thr Thr Phe Val Gly Leu Gly Ala Tyr Val Ala Ala Ile
 85 90 95
 Leu Gln Thr Pro Ile Arg Ala Gly Leu Ser Leu His Pro Ala Leu Ala
 100 105 110
 Ile Ile Thr Gly Gly Val Val Ala Ala Gly Val Gly Leu Ser Ile Gly
 115 120 125
 Ile Ile Thr Leu Arg Leu Arg Gly Tyr Tyr Phe Ser Leu Val Thr Ala
 130 135 140
 Ile Leu Pro Leu Val Phe Met Gln Thr Val Phe Ile Trp Arg Glu Leu
 145 150 155 160
 Phe Gly Gly Glu Glu Gly Phe Ala Ile Glu Asn Thr Met Leu Thr Thr
 165 170 175
 Thr Val Glu Lys Tyr Tyr Phe Ser Leu Ala Val Leu Val Val Ser Leu
 180 185 190
 Val Val Met Lys Lys Val Val Asp Ser Arg Ile Gly Leu Arg Phe Met
 195 200 205
 Ala Leu Arg Asp Ser Glu Glu Leu Ala Glu Ser Leu Gly Ile Asn Ala
 210 215 220
 Thr Lys Tyr Lys Val Leu Ala Phe Ala Leu Ser Ser Phe Phe Ala Gly
 225 230 235 240
 Ile Ala Gly Ala Met Val Val Asn Tyr Arg Val Thr Val Ser Pro Glu
 245 250 255
 Leu Tyr Gly Val Pro Leu Met Leu Leu Ile Ile Leu Ser Ala Val Leu
 260 265 270
 Gly Gly Leu Gly Thr Leu Tyr Gly Pro Leu Ala Gly Ala Ile Val Ile
 275 280 285
 Tyr Leu Ala Lys Asn Trp Trp Leu Gly Gln Ile Ile Arg Thr Leu Ser
 290 295 300
 Leu Pro Ile Asn Asp Asp Ile Val Leu Tyr Ala Leu Leu Ile Ala Val
 305 310 315 320
 Gly Ile Leu Met Pro Glu Gly Leu Tyr His Lys Val Lys Val Asn Lys
 325 330 335
 Gln Lys

<210> 454

<211> 894

<212> DNA

<213> Archaeoglobus fulgidus

<220>

<221> CDS

<222> (1)..(894)

<400> 454

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1 5 10 15	
gta gtg ggg ttc att tat gcc cta acg gca ctg ggg att aca ata atc	96
Val Val Gly Phe Ile Tyr Ala Leu Thr Ala Leu Gly Ile Thr Ile Ile	
20 25 30	
tac ggt att ttg cag att ccg gat ttc tcc cac ggg aac aga tac atg	144
Tyr Gly Ile Leu Gln Ile Pro Asp Phe Ser His Gly Asn Arg Tyr Met	
35 40 45	
atc ggt gct tac gcg gga ttc ctt gca gcc tca gta gct ggc agc atg	192
Ile Gly Ala Tyr Ala Gly Phe Leu Ala Ala Ser Val Ala Gly Ser Met	
50 55 60	

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ctt	gaa	atc	agc	tat	gtt	gct	gca	att	ctc	ggt	gca	gta	gca	gtc	tct	240
Leu	Glu	Ile	Ser	Tyr	Val	Ala	Ala	Ile	Leu	Gly	Ala	Val	Ala	Val	Ser	
65					70					75					80	
tcc	gta	att	gcc	gtt	ctg	agc	tac	ctt	ttc	ggt	tac	aag	aga	ttg	cta	288
Ser	Val	Ile	Ala	Val	Leu	Ser	Tyr	Leu	Phe	Val	Tyr	Lys	Arg	Leu	Leu	
				85					90					95		
agt	gct	cct	cac	ata	acg	tca	ttc	att	gca	gca	ata	ggt	ctt	tta	atg	336
Ser	Ala	Pro	His	Ile	Thr	Ser	Phe	Ile	Ala	Ala	Ile	Gly	Leu	Leu	Met	
			100					105					110			
ctg	ctg	gaa	gga	ttc	gcc	ctg	gca	gtc	ttc	ggt	ccg	aga	tac	cag	cgc	384
Leu	Leu	Glu	Gly	Phe	Ala	Leu	Ala	Val	Phe	Gly	Pro	Arg	Tyr	Gln	Arg	
		115			120							125				
att	cac	aca	ccc	ttc	gac	tac	att	ggt	ggt	att	gga	gca	ctg	aga	att	432
Ile	His	Thr	Pro	Phe	Asp	Tyr	Met	Val	Val	Ile	Gly	Ala	Leu	Arg	Ile	
	130				135						140					
aac	gcg	cag	agg	ctt	atc	gtc	ctt	ttc	tgc	tcc	atc	gcc	gcc	ata	gcg	480
Asn	Ala	Gln	Arg	Leu	Ile	Val	Leu	Phe	Cys	Ser	Ile	Ala	Ala	Ile	Ala	
145					150					155					160	
tct	ctg	ctg	tac	ttt	ttg	aga	agg	acg	gta	acc	gga	ata	gct	ctc	gag	528
Ser	Leu	Leu	Tyr	Phe	Leu	Arg	Arg	Thr	Val	Thr	Gly	Ile	Ala	Leu	Glu	
				165					170					175		
gct	gtt	gct	caa	tcg	cca	ata	gga	gcg	aag	ctc	gtt	gga	atc	aac	acc	576
Ala	Val	Ala	Gln	Ser	Pro	Ile	Gly	Ala	Lys	Leu	Val	Gly	Ile	Asn	Thr	
			180					185					190			
gat	aag	atg	acg	cta	ata	gcc	ttt	gcc	att	gcc	ggg	gcg	ctt	gca	ggt	624
Asp	Lys	Met	Thr	Leu	Ile	Ala	Phe	Ala	Ile	Ala	Gly	Ala	Leu	Ala	Gly	
		195					200					205				
ttc	gca	gcg	gca	tta	att	gct	cca	ata	act	ctt	gtg	tat	cct	ata	atg	672
Phe	Ala	Ala	Ala	Leu	Ile	Ala	Pro	Ile	Thr	Leu	Val	Tyr	Pro	Ile	Met	
	210					215					220					
ggt	gct	gag	ctc	aac	ttg	aag	gcc	ttc	gta	atc	tgc	gtc	gtt	ggt	ggg	720
Gly	Ala	Glu	Leu	Asn	Leu	Lys	Ala	Phe	Val	Ile	Cys	Val	Val	Gly	Gly	
225					230					235					240	
ctt	ggg	aac	atc	ccg	ggt	gcc	ata	gcc	gga	ggg	ctg	gtc	ctc	gga	att	768
Leu	Gly	Asn	Ile	Pro	Gly	Ala	Ile	Ala	Gly	Gly	Leu	Val	Leu	Gly	Ile	
				245					250					255		
gtt	gaa	tcc	ctc	tac	ggc	ggt	tat	ttt	gac	atc	agg	tgg	aaa	aac	ctc	816
Val	Glu	Ser	Leu	Tyr	Gly	Gly	Tyr	Phe	Asp	Ile	Arg	Trp	Lys	Asn	Leu	
			260					265					270			
gtt	gcg	ttt	ggg	att	ctt	gtc	gcc	atc	ctg	att	ctc	aag	cca	gaa	ggt	864
Val	Ala	Phe	Gly	Ile	Leu	Val	Ala	Ile	Leu	Ile	Leu	Lys	Pro	Glu	Gly	
		275					280					285				
ctg	ttt	ggt	aag	aag	gag	agg	aga	gca	tga							894
Leu	Phe	Gly	Lys	Lys	Glu	Arg	Arg	Ala								
	290					295										

<210> 455

<211> 297

<212> PRT

<213> Archaeoglobus fulgidus

<400> 455

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			20					25					30			
Tyr	Gly	Ile	Leu	Gln	Ile	Pro	Asp	Phe	Ser	His	Gly	Asn	Arg	Tyr	Met	
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Ile	Gly	Ala	Tyr	Ala	Gly	Phe	Leu	Ala	Ala	Ser	Val	Ala	Gly	Ser	Met	
	50					55					60					
Leu	Glu	Ile	Ser	Tyr	Val	Ala	Ala	Ile	Leu	Gly	Ala	Val	Ala	Val	Ser	
65					70					75					80	
Ser	Val	Ile	Ala	Val	Leu	Ser	Tyr	Leu	Phe	Val	Tyr	Lys	Arg	Leu	Leu	
				85					90					95		
Ser	Ala	Pro	His	Ile	Thr	Ser	Phe	Ile	Ala	Ala	Ile	Gly	Leu	Leu	Met	
			100					105					110			
Leu	Leu	Glu	Gly	Phe	Ala	Leu	Ala	Val	Phe	Gly	Pro	Arg	Tyr	Gln	Arg	
		115					120					125				
Ile	His	Thr	Pro	Phe	Asp	Tyr	Met	Val	Val	Ile	Gly	Ala	Leu	Arg	Ile	

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130	Asn	Ala	Gln	Arg	Leu	Ile	135	Val	Leu	Phe	Cys	Ser	140	Ile	Ala	Ala	Ile	Ala	
145	Ser	Leu	Leu	Tyr	Phe	Leu	150	Arg	Arg	Thr	Val	Thr	155	Gly	Ile	Ala	Leu	160	Glu
					165	Ser	Pro	Ile	Gly	Ala	Lys	Leu	170	Val	Gly	Ile	Asn	175	Thr
					180	Leu	Ile	Ala	Phe	Ala	Ile	Ala	185	Gly	Ala	Leu	Ala	190	Gly
					195	Thr			200	Pro	Ile	Thr	205	Val	Tyr	Pro	Ile	210	Met
					215	Leu	Ile	Ala	Ala	Phe	Val	Ile	220	Cys	Val	Val	Gly	225	Gly
					230	Asn	Leu	Lys	Ala	Phe	Val	Ile	235	Gly	Leu	Val	Leu	240	Gly
					245	Pro	Gly	Ala	Ile	Ala	Gly	250	Gly	Leu	Val	Leu	Gly	255	Ile
					260	Tyr	Gly	Gly	Tyr	Phe	Asp	Ile	265	Arg	Trp	Lys	Asn	270	Leu
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<210> 456

<211> 1278

<212> DNA

<213> Pseudomonas aeruginosa

<220>

<221> CDS

<222> (1)..(1278)

<400> 456

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1				5					10					15		
gtg	ctc	tcc	ggg	tgg	atc	gcc	ctg	gtg	gtg	ttc	ggc	ccc	atc	gtc	ggc	96
Val	Leu	Ser	Gly	Leu	Ile	Ala	Leu	Val	Val	Phe	Gly	Pro	Ile	Val	Gly	
			20					25					30			
gtg	gtc	ctc	gac	ggc	tac	ggc	ttc	aac	ctg	cat	tac	gag	cgg	gtc	ggc	144
Val	Val	Leu	Asp	Gly	Tyr	Gly	Phe	Asn	Leu	His	Tyr	Glu	Arg	Val	Gly	
			35				40					45				
tgg	atc	atc	gcg	atc	gtg	atg	gcc	ggg	cgc	ttc	ctg	ctc	agc	ctc	tac	192
Trp	Ile	Ile	Ala	Ile	Val	Met	Ala	Gly	Arg	Phe	Leu	Leu	Ser	Leu	Tyr	
			50			55			60							
ctg	cag	acc	cgc	ggc	ggg	cgc	gcc	gtg	ctg	gag	cgc	ttc	gag	ggg	gct	240
Leu	Gln	Thr	Arg	Gly	Gly	Arg	Ala	Val	Leu	Glu	Arg	Phe	Glu	Gly	Ala	
			65		70				75					80		
ggc	agc	ggc	gtc	cac	gtc	ctg	ccg	ccg	ggc	tac	aag	acc	cgc	ttg	cgc	288
Gly	Ser	Gly	Val	His	Val	Leu	Pro	Pro	Gly	Tyr	Lys	Thr	Arg	Leu	Arg	
				85				90						95		
tgg	atc	gtg	ccg	ctg	atc	ctg	gtg	gcc	gcg	gtg	atc	ttc	ccg	ttc	ttc	336
Trp	Ile	Val	Pro	Leu	Ile	Leu	Val	Ala	Ala	Val	Ile	Phe	Pro	Phe	Phe	
			100					105					110			
gcc	agc	aag	tac	ctg	ctg	gcg	gtg	gtc	atc	ctc	ggc	ctg	atc	tac	gtg	384
Ala	Ser	Lys	Tyr	Leu	Leu	Ala	Val	Val	Ile	Leu	Gly	Leu	Ile	Tyr	Val	
			115				120					125				
ctg	ctg	ggc	ctg	ggc	ctg	aac	atc	gtg	gtc	ggc	ctc	gcc	ggg	ctg	ctc	432
Leu	Leu	Gly	Leu	Gly	Leu	Asn	Ile	Val	Val	Gly	Leu	Ala	Gly	Leu	Leu	
			130			135					140					
gac	ctc	ggc	tac	gtg	gcc	ttc	tac	gcc	atc	ggc	gcc	tat	ggc	ctg	gcg	480
Asp	Leu	Gly	Tyr	Val	Ala	Phe	Tyr	Ala	Ile	Gly	Ala	Tyr	Gly	Leu	Ala	
					150				155					160		
ctg	ggc	tac	cag	tac	ctc	ggc	ctg	ggc	ttc	tgg	acc	gtc	ctg	ccg	ctg	528
Leu	Gly	Tyr	Gln	Tyr	Leu	Gly	Leu	Gly	Phe	Trp	Thr	Val	Leu	Pro	Leu	
				165				170						175		
gcc	gcg	ctg	acc	gcc	gcg	gtg	gcc	ggg	gcg	atc	ctc	ggc	ttc	ccg	gtg	576
Ala	Ala	Leu	Thr	Ala	Ala	Val	Ala	Gly	Ala	Ile	Leu	Gly	Phe	Pro	Val	
			180					185					190			
ttg	cgc	atg	cat	ggc	gac	tac	ctg	gcg	atc	gtc	acc	ctg	ggc	ttc	ggc	624

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Leu	Arg	Met	His	Gly	Asp	Tyr	Leu	Ala	Ile	Val	Thr	Leu	Gly	Phe	Gly		
gag	atc	atc	cgc	ctg	gta	ctg	aac	aac	tgg	ctg	tcc	ttc	acc	ggc	ggg	672	
Glu	Ile	Ile	Arg	Leu	Val	Leu	Asn	Asn	Trp	Leu	Ser	Phe	Thr	Gly	Gly		
210						215					220						
ccg	aac	ggc	atg	ccg	gcg	ccg	gcg	ccg	acc	ttc	ctc	ggc	ctg	gag	ttc	720	
Pro	Asn	Gly	Met	Pro	Ala	Pro	Ala	Pro	Thr	Phe	Leu	Gly	Leu	Glu	Phe		
225					230					235					240		
ggc	cgc	cgg	gcc	aag	gat	ggc	ggg	gtg	ccg	atc	cac	gag	ttc	ctc	ggc	768	
Gly	Arg	Arg	Ala	Lys	Asp	Gly	Gly	Val	Pro	Ile	His	Glu	Phe	Leu	Gly		
				245					250					255			
atc	gcc	tac	aac	ccc	aac	atg	aag	ttc	ctg	ttc	atc	tac	gtg	gtg	ctg	816	
Ile	Ala	Tyr	Asn	Pro	Asn	Met	Lys	Phe	Leu	Phe	Ile	Tyr	Val	Val	Leu		
				260				265					270				
ttc	ctg	gtc	gtg	ctg	ctg	gtg	ctc	tac	atc	aag	cac	cgg	ctg	acc	cgg	864	
Phe	Leu	Val	Val	Leu	Leu	Val	Leu	Tyr	Ile	Lys	His	Arg	Leu	Thr	Arg		
275						280						285					
atg	ccg	gtc	ggg	cgc	gcc	tgg	gag	gcg	ctg	cgc	gag	gac	gag	atc	gcc	912	
Met	Pro	Val	Gly	Arg	Ala	Trp	Glu	Ala	Leu	Arg	Glu	Asp	Glu	Ile	Ala		
290						295					300						
tgt	cgc	gcg	atg	ggc	ctc	aac	cat	gtg	ctg	gtg	aaa	ctc	tcg	gcg	ttc	960	
Cys	Arg	Ala	Met	Gly	Leu	Asn	His	Val	Leu	Val	Lys	Leu	Ser	Ala	Phe		
305					310					315					320		
atg	ctc	ggc	gcc	tcc	acc	gcg	gga	ctg	gcc	ggg	gtg	ttc	ttc	gcc	agc	1008	
Met	Leu	Gly	Ala	Ser	Thr	Ala	Gly	Leu	Ala	Gly	Val	Phe	Phe	Ala	Ser		
				325					330					335			
tac	cag	ggc	ttc	gtc	aac	ccg	tcc	tcg	ttc	aac	ttc	ttc	gag	tcg	gcg	1056	
Tyr	Gln	Gly	Phe	Val	Asn	Pro	Ser	Ser	Phe	Asn	Phe	Phe	Glu	Ser	Ala		
				340				345					350				
ctg	atc	ctc	gcc	atc	gtc	gtg	ctc	ggc	atg	ggc	tcg	acg	gtc	ggg		1104	
Leu	Ile	Leu	Ala	Ile	Val	Val	Leu	Gly	Gly	Met	Gly	Ser	Thr	Val	Gly		
				355			360					365					
gtg	gtg	atc	gcc	gcc	ttc	gtc	ctc	acc	gtg	gcg	ccg	gag	ctg	ctg	cgc	1152	
Val	Val	Ile	Ala	Ala	Phe	Val	Leu	Thr	Val	Ala	Pro	Glu	Leu	Leu	Arg		
370						375					380						
agc	ttc	gcc	gac	atc	cgc	gtg	ctg	ctg	ctc	ggg	ata	ctc	atg	gtg	gtg	1200	
Ser	Phe	Ala	Asp	Ile	Arg	Val	Leu	Leu	Leu	Gly	Ile	Leu	Met	Val	Val		
385					390					395					400		
atg	atg	atc	tgg	cgc	ccg	cgc	ggg	ctg	atc	cgc	atc	agc	cgc	gtg	ggc	1248	
Met	Met	Ile	Trp	Arg	Pro	Arg	Gly	Leu	Ile	Arg	Ile	Ser	Arg	Val	Gly		
				405					410					415			
ttc	gcc	ccg	cgc	aag	ggg	gtg	gcg	cca	tga							1278	
Phe	Ala	Pro	Arg	Lys	Gly	Val	Ala	Pro									
				420				425									

<210> 457

<211> 425

<212> PRT

<213> Pseudomonas aeruginosa

<400> 457

Met	Ser	Asn	Glu	Thr	Ser	Ile	Asp	Leu	Lys	Gln	Cys	Val	Leu	Asp	Ala		
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Val	Leu	Ser	Gly	Leu	Ile	Ala	Leu	Val	Val	Phe	Gly	Pro	Ile	Val	Gly		
			20					25					30				
Val	Val	Leu	Asp	Gly	Tyr	Gly	Phe	Asn	Leu	His	Tyr	Glu	Arg	Val	Gly		
			35				40					45					
Trp	Ile	Ile	Ala	Ile	Val	Met	Ala	Gly	Arg	Phe	Leu	Leu	Ser	Leu	Tyr		
			50			55					60						
Leu	Gln	Thr	Arg	Gly	Gly	Arg	Ala	Val	Leu	Glu	Arg	Phe	Glu	Gly	Ala		
65				70						75					80		
Gly	Ser	Gly	Val	His	Val	Leu	Pro	Pro	Gly	Tyr	Lys	Thr	Arg	Leu	Arg		
				85					90					95			
Trp	Ile	Val	Pro	Leu	Ile	Leu	Val	Ala	Ala	Val	Ile	Phe	Pro	Phe	Phe		
			100					105					110				
Ala	Ser	Lys	Tyr	Leu	Leu	Ala	Val	Val	Ile	Leu	Gly	Leu	Ile	Tyr	Val		
		115					120					125					
Leu	Leu	Gly	Leu	Gly	Leu	Asn	Ile	Val	Val	Gly	Leu	Ala	Gly	Leu	Leu		
130						135					140						

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Asp 145 Leu Gly Tyr Val Ala 150 Phe Tyr Ala Ile Gly 155 Ala Tyr Gly Leu Ala 160
 Leu Gly Tyr Gln Tyr 165 Leu Gly Leu Gly Phe 170 Trp Thr Val Leu Pro 175 Leu
 Ala Ala Leu Thr 180 Ala Ala Val Ala Gly 185 Ala Ile Leu Gly Phe 190 Pro Val
 Leu Arg Met 195 His Gly Asp Tyr Leu 200 Ala Ile Val Thr Leu 205 Gly Phe Gly
 Glu Ile 210 Ile Arg Leu Val Leu 215 Asn Asn Trp Leu Ser 220 Phe Thr Gly Gly
 Pro 225 Asn Gly Met Pro Ala 230 Pro Ala Pro Thr Phe 235 Leu Gly Leu Glu Phe 240
 Gly Arg Arg Ala Lys 245 Asp Gly Gly Val Pro 250 Ile His Glu Phe Leu 255 Gly
 Ile Ala Tyr Asn 260 Pro Asn Met Lys Phe 265 Leu Phe Ile Tyr Val 270 Val Leu
 Phe Leu Val 275 Val Leu Leu Val Leu 280 Tyr Ile Lys His Arg 285 Leu Thr Arg
 Met Pro 290 Val Gly Arg Ala Trp 295 Glu Ala Leu Arg Glu 300 Asp Glu Ile Ala
 Cys 305 Arg Ala Met Gly Leu 310 Asn His Val Leu Val Lys Leu Ser Ala Phe 320
 Met Leu Gly Ala Ser 325 Thr Ala Gly Leu Ala Gly Val Phe Phe Ala Ser 335
 Tyr Gln Gly Phe 340 Val Asn Pro Ser Ser 345 Phe Asn Phe Phe Glu Ser Ala
 Leu Ile Leu 355 Ala Ile Val Val Leu 360 Gly Gly Met Gly Ser 365 Thr Val Gly
 Val Val 370 Ile Ala Ala Phe Val 375 Leu Thr Val Ala Pro 380 Glu Leu Leu Arg
 Ser 385 Phe Ala Asp Ile Arg 390 Val Leu Leu Leu Gly 395 Ile Leu Met Val Val 400
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 Phe Ala Pro Arg 420 Lys Gly Val Ala Pro 425

<210> 458

<211> 957

<212> DNA

<213> Streptococcus pneumoniae

<220>

<221> CDS

<222> (1)..(957)

<400> 458

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Met Lys Glu Asn Leu 5 Lys Val Asn Ile Leu 10 Trp Leu Leu Leu 15	
gct ggc tat agc ttg att agt gta ctg gtt tca gtc gga gta ctt aat	96
Ala Gly Tyr Ser 20 Leu Ile Ser Val 25 Val Ser Val Gly 30 Val Leu Asn	
cta ttc tat gta cag att tta caa caa att gga att aat att att ttg	144
Leu Phe Tyr 35 Val Gln Ile Leu 40 Gln Ile Gly Ile Asn 45 Ile Ile Leu	
gct gtt ggt ctc aac tta atc ggt ttt tca gga caa ttt tca ctt	192
Ala Val 50 Gly Leu Asn Leu 55 Val Gly Phe Ser 60 Gln Phe Ser Leu	
ggt cat gct ggt ttc atg gcg att ggt gcc tat gca gca gct att att	240
Gly 65 His Ala Gly Phe Met 70 Ala Ile Gly Ala Tyr 75 Ala Ala Ala Ile Ile 80	
ggt tct aaa tca cca acc tac ggt gcc ttc ttt gga gct atg ctt gta	288
Gly Ser Lys Ser Pro 85 Thr Tyr Gly Ala Phe 90 Phe Gly Ala Met 95 Leu Val	
ggg gct ttg ctt tca gga gca gtt gcc tta ctt gtc ggc att cca acc	336
Gly Ala Leu 100 Ser Gly Ala Val 105 Ala Leu Leu Val Gly 110 Ile Pro Thr	
ttg cgc ttg aag ggg gac tat ctt gcg gta gca act cta ggt gtt tct	384

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Leu	Arg	Leu	Lys	Gly	Asp	Tyr	Leu	Ala	Val	Ala	Thr	Leu	Gly	Val	Ser		
gaa	att	atc	cgt	atc	ttt	atc	atc	aat	ggg	gga	agc	ctt	aca	aat	ggg	432	
Glu	Ile	Ile	Arg	Ile	Phe	Ile	Ile	Asn	Gly	Gly	Ser	Leu	Thr	Asn	Gly		
130					135					140							
gcg	gca	ggg	atc	tta	ggg	att	cct	aac	ttt	aca	act	tgg	caa	atg	ggt	480	
Ala	Ala	Gly	Ile	Leu	Gly	Ile	Pro	Asn	Phe	Thr	Thr	Trp	Gln	Met	Val		
145					150					155					160		
tac	ttc	ttt	gtc	gtg	att	aca	acc	att	gca	acc	ttg	aac	ttc	ttg	cgt	528	
Tyr	Phe	Phe	Val	Val	Ile	Thr	Thr	Ile	Ala	Thr	Leu	Asn	Phe	Leu	Arg		
			165						170					175			
agc	cca	att	ggg	cgt	tca	acc	ctc	tct	ggt	cgt	gaa	gat	gaa	atc	gct	576	
Ser	Pro	Ile	Gly	Arg	Ser	Thr	Leu	Ser	Val	Arg	Glu	Asp	Glu	Ile	Ala		
			180					185					190				
gct	gag	tca	ggt	ggg	ggt	aat	acg	act	aaa	att	aaa	atc	atc	gct	ttt	624	
Ala	Glu	Ser	Val	Gly	Val	Asn	Thr	Thr	Lys	Ile	Lys	Ile	Ile	Ala	Phe		
		195					200					205					
gtc	ttt	ggg	gcc	att	act	gca	agt	att	gct	ggg	tca	ctt	cag	gca	gga	672	
Val	Phe	Gly	Ala	Ile	Thr	Ala	Ser	Ile	Ala	Gly	Ser	Leu	Gln	Ala	Gly		
		210				215					220						
ttt	atc	ggg	tct	ggt	gta	ccg	aaa	gat	tac	acc	ttc	atc	aac	tca	atc	720	
Phe	Ile	Gly	Ser	Val	Val	Pro	Lys	Asp	Tyr	Thr	Phe	Ile	Asn	Ser	Ile		
225					230					235					240		
aac	ggt	ttg	att	att	ggt	gta	ttt	ggg	gga	ctc	ggg	tcc	att	aca	ggg	768	
Asn	Val	Leu	Ile	Ile	Val	Val	Phe	Gly	Gly	Leu	Gly	Ser	Ile	Thr	Gly		
				245				250						255			
gcg	att	ggt	tcg	gct	att	ggt	ctg	gga	att	ttg	aat	atg	ctt	ctc	caa	816	
Ala	Ile	Val	Ser	Ala	Ile	Val	Leu	Gly	Ile	Leu	Asn	Met	Leu	Leu	Gln		
			260				265					270					
gat	ggt	gct	agt	gtg	cgt	atg	att	att	tac	gct	ttg	gcc	ttg	gta	ttg	864	
Asp	Val	Ala	Ser	Val	Arg	Met	Ile	Ile	Tyr	Ala	Leu	Ala	Leu	Val	Leu		
			275			280						285					
gta	atg	att	ttc	aga	cca	ggg	gga	ctc	ctt	gga	aca	tgg	gaa	ctg	agc	912	
Val	Met	Ile	Phe	Arg	Pro	Gly	Gly	Leu	Leu	Gly	Thr	Trp	Glu	Leu	Ser		
		290				295				300							
cta	tca	cgt	ttc	ttt	aaa	aaa	tct	aag	aag	gag	gaa	caa	aac	taa		957	
Leu	Ser	Arg	Phe	Phe	Lys	Lys	Ser	Lys	Lys	Glu	Glu	Gln	Asn				
305					310					315							

<210> 459

<211> 318

<212> PRT

<213> Streptococcus pneumoniae

<400> 459

Met	Lys	Glu	Asn	Leu	Lys	Val	Asn	Ile	Leu	Trp	Leu	Leu	Leu	Leu	Leu		
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Ala	Gly	Tyr	Ser	Leu	Ile	Ser	Val	Leu	Val	Ser	Val	Gly	Val	Leu	Asn		
			20					25					30				
Leu	Phe	Tyr	Val	Gln	Ile	Leu	Gln	Gln	Ile	Gly	Ile	Asn	Ile	Ile	Leu		
		35					40					45					
Ala	Val	Gly	Leu	Asn	Leu	Ile	Val	Gly	Phe	Ser	Gly	Gln	Phe	Ser	Leu		
		50				55					60						
Gly	His	Ala	Gly	Phe	Met	Ala	Ile	Gly	Ala	Tyr	Ala	Ala	Ala	Ile	Ile		
65					70					75				80			
Gly	Ser	Lys	Ser	Pro	Thr	Tyr	Gly	Ala	Phe	Phe	Gly	Ala	Met	Leu	Val		
				85					90					95			
Gly	Ala	Leu	Leu	Ser	Gly	Ala	Val	Ala	Leu	Leu	Val	Gly	Ile	Pro	Thr		
			100					105					110				
Leu	Arg	Leu	Lys	Gly	Asp	Tyr	Leu	Ala	Val	Ala	Thr	Leu	Gly	Val	Ser		
		115					120					125					
Glu	Ile	Ile	Arg	Ile	Phe	Ile	Ile	Asn	Gly	Gly	Ser	Leu	Thr	Asn	Gly		
		130				135					140						
Ala	Ala	Gly	Ile	Leu	Gly	Ile	Pro	Asn	Phe	Thr	Thr	Trp	Gln	Met	Val		
145					150					155					160		
Tyr	Phe	Phe	Val	Val	Ile	Thr	Thr	Ile	Ala	Thr	Leu	Asn	Phe	Leu	Arg		
			165						170					175			
Ser	Pro	Ile	Gly	Arg	Ser	Thr	Leu	Ser	Val	Arg	Glu	Asp	Glu	Ile	Ala		
			180					185					190				

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Ala Glu Ser Val Gly Val Asn Thr Thr Lys Ile Lys Ile Ile Ala Phe
 Val Phe Gly Ala Ile Thr Ala Ser Ile Ala Gly Ser Leu Gln Ala Gly
 Phe Ile Gly Ser Val Val Pro Lys Asp Tyr Thr Phe Ile Asn Ser Ile
 Asn Val Leu Ile Ile Val Val Phe Gly Gly Leu Gly Ser Ile Thr Gly
 Ala Ile Val Ser Ala Ile Val Leu Gly Ile Leu Asn Met Leu Leu Gln
 Asp Val Ala Ser Val Arg Met Ile Ile Tyr Ala Leu Ala Leu Val Leu
 Val Met Ile Phe Arg Pro Gly Gly Leu Leu Gly Thr Trp Glu Leu Ser
 Leu Ser Arg Phe Phe Lys Lys Ser Lys Lys Glu Glu Gln Asn
 305 310 315

<210> 460

<211> 999

<212> DNA

<213> Brucella melitensis

<220>

<221> CDS

<222> (1)..(999)

<400> 460

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atg gat cag att ctc ttt gcc gta ttg aac ggc gcg atc tac gga ttg	96
Met Asp Gln Ile Leu Phe Ala Val Leu Asn Gly Ala Ile Tyr Gly Leu	
20 25 30	
ctg ctg ttc atg gtt tcg gcg ggt ctc acc ctc att ttc ggc atg atg	144
Leu Leu Phe Met Val Ser Ala Gly Leu Thr Leu Ile Phe Gly Met Met	
35 40 45	
ggg gtt ctc aac ttc gca cat gct tcc ttc tat atg atg gga gcc tat	192
Gly Val Leu Asn Phe Ala His Ala Ser Phe Tyr Met Met Gly Ala Tyr	
50 55 60	
ttc gct tac acg ctt cag ccg ctt acc ggc ttc tgg ctt gca atc ctg	240
Phe Ala Tyr Thr Leu Gln Pro Leu Thr Gly Phe Trp Leu Ala Ile Leu	
65 70 75 80	
att gcg ccc gtg atc gtc ggc att gtc ggc att gtc ggc gtt ctg gtt	288
Ile Ala Pro Val Ile Val Gly Ile Val Gly Ile Val Gly Val Leu Val	
85 90 95	
gaa cgc ttc att ttg cgc cgt gtc cac gct ttc ggc cat gcg cat gaa	336
Glu Arg Phe Ile Leu Arg Arg Val His Ala Phe Gly His Ala His Glu	
100 105 110	
ttg ctg gtc acg ttc ggc ctc tcg gtg gtc att gct gaa gtc atc aag	384
Leu Leu Val Thr Phe Gly Leu Ser Val Val Ile Ala Glu Val Ile Lys	
115 120 125	
att ttc tac ggc aat ttc gcc gaa tac cgc att ccc gca gca ctg	432
Ile Phe Tyr Gly Asn Phe Ala Val Glu Tyr Arg Ile Pro Ala Ala Leu	
130 135 140	
caa ttt tcg gct ttc gat ctt ggc ggg gtg agc tat cca ttc tac cgc	480
Gln Phe Ser Ala Phe Asp Leu Gly Gly Val Ser Tyr Pro Phe Tyr Arg	
145 150 155 160	
ctg ttc ata ggt gcc gtg gcg ctg gtg atg ttc ctg ctg atc tat ctg	528
Leu Phe Ile Gly Ala Val Ala Leu Val Met Phe Leu Leu Ile Tyr Leu	
165 170 175	
ctg ctc acg cgc acc cgc atc ggc atc gtc gtt cgc tcg gca atc tat	576
Leu Leu Thr Arg Thr Arg Ile Gly Ile Val Val Arg Ser Ala Ile Tyr	
180 185 190	
cgc ccg cgc atg gtg gag gcg ctc ggc cac aat gtt ccg ctg gtc ttc	624
Arg Pro Arg Met Val Glu Ala Leu Gly His Asn Val Pro Leu Val Phe	
195 200 205	
atg ggc gtg ttc ggc gtc ggc gca ttc ctt gcc ggc ctt gcc ggt tcg	672
Met Gly Val Phe Gly Val Gly Ala Phe Leu Ala Gly Leu Ala Gly Ser	
210 215 220	

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gtg	gcg	ggc	gcg	ttc	tat	acg	aca	aac	ccg	aac	atg	gcg	ctg	gaa	ctg	720
Val	Ala	Gly	Ala	Phe	Tyr	Thr	Thr	Asn	Pro	Asn	Met	Ala	Leu	Glu	Leu	
225				230				235							240	
ggc	gtc	atg	gtc	ttc	gtg	gtc	gtc	gtc	gtg	ggc	ggg	ctt	ggc	tcg	ctt	768
Gly	Val	Met	Val	Phe	Val	Val	Val	Val	Val	Gly	Gly	Leu	Gly	Ser	Leu	
				245				250						255		
ggc	gga	gcc	atg	ttt	gct	tcg	ctt	ctg	atc	ggc	att	ctt	tcc	tcc	gtc	816
Gly	Gly	Ala	Met	Phe	Ala	Ser	Leu	Leu	Ile	Gly	Ile	Leu	Ser	Ser	Val	
			260					265					270			
gcc	gtt	ggc	gtg	aag	gtc	tcg	atc	gca	agc	ctc	ctc	gat	tat	gtg	ggg	864
Ala	Val	Gly	Val	Lys	Val	Ser	Ile	Ala	Ser	Leu	Leu	Asp	Tyr	Val	Gly	
			275				280					285				
ctt	ggc	gat	tat	gcc	cgt	gaa	atc	ggc	ggc	gtg	ctg	acg	ctg	gaa	gtc	912
Leu	Gly	Asp	Tyr	Ala	Arg	Glu	Ile	Gly	Gly	Val	Leu	Thr	Leu	Glu	Val	
	290					295					300					
tcc	agc	att	gca	gcc	acc	ctg	cca	ttc	ttc	ctg	atg	ctt	atc	ggt	ctc	960
Ser	Ser	Ile	Ala	Ala	Thr	Leu	Pro	Phe	Phe	Leu	Met	Leu	Ile	Val	Leu	
305					310					315					320	
ctg	gta	cgt	cca	agc	gga	ctg	ttc	ggg	gca	aag	gag	taa				999
Leu	Val	Arg	Pro	Ser	Gly	Leu	Phe	Gly	Ala	Lys	Glu					
				325				330								

<210> 461

<211> 332

<212> PRT

<213> Brucella melitensis

<400> 461

Met	Asp	Arg	Ser	Pro	Val	Arg	Ala	Glu	Leu	Pro	Ile	Thr	Asp	Gln	Thr	
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Met	Asp	Gln	Ile	Leu	Phe	Ala	Val	Leu	Asn	Gly	Ala	Ile	Tyr	Gly	Leu	
			20					25					30			
Leu	Leu	Phe	Met	Val	Ser	Ala	Gly	Leu	Thr	Leu	Ile	Phe	Gly	Met	Met	
		35					40					45				
Gly	Val	Leu	Asn	Phe	Ala	His	Ala	Ser	Phe	Tyr	Met	Met	Gly	Ala	Tyr	
	50					55					60					
Phe	Ala	Tyr	Thr	Leu	Gln	Pro	Leu	Thr	Gly	Phe	Trp	Leu	Ala	Ile	Leu	
65					70				75						80	
Ile	Ala	Pro	Val	Ile	Val	Gly	Ile	Val	Gly	Ile	Val	Gly	Val	Leu	Val	
				85					90					95		
Glu	Arg	Phe	Ile	Leu	Arg	Arg	Val	His	Ala	Phe	Gly	His	Ala	His	Glu	
			100					105					110			
Leu	Leu	Val	Thr	Phe	Gly	Leu	Ser	Val	Val	Ile	Ala	Glu	Val	Ile	Lys	
		115					120					125				
Ile	Phe	Tyr	Gly	Asn	Phe	Ala	Val	Glu	Tyr	Arg	Ile	Pro	Ala	Ala	Leu	
	130					135					140					
Gln	Phe	Ser	Ala	Phe	Asp	Leu	Gly	Gly	Val	Ser	Tyr	Pro	Phe	Tyr	Arg	
145					150					155					160	
Leu	Phe	Ile	Gly	Ala	Val	Ala	Leu	Val	Met	Phe	Leu	Leu	Ile	Tyr	Leu	
				165					170					175		
Leu	Leu	Thr	Arg	Thr	Arg	Ile	Gly	Ile	Val	Val	Arg	Ser	Ala	Ile	Tyr	
			180					185					190			
Arg	Pro	Arg	Met	Val	Glu	Ala	Leu	Gly	His	Asn	Val	Pro	Leu	Val	Phe	
		195					200					205				
Met	Gly	Val	Phe	Gly	Val	Gly	Ala	Phe	Leu	Ala	Gly	Leu	Ala	Gly	Ser	
	210					215					220					
Val	Ala	Gly	Ala	Phe	Tyr	Thr	Thr	Asn	Pro	Asn	Met	Ala	Leu	Glu	Leu	
225					230					235					240	
Gly	Val	Met	Val	Phe	Val	Val	Val	Val	Val	Gly	Gly	Leu	Gly	Ser	Leu	
				245						250				255		
Gly	Gly	Ala	Met	Phe	Ala	Ser	Leu	Leu	Ile	Gly	Ile	Leu	Ser	Ser	Val	
			260					265					270			
Ala	Val	Gly	Val	Lys	Val	Ser	Ile	Ala	Ser	Leu	Leu	Asp	Tyr	Val	Gly	
		275					280					285				
Leu	Gly	Asp	Tyr	Ala	Arg	Glu	Ile	Gly	Gly	Val	Leu	Thr	Leu	Glu	Val	
	290					295					300					
Ser	Ser	Ile	Ala	Ala	Thr	Leu	Pro	Phe	Phe	Leu	Met	Leu	Ile	Val	Leu	
305					310					315					320	
Leu	Val	Arg	Pro	Ser	Gly	Leu	Phe	Gly	Ala	Lys	Glu					

<210> 462
 <211> 942
 <212> DNA
 <213> Agrobacterium tumefaciens

<220>
 <221> CDS
 <222> (1)..(942)

<400> 462
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 Tyr Ala Gln Asn Val Trp Tyr Gly Leu Ser Leu Gly Ser Val Leu Leu
 20 25 30
 ctg gcc gcc atc ggc ctt gcc atc acc ttc ggc gtg atg ggc atc atc 144
 Leu Ala Ala Ile Gly Leu Ala Ile Thr Phe Gly Val Met Gly Ile Ile
 35 40 45
 aac atg gca cat ggc gag atg gtg atg atc ggc gct tac tcc acc ttc 192
 Asn Met Ala His Gly Glu Met Val Met Ile Gly Ala Tyr Ser Thr Phe
 50 55 60
 atg gtg cag gaa gtg atc cgc agt cac ttc ccc ggc ctg ttc gac tgg 240
 Met Val Gln Glu Val Ile Arg Ser His Phe Pro Gly Leu Phe Asp Trp
 65 70 75 80
 tcg ctg gcg att gcc ttg cca gtc gcc ttt ctg gtg aca ggt ttt gtc 288
 Ser Leu Ala Ile Ala Leu Pro Val Ala Phe Leu Val Thr Gly Phe Val
 85 90 95
 ggc ctc gtg atg gaa cga ggc gtc atc cgc ttc ctc tac ggg cgg cct 336
 Gly Leu Val Met Glu Arg Gly Val Ile Arg Phe Leu Tyr Gly Arg Pro
 100 105 110
 ttg gaa acg ctg ctc gcc acc tgg ggc atc tcg ctg atg ttg caa cag 384
 Leu Glu Thr Leu Leu Ala Thr Trp Gly Ile Ser Leu Met Leu Gln Gln
 115 120 125
 ggc gta cgc tcc att ttc ggc ccc acc aac cgg gag gtt ggc agc ccc 432
 Gly Val Arg Ser Ile Phe Gly Pro Thr Asn Arg Glu Val Gly Ser Pro
 130 135 140
 ggc tgg atg tcc ggc tcc ttc agc gtc ggt tat ctc aat ttc acc tgg 480
 Gly Trp Met Ser Gly Ser Phe Ser Val Gly Tyr Leu Asn Phe Thr Trp
 145 150 155 160
 aac cgg gtg tgg atc gtc tgc ttc tcg ctg tcg gtg ttc ttc gcg ctg 528
 Asn Arg Val Trp Ile Val Cys Phe Ser Leu Ser Val Phe Phe Ala Leu
 165 170 175
 ctg gtg ctt ctg aag cgc tcc gcc ttc ggt ctg cag atg cgc gcc gtg 576
 Leu Val Leu Lys Arg Ser Ala Phe Gly Leu Gln Met Arg Ala Val
 180 185 190
 act cag aac cgc cgc atg gcc tcc tcc atg ggc att cgc acg ccc tgg 624
 Thr Gln Asn Arg Arg Met Ala Ser Ser Met Gly Ile Arg Thr Pro Trp
 195 200 205
 gtg gat gcc ttc acc ttc gcg ctc ggt tca ggc gtt gcc ggg ctt gcc 672
 Val Asp Ala Phe Thr Phe Ala Leu Gly Ser Gly Val Ala Gly Leu Ala
 210 215 220
 ggc gtt gcg cta tcg cag atc gac aat gtc tcg ccc aat ctc ggc cag 720
 Gly Val Ala Leu Ser Gln Ile Asp Asn Val Ser Pro Asn Leu Gly Gln
 225 230 235 240
 agc tac atc atc gac agt ttc atg gtg gtg ttc ggc ggc gtc ggc 768
 Ser Tyr Ile Ile Asp Ser Phe Met Val Val Val Phe Gly Gly Val Gly
 245 250 255
 aat ctc tgg gga acg ctg gtg ggt gca ttg tcg ctc ggc gtg ctc aac 816
 Asn Leu Trp Gly Thr Leu Val Gly Ala Leu Ser Leu Gly Val Leu Asn
 260 265 270
 aag ttc ctc gag ccg acg gtg ggc gcc gtg ctc ggc aag atc ctc gtg 864
 Lys Phe Leu Glu Pro Thr Val Gly Ala Val Leu Gly Lys Ile Leu Val
 275 280 285
 ctc gtt ctc atc atc ctg ttc atc cag aag cgg ccg cgc ggt ctc ttc 912
 Leu Val Leu Ile Ile Leu Phe Ile Gln Lys Arg Pro Arg Gly Leu Phe
 290 295 300

gca ctc aag gga agg gcg atc gaa gca tga
 Ala Leu Lys Gly Arg Ala Ile Glu Ala
 305 310

<210> 463
 <211> 313
 <212> PRT
 <213> Agrobacterium tumefaciens

<400> 463
 Met Asp Glu Ala Ile Ser Ser Ile Glu Ser Ala Leu Ala Phe Trp Asp
 1 5 10 15
 Tyr Ala Gln Asn Val Trp Tyr Gly Leu Ser Leu Gly Ser Val Leu Leu
 20 25 30
 Leu Ala Ala Ile Gly Leu Ala Ile Thr Phe Gly Val Met Gly Ile Ile
 35 40 45
 Asn Met Ala His Gly Glu Met Val Met Ile Gly Ala Tyr Ser Thr Phe
 50 55 60
 Met Val Gln Glu Val Ile Arg Ser His Phe Pro Gly Leu Phe Asp Trp
 65 70 75 80
 Ser Leu Ala Ile Ala Leu Pro Val Ala Phe Leu Val Thr Gly Phe Val
 85 90 95
 Gly Leu Val Met Glu Arg Gly Val Ile Arg Phe Leu Tyr Gly Arg Pro
 100 105 110
 Leu Glu Thr Leu Ala Thr Trp Gly Ile Ser Leu Met Leu Gln Gln
 115 120 125
 Gly Val Arg Ser Ile Phe Gly Pro Thr Asn Arg Glu Val Gly Ser Pro
 130 135 140
 Gly Trp Met Ser Gly Ser Phe Ser Val Gly Tyr Leu Asn Phe Thr Trp
 145 150 155 160
 Asn Arg Val Trp Ile Val Cys Phe Ser Leu Ser Val Phe Phe Ala Leu
 165 170 175
 Leu Val Leu Leu Lys Arg Ser Ala Phe Gly Leu Gln Met Arg Ala Val
 180 185 190
 Thr Gln Asn Arg Arg Met Ala Ser Met Gly Ile Arg Thr Pro Trp
 195 200 205
 Val Asp Ala Phe Thr Phe Ala Leu Gly Ser Gly Val Ala Gly Leu Ala
 210 215 220
 Gly Val Ala Leu Ser Gln Ile Asp Asn Val Ser Pro Asn Leu Gly Gln
 225 230 235 240
 Ser Tyr Ile Ile Asp Ser Phe Met Val Val Phe Gly Gly Val Gly
 245 250 255
 Asn Leu Trp Gly Thr Leu Val Gly Ala Leu Ser Leu Gly Val Leu Asn
 260 265 270
 Lys Phe Leu Glu Pro Thr Val Gly Ala Val Leu Gly Lys Ile Leu Val
 275 280 285
 Leu Val Leu Ile Ile Leu Phe Ile Gln Lys Arg Pro Arg Gly Leu Phe
 290 295 300
 Ala Leu Lys Gly Arg Ala Ile Glu Ala
 305 310

<210> 464
 <211> 897
 <212> DNA
 <213> Agrobacterium tumefaciens

<220>
 <221> CDS
 <222> (1)..(897)

<400> 464
 atg gct tat ttc ctg caa caa ttg ctg aat gcc gtg ccg gtc gca gcc 48
 Met Ala Tyr Phe Leu Gln Gln Leu Leu Asn Ala Val Pro Val Ala Ala 15
 1 5 10 15
 ctc tat gcg gtt ctg gcc ttc ggc tac gcc atc gcc ttc tcg gtc acg 96
 Leu Tyr Ala Val Leu Ala Phe Gly Tyr Ala Ile Ala Phe Ser Val Thr 20 25 30
 20 25 30
 aaa cgc gcc gat gtg acc tat ggc gcc atc ttt gcc ttc gcc ggg cag 144
 Lys Arg Ala Asp Val Thr Tyr Gly Ala Ile Phe Ala Phe Ala Gly Gln 295 300
 295 300

		35					40					45					
act	tgc	ctg	ctt	ttt	gct	gac	ttc	ggc	tgg	aac	cgg	ctg	tgg	ctg	gtt		192
Thr	Cys	Leu	Leu	Phe	Ala	Asp	Phe	Gly	Trp	Asn	Arg	Leu	Trp	Leu	Val		
	50					55					60						
ctg	ccg	gca	aca	ttg	gcg	ctg	ggg	gca	ggg	gcc	ggc	ctg	ttc	ggc	ggg		240
Leu	Pro	Ala	Thr	Leu	Ala	Leu	Gly	Ala	Gly	Ala	Gly	Leu	Phe	Gly	Gly		
65					70					75					80		
ctt	tgg	gcc	gcg	ggt	ctc	atc	ggt	agg	gcg	gtc	atg	cgg	ccg	ctg	gca		288
Leu	Trp	Ala	Ala	Gly	Leu	Ile	Gly	Arg	Ala	Val	Met	Arg	Pro	Leu	Ala		
				85					90					95			
aag	gcc	tct	ccc	aac	gcg	gtg	acc	gtg	gcc	tcc	atc	ggc	gtg	ctg	att		336
Lys	Ala	Ser	Pro	Asn	Ala	Val	Thr	Val	Ala	Ser	Ile	Gly	Val	Leu	Ile		
			100					105					110				
gcg	ctc	acg	gaa	agc	gca	agg	ctc	gcc	gcc	gat	aca	agg	caa	tta	tgg		384
Ala	Leu	Thr	Glu	Ser	Ala	Arg	Leu	Ala	Ala	Asp	Thr	Arg	Gln	Leu	Trp		
		115					120					125					
ctg	ccg	ccg	ctt	ttg	tcg	cag	cca	gta	cgt	ttc	tgg	atc	gag	ggc	ggc		432
Leu	Pro	Pro	Leu	Leu	Ser	Gln	Pro	Val	Arg	Phe	Trp	Ile	Glu	Gly	Gly		
	130					135					140						
ttt	gcc	gtc	acc	ctg	aca	ccg	att	cag	atg	ttg	aat	aca	gcc	gtc	ttc		480
Phe	Ala	Val	Thr	Leu	Thr	Pro	Ile	Gln	Met	Leu	Asn	Thr	Ala	Val	Phe		
145					150					155					160		
tgc	ctt	ctc	att	ctc	aca	ggt	tcg	ctt	tat	ctc	ggc	cgt	tcc	gct	ttc		528
Cys	Leu	Leu	Ile	Leu	Thr	Gly	Ser	Leu	Tyr	Leu	Gly	Arg	Ser	Ala	Phe		
				165					170					175			
ggc	agg	cgc	tgg	aag	gcc	gtg	tcg	gac	gat	gcc	ttt	gcc	gcc	tcg	ctc		576
Gly	Arg	Arg	Trp	Lys	Ala	Val	Ser	Asp	Asp	Ala	Phe	Ala	Ala	Ser	Leu		
			180					185					190				
ctg	ggg	gtg	aac	gcg	agc	agg	ata	ttt	ctg	ctg	tcc	tat	tgc	gcg	gcg		624
Leu	Gly	Val	Asn	Ala	Ser	Arg	Ile	Phe	Leu	Leu	Ser	Tyr	Cys	Ala	Ala		
		195					200					205					
ggt	ctc	gtg	gca	gcc	atc	gcc	gtg	ctc	gcc	acg	ttt	tat	tac	ggc		672	
Gly	Leu	Val	Ala	Ala	Ile	Ala	Gly	Val	Leu	Ala	Thr	Phe	Tyr	Tyr	Gly		
	210					215				220							
acc	atg	gat	ttt	ggc	gcc	ggt	ctc	gtt	ttt	ggc	ctg	aaa	gtc	gtg	ctg		720
Thr	Met	Asp	Phe	Gly	Ala	Gly	Leu	Val	Phe	Gly	Leu	Lys	Val	Val	Leu		
225					230					235					240		
atc	tcg	gcg	gcg	ggc	gga	tat	gcc	agc	ccg	ctc	atc	tgc	ggc	ctg	ggg		76

<210> 465

<211> 298

<212> PRT

<213> Agrobacterium tumefaciens

<400> 465

Met	Ala	Tyr	Phe	Leu	Gln	Gln	Leu	Leu	Asn	Ala	Val	Pro	Val	Ala	Ala
1				5					10					15	
Leu	Tyr	Ala	Val	Leu	Ala	Phe	Gly	Tyr	Ala	Ile	Ala	Phe	Ser	Val	Thr
			20					25					30		
Lys	Arg	Ala	Asp	Val	Thr	Tyr	Gly	Ala	Ile	Phe	Ala	Phe	Ala	Gly	Gln
		35					40					45			
Thr	Cys	Leu	Leu	Phe	Ala	Asp	Phe	Gly	Trp	Asn	Arg	Leu	Trp	Leu	Val
	50					55					60				
Leu	Pro	Ala	Thr	Leu	Ala	Leu	Gly	Ala	Gly	Ala	Gly	Leu	Phe	Gly	Gly
65					70					75					80
Leu	Trp	Ala	Ala	Gly	Leu	Ile	Gly	Arg	Ala	Val	Met	Arg	Pro	Leu	Ala
				85					90					95	
Lys	Ala	Ser	Pro	Asn	Ala	Val	Thr	Val	Ala	Ser	Ile	Gly	Val	Leu	Ile

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100 105 110
 Ala Leu Thr Glu Ser Ala Arg Leu Ala Ala Asp Thr Arg Gln Leu Trp
 115 120 125
 Leu Pro Pro Leu Leu Ser Gln Pro Val Arg Phe Trp Ile Glu Gly Gly
 130 135 140
 Phe Ala Val Thr Leu Thr Pro Ile Gln Met Leu Asn Thr Ala Val Phe
 145 150 155 160
 Cys Leu Leu Ile Leu Thr Gly Ser Leu Tyr Leu Gly Arg Ser Ala Phe
 165 170 175
 Gly Arg Arg Trp Lys Ala Val Ser Asp Asp Ala Phe Ala Ala Ser Leu
 180 185 190
 Leu Gly Val Asn Ala Ser Arg Ile Phe Leu Leu Ser Tyr Cys Ala Ala
 195 200 205
 Gly Leu Val Ala Ala Ile Ala Gly Val Leu Ala Thr Phe Tyr Tyr Gly
 210 215 220
 Thr Met Asp Phe Gly Ala Gly Leu Val Phe Gly Leu Lys Val Val Leu
 225 230 235 240
 Ile Ser Ala Ala Gly Tyr Ala Ser Pro Leu Ile Cys Gly Leu Gly
 245 250 255
 Ala Ala Ala Ile Gly Phe Ala Glu Thr Phe Trp Val Gly Tyr Gly Pro
 260 265 270
 Val Ala Trp Arg Asp Ala Ala Val Leu Ala Leu Leu Val Gly Trp Leu
 275 280 285
 Ile Val Met Arg Ser Arg Val Glu Ala Ala
 290 295

<210> 466

<211> 1035

<212> DNA

<213> Agrobacterium tumefaciens

<220>

<221> CDS

<222> (1)..(1035)

<400> 466

atg gac gcg aca att gcc act ttc ctg atc cag gac ggc gtc acc aac	48
Met Asp Ala Thr Ile Ala Thr Phe Leu Ile Gln Asp Gly Val Thr Asn	
1 5 10 15	
ggc gcg att tat gcg ctg ctg ggc ctt gcc atc gtt ctg gtt ttc tcg	96
Gly Ala Ile Tyr Ala Leu Leu Gly Leu Ala Ile Val Leu Val Phe Ser	
20 25 30	
gtc acg cgg gtg atc ttc att ccg cag ggt gag ttc gtc gcc cat ggc	144
Val Thr Arg Val Ile Phe Ile Pro Gln Gly Glu Phe Val Ala His Gly	
35 40 45	
gct ttg acc ctg gcg ctg ctg gat gcc ggc cgt gtg ccg ggc acg ctg	192
Ala Leu Thr Leu Ala Leu Leu Asp Ala Gly Arg Val Pro Gly Thr Leu	
50 55 60	
aac ctg ctg ctg tgc atg ggc gtc gtc gct ctt gtg ctg gat ctg tgg	240
Asn Leu Leu Leu Cys Met Gly Val Val Ala Leu Val Leu Asp Leu Trp	
65 70 75 80	
gca atg cgg cgg gac atg cgc ctt ccg cga ctg ttg cag gcg ctt gcc	288
Ala Met Arg Arg Asp Met Arg Leu Pro Arg Leu Leu Gln Ala Leu Ala	
85 90 95	
gtc aac ctt gcc ctg ccc ggc gcg att tac ggg ctc gtc gca att ctg	336
Val Asn Leu Ala Leu Pro Gly Ala Ile Tyr Gly Leu Val Ala Ile Leu	
100 105 110	
gcg ccc atg cag ctc ccc tcg ttc ctg cgt gcc atg att acc atc gcg	384
Ala Pro Met Gln Leu Pro Ser Phe Leu Arg Ala Met Ile Thr Ile Ala	
115 120 125	
atc atc gcg ccc atg gga tat tac gtc tat cgc atc gcc tac cgg ccg	432
Ile Ile Ala Pro Met Gly Tyr Tyr Val Tyr Arg Ile Ala Tyr Arg Pro	
130 135 140	
ctt tcc gat gct tcc gtt ctc gtt ctg ctg att gcc tcc gtc ggt gtg	480
Leu Ser Asp Ala Ser Val Leu Val Leu Leu Ile Ala Ser Val Gly Val	
145 150 155 160	
cat ctg gcg ttg atg ggc ctc ggg ctc gct ttc ttc ggt ccg gaa ggc	528
His Leu Ala Leu Met Gly Leu Gly Leu Ala Phe Phe Gly Pro Glu Gly	
165 170 175	

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ctg	cgc	gcg	gcg	gcg	ctc	agt	gat	ggg	ggg	ttc	acg	ctg	ggg	cca	atg	576
Leu	Arg	Ala	Ala	Ala	Leu	Ser	Asp	Gly	Gly	Phe	Thr	Leu	Gly	Pro	Met	
		180						185					190			
ctc	ggt	act	gcc	cag	agc	att	ttc	atc	tat	ctc	gcg	acc	atc	ctc	gtc	624
Leu	Val	Thr	Ala	Gln	Ser	Ile	Phe	Ile	Tyr	Leu	Ala	Thr	Ile	Leu	Val	
	195						200					205				
atg	atc	ggg	ctt	tac	ctg	ttt	ttc	gaa	aag	aca	ctg	ctc	ggc	aag	gcg	672
Met	Ile	Gly	Leu	Tyr	Leu	Phe	Phe	Glu	Lys	Thr	Leu	Leu	Gly	Lys	Ala	
	210					215					220					
ctg	aaa	gca	acg	gcg	atc	aac	cgg	ctc	ggc	gcc	cgt	ctc	gtc	ggg	ggt	720
Leu	Lys	Ala	Thr	Ala	Ile	Asn	Arg	Leu	Gly	Ala	Arg	Leu	Val	Gly	Val	
225					230				235						240	
cga	acg	gaa	ctc	acc	ggc	gtc	acc	gcc	ttt	gtg	ctg	gcc	gca	gcc	ata	768
Arg	Thr	Glu	Leu	Thr	Gly	Val	Thr	Ala	Phe	Val	Leu	Ala	Ala	Ala	Ile	
				245					250					255		
gcc	gcg	att	tcg	ggc	gta	ttg	atc	ggg	cca	atc	acg	acc	atc	ttc	tac	816
Ala	Ala	Ile	Ser	Gly	Val	Leu	Ile	Gly	Pro	Ile	Thr	Thr	Ile	Phe	Tyr	
			260					265					270			
gat	acg	ggc	ttc	ctc	att	ggg	ctc	aag	ggg	ttt	gtc	gct	gcc	att	ctc	864
Asp	Thr	Gly	Phe	Leu	Ile	Gly	Leu	Lys	Gly	Phe	Val	Ala	Ala	Ile	Leu	
		275					280					285				
ggc	ggc	atg	gcg	agc	ttt	ccc	gtc	acg	gcg	ggt	gcg	gcg	gtg	ggc	ggt	912
Gly	Gly	Met	Ala	Ser	Phe	Pro	Val	Thr	Ala	Val	Ala	Ala	Val	Gly	Val	
	290					295					300					
gga	ctc	atc	gag	gct	ttc	gcc	tcc	ttt	ttt	gct	agc	gac	ttc	aag	gag	960
Gly	Leu	Ile	Glu	Ala	Phe	Ala	Ser	Phe	Phe	Ala	Ser	Asp	Phe	Lys	Glu	
305					310					315					320	
atc	atc	gtg	ttc	ggc	ctc	atc	gtg	ccc	ggt	ttg	atc	tgg	ctt	tcc	ttc	1008
Ile	Ile	Val	Phe	Gly	Leu	Ile	Val	Pro	Val	Leu	Ile	Trp	Leu	Ser	Phe	
				325					330					335		
ggc	gca	agc	cat	cat	gag	gaa	gag	tga								1035
Gly	Ala	Ser	His	His	Glu	Glu	Glu									
			340													

<210> 467

<211> 344

<212> PRT

<213> Agrobacterium tumefaciens

<400> 467

Met	Asp	Ala	Thr	Ile	Ala	Thr	Phe	Leu	Ile	Gln	Asp	Gly	Val	Thr	Asn	
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Gly	Ala	Ile	Tyr	Ala	Leu	Leu	Gly	Leu	Ala	Ile	Val	Leu	Val	Phe	Ser	
		20						25					30			
Val	Thr	Arg	Val	Ile	Phe	Ile	Pro	Gln	Gly	Glu	Phe	Val	Ala	His	Gly	
		35					40					45				
Ala	Leu	Thr	Leu	Ala	Leu	Leu	Asp	Ala	Gly	Arg	Val	Pro	Gly	Thr	Leu	
	50					55				60						
Asn	Leu	Leu	Leu	Cys	Met	Gly	Val	Val	Ala	Leu	Val	Leu	Asp	Leu	Trp	
65				70					75					80		
Ala	Met	Arg	Arg	Asp	Met	Arg	Leu	Pro	Arg	Leu	Leu	Gln	Ala	Leu	Ala	
				85					90					95		
Val	Asn	Leu	Ala	Leu	Pro	Gly	Ala	Ile	Tyr	Gly	Leu	Val	Ala	Ile	Leu	
			100					105					110			
Ala	Pro	Met	Gln	Leu	Pro	Ser	Phe	Leu	Arg	Ala	Met	Ile	Thr	Ile	Ala	
		115					120					125				
Ile	Ile	Ala	Pro	Met	Gly	Tyr	Tyr	Val	Tyr	Arg	Ile	Ala	Tyr	Arg	Pro	
	130					135					140					
Leu	Ser	Asp	Ala	Ser	Val	Leu	Val	Leu	Leu	Ile	Ala	Ser	Val	Gly	Val	
145					150					155					160	
His	Leu	Ala	Leu	Met	Gly	Leu	Gly	Leu	Ala	Phe	Phe	Gly	Pro	Glu	Gly	
			165						170					175		
Leu	Arg	Ala	Ala	Ala	Leu	Ser	Asp	Gly	Gly	Phe	Thr	Leu	Gly	Pro	Met	
		180						185					190			
Leu	Val	Thr	Ala	Gln	Ser	Ile	Phe	Ile	Tyr	Leu	Ala	Thr	Ile	Leu	Val	
		195					200					205				
Met	Ile	Gly	Leu	Tyr	Leu	Phe	Phe	Glu	Lys	Thr	Leu	Leu	Gly	Lys	Ala	
	210					215					220					
Leu	Lys	Ala	Thr	Ala	Ile	Asn	Arg	Leu	Gly	Ala	Arg	Leu	Val	Gly	Val	

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225	Arg	Thr	Glu	Leu	Thr	230	Gly	Val	Thr	Ala	Phe	235	Val	Leu	Ala	Ala	Ala	240	Ile
	Ala	Ala	Ile	Ser	Gly	245	Val	Leu	Ile	Gly	Pro	250	Ile	Thr	Thr	Ile	Phe	255	Tyr
	Asp	Thr	Gly	Phe	Leu	Ile	Gly	Leu	Lys	Gly	Phe	265	Val	Ala	Ala	Ile	Leu		
	Gly	Gly	Met	Ala	Ser	Phe	Pro	Val	Thr	Ala	Val	280	Ala	Ala	Val	Gly	Val		
	Gly	Leu	Ile	Glu	Ala	Phe	Ala	Ser	Phe	Phe	Ala	295	Ser	Asp	Phe	Lys	Glu		
305	Ile	Ile	Val	Phe	Gly	Leu	Ile	Val	Pro	Val	Leu	315	Ile	Trp	Leu	Ser	Phe		
	Gly	Ala	Ser	His	His	Glu	Glu	Glu				330							

<210> 468

<211> 864

<212> DNA

<213> Brucella melitensis

<220>

<221> CDS

<222> (1)..(864)

<400> 468

atg	aat	ctt	ttc	tta	cag	atc	gtc	atc	aat	ggc	att	ctt	ctg	ggc	ggg		48
Met	Asn	Leu	Phe	Leu	Gln	Ile	Val	Ile	Asn	Gly	Ile	Leu	Leu	Gly	Gly		
1				5				10					15				
ctc	tat	gcc	atc	atg	gcg	cag	ggc	ctc	gct	ctg	gtc	tgg	ggc	gtg	ctg		96
Leu	Tyr	Ala	Ile	Met	Ala	Gln	Gly	Leu	Ala	Leu	Val	Trp	Gly	Val	Leu		
			20					25					30				
aac	atc	gtc	aac	ctc	gcc	cac	ggc	acg	atg	att	atg	ctg	ggt	ggt	tac		144
Asn	Ile	Val	Asn	Leu	Ala	His	Gly	Thr	Met	Ile	Met	Leu	Gly	Gly	Tyr		
			35				40					45					
gtt	acc	tgg	ctg	gta	ttt	gcc	aat	ttt	ggc	atc	gat	cca	ttc	atc	ggc		192
Val	Thr	Trp	Leu	Val	Phe	Ala	Asn	Phe	Gly	Ile	Asp	Pro	Phe	Ile	Gly		
			50			55					60						
gta	ttt	gca	gca	gca	gcc	gtg	atg	ttc	tgt	ttc	ggt	tac	gcc	ctg	caa		240
Val	Phe	Ala	Ala	Ala	Ala	Val	Met	Phe	Cys	Phe	Gly	Tyr	Ala	Leu	Gln		
			65		70				75						80		
cgc	tgc	gtc	ctc	aat	ctt	gtc	gca	cgc	ggg	ccg	atg	ttt	aat	gcg	ctg		288
Arg	Cys	Val	Leu	Asn	Leu	Val	Ala	Arg	Gly	Pro	Met	Phe	Asn	Ala	Leu		
			85					90					95				
ctc	atc	aca	ttc	ggc	att	gaa	att	atc	ttt	aca	gac	gtg	gcg	caa	cac		336
Leu	Ile	Thr	Phe	Gly	Ile	Glu	Ile	Ile	Phe	Thr	Asp	Val	Ala	Gln	His		
			100				105					110					
gtc	ttc	tcg	gcc	gat	ttt	cgc	gct	att	att	ccc	tcc	tat	tcg	gcg	gtg		384
Val	Phe	Ser	Ala	Asp	Phe	Arg	Ala	Ile	Ile	Pro	Ser	Tyr	Ser	Ala	Val		
			115			120						125					
aat	ttc	aac	gtc	tac	ggc	atc	acc	atc	ccg	ctg	atg	aac	ctg	ctc	gcc		432
Asn	Phe	Asn	Val	Tyr	Gly	Ile	Thr	Ile	Pro	Leu	Met	Asn	Leu	Leu	Ala		
			130			135					140						
ttc	atc	gca	gcc	ttc	gtg	gtt	tcc	ggc	ttc	atg	ttc	ttt	ttc	atg	atg		480
Phe	Ile	Ala	Ala	Phe	Val	Val	Ser	Gly	Phe	Met	Phe	Phe	Phe	Met	Met		
			145		150				155						160		
acg	acg	aaa	ctc	ggc	cgc	gcc	att	cgc	gcc	acg	gcg	caa	aac	ctc	acc		528
Thr	Thr	Lys	Leu	Gly	Arg	Ala	Ile	Arg	Ala	Thr	Ala	Gln	Asn	Leu	Thr		
			165					170					175				
gca	gca	cgg	ctt	tac	ggt	gtt	gaa	ccg	cgc	cat	ctt	tat	gcc	gtc	acc		576
Ala	Ala	Arg	Leu	Tyr	Gly	Val	Glu	Pro	Arg	His	Leu	Tyr	Ala	Val	Thr		
			180				185					190					
ttt	ggc	atc	ggt	gtg	gca	atc	gct	ggt	gct	ggc	ggg	ctt	tac	gca			624
Phe	Gly	Ile	Gly	Val	Ala	Ile	Ala	Gly	Val	Ala	Gly	Gly	Leu	Tyr	Ala		
			195				200				205						
acc	gtc	aac	cag	ctc	aat	ccc	tat	atc	ggt	gtg	ccg	ctg	acg	gcc	aaa		672
Thr	Val	Asn	Gln	Leu	Asn	Pro	Tyr	Ile	Gly	Val	Pro	Leu	Thr	Ala	Lys		
			210			215					220						
agc	ttc	gca	atc	acc	atc	att	ggc	ggc	ctc	gac	aat	ccg	ctc	ggc	gtc		720

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Ser	Phe	Ala	Ile	Thr	Ile	Ile	Gly	Gly	Leu	Asp	Asn	Pro	Leu	Gly	Val		
225					230					235					240		
atc	ctg	ggg	ggg	ctg	atc	ctc	ggg	gtc	atc	gaa	tcc	ctt	acc	gtg	ctc		768
Ile	Leu	Gly	Gly	Leu	Ile	Leu	Gly	Val	Ile	Glu	Ser	Leu	Thr	Val	Leu		
				245					250					255			
tat	ctc	ggc	gac	act	tac	cgc	aac	gtg	gtc	agc	ttc	agt	att	ctc	gtt		816
Tyr	Leu	Gly	Asp	Thr	Tyr	Arg	Asn	Val	Val	Ser	Phe	Ser	Ile	Leu	Val		
				260				265					270				
ctc	gta	ctg	atc	att	cgg	ccc	ggg	ggg	ctt	ttg	ggg	aaa	acg	gca			861
Leu	Val	Leu	Ile	Ile	Arg	Pro	Gly	Gly	Leu	Leu	Gly	Lys	Thr	Ala			
		275					280					285					
tga																	864

<210> 469

<211> 287

<212> PRT

<213> Brucella melitensis

<400> 469

Met	Asn	Leu	Phe	Leu	Gln	Ile	Val	Ile	Asn	Gly	Ile	Leu	Leu	Gly	Gly		
1				5					10					15			
Leu	Tyr	Ala	Ile	Met	Ala	Gln	Gly	Leu	Ala	Leu	Val	Trp	Gly	Val	Leu		
			20					25					30				
Asn	Ile	Val	Asn	Leu	Ala	His	Gly	Thr	Met	Ile	Met	Leu	Gly	Gly	Tyr		
			35				40					45					
Val	Thr	Trp	Leu	Val	Phe	Ala	Asn	Phe	Gly	Ile	Asp	Pro	Phe	Ile	Gly		
	50					55					60						
Val	Phe	Ala	Ala	Ala	Ala	Val	Met	Phe	Cys	Phe	Gly	Tyr	Ala	Leu	Gln		
65				70					75						80		
Arg	Cys	Val	Leu	Asn	Leu	Val	Ala	Arg	Gly	Pro	Met	Phe	Asn	Ala	Leu		
				85					90				95				
Leu	Ile	Thr	Phe	Gly	Ile	Glu	Ile	Ile	Phe	Thr	Asp	Val	Ala	Gln	His		
			100				105						110				
Val	Phe	Ser	Ala	Asp	Phe	Arg	Ala	Ile	Ile	Pro	Ser	Tyr	Ser	Ala	Val		
		115					120					125					
Asn	Phe	Asn	Val	Tyr	Gly	Ile	Thr	Ile	Pro	Leu	Met	Asn	Leu	Leu	Ala		
		130				135					140						
Phe	Ile	Ala	Ala	Phe	Val	Val	Ser	Gly	Phe	Met	Phe	Phe	Phe	Met	Met		
145				150					155					160			
Thr	Thr	Lys	Leu	Gly	Arg	Ala	Ile	Arg	Ala	Thr	Ala	Gln	Asn	Leu	Thr		
				165					170					175			
Ala	Ala	Arg	Leu	Tyr	Gly	Val	Glu	Pro	Arg	His	Leu	Tyr	Ala	Val	Thr		
			180				185						190				
Phe	Gly	Ile	Gly	Val	Ala	Ile	Ala	Gly	Val	Ala	Gly	Gly	Leu	Tyr	Ala		
		195					200					205					
Thr	Val	Asn	Gln	Leu	Asn	Pro	Tyr	Ile	Gly	Val	Pro	Leu	Thr	Ala	Lys		
		210				215					220						
Ser	Phe	Ala	Ile	Thr	Ile	Ile	Gly	Gly	Leu	Asp	Asn	Pro	Leu	Gly	Val		
225				230						235					240		
Ile	Leu	Gly	Gly	Leu	Ile	Leu	Gly	Val	Ile	Glu	Ser	Leu	Thr	Val	Leu		
				245					250					255			
Tyr	Leu	Gly	Asp	Thr	Tyr	Arg	Asn	Val	Val	Ser	Phe	Ser	Ile	Leu	Val		
			260					265					270				
Leu	Val	Leu	Ile	Ile	Arg	Pro	Gly	Gly	Leu	Leu	Gly	Lys	Thr	Ala			
		275					280					285					

<210> 470

<211> 924

<212> DNA

<213> Brucella melitensis

<220>

<221> CDS

<222> (1)..(924)

<400> 470

atg	ggg	ggc	ttc	tct	atg	gaa	tat	ttc	ttc	cag	cag	gtg	atc	aac	ggg		
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48

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Met 1	Gly	Gly	Phe	Ser 5	Met	Glu	Tyr	Phe	Phe 10	Gln	Gln	Val	Ile	Asn 15	Gly	
ctt	gcg	ctc	ggt	tcg	att	tat	ggc	ctg	atc	gcc	atc	ggt	tat	acg	atg	96
Leu	Ala	Leu	Gly 20	Ser	Ile	Tyr	Gly	Leu	Ile	Ala	Ile	Gly	Tyr 30	Thr	Met	
gtc	tat	ggc	att	atc	ggc	atg	atc	aac	ttt	gct	cat	ggc	gat	atc	ttc	144
Val	Tyr	Gly 35	Ile	Ile	Gly	Met	Ile 40	Asn	Phe	Ala	His	Gly 45	Asp	Ile	Phe	
atg	ctc	ggc	gcg	ttc	atg	gcg	ctg	att	ggt	ttc	ctc	att	atc	acg	acc	192
Met	Leu	Gly	Ala	Phe	Met	Ala 55	Leu	Ile	Val	Phe	Leu	Ile	Ile	Thr	Thr	
ttc	atc	gga	atg	ctg	ccg	ggt	gca	ctg	atg	ctg	ctt	ttg	atg	atg	atc	240
Phe 65	Ile	Gly	Met	Leu	Pro 70	Val	Ala	Leu	Met	Leu 75	Leu	Leu	Met	Met	Ile 80	
gtc	gcc	atg	ctt	ctg	acg	ggt	ctg	tgg	agc	tgg	gcg	atc	gag	cgc	gtg	288
Val	Ala	Met	Leu 85	Leu	Thr	Gly	Leu	Trp	Ser 90	Trp	Ala	Ile	Glu	Arg 95	Val	
gcc	tat	caa	ccg	ctg	cgt	ggt	tcg	ttc	cgc	ctt	gcg	ccg	ctg	atc	acg	336
Ala	Tyr	Gln	Pro 100	Leu	Arg	Gly	Ser	Phe 105	Arg	Leu	Ala	Pro	Leu 110	Ile	Thr	
gct	atc	ggc	atg	tcg	att	gcc	ttg	tcg	aac	ttc	ggt	cag	gtc	acg	cag	384
Ala	Ile	Gly 115	Met	Ser	Ile	Ala	Leu 120	Ser	Asn	Phe	Val	Gln 125	Val	Thr	Gln	
ggt	ccg	cgc	aac	aag	ccg	ggt	ccc	cag	ctt	ctg	aat	ggt	tcc	tac	gag	432
Gly	Pro 130	Arg	Asn	Lys	Pro	Val 135	Pro	Gln	Leu	Leu	Asn 140	Gly	Ser	Tyr	Glu	
ctg	ttc	ggc	agc	ggc	ggc	acg	atc	tcg	ctc	aag	cag	atc	gtg	gtg	atc	480
Leu	Phe	Gly	Ser	Gly	Gly 150	Thr	Ile	Ser	Leu	Lys 155	Gln	Ile	Val	Val	Ile 160	
gtg	ggt	acg	gca	ata	ctc	acg	atc	ttc	tgg	tat	gtc	gtc	aac	cgc	Arg	528
Val	Val	Thr	Ala 165	Ile	Leu	Leu	Thr	Ile	Phe 170	Trp	Tyr	Val	Val	Asn 175	Arg	
acc	tcg	ctg	ggg	cgc	gcg	caa	agg	gct	tgc	gag	cag	gat	cgc	aag	atg	576
Thr	Ser	Leu	Gly 180	Arg	Ala	Gln	Arg	Ala 185	Cys	Glu	Gln	Asp	Arg 190	Lys	Met	
gcg	gcc	ctt	ctt	ggc	atc	aat	gtc	cgt	gtc	atc	tcg	ctc	acc	ttc	Phe	624
Ala	Ala	Leu 195	Leu	Gly	Ile	Asn	Val 200	Asp	Arg	Val	Ile	Ser 205	Leu	Thr		
gtg	atg	ggc	gcc	atg	ctg	gcg	gcc	gta	gcc	ggg	acg	ctt	tac	ctc	tcc	672
Val	Met	Gly	Ala	Met	Leu	Ala 215	Ala	Val	Ala	Gly	Thr 220	Leu	Tyr	Leu	Ser	
ttc	tat	ggc	gtg	att	tcg	ttc	gct	gac	ggg	ttc	atc	ccc	ggt	gtg	aag	720
Phe 225	Tyr	Gly	Val	Ile	Ser 230	Phe	Ala	Asp	Gly	Phe 235	Ile	Pro	Gly	Val 240	Lys	
gcg	ttc	acg	gcg	gcg	ggt	ctg	ggc	ggc	atc	ggc	tcg	ctt	ccg	ggg	gct	768
Ala	Phe	Thr	Ala 245	Val	Leu	Gly	Gly	Ile 250	Gly	Gly	Ser	Leu	Pro	Gly 255	Ala	
ggt	gtc	ggc	ggg	ttg	ctt	atc	ggt	ctc	atc	gaa	gcg	ttg	tgg	tcg	gcc	816
Val	Val	Gly 260	Gly	Leu	Leu	Ile	Gly 265	Leu	Ile	Glu	Ala	Leu	Trp 270	Ser	Ala	
tat	ttc	tcg	atc	gac	tac	aag	gac	gtc	gcc	gcg	ttc	tcg	atc	ctg	gct	864
Tyr	Phe 275	Ser	Ile	Asp	Tyr	Lys 280	Asp 285	Val	Ala	Ala	Phe	Ser 285	Ile	Leu	Ala	
atc	gtg	ctg	atc	ttc	atg	ccg	tcc	ggc	att	ctt	ggc	cga	cct	gac	gtc	912
Ile	Val 290	Leu	Ile	Phe	Met	Pro 295	Ser	Gly	Ile	Leu	Gly 300	Arg	Pro	Asp	Val	
gaa	aag	gtg	taa													924
Glu	Lys	Val														
305																

<210> 471

<211> 307

<212> PRT

<213> Brucella melitensis

<400> 471

Met	Gly	Gly	Phe	Ser 5	Met	Glu	Tyr	Phe	Phe 10	Gln	Gln	Val	Ile	Asn 15	Gly	
Leu	Ala	Leu	Gly	Ser	Ile	Tyr	Gly	Leu	Ile	Ala	Ile	Gly	Tyr	Thr	Met	

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Val Tyr Gly²⁰ Ile Ile Gly Met Ile²⁵ Asn Phe Ala His Gly³⁰ Asp Ile Phe
 Met Leu Gly³⁵ Ala Phe Met Ala⁴⁰ Leu Ile Val Phe Leu⁴⁵ Ile Ile Thr Thr
 Phe Ile Gly Met Leu Pro⁵⁰ Val Ala Leu Met Leu⁵⁵ Leu Leu Met Met Ile
 Val⁶⁰ Ala Met Leu⁶⁵ Thr Gly Leu Trp⁷⁰ Ser Trp⁷⁵ Ala Ile Glu Arg⁸⁰ Val
 Ala Tyr Gln⁸⁵ Pro Leu Arg Gly Ser Phe⁹⁰ Arg Leu Ala Pro Leu⁹⁵ Ile Thr
 Ala Ile Gly¹⁰⁰ Met Ser Ile Ala Leu¹⁰⁵ Ser Asn Phe Val Gln¹¹⁰ Val Thr Gln
 Gly Pro¹¹⁵ Arg Asn Lys Pro Val¹²⁰ Pro Gln Leu Leu Asn¹²⁵ Gly Ser Tyr Glu
 Leu¹³⁰ Phe Gly Ser Gly¹³⁵ Thr Ile Ser Leu Lys¹⁴⁰ Gln Ile Val Val Ile
 Val¹⁴⁵ Val Thr Ala¹⁵⁰ Ile Leu Leu Thr Ile Phe¹⁵⁵ Trp Tyr Val Val Asn¹⁶⁰ Arg
 Thr Ser Leu¹⁶⁵ Gly Arg Ala Gln Arg Ala¹⁷⁰ Cys Glu Gln Asp Arg¹⁷⁵ Lys Met
 Ala Ala Leu¹⁸⁰ Leu Gly Ile Asn Val¹⁸⁵ Asp Arg Val Ile Ser¹⁹⁰ Leu Thr Phe
 Val¹⁹⁵ Met Gly Ala Met Leu Ala²⁰⁰ Val Ala Gly Thr²⁰⁵ Leu Tyr Leu Ser
 Phe Tyr Gly Val Ile Ser²¹⁰ Phe Ala Asp Gly Phe²¹⁵ Ile Pro Gly Val Lys
 Ala²²⁰ Phe Thr Ala²²⁵ Ala Val Leu Gly Gly²³⁰ Ile Gly Ser Leu Pro Gly²³⁵ Ala
 Val Val Gly²⁴⁰ Gly²⁴⁵ Leu Leu Ile Gly Leu²⁵⁰ Ile Glu Ala Leu Trp²⁵⁵ Ser Ala
 Tyr Phe Ser²⁶⁰ Ile Asp Tyr Lys Asp²⁶⁵ Val Ala Ala Phe Ser²⁷⁰ Ile Leu Ala
 Ile Val²⁷⁵ Leu Ile Phe Met Pro²⁸⁰ Ser Gly Ile Leu Gly²⁸⁵ Arg Pro Asp Val
 Glu²⁹⁰ Lys Val
 305

<210> 472

<211> 927

<212> DNA

<213> Yersinia pestis

<220>

<221> CDS

<222> (1)..(927)

<400> 472

atg tca gag cag ttt tta tat ttt ctg cag cag atg ttc aac ggt att	48
Met Ser Glu Gln Phe ⁵ Leu Tyr Phe ¹⁰ Leu Gln Gln Met Phe Asn Gly ¹⁵ Ile	
acg ttg ggc agc act tat gcg ctg atc gcc att ggt tat acc atg gtg	96
Thr Leu Gly Ser Thr Tyr Ala Leu Ile Ala Ile Gly Tyr Thr Met Val	
tac ggc att atc ggc atg atc aac ttt gct cac ggc gaa gta tat atg	144
Tyr Gly Ile Ile Gly Met Ile Asn ⁴⁰ Phe Ala His Gly ⁴⁵ Glu Val Tyr Met	
atc agc agt tac gtc tca ttt atc gtg atc gcc gca tta atg atg gtg	192
Ile Ser Ser Tyr Val Ser Phe ⁵⁵ Ile Val Ile Ala Ala Leu Met Met Val	
ggg atc gat gcc agt tgg ctg ttg att ggt tgc gct ttc cta gtg tcg	240
Gly Ile Asp Ala Ser Trp ⁷⁰ Leu Leu Ile Gly Cys ⁷⁵ Ala Phe Leu Val Ser	
att gtg atc gcc agt act tac ggc tgg agc att gaa cgg gta gcc tat	288
Ile Val Ile Ala Ser Thr Tyr Gly Trp ⁹⁰ Ser Ile Glu Arg Val Ala Tyr	
aag cca gtt cgt cgc tct aag cgc ctg atc gcg ctg att tcg gcg atc	336
Lys Pro Val Arg ¹⁰⁰ Arg Ser Lys Arg ¹⁰⁵ Leu Ile Ala Leu Ile ¹¹⁰	

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ggc atg tct att ttc cta cag aac tat gtc agc ttg acg caa ggt tca 384
 Gly Met Ser Ile Phe Leu Gln Asn Tyr Val Ser Leu Thr Gln Gly Ser
 115 120 125
 cgg gat ttg gca tta ccc agt ctg gtc acc ggg cag tgg acc tta ggt 432
 Arg Asp Leu Ala Leu Pro Ser Leu Val Thr Gly Gln Trp Thr Leu Gly
 130 135 140
 gag agt aat ggc ttt gct gcg acg atc agc acc atg cag ctg acg att 480
 Glu Ser Asn Gly Phe Ala Thr Ile Ser Thr Met Gln Leu Thr Ile
 145 150 155 160
 tgg att gtc acc ttc ttg gcc atg ttg gcg ctg act ctg ttt atc cgt 528
 Trp Ile Val Thr Phe Leu Ala Met Leu Ala Leu Thr Leu Phe Ile Arg
 165 170 175
 tat tca cga atg ggc cgt gct tgc cgc gcc ggt gaa gat ttg aaa 576
 Tyr Ser Arg Met Gly Arg Ala Cys Arg Ala Cys Ala Glu Asp Leu Lys
 180 185 190
 atg gcc agt tta ctg ggc att aac act gac cgg gtt atc tcg ctg act 624
 Met Ala Ser Leu Leu Gly Ile Asn Thr Asp Arg Val Ile Ser Leu Thr
 195 200 205
 ttt gtg att ggc gca ctg atg gcc gct gtc gcg ggt gtg tta ctc ggc 672
 Phe Val Ile Gly Ala Leu Met Ala Ala Val Ala Gly Val Leu Leu Gly
 210 215 220
 cag ttc tac ggg gtg atc aat ccc tat att ggc ttt atg gca ggg atg 720
 Gln Phe Tyr Gly Val Ile Asn Pro Tyr Ile Gly Phe Met Ala Gly Met
 225 230 235 240
 aaa gca ttc act gcc gca gta tta ggc ggt att ggc agt att ccg ggc 768
 Lys Ala Phe Thr Ala Ala Val Leu Gly Gly Ile Gly Ser Ile Pro Gly
 245 250 255
 gca atg att ggt ggt ttg gtt ctc ggt gtg gct gaa gca ctg acc tcc 816
 Ala Met Ile Gly Gly Leu Val Leu Gly Val Ala Glu Ala Leu Thr Ser
 260 265 270
 gct tat ctc agc act gaa tac aaa gat gcg gtt tca ttc gcg ctg ctg 864
 Ala Tyr Leu Ser Thr Glu Tyr Lys Asp Ala Val Ser Phe Ala Leu Leu
 275 280 285
 att gtg gtg ttg tta gtg atg cct acc ggg att tta ggc cgt ccg gag 912
 Ile Val Val Leu Leu Val Met Pro Thr Gly Ile Leu Gly Arg Pro Glu
 290 295 300
 gtt gaa aaa gta tga 927
 Val Glu Lys Val
 305

<210> 473

<211> 308

<212> PRT

<213> Yersinia pestis

<400> 473

Met Ser Glu Gln Phe Leu Tyr Phe Leu Gln Gln Met Phe Asn Gly Ile
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 Thr Leu Gly Ser Thr Tyr Ala Leu Ile Ala Ile Gly Tyr Thr Met Val
 20 25 30
 Tyr Gly Ile Ile Gly Met Ile Asn Phe Ala His Gly Glu Val Tyr Met
 35 40 45
 Ile Ser Ser Tyr Val Ser Phe Ile Val Ile Ala Ala Leu Met Met Val
 50 55 60
 Gly Ile Asp Ala Ser Trp Leu Leu Ile Gly Cys Ala Phe Leu Val Ser
 65 70 75 80
 Ile Val Ile Ala Ser Thr Tyr Gly Trp Ser Ile Glu Arg Val Ala Tyr
 85 90 95
 Lys Pro Val Arg Arg Ser Lys Arg Leu Ile Ala Leu Ile Ser Ala Ile
 100 105 110
 Gly Met Ser Ile Phe Leu Gln Asn Tyr Val Ser Leu Thr Gln Gly Ser
 115 120 125
 Arg Asp Leu Ala Leu Pro Ser Leu Val Thr Gly Gln Trp Thr Leu Gly
 130 135 140
 Glu Ser Asn Gly Phe Ala Ala Thr Ile Ser Thr Met Gln Leu Thr Ile
 145 150 155 160
 Trp Ile Val Thr Phe Leu Ala Met Leu Ala Leu Thr Leu Phe Ile Arg
 165 170 175
 Tyr Ser Arg Met Gly Arg Ala Cys Arg Ala Cys Ala Glu Asp Leu Lys

[illegible]

<213> Nostoc sp. PCC 7120

<222> (1) . . (867)

atg Met 1	gac Asp	ata Ile	caa Gln	acg Thr 5	att Ile	caa Gln	ctg Leu	att Ile	gtc Val 10	aat Asn	ggg Gly	att Ile	gct Ala 15	gta Val 15	ggg Gly	48
agt Ser	att Ile	atc Ile	gct Ala 20	ctt Leu	gca Ala	gct Ala	gtg Val	gga Gly 25	ctg Leu	act Thr	tta Leu	act Thr	tat Tyr 30	gga Gly	att Ile	96
tta Leu	cgg Arg	ttg Leu 35	tct Ser	aat Asn	ttt Phe	gcc Ala	cac His 40	ggg Gly	gat Asp	ttc Phe	tta Leu	act Thr 45	tta Leu	ggg Gly	gct Ala	144
tat Tyr 50	ctg Leu	act Thr	ttt Phe	ttt Phe	gtc Val	aac Asn 55	act Thr	ttt Phe	ggg Gly	gta Val	aat Asn 60	att Ile	tgg Trp	tta Leu	tcg Ser	192
atg Met 65	ata Ile	gtg Val	gca Ala	gta Val 70	gtg Val	gga Gly	acg Thr	gtg Val	gga Gly 75	gta Val	atg Met	tta Leu	ctg Leu	tca Ser 80	gaa Glu 80	240
aaa Lys	ttg Leu	cta Leu	tgg Trp	tct Ser 85	aga Arg	atg Met	cgc Arg	tcg Ser	att Ile 90	cga Arg	gct Ala	aat Asn	tcc Ser 95	act Thr 95	act Thr	288
ctt Leu	att Ile	att Ile	atc Ile 100	tca Ser	att Ile	ggg Gly	ctg Leu	gca Ala 105	tta Leu	ttc Phe	ctg Leu	cgt Arg	aac Asn 110	ggg Gly	att Ile	336
att Ile	tta Leu	att Ile 115	tgg Trp	ggg Gly	ggc Gly	agg Arg	aac Asn 120	caa Gln	aat Asn	tat Tyr	aat Asn	tta Leu 125	ccc Pro	atc Ile	acc Thr	384
ccc Pro	gcc Ala 130	tta Leu	gat Asp	att Ile	ttc Phe	gga Gly 135	gtg Val	aaa Lys	gta Val	cca Pro	caa Gln 140	aat Asn	caa Gln	ttg Leu	ctg Leu	432
gtg Val 145	ttg Leu	gca Ala	ttg Leu	gca Ala 150	gta Val 150	tta Leu	tcc Ser	atc Ile	ggc Gly 155	gca Ala 155	ctg Leu	cac His	tac Tyr	ctc Leu 160	tta Leu 160	480
caa Gln	aac Asn	aca Thr	aaa Lys 165	att Ile	ggg Gly	aag Lys	gcg Ala	atg Met	cgt Arg 170	gct Ala	ggt Val	gct Ala	gac Asp	gat Asp 175	ttg Leu	528
gat Asp	tta Leu	gcc Ala	aag Lys 180	gtt Val	tca Ser	ggg Gly	att Ile	gat Asp 185	gta Val	gag Glu	caa Gln	gta Val	att Ile 190	ttt Phe	tgg Trp	576
act Thr	tgg Trp	cta Leu 195	att Ile	gcc Ala	ggc Gly	aca Thr	gtc Val 200	acc Thr	tct Ser	tta Leu	ggg Gly 205	ggc Gly 205	agt Ser	atg Met	tat Tyr	624
ggc Gly	tta Leu	att Ile	acg Thr	gca Ala	gtg Val	cgt Arg	ccc Pro	aat Asn	atg Met	ggg Gly	tgg Trp	ttc Phe	ttg Leu	att Ile	ctg Leu	672

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210	215	220	
ccg cta ttc gct tct gta atc ttg ggc ggt att ggc aac cct tac ggt	720		
Pro Leu Phe Ala Ser Val Ile Leu Gly Gly Ile Gly Asn Pro Tyr Gly			
225 230 235 240			
gcg atc gcc gca gct ttt atc att ggt att gtt caa gaa gtt agt aca	768		
Ala Ile Ala Ala Ala Phe Ile Ile Gly Ile Val Gln Glu Val Ser Thr			
245 250 255			
ccc ttc tta ggt tcc caa tac aaa caa ggt gta gcc cta cta atc atg	816		
Pro Phe Leu Gly Ser Gln Tyr Lys Gln Gly Val Ala Leu Leu Ile Met			
260 265 270			
att ttg gtg ttg ctc att cgt cct aaa ggt tta ttt aaa ggc acg atg	864		
Ile Leu Val Leu Leu Ile Arg Pro Lys Gly Leu Phe Lys Gly Thr Met			
275 280 285			
tga	867		

<210> 475
 <211> 288
 <212> PRT
 <213> Nostoc sp. PCC 7120

<400> 475
 Met Asp Ile Gln Thr Ile Gln Leu Ile Val Asn Gly Ile Ala Val Gly
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 Ser Ile Ile Ala Leu Ala Ala Val Gly Leu Thr Leu Thr Tyr Gly Ile
 20 25 30
 Leu Arg Leu Ser Asn Phe Ala His Gly Asp Phe Leu Thr Leu Gly Ala
 35 40 45
 Tyr Leu Thr Phe Phe Val Asn Thr Phe Gly Val Asn Ile Trp Leu Ser
 50 55 60
 Met Ile Val Ala Val Val Gly Thr Val Gly Val Met Leu Leu Ser Glu
 65 70 75 80
 Lys Leu Leu Trp Ser Arg Met Arg Ser Ile Arg Ala Asn Ser Thr Thr
 85 90 95
 Leu Ile Ile Ile Ser Ile Gly Leu Ala Leu Phe Leu Arg Asn Gly Ile
 100 105 110
 Ile Leu Ile Trp Gly Gly Arg Asn Gln Asn Tyr Asn Leu Pro Ile Thr
 115 120 125
 Pro Ala Leu Asp Ile Phe Gly Val Lys Val Pro Gln Asn Gln Leu Leu
 130 135 140
 Val Leu Ala Leu Ala Val Leu Ser Ile Gly Ala Leu His Tyr Leu Leu
 145 150 155 160
 Gln Asn Thr Lys Ile Gly Lys Ala Met Arg Ala Val Ala Asp Asp Leu
 165 170 175
 Asp Leu Ala Lys Val Ser Gly Ile Asp Val Glu Gln Val Ile Phe Trp
 180 185 190
 Thr Trp Leu Ile Ala Gly Thr Val Thr Ser Leu Gly Gly Ser Met Tyr
 195 200 205
 Gly Leu Ile Thr Ala Val Arg Pro Asn Met Gly Trp Phe Leu Ile Leu
 210 215 220
 Pro Leu Phe Ala Ser Val Ile Leu Gly Gly Ile Gly Asn Pro Tyr Gly
 225 230 235 240
 Ala Ile Ala Ala Ala Phe Ile Ile Gly Ile Val Gln Glu Val Ser Thr
 245 250 255
 Pro Phe Leu Gly Ser Gln Tyr Lys Gln Gly Val Ala Leu Leu Ile Met
 260 265 270
 Ile Leu Val Leu Leu Ile Arg Pro Lys Gly Leu Phe Lys Gly Thr Met
 275 280 285

<210> 476
 <211> 951
 <212> DNA
 <213> Nostoc sp. PCC 7120

<220>
 <221> CDS
 <222> (1)..(951)

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 Met Asp Ile Ser Val Phe Leu Gln Gln Leu Leu Asn Gly Leu Ser Ile
 1 5 10 15
 ggc agc gtt tat gca atc ttt gcc tta ggt tat aca ttg gtt tat tcc 96
 Gly Ser Val Tyr Ala Ile Phe Ala Leu Gly Tyr Thr Leu Val Tyr Ser
 20 25 30
 att ttg gga att att aat tta gca cat ggg gca att ttt act ctg gga 144
 Ile Leu Gly Ile Ile Asn Leu Ala His Gly Ala Ile Phe Thr Leu Gly
 35 40 45
 gca tat ttt act tat gct ctt atg ggt gga acc ttt ggg ttt aat ggt 192
 Ala Tyr Phe Thr Tyr Ala Leu Met Gly Gly Thr Phe Gly Phe Asn Gly
 50 55 60
 ttg ctg gct aac gct act ttg ccg ata caa tta cca ttt gct atg gca 240
 Leu Leu Ala Asn Ala Thr Leu Pro Ile Gln Leu Pro Phe Ala Met Ala
 65 70 75 80
 ttg att atg ggt agt agt tta gct ggt tta gtg gga gta gca atg gaa 288
 Leu Ile Met Gly Ser Ser Leu Ala Gly Leu Val Gly Val Ala Met Glu
 85 90 95
 aga att gct ttt caa cct tta cga aaa aaa gga tct gac acc tta cta 336
 Arg Ile Ala Phe Gln Pro Leu Arg Lys Lys Gly Ser Asp Thr Leu Leu
 100 105 110
 act gtg gtt tct agc tta ggg gta gca gtg gta att gtg aac cta att 384
 Thr Val Val Ser Ser Leu Gly Val Ala Val Val Ile Val Asn Leu Ile
 115 120 125
 caa tat tta gta ggt gca gaa agt tat aca ttt cca gca aat act ttt 432
 Gln Tyr Leu Val Gly Ala Glu Ser Tyr Thr Phe Pro Ala Asn Thr Phe
 130 135 140
 ggg aat tta ccc cca gcg ttt aac ttt gga act ttg gaa aaa ccg att 480
 Gly Asn Leu Pro Pro Ala Phe Asn Phe Gly Thr Leu Glu Lys Pro Ile
 145 150 155 160
 cct att cgt agc gta cag gtg gta att ttt act gta tct gtt gtg att 528
 Pro Ile Arg Ser Val Gln Val Val Ile Phe Thr Val Ser Val Val Ile
 165 170 175
 gtg gct att ctt act tac ttt att aat cgt act aaa tac ggt aaa gca 576
 Val Ala Ile Leu Thr Tyr Phe Ile Asn Arg Thr Lys Tyr Gly Lys Ala
 180 185 190
 att cag gcg atc gcc gaa gat gcc act act gct agt tta tta ggt atc 624
 Ile Gln Ala Ile Ala Glu Asp Ala Thr Thr Ala Ser Leu Leu Gly Ile
 195 200 205
 aat agc gat cgc ttt att gtc tta act ttt ttt atc agc agt ttt ctc 672
 Asn Ser Asp Arg Phe Ile Val Leu Thr Phe Phe Ile Ser Ser Phe Leu
 210 215 220
 gct ggc ttg gcg ggt aca tta gtc gct tct agt gta agc att gca ggc 720
 Ala Gly Leu Ala Gly Thr Leu Val Ala Ser Ser Val Ser Ile Ala Gly
 225 230 235 240
 cct tat ttt ggg att ggc ttt ggg ttg ccg ggt tta gcg gtg att gtt 768
 Pro Tyr Phe Gly Ile Gly Phe Gly Leu Arg Gly Leu Ala Val Ile Val
 245 250 255
 ttg ggt ggc tta ggt agc att cct ggc gca gtg ctg gga ggt tta ctg 816
 Leu Gly Gly Leu Gly Ser Ile Pro Gly Ala Val Leu Gly Gly Leu Leu
 260 265 270
 att ggt gtg gtt gag gcg ctg gtt ccc tct gat tac tct ggt tat aaa 864
 Ile Gly Val Val Glu Ala Leu Val Pro Ser Asp Tyr Ser Gly Tyr Lys
 275 280 285
 gac gct gta gct ttc ggc att ttg ttt atc atg cta tta gtt aga ccc 912
 Asp Ala Val Ala Phe Gly Ile Leu Phe Ile Met Leu Leu Val Arg Pro
 290 295 300
 caa gga tta tta ggt cgt cgg ttt att cag aaa gtc tga 951
 Gln Gly Leu Leu Gly Arg Arg Phe Ile Gln Lys Val
 305 310 315

<210> 477

<211> 316

<212> PRT

<213> Nostoc sp. PCC 7120

<400> 477

Met Asp Ile Ser Val Phe Leu Gln Gln Leu Leu Asn Gly Leu Ser Ile

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1 Gly Ser Val Tyr 5 Ala Ile Phe Ala Leu 10 Gly Tyr Thr Leu Val 15 Tyr Ser
 20 Ile Leu Gly Ile Ile Asn Leu Ala His Gly Ala Ile Phe Thr Leu Gly
 35 Ala Tyr Phe Thr Tyr Ala Leu Met Gly Gly Thr Phe Gly Phe Asn Gly
 50 Leu Leu Ala Asn Ala Thr 55 Leu Pro Ile Gln Leu 60 Phe Ala Met Ala
 65 Leu Ile Met Gly Ser 85 Ser Leu Ala Gly Leu Val Gly Val Ala Met Glu
 90 Arg Ile Ala Phe 100 Gln Pro Leu Arg Lys Gly Ser Asp Thr Leu Leu
 110 Thr Val Val Ser Ser Leu Gly Val 120 Ala Val Val Ile Val Asn Leu Ile
 130 Gln Tyr Leu Val Gly Ala Glu Ser Tyr Thr Phe Pro Ala Asn Thr Phe
 145 Gly Asn Leu Pro Pro Ala 150 Phe Asn Phe Gly Thr Leu Glu Lys Pro Ile
 160 Pro Ile Arg Ser Val Gln Val Val Ile Phe Thr Val Ser Val Val Ile
 175 Val Ala Ile Leu Thr Tyr Phe Ile Asn Arg Thr Lys Tyr Gly Lys Ala
 180 Ile Gln Ala Ile Ala Glu Asp Ala 200 Thr Thr Ala Ser Leu Gly Ile
 210 Asn Ser Asp Arg Phe Ile Val Leu Thr Phe Phe Ile Ser Ser Phe Leu
 225 Ala Gly Leu Ala Gly Thr 230 Leu Val Ala Ser Ser Val Ser Ile Ala Gly
 240 Pro Tyr Phe Gly Ile 245 Gly Phe Gly Leu Arg Gly Leu Ala Val Ile Val
 255 Leu Gly Gly Leu Gly Ser Ile Pro Gly Ala Val Leu Gly Gly Leu Leu
 260 Ile Gly Val Val Glu Ala Leu Val 280 Pro Ser Asp Tyr Ser Gly Tyr Lys
 290 Asp Ala Val Ala Phe Gly Ile 295 Leu Phe Ile Met Leu Val Arg Pro
 305 Gln Gly Leu Leu Gly Arg Arg Phe Ile Gln Lys Val 315

<210> 478

<211> 903

<212> DNA

<213> Agrobacterium tumefaciens

<220>

<221> CDS

<222> (1)..(903)

<400> 478

atg gag tat ttt atc cag cag ctc atc aac ggg ctg act ctt gga tcg	48
Met Glu Tyr Phe Ile Gln Gln Leu Ile Asn Gly Leu Thr Leu Gly Ser	
1 atc tat ggc ctc atc gct atc ggc tac acg atg gtt tac ggc atc atc	96
Ile Tyr Gly Leu Ile Ala Ile Gly Tyr Thr Met Val Tyr Gly Ile Ile	
20 ggc atg atc aac ttc gcc cat ggc gat att ttc atg ctt ggc ttt	144
Gly Met Ile Asn Phe Ala His Gly Asp Ile Phe Met Leu Gly Gly Phe	
35 gcc gcg ctg atc gta ttt ctg atc gca aca tcg ttt ttc gcc ggc att	192
Ala Ala Leu Ile Val Phe Leu Ile Ala Thr Ser Phe Phe Ala Gly Ile	
50 ccg gtg gcg ctt ctt ctg ctt ttg atg atg atc gtc gcc atg ctg atg	240
Pro Val Ala Leu Leu Leu Leu Leu Met Met Ile Val Ala Met Leu Met	
65 acc ggc ctg tgg aac tgg gtg atc gag cgt gtt gcc tac cgc ccg ctc	288
Thr Gly Leu Trp Asn Trp Val Ile Glu Arg Val Ala Tyr Arg Pro Leu	
85 aga ggt tcc ttc cgc ctt gcg ccg ctg atc act gcc atc ggc atg tcg	336
310	

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Arg	Gly	Ser	Phe	Arg	Leu	Ala	Pro	Leu	Ile	Thr	Ala	Ile	Gly	Met	Ser		
atc	gcg	ctg	tcc	aac	ttc	att	cag	gtc	acc	cag	ggc	ccg	cgc	aac	aag		384
Ile	Ala	Leu	Ser	Asn	Phe	Ile	Gln	Val	Thr	Gln	Gly	Pro	Arg	Asn	Lys		
		115					120					125					
ccg	atc	ccg	tcg	atg	gtg	acg	gaa	agc	tat	cat	ttc	ggc	gcc	atc	acc		432
Pro	Ile	Pro	Ser	Met	Val	Thr	Glu	Ser	Tyr	His	Phe	Gly	Ala	Ile	Thr		
		130					135					140					
gtg	tcg	ctg	aag	cag	ctg	atc	atc	atg	gtc	ggt	acc	tcg	gta	ctg	ctt		480
Val	Ser	Leu	Lys	Gln	Leu	Ile	Ile	Met	Val	Val	Thr	Ser	Val	Leu	Leu		
		145					150					155					
ttc	gcc	ttc	tgg	tat	atc	gtc	aac	aag	acc	ccg	ctc	ggc	cgg	gcg	cag		528
Phe	Ala	Phe	Trp	Tyr	Ile	Val	Asn	Lys	Thr	Pro	Leu	Gly	Arg	Ala	Gln		
				165													
cgc	gcc	acc	gag	cag	gac	cgc	aag	atg	gcc	gcc	ctt	ttg	ggg	ggt	gat		576
Arg	Ala	Thr	Glu	Gln	Asp	Arg	Lys	Met	Ala	Ala	Leu	Leu	Gly	Val	Asp		
			180														
gtg	gac	aag	acg	att	tcc	atc	acc	ttc	atc	atg	ggt	gcg	gcg	ctg	gct		624
Val	Asp	Lys	Thr	Ile	Ser	Ile	Thr	Phe	Ile	Met	Gly	Ala	Ala	Leu	Ala		
			195														
gcg	gtc	gcg	ggc	acc	atg	tat	ctg	atg	tat	tac	ggt	ggt	gct	tcg	ttc		672
Ala	Val	Ala	Gly	Thr	Met	Tyr	Leu	Met	Tyr	Tyr	Gly	Val	Ala	Ser	Phe		
			210				215					220					
agc	gac	ggc	ttc	ggt	ccc	ggc	gtc	aag	gcc	ttc	acc	gcg	gcc	gtc	ctc		720
Ser	Asp	Gly	Phe	Val	Pro	Gly	Val	Lys	Ala	Phe	Thr	Ala	Ala	Val	Leu		
					230							235					
ggc	ggc	atc	ggc	tcg	ctt	ccg	ggc	gcc	ggt	ctt	ggt	ggc	ctg	ctg	atc		768
Gly	Gly	Ile	Gly	Ser	Leu	Pro	Gly	Ala	Val	Leu	Gly	Gly	Leu	Leu	Ile		
				245													
ggt	ctc	atc	gaa	tca	ctg	tgg	tcg	gcc	tat	tcc	att	gcc	tac	aag			816
Gly	Leu	Ile	Glu	Ser	Leu	Trp	Ser	Ala	Tyr	Phe	Ser	Ile	Ala	Tyr	Lys		
			260														
gat	gtt	gcg	gca	ttc	ggc	atc	ctg	gca	ttc	gtg	ctg	atc	ttc	aag	ccg		864
Asp	Val	Ala	Ala	Phe	Gly	Ile	Leu	Ala	Phe	Val	Leu	Ile	Phe	Lys	Pro		
			275														
acc	ggt	att	ctc	ggt	cgt	ccg	gaa	gtc	gag	aag	gtg	tga					903
Thr	Gly	Ile	Leu	Gly	Arg	Pro	Glu	Val	Glu	Lys	Val						
			290									300					

<210> 479

<211> 300

<212> PRT

<213> Agrobacterium tumefaciens

<400> 479

Met	Glu	Tyr	Phe	Ile	Gln	Gln	Leu	Ile	Asn	Gly	Leu	Thr	Leu	Gly	Ser		
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Ile	Tyr	Gly	Leu	Ile	Ala	Ile	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Ile		
			20					25					30				
Gly	Met	Ile	Asn	Phe	Ala	His	Gly	Asp	Ile	Phe	Met	Leu	Gly	Gly	Phe		
			35				40					45					
Ala	Ala	Leu	Ile	Val	Phe	Leu	Ile	Ala	Thr	Ser	Phe	Phe	Ala	Gly	Ile		
			50				55					60					
Pro	Val	Ala	Leu	Leu	Leu	Leu	Leu	Met	Met	Ile	Val	Ala	Met	Leu	Met		
				70													
Thr	Gly	Leu	Trp	Asn	Trp	Val	Ile	Glu	Arg	Val	Ala	Tyr	Arg	Pro	Leu		
				85					90					95			
Arg	Gly	Ser	Phe	Arg	Leu	Ala	Pro	Leu	Ile	Thr	Ala	Ile	Gly	Met	Ser		
			100					105					110				
Ile	Ala	Leu	Ser	Asn	Phe	Ile	Gln	Val	Thr	Gln	Gly	Pro	Arg	Asn	Lys		
			115					120				125					
Pro	Ile	Pro	Ser	Met	Val	Thr	Glu	Ser	Tyr	His	Phe	Gly	Ala	Ile	Thr		
						135						140					
Val	Ser	Leu	Lys	Gln	Leu	Ile	Ile	Met	Val	Val	Thr	Ser	Val	Leu	Leu		
					150						155						
Phe	Ala	Phe	Trp	Tyr	Ile	Val	Asn	Lys	Thr	Pro	Leu	Gly	Arg	Ala	Gln		
				165					170								
Arg	Ala	Thr	Glu	Gln	Asp	Arg	Lys	Met	Ala	Ala	Leu	Leu	Gly	Val	Asp		
			180						185								

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Val Asp Lys Thr Ile Ser Ile Thr Phe Ile Met Gly Ala Ala Leu Ala
 195 200 205
 Ala Val Ala Gly Thr Met Tyr Leu Met Tyr Tyr Gly Val Ala Ser Phe
 210 215 220
 Ser Asp Gly Phe Val Pro Gly Val Lys Ala Phe Thr Ala Ala Val Leu
 225 230 235 240
 Gly Gly Ile Gly Ser Leu Pro Gly Ala Val Leu Gly Gly Leu Leu Ile
 245 250 255
 Gly Leu Ile Glu Ser Leu Trp Ser Ala Tyr Phe Ser Ile Ala Tyr Lys
 260 265 270
 Asp Val Ala Ala Phe Gly Ile Leu Ala Phe Val Leu Ile Phe Lys Pro
 275 280 285
 Thr Gly Ile Leu Gly Arg Pro Glu Val Glu Lys Val
 290 295 300

<210> 480

<211> 924

<212> DNA

<213> Pseudomonas aeruginosa

<220>

<221> CDS

<222> (1)..(924)

<400> 480

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1				5				10						15		
gtc	ggc	agc	acc	tat	gcg	ctg	atc	gcg	atc	ggc	tac	acc	atg	gtc	tac	96
Val	Gly	Ser	Thr	Tyr	Ala	Leu	Ile	Ala	Ile	Gly	Tyr	Thr	Met	Val	Tyr	
			20					25					30			
ggc	atc	atc	ggc	atg	atc	aac	ttc	gcc	cac	ggc	gag	gtg	tac	atg	atc	144
Gly	Ile	Ile	Gly	Met	Ile	Asn	Phe	Ala	His	Gly	Glu	Val	Tyr	Met	Ile	
			35				40					45				
ggc	tcg	tac	atc	gcc	ttc	atc	gcc	atc	acc	ctg	ctg	gcg	atg	atg	ggg	192
Gly	Ser	Tyr	Ile	Ala	Phe	Ile	Ala	Ile	Thr	Leu	Leu	Ala	Met	Met	Gly	
			50			55					60					
ctg	gac	agc	gtt	ccg	ctg	atg	atg	ctc	gcc	gca	ttc	gcc	gcc	agc	atc	240
Leu	Asp	Ser	Val	Pro	Leu	Met	Met	Leu	Ala	Ala	Phe	Ala	Ala	Ser	Ile	
				70				75							80	
atc	gtc	acc	agt	gct	ttc	ggc	tac	agc	atc	gag	cgg	gtc	gcc	tac	cgc	288
Ile	Val	Thr	Ser	Ala	Phe	Gly	Tyr	Ser	Ile	Glu	Arg	Val	Ala	Tyr	Arg	
				85				90						95		
ccg	ttg	cgc	ggc	ggc	aac	cgc	ctg	atc	ccg	ctg	atc	tcc	gcg	atc	ggc	336
Pro	Leu	Arg	Gly	Gly	Asn	Arg	Leu	Ile	Pro	Leu	Ile	Ser	Ala	Ile	Gly	
			100					105					110			
atg	tcg	atc	ttc	ctg	cag	aac	gcc	gtg	atg	ctc	tcg	cag	gac	tcc	aag	384
Met	Ser	Ile	Phe	Leu	Gln	Asn	Ala	Val	Met	Leu	Ser	Gln	Asp	Ser	Lys	
			115				120					125				
gaa	aag	gcc	atc	ccg	acc	ctg	ctg	ccc	ggc	aac	ttc	gtg	ttc	ggc	gaa	432
Glu	Lys	Ala	Ile	Pro	Thr	Leu	Leu	Pro	Gly	Asn	Phe	Val	Phe	Gly	Glu	
			130			135					140					
agc	agc	atg	aac	ggc	gtg	gtg	atc	tcc	tat	atg	cag	atc	ctg	atc	ttc	480
Ser	Ser	Met	Asn	Gly	Val	Val	Ile	Ser	Tyr	Met	Gln	Ile	Leu	Ile	Phe	
				150				155							160	
gtc	gtc	acc	ttc	ctg	gtg	atg	ttc	ggc	ctc	acc	ctg	ttc	atc	tcc	cgt	528
Val	Val	Thr	Phe	Leu	Val	Met	Phe	Gly	Leu	Thr	Leu	Phe	Ile	Ser	Arg	
				165				170						175		
tcc	cgc	ctg	ggc	cgc	gcc	tgc	cgc	gcc	tgc	gcc	gag	gac	ctg	aag	atg	576
Ser	Arg	Leu	Gly	Arg	Ala	Cys	Arg	Ala	Cys	Ala	Glu	Asp	Leu	Lys	Met	
			180					185					190			
acc	aac	ctg	ggt	atc	aac	agc	aac	aac	atc	atc	gcc	ctc	acc	ttc		624
Thr	Asn	Leu	Gly	Ile	Asn	Ser	Asn	Asn	Ile	Ile	Ala	Leu	Thr	Phe		
			195			200					205					
gtc	atc	ggc	gcc	gcc	ctg	gcc	gcc	gtc	gcc	gag	gtg	ctg	ctg	ggc	atg	672
Val	Ile	Gly	Ala	Ala	Leu	Ala	Ala	Val	Ala	Ala	Val	Leu	Leu	Gly	Met	
			210			215					220					
cag	tac	ggc	gtg	atc	aac	ccc	ggg	atc	ggc	ttc	ctc	gcc	ggg	atc	aag	720
Gln	Tyr	Gly	Val	Ile	Asn	Pro	Gly	Ile	Gly	Phe	Leu	Ala	Gly	Ile	Lys	

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225	gcg	ttc	acc	gcc	gcg	230	gtg	ctc	ggc	ggc	atc	235	agg	atc	ccc	ggc	240		
	Ala	Phe	Thr	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Gly	Ser	Ile	Pro	Gly	gac		
					245					250						255			
	atg	ctc	ggc	ggc	ctg	ctg	ctg	ggc	gtc	gac	gaa	ggc	ttc	ggc	ggc	gac			
	Met	Leu	Gly	Gly	Leu	Leu	Leu	Gly	Val	Ala	Glu	Ala	Phe	Gly	Ala	Asp			
				260					265					270					
	gtg	ttc	ggc	gac	cag	tac	aag	gac	gtg	gtg	gac	ttc	ggc	ctg	ctg	atc			
	Val	Phe	Gly	Asp	Gln	Tyr	Lys	Asp	Val	Val	Ala	Phe	Gly	Leu	Leu	Ile			
			275					280					285						
	ctg	gtg	ctg	ctg	ttc	cga	cct	acc	ggc	atc	ctc	ggg	cgt	ccg	gag	gtg			
	Leu	Val	Leu	Leu	Phe	Arg	Pro	Thr	Gly	Ile	Leu	Gly	Arg	Pro	Glu	Val			
		290					295					300							
	gaa	aaa	gta	tga															
	Glu	Lys	Val																
	305																		

768

816

864

912

924

<210> 481

<211> 307

<212> PRT

<213> Pseudomonas aeruginosa

<400> 481

Met	Pro	Glu	Ile	Tyr	His	Tyr	Leu	Gln	Gln	Leu	Val	Asn	Gly	Leu	Thr
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			20					25					30		
Gly	Ile	Ile	Gly	Met	Ile	Asn	Phe	Ala	His	Gly	Glu	Val	Tyr	Met	Ile
		35					40					45			
Gly	Ser	Tyr	Ile	Ala	Phe	Ile	Ala	Ile	Thr	Leu	Leu	Ala	Met	Met	Gly
	50					55				60					
Leu	Asp	Ser	Val	Pro	Leu	Met	Met	Leu	Ala	Ala	Phe	Ala	Ala	Ser	Ile
65					70				75					80	
Ile	Val	Thr	Ser	Ala	Phe	Gly	Tyr	Ser	Ile	Glu	Arg	Val	Ala	Tyr	Arg
			85					90						95	
Pro	Leu	Arg	Gly	Gly	Asn	Arg	Leu	Ile	Pro	Leu	Ile	Ser	Ala	Ile	Gly
			100					105					110		
Met	Ser	Ile	Phe	Leu	Gln	Asn	Ala	Val	Met	Leu	Ser	Gln	Asp	Ser	Lys
		115					120					125			
Glu	Lys	Ala	Ile	Pro	Thr	Leu	Leu	Pro	Gly	Asn	Phe	Val	Phe	Gly	Glu
	130					135				140					
Ser	Ser	Met	Asn	Gly	Val	Val	Ile	Ser	Tyr	Met	Gln	Ile	Leu	Ile	Phe
145					150				155					160	
Val	Val	Thr	Phe	Leu	Val	Met	Phe	Gly	Leu	Thr	Leu	Phe	Ile	Ser	Arg
			165					170						175	
Ser	Arg	Leu	Gly	Arg	Ala	Cys	Arg	Ala	Cys	Ala	Glu	Asp	Leu	Lys	Met
			180					185					190		
Thr	Asn	Leu	Leu	Gly	Ile	Asn	Ser	Asn	Asn	Ile	Ile	Ala	Leu	Thr	Phe
		195				200						205			
Val	Ile	Gly	Ala	Ala	Leu	Ala	Ala	Val	Ala	Ala	Val	Leu	Leu	Gly	Met
	210				215						220				
Gln	Tyr	Gly	Val	Ile	Asn	Pro	Gly	Ile	Gly	Phe	Leu	Ala	Gly	Ile	Lys
225					230				235					240	
Ala	Phe	Thr	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ser	Ile	Pro	Gly	Ala
			245					250					255		
Met	Leu	Gly	Gly	Leu	Leu	Leu	Gly	Val	Ala	Glu	Ala	Phe	Gly	Ala	Asp
			260					265					270		
Val	Phe	Gly	Asp	Gln	Tyr	Lys	Asp	Val	Val	Ala	Phe	Gly	Leu	Leu	Ile
		275					280					285			
Leu	Val	Leu	Leu	Phe	Arg	Pro	Thr	Gly	Ile	Leu	Gly	Arg	Pro	Glu	Val
	290					295					300				
Glu	Lys	Val													
305															

<210> 482

<211> 798

<212> DNA

<213> Aeropyrum pernix

<220>

<221> CDS

<222> (1)..(798)

<400> 482

atg ggt ctt gcc atg atc tgg ggc gtt atg gag atc att aac ttc gcg	48
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1 5 10 15	
cat ggc gat ttt atg atg ctt gga gct ctg gca gcc tac tat gcg ttc	96
His Gly Asp Phe Met Met Leu Gly Ala Leu Ala Ala Tyr Tyr Ala Phe	
20 25 30	
acg cta atg ggg tta gac ccc ttg gct ggt ggt gta tta gcg ttt gta	144
Thr Leu Met Gly Leu Asp Pro Leu Ala Gly Gly Val Leu Ala Phe Val	
35 40 45	
atg gtg ttc gca ctg ggt gtg ggg gtg cag cgc ggc gtt ata aat agg	192
Met Val Phe Ala Leu Gly Val Gly Val Gln Arg Gly Val Ile Asn Arg	
50 55 60	
ata tta gat gct ccg tta ttg acg cag ata gcc gct aca ttc gct gtc	240
Ile Leu Asp Ala Pro Leu Thr Gln Ile Ala Ala Thr Phe Ala Val	
65 70 75 80	
ctc ctt ata ata cgg tat ggg gtg cag gct gtc ctg ggc ccc tac act	288
Leu Leu Ile Ile Arg Tyr Gly Val Gln Ala Val Leu Gly Pro Tyr Thr	
85 90 95	
agg agg ctt gtc acg tgg tat cag gac tat tac gtg ggg ctg gga ttc	336
Arg Arg Leu Val Thr Trp Tyr Gln Asp Tyr Tyr Val Gly Leu Gly Phe	
100 105 110	
act act gta ccc ctc tct aag ctt ctt ata ttc ctg gta tca ctc gtc	384
Thr Thr Val Pro Leu Ser Lys Leu Leu Ile Phe Leu Val Ser Leu Val	
115 120 125	
ata ttg gcc cta cta tat ata ttg ctg aac agg act gac atg ggg ata	432
Ile Leu Ala Leu Leu Tyr Ile Leu Leu Asn Arg Thr Asp Met Gly Ile	
130 135 140	
gcc att agg gct aca tca cag aat agg atg gtg gcg cag ctg atg gga	480
Ala Ile Arg Ala Thr Ser Gln Asn Arg Met Val Ala Gln Leu Met Gly	
145 150 155 160	
ata aat gta tct agg gtt tac gac gta acc ttc ggg att ggt gtc ggt	528
Ile Asn Val Ser Arg Val Tyr Asp Val Thr Phe Gly Ile Gly Val Gly	
165 170 175	
gta gct gca gta ggg ggc gcc ctg gta gcg ttg ttc tac cca ata ttc	576
Val Ala Ala Val Gly Gly Ala Leu Val Ala Leu Phe Tyr Pro Ile Phe	
180 185 190	
cct gag atg ggg gga ttc ttc gcg tta ata gca ttt ata gcg gtc gtc	624
Pro Glu Met Gly Gly Phe Phe Ala Leu Ile Ala Phe Ile Ala Val Val	
195 200 205	
ctc gga ggc ttt ggc aac gtg tat gga gcc tat gtg gga ggt ttg att	672
Leu Gly Gly Phe Gly Asn Val Tyr Gly Ala Tyr Val Gly Gly Leu Ile	
210 215 220	
ata ggc gtt acg gag agt gtt agc gcg tta ttt ata gag ccc gca ttg	720
Ile Gly Val Thr Glu Ser Val Ser Ala Leu Phe Ile Glu Pro Ala Leu	
225 230 235 240	
aag gat gta gta gcc ttc cta cta ttc ata ctc atc ata atg att aag	768
Lys Asp Val Val Ala Phe Leu Leu Phe Ile Leu Ile Ile Met Ile Lys	
245 250 255	
ccg aca gga tta ttt ggt agg ggt gaa tga	798
Pro Thr Gly Leu Phe Gly Arg Gly Glu	
260 265	

<210> 483

<211> 265

<212> PRT

<213> Aeropyrum pernix

<400> 483

Met Gly Leu Ala Met Ile Trp Gly Val Met Glu Ile Ile Asn Phe Ala
1 5 10 15
His Gly Asp Phe Met Met Leu Gly Ala Leu Ala Ala Tyr Tyr Ala Phe
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Thr Leu Met Gly Leu Asp Pro Leu Ala Gly Gly Val Leu Ala Phe Val
35 40 45

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Met Val Phe Ala Leu Gly Val Gly Val Gln Arg Gly Val Ile Asn Arg
50 55 60
Ile Leu Asp Ala Pro Leu Leu Thr Gln Ile Ala Ala Thr Phe Ala Val
65 70 75 80
Leu Leu Ile Ile Arg Tyr Gly Val Gln Ala Val Leu Gly Pro Tyr Thr
85 90 95
Arg Arg Leu Val Thr Trp Tyr Gln Asp Tyr Tyr Val Gly Leu Gly Phe
100 105 110
Thr Thr Val Pro Leu Ser Lys Leu Leu Ile Phe Leu Val Ser Leu Val
115 120 125
Ile Leu Ala Leu Leu Tyr Ile Leu Leu Asn Arg Thr Asp Met Gly Ile
130 135 140
Ala Ile Arg Ala Thr Ser Gln Asn Arg Met Val Ala Gln Leu Met Gly
145 150 155 160
Ile Asn Val Ser Arg Val Tyr Asp Val Thr Phe Gly Ile Gly Val Gly
165 170 175
Val Ala Ala Val Gly Gly Ala Leu Val Ala Leu Phe Tyr Pro Ile Phe
180 185 190
Pro Glu Met Gly Gly Phe Phe Ala Leu Ile Ala Phe Ile Ala Val Val
195 200 205
Leu Gly Gly Phe Gly Asn Val Tyr Gly Ala Tyr Val Gly Gly Leu Ile
210 215 220
Ile Gly Val Thr Glu Ser Val Ser Ala Leu Phe Ile Glu Pro Ala Leu
225 230 235 240
Lys Asp Val Val Ala Phe Leu Leu Phe Ile Leu Ile Ile Met Ile Lys
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Pro Thr Gly Leu Phe Gly Arg Gly Glu
260 265

<210> 484

<211> 885

<212> DNA

<213> Aeropyrum pernix

<220>

<221> CDS

<222> (1)..(885)

<400> 484

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1 5 10 15	
ctc atg ggg ctc cta tac tcc ctc ata gcc cta ggc tac aac atc gtc	96
Leu Met Gly Leu Leu Tyr Ser Leu Ile Ala Leu Gly Tyr Asn Ile Val	
20 25 30	
tac agg gtc aac aag tcc ata aac ttc gca gta ccc gag gtt gtg cta	144
Tyr Arg Val Asn Lys Ser Ile Asn Phe Ala Val Pro Glu Val Val Leu	
35 40 45	
cta gca gcc tac ctg gct tgg ata gcc tcg ata gcc acg ggc aac ctc	192
Leu Ala Ala Tyr Leu Ala Trp Ile Ala Ser Ile Ala Thr Gly Asn Leu	
50 55 60	
ctg gcg gct gtg gcc ata gct cta gcc gcc agc atc gcc gtc agc atg	240
Leu Ala Ala Val Ala Ile Ala Leu Ala Ala Ser Ile Ala Val Ser Met	
65 70 75 80	
gcc atg gag agg ttc gtc gcg aag cct ctg cta ggc cgt ccc ccc ata	288
Ala Met Glu Arg Phe Val Ala Lys Pro Leu Leu Gly Arg Pro Pro Ile	
85 90 95	
gcc ttg att gga gca acc ctg gga cta ttc tac atg ctt aag ggt gtt	336
Ala Leu Ile Gly Ala Thr Leu Gly Leu Phe Tyr Met Leu Lys Gly Val	
100 105 110	
gtc cta ata gtt gga aag ggc gag gtc gcg gta ctc ccc ttc tac ccc	384
Val Leu Ile Val Gly Lys Gly Glu Val Ala Val Leu Pro Phe Tyr Pro	
115 120 125	
gaa gtg tac agg ctg ggc ttc ctg acg ctc ggc aca aac gat gtt ata	432
Glu Val Tyr Arg Leu Gly Phe Leu Thr Leu Gly Thr Asn Asp Val Ile	
130 135 140	
gcc ctt cta ggc tcg ata gcc gtg cta gcc ggc atc atc gtc ctc cat	480
Ala Leu Leu Gly Ser Ile Ala Val Leu Ala Gly Ile Ile Val Leu His	
145 150 155 160	

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agg	aaa	act	agc	ttc	ggc	gct	gct	atg	agg	ggt	gtg	gcg	gag	gac	gca	528
Arg	Lys	Thr	Ser	Phe	Gly	Ala	Ala	Met	Arg	Gly	Val	Ala	Glu	Asp	Ala	
				165					170					175		
gag	ggc	gca	gcc	gcc	tac	ggg	ctc	cct	gtg	agg	agg	ctc	atg	ctg	gcc	576
Glu	Gly	Ala	Ala	Ala	Tyr	Gly	Leu	Pro	Val	Arg	Arg	Leu	Met	Leu	Ala	
			180					185					190			
ggc	tgg	gct	ctt	gcc	ggc	ctc	gtg	agc	ggc	ctc	gca	gcc	ctc	ctc	ctc	624
Gly	Trp	Ala	Leu	Ala	Gly	Leu	Val	Ser	Gly	Leu	Ala	Ala	Leu	Leu	Leu	
			195				200					205				
tca	atc	aaa	aca	cag	gtg	tcg	ccg	gac	ctc	gag	ttc	ttc	gcg	ata	ata	672
Ser	Ile	Lys	Thr	Gln	Val	Ser	Pro	Asp	Leu	Glu	Phe	Phe	Ala	Ile	Ile	
	210					215					220					
gcc	cta	gca	gct	agc	ctt	ata	gcg	ggt	ctc	gac	agc	ctg	gga	gga	ata	720
Ala	Leu	Ala	Ala	Ser	Leu	Ile	Ala	Gly	Leu	Asp	Ser	Leu	Gly	Gly	Ile	
225					230					235					240	
gtc	gtg	gga	ggc	gtc	ttc	ctc	ggc	ctg	gcc	gag	cag	ata	gcc	agc	aaa	768
Val	Val	Gly	Gly	Val	Phe	Leu	Gly	Leu	Ala	Glu	Gln	Ile	Ala	Ser	Lys	
				245					250					255		
act	ctg	gac	ccc	tac	ctg	ccc	ggt	ata	ggg	agg	gat	atc	gcg	ttc	ttc	816
Thr	Leu	Asp	Pro	Tyr	Leu	Pro	Gly	Ile	Gly	Arg	Asp	Ile	Ala	Phe	Phe	
			260					265					270			
ata	cta	ttc	cta	gta	ctc	cta	gtc	aag	ccc	tac	ggc	ctc	ttc	ggc	agt	864
Ile	Leu	Phe	Leu	Val	Leu	Leu	Val	Lys	Pro	Tyr	Gly	Leu	Phe	Gly	Ser	
			275				280					285				
gag	agg	ata	gag	agg	ctc	tag										885
Glu	Arg	Ile	Glu	Arg	Leu											
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<210> 485

<211> 294

<212> PRT

<213> Aeropyrum pernix

<400> 485

Met	Ala	Gly	Leu	Leu	Glu	Gln	Trp	Gly	Asn	Leu	Val	Phe	Gln	Gly	Val	
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			20					25					30			
Tyr	Arg	Val	Asn	Lys	Ser	Ile	Asn	Phe	Ala	Val	Pro	Glu	Val	Val	Leu	
		35					40					45				
Leu	Ala	Ala	Tyr	Leu	Ala	Trp	Ile	Ala	Ser	Ile	Ala	Thr	Gly	Asn	Leu	
		50				55					60					
Leu	Ala	Ala	Val	Ala	Ile	Ala	Leu	Ala	Ala	Ser	Ile	Ala	Val	Ser	Met	
65					70					75					80	
Ala	Met	Glu	Arg	Phe	Val	Ala	Lys	Pro	Leu	Gly	Arg	Pro	Pro	Ile		
				85					90				95			
Ala	Leu	Ile	Gly	Ala	Thr	Leu	Gly	Leu	Phe	Tyr	Met	Leu	Lys	Gly	Val	
			100					105					110			
Val	Leu	Ile	Val	Gly	Lys	Gly	Glu	Val	Ala	Val	Leu	Pro	Phe	Tyr	Pro	
		115					120					125				
Glu	Val	Tyr	Arg	Leu	Gly	Phe	Leu	Thr	Leu	Gly	Thr	Asn	Asp	Val	Ile	
	130					135					140					
Ala	Leu	Leu	Gly	Ser	Ile	Ala	Val	Leu	Ala	Gly	Ile	Ile	Val	Leu	His	
145					150					155					160	
Arg	Lys	Thr	Ser	Phe	Gly	Ala	Ala	Met	Arg	Gly	Val	Ala	Glu	Asp	Ala	
				165					170					175		
Glu	Gly	Ala	Ala	Tyr	Gly	Leu	Pro	Val	Arg	Arg	Leu	Met	Leu	Ala		
			180				185					190				
Gly	Trp	Ala	Leu	Ala	Gly	Leu	Val	Ser	Gly	Leu	Ala	Ala	Leu	Leu	Leu	
		195					200					205				
Ser	Ile	Lys	Thr	Gln	Val	Ser	Pro	Asp	Leu	Glu	Phe	Phe	Ala	Ile	Ile	
	210					215					220					
Ala	Leu	Ala	Ala	Ser	Leu	Ile	Ala	Gly	Leu	Asp	Ser	Leu	Gly	Gly	Ile	
225					230					235					240	
Val	Val	Gly	Gly	Val	Phe	Leu	Gly	Leu	Ala	Glu	Gln	Ile	Ala	Ser	Lys	
				245					250					255		
Thr	Leu	Asp	Pro	Tyr	Leu	Pro	Gly	Ile	Gly	Arg	Asp	Ile	Ala	Phe	Phe	
			260					265					270			
Ile	Leu	Phe	Leu	Val	Leu	Leu	Val	Lys	Pro	Tyr	Gly	Leu	Phe	Gly	Ser	

275
Glu Arg Ile Glu Arg Leu
290

280 285

<210> 486
<211> 1065
<212> DNA
<213> Aeropyrum pernix

<220>
<221> CDS
<222> (1)..(1065)

<400> 486
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ata gca ctc ctg agc ctg ggc ata acg ctt gca tac ata aca acc agg 96
Ile Ala Leu Leu Ser Leu Gly Ile Thr Leu Ala Tyr Ile Thr Thr Arg
20 25 30
gtg ttc aac ttc gcc cac cca agg ata gcc aac gtg ggg gcc tat gcg 144
Val Phe Asn Phe Ala His Pro Arg Ile Ala Asn Val Gly Ala Tyr Ala
35 40 45
gcc gcc gcc tcc atg gca ctc tat gtg gac ctg gtg cgt gac gag ggt 192
Ala Ala Ala Ser Met Ala Leu Tyr Val Asp Leu Val Arg Asp Glu Gly
50 55 60
ata ggc cgg ttt aaa gtc tcg cta ggc ccc ctc gag gtt aca ggg ctg 240
Ile Gly Arg Phe Lys Val Ser Leu Gly Pro Leu Glu Val Thr Gly Leu
65 70 75 80
gtg gcg ccc gac gtt cta gcc gtc ggg ata gtg ttc gcg gtc ata gcc 288
Val Ala Pro Asp Val Leu Ala Val Gly Ile Val Phe Ala Val Ile Ala
85 90 95
ggg att atc act gcg cta gcc gaa tac tac ctc gtc ctc agg ccc ctg 336
Gly Ile Ile Thr Ala Leu Ala Glu Tyr Tyr Leu Val Leu Arg Pro Leu
100 105 110
ata gag agg ggc gcc gac ttc ctg aag ctt atg ata gca aca ctt gct 384
Ile Glu Arg Gly Ala Asp Phe Leu Lys Leu Met Ile Ala Thr Leu Ala
115 120 125
ttc gac ttc ttc gtc ata gca aca ctg ttc atc ctc ggg aca cac ata 432
Phe Asp Phe Phe Val Ile Ala Thr Leu Phe Ile Leu Gly Thr His Ile
130 135 140
tcc gtc aag gag ctg gtc agc gga gtc ttc gga agg gag acc aca agc 480
Ser Val Lys Glu Leu Val Ser Gly Val Phe Gly Arg Glu Thr Thr Ser
145 150 155 160
ctt tct cta cac gcc ttc gac gcc aga atc gac cta gcc gtg cta gcc 528
Leu Ser Leu His Ala Phe Asp Ala Arg Ile Asp Leu Ala Val Leu Gly
165 170 175
tat aag ctg aga ggg att atg ctg ttc tcc ttc cta gga agc cta gcc 576
Tyr Lys Leu Arg Gly Ile Met Leu Phe Ser Phe Leu Gly Ser Leu Ala
180 185 190
ata gcc cta atg ctc tac ata cta ctc ttc aag acc aag ctg ggc gta 624
Ile Ala Leu Met Leu Tyr Ile Leu Leu Phe Lys Thr Lys Leu Gly Val
195 200 205
aag atg agg gcc tcc ata gag aac ccc tcc ctg gcc gag gtc ctc ggc 672
Lys Met Arg Ala Ser Ile Glu Asn Pro Ser Leu Ala Glu Val Leu Gly
210 215 220
ata aac gtg cag cag gtg tac act ata gcc tgg ata agc ggg gcc 720
Ile Asn Val Gln Gln Val Tyr Thr Ile Ala Trp Ile Ile Ser Gly Ala
225 230 235 240
acg gca ggg ttc gcc ggg ttc ctt ata ctg ttc atg ggc gac atc gtg 768
Thr Ala Gly Phe Ala Gly Phe Leu Ile Leu Phe Met Gly Asp Ile Val
245 250 255
aag ccc gtg aca gcg tcg agc ccg gcc gag ata ata gtg agc gcc 816
Lys Pro Val Thr Ala Ser Ser Pro Ala Asp Glu Ile Ile Val Ser Ala
260 265 270
ttc gca ggc agc ata gtt ggc ggg gtc aac agc gtg ttc ggc tcc ata 864
Phe Ala Gly Ser Ile Val Gly Gly Val Asn Ser Val Phe Gly Ser Ile
275 280 285
ggg gga ggc ttc ata ata ggc gct gtg gag ata ctg ata tcc tca gtt 912

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Gly	Gly	Gly	Phe	Ile	Ile	Gly	Ala	Val	Glu	Ile	Leu	Ile	Ser	Ser	Val		
290	290	290				295					300						
ata	aca	gac	gtc	act	ggc	ata	gac	gtt	acc	aga	tac	aac	aag	atg	ctc	960	
Ile	Thr	Asp	Val	Thr	Gly	Ile	Asp	Val	Thr	Arg	Tyr	Asn	Lys	Met	Leu		
305					310					315					320		
tcg	atg	ctg	gca	gta	gcc	ctg	acc	cta	ctc	ttc	gcg	ccg	cag	gga	ctg	1008	
Ser	Met	Leu	Ala	Val	Ala	Leu	Thr	Leu	Leu	Phe	Ala	Pro	Gln	Gly	Leu		
				325					330					335			
gcc	gct	cta	tac	tcc	gaa	aag	att	cag	gcc	agg	ctt	ccc	agg	ctg	agg	1056	
Ala	Ala	Leu	Tyr	Ser	Glu	Lys	Ile	Gln	Ala	Arg	Leu	Pro	Arg	Leu	Arg		
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gga	ggc	tag														1065	
Gly	Gly																

<210> 487

<211> 354

<212> PRT

<213> *Aeropyrum pernix*

<400> 487

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Ile	Ala	Leu	Leu	Ser	Leu	Gly	Ile	Thr	Leu	Ala	Tyr	Ile	Thr	Thr	Arg		
			20					25					30				
Val	Phe	Asn	Phe	Ala	His	Pro	Arg	Ile	Ala	Asn	Val	Gly	Ala	Tyr	Ala		
		35					40					45					
Ala	Ala	Ala	Ser	Met	Ala	Leu	Tyr	Val	Asp	Leu	Val	Arg	Asp	Glu	Gly		
	50					55				60							
Ile	Gly	Arg	Phe	Lys	Val	Ser	Leu	Gly	Pro	Leu	Glu	Val	Thr	Gly	Leu		
65				70					75						80		
Val	Ala	Pro	Asp	Val	Leu	Ala	Val	Gly	Ile	Val	Phe	Ala	Val	Ile	Ala		
			85					90						95			
Gly	Ile	Ile	Thr	Ala	Leu	Ala	Glu	Tyr	Tyr	Leu	Val	Leu	Arg	Pro	Leu		
			100					105					110				
Ile	Glu	Arg	Gly	Ala	Asp	Phe	Leu	Lys	Leu	Met	Ile	Ala	Thr	Leu	Ala		
		115					120					125					
Phe	Asp	Phe	Phe	Val	Ile	Ala	Thr	Leu	Phe	Ile	Leu	Gly	Thr	His	Ile		
	130					135					140						
Ser	Val	Lys	Glu	Leu	Val	Ser	Gly	Val	Phe	Gly	Arg	Glu	Thr	Thr	Ser		
145				150					155						160		
Leu	Ser	Leu	His	Ala	Phe	Asp	Ala	Arg	Ile	Asp	Leu	Ala	Val	Leu	Gly		
			165					170						175			
Tyr	Lys	Leu	Arg	Gly	Ile	Met	Leu	Phe	Ser	Phe	Leu	Gly	Ser	Leu	Ala		
		180					185						190				
Ile	Ala	Leu	Met	Leu	Tyr	Ile	Leu	Phe	Lys	Thr	Lys	Leu	Gly	Val			
		195					200				205						
Lys	Met	Arg	Ala	Ser	Ile	Glu	Asn	Pro	Ser	Leu	Ala	Glu	Val	Leu	Gly		
	210					215					220						
Ile	Asn	Val	Gln	Gln	Val	Tyr	Thr	Ile	Ala	Trp	Ile	Ile	Ser	Gly	Ala		
225				230					235					240			
Thr	Ala	Gly	Phe	Ala	Gly	Phe	Leu	Ile	Leu	Phe	Met	Gly	Asp	Ile	Val		
			245						250					255			
Lys	Pro	Val	Thr	Ala	Ser	Ser	Pro	Ala	Asp	Glu	Ile	Ile	Val	Ser	Ala		
		260					265						270				
Phe	Ala	Gly	Ser	Ile	Val	Gly	Gly	Val	Asn	Ser	Val	Phe	Gly	Ser	Ile		
		275					280					285					
Gly	Gly	Gly	Phe	Ile	Ile	Gly	Ala	Val	Glu	Ile	Leu	Ile	Ser	Ser	Val		
	290					295					300						
Ile	Thr	Asp	Val	Thr	Gly	Ile	Asp	Val	Thr	Arg	Tyr	Asn	Lys	Met	Leu		
305					310					315					320		
Ser	Met	Leu	Ala	Val	Ala	Leu	Thr	Leu	Leu	Phe	Ala	Pro	Gln	Gly	Leu		
			325					330					335				
Ala	Ala	Leu	Tyr	Ser	Glu	Lys	Ile	Gln	Ala	Arg	Leu	Pro	Arg	Leu	Arg		
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<211> 1047
 <212> DNA
 <213> *Deinococcus radiodurans*

<220>
 <221> CDS
 <222> (1)..(1047)

<400> 488

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1				5				10						15		
gcg	gcc	ccg	acg	ttg	ggg	gtg	gca	atg	ccc	agt	cag	ctg	atc	cag	96	
Ala	Ala	Pro	Thr	Leu	Gly	Val	Ala	Met	Glu	Pro	Ser	Gln	Leu	Ile	Gln	
			20					25					30			
aat	ctg	gtc	aac	ggc	ctg	gcg	atc	ggc	agc	gtc	tac	gcg	att	ttc	gcg	144
Asn	Leu	Val	Asn	Gly	Leu	Ala	Ile	Gly	Ser	Val	Tyr	Ala	Ile	Phe	Ala	
			35					40					45			
ctg	ggc	tac	acg	ctg	atc	ttc	tcg	att	ctg	ggc	atc	atc	aat	ttc	gcg	192
Leu	Gly	Tyr	Thr	Leu	Ile	Phe	Ser	Ile	Leu	Gly	Ile	Ile	Asn	Phe	Ala	
			50					55				60				
cag	ggg	gcc	gtg	ttt	acg	ctg	ggc	gcc	tac	ctg	acc	tac	acc	ctg	gtg	240
Gln	Gly	Ala	Val	Phe	Thr	Leu	Gly	Ala	Tyr	Leu	Thr	Tyr	Thr	Leu	Val	
			65			70					75				80	
tcg	ggg	cag	ttc	gag	aac	aac	ggg	ctg	ctc	aag	ggc	atc	aat	ctc	ttt	288
Ser	Gly	Gln	Phe	Glu	Asn	Asn	Gly	Leu	Leu	Lys	Gly	Ile	Asn	Leu	Phe	
				85					90					95		
ccc	gac	ggc	tca	ccg	ctg	gca	ggc	aat	ccc	tgg	gcc	ttt	ggg	ctc	gcc	336
Pro	Asp	Gly	Ser	Pro	Leu	Ala	Gly	Asn	Pro	Trp	Ala	Phe	Gly	Leu	Ala	
			100					105					110			
acc	ctg	ctc	ggc	tcg	gcg	ctg	gcg	ggt	ttg	atc	gcg	gtg	gtg	atc	gag	384
Thr	Leu	Leu	Gly	Ser	Ala	Leu	Ala	Gly	Leu	Ile	Ala	Val	Val	Ile	Glu	
			115					120					125			
cgc	ctc	gcc	ttc	cgg	ccc	atg	cgg	gcg	cgc	ggg	gcc	gag	ccg	ctg	ctg	432
Arg	Leu	Ala	Phe	Arg	Pro	Met	Arg	Ala	Arg	Gly	Ala	Glu	Pro	Leu	Leu	
			130			135						140				
gcg	ctg	gtg	agc	agc	ctg	ggg	gtg	gcg	ctg	gtg	atc	gtc	aac	ctc	att	480
Ala	Leu	Val	Ser	Ser	Leu	Gly	Val	Ala	Leu	Val	Ile	Val	Asn	Leu	Ile	
					150						155				160	
caa	ctg	ctc	gtc	ggc	gag	agc	tac	agc	ttc	ccg	gcc	aat	gcc	tac	528	
Gln	Leu	Leu	Val	Gly	Ala	Glu	Ser	Tyr	Ser	Phe	Pro	Ala	Asn	Ala	Tyr	
				165					170					175		
ggc	gag	ttt	ccg	ccc	gcg	ctg	acc	ttt	cat	gtg	ggc	gac	aag	gtg	gtg	576
Gly	Glu	Phe	Pro	Pro	Ala	Leu	Thr	Phe	His	Val	Gly	Asp	Lys	Val	Val	
			180					185					190			
gcg	gtc	cgc	acc	gtg	caa	ctg	gtg	att	ttc	gcc	gtc	agc	atg	gtg	atg	624
Ala	Val	Arg	Thr	Val	Gln	Leu	Val	Ile	Phe	Ala	Val	Ser	Met	Val	Met	
			195				200						205			
ctg	ggc	att	ctg	ggc	tac	gtc	atc	ggg	cgc	acc	aag	atc	ggc	aag	gcg	672
Leu	Gly	Ile	Leu	Gly	Tyr	Val	Ile	Gly	Arg	Thr	Lys	Ile	Gly	Lys	Ala	
			210			215					220					
ttg	cgg	gcg	gtg	gcc	gaa	aat	ccc	ggc	acg	gcg	agc	ctg	ctc	ggc	atc	720
Leu	Arg	Ala	Val	Ala	Glu	Asn	Pro	Gly	Thr	Ala	Ser	Leu	Leu	Gly	Ile	
				230							235				240	
agc	gtg	gac	cgc	tac	gtg	ctg	atc	act	ttt	ttc	ctc	tcg	ggc	ttt	ttg	768
Ser	Val	Asp	Arg	Tyr	Val	Leu	Ile	Thr	Phe	Phe	Leu	Ser	Gly	Phe	Leu	
				245					250					255		
ggt	ggg	ctg	gcg	ggc	acg	ctg	gtg	tcg	ctg	gcg	ttc	ggc	atc	ggc	ggg	816
Gly	Gly	Leu	Ala	Gly	Thr	Leu	Val	Ser	Leu	Ala	Phe	Gly	Ile	Gly	Gly	
			260					265						270		
ccg	tac	ttc	ggg	cag	gcc	ttc	ggg	ctc	aag	ggg	ctg	gcg	gtc	atc	gtg	864
Pro	Tyr	Phe	Gly	Gln	Ala	Phe	Gly	Leu	Lys	Gly	Leu	Ala	Val	Ile	Val	
			275					280					285			
ctc	ggc	ggg	ctg	ggc	agc	att	ccc	ggc	gcg	gtg	ctc	ggc	ggt	ctg	gtg	912
Leu	Gly	Gly	Leu	Gly	Ser	Ile	Pro	Gly	Ala	Val	Leu	Gly	Gly	Leu	Val	
			290			295					300					
atc	ggc	ctg	gcc	gag	gcg	ttc	gtg	ccc	gcc	gac	tac	agc	gcc	tac	aag	960
Ile	Gly	Leu	Ala	Glu	Ala	Phe	Val	Pro	Ala	Asp	Tyr	Ser	Ala	Tyr	Lys	
					310					315					320	

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gac gcg gtg gcc ttc gcg ctg ctg ttt atc gtg ctg ctg ctg cgg ccc 1008
 Asp Ala Val Ala Phe Ala Leu Leu Phe Ile Val Leu Leu Leu Arg Pro 335
 325 330
 cag ggg ctg ctc ggc aag gcc cag gtt cag aag gtg tga 1047
 Gln Gly Leu Leu Gly Lys Ala Gln Val Gln Lys Val 340 345

<210> 489
 <211> 348
 <212> PRT
 <213> *Deinococcus radiodurans*

<400> 489
 Met Arg Arg Pro Ser Gly Gly Ser Ala Pro Gly Gly Arg Ser Pro Arg
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 Ala Ala Pro Thr Leu Gly Val Ala Met Glu Pro Ser Gln Leu Ile Gln
 20 25 30
 Asn Leu Val Asn Gly Leu Ala Ile Gly Ser Val Tyr Ala Ile Phe Ala
 35 40 45
 Leu Gly Tyr Thr Leu Ile Phe Ser Ile Leu Gly Ile Ile Asn Phe Ala
 50 55 60
 Gln Gly Ala Val Phe Thr Leu Gly Ala Tyr Leu Thr Tyr Thr Leu Val
 65 70 75 80
 Ser Gly Gln Phe Glu Asn Asn Gly Leu Leu Lys Gly Ile Asn Leu Phe
 85 90 95
 Pro Asp Gly Ser Pro Leu Ala Gly Asn Pro Trp Ala Phe Gly Leu Ala
 100 105 110
 Thr Leu Leu Gly Ser Ala Leu Ala Gly Leu Ile Ala Val Val Ile Glu
 115 120 125
 Arg Leu Ala Phe Arg Pro Met Arg Ala Arg Gly Ala Glu Pro Leu Leu
 130 135 140
 Ala Leu Val Ser Ser Leu Gly Val Ala Leu Val Ile Val Asn Leu Ile
 145 150 155 160
 Gln Leu Leu Val Gly Ala Glu Ser Tyr Ser Phe Pro Ala Asn Ala Tyr
 165 170 175
 Gly Glu Phe Pro Ala Leu Thr Phe His Val Gly Asp Lys Val Val
 180 185 190
 Ala Val Arg Thr Val Gln Leu Val Ile Phe Ala Val Ser Met Val Met
 195 200 205
 Leu Gly Ile Leu Gly Tyr Val Ile Gly Arg Thr Lys Ile Gly Lys Ala
 210 215 220
 Leu Arg Ala Val Ala Glu Asn Pro Gly Thr Ala Ser Leu Leu Gly Ile
 225 230 235 240
 Ser Val Asp Arg Tyr Val Leu Ile Thr Phe Phe Leu Ser Gly Phe Leu
 245 250 255
 Gly Gly Leu Ala Gly Thr Leu Val Ser Leu Ala Phe Gly Ile Gly Gly
 260 265 270
 Pro Tyr Phe Gly Gln Ala Phe Gly Leu Lys Gly Leu Ala Val Ile Val
 275 280 285
 Leu Gly Gly Leu Gly Ser Ile Pro Gly Ala Val Leu Gly Gly Leu Val
 290 295 300
 Ile Gly Leu Ala Glu Ala Phe Val Pro Ala Asp Tyr Ser Ala Tyr Lys
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 Asp Ala Val Ala Phe Ala Leu Leu Phe Ile Val Leu Leu Leu Arg Pro
 325 330 335
 Gln Gly Leu Leu Gly Lys Ala Gln Val Gln Lys Val 340 345

<210> 490
 <211> 918
 <212> DNA
 <213> *Pseudomonas aeruginosa*

<220>
 <221> CDS
 <222> (4)..(918)

<400> 490
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 Seite 760

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ggc Gly	tcg Ser	gtc Val	tac Tyr	ggc Gly 20	ctc Leu	atc Ile	gcc Ala	atc Ile	ggc Gly 25	tac Tyr	acc Thr	atg Met	gtc Val	tac Tyr 30	ggc Gly	96
atc Ile	atc Ile	ggc Gly	atg Met 35	atc Ile	aac Asn	ttc Phe	gcc Ala	cac His 40	ggc Gly	gag Glu	gtg Val	tac Tyr	atg Met 45	atc Ile	tcc Ser	144
gcc Ala	tac Tyr	ctg Leu 50	tcg Ser	gcc Ala	atc Ile	gcc Ala	ctt Leu 55	gcc Ala	ctg Leu	ctg Leu	gcc Ala	ttc Phe 60	ttc Phe	ggc Gly	ctg Leu	192
cag Gln	aac Asn 65	ttc Phe	ccg Pro	ctg Leu	ctg Leu	atc Ile 70	ctc Leu	ggc Gly	acc Thr	ttg Leu	ctg Leu 75	ttc Phe	acc Thr	gtg Val	ctg Leu	240
gtg Val 80	acc Thr	tgc Cys	acc Thr	tac Tyr	ggc Gly 85	tgg Trp	gtg Val	atc Ile	gag Glu	cgc Arg 90	atc Ile	gcc Ala	tac Tyr	aag Lys	ccg Pro 95	288
ctg Leu	cgc Arg	aac Asn	tcc Ser	acg Thr 100	cgc Arg	ctg Leu	gcg Ala	ccg Pro	ctg Leu 105	atc Ile	tcg Ser	gcg Ala	atc Ile	ggc Gly 110	atg Met	336
tcg Ser	ctg Leu	atc Ile	ctg Leu 115	cag Gln	aac Asn	tac Tyr	gtg Val	cag Gln 120	gtg Val	gcg Ala	cag Gln	gga Gly	ccg Pro 125	cgc Arg	cag Gln	384
cag Gln	ggg Gly 130	atc Ile	ccg Pro	acc Thr	ctg Leu	ctc Leu	gac Asp 135	ggc Gly	gcc Ala	ctg Leu	aaa Lys	ttc Phe 140	cac His	gtc Val	ggc Gly	432
gac Asp 145	ggt Gly	ttc Phe	gtc Val	cag Gln	ctc Leu	acc Thr 150	tac Tyr	acc Thr	aag Lys	ctg Leu	ttc Phe 155	atc Ile	ctg Leu	atc Ile	gct Ala	480
tcg Ser 160	ctg Leu	atc Ile	ggc Gly	atg Met	gcg Ala 165	gtg Val	ctg Leu	acc Thr	tac Tyr	gtg Val 170	atc Ile	cgc Arg	tac Tyr	acc Thr	aag Lys 175	528
ctc Leu	ggg Gly	cgc Arg	atg Met	tgc Cys 180	cgg Arg	gcg Ala	acc Thr	cag Gln	cag Gln 185	gac Asp	cgc Arg	aag Lys	atg Met	gct Ala 190	tcg Ser	576
atc Ile	ctg Leu	ggg Gly	atc Ile 195	aac Asn	acc Thr	gac Asp	cgg Arg	gtg Val 200	atc Ile	tcc Ser	tac Tyr	gtg Val	ttc Phe 205	gtc Val	atc Ile	624
ggc Gly	gca Ala	gcg Ala 210	atg Met	gcc Ala	gcc Ala	ctg Leu	gcc Ala 215	ggg Gly	gtg Val	ctg Leu	atc Ile	acc Thr 220	atg Met	aac Asn	tac Tyr	672
ggc Gly	acc Thr 225	ttc Phe	gac Asp	ttc Phe	tac Tyr	gcc Ala 230	ggc Gly	ttc Phe	atc Ile	atc Ile	ggc Gly 235	atc Ile	aag Lys	gcg Ala	ttc Phe	720
acc Thr 240	gcg Ala	gcg Ala	gtg Val	ctc Leu	ggc Gly 245	ggc Gly	atc Ile	ggc Gly	tcg Ser	ctg Leu 250	ccc Pro	ggg Gly	gcg Ala	atg Met	ctc Leu 255	768
ggc Gly	ggc Gly	ctg Leu	gtg Val	ctg Leu 260	gga Gly	gtg Val	gcc Ala	gag Glu	gcg Ala 265	cag Gln	ttc Phe	tcg Ser	ggg Gly	atg Met 270	gtc Val	816
aac Asn	acc Thr	gac Asp 275	tac Tyr	aag Lys	gac Asp	gtg Val	ttc Phe	gcc Ala 280	ttc Phe	tcg Ser	ttg Leu	ctg Leu	gta Val 285	ctg Leu	atc Ile	864
ctg Leu	atc Ile	ttc Phe 290	cgt Arg	ccc Pro	cag Gln	ggc Gly	ctg Leu 295	ctc Leu	ggc Gly	cgc Arg	ccg Pro	cag Gln 300	atc Ile	gcc Ala	aag Lys	912
gtg val	taa															918

<210> 491

<211> 304

<212> PRT

<213> Pseudomonas aeruginosa

<400> 491

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Seite 761

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 Ile Gly Met Ile Asn Phe Ala His Gly Glu Val Tyr Met Ile Ser Ala
 35 40 45
 Tyr Leu Ser Ala Ile Ala Leu Ala Leu Ala Phe Phe Gly Leu Gln
 50 55 60
 Asn Phe Pro Leu Leu Ile Leu Gly Thr Leu Leu Phe Thr Val Leu Val
 65 70 75 80
 Thr Cys Thr Tyr Gly Trp Val Ile Glu Arg Ile Ala Tyr Lys Pro Leu
 85 90 95
 Arg Asn Ser Thr Arg Leu Ala Pro Leu Ile Ser Ala Ile Gly Met Ser
 100 105 110
 Leu Ile Leu Gln Asn Tyr Val Gln Val Ala Gln Gly Pro Arg Gln Gln
 115 120 125
 Gly Ile Pro Thr Leu Leu Asp Gly Ala Leu Lys Phe His Val Gly Asp
 130 135 140
 Gly Phe Val Gln Leu Thr Tyr Thr Lys Leu Phe Ile Leu Ile Ala Ser
 145 150 155 160
 Leu Ile Gly Met Ala Val Leu Thr Tyr Val Ile Arg Tyr Thr Lys Leu
 165 170 175
 Gly Arg Met Cys Arg Ala Thr Gln Gln Asp Arg Lys Met Ala Ser Ile
 180 185 190
 Leu Gly Ile Asn Thr Asp Arg Val Ile Ser Tyr Val Phe Val Ile Gly
 195 200 205
 Ala Ala Met Ala Ala Leu Ala Gly Val Leu Ile Thr Met Asn Tyr Gly
 210 215 220
 Thr Phe Asp Phe Tyr Ala Gly Phe Ile Ile Gly Ile Lys Ala Phe Thr
 225 230 235 240
 Ala Ala Val Leu Gly Gly Ile Gly Ser Leu Pro Gly Ala Met Leu Gly
 245 250 255
 Gly Leu Val Leu Gly Val Ala Glu Ala Gln Phe Ser Gly Met Val Asn
 260 265 270
 Thr Asp Tyr Lys Asp Val Phe Ala Phe Ser Leu Leu Val Leu Ile Leu
 275 280 285
 Ile Phe Arg Pro Gln Gly Leu Leu Gly Arg Pro Gln Ile Ala Lys Val
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<210> 492

<211> 954

<212> DNA

<213> Pseudomonas aeruginosa

<220>

<221> CDS

<222> (1)..(954)

<400> 492

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1				5					10					15		
ctg	gtc	ggc	gac	ctg	ctc	ggc	cag	gcc	ttc	agt	ggc	ctg	tcg	ctg	ggc	96
Leu	Val	Gly	Asp	Leu	Leu	Gly	Gln	Ala	Phe	Ser	Gly	Leu	Ser	Leu	Gly	
			20					25					30			
tcg	atc	ctg	ctg	ctc	gcg	gcg	ctc	ggc	ctg	gcg	atc	acc	tac	ggc	ctg	144
Ser	Ile	Leu	Leu	Leu	Ala	Ala	Leu	Gly	Leu	Ala	Ile	Thr	Tyr	Gly	Leu	
			35				40					45				
ctc	ggg	gtg	atc	aac	atg	gcc	cac	ggc	gaa	atg	ctc	atg	ctc	ggc	gcc	192
Leu	Gly	Val	Ile	Asn	Met	Ala	His	Gly	Glu	Met	Leu	Met	Leu	Gly	Ala	
	50					55			60							
tac	tcc	acc	tac	gtg	gtg	caa	ctg	ctg	ttc	cag	cgc	ctg	gcg	ccg	gaa	240
Tyr	Ser	Thr	Tyr	Val	Val	Gln	Leu	Leu	Phe	Gln	Arg	Leu	Ala	Pro	Glu	
	65			70					75						80	
tgg	ctg	gcg	ctc	tac	ccg	ttg	ctg	gcg	cta	ccg	gtg	gcg	ttc	tgc	gtc	288
Trp	Leu	Ala	Leu	Tyr	Pro	Leu	Leu	Ala	Leu	Pro	Val	Ala	Phe	Cys	Val	
			85					90						95		
agc	gcc	gcc	atc	ggc	atg	gcc	ctg	gag	cgc	acg	gtg	atc	cgc	cat	ctc	336
Ser	Ala	Ala	Ile	Gly	Met	Ala	Leu	Glu	Arg	Thr	Val	Ile	Arg	His	Leu	
			100					105					110			
tac	ggc	cgg	cca	ctg	gaa	acc	ctg	ctc	gcc	acc	tgg	ggc	atc	agc	ctg	384
Tyr	Gly	Arg	Pro	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Ile	Ser	Leu	

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gtg	ctg	115	caa	ctg	gtg	cgg	120	ctg	ttc	ggc	gcg	125	aac	gtc	gag	432
Val	Leu	Ile	Gln	Leu	Val	Arg	Met	Leu	Phe	Gly	Ala	Gln	Asn	Val	Glu	
gta	gcc	aac	ccg	gcc	tgg	ctg	tcc	ggc	ggc	atc	cag	gtg	ctg	ccg	aac	480
Val	Ala	Asn	Pro	Ala	Trp	Leu	Ser	Gly	Gly	Ile	Gln	Val	Leu	Pro	Asn	
ctg	gtg	ctg	ccg	tgg	aac	cgt	atc	gtc	atc	atc	ggc	ttc	gcc	ctg	ttc	528
Leu	Val	Leu	Pro	Trp	Asn	Arg	Ile	Val	Ile	Ile	Gly	Phe	Ala	Leu	Phe	
gtg	ctg	ctc	ctc	acc	tgg	ctg	ctg	ctg	aac	cgc	acg	cgg	ctc	ggc	ctg	576
Val	Leu	Leu	Leu	Thr	Trp	Leu	Leu	Leu	Asn	Arg	Thr	Arg	Leu	Gly	Leu	
aac	gtc	cgc	gcg	gtg	acc	cag	aac	cgc	aac	atg	gcg	gcc	tgc	ggg	ggg	624
Asn	Val	Arg	Ala	Val	Thr	Gln	Asn	Arg	Asn	Met	Ala	Ala	Cys	Cys	Gly	
gtg	ccc	aca	ggg	cgc	gtg	gac	atg	ctc	gcc	ttc	ggt	ctc	ggc	tcg	ggc	672
Val	Pro	Thr	Gly	Arg	Val	Asp	Met	Leu	Ala	Phe	Gly	Leu	Gly	Ser	Gly	
atc	gcc	ggg	ctc	ggc	ggg	gta	gcc	ctg	tcg	cag	gtc	ggc	aac	gtc	ggc	720
Ile	Ala	Gly	Leu	Gly	Gly	Val	Ala	Leu	Ser	Gln	Val	Gly	Asn	Val	Gly	
ccg	gac	ctc	ggc	cag	ggc	tac	atc	atc	gac	tcc	ttc	ctg	gtg	gtg	gtg	768
Pro	Asp	Leu	Gly	Gln	Gly	Tyr	Ile	Ile	Asp	Ser	Phe	Leu	Val	Val	Val	
ctc	ggc	ggc	gtc	ggc	cag	ctc	gcc	ggc	agc	gtc	ctc	gcc	gcc	ttc	ggc	816
Leu	Gly	Gly	Val	Gly	Gln	Leu	Ala	Gly	Ser	Val	Leu	Ala	Ala	Phe	Gly	
ctc	ggc	gtg	gcg	aac	aag	atc	ctc	gaa	ccg	cag	atc	ggc	gcg	gtg	ctg	864
Leu	Gly	Val	Ala	Asn	Lys	Ile	Leu	Glu	Pro	Gln	Ile	Gly	Ala	Val	Leu	
ggc	aag	atc	ctg	atc	ctc	gcg	ctg	atc	gtc	ctg	ttc	atc	cag	aaa	cgc	912
Gly	Lys	Ile	Leu	Ile	Leu	Ala	Leu	Ile	Val	Leu	Phe	Ile	Gln	Lys	Arg	
ccg	cag	gga	ctg	ttc	gcc	ctg	aaa	ggg	agg	gtc	atc	gat	tga			954
Pro	Gln	Gly	Leu	Phe	Ala	Leu	Lys	Gly	Arg	Val	Ile	Asp				
305					310					315						

<210> 493

<211> 317

<212> PRT

<213> Pseudomonas aeruginosa

<400> 493

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Leu	Val	Gly	Asp	Leu	Leu	Gly	Gln	Ala	Phe	Ser	Gly	Leu	Ser	Leu	Gly
			20					25					30		
Ser	Ile	Leu	Leu	Leu	Ala	Ala	Leu	Gly	Leu	Ala	Ile	Thr	Tyr	Gly	Leu
			35				40					45			
Leu	Gly	Val	Ile	Asn	Met	Ala	His	Gly	Glu	Met	Leu	Met	Leu	Gly	Ala
			50			55					60				
Tyr	Ser	Thr	Tyr	Val	Val	Gln	Leu	Leu	Phe	Gln	Arg	Leu	Ala	Pro	Glu
65				70					75					80	
Trp	Leu	Ala	Leu	Tyr	Pro	Leu	Leu	Ala	Leu	Pro	Val	Ala	Phe	Cys	Val
				85				90					95		
Ser	Ala	Ala	Ile	Gly	Met	Ala	Leu	Glu	Arg	Thr	Val	Ile	Arg	His	Leu
			100					105				110			
Tyr	Gly	Arg	Pro	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Ile	Ser	Leu
			115			120						125			
Val	Leu	Ile	Gln	Leu	Val	Arg	Met	Leu	Phe	Gly	Ala	Gln	Asn	Val	Glu
			130			135					140				
Val	Ala	Asn	Pro	Ala	Trp	Leu	Ser	Gly	Gly	Ile	Gln	Val	Leu	Pro	Asn
145				150					155					160	
Leu	Val	Leu	Pro	Trp	Asn	Arg	Ile	Val	Ile	Ile	Gly	Phe	Ala	Leu	Phe
				165				170						175	
Val	Leu	Leu	Leu	Thr	Trp	Leu	Leu	Leu	Asn	Arg	Thr	Arg	Leu	Gly	Leu
			180					185					190		
Asn	Val	Arg	Ala	Val	Thr	Gln	Asn	Arg	Asn	Met	Ala	Ala	Cys	Cys	Gly

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Val¹⁹⁵ Pro²¹⁰ Thr Gly Arg Val²⁰⁰ Asp²¹⁵ Met²⁰⁰ Leu Ala Phe Gly²⁰⁵ Leu Gly Ser Gly
 Ile²²⁵ Ala Gly Leu Gly Gly Val²³⁰ Ala Leu Ser Gln Val²²⁰ Gly Asn Val²⁴⁰ Gly
 Pro Asp Leu Gly Gln Gly Tyr Ile Ile Asp²³⁵ Ser Phe Leu Val²⁵⁵ Val²⁴⁰
 Leu Gly Gly Val²⁶⁰ Gly Gln Leu Ala Gly²⁶⁵ Ser Val Leu Ala Ala²⁷⁰ Phe Gly
 Leu Gly Val²⁷⁵ Ala Asn Lys Ile Leu²⁸⁰ Glu Pro Gln Ile Gly²⁸⁵ Ala Val Leu
 Gly Lys²⁹⁰ Ile Leu Ile Leu²⁹⁵ Ala Leu Ile Val Leu³⁰⁰ Phe Ile Gln Lys Arg
 Pro³⁰⁵ Gln Gly Leu Phe Ala³¹⁰ Leu Lys Gly Arg Val³¹⁵ Ile Asp

<210> 494

<211> 894

<212> DNA

<213> Bacillus halodurans

<220>

<221> CDS

<222> (1)..(894)

<400> 494

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tta atc gct ctt ggg ctt gcc ata acg ttc gga atg atg cga gtc att	96
Leu Ile Ala Leu ²⁰ Gly Leu Ala Ile Thr ²⁵ Phe Gly Met Met Arg Val Ile	
aac atg gca cac ggg gaa tta att atg gtt gga gcc tat gct act tac	144
Asn Met Ala ³⁵ His Gly Glu Leu Ile ⁴⁰ Met Val Gly Ala Tyr ⁴⁵ Ala Thr Tyr	
gtt gtt cag ctt ctt ttt agt caa tat gtt cct ccg gct tat ttt gat	192
Val Val Gln Leu Leu Phe Ser ⁵⁵ Gln Tyr Val Pro Pro ⁶⁰ Ala Tyr Phe Asp	
ctt tac ttt tta ctc gca gtc ccg tta tcg ttt gtc att tca gct ctt	240
Leu Tyr Phe Leu Leu Ala ⁷⁰ Val Pro Leu Ser Phe ⁷⁵ Val Ile Ser Ala Leu ⁸⁰	
atc ggt att ctc att gaa ctt acc gtt att cgc cac tta tac ggc cga	288
Ile Gly Ile Leu Ile ⁸⁵ Glu Leu Thr Val Ile ⁹⁰ Arg His Leu Tyr Gly ⁹⁵ Arg	
cct cta gat agt tta tta gcc acg ttt ggt gtt gga ctc atc ttg caa	336
Pro Leu Asp Ser ¹⁰⁰ Leu Leu Ala Thr ¹⁰⁵ Gly Val Gly Leu ¹¹⁰ Ile Leu Gln	
caa aca gcg cgg aca atc ttt ggg gca cca aat gta ggc gtc caa agc	384
Gln Thr Ala Arg Thr Ile Phe Gly ¹²⁰ Ala Pro Asn Val Gly ¹²⁵ Val Gln Ser	
cca tcg ttt tta cgt ggc ggg cta gag att gcc gga gtg aca ctc cct	432
Pro Ser Phe Leu Arg Gly ¹³⁵ Leu Glu Ile Ala ¹⁴⁰ Val Thr Leu Pro	
ttc tct cgg ttg ttt att atc act ctc gtc ctc gta agc ttt tgt ttg	480
Phe Ser Arg Leu Phe Ile ¹⁵⁰ Ile Thr Leu Val Leu ¹⁵⁵ Val Ser Phe Cys Leu ¹⁶⁰	
tta gcc tgg ttt ttt tat aaa act cgg aat ggc cga aaa att cgc ggg	528
Leu Ala Trp Phe ¹⁶⁵ Tyr Lys Thr Arg Asn ¹⁷⁰ Gly Arg Lys Ile Arg Gly ¹⁷⁵	
gtg atg caa aac cgg agc atg gcc aca tgt tta ggg atc tct aca cgc	576
Val Met Gln Asn Arg Ser Met Ala Thr ¹⁸⁵ Cys Leu Gly Ile Ser Thr Arg	
aaa gtg gat gtg atg aca ttt gcg att ggt tct ggt tgt gct ggt tta	624
Lys Val Asp Val ¹⁹⁵ Met Thr Phe Ala Ile Gly Ser Gly ²⁰⁵ Cys Ala Gly Leu	
gct ggt gct gca ctg acg ctg tta ggg ccg atc ggg cca acc atc ggt	672
Ala Gly Ala Ala Leu Thr ²¹⁵ Leu Leu Gly Pro Ile Gly ²²⁰ Pro Thr Ile Gly	
acc tat tat att gta gat gcc ttt atg gtc gtc gtt gtt ggc ggg gtc	720

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Thr	Tyr	Tyr	Ile	Val	Asp	Ala	Phe	Met	Val	Val	Val	Gly	Gly	Val		
225					230				235					240		
ggc	atg	tta	gta	gga	acg	gtg	gct	ggt	gcg	tta	gga	atc	ggg	atg	ttt	768
Gly	Met	Leu	Val	Gly	Thr	Val	Ala	Gly	Ala	Leu	Gly	Ile	Gly	Met	Phe	
				245					250					255		
aac	acc	tta	ttt	gaa	tat	tgg	acg	aat	gcc	tct	tta	gga	aaa	gta	ctc	816
Asn	Thr	Leu	Phe	Glu	Tyr	Trp	Thr	Asn	Ala	Ser	Leu	Gly	Lys	Val	Leu	
				260				265					270			
gtc	ttt	gcc	tgc	atc	att	ctc	ttt	tta	caa	tgg	cgc	ccg	caa	ggc	ttg	864
Val	Phe	Ala	Cys	Ile	Ile	Leu	Phe	Leu	Gln	Trp	Arg	Pro	Gln	Gly	Leu	
				275			280					285				
ttt	tcc	tta	cca	act	cgt	tct	tta	gat	taa							894
Phe	Ser	Leu	Pro	Thr	Arg	Ser	Leu	Asp								
	290					295										

<210> 495

<211> 297

<212> PRT

<213> Bacillus halodurans

<400> 495

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				20				25					30			
Asn	Met	Ala	His	Gly	Glu	Leu	Ile	Met	Val	Gly	Ala	Tyr	Ala	Thr	Tyr	
				35			40					45				
Val	Val	Gln	Leu	Leu	Phe	Ser	Gln	Tyr	Val	Pro	Pro	Ala	Tyr	Phe	Asp	
				50		55				60						
Leu	Tyr	Phe	Leu	Leu	Ala	Val	Pro	Leu	Ser	Phe	Val	Ile	Ser	Ala	Leu	
65					70					75					80	
Ile	Gly	Ile	Leu	Ile	Glu	Leu	Thr	Val	Ile	Arg	His	Leu	Tyr	Gly	Arg	
				85				90						95		
Pro	Leu	Asp	Ser	Leu	Leu	Ala	Thr	Phe	Gly	Val	Gly	Leu	Ile	Leu	Gln	
			100					105					110			
Gln	Thr	Ala	Arg	Thr	Ile	Phe	Gly	Ala	Pro	Asn	Val	Gly	Val	Gln	Ser	
			115				120					125				
Pro	Ser	Phe	Leu	Arg	Gly	Gly	Leu	Glu	Ile	Ala	Gly	Val	Thr	Leu	Pro	
					135					140						
Phe	Ser	Arg	Leu	Phe	Ile	Ile	Thr	Leu	Val	Leu	Val	Ser	Phe	Cys	Leu	
145					150					155					160	
Leu	Ala	Trp	Phe	Phe	Tyr	Lys	Thr	Arg	Asn	Gly	Arg	Lys	Ile	Arg	Gly	
				165					170					175		
Val	Met	Gln	Asn	Arg	Ser	Met	Ala	Thr	Cys	Leu	Gly	Ile	Ser	Thr	Arg	
			180					185					190			
Lys	Val	Asp	Val	Met	Thr	Phe	Ala	Ile	Gly	Ser	Gly	Cys	Ala	Gly	Leu	
			195				200					205				
Ala	Gly	Ala	Ala	Leu	Thr	Leu	Leu	Gly	Pro	Ile	Gly	Pro	Thr	Ile	Gly	
					215					220						
Thr	Tyr	Tyr	Ile	Val	Asp	Ala	Phe	Met	Val	Val	Val	Val	Gly	Gly	Val	
225					230				235						240	
Gly	Met	Leu	Val	Gly	Thr	Val	Ala	Gly	Ala	Leu	Gly	Ile	Gly	Met	Phe	
				245					250					255		
Asn	Thr	Leu	Phe	Glu	Tyr	Trp	Thr	Asn	Ala	Ser	Leu	Gly	Lys	Val	Leu	
			260					265					270			
Val	Phe	Ala	Cys	Ile	Ile	Leu	Phe	Leu	Gln	Trp	Arg	Pro	Gln	Gly	Leu	
			275				280					285				
Phe	Ser	Leu	Pro	Thr	Arg	Ser	Leu	Asp								
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<210> 496

<211> 1254

<212> DNA

<213> Pseudomonas aeruginosa

<220>

<221> CDS

<222> (1)..(1254)

BPS64510PC-2008083446

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Met	Ser	Gln	Ser	Leu	Lys	Arg	Ala	Leu	Phe	Ser	Ala	Leu	Leu	Val	Ile		
1				5					10					15			
ctg	gtg	tcc	tat	ccg	atc	cta	ggc	ctg	aag	ctg	cgc	acc	gtc	ggc	atc		96
Leu	Val	Ser	Tyr	Pro	Ile	Leu	Gly	Leu	Lys	Leu	Arg	Thr	Val	Gly	Ile		
			20					25					30				
aag	ctc	gag	gtc	ctc	ggc	gcc	gat	gcg	cag	acc	ctc	tgg	acc	atc	gcc		144
Lys	Leu	Glu	Val	Leu	Gly	Ala	Asp	Ala	Gln	Thr	Leu	Trp	Thr	Ile	Ala		
			35				40					45					
gcg	gcc	gcc	ctg	gcc	atg	ttc	gtc	tgg	cag	ctg	ttc	cgc	gac	cgc	atc		192
Ala	Ala	Ala	Leu	Ala	Met	Phe	Val	Trp	Gln	Leu	Phe	Arg	Asp	Arg	Ile		
			50			55					60						
ccg	ctc	aag	ctg	ggt	cgc	ggc	gtc	ggc	tac	aag	gtc	aac	ggc	agc	ggc		240
Pro	Leu	Lys	Leu	Gly	Arg	Gly	Val	Gly	Tyr	Lys	Val	Asn	Gly	Ser	Gly		
			65		70					75					80		
ctg	aag	aac	ttc	ctc	agc	ctg	cca	tcg	acc	cag	cgc	tgg	gcg	gtc	ctc		288
Leu	Lys	Asn	Phe	Leu	Ser	Leu	Pro	Ser	Thr	Gln	Arg	Trp	Ala	Val	Leu		
				85				90						95			
gcc	ctg	gtc	gtg	gtg	gct	ttc	gtc	tgg	ccg	ttc	ttc	gcc	tcg	cgc	ggg		336
Ala	Leu	Val	Val	Val	Ala	Phe	Val	Trp	Pro	Phe	Phe	Ala	Ser	Arg	Gly		
			100					105					110				
gcg	gtg	gac	atc	gcc	acc	ctg	atc	ctg	atc	tac	gtg	atg	ctc	ggc	atc		384
Ala	Val	Asp	Ile	Ala	Thr	Leu	Ile	Leu	Ile	Tyr	Val	Met	Leu	Gly	Ile		
			115				120					125					
ggc	ctg	aac	atc	gtg	gtc	ggc	ctg	gcc	ggc	ctg	ctc	gat	ctc	ggc	tac		432
Gly	Leu	Asn	Ile	Val	Val	Gly	Leu	Ala	Gly	Leu	Leu	Asp	Leu	Gly	Tyr		
			130			135						140					
gtc	ggc	ttc	tac	gcg	gta	ggt	gcc	tac	acc	tac	gcg	ctg	ctc	gcc	gag		480
Val	Gly	Phe	Tyr	Ala	Val	Gly	Ala	Tyr	Thr	Tyr	Ala	Leu	Leu	Ala	Glu		
			145		150			155							160		
tac	gcc	ggg	ttc	ggc	ttc	tgg	acc	gcc	ctg	ccg	atc	gcc	ggg	atg	atg		528
Tyr	Ala	Gly	Phe	Gly	Phe	Trp	Thr	Ala	Leu	Pro	Ile	Ala	Gly	Met	Met		
				165				170						175			
gcc	gcg	ctg	ttc	ggc	ttc	ctc	ctc	ggc	ttc	ccg	gtg	ctg	cgc	ctg	cgc		576
Ala	Ala	Leu	Phe	Gly	Phe	Leu	Leu	Gly	Phe	Pro	Val	Leu	Arg	Leu	Arg		
			180					185					190				
ggc	gac	tac	ctg	gcg	atc	gtg	acc	ctc	ggc	ttc	ggc	gag	atc	atc	cgc		

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gcc	gcg	355	gtg	gtg	atg	gtg	ctg	360	cag	gaa	atg	cgc	365	ttc	aac	gaa	1152
Ala	Ala	Val	Val	Met	Val	Leu	Leu	Leu	Gln	Glu	Met	Arg	Gly	Phe	Asn	Glu	
	370					375						380					
tac	cgc	atg	ctg	atc	ttc	ggc	ctg	acc	atg	atc	gtg	atg	atg	atc	tgg		1200
Tyr	Arg	Met	Leu	Ile	Phe	Gly	Leu	Thr	Met	Ile	Val	Met	Met	Ile	Trp		
385					390					395					400		
cgt	ccc	cag	gga	ctg	ctg	ccg	atg	caa	cgc	ccg	cac	ctg	gag	ctg	aag		1248
Arg	Pro	Gln	Gly	Leu	Leu	Pro	Met	Gln	Arg	Pro	His	Leu	Glu	Leu	Lys		
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cca	tga																1254
Pro																	

<210> 497

<211> 417

<212> PRT

<213> Pseudomonas aeruginosa

<400> 497

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			20					25					30			
Lys	Leu	Glu	Val	Leu	Gly	Ala	Asp	Ala	Gln	Thr	Leu	Trp	Thr	Ile	Ala	
		35					40					45				
Ala	Ala	Ala	Leu	Ala	Met	Phe	Val	Trp	Gln	Leu	Phe	Arg	Asp	Arg	Ile	
	50					55					60					
Pro	Leu	Lys	Leu	Gly	Arg	Gly	Val	Gly	Tyr	Lys	Val	Asn	Gly	Ser	Gly	
65				70					75						80	
Leu	Lys	Asn	Phe	Leu	Ser	Leu	Pro	Ser	Thr	Gln	Arg	Trp	Ala	Val	Leu	
			85						90					95		
Ala	Leu	Val	Val	Val	Ala	Phe	Val	Trp	Pro	Phe	Phe	Ala	Ser	Arg	Gly	
			100					105					110			
Ala	Val	Asp	Ile	Ala	Thr	Leu	Ile	Leu	Ile	Tyr	Val	Met	Leu	Gly	Ile	
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Gly	Leu	Asn	Ile	Val	Val	Gly	Leu	Ala	Gly	Leu	Leu	Asp	Leu	Gly	Tyr	
	130					135					140					
Val	Gly	Phe	Tyr	Ala	Val	Gly	Ala	Tyr	Thr	Tyr	Ala	Leu	Leu	Ala	Glu	
145				150					155						160	
Tyr	Ala	Gly	Phe	Gly	Phe	Trp	Thr	Ala	Leu	Pro	Ile	Ala	Gly	Met	Met	
			165					170						175		
Ala	Ala	Leu	Phe	Gly	Phe	Leu	Leu	Gly	Phe	Pro	Val	Leu	Arg	Leu	Arg	
			180					185					190			
Gly	Asp	Tyr	Leu	Ala	Ile	Val	Thr	Leu	Gly	Phe	Gly	Glu	Ile	Ile	Arg	
		195					200					205				
Ile	Leu	Leu	Arg	Asn	Met	Thr	Glu	Ile	Thr	Gly	Gly	Pro	Asn	Gly	Ile	
	210					215					220					
Gly	Ser	Ile	Pro	Lys	Pro	Thr	Leu	Phe	Gly	Leu	Thr	Phe	Glu	Arg	Arg	
225				230					235						240	
Ala	Pro	Glu	Gly	Met	Gln	Thr	Phe	His	Glu	Phe	Phe	Gly	Ile	Ala	Tyr	
				245					250					255		
Asn	Thr	Asn	Tyr	Lys	Val	Ile	Leu	Leu	Tyr	Val	Val	Ala	Leu	Leu	Leu	
			260					265					270			
Val	Leu	Leu	Ala	Leu	Phe	Val	Ile	Asn	Arg	Leu	Met	Arg	Met	Pro	Ile	
		275					280					285				
Gly	Arg	Ala	Trp	Glu	Ala	Leu	Arg	Glu	Asp	Glu	Val	Ala	Cys	Arg	Ala	
	290					295					300					
Leu	Gly	Leu	Asn	Pro	Thr	Ile	Val	Lys	Leu	Ser	Ala	Phe	Thr	Ile	Gly	
305				310						315					320	
Ala	Ser	Phe	Ala	Gly	Phe	Ala	Gly	Ser	Phe	Phe	Ala	Ala	Arg	Gln	Gly	
			325						330					335		
Leu	Val	Thr	Pro	Glu	Ser	Phe	Thr	Phe	Ile	Glu	Ser	Ala	Met	Ile	Leu	
			340					345					350			
Ala	Ile	Val	Val	Leu	Gly	Gly	Met	Gly	Ser	Gln	Leu	Gly	Val	Ile	Leu	
		355					360					365				
Ala	Ala	Val	Val	Met	Val	Leu	Leu	Gln	Glu	Met	Arg	Gly	Phe	Asn	Glu	
	370					375					380					
Tyr	Arg	Met	Leu	Ile	Phe	Gly	Leu	Thr	Met	Ile	Val	Met	Met	Ile	Trp	

385 Arg Pro Gln Gly Leu 390 Leu Pro Met Gln Arg 395 Pro His Leu Glu Leu 400 Lys
 405 410 415
 Pro

<210> 498
 <211> 936
 <212> DNA
 <213> Agrobacterium tumefaciens

<220>
 <221> CDS
 <222> (1)..(936)

<400> 498
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 Cys Thr Gly Arg Ser Phe Phe Ser Met Gln Thr Val Phe Ser Ile Leu
 20 25 30
 atc gat gcg ctt gcc tat ggc atg gtc ctg ttc atc atc tcc atc ggc 144
 Ile Asp Ala Leu Ala Tyr Gly Met Val Leu Phe Ile Ile Ser Ile Gly
 35 40 45
 ctt tcc gtc aca atg ggg ctg atg cgg gtg gtc aat ctg gca cac ggc 192
 Leu Ser Val Thr Met Gly Leu Met Arg Val Val Asn Leu Ala His Gly
 50 55 60
 gcg ttc gcg atg atc ggc ggt tat ctc gcg tct tat gcc gcc cac ggc 240
 Ala Phe Ala Met Ile Gly Tyr Leu Ala Ser Tyr Ala Ala His Gly
 65 70 75 80
 ctc ggc ctt ggt tat gcg atg gcg atc ctc gtt gcg att gtc ggc acc 288
 Leu Gly Leu Gly Tyr Ala Met Ala Ile Leu Val Ala Ile Val Gly Thr
 85 90 95
 atc gtc atc gcc ata ccg ctc gaa cgt ttc ctc tat cgc cgc atc tat 336
 Ile Val Ile Ala Ile Pro Leu Glu Arg Phe Leu Tyr Arg Arg Ile Tyr
 100 105 110
 ggc gcg cca gag ctg acg cag gtg ctg atg acc atc ggc atc acc ttc 384
 Gly Ala Pro Glu Leu Thr Gln Val Leu Met Thr Ile Gly Ile Thr Phe
 115 120 125
 tgc atc atc ggc atc gcc aat tac gtc ttc ggc ccc aca ttg aag acc 432
 Cys Ile Ile Gly Ile Ala Asn Tyr Val Phe Gly Pro Thr Leu Lys Thr
 130 135 140
 att cct ctg ccg cag cag ctc gcc ggc ccc acc gat ctc ggc ttc cgc 480
 Ile Pro Leu Pro Gln Gln Leu Ala Gly Pro Thr Asp Leu Gly Phe Arg
 145 150 155 160
 acc atc gcc acc cat cgc atc ttc gcc att gcc tgc ggg ctg gcc gtg 528
 Thr Ile Ala Thr His Arg Ile Phe Ala Ile Ala Cys Gly Leu Ala Val
 165 170 175
 gcc ggc gcg ctg tgg ttc acc ttc gaa aag acc gcc ttc ggt atc aag 576
 Ala Gly Ala Leu Trp Phe Thr Phe Glu Lys Thr Ala Phe Gly Ile Lys
 180 185 190 195
 ctg cgt gcc gcc gtc gat aat gcc gcc atg gcg gcg gca ctc ggc gtg 624
 Leu Arg Ala Ala Val Asp Asn Ala Ala Met Ala Ala Ala Leu Gly Val
 200 205 210
 cgc acg gaa atc atc tat gcc gtc agc ttt gcc atc gcc gtc ggc ctt 672
 Arg Thr Glu Ile Ile Tyr Ala Val Ser Phe Ala Ile Ala Val Gly Leu
 215 220 225
 gcc gcg atg ggc ggc gtc atc ggc gcg gaa ctg ctg ccg gtc gaa ccc 720
 Ala Ala Met Gly Gly Val Ile Gly Ala Glu Leu Leu Pro Val Glu Pro
 230 235 240
 tat tac gcg ctg cgc tac atg gtc acc ttc ctc gtg gtg gtt tcg gtc 768
 Tyr Tyr Ala Leu Arg Tyr Met Val Thr Phe Leu Val Val Val Ser Val
 245 250 255
 ggc ggc gcg ggc tcc ata ccc ggc gcg ctg atc gcc tgc ctg ctg ctc 816
 Gly Gly Ala Gly Ser Ile Pro Gly Ala Leu Ile Ala Cys Leu Leu Leu
 260 265 270
 ggc gcg atc gat acg acc ggc cgg tat ctc gcc ccg gaa tat ggc gag 864
 Gly Ala Ile Asp Thr Thr Gly Arg Tyr Leu Ala Pro Glu Tyr Gly Glu

ttc	ttc	ttt	tat	ctg	gcg	gtc	atc	gtg	atc	atc	acc	ttg	ttc	ccg	cgc	912
Phe	Phe	Phe	Tyr	Leu	Ala	Val	Ile	Val	Ile	Ile	Thr	Leu	Phe	Pro	Arg	
	290					295					300					
ggc	ctt	ctc	gga	agg	gcg	aaa	tga									936
Gly	Leu	Leu	Gly	Arg	Ala	Lys										
305					310											

<210> 499

<211> 311

<212> PRT

<213> Agrobacterium tumefaciens

<400> 499

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Cys	Thr	Gly	Arg	Ser	Phe	Phe	Ser	Met	Gln	Thr	Val	Phe	Ser	Ile	Leu	
			20					25					30			
Ile	Asp	Ala	Leu	Ala	Tyr	Gly	Met	Val	Leu	Phe	Ile	Ile	Ser	Ile	Gly	
		35					40					45				
Leu	Ser	Val	Thr	Met	Gly	Leu	Met	Arg	Val	Val	Asn	Leu	Ala	His	Gly	
	50					55					60					
Ala	Phe	Ala	Met	Ile	Gly	Gly	Tyr	Leu	Ala	Ser	Tyr	Ala	Ala	His	Gly	
65					70					75					80	
Leu	Gly	Leu	Gly	Tyr	Ala	Met	Ala	Ile	Leu	Val	Ala	Ile	Val	Gly	Thr	
				85					90					95		
Ile	Val	Ile	Ala	Ile	Pro	Leu	Glu	Arg	Phe	Leu	Tyr	Arg	Arg	Ile	Tyr	
			100					105					110			
Gly	Ala	Pro	Glu	Leu	Thr	Gln	Val	Leu	Met	Thr	Ile	Gly	Ile	Thr	Phe	
		115					120					125				
Cys	Ile	Ile	Gly	Ile	Ala	Asn	Tyr	Val	Phe	Gly	Pro	Thr	Leu	Lys	Thr	
	130					135					140					
Ile	Pro	Leu	Pro	Gln	Gln	Leu	Ala	Gly	Pro	Thr	Asp	Leu	Gly	Phe	Arg	
145					150					155					160	
Thr	Ile	Ala	Thr	His	Arg	Ile	Phe	Ala	Ile	Ala	Cys	Gly	Leu	Ala	Val	
				165					170					175		
Ala	Gly	Ala	Leu	Trp	Phe	Thr	Phe	Glu	Lys	Thr	Ala	Phe	Gly	Ile	Lys	
			180					185					190			
Leu	Arg	Ala	Ala	Val	Asp	Asn	Ala	Ala	Met	Ala	Ala	Ala	Leu	Gly	Val	
		195					200					205				
Arg	Thr	Glu	Ile	Ile	Tyr	Ala	Val	Ser	Phe	Ala	Ile	Ala	Val	Gly	Leu	
	210					215					220					
Ala	Ala	Met	Gly	Gly	Val	Ile	Gly	Ala	Glu	Leu	Leu	Pro	Val	Glu	Pro	
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Tyr	Tyr	Ala	Leu	Arg	Tyr	Met	Val	Thr	Phe	Leu	Val	Val	Val	Ser	Val	
				245					250					255		
Gly	Gly	Ala	Gly	Ser	Ile	Pro	Gly	Ala	Leu	Ile	Ala	Cys	Leu	Leu	Leu	
			260					265					270			
Gly	Ala	Ile	Asp	Thr	Thr	Gly	Arg	Tyr	Leu	Ala	Pro	Glu	Tyr	Gly	Glu	
		275					280					285				
Phe	Phe	Phe	Tyr	Leu	Ala	Val	Ile	Val	Ile	Ile	Thr	Leu	Phe	Pro	Arg	
	290					295					300					
Gly	Leu	Leu	Gly	Arg	Ala	Lys										
305					310											

<210> 500

<211> 948

<212> DNA

<213> Methanococcus jannaschii

<220>

<221> CDS

<222> (1)..(948)

<400> 500

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1				5					10					15		
gga	gct	att	ata	tac	tcc	aac	ctt	ttg	ggt	ttg	ttg	gct	ttg	gga	tta	96

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Gly	Ala	Ile	Ile	Tyr	Ser	Asn	Leu	Leu	Val	Leu	Leu	Ala	Leu	Gly	Leu	
			20					25					30			
act	cta	act	tat	ata	aca	aca	aac	gtt	cca	aac	ttt	gct	cag	gga	agt	144
Thr	Leu	Thr	Tyr	Ile	Thr	Thr	Asn	Val	Pro	Asn	Phe	Ala	Gln	Gly	Ser	
		35					40				45					
tat	gcg	ata	gtt	ggg	agt	tat	gtt	gct	tta	aca	tta	tta	aag	ttg	ttt	192
Tyr	Ala	Ile	Val	Gly	Ser	Tyr	Val	Ala	Leu	Thr	Leu	Leu	Lys	Leu	Phe	
	50					55				60						
ggt	att	tgt	cct	tat	ctt	tct	tta	cca	gtt	tta	ttt	gtt	ggt	ggg	gca	240
Gly	Ile	Cys	Pro	Tyr	Leu	Ser	Leu	Pro	Val	Leu	Phe	Val	Val	Gly	Ala	
	65			70				75						80		
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Ile	Val	Gly	Leu	Ile	Thr	Tyr	Leu	Ala	Leu	Lys	Pro	Leu	Ile	Lys	Arg	
				85				90						95		
aat	gcc	tct	gta	gag	att	tta	atg	att	gca	act	ctt	gct	ata	gat	tta	336
Asn	Ala	Ser	Val	Glu	Ile	Leu	Met	Ile	Ala	Thr	Leu	Ala	Ile	Asp	Leu	
		100					105					110				
ata	tta	ttg	ggt	ggt	att	ggg	gct	tac	tct	gaa	ata	tta	agt	caa	att	384
Ile	Leu	Leu	Gly	Val	Ile	Gly	Ala	Tyr	Ser	Glu	Ile	Leu	Ser	Gln	Ile	
		115				120					125					
ggt	ggt	tct	act	caa	gca	aaa	ttc	ggt	ttt	gca	aac	ttg	gat	ttt	tca	432
Val	Gly	Ser	Thr	Gln	Ala	Lys	Phe	Val	Phe	Ala	Asn	Leu	Asp	Phe	Ser	
	130			135						140						
tta	ttt	gga	ttt	aaa	gga	att	tta	ttt	ggt	tca	acc	ttc	gta	ggt	ata	480
Leu	Phe	Gly	Phe	Lys	Gly	Ile	Leu	Phe	Val	Ser	Thr	Phe	Val	Val	Ile	
	145			150					155					160		
cta	cta	tta	att	gga	ctt	tat	ctc	ctc	ctg	tat	aaa	aca	aag	ttt	ggt	528
Leu	Leu	Leu	Ile	Gly	Leu	Tyr	Leu	Leu	Leu	Tyr	Lys	Thr	Lys	Phe	Gly	
				165					170					175		
att	gct	ttg	aga	gct	tca	atg	gag	aat	cct	tca	tta	gct	caa	act	atg	576
Ile	Ala	Leu	Arg	Ala	Ser	Met	Glu	Asn	Pro	Ser	Leu	Ala	Gln	Thr	Met	
			180				185						190			
gga	att	gat	ggt	gaa	aaa	aca	aga	tta	ttt	tct	tggt	att	ctt	tct	gga	624
Gly	Ile	Asp	Val	Glu	Lys	Thr	Arg	Leu	Phe	Ser	Trp	Ile	Leu	Ser	Gly	
		195					200					205				
gct	tta	gct	gga	ggt	gct	ggt	ggg	ctt	tta	cct	ttc	atg	caa	gag	att	672
Ala	Leu	Ala	Gly	Val	Ala	Gly	Gly	Leu	Leu	Pro	Phe	Met	Gln	Glu	Ile	
	210			215						220						
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Val	Pro	Ala	Thr	Gly	Asp	Leu	Ile	Ile	Ile	Ser	Ile	Phe	Ala	Ala	Ser	
	225			230						235				240		
att	ggt	gga	ggt	tta	agg	cat	ata	agt	gga	gca	tta	ata	ggg	ggc	tat	768
Ile	Val	Gly	Gly	Leu	Arg	His	Ile	Ser	Gly	Ala	Leu	Ile	Gly	Gly	Tyr	
				245				250						255		
ata	att	gga	ata	tct	gag	agt	tta	ata	act	tat	tat	tta	gca	tca	gca	816
Ile	Ile	Gly	Ile	Ser	Glu	Ser	Leu	Ile	Thr	Tyr	Tyr	Leu	Ala	Ser	Ala	
			260				265					270				
ttt	gga	aca	gga	ttt	ttg	ggt	tat	gga	aag	ggt	atc	tcc	tta	ata	ata	864
Phe	Gly	Thr	Gly	Phe	Leu	Val	Tyr	Gly	Lys	Val	Ile	Ser	Leu	Ile	Ile	
	275			280							285					
atg	ata	gca	aca	tta	tta	ata	gca	cct	tat	gga	att	act	gga	gtc	gat	912
Met	Ile	Ala	Thr	Leu	Leu	Ile	Ala	Pro	Tyr	Gly	Ile	Thr	Gly	Val	Asp	
	290				295					300						
tggt	aaa	aag	tta	aaa	aga	tta	tta	tct	act	tca	taa					948
Trp	Lys	Lys	Leu	Lys	Arg	Leu	Leu	Ser	Thr	Ser						
	305				310					315						

<210> 501

<211> 315

<212> PRT

<213> Methanococcus jannaschii

<400> 501

Met	Val	Lys	Leu	Leu	Leu	Lys	Asp	Leu	Gly	Glu	Lys	Met	Ile	Leu	Glu	
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Gly	Ala	Ile	Ile	Tyr	Ser	Asn	Leu	Leu	Val	Leu	Leu	Ala	Leu	Gly	Leu	
			20					25				30				
Thr	Leu	Thr	Tyr	Ile	Thr	Thr	Asn	Val	Pro	Asn	Phe	Ala	Gln	Gly	Ser	
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Tyr Ala Ile Val Gly Ser Tyr Val Ala Leu Thr Leu Leu Lys Leu Phe
 50 55 60
 Gly Ile Cys Pro Tyr Leu Ser Leu Pro Val Leu Phe Val Val Gly Ala
 65 70 75 80
 Ile Val Gly Leu Ile Thr Tyr Leu Ala Leu Lys Pro Leu Ile Lys Arg
 85 90 95
 Asn Ala Ser Val Glu Ile Leu Met Ile Ala Thr Leu Ala Ile Asp Leu
 100 105 110
 Ile Leu Leu Gly Val Ile Gly Ala Tyr Ser Glu Ile Leu Ser Gln Ile
 115 120 125
 Val Gly Ser Thr Gln Ala Lys Phe Val Phe Ala Asn Leu Asp Phe Ser
 130 135 140
 Leu Phe Gly Phe Lys Gly Ile Leu Phe Val Ser Thr Phe Val Val Ile
 145 150 155 160
 Leu Leu Leu Ile Gly Leu Tyr Leu Leu Leu Tyr Lys Thr Lys Phe Gly
 165 170 175
 Ile Ala Leu Arg Ala Ser Met Glu Asn Pro Ser Leu Ala Gln Thr Met
 180 185 190
 Gly Ile Asp Val Glu Lys Thr Arg Leu Phe Ser Trp Ile Leu Ser Gly
 195 200 205
 Ala Leu Ala Gly Val Ala Gly Gly Leu Leu Pro Phe Met Gln Glu Ile
 210 215 220
 Val Pro Ala Thr Gly Asp Leu Ile Ile Ile Ser Ile Phe Ala Ala Ser
 225 230 235 240
 Ile Val Gly Gly Leu Arg His Ile Ser Gly Ala Leu Ile Gly Gly Tyr
 245 250 255
 Ile Ile Gly Ile Ser Glu Ser Leu Ile Thr Tyr Tyr Leu Ala Ser Ala
 260 265 270
 Phe Gly Thr Gly Phe Leu Val Tyr Gly Lys Val Ile Ser Leu Ile Ile
 275 280 285
 Met Ile Ala Thr Leu Leu Ile Ala Pro Tyr Gly Ile Thr Gly Val Asp
 290 295 300
 Trp Lys Lys Leu Lys Arg Leu Leu Ser Thr Ser
 305 310 315

<210> 502

<211> 900

<212> DNA

<213> *Thermotoga maritima*

<220>

<221> CDS

<222> (1)..(900)

<400> 502

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1 5 10 15	
ttg tac gcg ctc ata gcg att ggt tac acc atg gtt tat ggt att ctg	96
Leu Tyr Ala Leu Ile Ala Ile Gly Tyr Thr Met Val Tyr Gly Ile Leu	
20 25 30	
agg ctc atc aat ttc gcc cat ggc gat gtt atg atg atg ggt gtc tac	144
Arg Leu Ile Asn Phe Ala His Gly Asp Val Met Met Met Gly Val Tyr	
35 40 45	
ttc gcc ttc tac gct gct act ctt ctt tct ctg aat cca ctt ttt tct	192
Phe Ala Phe Tyr Ala Ala Thr Leu Leu Ser Leu Asn Pro Leu Phe Ser	
50 55 60	
gcc atc gta gcg atc ctc gga gca gcg cta ttg ggt ttt ctc ata gac	240
Ala Ile Val Ala Ile Leu Gly Ala Ala Leu Leu Gly Phe Leu Ile Asp	
65 70 75 80	
aga gtt gct tac aaa cct ctg aga aac gct ccc agg att tcc gct ctt	288
Arg Val Ala Tyr Lys Pro Leu Arg Asn Ala Pro Arg Ile Ser Ala Leu	
85 90 95	
atc acc gct atc gga gtt tct ttc ttc ctt gag agt ctc gct gtg gtc	336
Ile Thr Ala Ile Gly Val Ser Phe Phe Leu Glu Ser Leu Ala Val Val	
100 105 110	
gtt ttt gga gcc att ccc aag tct ttt ctg aag gtc ttc aag gac agg	384
Val Phe Gly Ala Ile Pro Lys Ser Phe Leu Lys Val Phe Lys Asp Arg	
115 120 125	

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acc	ata	ctg	aac	aaa	gtg	ctg	act	gta	gcg	gga	gcc	aga	ata	cca	ctc	432
Thr	Ile	Leu	Asn	Lys	Val	Leu	Thr	Val	Ala	Gly	Ala	Arg	Ile	Pro	Leu	
	130					135					140					
ctc	acg	ttc	ctc	gtg	atc	ttc	atc	acc	gcc	gtc	att	ctg	ata	gtc	ctg	480
Leu	Thr	Phe	Leu	Val	Ile	Phe	Ile	Thr	Ala	Val	Ile	Leu	Ile	Val	Leu	
145				150					155						160	
ttc	ttc	atc	gtt	tat	aga	acg	aag	atc	ggg	atg	gct	atg	aga	gcg	att	528
Phe	Phe	Ile	Val	Tyr	Arg	Thr	Lys	Ile	Gly	Met	Ala	Met	Arg	Ala	Ile	
				165					170					175		
tcc	atg	gat	att	cca	acg	act	gcc	ctc	atg	ggg	gtc	aac	gtg	gac	gcc	576
Ser	Met	Asp	Ile	Pro	Thr	Thr	Ala	Leu	Met	Gly	Val	Asn	Val	Asp	Ala	
			180					185					190			
gtc	atc	ggg	ttc	acg	ttt	gcc	ctc	ggg	tcg	gca	ctc	gct	gct	gcg	agt	624
Val	Ile	Gly	Phe	Thr	Phe	Ala	Leu	Gly	Ser	Ala	Leu	Ala	Ala	Ala	Ser	
		195					200					205				
ggg	atc	atg	tgg	gca	atg	aga	ttt	ccg	aac	gta	cat	cct	tac	atg	ggg	672
Gly	Ile	Met	Trp	Ala	Met	Arg	Phe	Pro	Asn	Val	His	Pro	Tyr	Met	Gly	
210						215					220					
ttc	atg	cca	ggg	ctc	aag	gct	ttc	att	gcg	gcg	gtg	ttt	gga	gga	ata	720
Phe	Met	Pro	Gly	Leu	Lys	Ala	Phe	Ile	Ala	Ala	Val	Phe	Gly	Gly	Ile	
225				230					235						240	
ggg	tcg	atc	ccc	gga	gct	gtt	ctc	ggg	ggc	gtt	ctt	ctc	ggg	ctc	att	768
Gly	Ser	Ile	Pro	Gly	Ala	Val	Leu	Gly	Gly	Val	Leu	Leu	Gly	Leu	Ile	
				245				250					255			
gag	ata	ttc	ctc	gca	gct	tat	ttc	cca	gct	gtt	atg	ggg	tac	cgg	gat	816
Glu	Ile	Phe	Leu	Ala	Ala	Tyr	Phe	Pro	Ala	Val	Met	Gly	Tyr	Arg	Asp	
			260					265					270			
gcg	ttc	gct	ttc	atc	atc	ctg	atc	atc	ata	ctg	ctc	gtg	aaa	cct	tct	864
Ala	Phe	Ala	Phe	Ile	Ile	Leu	Ile	Ile	Ile	Leu	Leu	Val	Lys	Pro	Ser	
		275					280					285				
gga	ctt	ctc	ggg	aaa	aaa	atc	gtg	gaa	aag	gtg	tga					900
Gly	Leu	Leu	Gly	Lys	Lys	Ile	Val	Glu	Lys	Val						
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<210> 503

<211> 299

<212> PRT

<213> Thermotoga maritima

<400> 503

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			20					25					30			
Arg	Leu	Ile	Asn	Phe	Ala	His	Gly	Asp	Val	Met	Met	Met	Gly	Val	Tyr	
		35					40					45				
Phe	Ala	Phe	Tyr	Ala	Ala	Thr	Leu	Leu	Ser	Leu	Asn	Pro	Leu	Phe	Ser	
	50					55					60					
Ala	Ile	Val	Ala	Ile	Leu	Gly	Ala	Ala	Leu	Leu	Gly	Phe	Leu	Ile	Asp	
65				70					75					80		
Arg	Val	Ala	Tyr	Lys	Pro	Leu	Arg	Asn	Ala	Pro	Arg	Ile	Ser	Ala	Leu	
			85					90					95			
Ile	Thr	Ala	Ile	Gly	Val	Ser	Phe	Phe	Leu	Glu	Ser	Leu	Ala	Val	Val	
		100					105					110				
Val	Phe	Gly	Ala	Ile	Pro	Lys	Ser	Phe	Leu	Lys	Val	Phe	Lys	Asp	Arg	
	115					120					125					
Thr	Ile	Leu	Asn	Lys	Val	Leu	Thr	Val	Ala	Gly	Ala	Arg	Ile	Pro	Leu	
	130					135					140					
Leu	Thr	Phe	Leu	Val	Ile	Phe	Ile	Thr	Ala	Val	Ile	Leu	Ile	Val	Leu	
145				150					155						160	
Phe	Phe	Ile	Val	Tyr	Arg	Thr	Lys	Ile	Gly	Met	Ala	Met	Arg	Ala	Ile	
				165					170					175		
Ser	Met	Asp	Ile	Pro	Thr	Thr	Ala	Leu	Met	Gly	Val	Asn	Val	Asp	Ala	
			180					185					190			
Val	Ile	Gly	Phe	Thr	Phe	Ala	Leu	Gly	Ser	Ala	Leu	Ala	Ala	Ala	Ser	
	195						200					205				
Gly	Ile	Met	Trp	Ala	Met	Arg	Phe	Pro	Asn	Val	His	Pro	Tyr	Met	Gly	
	210					215					220					
Phe	Met	Pro	Gly	Leu	Lys	Ala	Phe	Ile	Ala	Ala	Val	Phe	Gly	Gly	Ile	

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225 Gly Ser Ile Pro Gly 230 Ala Val Leu Gly Gly 235 Val Leu Leu Gly Leu 240 Ile
 Glu Ile Phe Leu 245 Ala Tyr Phe Pro 250 Ala Val Met Gly Tyr Arg Asp
 Ala Phe 260 Phe Ile Ile Leu 265 Ile Ile Leu Leu Val 270 Lys Pro Ser
 Gly Leu 275 Gly Lys Lys Ile 280 Val Glu Lys Val 285
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<210> 504

<211> 1614

<212> DNA

<213> Sinorhizobium meliloti

<220>

<221> CDS

<222> (1)..(1614)

<400> 504

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gcg atg gct ccg ggg ctt cgc gcg gaa gag gga ctg cgc gat ctg gtg	96
Ala Met Ala Pro Gly Leu Arg Ala Glu Gly Leu Arg Asp Leu Val	
20 25 30	
aac gcg ctc ggc gag gcg aag ctg tcc gag atg gac gag cat atc gcg	144
Asn Ala Leu Gly Glu Ala Lys Leu Ser Glu Met Asp Glu His Ile Ala	
35 40 45	
gca ctg gcg aag acc gga aag ccc gaa gtc gtc gcc atc ctc gag gcg	192
Ala Leu Ala Lys Thr Gly Lys Pro Glu Val Val Ala Ile Leu Glu Ala	
50 55 60	
ctc ggg gaa ggc gag ctc tat gcg cgc aag gcg gac ggc cag gtc ttg	240
Leu Gly Glu Gly Glu Leu Tyr Ala Arg Lys Ala Asp Gly Gln Val Leu	
65 70 75 80	
ttg acg aag gag agc ggt tcg aac ctg acc ctt acg gat ccg atc tcc	288
Leu Thr Lys Glu Ser Gly Ser Asn Leu Thr Leu Thr Asp Pro Ile Ser	
85 90 95	
ggc gac agc gcc ggc gaa gcg ccg aag gcg gca ctt tcg aag atc agg	336
Gly Asp Ser Ala Gly Glu Ala Pro Lys Ala Ala Leu Ser Lys Ile Arg	
100 105 110	
gtg aac aac agc gtg cgg cgc gcc gtg cgc acc gcc ctc ggc agc ctg	384
Val Asn Asn Ser Val Arg Arg Ala Val Arg Thr Ala Leu Gly Ser Leu	
115 120 125	
acg ctc ctc agc ccc gat cgc aat cag cgc ctc agg gcc gcg cag tcg	432
Thr Leu Leu Ser Pro Asp Arg Asn Gln Arg Leu Arg Ala Ala Gln Ser	
130 135 140	
gtg ctg caa tcg ccc gat gcc gac gcg ctc ggc gtc atc gag aat gca	480
Val Leu Gln Ser Pro Asp Ala Asp Ala Leu Gly Val Ile Glu Asn Ala	
145 150 155 160	
ctg gct gcc gag aag gat gga gcc gtt cgt gcg gtt ctc gaa cag gcg	528
Leu Ala Ala Glu Lys Asp Gly Ala Val Arg Ala Val Leu Glu Gln Ala	
165 170 175	
cgc gcc acg atg ctg ctt ctc tcc gac cgg ccg gtc gag gag aag aag	576
Arg Ala Thr Met Leu Leu Leu Ser Asp Arg Pro Val Glu Glu Lys Lys	
180 185 190	
gag gcg gtg cgg ctg ctg gag gaa aac ggc ggc cgc gag gcg ctg ccg	624
Glu Ala Val Arg Leu Leu Glu Glu Asn Gly Gly Arg Glu Ala Leu Pro	
195 200 205	
atc ctt tct gcc gcg ctc ggc tct gcc gac gaa agc ctg aag ccg gac	672
Ile Leu Ser Ala Ala Leu Gly Ser Ala Asp Glu Ser Leu Lys Pro Asp	
210 215 220	
atc gag gcg gcg ctc gcc agc atc gaa cag gcg caa gcc ttc tgg aat	720
Ile Glu Ala Ala Leu Ala Ser Ile Glu Gln Ala Gln Ala Phe Trp Asn	
225 230 235 240	
gcg ggc cag aac ata tgg tac ggc ctg tcg ctc ggc tcg gtg ctg ctc	768
Ala Gly Gln Asn Ile Trp Tyr Gly Leu Ser Leu Gly Ser Val Leu Leu	
245 250 255	
ttg gcg gcg atc ggt ctc gcc atc acc ttc ggc gtc atg ggc atc atc	816

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Leu	Ala	Ala	Ile	Gly	Leu	Ala	Ile	Thr	Phe	Gly	Val	Met	Gly	Ile	Ile	
aac	atg	gcg	cat	ggc	gag	atg	gtg	atg	ctc	ggg	gcc	tat	acg	acc	ttc	864
Asn	Met	Ala	His	Gly	Glu	Met	Val	Met	Leu	Gly	Ala	Tyr	Thr	Thr	Phe	
		275					280					285				
ctc	gtt	caa	gat	gtc	gtg	cgc	acc	tcc	ttt	cct	cat	ctt	ttc	gag	tgg	912
Leu	Val	Gln	Asp	Val	Val	Arg	Thr	Ser	Phe	Pro	His	Leu	Phe	Glu	Trp	
		290					295				300					
tcc	ttg	gcg	atc	gcg	ctg	ccg	ctc	gcc	ttt	ctt	gtt	aca	ggc	gcc	gtg	960
Ser	Leu	Ala	Ile	Ala	Leu	Pro	Leu	Ala	Phe	Leu	Val	Thr	Gly	Ala	Val	
		305					310				315				320	
ggc	ctc	gca	ctg	gaa	cgc	ggc	gtc	atc	cgc	ttt	ctc	tac	ggg	cgc	ccg	1008
Gly	Leu	Ala	Leu	Glu	Arg	Gly	Val	Ile	Arg	Phe	Leu	Tyr	Gly	Arg	Pro	
				325					330					335		
ctc	gaa	acg	ctg	ctt	gcc	acc	tgg	ggc	ata	tcg	ctc	atc	ctc	cag	cag	1056
Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Ile	Ser	Leu	Ile	Leu	Gln	Gln	
			340					345					350			
acg	gtg	cgg	acg	atc	ttc	ggc	ccc	acc	aac	cgt	gag	gtc	ggc	aat	ccg	1104
Thr	Val	Arg	Thr	Ile	Phe	Gly	Pro	Thr	Asn	Arg	Glu	Val	Gly	Asn	Pro	
		355					360					365				
tcc	tgg	atg	tcc	ggc	gcc	ttc	gag	ctc	ggc	gga	ctg	gcg	atc	acc	tgg	1152
Ser	Trp	Met	Ser	Gly	Ala	Phe	Glu	Leu	Gly	Gly	Leu	Ala	Ile	Thr	Trp	
		370				375					380					
aac	cgt	ctc	tgg	atc	atc	gtc	ttt	gcg	ctt	gcg	gtg	ttt	gcg	gca	ctt	1200
Asn	Arg	Leu	Trp	Ile	Ile	Val	Phe	Ala	Leu	Ala	Val	Phe	Ala	Ala	Leu	
		385				390					395				400	
ctc	ttt	ctg	ctc	aag	aag	acg	ccg	atg	ggc	ctg	cag	atg	cgc	gcg	gta	1248
Leu	Phe	Leu	Leu	Lys	Lys	Thr	Pro	Met	Gly	Leu	Gln	Met	Arg	Ala	Val	
				405					410					415		
acg	cag	aac	cgg	cgc	atg	gcc	tct	tcc	atg	ggc	atc	cgc	acg	ccc	tgg	1296
Thr	Gln	Asn	Arg	Arg	Met	Ala	Ser	Ser	Met	Gly	Ile	Arg	Thr	Pro	Trp	
			420					425					430			
gtc	gat	gcg	ctg	acc	ttc	gcg	ctc	ggc	tcc	ggc	atc	gcc	ggc	att	gcg	1344
Val	Asp	Ala	Leu	Thr	Phe	Ala	Leu	Gly	Ser	Gly	Ile	Ala	Gly	Ile	Ala	
		435					440					445				
ggt	gtg	gcg	ctt	tcg	cag	atc	gac	aac	gtc	tcg	ccg	aac	ctc	ggg	cag	1392
Gly	Val	Ala	Leu	Ser	Gln	Ile	Asp	Asn	Val	Ser	Pro	Asn	Leu	Gly	Gln	
		450				455					460					
ggc	tac	ata	atc	gac	agc	ttc	atg	gtc	gtg	gtc	ttc	ggc	ggc	gtc	ggc	1440
Gly	Tyr	Ile	Ile	Asp	Ser	Phe	Met	Val	Val	Val	Phe	Gly	Gly	Val	Gly	
		465				470				475					480	
aat	ctc	tgg	ggc	acg	ctt	gtc	ggc	gcc	ttc	tcg	ctc	ggc	atc	ctc	aac	1488
Asn	Leu	Trp	Gly	Thr	Leu	Val	Gly	Ala	Phe	Ser	Leu	Gly	Ile	Leu	Asn	
			485					490						495		
aag	ttc	ctg	gag	ccc	tat	gcc	ggc	gcc	gtg	ctc	ggc	aag	atc	ctc	gtg	1536
Lys	Phe	Leu	Glu	Pro	Tyr	Ala	Gly	Ala	Val	Leu	Gly	Lys	Ile	Leu	Val	
			500					505					510			
ctc	gtg	ctg	atc	atc	ctc	ttc	atc	cag	aag	cgg	ccg	cgc	ggg	ctc	ttc	1584
Leu	Val	Leu	Ile	Ile	Leu	Phe	Ile	Gln	Lys	Arg	Pro	Arg	Gly	Leu	Phe	
		515					520					525				
gca	ctc	aag	ggc	cgg	gcg	gtg	gaa	gca	tga							1614
Ala	Leu	Lys	Gly	Arg	Ala	Val	Glu	Ala								
		530				535										

<210> 505

<211> 537

<212> PRT

<213> Sinorhizobium meliloti

<400> 505

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			20					25				30			
Asn	Ala	Leu	Gly	Glu	Ala	Lys	Leu	Ser	Glu	Met	Asp	Glu	His	Ile	Ala
		35					40					45			
Ala	Leu	Ala	Lys	Thr	Gly	Lys	Pro	Glu	Val	Val	Ala	Ile	Leu	Glu	Ala
	50					55					60				
Leu	Gly	Glu	Gly	Glu	Leu	Tyr	Ala	Arg	Lys	Ala	Asp	Gly	Gln	Val	Leu

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65	Leu	Thr	Lys	Glu	Ser	70	Gly	Ser	Asn	Leu	Thr	75	Leu	Thr	Asp	Pro	Ile	80	Ser
					85							90					95		
	Gly	Asp	Ser	Ala	Gly	Glu	Ala	Pro	Lys	Ala	Ala	Leu	Ser	Lys	Ile	Arg			
			100						105					110					
	Val	Asn	Asn	Ser	Val	Arg	Arg	Ala	Val	Arg	Thr	Ala	Leu	Gly	Ser	Leu			
		115						120					125						
	Thr	Leu	Leu	Ser	Pro	Asp	Arg	Asn	Gln	Arg	Leu	Arg	Ala	Ala	Gln	Ser			
		130					135					140							
	Val	Leu	Gln	Ser	Pro	Asp	Ala	Asp	Ala	Leu	Gly	Val	Ile	Glu	Asn	Ala			
		145				150					155					160			
	Leu	Ala	Ala	Glu	Lys	Asp	Gly	Ala	Val	Arg	Ala	Val	Leu	Glu	Gln	Ala			
				165						170					175				
	Arg	Ala	Thr	Met	Leu	Leu	Ser	Asp	Arg	Pro	Val	Glu	Glu	Lys	Lys				
			180					185					190						
	Glu	Ala	Val	Arg	Leu	Leu	Glu	Glu	Asn	Gly	Gly	Arg	Glu	Ala	Leu	Pro			
			195					200					205						
	Ile	Leu	Ser	Ala	Ala	Leu	Gly	Ser	Ala	Asp	Glu	Ser	Leu	Lys	Pro	Asp			
		210					215					220							
	Ile	Glu	Ala	Ala	Leu	Ala	Ser	Ile	Glu	Gln	Ala	Gln	Ala	Phe	Trp	Asn			
		225				230					235					240			
	Ala	Gly	Gln	Asn	Ile	Trp	Tyr	Gly	Leu	Ser	Leu	Gly	Ser	Val	Leu	Leu			
				245						250					255				
	Leu	Ala	Ala	Ile	Gly	Leu	Ala	Ile	Thr	Phe	Gly	Val	Met	Gly	Ile	Ile			
				260					265					270					
	Asn	Met	Ala	His	Gly	Glu	Met	Val	Met	Leu	Gly	Ala	Tyr	Thr	Thr	Phe			
			275					280					285						
	Leu	Val	Gln	Asp	Val	Val	Arg	Thr	Ser	Phe	Pro	His	Leu	Phe	Glu	Trp			
		290					295					300							
	Ser	Leu	Ala	Ile	Ala	Leu	Pro	Leu	Ala	Phe	Leu	Val	Thr	Gly	Ala	Val			
		305				310					315					320			
	Gly	Leu	Ala	Leu	Glu	Arg	Gly	Val	Ile	Arg	Phe	Leu	Tyr	Gly	Arg	Pro			
				325						330					335				
	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Ile	Ser	Leu	Ile	Leu	Gln	Gln			
				340					345					350					
	Thr	Val	Arg	Thr	Ile	Phe	Gly	Pro	Thr	Asn	Arg	Glu	Val	Gly	Asn	Pro			
			355					360					365						
	Ser	Trp	Met	Ser	Gly	Ala	Phe	Glu	Leu	Gly	Gly	Leu	Ala	Ile	Thr	Trp			
		370					375					380							
	Asn	Arg	Leu	Trp	Ile	Ile	Val	Phe	Ala	Leu	Ala	Val	Phe	Ala	Ala	Leu			
		385				390					395					400			
	Leu	Phe	Leu	Leu	Lys	Lys	Thr	Pro	Met	Gly	Leu	Gln	Met	Arg	Ala	Val			
				405						410					415				
	Thr	Gln	Asn	Arg	Arg	Met	Ala	Ser	Ser	Met	Gly	Ile	Arg	Thr	Pro	Trp			
				420				425					430						
	Val	Asp	Ala	Leu	Thr	Phe	Ala	Leu	Gly	Ser	Gly	Ile	Ala	Gly	Ile	Ala			
			435					440					445						
	Gly	Val	Ala	Leu	Ser	Gln	Ile	Asp	Asn	Val	Ser	Pro	Asn	Leu	Gly	Gln			
		450				455					460								
	Gly	Tyr	Ile	Ile	Asp	Ser	Phe	Met	Val	Val	Val	Phe	Gly	Gly	Val	Gly			
		465			470					475					480				
	Asn	Leu	Trp	Gly	Thr	Leu	Val	Gly	Ala	Phe	Ser	Leu	Gly	Ile	Leu	Asn			
				485					490					495					
	Lys	Phe	Leu	Glu	Pro	Tyr	Ala	Gly	Ala	Val	Leu	Gly	Lys	Ile	Leu	Val			
			500					505					510						
	Leu	Val	Leu	Ile	Ile	Leu	Phe	Ile	Gln	Lys	Arg	Pro	Arg	Gly	Leu	Phe			
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<210> 506

<211> 1080

<212> DNA

<213> Thermotoga maritima

<220>

<221> CDS

<222> (1)..(1080)

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<400>	506																
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acg Thr	gtt Val	gtt Val	ttc Phe 20	ctg Leu	atc Ile	ttc Phe	atg Met	gcc Ala 25	ctt Leu	ctc Leu	tat Tyr	ctg Leu 30	gct Ala	gat Asp			96
aga Arg	tac Tyr	atg Met 35	gac Asp	agc Ser	tac Tyr	aag Lys	ctg Leu 40	aga Arg	gta Val	gtg Val	agg Arg	ctc Leu 45	atc Ile	gcc Ala	ata Ile		144
tac Tyr	ggg Gly 50	atc Ile	atg Met	gcg Ala	gtg Val	agt Ser 55	ttg Leu	aac Asn	ctg Leu	ata Ile	aac Asn 60	ggg Gly	atc Ile	acg Thr	ggg Gly		192
atc Ile 65	ttt Phe	tct Ser	ctt Leu	gga Gly	cac His 70	gcc Ala	ggg Gly	ttc Phe	atc Ile	ttg Leu 75	ata Ile	ggg Gly	gct Ala	tat Tyr	acg Thr 80		240
gcg Ala	tct Ser	ctt Leu	ctc Leu	aca Thr 85	ctt Leu	tca Ser	cca Pro	gag Glu	cag Gln 90	aaa Lys	gcg Ala	atg Met	tct Ser	ttt Phe 95	ata Ile		288
ata Ile	gag Glu	ccg Pro	atc Ile 100	gtt Val	ccc Pro	tgg Trp	ctt Leu	gcg Ala 105	aac Asn	gcg Ala	cac His	acc Thr	gac Asp 110	ttc Phe	ttc Phe		336
acc Thr	gcc Ala	aca Thr 115	gtg Val	gca Ala	ggc Gly	ggg Gly	gtt Val 120	ctg Leu	gca Ala	gcc Ala	gtc Val	ttc Phe 125	gct Ala	ttt Phe	ctc Leu		384
ata Ile	ggg Gly 130	tgg Trp	ccg Pro	gtt Val	ttg Leu	agg Arg 135	ctt Leu	tcc Ser	ggg Gly	gat Asp	tac Tyr 140	ctc Leu	gcg Ala	ata Ile	gcg Ala		432
tcc Ser 145	ctt Leu	ggg Gly	ttc Phe	gca Ala	gag Glu 150	gtg Val	ata Ile	agg Arg	atc Ile	atc Ile 155	gct Ala	ctc Leu	aac Asn	gcc Ala	atc Ile 160		480
agc Ser	atc Ile	aca Thr	aac Asn	ggc Gly 165	cct Pro	ctc Leu	ggg Gly	ctc Leu	aag Lys 170	gga Gly	att Ile	ccg Pro	gaa Glu 175	tac Tyr 175	tca Ser		528
aac Asn	atc Ile	tgg Trp	tgg Trp	tgt Cys	tac Tyr	ggc Gly	tgg Trp	cta Leu 185	ttc Phe	gta Val	acg Thr	gtt Val 190	ctg Leu	ttc Phe	atg Met		576
gca Ala	agc Ser	ctt Leu 195	gtg Val	aac Asn	agt Ser	agc Ser	tac Tyr 200	gga Gly	aga Arg	gct Ala	ttg Leu	aag Lys 205	gcc Ala	atc Ile	aga Arg		624
gaa Glu 210	gac Asp	cg Arg	ata Ile	gca Ala	gcc Ala	gaa Glu 215	gcc Ala	atg Met	gga Gly	ata Ile	aat Asn 220	gtt Val	ttc Phe	aaa Lys	cat His		672
cag Gln 225	ctt Leu	ctt Leu	tct Ser	ttc Phe	gtc Val 230	ata Ile	gga Gly	gcc Ala	ttc Phe	ttt Phe 235	gcg Ala	ggg Gly	gtt Val	tct Ser	ggg Gly 240		720
tcg Ser	ctc Leu	tac Tyr	gcg Ala	cac His 245	tgg Trp	ctc Leu	acc Thr	acg Thr	ata Ile 250	gat Asp	ccc Pro	aga Arg	acg Thr	acc Thr 255	aca Thr		768
ctc Leu	ggg Gly	ccc Pro	atg Met 260	ctc Leu	act Thr	ttc Phe	tac Tyr	gtt Val 265	ctc Leu	atc Ile	atg Met	ata Ile	gtt Val 270	ctg Leu	ggg Gly		816
gga Gly	ctc Leu	ggc Gly 275	agt Ser	att Ile	tcc Ser	ggg Gly	tcg Ser 280	ctc Leu	ata Ile	gga Gly	gcc Ala	gct Ala 285	ctc Leu	ttc Phe	gct Ala		864
ata Ile	ctc Leu 290	ttc Phe	gag Glu	tgg Trp	ctc Leu	agg Arg 295	gat Asp	ctg Leu	gaa Glu	gag Glu	cct Pro 300	acg Thr	ttc Phe	ttc Phe			912
ggc Gly 305	ata Ile	cac His	gtt Val	ccc Pro	ggg Gly 310	ata Ile	aag Lys	gga Gly	atg Met	agg Arg 315	atc Ile	ctc Leu	gtg Val	ata Ile	tcc Ser 320		960
gcc Ala	att Ile	ttc Phe	atc Ile	ctt Leu 325	gtg Val	atg Met	atc Ile	ttc Phe 33									

355

<210> 507
 <211> 359
 <212> PRT
 <213> *Thermotoga maritima*

<400> 507
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 Thr Val Val Phe Leu Ile Phe Met Ala Leu Leu Leu Tyr Leu Ala Asp
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 Arg Tyr Met Asp Ser Tyr Lys Leu Arg Val Val Arg Leu Ile Ala Ile
 35 40 45
 Tyr Gly Ile Met Ala Val Ser Leu Asn Leu Ile Asn Gly Ile Thr Gly
 50 55 60
 Ile Phe Ser Leu Gly His Ala Gly Phe Ile Leu Ile Gly Ala Tyr Thr
 65 70 75 80
 Ala Ser Leu Leu Thr Leu Ser Pro Glu Gln Lys Ala Met Ser Phe Ile
 85 90 95
 Ile Glu Pro Ile Val Pro Trp Leu Ala Asn Ala His Thr Asp Phe Phe
 100 105 110
 Thr Ala Thr Val Ala Gly Gly Val Leu Ala Ala Val Phe Ala Phe Leu
 115 120 125
 Ile Gly Trp Pro Val Leu Arg Leu Ser Gly Asp Tyr Leu Ala Ile Ala
 130 135 140
 Ser Leu Gly Phe Ala Glu Val Ile Arg Ile Ile Ala Leu Asn Ala Ile
 145 150 155 160
 Ser Ile Thr Asn Gly Pro Leu Gly Leu Lys Gly Ile Pro Glu Tyr Ser
 165 170 175
 Asn Ile Trp Trp Cys Tyr Gly Trp Leu Phe Val Thr Val Leu Phe Met
 180 185 190
 Ala Ser Leu Val Asn Ser Ser Tyr Gly Arg Ala Leu Lys Ala Ile Arg
 195 200 205
 Glu Asp Arg Ile Ala Ala Glu Ala Met Gly Ile Asn Val Phe Lys His
 210 215 220
 Gln Leu Leu Ser Phe Val Ile Gly Ala Phe Phe Ala Gly Val Ser Gly
 225 230 235 240
 Ser Leu Tyr Ala His Trp Leu Thr Thr Ile Asp Pro Arg Thr Thr Thr
 245 250 255
 Leu Gly Pro Met Leu Thr Phe Tyr Val Leu Ile Met Ile Val Leu Gly
 260 265 270
 Gly Leu Gly Ser Ile Ser Gly Ser Leu Ile Gly Ala Ala Leu Phe Ala
 275 280 285
 Ile Leu Phe Glu Trp Leu Arg Asp Leu Glu Glu Pro Phe Thr Phe Phe
 290 295 300
 Gly Ile His Val Pro Gly Ile Lys Gly Met Arg Ile Leu Val Ile Ser
 305 310 315 320
 Ala Ile Phe Ile Leu Val Met Ile Phe Trp Gln Arg Gly Ile Met Gly
 325 330 335
 Arg Glu Glu Leu Thr Trp Asn Asn Leu Tyr Arg Trp Leu Phe Ala Arg
 340 345 350
 Arg Arg Gly Gly Glu Glu Lys
 355

<210> 508
 <211> 858
 <212> DNA
 <213> *Deinococcus radiodurans*

<220>
 <221> CDS
 <222> (1)..(858)

<400> 508
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 Met Thr Thr Val Leu Gln Gln Leu Phe Asn Ala Leu Ala Leu Gly Gly
 1 5 10 15
 gtg tac gcc ctg gtc gcg ctg ggg ctg acg ctg gtc tac ggc gtg atg
 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95
 Seite 777

48

96

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Val	Tyr	Ala	Leu	Val	Ala	Leu	Gly	Leu	Thr	Leu	Val	Tyr	Gly	Val	Met	
aaa	att	ccc	aac	ttc	gcc	cac	ggc	gga	ctg	tac	atg	ctc	ggc	gct	tac	144
Lys	Ile	Pro	Asn	Phe	Ala	His	Gly	Gly	Leu	Tyr	Met	Leu	Gly	Ala	Tyr	
		35					40					45				
ctt	tct	tac	gcg	ggc	atc	agc	tcg	ctg	ggg	ctg	ggg	tac	gtg	ccc	gcg	192
Leu	Ser	Tyr	Ala	Gly	Ile	Ser	Ser	Leu	Gly	Leu	Gly	Tyr	Val	Pro	Ala	
	50					55					60					
ctg	ctg	ctc	tct	gcc	gtc	gtc	gtg	gcg	ctg	ctc	gct	gcc	ctg	atg	gaa	240
Leu	Leu	Leu	Ser	Ala	Val	Val	Val	Ala	Leu	Leu	Ala	Ala	Leu	Met	Glu	
65				70				75							80	
cgg	gtc	att	ttc	ttc	ccg	ctg	cgc	aac	gcg	ccg	cac	gtg	cag	ccc	atg	288
Arg	Val	Ile	Phe	Phe	Pro	Leu	Arg	Asn	Ala	Pro	His	Val	Gln	Pro	Met	
				85				90						95		
att	gcc	gcg	ctg	ggc	gtg	ctg	ttt	ttt	ctg	gaa	gcc	ggg	gtg	cag	ctc	336
Ile	Ala	Ala	Leu	Gly	Val	Leu	Phe	Phe	Leu	Glu	Ala	Gly	Val	Gln	Leu	
			100				105						110			
atc	tgg	ggc	gcc	gac	ttc	aag	cag	gtg	gcc	gag	cca	atc	cca	ggc	atc	384
Ile	Trp	Gly	Ala	Asp	Phe	Lys	Gln	Val	Ala	Glu	Pro	Ile	Pro	Gly	Ile	
	115						120					125				
ctc	aat	atc	ggc	ggc	gtc	acg	atc	acc	tgg	cag	cgc	ctg	atc	gtg	ctc	432
Leu	Asn	Ile	Gly	Gly	Val	Thr	Ile	Thr	Trp	Gln	Arg	Leu	Ile	Val	Leu	
130						135				140						
gtc	gcc	agc	gtg	gtc	gcc	atg	ctg	ggg	ctg	aac	ttc	ctg	cgc	cgc		480
Val	Ala	Ser	Val	Val	Ala	Met	Leu	Gly	Leu	Asn	Phe	Phe	Leu	Arg	Arg	
145					150					155					160	
acc	ctg	acc	ggc	gcc	acc	atc	gag	gcg	atg	gcg	caa	aac	cgt	gag	ggc	528
Thr	Leu	Thr	Gly	Ala	Thr	Ile	Glu	Ala	Met	Ala	Gln	Asn	Arg	Glu	Gly	
			165					170						175		
gca	cgg	ctc	gtc	ggc	atc	aac	acc	ggg	gtc	ggg	atg	ctc	acc	ttc		576
Ala	Arg	Leu	Val	Gly	Ile	Asn	Thr	Gly	Arg	Val	Gly	Met	Leu	Thr	Phe	
			180					185					190			
gcc	atc	tcg	ggg	gca	ctc	gcg	gcc	atc	ggg	gca	tct	ctc	atc	gcg	ccc	624
Ala	Ile	Ser	Gly	Ala	Leu	Ala	Ala	Ile	Gly	Ala	Ser	Leu	Ile	Ala	Pro	
		195					200					205				
atc	gtg	tcg	gtc	acc	ccg	gcg	atg	ggt	gaa	atc	atg	aac	ctc	aag	gtc	672
Ile	Val	Ser	Val	Thr	Pro	Ala	Met	Gly	Glu	Ile	Met	Asn	Leu	Lys	Val	
	210					215					220					
ttc	gcc	atc	atc	atc	ctg	ggc	ggc	atg	ggc	agc	att	ccc	ggc	gcc	atc	720
Phe	Ala	Ile	Ile	Ile	Leu	Gly	Gly	Met	Gly	Ser	Ile	Pro	Gly	Ala	Ile	
225					230					235					240	
gtg	ggg	gct	ttt	ttg	ctc	gcc	ttc	gct	gaa	gtg	ttc	ggc	ggc	tac	atc	768
Val	Gly	Ala	Phe	Leu	Leu	Ala	Phe	Ala	Glu	Val	Phe	Gly	Gly	Tyr	Ile	
			245					250						255		
aac	ctc	gac	ttt	gct	gag	gtc	atc	ggc	ttc	gcg	gtg	ctg	gtg	gtc	gtg	816
Asn	Leu	Asp	Phe	Ala	Glu	Val	Ile	Gly	Phe	Ala	Val	Leu	Val	Val	Val	
			260					265					270			
ctc	gcc	att	cgt	ccg	cag	ggc	ctg	ttc	cgg	agg	gcc	gca	tga			858
Leu	Ala	Ile	Arg	Pro	Gln	Gly	Leu	Phe	Arg	Arg	Ala	Ala				
	275						280					285				

<210> 509

<211> 285

<212> PRT

<213> Deinococcus radiodurans

<400> 509

Met	Thr	Thr	Val	Leu	Gln	Gln	Leu	Phe	Asn	Ala	Leu	Ala	Leu	Gly	Gly	
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Val	Tyr	Ala	Leu	Val	Ala	Leu	Gly	Leu	Thr	Leu	Val	Tyr	Gly	Val	Met	
			20					25					30			
Lys	Ile	Pro	Asn	Phe	Ala	His	Gly	Gly	Leu	Tyr	Met	Leu	Gly	Ala	Tyr	
		35					40					45				
Leu	Ser	Tyr	Ala	Gly	Ile	Ser	Ser	Leu	Gly	Leu	Gly	Tyr	Val	Pro	Ala	
	50					55					60					
Leu	Leu	Leu	Ser	Ala	Val	Val	Val	Ala	Leu	Leu	Ala	Ala	Leu	Met	Glu	
65				70				75							80	
Arg	Val	Ile	Phe	Phe	Pro	Leu	Arg	Asn	Ala	Pro	His	Val	Gln	Pro	Met	
				85				90						95		

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Ile Ala Ala Leu Gly Val Leu Phe Phe Leu Glu Ala Gly Val Gln Leu
 100 105 110
 Ile Trp Gly Ala Asp Phe Lys Gln Val Ala Glu Pro Ile Pro Gly Ile
 115 120 125
 Leu Asn Ile Gly Gly Val Thr Ile Thr Trp Gln Arg Leu Ile Val Leu
 130 135 140
 Val Ala Ser Val Val Ala Met Leu Gly Leu Asn Phe Phe Leu Arg Arg
 145 150 155 160
 Thr Leu Thr Gly Ala Thr Ile Glu Ala Met Ala Gln Asn Arg Glu Gly
 165 170 175
 Ala Arg Leu Val Gly Ile Asn Thr Gly Arg Val Gly Met Leu Thr Phe
 180 185 190
 Ala Ile Ser Gly Ala Leu Ala Ala Ile Gly Ala Ser Leu Ile Ala Pro
 195 200 205
 Ile Val Ser Val Thr Pro Ala Met Gly Glu Ile Met Asn Leu Lys Val
 210 215 220
 Phe Ala Ile Ile Ile Leu Gly Gly Met Gly Ser Ile Pro Gly Ala Ile
 225 230 235 240
 Val Gly Ala Phe Leu Ala Phe Ala Glu Val Phe Gly Gly Tyr Ile
 245 250 255
 Asn Leu Asp Phe Ala Glu Val Ile Gly Phe Ala Val Leu Val Val Val
 260 265 270
 Leu Ala Ile Arg Pro Gln Gly Leu Phe Arg Arg Ala Ala
 275 280 285

<210> 510

<211> 1053

<212> DNA

<213> Campylobacter jejuni

<220>

<221> CDS

<222> (1)..(1053)

<400> 510

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att att ttt att ttc att tct cct tat att ttt ggg gat tat gga tta	96
Ile Ile Phe Ile Phe Ile Ser Pro Tyr Ile Phe Gly Asp Tyr Gly Leu	
20 25 30	
aac att gtt aat caa att gct att ttt att att ttg gct gtg agt tac	144
Asn Ile Val Asn Gln Ile Ala Ile Phe Ile Ile Leu Ala Val Ser Tyr	
35 40 45	
aat ctt att aat ggt gta act gga caa ttt tca cta gaa ccc aat gga	192
Asn Leu Ile Asn Gly Val Thr Gly Gln Phe Ser Leu Glu Pro Asn Gly	
50 55 60	
ttt gtt gcg att gga gct tat gcg gct gct tta gtt ctt tta agt gct	240
Phe Val Ala Ile Gly Ala Tyr Ala Ala Ala Leu Val Leu Leu Ser Ala	
65 70 75 80	
gat gca aaa aat gat cag ttt ttt tta gat ggt cct agt tct ttt att	288
Asp Ala Lys Asn Asp Gln Phe Phe Leu Asp Gly Pro Ser Ser Phe Ile	
85 90 95	
tta gct atc cat tca aat tcc ttt att cta gct tta att gtg gct gga	336
Leu Ala Ile His Ser Asn Ser Phe Ile Leu Ala Leu Ile Val Ala Gly	
100 105 110	
att tgt tca tct tta ctt gcc ctg att ttg gct ttt gct gta ttt cgc	384
Ile Cys Ser Ser Leu Leu Ala Leu Ile Leu Ala Phe Ala Val Phe Arg	
115 120 125	
gtg aga ggg gat tat ttg gct att gta act tta ggc ttt gga ata att	432
Val Arg Gly Asp Tyr Leu Ala Ile Val Thr Leu Gly Phe Gly Ile Ile	
130 135 140	
att aaa ata gct gct att aat ttt cct tct att act aat ggc tca aga	480
Ile Lys Ile Ala Ala Ile Asn Phe Pro Ser Ile Thr Asn Gly Ser Arg	
145 150 155 160	
ggg ctg gta gat att cca caa ttt tcc acg atc tat tgg aca ggt ggt	528
Gly Leu Val Asp Ile Pro Gln Phe Ser Thr Ile Tyr Trp Thr Gly Gly	
165 170 175	
att gct att gta gcg gtt att tta att tta aat ata gtt tat tct aaa	576

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Ile	Ala	Ile	Val	Ala	Val	Ile	Leu	Ile	Leu	Asn	Ile	Val	Tyr	Ser	Lys	
tat	ggt	cgt	gca	atg	aag	gct	ata	aga	gat	gat	gaa	gat	gct	gca	agc	624
Tyr	Gly	Arg	Ala	Met	Lys	Ala	Ile	Arg	Asp	Asp	Glu	Asp	Ala	Ala	Ser	
		195					200					205				
gct	atg	gga	ata	aat	act	ttt	tgg	ata	aaa	act	tta	gct	ttt	agc	act	672
Ala	Met	Gly	Ile	Asn	Thr	Phe	Trp	Ile	Lys	Thr	Leu	Ala	Phe	Ser	Thr	
		210					215				220					
tca	gca	ttt	tta	gaa	ggt	gta	ggt	ggc	gga	ctt	tta	gct	tgt	ctg	ttg	720
Ser	Ala	Phe	Leu	Glu	Gly	Val	Gly	Gly	Gly	Leu	Leu	Ala	Cys	Leu	Leu	
225					230					235					240	
act	acc	gta	tct	cca	act	caa	ttt	gat	ttt	tta	ctt	act	ttt	cag	ctt	768
Thr	Thr	Val	Ser	Pro	Thr	Gln	Phe	Asp	Phe	Leu	Leu	Thr	Phe	Gln	Leu	
				245					250					255		
ttg	att	att	att	gtt	tta	ggt	gga	ctt	ggt	tct	act	aca	ggt	gct	att	816
Leu	Ile	Ile	Ile	Val	Leu	Gly	Gly	Leu	Gly	Ser	Thr	Thr	Gly	Ala	Ile	
			260					265					270			
ata	ggt	gcg	ata	ttg	gtt	att	ggt	gga	agt	gag	tgg	ctt	aga	ttt	tta	864
Ile	Gly	Ala	Ile	Leu	Val	Ile	Gly	Gly	Ser	Glu	Trp	Leu	Arg	Phe	Leu	
		275					280					285				
gat	gag	tta	aat	ata	aaa	ata	gat	tct	tta	aat	ctt	gat	atc	caa	tca	912
Asp	Glu	Leu	Asn	Ile	Lys	Ile	Asp	Ser	Leu	Asn	Leu	Asp	Ile	Gln	Ser	
		290				295					300					
acg	cca	ggg	ctt	aga	atg	gtt	ttt	tct	att	gtt	ctg	att	tta	gta		960
Thr	Pro	Gly	Leu	Arg	Met	Val	Val	Phe	Ser	Ile	Val	Leu	Ile	Leu	Val	
305					310					315					320	
atg	ctt	ttt	gca	aga	aaa	ggc	ata	atg	ggt	tat	tat	gag	ttg	agt	gat	1008
Met	Leu	Phe	Ala	Arg	Lys	Gly	Ile	Met	Gly	Tyr	Tyr	Glu	Leu	Ser	Asp	
			325						330					335		
gtg	att	aga	ggg	att	aaa	aag	cgt	ttt	aaa	agg	agc	aaa	aaa	tga		1053
Val	Ile	Arg	Gly	Ile	Lys	Lys	Arg	Phe	Lys	Arg	Ser	Lys	Lys			
			340					345					350			

<210> 511

<211> 350

<212> PRT

<213> Campylobacter jejuni

<400> 511

Met	Met	Val	Arg	Ile	Lys	Val	Ser	His	Leu	Ile	Phe	Leu	Ile	Ala	Ser	
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Ile	Ile	Phe	Ile	Phe	Ile	Ser	Pro	Tyr	Ile	Phe	Gly	Asp	Tyr	Gly	Leu	
			20					25					30			
Asn	Ile	Val	Asn	Gln	Ile	Ala	Ile	Phe	Ile	Ile	Leu	Ala	Val	Ser	Tyr	
		35					40					45				
Asn	Leu	Ile	Asn	Gly	Val	Thr	Gly	Gln	Phe	Ser	Leu	Glu	Pro	Asn	Gly	
	50					55					60					
Phe	Val	Ala	Ile	Gly	Ala	Tyr	Ala	Ala	Ala	Leu	Val	Leu	Leu	Ser	Ala	
65					70					75					80	
Asp	Ala	Lys	Asn	Asp	Gln	Phe	Phe	Leu	Asp	Gly	Pro	Ser	Ser	Phe	Ile	
			85						90					95		
Leu	Ala	Ile	His	Ser	Asn	Ser	Phe	Ile	Leu	Ala	Leu	Ile	Val	Ala	Gly	
			100					105					110			
Ile	Cys	Ser	Ser	Leu	Leu	Ala	Leu	Ile	Leu	Ala	Phe	Ala	Val	Phe	Arg	
	115						120					125				
Val	Arg	Gly	Asp	Tyr	Leu	Ala	Ile	Val	Thr	Leu	Gly	Phe	Gly	Ile	Ile	
	130					135					140					
Ile	Lys	Ile	Ala	Ala	Ile	Asn	Phe	Pro	Ser	Ile	Thr	Asn	Gly	Ser	Arg	
145					150					155					160	
Gly	Leu	Val	Asp	Ile	Pro	Gln	Phe	Ser	Thr	Ile	Tyr	Trp	Thr	Gly	Gly	
			165						170					175		
Ile	Ala	Ile	Val	Ala	Val	Ile	Leu	Ile	Leu	Asn	Ile	Val	Tyr	Ser	Lys	
			180					185					190			
Tyr	Gly	Arg	Ala	Met	Lys	Ala	Ile	Arg	Asp	Asp	Glu	Asp	Ala	Ala	Ser	
		195					200					205				
Ala	Met	Gly	Ile	Asn	Thr	Phe	Trp	Ile	Lys	Thr	Leu	Ala	Phe	Ser	Thr	
	210					215					220					
Ser	Ala	Phe	Leu	Glu	Gly	Val	Gly	Gly	Gly	Leu	Leu	Ala	Cys	Leu	Leu	240
225					230					235						

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Thr	Thr	Val	Ser	Pro	Thr	Gln	Phe	Asp	Phe	Leu	Leu	Thr	Phe	Gln	Leu
Leu	Ile	Ile	Ile	Val	Leu	Gly	Gly	Leu	Gly	Ser	Thr	Thr	Gly	Ala	Ile
Ile	Gly	Ala	Ile	Leu	Val	Ile	Gly	Gly	Ser	Glu	Trp	Leu	Arg	Phe	Leu
Asp	Glu	Leu	Asn	Ile	Lys	Ile	Asp	Ser	Leu	Asn	Leu	Asp	Ile	Gln	Ser
Thr	Pro	Gly	Leu	Arg	Met	Val	Val	Phe	Ser	Ile	Val	Leu	Ile	Leu	Val
Met	Leu	Phe	Ala	Arg	Lys	Gly	Ile	Met	Gly	Tyr	Tyr	Glu	Leu	Ser	Asp
Val	Ile	Arg	Gly	Ile	Lys	Lys	Arg	Phe	Lys	Arg	Ser	Lys	Lys		

<210> 512

<211> 918

<212> DNA

<213> Sulfolobus solfataricus

<220>

<221> CDS

<222> (1)..(918)

<400> 512

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1				5				10						15		
ggt	tta	tca	agt	ctc	tcc	cta	act	tta	act	tac	tta	aca	act	aaa	gta	96
Gly	Leu	Ser	Ser	Leu	Ser	Leu	Thr	Leu	Thr	Tyr	Leu	Thr	Thr	Lys	Val	
			20					25						30		
cct	aat	ttc	gct	cac	ggt	atc	ttt	ctg	ttg	ttt	ggt	tcc	tat	atg	acc	144
Pro	Asn	Phe	Ala	His	Gly	Ile	Phe	Leu	Leu	Phe	Gly	Ser	Tyr	Met	Thr	
			35				40					45				
ttt	acc	ata	gcc	gaa	gtc	tta	aaa	cag	aat	ccg	tac	att	tcg	cta	cct	192
Phe	Thr	Ile	Ala	Glu	Val	Leu	Lys	Gln	Asn	Pro	Tyr	Ile	Ser	Leu	Pro	
			50			55					60					
atc	gca	ttc	tta	tta	ggt	ggg	gca	att	gca	tta	ctc	caa	tac	tat	ggt	240
Ile	Ala	Phe	Leu	Leu	Gly	Gly	Ala	Ile	Ala	Leu	Leu	Gln	Tyr	Tyr	Gly	
			65		70					75				80		
gtg	tta	ctg	ccg	tta	agt	atg	aga	ggt	ggc	ggt	tta	gta	tca	caa	atg	288
Val	Leu	Leu	Pro	Leu	Ser	Met	Arg	Gly	Gly	Gly	Leu	Val	Ser	Gln	Met	
				85				90						95		
gtt	gct	act	cta	gcc	ttt	tcc	att	tta	ctg	tat	gga	gga	tta	aac	gca	336
Val	Ala	Thr	Leu	Ala	Phe	Ser	Ile	Leu	Leu	Tyr	Gly	Gly	Leu	Asn	Ala	
			100					105					110			
tat	gca	agt	tat	ctt	ggc	tat	gtg	tat	aat	gtg	caa	tct	aga	gat	gta	384
Tyr	Ala	Ser	Tyr	Leu	Gly	Tyr	Val	Tyr	Asn	Val	Gln	Ser	Arg	Asp	Val	
			115				120					125				
acg	cta	gga	ttc	tta	gat	tac	gaa	ata	gga	ggg	att	aga	gct	ggt	ttc	432
Thr	Leu	Gly	Phe	Leu	Asp	Tyr	Glu	Ile	Gly	Gly	Ile	Arg	Ala	Val	Phe	
			130			135					140					
cta	att	tcc	atc	atc	tta	gca	ata	gca	ttc	ata	ctc	tca	ctt	tat	atc	480
Leu	Ile	Ser	Ile	Ile	Leu	Ala	Ile	Ala	Phe	Ile	Leu	Ser	Leu	Tyr	Ile	
			145			150				155					160	
ttc	ttg	aat	aag	act	aga	tta	gga	ata	tcc	att	agg	gct	aca	ggt	gag	528
Phe	Leu	Asn	Lys	Thr	Arg	Leu	Gly	Ile	Ser	Ile	Arg	Ala	Thr	Val	Glu	
				165				170						175		
aac	tcg	tca	cta	gct	gaa	agc	atg	ggt	ata	aac	acg	aaa	cta	ggt	aag	576
Asn	Ser	Ser	Leu	Ala	Glu	Ser	Met	Gly	Ile	Asn	Thr	Lys	Leu	Val	Lys	
			180					185				190				
gcg	att	tct	tgg	ttt	tta	gct	gga	ggt	ata	gca	agt	act	gcc	ggc	tcc	624
Ala	Ile	Ser	Trp	Phe	Leu	Ala	Gly	Gly	Ile	Ala	Ser	Thr	Ala	Gly	Ser	
			195				200					205				
tta	tat	cct	cta	caa	ttt	gta	ttt	tca	cct	aca	tta	gcg	tac	tcg	ata	672
Leu	Tyr	Pro	Leu	Gln	Phe	Val	Phe	Ser	Pro	Thr	Leu	Ala	Tyr	Ser	Ile	
			210			215					220					
tta	cta	agt	ata	ttc	gca	gca	agt	gta	cta	gga	ggt	cta	atg	agc	cta	720
Leu	Leu	Ser	Ile	Phe	Ala	Ala	Ser	Val	Leu	Gly	Gly	Leu	Met	Ser	Leu	

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225	ttc	ggt	gga	ttc	att	230	ggt	gga	ttc	att	gag	235	gga	ttc	ata	gaa	aaa	240		
	Phe	Gly	Gly	Phe	Ile	Gly	Gly	Gly	Phe	Ile	Glu	Gly	Phe	Ile	Glu	Lys	Tyr			768
					245						250					255				
	atc	atg	act	gaa	tta	tca	atc	tat	ctg	tct	cca	cta	ata	gga	gtg	agt			816	
	Ile	Met	Thr	Glu	Leu	Ser	Ile	Tyr	Leu	Ser	Pro	Leu	Ile	Gly	Val	Ser				
				260					265					270						
	cct	ttc	gtt	att	aac	cag	tat	tca	aca	ctg	ggt	cct	ctt	ata	gta	gta			864	
	Pro	Phe	Val	Ile	Asn	Gln	Tyr	Ser	Thr	Leu	Val	Pro	Leu	Ile	Val	Val				
			275					280					285							
	gca	gca	gtt	ctc	ctg	ata	gct	cca	aac	gga	att	atg	gga	gtg	agg	gtg			912	
	Ala	Ala	Val	Leu	Leu	Ile	Ala	Pro	Asn	Gly	Ile	Met	Gly	Val	Arg	Val				
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	aaa	taa																	918	
	Lys																			
	305																			

<210> 513

<211> 305

<212> PRT

<213> Sulfolobus solfataricus

<400> 513

Met	Ile	Asp	Pro	Leu	Ile	Ile	Asn	Thr	Ile	Val	Tyr	Gly	Ser	Ile	Leu
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Gly	Leu	Ser	Ser	Leu	Ser	Leu	Thr	Leu	Thr	Tyr	Leu	Thr	Thr	Lys	Val
			20					25					30		
Pro	Asn	Phe	Ala	His	Gly	Ile	Phe	Leu	Leu	Phe	Gly	Ser	Tyr	Met	Thr
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Phe	Thr	Ile	Ala	Glu	Val	Leu	Lys	Gln	Asn	Pro	Tyr	Ile	Ser	Leu	Pro
	50					55					60				
Ile	Ala	Phe	Leu	Leu	Gly	Gly	Ala	Ile	Ala	Leu	Leu	Gln	Tyr	Tyr	Gly
65					70					75				80	
Val	Leu	Leu	Pro	Leu	Ser	Met	Arg	Gly	Gly	Gly	Leu	Val	Ser	Gln	Met
				85				90						95	
Val	Ala	Thr	Leu	Ala	Phe	Ser	Ile	Leu	Leu	Tyr	Gly	Gly	Leu	Asn	Ala
			100					105					110		
Tyr	Ala	Ser	Tyr	Leu	Gly	Tyr	Val	Tyr	Asn	Val	Gln	Ser	Arg	Asp	Val
		115					120					125			
Thr	Leu	Gly	Phe	Leu	Asp	Tyr	Glu	Ile	Gly	Gly	Ile	Arg	Ala	Val	Phe
	130					135					140				
Leu	Ile	Ser	Ile	Ile	Leu	Ala	Ile	Ala	Phe	Ile	Leu	Ser	Leu	Tyr	Ile
145					150					155				160	
Phe	Leu	Asn	Lys	Thr	Arg	Leu	Gly	Ile	Ser	Ile	Arg	Ala	Thr	Val	Glu
			165						170					175	
Asn	Ser	Ser	Leu	Ala	Glu	Ser	Met	Gly	Ile	Asn	Thr	Lys	Leu	Val	Lys
			180					185					190		
Ala	Ile	Ser	Trp	Phe	Leu	Ala	Gly	Gly	Ile	Ala	Ser	Thr	Ala	Gly	Ser
		195					200					205			
Leu	Tyr	Pro	Leu	Gln	Phe	Val	Phe	Ser	Pro	Thr	Leu	Ala	Tyr	Ser	Ile
	210					215					220				
Leu	Leu	Ser	Ile	Phe	Ala	Ala	Ser	Val	Leu	Gly	Gly	Leu	Met	Ser	Leu
225					230					235					240
Phe	Gly	Gly	Phe	Ile	Gly	Gly	Phe	Ile	Glu	Gly	Phe	Ile	Glu	Lys	Tyr
				245					250					255	
Ile	Met	Thr	Glu	Leu	Ser	Ile	Tyr	Leu	Ser	Pro	Leu	Ile	Gly	Val	Ser
			260					265					270		
Pro	Phe	Val	Ile	Asn	Gln	Tyr	Ser	Thr	Leu	Val	Pro	Leu	Ile	Val	Val
		275					280					285			
Ala	Ala	Val	Leu	Leu	Ile	Ala	Pro	Asn	Gly	Ile	Met	Gly	Val	Arg	Val
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Lys															
305															

<210> 514

<211> 1050

<212> DNA

<213> Deinococcus radiodurans

<220>

<221> CDS

<222> (1)..(1050)

<400> 514

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1				5					10					15		
ctg	acg	aac	ggc	gcg	gtg	tac	gcg	ctg	ctt	tcg	ctg	gcg	ctg	gtg	ctg	96
Leu	Thr	Asn	Gly	Ala	Val	Tyr	Ala	Leu	Leu	Ser	Leu	Ala	Leu	Val	Leu	
			20					25					30			
gtg	ttt	gcc	gtg	acc	cgc	gtg	att	ttt	att	ccg	cag	ggc	gaa	ttc	gtg	144
Val	Phe	Ala	Val	Thr	Arg	Val	Ile	Phe	Ile	Pro	Gln	Gly	Glu	Phe	Val	
		35					40					45				
atg	ttc	ggg	gcg	ctg	acg	ctg	gcg	agc	ctg	caa	gca	gga	aag	gtg	ccc	192
Met	Phe	Gly	Ala	Leu	Thr	Leu	Ala	Ser	Leu	Gln	Ala	Gly	Lys	Val	Pro	
	50					55				60						
ggc	acg	ctg	aaa	ctg	gta	ctg	gcg	ctg	ctc	gcc	ctg	agc	gtg	att	ctg	240
Gly	Thr	Leu	Lys	Leu	Val	Leu	Ala	Leu	Leu	Ala	Leu	Ser	Val	Ile	Leu	
	65				70				75						80	
aac	gtg	gta	cag	tcg	ctg	cgc	gcc	ggg	cac	act	caa	gcg	gcg	ctg	cga	288
Asn	Val	Val	Gln	Ser	Leu	Arg	Ala	Gly	His	Thr	Gln	Ala	Ala	Leu	Arg	
			85					90						95		
agt	gtc	ctg	att	ggc	ctg	ggc	gcc	tgg	gcg	ctg	ctg	tgg	gcg	ctg	acc	336
Ser	Val	Leu	Ile	Gly	Leu	Gly	Ala	Trp	Ala	Leu	Leu	Trp	Ala	Leu	Thr	
			100					105					110			
ggc	tgg	ctc	gcg	ccg	ctc	aag	gcg	cca	ctg	gcg	gtg	cag	gtg	ctg	ctg	384
Gly	Trp	Leu	Ala	Pro	Leu	Lys	Ala	Pro	Leu	Ala	Val	Gln	Val	Leu	Leu	
	115						120					125				
acg	ctg	ctg	ctc	gtc	gtg	ccg	ctg	ggg	ccg	ctg	ctt	tac	cgc	gtg	gtg	432
Thr	Leu	Leu	Leu	Val	Val	Pro	Leu	Gly	Pro	Leu	Leu	Tyr	Arg	Val	Val	
	130					135					140					
tac	cag	ccg	ctt	cgc	aac	gcc	acc	gtg	ctg	gtg	ctg	ctc	atc	gcc	tcg	480
Tyr	Gln	Pro	Leu	Arg	Asn	Ala	Thr	Val	Leu	Val	Leu	Leu	Ile	Ala	Ser	
	145				150				155						160	
gtc	gcg	ctg	cac	ctc	gcg	ctc	acc	ggg	ctg	ggg	ctt	gcg	ttc	ttc	ggc	528
Val	Ala	Leu	His	Leu	Ala	Leu	Thr	Gly	Leu	Gly	Leu	Ala	Phe	Phe	Gly	
			165					170						175		
gcc	gag	ggc	agc	aac	acg	ccc	gcc	ttc	gtc	agc	ggt	gat	ctc	cac	atc	576
Ala	Glu	Gly	Ser	Asn	Thr	Pro	Ala	Phe	Val	Ser	Gly	Asp	Leu	His	Ile	
			180					185					190			
ggc	agc	ttt	tcg	ctg	agt	tac	cag	aac	ctg	ctc	gtc	atg	gtc	gtt	tcg	624
Gly	Ser	Phe	Ser	Leu	Ser	Tyr	Gln	Asn	Leu	Leu	Val	Met	Val	Val	Ser	
	195						200					205				
ctg	gcg	ctg	atg	gcg	ggc	ctc	gcc	gtc	ttt	ttc	gag	cgc	acg	ctg	ctc	672
Leu	Ala	Leu	Met	Ala	Gly	Leu	Ala	Val	Phe	Phe	Glu	Arg	Thr	Leu	Leu	
	210				215						220					
ggc	aag	gcg	ctg	cgg	gcc	acc	gcc	gtg	aac	cgg	ctg	ggc	gcg	cgg	ctg	720
Gly	Lys	Ala	Leu	Arg	Ala	Thr	Ala	Val	Asn	Arg	Leu	Gly	Ala	Arg	Leu	
	225			230				235						240		
gtg	ggc	att	cgg	ccc	gag	ttc	gcc	ggg	tca	ctc	gcc	ttt	acg	gtg	gcg	768
Val	Gly	Ile	Arg	Pro	Glu	Phe	Ala	Gly	Ser	Leu	Ala	Phe	Thr	Val	Ala	
			245					250					255			
gcc	ttg	atg	ggc	gtg	ctg	agc	ggc	ctg	ctc	atc	ggc	ccc	aag	ttc	ccc	816
Ala	Leu	Met	Gly	Val	Leu	Ser	Gly	Leu	Leu	Ile	Gly	Pro	Lys	Phe	Pro	
			260				265					270				
atc	ggg	tac	gac	acc	ggc	ttc	ctc	atc	ggt	ctc	aag	ggc	ttt	gtc	ggc	864
Ile	Gly	Tyr	Asp	Thr	Gly	Phe	Leu	Ile	Gly	Leu	Lys	Gly	Phe	Val	Gly	
		275					280					285				
gcg	att	atc	ggc	ggg	ctg	gcg	tct	ttt	ccg	ctg	gcc	gcc	atc	ggg	gcg	912
Ala	Ile	Ile	Gly	Gly	Leu	Ala	Ser	Phe	Pro	Leu	Ala	Ala	Ile	Gly	Ala	
	290				295					300						
ctg	ctg	gtg	ggc	ctc	atc	gag	agt	tac	gcc	agt	ttc	agc	ctc	agc	cag	960
Leu	Leu	Val	Gly	Leu	Ile	Glu	Ser	Tyr	Ala	Ser	Phe	Ser	Leu	Ser	Gln	
	305				310				315						320	
tgg	aaa	gaa	gtc	atc	gtg	ttc	acc	ctg	att	ttg	ccg	gtg	ctg	ctg	tgg	1008
Trp	Lys	Glu	Val	Ile	Val	Phe	Thr	Leu	Ile	Leu	Pro	Val	Leu	Leu	Trp	
			325					330					335			
cgt	tcc	ctc	tcc	acc	cgg	cac	cat	gac	gag	gag	gaa	gag	tga			1050

Arg Ser Leu Ser Thr Arg His His Asp Glu Glu Glu Glu
 340 345

<210> 515

<211> 349

<212> PRT

<213> Deinococcus radiodurans

<400> 515

Met Asp Ile Phe Asp Pro Thr Ile Phe Pro Ile Leu Thr Thr Asp Gly
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 Leu Thr Asn Gly Ala Val Tyr Ala Leu Leu Ser Leu Ala Leu Val Leu
 20 25 30
 Val Phe Ala Val Thr Arg Val Ile Phe Ile Pro Gln Gly Glu Phe Val
 35 40 45
 Met Phe Gly Ala Leu Thr Leu Ala Ser Leu Gln Ala Gly Lys Val Pro
 50 55 60
 Gly Thr Leu Lys Leu Val Leu Ala Leu Leu Ala Leu Ser Val Ile Leu
 65 70 75 80
 Asn Val Val Gln Ser Leu Arg Ala Gly His Thr Gln Ala Ala Leu Arg
 85 90 95
 Ser Val Leu Ile Gly Leu Gly Ala Trp Ala Leu Leu Trp Ala Leu Thr
 100 105 110
 Gly Trp Leu Ala Pro Leu Lys Ala Pro Leu Ala Val Gln Val Leu Leu
 115 120 125
 Thr Leu Leu Leu Val Val Pro Leu Gly Pro Leu Leu Tyr Arg Val Val
 130 135 140
 Tyr Gln Pro Leu Arg Asn Ala Thr Val Leu Val Leu Leu Ile Ala Ser
 145 150 155 160
 Val Ala Leu His Leu Ala Leu Thr Gly Leu Gly Leu Ala Phe Phe Gly
 165 170 175
 Ala Glu Gly Ser Asn Thr Pro Ala Phe Val Ser Gly Asp Leu His Ile
 180 185 190
 Gly Ser Phe Ser Leu Ser Tyr Gln Asn Leu Leu Val Met Val Val Ser
 195 200 205
 Leu Ala Leu Met Ala Gly Leu Ala Val Phe Phe Glu Arg Thr Leu Leu
 210 215 220
 Gly Lys Ala Leu Arg Ala Thr Ala Val Asn Arg Leu Gly Ala Arg Leu
 225 230 235 240
 Val Gly Ile Arg Pro Glu Phe Ala Gly Ser Leu Ala Phe Thr Val Ala
 245 250 255
 Ala Leu Met Gly Val Leu Ser Gly Leu Leu Ile Gly Pro Lys Phe Pro
 260 265 270
 Ile Gly Tyr Asp Thr Gly Phe Leu Ile Gly Leu Lys Gly Phe Val Gly
 275 280 285
 Ala Ile Ile Gly Gly Leu Ala Ser Phe Pro Leu Ala Ala Ile Gly Ala
 290 295 300
 Leu Leu Val Gly Leu Ile Glu Ser Tyr Ala Ser Phe Ser Leu Ser Gln
 305 310 315 320
 Trp Lys Glu Val Ile Val Phe Thr Leu Ile Leu Pro Val Leu Leu Trp
 325 330 335
 Arg Ser Leu Ser Thr Arg His His Asp Glu Glu Glu Glu
 340 345

<210> 516

<211> 903

<212> DNA

<213> Deinococcus radiodurans

<220>

<221> CDS

<222> (1)..(903)

<400> 516

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 Met Asp Leu Thr Phe Leu Ala Asn Gln Leu Phe Thr Gly Leu Ser Val
 1 5 10 15
 gcg tcc atc ctg ctg ctg gcg gcg ctg ggg ctg gcg ctg acc ttc ggg
 Ala Ser Ile Leu Leu Leu Ala Ala Leu Gly Leu Ala Leu Thr Phe Gly
 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95

48

96

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ctg	atg	cgg	gtc	atc	aac	atg	gcg	cac	ggc	gaa	ttt	ctg	atg	gtg	ggc	144
Leu	Met	Arg	Val	Ile	Asn	Met	Ala	His	Gly	Glu	Phe	Leu	Met	Val	Gly	
		35					40					45				
ggt	tac	ctg	acc	tac	ctc	gcg	gcc	cgc	tgg	acc	ggc	ccc	ggc	ctg	ggc	192
Gly	Tyr	Leu	Thr	Tyr	Leu	Ala	Ala	Arg	Trp	Thr	Gly	Pro	Ala	Leu	Gly	
	50					55					60					
gac	ggc	tac	ctg	tgg	gtc	gct	ttt	ccg	ctc	gcc	ttc	gtg	ggc	acg	gcg	240
Asp	Gly	Tyr	Leu	Trp	Val	Ala	Phe	Pro	Leu	Ala	Phe	Val	Gly	Thr	Ala	
	65				70					75					80	
ctg	ctg	ggc	gcc	ctg	ctg	gaa	gtg	ctg	gtc	atc	cgg	cgg	ctc	tac	ggg	288
Leu	Leu	Gly	Ala	Leu	Leu	Glu	Val	Leu	Val	Ile	Arg	Arg	Leu	Tyr	Gly	
				85					90					95		
cgc	ccg	ctc	gac	acg	ctg	ctg	gca	acc	ttc	ggc	atc	agc	ttg	atc	ctg	336
Arg	Pro	Leu	Asp	Thr	Leu	Leu	Ala	Thr	Phe	Gly	Ile	Ser	Leu	Ile	Leu	
			100					105					110			
caa	cag	gcc	gcg	cgg	cag	gtg	ttc	ggc	agc	acg	ggc	gtg	ccg	gtc	acg	384
Gln	Gln	Ala	Ala	Arg	Gln	Val	Phe	Gly	Ser	Thr	Gly	Val	Pro	Val	Thr	
		115					120					125				
gct	ccc	gcc	tgg	ctg	tcg	ggc	agc	gtg	acg	ctg	ggc	gcc	gtg	acc	atg	432
Ala	Pro	Ala	Trp	Leu	Ser	Gly	Ser	Val	Thr	Leu	Gly	Ala	Val	Thr	Met	
	130					135					140					
ccg	ggc	agc	cgc	ctg	ttc	gtc	atc	gcg	ctt	tcc	ctg	ctg	gtg	atc	ggc	480
Pro	Gly	Ser	Arg	Leu	Phe	Val	Ile	Ala	Leu	Ser	Leu	Leu	Val	Ile	Gly	
	145				150					155					160	
gcg	gtg	tgg	tgg	ctg	ctc	tcg	cgc	acc	cgc	ttc	ggc	atg	gtg	gtg	cgg	528
Ala	Val	Trp	Trp	Leu	Leu	Ser	Arg	Thr	Arg	Phe	Gly	Met	Val	Val	Arg	
				165					170					175		
gcg	gtc	aac	cag	aac	cgt	gag	atg	gcg	gcg	gcg	ctg	ggc	gtc	aac	acc	576
Ala	Val	Asn	Gln	Asn	Arg	Glu	Met	Ala	Ala	Ala	Leu	Gly	Val	Asn	Thr	
			180					185					190			
cgg	gca	ctc	gac	ctg	ctc	gtc	ttt	tcc	ctc	ggc	gcg	ggc	att	gcg	ggg	624
Arg	Ala	Leu	Asp	Leu	Leu	Val	Phe	Ser	Leu	Gly	Ala	Gly	Ile	Ala	Gly	
		195					200					205				
gtg	gcg	ggc	gtg	ggc	ctc	gcg	ctg	ctt	gcc	cca	gtt	aac	cct	acc	gtc	672
Val	Ala	Gly	Val	Gly	Leu	Ala	Leu	Leu	Ala	Pro	Val	Asn	Pro	Thr	Val	
	210					215					220					
ggc	gcg	gcg	tac	atg	gtc	aat	gcc	ttt	ctc	gtc	gtg	gtg	gtc	ggc	ggc	720
Gly	Ala	Ala	Tyr	Met	Val	Asn	Ala	Phe	Leu	Val	Val	Val	Val	Gly	Gly	
	225				230					235					240	
gtg	ggc	agc	gtg	ctc	ggc	gcg	ggc	gtc	gcg	gcc	ata	ttg	ctc	ggc	agc	768
Val	Gly	Ser	Val	Leu	Gly	Ala	Gly	Val	Ala	Ala	Ile	Leu	Leu	Gly	Ser	
				245					250					255		
ctc	acg	gcg	ttg	gcc	gag	ggc	ctg	acc	agc	gag	agc	ctc	gcg	cag	gcc	816
Leu	Thr	Ala	Leu	Ala	Glu	Gly	Leu	Thr	Ser	Glu	Ser	Leu	Ala	Gln	Ala	
			260					265					270			
gcg	ctg	ctg	gtg	ctg	gtg	gtg	gcg	ttc	ttg	cag	tgg	aaa	ccg	cgc	ggc	864
Ala	Leu	Leu	Val	Leu	Val	Val	Ala	Phe	Leu	Gln	Trp	Lys	Pro	Arg	Gly	
			275				280					285				
ctg	ttt	ccc	acc	gag	tcc	cgc	gct	ctg	gag	gac	gca	tga				903
Leu	Phe	Pro	Thr	Glu	Ser	Arg	Ala	Leu	Glu	Asp	Ala					
	290					295					300					

<210> 517

<211> 300

<212> PRT

<213> Deinococcus radiodurans

<400> 517

Met	Asp	Leu	Thr	Phe	Leu	Ala	Asn	Gln	Leu	Phe	Thr	Gly	Leu	Ser	Val	
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Ala	Ser	Ile	Leu	Leu	Leu	Ala	Ala	Leu	Gly	Leu	Ala	Leu	Thr	Phe	Gly	
			20					25					30			
Leu	Met	Arg	Val	Ile	Asn	Met	Ala	His	Gly	Glu	Phe	Leu	Met	Val	Gly	
		35					40					45				
Gly	Tyr	Leu	Thr	Tyr	Leu	Ala	Ala	Arg	Trp	Thr	Gly	Pro	Ala	Leu	Gly	
	50					55					60					
Asp	Gly	Tyr	Leu	Trp	Val	Ala	Phe	Pro	Leu	Ala	Phe	Val	Gly	Thr	Ala	
	65				70					75					80	

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Leu Leu Gly Ala Leu Leu Glu Val Leu Val Ile Arg Arg Leu Tyr Gly
 Arg Pro Leu Asp Thr Leu Leu Ala Thr Phe Gly Ile Ser Leu Ile Leu
 Gln Gln Ala Ala Arg Gln Val Phe Gly Ser Thr Gly Val Pro Val Thr
 Ala Pro Ala Trp Leu Ser Gly Ser Val Thr Leu Gly Ala Val Thr Met
 Pro Gly Ser Arg Leu Phe Val Ile Ala Leu Ser Leu Leu Val Ile Gly
 Ala Val Trp Trp Leu Leu Ser Arg Thr Arg Phe Gly Met Val Val Arg
 Ala Val Asn Gln Asn Arg Glu Met Ala Ala Ala Leu Gly Val Asn Thr
 Arg Ala Leu Asp Leu Leu Val Phe Ser Leu Gly Ala Gly Ile Ala Gly
 Val Ala Gly Val Gly Leu Ala Leu Leu Ala Pro Val Asn Pro Thr Val
 Gly Ala Ala Tyr Met Val Asn Ala Phe Leu Val Val Val Gly Gly
 Val Gly Ser Val Leu Gly Ala Gly Val Ala Ala Ile Leu Leu Gly Ser
 Leu Thr Ala Leu Ala Glu Gly Leu Thr Ser Glu Ser Leu Ala Gln Ala
 Ala Leu Leu Val Leu Val Val Ala Phe Leu Gln Trp Lys Pro Arg Gly
 Leu Phe Pro Thr Glu Ser Arg Ala Leu Glu Asp Ala
 290 295 300

<210> 518

<211> 897

<212> DNA

<213> Campylobacter jejuni

<220>

<221> CDS

<222> (1)..(897)

<400> 518

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1 5 10 15	
ggc agt atg tat gct ctt att gct gtt ggc tat acg atg gtt tat ggt	96
Gly Ser Met Tyr Ala Leu Ile Ala Val Gly Tyr Thr Met Val Tyr Gly	
20 25 30	
gtg tta aga ctt att aat ttt gct cac ggc gat att atg atg gtt ggt	144
Val Leu Arg Leu Ile Asn Phe Ala His Gly Asp Ile Met Met Val Gly	
35 40 45	
gct tat gcg gct ctt ttt tgc atg act aat cta aat gtt cct ttt cta	192
Ala Tyr Ala Ala Leu Phe Cys Met Thr Asn Leu Asn Val Pro Phe Leu	
50 55 60	
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Gly Ala Leu Ser Leu Ala Met Ile Phe Ala Ala Cys Val Gly Ile Ala	
65 70 75 80	
aca gat aga atc gct tat aaa cct tta aga cag gct cct aga att tca	288
Thr Asp Arg Ile Ala Tyr Lys Pro Leu Arg Gln Ala Pro Arg Ile Ser	
85 90 95	
ttg ttg att aca gca atc ggt att agt ttt ttc ttg caa aat ctt ttt	336
Leu Leu Ile Thr Ala Ile Gly Ile Ser Phe Phe Leu Gln Asn Leu Phe	
100 105 110	
aat atg ctt ttt act tca aca cct aga act ttt aca ccg cca agt tat	384
Asn Met Leu Phe Thr Ser Thr Pro Arg Thr Phe Thr Pro Pro Ser Tyr	
115 120 125	
ttt gag gaa agt gtt aat ttt ggt gga gtg ata aca act tat ggt tct	432
Phe Glu Glu Ser Val Asn Phe Gly Gly Val Ile Thr Thr Tyr Gly Ser	
130 135 140	
tta atg gtt cct gct ctt aca ttt gtt att tta ata gca gtg tta tgg	480
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145 150 155 160	

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gat	ata	caa	aca	gta	aat	tta	atg	ggt	ata	gat	gca	aat	cgt	att	att	576
Asp	Ile	Gln	Thr	Val	Asn	Leu	Met	Gly	Ile	Asp	Ala	Asn	Arg	Ile	Ile	
			180					185					190			
gct	ata	ggt	ttt	gcc	cta	ggt	tca	gct	ttg	gca	gca	ggt	ggg	ggt	ggt	624
Ala	Ile	Val	Phe	Ala	Leu	Gly	Ser	Ala	Leu	Ala	Ala	Val	Gly	Gly	Val	
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Phe	Trp	Ala	Ala	Asn	Tyr	Tyr	Ser	Val	Glu	Pro	Thr	Met	Gly	Thr	Leu	
	210					215					220					
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Ile	Gly	Leu	Lys	Ala	Phe	Ala	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ser	
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gta	gta	ggt	gca	ggt	ttg	ggt	gga	ctt	att	ata	gga	ttt	act	gaa	ggt	768
Val	Val	Gly	Ala	Val	Leu	Gly	Gly	Leu	Ile	Ile	Gly	Phe	Thr	Glu	Val	
				245					250					255		
ggt	ggt	gtg	gct	ttt	ttt	cca	gat	tta	tca	ggc	ttt	aaa	gat	gca	ttt	816
Val	Val	Val	Ala	Phe	Phe	Pro	Asp	Leu	Ser	Gly	Phe	Lys	Asp	Ala	Phe	
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Ala	Phe	Ile	Phe	Leu	Val	Phe	Ile	Leu	Leu	Phe	Arg	Pro	Thr	Gly	Ile	
		275					280					285				
tta	ggt	ata	aat	ttt	gaa	aag	agg	ttt	taa							897
Leu	Gly	Ile	Asn	Phe	Glu	Lys	Ser	Arg	Phe							
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<210> 519

<211> 298

<212> PRT

<213> Campylobacter jejuni

<400> 519

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Val	Leu	Arg	Leu	Ile	Asn	Phe	Ala	His	Gly	Asp	Ile	Met	Met	Val	Gly	
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Ala	Tyr	Ala	Ala	Leu	Phe	Cys	Met	Thr	Asn	Leu	Asn	Val	Pro	Phe	Leu	
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Gly	Ala	Leu	Ser	Leu	Ala	Met	Ile	Phe	Ala	Ala	Cys	Val	Gly	Ile	Ala	
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Thr	Asp	Arg	Ile	Ala	Tyr	Lys	Pro	Leu	Arg	Gln	Ala	Pro	Arg	Ile	Ser	
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Leu	Leu	Ile	Thr	Ala	Ile	Gly	Ile	Ser	Phe	Phe	Leu	Gln	Asn	Leu	Phe	
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Asn	Met	Leu	Phe	Thr	Ser	Thr	Pro	Arg	Thr	Phe	Thr	Pro	Pro	Ser	Tyr	
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Phe	Glu	Gly	Ser	Val	Asn	Phe	Gly	Gly	Val	Ile	Thr	Thr	Tyr	Gly	Ser	
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Leu	Met	Val	Pro	Ala	Leu	Thr	Phe	Val	Ile	Leu	Ile	Ala	Val	Leu	Trp	
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Asp	Ile	Gln	Thr	Val	Asn	Leu	Met	Gly	Ile	Asp	Ala	Asn	Arg	Ile	Ile	
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Ala	Ile	Val	Phe	Ala	Leu	Gly	Ser	Ala	Leu	Ala	Ala	Val	Gly	Gly	Val	
		195					200					205				
Phe	Trp	Ala	Ala	Asn	Tyr	Tyr	Ser	Val	Glu	Pro	Thr	Met	Gly	Thr	Leu	
	210					215					220					
Ile	Gly	Leu	Lys	Ala	Phe	Ala	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ser	
	225				230					235					240	
Val	Val	Gly	Ala	Val	Leu	Gly	Gly	Leu	Ile	Ile	Gly	Phe	Thr	Glu	Val	
				245					250					255		
Val	Val	Val	Ala	Phe	Phe	Pro	Asp	Leu	Ser	Gly	Phe	Lys	Asp	Ala	Phe	
			260					265					270			
Ala	Phe	Ile	Phe	Leu	Val	Phe	Ile	Leu	Phe	Arg	Pro	Thr	Gly	Ile		

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 Leu Gly Ile Asn Phe Glu Lys Ser Arg Phe
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 <211> 939
 <212> DNA
 <213> Archaeoglobus fulgidus

<220>
 <221> CDS
 <222> (1)..(939)

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 tct ctc ata tac tcc aac ctt ctc gta ttg ctg agc ata ggg ctc acc 96
 Ser Leu Ile Tyr Ser Asn Leu Leu Val Leu Leu Ser Ile Gly Leu Thr
 20 25 30
 att acc tac ata act acg gca gtt ccc aac ttc gcg cag ggg agc ttc 144
 Ile Thr Tyr Ile Thr Thr Ala Val Pro Asn Phe Ala Gln Gly Ser Phe
 35 40 45
 gca ata ttt ggc tca tac gtg gcc ctg acc atg ctg agg ctt ttt ggc 192
 Ala Ile Phe Gly Ser Tyr Val Ala Leu Thr Met Leu Arg Leu Phe Gly
 50 55 60
 atc cac ccc tac gct tct ttg ccc gtt gct ttt gca ctt ggc ggt ttg 240
 Ile His Pro Tyr Ala Ser Leu Pro Val Ala Phe Ala Leu Gly Gly Leu
 65 70 75 80
 ctt ggc att gca acc tac atc ctc atc ctg cgc ccg ctc atc agg cgc 288
 Leu Gly Ile Ala Thr Tyr Ile Leu Ile Leu Arg Pro Leu Ile Arg Arg
 85 90 95
 ggc gcc tcc gta gtg att ttg atg att gca acg ctg gcc ttt gac ttg 336
 Gly Ala Ser Val Val Ile Leu Met Ile Ala Thr Leu Ala Phe Asp Leu
 100 105 110
 att ctc ctt ggc att att ggc tca tct gaa act ctc gca acc ata 384
 Ile Leu Leu Gly Ile Ile Gly Ser Tyr Ser Glu Thr Leu Ala Thr Ile
 115 120 125
 acc aga aaa tcc gcc tcg aag ttc acc ttt atc ccg aca gac ttc aag 432
 Thr Arg Lys Ser Ala Ser Lys Phe Thr Phe Ile Pro Thr Asp Phe Lys
 130 135 140
 atg ttt tcc ttc tcc gcc tca ctc ttc gtt tct tcc ctg gtt ata att 480
 Met Phe Ser Phe Ser Ala Ser Leu Phe Val Ser Ser Leu Val Ile Ile
 145 150 155 160
 att gtt ctc gca tca ctc gta acg ctg ctt tac aaa aca aag ttc gga 528
 Ile Val Leu Ala Ser Leu Val Thr Leu Tyr Lys Thr Lys Phe Gly
 165 170 175
 gtt gcc ctg agg gcc tcg atg gag aac ccc gct ctg gct gag gtg atg 576
 Val Ala Leu Arg Ala Ser Met Glu Asn Pro Ala Leu Ala Glu Val Met
 180 185 190
 ggt gtc aat gtg gag tac acg agg ctc ttc tcg tgg ttt ctt tca ggc 624
 Gly Val Asn Val Glu Tyr Thr Arg Leu Phe Ser Trp Phe Leu Ser Gly
 195 200 205
 gct ttg gct gcg atg gcg ggg tgt ctg ctg cca ttc aag tac gaa ata 672
 Ala Leu Ala Ala Met Ala Gly Cys Leu Leu Pro Phe Lys Tyr Glu Ile
 210 215 220
 gtt ccg agc acg ggt gca atc att gtc tcc ata ttt gct tcg agc 720
 Val Pro Ser Thr Gly Ala Ile Ile Val Ser Ile Phe Ala Ser Ser
 225 230 235 240
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 Ile Val Gly Gly Leu Ser Thr Ile Tyr Gly Ala Leu Leu Gly Gly Tyr
 245 250 255
 ata ata gga ttt tcg gag aca agt gtt act tac gca ctt tcc tct gtg 816
 Ile Ile Gly Phe Ser Glu Thr Ser Val Thr Tyr Ala Leu Ser Ser Val
 260 265 270
 ttc gga aca gga gtt ttg ctc tac ggc aga gtt gtt tcg ttg ctg gtg 864
 Phe Gly Thr Gly Val Leu Leu Tyr Gly Arg Val Val Ser Leu Leu Val
 275 280 285
 cta gtc gca aca ctt atc ctc gcc ccc aag ggc ctt aca ggt gtg aag 912

Leu Val Ala Thr Leu Ile Leu Ala Pro Lys Gly Leu Thr Gly Val Lys
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 Trp Arg Arg Leu Leu Trp Ser Arg
 305 310

939

<210> 521
 <211> 312
 <212> PRT
 <213> Archaeoglobus fulgidus

<400> 521
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 Ile Thr Tyr Ile Thr Thr Ala Val Pro Asn Phe Ala Gln Gly Ser Phe
 35 40 45
 Ala Ile Phe Gly Ser Tyr Val Ala Leu Thr Met Leu Arg Leu Phe Gly
 50 55 60
 Ile His Pro Tyr Ala Ser Leu Pro Val Ala Phe Ala Leu Gly Gly Leu
 65 70 75 80
 Leu Gly Ile Ala Thr Tyr Ile Leu Ile Leu Arg Pro Leu Ile Arg Arg
 85 90 95
 Gly Ala Ser Val Val Ile Leu Met Ile Ala Thr Leu Ala Phe Asp Leu
 100 105 110
 Ile Leu Leu Gly Ile Ile Gly Ser Tyr Ser Glu Thr Leu Ala Thr Ile
 115 120 125
 Thr Arg Lys Ser Ala Ser Lys Phe Thr Phe Ile Pro Thr Asp Phe Lys
 130 135 140
 Met Phe Ser Phe Ser Ala Ser Leu Phe Val Ser Ser Leu Val Ile Ile
 145 150 155 160
 Ile Val Leu Ala Ser Leu Val Thr Leu Leu Tyr Lys Thr Lys Phe Gly
 165 170 175
 Val Ala Leu Arg Ala Ser Met Glu Asn Pro Ala Leu Ala Glu Val Met
 180 185 190
 Gly Val Asn Val Glu Tyr Thr Arg Leu Phe Ser Trp Phe Leu Ser Gly
 195 200 205
 Ala Leu Ala Ala Met Ala Gly Cys Leu Leu Pro Phe Lys Tyr Glu Ile
 210 215 220
 Val Pro Ser Thr Gly Ala Ile Ile Ile Val Ser Ile Phe Ala Ser Ser
 225 230 235 240
 Ile Val Gly Gly Leu Ser Thr Ile Tyr Gly Ala Leu Leu Gly Gly Tyr
 245 250 255
 Ile Ile Gly Phe Ser Glu Thr Ser Val Thr Tyr Ala Leu Ser Ser Val
 260 265 270
 Phe Gly Thr Gly Val Leu Leu Tyr Gly Arg Val Val Ser Leu Leu Val
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 Trp Arg Arg Leu Leu Trp Ser Arg
 305 310

<210> 522
 <211> 1071
 <212> DNA
 <213> Deinococcus radiodurans

<220>
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 gcg gct tat gcc gca ggc gaa cga aag gaa act atg gac ata aac acg
 Ala Ala Tyr Ala Ala Gly Glu Arg Lys Gly Thr Met Asp Ile Asn Thr
 20 25 30

48

96

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gtg	ctc	acg	att	ctg	gct	cag	gtc	ttc	gtc	ggc	ggc	ctg	agc	ctc	ggc	144
Val	Leu	Thr	Ile	Leu	Ala	Gln	Val	Phe	Val	Gly	Gly	Leu	Ser	Leu	Gly	
		35					40					45				
gtg	ctg	tac	gcc	atc	atc	gcg	ctg	ggc	tac	acg	atg	gtg	tac	ggc	gtg	192
Val	Leu	Tyr	Ala	Ile	Ile	Ala	Leu	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Val	
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Leu	Gln	Leu	Ile	Asn	Phe	Ala	His	Ser	Glu	Val	Phe	Ile	Thr	Gly	Gly	
	65				70					75					80	
gtg	gtc	gcc	tac	ttc	gtc	ttt	gag	gcg	ctc	aag	gag	tcg	ccc	atg	aac	288
Val	Val	Ala	Tyr	Phe	Val	Phe	Glu	Ala	Leu	Lys	Glu	Ser	Pro	Met	Asn	
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ggg	ctg	ctc	aag	ctg	atc	gcg	gcg	ctc	gcg	gcg	atg	gcc	gtg	tcg		336
Gly	Leu	Leu	Lys	Leu	Ile	Ala	Ala	Leu	Ala	Ala	Met	Ala	Val	Ser		
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Gly	Gly	Leu	Asn	Val	Leu	Ile	Glu	Arg	Leu	Ala	Tyr	Arg	Pro	Ile	Arg	
		115					120					125				
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Gly	Ala	Gln	Arg	Leu	Val	Pro	Leu	Ile	Thr	Ala	Ile	Gly	Val	Ser	Leu	
	130					135					140					
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Ile	Leu	Gln	Asp	Leu	Leu	Arg	Leu	Ile	Val	Gly	Leu	Arg	Gly	Leu	Phe	
	145				150					155					160	
gac	ctc	agc	gtg	acg	ctg	ccg	cag	ggc	ttt	gcc	gac	ccc	atc	acc	aaa	528
Asp	Leu	Ser	Val	Thr	Leu	Pro	Gln	Gly	Phe	Ala	Asp	Pro	Ile	Thr	Lys	
				165					170					175		
gtc	ggc	ggg	gtg	aac	atc	tcg	gtg	ctg	aac	ttg	cag	gtc	aag	gac	atc	576
Val	Gly	Gly	Val	Asn	Ile	Ser	Val	Leu	Asn	Leu	Gln	Val	Lys	Asp	Ile	
			180					185					190			
atc	ctg	atc	gtg	gtg	gcc	ggg	ctg	atg	ctc	ata	ggg	ctc	aac	ctg	ctc	624
Ile	Leu	Ile	Val	Val	Ala	Gly	Leu	Met	Leu	Ile	Gly	Leu	Asn	Leu	Leu	
		195				200					205					
gtc	aac	cac	acc	cgg	ctg	ggc	cgc	gcc	att	cgc	gcc	gtg	gcg	cac	gac	672
Val	Asn	His	Thr	Arg	Leu	Gly	Arg	Ala	Ile	Arg	Ala	Val	Ala	His	Asp	
	210					215					220					
cgg	cag	acg	tcg	ggc	ctg	atg	ggc	atc	gac	tcg	aac	cgc	atc	atc	agc	720
Arg	Gln	Thr	Ser	Gly	Leu	Met	Gly	Ile	Asp	Ser	Asn	Arg	Ile	Ile	Ser	
	225			230					235						240	
ttg	acc	ttc	ttg	atc	ggg	ggc	gcg	ctg	ggc	ggc	ctc	ggc	ggg	gcg	atg	768
Leu	Thr	Phe	Leu	Ile	Gly	Gly	Ala	Leu	Gly	Gly	Leu	Gly	Gly	Ala	Met	
				245					250					255		
ttc	gcc	atg	aaa	tat	caa	gca	ctc	aac	gcc	tac	tcg	ggc	atg	gtg	ccg	816
Phe	Ala	Met	Lys	Tyr	Gln	Ala	Leu	Asn	Ala	Tyr	Ser	Gly	Met	Val	Pro	
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ggc	atc	aag	gcc	ttt	acg	gcg	gcg	gtg	ctc	ggc	ggc	atc	ggc	aac	att	864
Gly	Ile	Lys	Ala	Phe	Thr	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Asn	Ile	
		275					280					285				
ccc	ggc	gcg	gtg	ctc	ggc	ggg	ctg	gtg	ctc	ggc	tgg	ctc	gaa	acg	ctg	912
Pro	Gly	Ala	Val	Leu	Gly	Gly	Leu	Val	Leu	Gly	Trp	Leu	Glu	Thr	Leu	
	290				295						300					
ctc	ggc	acc	att	gac	ctc	ttt	cag	gtg	gtg	ccg	ggg	ctg	ggc	tgg	ctg	960
Leu	Gly	Thr	Ile	Asp	Leu	Phe	Gln	Val	Val	Pro	Gly	Leu	Gly	Trp	Leu	
	305				310					315					320	
aaa	tac	atc	act	tcc	gac	tac	aaa	gac	ctc	ggc	gcc	ttc	tta	gcg	ctg	1008
Lys	Tyr	Ile	Thr	Ser	Asp	Tyr	Lys	Asp	Leu	Gly	Ala	Phe	Leu	Ala	Leu	
				325					330					335		
ctg	ctg	att	ctc	ttt	ttc	aag	cct	gcc	ggt	ctg	ctc	ggc	aag	gcc	acc	1056
Leu	Leu	Ile	Leu	Phe	Phe	Lys	Pro	Ala	Gly	Leu	Leu	Gly	Lys	Ala	Thr	
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acg	gag	aag	gtg	taa												1071
Thr	Glu	Lys	Val													
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<210> 523

<211> 356

<212> PRT

<213> Deinococcus radiodurans

<400> 523

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35      40      45
Val Leu Tyr Ala Ile Ile Ala Leu Gly Tyr Thr Met Val Tyr Gly Val
50      55      60
Leu Gln Leu Ile Asn Phe Ala His Ser Glu Val Phe Ile Thr Gly Gly
65      70      75      80
Val Val Ala Tyr Phe Val Phe Glu Ala Leu Lys Glu Ser Pro Met Asn
85      90      95
Gly Leu Leu Lys Leu Leu Ile Ala Ala Leu Ala Ala Met Ala Val Ser
100     105
Gly Gly Leu Asn Val Leu Ile Glu Arg Leu Ala Tyr Arg Pro Ile Arg
115     120     125
Gly Ala Gln Arg Leu Val Pro Leu Ile Thr Ala Ile Gly Val Ser Leu
130     135     140
Ile Leu Gln Asp Leu Leu Arg Leu Ile Val Gly Leu Arg Gly Leu Phe
145     150     155     160
Asp Leu Ser Val Thr Leu Pro Gln Gly Phe Ala Asp Pro Ile Thr Lys
165     170     175
Val Gly Gly Val Asn Ile Ser Val Leu Asn Leu Gln Val Lys Asp Ile
180     185     190
Ile Leu Ile Val Val Ala Gly Leu Met Leu Ile Gly Leu Asn Leu Leu
195     200     205
Val Asn His Thr Arg Leu Gly Arg Ala Ile Arg Ala Val Ala His Asp
210     215     220
Arg Gln Thr Ser Gly Leu Met Gly Ile Asp Ser Asn Arg Ile Ile Ser
225     230     235     240
Leu Thr Phe Leu Ile Gly Gly Ala Leu Gly Gly Leu Gly Gly Ala Met
245     250     255
Phe Ala Met Lys Tyr Gln Ala Leu Asn Ala Tyr Ser Gly Met Val Pro
260     265     270
Gly Ile Lys Ala Phe Thr Ala Ala Val Leu Gly Gly Ile Gly Asn Ile
275     280     285
Pro Gly Ala Val Leu Gly Gly Leu Val Leu Gly Trp Leu Glu Thr Leu
290     295     300
Leu Gly Thr Ile Asp Leu Phe Gln Val Val Pro Gly Leu Gly Trp Leu
305     310     315     320
Lys Tyr Ile Thr Ser Asp Tyr Lys Asp Leu Gly Ala Phe Leu Ala Leu
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Thr Glu Lys Val
355

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<210> 524

<211> 864

<212> DNA

<213> Sinorhizobium meliloti

<220>

<221> CDS

<222> (1)..(864)

<400> 524

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gtg ctg ttc gtg atc tcg atc ggc ctt tcg gtc acg ctc ggc ctc atg      96
Val Leu Phe Val Ile Ser Ile Gly Leu Ser Val Thr Leu Gly Leu Met
20      25      30
cgc gtc gtc aat ctt gcc cac ggg gcc ttt gcg atg atc ggc ggc tat      144
Arg Val Val Asn Leu Ala His Gly Ala Phe Ala Met Ile Gly Gly Tyr
35      40      45
atc gca tcc tat gcg gcg cgt gat ctc ggg ctc ggc tac ggc gcc gcg      192
Ile Ala Ser Tyr Ala Ala Arg Asp Leu Gly Leu Gly Tyr Gly Ala Ala

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70	65	ctg	ctc	tac	cg	cg	atc	tac	gg	cag	ccg	gag	ctg	act	cag	gtg	288
85	Arg	Leu	Leu	Tyr	Arg	Arg	Ile	Tyr	Gly	Gln	Pro	Glu	Leu	Thr	Gln	Val	
100	ctg	atg	acg	atc	ggc	atc	acc	ttc	tgc	atc	ggc	att	gcc	aac	tac		336
115	Leu	Met	Thr	Ile	Gly	Ile	Thr	Phe	Cys	Ile	Ile	Gly	Ile	Ala	Asn	Tyr	
130	gtc	ttc	ggg	ccg	act	ctc	aag	acg	atc	ccg	ctg	ccg	ccg	agc	ctt	gag	384
145	Val	Phe	Gly	Pro	Thr	Leu	Lys	Thr	Ile	Pro	Leu	Pro	Pro	Ser	Leu	Glu	
160	ggc	tcc	gcc	gat	ctc	ggc	ttc	cgt	tgc	atc	gcc	gtg	cac	ata	ttc		432
175	Gly	Ser	Ala	Asp	Leu	Gly	Phe	Arg	Ser	Ile	Ala	Val	His	Arg	Ile	Phe	
190	gcg	atc	gtc	tgc	ggc	ctc	gcc	gtt	gcc	gga	gcc	ctc	tgg	ttt	gcc	atc	480
205	Ala	Ile	Val	Cys	Gly	Leu	Ala	Val	Ala	Gly	Ala	Leu	Trp	Phe	Ala	Ile	
220	gag	aag	acg	gcc	ttc	ggg	gtg	aaa	ctc	agg	gcc	gcc	gtc	gac	aat	gcg	528
235	Glu	Lys	Thr	Ala	Phe	Gly	Val	Lys	Leu	Arg	Ala	Ala	Val	Asp	Asn	Ala	
250	gcg	atg	gcg	gcg	gca	ctc	gga	gtg	cg	acg	gag	gtc	gtc	tat	gcc	gtg	576
265	Ala	Met	Ala	Ala	Ala	Leu	Gly	Val	Arg	Thr	Glu	Val	Val	Tyr	Ala	Val	
280	agt	ttc	gcc	gtc	gcc	gtg	ggc	ctt	gcc	gcg	ttc	ggc	ggc	gtc	gtc	ggc	624
295	Ser	Phe	Ala	Val	Ala	Val	Gly	Leu	Ala	Ala	Phe	Gly	Gly	Val	Val	Gly	
310	gcg	gaa	ctg	ctg	ccg	gtc	gag	ccc	tat	tat	gcg	ctc	aga	tac	atg	gtc	672
325	Ala	Glu	Leu	Leu	Pro	Val	Glu	Pro	Tyr	Tyr	Ala	Leu	Arg	Tyr	Met	Val	
340	acc	ttc	ctg	gtg	gtc	gtt	tcc	gtc	ggc	gg	gcg	ggg	tgc	atc	ccg	gg	720
355	Thr	Phe	Leu	Val	Val	Val	Ser	Val	Gly	Gly	Ala	Gly	Ser	Ile	Pro	Gly	
370	gcg	ctt	gcc	gcc	tgc	ctg	ctt	ggc	ggc	atc	gat	acg	acg	ggg	cg		768
385	Ala	Leu	Ala	Ala	Cys	Leu	Leu	Gly	Gly	Ile	Asp	Thr	Thr	Gly	Gly	Arg	
400	tat	ctc	atg	ccg	gaa	ttc	ggg	gaa	ttc	ttc	ttc	tat	ctc	gcc	gtc	atc	816
415	Tyr	Leu	Met	Pro	Glu	Phe	Gly	Glu	Phe	Phe	Phe	Tyr	Leu	Ala	Val	Ile	
430	gcc	atc	gtc	gta	ttt	ccg	cg	ggc	ctt	gcc	ggg	agg	att	aag			861
445	Ala	Ile	Val	Cys	Val	Phe	Pro	Arg	Gly	Leu	Ala	Gly	Arg	Ile	Lys		
460	tag																864

<210> 525

<211> 287

<212> PRT

<213> Sinorhizobium meliloti

<400> 525

Met	Gln	Thr	Ile	Phe	Ser	Ile	Ala	Val	Asp	Ala	Leu	Ala	Tyr	Gly	Thr
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			20					25					30		
Arg	Val	Val	Asn	Leu	Ala	His	Gly	Ala	Phe	Ala	Met	Ile	Gly	Gly	Tyr
			35				40					45			
Ile	Ala	Ser	Tyr	Ala	Ala	Arg	Asp	Leu	Gly	Leu	Gly	Tyr	Gly	Ala	Ala
			50			55					60				
Val	Leu	Ile	Ala	Val	Phe	Gly	Thr	Ile	Val	Ile	Ala	Ile	Pro	Ile	Glu
65					70				75						80
Arg	Leu	Leu	Tyr	Arg	Arg	Ile	Tyr	Gly	Gln	Pro	Glu	Leu	Thr	Gln	Val
				85				90						95	
Leu	Met	Thr	Ile	Gly	Ile	Thr	Phe	Cys	Ile	Ile	Gly	Ile	Ala	Asn	Tyr
			100				105					110			
Val	Phe	Gly	Pro	Thr	Leu	Lys	Thr	Ile	Pro	Leu	Pro	Pro	Ser	Leu	Glu
		115					120				125				

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Gly	Ser	Ala	Asp	Leu	Gly	Phe	Arg	Ser	Ile	Ala	Val	His	Arg	Ile	Phe
130	130					135				140	140				
Ala	Ile	Val	Cys	Gly	Leu	Ala	Val	Ala	Gly	Ala	Leu	Trp	Phe	Ala	Ile
145				150						155					160
Glu	Lys	Thr	Ala	Phe	Gly	Val	Lys	Leu	Arg	Ala	Ala	Val	Asp	Asn	Ala
				165					170					175	
Ala	Met	Ala	Ala	Ala	Leu	Gly	Val	Arg	Thr	Glu	Val	Val	Tyr	Ala	Val
				180				185					190		
Ser	Phe	Ala	Val	Ala	Val	Gly	Leu	Ala	Ala	Phe	Gly	Gly	Val	Val	Gly
		195				200						205			
Ala	Glu	Leu	Leu	Pro	Val	Glu	Pro	Tyr	Tyr	Ala	Leu	Arg	Tyr	Met	Val
	210					215					220				
Thr	Phe	Leu	Val	Val	Val	Ser	Val	Gly	Gly	Ala	Gly	Ser	Ile	Pro	Gly
225					230					235					240
Ala	Leu	Ala	Ala	Cys	Leu	Leu	Leu	Gly	Gly	Ile	Asp	Thr	Thr	Gly	Arg
				245					250					255	
Tyr	Leu	Met	Pro	Glu	Phe	Gly	Glu	Phe	Phe	Phe	Tyr	Leu	Ala	Val	Ile
			260					265					270		
Ala	Ile	Val	Cys	Val	Phe	Pro	Arg	Gly	Leu	Ala	Gly	Arg	Ile	Lys	
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<210> 526

<211> 855

<212> DNA

<213> Archaeoglobus fulgidus

<220>

<221> CDS

<222> (1)..(855)

<400> 526

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Met	Ile	Glu	Thr	Leu	Val	Lys	Ile	Ala	Val	Phe	Gly	Ala	Val	Val	Gly	
1				5					10					15		
gga	atc	tgg	ggg	ctc	gtc	gcc	tca	gga	ttc	tcc	cta	att	ttt	ggt	gtg	96
Gly	Ile	Trp	Gly	Leu	Val	Ala	Ser	Gly	Phe	Ser	Leu	Ile	Phe	Gly	Val	
			20					25					30			
tcg	agg	att	ctg	aac	ttc	gcc	cac	ggt	gca	gca	ttc	gtc	agc	tcc	gcc	144
Ser	Arg	Ile	Leu	Asn	Phe	Ala	His	Gly	Ala	Ala	Phe	Val	Ser	Ser	Ala	
			35				40					45				
ttt	ctg	gca	tac	gct	ctc	ata	agc	gag	ggg	tac	aac	ctt	tac	ctt	gcc	192
Phe	Leu	Ala	Tyr	Ala	Leu	Ile	Ser	Glu	Gly	Tyr	Asn	Leu	Tyr	Leu	Ala	
	50					55					60					
atc	ctc	gca	ggc	ttg	ctg	ctt	tca	gcg	cta	atc	ggt	ttg	gcg	gtt	tac	240
Ile	Leu	Ala	Gly	Leu	Leu	Leu	Ser	Ala	Leu	Ile	Gly	Leu	Ala	Val	Tyr	
	65				70				75					80		
gca	tta	aca	aag	cct	gtg	agg	gat	agg	gag	gtc	atg	gtt	atc	atc	ctg	288
Ala	Leu	Thr	Lys	Pro	Val	Arg	Asp	Arg	Glu	Val	Met	Val	Ile	Ile	Leu	
				85					90					95		
acg	ctc	gca	ttc	gcc	ctt	ctg	gtg	cag	caa	gta	ctc	ttg	gtt	ttg	tac	336
Thr	Leu	Ala	Phe	Ala	Leu	Leu	Val	Gln	Gln	Val	Leu	Leu	Val	Leu	Tyr	
				100				105					110			
ggg	gac	aga	ggc	gta	tcc	atc	gag	cca	ttt	gta	agc	ggg	ttt	gca	gag	384
Gly	Asp	Arg	Gly	Val	Ser	Ile	Glu	Pro	Phe	Val	Ser	Gly	Phe	Ala	Glu	
			115				120					125				
ata	ggg	ggt	gtt	aag	gtt	acc	tat	atg	aga	att	ctt	tca	ttt	gtc	cta	432
Ile	Gly	Gly	Val	Lys	Val	Thr	Tyr	Met	Arg	Ile	Leu	Ser	Phe	Val	Leu	
	130					135						140				
gcg	gtc	ctc	tgc	ctc	act	gcg	ctt	gag	gtt	ttt	gtg	acg	aga	acc	aag	480
Ala	Val	Leu	Cys	Leu	Thr	Ala	Leu	Glu	Val	Phe	Val	Thr	Arg	Thr	Lys	
	145				150					155					160	
ctc	gga	aag	aag	gtt	ata	gct	aca	gct	cag	gac	agc	aga	gcg	gcc	atg	528
Leu	Gly	Lys	Lys	Val	Ile	Ala	Thr	Ala	Gln	Asp	Ser	Arg	Ala	Ala	Met	
				165				170						175		
atg	gta	ggg	att	gac	atc	gaa	aag	ata	ttt	ctc	ctt	gtg	atg	gtt	ctt	576
Met	Val	Gly	Ile	Asp	Ile	Glu	Lys	Ile	Phe	Leu	Leu	Val	Met	Val	Leu	
			180					185					190			
tca	tcc	gtc	ctt	gca	gga	ttc	gct	ggg	att	ctc	tac	gcc	cag	ata	ttt	624
Ser	Ser	Val	Leu	Ala	Gly	Phe	Ala	Gly	Ile	Leu	Tyr	Ala	Gln	Ile	Phe	

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gca	gtc	195	ccc	gaa	gtc	tcc	200	agg	gct	tta	att	tac	gcc	ttc	gcc	672
Ala	Val	210	Ser	Pro	Glu	Val	215	Leu	Arg	Ala	Leu	Ile	Tyr	Ala	Phe	Ala
atc	gta	att	ctc	ggg	ggg	ctt	ggc	agc	ctt	agg	ggc	agt	ggt	ggt	gca	720
Ile	Val	Ile	Leu	Gly	Gly	Leu	Gly	Ser	Leu	Arg	Gly	Ser	Val	Val	Ala	
225				230						235					240	
tcg	ttc	ata	gtg	gga	tac	att	ctc	gtg	acg	acg	ata	acc	ttc	ctc	gga	768
Ser	Phe	Ile	Val	Gly	Tyr	Ile	Leu	Val	Thr	Thr	Ile	Thr	Phe	Leu	Gly	
				245					250					255		
gcg	aga	tgg	tcc	gag	ttc	gtg	atg	ctt	cta	acg	atc	gtg	gcg	att	cta	816
Ala	Arg	Trp	Ser	Glu	Phe	Val	Met	Leu	Leu	Thr	Ile	Val	Ala	Ile	Leu	
			260					265					270			
att	gtc	aag	cca	acg	ggg	ctg	ttc	ggg	gtg	gaa	gaa	tga				855
Ile	Val	Lys	Pro	Thr	Gly	Leu	Phe	Gly	Val	Glu	Glu					
		275					280									

<210> 527

<211> 284

<212> PRT

<213> Archaeoglobus fulgidus

<400> 527

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Gly	Ile	Trp	Gly	Leu	Val	Ala	Ser	Gly	Phe	Ser	Leu	Ile	Phe	Gly	Val	
			20					25					30			
Ser	Arg	Ile	Leu	Asn	Phe	Ala	His	Gly	Ala	Ala	Phe	Val	Ser	Ser	Ala	
			35				40					45				
Phe	Leu	Ala	Tyr	Ala	Leu	Ile	Ser	Glu	Gly	Tyr	Asn	Leu	Tyr	Leu	Ala	
	50				55					60						
Ile	Leu	Ala	Gly	Leu	Leu	Leu	Ser	Ala	Leu	Ile	Gly	Leu	Ala	Val	Tyr	
65				70					75					80		
Ala	Leu	Thr	Lys	Pro	Val	Arg	Asp	Arg	Glu	Val	Met	Val	Ile	Ile	Leu	
			85					90					95			
Thr	Leu	Ala	Phe	Ala	Leu	Leu	Val	Gln	Gln	Val	Leu	Leu	Val	Leu	Tyr	
			100					105					110			
Gly	Asp	Arg	Gly	Val	Ser	Ile	Glu	Pro	Phe	Val	Ser	Gly	Phe	Ala	Glu	
	115						120					125				
Ile	Gly	Gly	Val	Lys	Val	Thr	Tyr	Met	Arg	Ile	Leu	Ser	Phe	Val	Leu	
	130				135						140					
Ala	Val	Leu	Cys	Leu	Thr	Ala	Leu	Glu	Val	Phe	Val	Thr	Arg	Thr	Lys	
145				150						155					160	
Leu	Gly	Lys	Lys	Val	Ile	Ala	Thr	Ala	Gln	Asp	Ser	Arg	Ala	Ala	Met	
			165					170					175			
Met	Val	Gly	Ile	Asp	Ile	Glu	Lys	Ile	Phe	Leu	Leu	Val	Met	Val	Leu	
			180					185					190			
Ser	Ser	Val	Leu	Ala	Gly	Phe	Ala	Gly	Ile	Leu	Tyr	Ala	Gln	Ile	Phe	
	195						200					205				
Ala	Val	Ser	Pro	Glu	Val	Ser	Leu	Arg	Ala	Leu	Ile	Tyr	Ala	Phe	Ala	
	210					215					220					
Ile	Val	Ile	Leu	Gly	Gly	Leu	Gly	Ser	Leu	Arg	Gly	Ser	Val	Val	Ala	
225				230						235					240	
Ser	Phe	Ile	Val	Gly	Tyr	Ile	Leu	Val	Thr	Thr	Ile	Thr	Phe	Leu	Gly	
				245					250					255		
Ala	Arg	Trp	Ser	Glu	Phe	Val	Met	Leu	Leu	Thr	Ile	Val	Ala	Ile	Leu	
			260					265					270			
Ile	Val	Lys	Pro	Thr	Gly	Leu	Phe	Gly	Val	Glu	Glu					
		275					280									

<210> 528

<211> 972

<212> DNA

<213> Archaeoglobus fulgidus

<220>

<221> CDS

<222> (1)..(972)

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 ctg ccg ctg aca ggt tcg tct tat gcg ctc agg att tca acg ctg ttc 96
 Leu Pro Leu Thr Gly Ser Ser Tyr Ala Leu Arg Ile Ser Thr Leu Phe
 20 25 30
 ata ata tac aca ata gct gcc atg ggg ctg aac ata ata atc gga tac 144
 Ile Ile Tyr Thr Ile Ala Ala Met Gly Leu Asn Ile Ile Ile Gly Tyr
 35 40 45
 aca ggc caa gct tct ctg gct cag gga gct ttt tac ggt ctt gga gcc 192
 Thr Gly Gln Ala Ser Leu Ala Gln Gly Ala Phe Tyr Gly Leu Gly Ala
 50 55 60
 tac gtt agc gcc ttg ctt gtg ctt aac ggc tgg tct ttc tgg gcg tca 240
 Tyr Val Ser Ala Leu Leu Val Leu Asn Gly Trp Ser Phe Trp Ala Ser
 65 70 75 80
 gtg atc gtg gca atc gcc ttc gtg gcc ttt gtg gcg ttc ctg ata ggt 288
 Val Ile Val Ala Ile Ala Phe Val Ala Phe Val Ala Phe Leu Ile Gly
 85 90 95
 cta atg act ctc aga ctt aag ggt gcg tac ttt gcc att gcc acg ctc 336
 Leu Met Thr Leu Arg Leu Lys Gly Ala Tyr Phe Ala Ile Ala Thr Leu
 100 105 110
 tta ttc aac gtc ata atc tat gaa gtt gtg gac aag tgg gat gag gtt 384
 Leu Phe Asn Val Ile Ile Tyr Glu Val Val Asp Lys Trp Asp Glu Val
 115 120 125
 acc aga ggg ccg agg ggg ctt ttt ggc atc cct tct ccg tca att gag 432
 Thr Arg Gly Pro Arg Gly Leu Phe Gly Ile Pro Ser Pro Ser Ile Glu
 130 135 140
 ctt agc ggt att tca atc agt ttc agt gga acc tac aac ttt tac tac 480
 Leu Ser Gly Ile Ser Ile Ser Phe Ser Gly Thr Tyr Asn Phe Tyr Tyr
 145 150 155 160
 ctc atg ctg gcc gtt ctg atc gtc atg act ctc ctt tac tgg ctt ata 528
 Leu Met Leu Ala Val Leu Ile Val Met Thr Leu Leu Tyr Trp Leu Ile
 165 170 175
 atc agg tcc tcc ggc agc ata ata gtt gca atc aga gag aat gag 576
 Ile Arg Ser Ser Phe Gly Ser Ile Ile Val Ala Ile Arg Glu Asn Glu
 180 185 190
 cta ttg gcc gag tac gca ggg gta aat ctt acg aag ttc aag gtt gcc 624
 Leu Leu Ala Glu Tyr Ala Gly Val Asn Leu Thr Lys Phe Lys Val Ala
 195 200 205
 tct ttc gtc tta agt gcc atc ttc gcc gct gtt gct gga gcc ttc tac 672
 Ser Phe Val Leu Ser Ala Ile Phe Ala Val Ala Gly Ala Phe Tyr
 210 215 220
 tct gca tac atc ggc agc atc ttt cca gat att acg agc ttc gtt aac 720
 Ser Ala Tyr Ile Gly Ser Ile Phe Pro Asp Ile Thr Ser Phe Val Asn
 225 230 235 240
 agc ttt gca ttc ctc acc gct atc atc ttt gga ggc gct gga act atg 768
 Ser Phe Ala Phe Leu Thr Ala Ile Ile Phe Gly Gly Ala Gly Thr Met
 245 250 255
 ctt gga ccg ttc ata gga acc gcc gtt gtt acg ctg ata aac gag gtc 816
 Leu Gly Pro Phe Ile Gly Thr Ala Val Val Thr Leu Ile Asn Glu Val
 260 265 270 275
 ttc ttc aca ctc gct cag tac aca gtc ctc gtt cag gga atc gta ttc 864
 Phe Phe Thr Leu Ala Gln Tyr Thr Val Leu Val Gln Gly Ile Val Phe
 280 285 290
 ctt ttg gcg att ctg ttc atg cca aaa gga gtt atg ggg gct tac tac 912
 Leu Leu Ala Ile Leu Phe Met Pro Lys Gly Val Met Gly Ala Tyr Tyr
 295 300 305
 tct aga aag gcc gag aag gga gaa aaa ctt ccc aaa agg gct ctt gta 960
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 310 315 320
 ggt aag ttc tga
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<210> 529

<211> 323

<212> PRT

<213> Archaeoglobus fulgidus

<400> 529

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 20 25 30
 Ile Ile Tyr Thr Ile Ala Ala Met Gly Leu Asn Ile Ile Gly Tyr
 35 40 45
 Thr Gly Gln Ala Ser Leu Ala Gln Gly Ala Phe Tyr Gly Leu Gly Ala
 50 55 60
 Tyr Val Ser Ala Leu Leu Val Leu Asn Gly Trp Ser Phe Trp Ala Ser
 65 70 75 80
 Val Ile Val Ala Ile Ala Phe Val Ala Phe Val Ala Phe Leu Ile Gly
 85 90 95
 Leu Met Thr Leu Arg Leu Lys Gly Ala Tyr Phe Ala Ile Ala Thr Leu
 100 105 110
 Leu Phe Asn Val Ile Ile Tyr Glu Val Val Asp Lys Trp Asp Glu Val
 115 120 125
 Thr Arg Gly Pro Arg Gly Leu Phe Gly Ile Pro Ser Ser Ile Glu
 130 135 140
 Leu Ser Gly Ile Ser Ile Ser Phe Ser Gly Thr Tyr Asn Phe Tyr Tyr
 145 150 155 160
 Leu Met Leu Ala Val Leu Ile Val Met Thr Leu Leu Tyr Trp Leu Ile
 165 170 175
 Ile Arg Ser Ser Phe Gly Ser Ile Ile Val Ala Ile Arg Glu Asn Glu
 180 185 190
 Leu Leu Ala Glu Tyr Ala Gly Val Asn Leu Thr Lys Phe Lys Val Ala
 195 200 205
 Ser Phe Val Leu Ser Ala Ile Phe Ala Ala Val Ala Gly Ala Phe Tyr
 210 215 220
 Ser Ala Tyr Ile Gly Ser Ile Phe Pro Asp Ile Thr Ser Phe Val Asn
 225 230 235 240
 Ser Phe Ala Phe Leu Thr Ala Ile Ile Phe Gly Gly Ala Gly Thr Met
 245 250 255
 Leu Gly Pro Phe Ile Gly Thr Ala Val Val Thr Leu Ile Asn Glu Val
 260 265 270
 Phe Phe Thr Leu Ala Gln Tyr Thr Val Leu Val Gln Gly Ile Val Phe
 275 280 285
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 290 295 300
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<210> 530

<211> 870

<212> DNA

<213> Streptococcus pneumoniae

<220>

<221> CDS

<222> (1)..(870)

<400> 530

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ctg tta gcc cta gga tat acc atg gtt tac gga att atc aag ctc atc	96
Leu Leu Ala Leu Gly Tyr Thr Met Val Tyr Gly Ile Ile Lys Leu Ile	
20 25 30	
aac ttc gcc cat ggt gat att tat atg atg gga gcc ttt atc ggt tat	144
Asn Phe Ala His Gly Asp Ile Tyr Met Met Gly Ala Phe Ile Gly Tyr	
35 40 45	
ttc ttg atc aat tct ttc caa atg aat ttc ttt gta gcg ctt att gta	192
Phe Leu Ile Asn Ser Phe Gln Met Asn Phe Phe Val Ala Leu Ile Val	
50 55 60	
gct atg cta gcg aca gct att ctt ggt gtc gtg att gag ttt ctt gct	240
Ala Met Leu Ala Thr Ala Ile Leu Gly Val Val Ile Glu Phe Leu Ala	

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Tyr	Arg	Pro	Leu	Arg	His	Ser	Thr	Arg	Ile	Ala	Val	Leu	Ile	Thr	Ala	288
				85					90					95		
att	ggg	ggt	tct	ttc	cta	ttg	gag	tat	gga	atg	gtc	tat	ctg	ggt	ggt	
Ile	Gly	Val	Ser	Phe	Leu	Leu	Glu	Tyr	Gly	Met	Val	Tyr	Leu	Val	Gly	336
			100					105					110			
gcc	aat	acc	cg	gcc	ttc	cct	caa	gcg	att	caa	aca	ggt	cga	tat	gat	
Ala	Asn	Thr	Arg	Ala	Phe	Pro	Gln	Ala	Ile	Gln	Thr	Val	Arg	Tyr	Asp	384
		115					120					125				
ttg	gga	cca	att	agc	tta	aca	aat	gtg	cag	tta	atg	att	ttg	gcc	att	
Leu	Gly	Pro	Ile	Ser	Leu	Thr	Asn	Val	Gln	Leu	Met	Ile	Leu	Ala	Ile	432
		130				135					140					
tcc	ttg	att	ttg	atg	att	ttg	tta	caa	gtc	att	gtc	caa	aag	act	aag	
Ser	Leu	Ile	Leu	Met	Ile	Leu	Leu	Gln	Val	Ile	Val	Gln	Lys	Thr	Lys	480
145				150					155						160	
atg	ggg	aaa	gcc	atg	cg	gca	gta	tca	gta	gat	agc	gac	gcg	gcg	caa	
Met	Gly	Lys	Ala	Met	Arg	Ala	Val	Ser	Val	Asp	Ser	Asp	Ala	Ala	Gln	528
				165					170				175			
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Leu	Met	Gly	Ile	Asn	Val	Asn	Arg	Thr	Ile	Ser	Phe	Thr	Phe	Ala	Leu	576
			180					185				190				
ggt	tct	gct	ctt	gcg	ggt	gcg	gct	ggt	ggt	ctg	att	gct	ctt	tat	tat	
Gly	Ser	Ala	Leu	Ala	Gly	Ala	Ala	Gly	Val	Leu	Ile	Ala	Leu	Tyr	Tyr	624
		195					200					205				
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Asn	Ser	Leu	Glu	Pro	Leu	Met	Gly	Val	Thr	Pro	Gly	Leu	Lys	Ser	Phe	672
		210				215					220					
ggt	gcc	gca	gta	ctt	ggt	ggt	atc	gga	att	att	cct	ggt	gcg	gct	ctt	
Val	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ile	Ile	Pro	Gly	Ala	Ala	Leu	720
225					230					235					240	
ggt	ggc	ttt	gtg	att	ggt	cta	ttg	gaa	acc	ttt	gcg	act	gcc	ttt	ggg	
Gly	Gly	Phe	Val	Ile	Gly	Leu	Leu	Glu	Thr	Phe	Ala	Thr	Ala	Phe	Gly	768
			245					250					255			
atg	tca	gat	ttc	cg	gat	gcc	att	ggt	tat	gga	atc	ttg	ttg	ttg	atc	
Met	Ser	Asp	Phe	Arg	Asp	Ala	Ile	Val	Tyr	Gly	Ile	Leu	Leu	Leu	Ile	816
			260					265					270			
ttg	att	gtc	cg	cca	gct	ggt	atc	ctt	ggt	aag	aat	gtg	aaa	gag	aag	
Leu	Ile	Val	Arg	Pro	Ala	Gly	Ile	Leu	Gly	Lys	Asn	Val	Lys	Glu	Lys	864
		275					280					285				
gtg	tag															870
Val																

<210> 531

<211> 289

<212> PRT

<213> Streptococcus pneumoniae

<400> 531

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			20					25					30		
Asn	Phe	Ala	His	Gly	Asp	Ile	Tyr	Met	Met	Gly	Ala	Phe	Ile	Gly	Tyr
		35					40				45				
Phe	Leu	Ile	Asn	Ser	Phe	Gln	Met	Asn	Phe	Phe	Val	Ala	Leu	Ile	Val
		50				55					60				
Ala	Met	Leu	Ala	Thr	Ala	Ile	Leu	Gly	Val	Val	Ile	Glu	Phe	Leu	Ala
65					70				75					80	
Tyr	Arg	Pro	Leu	Arg	His	Ser	Thr	Arg	Ile	Ala	Val	Leu	Ile	Thr	Ala
				85					90					95	
Ile	Gly	Val	Ser	Phe	Leu	Leu	Glu	Tyr	Gly	Met	Val	Tyr	Leu	Val	Gly
			100					105					110		
Ala	Asn	Thr	Arg	Ala	Phe	Pro	Gln	Ala	Ile	Gln	Thr	Val	Arg	Tyr	Asp
		115					120					125			
Leu	Gly	Pro	Ile	Ser	Leu	Thr	Asn	Val	Gln	Leu	Met	Ile	Leu	Ala	Ile
	130					135					140				
Ser	Leu	Ile	Leu	Met	Ile	Leu	Leu	Gln	Val	Ile	Val	Gln	Lys	Thr	Lys

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145      150      155      160
Met Gly Lys Ala Met Arg Ala Val Ser Val Asp Ser Asp Ala Ala Gln
165      170      175
Leu Met Gly Ile Asn Val Asn Arg Thr Ile Ser Phe Thr Phe Ala Leu
180      185      190
Gly Ser Ala Leu Ala Gly Ala Ala Gly Val Leu Ile Ala Leu Tyr Tyr
195
Asn Ser Leu Glu Pro Leu Met Gly Val Thr Pro Gly Leu Lys Ser Phe
210
Val Ala Ala Val Leu Gly Gly Ile Gly Ile Ile Pro Gly Ala Ala Leu
225      230      235      240
Gly Gly Phe Val Ile Gly Leu Leu Glu Thr Phe Ala Thr Ala Phe Gly
245      250      255
Met Ser Asp Phe Arg Asp Ala Ile Val Tyr Gly Ile Leu Leu Ile
260      265      270      275
Leu Ile Val Arg Pro Ala Gly Ile Leu Gly Lys Asn Val Lys Glu Lys
280
Val

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<210> 532

<211> 888

<212> DNA

<213> Agrobacterium tumefaciens

<220>

<221> CDS

<222> (1)..(888)

<400> 532

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1      5      10      15
ctg atc ggc ctg atc aac ggc tcg ttt tat gcg ctg ctg tcg ctc ggc      96
Leu Ile Gly Leu Ile Asn Gly Ser Phe Tyr Ala Leu Leu Ser Leu Gly
20      25      30
ctt gcc gtc att ttc ggc ctg ctg cgc gtc atc aat ttt gcc cat ggg      144
Leu Ala Val Ile Phe Gly Leu Leu Arg Val Ile Asn Phe Ala His Gly
35      40      45
gcg caa tat atg ctc ggc gct ttt gtc gcc ttc ctc ggc ctg caa tat      192
Ala Gln Tyr Met Leu Gly Ala Phe Val Ala Phe Leu Gly Leu Gln Tyr
50      55      60
ttc ggc atc aat ttc tgg atg gcg ctc atc gtt acg ccg ctc gtc gtc      240
Phe Gly Ile Asn Phe Trp Met Ala Leu Ile Val Thr Pro Leu Val Val
65      70      75      80
gcg ctt ttc ggt gcg atc gtc gaa cgt ttc atg ctg tcg cgg ctt tat      288
Ala Leu Phe Gly Ala Ile Val Glu Arg Phe Met Leu Ser Arg Leu Tyr
85      90      95
gat ctc gat ccg ctt tac ggc ctg ctt ttc acc ttc ggt ctg gcg ctg      336
Asp Leu Asp Pro Leu Tyr Gly Leu Leu Phe Thr Phe Gly Leu Ala Leu
100      105      110
gtg gtg gaa ggc acg ttc cgc tgg ctt tat ggt gcg gcg ggc cag ccc      384
Val Val Glu Gly Thr Phe Arg Trp Leu Tyr Gly Ala Ala Gly Gln Pro
115      120      125
tat tcg gtg ccg cgt gag ctt gcc ggc ggc acc aat ctc ggc ttc atg      432
Tyr Ser Val Pro Arg Glu Leu Ala Gly Gly Thr Asn Leu Gly Phe Met
130      135      140      145
ttc ctg ccg aat tat cgc gcc ttc gtt gtc gtc att tcg ctg gtc gcc      480
Phe Leu Pro Asn Tyr Arg Ala Phe Val Val Val Ile Ser Leu Val Ala
150      155      160
tgc atc gcc acc tgg gcg ttg atc gaa aag acg ccg ctc ggc tcc tat      528
Cys Ile Ala Thr Trp Ala Leu Ile Glu Lys Thr Arg Leu Gly Ser Tyr
165      170      175
ctg cgg gcg gcg acg gaa aat ccg acg ctg gtg cag gct ttc ggc atc      576
Leu Arg Ala Ala Thr Glu Asn Pro Thr Leu Val Gln Ala Phe Gly Ile
180      185      190
aac gtg ccg gtg ctg ctg acg ctg act tat gcg ctg ggt gcc ggc ctt      624
Asn Val Pro Val Leu Leu Thr Leu Thr Tyr Ala Leu Gly Ala Gly Leu
195      200      205

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Ala	Gly	Phe	Thr	Gly	Val	Leu	Ala	Ala	Pro	Ile	Tyr	Gln	Val	Ser	Pro	
	210					215					220					
ctg	atg	ggc	acc	aac	ctc	atc	atc	gtc	gtt	ttc	gcc	gtg	gtc	gtc	gtc	720
Leu	Met	Gly	Thr	Asn	Leu	Ile	Ile	Val	Val	Phe	Ala	Val	Val	Val	Val	
225					230					235					240	
ggc	ggc	atg	ggg	tcg	atc	atg	ggg	gcc	atc	gtc	acc	ggg	tac	atg	ctg	768
Gly	Gly	Met	Gly	Ser	Ile	Met	Gly	Ala	Ile	Val	Thr	Gly	Tyr	Met	Leu	
				245					250					255		
ggg	atc	gcc	gaa	ggc	ctg	acc	aag	gtg	ttt	tac	cct	gag	gcc	tcc	aat	816
Gly	Ile	Ala	Glu	Gly	Leu	Thr	Lys	Val	Phe	Tyr	Pro	Glu	Ala	Ser	Asn	
			260					265					270			
atc	gtc	atc	ttc	gtc	atc	atg	gcc	ttt	gtg	ctg	ctc	atc	cgc	ccc	gcc	864
Ile	Val	Ile	Phe	Val	Ile	Met	Ala	Phe	Val	Leu	Leu	Ile	Arg	Pro	Ala	
		275					280					285				
gga	ctt	ttc	gga	aag	gac	gcc	tga									888
Gly	Leu	Phe	Gly	Lys	Asp	Ala										
	290					295										

<210> 533

<211> 295

<212> PRT

<213> Agrobacterium tumefaciens

<400> 533

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			20					25					30			
Leu	Ala	Val	Ile	Phe	Gly	Leu	Leu	Arg	Val	Ile	Asn	Phe	Ala	His	Gly	
		35					40					45				
Ala	Gln	Tyr	Met	Leu	Gly	Ala	Phe	Val	Ala	Phe	Leu	Gly	Leu	Gln	Tyr	
	50					55					60					
Phe	Gly	Ile	Asn	Phe	Trp	Met	Ala	Leu	Ile	Val	Thr	Pro	Leu	Val	Val	
65					70					75					80	
Ala	Leu	Phe	Gly	Ala	Ile	Val	Glu	Arg	Phe	Met	Leu	Ser	Arg	Leu	Tyr	
				85					90					95		
Asp	Leu	Asp	Pro	Leu	Tyr	Gly	Leu	Leu	Phe	Thr	Phe	Gly	Leu	Ala	Leu	
			100					105					110			
Val	Val	Glu	Gly	Thr	Phe	Arg	Trp	Leu	Tyr	Gly	Ala	Ala	Gly	Gln	Pro	
		115					120					125				
Tyr	Ser	Val	Pro	Arg	Glu	Leu	Ala	Gly	Gly	Thr	Asn	Leu	Gly	Phe	Met	
	130					135					140					
Phe	Leu	Pro	Asn	Tyr	Arg	Ala	Phe	Val	Val	Val	Ile	Ser	Leu	Val	Ala	
145					150					155					160	
Cys	Ile	Ala	Thr	Trp	Ala	Leu	Ile	Glu	Lys	Thr	Arg	Leu	Gly	Ser	Tyr	
				165					170					175		
Leu	Arg	Ala	Ala	Thr	Glu	Asn	Pro	Thr	Leu	Val	Gln	Ala	Phe	Gly	Ile	
			180					185					190			
Asn	Val	Pro	Val	Leu	Leu	Thr	Leu	Thr	Tyr	Ala	Leu	Gly	Ala	Gly	Leu	
		195					200					205				
Ala	Gly	Phe	Thr	Gly	Val	Leu	Ala	Ala	Pro	Ile	Tyr	Gln	Val	Ser	Pro	
	210					215					220					
Leu	Met	Gly	Thr	Asn	Leu	Ile	Ile	Val	Val	Phe	Ala	Val	Val	Val	Val	
225					230					235					240	
Gly	Gly	Met	Gly	Ser	Ile	Met	Gly	Ala	Ile	Val	Thr	Gly	Tyr	Met	Leu	
				245					250					255		
Gly	Ile	Ala	Glu	Gly	Leu	Thr	Lys	Val	Phe	Tyr	Pro	Glu	Ala	Ser	Asn	
			260					265					270			
Ile	Val	Ile	Phe	Val	Ile	Met	Ala	Phe	Val	Leu	Leu	Ile	Arg	Pro	Ala	
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Gly	Leu	Phe	Gly	Lys	Asp	Ala										
	290					295										

<210> 534

<211> 1278

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (1)..(1278)

<400> 534

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ttt	gtg	ctg	gcg	ggc	gtc	ttt	atg	ggc	gtg	caa	ctg	gag	ctg	gat	ggc	96
Phe	Val	Leu	Ala	Gly	Val	Phe	Met	Gly	Val	Gln	Leu	Glu	Leu	Asp	Gly	
			20					25					30			
acc	aaa	ctg	gtg	gtc	gac	acg	gct	tgc	gat	gtc	cgt	tgg	cag	tgg	gtg	144
Thr	Lys	Leu	Val	Val	Asp	Thr	Ala	Ser	Asp	Val	Arg	Trp	Gln	Trp	Val	
			35				40					45				
ttt	atc	ggc	acg	gcg	gtg	gtc	ttt	ttc	ttc	cag	ctt	ttg	cga	ccg	gct	192
Phe	Ile	Gly	Thr	Ala	Val	Val	Phe	Phe	Phe	Gln	Leu	Leu	Arg	Pro	Ala	
	50				55					60						
ttc	cag	aaa	ggg	ttg	aaa	agc	gtt	tcc	gga	ccg	aag	ttt	att	ctg	ccc	240
Phe	Gln	Lys	Gly	Leu	Lys	Ser	Val	Ser	Gly	Pro	Lys	Phe	Ile	Leu	Pro	
	65				70				75					80		
gcc	att	gat	ggc	tcc	acg	gtg	aag	cag	aaa	ctg	ttc	ctc	gtg	gcg	ctg	288
Ala	Ile	Asp	Gly	Ser	Thr	Val	Lys	Gln	Lys	Leu	Phe	Leu	Val	Ala	Leu	
				85				90					95			
ttg	gtg	ctt	gcg	gtg	gcg	tgg	ccg	ttt	atg	gtt	tca	cgc	ggg	acg	gtg	336
Leu	Val	Leu	Ala	Val	Ala	Trp	Pro	Phe	Met	Val	Ser	Arg	Gly	Thr	Val	
			100					105					110			
gat	att	gcc	acc	ctg	acc	atg	atc	tac	att	atc	ctc	ggt	ctc	ggg	ctg	384
Asp	Ile	Ala	Thr	Leu	Thr	Met	Ile	Tyr	Ile	Ile	Leu	Gly	Leu	Gly	Leu	
		115					120					125				
aac	gtg	gtt	gtt	ggt	ctt	tct	ggt	ctg	ctg	gtg	ctg	ggg	tac	ggc	ggt	432
Asn	Val	Val	Val	Gly	Leu	Ser	Gly	Leu	Leu	Val	Leu	Gly	Tyr	Gly	Gly	
	130					135				140						
ttt	tac	gcc	atc	ggc	gct	tac	act	ttt	gcg	ctg	ctc	aat	cac	tat	tac	480
Phe	Tyr	Ala	Ile	Gly	Ala	Tyr	Thr	Phe	Ala	Leu	Leu	Asn	His	Tyr	Tyr	
	145				150					155					160	
ggc	ttg	ggc	ttc	tgg	acc	tgc	ctg	ccg	att	gct	gga	tta	atg	gca	gcg	528
Gly	Leu	Gly	Phe	Trp	Thr	Cys	Leu	Pro	Ile	Ala	Gly	Leu	Met	Ala	Ala	
				165				170						175		
gcg	gcg	ggc	ttc	ctg	ctc	ggt	ttt	ccg	gtg	ctg	cgt	ttg	cgc	ggt	gac	576
Ala	Ala	Gly	Phe	Leu	Leu	Gly	Phe	Pro	Val	Leu	Arg	Leu	Arg	Gly	Asp	
			180					185					190			
tat	ctg	gcg	atc	gtt	acc	ctc	ggt	ttc	ggc	gaa	att	gtg	cgc	ata	ttg	624
Tyr	Leu	Ala	Ile	Val	Thr	Leu	Gly	Phe	Gly	Glu	Ile	Val	Arg	Ile	Leu	
		195					200					205				
ctg	ctc	aat	aac	acc	gaa	att	acc	ggc	ggc	ccg	aac	gga	atc	agt	cag	672
Leu	Leu	Asn	Asn	Thr	Glu	Ile	Thr	Gly	Gly	Pro	Asn	Gly	Ile	Ser	Gln	
		210				215					220					
atc	ccg	aaa	ccg	aca	ctc	ttc	gga	ctc	gag	ttc	agc	cgt	acc	gct	cgt	720
Ile	Pro	Lys	Pro	Thr	Leu	Phe	Gly	Leu	Glu	Phe	Ser	Arg	Thr	Ala	Arg	
	225				230				235					240		
gaa	ggc	ggc	tgg	gac	acg	ttc	agt	aat	ttc	ttt	ggc	ctg	aaa	tac	gat	768
Glu	Gly	Gly	Trp	Asp	Thr	Phe	Ser	Asn	Phe	Phe	Gly	Leu	Lys	Tyr	Asp	
				245				250						255		
ccc	tcc	gat	cgt	gtc	atc	ttc	ctc	tac	ctg	gtg	gcg	ttg	ctg	ctg	gtg	816
Pro	Ser	Asp	Arg	Val	Ile	Phe	Leu	Tyr	Leu	Val	Ala	Leu	Leu	Leu	Val	
			260					265					270			
gtg	cta	agc	ctg	ttt	gtc	att	aac	cgc	ctg	ctg	cgg	atg	ccg	ctg	ggg	864
Val	Leu	Ser	Leu	Phe	Val	Ile	Asn	Arg	Leu	Leu	Arg	Met	Pro	Leu	Gly	
		275					280					285				
cgt	gcg	tgg	gaa	gcg	ttg	cgt	gaa	gat	gaa	atc	gcc	tgc	cgt	tcg	ctg	912
Arg	Ala	Trp	Glu	Ala	Leu	Arg	Glu	Asp	Glu	Ile	Ala	Cys	Arg	Ser	Leu	
		290				295					300					
ggc	tta	agc	ccg	cgt	cgt	atc	aag	ctg	act	gcc	ttt	acc	ata	agt	gcc	960
Gly	Leu	Ser	Pro	Arg	Arg	Ile	Lys	Leu	Thr	Ala	Phe	Thr	Ile	Ser	Ala	
	305				310					315					320	
gcg	ttt	gcc	ggt	ttt	gcc	gga	acg	ctg	ttt	gcg	gcg	cgt	cag	ggc	ttt	1008
Ala	Phe	Ala	Gly	Phe	Ala	Gly	Thr	Leu	Phe	Ala	Ala	Arg	Gln	Gly	Phe	
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gtc	agc	ccg	gaa	tcc	ttc	acc	ttt	gcc	gaa	tcg	gcg	ttt	gtg	ctg	gcg	1056

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Ile	Val	Val	Leu	Gly	Gly	Met	Gly	Ser	Gln	Phe	Ala	Val	Ile	Leu	Ala		
		355					360					365					
gca	att	ttg	ctg	gtg	gtg	tcg	cgc	gag	ttg	atg	cgt	gat	ttc	aac	gaa	1152	
Ala	Ile	Leu	Leu	Val	Val	Ser	Arg	Glu	Leu	Met	Arg	Asp	Phe	Asn	Glu		
		370				375					380						
tac	agc	atg	tta	atg	ctc	ggg	ggg	ttg	atg	gtg	ctg	atg	atg	atc	tgg	1200	
Tyr	Ser	Met	Leu	Met	Leu	Gly	Gly	Leu	Met	Val	Leu	Met	Met	Ile	Trp		
					390					395					400		
cgt	ccg	cag	ggc	ttg	ctg	ccc	atg	acg	cgc	ccg	caa	ctg	aag	ctg	aaa	1248	
Arg	Pro	Gln	Gly	Leu	Leu	Pro	Met	Thr	Arg	Pro	Gln	Leu	Lys	Leu	Lys		
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aac	ggc	gca	gcg	aaa	gga	gag	cag	gca	tga							1278	
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<210> 535

<211> 425

<212> PRT

<213> Escherichia coli

<400> 535

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			20					25					30				
Thr	Lys	Leu	Val	Val	Asp	Thr	Ala	Ser	Asp	Val	Arg	Trp	Gln	Trp	Val		
			35				40					45					
Phe	Ile	Gly	Thr	Ala	Val	Val	Phe	Phe	Phe	Gln	Leu	Leu	Arg	Pro	Ala		
			50			55					60						
Phe	Gln	Lys	Gly	Leu	Lys	Ser	Val	Ser	Gly	Pro	Lys	Phe	Ile	Leu	Pro		
65				70				75						80			
Ala	Ile	Asp	Gly	Ser	Thr	Val	Lys	Gln	Lys	Leu	Phe	Leu	Val	Ala	Leu		
				85				90						95			
Leu	Val	Leu	Ala	Val	Ala	Trp	Pro	Phe	Met	Val	Ser	Arg	Gly	Thr	Val		
			100					105					110				
Asp	Ile	Ala	Thr	Leu	Thr	Met	Ile	Tyr	Ile	Ile	Leu	Gly	Leu	Gly	Leu		
		115				120						125					
Asn	Val	Val	Gly	Leu	Ser	Gly	Leu	Leu	Val	Leu	Gly	Tyr	Gly	Gly			
		130			135					140							
Phe	Tyr	Ala	Ile	Gly	Ala	Tyr	Thr	Phe	Ala	Leu	Leu	Asn	His	Tyr	Tyr		
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			180				185					190					
Tyr	Leu	Ala	Ile	Val	Thr	Leu	Gly	Phe	Gly	Glu	Ile	Val	Arg	Ile	Leu		
		195				200						205					
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		210			215						220						
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225				230					235					240			
Glu	Gly	Gly	Trp	Asp	Thr	Phe	Ser	Asn	Phe	Phe	Gly	Leu	Lys	Tyr	Asp		
			245					250						255			
Pro	Ser	Asp	Arg	Val	Ile	Phe	Leu	Tyr	Leu	Val	Ala	Leu	Leu	Val			
			260					265					270				
Val	Leu	Ser	Leu	Phe	Val	Ile	Asn	Arg	Leu	Leu	Arg	Met	Pro	Leu	Gly		
		275					280					285					
Arg	Ala	Trp	Glu	Ala	Leu	Arg	Glu	Asp	Glu	Ile	Ala	Cys	Arg	Ser	Leu		
		290				295					300						
Gly	Leu	Ser	Pro	Arg	Arg	Ile	Lys	Leu	Thr	Ala	Phe	Thr	Ile	Ser	Ala		
305				310						315				320			
Ala	Phe	Ala	Gly	Phe	Ala	Gly	Thr	Leu	Phe	Ala	Ala	Arg	Gln	Gly	Phe		
			325					330						335			
Val	Ser	Pro	Glu	Ser	Phe	Thr	Phe	Ala	Glu	Ser	Ala	Phe	Val	Leu	Ala		
			340					345					350				
Ile	Val	Val	Leu	Gly	Gly	Met	Gly	Ser	Gln	Phe	Ala	Val	Ile	Leu	Ala		

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355
 Ala Ile Leu Leu Val Val Ser 360
 370 Arg Glu Leu Met Arg 365
 Tyr Ser Met Leu Met Leu 375
 385 Gly Gly Leu Met Val 380
 Arg Pro Gln Gly Leu 390
 405 Pro Met Thr Arg 395
 410 Pro Gln Leu Lys 415
 Asn Gly Ala 420
 Lys Gly Glu Gln Ala 425

<210> 536

<211> 861

<212> DNA

<213> Synechocystis sp

<220>

<221> CDS

<222> (1)..(861)

<400> 536

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1				5					10					15		
atc	gcc	ctg	ggg	gca	gtg	ggg	ttg	acc	ctg	acc	tat	ggc	att	tta	cgc	96
Ile	Ala	Leu	Gly	Ala	Val	Gly	Leu	Thr	Leu	Thr	Tyr	Gly	Ile	Leu	Arg	
			20					25					30			
ctg	tct	aat	ttt	gcc	cat	ggt	gat	ttt	atg	act	ttg	gcg	gcc	tat	tta	144
Leu	Ser	Asn	Phe	Ala	His	Gly	Asp	Phe	Met	Thr	Leu	Ala	Ala	Tyr	Leu	
			35				40					45				
act	tgg	tgg	gcc	aac	acc	agc	ggc	att	aat	ttg	tgg	tta	tcc	atg	gcc	192
Thr	Trp	Trp	Ala	Asn	Thr	Ser	Gly	Ile	Asn	Leu	Trp	Leu	Ser	Met	Ala	
	50					55				60						
ctg	ggt	tgt	gtc	ggt	acc	atc	att	gcc	atg	ttc	att	ggt	gaa	tgg	ttg	240
Leu	Gly	Cys	Val	Gly	Thr	Ile	Ile	Ala	Met	Phe	Ile	Gly	Glu	Trp	Leu	
	65				70					75					80	
ctc	tgg	aag	ccc	atg	cgg	gcc	cgg	cgg	gct	acg	gca	aca	acg	ctg	atc	288
Leu	Trp	Lys	Pro	Met	Arg	Ala	Arg	Arg	Ala	Thr	Ala	Thr	Thr	Leu	Ile	
				85					90					95		
att	att	tcc	att	ggt	cta	gcc	cta	ttt	ctc	cgc	aac	ggc	atc	ctc	ttg	336
Ile	Ile	Ser	Ile	Gly	Leu	Ala	Leu	Phe	Leu	Arg	Asn	Gly	Ile	Leu	Leu	
			100					105					110			
atc	tgg	ggt	ggc	aat	aac	caa	aat	tac	cga	gtg	ccc	att	gtc	cct	gcc	384
Ile	Trp	Gly	Gly	Asn	Asn	Gln	Asn	Tyr	Arg	Val	Pro	Ile	Val	Pro	Ala	
		115					120				125					
cag	gat	ttt	atg	ggc	att	aaa	ttt	gag	tat	tac	cgt	cta	ctg	gtc	att	432
Gln	Asp	Phe	Met	Gly	Ile	Lys	Phe	Glu	Tyr	Tyr	Arg	Leu	Leu	Val	Ile	
	130					135					140					
gct	atg	gcg	atc	gcc	gcc	atg	gtg	gtg	ttg	cat	ttg	att	ttg	caa	agg	480
Ala	Met	Ala	Ile	Ala	Ala	Met	Val	Val	Leu	His	Leu	Ile	Leu	Gln	Arg	
	145				150					155					160	
acg	aaa	gtg	ggc	aaa	gcg	atg	cgg	gcc	gtg	gcg	gac	aat	ggt	gat	ctg	528
Thr	Lys	Val	Gly	Lys	Ala	Met	Arg	Ala	Val	Ala	Asp	Asn	Val	Asp	Leu	
				165					170					175		
gcg	aaa	gta	tcc	ggc	atc	aac	gtg	gaa	tgg	gta	gtg	atg	tgg	acc	tgg	576
Ala	Lys	Val	Ser	Gly	Ile	Asn	Val	Glu	Trp	Val	Val	Met	Trp	Thr	Trp	
			180					185					190			
gta	atg	acc	gca	gtg	tta	aca	gcc	cta	gga	gga	tcc	atg	tat	ggc	ctg	624
Val	Met	Thr	Ala	Val	Leu	Thr	Ala	Leu	Gly	Gly	Ser	Met	Tyr	Gly	Leu	
		195					200					205				
atg	acc	acc	ctg	aaa	ccg	aat	atg	ggg	tgg	ttt	ttg	att	ttg	ccc	atg	672
Met	Thr	Thr	Leu	Lys	Pro	Asn	Met	Gly	Trp	Phe	Leu	Ile	Leu	Pro	Met	
	210					215					220					
ttt	gct	tcg	gtg	att	cta	ggg	att	ggt	aat	ccc	tac	ggg	gcg	atc		720
Phe	Ala	Ser	Val	Ile	Leu	Gly	Gly	Ile	Gly	Asn	Pro	Tyr	Gly	Ala	Ile	
	225				230					235					240	
gcc	ggg	ggg	ata	att	att	ggc	gta	gcc	cag	gaa	gtg	agc	gtg	cct	tgg	768
Ala	Gly	Gly	Ile	Ile	Ile	Gly	Val	Ala	Gln	Glu	Val	Ser	Val	Pro	Trp	
				245					250					255		
ttt	ggc	acc	agt	tac	aaa	atg	ggg	gtg	gca	ttg	ctg	ttg	atg	atc	atc	816

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Phe Gly Thr Ser Tyr Lys Met Gly Val Ala Leu Leu Leu Met Ile Ile
 att ttg ttc att cgt ccc caa ggt ttg ttt aaa ggc act caa taa
 Ile Leu Phe Ile Arg Pro Gln Gly Leu Phe Lys Gly Thr Gln
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861

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<211> 286

<212> PRT

<213> Synechocystis sp

<400> 537

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 20 25 30
 Leu Ser Asn Phe Ala His Gly Asp Phe Met Thr Leu Ala Ala Tyr Leu
 35 40 45
 Thr Trp Trp Ala Asn Thr Ser Gly Ile Asn Leu Trp Leu Ser Met Ala
 50 55 60
 Leu Gly Cys Val Gly Thr Ile Ile Ala Met Phe Ile Gly Glu Trp Leu
 65 70 75 80
 Leu Trp Lys Pro Met Arg Ala Arg Arg Ala Thr Thr Leu Ile
 85 90 95
 Ile Ile Ser Ile Gly Leu Ala Leu Phe Leu Arg Asn Gly Ile Leu Leu
 100 105 110
 Ile Trp Gly Gly Asn Asn Gln Asn Tyr Arg Val Pro Ile Val Pro Ala
 115 120 125
 Gln Asp Phe Met Gly Ile Lys Phe Glu Tyr Tyr Arg Leu Leu Val Ile
 130 135 140
 Ala Met Ala Ile Ala Ala Met Val Val Leu His Leu Ile Leu Gln Arg
 145 150 155 160
 Thr Lys Val Gly Lys Ala Met Arg Ala Val Ala Asp Asn Val Asp Leu
 165 170 175
 Ala Lys Val Ser Gly Ile Asn Val Glu Trp Val Val Met Trp Thr Trp
 180 185 190
 Val Met Thr Ala Val Leu Thr Ala Leu Gly Gly Ser Met Tyr Gly Leu
 195 200 205
 Met Thr Thr Leu Lys Pro Asn Met Gly Trp Phe Leu Ile Leu Pro Met
 210 215 220
 Phe Ala Ser Val Ile Leu Gly Gly Ile Gly Asn Pro Tyr Gly Ala Ile
 225 230 235 240
 Ala Gly Gly Ile Ile Ile Gly Val Ala Gln Glu Val Ser Val Pro Trp
 245 250 255
 Phe Gly Thr Ser Tyr Lys Met Gly Val Ala Leu Leu Leu Met Ile Ile
 260 265 270
 Ile Leu Phe Ile Arg Pro Gln Gly Leu Phe Lys Gly Thr Gln
 275 280 285

<210> 538

<211> 1167

<212> DNA

<213> Synechocystis sp

<220>

<221> CDS

<222> (1)..(1167)

<400> 538

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 1 10 15
 gtg tta ctg att gct gcc ctg ggt ttg gcg atc gtc ttt ggt ctg atg
 Val Leu Leu Ile Ala Ala Leu Gly Leu Ala Ile Val Phe Gly Leu Met
 20 25 30
 ggg gta att aac ctg gcc cat ggg gaa ttg atg atg ttg ggc gct tac
 Gly Val Ile Asn Leu Ala His Gly Glu Leu Met Met Leu Gly Ala Tyr
 35 40 45
 agc acc ttt gtg gtg caa aac ctc ttc cag agc ctc ggt gac cct tgg
 50 55 60 65 70 75 80 85 90 95

48

96

144

192

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Ser	Thr	Phe	Val	Val	Gln	Asn	Leu	Phe	Gln	Ser	Leu	Gly	Asp	Pro	Trp	
50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	
ttt	gac	ctc	tac	att	ttt	gcc	gct	ctg	ccc	ggt	gct	ttc	ctg	gtg	gcg	240
Phe	Asp	Leu	Tyr	Ile	Phe	Ala	Ala	Leu	Pro	Val	Ala	Phe	Leu	Val	Ala	
65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	
gcg	atc	gcc	ggt	cta	ggt	ttg	gaa	aga	cag	ggt	atc	cg	tac	ttg	tac	288
Ala	Ile	Ala	Gly	Leu	Val	Leu	Glu	Arg	Gln	Val	Ile	Arg	Tyr	Leu	Tyr	
85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	
ggc	cga	ccg	ctg	gaa	aca	ttg	ctg	gcc	acc	tgg	ggg	gtg	agc	ctg	att	336
Gly	Arg	Pro	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Val	Ser	Leu	Ile	
100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	
ttg	caa	cag	ttt	gtc	cg	agt	gtg	aac	tgg	att	atg	gtg	ctg	gtg	gtg	384
Leu	Gln	Gln	Phe	Val	Arg	Ser	Val	Asn	Trp	Ile	Met	Val	Leu	Val	Val	
115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	
ggt	ata	ttt	ttg	ctt	tta	tat	ttc	ggt	ggc	acc	tgg	tta	att	aaa	cgc	432
Gly	Ile	Phe	Leu	Leu	Leu	Tyr	Phe	Gly	Gly	Thr	Trp	Leu	Ile	Lys	Arg	
130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	
cag	gcc	ggt	ggc	aaa	cct	tgg	tta	ggg	aaa	gcc	caa	gtc	atc	ctt	ttc	480
Gln	Ala	Gly	Gly	Lys	Pro	Trp	Leu	Gly	Lys	Ala	Gln	Val	Ile	Leu	Phe	
145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	
ttt	ctc	tca	gcg	gcg	atc	tcc	ggc	att	agt	ggt	ttt	gtg	gtg	gcc	cag	528
Phe	Leu	Ser	Ala	Ala	Ile	Ser	Gly	Ile	Ser	Gly	Phe	Val	Val	Ala	Gln	
165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
gcc	aat	tct	ccc	ctg	tgg	aat	cg	gct	tgg	ttt	gga	gct	agg	aac	gtc	576
Ala	Asn	Ser	Pro	Leu	Trp	Asn	Arg	Ala	Trp	Phe	Gly	Ala	Arg	Asn	Val	
180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	
aat	ggt	agt	gcc	ccc	act	tgg	ttg	cg	ggg	ggg	ctt	gcc	att	ggc	act	624
Asn	Val	Ser	Ala	Pro	Thr	Trp	Leu	Arg	Gly	Gly	Leu	Ala	Ile	Gly	Thr	
195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	
ttc	cag	gta	ccc	tac	acc	agg	att	ttt	ata	att	ttc	ctg	act	ctg	ctc	672
Phe	Gln	Val	Pro	Tyr	Thr	Arg	Ile	Phe	Ile	Ile	Phe	Leu	Thr	Leu	Leu	
210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	
tgt	tta	ctg	gcg	gtg	tat	cta	att	ttc	tac	cgt	tct	aat	tgg	gga	ctg	720
Cys	Leu	Leu	Ala	Val	Tyr	Leu	Ile	Phe	Tyr	Arg	Ser	Asn	Trp	Gly	Leu	
225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	
aga	att	cga	gcc	ggt	acc	caa	aac	cg	ggt	atg	agt	gct	tgt	ttg	ggt	768
Arg	Ile	Arg	Ala	Val	Thr	Gln	Asn	Arg	Gly	Met	Ser	Ala	Cys	Leu	Gly	
245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
att	ccc	act	ggg	cag	gtg	gat	gct	ttg	acc	ttt	gcc	ctt	ggt	tct	ggc	816
Ile	Pro	Thr	Gly	Gln	Val	Asp	Ala	Leu	Thr	Phe	Ala	Leu	Gly	Ser	Gly	
260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	
cta	gcg	ggc	att	gca	ggc	tgt	gcc	att	agt	ttt	ctg	ggg	gcg	gtg	ggg	864
Leu	Ala	Gly	Ile	Ala	Gly	Cys	Ala	Ile	Ser	Phe	Leu	Gly	Ala	Val	Gly	
275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	
ccc	aac	att	ggt	caa	aac	tac	att	atc	aat	acc	ttc	atg	gtg	gtg	gtg	912
Pro	Asn	Ile	Gly	Gln	Asn	Tyr	Ile	Ile	Asn	Thr	Phe	Met	Val	Val	Val	
290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	
gta	ggg	ggc	gta	ggt	aac	cta	ctc	gga	acc	att	att	gct	tcc	ctg	gcg	960
Val	Gly	Gly	Val	Gly	Asn	Leu	Leu	Gly	Thr	Ile	Ile	Ala	Ser	Leu	Ala	
305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	
atc	ggt	gta	tcc	agt	gac	ttg	att	ggt	agt	ggc	acc	ctg	att	cgt	tta	1008
Ile	Gly	Val	Ser	Ser	Asp	Leu	Ile	Gly	Ser	Gly	Thr	Leu	Ile	Arg	Leu	
325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	
ttc	ccc	cca	gag	gga	gca	ttg	caa	cct	ctg	tac	gaa	ttt	ttt	acc	ttt	1056
Phe	Pro	Pro	Glu	Gly	Ala	Leu	Gln	Pro	Leu	Tyr	Glu	Phe	Phe	Thr	Phe	
340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	
ttt	gcc	acc	agg	atg	gcc	agg	gtt	tta	gtc	ttc	gcc	ctg	att	atc	atc	1104
Phe	Ala	Thr	Ser	Met	Ala	Arg	Val	Leu	Val	Phe	Ala	Leu	Ile	Ile	Ile	
355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	
ctt	ttt	ctg	caa	atc	aag	cca	gcg	ggt	att	ttc	cct	ccc	aaa	ggc	cgg	1152
Leu	Phe	Leu	Gln	Ile	Lys	Pro	Ala	Gly	Ile	Phe	Pro	Pro	Lys	Gly	Arg	
370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	
acg	gcg	gaa	ttg	tag												1167
Thr	Ala	Glu	Leu													
385																

<210> 539

<211> 388

<212> PRT

<213> Synechocystis sp

<400> 539

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 Val Leu Leu Ile Ala Ala Leu Gly Leu Ala Ile Val Phe Gly Leu Met
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 Gly Val Ile Asn Leu Ala His Gly Glu Leu Met Met Leu Gly Ala Tyr
 35 40 45
 Ser Thr Phe Val Val Gln Asn Leu Phe Gln Ser Leu Gly Asp Pro Trp
 50 55 60
 Phe Asp Leu Tyr Ile Phe Ala Ala Leu Pro Val Ala Phe Leu Val Ala
 65 70 75 80
 Ala Ile Ala Gly Leu Val Leu Glu Arg Gln Val Ile Arg Tyr Leu Tyr
 85 90 95
 Gly Arg Pro Leu Glu Thr Leu Leu Ala Thr Trp Gly Val Ser Leu Ile
 100 105 110
 Leu Gln Gln Phe Val Arg Ser Val Asn Trp Ile Met Val Leu Val Val
 115 120 125
 Gly Ile Phe Leu Leu Leu Tyr Phe Gly Gly Thr Trp Leu Ile Lys Arg
 130 135 140
 Gln Ala Gly Gly Lys Pro Trp Leu Gly Lys Ala Gln Val Ile Leu Phe
 145 150 155 160
 Phe Leu Ser Ala Ala Ile Ser Gly Ile Ser Gly Phe Val Val Ala Gln
 165 170 175
 Ala Asn Ser Pro Leu Trp Asn Arg Ala Trp Phe Gly Ala Arg Asn Val
 180 185 190
 Asn Val Ser Ala Pro Thr Trp Leu Arg Gly Gly Leu Ala Ile Gly Thr
 195 200 205
 Phe Gln Val Pro Tyr Thr Arg Ile Phe Ile Ile Phe Leu Thr Leu Leu
 210 215 220
 Cys Leu Leu Ala Val Tyr Leu Ile Phe Tyr Arg Ser Asn Trp Gly Leu
 225 230 235 240
 Arg Ile Arg Ala Val Thr Gln Asn Arg Gly Met Ser Ala Cys Leu Gly
 245 250 255
 Ile Pro Thr Gly Gln Val Asp Ala Leu Thr Phe Ala Leu Gly Ser Gly
 260 265 270
 Leu Ala Gly Ile Ala Gly Cys Ala Ile Ser Phe Leu Gly Ala Val Gly
 275 280 285
 Pro Asn Ile Gly Gln Asn Tyr Ile Ile Asn Thr Phe Met Val Val Val
 290 295 300
 Val Gly Gly Val Gly Asn Leu Leu Gly Thr Ile Ile Ala Ser Leu Ala
 305 310 315 320
 Ile Gly Val Ser Ser Asp Leu Ile Gly Ser Gly Thr Leu Ile Arg Leu
 325 330 335
 Phe Pro Pro Glu Gly Ala Leu Gln Pro Leu Tyr Glu Phe Phe Thr Phe
 340 345 350
 Phe Ala Thr Thr Ser Met Ala Arg Val Leu Val Phe Ala Leu Ile Ile
 355 360 365
 Leu Phe Leu Gln Ile Lys Pro Ala Gly Ile Phe Pro Pro Lys Gly Arg
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 Thr Ala Glu Leu
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<211> 1233

<212> DNA

<213> Synechocystis sp

<220>

<221> CDS

<222> (1)..(1233)

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 aag aag ttg ggt tgg aat gac tat gcg ttg ttc ggg tca gtg ttg gtt
 Lys Lys Leu Gly Trp Asn Asp Tyr Ala Leu Phe Gly Ser Val Leu Val
 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95

48

96

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20	25	30		
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Phe Ala Cys Ile Pro Leu Ile Ile Ala Val Leu Ser Leu Ser Asp Gly				
35	40	45		
ggc cca agt caa tgg ctg ttg aat aat ttt cct ttc cta cgg ctc agg				192
Gly Pro Ser Gln Trp Leu Leu Asn Asn Phe Pro Phe Leu Arg Leu Arg				
50	55	60		
ttg atg ggg cgt ttt ctg tct ttg gct att att gcc ctg ggc att gac				240
Leu Met Gly Arg Phe Leu Ser Leu Ala Ile Ile Ala Leu Gly Ile Asp				
65	70	75		
cta att tgg ggc tac acg ggg tta ctc agt tta ggt cat ggc ata ttt				288
Leu Ile Trp Gly Tyr Thr Gly Leu Leu Ser Leu Gly His Gly Ile Phe				
85	90	95		
ttt gcc ctt ggg ggt tat gcc ttt gcc atg tat ctc aat ctc cag tta				336
Phe Ala Leu Gly Gly Tyr Ala Phe Ala Met Tyr Leu Asn Leu Gln Leu				
100	105	110		
ccg gaa ggg caa tta cct gaa ttt ttt ggt ctc tac ggg gtg gat aaa				384
Pro Glu Gly Gln Leu Pro Glu Phe Phe Gly Leu Tyr Gly Val Asp Lys				
115	120	125		
ctg cca ctg att tgg caa cct ttc cat tcg tta ccc gtt act gta ttg				432
Leu Pro Leu Ile Trp Gln Pro Phe His Ser Leu Pro Val Thr Val Leu				
130	135	140		
gcc atg gtg ttg gtg cca ggg gcg atc gcc gcc ctg ttg ggt tat tta				480
Ala Met Val Leu Val Pro Gly Ala Ile Ala Leu Leu Gly Tyr Leu				
145	150	155		
att ttt cgt aac cgc atc aag ggt gta tat ttt tcg att ttg acc cag				528
Ile Phe Arg Asn Arg Ile Lys Gly Val Tyr Phe Ser Ile Leu Thr Gln				
165	170	175		
gcg gct ctg ttg gtg ttt tac aac ttt ttc aac ggg caa cag aaa tta				576
Ala Ala Leu Val Phe Tyr Asn Phe Phe Asn Gly Gln Lys Leu				
180	185	190		
att aac ggt act aat ggc tta aaa act gat aca gaa aga att ttt ggt				624
Ile Asn Gly Thr Asn Gly Leu Lys Thr Asp Thr Glu Arg Ile Phe Gly				
195	200	205		
tac cta gcc agt tcc gac gga gtc caa ctg gta ttt tat gaa gtc acc				672
Tyr Leu Ala Ser Ser Asp Gly Val Gln Leu Val Phe Tyr Glu Val Thr				
210	215	220		
gtc ctg gct ctg tta ttg gtt tat att ctt tgc cgt tgg ctt act agt				720
Val Leu Ala Leu Leu Leu Val Tyr Ile Leu Cys Arg Trp Leu Thr Ser				
225	230	235		
ggg cgc ttt ggc cgc atc ctc gta gcc att cgg gac gat gaa acc agg				768
Gly Arg Phe Gly Arg Ile Leu Val Ala Ile Arg Asp Asp Glu Thr Arg				
245	250	255		
gta aga ttt acc ggt tac gat ccc act ggc ttc aag gtg ttg gta ttt				816
Val Arg Phe Thr Gly Tyr Asp Pro Thr Gly Phe Lys Val Leu Val Phe				
260	265	270		
ggc att tcc ggg gcg atc gcc ggt ctg tcg ggg ggg cta tac aca gtg				864
Gly Ile Ser Gly Ala Ile Ala Gly Leu Ser Gly Gly Leu Tyr Thr Val				
275	280	285		
caa acg ggg att att act ccg agc att atg gat gtg gcc ttt tcc att				912
Gln Thr Gly Ile Ile Thr Pro Ser Ile Met Asp Val Ala Phe Ser Ile				
290	295	300		
gaa atg gtc att tgg gtt gcg gtt ggc ggc agg gct acc cta gtg ggg				960
Glu Met Val Ile Trp Val Ala Val Gly Gly Arg Ala Thr Leu Val Gly				
305	310	315		
gct gtg ttg gga acc ctg ttg gtg cgc cta gcc cag agc agt ttg agc				1008
Ala Val Leu Gly Thr Leu Leu Val Arg Leu Ala Gln Ser Ser Leu Ser				
325	330	335		
gag cag ttt ccc gag gtt tgg ctg ttt ttc caa ggg gct ttg ttc ctg				1056
Glu Gln Phe Pro Glu Val Trp Leu Phe Phe Gln Gly Ala Leu Phe Leu				
340	345	350		
att gta gtt act gtg ctt ccc aac ggc att gtc ggt tgg tgg caa gaa				1104
Ile Val Val Thr Val Leu Pro Asn Gly Ile Val Gly Trp Trp Gln Glu				
355	360	365		
cag ggc att gtg caa ctc agg aat ttg ttc cga ggt aaa ccc cag ttg				1152
Gln Gly Ile Val Gln Leu Arg Asn Leu Phe Arg Gly Lys Pro Gln Leu				
370	375	380		
gcc acc ttt cct agt ttg gaa gaa gat cct ttg gtg cag gaa gaa cgc				1200
Ala Thr Phe Pro Ser Leu Glu Glu Asp Pro Leu Val Gln Glu Glu Arg				

385 390 395 400
aaa cag ttt gaa gga gag tct aag gaa ccg taa 1233
Lys Gln Phe Glu Gly Glu Ser Lys Glu Pro

405 410

<210> 541
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<213> Synechocystis sp

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			20					25					30		
Phe	Ala	Cys	Ile	Pro	Leu	Ile	Ile	Ala	Val	Leu	Ser	Leu	Ser	Asp	Gly
		35					40					45			
Gly	Pro	Ser	Gln	Trp	Leu	Leu	Asn	Asn	Phe	Pro	Phe	Leu	Arg	Leu	Arg
	50					55					60				
Leu	Met	Gly	Arg	Phe	Leu	Ser	Leu	Ala	Ile	Ile	Ala	Leu	Gly	Ile	Asp
65					70					75					80
Leu	Ile	Trp	Gly	Tyr	Thr	Gly	Leu	Leu	Ser	Leu	Gly	His	Gly	Ile	Phe
				85					90					95	
Phe	Ala	Leu	Gly	Gly	Tyr	Ala	Phe	Ala	Met	Tyr	Leu	Asn	Leu	Gln	Leu
			100					105					110		
Pro	Glu	Gly	Gln	Leu	Pro	Glu	Phe	Gly	Leu	Tyr	Gly	Val	Asp	Lys	
		115					120				125				
Leu	Pro	Leu	Ile	Trp	Gln	Pro	Phe	His	Ser	Leu	Pro	Val	Thr	Val	Leu
	130					135					140				
Ala	Met	Val	Leu	Val	Pro	Gly	Ala	Ile	Ala	Ala	Leu	Leu	Gly	Tyr	Leu
145					150				155						160
Ile	Phe	Arg	Asn	Arg	Ile	Lys	Gly	Val	Tyr	Phe	Ser	Ile	Leu	Thr	Gln
			165						170					175	
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			180					185					190		
Ile	Asn	Gly	Thr	Asn	Gly	Leu	Lys	Thr	Asp	Thr	Glu	Arg	Ile	Phe	Gly
		195					200					205			
Tyr	Leu	Ala	Ser	Ser	Asp	Gly	Val	Gln	Leu	Val	Phe	Tyr	Glu	Val	Thr
	210					215					220				
Val	Leu	Ala	Leu	Leu	Leu	Val	Tyr	Ile	Leu	Cys	Arg	Trp	Leu	Thr	Ser
225					230					235					240
Gly	Arg	Phe	Gly	Arg	Ile	Leu	Val	Ala	Ile	Arg	Asp	Asp	Glu	Thr	Arg
			245					250						255	
Val	Arg	Phe	Thr	Gly	Tyr	Asp	Pro	Thr	Gly	Phe	Lys	Val	Leu	Val	Phe
			260					265					270		
Gly	Ile	Ser	Gly	Ala	Ile	Ala	Gly	Leu	Ser	Gly	Gly	Leu	Tyr	Thr	Val
		275					280					285			
Gln	Thr	Gly	Ile	Ile	Thr	Pro	Ser	Ile	Met	Asp	Val	Ala	Phe	Ser	Ile
	290					295					300				
Glu	Met	Val	Ile	Trp	Val	Ala	Val	Gly	Gly	Arg	Ala	Thr	Leu	Val	Gly
305					310					315					320
Ala	Val	Leu	Gly	Thr	Leu	Leu	Val	Arg	Leu	Ala	Gln	Ser	Ser	Leu	Ser
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Glu	Gln	Phe	Pro	Glu	Val	Trp	Leu	Phe	Phe	Gln	Gly	Ala			

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<210> 542
<211> 933
<212> DNA
<213> Streptomyces coelicolor
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<220>

<221> CDS

<222> (1)..(933)

<400> 542

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atg tac ggg ctc gtc gcc atc ggc tac aca atg gtc tac ggc atc gtc	96
Met Tyr Gly Leu ₂₀ Val Ala Ile Gly Tyr ₂₅ Thr Met Val Tyr Gly ₃₀ Ile Val	
cag ctc atc aac ttc gcc cac ggc gag atc ttc atg acc ggt gcc ttc	144
Gln Leu Ile ₃₅ Asn Phe Ala His Gly ₄₀ Glu Ile Phe Met Thr ₄₅ Gly Ala Phe	
ggc gca ctc acg gtc tac atg tac atc ctg ccc gac ggc acc tcc atg	192
Gly Ala Leu Thr Val Tyr Met Tyr Ile Leu Pro Asp ₆₀ Gly Thr Ser Met	
ctg atc gcc ctg ccc ctg atg ctc atc ggc gcg gtc atc gtc tcc acc	240
Leu Ile Ala Leu Pro ₇₀ Met Leu Ile Gly Ala Val Ile Val Ser Thr ₈₀	
acc gtc gcc gtc ggg gcg gaa cgg ttc gcc tat cgc ccc ctg cgc ggc	288
Thr Val Ala Val Gly ₈₅ Ala Glu Arg Phe Ala Tyr Arg Pro Leu Arg Gly ₉₅	
gca ccc cgg ctc gcg ccc ctc atc acc gcg atc ggc ctc tcc ctc gcc	336
Ala Pro Arg Leu ₁₀₀ Ala Pro Leu Ile Thr ₁₀₅ Ala Ile Gly Leu Ser Leu Ala	
ctg cag cag gcg gtg tgg gcc tgg tac ccg gac gcg aag tcc gcg cgg	384
Leu Gln Gln Ala Val Trp Ala Trp Tyr Pro Asp Ala Lys ₁₂₅ Ser Ala Arg	
ccc ttc ccg cag atc gac ggc ggc ccc ttc cac atc ggc aac gtc acc	432
Pro Phe Pro Gln Ile Asp Gly ₁₃₅ Gly Pro Phe His Ile Gly Asn Val Thr	
ctc cag acc ggc gac atc ttc ctg ttc gtc gtc gcc ccg gtg agc atg	480
Leu Gln Thr Gly Asp Ile Phe Leu Phe Val Val ₁₅₅ Ala Pro Val Ser Met ₁₆₀	
gcc atc ctc ggc ttc ttc gtg atg cgc acc cgc acc gga cgg ggt atg	528
Ala Ile Leu Gly Phe Phe Val Met Arg Thr Arg Thr Gly Arg Gly Met ₁₇₅	
cag gcc acc gcc cag gac ccg gac acc gcc aag ctg atg ggc gtc gac	576
Gln Ala Thr Ala ₁₈₀ Gln Asp Pro Asp Thr ₁₈₅ Ala Lys Leu Met Gly ₁₉₀ Val Asp	
acg gac cgc atc atc gtg atc gcc ttc gcc ctc ggc gcc gtc ttc gcc	624
Thr Asp Arg Ile Ile Val Ile Ala Phe Ala Leu Gly Ala Val Phe Ala	
gcc gtc gga ggc gtc gcc tac ggc ctc agg tac ggc cag atc gag ttc	672
Ala Val Gly Gly Val Ala Tyr ₂₁₅ Gly Leu Arg Tyr Gly ₂₂₀ Gln Ile Glu Phe	
aag atg ggc ttc atc ctc ggt ctc aag gcc ttc acg gcg gcg gtc ctc	720
Lys Met Gly Phe Ile Leu Gly Leu Lys Ala Phe Thr Ala Ala Val Leu ₂₄₀	
ggc ggc atc ggc aac atc tac ggc gcc atg atc ggc ggt gtc gtc ctc	768
Gly Gly Ile Gly Asn ₂₄₅ Ile Tyr Gly Ala Met ₂₅₀ Ile Gly Gly Val Val ₂₅₅ Leu	
ggc gtc gcc gag acc ctg gcc acc gcc tac atc gcc gac gtc ccc ggc	816
Gly Val Ala Glu Thr Leu Ala Thr Ala Tyr Ile Ala Asp Val Pro Gly	
ctg gac aag ttc ggc agc cag tcc tgg gcg gac gtc tgg gcc ttc atc	864
Leu Asp Lys ₂₇₅ Phe Gly Ser Gln Ser ₂₈₀ Trp Ala Asp Val Trp ₂₈₅ Ala Phe Ile	
ctc ctc atc ctc gtg ctg ttg ttc agg cca cag ggc ctg ctc ggc gaa	912
Leu Leu Ile Leu Val Leu Leu Phe Arg Pro Gln Gly ₃₀₀ Leu Leu Gly Glu	
cgc gtt gcg gac agg gcg tga	933
Arg Val Ala Asp Arg Ala ₃₁₀	

<210> 543

<211> 310

<212> PRT

<213> Streptomyces coelicolor

<400> 543

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 35 40 45
 Gly Ala Leu Thr Val Tyr Met Tyr Ile Leu Pro Asp Gly Thr Ser Met
 50 55 60
 Leu Ile Ala Leu Pro Leu Met Leu Ile Gly Ala Val Ile Val Ser Thr
 65 70 75 80
 Thr Val Ala Val Gly Ala Glu Arg Phe Ala Tyr Arg Pro Leu Arg Gly
 85 90 95
 Ala Pro Arg Leu Ala Pro Leu Ile Thr Ala Ile Gly Leu Ser Leu Ala
 100 105 110
 Leu Gln Gln Ala Val Trp Ala Trp Tyr Pro Asp Ala Lys Ser Ala Arg
 115 120 125
 Pro Phe Pro Gln Ile Asp Gly Gly Pro Phe His Ile Gly Asn Val Thr
 130 135 140
 Leu Gln Thr Gly Asp Ile Phe Leu Phe Val Val Ala Pro Val Ser Met
 145 150 155 160
 Ala Ile Leu Gly Phe Phe Val Met Arg Thr Arg Thr Gly Arg Gly Met
 165 170 175
 Gln Ala Thr Ala Gln Asp Pro Asp Thr Ala Lys Leu Met Gly Val Asp
 180 185 190
 Thr Asp Arg Ile Ile Val Ile Ala Phe Ala Leu Gly Ala Val Phe Ala
 195 200 205
 Ala Val Gly Gly Val Ala Tyr Gly Leu Arg Tyr Gly Gln Ile Glu Phe
 210 215 220
 Lys Met Gly Phe Ile Leu Gly Leu Lys Ala Phe Thr Ala Ala Val Leu
 225 230 235 240
 Gly Gly Ile Gly Asn Ile Tyr Gly Ala Met Ile Gly Gly Val Val Leu
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 Gly Val Ala Glu Thr Leu Ala Thr Ala Tyr Ile Ala Asp Val Pro Gly
 260 265 270
 Leu Asp Lys Phe Gly Ser Gln Ser Trp Ala Asp Val Trp Ala Phe Ile
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<210> 544

<211> 861

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(861)

<400> 544

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gtg att ttc ctg gcc gcc agc ggc ctg acc ctg gtg ttc ggc att ctc	96
Val Ile Phe Leu Ala Ala Ser Gly Leu Thr Leu Val Phe Gly Ile Leu	
20 25 30	
ggc gtc atc aat ctc tcg cac ggc tcg ttc tac atg ctc ggc gcc tat	144
Gly Val Ile Asn Leu Ser His Gly Ser Phe Tyr Met Leu Gly Ala Tyr	
35 40 45	
ttg gcg ctc tcg ctg acc ggc atg ttc ggc gat gtc ttt ctg gcg ctg	192
Leu Ala Leu Ser Leu Thr Gly Met Phe Gly Asp Val Phe Leu Ala Leu	
50 55 60	
gtc gcc ggc atc ccg ctc gcc ttc ctg ctt ggt ctg gcg atc gag tgg	240
Val Ala Gly Ile Pro Leu Ala Phe Leu Leu Gly Leu Ala Ile Glu Trp	
65 70 75 80	

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ctg	ttc	atc	cgc	cat	ctc	tac	gac	cgc	gac	cac	ctg	cag	cag	gtg	ctg	288
Leu	Phe	Ile	Arg	His	Leu	Tyr	Asp	Arg	Asp	His	Leu	Gln	Gln	Val	Leu	
				85					90					95		
ctg	acc	ttc	cgc	ctg	atc	ctg	atc	ttc	aat	gaa	ttt	cag	caa	gtg	gtg	336
Leu	Thr	Phe	Ala	Leu	Ile	Leu	Ile	Phe	Asn	Glu	Phe	Gln	Gln	Val	Val	
			100					105					110			
tgg	ggg	tcg	tat	ccg	cac	tcg	atc	ccg	gcg	ccg	agc	tat	ctg	gcc	aac	384
Trp	Gly	Ser	Tyr	Pro	His	Ser	Ile	Pro	Ala	Pro	Ser	Tyr	Leu	Ala	Asn	
		115					120					125				
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Ser	Val	Arg	Leu	Thr	Glu	Gly	Leu	Ser	Tyr	Pro	Val	Tyr	Arg	Leu	Ala	
	130					135					140					
ctg	atg	gcg	atc	tgc	gtc	gcg	ctg	gcg	att	gcg	atg	gcg	ctg	gtg	atc	480
Leu	Met	Ala	Ile	Cys	Val	Ala	Leu	Ala	Ile	Ala	Met	Ala	Leu	Val	Ile	
	145				150					155					160	
cag	aag	acc	cgg	atc	ggc	cgc	ctg	atc	cgt	gcc	gcc	gag	tcc	aat	cgc	528
Gln	Lys	Thr	Arg	Ile	Gly	Arg	Leu	Ile	Arg	Ala	Ala	Glu	Ser	Asn	Arg	
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gag	atg	gtc	gaa	ctc	ggc	ttc	gac	tcg	cgg	ctg	atc	ttc	cgg	atg		576
Glu	Met	Val	Glu	Ala	Leu	Gly	Phe	Asp	Ser	Arg	Leu	Ile	Phe	Arg	Met	
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gtg	ttc	gcc	acc	ggt	gtc	gca	ctc	gcc	gcc	acc	gcc	ggc	atg	ctc	gcg	624
Val	Phe	Ala	Thr	Gly	Val	Ala	Leu	Ala	Ala	Thr	Ala	Gly	Met	Leu	Ala	
		195					200					205				
gcc	cca	atc	gag	agc	gcc	tat	ccg	ggc	atc	ggc	gat	cgc	gtg	ctg	atc	672
Ala	Pro	Ile	Glu	Ser	Ala	Tyr	Pro	Gly	Ile	Gly	Asp	Arg	Val	Leu	Ile	
	210					215					220					
gtc	tcg	ttc	gtg	gtt	gtg	gtg	atc	ggc	ggc	atc	ggt	tcg	gta	cgc	ggc	720
Val	Ser	Phe	Val	Val	Val	Val	Ile	Gly	Gly	Ile	Gly	Ser	Val	Arg	Gly	
	225				230					235					240	
gct	ttc	att	gga	tcg	ctg	ctg	atc	ggc	atg	gcc	gac	gcc	ttc	ggc	aag	768
Ala	Phe	Ile	Gly	Ser	Leu	Leu	Ile	Gly	Met	Ala	Asp	Ala	Phe	Gly	Lys	
				245					250					255		
gtg	ttc	cta	ccg	cag	ttc	tcc	agc	atc	atc	atc	tac	gcg	ttg	atg	gcg	816
Val	Phe	Leu	Pro	Gln	Phe	Ser	Ser	Ile	Ile	Ile	Tyr	Ala	Leu	Met	Ala	
			260					265					270			
ctg	gtg	ctg	gtg	ata	cgc	ccg	gcc	ggg	ctg	ttc	ggg	cgg	gcc	tga		861
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<210> 545

<211> 286

<212> PRT

<213> Rhodopseudomonas palustris

<400> 545

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			20					25					30			
Gly	Val	Ile	Asn	Leu	Ser	His	Gly	Ser	Phe	Tyr	Met	Leu	Gly	Ala	Tyr	
		35					40					45				
Leu	Ala	Leu	Ser	Leu	Thr	Gly	Met	Phe	Gly	Asp	Val	Phe	Leu	Ala	Leu	
		50				55					60					
Val	Ala	Gly	Ile	Pro	Leu	Ala	Phe	Leu	Leu	Gly	Leu	Ala	Ile	Glu	Trp	
	65				70					75				80		
Leu	Phe	Ile	Arg	His	Leu	Tyr	Asp	Arg	Asp	His	Leu	Gln	Gln	Val	Leu	
				85					90					95		
Leu	Thr	Phe	Ala	Leu	Ile	Leu	Ile	Phe	Asn	Glu	Phe	Gln	Gln	Val	Val	
			100					105					110			
Trp	Gly	Ser	Tyr	Pro	His	Ser	Ile	Pro	Ala	Pro	Ser	Tyr	Leu	Ala	Asn	
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Ser	Val	Arg	Leu	Thr	Glu	Gly	Leu	Ser	Tyr	Pro	Val	Tyr	Arg	Leu	Ala	
	130					135					140					
Leu	Met	Ala	Ile	Cys	Val	Ala	Leu	Ala	Ile	Ala	Met	Ala	Leu	Val	Ile	
	145				150					155					160	
Gln	Lys	Thr	Arg	Ile	Gly	Arg	Leu	Ile	Arg	Ala	Ala	Glu	Ser	Asn	Arg	
				165					170					175		
Glu	Met	Val	Glu	Ala	Leu	Gly	Phe	Asp	Ser	Arg	Leu	Ile	Phe	Arg	Met	

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Val Phe Ala 180 Thr Gly Val Ala 185 Leu Ala Thr Ala Gly 190 Met Leu Ala
 Ala Pro Ile 195 Glu Ser Ala Tyr 200 Pro Gly Ile Gly Asp 205 Arg Val Leu Ile
 Val Ser Phe 210 Val Val Val Val Ile Gly Gly Ile Gly Ser Val Arg Gly
 225 Ala Phe Ile Gly Ser 230 Leu Leu Ile Gly Met 235 Ala Asp Ala Phe Gly 240 Lys
 Val Phe Leu 245 Gln Phe Ser Ser Ile Ile Ile Tyr Ala Leu Met Ala
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<210> 546

<211> 918

<212> DNA

<213> *Methylophilus methylotrophus*

<220>

<221> CDS

<222> (1)..(918)

<400> 546

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ggc	ttt	tcc	ggc	ctg	agc	atg	ttt	aca	gtg	ttg	ctg	ctg	atg	gca	ctt	96
Gly	Phe	Ser	Gly	Leu	Ser	Met	Phe	Thr	Val	Leu	Leu	Leu	Met	Ala	Leu	
			20					25					30			
ggt	ctc	gcg	att	att	ttc	ggg	cag	atg	ggt	gtg	att	aac	atg	gca	cat	144
Gly	Leu	Ala	Ile	Ile	Phe	Gly	Gln	Met	Gly	Val	Ile	Asn	Met	Ala	His	
			35				40					45				
ggc	gag	ttt	atg	acc	ata	ggc	gcc	tac	acc	acc	gta	ctc	att	tca	aaa	192
Gly	Glu	Phe	Met	Thr	Ile	Gly	Ala	Tyr	Thr	Thr	Val	Leu	Ile	Ser	Lys	
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gta	gca	gcc	agt	tac	ggc	ttc	acg	gat	tac	tac	ttc	gtg	ttt	gcc	att	240
Val	Ala	Ala	Ser	Tyr	Gly	Phe	Thr	Asp	Tyr	Tyr	Phe	Val	Phe	Ala	Ile	
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Ala	Ile	Ala	Phe	Leu	Leu	Ala	Phe	Ala	Val	Gly	Tyr	Phe	Val	Glu	Phe	
				85				90						95		
att	atg	atc	agg	cac	ttg	tat	aag	cgg	ccg	ctg	gat	acg	cta	ctg	gcc	336
Ile	Met	Ile	Arg	His	Leu	Tyr	Lys	Arg	Pro	Leu	Asp	Thr	Leu	Leu	Ala	
			100					105					110			
acc	tgg	ggc	ttg	aat	ctg	gtc	atg	caa	att	ttc	cgc	tct	tca	ttc		384
Thr	Trp	Gly	Leu	Asn	Leu	Val	Met	Gln	Gln	Ile	Phe	Arg	Ser	Ser	Phe	
			115				120					125				
ggc	gcc	aaa	gaa	gtg	agt	gcc	gaa	ctg	cct	gag	tgg	atg	ctg	ggc	tct	432
Gly	Ala	Lys	Glu	Val	Ser	Ala	Glu	Leu	Pro	Glu	Trp	Met	Leu	Gly	Ser	
						135					140					
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Phe	Lys	Pro	Thr	Pro	Asp	Ile	Asp	Ile	Pro	Ile	Asn	Gly	Val	Phe	Val	
					150					155					160	
atg	gtg	ctg	gcg	gcg	cta	gtg	act	ttc	ggt	gtc	tac	atg	ttt	atg	tac	528
Met	Val	Leu	Ala	Ala	Leu	Val	Thr	Phe	Gly	Val	Tyr	Met	Phe	Met	Tyr	
				165					170					175		
aaa	tcc	cgc	tgg	ggc	ttg	cgt	gta	cgt	gcc	acg	gtg	cag	aac	cgt	acc	576
Lys	Ser	Arg	Trp	Gly	Leu	Arg	Val	Arg	Ala	Thr	Val	Gln	Asn	Arg	Thr	
			180					185					190			
atg	gct	ggc	gca	gta	ggg	att	aat	aca	gcc	aaa	gtt	gac	cgc	gtc	act	624
Met	Ala	Gly	Ala	Val	Gly	Ile	Asn	Thr	Ala	Lys	Val	Asp	Arg	Val	Thr	
			195				200					205				
ttt	gcc	ctg	ggc	tgc	ggc	att	gcc	ggg	att	gcc	ggt	gct	gca	ttt	acc	672
Phe	Ala	Leu	Gly	Cys	Gly	Ile	Ala	Gly	Ile	Ala	Gly	Ala	Ala	Phe	Thr	
			210			215					220					
acc	att	gcc	tct	act	ggc	ccg	acc	aca	ggg	acc	ttg	tat	atc	gtg	gac	720
Thr	Ile	Ala	Ser	Thr	Gly	Pro	Thr	Thr	Gly	Thr	Leu	Tyr	Ile	Val	Asp	
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				245					250					255		
att	gct	tcc	gcc	ttc	ggg	att	gcc	cag	gcg	caa	tcg	ata	ctg	caa	ttc	816
Ile	Ala	Ser	Ala	Phe	Gly	Ile	Ala	Gln	Ala	Gln	Ser	Ile	Leu	Gln	Phe	
			260					265					270			
ttt	atg	acc	agc	tct	atg	ggt	aag	gtc	tcc	acc	ttg	ctc	gtc	atc	gtc	864
Phe	Met	Thr	Ser	Ser	Met	Gly	Lys	Val	Ser	Thr	Leu	Leu	Val	Ile	Val	
		275					280					285				
acc	atc	ctg	atg	atg	aaa	ccg	gaa	ggt	ctg	ttt	gcc	tcc	aaa	ctg	cgt	912
Thr	Ile	Leu	Met	Met	Lys	Pro	Glu	Gly	Leu	Phe	Ala	Ser	Lys	Leu	Arg	
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Lys																
305																

<210> 547

<211> 305

<212> PRT

<213> Methylophilus methylotrophus

<400> 547

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Gly	Leu	Ala	Ile	Ile	Phe	Gly	Gln	Met	Gly	Val	Ile	Asn	Met	Ala	His	
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Gly	Glu	Phe	Met	Thr	Ile	Gly	Ala	Tyr	Thr	Thr	Val	Leu	Ile	Ser	Lys	
	50					55					60					
Val	Ala	Ala	Ser	Tyr	Gly	Phe	Thr	Asp	Tyr	Tyr	Phe	Val	Phe	Ala	Ile	
65					70				75						80	
Ala	Ile	Ala	Phe	Leu	Leu	Ala	Phe	Ala	Val	Gly	Tyr	Phe	Val	Glu	Phe	
			85					90						95		
Ile	Met	Ile	Arg	His	Leu	Tyr	Lys	Arg	Pro	Leu	Asp	Thr	Leu	Leu	Ala	
			100					105					110			
Thr	Trp	Gly	Leu	Asn	Leu	Val	Met	Gln	Gln	Ile	Phe	Arg	Ser	Ser	Phe	
		115					120					125				
Gly	Ala	Lys	Glu	Val	Ser	Ala	Glu	Leu	Pro	Glu	Trp	Met	Leu	Gly	Ser	
	130					135					140					
Phe	Lys	Pro	Thr	Pro	Asp	Ile	Asp	Ile	Pro	Ile	Asn	Gly	Val	Phe	Val	
145					150					155					160	
Met	Val	Leu	Ala	Ala	Leu	Val	Thr	Phe	Gly	Val	Tyr	Met	Phe	Met	Tyr	
			165					170						175		
Lys	Ser	Arg	Trp	Gly	Leu	Arg	Val	Arg	Ala	Thr	Val	Gln	Asn	Arg	Thr	
		180						185					190			
Met	Ala	Gly	Ala	Val	Gly	Ile	Asn	Thr	Ala	Lys	Val	Asp	Arg	Val	Thr	
	195						200					205				
Phe	Ala	Leu	Gly	Cys	Gly	Ile	Ala	Gly	Ile	Ala	Gly	Ala	Ala	Phe	Thr	
	210					215					220					
Thr	Ile	Ala	Ser	Thr	Gly	Pro	Thr	Thr	Gly	Thr	Leu	Tyr	Ile	Val	Asp	
225					230					235					240	
Ser	Phe	Met	Val	Val	Val	Phe	Gly	Gly	Ala	Ala	Ser	Ile	Val	Gly	Thr	
			245						250					255		
Ile	Ala	Ser	Ala	Phe	Gly	Ile	Ala	Gln	Ala	Gln	Ser	Ile	Leu	Gln	Phe	
			260					265					270			
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<211> 1845

<212> DNA

<213> Pseudomonas aeruginosa

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Val Glu Trp Ala Ala Ile Arg Arg Pro Ala Val Phe Ala Gly Arg Arg	
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Ser Leu Tyr Met Leu Gly Ala Tyr Phe Ala Ala Leu Thr Phe Lys Asn	
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Thr Asp Ser Leu Thr Leu Ala Phe Phe Ala Ala Ile Phe Gly Ser Ile	
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Ala Val Gly Val Ile Leu Glu Arg Leu Ala Val Ser Arg Leu Tyr Ser	
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<212> PRT

<213> Pseudomonas aeruginosa

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 <212> DNA
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 <221> CDS
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			530			535					540										
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Tyr	Ile	Ala	Pro	Asp	Thr	Phe	Thr	His	Ala	Met	Ser	Leu	Gln	Val	Leu						
				550							555				560						
acg	atg	gtg	gtg	ctg	ggc	ggg	ctg	gac	aac	acc	atc	ggc	gcc	gtg	gcg						
Thr	Met	Val	Val	Leu	Gly	Gly	Leu	Asp	Asn	Thr	Ile	Gly	Ala	Val	Ala						
				565					570					575							
ggg	gcc	ctc	gcc	ctg	atc	gtc	atc	ccc	gag	tcc	gcc	cgg	ttc	ctg	gcg						
Gly	Ala	Leu	Ala	Leu	Ile	Val	Ile	Pro	Glu	Ser	Ala	Arg	Phe	Leu	Ala						
			580					585					590								
gag	tac	cgg	ttc	ctg	gtc	tac	ggc	ctg	ctg	ctt	ctg	gtc	atg	ctc	agg						
Glu	Tyr	Arg	Phe	Leu	Val	Tyr	Gly	Leu	Leu	Leu	Leu	Val	Met	Leu	Arg						
			595				600					605									
ttc	cgg	ccc	cgg	ggc	ctc	ctg	agc	gcc	gca	tcg	tga										
Phe	Arg	Pro	Arg	Gly	Leu	Leu	Ser	Ala	Ala	Ser											
			610			615															

<210> 551

<211> 619

<212> PRT

<213> Symbiobacterium thermophilum

<400> 551

Met	Ala	Ala	Pro	Leu	Arg	Ser	Gly	Thr	Arg	Arg	Arg	Gly	Ser	Met	Leu
1				5					10				15		
Asp	Gln	Leu	Ile	Asn	Gly	Leu	Val	Val	Gly	Asn	Leu	Tyr	Ala	Leu	Thr
			20					25					30		

Ala	Val	Gly ₃₅	Ile	Thr	Gln	Ile	Tyr ₄₀	Gly	Val	Ala	Asn ₄₅	Val	Ile	Asn	Phe
Ala	His ₅₀	Gly	Ser	Leu	Tyr	Met ₅₅	Val	Gly	Ala	Phe	Val ₆₀	Gly	Trp	Met	Ala
Val ₆₅	Thr	Trp	Leu	Gly	Leu ₇₀	Pro	Leu	Leu	Pro	Thr ₇₅	Leu	Leu	Leu	Val	Leu ₈₀
Val	Ala	Ser	Ala	Leu ₈₅	Leu	Gly	Leu	Ala	Val ₉₀	Glu	Arg	Val	Ala	Ile ₉₅	Arg
Pro	Phe	Ala	Gly ₁₀₀	Ser	Gly	Arg	Thr	Val ₁₀₅	Leu	Leu	Leu	Thr	Thr ₁₁₀	Ile	Ala
Ala	Gly	Leu ₁₁₅	Val	Leu	Glu	Gln	Ala ₁₂₀	Ala	Gln	Leu	Ile	Trp ₁₂₅	Gly	Pro	Glu
Thr	Lys ₁₃₀	Ala	Phe	His	Thr	Pro ₁₃₅	Phe	Ala	Asp	Val ₁₄₀	Arg	Val	Arg	Val	Gly
Gly ₁₄₅	Gly	Phe	Leu	Ser	Ser ₁₅₀	Leu	Asp	Leu	Val ₁₅₅	Ile	Leu	Ala	Val	Gly	Leu ₁₆₀
Thr	Thr	Ala	Leu	Ala ₁₆₅	Leu	Trp	Leu	Phe	Leu ₁₇₀	Lys	Arg	Ser	Arg	Leu ₁₇₅	Gly
Trp	Ala	Val ₁₈₀	Arg	Ala	Thr	Ala	Gln	Asp ₁₈₅	Arg	Glu	Ala	Ala	Leu ₁₉₀	Gln	Met
Gly	Val	Asp ₁₉₅	Val	Asn	Gln	Val	Ser ₂₀₀	Arg	Val	Ser	Phe	Ala ₂₀₅	Met	Ala	Gly
Ala	Leu ₂₁₀	Ala	Gly	Val	Ser	Gly ₂₁₅	Leu	Leu	Val	Gly	Leu ₂₂₀	Tyr	Tyr	His	Ser
Val ₂₂₅	Tyr	Pro	Thr	Met	Gly ₂₃₀	Phe	Ser	Ala	Ser	Leu ₂₃₅	Lys	Gly	Phe	Thr	Ala ₂₄₀
Ala	Leu	Leu	Gly	Gly ₂₄₅	Leu	Gly	Asn	Ile	Pro ₂₅₀	Gly	Ala	Leu	Val	Gly ₂₅₅	Ala
Tyr	Leu	Leu	Gly ₂₆₀	Thr	Ala	Glu	Ser	Leu ₂₆₅	Ala	Val	Ala	Trp	Leu ₂₇₀	Gly	Ser
Thr	Trp	Arg ₂₇₅	Asp	Leu	Val	Gly	Ile ₂₈₀	Gly	Leu	Leu	Leu	Gly ₂₈₅	Val	Leu	Leu
Phe	Arg ₂₉₀	Pro	Asn	Gly	Leu	Phe ₂₉₅	Ala	Ala	Ala	Arg	Ala ₃₀₀	Leu	Leu	Pro	Glu
Pro	Thr	Ala	Gly	Thr	Phe ₃₁₀	Ile	Pro	Ile	Gly	Arg ₃₁₅	Pro	Leu	Pro	Ile	Pro ₃₂₀
Arg	Trp	Ala	Leu	Pro ₃₂₅	Ala	Ala	Gly	Ala	Val ₃₃₀	Ala	Leu	Ala	Leu	Pro ₃₃₅	Leu
Val	Val	Arg	Asn ₃₄₀	Gly	Tyr	Trp	Leu	Gln ₃₄₅	Val	Leu	Ala	Thr	Ala ₃₅₀	Trp	Ile
Phe	Gly	Leu ₃₅₅	Leu	Ala	Ile	Ser	Leu ₃₆₀	Asn	Leu	Ile	Ala	Gly ₃₆₅	Thr	Ala	Gly
Gln	Ile ₃₇₀	Ser	Leu	Gly	His	Ala ₃₇₅	Gly	Phe	Leu	Ala	Leu ₃₈₀	Gly	Ala	Tyr	Ala
Ser	Ala	Ile	Leu	Thr	Thr ₃₉₀	Arg	Leu	Gln	Trp	Pro ₃₉₅	Phe	Leu	Leu	Ser	Leu ₄₀₀
Ala	Val	Ala	Pro	Val ₄₀₅	Ile	Ala	Ala	Ala	Val ₄₁₀	Gly	Val	Val	Leu	Cys ₄₁₅	Tyr
Pro	Ala	Leu	Arg ₄₂₀	Leu	Arg	Gly	Gln	Tyr ₄₂₅	Leu	Ala	Val	Ala	Thr ₄₃₀	Ile	Gly
Leu	Gly	Gln	Gly ₄₃₅	Ile	Ala	Leu	Val ₄₄₀	Ala	Leu	Asn	Trp	Thr ₄₄₅	Ala	Leu	Thr
Arg	Gly ₄₅₀	Pro	Leu	Gly	Ile	Ser ₄₅₅	Asn	Ile	Ala	Pro	Pro ₄₆₀	Gly	Leu	Phe	Gly
Val ₄₆₅	Glu	Ile	Thr	Ser	Ala ₄₇₀	Ala	Gly	Phe	Tyr	Trp ₄₇₅	Leu	Thr	Leu	Thr	Leu ₄₈₀
Leu	Leu	Gly	Gly	Ile ₄₈₅	Trp	Val	Ala	Glu	Arg ₄₉₀	Leu	Ser	Gly	Ser	Tyr ₄₉₅	Leu
Gly	Arg	Ala	Leu	Arg	Ala	Val	Arg	Glu ₅₀₅	Asp	Glu	Val	Ala	Ala ₅₁₀	Arg	Ala
Tyr	Gly	Val ₅₁₅	Gly	Leu	Glu	Arg	Tyr ₅₂₀	Lys	Ser	Ile	Ala	Phe ₅₂₅	Gly	Leu	Ser
Ala	Phe ₅₃₀	Ile	Ala	Gly	Leu	Ala ₅₃₅	Gly	Val	Leu	Leu	Ala ₅₄₀	His	Ala	Tyr	Thr
Tyr ₅₄₅	Ile	Ala	Pro	Asp	Thr ₅₅₀	Phe	Thr	His	Ala	Met ₅₅₅	Ser	Leu	Gln	Val	Leu ₅₆₀
Thr	Met	Val	Val	Leu ₅₆₅	Gly	Gly	Leu	Asp	Asn ₅₇₀	Thr	Ile	Gly	Ala	Val ₅₇₅	Ala
Gly	Ala	Leu	Ala	Leu	Ile	Val	Ile	Pro	Glu	Ser	Ala	Arg	Phe	Leu	Ala

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Glu Tyr Arg 580 Phe Leu Val Tyr Gly 585 Leu Leu Leu Val 590 Met Leu Arg
 Phe Arg 595 Pro Arg Gly Leu Leu 600 Ser Ala Ala Ser
 610 615

<210> 552
 <211> 1050
 <212> DNA
 <213> *Symbiobacterium thermophilum*

<220>
 <221> CDS
 <222> (1)..(1050)

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 Met Ala Thr Val Pro Asn Gly Ser Ser Ser 10 Phe Ala Gly Gly Gly Arg
 1 5
 ccg gcg gtg acg gtg aac gcg gtg gtc tcc gcc gcg ctg atc gtc gcc 96
 Pro Ala Val Thr Val Asn Ala Val Val Ser Ala Ala Leu Ile Val Ala
 20 25 30
 ctg tac atc gtg ctc tcc ctg ctg cgg cag cag gcc atc atc ggc acc 144
 Leu Tyr Ile Val Leu Ser Leu Arg Gln Gln Gly Ile Ile Gly Thr
 35 40 45
 tac tgg ggc atg atc ctg gac ctg gcc ctg atc acc acc acc tcg gca 192
 Tyr Trp Gly Met Ile Leu Asp Leu Ala Leu Ile Thr Thr Thr Ser Ala
 50 55 60
 atc ggt ctc agc ctg atc tac ggc ttc gcc ggc cag ttc tcg ctg ggg 240
 Ile Gly Leu Ser Leu Ile Tyr Gly Phe Ala Gly Gln Phe Ser Leu Gly
 65 70 75 80
 cac gtg gcc ttc tac ggc atc ggc ggg tat gtg tcg gcc tac atc acc 288
 His Val Ala Phe Tyr Gly Ile Gly Gly Tyr Val Ser Ala Tyr Ile Thr
 85 90 95
 aag gcc tac ggc gcc acc ctc aac ttc gtg ctg ggc ctc gcc gcc 336
 Lys Ala Tyr Gly Ala Thr Thr Leu Asn Phe Val Leu Gly Leu Ala Ala
 100 105 110
 ggc acc ctc gcg gcg gcc ctg atc gcg ttc ctg atc ggc ctg ccc atc 384
 Gly Thr Leu Ala Ala Ala Leu Ile Ala Phe Leu Ile Gly Leu Pro Ile
 115 120 125
 ctc cgg ctg cgg tcg gac tac ctg ggc atc gcc acg ctg ggc ttc ggc 432
 Leu Arg Leu Arg Ser Asp Tyr Leu Gly Ile Ala Thr Leu Gly Phe Gly
 130 135 140
 gtc atc gtc aag gtg ttc atg gac aac agc gac aag atc tcc aag ctg 480
 Val Ile Val Lys Val Phe Met Asp Asn Ser Asp Lys Ile Ser Lys Leu
 145 150 155 160
 ctg ggc ggc tcc atg ggc atg acc ggc atc ccg cgc ctc acc acc ttt 528
 Leu Gly Gly Ser Met Gly Met Thr Gly Ile Pro Arg Leu Thr Thr Phe
 165 170 175
 ccc tgg gtg ttc tgg tcg gcg gtg ctg gtg atc ctg ctg gcc cgg aac 576
 Pro Trp Val Phe Trp Ser Ala Val Leu Val Ile Leu Leu Ala Arg Asn
 180 185 190
 ctg gtc cac tcc agc cac gga cgg gcg tgc atc agc gtg cgg gag gac 624
 Leu Val His Ser Ser His Gly Arg Ala Cys Ile Ser Val Arg Glu Asp
 195 200 205
 gag atc gcc gcg gac atc atg ggc atc gac acc acc cgg ttc aag atg 672
 Glu Ile Ala Ala Asp Ile Met Gly Ile Asp Thr Arg Phe Lys Met
 210 215 220
 ctg gcc ttc gtc ctg ggc tgc gcc atg gcc ggg ctg gcg ggc ggc ctg 720
 Leu Ala Phe Val Leu Gly Cys Ala Met Ala Gly Leu Ala Gly Gly Leu
 225 230 235 240
 tac gct cac ctg tat gtc tac ctg cac ccg aag agc ttc gag ttc ctg 768
 Tyr Ala His Leu Tyr Val Tyr Leu His Pro Lys Ser Phe Glu Phe Leu
 245 250 255
 aag tcc ttc gac gtg ctc ctg atc gtg gtg ctg ggg ggc ctg ggc agc 816
 Lys Ser Phe Asp Val Leu Leu Ile Val Val Leu Gly Gly Leu Gly Ser
 260 265 270
 ctg acc ggc acg gtg gtg gcc ggc atg ggc gtg gtg ttc ctg gag gag 864
 Leu Thr Gly Thr Val Val Ala Gly Met Gly Val Val Phe Leu Gln Glu

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gtg	ctg	275	gac	gtg	ctg	ggc	280	cag	ttc	ctg	gag	285	cgc	ggc	gtg	912
Val	Leu	Arg	Asp	Val	Leu	Gly	Gln	Gln	Phe	Leu	Glu	Trp	Arg	Gly	Val	
	290					295					300					
gtc	tac	gcc	ctg	gtg	ctg	atc	gtg	ctg	atg	atc	ctg	cgc	ccg	cag	ggg	960
Val	Tyr	Ala	Leu	Val	Leu	Ile	Val	Leu	Met	Ile	Leu	Arg	Pro	Gln	Gly	
305					310					315					320	
ctc	atg	ggc	ggc	tgg	gag	ttc	agc	ctc	gac	cgg	tgg	ctt	tcg	cgt	ccg	1008
Leu	Met	Gly	Gly	Trp	Glu	Phe	Ser	Leu	Asp	Arg	Trp	Leu	Ser	Arg	Pro	
				325					330					335		
tcg	aag	gga	ggg	aag	gcc	agt	ggc	act	gct	gga	atg	ccg	tga			1050
Ser	Lys	Gly	Gly	Lys	Ala	Ser	Gly	Thr	Ala	Gly	Met	Pro				
			340					345								

<210> 553

<211> 349

<212> PRT

<213> Symbiobacterium thermophilum

<400> 553

Met	Ala	Thr	Val	Pro	Asn	Gly	Ser	Ser	Ser	Phe	Ala	Gly	Gly	Gly	Arg	
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Pro	Ala	Val	Thr	Val	Asn	Ala	Val	Val	Ser	Ala	Ala	Leu	Ile	Val	Ala	
			20					25					30			
Leu	Tyr	Ile	Val	Leu	Ser	Leu	Leu	Arg	Gln	Gln	Gly	Ile	Ile	Gly	Thr	
		35					40					45				
Tyr	Trp	Gly	Met	Ile	Leu	Asp	Leu	Ala	Leu	Ile	Thr	Thr	Thr	Ser	Ala	
	50					55				60						
Ile	Gly	Leu	Ser	Leu	Ile	Tyr	Gly	Phe	Ala	Gly	Gln	Phe	Ser	Leu	Gly	
65				70					75						80	
His	Val	Ala	Phe	Tyr	Gly	Ile	Gly	Gly	Tyr	Val	Ser	Ala	Tyr	Ile	Thr	
			85					90					95			
Lys	Ala	Tyr	Gly	Ala	Thr	Thr	Leu	Asn	Phe	Val	Leu	Gly	Leu	Ala	Ala	
			100					105					110			
Gly	Thr	Leu	Ala	Ala	Ala	Leu	Ile	Ala	Phe	Leu	Ile	Gly	Leu	Pro	Ile	
		115					120					125				
Leu	Arg	Leu	Arg	Ser	Asp	Tyr	Leu	Gly	Ile	Ala	Thr	Leu	Gly	Phe	Gly	
	130					135					140					
Val	Ile	Val	Lys	Val	Phe	Met	Asp	Asn	Ser	Asp	Lys	Ile	Ser	Lys	Leu	
145					150					155					160	
Leu	Gly	Gly	Ser	Met	Gly	Met	Thr	Gly	Ile	Pro	Arg	Leu	Thr	Thr	Phe	
			165					170					175			
Pro	Trp	Val	Phe	Trp	Ser	Ala	Val	Leu	Val	Ile	Leu	Leu	Ala	Arg	Asn	
			180					185					190			
Leu	Val	His	Ser	Ser	His	Gly	Arg	Ala	Cys	Ile	Ser	Val	Arg	Glu	Asp	
		195					200					205				
Glu	Ile	Ala	Ala	Asp	Ile	Met	Gly	Ile	Asp	Thr	Thr	Arg	Phe	Lys	Met	
	210					215				220						
Leu	Ala	Phe	Val	Leu	Gly	Cys	Ala	Met	Ala	Gly	Leu	Ala	Gly	Gly	Leu	
225					230					235					240	
Tyr	Ala	His	Leu	Tyr	Val	Tyr	Leu	His	Pro	Lys	Ser	Phe	Glu	Phe	Leu	
			245						250				255			
Lys	Ser	Phe	Asp	Val	Leu	Leu	Ile	Val	Val	Leu	Gly	Gly	Leu	Gly	Ser	
			260					265					270			
Leu	Thr	Gly	Thr	Val	Val	Ala	Gly	Met	Gly	Val	Val	Phe	Leu	Gln	Glu	
		275					280					285				
Val	Leu	Arg	Asp	Val	Leu	Gly	Gln	Gln	Phe	Leu	Glu	Trp	Arg	Gly	Val	
	290					295					300					
Val	Tyr	Ala	Leu	Val	Leu	Ile	Val	Leu	Met	Ile	Leu	Arg	Pro	Gln	Gly	
305					310					315					320	
Leu	Met	Gly	Gly	Trp	Glu	Phe	Ser	Leu	Asp	Arg	Trp	Leu	Ser	Arg	Pro	
			325						330					335		
Ser	Lys	Gly	Gly	Lys	Ala	Ser	Gly	Thr	Ala	Gly	Met	Pro				
			340					345								

<210> 554

<211> 870

<212> DNA

<213> Symbiobacterium thermophilum

<220>
 <221> CDS
 <222> (1)..(870)

<400> 554
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 Met Ile Phe Ala Gln Gln Ile Ile Ser Gly Leu Ala Thr Gly Ser Leu
 1 5 10 15
 tac gcc ctg gcc gcc ctg ggc ctg gtg ctg atc ttc aag acc acc gac 96
 Tyr Ala Leu Ala Ala Leu Gly Leu Val Leu Ile Phe Lys Thr Thr Asp
 20 25 30
 gtg gtc aac ttc gcc cag ggc gag atg ttc ggc acc ttc atc 144
 Val Val Asn Phe Ala Gln Gly Glu Met Ala Met Phe Gly Thr Phe Ile
 35 40 45
 atg ttc acc ctg ctg aag acc gcc ggc ctc ccc tac tgg ggc gcc ttc 192
 Met Phe Thr Leu Leu Lys Thr Ala Gly Leu Pro Tyr Trp Gly Ala Phe
 50 55 60
 gtg ctg gcg ctg gcc ttc gcc ttc ctg atg ggc gcc gtc atc gag cgg 240
 Val Leu Ala Leu Ala Phe Ala Phe Leu Met Gly Ala Val Ile Glu Arg
 65 70 75 80
 gtg gcg ctg cgc ccc ctg gcc cag gcc ccc ctc atc agc gtg ctg atc 288
 Val Ala Leu Arg Pro Leu Ala Gln Ala Pro Leu Ile Ser Val Leu Ile
 85 90 95
 gcg acg ctg ggc ctg atg cag atc atc aac ggc gtg gcc ggc tgg atc 336
 Ala Thr Leu Gly Leu Met Gln Ile Ile Asn Gly Val Ala Gly Trp Ile
 100 105 110
 tgg ggc tac cag gcc agg ccg ttc ccg acg gcg gtg agc ggc agc ccc 384
 Trp Gly Tyr Gln Ala Arg Pro Phe Pro Thr Ala Val Ser Gly Ser Pro
 115 120 125
 atc cgc ctg ggc gac ctg gtg atc acc ttg ccg gac ctg gtc aac ctc 432
 Ile Arg Leu Gly Asp Leu Val Ile Thr Leu Pro Asp Leu Val Asn Leu
 130 135 140
 gcc gtc agc ctc gtg gtg atg acc ggc ttc ttc ctc ctc ttc aag ttc 480
 Ala Val Ser Leu Val Val Met Thr Gly Phe Phe Leu Leu Phe Lys Phe
 145 150 155 160
 acc aag ctg ggc atc gcc atg ccg gcg gtg gcc gaa aac cgg gtg gcg 528
 Thr Lys Leu Gly Ile Ala Met Arg Ala Val Ala Glu Asn Arg Val Ala
 165 170 175
 gcc cgc ctg atg ggc atc ccc acc gac ccg atc ctc tcc ctc acc tgg 576
 Ala Arg Leu Met Gly Ile Pro Thr Asp Arg Ile Leu Ser Leu Thr Trp
 180 185 190
 ggg ctg gga ggc gtc ctg gcc gcc acc gcc ggc atc ctc atc gcc ccg 624
 Gly Leu Gly Gly Val Leu Ala Ala Thr Ala Gly Ile Leu Ile Ala Pro
 195 200 205
 gtg acc aac ctg gac atc aac atg atg gcc gac atg cag atc aag gcg 672
 Val Thr Asn Leu Asp Ile Asn Met Met Ala Asp Met Gln Ile Lys Ala
 210 215 220
 ttc acc gcc gcg gtg ctg ggc ggg ttc acc tcg ctg ccc ggc gcc gtg 720
 Phe Thr Ala Ala Val Leu Gly Gly Phe Thr Ser Leu Pro Gly Ala Val
 225 230 235 240
 gtg ggc ggc ctc acc ctc ggc gtg ctg gag aac ctg gtc ggc cag ttc 768
 Val Gly Gly Leu Thr Leu Gly Val Leu Glu Asn Leu Val Gly Gln Phe
 245 250 255
 gtc ccg cag ctg aaa acc ccc ttt gcc ttc ggc ctc atc gtg ctg gtg 816
 Val Pro Gln Leu Lys Thr Pro Phe Ala Phe Gly Leu Ile Val Leu Val
 260 265 270
 ctg atg ctg agg ccc agc ggc ctg atg ggg acc gtc cag cga aag aag 864
 Leu Met Leu Arg Pro Ser Gly Leu Met Gly Thr Val Gln Arg Lys Lys
 275 280 285
 gtg tag 870
 Val

<210> 555
 <211> 289
 <212> PRT
 <213> Symbiobacterium thermophilum

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<400> 555

Met Ile Phe Ala Gln Gln Ile Ile Ser Gly Leu Ala Thr Gly Ser Leu
 1 Tyr Ala Leu Ala Ala Leu Gly Leu Val Leu Ile Phe Lys Thr Thr Asp
 20 Val Val Asn Phe Ala Gln Gly Glu Met Ala Met Phe Gly Thr Phe Ile
 35 Met Phe Thr Leu Leu Lys Thr Ala Gly Leu Pro Tyr Trp Gly Ala Phe
 50 Val Leu Ala Leu Ala Phe Ala Phe Leu Met Gly Ala Val Ile Glu Arg
 65 Val Ala Leu Arg Pro Leu Ala Gln Ala Pro Leu Ile Ser Val Leu Ile
 85 Ala Thr Leu Gly Leu Met Gln Ile Ile Asn Gly Val Ala Gly Trp Ile
 100 Trp Gly Tyr Gln Ala Arg Pro Phe Pro Thr Ala Val Ser Gly Ser Pro
 115 Ile Arg Leu Gly Asp Leu Val Ile Thr Leu Pro Asp Leu Val Asn Leu
 130 Ala Val Ser Leu Val Val Met Thr Gly Phe Phe Leu Leu Phe Lys Phe
 145 Thr Lys Leu Gly Ile Ala Met Arg Ala Val Ala Glu Asn Arg Val Ala
 165 Ala Arg Leu Met Gly Ile Pro Thr Asp Arg Ile Leu Ser Leu Thr Trp
 180 Gly Leu Gly Gly Val Leu Ala Ala Thr Ala Gly Ile Leu Ile Ala Pro
 195 Val Thr Asn Leu Asp Ile Asn Met Met Ala Asp Met Gln Ile Lys Ala
 210 Phe Thr Ala Ala Val Leu Gly Gly Phe Thr Ser Leu Pro Gly Ala Val
 225 Val Gly Gly Leu Thr Leu Gly Val Leu Glu Asn Leu Val Gly Gln Phe
 245 Val Pro Gln Leu Lys Thr Pro Phe Ala Phe Gly Leu Ile Val Leu Val
 260 Leu Met Leu Arg Pro Ser Gly Leu Met Gly Thr Val Gln Arg Lys Lys
 275 Val

<210> 556

<211> 1026

<212> DNA

<213> *Symbiobacterium thermophilum*

<220>

<221> CDS

<222> (1)..(1026)

<400> 556

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Met Gly Lys Lys Leu Leu Phe Leu Leu Gly Ala Leu Ala Val Leu Ala	
ctg ccc tac gcg ctg cct gac gaa tgg tcg tgg ctg gtg ctg ctc acc	96
Leu Pro Tyr Ala Leu Pro Asp Glu Trp Ser Trp Leu Val Leu Leu Thr	
aac cgg gcc ctg atc ctg gcc atc ggc gcc atc ggc ctc aac ctg ctc	144
Asn Arg Ala Leu Ile Leu Ala Ile Ala Ala Ile Gly Leu Asn Leu Leu	
acc ggc ttc gcc ggc cag atc tcc atc ggc cac gcg gcc ttc atg gcc	192
Thr Gly Phe Ala Gly Gln Ile Ser Ile Gly His Ala Ala Phe Met Ala	
atc ggc gcc ttc gcc agc tac ggc ctc acc gcc aag gtc ggc att ccc	240
Ile Gly Ala Phe Ala Ser Tyr Gly Leu Thr Ala Lys Val Gly Ile Pro	
ttc tgg ggc gcc ctg ccg ctg gca ggg ctg atc agc gcc gcc gtg ggc	288
Phe Trp Gly Ala Leu Pro Leu Ala Gly Leu Ile Ser Ala Ala Val Gly	
tac gcc ctg ggc ttc ccg gcg ctc cgg ctg cag ggc cac tac ctg gcc	336

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Tyr	Ala	Leu	Gly	Phe	Pro	Ala	Leu	Arg	Leu	Gln	Gly	His	Tyr	Leu	Ala		
atc	gcc	acc	ctg	ggc	ttc	ggc	gtg	gcg	gtg	ccc	cag	atc	ctc	aac	ctc		384
Ile	Ala	Thr	Leu	Gly	Phe	Gly	Val	Ala	Val	Pro	Gln	Ile	Leu	Asn	Leu		
		115					120					125					
tgg	aag	ggg	ctc	tcc	ggc	ggc	tgg	acc	ggg	gtg	aag	ccc	gcc	gcc	cct		432
Trp	Lys	Gly	Leu	Ser	Gly	Gly	Trp	Thr	Gly	Val	Lys	Pro	Ala	Ala	Pro		
		130				135					140						
tac	ctc	tat	ggc	ctc	tac	ttc	aag	gag	gac	cgc	ccc	tac	tac	tac	ctg		480
Tyr	Leu	Tyr	Gly	Leu	Tyr	Phe	Lys	Glu	Asp	Arg	Pro	Tyr	Tyr	Tyr	Leu		
145					150				155						160		
atc	ctg	atc	gcc	ctg	gcc	ctc	ctc	acc	tgg	gtg	gcc	ctg	aac	atc	gcc		528
Ile	Leu	Ile	Ala	Leu	Ala	Leu	Leu	Thr	Trp	Val	Ala	Leu	Asn	Ile	Ala		
				165					170					175			
aga	cgg	cgc	acc	ggg	cgg	gcc	ttc	atc	gcc	ctg	cgg	gac	agc	agc	gtc		576
Arg	Arg	Arg	Thr	Gly	Arg	Ala	Phe	Ile	Ala	Leu	Arg	Asp	Ser	Ser	Val		
			180					185					190				
gcc	gcg	cag	gcg	atg	ggc	atc	agc	ctg	gcc	cgg	tac	aag	acc	acc	gcc		624
Ala	Ala	Gln	Ala	Met	Gly	Ile	Ser	Leu	Ala	Arg	Tyr	Lys	Thr	Thr	Ala		
		195					200					205					
ttc	gcc	ctc	tcg	gcg	ttc	tac	gcc	ggc	atc	gcc	ggc	agc	ctc	tgg	gcc		672
Phe	Ala	Leu	Ser	Ala	Phe	Tyr	Ala	Gly	Ile	Ala	Gly	Ser	Leu	Trp	Ala		
		210				215					220						
cac	atg	atg	aac	tac	atc	gcc	ccc	cac	gac	ttc	aac	ctg	gcc	ctg	tcg		720
His	Met	Met	Asn	Tyr	Ile	Ala	Pro	His	Asp	Phe	Asn	Leu	Ala	Leu	Ser		
225					230				235						240		
atg	gag	ctg	ttc	acc	atc	atc	gtg	ctg	ggc	ggc	ctg	gcc	tcg	gtg	ccc		768
Met	Glu	Leu	Phe	Thr	Ile	Ile	Val	Leu	Gly	Gly	Leu	Ala	Ser	Val	Pro		
				245				250						255			
ggc	tcg	atc	gtg	ggg	tcg	ctg	ttc	atg	tcc	ctg	atg	ccc	aag	gcc	gtg		816
Gly	Ser	Ile	Val	Gly	Ser	Leu	Phe	Met	Ser	Leu	Met	Pro	Lys	Ala	Val		
			260					265					270				
gaa	cgg	atc	tcg	ctg	gcg	ctt	cag	cgg	tcg	ggg	gcc	ttc	gac	cat	tcc		864
Glu	Arg	Ile	Ser	Leu	Ala	Leu	Gln	Arg	Ser	Gly	Ala	Phe	Asp	His	Ser		
		275					280					285					
ccg	ttc	ctc	atg	aac	gtc	ttc	aag	aac	ctg	aat	cag	gtg	ctg	acg	ggc		912
Pro	Phe	Leu	Met	Asn	Val	Phe	Lys	Asn	Leu	Asn	Gln	Val	Leu	Thr	Gly		
		290				295					300						
gtc	atc	ctg	gtg	ctg	gtg	gtg	ctc	tac	ctg	ccc	ctg	ggg	ctc	gtg	gac		960
Val	Ile	Leu	Val	Leu	Val	Val	Leu	Tyr	Leu	Pro	Leu	Gly	Leu	Val	Asp		
305					310				315						320		
ctg	tgg	cgg	agg	ctg	cag	cac	tgg	tgg	gcc	ggg	cgc	cgg	cac	gcc	gcg		1008
Leu	Trp	Arg	Arg	Leu	Gln	His	Trp	Trp	Ala	Gly	Arg	Arg	His	Ala	Ala		
				325					330					335			
gcc	ggg	ggg	gtg	gag	tag												1026
Ala	Gly	Gly	Val	Glu													
			340														

<210> 557

<211> 341

<212> PRT

<213> Symbiobacterium thermophilum

<400> 557

Met	Gly	Lys	Lys	Leu	Leu	Phe	Leu	Leu	Gly	Ala	Leu	Ala	Val	Leu	Ala		
1				5					10					15			
Leu	Pro	Tyr	Ala	Leu	Pro	Asp	Glu	Trp	Ser	Trp	Leu	Val	Leu	Leu	Thr		
			20					25					30				
Asn	Arg	Ala	Leu	Ile	Leu	Ala	Ile	Ala	Ala	Ile	Gly	Leu	Asn	Leu	Leu		
		35				40						45					
Thr	Gly	Phe	Ala	Gly	Gln	Ile	Ser	Ile	Gly	His	Ala	Ala	Phe	Met	Ala		
	50					55				60							
Ile	Gly	Ala	Phe	Ala	Ser	Tyr	Gly	Leu	Thr	Ala	Lys	Val	Gly	Ile	Pro		
65					70				75						80		
Phe	Trp	Gly	Ala	Leu	Pro	Leu	Ala	Gly	Leu	Ile	Ser	Ala	Ala	Val	Gly		
			85					90						95			
Tyr	Ala	Leu	Gly	Phe	Pro	Ala	Leu	Arg	Leu	Gln	Gly	His	Tyr	Leu	Ala		
			100					105					110				
Ile	Ala	Thr	Leu	Gly	Phe	Gly	Val	Ala	Val	Pro	Gln	Ile	Leu	Asn	Leu		

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Trp	Lys	115	Gly	Leu	Ser	Gly	Gly	120	Trp	Thr	Gly	Val	Lys	125	Pro	Ala	Ala	Pro
	130						135						140					
Tyr	Leu	Tyr	Gly	Leu	Tyr	Phe	Lys	Glu	Asp	Arg	Pro	Tyr	Tyr	Tyr	Leu			
145					150					155					160			
Ile	Leu	Ile	Ala	Leu	Ala	Leu	Leu	Thr	Trp	Val	Ala	Leu	Asn	Ile	Ala			
			165						170					175				
Arg	Arg	Arg	Thr	Gly	Arg	Ala	Phe	Ile	Ala	Leu	Arg	Asp	Ser	Ser	Val			
			180					185					190					
Ala	Ala	Gln	Ala	Met	Gly	Ile	Ser	Leu	Ala	Arg	Tyr	Lys	Thr	Thr	Ala			
		195					200					205						
Phe	Ala	Leu	Ser	Ala	Phe	Tyr	Ala	Gly	Ile	Ala	Gly	Ser	Leu	Trp	Ala			
	210					215					220							
His	Met	Met	Asn	Tyr	Ile	Ala	Pro	His	Asp	Phe	Asn	Leu	Ala	Leu	Ser			
225					230					235					240			
Met	Glu	Leu	Phe	Thr	Ile	Ile	Val	Leu	Gly	Gly	Leu	Ala	Ser	Val	Pro			
				245					250					255				
Gly	Ser	Ile	Val	Gly	Ser	Leu	Phe	Met	Ser	Leu	Met	Pro	Lys	Ala	Val			
			260					265					270					
Glu	Arg	Ile	Ser	Leu	Ala	Leu	Gln	Arg	Ser	Gly	Ala	Phe	Asp	His	Ser			
		275					280					285						
Pro	Phe	Leu	Met	Asn	Val	Phe	Lys	Asn	Leu	Asn	Gln	Val	Leu	Thr	Gly			
	290					295					300							
Val	Ile	Leu	Val	Leu	Val	Val	Leu	Tyr	Leu	Pro	Leu	Gly	Leu	Val	Asp			
305					310					315					320			
Leu	Trp	Arg	Arg	Leu	Gln	His	Trp	Trp	Ala	Gly	Arg	Arg	His	Ala	Ala			
				325					330					335				
Ala	Gly	Gly	Val	Glu														
			340															

<210> 558

<211> 1068

<212> DNA

<213> Desulfotalea psychrophila

<220>

<221> CDS

<222> (1)..(1068)

<400> 558

atg	aaa	aat	aat	atc	tcc	ttg	ttt	ttg	ttt	gtg	ata	gtc	att	gtt	ggc	48
Met	Lys	Asn	Asn	Ile	Ser	Leu	Phe	Leu	Phe	Val	Ile	Val	Ile	Val	Gly	
1				5				10					15			
ctt	cat	ctt	ctt	acc	gcc	agt	acg	ggg	tct	ctc	tac	cta	ctg	acc	cag	96
Leu	His	Leu	Leu	Thr	Ala	Ser	Thr	Gly	Ser	Leu	Tyr	Leu	Leu	Thr	Gln	
			20					25					30			
ttg	acc	atg	tcc	gca	tat	tat	tcc	ctg	ctg	gcc	ata	ggc	ctc	tgc	ctg	144
Leu	Thr	Met	Ser	Ala	Tyr	Tyr	Ser	Leu	Leu	Ala	Ile	Gly	Leu	Cys	Leu	
		35				40						45				
ctt	atg	ggc	cat	gct	gga	cag	ata	tcc	atg	ggc	cat	ggc	ggg	ttc	ttt	192
Leu	Met	Gly	His	Ala	Gly	Gln	Ile	Ser	Met	Gly	His	Ala	Gly	Phe	Phe	
	50				55					60						
gcc	att	ggg	ggc	tat	ctg	tcg	gcc	agt	ctc	acc	act	cat	aat	atg	gtc	240
Ala	Ile	Gly	Gly	Tyr	Leu	Ser	Ala	Ser	Leu	Thr	Thr	His	Asn	Met	Val	
	65				70					75					80	
tcc	tct	gct	gaa	aca	ggc	tgg	gtg	caa	ggc	ctc	tca	tct	ctc	ggc	ctt	288
Ser	Ser	Ala	Glu	Thr	Gly	Trp	Val	Gln	Gly	Leu	Ser	Ser	Leu	Gly	Leu	
			85					90					95			
tta	cat	gca	ggc	gag	gat	atg	ttc	ggg	gat	gcc	ctc	ctc	gtc	ttg	gcg	336
Leu	His	Ala	Gly	Glu	Asp	Met	Phe	Gly	Asp	Ala	Leu	Leu	Val	Leu	Ala	
		100					105						110			
cca	tgg	cct	gcc	tgc	cta	atg	gct	att	gcc	gtt	gcc	gct	ctg	gtg	gcc	384
Pro	Trp	Pro	Ala	Cys	Leu	Met	Ala	Ile	Ala	Val	Ala	Ala	Leu	Val	Ala	
		115					120					125				
ctc	ctg	ctt	ggc	att	ccc	atc	ttg	aag	ctc	aag	ggc	cat	tat	ctt	gcc	432
Leu	Leu	Leu	Gly	Ile	Pro	Ile	Leu	Lys	Leu	Lys	Gly	His	Tyr	Leu	Ala	
	130					135					140					
atg	gcg	acc	ctg	ggc	ttt	ggc	att	att	gtc	tac	cgc	ctg	gtc	ctg	gcc	480
Met	Ala	Thr	Leu	Gly	Phe	Gly	Ile	Ile	Val	Tyr	Arg	Leu	Val	Leu	Ala	

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145	acg	gaa	ttt	ttt	ggt	150	gag	gca	gat	ggc	155	tcc	gat	gta	cct	gcc	160	ttt	528
	Thr	Glu	Phe	Phe	Gly		Glu	Ala	Asp	Gly		Ser	Asp	Val	Pro	Ala		Phe	
					165						170					175			
	gct	atc	ctg	cct	ggc	175	ttg	agc	att	ggt	180	gat	ttg	gat	gtg	cgg	gtg	576	
	Ala	Ile	Leu	Pro	Gly		Leu	Ser	Ile	Val		Asp	Leu	Asp	Val	Arg	Val		
				180						185					190				
	gaa	aat	tat	tat	att	195	gcc	gcc	gta	atc	ctc	ttc	ttc	ggc	ttt	gtc	ctt	624	
	Glu	Asn	Tyr	Tyr	Ile		Ala	Ala	Val	Ile	Leu	Phe	Phe	Gly	Phe	Val	Leu		
			195						200					205					
	tta	aga	aat	ctg	acc	205	agg	tct	cgg	gta	ggg	agg	gcc	tta	cgg	gca	ata	672	
	Leu	Arg	Asn	Leu	Thr		Arg	Ser	Arg	Val	Gly	Arg	Ala	Leu	Arg	Ala	Ile		
								215					220						
	cac	agc	gcc	gaa	gat	225	gcg	gcc	gat	tcc	atg	ggg	ata	aat	gtt	gcc	cac	720	
	His	Ser	Ala	Glu	Asp		Ala	Ala	Asp	Ser	Met	Gly	Ile	Asn	Val	Ala	His		
								230				235							
	tat	aag	ttg	att	acc	240	ttt	gtt	cta	tcc	gcc	gtt	ttt	gcc	gcc	ttt	gcc	768	
	Tyr	Lys	Leu	Ile	Thr		Phe	Val	Leu	Ser	Ala	Val	Phe	Ala	Ala	Phe	Ala		
								245				250				255			
	ggt	gtt	tgt	ctg	act	260	cac	tat	aac	ggg	ggc	atc	ggg	cct	tcg	gag	gcg	816	
	Gly	Val	Cys	Leu	Thr		His	Tyr	Asn	Gly	Gly	Ile	Gly	Pro	Ser	Glu	Ala		
									265					270					
	ggg	atg	atg	aaa	tcc	275	gtt	cgt	tat	gtg	gcc	att	gtt	gcc	gtg	gga	gga	864	
	Gly	Met	Met	Lys	Ser		Val	Arg	Tyr	Val	Ala	Ile	Val	Ala	Val	Gly	Gly		
								280						285					
	atg	gca	aat	ctc	tgg	290	gga	gtg	ctg	acc	atg	agc	atg	gtg	ctg	aac	tac	912	
	Met	Ala	Asn	Leu	Trp		Gly	Val	Leu	Thr	Met	Ser	Met	Val	Leu	Asn	Tyr		
								295					300						
	ctc	tcc	ctt	cgt	ggc	305	atc	ttt	ggc	agt	tat	gat	gcc	gtt	ttt	ggc	960		
	Leu	Ser	Leu	Arg	Gly		Ile	Phe	Gly	Ser	Tyr	Asp	Ala	Val	Phe	Gly			
								310				315							
	acc	gtc	ctg	gtc	ttg	325	gtg	atg	ctc	ttt	gct	ccc	gat	gga	att	ttt	agc	1008	
	Thr	Val	Leu	Val	Leu		Val	Met	Leu	Phe	Ala	Pro	Asp	Gly	Ile	Phe	Ser		
											330				335				
	att	aag	ctt	cgt	gcc	340	ggg	ctt	gcc	caa	ctc	cgg	gcg	aaa	tat	gga	gag	1056	
	Ile	Lys	Leu	Arg	Ala		Gly	Leu	Ala	Gln	Leu	Arg	Ala	Lys	Tyr	Gly	Glu		
										345					350				
	gat	ctc	tca	tga														1068	
	Asp	Leu	Ser																

<210> 559

<211> 355

<212> PRT

<213> Desulfotalea psychrophila

<400> 559

Met	Lys	Asn	Asn	Ile	Ser	Leu	Phe	Leu	Phe	Val	Ile	Val	Ile	Val	Gly
1				5					10					15	
Leu	His	Leu	Leu	Thr	Ala	Ser	Thr	Gly	Ser	Leu	Tyr	Leu	Leu	Thr	Gln
			20					25					30		
Leu	Thr	Met	Ser	Ala	Tyr	Tyr	Ser	Leu	Leu	Ala	Ile	Gly	Leu	Cys	Leu
		35					40					45			
Leu	Met	Gly	His	Ala	Gly	Gln	Ile	Ser	Met	Gly	His	Ala	Gly	Phe	Phe
	50					55					60				
Ala	Ile	Gly	Gly	Tyr	Leu	Ser	Ala	Ser	Leu	Thr	Thr	His	Asn	Met	Val
65					70					75					80
Ser	Ser	Ala	Glu	Thr	Gly	Trp	Val	Gln	Gly	Leu	Ser	Ser	Leu	Gly	Leu
				85					90					95	
Leu	His	Ala	Gly	Glu	Asp	Met	Phe	Gly	Asp	Ala	Leu	Leu	Val	Leu	Ala
		100					105						110		
Pro	Trp	Pro	Ala	Cys	Leu	Met	Ala	Ile	Ala	Val	Ala	Ala	Ala	Val	Ala
		115					120					125			
Leu	Leu	Leu	Gly	Ile	Pro	Ile	Leu	Lys	Leu	Lys	Gly	His	Tyr	Leu	Ala
	130					135					140				
Met	Ala	Thr	Leu	Gly	Phe	Gly	Ile	Ile	Val	Tyr	Arg	Leu	Val	Leu	Ala
145					150					155					160
Thr	Glu	Phe	Phe	Gly	Glu	Ala	Asp	Gly	Ile	Ser	Asp	Val	Pro	Ala	Phe
				165					170					175	

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Ala Ile Leu Pro Gly Leu Ser Ile Val Gly Asp Leu Asp Val Arg Val
 180 185 190
 Glu Asn Tyr Tyr Ile Ala Ala Val Ile Leu Phe Phe Gly Phe Val Leu
 195 200 205
 Leu Arg Asn Leu Thr Arg Ser Arg Val Gly Arg Ala Leu Arg Ala Ile
 210 215 220
 His Ser Ala Glu Asp Ala Ala Asp Ser Met Gly Ile Asn Val Ala His
 225 230 235 240
 Tyr Lys Leu Ile Thr Phe Val Leu Ser Ala Val Phe Ala Ala Phe Ala
 245 250 255
 Gly Val Cys Leu Thr His Tyr Asn Gly Gly Ile Gly Pro Ser Glu Ala
 260 265 270
 Gly Met Met Lys Ser Val Arg Tyr Val Ala Ile Val Ala Val Gly Gly
 275 280 285
 Met Ala Asn Leu Trp Gly Val Leu Thr Met Ser Met Val Leu Asn Tyr
 290 295 300
 Leu Ser Leu Arg Gly Ile Phe Gly Ser Tyr Asp Asp Ala Val Phe Gly
 305 310 315 320
 Thr Val Leu Val Leu Val Met Leu Phe Ala Pro Asp Gly Ile Phe Ser
 325 330 335
 Ile Lys Leu Arg Ala Gly Leu Ala Gln Leu Arg Ala Lys Tyr Gly Glu
 340 345 350
 Asp Leu Ser
 355

<210> 560

<211> 891

<212> DNA

<213> Desulfotalea psychrophila

<220>

<221> CDS

<222> (1)..(891)

<400> 560

atg agt agc cag tta ttt gtc cag tat tta ctt gcc ggt att acc tat	48
Met Ser Ser Gln Leu Phe Val Gln Tyr Leu Leu Ala Gly Ile Thr Tyr	
1 5 10 15	
ggt tcc atg tat gcc att gtc gcc ata ggc ttt aat att att tat aat	96
Gly Ser Met Tyr Ala Ile Val Ala Ile Gly Phe Asn Ile Ile Tyr Asn	
20 25 30	
acc aca ggg att ata aat ttt gct cag ggg gag ttt gtc atg ctg ggg	144
Thr Thr Gly Ile Ile Asn Phe Ala Gln Gly Glu Phe Val Met Leu Gly	
35 40 45	
ggg atg ctc tcc atc tct ctc ttg cag ttt atg ccc ctg cct ttg gcc	192
Gly Met Leu Ser Ile Ser Leu Leu Gln Phe Met Pro Leu Pro Leu Ala	
50 55 60	
att ggc ctg gca gtg gtg ctg acc atg gct gtc ggc ggt ctg gtg gag	240
Ile Gly Leu Ala Val Val Leu Thr Met Ala Val Gly Gly Leu Val Glu	
65 70 75 80	
ata ctg ttt atc cgt tgg tta aaa aat ccc ggt gta ctg cgc atg att	288
Ile Leu Phe Ile Arg Trp Leu Lys Asn Pro Gly Val Leu Arg Met Ile	
85 90 95	
gtg atc acc gtt ggc ctc tct att ctc ctg cgg gaa atc gcc ctc cat	336
Val Ile Thr Val Gly Leu Ser Ile Leu Leu Arg Glu Ile Ala Leu His	
100 105 110	
att tgg ggt gag ggt gtt tat tca ctg ccc tat ttt tat ggt aat gag	384
Ile Trp Gly Glu Gly Val Tyr Ser Leu Pro Tyr Phe Tyr Gly Asn Glu	
115 120 125	
atc agc acg gtg gtt att ttg ggg gca cgg gta tca cca cag att tta	432
Ile Ser Thr Val Val Ile Leu Gly Ala Arg Val Ser Pro Gln Ile Leu	
130 135 140	
tgg gtc ata ggt gtc tgt ctc ctt ctt gtt gtc ctg ctt cat ctt ttt	480
Trp Val Ile Gly Val Cys Leu Leu Val Val Leu Leu His Leu Phe	
145 150 155 160	
ttc aag act tcc ccc atg ggg cgg gag atg cgt gcc tgt gcg gtc aat	528
Phe Lys Thr Ser Pro Met Gly Arg Glu Met Arg Ala Cys Ala Val Asn	
165 170 175	
aaa aag gct gcc cta ctc tgc ggg atc aat gcc cgt aat atg gtc acc	576

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Lys	Lys	Ala	Ala	Leu	Leu	Cys	Gly	Ile	Asn	Ala	Arg	Asn	Met	Val	Thr		
180								185					190				
ttc	tcc	ttt	atg	ctc	agt	gcc	ggt	att	ggt	gcc	ctg	gcc	ggt	gcg	gtt	624	
Phe	Ser	Phe	Met	Leu	Ser	Ala	Gly	Ile	Gly	Ala	Leu	Ala	Gly	Ala	Val		
195							200					205					
atg	tca	cct	att	acc	tat	act	cag	tat	gat	tcg	ggc	gcc	gcc	ctt	gcc	672	
Met	Ser	Pro	Ile	Thr	Tyr	Thr	Gln	Tyr	Asp	Ser	Gly	Ala	Ala	Leu	Ala		
210						215					220						
att	aag	ggt	ttt	acc	gtg	gct	att	ctt	ggt	ggt	ctg	ggc	aat	ctc	ttt	720	
Ile	Lys	Gly	Phe	Thr	Val	Ala	Ile	Leu	Gly	Gly	Leu	Gly	Asn	Leu	Phe		
225					230					235					240		
ggt	gcc	gtg	gcg	gcg	gga	ata	ttg	ctc	ggg	gtg	ttg	gag	gca	ttt	tcg	768	
Gly	Ala	Val	Ala	Ala	Gly	Ile	Leu	Leu	Gly	Val	Leu	Glu	Ala	Phe	Ser		
				245					250					255			
gtc	tct	gtt	cta	ccc	ctg	gcc	ttt	cag	gat	gcc	atc	gcc	att	agc	ctg	816	
Val	Ser	Val	Leu	Pro	Leu	Ala	Phe	Gln	Asp	Ala	Ile	Ala	Ile	Ser	Leu		
			260					265					270				
ctc	ctt	gtt	att	ctc	tgt	gtg	cgt	ccc	cat	ggt	ctc	ttt	ggc	tca	gca	864	
Leu	Leu	Val	Ile	Leu	Cys	Val	Arg	Pro	His	Gly	Leu	Phe	Gly	Ser	Ala		
			275				280					285					
acg	gcc	gcc	ggt	tta	aag	gat	ttt	tag								891	
Thr	Ala	Ala	Gly	Leu	Lys	Asp	Phe										
290						295											

<210> 561

<211> 296

<212> PRT

<213> Desulfotalea psychrophila

<400> 561

Met	Ser	Ser	Gln	Leu	Phe	Val	Gln	Tyr	Leu	Leu	Ala	Gly	Ile	Thr	Tyr		
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Gly	Ser	Met	Tyr	Ala	Ile	Val	Ala	Ile	Gly	Phe	Asn	Ile	Ile	Tyr	Asn		
			20					25					30				
Thr	Thr	Gly	Ile	Ile	Asn	Phe	Ala	Gln	Gly	Glu	Phe	Val	Met	Leu	Gly		
		35					40					45					
Gly	Met	Leu	Ser	Ile	Ser	Leu	Leu	Gln	Phe	Met	Pro	Leu	Pro	Leu	Ala		
		50				55					60						
Ile	Gly	Leu	Ala	Val	Val	Leu	Thr	Met	Ala	Val	Gly	Gly	Leu	Val	Glu		
65				70						75					80		
Ile	Leu	Phe	Ile	Arg	Trp	Leu	Lys	Asn	Pro	Gly	Val	Leu	Arg	Met	Ile		
			85					90						95			
Val	Ile	Thr	Val	Gly	Leu	Ser	Ile	Leu	Leu	Arg	Glu	Ile	Ala	Leu	His		
			100					105					110				
Ile	Trp	Gly	Glu	Gly	Val	Tyr	Ser	Leu	Pro	Tyr	Phe	Tyr	Gly	Asn	Glu		
		115					120					125					
Ile	Ser	Thr	Val	Val	Ile	Leu	Gly	Ala	Arg	Val	Ser	Pro	Gln	Ile	Leu		
		130				135					140						
Trp	Val	Ile	Gly	Val	Cys	Leu	Leu	Leu	Val	Val	Leu	Leu	His	Leu	Phe		
145					150					155					160		
Phe	Lys	Thr	Ser	Pro	Met	Gly	Arg	Glu	Met	Arg	Ala	Cys	Ala	Val	Asn		
				165					170					175			
Lys	Lys	Ala	Ala	Leu	Leu	Cys	Gly	Ile	Asn	Ala	Arg	Asn	Met	Val	Thr		
			180					185					190				
Phe	Ser	Phe	Met	Leu	Ser	Ala	Gly	Ile	Gly	Ala	Leu	Ala	Gly	Ala	Val		
		195					200					205					
Met	Ser	Pro	Ile	Thr	Tyr	Thr	Gln	Tyr	Asp	Ser	Gly	Ala	Ala	Leu	Ala		
		210				215					220						
Ile	Lys	Gly	Phe	Thr	Val	Ala	Ile	Leu	Gly	Gly	Leu	Gly	Asn	Leu	Phe		
225					230					235					240		
Gly	Ala	Val	Ala	Ala	Gly	Ile	Leu	Leu	Gly	Val	Leu	Glu	Ala	Phe	Ser		
			245						250					255			
Val	Ser	Val	Leu	Pro	Leu	Ala	Phe	Gln	Asp	Ala	Ile	Ala	Ile	Ser	Leu		
			260					265					270				
Leu	Leu	Val	Ile	Leu	Cys	Val	Arg	Pro	His	Gly	Leu	Phe	Gly	Ser	Ala		
		275					280					285					
Thr	Ala	Ala	Gly	Leu	Lys	Asp	Phe										
290						295											

<210> 562
 <211> 882
 <212> DNA
 <213> Acinetobacter sp

<220>
 <221> CDS
 <222> (1)..(882)

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 Met Tyr Ser Leu Val Ala Ile Gly Phe Val Leu Ile Tyr Arg Ala Ser 20 25 30
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 Thr Phe Val Asn Leu Thr Glu His Gly Val Pro Phe Ile Val Ala Phe 50 55 60
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 Ala Val Thr Leu Phe 70 Ile Phe Ile Val Val Leu Leu Ile Asp Ala 65 75 80
 ttg gtg tta aag cat cta gtg aat cgt tca gtg att acg ctt ttt atg 288
 Leu Val Leu Lys His 85 Leu Val Asn Arg Ser Val Ile Thr Leu Phe Met 90 95
 gcg aca tta ggc tta agt tat gtg ctt gag ggg act gca caa gca gta 336
 Ala Thr Leu Gly 100 Leu Ser Tyr Val Leu 105 Glu Gly Thr Ala Gln Ala Val 110
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 Trp Gly Thr Gln Val His Gly Leu Asp Leu Gly Ile Ser Asp Val Pro 115 120 125
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 Ile Asp Phe Tyr Gly Ile His 135 Leu Ser Lys Phe Asp Leu Val Ala Thr 130 140
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 Thr Arg Phe Gly 165 Ser Leu Arg Ala Val Ala Asp Asp Pro Leu Ala 170 175
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 Ser Gln Ser Val Gly Ile Arg Leu Asn Tyr Ile Trp Ile Leu Val Trp 180 185 190
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 Ser Val Ala Gly Leu Val Ala Leu Val Ala Gly Leu Leu Trp Gly Ala 195 200 205
 cgt tta ggt gtg caa ttt tca ctg tca ctc gtg gtt tta aaa gca tta 672
 Arg Leu Gly Val Gln Phe Ser 215 Leu Ser Leu Val Val Leu Lys Ala Leu 210 220 225
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 Gly Gly Leu Ile 245 Gly Ala Ser Glu Lys 250 Leu Ala Glu Ile Tyr Leu 255
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 Gly Ser Leu Ile Gly Ser Gly Ile Glu Asn Trp Phe Pro Tyr Leu Ile 260 265 270
 gca att tta ttt tta ctg ata cgt ccg aca ggg cta ttt ggt gaa caa 864
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<211> 293

<212> PRT

<213> Acinetobacter sp

<400> 563

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Thr Phe Val Asn Leu Thr Glu His Gly Val Pro Phe Ile Val Ala Phe
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Ala Val Thr Leu Phe Ile Ile Phe Ile Val Val Leu Leu Ile Asp Ala
65      70      75      80
Leu Val Leu Lys His Leu Val Asn Arg Ser Val Ile Thr Leu Phe Met
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Ala Thr Leu Gly Leu Ser Tyr Val Leu Glu Gly Thr Ala Gln Ala Val
      100      105      110
Trp Gly Thr Gln Val His Gly Leu Asp Leu Gly Ile Ser Asp Val Pro
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Ile Asp Phe Tyr Gly Ile His Leu Ser Lys Phe Asp Leu Val Ala Thr
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Leu Ile Ala Gly Ser Leu Val Ile Ile Leu Ser Phe Leu Phe Thr Lys
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Thr Arg Phe Gly Ile Ser Leu Arg Ala Val Ala Asp Asp Pro Leu Ala
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Ser Gln Ser Val Gly Ile Arg Leu Asn Tyr Ile Trp Ile Leu Val Trp
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Ser Val Ala Gly Leu Val Ala Leu Val Ala Gly Leu Leu Trp Gly Ala
195      200      205
Arg Leu Gly Val Gln Phe Ser Leu Ser Leu Val Val Leu Lys Ala Leu
210      215      220
Pro Val Leu Ile Ile Gly Gly Phe Thr Ser Ile Thr Gly Ala Ile Val
225      230      235      240
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Gly Ser Leu Ile Gly Ser Gly Ile Glu Asn Trp Phe Pro Tyr Leu Ile
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Ala Asp Asn Thr Pro Ala Ile His Ser Leu Gln Gln Glu Asp Ala Ile
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Gln Gln Phe Val Lys Ser Asp Phe Asn Thr Arg Arg Met Met Leu Asn
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Lys	Asn	Asp	Glu	Thr	Leu	Leu	Ser	Tyr	Pro	Asp	Glu	Lys	Ile	Ile	Lys	
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gac	tgg	ccc	gca	gat	tta	tca	caa	gtc	act	tta	gtc	aat	aca	ttg	cgt	384
Asp	Trp		Ala	Asp	Leu	Ser	Gln	Val	Thr	Leu	Val	Asn	Thr	Leu	Arg	
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Lys	Ala	Leu	Thr	Phe	Gly	Gln	Ala	Lys	Ala	Lys	Leu	Asn	Ser	Glu	Asp	
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gcg	acc	caa	cga	tta	cgt	gca	gtc	gat	att	tta	gaa	aat	aat	att	tct	480
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Leu	Ala	Ile	Thr	Tyr	Gly	Leu	Leu	Gly	Val	Ile	Asn	Met	Ala	His	Gly	
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Asn	Lys	Thr	Arg	Phe	Gly	Leu	Phe	Ile	Arg	Ala	Val	Thr	Gln	Asn	Arg	
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Gln	Met	Ala	Arg	Ala	Val	Gly	Ile	Arg	Ser	Ala	Arg	Ile	Asp	Met	Met	
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Arg	Phe	Val	Glu													
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 Gly Ile Ala Leu Thr Pro Ser Leu Met Leu Pro Tyr Asn Arg Ile Ala
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 Asn Lys Thr Arg Phe Gly Leu Phe Ile Arg Ala Val Thr Gln Asn Arg
 Gln Met Ala Arg Ala Val Gly Ile Arg Ser Ala Arg Ile Asp Met Met
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<221> CDS

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Ile	Arg	Ile	Val	Ile	Thr	Asn	Ala	Thr	Ser	Leu	Thr	Asn	Gly	Ser	Leu	

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Trp	Leu	Ala	Phe	Thr	Val	Thr	Phe	Ile	Val	Leu	Leu	Leu	Arg	Ser	Asn					
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aca	atg	ggt	atc	aac	gct	ttt	ttc	tac	cg	agc	ttt	tcc	ttt	act	ggt	672				
Thr	Met	Gly	Ile	Asn	Ala	Phe	Phe	Tyr	Arg	Ser	Phe	Ser	Phe	Thr	Val					
ggt	gca	ttt	ttt	gca	ggg	atc	gga	gga	gca	tta	acg	gct	gct	ctt	att	720				
Gly	Ala	Phe	Phe	Ala	Gly	Ile	Gly	Gly	Ala	Leu	Thr	Ala	Ala	Leu	Ile					
225	tca	act	atc	gat	ccc	aaa	atg	ttc	aac	ttt	ctc	cta	acc	ttt	aat	att	768			
Ser	Thr	Ile	Asp	Pro	Lys	Met	Phe	Asn	Phe	Leu	Leu	Thr	Phe	Asn	Ile					
ttg	atg	att	ggt	ggt	gct	ggt	ggt	ctt	ggt	tcg	att	aca	ggc	agt	ggt	816				
Leu	Met	Ile	Val	Val	Ala	Gly	Gly	Leu	Gly	Ser	Ile	Thr	Gly	Ser	Val					
ata	agt	agt	ggt	att	ggt	aca	gct	atg	ctt	gaa	tgg	ctt	cg	atc	att	864				
Ile	Ser	Ser	Val	Ile	Val	Thr	Ala	Met	Leu	Glu	Trp	Leu	Arg	Ile	Ile					
gaa	agt	cca	ttt	gac	tta	ggt	ttt	ata	tat	att	cca	gaa	ata	cca	gga	912				
Glu	Ser	Pro	Phe	Asp	Leu	Gly	Phe	Ile	Tyr	Ile	Pro	Glu	Ile	Pro	Gly					
290	ctt	cg	atg	ggt	ggt	ttt	tct	ctt	tta	ttg	tta	gta	att	atc	tta	ttt	960			
Leu	Arg	Met	Val	Val	Phe	Ser	Leu	Leu	Leu	Leu	Val	Val	Ile	Ile	Leu	Phe				
305	tgg	cga	aaa	gga	ttg	ctg	gga	caa	cg	gaa	ttc	tca	tgg	aat	tgg	att	1008			
Trp	Arg	Lys	Gly	Leu	Leu	Gly	Gln	Arg	Glu	Phe	Ser	Trp	Trp	Asn	Trp	Ile				
tat	ggt	ttt	ttg	aca	cga	aag	aag	ctc	aat	act	gag	gga	aag	cta	1056					
Tyr	Gly	Phe	Leu	Thr	Arg	Lys	Lys	Leu	Pro	Asn	Thr	Glu	Gly	Lys	Leu					
340	tga															1059				

<210> 567

<211> 352

<212> PRT

<213> Bartonella quintana

<400> 567

Met	Thr	Lys	Ser	Ala	Ser	Thr	Phe	Leu	Ser	Cys	Ile	Ser	Ile	Leu	Val
1				5					10					15	
Leu	Ile	Gly	Phe	Leu	Phe	Tyr	Ala	Asp	Asn	His	Phe	Asn	Asp	Tyr	Thr
			20					25					30		
Leu	Arg	Val	Ile	Asn	Leu	Ile	Ala	Ile	Asn	Ala	Ile	Leu	Ala	Ile	Ser
		35					40					45			
Leu	Asn	Leu	Ile	Tyr	Gly	Phe	Thr	Gly	Met	Phe	Ser	Leu	Gly	His	Ala
	50				55					60					
Gly	Phe	Met	Ala	Ile	Gly	Ala	Tyr	Val	Cys	Ala	Ile	Leu	Leu	Leu	Ser
65					70					75					80
Pro	Glu	Gln	Lys	Glu	Met	Met	Trp	Ile	Leu	Glu	Pro	Ile	Ala	Glu	Pro
				85					90					95	
Leu	His	Tyr	Leu	Gln	Leu	Pro	Phe	Phe	Val	Ala	Val	Val	Ile	Ser	Gly
			100					105					110		
Leu	Cys	Ala	Val	Ile	Gly	Leu	Val	Ala	Leu	Pro	Ile	Leu	Arg		
		115					120			125					
Leu	Gly	Gly	Asp	Tyr	Leu	Gly	Ile	Ala	Thr	Leu	Gly	Phe	Ala	Glu	Ile
	130					135				140					
Ile	Arg	Ile	Val	Ile	Thr	Asn	Ala	Thr	Ser	Leu	Thr	Asn	Gly	Ser	Leu
145					150					155					160
Gly	Ile	Lys	Gly	Ile	Pro	Gln	Asn	Ala	Thr	Leu	Trp	Trp	Asn	Tyr	Gly
				165					170					175	

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Trp	Leu	Ala	Phe	Thr	Val	Thr	Phe	Ile	Val	Leu	Leu	Leu	Arg	Ser	Asn
			180					185					190		
Ala	Gly	Asn	Val	Leu	Arg	Ala	Ile	Arg	Asp	Asp	Glu	Ile	Ala	Ala	Lys
		195					200					205			
Thr	Met	Gly	Ile	Asn	Ala	Phe	Phe	Tyr	Arg	Ser	Phe	Ser	Phe	Thr	Val
	210					215					220				
Gly	Ala	Phe	Phe	Ala	Gly	Ile	Gly	Gly	Ala	Leu	Thr	Ala	Ala	Leu	Ile
	225				230					235					240
Ser	Thr	Ile	Asp	Pro	Lys	Met	Phe	Asn	Phe	Leu	Leu	Thr	Phe	Asn	Ile
			245					250						255	
Leu	Met	Ile	Val	Val	Ala	Gly	Gly	Leu	Gly	Ser	Ile	Thr	Gly	Ser	Val
		260						265					270		
Ile	Ser	Ser	Val	Ile	Val	Thr	Ala	Met	Leu	Glu	Trp	Leu	Arg	Ile	Ile
		275					280					285			
Glu	Ser	Pro	Phe	Asp	Leu	Gly	Phe	Ile	Tyr	Ile	Pro	Glu	Ile	Pro	Gly
	290					295					300				
Leu	Arg	Met	Val	Val	Phe	Ser	Leu	Leu	Leu	Leu	Val	Ile	Ile	Leu	Phe
	305				310					315					320
Trp	Arg	Lys	Gly	Leu	Gly	Gln	Arg	Glu	Phe	Ser	Trp	Asn	Trp	Trp	Ile
			325					330					335		
Tyr	Gly	Phe	Leu	Thr	Arg	Lys	Lys	Leu	Pro	Asn	Thr	Glu	Gly	Lys	Leu
			340					345					350		

<210> 568

<211> 1065

<212> DNA

<213> Bartonella quintana

<220>

<221> CDS

<222> (1)..(1065)

<400> 568

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Met	Phe	Ile	Gln	Tyr	Phe	Phe	Asn	Ala	Leu	Ala	Leu	Gly	Ser	Leu	Tyr	
	1			5					10					15		
ggg	ctt	att	gcc	att	ggt	tat	act	atg	atc	tat	ggt	att	cta	agg	ctc	96
Gly	Leu	Ile	Ala	Ile	Gly	Tyr	Thr	Met	Ile	Tyr	Gly	Ile	Leu	Arg	Leu	
			20					25					30			
att	aat	ttt	gtt	cac	ggc	gat	atc	ttt	atg	ctg	ggg	gca	tat	ttt	gtt	144
Ile	Asn	Phe	Val	His	Gly	Asp	Ile	Phe	Met	Leu	Gly	Ala	Tyr	Phe	Val	
		35					40					45				
ttc	ttt	tct	aca	att	agc	ttt	ata	cct	gct	tgg	gct	gct	gtt	ctt	ctt	192
Phe	Phe	Ser	Thr	Ile	Ser	Phe	Ile	Pro	Ala	Trp	Ala	Ala	Val	Leu	Leu	
	50					55				60						
gta	tca	tta	gct	att	ctt	att	tat	tat	tca	gta	ttt	ata	ggg	ttt	aaa	240
Val	Ser	Leu	Ala	Ile	Leu	Ile	Tyr	Tyr	Ser	Val	Phe	Ile	Gly	Phe	Lys	
	65				70				75						80	
aaa	cgc	ctt	tca	att	tat	tgg	ggt	gtt	gct	ttt	tta	att	ctt	att	tta	288
Lys	Arg	Leu	Ser	Ile	Tyr	Trp	Gly	Val	Ala	Phe	Leu	Ile	Leu	Ile	Leu	
			85					90					95			
gca	ttc	att	tat	tat	ttt	aaa	att	gcc	cca	caa	gat	ttt	acg	cca	act	336
Ala	Phe	Ile	Tyr	Tyr	Phe	Lys	Ile	Ala	Pro	Gln	Asp	Phe	Thr	Pro	Thr	
			100					105					110			
tgg	att	tta	gcc	ctc	tgt	ttt	tca	att	ttc	atc	aca	agt	gca	gtg	ggt	384
Trp	Ile	Leu	Ala	Leu	Cys	Phe	Ser	Ile	Phe	Ile	Thr	Ser	Ala	Val	Gly	
		115					120					125				
att	act	att	gat	caa	ttt	gcc	tac	aaa	cct	ctg	cgc	cat	gct	ccc	cgt	432
Ile	Thr	Ile	Asp	Gln	Phe	Ala	Tyr	Lys	Pro	Leu	Arg	His	Ala	Pro	Arg	
	130					135					140					
att	tca	gcg	ctt	att	ggt	gcg	ata	gga	gtt	tcc	ttt	ttt	att	gaa	aat	480
Ile	Ser	Ala	Leu	Ile	Gly	Ala	Ile	Gly	Val	Ser	Phe	Phe	Ile	Glu	Asn	
	145				150				155					160		
ctt	gct	aca	att	ctc	ttt	agt	ggt	gtt	ccc	aaa	ggt	gtg	aaa	cag	cca	528
Leu	Ala	Thr	Ile	Leu	Phe	Ser	Gly	Val	Pro	Lys	Gly	Val	Lys	Gln	Pro	
			165					170					175			
gat	ttt	ctt	gta	acg	ccg	ttc	tta	tgg	cat	tta	ggg	caa	agt	tca	gat	576
Asp	Phe	Leu	Val	Thr	Pro	Phe	Leu	Trp	His	Leu	Gly	Gln	Ser	Ser	Asp	
			180					185					190			

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gga	atc	att	aga	att	gct	cct	atg	tct	ttg	atc	ggt	ccc	act	att	tcg	624
Gly	Ile	Ile	Arg	Ile	Ala	Pro	Met	Ser	Leu	Ile	Val	Pro	Thr	Ile	Ser	
		195					200					205				
ttt	att	ctt	att	gtg	tta	ctg	cta	tgg	att	att	cat	aaa	aca	aaa	cct	672
Phe	Ile	Leu	Ile	Val	Leu	Leu	Leu	Trp	Ile	Ile	His	Lys	Thr	Lys	Pro	
	210					215					220					
ggt	ctt	gct	atg	cgt	gca	atc	tca	cat	gat	atc	gaa	acg	act	cgt	ttg	720
Gly	Leu	Ala	Met	Arg	Ala	Ile	Ser	His	Asp	Ile	Glu	Thr	Thr	Arg	Leu	
	225				230					235					240	
atg	ggt	ggt	tct	gtc	aat	aaa	gtc	att	gca	ttc	aca	ttt	ggg	ata	ggc	768
Met	Gly	Val	Ser	Val	Asn	Lys	Val	Ile	Ala	Phe	Thr	Phe	Gly	Ile	Gly	
				245					250					255		
tca	gca	ctc	gct	gct	att	gcg	ggt	atc	atg	tgg	gct	cta	cgc	tat	cct	816
Ser	Ala	Leu	Ala	Ala	Ile	Ala	Gly	Ile	Met	Trp	Ala	Leu	Arg	Tyr	Pro	
			260					265					270			
caa	att	caa	cct	cat	atg	ggt	ggt	ctt	cct	ggc	ctc	aaa	gca	ttt	ggt	864
Gln	Ile	Gln	Pro	His	Met	Gly	Val	Leu	Pro	Gly	Leu	Lys	Ala	Phe	Val	
	275						280					285				
gca	gct	ggt	atc	gga	ggt	att	ggc	tca	att	cca	gga	gca	atg	ttg	ggg	912
Ala	Ala	Val	Ile	Gly	Gly	Ile	Gly	Ser	Ile	Pro	Gly	Ala	Met	Leu	Gly	
	290					295				300						
gga	ctg	tta	cta	gga	ttt	att	gaa	att	atg	att	atc	gca	ttc	ttt	ccc	960
Gly	Leu	Leu	Leu	Gly	Phe	Ile	Glu	Ile	Met	Ile	Ile	Ala	Phe	Phe	Pro	
	305				310					315					320	
att	cta	tcc	gga	tac	cga	gat	gcc	ttc	gcc	ttt	att	tta	ttg	att	ctg	1008
Ile	Leu	Ser	Gly	Tyr	Arg	Asp	Ala	Phe	Ala	Phe	Ile	Leu	Leu	Ile	Leu	
				325			330							335		
att	tta	ttg	atg	atg	ccc	act	ggt	tta	atg	ggc	aaa	aaa	agt	cag	gag	1056
Ile	Leu	Leu	Met	Met	Pro	Thr	Gly	Leu	Met	Gly	Lys	Lys	Ser	Gln	Glu	
			340					345					350			
aaa	atc	taa														1065
Lys	Ile															

<210> 569

<211> 354

<212> PRT

<213> Bartonella quintana

<400> 569

Met	Phe	Ile	Gln	Tyr	Phe	Phe	Asn	Ala	Leu	Ala	Leu	Gly	Ser	Leu	Tyr	
1				5					10					15		
Gly	Leu	Ile	Ala	Ile	Gly	Tyr	Thr	Met	Ile	Tyr	Gly	Ile	Leu	Arg	Leu	
			20					25					30			
Ile	Asn	Phe	Val	His	Gly	Asp	Ile	Phe	Met	Leu	Gly	Ala	Tyr	Phe	Val	
		35					40					45				
Phe	Phe	Ser	Thr	Ile	Ser	Phe	Ile	Pro	Ala	Trp	Ala	Ala	Val	Leu	Leu	
	50					55				60						
Val	Ser	Leu	Ala	Ile	Leu	Ile	Tyr	Tyr	Ser	Val	Phe	Ile	Gly	Phe	Lys	
65				70					75						80	
Lys	Arg	Leu	Ser	Ile	Tyr	Trp	Gly	Val	Ala	Phe	Leu	Ile	Leu	Ile	Leu	
				85				90						95		
Ala	Phe	Ile	Tyr	Tyr	Phe	Lys	Ile	Ala	Pro	Gln	Asp	Phe	Thr	Pro	Thr	
			100					105					110			
Trp	Ile	Leu	Ala	Leu	Cys	Phe	Ser	Ile	Phe	Ile	Thr	Ser	Ala	Val	Gly	
		115					120					125				
Ile	Thr	Ile	Asp	Gln	Phe	Ala	Tyr	Lys	Pro	Leu	Arg	His	Ala	Pro	Arg	
	130					135					140					
Ile	Ser	Ala	Leu	Ile	Gly	Ala	Ile	Gly	Val	Ser	Phe	Phe	Ile	Glu	Asn	
145				150					155						160	
Leu	Ala	Thr	Ile	Leu	Phe	Ser	Gly	Val	Pro	Lys	Gly	Val	Lys	Gln	Pro	
				165					170					175		
Asp	Phe	Leu	Val	Thr	Pro	Phe	Leu	Trp	His	Leu	Gly	Gln	Ser	Ser	Asp	
			180					185					190			
Gly	Ile	Ile	Arg	Ile	Ala	Pro	Met	Ser	Leu	Ile	Val	Pro	Thr	Ile	Ser	
		195					200					205				
Phe	Ile	Leu	Ile	Val	Leu	Leu	Leu	Trp	Ile	Ile	His	Lys	Thr	Lys	Pro	
	210					215					220					
Gly	Leu	Ala	Met	Arg	Ala	Ile	Ser	His	Asp	Ile	Glu	Thr	Thr	Arg	Leu	

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225 Met Gly Val Ser Val 230 Asn Lys Val Ile Ala 235 Phe Thr Phe Gly Ile 240 Gly
 Ser Ala Leu Ala 245 Ala Ile Ala Gly Ile 250 Met Trp Ala Leu Arg Tyr Pro
 Gln Ile Gln 260 His Met Gly Val 265 Leu Pro Gly Leu Lys 270 Ala Phe Val
 Ala Ala Val 275 Ile Gly Gly Ile 280 Gly Ser Ile Pro Gly 285 Ala Met Leu Gly
 Gly Leu Leu Leu Gly Phe 295 Ile Glu Ile Met Ile 300 Ile Ala Phe Phe Pro
 305 Ile Leu Ser Gly Tyr 310 Arg Asp Ala Phe Ala 315 Phe Ile Leu Leu Ile Leu
 Ile Leu Leu Met 325 Met Pro Thr Gly Leu 330 Met Gly Lys Lys Ser 335 Gln Glu
 Lys Ile 340 345 350

<210> 570

<211> 1065

<212> DNA

<213> Bartonella henselae

<220>

<221> CDS

<222> (1)..(1065)

<400> 570

atg ttc atc cag tat ttt ttt aat gca ctt gca ttg ggg gct ctt tat	48
Met Phe Ile Gln Tyr 5 Phe Phe Asn Ala 10 Ala Leu Gly Ala 15 Tyr	
ggg ctt atc gca att ggt tac acc atg gtc tat ggt att cta aga ctc	96
Gly Leu Ile Ala 20 Ile Gly Tyr Thr Met Val Tyr Gly Ile Leu Arg Leu	
att aat ttc gct cat ggt gat atc ttt atg cta ggg gcg tat ttt gtt	144
Ile Asn Phe 35 Ala His Gly Asp Ile Phe Met Leu Gly Ala Tyr Phe Val	
ttc ttt tcc aca atc agc ttt atg cct gct tgg gct gct gtt ctt ctt	192
Phe Phe Ser Thr Ile Ser Phe 55 Met Pro Ala Trp Ala Ala Val Leu Leu	
ata tta ttg gct ctt ttc att tat tat tca gta ttt ata ggg ttt aaa	240
Ile Leu Leu Ala Leu Phe 70 Ile Tyr Tyr Ser Val Phe Ile Gly Phe Lys	
aaa cgc cct aaa att tat tgg gtt gct gtt ttt ttt gct ttt att tta	288
Lys Arg Pro Lys 85 Tyr Trp Val Ala Val Phe Phe Ala Phe Ile Leu	
acg ttc att tat tat ttt aaa att gct cca caa gat ttt aca ccg att	336
Thr Phe Ile Tyr Tyr Phe Lys Ile Ala Pro Gln Asp Phe Thr Pro Ile	
tgg att tta gct ctc tgt ttt tca att ttt atc aca agt gca gtg ggt	384
Trp Ile Leu Ala Leu Cys Phe Ser 120 Ile Phe Ile Thr Ser Ala Val Gly	
att act att gac cag ttt gcc tat aaa cca ctg cgt cat gct cca cgt	432
Ile Thr Ile Asp Gln Phe 135 Ala Tyr Lys Pro Leu Arg His Ala Pro Arg	
att tca gcg ctt att ggt gca ata gga gtt tcc ttt ttt att gaa aat	480
Ile Ser Ala Leu Ile Gly Ala Ile Gly Val Ser Phe Phe Ile Glu Asn	
ctt gct act gta atc ttt agt ggt gtc cca aag ggt gta aaa cag cca	528
Leu Ala Thr Val Ile Phe Ser Gly Val Pro Lys Gly Val Lys Gln Pro	
gat ttt ctt gtc aca cca ttc cta tgg cat tta gga tca ggg gaa aat	576
Asp Phe Leu Val Thr Pro Phe Leu Trp 185 His Leu Gly Ser Gly Glu Asn	
gga att att aga att gct ccc atg tct ctg atc gtt ccc att gtt tca	624
Gly Ile Ile Arg Ile Ala Pro Met 200 Ser Leu Ile Val Pro Ile Val Ser	
ttt att ctt atc gtg tta ttg cta tgg att atc cat aag aca aaa cct	672
Phe Ile Leu Ile Val Leu Leu Leu Trp Ile Ile His Lys Thr Lys Pro	

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210	215	220	
ggt ctt gct atg cgt gca att tcc cac gat att gaa acg act cgt ttg	215	220	720
Gly Leu Ala Met Arg Ala Ile Ser His Asp Ile Glu Thr Thr Arg Leu	215	220	
225 atg ggt gtt tct gtc aat aaa gtc atc gca ctt acc ttt ggg ata ggc	230	235	768
Met Gly Val Ser Val Asn Lys Val Ile Ala Leu Thr Phe Gly Ile Gly	230	235	
245 tca gca ctt gct gct att gca ggc atc atg tgg gct tta cgc tat cct	245	250	816
Ser Ala Leu Ala Ala Ile Ala Gly Ile Met Trp Ala Leu Arg Tyr Pro	245	250	
260 caa gtt caa cct tat atg ggt att ctt cct gga ctc aaa gca ttt ata	260	265	864
Gln Val Gln Pro Tyr Met Gly Ile Leu Pro Gly Leu Lys Ala Phe Ile	260	265	
275 gca gcc gtt atc gga ggc att ggt tca att cca gga gca atg ttg ggg	275	280	912
Ala Ala Val Ile Gly Gly Ile Gly Ser Ile Pro Gly Ala Met Leu Gly	275	280	
290 ggg ctg tta cta gga ttt att gaa att atg att gtc gca ttc ttt cct	290	295	960
Gly Leu Leu Leu Gly Phe Ile Glu Ile Met Ile Val Ala Phe Phe Pro	290	295	
305 gct cta tcc gga tat aga gat gct ttt gcc ttt att tta tta att ctg	305	310	1008
Ala Leu Ser Gly Tyr Arg Asp Ala Phe Ala Phe Ile Leu Leu Ile Leu	305	310	
325 att tta tta gta atg ccc act ggt tta atg ggc aaa aaa aat cag gag	325	330	1056
Ile Leu Leu Val Met Pro Thr Gly Leu Met Gly Lys Lys Asn Gln Glu	325	330	
340 aaa atc taa	340	345	1065
Lys Ile	340	345	

<210> 571

<211> 354

<212> PRT

<213> Bartonella henselae

<400> 571

Met Phe Ile Gln Tyr Phe Phe Asn Ala Leu Ala Leu Gly Ala Leu Tyr	1	5	10	15
Gly Leu Ile Ala Ile Gly Tyr Thr Met Val Tyr Gly Ile Leu Arg Leu	1	5	10	15
Ile Asn Phe Ala His Gly Asp Ile Phe Met Leu Gly Ala Tyr Phe Val	20	25	30	35
Phe Phe Ser Thr Ile Ser Phe Met Pro Ala Trp Ala Ala Val Leu Leu	35	40	45	50
Ile Leu Leu Ala Leu Phe Ile Tyr Tyr Ser Val Phe Ile Gly Phe Lys	50	55	60	65
65 Lys Arg Pro Lys Ile Tyr Trp Val Ala Val Phe Phe Ala Phe Ile Leu	65	70	75	80
Thr Phe Ile Tyr Tyr Phe Lys Ile Ala Pro Gln Asp Phe Thr Pro Ile	80	85	90	95
Trp Ile Leu Ala Leu Cys Phe Ser Ile Phe Ile Thr Ser Ala Val Gly	95	100	105	110
Ile Thr Ile Asp Gln Phe Ala Tyr Lys Pro Leu Arg His Ala Pro Arg	110	115	120	125
Ile Ser Ala Leu Ile Gly Ala Ile Gly Val Ser Phe Phe Ile Glu Asn	125	130	135	140
145 Leu Ala Thr Val Ile Phe Ser Gly Val Pro Lys Gly Val Lys Gln Pro	145	150	155	160
Asp Phe Leu Val Thr Pro Phe Leu Trp His Leu Gly Ser Gly Glu Asn	160	165	170	175
Gly Ile Ile Arg Ile Ala Pro Met Ser Leu Ile Val Pro Ile Val Ser	175	180	185	190
Phe Ile Leu Ile Val Leu Leu Trp Ile Ile His Lys Thr Lys Pro	190	195	200	205
Gly Leu Ala Met Arg Ala Ile Ser His Asp Ile Glu Thr Thr Arg Leu	205	210	215	220
225 Met Gly Val Ser Val Asn Lys Val Ile Ala Leu Thr Phe Gly Ile Gly	225	230	235	240
ser Ala Leu Ala Ala Ile Ala Gly Ile Met Trp Ala Leu Arg Tyr Pro	240	245	250	255
260	265	270		

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Gln Val Gln Pro Tyr Met Gly Ile Leu Pro Gly Leu Lys Ala Phe Ile
 275 280 285
 Ala Ala Val Ile Gly Gly Ile Gly Ser Ile Pro Gly Ala Met Leu Gly
 290 295 300
 Gly Leu Leu Leu Gly Phe Ile Glu Ile Met Ile Val Ala Phe Phe Pro
 305 310 315
 Ala Leu Ser Gly Tyr Arg Asp Ala Phe Ala Phe Ile Leu Leu Ile Leu
 325 330 335
 Ile Leu Leu Val Met Pro Thr Gly Leu Met Gly Lys Lys Asn Gln Glu
 340 345 350
 Lys Ile

<210> 572
 <211> 1059
 <212> DNA
 <213> Bartonella henselae

<220>
 <221> CDS
 <222> (1)..(1059)

<400> 572
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 Met Ala Lys Ser Ala Ser Thr Phe Leu Ser Cys Ile Ser Ile Leu Phe
 1 5 10 15
 ttt atc ggt ttt tta ttt tat gct gat aac cat ttt aat gag tac aca 96
 Phe Ile Gly Phe Leu Phe Tyr Ala Asp Asn His Phe Asn Glu Tyr Thr
 20 25 30
 ctt cgt gtc atc aac ctt att gct atc aat gcg ata ttg gca att tcg 144
 Leu Arg Val Ile Asn Leu Ile Ala Ile Asn Ala Ile Ala Ile Ser
 35 40 45
 ctt aat ttg att tac ggt ttc acc ggg atg ttt tct ctt gga cat gct 192
 Leu Asn Leu Ile Tyr Gly Phe Thr Gly Met Phe Ser Leu Gly His Ala
 50 55 60
 gga ttc atg gct att ggt gct tat gta tgc gcg att tta ctt ctt tct 240
 Gly Phe Met Ala Ile Gly Ala Tyr Val Cys Ala Ile Leu Leu Leu Ser
 65 70 75 80
 cct gaa caa aaa gaa atg atg tgg att ctt gaa cct ata gct gag cca 288
 Pro Glu Gln Lys Glu Met Met Trp Ile Leu Glu Pro Ile Ala Glu Pro
 85 90 95
 ttg cat gat cta cag tta cct ttt ttt gta act gtt gtt gta agt ggt 336
 Leu His Asp Leu Gln Leu Pro Phe Phe Val Thr Val Val Val Ser Gly
 100 105 110
 ctg tgt gct gca gtt gta ggt tta att gct ctt cct atc tta cgt 384
 Leu Cys Ala Ala Val Val Gly Leu Leu Ile Ala Leu Pro Ile Leu Arg
 115 120 125
 ctt ggc gga gat tat ctt gga att gca acg ttg ggt ttt gca gaa att 432
 Leu Gly Gly Asp Tyr Leu Gly Ile Ala Thr Leu Gly Phe Ala Glu Ile
 130 135 140
 att cgc att gtt att aca aac gcg aca tcc gta aca aat ggt tct tta 480
 Ile Arg Ile Val Ile Thr Asn Ala Thr Ser Val Thr Asn Gly Ser Leu
 145 150 155 160
 gga atc aaa gga ata cct caa aat gcg aca tta tgg tgg aac tat agt 528
 Gly Ile Lys Gly Ile Pro Gln Asn Ala Thr Leu Trp Trp Asn Tyr Ser
 165 170 175
 tgg tta gta ttt acg gtt acc ttc att att ctc tta ctg cga agc aat 576
 Trp Leu Val Phe Thr Val Thr Phe Ile Ile Leu Leu Leu Arg Ser Asn
 180 185 190
 act ggt aat gta ctg cgc gct att cgt gat gat gaa atc gct gcg aaa 624
 Thr Gly Asn Val Leu Arg Ala Ile Arg Asp Asp Glu Ile Ala Ala Lys
 195 200 205
 aca atg ggg att aac gct ttt ttc tac cgt agc ttt tcc ttt act gca 672
 Thr Met Gly Ile Asn Ala Phe Phe Tyr Arg Ser Phe Ser Phe Thr Ala
 210 215 220
 ggt gca ttc ttt gca ggt gtc gga gga gca tta atg gcc gct ctt att 720
 Gly Ala Phe Phe Ala Gly Val Gly Gly Ala Leu Met Ala Ala Leu Ile
 225 230 235 240
 tca aca atc gat cca aaa atg ttc aac ttc ctt cta act ttt aat att 768

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Ser	Thr	Ile	Asp	Pro	Lys	Met	Phe	Asn	Phe	Leu	Leu	Thr	Phe	Asn	Ile		
ttg	atg	att	gtt	gtt	gct	ggt	ggt	ctt	ggt	tcg	att	aca	ggt	agc	att		816
Leu	Met	Ile	Val	Val	Ala	Gly	Gly	Leu	Gly	Ser	Ile	Thr	Gly	Ser	Ile		
			260				265						270				
att	ggc	agc	att	att	att	acg	gtc	atg	ctt	gaa	tgg	ctt	cgc	att	atc		864
Ile	Gly	Ser	Ile	Ile	Ile	Thr	Val	Met	Leu	Glu	Trp	Leu	Arg	Ile	Ile		
			275				280					285					
gag	agt	cca	ttt	gac	tta	ggt	ttt	ata	cat	att	cca	gag	aca	cca	ggg		912
Glu	Ser	Pro	Phe	Asp	Leu	Gly	Phe	Ile	His	Ile	Pro	Glu	Thr	Pro	Gly		
			290			295					300						
ctt	agg	atg	gtt	att	ttt	tct	ctt	tta	ttg	ctc	gtc	att	atc	tta	ttt		960
Leu	Arg	Met	Val	Ile	Phe	Ser	Leu	Leu	Leu	Val	Ile	Ile	Ile	Leu	Phe		
305					310					315					320		
tgg	aga	aga	ggt	tta	ttg	gga	caa	cgt	gaa	ttc	tca	tgg	agc	ggg	att		1008
Trp	Arg	Arg	Gly	Leu	Leu	Gly	Gln	Arg	Glu	Phe	Ser	Trp	Ser	Gly	Ile		
				325				330						335			
tat	agc	ttt	ttt	aca	cgc	aaa	aag	ttc	tct	aat	act	gag	gaa	aag	cta		1056
Tyr	Ser	Phe	Phe	Thr	Arg	Lys	Lys	Phe	Ser	Asn	Thr	Glu	Glu	Lys	Leu		
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tga																	1059

<210> 573
 <211> 352
 <212> PRT
 <213> Bartonella henselae

<400> 573

Met	Ala	Lys	Ser	Ala	Ser	Thr	Phe	Leu	Ser	Cys	Ile	Ser	Ile	Leu	Phe		
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			20					25					30				
Leu	Arg	Val	Ile	Asn	Leu	Ile	Ala	Ile	Asn	Ala	Ile	Leu	Ala	Ile	Ser		
			35				40					45					
Leu	Asn	Leu	Ile	Tyr	Gly	Phe	Thr	Gly	Met	Phe	Ser	Leu	Gly	His	Ala		
			50			55					60						
Gly	Phe	Met	Ala	Ile	Gly	Ala	Tyr	Val	Cys	Ala	Ile	Leu	Leu	Leu	Ser		
65				70					75					80			
Pro	Glu	Gln	Lys	Glu	Met	Met	Trp	Ile	Leu	Glu	Pro	Ile	Ala	Glu	Pro		
				85				90						95			
Leu	His	Asp	Leu	Gln	Leu	Pro	Phe	Phe	Val	Thr	Val	Val	Val	Ser	Gly		
			100				105						110				
Leu	Cys	Ala	Ala	Val	Val	Gly	Leu	Ile	Ala	Leu	Pro	Ile	Ile	Leu	Arg		
			115			120					125						
Leu	Gly	Gly	Asp	Tyr	Leu	Gly	Ile	Ala	Thr	Leu	Gly	Phe	Ala	Glu	Ile		
			130			135					140						
Ile	Arg	Ile	Val	Ile	Thr	Asn	Ala	Thr	Ser	Val	Thr	Asn	Gly	Ser	Leu		
145				150				155						160			
Gly	Ile	Lys	Gly	Ile	Pro	Gln	Asn	Ala	Thr	Leu	Trp	Trp	Asn	Tyr	Ser		
				165				170					175				
Trp	Leu	Val	Phe	Thr	Val	Thr	Phe	Ile	Ile	Leu	Leu	Leu	Arg	Ser	Asn		
			180				185						190				
Thr	Gly	Asn	Val	Leu	Arg	Ala	Ile	Arg	Asp	Asp	Glu	Ile	Ala	Ala	Lys		
			195			200					205						
Thr	Met	Gly	Ile	Asn	Ala	Phe	Phe	Tyr	Arg	Ser	Phe	Ser	Phe	Thr	Ala		
			210			215					220						
Gly	Ala	Phe	Phe	Ala	Gly	Val	Gly	Gly	Ala	Leu	Met	Ala	Ala	Leu	Ile		
225				230					235					240			
Ser	Thr	Ile	Asp	Pro	Lys	Met	Phe	Asn	Phe	Leu	Leu	Thr	Phe	Asn	Ile		
				245				250						255			
Leu	Met	Ile	Val	Val	Ala	Gly	Gly	Leu	Gly	Ser	Ile	Thr	Gly	Ser	Ile		
			260				265						270				
Ile	Gly	Ser	Ile	Ile	Ile	Thr	Val	Met	Leu	Glu	Trp	Leu	Arg	Ile	Ile		
			275				280					285					
Glu	Ser	Pro	Phe	Asp	Leu	Gly	Phe	Ile	His	Ile	Pro	Glu	Thr	Pro	Gly		
						295					300						
Leu	Arg	Met	Val	Ile	Phe	Ser	Leu	Leu	Leu	Leu	Val	Ile	Ile	Leu	Phe		

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305 Trp Arg Arg Gly Leu 310 Leu Gly Gln Arg Glu 315 Phe Ser Trp Ser Gly 320 Ile
 Tyr Ser Phe Phe Thr 325 Arg Lys Lys Phe 330 Ser Asn Thr Glu Glu 335 Lys Leu
 340 345 350

<210> 574
 <211> 861
 <212> DNA
 <213> *Bacillus thuringiensis*

<220>
 <221> CDS
 <222> (1)..(861)

<400> 574
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 Met Asp Val Leu Ile Asn Leu Phe Val Asn Gly Ile Ser Thr Gly Met
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 ctc att ttt tta tta gca tca ggt ctt tcc ctt att ttc ggt tta atg 96
 Leu Ile Phe Leu Leu Ala Ser Gly Leu Ser Leu Ile Phe Gly Leu Met
 20 25 30
 agt gtt cta aac ttt gca cat ggt ggt tta ttt gca tgg gga gcg ttt 144
 Ser Val Leu Asn Phe Ala His Gly Gly Leu Phe Ala Trp Gly Ala Phe
 35 40 45
 aca ggt gtt tgg tta ttt aat atg aca ggt agt tac gta tta gca tta 192
 Thr Gly Val Trp Leu Phe Asn Met Thr Gly Ser Tyr Val Leu Ala Leu
 50 55 60
 att gga gca gta gct atg gga atg ttc ctt gga ttc att tta gaa aga 240
 Ile Gly Ala Val Ala Met Gly Met Phe Leu Gly Phe Ile Leu Glu Arg
 65 70 75 80
 ttc ctt att aga ccg gta tat gga aat cat gtt cgc cag ctt ctt gtt 288
 Phe Leu Ile Arg Pro Val Tyr Gly Asn His Val Arg Gln Leu Leu Val
 85 90 95
 acg ctt gga gga atg ctt gta ctt agt gaa tgt att aaa gta ttt tgg 336
 Thr Leu Gly Gly Met Leu Val Leu Ser Glu Cys Ile Lys Val Phe Trp
 100 105 110
 gga cca aat cca att ggg gca aag tta ccg tta tgg cta caa gga agt 384
 Gly Pro Asn Pro Ile Gly Ala Lys Leu Pro Leu Trp Leu Gln Gly Ser
 115 120 125
 ttt aca ttc gga ggc gtt ata tta att aaa tat cgt cta ttt gtt att 432
 Phe Thr Phe Gly Gly Val Ile Leu Ile Lys Tyr Arg Leu Phe Val Ile
 130 135 140
 tta att ggg att atc att tac gtt gcc tta cta tta ttg ctc aaa aaa 480
 Leu Ile Gly Ile Ile Ile Tyr Val Ala Leu Leu Leu Leu Lys Lys
 145 150 155 160
 aca aag ata ggt ctt atg ata cgc gca ggt gta atg gat aaa gag atg 528
 Thr Lys Ile Gly Leu Met Ile Arg Ala Gly Val Met Asp Lys Glu Met
 165 170 175
 gtt caa gcg ctc ggt att aac gta aaa gcg ata ttt tct ttc gtc ttt 576
 Val Gln Ala Leu Gly Ile Asn Val Lys Ala Ile Phe Ser Phe Val Phe
 180 185 190 195
 tta tta gga gca ggg atg gca gcg ttg gga ggt ttc tta tta gca ccg 624
 Leu Leu Gly Ala Gly Met Ala Ala Leu Gly Gly Phe Leu Leu Ala Pro
 195 200 205
 tat tca ggt gtt att ttc gcc gaa atg ggt atg cag tat gcg att tta 672
 Tyr Ser Gly Val Ile Phe Ala Glu Met Gly Met Gln Tyr Ala Ile Leu
 210 215 220
 gct ttc ata gta gta atc att gga gga tta gga agc gta caa ggt tca 720
 Ala Phe Ile Val Val Ile Ile Gly Gly Leu Gly Ser Val Gln Gly Ser
 225 230 235 240
 gca att gct tct tta att gtc gga tta gct ggt gct ttt aca gcg tat 768
 Ala Ile Ala Ser Leu Ile Val Gly Leu Ala Gly Ala Phe Thr Ala Tyr
 245 250 255
 ttt ata ccg gat tta tca ctt gca atc aat atg tta atg cta ctg ttt 816
 Phe Ile Pro Asp Leu Ser Leu Ala Ile Asn Met Leu Met Leu Leu Phe
 260 265 270
 ttc tta atc gtg aag cca aat ggg gtt ggt gaa aag ggg tga 861
 Phe Leu Ile Val Lys Pro Asn Gly Leu Val Gly Glu Lys Gly

275

<210> 575
<211> 286
<212> PRT
<213> Bacillus thuringiensis

<400> 575
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Ser Val Leu Asn Phe Ala His Gly Leu Phe Ala Trp Gly Ala Phe
35 40 45
Thr Gly Val Trp Leu Phe Asn Met Thr Gly Ser Tyr Val Leu Ala Leu
50 55 60
Ile Gly Ala Val Ala Met Gly Met Phe Leu Gly Phe Ile Leu Glu Arg
65 70 75 80
Phe Leu Ile Arg Pro Val Tyr Gly Asn His Val Arg Gln Leu Leu Val
85 90 95
Thr Leu Gly Gly Met Leu Val Leu Ser Glu Cys Ile Lys Val Phe Trp
100 105 110
Gly Pro Asn Pro Ile Gly Ala Lys Leu Pro Leu Trp Leu Gln Gly Ser
115 120 125
Phe Thr Phe Gly Gly Val Ile Leu Ile Lys Tyr Arg Leu Phe Val Ile
130 135 140
Leu Ile Gly Ile Ile Ile Tyr Val Ala Leu Leu Leu Leu Lys Lys
145 150 155 160
Thr Lys Ile Gly Leu Met Ile Arg Ala Gly Val Met Asp Lys Glu Met
165 170 175
Val Gln Ala Leu Gly Ile Asn Val Lys Ala Ile Phe Ser Phe Val Phe
180 185 190
Leu Leu Gly Ala Gly Met Ala Ala Leu Gly Gly Phe Leu Leu Ala Pro
195 200 205
Tyr Ser Gly Val Ile Phe Ala Glu Met Gly Met Gln Tyr Ala Ile Leu
210 215 220
Ala Phe Ile Val Val Ile Ile Gly Gly Leu Gly Ser Val Gln Gly Ser
225 230 235 240
Ala Ile Ala Ser Leu Ile Val Gly Leu Ala Gly Ala Phe Thr Ala Tyr
245 250 255
Phe Ile Pro Asp Leu Ser Leu Ala Ile Asn Met Leu Met Leu Phe
260 265 270
Phe Leu Ile Val Lys Pro Asn Gly Leu Val Gly Glu Lys Gly
275 280 285

<210> 576
<211> 972
<212> DNA
<213> Bdellovibrio bacteriovorus

<220>
<221> CDS
<222> (1)..(972)

<400> 576
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ctg gga ctt gga ctg gat ttt ggc gtc aat gcc tac atc aaa ctg atc 96
Leu Gly Leu Gly Leu Asp Phe Gly Val Asn Ala Tyr Ile Lys Leu Ile 20 25 30
ctg ctt ttt gcc act gtg aac tgc ctg ctg tcg atg agt ctg aat ctg 144
Leu Leu Phe Ala Thr Val Asn Cys 40 Leu Leu Ser Met 45 Leu Asn Leu
gtc aat ggt tac acc gga cag ttt tct ttg ggg cac gca ggt ttt atg 192
Val Asn Gly Tyr Thr Gly Gln Phe Ser Leu Gly His Ala Gly Phe Met 50 55 60
gcg atc ggg gct tac ttt tcc gct tac gct tcc acc aag tgg ggc ttt 240
Ala Ile Gly Ala Tyr Phe Ser Ala Tyr Ala Ser Thr Lys Trp Gly Phe

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65											70											75											80	
ctg	cct	gaa	tcc	ctg	caa	ctg	ctt	caa	tcc	ttt	gtc	ttt	gtc	atc	ggg	288																		
Leu	Pro	Glu	Ser	Leu	Gln	Leu	Leu	Gln	Ser	Phe	Val	Phe	Val	Ile	Gly																			
				85					90					95																				
gcg	ggt	ctt	gcc	gct	gcg	gtg	gct	ggc	ttt	ctg	gtg	ggt	ctg	cct	tca	336																		
Ala	Gly	Leu	Ala	Ala	Ala	Val	Ala	Gly	Phe	Leu	Val	Gly	Leu	Pro	Ser																			
			100					105					110																					
ttg	cgt	ttg	aag	ggt	gac	tat	ctg	gcc	att	gtc	act	ctg	ggt	ttt	ggc	384																		
Leu	Arg	Leu	Lys	Gly	Asp	Tyr	Leu	Ala	Ile	Val	Thr	Leu	Gly	Phe	Gly																			
		115					120					125																						
gaa	atc	atc	cgc	gtg	gcg	ctg	ctg	aat	atg	gat	ttc	ctg	ggg	gga	ccg	432																		
Glu	Ile	Ile	Arg	Val	Ala	Leu	Leu	Asn	Met	Asp	Phe	Leu	Gly	Gly	Pro																			
	130					135					140																							
cgc	ggt	ctt	tcc	ggc	att	ccc	agc	ttt	ggt	tca	ttc	ccg	ttt	gcc	ttt	480																		
Arg	Gly	Leu	Ser	Gly	Ile	Pro	Ser	Phe	Gly	Ser	Phe	Pro	Phe	Ala	Phe																			
145				150				155						160																				
atg	ttt	gca	tcc	gtg	tgg	ctg	gtg	att	tgt	ttc	ttc	acc	atc	tgg	cgg	528																		
Met	Phe	Ala	Ser	Val	Trp	Leu	Val	Ile	Cys	Phe	Phe	Thr	Ile	Trp	Arg																			
				165				170					175																					
gtc	atg	cat	tcc	agt	cac	ggg	cgc	ggg	ttc	ttg	agt	gtg	cgt	gaa	gac	576																		
Val	Met	His	Ser	Ser	His	Gly	Arg	Gly	Phe	Leu	Ser	Val	Arg	Glu	Asp																			
			180				185						190																					
gag	atc	gct	gcg	gaa	gcc	atg	ggt	atc	aac	acc	acc	cgc	atg	aaa	gta	624																		
Glu	Ile	Ala	Ala	Glu	Ala	Met	Gly	Ile	Asn	Thr	Thr	Arg	Met	Lys	Val																			
		195					200					205																						
aaa	gct	ttt	gtg	ctt	tcc	agc	ttc	ttt	gcc	ggt	gtg	gcg	ggg	gct	ttg	672																		
Lys	Ala	Phe	Val	Leu	Ser	Ser	Phe	Phe	Ala	Gly	Val	Ala	Gly	Ala	Leu																			
	210					215					220																							
ttt	gcg	cac	ttt	act	aat	ttc	atc	aat	cca	tcc	tct	ttc	acc	ttc	ctg	720																		
Phe	Ala	His	Phe	Thr	Asn	Phe	Ile	Asn	Pro	Ser	Ser	Phe	Thr	Phe	Leu																			
225				230					235						240																			
caa	agt	gtg	aat	gcc	gtg	atc	atg	gtg	ggt	ctg	ggt	ggc	atg	ggt	tcc	768																		
Gln	Ser	Val	Asn	Ala	Val	Ile	Met	Val	Val	Leu	Gly	Gly	Met	Gly	Ser																			
				245				250					255																					
atg	acc	ggc	tcc	atc	gtg	gcg	gcg	gtc	atc	acc	ggt	ttg	cca	gaa		816																		
Met	Thr	Gly	Ser	Ile	Val	Ala	Ala	Val	Ile	Ile	Thr	Val	Leu	Pro	Glu																			
			260					265				270																						
gcc	ctg	cgc	ccg	ctg	caa	gaa	ctg	acc	ggt	gtg	gat	ctg	cgc	atg	gtg	864																		
Ala	Leu	Arg	Pro	Leu	Gln	Glu	Leu	Thr	Gly	Val	Asp	Leu	Arg	Met	Val																			
		275					280					285																						
atc	tat	tcc	ctg	gct	ttg	att	ctg	atg	atg	att	ctt	cga	cca	aaa	ggt	912																		
Ile	Tyr	Ser	Leu	Ala	Leu	Ile	Leu	Met	Met	Ile	Leu	Arg	Pro	Lys	Gly																			
	290				295					300																								
ttg	ttc	ggg	gat	atg	gaa	ttc	agc	gat	ggt	tgg	aga	aaa	tat	gtc	cga	960																		
Leu	Phe	Gly	Asp	Met	Glu	Phe	Ser	Asp	Val	Trp	Arg	Lys	Tyr	Val	Arg																			
305				310				315						320																				
cg	tct	gct	tga													972																		
Arg	Ser	Ala																																

<210> 577

<211> 323

<212> PRT

<213> Bdellovibrio bacteriovorus

<400> 577

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Leu Leu Phe Ala Thr Val Asn Cys Leu Leu Ser Met Ser Leu Asn Leu
35 40 45
Val Asn Gly Tyr Thr Gly Gln Phe Ser Leu Gly His Ala Gly Phe Met
50 55 60
Ala Ile Gly Ala Tyr Phe Ser Ala Tyr Ala Ser Thr Lys Trp Gly Phe
65 70 75 80
Leu Pro Glu Ser Leu Gln Leu Leu Gln Ser Phe Val Phe Val Ile Gly
85 90 95
Ala Gly Leu Ala Ala Val Ala Gly Phe Leu Val Gly Leu Pro Ser

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      100      105      110
Leu Arg Leu Lys Gly Asp Tyr Leu Ala Ile Val Thr Leu Gly Phe Gly
      115      120      125
Glu Ile Ile Arg Val Ala Leu Leu Asn Met Asp Phe Leu Gly Gly Pro
      130      135      140
Arg Gly Leu Ser Gly Ile Pro Ser Phe Gly Ser Phe Pro Phe Ala Phe
145 Met Phe Ala Ser Val Trp Leu Val Ile Cys Phe Phe Thr Ile Trp Arg
      150      155      160
Val Met His Ser Ser His Gly Arg Gly Phe Leu Ser Val Arg Glu Asp
      165      170      175
Glu Ile Ala Glu Ala Met Gly Ile Asn Thr Thr Arg Met Lys Val
      180      185      190
Lys Ala Phe Val Leu Ser Ser Phe Phe Ala Gly Val Ala Gly Ala Leu
210 Phe Ala His Phe Thr Asn Phe Ile Asn Pro Ser Ser Phe Thr Phe Leu
225 Gln Ser Val Asn Ala Val Ile Met Val Val Leu Gly Gly Met Gly Ser
      230      235      240
Met Thr Gly Ser Ile Val Ala Ala Val Ile Ile Thr Val Leu Pro Glu
      245      250      255
Ala Leu Arg Pro Leu Gln Glu Leu Thr Gly Val Asp Leu Arg Met Val
275 Ile Tyr Ser Leu Ala Leu Ile Leu Met Met Ile Leu Arg Pro Lys Gly
290 Leu Phe Gly Asp Met Glu Phe Ser Asp Val Trp Arg Lys Tyr Val Arg
305 Arg Ser Ala
      310      315      320

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<210> 578

<211> 903

<212> DNA

<213> Bdellovibrio bacteriovorus

<220>

<221> CDS

<222> (1)..(903)

<400> 578

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atc tac gca ttg atc gcc ctg ggc tac acg atg gtg tac gga atc ctg      96
Ile Tyr Ala Leu Ile Ala Leu Gly Tyr Thr Met Val Tyr Gly Ile Leu
      20      25      30
aaa atg atc aac ttc gcc cac tcg gat gtt tac atg gtg gcc ttt      144
Lys Met Ile Asn Phe Ala His Ser Asp Val Tyr Met Val Gly Ala Phe
      35      40      45
gcc gcc tac tat ttc gcc cgc tgg ctg gga att gaa aac aac ccc ggc      192
Ala Ala Tyr Tyr Phe Ala Arg Trp Leu Gly Ile Glu Asn Asn Pro Gly
      50      55      60
ttc agc act ctt ctg acc ctg att gta atc acg atg atc tgc tgc agc      240
Phe Ser Thr Leu Leu Thr Leu Ile Val Ile Thr Met Ile Cys Cys Ser
      65      70      75
ctt ctg ggg ctg gtg att gaa cgc ctg gcg tac cgc ccg ctt aga aac      288
Leu Leu Gly Leu Val Ile Glu Arg Leu Ala Tyr Arg Pro Leu Arg Asn
      80      85      90      95
tca cca aaa ctg aac gtc ctg atc acc gcc att ggt gtc agc ttg ttt      336
Ser Pro Lys Leu Asn Val Leu Ile Thr Ala Ile Gly Val Ser Leu Phe
      100      105      110
ttg cag tat tcc ggt cag gtg gtt ttt gga gcc gat ccc aaa gtc ttt      384
Leu Gln Tyr Ser Gly Gln Val Val Phe Gly Ala Asp Pro Lys Val Phe
      115      120      125
cct gaa gtc atg aaa gac ttt gtg atc ttc tct atc ggc atc gtt gaa      432
Pro Glu Val Met Lys Asp Phe Val Ile Phe Ser Ile Gly Ile Val Glu
      130      135      140
gtc cgc tct ttt gat gtg acg gtt ctg ggt gtg ggc att gtt gcc atg      480
Val Arg Ser Phe Asp Val Thr Val Leu Gly Val Gly Ile Val Ala Met

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145	ctg	gga	ctg	cag	ttc	150	ctg	ttc	aaa	aca	155	atg	ggc	cgt	gcc	160	atg		
	Leu	Gly	Leu	Gln	Phe		Leu	Leu	Phe	Lys		Lys	Met	Gly	Arg	Ala	Met		
					165					170						175			
	cgg	gcg	gtg	agc	gcc	aac	ccg	atg	gtg	gcc	agc	ctg	atg	ggg	gtg	aac			
	Arg	Ala	Val	Ser	Ala	Asn	Pro	Met	Val	Ala	Ser	Leu	Met	Gly	Val	Asn			
				180					185					190					
	ccg	gac	cg	att	gcc	ttc	acg	ttt	gtt	gtc	gga	tcc	tct	ctg	gcc				
	Pro	Asp	Arg	Ile	Ala	Phe	Thr	Phe	Val	Val	Gly	Ser	Ser	Leu	Ala				
			195				200					205							
	gga	att	ggc	agt	gtt	ctg	gtc	ggc	atg	aag	tat	ccc	aag	att	gac	ccg			
	Gly	Ile	Gly	Ser	Val	Leu	Val	Gly	Met	Lys	Tyr	Pro	Lys	Ile	Asp	Pro			
		210					215					220							
	ctg	atg	ggc	atg	atg	atc	ggc	atg	aag	gcg	ttt	gtc	gcc	gca	gtt	ctg			
	Leu	Met	Gly	Met	Met	Ile	Gly	Met	Lys	Ala	Phe	Val	Ala	Ala	Val	Leu			
	225					230					235					240			
	ggt	ggc	atc	ggc	aac	gtc	ggt	ggt	gcg	gtc	ctg	ggg	gcg	atg	atc	atg			
	Gly	Gly	Ile	Gly	Asn	Val	Gly	Gly	Ala	Val	Leu	Gly	Ala	Met	Ile	Met			
					245				250						255				
	ggc	ctt	tcc	gaa	gaa	atg	gtc	gtg	gct	tat	ctt	tcc	agc	acc	tac	cgt			
	Gly	Leu	Ser	Glu	Glu	Met	Val	Val	Ala	Tyr	Leu	Ser	Ser	Thr	Tyr	Arg			
				260					265					270					
	gat	gct	ttg	gcc	ttt	gga	att	ctg	att	gtg	att	ctg	atc	ttt	aag	ccg			
	Asp	Ala	Leu	Ala	Phe	Gly	Ile	Leu	Ile	Val	Ile	Leu	Ile	Phe	Lys	Pro			
			275					280					285						
	gca	ggt	ctg	ctg	ggt	aaa	tac	tct	gtg	gag	aag	gtc	tga						
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<210> 579

<211> 300

<212> PRT

<213> Bdellovibrio bacteriovorus

<400> 579

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Lys	Met	Ile	Asn	Phe	Ala	His	Ser	Asp	Val	Tyr	Met	Val	Gly	Ala	Phe
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Phe	Ser	Thr	Leu	Leu	Thr	Leu	Ile	Val	Ile	Thr	Met	Ile	Cys	Cys	Ser
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Leu	Leu	Gly	Leu	Val	Ile	Glu	Arg	Leu	Ala	Tyr	Arg	Pro	Leu	Arg	Asn
				85					90					95	
Ser	Pro	Lys	Leu	Asn	Val	Leu	Ile	Thr	Ala	Ile	Gly	Val	Ser	Leu	Phe
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Leu	Gln	Tyr	Ser	Gly	Gln	Val	Val	Phe	Gly	Ala	Asp	Pro	Lys	Val	Phe
		115					120					125			
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	130					135					140				
Val	Arg	Ser	Phe	Asp	Val	Thr	Val	Leu	Gly	Val	Gly	Ile	Val	Ala	Met
145					150					155				160	
Leu	Gly	Leu	Gln	Phe	Leu	Leu	Phe	Lys	Thr	Lys	Met	Gly	Arg	Ala	Met
				165					170					175	
Arg	Ala	Val	Ser	Ala	Asn	Pro	Met	Val	Ala	Ser	Leu	Met	Gly	Val	Asn
			180					185					190		
Pro	Asp	Arg	Ile	Ile	Ala	Phe	Thr	Phe	Val	Val	Gly	Ser	Ser	Leu	Ala
		195					200					205			
Gly	Ile	Gly	Ser	Val	Leu	Val	Gly	Met	Lys	Tyr	Pro	Lys	Ile	Asp	Pro
	210					215					220				
Leu	Met	Gly	Met	Met	Ile	Gly	Met	Lys	Ala	Phe	Val	Ala	Ala	Val	Leu
225					230					235				240	
Gly	Gly	Ile	Gly	Asn	Val	Gly	Gly	Ala	Val	Leu	Gly	Ala	Met	Ile	Met
				245					250					255	
Gly	Leu	Ser	Glu	Glu	Met	Val	Val	Ala	Tyr	Leu	Ser	Ser	Thr	Tyr	Arg
			260					265					270		

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 Ala Gly Leu Leu Gly Lys Tyr Ser Val Glu Lys Val
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<210> 580

<211> 1068

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(1068)

<400> 580

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1				5					10				15			
ctc	ctg	atc	acg	atc	gtg	gtg	gtg	ctg	gcg	atc	acg	ccg	ttc	gtg	ttt	96
Leu	Leu	Ile	Thr	Ile	Val	Val	Val	Leu	Ala	Ile	Thr	Pro	Phe	Val	Phe	
			20					25					30			
ccc	ggc	gcc	aag	ccg	ctc	aac	gtc	gcc	gcc	aag	atc	tgc	atc	ttc	gcg	144
Pro	Gly	Ala	Lys	Pro	Leu	Asn	Val	Ala	Ala	Lys	Ile	Cys	Ile	Phe	Ala	
		35					40					45				
gcc	ctg	gtg	gcg	tcc	tat	gat	ctg	ttg	ctc	ggc	tac	acc	ggc	acg	gtg	192
Ala	Leu	Val	Ala	Ser	Tyr	Asp	Leu	Leu	Leu	Gly	Tyr	Thr	Gly	Thr	Val	
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tcg	ttc	gcc	cac	acc	atg	ttc	tac	ggc	atc	ggc	tcg	tat	gct	gtg	gcg	240
Ser	Phe	Ala	His	Thr	Met	Phe	Tyr	Gly	Ile	Gly	Ser	Tyr	Ala	Val	Ala	
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atc	gcg	ctg	tac	ggc	atg	ggg	ccg	agc	tgg	gcc	gcg	gtc	ggc	gcc	ggc	288
Ile	Ala	Leu	Tyr	Gly	Met	Gly	Pro	Ser	Trp	Ala	Ala	Val	Gly	Ala	Gly	
				85					90					95		
gtg	ctg	atc	ggc	ctg	ccg	ctc	gcc	gcg	ctc	ttg	gcg	ctc	gtc	atc	ggg	336
Val	Leu	Ile	Gly	Leu	Pro	Leu	Ala	Ala	Leu	Leu	Ala	Leu	Val	Ile	Gly	
			100				105						110			
ttg	ttc	tcg	ctg	cgg	gtc	gag	gcg	atc	ttc	ttt	gcg	atg	atc	acg	ctg	384
Leu	Phe	Ser	Leu	Arg	Val	Glu	Ala	Ile	Phe	Phe	Ala	Met	Ile	Thr	Leu	
		115					120					125				
gcg	gtc	gcc	tcc	gcc	ttc	ctg	gtg	ctg	gcg	tcg	cag	ctg	tcg	tgg	ctg	432
Ala	Val	Ala	Ser	Ala	Phe	Leu	Val	Leu	Ala	Ser	Gln	Leu	Ser	Trp	Leu	
	130					135					140					
acc	ggc	ggc	gag	gac	ggc	cgc	agc	ttc	agc	ctg	ccg	gag	ctg	ctg	cgg	480
Thr	Gly	Gly	Glu	Asp	Gly	Arg	Ser	Phe	Ser	Leu	Pro	Glu	Leu	Leu	Arg	
	145				150					155					160	
ccc	ggc	acg	gtg	ttc	gtc	aaa	gac	ttc	ttc	ggg	gtg	cgg	atc	aac	ggc	528
Pro	Gly	Thr	Val	Phe	Val	Lys	Asp	Phe	Phe	Gly	Val	Arg	Ile	Asn	Gly	
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cgt	atc	ctg	acc	tac	tac	atc	atc	ctg	gtc	ggc	tgc	gcc	ggc	atg	atc	576
Arg	Ile	Leu	Thr	Tyr	Tyr	Ile	Ile	Leu	Val	Gly	Cys	Ala	Gly	Met	Ile	
			180					185				190				
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Leu	Ala	Leu	Arg	Val	Val	Asn	Ser	Pro	Phe	Gly	Arg	Val	Leu	Gln		
		195				200					205					
gcg	gtc	cgc	gag	aac	cgc	ttc	cgt	gcc	gag	gcg	ctc	ggc	tat	cgc	acc	672
Ala	Val	Arg	Glu	Asn	Arg	Phe	Arg	Ala	Glu	Ala	Leu	Gly	Tyr	Arg	Thr	
	210					215					220					
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Val	Phe	His	Leu	Thr	Tyr	Ala	Asn	Val	Leu	Ala	Ala	Leu	Val	Ala	Ala	
	225				230				235					240		
gcc	gcc	ggc	gtg	ctg	aat	gcg	atg	tgg	ctg	cgc	tat	gcc	ggg	ccg	gac	768
Ala	Ala	Gly	Val	Leu	Asn	Ala	Met	Trp	Leu	Arg	Tyr	Ala	Gly	Pro	Asp	
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acc	tcg	ctg	agc	ttc	tcg	atc	atg	ctc	gac	att	ctc	ttg	atg	gtg	gtg	816
Thr	Ser	Leu	Ser	Phe	Ser	Ile	Met	Leu	Asp	Ile	Leu	Leu	Met	Val	Val	
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Ile	Gly	Gly	Met	Gly	Thr	Ile	Tyr	Gly	Ala	Ile	Ile	Gly	Ala	Thr	Ile	
		275					280					285				

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ttc	atc	ctg	gcg	cag	aac	tat	ctg	cag	gcg	ctg	atg	ggc	gca	gcc	tca	912
Phe	Ile	Leu	Ala	Gln	Asn	Tyr	Leu	Gln	Ala	Leu	Met	Gly	Ala	Ala	Ser	
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ggc	gcc	gcc	gct	gac	gcg	ggg	cta	ccg	ttg	ctg	ccg	aac	cta	tta	cat	960
Gly	Ala	Ala	Ala	Asp	Ala	Gly	Leu	Pro	Leu	Leu	Pro	Asn	Leu	Leu	His	
305					310					315					320	
ccg	gac	cgc	tgg	ctg	ctg	tgg	ctc	ggg	ctg	ctg	ttc	gtc	gcc	agc	gtc	1008
Pro	Asp	Arg	Trp	Leu	Leu	Trp	Leu	Gly	Leu	Leu	Phe	Val	Ala	Ser	Val	
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tac	ttc	ttc	ccg	acc	gga	atc	gtc	ggc	cga	ttg	cgc	ggg	gca	ccg	aag	1056
Tyr	Phe	Phe	Pro	Thr	Gly	Ile	Val	Gly	Arg	Leu	Arg	Gly	Ala	Pro	Lys	
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Val	Ala	Asp														
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<210> 581

<211> 355

<212> PRT

<213> Rhodopseudomonas palustris

<400> 581

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Leu	Leu	Ile	Thr	Ile	Val	Val	Val	Leu	Ala	Ile	Thr	Pro	Phe	Val	Phe	
			20					25					30			
Pro	Gly	Ala	Lys	Pro	Leu	Asn	Val	Ala	Ala	Lys	Ile	Cys	Ile	Phe	Ala	
		35				40						45				
Ala	Leu	Val	Ala	Ser	Tyr	Asp	Leu	Leu	Leu	Gly	Tyr	Thr	Gly	Thr	Val	
	50					55					60					
Ser	Phe	Ala	His	Thr	Met	Phe	Tyr	Gly	Ile	Gly	Ser	Tyr	Ala	Val	Ala	
65					70					75					80	
Ile	Ala	Leu	Tyr	Gly	Met	Gly	Pro	Ser	Trp	Ala	Ala	Val	Gly	Ala	Gly	
				85					90					95		
Val	Leu	Ile	Gly	Leu	Pro	Leu	Ala	Ala	Leu	Leu	Ala	Leu	Val	Ile	Gly	
			100					105					110			
Leu	Phe	Ser	Leu	Arg	Val	Glu	Ala	Ile	Phe	Phe	Ala	Met	Ile	Thr	Leu	
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Ala	Val	Ala	Ser	Ala	Phe	Leu	Val	Leu	Ala	Ser	Gln	Leu	Ser	Trp	Leu	
	130					135					140					
Thr	Gly	Gly	Glu	Asp	Gly	Arg	Ser	Phe	Ser	Leu	Pro	Glu	Leu	Leu	Arg	
145					150					155					160	
Pro	Gly	Thr	Val	Phe	Val	Lys	Asp	Phe	Phe	Gly	Val	Arg	Ile	Asn	Gly	
				165					170					175		
Arg	Ile	Leu	Thr	Tyr	Tyr	Ile	Ile	Leu	Val	Gly	Cys	Ala	Gly	Met	Ile	
			180					185					190			
Leu	Ala	Leu	Leu	Arg	Val	Val	Asn	Ser	Pro	Phe	Gly	Arg	Val	Leu	Gln	
		195					200					205				
Ala	Val	Arg	Glu	Asn	Arg	Phe	Arg	Ala	Glu	Ala	Leu	Gly	Tyr	Arg	Thr	
	210					215					220					
Val	Phe	His	Leu	Thr	Tyr	Ala	Asn	Val	Leu	Ala	Ala	Leu	Val	Ala	Ala	
225					230					235					240	
Ala	Ala	Gly	Val	Leu	Asn	Ala	Met	Trp	Leu	Arg	Tyr	Ala	Gly	Pro	Asp	
				245				250						255		
Thr	Ser	Leu	Ser	Phe	Ser	Ile	Met	Leu	Asp	Ile	Leu	Leu	Met	Val	Val	
			260					265					270			
Ile	Gly	Gly	Met	Gly	Thr	Ile	Tyr	Gly	Ala	Ile	Ile	Gly	Ala	Thr	Ile	
		275					280					285				
Phe	Ile	Leu	Ala	Gln	Asn	Tyr	Leu	Gln	Ala	Leu	Met	Gly	Ala	Ala	Ser	
	290					295					300					
Gly	Ala	Ala	Ala	Asp	Ala	Gly	Leu	Pro	Leu	Leu	Pro	Asn	Leu	Leu	His	
305					310					315					320	
Pro	Asp	Arg	Trp	Leu	Leu	Trp	Leu	Gly	Leu	Leu	Phe	Val	Ala	Ser	Val	
				325					330					335		
Tyr	Phe	Phe	Pro	Thr	Gly	Ile	Val	Gly	Arg	Leu	Arg	Gly	Ala	Pro	Lys	
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Val	Ala	Asp														
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<210> 582
 <211> 939
 <212> DNA
 <213> Rhodopseudomonas palustris

<220>
 <221> CDS
 <222> (1)..(939)

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 aac tcg cac ctc ctg atc cag ctt ctc gtc aac ggc ctc gtg gtc ggc 96
 Asn Ser His Leu Leu Ile Gln Leu Leu Val Asn Gly Leu Val Val Gly 20 25 30
 acg cta tac ggc gtg gtc gcg atg agt ttc gtg ctg atc tac aag gcg 144
 Thr Leu Tyr Gly Val Val Ala Met Ser Phe Val Leu Ile Tyr Lys Ala 35 40 45
 acg cag gtc gtc aac ttc gcc caa ggc gag ctg ctg ctg atc ggt gcc 192
 Thr Gln Val Val Asn Phe Ala Gln Gly Glu Leu Leu Leu Ile Gly Ala 50 55 60
 tgg gtg tgc tgg acg ctg ctg gcg aaa tat cag ctg ccg ttc tgg gtc 240
 Trp Val Cys Trp Thr Leu Leu Ala Lys Tyr Gln Leu Pro Phe Trp Val 65 70 75 80
 ggc atg ccg atc acg ctg gtg ttc atg ttc atc ttc ggc atc gcg gtt 288
 Gly Met Pro Ile Thr Leu Val Phe Met Phe Ile Phe Gly Ile Ala Val 85 90 95
 cag atc atc gtg ctg cgg ccg atg atc ggc gag ccg atc atc tcg gtg 336
 Gln Ile Ile Val Leu Arg Pro Met Ile Gly Glu Pro Ile Ile Ser Val 100 105 110
 atc atg gtg acg atc gcg ctg tcg acc gtg ttc cag gcg gcg ctg aag 384
 Ile Met Val Thr Ile Ala Leu Ser Thr Val Phe Gln Ala Ala Leu Lys 115 120 125
 tgg atc ttc ggc gtc aat ccg cag ccg ttc ccc cag atc ttc acc acc 432
 Trp Ile Phe Gly Val Asn Pro Gln Pro Phe Pro Gln Ile Phe Thr Thr 130 135 140
 cga tcg atc tcg atc ggc ggc ctg cag atc cag acc gtc tat gtg atg 480
 Arg Ser Ile Ser Ile Gly Gly Leu Gln Ile Gln Thr Val Tyr Val Met 145 150 155 160
 agc ctg gtc gtc tcg gtc gcg atg atg atc ggc atg gcg tgg ttc ttc 528
 Ser Leu Val Val Ser Val Ala Met Met Ile Gly Met Ala Trp Phe Phe 165 170 175
 agg gtg tcg aaa tac ggc ctc gcg atg cgc gcc acc gcg ttc aac cag 576
 Arg Val Ser Lys Tyr Gly Leu Ala Met Arg Ala Thr Ala Phe Asn Gln 180 185 190
 cag gtg gcg cag tcg ctc ggc atc tcg gtg aag agc gta ttc gcg atg 624
 Gln Val Ala Gln Ser Leu Gly Ile Ser Val Lys Ser Val Phe Ala Met 195 200 205
 gcc tgg gcg atc tcg gcc acc gtt tcg gcg gtc gcc ggc gtc gtc gtc 672
 Ala Trp Ala Ile Ser Ala Thr Val Ser Ala Val Ala Gly Val Val Val 210 215 220
 gcc gtg gtc aac ggc gtg tcg tcg ggg ctg tcg gcc tac ggc atc aag 720
 Ala Val Val Asn Gly Val Ser Ser Gly Leu Ser Ala Tyr Gly Ile Lys 225 230 235 240
 gtg ttt ccg gcc gcg atc ctc ggc ggc ctc gac tcg atc ggc ggc gcg 768
 Val Phe Pro Ala Ala Ile Leu Gly Gly Leu Asp Ser Ile Gly Gly Ala 245 250 255
 gtg ctc ggc ggc atc atc atc ggc ctt ttg gag aac atc gcc cag tac 816
 Val Leu Gly Gly Ile Ile Ile Gly Leu Leu Glu Asn Ile Ala Gln Tyr 260 265 270
 gtc gac agc gaa tat ctg cac tgg ggc aat ctc tac gaa ata gcg ccg 864
 Val Asp Ser Glu Tyr Leu His Trp Gly Asn Leu Tyr Glu Ile Ala Pro 275 280 285
 ttc tac gtg ctg atc atc atc ctg atg atc aag ccc tac ggc ctg ttc 912
 Phe Tyr Val Leu Ile Ile Ile Leu Met Ile Lys Pro Tyr Gly Leu Phe 290 295 300
 ggc acc aag gac atc gag cgg atc tag 939
 Gly Thr Lys Asp Ile Glu Arg Ile

305

310

<210> 583

<211> 312

<212> PRT

<213> *Rhodopseudomonas palustris*

<400> 583

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Thr Leu Tyr Gly Val Val Ala Met Ser Phe Val Leu Ile Tyr Lys Ala
      35      40      45
Thr Gln Val Val Asn Phe Ala Gln Gly Glu Leu Leu Leu Ile Gly Ala
      50      55      60
Trp Val Cys Trp Thr Leu Leu Ala Lys Tyr Gln Leu Pro Phe Trp Val
65      70      75      80
Gly Met Pro Ile Thr Leu Val Phe Met Phe Ile Phe Gly Ile Ala Val
      85      90      95
Gln Ile Ile Val Leu Arg Pro Met Ile Gly Glu Pro Ile Ile Ser Val
      100      105      110
Ile Met Val Thr Ile Ala Leu Ser Thr Val Phe Gln Ala Ala Leu Lys
      115      120      125
Trp Ile Phe Gly Val Asn Pro Gln Pro Phe Pro Gln Ile Phe Thr Thr
130      135      140
Arg Ser Ile Ser Ile Gly Gly Leu Gln Ile Gln Thr Val Tyr Val Met
145      150      155      160
Ser Leu Val Val Ser Val Ala Met Met Ile Gly Met Ala Trp Phe Phe
      165      170      175
Arg Val Ser Lys Tyr Gly Leu Ala Met Arg Ala Thr Ala Phe Asn Gln
      180      185      190
Gln Val Ala Gln Ser Leu Gly Ile Ser Val Lys Ser Val Phe Ala Met
      195      200      205
Ala Trp Ala Ile Ser Ala Thr Val Ser Ala Val Ala Gly Val Val Val
210      215      220
Ala Val Val Asn Gly Val Ser Ser Gly Leu Ser Ala Tyr Gly Ile Lys
225      230      235      240
Val Phe Pro Ala Ala Ile Leu Gly Gly Leu Asp Ser Ile Gly Gly Ala
      245      250      255
Val Leu Gly Gly Ile Ile Ile Gly Leu Leu Glu Asn Ile Ala Gln Tyr
      260      265      270
Val Asp Ser Glu Tyr Leu His Trp Gly Asn Leu Tyr Glu Ile Ala Pro
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Phe Tyr Val Leu Ile Ile Ile Leu Met Ile Lys Pro Tyr Gly Leu Phe
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Gly Thr Lys Asp Ile Glu Arg Ile
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<210> 584

<211> 948

<212> DNA

<213> *Rhodopseudomonas palustris*

<220>

<221> CDS

<222> (1)..(948)

<400> 584

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1      5      10      15
atg ctg ctg ttc ttg atg gcg agc ggg ctc acc gtc atc ttc agc atg      96
Met Leu Leu Phe Leu Met Ala Ser Gly Leu Thr Val Ile Phe Ser Met
      20      25      30
ctc ggc gtg ctg aac ttc gct cat gcc agc ttc tat atg ctc ggc gcc      144
Leu Gly Val Leu Asn Phe Ala His Ala Ser Phe Tyr Met Leu Gly Ala
      35      40      45
ttc ttc ggc tat cag atc agc cgc tgg aca gga ttc tgg ccg gcg ctg      192

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Leu	Ile	Ala	Pro	Leu	Leu	Ala	Gly	Ala	Ile	Gly	Ala	Ala	Val	Glu	Arg	80	
65					70					75							
ttc	ggc	ctg	cgc	cgc	gtc	cac	cgc	aac	ggc	cat	gtc	gcc	gaa	ctg	ctg	288	
Phe	Gly	Leu	Arg	Arg	Val	His	Arg	Asn	Gly	His	Val	Ala	Glu	Leu	Leu	95	
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ttc	acc	ttc	ggg	ctc	gcc	ttc	gcg	atc	gaa	gaa	gtg	gtg	tcg	atc	atc	336	
Phe	Thr	Phe	Gly	Leu	Ala	Phe	Ala	Ile	Glu	Glu	Val	Val	Ser	Ile	Ile	110	
			100					105									
tgg	ggc	aag	gtt	ccg	gtc	gat	tac	cgc	acc	ccg	gcc	ctg	ctc	gac	ttc	384	
Trp	Gly	Lys	Val	Pro	Val	Asp	Tyr	Arg	Thr	Pro	Ala	Leu	Leu	Asp	Phe	125	
		115					120										
ccg	gca	ttc	acg	atc	ttc	tcc	acc	aac	tac	ccc	gcc	tac	aag	atg	ttc	432	
Pro	Ala	Phe	Thr	Ile	Phe	Ser	Thr	Asn	Tyr	Pro	Ala	Tyr	Lys	Met	Phe	140	
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Met	Leu	Ala	Val	Ser	Val	Val	Ile	Phe	Val	Gly	Leu	Leu	Val	Val	Leu	160	
145					150					155							
aag	aag	acc	cgg	atc	ggc	ctg	atc	gtt	cag	gcg	gcg	ctg	acc	cac	cca	528	
Lys	Lys	Thr	Arg	Ile	Gly	Leu	Ile	Val	Gln	Ala	Ala	Leu	Thr	His	Pro	175	
				165					170								
cac	atg	gtc	gcg	cat	ctc	ggc	cac	aac	gtc	gaa	cgg	atc	ttc	atg	ctg	576	
His	Met	Val	Ala	His	Leu	Gly	His	Asn	Val	Glu	Arg	Ile	Phe	Met	Leu	190	
			180					185									
gtg	ttc	ggc	gtc	ggc	act	gcg	ctg	gcc	gcc	gtt	gcc	ggc	gtg	atc	gcg	624	
Val	Phe	Gly	Val	Gly	Thr	Ala	Leu	Ala	Ala	Val	Ala	Gly	Val	Ile	Ala	205	
		195					200										
ggc	ccg	tcg	ctg	gtg	acg	cag	tcc	aac	atg	gct	tcg	ctg	ctc	ggg	ccg	672	
Gly	Pro	Ser	Leu	Val	Thr	Gln	Ser	Asn	Met	Ala	Ser	Leu	Leu	Gly	Pro	220	
						215											
atc	ctg	ttc	gtc	gtc	gtc	gtg	gtc	ggc	ggc	ctc	ggc	tcg	ttg	ccc	ggc	720	
Ile	Leu	Phe	Val	Val	Val	Val	Val	Gly	Gly	Leu	Gly	Ser	Leu	Pro	Gly	240	
225					230					235							
gca	ttc	atc	gcc	tcg	ctg	ctg	atc	ggg	ctg	ctg	cag	acc	ttc	gcg	gtg	768	
Ala	Phe	Ile	Ala	Ser	Leu	Leu	Ile	Gly	Leu	Leu	Gln	Thr	Phe	Ala	Val	255	
				245					250								
tct	atc	aac	gct	tcg	ccc	gca	acg	ctg	ttc	ggt	ccg	ctc	ggt	ccc	gat	816	
Ser	Ile	Asn	Ala	Ser	Pro	Ala	Thr	Leu	Phe	Gly	Pro	Leu	Gly	Pro	Asp	270	
			260					265									
ctc	gcc	gcc	tcc	tgg	ctc	aac	gac	atc	tgg	aac	gtg	acc	atc	gct	cag	864	
Leu	Ala	Ala	Ser	Trp	Leu	Asn	Asp	Ile	Trp	Asn	Val	Thr	Ile	Ala	Gln	285	
		275					280										
atc	gca	ccg	atc	atg	ccg	tat	ctg	ctg	ctc	gtg	ctc	atc	ctg	atc	ttc	912	
Ile	Ala	Pro	Ile	Met	Pro	Tyr	Leu	Leu	Leu	Val	Leu	Ile	Leu	Ile	Phe	300	
		290				295											
cgg	ccg	atg	ggg	ctg	ttg	gga	acc	cgc	gaa	aca	tga					948	
Arg	Pro	Met	Gly	Leu	Leu	Gly	Thr	Arg	Glu	Thr						310	
305					310					315							

<210> 585

<211> 315

<212> PRT

<213> Rhodopseudomonas palustris

<400> 585

Met	Leu	Glu	Leu	Ile	Val	Ile	Ser	Thr	Leu	Asn	Gly	Val	Leu	Tyr	Gly
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			20					25					30		
Leu	Gly	Val	Leu	Asn	Phe	Ala	His	Ala	Ser	Phe	Tyr	Met	Leu	Gly	Ala
		35					40					45			
Phe	Phe	Gly	Tyr	Gln	Ile	Ser	Arg	Trp	Thr	Gly	Phe	Trp	Pro	Ala	Leu
		50				55					60				
Leu	Ile	Ala	Pro	Leu	Leu	Ala	Gly	Ala	Ile	Gly	Ala	Ala	Val	Glu	Arg
65				70						75				80	
Phe	Gly	Leu	Arg	Arg	Val	His	Arg	Asn	Gly	His	Val	Ala	Glu	Leu	Leu
				85					90					95	

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Phe Thr Phe Gly Leu Ala Phe Ala Ile Glu Glu Val Val Ser Ile Ile
 100 105 110
 Trp Gly Lys Val Pro Val Asp Tyr Arg Thr Pro Ala Leu Asp Phe
 115 120 125
 Pro Ala Phe Thr Ile Phe Ser Thr Asn Tyr Pro Ala Tyr Lys Met Phe
 130 135 140
 Met Leu Ala Val Ser Val Val Ile Phe Val Gly Leu Leu Val Val Leu
 145 150 155 160
 Lys Lys Thr Arg Ile Gly Leu Ile Val Gln Ala Ala Leu Thr His Pro
 165 170 175
 His Met Val Ala His Leu Gly His Asn Val Glu Arg Ile Phe Met Leu
 180 185 190
 Val Phe Gly Val Gly Thr Ala Leu Ala Val Ala Gly Val Ile Ala
 195 200 205
 Gly Pro Ser Leu Val Thr Gln Ser Asn Met Ala Ser Leu Leu Gly Pro
 210 215 220
 Ile Leu Phe Val Val Val Val Val Gly Gly Leu Gly Ser Leu Pro Gly
 225 230 235 240
 Ala Phe Ile Ala Ser Leu Leu Ile Gly Leu Leu Gln Thr Phe Ala Val
 245 250 255
 Ser Ile Asn Ala Ser Pro Ala Thr Leu Phe Gly Pro Leu Gly Pro Asp
 260 265 270
 Leu Ala Ala Ser Trp Leu Asn Asp Ile Trp Asn Val Thr Ile Ala Gln
 275 280 285
 Ile Ala Pro Ile Met Pro Tyr Leu Leu Val Leu Ile Leu Ile Phe
 290 295 300
 Arg Pro Met Gly Leu Leu Gly Thr Arg Glu Thr
 305 310 315

<210> 586

<211> 948

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(948)

<400> 586

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1 5 10 15	
gct gtg gtg atg gcg gtg ctg ccg ctg ctg ttt cca tcg agc tat tac	96
Ala Val Val Met Ala Val Leu Pro Leu Leu Phe Pro Ser Ser Tyr Tyr	
20 25 30	
ttc cgc gtc gcc tcg ctg gtc tgg gtc tcg gca ctg gcg gcg atc ggt	144
Phe Arg Val Ala Ser Leu Val Trp Val Ser Ala Leu Ala Ala Ile Gly	
35 40 45	
ctc aac att ctg atg ggt aag gcc gcc cag gtc agc ctc gcc cat gcc	192
Leu Asn Ile Leu Met Gly Lys Ala Gly Gln Val Ser Leu Gly His Ala	
50 55 60	
ggc ttc ttc ggc atc ggc gct tat gct gtg gcg atc ggg ccg gcg cat	240
Gly Phe Phe Gly Ile Gly Ala Tyr Ala Val Ala Ile Gly Pro Ala His	
65 70 75 80	
ttg ggc ctc aac gcg ctg ctt gca gtg ctg gtt ggc gcc ctg ctc tcc	288
Leu Gly Leu Asn Ala Leu Leu Ala Val Leu Val Gly Ala Leu Leu Ser	
85 90 95	
gcc ctg ctg gca ttt ctg gtc gcc cgg ccg atc ctg cgg ctg aag ggg	336
Ala Leu Leu Ala Phe Leu Val Gly Arg Pro Ile Leu Arg Leu Lys Gly	
100 105 110	
cat tat ctc gcc atc gcc acg ctc ggg ctc ggc gtg ctg gtg gcg atg	384
His Tyr Leu Ala Ile Ala Thr Leu Gly Leu Gly Val Leu Val Ala Met	
115 120 125	
gtc atc acc acc gaa agc ggc tgg acc gga ggc cct gac ggc atg ccg	432
Val Ile Thr Thr Glu Ser Gly Trp Thr Gly Gly Pro Asp Gly Met Pro	
130 135 140	
gtg ccg aag ctg tcg ttg ttc ggc tgg cgc att tcc gga tcg aac acc	480
Val Pro Lys Leu Ser Leu Phe Gly Trp Arg Ile Ser Gly Ser Asn Thr	
145 150 155 160	

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tg	g	t	a	t	g	a	c	g	g	c	t	g	t	a	c	g	a	c	t	g	t	t	c	g	a		528
Trp	Tyr	Trp	Ile		Thr	Ala	Gly	Leu	Leu	Ile	Gly	Thr	Trp	Phe	Ala												
					165																						
ctc	aac	ctc	gac	gac	acg	ccg	acc	ggg	cgc	gcc	ttc	cgc	gcc	ctg	cac											576	
Leu	Asn	Leu	Asp	Asp	Thr	Pro	Thr	Gly	Arg	Ala	Phe	Arg	Ala	Leu	His												
			180					185						190													
gac	agc	gag	atc	gcc	gcg	cgc	acc	gca	ggc	gtg	cat	gtc	gag	cgc	ttc											624	
Asp	Ser	Glu	Ile	Ala	Ala	Arg	Thr	Ala	Gly	Val	His	Val	Glu	Arg	Phe												
		195					200					205															
aag	cta	cag	gcc	ttc	gtc	att	gcg	gcg	gtg	tac	gcc	tcg	att	gcc	ggc											672	
Lys	Leu	Gln	Ala	Phe	Val	Ile	Ala	Ala	Val	Tyr	Ala	Ser	Ile	Ala	Gly												
		210				215					220																
tcg	gcg	ctg	gcg	atg	atg	aat	ggc	ttc	gtc	aat	ccg	gat	cag	gcc	ggc											720	
Ser	Ala	Leu	Ala	Met	Met	Asn	Gly	Phe	Val	Asn	Pro	Asp	Gln	Ala	Gly												
		225			230					235					240												
ttc	ctg	cat	tcg	gtc	gag	ctg	gtg	acg	atg	gtg	gtg	ctc	ggc	ggc	ctc											768	
Phe	Leu	His	Ser	Val	Glu	Leu	Val	Thr	Met	Val	Val	Leu	Gly	Gly	Leu												
				245				250						255													
ggc	tcc	atc	gtc	ggc	agt	atc	gtt	ggc	gcc	gcg	gtg	ctg	gtg	gtg	ctg											816	
Gly	Ser	Ile	Val	Gly	Ser	Ile	Val	Gly	Ala	Ala	Val	Leu	Val	Val	Leu												
			260					265				270															
ccg	caa	ctg	ctg	acg	gta	ttt	cag	gac	tac	gag	cat	ttc	ctg	ctc	ggt											864	
Pro	Gln	Leu	Leu	Thr	Val	Phe	Gln	Asp	Tyr	Glu	His	Phe	Leu	Leu	Gly												
		275					280					285															
ctg	atc	atc	atc	gtg	tcg	atg	atc	ttc	atg	cgt	gac	ggc	atg	gtg	ccg											912	
Leu	Ile	Ile	Ile	Val	Ser	Met	Ile	Phe	Met	Arg	Asp	Gly	Met	Val	Pro												
		290				295					300																
atg	ctg	gcg	aag	ctg	acc	atg	agg	gcg	cgg	cga	tga															948	
Met	Leu	Ala	Lys	Leu	Thr	Met	Arg	Ala	Arg	Arg																	
		305			310					315																	

<210> 587

<211> 315

<212> PRT

<213> Rhodopseudomonas palustris

<400> 587

Met	Met	Pro	Asn	Leu	Phe	Gly	Arg	Arg	Ser	Val	Ile	Leu	Ile	Ala	Leu											
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Ala	Val	Val	Met	Ala	Val	Leu	Pro	Leu	Leu	Phe	Pro	Ser	Ser	Tyr	Tyr											
			20					25					30													
Phe	Arg	Val	Ala	Ser	Leu	Val	Trp	Val	Ser	Ala	Leu	Ala	Ala	Ile	Gly											
		35					40					45														
Leu	Asn	Ile	Leu	Met	Gly	Lys	Ala	Gly	Gln	Val	Ser	Leu	Gly	His	Ala											
	50					55					60															
Gly	Phe	Phe	Gly	Ile	Gly	Ala	Tyr	Ala	Val	Ala	Ile	Gly	Pro	Ala	His											
				70						75					80											
Leu	Gly	Leu	Asn	Ala	Leu	Leu	Ala	Val	Leu	Val	Gly	Ala	Leu	Leu	Ser											
			85						90					95												
Ala	Leu	Leu	Ala	Phe	Leu	Val	Gly	Arg	Pro	Ile	Leu	Arg	Leu	Lys	Gly											
			100					105					110													
His	Tyr	Leu	Ala	Ile	Ala	Thr	Leu	Gly	Leu	Gly	Val	Leu	Val	Ala	Met											
		115					120					125														
Val	Ile	Thr	Thr	Glu	Ser	Gly	Trp	Thr	Gly	Gly	Pro	Asp	Gly	Met	Pro											
		130				135					140															
Val	Pro	Lys	Leu	Ser	Leu	Phe	Gly	Trp	Arg	Ile	Ser	Gly	Ser	Asn	Thr											
				150						155					160											
Trp	Tyr	Trp	Ile	Thr	Ala	Gly	Leu	Leu	Leu	Ile	Gly	Thr	Trp	Phe	Ala											
			165						170					175												
Leu	Asn	Leu	Asp	Asp	Thr	Pro	Thr	Gly	Arg	Ala	Phe	Arg	Ala	Leu	His											
			180					185						190												
Asp	Ser	Glu	Ile	Ala	Ala	Arg	Thr	Ala	Gly	Val	His	Val	Glu	Arg	Phe											
		195					200					205														
Lys	Leu	Gln	Ala	Phe	Val	Ile	Ala	Ala	Val	Tyr	Ala	Ser	Ile	Ala	Gly											
		210				215				220																
Ser	Ala	Leu	Ala	Met	Met	Asn	Gly	Phe	Val	Asn	Pro	Asp	Gln	Ala	Gly											
		225			230					235					240											
Phe	Leu	His	Ser	Val	Glu	Leu	Val	Thr	Met	Val	Val	Leu	Gly	Gly	Leu											
				245					250					255												

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Gly Ser Ile Val Gly Ser Ile Val Gly Ala Ala Val Leu Val Val Leu
 260 265 270 275 280 285
 Pro Gln Leu Leu Thr Val Phe Gln Asp Tyr Glu His Phe Leu Leu Gly
 290 295 300
 Leu Ile Ile Ile Val Ser Met Ile Phe Met Arg Asp Gly Met Val Pro
 305 310 315
 Met Leu Ala Lys Leu Thr Met Arg Ala Arg Arg

<210> 588

<211> 873

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(873)

<400> 588

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1 5 10 15	
gtg tat gcg ctg gtc gca ctc ggc ttc acg ctg gtc tat cac gcc tcc	96
Val Tyr Ala Leu Val Ala Leu Gly Phe Thr Leu Val Tyr His Ala Ser	
20 25 30	
gac gtc gtc aat ttc gcc cag ggc gaa ttc gtc atg ctc ggc ggc atg	144
Asp Val Val Asn Phe Ala Gln Gly Glu Phe Val Met Leu Gly Gly Met	
35 40 45	
gtc acc gtg ttt gcg tat gcg gcc ggc ttg ccg ctg ccg ctg gcg gcc	192
Val Thr Val Phe Ala Tyr Ala Gly Leu Pro Leu Pro Leu Ala Ala	
50 55 60	
ttg ctg gcg gtg atc gtc gcg gtg gtc gtc ggc ctg tta ctg tat tgg	240
Leu Leu Ala Val Ile Val Ala Val Val Val Gly Leu Leu Leu Tyr Trp	
65 70 75 80	
ctg gcg att gcg ccg gcc cgc ggc gcc tcg gcg gta tcg ctg atc atc	288
Leu Ala Ile Ala Pro Ala Arg Gly Ala Ser Ala Val Ser Leu Ile Ile	
85 90 95	
atc acc atc ggc gcc tcg atc ctg ctg cgc ggt gcg gcg cag atc gtg	336
Ile Thr Ile Gly Ala Ser Ile Leu Leu Arg Gly Ala Ala Gln Ile Val	
100 105 110	
ttc gac aag cag ttc cac aag ctg ccg gcc ttc tcc ggc gat gcg ccg	384
Phe Asp Lys Gln Phe His Lys Leu Pro Ala Phe Ser Gly Asp Ala Pro	
115 120 125	
atc cac ctg ctc ggc gcg gtg atc cag ccg cag agc ctg tgg gtg ctc	432
Ile His Leu Leu Gly Ala Val Ile Gln Pro Gln Ser Leu Trp Val Leu	
130 135 140	
ggc ggc gcg gcg ctc gtg gtg ctg acg ctt tac gtg atg gag cga	480
Gly Gly Ala Ala Leu Val Val Leu Thr Leu Tyr Tyr Val Met Glu Arg	
145 150 155 160	
acg ctg atc ggc aaa gcc gtg gtc gcg acc gcc gcc aac cgg ctc gcg	528
Thr Leu Ile Gly Lys Ala Val Val Ala Thr Ala Ala Asn Arg Leu Ala	
165 170 175	
gcg cgg ctg gtc ggc gtc aac gtc gcc acc gtg atg gcg ctg gcg ttc	576
Ala Arg Leu Val Gly Val Asn Val Ala Thr Val Met Ala Leu Ala Phe	
180 185 190	
ggc ggc tcg gcc gcg atc ggc gcc atc gcc ggc att ctg atc acc ccg	624
Gly Gly Ser Ala Ala Ile Gly Ala Ile Ala Gly Ile Leu Ile Thr Pro	
195 200 205	
atc acg ctg acc agc tac gac gtc ggc acg ctg ctg gcg ctg aag ggc	672
Ile Thr Leu Thr Ser Tyr Asp Val Gly Thr Leu Leu Ala Leu Lys Gly	
210 215 220	
ttt gcg gca gcg atg ctc ggc ggc atg ggc aat ccg ctc ggt gcc gtg	720
Phe Ala Ala Ala Met Leu Gly Gly Met Gly Asn Pro Leu Gly Ala Val	
225 230 235 240	
atc ggc ggc ctg ttg ctg ggc ctg ttg gag tcg ttc ggc gcc ggc tac	768
Ile Gly Gly Leu Leu Leu Gly Leu Leu Glu Ser Phe Gly Ala Gly Tyr	
245 250 255	
gtg tcg tcg acc tac aag gac gcc atc gcc ttc atc gtc atc ctc gcc	816
Val Ser Ser Thr Tyr Lys Asp Ala Ile Ala Phe Ile Val Ile Leu Ala	

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260 265 270
 gtg ctg ttc gtc gcg ccg cag ggg ctg gtc ggc cgt cgc act gtc gag 864
 Val Leu Phe Val Ala Pro Gln Gly Leu Val Gly Arg Arg Thr Val Glu
 275 280 285
 cgg gtc tga
 Arg Val 873
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<210> 589

<211> 290

<212> PRT

<213> Rhodopseudomonas palustris

<400> 589

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 20 25 30
 Asp Val Val Asn Phe Ala Gln Gly Glu Phe Val Met Leu Gly Gly Met
 35 40 45
 Val Thr Val Phe Ala Tyr Ala Ala Gly Leu Pro Leu Pro Leu Ala Ala
 50 55 60
 Leu Leu Ala Val Ile Val Ala Val Val Val Gly Leu Leu Leu Tyr Trp
 65 70 75 80
 Leu Ala Ile Ala Pro Ala Arg Gly Ala Ser Ala Val Ser Leu Ile Ile
 85 90 95
 Ile Thr Ile Gly Ala Ser Ile Leu Leu Arg Gly Ala Ala Gln Ile Val
 100 105 110
 Phe Asp Lys Gln Phe His Lys Leu Pro Ala Phe Ser Gly Asp Ala Pro
 115 120 125
 Ile His Leu Leu Gly Ala Val Ile Gln Pro Gln Ser Leu Trp Val Leu
 130 135 140
 Gly Gly Ala Ala Leu Val Val Leu Thr Leu Tyr Tyr Val Met Glu Arg
 145 150 155 160
 Thr Leu Ile Gly Lys Ala Val Val Ala Thr Ala Ala Asn Arg Leu Ala
 165 170 175
 Ala Arg Leu Val Gly Val Asn Val Ala Thr Val Met Ala Leu Ala Phe
 180 185 190
 Gly Gly Ser Ala Ala Ile Gly Ala Ile Ala Gly Ile Leu Ile Thr Pro
 195 200 205
 Ile Thr Leu Thr Ser Tyr Asp Val Gly Thr Leu Leu Ala Leu Lys Gly
 210 215 220
 Phe Ala Ala Ala Met Leu Gly Gly Met Gly Asn Pro Leu Gly Ala Val
 225 230 235 240
 Ile Gly Gly Leu Leu Leu Gly Leu Leu Glu Ser Phe Gly Ala Gly Tyr
 245 250 255
 Val Ser Ser Thr Tyr Lys Asp Ala Ile Ala Phe Ile Val Ile Leu Ala
 260 265 270
 Val Leu Phe Val Ala Pro Gln Gly Leu Val Gly Arg Arg Thr Val Glu
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 Arg Val
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<210> 590

<211> 918

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(918)

<400> 590

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 atc tat ggc ctg atc gcg atc ggc tac acg atg gtg tac ggc atc gtc 96
 Ile Tyr Gly Leu Ile Ala Ile Gly Tyr 25 Thr Met Val Tyr Gly Ile Val
 20 30

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ggc atg atc aat ttc gcc cat ggc gac atc ttc atg atc ggc ggc ttc      144
Gly Met Ile 35 Asn Phe Ala His Gly 40 Asp Ile Phe Met 45 Gly Gly Phe
atc gcg ctg atc agc ttc ctg atc ctg gtg tcg ttc ggc ctc acc ttc      192
Ile Ala Leu 50 Ile Ser Phe Leu 55 Ile Leu Val Ser Phe 60 Gly Leu Thr Phe
gtc ccg ctc atc ctc ctg gtg ctg ctg gtg tcg atg gcg atc acc      240
Val Pro Leu 65 Ile Leu 70 Val Val Leu Leu Val 75 Ser Met Ala Ile Thr 80
gcg ctg tac ggc tgg acg gtc gag cgc ata gcg tac cgc ccg ttg cgg      288
Ala Leu Tyr 85 Gly Trp Thr Val Glu Arg Ile Ala Tyr Arg Pro Leu Arg 95
cat tcg ttc cgc ctc gcc ccg atg ctg tcg gcg atc ggc atg tcg ttc      336
His Ser Phe 100 Arg Leu Ala Pro Met Leu 105 Ser Ala Ile Gly Met Ser Phe 110
gtg ctg atg aac tac gcc cag gtg tcg cag ggc gcc cgc gtc aag ccg      384
Val Leu Met 115 Asn Tyr Ala Gln Val Ser Gln Gly Ala Arg Val Lys Pro 125
gtg ccg ccg atc atc acc ggc ggc tat acg ctg cac gag agc gcc gac      432
Val Pro Pro 130 Ile Ile Thr Gly 135 Gly Tyr Thr Leu His 140 Glu Ser Ala Asp 145
ggc ttc aac gtg cag ctc tcc aac gtc cag atc ctt gtg gtg gtc acc      480
Gly Phe Asn Val Gln Leu Ser Asn Val Gln Ile 155 Leu Val Val Val Thr 160
acc gtg gtg ctg ctc ggc atc ttc acc tgg ctg gtg gcc aag acc cgg      528
Thr Val Val 165 Leu Leu Gly Ile Phe Thr Trp Leu Val Ala Lys Thr Arg 175
ctc ggc cgc gac atg cgc gcc tgc gag cag gat cag acc atg gct gcg      576
Leu Gly Arg 180 Asp Met Arg Ala Cys Glu Gln Asp Gln Thr Met Ala Ala 190
ctg ctc ggc gtc gac gtc gac cgc acc atc tcg atg acc ttc gtg atc      624
Leu Leu Gly Val Asp Val Asp Arg Thr Ile Ser Met Thr Phe Val Ile 205
ggc gcc gcg ctc gcc tcg gtc gcg ggc atg atg tac ctg ctg tat tac      672
Gly Ala Ala Leu Ala Ser 215 Val Ala Gly Met Met Tyr Leu Leu Tyr Tyr 220
ggg ctg atc gac ttc ttc atg ggc ttc atc gcc ggc atc aag gct ttc      720
Gly Leu Ile Asp Phe Phe Met Gly Phe Ile Ala Gly Ile Lys Ala Phe 235
225 acc gcg gct gtg ctc ggc ggc atc ggc tcg ctg ccc ggc gcg atg ctc      768
Thr Ala Ala Val 245 Leu Gly Gly Ile Gly Ser 250 Leu Pro Gly Ala Met Leu 255
ggc ggc ctg ttg atc ggc ctg atc gag acc ttc tgg tcg gcc tat ttc      816
Gly Gly Leu Leu Ile Gly Leu Ile Glu Thr Phe Trp Ser Ala Tyr Phe 260
tcg gtc gag tac aag gac gtt gcg ggc ttc tcg atc ctg atc atc gtg      864
Ser Val 275 Glu Tyr Lys Asp Val Ala 280 Ala Phe Ser Ile Leu Ile Ile Val 285
ctg atc ttc atg ccg acc ggc ctg ctg ggc cgc ccg gaa gtc gaa aaa      912
Leu Ile Phe Met Pro Thr Gly 295 Leu Leu Gly Arg Pro 300 Glu Val Glu Lys 305
gtc tga
Val
305

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<210> 591

<211> 305

<212> PRT

<213> Rhodopseudomonas palustris

<400> 591

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20 Gly Met Ile Asn Phe Ala His Gly Asp Ile Phe Met Ile Gly Gly Phe
35 Ile Ala Leu 40 Ile Ser Phe Leu 55 Ile Leu Val Ser Phe 60 Gly Leu Thr Phe
50

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Val₆₅ Pro Leu Ile Leu₇₀ Val Val Leu Leu₇₅ Ser Met Ala Ile Thr₈₀
 Ala Leu Tyr Gly Trp₈₅ Val Glu Arg Ile₉₀ Ala Tyr Arg Pro Leu Arg₉₅
 His Ser Phe Arg₁₀₀ Leu Ala Pro Met Leu₁₀₅ Ser Ala Ile Gly Met₁₁₀ Ser Phe
 Val Leu Met₁₁₅ Asn Tyr Ala Gln Val₁₂₀ Ser Gln Gly Ala Arg₁₂₅ Val Lys Pro
 Val Pro₁₃₀ Pro Ile Ile Thr Gly₁₃₅ Gly Tyr Thr Leu His₁₄₀ Glu Ser Ala Asp
 Gly₁₄₅ Phe Asn Val Gln Leu₁₅₀ Ser Asn Val Gln Ile Leu Val Val Val Thr₁₆₀
 Thr Val Val Leu₁₆₅ Gly Ile Phe Thr Trp₁₇₀ Leu Val Ala Lys Thr Arg₁₇₅
 Leu Gly Arg Asp₁₈₀ Met Arg Ala Cys Glu₁₈₅ Gln Asp Gln Thr Met Ala Ala
 Leu Leu Gly₁₉₅ Val Asp Val Asp Arg₂₀₀ Thr Ile Ser Met Thr₂₀₅ Phe Val Ile
 Gly Ala₂₁₀ Ala Leu Ala Ser Val₂₁₅ Ala Gly Met Met Tyr₂₂₀ Leu Leu Tyr Tyr
 Gly₂₂₅ Leu Ile Asp Phe Phe₂₃₀ Met Gly Phe Ile Ala Gly Ile Lys Ala Phe₂₄₀
 Thr Ala Ala Val₂₄₅ Leu Gly Gly Ile Gly Ser₂₅₀ Leu Pro Gly Ala Met Leu₂₅₅
 Gly Gly Leu₂₆₀ Ile Gly Leu Ile Glu₂₆₅ Thr Phe Trp Ser Ala Tyr Phe₂₇₀
 Ser Val Glu Tyr Lys Asp Val Ala₂₈₀ Ala Phe Ser Ile Leu₂₈₅ Ile Ile Val
 Leu Ile₂₉₀ Phe Met Pro Thr Gly₂₉₅ Leu Leu Gly Arg Pro₃₀₀ Glu Val Glu Lys
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<210> 592

<211> 1614

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(1614)

<400> 592

atg cct ctc atc cat ctg acg cgc att cta ttt gcc gca gtc gcg atc	48
Met Pro Leu Ile His ₅ Leu Thr Arg Ile Leu ₁₀ Phe Ala Ala Val ₁₅ Ala Ile	
gcg ttc gtc act ctg ggg agc ctg ccg gcg gtg gcc ggt ccc tat gag	96
Ala Phe Val Thr ₂₀ Leu Gly Ser Leu Pro ₂₅ Ala Val Ala Gly Pro ₃₀ Tyr Glu	
gac gcc atc gcg caa ttc gcc caa gat tcc ttc acc gac agc gag gac	144
Asp Ala Ile ₃₅ Ala Gln Phe Ala Gln ₄₀ Asp Ser Phe Thr Asp ₄₅ Ser Glu Asp	
gcg atc ggc aag ctg gtc gcc agc ggc aat ccg cgc gcc gcg gtg atc	192
Ala Ile Gly Lys Leu Val ₅₅ Ala Ser Gly Asn Pro Arg Ala Ala Val ₆₀ Ile	
atc acc gcg ctg cag gac ggc aag ctc tac gcc gac ccg gac agc aaa	240
Ile Thr Ala Leu Gln Asp ₇₀ Gly Lys Leu Tyr ₇₅ Ala Asp Pro Asp Ser Lys ₈₀	
gcg gcc ttc atc aag acc gac gac ggc aag atc gcc aat gcg gcg acc	288
Ala Ala Phe Ile Lys ₈₅ Thr Asp Asp Gly Lys ₉₀ Ile Ala Asn Ala Ala Thr ₉₅	
ggc gag gcg gtc ggt gcg ctg ccg gcc aag gcc agc gcg gtt cgg ctc	336
Gly Glu Ala Val ₁₀₀ Gly Ala Leu Pro ₁₀₅ Ala Lys Ala Ser Ala Val ₁₁₀ Arg Leu	
aac aac aag ctg cgc cgc gtc gtc gcc ggc gcg atg gcc ggc ctg acg	384
Asn Asn Lys ₁₁₅ Leu Arg Arg Val ₁₂₀ Val Ala Gly Ala Met ₁₂₅ Ala Gly Leu Thr	
ctg ctg tcg ccg gat ctc gac aag cgg ctg cag gct gcg caa tcg gta	432
Leu Leu Ser Pro Asp Leu Asp Lys Arg Leu Gln Ala Glu Ser Val	

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130	135	140		
tac aag tgc cac gac gag acc atg ctg ccg acc gtc gag gcg gcg ctg	135	140		
Phe Lys Ser His Asp Glu Thr Met Leu Pro Thr Val Glu Ala Ala Leu	135	140		
145	150	155		
aag gcg gaa aag aac gcc gcc gcc aag cgc gcc ttc acc gaa gcg cgg	150	155		
Lys Ala Glu Lys Asn Ala Ala Ala Lys Arg Ala Phe Thr Glu Ala Arg	150	155		
165	170	175		
gcg tgc atc ctg ctg ttc aag cag ggc gcc tcc gat gcc gac aag ctg	165	170		
Ala Ser Ile Leu Leu Phe Lys Gln Gly Ala Ser Asp Ala Asp Lys Leu	165	170		
180	185	190		
gac gcg atc gcc acc atc aag gcg cgc gcc gat cag gag gcg atg gcg	180	185		
Asp Ala Ile 195 Ala Thr Ile Lys Ala Arg Gly Asp Gln Glu Ala Met Ala	180	185		
200	205	210		
ctg ctc acc ggc gcg ccg tgc aac cag agc gcc gcc gtc gcc agc ggc	200	205		
Leu Leu Thr Gly Ala Pro Ser Asn Gln Ser Ala Ala Val Ala Ser Gly	200	205		
215	220	225		
atc gcc ggc gcc aag gcg gcg atc gag cgc aat ctg gcg atc tgg tgc	215	220		
Ile Ala Gly Ala Lys Ala Ala Ile Glu Arg Asn Leu Ala Ile Trp Ser	215	220		
230	235	240		
atg gtg cag aac gcc tgg tat gga ctg tgc ctc ggc tgc gtt cta ctg	230	235		
Met Val Gln Asn Ala Trp Tyr Gly Leu Ser Leu Gly Ser Val Leu Leu	230	235		
245	250	255		
ctt gcc gcg atc ggc ctc gcc atc acc ttc ggt gtg atg ggc gtc atc	245	250		
Leu Ala Ala Ile 260 Gly Leu Ala Ile Thr Phe Gly Val Met 270 Val Ile	245	250		
265	270	275		
aac atg gcg cat ggc gag atg gtg atg ctc ggg gcc tac acc acc ttc	265	270		
Asn Met Ala His Gly Glu Met Val Met Leu Gly Ala Tyr Thr Thr Phe	265	270		
280	285	290		
gtg gtg cag gag gcg atc cgc acg cgt tat ccg gcg ctg ttc gac tat	280	285		
Val Val Gln Glu Ala Ile Arg Thr Arg Tyr Pro Ala Leu Phe Asp Tyr	280	285		
295	300	305		
tct ttg ttg att gcg gtc ccg ctc gcg ttc ctc gtt gcc ggc gca gtc	295	300		
Ser Leu Leu Ile Ala Val Pro Leu Ala Phe Leu Val Ala Gly Ala Val	295	300		
310	315	320		
ggc gtt ctg atc gaa cgc acc gtg atc cgc ttc ctc tac ggc cgt ccg	310	315		
Gly Val Leu Ile Glu Arg Thr Val Ile Arg Phe Leu Tyr Gly Arg Pro	310	315		
325	330	335		
ctg gag acc ttg ctc gcc acc tgg gga ctg tgc ctg atc ctg cag cag	325	330		
Leu Glu Thr Leu Leu Ala Thr Trp Gly Leu Ser Leu Ile Leu Gln Gln	325	330		
340	345	350		
gcg gtg cgc acg ctg ttc ggc ccc acc cgc gag gtc ggc aat ccg	340	345		
Ala Val Arg Thr Leu Phe Gly Pro Thr Asn Arg Glu Val Gly Asn Pro	340	345		
355	360	365		
agc tgg atg agc ggt gcg ttc gaa ctc ggc gag atg acc atc act tac	355	360		
Ser Trp Met Ser Gly Ala Phe Glu Leu Gly Glu Met Thr Ile Thr Tyr	355	360		
370	375	380		
aac cgc ctg tgg atc ctg tgc ttc acg ctg gcg gtg ttc gcc ctg ctg	370	375		
Asn Arg Leu Trp Ile Leu Cys Phe Thr Leu Ala Val Phe Ala Leu Leu	370	375		
385	390	395		
ctg gcg atg ctg cgc tac acc tgc ctc ggc ctg gag atg cgc gcg gtg	385	390		
Leu Ala Met Leu Arg Tyr Thr Ser Leu Gly Leu Glu Met Arg Ala Val	385	390		
405	410	415		
acg cag aac cgc cgt atg gcc gcg tgc atg ggc att gcc acg tgc cgg	405	410		
Thr Gln Asn Arg Arg Met Ala Ala Ser Met Gly Ile Ala Thr Ser Arg	405	410		
420	425	430		
gtc gac gcg ctg acg ttc gga ctc ggc tcc ggc atc gcc ggc att gcc	420	425		
Val Asp Ala Leu Thr Phe Gly Leu Gly Ser Gly Ile Ala Gly Ile Ala	420	425		
435	440	445		
ggt gtg gcg ctg tgc cag atc gac aac gtc tgc ccg aac ctc ggc cag	435	440		
Gly Val Ala Leu Ser Gln Ile Asp Asn Val Ser Pro Asn Leu Gly Gln	435	440		
450	455	460		
agc tac atc atc gac agc ttc atg gtg gtg gtg ttc ggc ggc gtc gga	450	455		
Ser Tyr Ile Ile Asp Ser Phe Met Val Val Val Phe Gly Gly Val Gly	450	455		
465	470	475		
aac ctg tgg ggc acg ctg gtc ggc gcc ttc tgc ctc ggc atc gcc aac	465	470		
Asn Leu Trp Gly Thr Leu Val Gly Ala Phe Ser Leu Gly Ile Ala Asn	465	470		
485	490	495		
aag ttc ctg gag ccg gtc gcc ggc gcc cta ggc aag atc gcc atc	485	490		
Lys Phe Leu Glu Pro Val Ala Gly Ala Val Leu Gly Lys Ile Ala Ile	485	490		

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ctg	gtg	ctg	500	atc	ctg	ttc	atc	505	caa	aag	cgc	ccc	cgc	510	ctg	ttc	1584
Leu	Val	Leu	Ile	Ile	Leu	Phe	Ile	Gln	Lys	Arg	Pro	Arg	Gly	Leu	Phe		
		515					520					525					
gcg	ctc	aag	ggc	cgg	gcg	gtg	gag	gca	tga							1614	
Ala	Leu	Lys	Gly	Arg	Ala	Val	Glu	Ala									
	530					535											

<210> 593

<211> 537

<212> PRT

<213> *Rhodopseudomonas palustris*

<400> 593

Met	Pro	Leu	Ile	His	Leu	Thr	Arg	Ile	Leu	Phe	Ala	Ala	Val	Ala	Ile
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Ala	Phe	Val	Thr	Leu	Gly	Ser	Leu	Pro	Ala	Val	Ala	Gly	Pro	Tyr	Glu
			20					25					30		
Asp	Ala	Ile	Ala	Gln	Phe	Ala	Gln	Asp	Ser	Phe	Thr	Asp	Ser	Glu	Asp
		35					40					45			
Ala	Ile	Gly	Lys	Leu	Val	Ala	Ser	Gly	Asn	Pro	Arg	Ala	Ala	Val	Ile
	50					55				60					
Ile	Thr	Ala	Leu	Gln	Asp	Gly	Lys	Leu	Tyr	Ala	Asp	Pro	Asp	Ser	Lys
65				70					75						80
Ala	Ala	Phe	Ile	Lys	Thr	Asp	Asp	Gly	Lys	Ile	Ala	Asn	Ala	Ala	Thr
			85					90					95		
Gly	Glu	Ala	Val	Gly	Ala	Leu	Pro	Ala	Lys	Ala	Ser	Ala	Val	Arg	Leu
		100						105					110		
Asn	Asn	Lys	Leu	Arg	Arg	Val	Val	Ala	Gly	Ala	Met	Ala	Gly	Leu	Thr
		115					120					125			
Leu	Leu	Ser	Pro	Asp	Leu	Asp	Lys	Arg	Leu	Gln	Ala	Ala	Gln	Ser	Val
	130					135				140					
Phe	Lys	Ser	His	Asp	Glu	Thr	Met	Leu	Pro	Thr	Val	Glu	Ala	Ala	Leu
145				150					155						160
Lys	Ala	Glu	Lys	Asn	Ala	Ala	Ala	Lys	Arg	Ala	Phe	Thr	Glu	Ala	Arg
			165					170					175		
Ala	Ser	Ile	Leu	Leu	Phe	Lys	Gln	Gly	Ala	Ser	Asp	Ala	Asp	Lys	Leu
		180					185					190			
Asp	Ala	Ile	Ala	Thr	Ile	Lys	Ala	Arg	Gly	Asp	Gln	Glu	Ala	Met	Ala
	195					200						205			
Leu	Leu	Thr	Gly	Ala	Pro	Ser	Asn	Gln	Ser	Ala	Ala	Val	Ala	Ser	Gly
	210					215				220					
Ile	Ala	Gly	Ala	Lys	Ala	Ala	Ile	Glu	Arg	Asn	Leu	Ala	Ile	Trp	Ser
225				230					235						240
Met	Val	Gln	Asn	Ala	Trp	Tyr	Gly	Leu	Ser	Leu	Gly	Ser	Val	Leu	Leu
			245					250					255		
Leu	Ala	Ala	Ile	Gly	Leu	Ala	Ile	Thr	Phe	Gly	Val	Met	Gly	Val	Ile
		260					265					270			
Asn	Met	Ala	His	Gly	Glu	Met	Val	Met	Leu	Gly	Ala	Tyr	Thr	Thr	Phe
	275					280						285			
Val	Val	Gln	Glu	Ala	Ile	Arg	Thr	Arg	Tyr	Pro	Ala	Leu	Phe	Asp	Tyr
	290					295				300					
Ser	Leu	Leu	Ile	Ala	Val	Pro	Leu	Ala	Phe	Leu	Val	Ala	Gly	Ala	Val
305				310					315						320
Gly	Val	Leu	Ile	Glu	Arg	Thr	Val	Ile	Arg	Phe	Leu	Tyr	Gly	Arg	Pro
			325					330					335		
Leu	Glu	Thr	Leu	Ala	Thr	Trp	Gly	Leu	Ser	Leu	Ile	Leu	Gln	Gln	
		340					345					350			
Ala	Val	Arg	Thr	Leu	Phe	Gly	Pro	Thr	Asn	Arg	Glu	Val	Gly	Asn	Pro
	355					360						365			
Ser	Trp	Met	Ser	Gly	Ala	Phe	Glu	Leu	Gly	Glu	Met	Thr	Ile	Thr	Tyr
	370				375					380					
Asn	Arg	Leu	Trp	Ile	Leu	Cys	Phe	Thr	Leu	Ala	Val	Phe	Ala	Leu	Leu
385				390					395						400
Leu	Ala	Met	Leu	Arg	Tyr	Thr	Ser	Leu	Gly	Leu	Glu	Met	Arg	Ala	Val
		405						410					415		
Thr	Gln	Asn	Arg	Arg	Met	Ala	Ala	Ser	Met	Gly	Ile	Ala	Thr	Ser	Arg
		420					425					430			
Val	Asp	Ala	Leu	Thr	Phe	Gly	Leu	Gly	Ser	Gly	Ile	Ala	Gly	Ile	Ala

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435 440 445
 Gly Val Ala Leu Ser Gln Ile Asp Asn Val Ser Pro Asn Leu Gly Gln
 450 455 460
 Ser Tyr Ile Ile Asp Ser Phe Met Val Val Val Phe Gly Gly Val Gly
 465 470 475 480
 Asn Leu Trp Gly Thr Leu Val Gly Ala Phe Ser Leu Gly Ile Ala Asn
 485 490 495
 Lys Phe Leu Glu Val Ala Gly Ala Val Leu Gly Lys Ile Ala Ile
 500 505 510
 Leu Val Leu Ile Ile Leu Phe Ile Gln Lys Arg Pro Arg Gly Leu Phe
 515 520 525
 Ala Leu Lys Gly Arg Ala Val Glu Ala
 530 535

<210> 594

<211> 1008

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(1008)

<400> 594

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Met Asp Ala Ile Val Leu Gln Ile Leu Asn Gly Leu Asp Lys Gly Gly	
1 5 10 15	
gcc tat gcg ctg atc gcg ctc ggg ctg acc ttg gcc ttc ggc acg ctc	96
Ala Tyr Ala Leu Ile Ala Leu Gly Leu Thr Leu Ala Phe Gly Thr Leu	
20 25 30	
ggc gtg gtg aac ttc gcc cac ggc gcg ctg ttc atg ctc ggc gcg ttc	144
Gly Val Val Asn Phe Ala His Gly Ala Leu Phe Met Leu Gly Ala Phe	
35 40 45	
tgc gcc gtg gtg ttc aac aag ttt ctg acg ctg gag atc gtc aag atc	192
Cys Ala Val Val Phe Asn Lys Phe Leu Thr Leu Glu Ile Val Lys Ile	
50 55 60	
gat ccg acg cgg acg acg ccc tgg ggc tcg ccg ctg gag gtc aag acg	240
Asp Pro Thr Arg Thr Thr Pro Trp Gly Ser Pro Leu Glu Val Lys Thr	
65 70 75 80	
ccg tat gtc cag gcg atg ctg ggc gat tgg ggt aag gtg ctg atc gat	288
Pro Tyr Val Gln Ala Met Leu Gly Asp Trp Gly Lys Val Leu Ile Asp	
85 90 95	
tac tcg gtg ccg gtc tcg att ctg ctc gcc att ccg gtg atg ctg ctg	336
Tyr Ser Val Pro Val Ser Ile Leu Leu Ala Ile Pro Val Met Leu Leu	
100 105 110	
atc ggc atc ctg atc gag cgc ggc ctg atc cgg ttc ttc aag cgc	384
Ile Gly Ile Leu Ile Glu Arg Gly Leu Ile Arg Phe Phe Tyr Lys Arg	
115 120 125	
cca cac gcc gac cag atc ctg gtc act ttc ggc ctt gcc atc gtg ctg	432
Pro His Ala Asp Gln Ile Leu Val Thr Phe Gly Leu Ala Ile Val Leu	
130 135 140	
cag gag atc gtc aag cac ttc ggc gcc aat ccg atc gcg cag tcg	480
Gln Glu Ile Val Lys His Phe Phe Gly Ala Asn Pro Ile Ala Gln Ser	
145 150 155 160	
gcg cca gcg ttg ttc tcc ggc tcg ctg cag atc acc gag gcg atc gtc	528
Ala Pro Ala Leu Phe Ser Gly Ser Leu Gln Ile Thr Glu Ala Ile Val	
165 170 175	
tat cca tac tgg cgc atc gtc tat cta tgc ttc tcg ctg gtg gtg atc	576
Tyr Pro Tyr Trp Arg Ile Val Tyr Leu Cys Phe Ser Leu Val Val Ile	
180 185 190	
ggc tcg gtc ttt gcc ttc ctc cag ctc acc acc ttc ggc atg gtg gtg	624
Gly Ser Val Phe Ala Phe Leu Gln Leu Thr Thr Phe Gly Met Val Val	
195 200 205	
cgc gcc ggc atg cag gac cgg gaa acc gtc ggc ctg ctc ggc atc aat	672
Arg Ala Gly Met Gln Asp Arg Glu Thr Val Gly Leu Leu Gly Ile Asn	
210 215 220	
atc gag cgg cgc ttc acc atc gtg ttc ggc ctt ggc gcg atc gtc gcg	720
Ile Glu Arg Arg Phe Thr Ile Val Phe Gly Leu Ala Ala Ile Val Ala	
225 230 235 240	

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ggt	ctg	gcc	ggt	gtg	atg	tac	acg	ccg	atc	gtg	cca	ccc	gac	tat	cac	768
Gly	Leu	Ala	Gly	Val	Met	Tyr	Thr	Pro	Ile	Val	Pro	Pro	Asp	Tyr	His	
				245					250					255		
atg	ggc	atg	gac	ttc	ctg	gtg	ctg	tcg	ttc	gtc	gtc	gtc	gtg	gtg	ggc	816
Met	Gly	Met	Asp	Phe	Leu	Val	Leu	Ser	Phe	Val	Val	Val	Val	Val	Gly	
			260					265					270			
ggc	atg	ggg	tcg	ctg	ccg	ggc	gcg	gtg	ctg	gcc	ggc	ttc	ctg	ctc	ggc	864
Gly	Met	Gly	Ser	Leu	Pro	Gly	Ala	Val	Leu	Ala	Gly	Phe	Leu	Leu	Gly	
			275				280					285				
atc	ctg	cag	tcg	ttc	gcc	tcg	atg	aac	gag	atc	aaa	ggc	ctg	ctg	ccg	912
Ile	Leu	Gln	Ser	Phe	Ala	Ser	Met	Asn	Glu	Ile	Lys	Gly	Leu	Leu	Pro	
	290					295					300					
ggc	atc	gat	cag	atc	atc	atc	tat	ctg	gtc	gcc	gtg	gtg	gtg	ttg	ttg	960
Gly	Ile	Asp	Gln	Ile	Ile	Ile	Tyr	Leu	Val	Ala	Val	Val	Val	Leu	Leu	
305					310					315					320	
gtg	cgt	ccg	cg	ggt	ttg	ctg	gga	cg	aag	ggc	gtg	atg	gag	agc		1005
Val	Arg	Pro	Arg	Gly	Leu	Leu	Gly	Arg	Lys	Gly	Val	Met	Glu	Ser		
				325					330					335		
tga																1008

<210> 595

<211> 335

<212> PRT

<213> Rhodopseudomonas palustris

<400> 595

Met	Asp	Ala	Ile	Val	Leu	Gln	Ile	Leu	Asn	Gly	Leu	Asp	Lys	Gly	Gly	
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Ala	Tyr	Ala	Leu	Ile	Ala	Leu	Gly	Leu	Thr	Leu	Ala	Phe	Gly	Thr	Leu	
			20					25					30			
Gly	Val	Val	Asn	Phe	Ala	His	Gly	Ala	Leu	Phe	Met	Leu	Gly	Ala	Phe	
		35					40					45				
Cys	Ala	Val	Val	Phe	Asn	Lys	Phe	Leu	Thr	Leu	Glu	Ile	Val	Lys	Ile	
	50					55					60					
Asp	Pro	Thr	Arg	Thr	Thr	Pro	Trp	Gly	Ser	Pro	Leu	Glu	Val	Lys	Thr	
65					70					75					80	
Pro	Tyr	Val	Gln	Ala	Met	Leu	Gly	Asp	Trp	Gly	Lys	Val	Leu	Ile	Asp	
				85					90					95		
Tyr	Ser	Val	Pro	Val	Ser	Ile	Leu	Leu	Ala	Ile	Pro	Val	Met	Leu	Leu	
			100					105					110			
Ile	Gly	Ile	Leu	Ile	Glu	Arg	Gly	Leu	Ile	Arg	Phe	Phe	Tyr	Lys	Arg	
		115					120					125				
Pro	His	Ala	Asp	Gln	Ile	Leu	Val	Thr	Phe	Gly	Leu	Ala	Ile	Val	Leu	
	130					135					140					
Gln	Glu	Ile	Val	Lys	His	Phe	Phe	Gly	Ala	Asn	Pro	Ile	Ala	Gln	Ser	
145					150					155					160	
Ala	Pro	Ala	Leu	Phe	Ser	Gly	Ser	Leu	Gln	Ile	Thr	Glu	Ala	Ile	Val	
				165					170					175		
Tyr	Pro	Tyr	Trp	Arg	Ile	Val	Tyr	Leu	Cys	Phe	Ser	Leu	Val	Val	Ile	
			180					185					190			
Gly	Ser	Val	Phe	Ala	Phe	Leu	Gln	Leu	Thr	Thr	Phe	Gly	Met	Val	Val	
		195					200					205				
Arg	Ala	Gly	Met	Gln	Asp	Arg	Glu	Thr	Val	Gly	Leu	Leu	Gly	Ile	Asn	
	210					215					220					
Ile	Glu	Arg	Arg	Phe	Thr	Ile	Val	Phe	Gly	Leu	Ala	Ala	Ile	Val	Ala	
225					230					235					240	
Gly	Leu	Ala	Gly	Val	Met	Tyr	Thr	Pro	Ile	Val	Pro	Pro	Asp	Tyr	His	
				245					250					255		
Met	Gly	Met	Asp	Phe	Leu	Val	Leu	Ser	Phe	Val	Val	Val	Val	Val	Gly	
			260					265					270			
Gly	Met	Gly	Ser	Leu	Pro	Gly	Ala	Val	Leu	Ala	Gly	Phe	Leu	Leu	Gly	
		275					280					285				
Ile	Leu	Gln	Ser	Phe	Ala	Ser	Met	Asn	Glu	Ile	Lys	Gly	Leu	Leu	Pro	
	290					295					300					
Gly	Ile	Asp	Gln	Ile	Ile	Ile	Tyr	Leu	Val	Ala	Val	Val	Val	Leu	Leu	
305					310					315					320	
Val	Arg	Pro	Arg	Gly	Leu	Leu	Gly	Arg	Lys	Gly	Val	Met	Glu	Ser		

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 <213> *Rhodopseudomonas palustris*

<220>
 <221> CDS
 <222> (1)..(873)

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 gcc ttt gcc ttc ctg gtg ctg tgc gcc tgc ggg ctc gcc gtc atc ttc 96
 Ala Phe Ala Phe Leu Val Leu Ser Ala Cys Gly Leu Ala Val Ile Phe
 20 25 30
 ggc atg atg ggc gtc atc aat ctc gcc cac ggc gag ttc atc atg tgt 144
 Gly Met Met Gly Val Ile Asn Leu Ala His Gly Glu Phe Ile Met Cys
 35 40 45
 ggc gcc tac gtc acc gcc acc gcg gct cac gcc gga ctg ccg ctg ccg 192
 Gly Ala Tyr Val Thr Ala Thr Ala Ala His Ala Gly Leu Pro Leu Pro
 50 55 60
 ctc gcc att ctg acc ggt gcg ctg gtt tgc gcg atg gtc ggc atg ctg 240
 Leu Ala Ile Leu Thr Gly Ala Leu Val Ser Ala Met Val Gly Met Leu
 65 70 75 80
 gtc gag ttc gtg gtg gtg cgg cat ctc tat gaa cgc ccg ctc gac acc 288
 Val Glu Phe Val Val Val Arg His Leu Tyr Glu Arg Pro Leu Asp Thr
 85 90 95
 atc gtc gcc acc tgg ggc ctc agc ctg atc gcg acg caa ggc aca ctg 336
 Ile Val Ala Thr Trp Gly Leu Ser Leu Ile Ala Thr Gln Gly Thr Leu
 100 105 110
 atc gtg atc ggc tgc acc atg gct ggt gtc ggt acg ccg ttc ggc agt 384
 Ile Val Ile Gly Ser Thr Met Ala Gly Val Gly Thr Pro Phe Gly Ser
 115 120 125
 ttt cag gtc ggc gcc tat tcc tat tgc atc tac cgg atc gtg ctg ttt 432
 Phe Gln Val Gly Ala Tyr Ser Tyr Ser Ile Tyr Arg Ile Val Leu Phe
 130 135 140
 ctg gcc gcg ctc ggc gtg ctc ggc ggg ctg tac gcg gtg ttc aac tgg 480
 Leu Ala Ala Leu Gly Val Leu Gly Gly Leu Tyr Ala Val Phe Asn Trp
 145 150 155 160
 aca tcc ttc ggc gtc aaa gca cgc gcc acc atc cag gtg ccg cac atg 528
 Thr Ser Phe Gly Val Lys Ala Arg Ala Thr Ile Gln Val Pro His Met
 165 170 175
 gcg gat gcg ctc ggc gtc gac acc cgc tgg atc tac agc ctg acc ttc 576
 Ala Asp Ala Leu Gly Val Asp Thr Arg Trp Ile Tyr Ser Leu Thr Phe
 180 185 190
 gcc tgc ggc gcc ggg ctc gcc gga ctg gcc ggc ggg ctg tac gcg ccg 624
 Ala Cys Gly Ala Gly Leu Ala Gly Leu Ala Gly Gly Leu Tyr Ala Pro
 195 200 205
 acc atg aca ttg gtg ccg acg atg ggc gcg acc ttc ctg atg gag gcg 672
 Thr Met Thr Leu Val Pro Thr Met Gly Ala Thr Phe Leu Met Glu Ala
 210 215 220
 ttc gtc acg gtg gtg atc ggc ggc gcg gac gtg ttc ctc ggc acg gcg 720
 Phe Val Thr Val Val Ile Gly Gly Ala Asp Val Phe Leu Gly Thr Ala
 225 230 235 240
 ccg gct gct gca gtc ctg gct gtg gtg aag tgc gcg atg acg tca tgg 768
 Pro Ala Ala Ala Val Leu Ala Val Val Lys Ser Ala Met Thr Ser Trp
 245 250 255
 cag ggc cag ttg ttc ggt caa atc ggc ctg ttg gtc gcg gtg atc atc 816
 Gln Gly Gln Leu Phe Gly Gln Ile Gly Leu Leu Val Ala Val Ile Ile
 260 265 270
 gtg gtt cgg gtg ctg ccg aaa ggc atc tcc ggc ttc ctg ctg cgt gaa 864
 Val Val Arg Val Leu Pro Lys Gly Ile Ser Gly Phe Leu Leu Arg Glu
 275 280 285
 cgg acc tga 873
 Arg Thr
 290

<210> 597
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 <213> Rhodopseudomonas palustris

<400> 597
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 Gly Met Met Gly Val Ile Asn Leu Ala His Gly Glu Phe Ile Met Cys
 35 40 45
 Gly Ala Tyr Val Thr Ala Thr Ala His Ala Gly Leu Pro Leu Pro
 50 55 60
 Leu Ala Ile Leu Thr Gly Ala Leu Val Ser Ala Met Val Gly Met Leu
 65 70 75 80
 Val Glu Phe Val Val Arg His Leu Tyr Glu Arg Pro Leu Asp Thr
 85 90 95
 Ile Val Ala Thr Trp Gly Leu Ser Leu Ile Ala Thr Gln Gly Thr Leu
 100 105 110
 Ile Val Ile Gly Ser Thr Met Ala Gly Val Gly Thr Pro Phe Gly Ser
 115 120 125
 Phe Gln Val Gly Ala Tyr Ser Tyr Ser Ile Tyr Arg Ile Val Leu Phe
 130 135 140
 Leu Ala Ala Leu Gly Val Leu Gly Gly Leu Tyr Ala Val Phe Asn Trp
 145 150 155 160
 Thr Ser Phe Gly Val Lys Ala Arg Ala Thr Ile Gln Val Pro His Met
 165 170 175
 Ala Asp Ala Leu Gly Val Asp Thr Arg Trp Ile Tyr Ser Leu Thr Phe
 180 185 190
 Ala Cys Gly Ala Gly Leu Ala Gly Leu Ala Gly Gly Leu Tyr Ala Pro
 195 200 205
 Thr Met Thr Leu Val Pro Thr Met Gly Ala Thr Phe Leu Met Glu Ala
 210 215 220
 Phe Val Thr Val Val Ile Gly Gly Ala Asp Val Phe Leu Gly Thr Ala
 225 230 235 240
 Pro Ala Ala Ala Val Leu Ala Val Val Lys Ser Ala Met Thr Ser Trp
 245 250 255
 Gln Gly Gln Leu Phe Gly Gln Ile Gly Leu Leu Val Ala Val Ile Ile
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 Val Val Arg Val Leu Pro Lys Gly Ile Ser Gly Phe Leu Leu Arg Glu
 275 280 285
 Arg Thr
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<210> 598
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 <212> DNA
 <213> Rhodopseudomonas palustris

<220>
 <221> CDS
 <222> (1)..(876)

<400> 598
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 1 5 10
 atc aac ggt tcg ttc tac gcg ctg ctc agc ctc ggc ctc gcc gtg atc 96
 Ile Asn Gly Ser Phe Tyr Ala Leu Leu Ser Leu Gly Leu Ala Val Ile 20 25 30
 ttc ggc atg ctc aac atc atc aac ttc gcg cac ggc gcg ttg tac atg 144
 Phe Gly Met Leu Asn Ile Ile Asn Phe Ala His Gly Ala Leu Tyr Met 35 40 45
 atg ggc gcg ttc tgc gcc tat ttc ctg ctc aat ctg ctc ggc ctg aac 192
 Met Gly Ala Phe Cys Ala Tyr Phe Leu Leu Asn Leu Leu Gly Leu Asn 50 55 60
 tat tgg tgg gcg ctg att ctg tcg ccg atc atc gtc ggc ctg ttc ggc 240
 275 280 285
 Seite 861

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Tyr 65	Trp	Trp	Ala	Leu	Ile 70	Leu	Ser	Pro	Ile 75	Val	Gly	Leu	Phe	Gly 80	
atg	gtg	atg	gag	cgc	acg	ctg	cta	caa	tgg	ctg	tcg	ggg	ctc	gat	cac
Met	Val	Met	Glu	Arg	Thr	Leu	Leu	Gln	Trp	Leu	Ser	Gly	Leu	Asp	His
				85					90					95	
ctc	tac	ggc	ctg	ctg	ctc	acc	ttc	ggc	gtg	gcg	ctg	atc	atc	cag	ggc
Leu	Tyr	Gly	Leu	Leu	Leu	Thr	Phe	Gly	Val	Ala	Leu	Ile	Ile	Gln	Gly
				100				105						110	
gtg	ttc	cag	aac	tat	ttc	ggt	tca	tcc	ggc	ctg	cct	tat	gcg	atc	ccc
Val	Phe	Gln	Asn	Tyr	Phe	Gly	Ser	Ser	Gly	Leu	Pro	Tyr	Ala	Ile	Pro
				115				120						125	
gaa	cag	ctc	cgc	ggc	gcg	atc	aat	ctc	ggc	ttc	atg	tat	ctg	ccg	gtg
Glu	Gln	Leu	Arg	Gly	Ala	Ile	Asn	Leu	Gly	Phe	Met	Tyr	Leu	Pro	Val
				130				135						140	
tat	cgc	ggc	tgg	gtg	gtg	gtg	ttc	tcg	ctg	gtg	gtg	tgc	ctg	ctc	act
Tyr	Arg	Gly	Trp	Val	Val	Val	Phe	Ser	Leu	Val	Val	Cys	Leu	Leu	Thr
				150											160
tgg	ttc	ctg	atc	gag	cgt	acc	cgg	ctc	ggc	gcc	tat	ttg	cgc	gcc	gcc
Trp	Phe	Leu	Ile	Glu	Arg	Thr	Arg	Leu	Gly	Ala	Tyr	Leu	Arg	Ala	Ala
				165											175
acc	gag	aac	ccg	acg	ctg	gtg	cgc	gcg	ttc	ggc	atc	aac	gtg	ccg	cgg
Thr	Glu	Asn	Pro	Thr	Leu	Val	Arg	Ala	Phe	Gly	Ile	Asn	Val	Pro	Arg
				180				185						190	
atg	atc	acg	ctg	acc	tac	ggc	ctc	ggc	gtg	ggc	ctg	gcc	gcg	ctt	gcc
Met	Ile	Thr	Leu	Thr	Tyr	Gly	Leu	Gly	Val	Gly	Leu	Ala	Ala	Leu	Ala
				195				200						205	
ggc	gtg	ctg	tct	gcg	ccg	atc	aac	caa	gtc	cgc	ccg	ctg	atg	ggc	gcc
Gly	Val	Leu	Ser	Ala	Pro	Ile	Asn	Gln	Val	Arg	Pro	Leu	Met	Gly	Ala
				210				215						220	
gac	ctg	atc	atc	gtg	gtg	ttc	gcc	gtg	gtg	gtg	atc	ggc	ggc	atg	ggc
Asp	Leu	Ile	Ile	Val	Val	Phe	Ala	Val	Val	Val	Ile	Gly	Gly	Met	Gly
				230											240
tcg	atc	atg	ggc	tcg	atc	atc	acc	ggc	ttc	gct	ctc	ggc	gtc	gtc	gag
Ser	Ile	Met	Gly	Ser	Ile	Ile	Thr	Gly	Phe	Ala	Leu	Gly	Val	Val	Glu
				245											255
ggc	ttg	acc	aag	tat	ttc	tac	ccc	gag	gcc	tcc	aac	acc	gtg	gtg	ttc
Gly	Leu	Thr	Lys	Tyr	Phe	Tyr	Pro	Glu	Ala	Ser	Asn	Thr	Val	Val	Phe
				260				265						270	
gtg	ctg	atg	gtg	ctg	gtg	ctg	ctt	gtg	aaa	ccc	tcg	ggc	ctg	acc	gga
Val	Leu	Met	Val	Leu	Val	Leu	Leu	Val	Lys	Pro	Ser	Gly	Leu	Thr	Gly
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cgg	gca	acc	tga												
Arg	Ala	Thr													
				290											

<210> 599

<211> 291

<212> PRT

<213> Rhodopseudomonas palustris

<400> 599

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				20					25				30		
Phe	Gly	Met	Leu	Asn	Ile	Ile	Asn	Phe	Ala	His	Gly	Ala	Leu	Tyr	Met
				35				40				45			
Met	Gly	Ala	Phe	Cys	Ala	Tyr	Phe	Leu	Leu	Asn	Leu	Leu	Gly	Leu	Asn
				50				55			60				
Tyr	Trp	Trp	Ala	Leu	Ile	Leu	Ser	Pro	Ile	Ile	Val	Gly	Leu	Phe	Gly
65				70							75				80
Met	Val	Met	Glu	Arg	Thr	Leu	Leu	Gln	Trp	Leu	Ser	Gly	Leu	Asp	His
				85					90					95	
Leu	Tyr	Gly	Leu	Leu	Leu	Thr	Phe	Gly	Val	Ala	Leu	Ile	Ile	Gln	Gly
				100				105						110	
Val	Phe	Gln	Asn	Tyr	Phe	Gly	Ser	Ser	Gly	Leu	Pro	Tyr	Ala	Ile	Pro
				115				120						125	
Glu	Gln	Leu	Arg	Gly	Ala	Ile	Asn	Leu	Gly	Phe	Met	Tyr	Leu	Pro	Val
				130				135						140	

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Tyr Arg Gly Trp Val Val Val Phe Ser Leu Val Val Cys Leu Leu Thr
 145 150 155 160
 Trp Phe Leu Ile Glu Arg Thr Arg Leu Gly Ala Tyr Leu Arg Ala Ala
 165 170 175
 Thr Glu Asn Pro Thr Leu Val Arg Ala Phe Gly Ile Asn Val Pro Arg
 180 185 190
 Met Ile Thr Leu Thr Tyr Gly Leu Gly Val Gly Leu Ala Leu Ala
 195 200 205
 Gly Val Leu Ser Ala Pro Ile Asn Gln Val Arg Pro Leu Met Gly Ala
 210 215 220
 Asp Leu Ile Ile Val Val Phe Ala Val Val Val Ile Gly Gly Met Gly
 225 230 235 240
 Ser Ile Met Gly Ser Ile Ile Thr Gly Phe Ala Leu Gly Val Val Glu
 245 250 255
 Gly Leu Thr Lys Tyr Phe Tyr Pro Glu Ala Ser Asn Thr Val Val Phe
 260 265 270
 Val Leu Met Val Leu Val Leu Leu Val Lys Pro Ser Gly Leu Thr Gly
 275 280 285
 Arg Ala Thr
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<210> 600

<211> 1041

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(1041)

<400> 600

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1 5 10 15	
ggc gcg atc tac gca ctg ctc ggg ctg gcg ctg gtg ctg gtc ttt gcg	96
Gly Ala Ile Tyr Ala Leu Leu Gly Leu Ala Leu Val Leu Val Phe Ala	
20 25 30	
gtc acc cgg gtg atc ctg atc ccc cag ggt gaa ttc atc aca ttc ggc	144
Val Thr Arg Val Ile Leu Ile Pro Gln Gly Glu Phe Ile Thr Phe Gly	
35 40 45	
gct ctc acc tac gcg acg ctg tcg gcc ggc ggc gtg ccg ggc acc gcg	192
Ala Leu Thr Tyr Ala Thr Leu Ser Ala Gly Gly Val Pro Gly Thr Ala	
50 55 60	
cag ctt gcg ctg atg atg ggc ctg gtg gcg ttc ggc ttc gag ctg ttc	240
Gln Leu Ala Leu Met Met Gly Leu Val Ala Phe Gly Phe Glu Leu Phe	
65 70 75 80	
agc gcc cgt aaa tcg ctg cat gtc gcc aaa gtg atg cgc gcg gcg ctg	288
Ser Ala Arg Lys Ser Leu His Val Ala Lys Val Met Arg Ala Ala Leu	
85 90 95	
atc tac atc gcc ttc ccg gcg atc gtg ctg gcg ctg gcg acc tgg ctg	336
Ile Tyr Ile Ala Phe Pro Ala Ile Val Leu Ala Leu Ala Thr Trp Leu	
100 105 110	
ccg gcg cat aaa ccg ggc gtc gcc gtc aac atc gcg ctg tcg ctg ctg	384
Pro Ala His Lys Pro Gly Val Ala Val Asn Ile Ala Leu Ser Leu Leu	
115 120 125	
atc gtc gcc gcg atc ggg ctg ttt ctg tat cgc atc gcc ttc cag ccg	432
Ile Val Ala Ala Ile Gly Leu Phe Leu Tyr Arg Ile Ala Phe Gln Pro	
130 135 140	
ctg gcg cac act tcg gtg ctg gtg ctg ctg atc gcc tcg gtc ggc tgc	480
Leu Ala His Thr Ser Val Leu Val Leu Leu Ile Ala Ser Val Gly Cys	
145 150 155 160	
cac ttg gcg ctg cag ggc ttc ggc ctg gtc ttc ttc ggc gcc gaa ggc	528
His Leu Ala Leu Gln Gly Phe Gly Leu Val Phe Phe Gly Ala Glu Gly	
165 170 175	
ctg cgc ggc cca ccg ctg tcg gac gtg gcg ctc agc gtc gga ccg ttg	576
Leu Arg Gly Pro Pro Leu Ser Asp Val Ala Leu Ser Val Gly Pro Leu	
180 185 190	
cta ttc acc ggc cag agc ctc gcg gtg tac ggc atc acg ctg gcg ctg	624
Leu Phe Thr Gly Gln Ser Leu Ala Val Tyr Gly Ile Thr Leu Ala Leu	

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atg	gcg	195	ctg	tgg	ctg	ttc	200	ggc	tac	acc	cgc	205	ggc	aag	gcg	672
Met	Ala	Ala	Leu	Trp	Leu	Phe	Phe	Gly	Tyr	Thr	Arg	Tyr	Gly	Lys	Ala	
	210					215					220					
ctg	cgc	gcc	acc	gcg	gtc	aac	cgg	ctc	ggc	gcg	cga	ctg	gtc	ggc	atc	720
Leu	Arg	Ala	Thr	Ala	Val	Asn	Arg	Leu	Gly	Ala	Arg	Leu	Val	Gly	Ile	
225					230					235					240	
cgt	acc	tcg	ctc	tcc	ggc	cag	atc	gcg	ttc	ctg	gcc	tcg	gta	atc		768
Arg	Thr	Ser	Leu	Ser	Gly	Gln	Ile	Ala	Phe	Leu	Leu	Ala	Ser	Val	Ile	
				245					250					255		
ggc	gcg	atc	tcc	ggc	atc	ctg	atc	gta	ccg	atc	acc	aca	ctc	tat	tac	816
Gly	Ala	Ile	Ser	Gly	Ile	Leu	Ile	Val	Pro	Ile	Thr	Thr	Leu	Tyr	Tyr	
			260					265					270			
gat	acc	ggc	ttc	ctg	atc	ggc	ctc	aag	ggc	ttc	gtc	gcc	gcg	atc	atc	864
Asp	Thr	Gly	Phe	Leu	Ile	Gly	Leu	Lys	Gly	Phe	Val	Ala	Ala	Ile	Ile	
		275					280					285				
ggc	gga	ctg	gtc	agc	tat	ccg	ctc	acc	gcc	atc	gcc	gcg	atc	gtg	gtc	912
Gly	Gly	Leu	Val	Ser	Tyr	Pro	Leu	Thr	Ala	Ile	Ala	Ala	Ile	Val	Val	
		290				295					300					
ggt	atc	gtc	gag	tcg	ttc	tcc	tcg	ttc	tat	gcc	tcg	aac	tac	aag	gag	960
Gly	Ile	Val	Glu	Ser	Phe	Ser	Ser	Phe	Tyr	Ala	Ser	Asn	Tyr	Lys	Glu	
305					310					315					320	
gtc	atc	gtc	ttc	acg	ctg	atc	ctg	ccg	gtg	ctg	gtg	ctg	cgc	tcg	ctc	1008
Val	Ile	Val	Phe	Thr	Leu	Ile	Leu	Pro	Val	Leu	Val	Leu	Arg	Ser	Leu	
				325					330					335		
gcc	acc	ccc	gcg	gtc	gaa	gaa	gag	aag	gac	taa						1041
Ala	Thr	Pro	Ala	Val	Glu	Glu	Glu	Lys	Asp							
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<210> 601

<211> 346

<212> PRT

<213> Rhodopseudomonas palustris

<400> 601

Met	Asn	Thr	Thr	Ile	Leu	Leu	Phe	Leu	Val	Gln	Asp	Gly	Ile	Thr	Asn	
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			20					25					30			
Val	Thr	Arg	Val	Ile	Leu	Ile	Pro	Gln	Gly	Glu	Phe	Ile	Thr	Phe	Gly	
		35					40					45				
Ala	Leu	Thr	Tyr	Ala	Thr	Leu	Ser	Ala	Gly	Gly	Val	Pro	Gly	Thr	Ala	
		50				55					60					
Gln	Leu	Ala	Leu	Met	Met	Gly	Leu	Val	Ala	Phe	Gly	Phe	Glu	Leu	Phe	
65				70					75					80		
Ser	Ala	Arg	Lys	Ser	Leu	His	Val	Ala	Lys	Val	Met	Arg	Ala	Ala	Leu	
			85						90					95		
Ile	Tyr	Ile	Ala	Phe	Pro	Ala	Ile	Val	Leu	Ala	Leu	Ala	Thr	Trp	Leu	
			100					105					110			
Pro	Ala	His	Lys	Pro	Gly	Val	Ala	Val	Asn	Ile	Ala	Leu	Ser	Leu	Leu	
		115				120						125				
Ile	Val	Ala	Ala	Ile	Gly	Leu	Phe	Leu	Tyr	Arg	Ile	Ala	Phe	Gln	Pro	
	130					135					140					
Leu	Ala	His	Thr	Ser	Val	Leu	Val	Leu	Leu	Ile	Ala	Ser	Val	Gly	Cys	
145					150					155					160	
His	Leu	Ala	Leu	Gln	Gly	Phe	Gly	Leu	Val	Phe	Phe	Gly	Ala	Glu	Gly	
				165					170					175		
Leu	Arg	Gly	Pro	Pro	Leu	Ser	Asp	Val	Ala	Leu	Ser	Val	Gly	Pro	Leu	
			180					185					190			
Leu	Phe	Thr	Gly	Gln	Ser	Leu	Ala	Val	Tyr	Gly	Ile	Thr	Leu	Ala	Leu	
		195					200					205				
Met	Ala	Ala	Leu	Trp	Leu	Phe	Phe	Gly	Tyr	Thr	Arg	Tyr	Gly	Lys	Ala	
	210					215					220					
Leu	Arg	Ala	Thr	Ala	Val	Asn	Arg	Leu	Gly	Ala	Arg	Leu	Val	Gly	Ile	
225					230					235					240	
Arg	Thr	Ser	Leu	Ser	Gly	Gln	Ile	Ala	Phe	Leu	Leu	Ala	Ser	Val	Ile	
				245					250					255		
Gly	Ala	Ile	Ser	Gly	Ile	Leu	Ile	Val	Pro	Ile	Thr	Thr	Leu	Tyr	Tyr	
			260					265					270			

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Asp Thr Gly Phe Leu Ile Gly Leu Lys Gly Phe Val Ala Ala Ile Ile
 275 280
 Gly Gly Leu Val Ser Tyr Pro Thr Ala Ile Ala Ile Val Val
 290 295 300
 Gly Ile Val Glu Ser Phe Ser Ser Phe Tyr Ala Ser Asn Tyr Lys Glu
 305 310 315 320
 Val Ile Val Phe Thr Leu Ile Leu Pro Val Leu Val Leu Arg Ser Leu
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 Ala Thr Pro Ala Val Glu Glu Glu Lys Asp
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<210> 602

<211> 1773

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(1773)

<400> 602

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ctg ccg ctg att ccg ggc att ccg ccg ttc tgg atc gtg ctg ctc gac	96
Leu Pro Leu Ile Pro Gly Ile Pro Pro Phe Trp Ile Val Leu Leu Asp	
aat atc ggc ctc gcc gcg ctg gtg gcg atg ggc ctg gtg ctg ctc acc	144
Asn Ile Gly 35 Leu Ala Ala Leu Val 40 Ala Met Gly Leu 45 Val Leu Leu Thr	
ggc gtc ggc ggg ctc acc tcg ttc ggt cag gcc gcg ttc tgc ggc ttc	192
Gly Val Gly Gly Leu Thr Ser 55 Phe Gly Gln Ala Ala Phe Cys Gly Phe	
ggc gcc tac acc acc gcc tac atc acc acc gtc tac ggc atc tcg ccg	240
Gly Ala Tyr Thr Thr 70 Tyr Ile Thr Thr Val Tyr Gly Ile Ser Pro	
tgg ctg gcg ctg ccg gcc tcg ctg gtg gtc gcc ggc atc gcc gca gtg	288
Trp Leu Ala Leu Pro 85 Ala Ser Leu Val 90 Val Ala Gly Ile Ala Ala Val	
ctg ctc ggg ctg atg acg gtc cgg ctc tca ggc cat tat ctg ccg ctc	336
Leu Leu Gly Leu 100 Met Thr Val Arg 105 Ser Gly His Tyr 110 Leu Pro Leu	
ggc acc atc gcc tgg ggc atc gcg ctt tac tac ctg ttc agc aag ctc	384
Gly Thr Ile Ala Trp Gly Ile Ala Leu Tyr Tyr Leu Phe Ser Lys Leu	
gac ttc ctc ggc cgc aac gac ggc atc tcg ccg gtg ccg ctg tcg	432
Asp Phe 130 Leu Gly Arg Asn 135 Asp Gly Ile Ser Arg Val 140 Pro Pro Leu Ser	
atc ggc ccg atc gac atg tac gat ccg cat acg atc tat ttc gtg atc	480
Ile Gly Pro Ile Asp Met 150 Tyr Asp Pro His Thr 155 Ile Tyr Phe Val Ile	
tgg gcg atg gta ctg atc agc gcg gtg ctg acg atg aac ctg ctc gac	528
Trp Ala Met Val Leu 165 Ile Ser Ala Val 170 Leu Thr Met Asn Leu Leu Asp	
agc cgc acc ggc cgc gcg atc cgc gcg cta cgc cgt ggc cat gtc gct	576
Ser Arg Thr Gly 180 Arg Ala Ile Arg Ala 185 Leu Arg Arg Gly His Val Ala	
gcc gaa gca ttc ggg gtg cag acc gcg cgc gcc aag ctt ctg gtg ttc	624
Ala Glu Ala Phe Gly Val Gln Thr 200 Ala Arg Ala Lys Leu Leu Val Phe	
atc tac gcc gcg gtg ctc gcc ggc ctt tcc ggc tgg ctg tac gcg cat	672
Ile Tyr Ala Ala Val Leu Ala 215 Gly Leu Ser Gly Trp 220 Leu Tyr Ala His	
ttc cag cgc aac gtg aac ccg acg ccg ttc ggg ccc cag gcc ggc atc	720
Phe Gln Arg Asn Val 230 Asn Pro Thr Phe Gly 235 Pro Gln Ala Gly Ile	
gag tat ctg ttc atc gcc gtg gtc ggc ggc gcc ggc tat gtc tgg ggc	768
Glu Tyr Leu Phe 245 Ala Val Val Gly 250 Ala Gly Tyr Val Trp 255 Gly	

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ggc Gly	gtg Val	ctt Leu	ggc Gly 260	gcc Ala	gcg Ala	atc Ile	gtc Val	atc Ile 265	atc Ile	ctg Leu	aag Lys	gaa Glu	gtg Val 270	ctg Leu	cag Gln	816
ggc Gly	tat Tyr	ctg Leu 275	ccg Pro	ctg Leu	ctg Leu	ttc Phe	ggc Gly 280	ggc Gly	cag Gln	ggc Gly	cag Gln	ctc Leu 285	gag Glu	atc Ile	atc Ile	864
gtg Val	ttc Phe 290	ggc Gly	atc Ile	ctc Leu	ttg Leu	gtg Val 295	gtg Val	ctg Leu	ctg Leu	cag Gln	ctc Leu 300	ggc Ala	ccc Pro	ggc Gly	ggc Gly	912
gtc Val 305	tgg Trp	ccc Pro	tgg Trp	ctc Leu	gcc Ala 310	aat Asn	ctg Leu	gtg Val	ccg Pro	ctg Leu 315	aaa Lys	ttc Phe	cgg Arg	cgt Arg	gcc Ala 320	960
gtc Val	acc Thr	ggc Gly	aat Asn	gcc Ala 325	gac Asp	ggc Gly	ctg Leu	ccc Pro	gcg Ala 330	cgc Arg	gag Glu	cgc Arg	gtc Val	ggc Gly 335	ggc Gly	1008
tcc Ser	acc Thr	acc Thr	gcc Ala 340	ccg Pro	ctg Leu	ctg Leu	aag Lys	gtc Val 345	gaa Glu	cgc Arg	gcg Ala	cga Arg	aag Lys 350	cag Gln	ttc Phe	1056
ggc Gly	ggc Gly	gtg Val 355	gtt Val	gcg Ala	gtc Val	aac Asn	gac Asp 360	gtg Val	tcg Ser	ttc Phe	gag Glu	gtc Val 365	aac Asn	gcc Ala	gcg Ala	1104
gag Glu	atc Ile 370	gtc Val	gcg Ala	ctg Leu	atc Ile	ggc Gly 375	ccg Pro	aac Asn	ggc Gly	gcc Ala	ggc Gly 380	aaa Lys	tcg Ser	acc Thr	acc Thr	1152
ttc Phe 385	aac Asn	ctg Leu	atc Ile	acc Thr	ggc Gly 390	atc Ile	ctc Leu	acc Thr	act Thr	acc Thr	ggc Gly 395	ggg Gly	cgg Arg	atc Ile	gaa Glu 400	1200
gtg Val	cac His	ggc Gly	aag Lys	ccg Pro 405	gtc Val	gac Asp	aac Asn	acg Thr	ccg Pro 410	ccg Pro	cag Gln	gag Glu	gtg Val 415	gtg Val	aag Lys	1248
ctc Leu	ggc Gly	atc Ile	gcc Ala 420	gcg Arg	acc Thr	ttc Phe	cag Gln	cac His 425	gtc Val	aag Lys	ctg Leu	gtg Val 430	ccg Pro	gac Asp	atg Met	1296
acc Thr	gtc Val	ctg Leu 435	gag Glu	aat Asn	gtc Val	gcg Ala	atc Ile 440	gga Gly	gcg Ala	cac His	ttg Leu	cgc Arg 445	ggc Gly	cgc Arg	tcc Ser	1344
ggg Gly	gcg Ala 450	atc Ile	acc Thr	agt Ser	atg Met	ctg Leu 455	cgg Arg	ttc Phe	gat Asp	cgc Arg	ggc Gly 460	gac Asp	gag Glu	gcc Ala	aag Lys	1392
ctg Leu 465	ctc Leu	gcc Ala	gaa Glu	gcc Ala	gca Ala 470	gcg Arg	cag Gln	atc Ile	gag Glu	cgc Arg 475	gtc Val	ggg Gly	ctc Leu	ggc Gly	gcc Ala 480	1440
gag Glu	atc Ile	gat Asp	cag Gln	ctc Leu 485	gcg Ala	ggg Gly	tcg Ser	ctc Leu	tcg Ser 490	ctc Leu	ggc Gly	cag Gln	cag Gln	cgc Arg 495	atc Ile	1488
gtc Val	gaa Glu	att Ile	gcg Ala 500	cgg Arg	gcg Ala	ctg Leu	tgt Cys	gcc Ala 505	gat Asp	ccc Pro	gaa Glu	ctg Leu	ctt Leu 510	ctg Leu	ctc Leu	1536
gac Asp	gag Glu	cca Pro 515	gcc Ala	gcc Ala	ggc Gly	ctg Leu	cgc Arg 520	cac His	atg Met	gaa Glu	aag Lys	cag Gln 525	cgg Arg	ctc Leu	gct Ala	1584
gcg Ala 530	ctg Leu	ctg Leu	cgg Arg	cag Gln	ctc Leu	aag Lys 535	gac Asp	agc Ser	ggc Gly	atg Met	tcg Ser 540	cta Val	ctg Leu	gtc Val	gtc Val	1632
gaa Glu 545	cac His	gac Asp	atg Met	ggc Gly	ttt Phe 550	gtg Val	atg Met	gac Asp	ctc Leu	gcc Ala 555	gac Asp	cgc Arg	atc Ile	gtc Val	gtg Val 560	1680
ctc Leu	gac Asp	ttc Phe	ggc Gly	acc Thr 565	agg Arg	atc Ile	gcc Ala	gaa Glu	ggc Gly 570	acc Thr	ccc Pro	gac Asp	gct Ala	atc Ile 575	aag Lys	1728
acc Thr	aat Asn	ccg Pro	gac Asp 580	gtg Val	atc Ile	aag Lys	gcc Ala	tat Tyr 585	ctc Leu	gga Gly	gcg Ala	ctg Leu	gca Ala 590	tga		1773

<210> 603

<211> 590

<212> PRT

<213> Rhodopseudomonas palustris

<400> 603

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      20      25      30
Asn Ile Gly Leu Ala Ala Leu Val Ala Met Gly Leu Val Leu Leu Thr
      35      40      45
Gly Val Gly Gly Leu Thr Ser Phe Gly Gln Ala Ala Phe Cys Gly Phe
      50      55      60
Gly Ala Tyr Thr Thr Ala Tyr Ile Thr Thr Val Tyr Gly Ile Ser Pro
65      70      75      80
Trp Leu Ala Leu Pro Ala Ser Leu Val Val Ala Gly Ile Ala Ala Val
      85      90      95
Leu Leu Gly Leu Met Thr Val Arg Leu Ser Gly His Tyr Leu Pro Leu
      100      105      110
Gly Thr Ile Ala Trp Gly Ile Ala Leu Tyr Tyr Leu Phe Ser Lys Leu
      115      120      125
Asp Phe Leu Gly Arg Asn Asp Gly Ile Ser Arg Val Pro Pro Leu Ser
130      135      140
Ile Gly Pro Ile Asp Met Tyr Asp Pro His Thr Ile Tyr Phe Val Ile
145      150      155      160
Trp Ala Met Val Leu Ile Ser Ala Val Leu Thr Met Asn Leu Leu Asp
      165      170      175
Ser Arg Thr Gly Arg Ala Ile Arg Ala Leu Arg Arg Gly His Val Ala
      180      185      190
Ala Glu Ala Phe Gly Val Gln Thr Ala Arg Ala Lys Leu Leu Val Phe
      195      200      205
Ile Tyr Ala Ala Val Leu Ala Gly Leu Ser Gly Trp Leu Tyr Ala His
210      215      220
Phe Gln Arg Asn Val Asn Pro Thr Pro Phe Gly Pro Gln Ala Gly Ile
225      230      235      240
Glu Tyr Leu Phe Ile Ala Val Val Gly Gly Ala Gly Tyr Val Trp Gly
      245      250      255
Gly Val Leu Gly Ala Ala Ile Val Ile Ile Leu Lys Glu Val Leu Gln
      260      265      270
Gly Tyr Leu Pro Leu Leu Phe Gly Gly Gln Gly Gln Leu Glu Ile Ile
      275      280      285
Val Phe Gly Ile Leu Leu Val Val Leu Leu Gln Leu Ala Pro Gly Gly
290      295      300
Val Trp Pro Trp Leu Ala Asn Leu Val Pro Leu Lys Phe Arg Arg Ala
305      310      315      320
Val Thr Gly Asn Ala Asp Gly Leu Pro Ala Arg Glu Arg Val Gly Gly
      325      330      335
Ser Thr Thr Ala Pro Leu Leu Lys Val Glu Arg Ala Arg Lys Gln Phe
      340      345      350
Gly Gly Val Val Ala Val Asn Asp Val Ser Phe Glu Val Asn Ala Ala
355      360      365
Glu Ile Val Ala Leu Ile Gly Pro Asn Gly Ala Gly Lys Ser Thr Thr
370      375      380
Phe Asn Leu Ile Thr Gly Ile Leu Thr Thr Thr Gly Gly Arg Ile Glu
385      390      395      400
Val His Gly Lys Pro Val Asp Asn Thr Pro Pro Gln Glu Val Val Lys
      405      410      415
Leu Gly Ile Ala Arg Thr Phe Gln His Val Lys Leu Val Pro Asp Met
      420      425      430
Thr Val Leu Glu Asn Val Ala Ile Gly Ala His Leu Arg Gly Arg Ser
      435      440      445
Gly Ala Ile Thr Ser Met Leu Arg Phe Asp Arg Gly Asp Glu Ala Lys
450      455      460
Leu Leu Ala Glu Ala Ala Arg Gln Ile Glu Arg Val Gly Leu Gly Ala
465      470      475      480
Glu Ile Asp Gln Leu Ala Gly Ser Leu Ser Leu Gly Gln Gln Arg Ile
      485      490      495
Val Glu Ile Ala Arg Ala Leu Cys Ala Asp Pro Glu Leu Leu Leu Leu
500      505      510
Asp Glu Pro Ala Ala Gly Leu Arg His Met Glu Lys Gln Arg Leu Ala
515      520      525
Ala Leu Leu Arg Gln Leu Lys Asp Ser Gly Met Ser Val Leu Leu Val
530      535      540

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Glu His Asp Met Gly Phe Val Met Asp Leu Ala Asp Arg Ile Val Val
 545 550 555 565 570 575 580 585 590
 Leu Asp Phe Gly Thr Arg Ile Ala Glu Gly Thr Pro Asp Ala Ile Lys
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<210> 604

<211> 834

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(834)

<400> 604

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1 5 10 15	
ggc ctg atg gat gtc acc aac ttc gcc cac ggc gaa ttc ctg atg ttg	96
Gly Leu Met Asp Val Thr Asn Phe Ala His Gly Glu Phe Leu Met Leu	
20 25 30	
gcg atg tac atc acc ttc ttc ctg ttc gcg ttc ttc gcg atc gat ccg	144
Ala Met Tyr Ile Thr Phe Phe Leu Phe Ala Phe Phe Ala Ile Asp Pro	
35 40 45	
atc ctc gcc gct ccg ctc gtc ggg gcg gcg atg ttc gtg ttc ggc gcg	192
Ile Leu Ala Ala Pro Leu Val Gly Ala Ala Met Phe Val Phe Gly Ala	
50 55 60	
gtg att tac cta ttg gtc gtc cga ttt gcg atg aga gcc aga gcc aat	240
Val Ile Tyr Leu Leu Val Val Arg Phe Ala Met Arg Ala Arg Ala Asn	
65 70 75 80	
atc ggc atg gtg cag atc ttc acg acc ttc ggc ctc gca atc ctg atg	288
Ile Gly Met Val Gln Ile Phe Thr Thr Phe Gly Leu Ala Ile Leu Met	
85 90 95	
cgc ggc ttg gcg cag tac ttc ttc acc ccc gac tat cgc agc atc aac	336
Arg Gly Leu Ala Gln Tyr Phe Phe Thr Pro Asp Tyr Arg Ser Ile Asn	
100 105 110	
gtc tcc tgg ctg ggc ggc aag acg ctg gag atc ggc ggc gtg ttc ctg	384
Val Ser Trp Leu Gly Gly Lys Thr Leu Glu Ile Gly Gly Val Phe Leu	
115 120 125	
ccc gtg ccg caa ctg gtt ggc gcg ctg gtg tcg atc gcc gcg ttc ggc	432
Pro Val Pro Gln Leu Val Gly Ala Leu Val Ser Ile Ala Ala Phe Gly	
130 135 140	
gcg ttg tac ttc ttc atg aag aag acc gat ttc ggc cgt gcg ctc gaa	480
Ala Leu Tyr Phe Phe Met Lys Lys Thr Asp Phe Gly Arg Ala Leu Glu	
145 150 155 160	
gcg acc cgc gag gac gca ggc gcg gtg gcc ctg gtc ggc atc gac aag	528
Ala Thr Arg Glu Asp Ala Gly Ala Val Ala Leu Val Gly Ile Asp Lys	
165 170 175	
aac aag gtg ttc gcg ctg ggt tgg ggc ctt ggc tcg gca ttg atc ggt	576
Asn Lys Val Phe Ala Leu Gly Trp Gly Leu Gly Ser Ala Leu Ile Gly	
180 185 190	
ctg gcg ggc gcc gtg atg gcg atc ttc ttc tat atc tat ccc gat gtc	624
Leu Ala Gly Ala Val Met Ala Ile Phe Phe Tyr Ile Tyr Pro Asp Val	
195 200 205	
ggc gcc tcg ttc gcg ctg atc gcc tac gtc acc gtg gcg ctc ggc ggc	672
Gly Ala Ser Phe Ala Leu Ile Ala Tyr Val Thr Val Ala Leu Gly Gly	
210 215 220	
ttt ggc agc gtg ttc ggc gcc ttc gcc ggt ggc atc atc gtc ggc ctg	720
Phe Gly Ser Val Phe Gly Ala Phe Ala Gly Gly Ile Ile Val Gly Leu	
225 230 235 240	
gtc gag gcg acc acc gcg atg atc ctg ccg ccg tcg ctg aag tcg atc	768
Val Glu Ala Thr Thr Ala Met Ile Leu Pro Pro Ser Leu Lys Ser Ile	
245 250 255	
ggc atc tac gcc gtt tat ctg ctg gtt gtg ttc att cgg ccg cgt ggc	816
Gly Ile Tyr Ala Val Tyr Leu Leu Val Val Phe Ile Arg Pro Arg Gly	
260 265 270	
ctg ttc gga tcg atc tga	834

Leu Phe Gly Ser Ile
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<210> 605

<211> 277

<212> PRT

<213> Rhodopseudomonas palustris

<400> 605

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Gly Leu Met Asp Val Thr Asn Phe Ala His Gly Glu Phe Leu Met Leu
20 25 30
Ala Met Tyr Ile Thr Phe Phe Leu Phe Ala Phe Phe Ala Ile Asp Pro
35 40 45
Ile Leu Ala Ala Pro Leu Val Gly Ala Ala Met Phe Val Phe Gly Ala
50 55 60
Val Ile Tyr Leu Leu Val Val Arg Phe Ala Met Arg Ala Arg Ala Asn
65 70 75 80
Ile Gly Met Val Gln Ile Phe Thr Thr Phe Gly Leu Ala Ile Leu Met
85 90 95
Arg Gly Leu Ala Gln Tyr Phe Phe Thr Pro Asp Tyr Arg Ser Ile Asn
100 105 110
Val Ser Trp Leu Gly Gly Lys Thr Leu Glu Ile Gly Gly Val Phe Leu
115 120 125
Pro Val Pro Gln Leu Val Gly Ala Leu Val Ser Ile Ala Ala Phe Gly
130 135 140
Ala Leu Tyr Phe Phe Met Lys Lys Thr Asp Phe Gly Arg Ala Leu Glu
145 150 155 160
Ala Thr Arg Glu Asp Ala Gly Ala Val Ala Leu Val Gly Ile Asp Lys
165 170 175
Asn Lys Val Phe Ala Leu Gly Trp Gly Leu Gly Ser Ala Leu Ile Gly
180 185 190
Leu Ala Gly Ala Val Met Ala Ile Phe Phe Tyr Ile Tyr Pro Asp Val
195 200 205
Gly Ala Ser Phe Ala Leu Ile Ala Tyr Val Thr Val Ala Leu Gly Gly
210 215 220
Phe Gly Ser Val Phe Gly Ala Phe Ala Gly Gly Ile Ile Val Gly Leu
225 230 235 240
Val Glu Ala Thr Thr Ala Met Ile Leu Pro Ser Leu Lys Ser Ile
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260 265 270
Leu Phe Gly Ser Ile
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<210> 606

<211> 876

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(876)

<400> 606

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1 5 10 15	
tat gcg ctg ggc gcg acc ggg ttc acg ttg atc ttc ggc gtc tcc ggc	96
Tyr Ala Leu Gly Ala Thr Gly Phe Thr Leu Ile Phe Gly Val Ser Gly	
20 25 30	
gtg ctc aac ctg tca cac ggc gcc atc atg gtc gcc gcc gcg gtc gcg	144
Val Leu Asn Leu Ser His Gly Ala Ile Met Val Ala Ala Val Ala	
35 40 45	
gcc tgg gcg gca tcg agc acg ttc ggc atc ggc agc tac gcc ggc gcg	192
Ala Trp Ala Ala Ser Ser Thr Phe Gly Ile Gly Ser Tyr Ala Gly Ala	
50 55 60	
ctg atc ggc atc gcc acc gcc ctg gtg atc gca ttg ctg acc tat ttt	240

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Leu 65	Ile	Gly	Ile	Ala	Thr 70	Ala	Leu	Val	Ile	Ala 75	Leu	Leu	Thr	Tyr	Phe 80	
gcg	gtg	gtg	cag	ccg	atc	cag	cgg	tca	cgg	cgg	atc	gcc	aat	gag	gag	288
Ala	Val	Val	Gln	Pro 85	Ile	Gln	Arg	Ser	Arg	Arg	Ile	Ala	Asn	Glu	Glu	
aag	gag	atc	ttc	gtc	ctc	acc	ggc	acc	ctg	ctc	tgg	ggc	atc	atg	atc	336
Lys	Glu	Ile	Phe 100	Val	Leu	Thr	Gly	Thr 105	Leu	Leu	Trp	Gly	Ile 110	Met	Ile	
cag	gag	gcg	atc	gct	tac	ttt	ttc	acc	aac	aac	gcc	aag	acg	gtg	ttg	384
Gln	Glu	Ala	Ile	Ala	Tyr	Phe	Phe 120	Thr	Asn	Asn	Ala	Lys 125	Thr	Val	Leu	
ccg	atc	gtc	acc	ggc	gtg	gtc	gaa	att	ctc	ggc	gtc	cgc	acc	ccg	cgc	432
Pro	Ile	Val	Thr	Gly	Val 135	Val	Glu	Ile	Leu	Gly	Val 140	Arg	Thr	Pro	Arg	
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Asn	Glu	Ile	Phe	Thr	Ala 150	Leu	Val	Cys	Cys	Leu	Val 155	Ile	Ala	Leu	Leu	
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Trp	Leu	Leu	Val	Asn 165	Arg	Thr	Lys	Ile	Gly	Lys	Ala	Val	Leu	Gly	Ala	
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Ser	Met	Asn	Pro 180	Arg	Gly	Val	Thr	Leu 185	Leu	Gly	Leu	Glu	Leu	Thr	Asn	
atc	tac	gtc	gtc	gtc	tgg	atc	atc	tac	ggc	gtg	ctc	gcc	ggg	atc	gcc	624
Ile	Tyr	Val 195	Val	Val	Trp	Ile	Ile 200	Tyr	Gly	Val	Leu	Ala 205	Gly	Ile	Ala	
ggg	gtg	ctg	ctc	ggc	atg	ttc	ctg	ggc	gtg	tgc	tcc	tac	agc	gtc	ggg	672
Gly	Val 210	Leu	Leu	Gly	Met	Phe 215	Leu	Gly	Val	Ser	Ser 220	Tyr	Ser	Val	Gly	
ccg	ctg	acc	g	agc	gca	ttc	tcg	atc	gtg	gtg	ctc	ggc	ggg	ctc	ggc	720
Pro	Leu	Thr	Ala	Ser	Ala 230	Phe	Ser	Ile	Val	Val 235	Leu	Gly	Gly	Leu	Gly	
225	agc	gtc	tcc	ggc	tcg	ctg	atc	gcc	gcc	ttc	gtg	gtc	ggc	tat	ctg	768
Ser	Val	Ser	Gly	Ser 245	Leu	Ile	Ala	Ala	Phe	Val 250	Val	Val	Gly	Tyr	Leu	
acc	ttc	acc	gct	tac	atg	atc	tcg	ccg	gcc	tat	cga	tcg	atc	ccg	g	816
Thr	Phe	Thr	Ala 260	Tyr	Met	Ile	Ser	Pro 265	Ala	Tyr	Arg	Ser	Ile 270	Pro	Ala	
ctg	ctg	ctg	ttg	gtc	acg	gtg	atg	tat	ctg	cg	cct	cag	ggc	ctg	ctc	864
Leu	Leu	Leu	Leu	Val	Thr	Val	Met 280	Tyr	Leu	Arg	Pro	Gln 285	Gly	Leu	Leu	
ggg	agg	cg	tga													876
Gly	Arg	Arg														
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<210> 607

<211> 291

<212> PRT

<213> Rhodopseudomonas palustris

<400> 607

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				20				25					30			
Val	Leu	Asn	Leu	Ser	His	Gly	Ala	Ile	Met	Val	Ala	Ala	Ala	Val	Ala	
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Ala	Trp	Ala	Ala	Ser	Ser	Thr	Phe	Gly	Ile	Gly	Ser	Tyr	Ala	Gly	Ala	
	50					55					60					
Leu	Ile	Gly	Ile	Ala	Thr	Ala	Leu	Val	Ile	Ala	Leu	Leu	Thr	Tyr	Phe	
65					70					75					80	
Ala	Val	Val	Gln	Pro	Ile	Gln	Arg	Ser	Arg	Arg	Ile	Ala	Asn	Glu	Glu	
				85					90					95		
Lys	Glu	Ile	Phe	Val	Leu	Thr	Gly	Thr	Leu	Leu	Trp	Gly	Ile	Met	Ile	
			100					105					110			
Gln	Glu	Ala	Ile	Ala	Tyr	Phe	Phe	Thr	Asn	Asn	Ala	Lys	Thr	Val	Leu	
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	130					135					140					

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Asn Glu Ile Phe Thr Ala Leu Val Cys Cys Leu Val Ile Ala Leu Leu
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 165 170 175
 Ser Met Asn Pro Arg Gly Val Thr Leu Leu Gly Leu Glu Leu Thr Asn
 180 185 190
 Ile Tyr Val Val Val Trp Ile Ile Tyr Gly Val Leu Ala Gly Ile Ala
 195 200 205
 Gly Val Leu Leu Gly Met Phe Leu Gly Val Ser Ser Tyr Ser Val Gly
 210 215 220
 Pro Leu Thr Ala Ser Ala Phe Ser Ile Val Val Leu Gly Gly Leu Gly
 225 230 235 240
 Ser Val Ser Gly Ser Leu Ile Ala Ala Phe Val Val Gly Tyr Leu Glu
 245 250 255
 Thr Phe Thr Ala Tyr Met Ile Ser Pro Ala Tyr Arg Ser Ile Pro Ala
 260 265 270
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 Gly Arg Arg
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<210> 608

<211> 876

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(876)

<400> 608

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Leu Gly Ser Leu Leu Ala Leu Val Ser Ser Gly Leu Thr Ile Ile Leu	
20 25 30	
ggc acg ctc ggc gtg ctc aat ttt gcc cac ggc gcg ctg ttc gcc gtg	144
Gly Thr Leu Gly Val Leu Asn Phe Ala His Gly Ala Leu Phe Ala Val	
35 40 45	
ggc gcc tac acc gtc ttc gtg atg ctg cag tac acc tcg tcc ttc gtg	192
Gly Ala Tyr Thr Val Phe Val Met Leu Gln Tyr Thr Ser Ser Phe Val	
50 55 60	
ctg gcg gtc gtc gtc ggc tgc ggc ttc atg ctg gtg ctc ggc ttc gtg	240
Leu Ala Val Val Val Gly Cys Gly Phe Met Leu Val Leu Gly Phe Val	
65 70 75 80	
ctc gag cgc gtc att atc cgt tac ttt tac gac cga ccg cac gaa gac	288
Leu Glu Arg Val Ile Ile Arg Tyr Phe Tyr Asp Arg Pro His Glu Asp	
85 90 95	
cag atc ctc gtg acg tac ggc atc ggc atc gtg ctc gtc gag tgc atc	336
Gln Ile Leu Val Thr Tyr Gly Ile Gly Ile Val Leu Val Gln Cys Ile	
100 105 110	
cga gcc gga ttc gga ggc aac gcc cag cgg gtg ccc gtg ccg tcc tgg	384
Arg Ala Gly Phe Gly Gly Asn Ala Gln Arg Val Pro Val Pro Ser Trp	
115 120 125	
ggg cag ggc gcc acg cag ctc ggc ttc ctg atc tat cca acc tat cgg	432
Gly Gln Gly Ala Thr Gln Gly Phe Leu Ile Tyr Pro Thr Tyr Arg	
130 135 140	
ttg caa ctg atc gcg atc atc gcc ggg ttg ctg ctc gcc ctc tat ctg	480
Leu Gln Leu Ile Ala Ile Ile Ala Gly Leu Leu Leu Ala Leu Tyr Leu	
145 150 155 160	
gtg ttg tac cgt acc tca atg ggc ctg gtg gtc cgc gcc ggg atc gaa	528
Val Leu Tyr Arg Thr Ser Met Gly Leu Val Val Arg Ala Gly Ile Glu	
165 170 175	
aat ccg ggt atg gtc gga att cta ggc atc aat gtc cgc cgt gcc ttc	576
Asn Pro Gly Met Val Gly Ile Leu Gly Ile Asn Val Arg Arg Ala Phe	
180 185 190	
ctt ctg gtg ttc gcg atc ggc atc gtc gcc gtc ggc ctc gca gga atg	624
Leu Leu Val Phe Ala Ile Gly Ile Val Ala Val Gly Leu Ala Gly Met	

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Leu	Tyr	210	Ala	Pro	Val	Val	Ala	215	Val	Ser	Pro	Asp	Met	220	Gly	Ala	Asn	Phe		
atg	gcc	caa	tcc	ttc	gtg	ggt	atc	gtg	ctc	ggg	ggg	ctc	ggc	tcg	ttc					720
Met	Ala	Gln	Ser	Phe	Val	Val	Ile	Val	Leu	Gly	Gly	Leu	Gly	Ser	Phe					
225					230					235					240					
ccc	ggc	gcc	atc	gtc	ggc	ggc	ctg	atc	gcg	ggc	gag	atc	atc	agt	ctc					768
Pro	Gly	Ala	Ile	Val	Gly	Gly	Leu	Ile	Ala	Gly	Glu	Ile	Ile	Ser	Leu					
				245					250					255						
acg	agt	gcg	ttc	aac	tcg	tcg	tat	tcg	gaa	gtc	atg	ctc	tac	gca	ctt					816
Thr	Ser	Ala	Phe	Asn	Ser	Ser	Tyr	Ser	Glu	Val	Met	Leu	Tyr	Ala	Leu					
			260					265					270							
atg	gcg	ctg	ttg	ctc	gtg	atg	cgt	ccg	cag	ggg	ctg	ttc	ggg	acg	gaa					864
Met	Ala	Leu	Leu	Leu	Val	Met	Arg	Pro	Gln	Gly	Leu	Phe	Gly	Thr	Glu					
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ggc	cg	gca	tga																	876
Gly	Arg	Ala																		
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<210> 609

<211> 291

<212> PRT

<213> Rhodopseudomonas palustris

<400> 609

Met	Pro	Ser	Leu	Pro	Val	Leu	Ile	Ser	Gln	Ala	Phe	Asn	Gly	Leu	Ala					
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			20				25					30								
Gly	Thr	Leu	Gly	Val	Leu	Asn	Phe	Ala	His	Gly	Ala	Leu	Phe	Ala	Val					
		35				40						45								
Gly	Ala	Tyr	Thr	Val	Phe	Val	Met	Leu	Gln	Tyr	Thr	Ser	Ser	Phe	Val					
	50					55					60									
Leu	Ala	Val	Val	Val	Gly	Cys	Gly	Phe	Met	Leu	Val	Leu	Gly	Phe	Val					
65					70					75										
Leu	Glu	Arg	Val	Ile	Ile	Arg	Tyr	Phe	Tyr	Asp	Arg	Pro	His	Glu	Asp					
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Gln	Ile	Leu	Val	Thr	Tyr	Gly	Ile	Gly	Ile	Val	Leu	Val	Glu	Cys	Ile					
		100						105					110							
Arg	Ala	Gly	Phe	Gly	Gly	Asn	Ala	Gln	Arg	Val	Pro	Val	Pro	Ser	Trp					
		115				120						125								
Gly	Gln	Gly	Ala	Thr	Gln	Leu	Gly	Phe	Leu	Ile	Tyr	Pro	Thr	Tyr	Arg					
	130				135						140									
Leu	Gln	Leu	Ile	Ala	Ile	Ile	Ala	Gly	Leu	Leu	Ala	Leu	Tyr	Leu						
145					150					155										
Val	Leu	Tyr	Arg	Thr	Ser	Met	Gly	Leu	Val	Val	Arg	Ala	Gly	Ile	Glu					
			165					170						175						
Asn	Pro	Gly	Met	Val	Gly	Ile	Leu	Gly	Ile	Asn	Val	Arg	Arg	Ala	Phe					
		180						185					190							
Leu	Leu	Val	Phe	Ala	Ile	Gly	Ile	Val	Ala	Val	Gly	Leu	Ala	Gly	Met					
		195					200					205								
Leu	Tyr	Ala	Pro	Val	Val	Ala	Val	Ser	Pro	Asp	Met	Gly	Ala	Asn	Phe					
	210					215					220									
Met	Ala	Gln	Ser	Phe	Val	Val	Ile	Val	Leu	Gly	Gly	Leu	Gly	Ser	Phe					
225					230					235					240					
Pro	Gly	Ala	Ile	Val	Gly	Gly	Leu	Ile	Ala	Gly	Glu	Ile	Ile	Ser	Leu					
				245					250					255						
Thr	Ser	Ala	Phe	Asn	Ser	Ser	Tyr	Ser	Glu	Val	Met	Leu	Tyr	Ala	Leu					
			260					265					270							
Met	Ala	Leu	Leu	Leu	Val	Met	Arg	Pro	Gln	Gly	Leu	Phe	Gly	Thr	Glu					
		275					280					285								
Gly	Arg	Ala																		
	290																			

<210> 610

<211> 864

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(864)

<400> 610

atg	agc	gaa	ttc	tgg	cag	gcc	ttg	gcg	caa	ggc	gtc	ctg	atc	gga	agc	48
Met	Ser	Glu	Phe	Trp	Gln	Ala	Leu	Ala	Gln	Gly	Val	Leu	Ile	Gly	Ser	
1				5				10					15			
acc	tac	ggg	ctg	ctc	gcg	ctg	ggc	atg	ggc	ctg	gtg	tac	ggc	gtg	tcc	96
Thr	Tyr	Gly	Leu	Leu	Ala	Leu	Gly	Met	Gly	Leu	Val	Tyr	Gly	Val	Ser	
		20					25					30				
ggc	atc	gtc	aac	ttc	gcc	cat	ggc	gat	ttc	atc	tca	ctg	gcg	atg	ttc	144
Gly	Ile	Val	Asn	Phe	Ala	His	Gly	Asp	Phe	Ile	Ser	Leu	Ala	Met	Phe	
		35					40					45				
atg	gcg	ctg	gcg	ctg	ttc	tcg	gca	ttc	gcg	ctg	gat	cct	tac	gtc	tcg	192
Met	Ala	Leu	Ala	Leu	Phe	Ser	Ala	Phe	Ala	Leu	Asp	Pro	Tyr	Val	Ser	
	50					55					60					
gcg	ctg	att	acc	atc	ccg	gtg	atg	gcg	ctc	atc	ggc	gga	ctg	gtc	tat	240
Ala	Leu	Ile	Thr	Ile	Pro	Val	Met	Ala	Leu	Ile	Gly	Gly	Leu	Val	Tyr	
	65				70					75					80	
cgc	tat	ctg	tta	cgg	ccg	atg	gcc	ggg	cac	cag	ttc	ttg	atg	atc	gta	288
Arg	Tyr	Leu	Leu	Arg	Pro	Met	Ala	Gly	His	Gln	Phe	Leu	Met	Ile	Val	
				85				90						95		
cag	ctc	acc	ctc	ggt	ctc	agc	ctc	gtg	cag	aac	ggc	atc	ctg	atg		336
Gln	Leu	Thr	Leu	Gly	Leu	Ser	Leu	Val	Leu	Gln	Asn	Gly	Ile	Leu	Met	
			100					105				110				
gtt	ttc	ggc	ggc	cag	ccg	gcg	cgc	acg	ccg	tcg	atc	gtg	gaa	tcg	aag	384
Val	Phe	Gly	Gly	Gln	Pro	Ala	Arg	Thr	Pro	Ser	Ile	Val	Glu	Ser	Lys	
		115					120					125				
ttg	atc	att	ctc	ggc	gac	gtc	gtg	ctg	cgg	ttg	ccg	cat	ctg	atc	gcg	432
Leu	Ile	Ile	Leu	Gly	Asp	Val	Val	Leu	Arg	Leu	Pro	His	Leu	Ile	Ala	
	130				135						140					
ttt	gcg	gtc	gcg	ttc	gcg	atg	gcg	atc	ggg	ctg	tac	gtg	atg	ctg	cgc	480
Phe	Ala	Val	Ala	Phe	Ala	Met	Ala	Ile	Gly	Leu	Tyr	Val	Met	Leu	Arg	
	145				150				155						160	
tcg	acc	gat	ttc	ggc	cgc	tcg	atc	cgc	gcg	gtg	cat	cag	aac	gcg	cgc	528
Ser	Thr	Asp	Phe	Gly	Arg	Ser	Ile	Arg	Ala	Val	His	Gln	Asn	Ala	Arg	
			165					170						175		
gcc	gca	gcg	ttg	atg	ggg	gtc	gac	gtg	ggc	cgt	gtt	cag	gtc	gtc	acc	576
Ala	Ala	Ala	Leu	Met	Gly	Val	Asp	Val	Gly	Arg	Val	Gln	Val	Val	Thr	
			180					185					190			
ttt	gcg	atc	ggt	gtc	gcc	atc	ctc	gcc	gtt	gct	gcg	gcg	ctg	ctg	ctg	624
Phe	Ala	Ile	Gly	Val	Ala	Ile	Leu	Ala	Val	Ala	Ala	Ala	Leu	Leu	Leu	
		195					200					205				
ccg	ggc	acg	ccg	atc	act	ccg	acc	cag	ggc	ctg	cag	tac	act	gtt	atc	672
Pro	Gly	Thr	Pro	Ile	Thr	Pro	Thr	Gln	Gly	Leu	Gln	Tyr	Thr	Val	Ile	
	210					215					220					
acg	ctg	ctg	gtc	gtg	gtg	ctc	ggc	ggc	atg	acc	aat	ttc	gtc	agc	atc	720
Thr	Leu	Leu	Val	Val	Val	Leu	Gly	Gly	Met	Thr	Asn	Phe	Val	Ser	Ile	
	225				230					235					240	
atg	ctc	agc	ggc	ctg	gtg	atc	ggt	atc	tcc	gag	gcg	ttc	ggc	cag	atc	768
Met	Leu	Ser	Gly	Leu	Val	Ile	Gly	Ile	Ser	Glu	Ala	Phe	Gly	Gln	Ile	
			245					250						255		
tat	gta	tcg	gat	acg	ctc	ggc	cgt	ctc	gtg	ccg	tac	gcg	atc	ttc	gtg	816
Tyr	Val	Ser	Asp	Thr	Leu	Gly	Arg	Leu	Val	Pro	Tyr	Ala	Ile	Phe	Val	
			260					265					270			
ctg	atc	atg	ctg	ttc	cgg	ccg	cag	ggc	ctg	acc	tgg	agg	acg	tca		861
Leu	Ile	Met	Leu	Phe	Arg	Pro	Gln	Gly	Leu	Thr	Trp	Arg	Thr	Ser		
		275					280					285				
tga																864

<210> 611

<211> 287

<212> PRT

<213> Rhodopseudomonas palustris

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<400> 611

Met Ser Glu Phe Trp₅ Gln Ala Leu Ala Gln₁₀ Gly Val Leu Ile Gly₁₅ Ser
 1 Thr Tyr Gly Leu₂₀ Leu Ala Leu Gly Met₂₅ Gly Leu Val Tyr Gly₃₀ Val Ser
 Gly Ile Val₃₅ Asn Phe Ala His Gly₄₀ Asp Phe Ile Ser Leu₄₅ Ala Met Phe
 Met Ala₅₀ Leu Ala Leu Phe Ser₅₅ Ala Phe Ala Leu Asp₆₀ Pro Tyr Val Ser
 Ala Leu Ile Thr Ile Pro Val Met Ala Leu Ile Gly₇₅ Gly Leu Val Tyr₈₀
 65 Arg Tyr Leu Leu Arg₈₅ Pro Met Ala Gly His₉₀ Gln Phe Leu Met Ile₉₅ Val
 Gln Leu Thr Leu₁₀₀ Gly Leu Ser Leu Val₁₀₅ Leu Gln Asn Gly Ile₁₁₀ Leu Met
 Val Phe Gly₁₁₅ Gly Gln Pro Ala Arg Thr Pro Ser Ile Val₁₂₅ Glu Ser Lys
 Leu Ile₁₃₀ Ile Leu Gly Asp Val₁₃₅ Val Leu Arg Leu Pro His Leu Ile Ala
 Phe Ala Val Ala Phe Ala Met Ala Ile Gly Leu Tyr Val Met Leu Arg
 145 Ser Thr Asp Phe Gly₁₆₅ Arg Ser Ile Arg Ala Val His Gln Asn Ala₁₇₅ Arg
 Ala Ala Ala Leu₁₈₀ Met Gly Val Asp Val₁₈₅ Gly Arg Val Gln Val₁₉₀ Val Thr
 Phe Ala Ile Gly Val Ala Ile Leu Ala Val Ala Ala Ala Leu Leu Leu
 195 Pro Gly Thr Pro Ile Thr Pro Thr Gln Gly Leu Gln Tyr Thr Val Ile
 210 Thr Leu Leu Val Val₂₃₀ Leu Gly Gly Met Thr Asn Phe Val Ser Ile₂₄₀
 225 Met Leu Ser Gly Leu Val Ile Gly Ile Ser₂₅₀ Glu Ala Phe Gly Gln Ile₂₅₅
 Tyr Val Ser Asp₂₆₀ Thr Leu Gly Arg Leu Val Pro Tyr Ala Ile₂₇₀ Phe Val
 Leu Ile Met₂₇₅ Leu Phe Arg Pro Gln₂₈₀ Gly Leu Thr Trp Arg₂₈₅ Thr Ser

<210> 612

<211> 927

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(927)

<400> 612

atg ttc ggc gaa tat tcg att ggt gat ctc ggg gcg atc ttc gcg atg	48
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cag ggc ttc gcg ggc ctc att ctg ttt tcc gtc tac gtg ctg atg gcg	96
Gln Gly Phe Ala Gly Leu Ile Leu Phe ₂₅ Ser Val Tyr Val Leu Met Ala ₃₀	
ctt ggc ctg gcg atc atc ttc ggc cag atg ggc gtc atc aac atg gcc	144
Leu Gly Leu ₃₅ Ala Ile Ile Phe Gly ₄₀ Gln Met Gly Val Ile Asn Met Ala ₄₅	
cac ggc gag ttc atg atc ctc ggc gcc tac gtc acc tgg atg acg tcg	192
His Gly Glu Phe Met Ile Leu Gly Ala Tyr Val Thr Trp Met Thr Ser ₆₀	
aac ttc ttc caa tcc tat ctg ccg tcg ctg ttc gcc ggc tac ttc ttc	240
Asn Phe Phe Gln Ser Tyr ₇₀ Leu Pro Ser Leu Phe ₇₅ Ala Gly Tyr Phe Phe ₈₀	
atc gcg atg atc ctg gcg ttc atc gcc tcc ggg gca ctc ggc atg ctg	288
Ile Ala Met Ile Leu Ala Phe Ile Ala Ser ₉₀ Gly Ala Leu Gly Met Leu ₉₅	
gtg gag tgg ggc ctg atc cgc cac ctc tat aag cgt ccg ctc gac acc	336
Val Glu Trp Gly ₁₀₀ Leu Ile Arg His Leu ₁₀₅ Tyr Lys Arg Pro Leu Asp Thr ₁₁₀	

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ctg	ctg	gcg	acc	tgg	ggg	ttg	tcg	ctg	atc	ctt	cag	cag	gcc	tac	cgg	384
Leu	Leu	Ala	Thr	Trp	Gly	Leu	Ser	Leu	Ile	Leu	Gln	Gln	Ala	Tyr	Arg	
		115					120				125					
tcg	atc	ttc	ggt	gcg	cgc	gag	gtc	ggc	gtc	gag	ttg	ccg	cag	tgg	atg	432
Ser	Ile	Phe	Gly	Ala	Arg	Glu	Val	Gly	Val	Glu	Leu	Pro	Gln	Trp	Met	
	130					135					140					
ctc	ggc	tcc	aag	cag	gtc	acc	gac	acc	atc	gag	att	ccg	atc	aac	ggc	480
Leu	Gly	Ser	Lys	Gln	Val	Thr	Asp	Thr	Ile	Glu	Ile	Pro	Ile	Asn	Gly	
	145				150					155					160	
atg	ttc	gtg	atg	gcg	ctc	acc	gtg	ctg	atc	acc	gcg	gcc	gtg	tcc	tac	528
Met	Phe	Val	Met	Ala	Leu	Thr	Val	Leu	Ile	Thr	Ala	Ala	Val	Ser	Tyr	
				165				170						175		
gtc	ctg	ttc	tgg	tcg	cgc	tgg	ggc	cgc	cag	gtc	cgc	gcc	gtg	gta	cag	576
Val	Leu	Phe	Trp	Ser	Arg	Trp	Gly	Arg	Gln	Val	Arg	Ala	Val	Val	Gln	
			180				185						190			
aat	cgg	gtg	atg	gcc	ggc	gcc	gtc	ggc	atc	aac	act	gaa	aag	gtc	gac	624
Asn	Arg	Val	Met	Ala	Gly	Ala	Val	Gly	Ile	Asn	Thr	Glu	Lys	Val	Asp	
	195						200					205				
cgc	tac	acc	ttc	ggc	ctc	ggc	tgc	ggc	atc	gca	ggc	atc	gca	ggc	tcg	672
Arg	Tyr	Thr	Phe	Gly	Leu	Gly	Cys	Gly	Ile	Ala	Gly	Ile	Ala	Gly	Ser	
	210				215						220					
gcc	ttc	acc	atg	atc	ggt	tcg	acc	ggt	ccg	acc	tcc	ggc	cag	ctc	tat	720
Ala	Phe	Thr	Met	Ile	Gly	Ser	Thr	Gly	Pro	Thr	Ser	Gly	Gln	Leu	Tyr	
	225				230				235					240		
atc	gtc	gac	acc	ttc	ctg	gtc	gtg	gtg	ttc	ggc	ggc	gcc	gcc	agc	ctg	768
Ile	Val	Asp	Thr	Phe	Leu	Val	Val	Val	Phe	Gly	Gly	Ala	Ala	Ser	Leu	
				245					250					255		
ttc	ggc	acc	att	gca	tcg	gcc	ttc	agc	atc	tca	cag	gcg	cag	tcg	acc	816
Phe	Gly	Thr	Ile	Ala	Ser	Ala	Phe	Ser	Ile	Ser	Gln	Ala	Gln	Ser	Thr	
			260					265					270			
atg	gag	ttc	ttc	atg	tcc	ggc	tcg	atg	gcc	aag	gtg	ctg	acg	ctg	ctc	864
Met	Glu	Phe	Phe	Met	Ser	Gly	Ser	Met	Ala	Lys	Val	Leu	Thr	Leu	Leu	
	275						280					285				
gcc	atc	gtc	gcg	atc	ctg	atg	gtg	cgg	ccg	caa	ggc	ctg	ttc	gct	ctc	912
Ala	Ile	Val	Ala	Ile	Leu	Met	Val	Arg	Pro	Gln	Gly	Leu	Phe	Ala	Leu	
	290					295					300					
aag	gtc	cgt	aag	taa												927
Lys	Val	Arg	Lys													
	305															

<210> 613

<211> 308

<212> PRT

<213> Rhodopseudomonas palustris

<400> 613

Met	Phe	Gly	Glu	Tyr	Ser	Ile	Gly	Asp	Leu	Gly	Ala	Ile	Phe	Ala	Met	
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Gln	Gly	Phe	Ala	Gly	Leu	Ile	Leu	Phe	Ser	Val	Tyr	Val	Leu	Met	Ala	
			20					25					30			
Leu	Gly	Leu	Ala	Ile	Ile	Phe	Gly	Gln	Met	Gly	Val	Ile	Asn	Met	Ala	
		35					40					45				
His	Gly	Glu	Phe	Met	Ile	Leu	Gly	Ala	Tyr	Val	Thr	Trp	Met	Thr	Ser	
	50					55					60					
Asn	Phe	Phe	Gln	Ser	Tyr	Leu	Pro	Ser	Leu	Phe	Ala	Gly	Tyr	Phe	Phe	
65					70					75				80		
Ile	Ala	Met	Ile	Leu	Ala	Phe	Ile	Ala	Ser	Gly	Ala	Leu	Gly	Met	Leu	
			85						90					95		
Val	Glu	Trp	Gly	Leu	Ile	Arg	His	Leu	Tyr	Lys	Arg	Pro	Leu	Asp	Thr	
		100						105					110			
Leu	Leu	Ala	Thr	Trp	Gly	Leu	Ser	Leu	Ile	Leu	Gln	Gln	Ala	Tyr	Arg	
		115					120					125				
Ser	Ile	Phe	Gly	Ala	Arg	Glu	Val	Gly	Val	Glu	Leu	Pro	Gln	Trp	Met	
	130					135					140					
Leu	Gly	Ser	Lys	Gln	Val	Thr	Asp	Thr	Ile	Glu	Ile	Pro	Ile	Asn	Gly	
	145				150					155					160	
Met	Phe	Val	Met	Ala	Leu	Thr	Val	Leu	Ile	Thr	Ala	Ala	Val	Ser	Tyr	
				165					170					175		
Val	Leu	Phe	Trp	Ser	Arg	Trp	Gly	Arg	Gln	Val	Arg	Ala	Val	Val	Gln	

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180 185 190
 Asn Arg Val Met Ala Gly Ala Val Gly Ile Asn Thr Glu Lys Val Asp
 195 200 205
 Arg Tyr Thr Phe Gly Leu Gly Cys Gly Ile Ala Gly Ile Ala Gly Ser
 210 215 220
 Ala Phe Thr Met Ile Gly Ser Thr Gly Pro Thr Ser Gly Gln Leu Tyr
 225 230 235 240
 Ile Val Asp Thr Phe Leu Val Val Val Phe Gly Gly Ala Ala Ser Leu
 245 250 255
 Phe Gly Thr Ile Ala Ser Ala Phe Ser Ile Ser Gln Ala Gln Ser Thr
 260 265 270
 Met Glu Phe Phe Met Ser Gly Ser Met Ala Lys Val Leu Thr Leu Leu
 275 280 285
 Ala Ile Val Ala Ile Leu Met Val Arg Pro Gln Gly Leu Phe Ala Leu
 290 295 300
 Lys Val Arg Lys
 305

<210> 614

<211> 873

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(873)

<400> 614

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Met	Leu	Asp	Phe	Val	Gln	Gln	Val	Ile	Gly	Gly	Ile	Ala	Leu	Gly	Cys	
1				5				10						15		
gtc	tac	ggc	ttg	atc	gcc	ctc	ggc	ttc	gtg	ctg	atc	tac	aag	gcg	acc	96
Val	Tyr	Gly	Leu	Ile	Ala	Leu	Gly	Phe	Val	Leu	Ile	Tyr	Lys	Ala	Thr	
			20					25					30			
gaa	gtc	gtc	aat	ttt	gcg	cag	ggc	gaa	atc	atg	atg	ctc	ggc	gcg	ttt	144
Glu	Val	Val	Asn	Phe	Ala	Gln	Gly	Glu	Ile	Met	Met	Leu	Gly	Ala	Phe	
			35				40					45				
ctg	tcg	ttc	acc	ttc	atc	gcc	acg	ctc	ggg	ctg	aac	tac	tgg	ttc	ggc	192
Leu	Ser	Phe	Thr	Phe	Ile	Ala	Thr	Leu	Gly	Leu	Asn	Tyr	Trp	Phe	Gly	
			50			55					60					
ttc	ctg	ctt	tgt	gtg	gtc	agc	atg	gcg	gtg	ctc	ggc	gcc	gcg	atg	gaa	240
Phe	Leu	Leu	Cys	Val	Val	Ser	Met	Ala	Val	Leu	Gly	Ala	Ala	Met	Glu	
				70						75					80	
cgg	ctg	gtg	gtg	cgg	ccg	atc	ctc	ggg	tac	ccg	cag	ttc	tcg	atc	gtg	288
Arg	Leu	Val	Val	Arg	Pro	Ile	Leu	Gly	Tyr	Pro	Gln	Phe	Ser	Ile	Val	
				85				90						95		
atg	gcg	acg	atc	ggg	ctc	ggt	ctc	gtc	atc	cgc	tcg	ttg	gtt	ggc	atc	336
Met	Ala	Thr	Ile	Gly	Leu	Gly	Leu	Val	Ile	Arg	Ser	Leu	Val	Gly	Ile	
			100					105					110			
atc	tgg	ggc	acc	gac	gat	ttg	cgg	atc	gag	acg	ccg	ttc	acc	ggc	ggt	384
Ile	Trp	Gly	Thr	Asp	Asp	Leu	Arg	Ile	Glu	Thr	Pro	Phe	Thr	Gly	Gly	
			115				120					125				
gtg	atc	cag	ctt	ggc	ggc	ttg	gtg	ctg	tcg	cag	gac	agc	ctg	tcg	atc	432
Val	Ile	Gln	Leu	Gly	Gly	Leu	Val	Leu	Ser	Gln	Asp	Ser	Leu	Ser	Ile	
			130			135					140					
att	gtt	gcc	acc	gcg	ctg	ctg	tgc	gcc	gtg	ctg	tac	gct	ttc	ttc	cgc	480
Ile	Val	Ala	Thr	Ala	Leu	Leu	Cys	Ala	Val	Leu	Tyr	Ala	Phe	Phe	Arg	
				150						155					160	
ttc	acc	aag	atc	ggt	atc	gcc	atg	cag	gcg	acg	tcc	cag	aac	atg	ctg	528
Phe	Thr	Lys	Ile	Gly	Ile	Ala	Met	Gln	Ala	Thr	Ser	Gln	Asn	Met	Leu	
				165				170						175		
gcg	gcc	tac	tac	atg	ggc	att	ccg	gtg	aag	cgg	atg	ttc	tcg	ctg	atc	576
Ala	Ala	Tyr	Tyr	Met	Gly	Ile	Pro	Val	Lys	Arg	Met	Phe	Ser	Leu	Ile	
				180				185					190			
tgg	agc	ctg	agt	gcg	atc	gta	gcc	tgc	tgc	gcc	ggc	gtg	ctg	ctg	gcg	624
Trp	Ser	Leu	Ser	Ala	Ile	Val	Ala	Cys	Cys	Ala	Gly	Val	Leu	Leu	Ala	
			195				200					205				
ccg	atc	acc	ttc	atc	cac	gcc	aat	ctg	ggt	ttc	ctc	ggc	atc	aag	gcg	672
Pro	Ile	Thr	Phe	Ile	His	Ala	Asn	Leu	Gly	Phe	Leu	Gly	Ile	Lys	Ala	

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210	215	220	
ttc ccg gcc gcc gtg ctc	ggc ggc ttc ggc agc atc ccc ggc gcg ctc		720
Phe Pro Ala Ala Val Leu	Gly Gly Phe Gly Ser Ile Pro Gly Ala Leu		
225	230	235	240
gcc ggc ggc atc acc atc	ggc atc gtg gaa tcg ctg tcg ggc ttc tat		768
Ala Gly Gly Ile Thr Ile	Gly Ile Val Glu Ser Leu Ser Gly Phe Tyr		
245	250	255	
ctg ccg gaa ggg ttc aag gac gtc gcg gcc tac atc gtg ctg ctc gcg			816
Leu Pro Glu Gly Phe Lys Asp Val Ala Ala Tyr Ile Val Leu Leu Ala			
260	265	270	
gtg ctg ctg tgg cgg ccg cag ggc ctg ttc ggc agc aac gcg ctg aag			864
Val Leu Leu Trp Arg Pro Gln Gly Leu Phe Gly Ser Asn Ala Leu Lys			
275	280	285	
aag gtc tga			873
Lys Val			
290			

<210> 615

<211> 290

<212> PRT

<213> Rhodopseudomonas palustris

<400> 615

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20 Glu Val Val Asn Phe Ala Gln Gly Glu Ile Met Met Leu Gly Ala Phe	
35 Leu Ser Phe Thr Phe Ile Ala Thr Leu Gly Leu Asn Tyr Trp Phe Gly	
50 Phe Leu Leu Cys Val Val Ser Met Ala Val Leu Gly Ala Ala Met Glu	
65 Arg Leu Val Val Arg Pro Ile Leu Gly Tyr Pro Gln Phe Ser Ile Val	
85 Met Ala Thr Ile Gly Leu Gly Leu Val Ile Arg Ser Leu Val Gly Ile	
100 Ile Trp Gly Thr Asp Asp Leu Arg Ile Glu Thr Pro Phe Thr Gly Gly	
115 Val Ile Gln Leu Gly Gly Leu Val Leu Ser Gln Asp Ser Leu Ser Ile	
130 Ile Val Ala Thr Ala Leu Leu Cys Ala Val Leu Tyr Ala Phe Phe Arg	
145 Phe Thr Lys Ile Gly Ile Ala Met Gln Ala Thr Ser Gln Asn Met Leu	
165 Ala Ala Tyr Tyr Met Gly Ile Pro Val Lys Arg Met Phe Ser Leu Ile	
180 Trp Ser Leu Ser Ala Ile Val Ala Cys Cys Ala Gly Val Leu Leu Ala	
195 Pro Ile Thr Phe Ile His Ala Asn Leu Gly Phe Leu Gly Ile Lys Ala	
210 Phe Pro Ala Ala Val Leu Gly Gly Phe Gly Ser Ile Pro Gly Ala Leu	
225 Ala Gly Gly Ile Thr Ile Gly Ile Val Glu Ser Leu Ser Gly Phe Tyr	
245 Leu Pro Glu Gly Phe Lys Asp Val Ala Ala Tyr Ile Val Leu Leu Ala	
260 Val Leu Leu Trp Arg Pro Gln Gly Leu Phe Gly Ser Asn Ala Leu Lys	
275 Lys Val	
290	

<210> 616

<211> 867

<212> DNA

<213> Rhodopseudomonas palustris

<220>

<221> CDS

<222> (1)..(867)

<400> 616

atg	cgg	acg	att	ctc	gga	atc	ctg	ccg	gac	gcg	ctg	gcc	tac	ggc	atg	48
Met	Arg	Thr	Ile	Leu	Gly	Ile	Leu	Pro	Asp	Ala	Leu	Ala	Tyr	Gly	Met	
1				5				10						15		
gtg	ctg	ttc	acg	atc	tcg	atc	ggc	ctg	tcg	atc	atg	atg	ggc	ttg	atg	96
Val	Leu	Phe	Thr	Ile	Ser	Ile	Gly	Leu	Ser	Ile	Met	Met	Gly	Leu	Met	
			20					25					30			
cgc	gtg	gtc	aat	ctc	gca	cac	ggc	gca	ttc	gcg	atg	atc	ggc	ggt	tat	144
Arg	Val	Val	Asn	Leu	Ala	His	Gly	Ala	Phe	Ala	Met	Ile	Gly	Gly	Tyr	
			35				40					45				
ctc	gcc	tcg	ttc	gcg	ctg	gtt	tcg	ctc	ggc	gtt	tcc	tat	ccg	ata	gcg	192
Leu	Ala	Ser	Phe	Ala	Leu	Val	Ser	Leu	Gly	Val	Ser	Tyr	Pro	Ile	Ala	
	50					55					60					
atc	ctg	atc	gcg	gtg	atc	ggc	gcg	gtc	atc	atc	tcg	gtc	ccg	ttc	gag	240
Ile	Leu	Ile	Ala	Val	Ile	Gly	Ala	Val	Ile	Ile	Ser	Val	Pro	Phe	Glu	
	65				70					75					80	
ttc	ctg	ctg	tat	cgg	cgg	atc	tat	cgc	cgc	tcc	gac	gaa	ctg	acc	cag	288
Phe	Leu	Leu	Tyr	Arg	Arg	Ile	Tyr	Arg	Arg	Ser	Asp	Glu	Leu	Thr	Gln	
				85				90						95		
atc	ctg	ctg	acg	atc	ggc	atc	acc	ttc	ttc	atc	gtc	ggc	atc	gcc	aac	336
Ile	Leu	Leu	Thr	Ile	Gly	Ile	Thr	Phe	Phe	Ile	Val	Gly	Ile	Ala	Asn	
			100					105					110			
tac	atc	ttc	ggg	ccg	act	tcg	aag	ccg	atc	ccg	ctg	ccg	gag	atg	ctg	384
Tyr	Ile	Phe	Gly	Pro	Thr	Ser	Lys	Pro	Ile	Pro	Leu	Pro	Glu	Met	Leu	
			115				120					125				
aag	ggg	ccg	ttc	gat	ctc	ggc	ttc	cgc	atg	atc	ccg	gcg	cac	cgg	ctg	432
Lys	Gly	Pro	Phe	Asp	Leu	Gly	Phe	Arg	Met	Ile	Pro	Ala	His	Arg	Leu	
	130					135					140					
ttc	gtg	atc	ggc	tgt	ggc	gtg	gtc	acc	gcg	gtg	gcg	ctg	tgg	cta	ctg	480
Phe	Val	Ile	Gly	Cys	Gly	Val	Val	Thr	Ala	Val	Ala	Leu	Trp	Leu	Leu	
	145				150				155					160		
ata	gag	aag	acc	gag	ttc	ggc	gtg	cgg	ctg	cgc	gcg	gcg	gtc	gac	aat	528
Ile	Glu	Lys	Thr	Glu	Phe	Gly	Val	Arg	Leu	Arg	Ala	Ala	Val	Asp	Asn	
				165				170						175		
ggc	gac	atg	gcc	gag	gcg	ctg	ggc	att	cgc	acc	caa	att	gtc	tat	tcg	576
Gly	Asp	Met	Ala	Glu	Ala	Leu	Gly	Ile	Arg	Thr	Gln	Ile	Val	Tyr	Ser	
			180					185					190			
gtc	acc	ttc	gcg	ctg	gcg	gtg	ggg	ctc	gcg	gcg	ttc	ggc	ggc	gtg	gtc	624
Val	Thr	Phe	Ala	Leu	Ala	Val	Gly	Leu	Ala	Ala	Phe	Gly	Gly	Val	Val	
			195				200					205				
ggc	gcc	gag	ctg	ctg	ccg	gtc	gag	ccg	ttc	tac	gcg	ctg	cgc	tac	atg	672
Gly	Ala	Glu	Leu	Leu	Pro	Val	Glu	Pro	Phe	Tyr	Ala	Leu	Arg	Tyr	Met	
	210					215					220					
gtg	acg	ttc	ctg	gtc	gtg	gtc	tcg	gtc	ggc	ggc	gcc	ggc	tcg	gtc	acc	720
Val	Thr	Phe	Leu	Val	Val	Val	Ser	Val	Gly	Gly	Ala	Gly	Ser	Val	Thr	
	225				230					235					240	
ggt	gcg	atg	gcg	gcg	tcg	ctg	ttg	ctc	ggc	ctt	gcc	gac	act	acc	ggc	768
Gly	Ala	Met	Ala	Ala	Ser	Leu	Leu	Leu	Gly	Leu	Ala	Asp	Thr	Thr	Gly	
				245				250						255		
aaa	tat	ctg	gcg	cgg	gag	ttt	ggc	gag	ttc	ttc	tat	gtc	gcg	gtg		816
Lys	Tyr	Leu	Ala	Pro	Glu	Phe	Gly	Glu	Phe	Phe	Phe	Tyr	Val	Ala	Val	
			260				265					270				
atc	gtc	atc	gtt	tac	gta	ttc	ccg	cac	ggc	ctg	ttc	gga	aag	gcg	cac	864
Ile	Val	Ile	Val	Tyr	Val	Phe	Pro	His	Gly	Leu	Phe	Gly	Lys	Ala	His	
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taa																867

<210> 617

<211> 288

<212> PRT

<213> Rhodopseudomonas palustris

<400> 617

Met	Arg	Thr	Ile	Leu	Gly	Ile	Leu	Pro	Asp	Ala	Leu	Ala	Tyr	Gly	Met
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Val Leu Phe Thr Ile Ser Ile Gly Leu Ser Ile Met Met Gly Leu Met
 Arg Val Val Asn Leu Ala His Gly Ala Phe Ala Met Ile Gly Gly Tyr
 Leu Ala Ser Phe Ala Leu Val Ser Leu Gly Val Ser Tyr Pro Ile Ala
 Ile Leu Ile Ala Val Ile Gly Ala Val Ile Ile Ser Val Pro Phe Glu
 Phe Leu Leu Tyr Arg Arg Ile Tyr Arg Arg Ser Asp Glu Leu Thr Gln
 Ile Leu Leu Thr Ile Gly Ile Thr Phe Phe Ile Val Gly Ile Ala Asn
 Tyr Ile Phe Gly Pro Thr Ser Lys Phe Arg Met Ile Pro Ala His Arg Leu
 Lys Gly Pro Phe Asp Leu Gly Phe Arg Met Ile Pro Ala His Arg Leu
 Phe Val Ile Gly Cys Gly Val Val Thr Ala Val Ala Leu Trp Leu Leu
 Ile Glu Lys Thr Glu Phe Gly Val Arg Leu Arg Ala Ala Val Asp Asn
 Gly Asp Met Ala Glu Ala Leu Gly Ile Arg Thr Gln Ile Val Tyr Ser
 Val Thr Phe Ala Leu Ala Val Gly Leu Ala Ala Phe Gly Gly Val Val
 Gly Ala Glu Leu Leu Pro Val Val Gly Pro Phe Tyr Ala Leu Arg Tyr Met
 Val Thr Phe Leu Val Val Val Ser Val Gly Gly Ala Gly Ser Val Thr
 Gly Ala Met Ala Ala Ser Leu Leu Leu Gly Leu Ala Asp Thr Thr Gly
 Lys Tyr Leu Ala Pro Glu Phe Gly Glu Phe Phe Phe Tyr Val Ala Val
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<210> 618

<211> 870

<212> DNA

<213> uncultured bacterium 582

<220>

<221> CDS

<222> (1)..(870)

<400> 618

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Met Leu Met Leu Phe Glu Gln Ile Leu Asn Gly Leu Leu Val Gly Ser	
1 5 10 15	
tat tat acc ctt ctc gcg ctc ggc ctc tcg att att ttt agt ctt ggg	96
Tyr Tyr Thr Leu Leu Ala Leu Gly Leu Ser Ile Ile Phe Ser Leu Gly	
20 25 30	
ggc gtc gtc aat ctt gcc cat ggc gcg ttt tat gcg gtt ggg gcg tat	144
Gly Val Val Asn Leu Ala His Gly Ala Phe Tyr Ala Val Gly Ala Tyr	
35 40 45	
ctg aca gtg ttg ttt act gat att ctt ggg ttt ggc ctt gcc ttt ttg	192
Leu Thr Val Leu Phe Thr Asp Ile Leu Gly Phe Gly Leu Ala Phe Leu	
50 55 60	
atc acc ccc gct gtg gtt ggt ctc atc ggc att gca att gag gcg ctg	240
Ile Thr Pro Ala Val Val Gly Leu Ile Gly Ile Ala Ile Glu Ala Leu	
65 70 75 80	
ttt ttg cgc aga ctt tac aac aaa gat cca att ctg acc ttg ctg ttt	288
Phe Leu Arg Arg Leu Tyr Asn Lys Asp Pro Ile Leu Thr Leu Phe	
85 90 95	
act ttt ggt tta gcg atg tcc ggt gaa caa gct ttg cgc tta att ttt	336
Thr Phe Gly Leu Ala Met Ser Gly Glu Gln Ala Leu Arg Leu Ile Phe	
100 105 110	
ggg gcc tcc ggc att cca ttc tcg att cca gaa ttt ttg tcg ggt cag	384
Gly Ala Ser Gly Ile Pro Phe Ser Ile Pro Glu Phe Ser Gly Gln	
115 120 125	

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cta	cac	gtc	ggt	gat	ttt	cta	tat	tca	tac	tac	cgc	ctg	tca	att	ctg	432
Leu	His	Val	Gly	Asp	Phe	Leu	Tyr	Ser	Tyr	Tyr	Arg	Leu	Ser	Ile	Leu	
	130					135					140					
gcg	gtc	acc	agc	tta	tca	att	gca	ggg	ttg	tgg	ata	tta	ttc	aat	aag	480
Ala	Val	Thr	Ser	Leu	Ser	Ile	Ala	Gly	Leu	Trp	Ile	Leu	Phe	Asn	Lys	
145					150					155					160	
acc	tcc	ttt	ggt	ctg	atc	ggt	cga	gcc	ggc	ggt	gca	gat	gct	gaa	atg	528
Thr	Ser	Phe	Gly	Leu	Ile	Val	Arg	Ala	Gly	Val	Ala	Asp	Ala	Glu	Met	
				165					170					175		
gtc	cgc	gcg	atg	gga	ata	tct	gtc	aaa	ccc	att	ttg	tct	atg	ggt	ttt	576
Val	Arg	Ala	Met	Gly	Ile	Ser	Val	Lys	Pro	Ile	Leu	Ser	Met	Val	Phe	
			180					185					190			
gca	att	ggc	gtg	ggt	ttg	gct	gca	gta	gca	ggg	tcc	atg	tcg	gca	agc	624
Ala	Ile	Gly	Val	Gly	Leu	Ala	Ala	Val	Ala	Gly	Ser	Met	Ser	Ala	Ser	
		195					200					205				
tta	acg	ggt	ggt	caa	cct	gcc	atg	gga	aat	gac	atc	gtg	aca	gcc	gct	672
Leu	Thr	Gly	Val	Gln	Pro	Ala	Met	Gly	Asn	Asp	Ile	Val	Thr	Ala	Ala	
210						215					220					
ttt	gtc	atc	tgt	gtc	tta	ggc	gga	tta	ggc	agt	ttt	tgg	ggc	gtc	ggt	720
Phe	Val	Ile	Cys	Val	Leu	Gly	Gly	Leu	Gly	Ser	Phe	Trp	Gly	Val	Val	
225				230						235					240	
ttt	gcg	ggt	ctc	tta	gtg	ggt	att	ttg	aag	ggc	ggt	aca	gct	ttg	tat	768
Phe	Ala	Gly	Leu	Leu	Val	Gly	Ile	Leu	Lys	Gly	Val	Thr	Ala	Leu	Tyr	
				245					250					255		
ttt	cca	cct	gcg	gct	gag	gga	tcg	atc	tat	gca	ttg	atg	ggt	ctg	ggt	816
Phe	Pro	Pro	Ala	Ala	Glu	Gly	Ser	Ile	Tyr	Ala	Leu	Met	Val	Leu	Val	
			260					265					270			
ctg	atc	ttt	cgt	cca	cgc	ggg	atg	ttt	ggt	ggt	aaa	ttt	gaa	agg	ctc	864
Leu	Ile	Phe	Arg	Pro	Arg	Gly	Met	Phe	Gly	Val	Lys	Phe	Glu	Arg	Leu	
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Glu																

<210> 619

<211> 289

<212> PRT

<213> uncultured bacterium 582

<400> 619

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			20					25					30			
Gly	Val	Val	Asn	Leu	Ala	His	Gly	Ala	Phe	Tyr	Ala	Val	Gly	Ala	Tyr	
		35					40					45				
Leu	Thr	Val	Leu	Phe	Thr	Asp	Ile	Leu	Gly	Phe	Gly	Leu	Ala	Phe	Leu	
	50					55					60					
Ile	Thr	Pro	Ala	Val	Val	Gly	Leu	Ile	Gly	Ile	Ala	Ile	Glu	Ala	Leu	
65				70					75						80	
Phe	Leu	Arg	Arg	Leu	Tyr	Asn	Lys	Asp	Pro	Ile	Leu	Thr	Leu	Leu	Phe	
			85					90					95			
Thr	Phe	Gly	Leu	Ala	Met	Ser	Gly	Glu	Gln	Ala	Leu	Arg	Leu	Ile	Phe	
			100					105					110			
Gly	Ala	Ser	Gly	Ile	Pro	Phe	Ser	Ile	Pro	Glu	Phe	Leu	Ser	Gly	Gln	
		115					120					125				
Leu	His	Val	Gly	Asp	Phe	Leu	Tyr	Ser	Tyr	Tyr	Arg	Leu	Ser	Ile	Leu	
	130					135					140					
Ala	Val	Thr	Ser	Leu	Ser	Ile	Ala	Gly	Leu	Trp	Ile	Leu	Phe	Asn	Lys	
145					150					155					160	
Thr	Ser	Phe	Gly	Leu	Ile	Val	Arg	Ala	Gly	Val	Ala	Asp	Ala	Glu	Met	
				165					170					175		
Val	Arg	Ala	Met	Gly	Ile	Ser	Val	Lys	Pro	Ile	Leu	Ser	Met	Val	Phe	
			180					185					190			
Ala	Ile	Gly	Val	Gly	Leu	Ala	Ala	Val	Ala	Gly	Ser	Met	Ser	Ala	Ser	
		195					200					205				
Leu	Thr	Gly	Val	Gln	Pro	Ala	Met	Gly	Asn	Asp	Ile	Val	Thr	Ala	Ala	
	210					215					220					
Phe	Val	Ile	Cys	Val	Leu	Gly	Gly	Leu	Gly	Ser	Phe	Trp	Gly	Val	Val	

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225 Phe Ala Gly Leu 230 Val Gly Ile Leu 235 Gly Val Thr Ala Leu 240 Tyr
 Phe Pro Pro Ala 245 Glu Gly Ser Ile 250 Tyr Ala Leu Met Val 255 Leu Val
 Leu Ile Phe 260 Arg Pro Arg Gly Met 265 Phe Gly Val Lys Phe 270 Glu Arg Leu
 Glu 275 280 285

<210> 620

<211> 1254

<212> DNA

<213> symbiont bacterium of *Paederus fuscipes*

<220>

<221> CDS

<222> (1)..(1254)

<400> 620

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Met	Ser	Gln	Ser	Leu	Lys	Arg	Ala	Leu	Phe	Ser	Ala	Leu	Leu	Val	Leu	
1				5				10						15		
ttg	gtg	tct	tat	ccg	atc	ctt	ggc	ctg	agg	ttg	cgt	acc	gtt	ggc	atc	96
Leu	Val	Ser	Tyr	Pro	Ile	Leu	Gly	Leu	Arg	Leu	Arg	Thr	Val	Gly	Ile	
			20					25					30			
aag	cta	caa	gtt	atc	ggc	gat	gca	cag	acc	ctc	tgg	agt	att	gcc		144
Lys	Leu	Gln	Val	Ile	Gly	Ala	Asp	Ala	Gln	Thr	Leu	Trp	Ser	Ile	Ala	
		35				40					45					
gta	gcc	act	atg	gct	atg	ttc	gtc	tgg	caa	ctg	ttt	cgt	gac	cgt	gtc	192
Val	Ala	Thr	Met	Ala	Met	Phe	Val	Trp	Gln	Leu	Phe	Arg	Asp	Arg	Val	
	50					55					60					
cta	ctc	aag	ttt	ggg	agt	ggg	atc	aag	tac	aag	gtg	gac	aac	cgt	ggc	240
Leu	Leu	Lys	Phe	Gly	Ser	Gly	Ile	Lys	Tyr	Lys	Val	Asp	Asn	Arg	Gly	
65				70				75						80		
ctg	aag	atc	ttt	ctc	agc	ctg	ccg	tcg	acc	cag	cgc	tgg	atc	gtt	ctg	288
Leu	Lys	Ile	Phe	Leu	Ser	Leu	Pro	Ser	Thr	Gln	Arg	Trp	Ile	Val	Leu	
				85				90						95		
gct	ttg	gtg	tta	gtg	gca	ttc	att	tgg	ccg	ttc	ttc	gcc	tca	cgt	ggc	336
Ala	Leu	Val	Leu	Val	Ala	Phe	Ile	Trp	Pro	Phe	Phe	Ala	Ser	Arg	Gly	
			100					105					110			
gca	gtg	gat	atc	gcc	act	ctg	atc	ttg	atc	tac	gtg	atg	ctg	agt	att	384
Ala	Val	Asp	Ile	Ala	Thr	Leu	Ile	Leu	Ile	Tyr	Val	Met	Leu	Ser	Ile	
		115				120						125				
ggc	ttg	aat	atc	gtg	gtc	ggc	ctg	gcc	ggc	ctg	ctc	gac	ctg	ggc	tat	432
Gly	Leu	Asn	Ile	Val	Val	Gly	Leu	Ala	Gly	Leu	Leu	Asp	Leu	Gly	Tyr	
	130					135					140					
gtc	ggc	ttc	tac	gca	gtg	ggc	gca	tat	acc	tac	gcg	ctg	ctt	gcc	gag	480
Val	Gly	Phe	Tyr	Ala	Val	Gly	Ala	Tyr	Thr	Tyr	Ala	Leu	Leu	Ala	Glu	
145				150				155						160		
tac	gcc	ggc	ttc	ggc	ttc	tgg	agc	gct	ctg	ccc	atc	gct	gga	ata	atg	528
Tyr	Ala	Gly	Phe	Gly	Phe	Trp	Ser	Ala	Leu	Pro	Ile	Ala	Gly	Ile	Met	
				165				170						175		
gcg	gcg	ctg	ttc	ggc	ttt	ctg	ctt	ggc	ttc	ccg	gtg	ctg	cgc	ctg	cgc	576
Ala	Ala	Leu	Phe	Gly	Phe	Leu	Leu	Gly	Phe	Pro	Val	Leu	Arg	Leu	Arg	
			180					185					190			
ggc	gac	tac	ttg	gcg	atc	gtg	acg	ttg	ggc	ttc	ggc	gaa	atc	cgc		624
Gly	Asp	Tyr	Leu	Ala	Ile	Val	Thr	Leu	Gly	Phe	Gly	Glu	Ile	Ile	Arg	
		195				200						205				
atc	ttg	ctg	cgc	aac	ctg	acc	gat	atc	acc	ggc	ggc	ccc	aac	ggc	att	672
Ile	Leu	Leu	Arg	Asn	Leu	Thr	Asp	Ile	Thr	Gly	Gly	Pro	Asn	Gly	Ile	
	210				215						220					
ggc	tcg	atc	ccc	aag	ccg	act	ctg	ttc	ggc	ctt	agc	ttc	gaa	cgc	cgc	720
Gly	Ser	Ile	Pro	Lys	Pro	Thr	Leu	Phe	Gly	Leu	Ser	Phe	Glu	Arg	Arg	
225				230				235						240		
gca	cca	ggg	ggc	tta	cag	act	ttt	cat	gag	ttt	ttc	gat	atc	gac	tac	768
Ala	Pro	Gly	Gly	Leu	Gln	Thr	Phe	His	Glu	Phe	Phe	Asp	Ile	Asp	Tyr	
				245					250					255		
aac	agt	aac	tac	aag	gtg	atc	ctg	ctc	tat	atg	atc	gct	ttg	ctg	ctg	816

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gta	ctg	cta	gcc	ctg	ttc	gtg	atc	aac	cgg	ctg	ata	cgc	atg	ccg	atc	864
Val	Leu	Leu	Ala	Leu	Phe	Val	Ile	Asn	Arg	Leu	Ile	Arg	Met	Pro	Ile	
		275					280					285				
ggc	cgc	gcc	tg	gaa	gcg	ctg	cgt	gaa	gat	gaa	gta	gcc	tgc	cgt	gct	912
Gly	Arg	Ala	Trp	Glu	Ala	Leu	Arg	Glu	Asp	Glu	Val	Ala	Cys	Arg	Ala	
	290					295					300					
ctg	ggc	ctt	aac	ccg	act	ctt	gtc	aag	ctc	tct	gca	ttc	act	atc	gg	960
Leu	Gly	Leu	Asn	Pro	Thr	Leu	Val	Lys	Leu	Ser	Ala	Phe	Thr	Ile	Gly	
305					310					315					320	
gcc	gg	ttc	gct	gg	ttc	gcc	gg	tgc	ttc	ttc	gca	gct	cgc	cag	gg	1008
Ala	Gly	Phe	Ala	Gly	Phe	Ala	Gly	Cys	Phe	Phe	Ala	Ala	Arg	Gln	Gly	
				325				330						335		
cta	gtt	acg	ccg	gag	tcc	ttc	acc	ttc	att	gag	tcc	gtg	atg	atc	ctc	1056
Leu	Val	Thr	Pro	Glu	Ser	Phe	Thr	Phe	Ile	Glu	Ser	Val	Met	Ile	Leu	
			340					345					350			
gcg	atc	gtt	gta	ctc	gg	gg	atg	ggc	tca	cag	ctt	ggc	gta	atc	ctt	1104
Ala	Ile	Val	Val	Leu	Gly	Gly	Met	Gly	Ser	Gln	Leu	Gly	Val	Ile	Leu	
		355					360					365				
ggc	gcg	gta	gtg	atg	gta	ctg	ctc	tta	gag	cgg	cga	gag	ttc	gcc	gaa	1152
Gly	Ala	Val	Val	Met	Val	Leu	Leu	Leu	Glu	Arg	Arg	Glu	Phe	Ala	Glu	
		370				375					380					
tac	cgg	atg	ctg	atc	ttc	gg	ctg	gcc	atg	atc	gtg	atg	atg	atc	tg	1200
Tyr	Arg	Met	Leu	Ile	Phe	Gly	Leu	Ala	Met	Ile	Val	Met	Met	Ile	Trp	
385					390					395					400	
cgc	ccg	caa	gga	cta	ctg	ccg	atg	caa	cgc	ccg	cac	ttg	gag	ctg	aaa	1248
Arg	Pro	Gln	Gly	Leu	Leu	Pro	Met	Gln	Arg	Pro	His	Leu	Glu	Leu	Lys	
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Pro																

<210> 621

<211> 417

<212> PRT

<213> symbiont bacterium of Paederus fuscipes

<400> 621

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			20					25					30			
Lys	Leu	Gln	Val	Ile	Gly	Ala	Asp	Ala	Gln	Thr	Leu	Trp	Ser	Ile	Ala	
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		50				55					60					
Leu	Leu	Lys	Phe	Gly	Ser	Gly	Ile	Lys	Tyr	Lys	Val	Asp	Asn	Arg	Gly	
65					70					75					80	
Leu	Lys	Ile	Phe	Leu	Ser	Leu	Pro	Ser	Thr	Gln	Arg	Trp	Ile	Val	Leu	
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Ala	Leu	Val	Leu	Val	Ala	Phe	Ile	Trp	Pro	Phe	Phe	Ala	Ser	Arg	Gly	
			100					105					110			
Ala	Val	Asp	Ile	Ala	Thr	Leu	Ile	Leu	Ile	Tyr	Val	Met	Leu	Ser	Ile	
		115					120					125				
Gly	Leu	Asn	Ile	Val	Val	Gly	Leu	Ala	Gly	Leu	Leu	Asp	Leu	Gly	Tyr	
	130					135					140					
Val	Gly	Phe	Tyr	Ala	Val	Gly	Ala	Tyr	Thr	Tyr	Ala	Leu	Leu	Ala	Glu	
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Tyr	Ala	Gly	Phe	Gly	Phe	Trp	Ser	Ala	Leu	Pro	Ile	Ala	Gly	Ile	Met	
				165					170					175		
Ala	Ala	Leu	Phe	Gly	Phe	Leu	Leu	Gly	Phe	Pro	Val	Leu	Arg	Leu	Arg	
			180					185					190			
Gly	Asp	Tyr	Leu	Ala	Ile	Val	Thr	Leu	Gly	Phe	Gly	Glu	Ile	Ile	Arg	
	195						200					205				
Ile	Leu	Leu	Arg	Asn	Leu	Thr	Asp	Ile	Thr	Gly	Gly	Pro	Asn	Gly	Ile	
	210					215					220					
Gly	Ser	Ile	Pro	Lys	Pro	Thr	Leu	Phe	Gly	Leu	Ser	Phe	Glu	Arg	Arg	
225					230					235					240	

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Ala Pro Gly Gly Leu Gln Thr Phe His Glu Phe Phe Asp Ile Asp Tyr
 245 250 255
 Asn Ser Asn Tyr Lys Val Ile Leu Leu Tyr Met Ile Ala Leu Leu
 260 265 270
 Val Leu Leu Ala Leu Phe Val Ile Asn Arg Leu Ile Arg Met Pro Ile
 275 280 285
 Gly Arg Ala Trp Glu Ala Leu Arg Glu Asp Glu Val Ala Cys Arg Ala
 290 295 300
 Leu Gly Leu Asn Pro Thr Leu Val Lys Leu Ser Ala Phe Thr Ile Gly
 305 310 315 320
 Ala Gly Phe Ala Gly Phe Ala Gly Cys Phe Phe Ala Ala Arg Gln Gly
 325 330 335
 Leu Val Thr Pro Glu Ser Phe Thr Phe Ile Glu Ser Val Met Ile Leu
 340 345 350
 Ala Ile Val Val Leu Gly Gly Met Gly Ser Gln Leu Gly Val Ile Leu
 355 360 365
 Gly Ala Val Val Met Val Leu Leu Glu Arg Arg Glu Phe Ala Glu
 370 375 380
 Tyr Arg Met Leu Ile Phe Gly Leu Ala Met Ile Val Met Met Ile Trp
 385 390 395 400
 Arg Pro Gln Gly Leu Leu Pro Met Gln Arg Pro His Leu Glu Leu Lys
 405 410 415
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<210> 622

<211> 879

<212> DNA

<213> Alcaligenes eutrophus

<220>

<221> CDS

<222> (1)..(879)

<400> 622

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1 5 10 15	
atg gtg ctg ttc ctg gtc gct tcg ggc atg acg ctg atc ttc ggc acg	96
Met Val Leu Phe Leu Val Ala Ser Gly Met Thr Leu Ile Phe Gly Thr	
20 25 30	
ctg cgc gtc gcc aat ttc gcg cac ggc tcc ttc tac atg atc gcg gcc	144
Leu Arg Val Ala Asn Phe Ala His Gly Ser Phe Tyr Met Ile Ala Ala	
35 40 45	
tac ctg agc ttc acg ctc acg cgc tgg gtc ggc cac gga acc tgg ggc	192
Tyr Leu Ser Phe Thr Leu Thr Arg Trp Val Gly His Gly Thr Trp Gly	
50 55 60	
ttc gtc gtc tcg ctg gtc gtg gcg ccg ctc atc gtc gca ctg ctc ggg	240
Phe Val Val Ser Leu Val Val Ala Pro Leu Ile Val Ala Leu Leu Gly	
65 70 75 80	
ctg gtg gtc gag cgc ttc ctg ctg cgc cgc atc gcc acg cgc gcc cac	288
Leu Val Val Glu Arg Phe Leu Leu Arg Arg Ile Ala Thr Arg Ala His	
85 90 95	
cag tac cag ctg atc ctg acc tat gcg ctg acg ctg atc ctg gcg gat	336
Gln Tyr Gln Leu Ile Leu Thr Tyr Ala Leu Thr Leu Ile Leu Ala Asp	
100 105 110	
gcc gtg aag atg atc tgg ggc cgc gac aac ttc acg gtg ccg cgc ccc	384
Ala Val Lys Met Ile Trp Gly Arg Asp Asn Phe Thr Val Pro Arg Pro	
115 120 125	
ggc gcg ctc gac ggc gcc ttc gac atc ttc ggc acg ccc ttc ccg agc	432
Gly Ala Leu Asp Gly Ala Phe Asp Ile Phe Gly Thr Pro Phe Pro Ser	
130 135 140	
tac tac gcg ctc ttg atc gtg gtc ggc gcc gtc atc gcc gtc gcg ctg	480
Tyr Tyr Ala Leu Leu Ile Val Val Gly Ala Val Ile Ala Val Ala Leu	
145 150 155 160	
cac ctg ctg ctg acg cgc acg cgc ttc ggc aag gtg ctg cgc gcc tcg	528
His Leu Leu Leu Thr Arg Thr Arg Phe Gly Lys Val Leu Arg Ala Ser	
165 170 175	
gtc gcc gac ggc cag atg gtg ggc gcg ctc ggc atc gac gtg ccg cgc	576

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Val	Ala	Asp	Gly	Gln	Met	Val	Gly	Ala	Leu	Gly	Ile	Asp	Val	Pro	Arg	
			180					185					190			
ctg	tac	acc	ggc	gtg	ttc	gcg	ctc	ggc	tgg	ctg	gcc	ggc	ctg	ggc		624
Leu	Tyr	Thr	Gly	Val	Phe	Ala	Leu	Gly	Ala	Trp	Leu	Ala	Gly	Leu	Gly	
		195					200				205					
ggt	gcc	ctg	gcg	gcg	ccg	gtg	ggc	tcg	atc	tcg	ctg	ggc	atc	gac	agc	672
Gly	Ala	Leu	Ala	Ala	Pro	Val	Gly	Ser	Ile	Ser	Leu	Gly	Ile	Asp	Ser	
	210					215					220					
tcg	atc	atc	atc	gaa	tgc	ttc	gcg	gtc	gtg	atc	atc	ggc	ggc	gtc	ggc	720
Ser	Ile	Ile	Ile	Glu	Cys	Phe	Ala	Val	Val	Ile	Ile	Gly	Gly	Val	Gly	
	225				230					235						
agc	gtc	ggc	ggc	gcc	ctg	ctc	ggc	gcg	ctg	atc	atc	ggc	gtg	acc	aag	768
Ser	Val	Gly	Gly	Ala	Leu	Leu	Gly	Ala	Leu	Ile	Ile	Gly	Val	Thr	Lys	
				245					250					255		
tcg	gtc	ggc	atc	ctg	ttc	gcg	ccc	aag	ctg	gcg	atc	gcc	ttc	atc	ttc	816
Ser	Val	Gly	Ile	Leu	Phe	Ala	Pro	Lys	Leu	Ala	Ile	Ala	Phe	Ile	Phe	
			260					265					270			
att	gcg	ctg	tgc	gcg	gtg	ctg	gtg	ctg	cgg	ccg	cag	ggc	ctg	ctg	ggc	864
Ile	Ala	Leu	Cys	Ala	Val	Leu	Val	Leu	Arg	Pro	Gln	Gly	Leu	Leu	Gly	
		275					280					285				
cgc	agc	acg	gcc	tga												879
Arg	Ser	Thr	Ala													
		290														

<210> 623

<211> 292

<212> PRT

<213> Alcaligenes eutrophus

<400> 623

Met	Phe	Gln	Ser	Ile	Leu	Val	Gln	Ala	Leu	Ser	Gly	Val	Ser	Ser	Gly	
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			20					25					30			
Leu	Arg	Val	Ala	Asn	Phe	Ala	His	Gly	Ser	Phe	Tyr	Met	Ile	Ala	Ala	
		35					40					45				
Tyr	Leu	Ser	Phe	Thr	Leu	Thr	Arg	Trp	Val	Gly	His	Gly	Thr	Trp	Gly	
		50				55					60					
Phe	Val	Val	Ser	Leu	Val	Val	Ala	Pro	Leu	Ile	Val	Ala	Leu	Leu	Gly	
65				70						75				80		
Leu	Val	Val	Glu	Arg	Phe	Leu	Leu	Arg	Arg	Ile	Ala	Thr	Arg	Ala	His	
				85					90					95		
Gln	Tyr	Gln	Leu	Ile	Leu	Thr	Tyr	Ala	Leu	Thr	Leu	Ile	Leu	Ala	Asp	
			100					105					110			
Ala	Val	Lys	Met	Ile	Trp	Gly	Arg	Asp	Asn	Phe	Thr	Val	Pro	Arg	Pro	
		115					120					125				
Gly	Ala	Leu	Asp	Gly	Ala	Phe	Asp	Ile	Phe	Gly	Thr	Pro	Phe	Pro	Ser	
	130				135						140					
Tyr	Tyr	Ala	Leu	Leu	Ile	Val	Val	Gly	Ala	Val	Ile	Ala	Val	Ala	Leu	
145				150						155					160	
His	Leu	Leu	Leu	Thr	Arg	Thr	Arg	Phe	Gly	Lys	Val	Leu	Arg	Ala	Ser	
				165					170					175		
Val	Ala	Asp	Gly	Gln	Met	Val	Gly	Ala	Leu	Gly	Ile	Asp	Val	Pro	Arg	
			180					185					190			
Leu	Tyr	Thr	Gly	Val	Phe	Ala	Leu	Gly	Ala	Trp	Leu	Ala	Gly	Leu	Gly	
		195					200					205				
Gly	Ala	Leu	Ala	Ala	Pro	Val	Gly	Ser	Ile	Ser	Leu	Gly	Ile	Asp	Ser	
	210				215						220					
Ser	Ile	Ile	Ile	Glu	Cys	Phe	Ala	Val	Val	Ile	Ile	Gly	Gly	Val	Gly	
225					230					235					240	
Ser	Val	Gly	Gly	Ala	Leu	Leu	Gly	Ala	Leu	Ile	Ile	Gly	Val	Thr	Lys	
				245					250					255		
Ser	Val	Gly	Ile	Leu	Phe	Ala	Pro	Lys	Leu	Ala	Ile	Ala	Phe	Ile	Phe	
			260					265					270			
Ile	Ala	Leu	Cys	Ala	Val	Leu	Val	Leu	Arg	Pro	Gln	Gly	Leu	Leu	Gly	
		275					280					285				
Arg	Ser	Thr	Ala													
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<210> 624
 <211> 882
 <212> DNA
 <213> Rhizobium sp

<220>
 <221> CDS
 <222> (1)..(882)

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<400> 624
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1
atc tac gcg tcc ctg gcg ctg gcc ttg gtc ctg atc ttc cgt gcg acg      96
Ile Tyr Ala Ser Leu Ala Leu Ala Leu Val Leu Ile Phe Arg Ala Thr
20
cgc atc gtc aat ttc ggg caa ggc gaa atg gcc acc ttc tcg gct tat      144
Arg Ile Val 35 Asn Phe Gly Gln Gly 40 Glu Met Ala Thr Phe 45 Ser Ala Tyr
35
tgt gcc tgg cag ctc tat gaa tgg ggc atg ccg atg atg ctt tcc ttc      192
Cys Ala Trp Gln Leu Tyr Glu Trp Gly Met Pro Met Met Leu Ser Phe
50
ctc gtc gtc ggc gtc ttc gcg ttc gtg ctc ggc atc ggc att ttc cgc      240
Leu Val Val Gly Val Phe 70 Ala Phe Val Leu Gly 75 Ile Gly Ile Phe Arg
65
ttc gtc atc agg ccg gtt tct aag gcc ccg gtc gag gcc gtc gtc gtc      288
Phe Val Ile Arg Pro Val Ser Lys Ala Pro Val Glu Ala Val Val Val
85
gtg acg ctc ggc ctc ttc gtc gtc ttc cag gcg cta tcc ctg tgg ctc      336
Val Thr Leu Gly 100 Leu Phe Val Val Phe 105 Gln Ala Leu Ser 110 Trp Leu
100
tgg ggt tcc gac cag cgt gct ttt ccc tcg ctg ttc ccg aac atc ggc      384
Trp Gly Ser Asp Gln Arg Ala Phe 120 Pro Ser Leu Phe Pro Asn Ile Gly
115
tgg gat ttc ctt ggc gtg cgc atg acg gca agt gcg gcc ggc atg atc      432
Trp Asp Phe Leu Gly Val Arg 135 Met Thr Ala Ser 140 Ala Ala Gly Met Ile
130
gcc ctt ctg ctc tgt ctc gcc gtg gcc acg ggc gcg gtc ttt cgc ttc      480
Ala Leu Leu Leu Cys Leu 150 Ala Val Ala Thr Gly 155 Ala Val Phe Arg Phe
145
aca cgg ctt ggc ctc gcc atg cga gcc tcc gcc ttt gat ggc gag aag      528
Thr Arg Leu Gly 165 Ala Met Arg Ala Ser 170 Ala Phe Asp Gly Glu Lys
165
agc ctg ctt gtt ggg atc ccc gtc gaa cgg atg ctg atg ctc ggc tgg      576
Ser Leu Leu Val 180 Gly Ile Pro Val Glu 185 Arg Met Leu Met Leu Gly Trp
180
ggc ttt gcc gcg gtg att ggc ttc gtc gcg gcg ctt ctg gtc ggc ccg      624
Gly Phe Ala Ala Val Ile Gly Phe Val Ala Ala Leu Leu Val Gly Pro
195
cgg ctg ttc ctg agc ccg acg atg atg atg ccg atc ctg ctc tac gcc      672
Arg Leu Phe Leu Ser Pro Thr 215 Met Met Met Pro Ile Leu Leu Tyr Ala
210
ctg gcg tcg gcg acc ctt ggc ggc tgg gac agc ccg ctc ggc gcg atg      720
Leu Ala Ser Ala Thr Leu 230 Gly Gly Trp Asp Ser 235 Pro Leu Gly Ala Met
225
atc ggc ggt ctg att gtc ggt gtg gcg gaa agc ctc ggc gcg acc ttt      768
Ile Gly Gly Leu 245 Val Gly Val Ala Glu 250 Ser Leu Gly Ala Thr Phe
245
ctc ccc ttc atc ggt gcg gat ctg cgc gtg gtg atc ccg ata ctc gtc      816
Leu Pro Phe Ile Gly Ala Asp Leu Arg 265 Val Val Ile Pro Ile Leu Val
260
act ctc gtc gtc ctg ctc gtt cgg ccg gtc ggt ctc ttc ggt act cgc      864
Thr Leu Val 275 Val Leu Val Arg 280 Pro Val Gly Leu 285 Phe Gly Thr Arg
275
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Thr Val Val Lys Leu
290

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<210> 625

<211> 293
 <212> PRT
 <213> Rhizobium sp

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 Arg Ile Val Asn Phe Gly Gln Gly Glu Met Ala Thr Phe Ser Ala Tyr
 35 40 45
 Cys Ala Trp Gln Leu Tyr Glu Trp Gly Met Pro Met Leu Ser Phe
 50 55 60
 Leu Val Val Gly Val Phe Ala Phe Val Leu Gly Ile Gly Ile Phe Arg
 65 70 75 80
 Phe Val Ile Arg Pro Val Ser Lys Ala Pro Val Glu Ala Val Val Val
 85 90 95
 Val Thr Leu Gly Leu Phe Val Val Phe Gln Ala Leu Ser Leu Trp Leu
 100 105 110
 Trp Gly Ser Asp Gln Arg Ala Phe Pro Ser Leu Phe Pro Asn Ile Gly
 115 120 125
 Trp Asp Phe Leu Gly Val Arg Met Thr Ala Ser Ala Ala Gly Met Ile
 130 135 140
 Ala Leu Leu Leu Cys Leu Ala Val Ala Thr Gly Ala Val Phe Arg Phe
 145 150 155 160
 Thr Arg Leu Gly Leu Ala Met Arg Ala Ser Ala Phe Asp Gly Glu Lys
 165 170 175
 Ser Leu Leu Val Gly Ile Pro Val Glu Arg Met Leu Met Leu Gly Trp
 180 185 190
 Gly Phe Ala Val Ile Gly Phe Val Ala Ala Leu Leu Val Gly Pro
 195 200 205
 Arg Leu Phe Leu Ser Pro Thr Met Met Met Pro Ile Leu Leu Tyr Ala
 210 215 220
 Leu Ala Ser Ala Thr Leu Gly Gly Trp Asp Ser Pro Leu Gly Ala Met
 225 230 235 240
 Ile Gly Gly Leu Ile Val Gly Val Ala Glu Ser Leu Gly Ala Thr Phe
 245 250 255
 Leu Pro Phe Ile Gly Ala Asp Leu Arg Val Val Ile Pro Ile Leu Val
 260 265 270
 Thr Leu Val Val Leu Leu Val Arg Pro Val Gly Leu Phe Gly Thr Arg
 275 280 285
 Thr Val Val Lys Leu
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<210> 626
 <211> 921
 <212> DNA
 <213> Desulfovibrio vulgaris

<220>
 <221> CDS
 <222> (1)..(921)

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 Met Glu Thr Phe Ile Gln Asn Ile Phe Asn Ala Leu Gln Trp Gly Ser 15
 1 5 10
 ttc tac gcc ctc atc gcg ctc ggt tat acg ctg gtg tac ggc gta ctt 96
 Phe Tyr Ala Leu Ile Ala Leu Gly Tyr Thr Leu Val Tyr Gly Val Leu 20 25 30
 ctg ctc atc aac ttc gcc cac ggc gac atc ttc atg gtg ggc gcg tac 144
 Leu Leu Ile Asn Phe Ala His Gly Asp Ile Phe Met Val Gly Ala Tyr 35 40 45
 atc tcg ttc ttc gtt gcc tcc atc ctg ctc ggg cag ata ggg gga ttc 192
 Ile Ser Phe Phe Val Ala Ser Ile Leu Leu Gly Gln Ile Gly Gly Phe 50 55 60
 ttc gaa ctt tcg ggg ccc atg gcc ctt gcc ctc acc gtg ccg ctg acc 240
 Phe Glu Leu Ser Gly Pro Met Ala Leu Ala Leu Thr Val Pro Leu Thr 65 70 75 80

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atg gtc ctg acc gca ggc gtc ggg gtc acc ctc gaa cgg gtg gcc tac	288
Met Val Leu Thr Ala 85 Gly Val Gly Val Thr 90 Leu Glu Arg Val Ala 95 Tyr	
aga ccc ctg cgc cgc aag ggg gcc cac cgc ctg tat gtg gtc atc acc	336
Arg Pro Leu Arg Arg Lys Gly Ala His 105 Arg Leu Tyr Val Val 110 Ile Thr	
gca ctc atg tgc ggc atc atg ctc gag aac ggc aac ctc gcc ctg ctg	384
Ala Leu Met 115 Cys Gly Ile Met 120 Leu Glu Asn Gly Asn 125 Ala Leu Leu	
ggc gcc agc cgc aag gct ctg ccg gag atg atc gac aag gtg gtg tac	432
Gly Ala Ser Arg Lys Ala Leu Pro Glu Met Ile Asp 140 Lys Val Val Tyr	
acc atc ggc acc gtt tgc ctg acc aac ctg aag ctc atg gtc atc gtc	480
Thr Ile Gly Thr Val Ser 150 Val Thr Asn Leu Lys 155 Leu Met Val Ile Val 160	
acc gcc ttt ctc gtc ttc gcg ctt ctg cag ttc atc gtc acg cgt acc	528
Thr Ala Phe Leu Val 165 Phe Ala Leu Leu Gln Phe Ile Val Thr Arg 175 Thr	
cgc atc ggc atg gcc atg cgc gcg gtg gcg tgg gac aag ttc gcg ctg	576
Arg Ile Gly Met 180 Ala Met Arg Ala Val 185 Ala Trp Asp Lys Phe Ala Leu	
ccg ctc atg ggt atc ccg ctc gac agt atc atc gtc ttc acc ttc gtg	624
Pro Leu Met 195 Gly Ile Pro Leu Asp 200 Ser Ile Ile Val Phe Thr Phe Val	
ctc ggc tcc ggt ttt gcc ggt ctt gcg ggg ctg ctc ttc gcc atg tcg	672
Leu Gly Ser Gly Phe Ala Gly Leu Ala Gly Leu Leu Phe Ala Met Ser	
tac ccc atc ctc gat ccc tac atg gga gcc atg gtg ggg tgg aag gcc	720
Tyr Pro Ile Leu Asp Pro 230 Tyr Met Gly Ala Met 235 Val Gly Trp Lys Ala 240	
ttc atc gcc gcc gtc gtg ggc ggc ata ggc gat atc cgc ggg gcg ttc	768
Phe Ile Ala Ala Val 245 Val Gly Gly Ile Gly Asp Ile Arg Gly Ala Phe 255	
atc gga ggc ttc ctg ctg gcg ttc atc gag atc atg gtg gcg gcg gtc	816
Ile Gly Gly Phe 260 Leu Leu Ala Phe 265 Ile Glu Ile Met Val 270 Ala Ala Val	
ttc ccc tcc acg ttc cgc gac ctg ttc gcc ttc tcg att ctg ctc ttc	864
Phe Pro Ser Thr Phe Arg Asp 280 Leu Phe Ala Phe Ser Ile Leu Leu Phe	
atc atg tgg cag cgg ccc acc gga ctg ttc ggc gtg gcg aag acc acc	912
Ile Met Trp Gln Arg Pro 295 Gly Leu Phe Gly Val Ala Lys Thr Thr	
aag atc taa	921
Lys Ile	
305	

<210> 627

<211> 306

<212> PRT

<213> Desulfovibrio vulgaris

<400> 627

Met Glu Thr Phe Ile Gln Asn Ile Phe Asn Ala Leu Gln Trp Gly Ser	
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20 25 30	
Leu Leu Ile Asn Phe Ala His Gly Asp Ile Phe Met Val Gly Ala Tyr	
35 40 45	
Ile Ser Phe Phe Val Ala Ser Ile Leu Leu Gly Gln Ile Gly Gly Phe	
50 55 60	
Phe Glu Leu Ser Gly Pro Met Ala Leu Ala Leu Thr Val Pro Leu Thr	
65 70 75 80	
Met Val Leu Thr Ala Gly Val Gly Val Thr 90 Leu Glu Arg Val Ala Tyr	
85 95	
Arg Pro Leu Arg Arg Lys Gly Ala His Arg Leu Tyr Val Val Ile Thr	
100 105 110	
Ala Leu Met Cys Gly Ile Met Leu Glu Asn Gly Asn Leu Ala Leu Leu	
115 120 125	
Gly Ala Ser Arg Lys Ala Leu Pro Glu Met Ile Asp Lys Val Val Tyr	

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130	Thr	Ile	Gly	Thr	Val	135	Val	Thr	Asn	Leu	140	Lys	Leu	Met	Val	Ile	Val
145	Thr	Ala	Phe	Leu	Val	150	Phe	Ala	Leu	Leu	155	Gln	Phe	Ile	Val	Thr	Arg
					165	Met	Arg	Ala	Val	170	Ala	Trp	Asp	Lys	Phe	Ala	Leu
Arg	Ile	Gly	Met	Ala	180	Ile	Pro	Leu	Asp	185	Ser	Ile	Ile	Val	Phe	Thr	Phe
Pro	Leu	Met	Gly	Phe	195	Ala	Gly	Leu	Ala	200	Gly	Leu	Leu	Phe	Ala	Met	Ser
Leu	Gly	Ser	Gly	Leu	210	Pro	Tyr	Met	Gly	215	Ala	Met	Val	Gly	Trp	Lys	Ala
Tyr	Pro	Ile	Leu	Asp	225	Val	Gly	Gly	Ile	230	Gly	Asp	Ile	Arg	Gly	Ala	Phe
Phe	Ile	Ala	Ala	Val	245	Leu	Leu	Ala	Phe	250	Glu	Ile	Met	Val	Ala	Ala	Val
Ile	Gly	Gly	Phe	Leu	260	Arg	Asp	Leu	Phe	265	Ala	Phe	Ser	Ile	Leu	Leu	Phe
Phe	Pro	Ser	Thr	Phe	275	Pro	Thr	Gly	Leu	280	Phe	Gly	Val	Ala	Lys	Thr	Thr
Ile	Met	Trp	Gln	Arg	290					295							
Lys	Ile				305												

<210> 628

<211> 906

<212> DNA

<213> Desulfovibrio vulgaris

<220>

<221> CDS

<222> (1)..(906)

<400> 628

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1				5				10					15				
atc	tac	gcc	ctc	atc	gcc	ctc	ggg	tac	acc	atg	gtg	tac	ggc	gtg	ctc		96
Ile	Tyr	Ala	Leu	Ile	Ala	Leu	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Val	Leu		
			20				25					30					
aaa	ctc	atc	aac	ttc	gcg	cat	ggc	gac	ctg	ttc	acc	atc	gga	gcc	tat		144
Lys	Leu	Ile	Asn	Phe	Ala	His	Gly	Asp	Leu	Phe	Thr	Ile	Gly	Ala	Tyr		
			35				40					45					
ctc	ggg	ttc	acg	gtg	ttc	gcc	gcg	ctg	ggg	ctt	tcg	ggg	cat	gtc	tcc		192
Leu	Gly	Phe	Thr	Val	Phe	Ala	Ala	Leu	Gly	Leu	Ser	Gly	His	Val	Ser		
			50			55					60						
ggg	gcg	gtg	gcc	gta	ttg	ctg	gtc	acg	acc	atg	gtc	atg	ggg	ctt	gtg		240
Gly	Ala	Val	Ala	Val	Leu	Leu	Val	Thr	Thr	Met	Val	Met	Gly	Leu	Val		
					70			75							80		
gca	ctc	atc	ggc	tat	ctg	ctt	gaa	cgt	gtg	gcc	tac	cgg	cca	ttg	cgc		288
Ala	Leu	Ile	Gly	Tyr	Leu	Leu	Glu	Arg	Val	Ala	Tyr	Arg	Pro	Leu	Arg		
				85				90						95			
tcg	tca	agc	cgc	ctc	tct	gcc	gtg	gtc	tct	gcg	ctt	ggt	gcc	tcc	atc		336
Ser	Ser	Ser	Arg	Leu	Ser	Ala	Val	Val	Ser	Ala	Leu	Gly	Ala	Ser	Ile		
			100				105					110					
ttc	ttc	cag	aac	gcc	gtg	atg	ctc	atc	tac	ggt	gcc	aag	ttc	caa	gtc		384
Phe	Phe	Gln	Asn	Ala	Val	Met	Leu	Ile	Tyr	Gly	Ala	Lys	Phe	Gln	Val		
			115				120					125					
tac	ccc	aac	gac	atc	agg	ccc	acc	atg	gcc	gtg	agc	ttc	ttc	ggc	atg		432
Tyr	Pro	Asn	Asp	Ile	Arg	Pro	Thr	Met	Ala	Val	Ser	Phe	Phe	Gly	Met		
						135					140						
gac	atc	cct	ctg	gtg	cgc	atc	atg	atg	ttc	ggt	gct	tct	gtg	gcg	ctc		480
Asp	Ile	Pro	Leu	Val	Arg	Ile	Met	Met	Phe	Gly	Ala	Ser	Val	Ala	Leu		
					150					155					160		
atg	ctg	ctt	ctg	cat	ttc	ttc	atc	cac	cgc	acc	cgc	acg	ggc	act	gcc		528
Met	Leu	Leu	Leu	His	Phe	Phe	Ile	His	Arg	Thr	Arg	Thr	Gly	Thr	Ala		
				165				170						175			
atc	cgc	gcc	gtg	gcc	atc	gac	cag	ggc	gcg	gcc	aag	ctc	atg	ggc	atc		576
Ile	Arg	Ala	Val	Ala	Ile	Asp	Gln	Gly	Ala	Ala	Lys	Leu	Met	Gly	Ile		

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gac Asp	gtg Val	aac Asn 195	cgg Arg	gtc Val	atc Ile	gcg Ala	ctg Leu 200	gtg Val	ttc Phe	atg Met	atc Ile	ggc Gly 205	cct Pro	gca Ala	ctg Leu	624
ggg Gly	ggc Gly 210	gcc Ala	gca Ala	ggc Gly	gtc Val	atg Met 215	gta Val	ggc Gly	ctc Leu	tac Tyr	tat Tyr 220	ggg Gly	cag Gln	ata Ile	gac Asp	672
ttc Phe 225	acc Thr	atg Met	ggg Gly	tgg Trp	gtg Val 230	tac Tyr	ggc Gly	ctc Leu	aag Lys	gcc Ala 235	ttc Phe	acc Thr	gcc Ala	gcc Ala	atc Ile 240	720
ctc Leu	ggg Gly	ggc Gly	atc Ile	ggc Gly 245	aac Asn	atc Ile	ccc Pro	ggg Gly	gcc Ala 250	atg Met	gtg Val	ggc Gly	ggg Gly	ctt Leu 255	ctg Leu	768
ctg Leu	ggc Gly	gtc Val	atc Ile 260	gag Glu	gcc Ala	ctc Leu	ggg Gly	gcg Ala 265	gca Ala	tac Tyr	atc Ile	tcc Ser	atc Ile 270	gcg Ala	tgg Trp	816
aaa Lys	gac Asp	gcc Ala 275	atc Ile	gcc Ala	ttc Phe	ctc Leu	gtc Val 280	ctc Leu	atc Ile	ctc Leu	atc Ile	ctg Leu 285	atc Ile	atc Ile	agg Arg	864
ccc Pro	acg Thr 290	ggc Gly	ctt Leu	ctc Leu	ggc Gly	gaa Glu 295	agg Arg	gtg Val	gcc Ala	gac Asp	aag Lys 300	ata Ile	tga			906

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<211> 301
<212> PRT
<213> Desulfovibrio vulgaris
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Ile	Tyr	Ala	Leu 20	Ile	Ala	Leu	Gly	Tyr 25	Thr	Met	Val	Tyr	Gly 30	Val	Leu
Lys	Leu	Ile 35	Asn	Phe	Ala	His	Gly 40	Asp	Leu	Phe	Thr	Ile 45	Gly	Ala	Tyr
Leu	Gly 50	Phe	Thr	Val	Phe	Ala 55	Ala	Leu	Gly	Leu	Ser 60	Gly	His	Val	Ser
Gly 65	Ala	Val	Ala	Val	Leu 70	Leu	Val	Thr	Thr	Met 75	Val	Met	Gly	Leu	Val 80
Ala	Leu	Ile	Gly	Tyr 85	Leu	Leu	Glu	Arg	Val 90	Ala	Tyr	Arg	Pro	Leu 95	Arg
Ser	Ser	Ser	Arg 100	Leu	Ser	Ala	Val	Val 105	Ser	Ala	Leu	Gly	Ala 110	Ser	Ile
Phe	Phe	Gln 115	Asn	Ala	Val	Met	Leu 120	Ile	Tyr	Gly	Ala	Lys 125	Phe	Gln	Val
Tyr	Pro	Asn	Asp	Ile	Arg	Pro 135	Thr	Met	Ala	Val	Ser 140	Phe	Phe	Gly	Met
Asp 145	Ile	Pro	Leu	Val	Arg 150	Ile	Met	Met	Phe	Gly 155	Ala	Ser	Val	Ala	Leu 160
Met	Leu	Leu	Leu	His 165	Phe	Phe	Ile	His	Arg 170	Thr	Arg	Thr	Gly	Thr 175	Ala
Ile	Arg	Ala	Val 180	Ala	Ile	Asp	Gln	Gly 185	Ala	Ala	Lys	Leu	Met 190	Gly	Ile
Asp	Val	Asn 195	Arg	Val	Ile	Ala	Leu 200	Val	Phe	Met	Ile	Gly 205	Pro	Ala	Leu
Gly	Gly 210	Ala	Ala	Gly	Val	Met 215	Val	Gly	Leu	Tyr	Tyr 220	Gly	Gln	Ile	Asp
Phe 225	Thr	Met	Gly	Trp	Val 230	Tyr	Gly	Leu	Lys	Ala 235	Phe	Thr	Ala	Ala	Ile 240
Leu	Gly	Gly	Ile	Gly 245	Asn	Ile	Pro	Gly	Ala 250	Met	Val	Gly	Gly	Leu 255	Leu
Leu	Gly	Val	Ile 260	Glu	Ala	Leu	Gly	Ala 265	Ala	Tyr	Ile	Ser	Ile 270	Ala	Trp
Lys	Asp	Ala 275	Ile	Ala	Phe	Leu	Val 280	Leu	Ile	Leu	Ile	Leu 285	Ile	Ile	Arg
Pro	Thr 290	Gly	Leu	Leu	Gly	Glu 295	Arg	Val	Ala	Asp	Lys 300	Ile			

$\langle 210 \rangle$ 630

<211> 1224
 <212> DNA
 <213> *Desulfovibrio vulgaris*

<220>
 <221> CDS
 <222> (1)..(1224)

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Met Gln Gly Ile Ile Lys Ser Leu Gln Val Gly Leu Trp Phe Met Phe
   1           5          10          15
ctg acc ttt ccg ctg atg gtc ata cgg gtc gac acg ctg aac ggt acg      96
Leu Thr Phe Pro Leu Met Val Ile Arg Val Asp Thr Leu Asn Gly Thr
           20          25          30
gtg gac tgg cgg tgg cag aac atg gtc atg atg ggg ctt gga acc ttc      144
Val Asp Trp Arg Trp Gln Asn Met Val Met Met Gly Leu Gly Thr Phe
           35          40          45
gcc ctg tcg ttc ctg tgg cgc tat atg ctc gcc cgc aag gaa gcg ggg      192
Ala Leu Ser Phe Leu Trp Arg Tyr Met Leu Ala Arg Lys Glu Ala Gly
           50          55          60
ggc gca tct gcc cgg cag ggc aac gcc gcc gcc ggc ggg ctg atg gcc      240
Gly Ala Ser Ala Arg Gln Gly Asn Ala Ala Ala Gly Gly Leu Met Ala
           65          70          75
cgc gtg cgc agt gac gcc cga ctc cgg acc ccg gcg ctg ctt gcg gtg      288
Arg Val Arg Ser Asp Ala Arg Leu Arg Thr Pro Ala Leu Leu Ala Val
           85          90          95
ctt gtg gtg ttc gcc gtg ctg ccc atg ctg gtc tcc acc tat cag acc      336
Leu Val Val Phe Ala Val Leu Pro Met Leu Val Ser Thr Tyr Gln Thr
           100          105          110
aac atc atg att tcg gcc ctg ctc tac gtg atg ctc ggc ctc ggg ctg      384
Asn Ile Met Ile Ser Ala Leu Leu Tyr Val Met Leu Gly Leu Gly Leu
           115          120          125
aac atc gtc gtg ggc ctt tcc ggt cag ctt gtg ctc ggc tac gtg gcc      432
Asn Ile Val Val Gly Leu Ser Gly Gln Leu Val Leu Gly Tyr Val Ala
           130          135          140
ttc tac gcc gtg ggc gcc tac gcc tac gcc ctg ctc aac gcg gac ttc      480
Phe Tyr Ala Val Gly Ala Tyr Ala Tyr Ala Leu Leu Asn Ala Asp Phe
           145          150          155
ggt ctc ggc ttc tgg acg gtg ctg ccc atc ggg gga gct ctg gct gcc      528
Gly Leu Gly Phe Trp Thr Val Leu Pro Ile Gly Gly Ala Leu Ala Ala
           165          170          175
gtc ttc ggc atc ctg ctc ggt ttt ccg gtg ctg cgg ctg aag ggc gac      576
Val Phe Gly Ile Leu Leu Gly Phe Pro Val Leu Arg Leu Lys Gly Asp
           180          185          190
tat ctt gcc atc gtc acg ctg ggc ttc ggt gaa atc gtc cgc ctc gtg      624
Tyr Leu Ala Ile Val Thr Leu Gly Phe Gly Glu Ile Val Arg Leu Val
           195          200          205
ctg gaa aac tgg ggc agt gtc acg cgc ggt ccc agc ggc atc tcc aag      672
Leu Glu Asn Trp Gly Ser Val Thr Arg Gly Pro Ser Gly Ile Ser Lys
           210          215          220
atc gcc cgc ccc ggt ctt ttc ggc atg gaa ctg tcg gtg agc gaa gcc      720
Ile Ala Arg Pro Gly Leu Phe Gly Met Glu Leu Ser Val Ser Glu Ala
           225          230          235
acc acc tac atc tat tac ctc atc ctt gcg gcg gtg att ttc acc atc      768
Thr Thr Tyr Ile Tyr Tyr Leu Ile Leu Ala Ala Val Ile Phe Thr Ile
           245          250          255
ttc gcc gtg gga cgc ctc aag gac tcg cgc ata gga cgc gcc tgg cag      816
Phe Ala Val Gly Arg Leu Lys Asp Ser Arg Ile Gly Arg Ala Trp Gln
           260          265          270
gcc ctg cgc gaa gac gaa atc gcc tgc gag gcc atg ggc atc gac ctc      864
Ala Leu Arg Glu Asp Glu Ile Ala Cys Glu Ala Met Gly Ile Asp Leu
           275          280          285
acc acc acc aag ctc acg gct ttc gcg ctg gga gcg tgc tgg gcc ggc      912
Thr Thr Thr Lys Leu Thr Ala Phe Ala Leu Gly Ala Cys Trp Ala Gly
           290          295          300
ttc gcc ggg gtc atc ttc gcg gcc aag acc acc ttc atc aac ccc gcc      960
Phe Ala Gly Val Ile Phe Ala Ala Lys Thr Thr Phe Ile Asn Pro Ala
           305          310          320

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agc	ttc	acc	ttc	ctc	gaa	tcg	gcg	atg	att	ctc	gcc	atg	gtg	gtg	ctt	1008
Ser	Phe	Thr	Phe	Leu	Glu	Ser	Ala	Met	Ile	Leu	Ala	Met	Val	Val	Leu	
				325					330					335		
ggc	ggc	atg	ggg	tcg	aca	ctg	ggg	gtg	gtg	ctg	gga	gcg	ctg	gtg	ctc	1056
Gly	Gly	Met	Gly	Ser	Thr	Leu	Gly	Val	Val	Leu	Gly	Ala	Leu	Val	Leu	
			340					345					350			
atc	ctt	ctg	ccc	gaa	tac	ctg	cgt	gcc	ttc	tcg	gag	tac	cgc	atg	ctc	1104
Ile	Leu	Leu	Pro	Glu	Tyr	Leu	Arg	Ala	Phe	Ser	Glu	Tyr	Arg	Met	Leu	
			355				360					365				
atc	ttc	ggg	gcg	gcg	atg	gtg	ctc	atg	atg	gtg	ttc	agg	ccg	cag	ggg	1152
Ile	Phe	Gly	Ala	Ala	Met	Val	Leu	Met	Met	Val	Phe	Arg	Pro	Gln	Gly	
			370			375					380					
ctg	gtg	tcg	tgc	cgc	tcc	aga	gag	tat	gat	gtg	aac	gac	ccc	gaa	gcg	1200
Leu	Val	Ser	Cys	Arg	Ser	Arg	Glu	Tyr	Asp	Val	Asn	Asp	Pro	Glu	Ala	
					390					395					400	
ggg	aag	agc	ggg	gag	aag	gcg	taa									1224
Gly	Lys	Ser	Gly	Glu	Lys	Ala										
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<210> 631

<211> 407

<212> PRT

<213> Desulfovibrio vulgaris

<400> 631

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Leu	Thr	Phe	Pro	Leu	Met	Val	Ile	Arg	Val	Asp	Thr	Leu	Asn	Gly	Thr	
			20					25					30			
Val	Asp	Trp	Arg	Trp	Gln	Asn	Met	Val	Met	Met	Gly	Leu	Gly	Thr	Phe	
			35				40					45				
Ala	Leu	Ser	Phe	Leu	Trp	Arg	Tyr	Met	Leu	Ala	Arg	Lys	Glu	Ala	Gly	
			50			55					60					
Gly	Ala	Ser	Ala	Arg	Gln	Gly	Asn	Ala	Ala	Ala	Gly	Gly	Leu	Met	Ala	
65				70					75					80		
Arg	Val	Arg	Ser	Asp	Ala	Arg	Leu	Arg	Thr	Pro	Ala	Leu	Leu	Ala	Val	
				85					90					95		
Leu	Val	Val	Phe	Ala	Val	Leu	Pro	Met	Leu	Val	Ser	Thr	Tyr	Gln	Thr	
			100					105					110			
Asn	Ile	Met	Ile	Ser	Ala	Leu	Leu	Tyr	Val	Met	Leu	Gly	Leu	Gly	Leu	
		115					120					125				
Asn	Ile	Val	Val	Gly	Leu	Ser	Gly	Gln	Leu	Val	Leu	Gly	Tyr	Val	Ala	
		130			135						140					
Phe	Tyr	Ala	Val	Gly	Ala	Tyr	Ala	Tyr	Ala	Leu	Leu	Asn	Ala	Asp	Phe	
145				150					155					160		
Gly	Leu	Gly	Phe	Trp	Thr	Val	Leu	Pro	Ile	Gly	Gly	Ala	Leu	Ala	Ala	
			165					170					175			
Val	Phe	Gly	Ile	Leu	Leu	Gly	Phe	Pro	Val	Leu	Arg	Leu	Lys	Gly	Asp	
			180				185						190			
Tyr	Leu	Ala	Ile	Val	Thr	Leu	Gly	Phe	Gly	Glu	Ile	Val	Arg	Leu	Val	
		195				200						205				
Leu	Glu	Asn	Trp	Gly	Ser	Val	Thr	Arg	Gly	Pro	Ser	Gly	Ile	Ser	Lys	
	210				215						220					
Ile	Ala	Arg	Pro	Gly	Leu	Phe	Gly	Met	Glu	Leu	Ser	Val	Ser	Glu	Ala	
225				230					235					240		
Thr	Thr	Tyr	Ile	Tyr	Tyr	Leu	Ile	Leu	Ala	Ala	Val	Ile	Phe	Thr	Ile	
			245						250				255			
Phe	Ala	Val	Gly	Arg	Leu	Lys	Asp	Ser	Arg	Ile	Gly	Arg	Ala	Trp	Gln	
			260					265					270			
Ala	Leu	Arg	Glu	Asp	Glu	Ile	Ala	Cys	Glu	Ala	Met	Gly	Ile	Asp	Leu	
		275					280					285				
Thr	Thr	Lys	Leu	Thr	Ala	Phe	Ala	Leu	Gly	Ala	Cys	Trp	Ala	Gly		
	290				295						300					
Phe	Ala	Gly	Val	Ile	Phe	Ala	Ala	Lys	Thr	Thr	Phe	Ile	Asn	Pro	Ala	
305				310					315					320		
Ser	Phe	Thr	Phe	Leu	Glu	Ser	Ala	Met	Ile	Leu	Ala	Met	Val	Val	Leu	
				325					330					335		
Gly	Gly	Met	Gly	Ser	Thr	Leu	Gly	Val	Val	Leu	Gly	Ala	Leu	Val	Leu	
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Ile Leu Leu Pro Glu Tyr Leu Arg Ala Phe Ser Glu Tyr Arg Met Leu
 355 360
 Ile Phe Gly Ala Ala Met Val Leu Met Met Val Phe Arg Pro Gln Gly
 370 375 380
 Leu Val Ser Cys Arg Ser Arg Glu Tyr Asp Val Asn Asp Pro Glu Ala
 385 390 395 400
 Gly Lys Ser Gly Glu Lys Ala
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<210> 632

<211> 909

<212> DNA

<213> Desulfovibrio vulgaris

<220>

<221> CDS

<222> (1)..(909)

<400> 632

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ggc	agc	atc	tat	gca	ctt	atc	gcg	ctc	ggc	tac	acc	atg	gtg	tac	ggg	96
Gly	Ser	Ile	Tyr	Ala	Leu	Ile	Ala	Leu	Gly	Tyr	Thr	Met	Val	Tyr	Gly	
			20					25					30			
atc	atc	gag	ctc	atc	aac	ttc	gcc	cat	ggc	gag	gtc	tac	atg	atc	ggc	144
Ile	Ile	Glu	Leu	Ile	Asn	Phe	Ala	His	Gly	Glu	Val	Tyr	Met	Ile	Gly	
		35					40					45				
gcg	ttc	acg	gcg	ctc	atc	gtg	gcg	ggt	gtg	ctc	ggc	atc	tat	ggc	ttt	192
Ala	Phe	Thr	Ala	Leu	Ile	Val	Ala	Gly	Val	Leu	Gly	Ile	Tyr	Gly	Phe	
	50					55					60					
ccc	gag	gcg	ggc	atc	ctc	atc	atc	gcc	gcc	atc	gtc	gcg	gtc	atc	tac	240
Pro	Glu	Ala	Gly	Ile	Leu	Ile	Ile	Ala	Ala	Ile	Val	Ala	Val	Ile	Tyr	
	65				70			75							80	
tgc	gcc	gcc	tac	ggg	ttc	acg	ctg	gag	aag	gtg	gcg	tac	aag	ccc	ctg	288
Cys	Ala	Ala	Tyr	Gly	Phe	Thr	Leu	Glu	Lys	Val	Ala	Tyr	Lys	Pro	Leu	
				85					90					95		
cgt	gac	gcg	cca	cgc	ctt	tct	ccg	ctg	atc	tcg	gcc	atc	ggc	atg	tcc	336
Arg	Asp	Ala	Pro	Arg	Leu	Ser	Pro	Leu	Ile	Ser	Ala	Ile	Gly	Met	Ser	
			100					105					110			
atc	ttt	ctc	cag	aac	tat	gtc	atc	ctc	gcg	cag	acc	tcg	gac	ttc	gtg	384
Ile	Phe	Leu	Gln	Asn	Tyr	Val	Ile	Leu	Ala	Gln	Thr	Ser	Asp	Phe	Val	
		115					120					125				
ccg	ttt	ccg	cgc	ctc	gtg	ccc	gac	ctc	gcc	atc	ctt	gag	ccc	atc	gcc	432
Pro	Phe	Pro	Arg	Leu	Val	Pro	Asp	Leu	Ala	Ile	Leu	Glu	Pro	Ile	Ala	
	130					135					140					
cac	atc	acc	ggg	acg	agt	gat	ggt	ctg	atc	atc	gtc	acg	agc	gcc	atc	480
His	Ile	Thr	Gly	Thr	Ser	Asp	Val	Leu	Ile	Ile	Val	Thr	Ser	Ala	Ile	
					150				155						160	
acc	atg	gtg	ggc	ctc	acc	ctg	ttc	atc	aag	tac	acc	cgc	atg	ggc	aag	528
Thr	Met	Val	Gly	Leu	Thr	Leu	Phe	Ile	Lys	Tyr	Thr	Arg	Met	Gly	Lys	
				165					170					175		
gcc	atg	cgc	gcc	acg	gcg	cag	aac	cgc	aag	atg	gcc	atg	ctg	ctc	ggc	576
Ala	Met	Arg	Ala	Thr	Ala	Gln	Asn	Arg	Lys	Met	Ala	Met	Leu	Leu	Gly	
			180					185					190			
atc	gac	gcc	gac	agg	gtc	atc	tcc	ctc	acc	ttc	atc	atc	ggc	tcc	tcg	624
Ile	Asp	Ala	Asp	Arg	Val	Ile	Ser	Leu	Thr	Phe	Ile	Ile	Gly	Ser	Ser	
		195					200					205				
ctg	gcg	gcc	atc	ggc	ggc	gtg	ctc	atc	gcc	tcg	cat	atc	ggc	cag	gtg	672
Leu	Ala	Ala	Ile	Gly	Gly	Val	Leu	Ile	Ala	Ser	His	Ile	Gly	Gln	Val	
	210					215					220					
aac	ttc	gcc	atc	ggc	ttc	atc	gca	ggc	atc	aag	gcg	ttc	acc	gcc	gct	720
Asn	Phe	Ala	Ile	Gly	Phe	Ile	Ala	Gly	Ile	Lys	Ala	Phe	Thr	Ala	Ala	
	225				230					235					240	
gtg	ctt	ggc	ggc	atc	ggc	tcc	att	cct	ggc	gcc	atg	gcg	ggc	ggg	ctt	768
Val	Leu	Gly	Gly	Ile	Gly	Ser	Ile	Pro	Gly	Ala	Met	Ala	Gly	Gly	Leu	
				245					250					255		
gtg	ctc	ggc	ctt	tgc	gag	agt	ttc	gca	acc	ggc	tac	gtg	tcc	agc	gac	816
Val	Leu	Gly	Leu	Cys	Glu	Ser	Phe	Ala	Thr	Gly	Tyr	Val	Ser	Ser	Asp	

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tat	gaa	gac	gcc	ctc	gcc	ttc	gcg	ctg	ctc	gtg	ctc	att	ctc	atc	ttc	864
Tyr	Glu	Asp	Ala	Leu	Ala	Phe	Ala	Leu	Leu	Val	Leu	Ile	Leu	Ile	Phe	
aga	ccc	tcc	ggt	atc	ctg	ggc	aag	ccc	aag	acc	cag	aag	gtc	tag		909
Arg	Pro	Ser	Gly	Ile	Leu	Gly	Lys	Pro	Lys	Thr	Gln	Lys	Val			

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<210> 633
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<212> PRT
<213> Desulfovibrio vulgaris
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			20					25					30		
Ile	Ile	Glu	Leu	Ile	Asn	Phe	Ala	His	Gly	Glu	Val	Tyr	Met	Ile	Gly
		35					40					45			
Ala	Phe	Thr	Ala	Leu	Ile	Val	Ala	Gly	Val	Leu	Gly	Ile	Tyr	Gly	Phe
	50					55					60				
Pro	Glu	Ala	Gly	Ile	Leu	Ile	Ile	Ala	Ala	Ile	Val	Ala	Val	Ile	Tyr
65					70					75					80
Cys	Ala	Ala	Tyr	Gly	Phe	Thr	Leu	Glu	Lys	Val	Ala	Tyr	Lys	Pro	Leu
				85					90					95	
Arg	Asp	Ala	Pro	Arg	Leu	Ser	Pro	Leu	Ile	Ser	Ala	Ile	Gly	Met	Ser
			100					105					110		
Ile	Phe	Leu	Gln	Asn	Tyr	Val	Ile	Leu	Ala	Gln	Thr	Ser	Asp	Phe	Val
		115					120					125			
Pro	Phe	Pro	Arg	Leu	Val	Pro	Asp	Leu	Ala	Ile	Leu	Glu	Pro	Ile	Ala
		130				135					140				
His	Ile	Thr	Gly	Thr	Ser	Asp	Val	Leu	Ile	Ile	Val	Thr	Ser	Ala	Ile
145					150					155					160
Thr	Met	Val	Gly	Leu	Thr	Leu	Phe	Ile	Lys	Tyr	Thr	Arg	Met	Gly	Lys
				165					170					175	
Ala	Met	Arg	Ala	Thr	Ala	Gln	Asn	Arg	Lys	Met	Ala	Met	Leu	Leu	Gly
			180					185					190		
Ile	Asp	Ala	Asp	Arg	Val	Ile	Ser	Leu	Thr	Phe	Ile	Ile	Gly	Ser	Ser
		195					200					205			
Leu	Ala	Ala	Ile	Gly	Gly	Val	Leu	Ile	Ala	Ser	His	Ile	Gly	Gln	Val
		210				215					220				
Asn	Phe	Ala	Ile	Gly	Phe	Ile	Ala	Gly	Ile	Lys	Ala	Phe	Thr	Ala	Ala
225					230					235					240
Val	Leu	Gly	Gly	Ile	Gly	Ser	Ile	Pro	Gly	Ala	Met	Ala	Gly	Gly	Leu
				245					250					255	
Val	Leu	Gly	Leu	Cys	Glu	Ser	Phe	Ala	Thr	Gly	Tyr	Val	Ser	Ser	Asp
			260					265					270		
Tyr	Glu	Asp	Ala	Leu	Ala	Phe	Ala	Leu	Leu	Val	Leu	Ile	Leu	Ile	Phe
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Arg	Pro	Ser	Gly	Ile	Leu	Gly	Lys	Pro	Lys	Thr	Gln	Lys	Val		
	290					295					300				

<210> 634
<211> 969
<212> DNA
<213> *Thermus thermophilus*

<220>
<221> CDS
<222> (1)..(969)

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Met	Leu	Glu	Gln	Ile	Leu	Val	Leu	Leu	Pro	Gln	Val	Leu	Phe	Asp	Gly	
1				5					10					15		
ttc	atc	ctg	ggc	ttc	atc	tac	gcc	atg	atc	gcc	ctg	ggg	tac	acc	atg	96
Phe	Ile	Leu	Gly	Phe	Ile	Tyr	Ala	Met	Ile	Ala	Leu	Gly	Tyr	Thr	Met	
			20					25					30			

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gtc	tac	ggc	gtc	ttg	gag	ctc	atc	aac	ttc	gcc	cac	tcc	gag	atc	ttc	144
Val	Tyr	Gly	Val	Leu	Glu	Leu	Ile	Asn	Phe	Ala	His	Ser	Glu	Ile	Phe	
		35					40					45				
atg	atc	ggg	gcc	gtg	gcc	ggg	gtg	gag	gtc	ttc	cgc	tac	ctc	gcc	ccc	192
Met	Ile	Gly	Ala	Val	Ala	Gly	Val	Glu	Val	Phe	Arg	Tyr	Leu	Ala	Pro	
	50					55					60					
ctg	atc	ccc	aac	ggc	tac	ctc	ctc	ctc	ctg	gtg	gcc	gtg	gtg	gtg	ggg	240
Leu	Ile	Pro	Asn	Gly	Tyr	Leu	Leu	Leu	Leu	Val	Ala	Val	Val	Val	Gly	
	65				70					75					80	
gcg	gcg	gtg	gcg	ggc	ctc	acc	gcc	atc	ctg	gtg	gag	cgc	atg	gcc	tac	288
Ala	Ala	Val	Ala	Gly	Leu	Thr	Ala	Ile	Leu	Val	Glu	Arg	Met	Ala	Tyr	
				85					90					95		
cgg	ccc	ctc	cgc	cgc	cgg	ggc	acc	acc	cgc	ctc	gtg	ccc	ctg	gtg		336
Arg	Pro	Leu	Arg	Arg	Arg	Gly	Thr	Thr	Asn	Arg	Leu	Val	Pro	Leu	Val	
			100					105					110			
acg	gcc	atc	ggg	gtg	agc	ttc	ttc	ctc	cag	gac	ctg	gtg	cgg	ctc	att	384
Thr	Ala	Ile	Gly	Val	Ser	Phe	Phe	Leu	Gln	Asp	Leu	Val	Arg	Leu	Ile	
		115					120					125				
gag	ggc	ctc	tgg	cac	aac	gag	ttc	ctg	cgc	atg	cgc	acc	ata	ccg		432
Glu	Gly	Leu	Trp	His	Asn	Glu	Phe	Phe	Leu	Arg	Met	Arg	Thr	Ile	Pro	
	130					135					140					
gac	ctc	gag	ggc	tcc	ttc	acc	ctc	ttc	ggg	ggc	gcc	atc	ttc	atc	cag	480
Asp	Leu	Glu	Gly	Ser	Phe	Thr	Leu	Phe	Gly	Gly	Ala	Ile	Phe	Ile	Gln	
	145				150				155						160	
acc	aag	tcg	gtg	atc	gtc	atc	gtg	gtc	tcc	gtg	ctc	atg	ctc	tgg	ggg	528
Thr	Lys	Ser	Val	Ile	Val	Ile	Val	Val	Ser	Val	Leu	Met	Leu	Trp	Gly	
				165					170					175		
ctc	acc	tac	ctg	gtg	aac	cgc	acc	aag	ctg	ggg	atg	gcc	atc	cgg	gcc	576
Leu	Thr	Tyr	Leu	Val	Asn	Arg	Thr	Lys	Leu	Gly	Met	Ala	Ile	Arg	Ala	
			180					185					190			
gtg	gcc	cag	gac	ctc	acc	acg	gcg	agc	ctc	atg	ggc	atc	aac	ccc	gac	624
Val	Ala	Gln	Asp	Leu	Thr	Thr	Ala	Ser	Leu	Met	Gly	Ile	Asn	Pro	Asp	
		195					200				205					
cag	atc	atc	tcc	cgc	acc	ttc	ctc	atc	ggc	ggc	gcc	ttg	ggc	ggg	gtg	672
Gln	Ile	Ile	Ser	Arg	Thr	Phe	Leu	Ile	Gly	Gly	Ala	Leu	Gly	Gly	Val	
	210					215					220					
gcc	ggg	gtc	ctc	ttc	gcc	ctc	atc	tac	acc	acc	atc	aac	ccc	tac	gtg	720
Ala	Gly	Val	Leu	Phe	Ala	Leu	Ile	Tyr	Thr	Thr	Ile	Asn	Pro	Tyr	Val	
	225				230				235						240	
ggc	ttc	ctc	ccc	ggc	atc	aag	gcc	ttc	acc	gcg	gcg	gtc	ctg	ggc	ggg	768
Gly	Phe	Leu	Pro	Gly	Ile	Lys	Ala	Phe	Thr	Ala	Ala	Val	Leu	Gly	Gly	
				245					250					255		
atc	ggc	aac	atc	ccc	ggg	gcc	atg	ctc	ggg	ggc	ctc	gtc	ctg	ggg	cag	816
Ile	Gly	Asn	Ile	Pro	Gly	Ala	Met	Leu	Gly	Gly	Leu	Val	Leu	Gly	Gln	
			260					265					270			
ctg	gag	aac	ttc	ttc	ggc	acc	tac	ctg	ccc	atc	ctc	acc	gcc	ggc	aac	864
Leu	Glu	Asn	Phe	Phe	Gly	Thr	Tyr	Leu	Pro	Ile	Leu	Thr	Ala	Gly	Asn	
		275					280					285				
ttc	ggg	acg	gag	tac	aaa	gac	gtg	gtg	gcc	ttc	ctc	atc	ctc	atc	ttc	912
Phe	Gly	Thr	Glu	Tyr	Lys	Asp	Val	Val	Ala	Phe	Leu	Ile	Leu	Ile	Phe	
	290					295					300					
atc	ctc	ctc	ttc	cgg	ccc	caa	ggc	ctc	ctg	ggc	cag	atg	gtt	aag	gag	960
Ile	Leu	Leu	Phe	Arg	Pro	Gln	Gly	Leu	Leu	Gly	Gln	Met	Val	Lys	Glu	
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aag	gta	tga														969
Lys	Val															

<210> 635

<211> 322

<212> PRT

<213> Thermus thermophilus

<400> 635

Met Leu Glu Gln Ile Leu Val Leu Leu Pro Gln Val Leu Phe Asp Gly

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Phe Ile Leu Gly Phe Ile Tyr Ala Met Ile Ala Leu Gly Tyr Thr Met

Val Tyr Gly Val Leu Glu Leu Ile Asn Phe Ala His Ser Glu Ile Phe

35 40 45
 Met Ile Gly Ala Val Ala Gly Val Glu Val Phe Arg Tyr Leu Ala Pro
 50 55 60
 Leu Ile Pro Asn Gly Tyr Leu Leu Leu Val Ala Val Val Val Gly
 65 70 75 80
 Ala Ala Val Ala Gly Leu Thr Ala Ile Leu Val Glu Arg Met Ala Tyr
 85 90 95
 Arg Pro Leu Arg Arg Gly Thr Thr Asn Arg Leu Val Pro Leu Val
 100 105 110
 Thr Ala Ile Gly Val Ser Phe Phe Leu Gln Asp Leu Val Arg Leu Ile
 115 120 125
 Glu Gly Leu Trp His Asn Glu Phe Phe Leu Arg Met Arg Thr Ile Pro
 130 135 140
 Asp Leu Glu Gly Ser Phe Thr Leu Phe Gly Gly Ala Ile Phe Ile Gln
 145 150 155 160
 Thr Lys Ser Val Ile Val Ile Val Val Ser Val Leu Met Leu Trp Gly
 165 170 175
 Leu Thr Tyr Leu Val Asn Arg Thr Lys Leu Gly Met Ala Ile Arg Ala
 180 185 190
 Val Ala Gln Asp Leu Thr Thr Ala Ser Leu Met Gly Ile Asn Pro Asp
 195 200 205
 Gln Ile Ile Ser Arg Thr Phe Leu Ile Gly Gly Ala Leu Gly Gly Val
 210 215 220
 Ala Gly Val Leu Phe Ala Leu Ile Tyr Thr Thr Ile Asn Pro Tyr Val
 225 230 235 240
 Gly Phe Leu Pro Gly Ile Lys Ala Phe Thr Ala Ala Val Leu Gly Gly
 245 250 255
 Ile Gly Asn Ile Pro Gly Ala Met Leu Gly Gly Leu Val Leu Gly Gln
 260 265 270
 Leu Glu Asn Phe Phe Gly Thr Tyr Leu Pro Ile Leu Thr Ala Gly Asn
 275 280 285
 Phe Gly Thr Glu Tyr Lys Asp Val Val Ala Phe Leu Ile Leu Ile Phe
 290 295 300
 Ile Leu Leu Phe Arg Pro Gln Gly Leu Leu Gly Gln Met Val Lys Glu
 305 310 315 320
 Lys Val

<210> 636

<211> 978

<212> DNA

<213> Thermus thermophilus

<220>

<221> CDS

<222> (1)..(978)

<400> 636

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1 5 10 15	
ggg gtc atc tac ggg ctt ctc gcc ctg gcc atg gtc ctc gtc ttc gcc	96
Gly Val Ile Tyr Gly Leu Leu Ala Leu Ala Met Val Leu Val Phe Ala	
20 25 30	
gtg acc cgg gtg atc ctg gtg ccc atc ggg gag ctc atg atg ttc gcc	144
Val Thr Arg Val Ile Leu Val Pro Ile Gly Glu Leu Met Met Phe Ala	
35 40 45	
ccc ctc tcc ttc gtc tgg ctc caa gag ggg aag ctc ccc ggc acc ctg	192
Pro Leu Ser Phe Val Trp Leu Gln Glu Gly Lys Leu Pro Gly Thr Leu	
50 55 60	
tgg ctc gcc ctc gcc ttg ggg gtc ctt tgg gcc ctg ttg gag cgg gga	240
Trp Leu Ala Leu Ala Leu Gly Val Leu Trp Ala Leu Leu Glu Arg Gly	
65 70 75 80	
agg ggc cgg ggg ctc ccc ctc ctg gga ggg atg ggg ctt ctc ctc ctc	288
Arg Gly Arg Gly Leu Pro Leu Leu Gly Gly Met Gly Leu Leu Leu Leu	
85 90 95	
ttc ctc ctc gcc cag gga agc ccg gcc ctc gcc tat ttg gcg gcc ctc	336
Phe Leu Leu Ala Gln Gly Ser Pro Ala Leu Ala Tyr Leu Ala Leu	
100 105 110	

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ctc	ctc	gtg	gtc	tac	ctg	ggg	gtg	gcc	acc	tac	cgg	gtc	ttc	ttc	cag	384
Leu	Leu	Val	Val	Tyr	Leu	Gly	Val	Ala	Thr	Tyr	Arg	Val	Phe	Phe	Gln	
		115					120					125				
ccc	atg	cgg	gag	gcc	acg	gtc	ctc	gcc	ctc	ctc	atc	atg	gcc	gtg	ggg	432
Pro	Met	Arg	Glu	Ala	Thr	Val	Leu	Ala	Leu	Leu	Ile	Met	Ala	Val	Gly	
	130					135					140					
ctt	cac	gtg	gcc	tac	cag	ggc	ctg	ggc	ctc	gtc	ttc	ttc	ggc	ccg	gag	480
Leu	His	Val	Ala	Tyr	Gln	Gly	Leu	Gly	Leu	Val	Phe	Phe	Gly	Pro	Glu	
	145				150					155					160	
cag	ttc	cgc	ccc	gac	ccc	ctt	ctc	cag	ggg	gag	gtg	gtg	gtg	ggc	ctc	528
Gln	Phe	Arg	Pro	Asp	Pro	Leu	Leu	Gln	Gly	Glu	Val	Val	Val	Gly	Leu	
				165					170					175		
acc	tgg	cag	ggc	gtc	ttg	gtc	ctg	gcc	ttc	gcc	ctc	ttg	agc	gcc	gcc	576
Thr	Trp	Gln	Gly	Val	Leu	Val	Leu	Ala	Phe	Ala	Leu	Leu	Ser	Ala	Ala	
			180					185					190			
gcc	ctc	tac	ctc	ttc	ttc	cgc	cgt	tcc	ctc	ttc	ggg	aag	gcc	ctt	ctg	624
Ala	Leu	Tyr	Leu	Phe	Phe	Arg	Arg	Ser	Leu	Phe	Gly	Lys	Ala	Leu	Leu	
		195					200					205				
gcg	gcg	gcg	gag	aac	cgg	ctt	ggg	gcg	agg	ctt	tgc	ggg	atc	cgc	ccg	672
Ala	Ala	Ala	Glu	Asn	Arg	Leu	Gly	Ala	Arg	Leu	Cys	Gly	Ile	Arg	Pro	
		210				215					220					
gag	gag	gcg	ggg	atg	gtg	gcc	ttc	gcc	atc	gcg	ggc	ctc	atg	gcg	gcc	720
Glu	Glu	Ala	Gly	Met	Val	Ala	Phe	Ala	Ile	Ala	Gly	Leu	Met	Ala	Ala	
		225			230					235					240	
ctt	tcg	ggg	ctt	ctt	ttg	gcg	ccc	ctc	atc	aac	gcc	gcc	tac	ttc	atg	768
Leu	Ser	Gly	Leu	Leu	Leu	Ala	Pro	Leu	Ile	Asn	Ala	Ala	Tyr	Phe	Met	
			245						250					255		
ggc	ttt	atg	ctg	ggg	ctc	aag	gcc	ttc	gtg	gcg	gcc	atc	ctg	ggt	ggg	816
Gly	Phe	Met	Leu	Gly	Leu	Lys	Ala	Phe	Val	Ala	Ala	Ile	Leu	Gly	Gly	
			260					265					270			
ctc	gtg	agc	tac	ccg	gtg	gcc	ttt	ttg	ggc	gcg	gtc	ctg	gtg	ggg	ctt	864
Leu	Val	Ser	Tyr	Pro	Val	Ala	Phe	Leu	Gly	Ala	Val	Leu	Val	Gly	Leu	
		275				280						285				
ttt	gaa	agc	ttc	acc	agc	ttc	tac	gcg	agc	gcc	tac	aag	gaa	gct	ttg	912
Phe	Glu	Ser	Phe	Thr	Ser	Phe	Tyr	Ala	Ser	Ala	Tyr	Lys	Glu	Ala	Leu	
	290					295					300					
gtg	ttc	ctc	ctc	ctg	gtg	ccg	gcc	ctc	ttc	tac	cag	agc	ctc	cgg	gcg	960
Val	Phe	Leu	Leu	Leu	Val	Pro	Ala	Leu	Phe	Tyr	Gln	Ser	Leu	Arg	Ala	
		305			310					315					320	
aag	ggg	gtg	gag	gag	tga											978
Lys	Gly	Val	Glu	Glu												
				325												

<210> 637

<211> 325

<212> PRT

<213> Thermus thermophilus

<400> 637

Met	Asp	Ala	Thr	Ile	Leu	Gly	Leu	Leu	Leu	Leu	Asp	Gly	Val	Gln	Asn	
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Gly	Val	Ile	Tyr	Gly	Leu	Leu	Ala	Leu	Ala	Met	Val	Leu	Val	Phe	Ala	
		20					25						30			
Val	Thr	Arg	Val	Ile	Leu	Val	Pro	Ile	Gly	Glu	Leu	Met	Met	Phe	Ala	
		35					40					45				
Pro	Leu	Ser	Phe	Val	Trp	Leu	Gln	Glu	Gly	Lys	Leu	Pro	Gly	Thr	Leu	
	50					55					60					
Trp	Leu	Ala	Leu	Ala	Leu	Gly	Val	Leu	Trp	Ala	Leu	Leu	Glu	Arg	Gly	
	65				70				75						80	
Arg	Gly	Arg	Gly	Leu	Pro	Leu	Leu	Gly	Gly	Met	Gly	Leu	Leu	Leu	Leu	
				85					90					95		
Phe	Leu	Leu	Ala	Gln	Gly	Ser	Pro	Ala	Leu	Ala	Tyr	Leu	Ala	Ala	Leu	
			100					105					110			
Leu	Leu	Val	Val	Tyr	Leu	Gly	Val	Ala	Thr	Tyr	Arg	Val	Phe	Phe	Gln	
		115					120					125				
Pro	Met	Arg	Glu	Ala	Thr	Val	Leu	Ala	Leu	Leu	Ile	Met	Ala	Val	Gly	
	130					135					140					
Leu	His	Val	Ala	Tyr	Gln	Gly	Leu	Gly	Leu	Val	Phe	Phe	Gly	Pro	Glu	160
					150					155						

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Gln Phe Arg Pro Asp Pro Leu Leu Gln Gly Glu Val Val Val Gly Leu
 165 170 175
 Thr Trp Gln Gly Val Leu Val Leu Ala Phe Ala Leu Leu Ser Ala Ala
 180 185 190
 Ala Leu Tyr Leu Phe Phe Arg Arg Ser Leu Phe Gly Lys Ala Leu Leu
 195 200 205
 Ala Ala Ala Glu Asn Arg Leu Gly Ala Arg Leu Cys Gly Ile Arg Pro
 210 215 220
 Glu Glu Ala Gly Met Val Ala Phe Ala Ile Ala Gly Leu Met Ala Ala
 225 230 235 240
 Leu Ser Gly Leu Leu Leu Ala Pro Leu Ile Asn Ala Ala Tyr Phe Met
 245 255
 Gly Phe Met Leu Gly Leu Lys Ala Phe Val Ala Ala Ile Leu Gly Gly
 260 265 270
 Leu Val Ser Tyr Pro Val Ala Phe Leu Gly Ala Val Leu Val Gly Leu
 275 280 285
 Phe Glu Ser Phe Thr Ser Phe Tyr Ala Ser Ala Tyr Lys Glu Ala Leu
 290 295 300
 Val Phe Leu Leu Leu Val Pro Ala Leu Phe Tyr Gln Ser Leu Arg Ala
 305 310 315 320
 Lys Gly Val Glu Glu
 325

<210> 638

<211> 858

<212> DNA

<213> Thermus thermophilus

<220>

<221> CDS

<222> (1)..(858)

<400> 638

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1 5 10 15	
gtc tac gcc ctg gtg gcc acg ggc ctc gcc ctc tcc ctg ggg gtg gtg	96
Val Tyr Ala Leu Val Ala Thr Gly Leu Ala Leu Ser Leu Gly Val Val	
20 25 30	
ggc atc gtc aac ttc gcc cac ggc gag ttc ctc atg ctc ggg gcc tac	144
Gly Ile Val Asn Phe Ala His Gly Glu Phe Leu Met Leu Gly Ala Tyr	
35 40 45	
ctc tcc tac ctc ctc ttc gcc ttc cgc ggc gtg gac ccc ctc ctt tcc	192
Leu Ser Tyr Leu Leu Phe Ala Phe Arg Gly Val Asp Pro Leu Leu Ser	
50 55 60	
ctg ggc ctc gcc ttc ctg gcc ttc ctg gtg ggc ggc ctg acc tac	240
Leu Gly Leu Ala Phe Leu Ala Ala Phe Leu Val Gly Ala Leu Thr Tyr	
65 70 75 80	
cac ggc ctg atc cgc ccg gtg ctc aaa gct ccg gag ctc aac cag atg	288
His Gly Leu Ile Arg Pro Val Leu Lys Ala Pro Glu Leu Asn Gln Met	
85 90 95	
ctc ctc acc ttc ggc ctc tcc gtg ttc ctg cag aac ctg gcc ctc ctc	336
Leu Leu Thr Phe Gly Leu Ser Val Phe Leu Gln Asn Leu Ala Leu Leu	
100 105 110	
ctc ttc ggg gcg gac acc cgg gtg gtg gcc ccg ccc tac cag gcg gcc	384
Leu Phe Gly Ala Asp Thr Arg Val Val Ala Pro Pro Tyr Gln Ala Ala	
115 120 125	
acc ctc gct ttg ggc ccc ttc ttc ctg ggg gcg gtg ccc ctc ggg gcc	432
Thr Leu Ala Leu Gly Pro Phe Phe Leu Gly Ala Val Pro Leu Gly Ala	
130 135 140	
ttc ctc ctc tcc ctg gcc ctg ctt ctc ctt ctc cag gcc ttc ctc acc	480
Phe Leu Leu Ser Leu Ala Leu Leu Leu Leu Gln Ala Phe Leu Thr	
145 150 155 160	
cga agc cgc ctg ggg ctt gcg gtg cgg gcc gtg gcc caa aac cgg gtg	528
Arg Ser Arg Leu Gly Leu Ala Val Arg Ala Val Ala Gln Asn Arg Val	
165 170 175	
gcc ccc ggg ctt tta ggg ata gag gcg gag gcg gtc tac ctc ctc gcc	576
Ala Pro Gly Leu Leu Gly Ile Glu Ala Glu Ala Val Tyr Leu Leu Ala	
180 185 190	

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ttc	ggc	ctc	tcg	gcc	gcc	ctg	gcc	ggg	gtc	gcc	ggg	gtg	atg	ctc	tcg	624
Phe	Gly	Leu	Ser	Ala	Ala	Leu	Ala	Gly	Val	Ala	Gly	Val	Met	Leu	Ser	
		195					200					205				
gtg	atg	ctc	tac	gcc	agc	ccc	acg	gtg	ggc	ttc	ctc	ttc	acc	cta	aag	672
Val	Met	Leu	Tyr	Ala	Ser	Pro	Thr	Val	Gly	Phe	Leu	Phe	Thr	Leu	Lys	
	210					215					220					
tcc	ttc	gcc	atc	gtg	gcc	ttg	gcg	ggg	ctc	ggg	aac	ctc	aag	ggg	gtg	720
Ser	Phe	Ala	Ile	Val	Ala	Leu	Ala	Gly	Leu	Gly	Asn	Leu	Lys	Gly	Val	
	225				230					235					240	
atc	ccg	gcg	gct	ttg	gtc	ctg	gcc	ctg	gcc	gag	gcc	ctg	gtg	agc	acc	768
Ile	Pro	Ala	Ala	Leu	Val	Leu	Ala	Leu	Ala	Glu	Ala	Leu	Val	Ser	Thr	
			245				250							255		
tac	gtc	ccc	ggg	ggc	ggg	ggg	ctg	gtg	gag	gcc	gtc	ttc	ttc	ctg	gtg	816
Tyr	Val	Pro	Gly	Gly	Gly	Gly	Leu	Val	Glu	Ala	Val	Phe	Phe	Leu	Val	
			260				265						270			
ctc	ttc	ctg	gcc	ctg	gtg	ggc	cgg	gcc	tgg	agg	gcg	gca	tga			858
Leu	Phe	Leu	Ala	Leu	Val	Gly	Arg	Ala	Trp	Arg	Ala	Ala				
		275					280					285				

<210> 639

<211> 285

<212> PRT

<213> Thermus thermophilus

<400> 639

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			20					25					30			
Gly	Ile	Val	Asn	Phe	Ala	His	Gly	Glu	Phe	Leu	Met	Leu	Gly	Ala	Tyr	
		35					40					45				
Leu	Ser	Tyr	Leu	Leu	Phe	Ala	Phe	Arg	Gly	Val	Asp	Pro	Leu	Leu	Ser	
	50				55					60						
Leu	Gly	Leu	Ala	Phe	Leu	Ala	Ala	Phe	Leu	Val	Gly	Ala	Leu	Thr	Tyr	
65					70					75					80	
His	Gly	Leu	Ile	Arg	Pro	Val	Leu	Lys	Ala	Pro	Glu	Leu	Asn	Gln	Met	
			85						90					95		
Leu	Leu	Thr	Phe	Gly	Leu	Ser	Val	Phe	Leu	Gln	Asn	Leu	Ala	Leu	Leu	
			100					105					110			
Leu	Phe	Gly	Ala	Asp	Thr	Arg	Val	Val	Ala	Pro	Pro	Tyr	Gln	Ala	Ala	
		115					120					125				
Thr	Leu	Ala	Leu	Gly	Pro	Phe	Phe	Leu	Gly	Ala	Val	Pro	Leu	Gly	Ala	
	130					135					140					
Phe	Leu	Leu	Ser	Leu	Ala	Leu	Leu	Leu	Leu	Leu	Gln	Ala	Phe	Leu	Thr	
145					150				155						160	
Arg	Ser	Arg	Leu	Gly	Leu	Ala	Val	Arg	Ala	Val	Ala	Gln	Asn	Arg	Val	
			165					170						175		
Ala	Pro	Gly	Leu	Leu	Gly	Ile	Glu	Ala	Glu	Ala	Val	Tyr	Leu	Leu	Ala	
		180					185						190			
Phe	Gly	Leu	Ser	Ala	Ala	Leu	Ala	Gly	Val	Ala	Gly	Val	Met	Leu	Ser	
		195					200					205				
Val	Met	Leu	Tyr	Ala	Ser	Pro	Thr	Val	Gly	Phe	Leu	Phe	Thr	Leu	Lys	
	210					215					220					
Ser	Phe	Ala	Ile	Val	Ala	Leu	Ala	Gly	Leu	Gly	Asn	Leu	Lys	Gly	Val	
225					230					235					240	
Ile	Pro	Ala	Ala	Leu	Val	Leu	Ala	Leu	Ala	Glu	Ala	Leu	Val	Ser	Thr	
			245						250					255		
Tyr	Val	Pro	Gly	Gly	Gly	Gly	Leu	Val	Glu	Ala	Val	Phe	Phe	Leu	Val	
			260				265						270			
Leu	Phe	Leu	Ala	Leu	Val	Gly	Arg	Ala	Trp	Arg	Ala	Ala				
		275					280					285				

<210> 640

<211> 876

<212> DNA

<213> Thermus thermophilus

<220>

<221> CDS

<222> (1)..(876)

<400> 640

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Met	Ala	Asp	Leu	Leu	Pro	Tyr	Leu	Ile	Gly	Gly	Leu	Ala	Asn	Gly	Ala	
1				5				10					15			
ctc	tac	agc	ctc	ctc	gcc	ttg	ggc	ttc	gtc	ctc	gtc	tac	cgg	gcg	acc	96
Leu	Tyr	Ser	Leu	Leu	Ala	Leu	Gly	Phe	Val	Leu	Val	Tyr	Arg	Ala	Thr	
			20					25					30			
agc	gtg	gtg	aac	ttc	gcc	atc	ggg	gag	ttc	ctc	ctc	gtg	ggg	gcc	tac	144
Ser	Val	Val	Asn	Phe	Ala	Ile	Gly	Glu	Phe	Leu	Leu	Val	Gly	Ala	Tyr	
		35					40					45				
ctc	acc	tac	acc	ttc	gcc	ctc	ctc	ctt	ccc	ctc	ccc	ttg	gcc	ctc	ctc	192
Leu	Thr	Tyr	Thr	Phe	Ala	Leu	Leu	Leu	Pro	Leu	Pro	Leu	Ala	Leu	Leu	
	50					55					60					
gcc	gcc	ctg	ccc	ctc	gcc	ttc	ctc	ttc	ggg	gtc	ctg	gtg	gaa	cgg	ggc	240
Ala	Ala	Leu	Pro	Leu	Ala	Phe	Leu	Phe	Gly	Val	Leu	Val	Glu	Arg	Gly	
65				70					75						80	
ttc	gtg	cgg	ccc	ctt	ctc	ggc	cgg	aac	gtg	gtg	gcg	gtg	atc	atg	gcg	288
Phe	Val	Arg	Pro	Leu	Leu	Gly	Arg	Asn	Val	Val	Ala	Val	Ile	Met	Ala	
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acc	atc	ggc	ctc	gcc	gcc	gcc	ctg	gat	ggg	ggg	gtg	cag	ctc	ctc	tgg	336
Thr	Ile	Gly	Leu	Ala	Ala	Ala	Leu	Asp	Gly	Gly	Val	Gln	Leu	Leu	Trp	
			100					105				110				
ggc	ccg	gac	ctc	aag	tac	ctg	ccg	gga	agc	ctc	ccc	gac	ctc	ggc	ttt	384
Gly	Pro	Asp	Leu	Lys	Tyr	Leu	Pro	Gly	Ser	Leu	Pro	Asp	Leu	Gly	Phe	
		115					120					125				
gaa	gcg	gga	ggg	gtc	tac	gtc	tcc	tcc	cgg	gcg	gtc	tgg	aac	ctc	ctc	432
Glu	Ala	Gly	Gly	Val	Tyr	Val	Ser	Ser	Arg	Ala	Val	Trp	Asn	Leu	Leu	
	130					135					140					
ctg	gcc	ctg	ccc	ttg	ggg	ctc	ggc	ctc	ctc	tgg	ctc	ctc	cgg	aaa	agc	480
Leu	Ala	Leu	Pro	Leu	Gly	Leu	Gly	Leu	Leu	Trp	Leu	Leu	Arg	Lys	Ser	
145				150					155						160	
cgc	tac	ggc	gtc	ctg	gtc	cgg	gcc	atc	tcc	gag	cgg	gag	gtg	gcc	gcc	528
Arg	Tyr	Gly	Val	Leu	Val	Arg	Ala	Ile	Ser	Glu	Arg	Glu	Val	Ala	Ala	
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ttg	gcc	ctg	ggc	atc	ccc	acg	gcc	cgg	atc	ctg	gcc	ggg	gtc	tgg	ggg	576
Leu	Ala	Leu	Gly	Ile	Pro	Thr	Ala	Arg	Ile	Leu	Ala	Gly	Val	Trp	Gly	
			180				185						190			
gtc	tcc	gcc	ctc	ctc	gcc	acc	ttg	gcg	ggg	gcc	ctc	ctc	gcc	gcg	gcg	624
Val	Ser	Ala	Leu	Leu	Ala	Thr	Leu	Ala	Gly	Ala	Leu	Leu	Ala	Ala	Ala	
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agc	ggg	gtg	ggg	cac	aac	ctc	gtc	ttc	ttc	ggg	ctc	aag	gtc	ttc	ccc	672
Ser	Gly	Val	Gly	His	Asn	Leu	Val	Phe	Phe	Gly	Leu	Lys	Val	Phe	Pro	
	210					215				220						
gtg	gcc	atc	ctg	ggg	ggg	ctt	gac	gcc	gtg	ggc	ggg	gct	ctg	gcg	gcg	720
Val	Ala	Ile	Leu	Gly	Gly	Leu	Asp	Ala	Val	Gly	Gly	Ala	Leu	Ala	Ala	
225				230					235						240	
ggg	ttt	ttg	ctc	ggg	gtc	ctc	gag	gcc	ctc	tcc	cag	cgc	tac	ctg	gag	768
Gly	Phe	Leu	Leu	Gly	Val	Leu	Glu	Ala	Leu	Ser	Gln	Arg	Tyr	Leu	Glu	
			245				250						255			
gcc	tac	ctc	ccc	ggc	ttc	acc	gag	gcc	ctg	ccc	ttc	gtg	gtg	gtc	ctc	816
Ala	Tyr	Leu	Pro	Gly	Phe	Thr	Glu	Ala	Leu	Pro	Phe	Val	Val	Val	Leu	
			260				265					270				
ctc	gtc	ctc	ctc	gtg	agg	ccc	tac	ggc	ctc	ttc	ggg	gag	cgg	cag	att	864
Leu	Val	Leu	Leu	Val	Arg	Pro	Tyr	Gly	Leu	Phe	Gly	Glu	Arg	Gln	Ile	
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gag	agg	gtg	tag													876
Glu	Arg	Val														
	290															

<210> 641

<211> 291

<212> PRT

<213> Thermus thermophilus

<400> 641

Met	Ala	Asp	Leu	Leu	Pro	Tyr	Leu	Ile	Gly	Gly	Leu	Ala	Asn	Gly	Ala	
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Leu Tyr Ser Leu Leu Ala Leu Gly Phe Val Leu Val Tyr Arg Ala Thr
 20 25 30
 Ser Val Val Asn Phe Ala Ile Gly Glu Phe Leu Leu Val Gly Ala Tyr
 35 40 45
 Leu Thr Tyr Thr Phe Ala Leu Leu Leu Pro Leu Pro Leu Ala Leu Leu
 50 55 60
 Ala Ala Leu Pro Leu Ala Phe Leu Phe Gly Val Leu Val Glu Arg Gly
 65 70 75 80
 Phe Val Arg Pro Leu Leu Gly Arg Asn Val Val Ala Val Ile Met Ala
 85 90 95
 Thr Ile Gly Leu Ala Ala Ala Leu Asp Gly Gly Val Gln Leu Leu Trp
 100 105 110
 Gly Pro Asp Leu Lys Tyr Leu Pro Gly Ser Leu Pro Asp Leu Gly Phe
 115 120 125
 Glu Ala Gly Gly Val Tyr Val Ser Ser Arg Ala Val Trp Asn Leu Leu
 130 135 140
 Leu Ala Leu Pro Leu Gly Leu Gly Leu Leu Trp Leu Leu Arg Lys Ser
 145 150 155 160
 Arg Tyr Gly Val Leu Val Arg Ala Ile Ser Glu Arg Glu Val Ala Ala
 165 170 175
 Leu Ala Leu Gly Ile Pro Thr Ala Arg Ile Leu Ala Gly Val Trp Gly
 180 185 190
 Val Ser Ala Leu Leu Ala Thr Leu Ala Gly Ala Leu Leu Ala Ala Ala
 195 200 205
 Ser Gly Val Gly His Asn Leu Val Phe Phe Gly Leu Lys Val Phe Pro
 210 215 220
 Val Ala Ile Leu Gly Gly Leu Asp Ala Val Gly Gly Ala Leu Ala Ala
 225 230 235 240
 Gly Phe Leu Leu Gly Val Leu Glu Ala Leu Ser Gln Arg Tyr Leu Glu
 245 250 255
 Ala Tyr Leu Pro Gly Phe Thr Glu Ala Leu Pro Phe Val Val Val Leu
 260 265 270
 Leu Val Leu Leu Val Arg Pro Tyr Gly Leu Phe Gly Glu Arg Gln Ile
 275 280 285
 Glu Arg Val
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<210> 642

<211> 1068

<212> DNA

<213> Thermus thermophilus

<220>

<221> CDS

<222> (1)..(1068)

<400> 642

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gcc cgg gcg gtg cgg gag acc tac cgg gag gac gag gcc tac gcc agc	96
Ala Arg Ala Val Arg Glu Thr Tyr Arg Glu Asp Glu Ala Tyr Ala Ser	
20 25 30	
acc ccc ttg ggc cgc ctc gcc ctc tac gcc ttt ctc ctc ctg ctc ctc	144
Thr Pro Leu Gly Arg Leu Ala Leu Tyr Ala Phe Leu Leu Leu Leu Leu	
35 40 45	
ctc ctc ccc ctc ctc ctc ggc ccc tac ccc atg tac gtg gcc acc ctg	192
Leu Leu Pro Leu Leu Leu Gly Pro Tyr Pro Met Tyr Val Ala Thr Leu	
50 55 60	
gtg gcc atc ggg gcc ctc tcc gcc ctg ggc ctc cac ctc ctg gtg ggg	240
Val Ala Ile Gly Ala Leu Ser Ala Leu Gly Leu His Leu Leu Val Gly	
65 70 75 80	
ggc gcg ggg cag atc tcc tta ggc cac gcc gcc ttc atg ggg gtg ggg	288
Gly Ala Gly Gln Ile Ser Leu Gly His Ala Ala Phe Met Gly Val Gly	
85 90 95	
gcc tac gcg gca agc cac ctc acg ggc ccc ctc gcc ccc ttg ggg atc	336
Ala Tyr Ala Ala Ser His Leu Thr Gly Pro Leu Ala Pro Leu Gly Ile	
100 105 110	
ctc ctc ggg ggc ggg atc gcc gcc ttt ttg ggg ctt ctc ctc ggc ctc	384

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Leu	Leu	Gly	Gly	Gly	Ile	Ala	Ala	Phe	Leu	Gly	Leu	Leu	Leu	Gly	Leu		
ccc	tcc	ctc	agg	atc	aag	ggg	gtg	tac	ctg	gcc	atc	gcc	acc	ctg	gcc	432	
Pro	Ser	Leu	Arg	Ile	Lys	Gly	Val	Tyr	Leu	Ala	Ile	Ala	Thr	Leu	Ala		
	130					135					140						
ttc	cag	ttc	ctg	gcg	gac	tac	gtc	ttc	aag	acc	tgg	gag	gcg	gtc	acg	480	
Phe	Gln	Phe	Leu	Ala	Asp	Tyr	Val	Phe	Lys	Thr	Trp	Glu	Ala	Val	Thr		
	145				150					155					160		
ggg	ggg	atc	cgg	ggc	cgg	acc	ctt	cct	ccc	ccc	gag	gtc	ttg	ggc	ctc	528	
Gly	Gly	Ile	Arg	Gly	Arg	Thr	Leu	Pro	Pro	Pro	Glu	Val	Leu	Gly	Leu		
				165				170						175			
gtc	ctg	gac	acc	ccg	gag	aag	ctc	tgg	tac	ctg	gtc	ctc	ctc	ttc	gcc	576	
Val	Leu	Asp	Thr	Pro	Glu	Lys	Leu	Trp	Tyr	Leu	Val	Leu		Phe	Ala		
			180					185					190				
ctc	ccc	ctc	ttc	ttc	tac	ggc	aag	cgc	ctc	ctc	atg	acc	cgc	gcc	ggg	624	
Leu	Pro	Leu	Phe	Phe	Tyr	Gly	Lys	Arg	Leu	Leu	Met	Thr	Arg	Ala	Gly		
		195				200					205						
cgg	gcc	ttc	cgg	gcg	gtg	cgg	gac	aac	gac	ctc	tcc	gcc	cgg	gtg	gcc	672	
Arg	Ala	Phe	Arg	Ala	Val	Arg	Asp	Asn	Asp	Leu	Ser	Ala	Arg	Val	Ala		
	210					215					220						
ggg	gtg	gac	ctc	acc	cgg	acc	aag	ctc	ctc	gcc	ttc	gcc	ctc	tcc	gcc	720	
Gly	Val	Asp	Leu	Thr	Arg	Thr	Lys	Leu	Leu	Ala	Phe	Ala	Leu	Ser	Ala		
	225				230					235					240		
ttc	tac	gcc	ggg	gtg	gcg	ggg	ggg	ctt	ctc	gcc	ggg	ctc	tac	aag	gcg	768	
Phe	Tyr	Ala	Gly	Val	Ala	Gly	Gly	Leu	Leu	Ala	Gly	Leu	Tyr	Lys	Ala		
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gtg	acc	ccg	gag	tac	ttt	ccc	ctc	tcc	gtg	agc	atc	cag	tac	ctg	gcc	816	
Val	Thr	Pro	Glu	Tyr	Phe	Pro	Leu	Ser	Val	Ser	Ile	Gln	Tyr	Leu	Ala		
			260					265				270					
atg	gtc	atc	gtg	ggc	ggg	gcg	ggg	acg	gtc	ttg	gga	gcg	gtc	ttg	ggg	864	
Met	Val	Ile	Val	Gly	Gly	Ala	Gly	Thr	Val	Leu	Gly	Ala	Val	Leu	Gly		
		275					280				285						
gcc	ttc	ttc	gtc	ctc	ctc	atc	ccc	gag	gtg	ctc	aat	agc	ttc	gtg	ggg	912	
Ala	Phe	Phe	Val	Leu	Leu	Ile	Pro	Glu	Val	Leu	Asn	Ser	Phe	Val	Gly		
	290					295					300						
gcc	ctg	ggc	ccg	gag	tac	gcc	gcc	cag	ctc	gcc	tgg	cgc	aac	gtg		960	
Ala	Leu	Gly	Pro	Glu	Tyr	Ala	Ala	Gln	Leu	Ala	Ala	Trp	Arg	Asn	Val		
	305				310					315					320		
gtc	ttc	ggc	ggc	ctc	atc	ctc	ctc	ttc	ctg	gtc	ctc	gag	ccc	ctg	ggc	1008	
Val	Phe	Gly	Gly	Leu	Ile	Leu	Leu	Phe	Leu	Val	Leu	Glu	Pro		Gly		
				325					330					335			
ctg	gtg	ggg	ctt	tgg	ggg	cgg	gtg	cgg	gac	tac	ttc	cgc	acc	tgg	ccc	1056	
Leu	Val	Gly	Leu	Trp	Gly	Arg	Val	Arg	Asp	Tyr	Phe	Arg	Thr	Trp	Pro		
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ctg	ccc	tac	tag													1068	
Leu	Pro	Tyr															
		355															

<210> 643

<211> 355

<212> PRT

<213> Thermus thermophilus

<400> 643

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			20					25					30				
Thr	Pro	Leu	Gly	Arg	Leu	Ala	Leu	Tyr	Ala	Phe	Leu	Leu	Leu	Leu	Leu		
		35					40					45					
Leu	Leu	Pro	Leu	Leu	Leu	Gly	Pro	Tyr	Pro	Met	Tyr	Val	Ala	Thr	Leu		
	50					55				60							
Val	Ala	Ile	Gly	Ala	Leu	Ser	Ala	Leu	Gly	Leu	His	Leu	Leu	Val	Gly		
	65				70				75						80		
Gly	Ala	Gly	Gln	Ile	Ser	Leu	Gly	His	Ala	Ala	Phe	Met	Gly	Val	Gly		
			85					90						95			
Ala	Tyr	Ala	Ala	Ser	His	Leu	Thr	Gly	Pro	Leu	Ala	Pro	Leu	Gly	Ile		
			100					105					110				
Leu	Leu	Gly	Gly	Gly	Ile	Ala	Ala	Phe	Leu	Gly	Leu	Leu	Leu	Gly	Leu		

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      115      120      125
Pro  Ser  Leu  Arg  Ile  Lys  Gly  Val  Tyr  Leu  Ala  Ile  Thr  Leu  Ala
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Phe  Gln  Phe  Leu  Ala  Asp  Tyr  Val  Phe  Lys  Thr  Trp  Glu  Ala  Val  Thr
145      150      155      160
Gly  Gly  Ile  Arg  Gly  Arg  Thr  Leu  Pro  Pro  Pro  Glu  Val  Leu  Gly  Leu
    165      170      175
Val  Leu  Asp  Thr  Pro  Glu  Lys  Leu  Trp  Tyr  Leu  Val  Leu  Leu  Phe  Ala
    180      185      190
Leu  Pro  Leu  Phe  Phe  Tyr  Gly  Lys  Arg  Leu  Leu  Met  Thr  Arg  Ala  Gly
    195      200      205
Arg  Ala  Phe  Arg  Ala  Val  Arg  Asp  Asn  Asp  Leu  Ser  Ala  Arg  Val  Ala
    210      215      220
Gly  Val  Asp  Leu  Thr  Arg  Thr  Lys  Leu  Leu  Ala  Phe  Ala  Leu  Ser  Ala
225      230      235      240
Phe  Tyr  Ala  Gly  Val  Ala  Gly  Gly  Leu  Leu  Ala  Gly  Leu  Tyr  Lys  Ala
    245      250      255
Val  Thr  Pro  Glu  Tyr  Phe  Pro  Leu  Ser  Val  Ser  Ile  Gln  Tyr  Leu  Ala
    260      265      270
Met  Val  Ile  Val  Gly  Gly  Ala  Gly  Thr  Val  Leu  Gly  Ala  Val  Leu  Gly
    275      280      285
Ala  Phe  Phe  Val  Leu  Leu  Ile  Pro  Glu  Val  Leu  Asn  Ser  Phe  Val  Gly
    290      295      300
Ala  Leu  Gly  Pro  Glu  Tyr  Ala  Ala  Gln  Leu  Ala  Ala  Trp  Arg  Asn  Val
305      310      315      320
Val  Phe  Gly  Gly  Leu  Ile  Leu  Leu  Phe  Leu  Val  Leu  Glu  Pro  Leu  Gly
    325      330      335
Leu  Val  Gly  Leu  Trp  Gly  Arg  Val  Arg  Asp  Tyr  Phe  Arg  Thr  Trp  Pro
    340      345      350
Leu  Pro  Tyr
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<210> 644

<211> 894

<212> DNA

<213> Thermus thermophilus

<220>

<221> CDS

<222> (1)..(894)

<400> 644

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  1      5      10      15
gtc tac gcc ctc gcc ttg ggc ttc ctc atc tac aag gcg agc      96
Val Tyr Ala Leu Ala Ala Leu Gly Phe Val Leu Ile Tyr Lys Ala Ser
    20      25      30
cgg gtg gtg aac ttc gcc cag ggg cag ttc atc gcc atc ggg gcc ttt      144
Arg Val Val Asn Phe Ala Gln Gly Gln Phe Ile Ala Ile Gly Ala Phe
    35      40      45
ttg gcc tac tgg gcc atg gtc ggc ttg ggg gcg ccc ttt ctt ttg gcc      192
Leu Ala Tyr Trp Ala Met Val Ala Leu Gly Ala Pro Phe Leu Leu Ala
    50      55      60
gcg gcc ttg gcc ctg gcc tta acc gcc ctc ttg ggc ttt ggg gtg gag      240
Ala Ala Leu Ala Leu Ala Leu Thr Ala Leu Leu Gly Phe Gly Val Glu
    65      70      75      80
cgg gtc ttc ctg aag cgc atg gtg ggg cag ccc atc atc tcc gtc atc      288
Arg Val Phe Leu Lys Arg Met Val Gly Gln Pro Ile Ile Ser Val Ile
    85      90      95
atg gcc acc atc ggc ctc gcc tcc ctc ctt gac ggc ctg atc cac ctt      336
Met Ala Thr Ile Gly Leu Ala Ser Leu Leu Asp Gly Leu Ile His Leu
    100      105      110
acc ccc ttc ggg gcg ggc aac ttc agc tac ccc gcc ttc ctg ccc tcg      384
Thr Pro Phe Gly Ala Gly Asn Phe Ser Tyr Pro Ala Phe Leu Pro Ser
    115      120      125
ggc ggc gtc gcc ctc ctg ggg gcg cag gtc tcc tac ccc cag ctc ctc      432
Gly Gly Val Ala Leu Leu Gly Ala Gln Val Ser Tyr Pro Gln Leu Leu
    130      135      140

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Ala	Leu	Gly	Phe	Thr	Leu	Ala	Phe	Leu	Ala	Leu	Phe	Thr	Trp	Phe	Phe	
145					150				155						160	
cag	cgc	tcc	acc	ctg	ggg	atc	gcc	atg	cgg	agc	gtg	gcc	gac	gac	cag	528
Gln	Arg	Ser	Thr	Leu	Gly	Ile	Ala	Met	Arg	Ser	Val	Ala	Asp	Asp	Gln	
				165					170						175	
atg	gcg	gcc	atg	agc	ctc	ggg	gtc	tcg	gtg	gag	aag	gtc	ttc	gcc	ctg	576
Met	Ala	Ala	Met	Ser	Leu	Gly	Val	Ser	Val	Glu	Lys	Val	Phe	Ala	Leu	
				180					185						190	
gcc	tgg	gcg	gcg	gcg	ggg	ctc	acg	gcg	gcg	gcg	gcc	ggg	atc	gtg	gtg	624
Ala	Trp	Ala	Ala	Ala	Gly	Leu	Thr	Ala	Ala	Ala	Ala	Gly	Ile	Val	Val	
				195					200						205	
ggc	acc	atc	ggc	ggc	ctc	aac	ctg	gac	ggg	ctg	gtg	cac	atc	ggc	ctt	672
Gly	Thr	Ile	Ala	Gly	Leu	Asn	Leu	Asp	Gly	Leu	Val	His	Ile	Gly	Leu	
				210											220	
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Arg	Val	Phe	Pro	Val	Val	Ile	Leu	Gly	Gly	Leu	Asp	Ser	Ile	Pro	Gly	
				225											240	
cgc	gtg	gtg	gcg	ggg	atc	ctc	atc	ggc	gtc	ttg	gaa	aac	ctg	gcg	gcg	768
Ala	Val	Val	Ala	Gly	Ile	Leu	Ile	Gly	Val	Leu	Glu	Asn	Leu	Ala	Ala	
				245											255	
ggc	tac	ctg	gac	ccc	ttt	gtc	ccc	ggc	ggg	ggg	acc	cgg	gac	gtc	ttc	816
Gly	Tyr	Leu	Asp	Pro	Phe	Val	Pro	Gly	Gly	Gly	Thr	Arg	Asp	Val	Phe	
				260											270	
ccc	ttc	ctg	gtc	ctc	ctt	ttg	gtt	ctc	tgg	ttc	aag	ccc	cat	ggc	ctc	864
Pro	Phe	Leu	Val	Leu	Leu	Leu	Val	Leu	Trp	Phe	Lys	Pro	His	Gly	Leu	
				275											285	
ttc	ggc	acg	gag	gag	att	gag	cgc	gta	tga							894
Phe	Gly	Thr	Glu	Glu	Ile	Glu	Arg	Val								
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<210> 645

<211> 297

<212> PRT

<213> Thermus thermophilus

<400> 645

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				20				25					30			
Arg	Val	Val	Asn	Phe	Ala	Gln	Gly	Gln	Phe	Ile	Ala	Ile	Gly	Ala	Phe	
				35				40					45			
Leu	Ala	Tyr	Trp	Ala	Met	Val	Ala	Leu	Gly	Ala	Pro	Phe	Leu	Leu	Ala	
				50				55				60				
Ala	Ala	Leu	Ala	Leu	Ala	Leu	Thr	Ala	Leu	Leu	Gly	Phe	Gly	Val	Glu	
				65				70							80	
Arg	Val	Phe	Leu	Lys	Arg	Met	Val	Gly	Gln	Pro	Ile	Ile	Ser	Val	Ile	
				85				90							95	
Met	Ala	Thr	Ile	Gly	Leu	Ala	Ser	Leu	Leu	Asp	Gly	Leu	Ile	His	Leu	
				100				105						110		
Thr	Pro	Phe	Gly	Ala	Gly	Asn	Phe	Ser	Tyr	Pro	Ala	Phe	Leu	Pro	Ser	
				115				120						125		
Gly	Gly	Val	Ala	Leu	Leu	Gly	Ala	Gln	Val	Ser	Tyr	Pro	Gln	Leu	Leu	
				130				135					140			
Ala	Leu	Gly	Phe	Thr	Leu	Ala	Phe	Leu	Ala	Leu	Phe	Thr	Trp	Phe	Phe	
				145				150							160	
Gln	Arg	Ser	Thr	Leu	Gly	Ile	Ala	Met	Arg	Ser	Val	Ala	Asp	Asp	Gln	
				165					170						175	
Met	Ala	Ala	Met	Ser	Leu	Gly	Val	Ser	Val	Glu	Lys	Val	Phe	Ala	Leu	
				180				185							190	
Ala	Trp	Ala	Ala	Ala	Gly	Leu	Thr	Ala	Ala	Ala	Ala	Gly	Ile	Val	Val	
				195				200							205	
Gly	Thr	Ile	Ala	Gly	Leu	Asn	Leu	Asp	Gly	Leu	Val	His	Ile	Gly	Leu	
				210				215							220	
Arg	Val	Phe	Pro	Val	Val	Ile	Leu	Gly	Gly	Leu	Asp	Ser	Ile	Pro	Gly	
				225											240	
Ala	Val	Val	Ala	Gly	Ile	Leu	Ile	Gly	Val	Leu	Glu	Asn	Leu	Ala	Ala	
				245											255	

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Gly Tyr Leu Asp Pro Phe Val Pro Gly Gly Gly Thr Arg Asp Val Phe
 260 270
 Pro Phe Leu Val Leu Leu Leu Val Leu Trp Phe Lys Pro His Gly Leu
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 Phe Gly Thr Glu Glu Ile Glu Arg Val
 290 295

<210> 646

<211> 861

<212> DNA

<213> Bacillus cereus

<220>

<221> CDS

<222> (1)..(861)

<400> 646

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1 5 10 15	
ctc att ttt tta tta gca tca ggt ctt tca ctt att ttc ggt tta atg	96
Leu Ile Phe Leu Leu Ala Ser Gly Leu Ser Leu Ile Phe Gly Leu Met	
20 25 30	
agt gtt cta aac ttc gca cat ggt ggt tta ttt gca tgg gga gca ttt	144
Ser Val Leu Asn Phe Ala His Gly Gly Leu Phe Ala Trp Gly Ala Phe	
35 40 45	
aca ggt gtt tgg cta ttt aat atg aca ggg agt tat gtg tta gct tta	192
Thr Gly Val Trp Leu Phe Asn Met Thr Gly Ser Tyr Val Leu Ala Leu	
50 55 60	
att gga gca ata gct atg gga atg ttc ctt gga ttt att tta gaa aga	240
Ile Gly Ala Ile Ala Met Gly Met Phe Leu Gly Phe Ile Leu Glu Arg	
65 70 75 80	
ttc ctt att aga ccg gta tac gga aat cat gtt cga cag ctt ctt gtt	288
Phe Leu Ile Arg Pro Val Tyr Gly Asn His Val Arg Gln Leu Leu Val	
85 90 95	
aca ctt gga gga atg ctt gta ctt agt gaa tgt att aaa gta ttt tgg	336
Thr Leu Gly Gly Met Leu Val Leu Ser Glu Cys Ile Lys Val Phe Trp	
100 105 110	
gga cca aat cca att ggg gca aag tta ccg tta tgg cta caa gga agt	384
Gly Pro Asn Pro Ile Gly Ala Lys Leu Pro Leu Trp Leu Gln Gly Ser	
115 120 125	
ttt acg ttc gga ggc gtt ata tta att aaa tat cgt cta ttc gtt atc	432
Phe Thr Phe Gly Gly Val Ile Leu Ile Lys Tyr Arg Leu Phe Val Ile	
130 135 140	
ata att ggg gtt atc ata tac att gcc tta tta ttg ctc aaa aaa	480
Ile Ile Gly Val Ile Ile Tyr Ile Ala Leu Leu Leu Leu Lys Lys	
145 150 155 160	
aca aag ata ggt ctt atg ata cgc gca ggt gta atg gat aaa gag atg	528
Thr Lys Ile Gly Leu Met Ile Arg Ala Gly Val Met Asp Lys Glu Met	
165 170 175	
gtt caa gcg ctc ggt att aac gta aaa gct ata ttt tct ttc gtc ttt	576
Val Gln Ala Leu Gly Ile Asn Val Lys Ala Ile Phe Ser Phe Val Phe	
180 185 190	
tta tta gga gca ggg atg gct gcc tta ggt ggc ttc tta tta gca cca	624
Leu Leu Gly Ala Gly Met Ala Ala Leu Gly Gly Phe Leu Leu Ala Pro	
195 200 205	
tac tca ggc gtt att ttc gct gag atg ggt atg cag tat gcg att tta	672
Tyr Ser Gly Val Ile Phe Ala Glu Met Gly Met Gln Tyr Ala Ile Leu	
210 215 220	
gct ttc ata gta gta atc att gga ggg cta gga agc gta caa ggt tca	720
Ala Phe Ile Val Val Ile Ile Gly Gly Leu Gly Ser Val Gln Gly Ser	
225 230 235 240	
gcc atc gct tct tta att gtc gga tta gct ggt gct ttt aca gcg tat	768
Ala Ile Ala Ser Leu Ile Val Gly Leu Ala Gly Ala Phe Thr Ala Tyr	
245 250 255	
ttt ata ccg gat tta tca ctt gca atc aat atg tta atg tta cta ttt	816
Phe Ile Pro Asp Leu Ser Leu Ala Ile Asn Met Leu Met Leu Leu Phe	
260 265 270	
ttc tta ata gtg aag cca aat gga ctt gtt ggt gaa aag ggg tga	861

Phe Leu Ile Val Lys Pro Asn Gly Leu Val Gly Glu Lys Gly
 275 280 285

<210> 647

<211> 286

<212> PRT

<213> *Bacillus cereus*

<400> 647

Met Asp Val Leu Ile Asn Leu Phe Val Asn Gly Ile Ser Thr Gly Met
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 Leu Ile Phe Leu Leu Ala Ser Gly Leu Ser Leu Ile Phe Gly Leu Met
 20 25 30
 Ser Val Leu Asn Phe Ala His Gly Gly Leu Phe Ala Trp Gly Ala Phe
 35 40 45
 Thr Gly Val Trp Leu Phe Asn Met Thr Gly Ser Tyr Val Leu Ala Leu
 50 55 60
 Ile Gly Ala Ile Ala Met Gly Met Phe Leu Gly Phe Ile Leu Glu Arg
 65 70 75 80
 Phe Leu Ile Arg Pro Val Tyr Gly Asn His Val Arg Gln Leu Leu Val
 85 90 95
 Thr Leu Gly Gly Met Leu Val Leu Ser Glu Cys Ile Lys Val Phe Trp
 100 105 110
 Gly Pro Asn Pro Ile Gly Ala Lys Leu Pro Leu Trp Leu Gln Gly Ser
 115 120 125
 Phe Thr Phe Gly Gly Val Ile Leu Ile Lys Tyr Arg Leu Phe Val Ile
 130 135 140
 Ile Ile Gly Val Ile Ile Tyr Ile Ala Leu Leu Leu Leu Lys Lys
 145 150 155 160
 Thr Lys Ile Gly Leu Met Ile Arg Ala Gly Val Met Asp Lys Glu Met
 165 170 175
 Val Gln Ala Leu Gly Ile Asn Val Lys Ala Ile Phe Ser Phe Val Phe
 180 185 190
 Leu Leu Gly Ala Gly Met Ala Ala Leu Gly Gly Phe Leu Leu Ala Pro
 195 200 205
 Tyr Ser Gly Val Ile Phe Ala Glu Met Gly Met Gln Tyr Ala Ile Leu
 210 215 220
 Ala Phe Ile Val Val Ile Ile Gly Gly Leu Gly Ser Val Gln Gly Ser
 225 230 235 240
 Ala Ile Ala Ser Leu Ile Val Gly Leu Ala Gly Ala Phe Thr Ala Tyr
 245 250 255
 Phe Ile Pro Asp Leu Ser Leu Ala Ile Asn Met Leu Met Leu Leu Phe
 260 265 270
 Phe Leu Ile Val Lys Pro Asn Gly Leu Val Gly Glu Lys Gly
 275 280 285

<210> 648

<211> 900

<212> DNA

<213> *Treponema denticola*

<220>

<221> CDS

<222> (1)..(900)

<400> 648

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Met Leu Leu Gln Gln Leu Ile Asn Gly Leu Val Ile Gly Ser Thr Tyr	
1 5 10 15	
gca ttg gtt aca ata ggt ttt aat atg gtg tac ggt gtg ttg gag ctg	96
Ala Leu Val Thr Ile Gly Phe Asn Met Val Tyr Gly Val Leu Glu Leu	
20 25 30	
act aat ttt gcc cat agt tct ttt tat atg ctg gct gcg tat ata ggt	144
Thr Asn Phe Ala His Ser Ser Phe Tyr Met Leu Ala Ala Tyr Ile Gly	
35 40 45	
caa ttc att ttg tta aaa ttc ttt atg act gta tcg gtc cct att gct	192
Gln Phe Ile Leu Leu Lys Phe Phe Met Thr Val Ser Val Pro Ile Ala	
50 55 60	
ctg att ata aca ttt tta act tcc ata att ata aca gcc ttt ttg ggt	240

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Leu 65	Ile	Ile	Thr	Phe	Leu 70	Thr	Ser	Ile	Ile	Ile 75	Thr	Ala	Phe	Leu	Gly 80	
gct	ctt	atg	gat	aaa	att	gct	ttg	gag	cct	ata	aga	ata	aaa	aaa	ggt	288
Ala	Leu	Met	Asp	Lys 85	Ile	Ala	Leu	Glu	Pro	Ile	Arg	Ile	Lys	Lys 95	Gly	
gct	cct	att	tca	tct	tta	ata	agt	act	gtc	ggt	ggt	cag	act	ata	atc	336
Ala	Pro	Ile	Ser	Ser	Leu	Ile	Ser	Thr	Val	Gly	Val	Gln	Thr	Ile	Ile	
aac	aac	tcc	ggt	ctt	tta	att	ttc	ggc	aca	ggt	cca	tta	tac	ttt	cct	384
Asn	Asn	Ser	Val	Leu	Leu	Ile	Phe	Gly	Thr	Val	Pro	Leu	Tyr	Phe	Pro	
gat	tta	tta	aag	ctg	ggt	aaa	ttt	act	att	tat	ggc	gga	act	gtg	ggt	432
Asp	Leu	Leu	Lys	Leu	Gly	Lys 135	Phe	Thr	Ile	Tyr	Gly	Gly	Thr	Val	Val	
caa	tgg	att	cag	ggt	ctc	ata	ttg	att	atg	act	tta	att	ata	atg	ctt	480
Gln	Trp	Ile	Gln	Val	Leu	Ile	Leu	Ile	Met	Thr	Leu	Ile	Ile	Met	Leu	
145					150					155					160	
gta	tta	act	ttt	att	ggt	acg	cgt	aca	cgc	tta	gga	aag	tca	atg	cgg	528
Val	Leu	Thr	Phe	Ile 165	Val	Thr	Arg	Thr	Arg	Leu	Gly	Lys	Ser	Met	Arg	
gca	att	tct	caa	aat	caa	ggt	gct	gca	aga	ctt	atg	gga	ata	aat	ata	576
Ala	Ile	Ser	Gln	Asn	Gln	Val	Ala	Ala	Arg	Leu	Met	Gly	Ile	Asn	Ile	
			180				185						190			
aat	aga	ggt	ata	acc	ctt	aca	ttc	ttt	ata	gga	act	aca	ggt	gcc	ggt	624
Asn	Arg	Val	Ile	Thr	Leu	Thr	Phe 200	Phe	Ile	Gly	Thr	Thr	Val	Ala	Gly	
			195				200					205				
att	tca	ggt	tta	atg	ggt	gca	atg	tat	tat	caa	aga	gta	gat	acc	tta	672
Ile	Ser	Gly	Leu	Met	Val	Ala 215	Met	Tyr	Tyr	Gln	Arg	Val	Asp	Thr	Leu	
						215					220					
atg	ggg	gca	tct	gta	gga	tta	aag	tca	ttt	gct	gca	gca	ggt	ctt	ggc	720
Met	Gly	Ala	Ser	Val	Gly	Leu	Lys	Ser	Phe	Ala	Ala	Ala	Val	Leu	Gly	
225					230					235					240	
gga	atg	ggc	tct	ctc	ccc	gga	gcg	gct	ata	gga	gga	tta	ttg	ata	ggc	768
Gly	Met	Gly	Ser	Leu	Pro	Gly	Ala	Ala	Ile	Gly	Gly	Leu	Leu	Ile	Gly	
				245					250					255		
tta	ctt	gaa	act	ctt	ttt	gcc	gct	tat	ata	agt	tca	gga	tat	agg	gat	816
Leu	Leu	Glu	Thr	Leu	Phe	Ala	Ala	Tyr	Ile	Ser	Ser	Gly	Tyr	Arg	Asp	
			260				265						270			
att	ggt	gca	ttt	gtg	ata	ttg	ata	ttg	ggt	ctt	ctt	att	cgg	ccc	tca	864
Ile	Val	Ala	Phe	Val	Ile	Leu	Ile	Leu	Val	Leu	Leu	Ile	Arg	Pro	Ser	
			275				280					285				
ggc	tta	atg	ggt	aaa	aaa	agt	gta	gat	aag	gta	tag					900
Gly	Leu	Met	Gly	Lys	Lys	Ser 295	Val	Asp	Lys	Val						
						290										

<210> 649

<211> 299

<212> PRT

<213> Treponema denticola

<400> 649

Met	Leu	Leu	Gln	Gln	Leu	Ile	Asn	Gly	Leu	Val	Ile	Gly	Ser	Thr	Tyr
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Ala	Leu	Val	Thr	Ile	Gly	Phe	Asn	Met	Val	Tyr	Gly	Val	Leu	Glu	Leu
			20				25						30		
Thr	Asn	Phe	Ala	His	Ser	Ser	Phe	Tyr	Met	Leu	Ala	Ala	Tyr	Ile	Gly
		35					40					45			
Gln	Phe	Ile	Leu	Leu	Lys	Phe	Phe	Met	Thr	Val	Ser	Val	Pro	Ile	Ala
	50					55					60				
Leu	Ile	Ile	Thr	Phe	Leu	Thr	Ser	Ile	Ile	Ile	Thr	Ala	Phe	Leu	Gly
65					70				75						80
Ala	Leu	Met	Asp	Lys	Ile	Ala	Leu	Glu	Pro	Ile	Arg	Ile	Lys	Lys	Gly
				85				90					95		
Ala	Pro	Ile	Ser	Ser	Leu	Ile	Ser	Thr	Val	Gly	Val	Gln	Thr	Ile	Ile
			100				105					110			
Asn	Asn	Ser	Val	Leu	Leu	Ile	Phe	Gly	Thr	Val	Pro	Leu	Tyr	Phe	Pro
		115					120					125			
Asp	Leu	Lys	Leu	Gly	Lys	Lys	Phe	Thr	Ile	Tyr	Gly	Gly	Thr	Val	Val
	130				135						140				

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Gln Trp Ile Gln Val Leu Ile Leu Ile Met Thr Leu Ile Ile Met Leu
 145 Val Leu Thr Phe Ile Val Thr Arg Thr Arg Leu Gly Lys Ser Met Arg
 165 Ala Ile Ser Gln Asn Gln Val Ala Ala Arg Leu Met Gly Ile Asn Ile
 180 Asn Arg Val Ile Thr Leu Thr Phe Ile Gly Thr Thr Val Ala Gly
 195 Ile Ser Gly Leu Met Val Ala Met Tyr Tyr Gln Arg Val Asp Thr Leu
 210 Met Gly Ala Ser Val Gly Leu Lys Ser Phe Ala Ala Val Leu Gly
 225 Gly Met Gly Ser Leu Pro Gly Ala Ala Ile Gly Gly Leu Leu Ile Gly
 245 Leu Leu Glu Thr Leu Phe Ala Ala Tyr Ile Ser Ser Gly Tyr Arg Asp
 260 Ile Val Ala Phe Val Ile Leu Ile Leu Val Leu Leu Ile Arg Pro Ser
 275 Gly Leu Met Gly Lys Lys Ser Val Asp Lys Val
 290

<210> 650

<211> 1020

<212> DNA

<213> Treponema denticola

<220>

<221> CDS

<222> (1)..(1020)

<400> 650

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Met Arg Lys Lys Ser Ile Ile Leu Asp Lys Met Ile Lys Lys Ile Ala	
1 5 10 15	
aaa aat cag ata ttt gtt tta att ata ctt gct gtt ctg gca ata tct	96
Lys Asn Gln Phe Val Leu Ile Ile Leu Ala Val Leu Ala Ile Ser	
20 25 30	
ttc ccg att ttt gtt gac aat aat tac tat ctt ggc ata gca ata atg	144
Phe Pro Ile Phe Val Asp Asn Asn Tyr Tyr Leu Gly Ile Ala Ile Met	
35 40 45	
ttc ttt ata tat tca ata ttg acc tta tct ctt aat tta gtt acg ggt	192
Phe Phe Ile Tyr Ser Ile Leu Thr Leu Ser Leu Asn Leu Val Thr Gly	
50 55 60	
tat gtt gga ttt aca ctt ttg gga caa gcg gct ttt ttc ggt ttg ggg	240
Tyr Val Gly Phe Thr Leu Leu Gly Gln Ala Ala Phe Phe Gly Leu Gly	
65 70 75 80	
gct tat gtt gct gca ata ctt gga acg cgt ttt caa gtt gat ttt att	288
Ala Tyr Val Ala Ala Ile Leu Gly Thr Arg Phe Gln Val Asp Phe Ile	
85 90 95	
atc gga tgt ata gca gcc tct tta ttt gct ggt att ttt gga gca atg	336
Ile Gly Cys Ile Ala Ala Ser Leu Phe Ala Gly Ile Phe Gly Ala Met	
100 105 110	
ctg gct ctc ccg act ttg cgc ata cgc ggc cga tat ttt gca att gta	384
Leu Ala Leu Pro Thr Leu Arg Ile Arg Gly Arg Tyr Phe Ala Ile Val	
115 120 125	
act cta ggt ttt tct gaa atc atg cga atg ata gag ctt aac tgg atg	432
Thr Leu Gly Phe Ser Glu Ile Met Arg Met Ile Glu Leu Asn Trp Met	
130 135 140	
gag atg acg cga ggc cct cag gga att tca agg ata ccg ggt ata gta	480
Glu Met Thr Arg Gly Pro Gln Gly Ile Ser Arg Ile Pro Gly Ile Val	
145 150 155 160	
att ttt ggg aaa gag ttt gac tca tac aga ttt aag tac tat gtt ggg	528
Ile Phe Gly Lys Glu Phe Asp Ser Tyr Arg Phe Lys Tyr Tyr Val Gly	
165 170 175	
ctg gtt ctt tta ata ttt gcc tta tat ata att aat tca att tta aat	576
Leu Val Leu Leu Ile Phe Ala Leu Tyr Ile Ile Asn Ser Ile Leu Asn	
180 185 190	
tca aaa cat ggg cgt gcc gta cgc gca ata aaa gat gac gat tta gct	624
Ser Lys His Gly Arg Ala Val Arg Ala Ile Lys Asp Asp Asp Leu Ala	

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gcc	gga	195	gct	att	gga	gta	aat	200	ggt	tat	aaa	tat	acc	ggt	att	ata	ttt	672
Ala	Gly	210	Ala	Ile	Gly	Val	Asn	215	Val	Tyr	Lys	Tyr	Thr	Val	Ile	Ile	Phe	
tct	att	tca	gcg	ggt	att	gca	gga	atg	gcc	gga	gcc	tat	tac	gct	cat			720
Ser	Ile	Ser	Ala	Gly	Ile	Ala	Gly	Met	Ala	Gly	Ala	Tyr	Tyr	Ala	His			
225				230						235					240			
tat	atg	agt	ttt	att	gat	cct	aat	gct	ttt	aat	ttt	gaa	caa	tca	att			768
Tyr	Met	Ser	Phe	Ile	Asp	Pro	Asn	Ala	Phe	Asn	Phe	Glu	Gln	Ser	Ile			
				245					250						255			
tta	att	tta	tcg	atg	gcc	ata	ttt	ggc	gga	ttg	gga	agt	ttg	ccc	gga			816
Leu	Ile	Leu	Ser	Met	Ala	Ile	Phe	Gly	Gly	Leu	Gly	Ser	Leu	Pro	Gly			
				260				265						270				
agt	att	tta	gga	gct	ctg	gca	ttg	act	att	tta	cct	gaa	gcc	ctc	aga			864
Ser	Ile	Leu	Gly	Ala	Leu	Ala	Leu	Thr	Ile	Leu	Pro	Glu	Ala	Leu	Arg			
				275			280						285					
ttt	tta	tcc	gat	tat	cgg	caa	att	ata	tat	ggc	ctt	ata	ttg	ggt	ttg			912
Phe	Leu	Ser	Asp	Tyr	Arg	Gln	Ile	Ile	Tyr	Gly	Leu	Ile	Leu	Val	Leu			
				290			295				300							
ata	ggt	ata	ttt	aaa	ccc	tca	ggt	ggt	atg	ggc	aag	ata	aat	ttt	gaa			960
Ile	Val	Ile	Phe	Lys	Pro	Ser	Gly	Val	Met	Gly	Lys	Ile	Asn	Phe	Glu			
305					310					315					320			
cgg	ata	cga	tct	ata	gca	aat	atg	gaa	aag	gag	gac	tta	aat	gtc	gaa			1008
Arg	Ile	Arg	Ser	Ile	Ala	Asn	Met	Glu	Lys	Glu	Asp	Leu	Asn	Val	Glu			
				325					330					335				
tcc	aat	tct	taa															1020
Ser	Asn	Ser																

<210> 651

<211> 339

<212> PRT

<213> Treponema denticola

<400> 651

Met	Arg	Lys	Lys	Ser	Ile	Ile	Leu	Asp	Lys	Met	Ile	Lys	Lys	Ile	Ala			
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Lys	Asn	Gln	Ile	Phe	Val	Leu	Ile	Ile	Leu	Ala	Val	Leu	Ala	Ile	Ser			
			20					25					30					
Phe	Pro	Ile	Phe	Val	Asp	Asn	Asn	Tyr	Tyr	Leu	Gly	Ile	Ala	Ile	Met			
		35					40					45						
Phe	Phe	Ile	Tyr	Ser	Ile	Leu	Thr	Leu	Ser	Leu	Asn	Leu	Val	Thr	Gly			
		50				55					60							
Tyr	Val	Gly	Phe	Thr	Leu	Leu	Gly	Gln	Ala	Ala	Phe	Phe	Gly	Leu	Gly			
65					70				75					80				
Ala	Tyr	Val	Ala	Ala	Ile	Leu	Gly	Thr	Arg	Phe	Gln	Val	Asp	Phe	Ile			
			85					90						95				
Ile	Gly	Cys	Ile	Ala	Ala	Ser	Leu	Phe	Ala	Gly	Ile	Phe	Gly	Ala	Met			
			100					105					110					
Leu	Ala	Leu	Pro	Thr	Leu	Arg	Ile	Arg	Gly	Arg	Tyr	Phe	Ala	Ile	Val			
		115				120						125						
Thr	Leu	Gly	Phe	Ser	Glu	Ile	Met	Arg	Met	Ile	Glu	Leu	Asn	Trp	Met			
		130				135					140							
Glu	Met	Thr	Arg	Gly	Pro	Gln	Gly	Ile	Ser	Arg	Ile	Pro	Gly	Ile	Val			
145					150					155					160			
Ile	Phe	Gly	Lys	Glu	Phe	Asp	Ser	Tyr	Arg	Phe	Lys	Tyr	Tyr	Val	Gly			
			165						170					175				
Leu	Val	Leu	Leu	Ile	Phe	Ala	Leu	Tyr	Ile	Ile	Asn	Ser	Ile	Leu	Asn			
		180						185					190					
Ser	Lys	His	Gly	Arg	Ala	Val	Arg	Ala	Ile	Lys	Asp	Asp	Asp	Leu	Ala			
		195					200						205					
Ala	Gly	Ala	Ile	Gly	Val	Asn	Val	Tyr	Lys	Tyr	Thr	Val	Ile	Ile	Phe			
		210				215						220						
Ser	Ile	Ser	Ala	Gly	Ile	Ala	Gly	Met	Ala	Gly	Ala	Tyr	Tyr	Ala	His			
225				230						235				240				
Tyr	Met	Ser	Phe	Ile	Asp	Pro	Asn	Ala	Phe	Asn	Phe	Glu	Gln	Ser	Ile			
				245					250					255				
Leu	Ile	Leu	Ser	Met	Ala	Ile	Phe	Gly	Gly	Leu	Gly	Ser	Leu	Pro	Gly			
			260					265					270					

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Ser Ile Leu Gly Ala Leu Ala Leu Thr Ile Leu Pro Glu Ala Leu Arg
 275 280
 Phe Leu Ser Asp Tyr Arg Gln Ile Ile Tyr Gly Leu Ile Leu Val Leu
 290 295 300
 Ile Val Ile Phe Lys Pro Ser Gly Val Met Gly Lys Ile Asn Phe Glu
 305 310 315 320
 Arg Ile Arg Ser Ile Ala Asn Met Glu Lys Glu Asp Leu Asn Val Glu
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 Ser Asn Ser

<210> 652

<211> 885

<212> DNA

<213> Geobacter sulfurreducens

<220>

<221> CDS

<222> (1)..(885)

<400> 652

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1 5 10 15	
acg gga gcc atc tat tcc ctg atc ggg gtc ggg ttt gcc atc att cac	96
Thr Gly Ala Ile Tyr Ser Leu Ile Gly Val Gly Phe Ala Ile Ile His	
20 25 30	
aat gcc aca ggc att atc aat ttc gcc caa ggc gaa ctc gtg atg ctt	144
Asn Ala Thr Gly Ile Ile Asn Phe Ala Gln Gly Glu Leu Val Met Leu	
35 40 45	
ggc ggc atg ttc acg ctc ttt ttt ctg aca gcc ctg aat ctg ccg ctg	192
Gly Gly Met Phe Thr Leu Phe Phe Leu Thr Ala Leu Asn Leu Pro Leu	
50 55 60	
ctg gta gcc ata atc ctg gca atc ggc gcc acc acc ctc gtg ggc gta	240
Leu Val Ala Ile Ile Leu Ala Ile Gly Ala Thr Thr Leu Val Gly Val	
65 70 75 80	
gtg ttc gaa cgt ctc gcc atc cgt ccc atg aag aat gcc tcg cct atc	288
Val Phe Glu Arg Leu Ala Ile Arg Pro Met Lys Asn Ala Ser Pro Ile	
85 90 95	
agc ctc gtc atc atc acg atc ggc ggc agc att ctc atc cgc ggc att	336
Ser Leu Val Ile Thr Ile Gly Gly Ser Ile Leu Ile Arg Gly Ile	
100 105 110	
gcc atg atc gtc tgg ggc aag gac act cac gcc att ccc aca ttc tcg	384
Ala Met Ile Val Trp Gly Lys Asp Thr His Ala Ile Pro Thr Phe Ser	
115 120 125	
ggc aat gag ccg atc cat ctg ggc gag gca acc atc ctt cca cag cac	432
Gly Asn Glu Pro Ile His Leu Gly Glu Ala Thr Ile Leu Pro Gln His	
130 135 140	
ctc tgg ata ttt gcg gtg acc att gtg gtc atg atc tgc agc aaa ctc	480
Leu Trp Ile Phe Ala Val Thr Ile Val Val Met Ile Cys Ser Lys Leu	
145 150 155 160	
tac ttc aac tac acc atc agc ggc aag gcc atg atg gcc tgc gcc tac	528
Tyr Phe Asn Tyr Thr Ile Ser Gly Lys Ala Met Arg Ala Cys Ala Tyr	
165 170 175	
aac cgt cgg gcc gcc ggt ctc gtg ggg atc gac gtg cgg cgc atg gtg	576
Asn Arg Arg Ala Ala Gly Leu Val Gly Ile Asp Val Arg Arg Met Val	
180 185 190	
ctt ttt tcc ttt gcc atc agc tct gcc atg ggt tcc ctg gcc ggt atc	624
Leu Phe Ser Phe Ala Ile Ser Ser Ala Met Gly Ser Leu Ala Gly Ile	
195 200 205	
atc atc gct ccg ctc acc atg acc tcc tat gat gtt ggc atc atg ctc	672
Ile Ile Ala Pro Leu Thr Met Thr Ser Tyr Asp Val Gly Ile Met Leu	
210 215 220	
ggc ctc aaa gga ttc tgc gcc gcc atc atc ggc ggc atg agc agc ggc	720
Gly Leu Lys Gly Phe Cys Ala Ala Ile Ile Gly Gly Met Ser Ser Gly	
225 230 235 240	
ctc ggc acc atc ctg ggc ggc att ctc ctc ggc atc ctg gaa tcg ctt	768
Leu Gly Thr Ile Leu Gly Gly Ile Leu Leu Gly Ile Leu Glu Ser Leu	
245 250 255	

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ggc gct gga ctt ttc tca tcc ggc tat aag gac gcc att gcc ttt atc 816
 Gly Ala Gly Leu Phe Ser Ser Gly Tyr Lys Asp Ala Ile Ala Phe Ile
 260 265 270
 atc ctg ttg ctg att ctc ttt gta cgt ccc cag gga ttg ttc cgc aag 864
 Ile Leu Leu Leu Ile Leu Phe Val Arg Pro Gln Gly Leu Phe Arg Lys
 275 280 285
 ggc gag acc gag cgt gtc taa 885
 Gly Glu Thr Glu Arg Val
 290

<210> 653

<211> 294

<212> PRT

<213> *Geobacter sulfurreducens*

<400> 653

Met Asn Leu Gly Gln Gln Ile Ala Gln Tyr Leu Leu Ser Gly Leu Ser
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 Thr Gly Ala Ile Tyr Ser Leu Ile Gly Val Gly Phe Ala Ile Ile His
 20 25 30
 Asn Ala Thr Gly Ile Ile Asn Phe Ala Gln Gly Glu Leu Val Met Leu
 35 40 45
 Gly Gly Met Phe Thr Leu Phe Phe Leu Thr Ala Leu Asn Leu Pro Leu
 50 55 60
 Leu Val Ala Ile Ile Leu Ala Ile Gly Ala Thr Thr Leu Val Gly Val
 65 70 75 80
 Val Phe Glu Arg Leu Ala Ile Arg Pro Met Lys Asn Ala Ser Pro Ile
 85 90 95
 Ser Leu Val Ile Thr Ile Gly Gly Ser Ile Leu Ile Arg Gly Ile
 100 105 110
 Ala Met Ile Val Trp Gly Lys Asp Thr His Ala Ile Pro Thr Phe Ser
 115 120 125
 Gly Asn Glu Pro Ile His Leu Gly Glu Ala Thr Ile Leu Pro Gln His
 130 135 140
 Leu Trp Ile Phe Ala Val Thr Ile Val Val Met Ile Cys Ser Lys Leu
 145 150 155 160
 Tyr Phe Asn Tyr Thr Ile Ser Gly Lys Ala Met Arg Ala Cys Ala Tyr
 165 170 175
 Asn Arg Arg Ala Ala Gly Leu Val Gly Ile Asp Val Arg Arg Met Val
 180 185 190
 Leu Phe Ser Phe Ala Ile Ser Ser Ala Met Gly Ser Leu Ala Gly Ile
 195 200 205
 Ile Ile Ala Pro Leu Thr Met Thr Ser Tyr Asp Val Gly Ile Met Leu
 210 215 220
 Gly Leu Lys Gly Phe Cys Ala Ala Ile Ile Gly Gly Met Ser Ser Gly
 225 230 235 240
 Leu Gly Thr Ile Leu Gly Gly Ile Leu Leu Gly Ile Leu Glu Ser Leu
 245 250 255
 Gly Ala Gly Leu Phe Ser Ser Gly Tyr Lys Asp Ala Ile Ala Phe Ile
 260 265 270
 Ile Leu Leu Leu Ile Leu Phe Val Arg Pro Gln Gly Leu Phe Arg Lys
 275 280 285
 Gly Glu Thr Glu Arg Val
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<210> 654

<211> 1158

<212> DNA

<213> *Agrobacterium tumefaciens*

<220>

<221> CDS

<222> (1)..(1158)

<400> 654

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 Met Pro Ile Arg Arg Arg Ser Asn Arg Cys Pro Ile Arg Pro Met Gly
 1 5 10 15
 aga cgg aaa gca atc tgt tct gca cca cca acg gtc tcg acg cag caa 96
 Seite 910

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Arg	Arg	Lys	Ala 20	Ile	Cys	Ser	Ala	Pro 25	Pro	Thr	Val	Ser	Thr 30	Gln	Gln		
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Ser	Ser	Lys 35	Ala	Asp	Pro	Ser	Pro 40	Arg	Gly	Pro	Ala	Glu 45	Pro	Cys	Leu		
gcg	gga	caa	agt	ctc	ggc	aag	gcg	gat	ctg	cgt	ttt	ttg	tct	gct	cgg	192	
Ala	Gly 50	Gln	Ser	Leu	Gly	Lys 55	Ala	Asp	Leu	Arg	Phe 60	Leu	Ser	Ala	Arg		
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His 65	Gln	Pro	Asp	Phe	Gly 70	Asn	Gly	Lys	Lys	Gln 75	Asn	Lys	Val	Trp	Ser 80		
gcc	ctt	ctc	acg	aac	ggt	ggc	ggt	atg	ctc	gac	att	ctc	ttt	atc	ggt	288	
Ala	Leu	Leu	Thr	Asn 85	Gly	Gly	Val	Met	Leu 90	Asp	Ile	Leu	Phe	Ile 95	Gly		
ctc	agt	ctc	ggc	tcg	atc	ctt	ctt	ctg	gtg	gca	ctc	ggt	ctc	gcc	atc	336	
Leu	Ser	Leu	Gly 100	Ser	Ile	Leu	Leu 105	Val	Val	Ala	Leu	Gly 110	Leu	Ala	Ile		
acc	tac	ggc	gcc	atg	ggc	gtc	atc	aat	atg	gcc	cat	ggc	gaa	atg	gtc	384	
Thr	Tyr	Gly 115	Ala	Met	Gly	Val	Ile 120	Asn	Met	Ala	His	Gly 125	Glu	Met	Val		
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Ser 145	Leu	Leu	Leu	Ala	Ile 150	Pro	Leu	Ala	Phe	Val 155	Val	Thr	Ala	Leu	Leu 160		
ggc	ctg	ata	atc	gag	cgg	gtg	ggt	gtg	cgg	cga	ctc	tac	ggc	cgc	ctg	528	
Gly	Leu	Ile	Ile	Glu 165	Arg	Val	Val	Val	Arg 170	Arg	Leu	Tyr	Gly 175	Arg	Leu		
ctg	gac	acg	ctt	ctc	gcc	acc	tgg	ggc	att	gcc	atc	ctt	ctg	cag	caa	576	
Leu	Asp	Thr	Leu 180	Leu	Ala	Thr	Trp	Gly 185	Ile	Ala	Ile	Leu	Leu 190	Gln	Gln		
gcc	gta	agg	ctc	gaa	ctg	ggc	ctc	acc	ttt	tta	ggc	att	cat	ata	gaa	624	
Ala	Val	Arg 195	Leu	Glu	Leu	Gly	Leu 200	Thr	Phe	Leu	Gly 205	Ile	His	Ile	Glu		
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Gly	Leu 210	Gly	Ala	Gly	Leu	Gln 215	Asn	Val	Ala	Val	Pro 220	Ser	Tyr	Leu	Gln		
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Gly	Thr 225	Phe	Arg	Phe	Ala 230	Gly	Ala	Asp	Ile	Asn 235	Ala	Tyr	Arg	Thr 240	Phe		
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Tyr	Arg	Thr 260	Thr	Ala	Gly	Met	Gln 265	Val	Arg	Ala	Ile	Ile 270	Arg	Asn	Pro		
aag	atg	gct	gcg	gcc	tgc	ggc	atc	gat	gta	aaa	cgc	att	aac	gcg	ctc	864	
Lys	Met 275	Ala	Ala	Ala	Cys	Gly	Ile 280	Asp	Val	Lys	Arg	Ile 285	Asn	Ala	Leu		
act	ttc	gcc	ttc	ggt	tcc	ggt	ctc	gcc	ggt	ggt	gcg	ggg	gtc	atg	atg	912	
Thr	Phe 290	Ala	Phe	Gly	Ser	Gly 295	Leu	Ala	Gly	Val	Ala 300	Gly	Val	Met	Met		
tcc	ggc	ttc	aag	acc	gtg	ttc	ccg	gat	atg	ggc	aca	acg	atg	gtc	gtg	960	
Ser 305	Gly	Phe	Lys	Thr 310	Val	Phe	Pro	Asp	Met	Gly 315	Thr	Thr	Met	Val 320	Val		
gac	ggt	ttc	atg	gtc	gtg	gta	acg	ggc	ggc	gtc	ggc	agt	ctc	ttc	ggt	1008	
Asp	Gly	Phe	Met	Val 325	Val	Val	Thr	Gly	Gly 330	Val	Gly	Ser	Leu	Phe 335	Gly		
acg	gcc	ctg	tct	tcc	ggg	ctt	ctc	ggc	gaa	atc	aac	gcg	ctg	gtg	gcc	1056	
Thr	Ala	Leu	Ser 340	Ser	Gly	Leu	Leu 345	Gly	Glu	Ile	Asn	Ala 350	Leu	Val	Ala		
atc	ggc	acg	aac	gac	att	ctg	gcg	gcc	gtc	ggt	ttc	ggg	gtc	gtc		1104	
Ile	Gly 355	Thr	Asn	Asp	Ile	Leu	Ala 360	Arg	Ala	Val	Val 365	Phe	Gly	Val	Val		
atc	ctc	gtc	att	ctc	gta	aag	ccc	agc	ggg	ctg	ttc	tcc	ttc	aag	ggg	1152	
Ile	Leu 370	Val	Ile	Leu	Val 375	Lys	Pro	Ser	Gly	Leu	Phe 380	Ser	Phe	Lys	Gly		
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Arg
385

<210> 655
<211> 385
<212> PRT
<213> Agrobacterium tumefaciens

<400> 655
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Ser Ser Lys Ala Asp Pro Ser Pro Arg Gly Pro Ala Glu Pro Cys Leu
35 40 45
Ala Gly Gln Ser Leu Gly Lys Ala Asp Leu Arg Phe Leu Ser Ala Arg
50 55 60
His Gln Pro Asp Phe Gly Asn Gly Lys Lys Gln Asn Lys Val Trp Ser
65 70 75 80
Ala Leu Leu Thr Asn Gly Gly Val Met Leu Asp Ile Leu Phe Ile Gly
85 90 95
Leu Ser Leu Gly Ser Ile Leu Leu Leu Val Ala Leu Gly Leu Ala Ile
100 105 110
Thr Tyr Gly Ala Met Gly Val Ile Asn Met Ala His Gly Glu Met Val
115 120 125
Met Ile Gly Ala Tyr Val Ala Val Leu Ser Gly Ile Trp Leu Lys Thr
130 135 140
Ser Leu Leu Leu Ala Ile Pro Leu Ala Phe Val Val Thr Ala Leu Leu
145 150 155 160
Gly Leu Ile Ile Glu Arg Val Val Val Arg Arg Leu Tyr Gly Arg Leu
165 170 175
Leu Asp Thr Leu Leu Ala Thr Trp Gly Ile Ala Ile Leu Leu Gln Gln
180 185 190
Ala Val Arg Leu Glu Leu Gly Leu Thr Phe Leu Gly Ile His Ile Glu
195 200 205
Gly Leu Gly Ala Gly Leu Gln Asn Val Ala Val Pro Ser Tyr Leu Gln
210 215 220
Gly Thr Phe Arg Phe Ala Gly Ala Asp Ile Asn Ala Tyr Arg Thr Phe
225 230 235 240
Ile Ile Ala Val Thr Ala Ala Leu Thr Leu Ala Thr Trp Phe Ile Leu
245 250 255
Tyr Arg Thr Thr Ala Gly Met Gln Val Arg Ala Ile Ile Arg Asn Pro
260 265 270
Lys Met Ala Ala Ala Cys Gly Ile Asp Val Lys Arg Ile Asn Ala Leu
275 280 285
Thr Phe Ala Phe Gly Ser Gly Leu Ala Gly Val Ala Gly Val Met Met
290 295 300
Ser Gly Phe Lys Thr Val Phe Pro Asp Met Gly Thr Thr Met Val Val
305 310 315 320
Asp Gly Phe Met Val Val Val Thr Gly Gly Val Gly Ser Leu Phe Gly
325 330 335
Thr Ala Leu Ser Ser Gly Leu Leu Gly Glu Ile Asn Ala Leu Val Ala
340 345 350
Ile Gly Thr Asn Asp Ile Leu Ala Arg Ala Val Val Phe Gly Val Val
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Ile Leu Val Ile Leu Val Lys Pro Ser Gly Leu Phe Ser Phe Lys Gly
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Arg
385

<210> 656
<211> 903
<212> DNA
<213> Wolinella succinogenes

<220>
<221> CDS
<222> (1)..(903)

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 ctt ggg agc atg tac gct ctc att gcg att ggc tat acg atg gtt tat 96
 Leu Gly Ser Met Tyr Ala Leu Ile Ala Ile Gly Tyr Thr Met Val Tyr
 20 25 30
 ggg gtc ttg cgc ctc ata aac ttc gcg cac gcg gat gtg atg gtg 144
 Gly Val Leu Arg Leu Ile Asn Phe Ala His Ala Asp Val Met Met Val
 35 40 45
 ggc gct ttt tta gtg ttt ttt ggg gtc tct agc ttt gct ctc cct ttt 192
 Gly Ala Phe Leu Val Phe Phe Gly Val Ser Ser Phe Ala Leu Pro Phe
 50 55 60
 tgg gcg gct gca ttg ctt tcg att ctt ttt tca gcg ctt ctt gga gtg 240
 Trp Ala Ala Ala Leu Leu Ser Ile Leu Phe Ser Ala Leu Leu Gly Val
 65 70 75 80
 gtg atc gac aag att gcc tac aaa ccc tta aga aac gcc ccc cga atc 288
 Val Ile Asp Lys Ile Ala Tyr Lys Pro Leu Arg Asn Ala Pro Arg Ile
 85 90 95
 tcc atg ctc atc acg gct att ggt gtg agc ttt ttc ttg gag aac atc 336
 Ser Met Leu Ile Thr Ala Ile Gly Val Ser Phe Phe Leu Glu Asn Ile
 100 105 110
 ttc aac gtc ttt ttt gga agc act ccc aaa tcc ttt gag gct ccc gct 384
 Phe Asn Val Phe Phe Gly Ser Thr Pro Lys Ser Phe Glu Ala Pro Ala
 115 120 125
 ttt ttc aat gag acc ctc tcg ctt tcg cat ctc gtt ttg acc cat atc 432
 Phe Phe Asn Glu Thr Leu Ser Leu Ser His Leu Val Leu Thr His Ile
 130 135 140
 gct ctg att gtt cct ttg gtg acg ctc ctt ctt ttg ggg atc ttg ctc 480
 Ala Leu Ile Val Pro Leu Val Thr Leu Leu Leu Gly Ile Leu Leu
 145 150 155 160
 tat gtg ctc tat cgc acc aag caa ggg atg gcc att aga gcg gtg gcg 528
 Tyr Val Leu Tyr Arg Thr Lys Gln Gly Met Ala Ile Arg Ala Val Ala
 165 170 175
 ttt gat gtg aac acc gtg agg ctc atg ggg gtg gat gcc aat caa att 576
 Phe Asp Val Asn Thr Val Arg Leu Met Gly Val Asp Ala Asn Gln Ile
 180 185 190
 atc tct atc gtc ttt atc atg gga agt gct cta gcg gcc gtg gga ggg 624
 Ile Ser Ile Val Phe Ile Met Gly Ser Ala Leu Ala Ala Val Gly Gly
 195 200 205
 att ttt tat gcg att agc tac ccc acc att gat ccg cta atg ggg gtt 672
 Ile Phe Tyr Ala Ile Ser Tyr Pro Thr Ile Asp Pro Leu Met Gly Val
 210 215 220
 ctt att ggc ctt aag gcg ttt gca gcc gcg gtt ttg ggc ggg att gga 720
 Leu Ile Gly Leu Lys Ala Phe Ala Ala Val Leu Gly Gly Ile Gly
 225 230 235 240
 agc gtg acg ggc gca gtg ctt gga gga ttt atc ctt gga ttc act gag 768
 Ser Val Thr Gly Ala Val Leu Gly Gly Phe Ile Leu Gly Phe Thr Glu
 245 250 255
 gtg gtt gtg gtg gcg cta ttt cct gaa tta agc ggc tat aag gat gcc 816
 Val Val Val Val Ala Leu Phe Pro Glu Leu Ser Gly Tyr Lys Asp Ala
 260 265 270 275
 ttt gcc ttc ctc ttt tta att cta gtg ctt ctc ttt aga cct gtg gga 864
 Phe Ala Phe Leu Phe Leu Ile Leu Val Leu Leu Phe Arg Pro Val Gly
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 atc atg ggg gat gag cgc ttg gag agg agt cga ttc taa 903
 Ile Met Gly Asp Glu Arg Leu Glu Arg Ser Arg Phe
 290 295 300

<210> 657
 <211> 300
 <212> PRT
 <213> Wolinella succinogenes

<400> 657
 Met Met Asp Ile Leu Thr Phe Phe Gln Gln Leu Ile Asn Gly Val Ser
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 20 25 30

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Gly Val Leu Arg Leu Ile Asn Phe Ala His Ala Asp Val Met Met Val
 35 40 45
 Gly Ala Phe Leu Val Phe Phe Gly Val Ser Ser Phe Ala Leu Pro Phe
 50 55 60
 Trp Ala Ala Ala Leu Leu Ser Ile Leu Phe Ser Ala Leu Leu Gly Val
 65 70 75 80
 Val Ile Asp Lys Ile Ala Tyr Lys Pro Leu Arg Asn Ala Pro Arg Ile
 85 90 95
 Ser Met Leu Ile Thr Ala Ile Gly Val Ser Phe Phe Leu Glu Asn Ile
 100 105 110
 Phe Asn Val Phe Phe Gly Ser Thr Pro Lys Ser Phe Glu Ala Pro Ala
 115 120 125
 Phe Phe Asn Glu Thr Leu Ser Leu Ser His Leu Val Leu Thr His Ile
 130 135 140
 Ala Leu Ile Val Pro Leu Val Thr Leu Leu Leu Leu Gly Ile Leu Leu
 145 150 155 160
 Tyr Val Leu Tyr Arg Thr Lys Gln Gly Met Ala Ile Arg Ala Val Ala
 165 170 175
 Phe Asp Val Asn Thr Val Arg Leu Met Gly Val Asp Ala Asn Gln Ile
 180 185 190
 Ile Ser Ile Val Phe Ile Met Gly Ser Ala Leu Ala Ala Val Gly Gly
 195 200 205
 Ile Phe Tyr Ala Ile Ser Tyr Pro Thr Ile Asp Pro Leu Met Gly Val
 210 215 220
 Leu Ile Gly Leu Lys Ala Phe Ala Ala Ala Val Leu Gly Gly Ile Gly
 225 230 235 240
 Ser Val Thr Gly Ala Val Leu Gly Gly Phe Ile Leu Gly Phe Thr Glu
 245 250 255
 Val Val Val Val Ala Leu Phe Pro Glu Leu Ser Gly Tyr Lys Asp Ala
 260 265 270
 Phe Ala Phe Leu Phe Leu Ile Leu Val Leu Leu Phe Arg Pro Val Gly
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<210> 658

<211> 1110

<212> DNA

<213> *Gloeobacter violaceus*

<220>

<221> CDS

<222> (1)..(1110)

<400> 658

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Gln Leu Pro Ile Arg Gln Thr Ile Phe Gln Trp Ser Glu Arg Leu Pro	
20 25 30	
gca ccg ctc agg cgc tac ggg ctt ttg ggt gtg ggc ctg ctc atc ccg	144
Ala Pro Leu Arg Arg Tyr Gly Leu Leu Gly Val Gly Leu Leu Ile Pro	
35 40 45	
gca ttg atg ctg ctc act tcc cag ccg agc tac ctg gcc aat gtc gcg	192
Ala Leu Met Leu Leu Thr Ser Gln Pro Ser Tyr Leu Ala Asn Val Ala	
50 55 60	
gtg acc gtg gcg gtt tac atg gtg ctg gcc atg ggg ctc aac atc gtg	240
Val Thr Val Ala Val Tyr Met Val Leu Ala Met Gly Leu Asn Ile Val	
65 70 75 80	
gtc ggc ctg gcg ggc ctg ttg gat ctg ggc tac atc gcc ttt ttc gcg	288
Val Gly Leu Ala Gly Leu Leu Asp Leu Gly Tyr Ile Ala Phe Phe Ala	
85 90 95	
gtg ggc gcc tat acc tac gcc atc ggg gcg ccc cat ggc ctc agc ttc	336
Val Gly Ala Tyr Thr Tyr Ala Ile Gly Ala Pro His Gly Leu Ser Phe	
100 105 110	
tgg ctc gcc ctg ccg gtg gct gca ctg ctt gcc gcc ggt ttc ggg gtg	384
Trp Leu Ala Leu Pro Val Ala Leu Leu Ala Ala Gly Phe Gly Val	
115 120 125	

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Leu	Leu	Gly	Ala	Pro	Thr	Leu	Pro	Leu	Arg	Gly	Asp	Tyr	Leu	Ala	Ile	
	130					135					140					
gtc	acc	ctc	ggt	ttc	ggc	gaa	atc	atc	cgc	atc	tcg	ctc	aac	aac	ctc	480
Val	Thr	Leu	Gly	Phe	Gly	Glu	Ile	Ile	Arg	Ile	Ser	Leu	Asn	Asn	Leu	
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Asp	Trp	Leu	Thr	Arg	Gly	Pro	Ala	Gly	Ile	Ser	Gly	Val	Pro	Ala	Pro	
				165					170					175		
gtg	atc	ccc	tgg	ata	ggc	gcc	aaa	ggc	ttc	acc	tgg	ctc	acg	ctc	tat	576
Val	Ile	Pro	Trp	Ile	Gly	Ala	Lys	Gly	Phe	Thr	Trp	Leu	Thr	Leu	Tyr	
			180					185					190			
cag	ccg	ctg	caa	ctc	tat	ttc	atc	gcg	ctt	gcc	ttc	gtc	gcc	ttt	gtc	624
Gln	Pro	Leu	Gln	Leu	Tyr	Phe	Ile	Ala	Leu	Ala	Phe	Val	Ala	Phe	Val	
		195				200						205				
tac	tgg	atg	acc	agc	cgc	ctg	aag	cag	tcg	cgc	gtc	ggc	cgc	gcc	tgg	672
Tyr	Trp	Met	Thr	Ser	Arg	Leu	Lys	Gln	Ser	Arg	Val	Gly	Arg	Ala	Trp	
	210					215					220					
gta	gcc	atc	cgc	gag	gat	gag	att	gcc	gcc	gcc	atg	ggc	gtc	gac		720
Val	Ala	Ile	Arg	Glu	Asp	Glu	Ile	Ala	Ala	Ala	Met	Gly	Val	Asp		
225					230			235						240		
acc	gtc	aag	ctc	aag	ctc	ctg	gcc	ttc	gcc	acc	ggg	gcg	gcc	ctg	gcc	768
Thr	Val	Lys	Leu	Lys	Leu	Leu	Ala	Phe	Ala	Thr	Gly	Ala	Ala	Leu	Ala	
				245				250						255		
ggc	atg	gtc	ggg	gtg	ctc	ttt	gcc	gtg	cag	ctc	acc	tat	gtc	tcc	ccc	816
Gly	Met	Val	Gly	Val	Leu	Phe	Ala	Val	Gln	Leu	Thr	Tyr	Val	Ser	Pro	
			260					265					270			
gac	agc	ttc	acc	ctg	atc	gaa	tcg	gtg	atg	gtc	gtc	tcg	atg	gtg	gtc	864
Asp	Ser	Phe	Thr	Leu	Ile	Glu	Ser	Val	Met	Val	Val	Ser	Met	Val	Val	
		275					280					285				
ctg	gga	ggg	atg	gga	tcg	gtg	ccc	ggg	gtg	gcc	ctt	ggg	gct	ttg	atc	912
Leu	Gly	Gly	Met	Gly	Ser	Val	Pro	Gly	Val	Ala	Leu	Gly	Ala	Leu	Ile	
	290					295				300						
cta	att	gtc	ctg	ccg	gag	gcg	ctc	cgg	ggc	ttt	tcc	gag	tac	cgg	ctg	960
Leu	Ile	Val	Leu	Pro	Glu	Ala	Leu	Arg	Gly	Phe	Ser	Glu	Tyr	Arg	Leu	
305					310					315					320	
ctg	tta	ttt	ggc	gcg	gcg	atg	atc	ctg	gtg	atg	ctc	atc	cgt	ccc	cag	1008
Leu	Leu	Phe	Gly	Ala	Ala	Met	Ile	Leu	Val	Met	Leu	Ile	Arg	Pro	Gln	
				325				330						335		
gga	tta	ttg	ggc	gag	cgg	cag	ggc	gtg	ccg	ccc	cgg	cct	aca	gga	gcc	1056
Gly	Leu	Leu	Gly	Glu	Arg	Gln	Gly	Val	Pro	Pro	Arg	Pro	Thr	Gly	Ala	
			340					345					350			
ggt	ctt	gaa	gac	gaa	acg	ccg	ctc	gaa	gtc	gaa	aag	cgc	gac	ctg	ccg	1104
Gly	Leu	Glu	Asp	Glu	Thr	Pro	Leu	Glu	Val	Glu	Lys	Arg	Asp	Leu	Pro	
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gtg	taa															1110
Val																

<210> 659

<211> 369

<212> PRT

<213> Gloeobacter violaceus

<400> 659

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			20					25					30			
Ala	Pro	Leu	Arg	Arg	Tyr	Gly	Leu	Leu	Gly	Val	Gly	Leu	Leu	Ile	Pro	
		35				40						45				
Ala	Leu	Met	Leu	Leu	Thr	Ser	Gln	Pro	Ser	Tyr	Leu	Ala	Asn	Val	Ala	
		50				55					60					
val	Thr	Val	Ala	Val	Tyr	Met	Val	Leu	Ala	Met	Gly	Leu	Asn	Ile	Val	
65					70					75					80	
Val	Gly	Leu	Ala	Gly	Leu	Leu	Asp	Leu	Gly	Tyr	Ile	Ala	Phe	Phe	Ala	
				85					90					95		
Val	Gly	Ala	Tyr	Thr	Tyr	Ala	Ile	Gly	Ala	Pro	His	Gly	Leu	Ser	Phe	
			100					105					110			

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Trp Leu Ala Leu Pro Val Ala Ala Leu Leu Ala Ala Gly Phe Gly Val
 115 120 125
 Leu Leu Gly Ala Pro Thr Leu Pro Leu Arg Gly Asp Tyr Leu Ala Ile
 130 135 140
 Val Thr Leu Gly Phe Gly Glu Ile Ile Arg Ile Ser Leu Asn Asn Leu
 145 150 155
 Asp Trp Leu Thr Arg Gly Pro Ala Gly Ile Ser Gly Val Pro Ala Pro
 165 170 175
 Val Ile Pro Trp Ile Gly Ala Lys Gly Phe Thr Trp Leu Thr Leu Tyr
 180 185 190
 Gln Pro Leu Gln Leu Tyr Phe Ile Ala Leu Ala Phe Val Ala Phe Val
 195 200 205
 Tyr Trp Met Thr Ser Arg Leu Lys Gln Ser Arg Val Gly Arg Ala Trp
 210 215 220
 Val Ala Ile Arg Glu Asp Glu Ile Ala Ala Ala Met Gly Val Asp
 225 230 235 240
 Thr Val Lys Leu Lys Leu Leu Ala Phe Ala Thr Gly Ala Ala Leu Ala
 245 250 255
 Gly Met Val Gly Val Leu Phe Ala Val Gln Leu Thr Tyr Val Ser Pro
 260 265 270
 Asp Ser Phe Thr Leu Ile Glu Ser Val Met Val Val Ser Met Val Val
 275 280 285
 Leu Gly Gly Met Gly Ser Val Pro Gly Val Ala Leu Gly Ala Leu Ile
 290 295 300
 Leu Ile Val Leu Pro Glu Ala Leu Arg Gly Phe Ser Glu Tyr Arg Leu
 305 310 315 320
 Leu Leu Phe Gly Ala Ala Met Ile Leu Val Met Leu Ile Arg Pro Gln
 325 330 335
 Gly Leu Leu Gly Glu Arg Gln Gly Val Pro Pro Arg Pro Thr Gly Ala
 340 345 350
 Gly Leu Glu Asp Glu Thr Pro Leu Glu Val Glu Lys Arg Asp Leu Pro
 355 360 365
 Val

<210> 660

<211> 1170

<212> DNA

<213> *Gloeobacter violaceus*

<220>

<221> CDS

<222> (1)..(1170)

<400> 660

atg	ata	gag	cat	cca	tcc	cac	ttt	ggg	acg	ggc	ggt	ggt	acg	ctt	tgg	48
Met	Ile	Glu	His	Pro	Ser	His	Phe	Gly	Thr	Gly	Gly	Gly	Thr	Leu	Trp	
1				5				10						15		
tgt	gtt	cg	cg	gct	ttg	agg	ttt	gct	ttg	caa	gaa	ctg	ggt	cag	cag	96
Cys	Val	Arg	Arg	Ala	Leu	Arg	Phe	Ala	Leu	Gln	Glu	Leu	Val	Gln	Gln	
			20				25					30				
ctg	gtc	aac	ggc	atc	acc	ctt	ggc	agt	gtg	tac	gcc	ctc	atc	gcc	ctg	144
Leu	Val	Asn	Gly	Ile	Thr	Leu	Gly	Ser	Val	Tyr	Ala	Leu	Ile	Ala	Leu	
		35					40					45				
ggc	tac	acg	atg	gtt	tac	ggc	atc	ctg	gaa	ctg	atc	aat	ttt	gcc	cac	192
Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Leu	Glu	Leu	Ile	Asn	Phe	Ala	His	
	50					55					60					
ggc	gaa	gtg	ttc	atg	gtt	gga	gct	ttc	gtc	gcc	ctg	ggg	gtg	ttc	gtg	240
Gly	Glu	Val	Phe	Met	Val	Gly	Ala	Phe	Val	Ala	Leu	Gly	Val	Phe	Val	
	65				70				75						80	
gtg	ctg	ggc	ggc	gca	ggg	ttg	ccc	tgg	tgg	ttg	ctg	ctg	ctt	gcg	gct	288
Val	Leu	Gly	Gly	Ala	Gly	Leu	Pro	Trp	Trp	Leu	Leu	Leu	Leu	Ala	Ala	
				85				90						95		
ctg	ctg	tgt	gcg	atg	gcc	gtc	tgc	ctg	ctg	ggt	atg	ggg	ctt	gaa		336
Leu	Leu	Cys	Ala	Met	Ala	Val	Cys	Ser	Leu	Leu	Gly	Met	Gly	Leu	Glu	
		100					105					110				
cgc	ctc	gcc	tac	cgg	ccg	ctc	ctg	agc	gaa	gcg	aaa	ccg	ctc	ggg	gcg	384
Arg	Leu	Ala	Tyr	Arg	Pro	Leu	Leu	Ser	Glu	Ala	Lys	Pro	Leu	Gly	Ala	
		115					120					125				

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gtg	gaa	ctg	ggc	gtg	atc	gcg	gca	agc	ggc	agc	ggc	atc	tgg	tgg	ctg	432
Val	Glu	Leu	Gly	Val	Ile	Ala	Ala	Ser	Gly	Ser	Gly	Ile	Trp	Trp	Leu	
	130					135					140					
tac	cat	cag	ctc	aaa	ggc	ggc	cta	tcc	cag	gcg	gag	tgg	tgg	ttg	ggg	480
Tyr	His	Gln	Leu	Lys	Gly	Gly	Leu	Ser	Gln	Ala	Glu	Trp	Trp	Leu	Gly	
145					150					155					160	
ccg	gcg	gtg	ggt	ctg	ggg	gcc	gcc	gcc	gcg	ttt	tgg	ggg	ctt	ttt	gct	528
Pro	Ala	Val	Gly	Leu	Gly	Ala	Ala	Ala	Ala	Phe	Trp	Gly	Leu	Phe	Ala	
				165						170				175		
tac	ctt	ggc	cgc	agc	ggt	ccg	gcg	cgc	aag	acg	ccg	cgc	ctg	tcg	ctg	576
Tyr	Leu	Gly	Arg	Ser	Gly	Pro	Ala	Arg	Lys	Thr	Pro	Arg	Leu	Ser	Leu	
			180					185					190			
ctg	atc	acg	gcg	ctg	ggg	gcc	tcg	att	ttg	ctg	cag	aac	gcc	atg	cgc	624
Leu	Ile	Thr	Ala	Leu	Gly	Ala	Ser	Ile	Leu	Leu	Gln	Asn	Ala	Met	Arg	
		195					200					205				
ctc	atc	gtc	ggc	agc	cgc	gat	cgg	atc	ctg	ccc	gag	gtg	ctg	ccg	gcg	672
Leu	Ile	Val	Gly	Ser	Arg	Asp	Arg	Ile	Leu	Pro	Glu	Val	Leu	Pro	Ala	
	210					215					220					
tgg	agc	ttt	acg	ctg	gcg	ggg	gtg	cag	att	acc	gcg	ccg	caa	ata	ctg	720
Trp	Ser	Phe	Thr	Leu	Ala	Gly	Val	Gln	Ile	Thr	Ala	Pro	Gln	Ile	Leu	
225					230				235						240	
acg	gtg	ggg	gtg	agc	ggt	acg	gcg	atg	gtc	ttg	ctc	acc	tgg	ctg	gtg	768
Thr	Val	Gly	Val	Ser	Val	Thr	Ala	Met	Val	Leu	Leu	Thr	Trp	Leu	Val	
				245					250					255		
cag	agc	acg	cgc	ttg	ggc	aag	gcg	atg	cgc	gcc	acg	gcc	cag	gac	atc	816
Gln	Ser	Thr	Arg	Leu	Gly	Lys	Ala	Met	Arg	Ala	Thr	Ala	Gln	Asp	Ile	
			260					265					270			
gag	gcg	gcc	cag	ttg	atg	ggc	atc	aac	acc	cgc	ctg	atc	atc	gtc	atc	864
Glu	Ala	Ala	Gln	Leu	Met	Gly	Ile	Asn	Thr	Arg	Leu	Ile	Ile	Val	Ile	
		275					280					285				
gtc	ttt	gtc	ctc	ggc	tcc	agc	ctg	gcg	gcg	gta	gca	ggg	ggt	ctg	ttc	912
Val	Phe	Val	Leu	Gly	Ser	Ser	Leu	Ala	Ala	Val	Ala	Gly	Val	Leu	Phe	
	290					295					300					
ggc	ata	ttc	ttt	aaa	tcg	atc	aat	ttt	ttc	atc	ggc	ttc	cag	gcc	ggt	960
Gly	Ile	Phe	Phe	Lys	Ser	Ile	Asn	Phe	Phe	Ile	Gly	Phe	Gln	Ala	Gly	
305					310				315						320	
ctc	aag	gcg	ttc	acc	gcc	gcg	gtc	ttg	gga	gga	atc	ggc	aac	att	cct	1008
Leu	Lys	Ala	Phe	Thr	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Asn	Ile	Pro	
				325					330					335		
ggg	gcg	gtg	ttg	gga	ggg	ctg	ttg	ctc	ggg	ttg	ctc	gaa	tca	ctg	ggg	1056
Gly	Ala	Val	Leu	Gly	Gly	Leu	Leu	Leu	Gly	Leu	Leu	Glu	Ser	Leu	Gly	
			340					345					350			
tcg	ggc	tat	att	tcg	agt	gaa	tgg	aaa	gac	gta	ttt	gcg	ttt	ata	gtg	1104
Ser	Gly	Tyr	Ile	Ser	Ser	Glu	Trp	Lys	Asp	Val	Phe	Ala	Phe	Ile	Val	
		355					360					365				
ctg	gtc	ggt	gtg	ctt	ttg	ctt	cgc	ccc	tcg	ggg	ctt	ctg	ggc	gag	aat	1152
Leu	Val	Gly	Val	Leu	Leu	Leu	Arg	Pro	Ser	Gly	Leu	Leu	Gly	Glu	Asn	
	370					375					380					
gtg	ccc	gaa	aaa	ggt	tga											1170
Val	Pro	Glu	Lys	Val												
385																

<210> 661

<211> 389

<212> PRT

<213> Gloeobacter violaceus

<400> 661

Met	Ile	Glu	His	Pro	Ser	His	Phe	Gly	Thr	Gly	Gly	Gly	Thr	Leu	Trp
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Cys	Val	Arg	Arg	Ala	Leu	Arg	Phe	Ala	Leu	Gln	Glu	Leu	Val	Gln	Gln
			20					25					30		
Leu	Val	Asn	Gly	Ile	Thr	Leu	Gly	Ser	Val	Tyr	Ala	Leu	Ile	Ala	Leu
		35					40					45			
Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Leu	Glu	Leu	Ile	Asn	Phe	Ala	His
	50					55					60				
Gly	Glu	Val	Phe	Met	Val	Gly	Ala	Phe	Val	Ala	Leu	Gly	Val	Phe	Val
65					70					75					80
Val	Leu	Gly	Gly	Ala	Gly	Leu	Pro	Trp	Trp	Leu	Leu	Leu	Leu	Ala	Ala

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85 90 95
 Leu Leu Cys Ala Met Ala Val Cys Ser Leu Leu Gly Met Gly Leu Glu
 100 105 110
 Arg Leu Ala Tyr Arg Pro Leu Leu Ser Glu Ala Lys Pro Leu Gly Ala
 115 120 125
 Val Glu Leu Gly Val Ile Ala Ala Ser Gly Ser Gly Ile Trp Trp Leu
 130 135 140
 Tyr His Gln Leu Lys Gly Leu Ser Gln Ala Glu Trp Trp Leu Gly
 145 150 155 160
 Pro Ala Val Gly Leu Gly Ala Ala Ala Phe Trp Gly Leu Phe Ala
 165 170 175
 Tyr Leu Gly Arg Ser Gly Pro Ala Arg Lys Thr Pro Arg Leu Ser Leu
 180 185 190
 Leu Ile Thr Ala Leu Gly Ala Ser Ile Leu Leu Gln Asn Ala Met Arg
 195 200 205
 Leu Ile Val Gly Ser Arg Asp Arg Ile Leu Pro Glu Val Leu Pro Ala
 210 215 220
 Trp Ser Phe Thr Leu Ala Gly Val Gln Ile Thr Ala Pro Gln Ile Leu
 225 230 235 240
 Thr Val Gly Val Ser Val Thr Ala Met Val Leu Leu Thr Trp Leu Val
 245 250 255
 Gln Ser Thr Arg Leu Gly Lys Ala Met Arg Ala Thr Ala Gln Asp Ile
 260 265 270
 Glu Ala Ala Gln Leu Met Gly Ile Asn Thr Arg Leu Ile Val Ile
 275 280 285
 Val Phe Val Leu Gly Ser Ser Leu Ala Ala Val Ala Gly Val Leu Phe
 290 295 300
 Gly Ile Phe Phe Lys Ser Ile Asn Phe Phe Ile Gly Phe Gln Ala Gly
 305 310 315 320
 Leu Lys Ala Phe Thr Ala Ala Val Leu Gly Gly Ile Gly Asn Ile Pro
 325 330 335
 Gly Ala Val Leu Gly Gly Leu Leu Leu Gly Leu Leu Glu Ser Leu Gly
 340 345 350
 Ser Gly Tyr Ile Ser Ser Glu Trp Lys Asp Val Phe Ala Phe Ile Val
 355 360 365
 Leu Val Gly Val Leu Leu Leu Arg Pro Ser Gly Leu Gly Glu Asn
 370 375 380
 Val Pro Glu Lys Val
 385

<210> 662

<211> 1092

<212> DNA

<213> Chromobacterium violaceum

<220>

<221> CDS

<222> (1)..(1092)

<400> 662

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Met Asp Leu Asn His Leu Ser Thr Gly Lys Lys Met Ala Val Phe Ala	
1 5 10 15	
gcc tgc gcg gtc ctt ctg gcc gtg ctg ccc ttc ctg gtc ggc ggc gcg	96
Ala Cys Ala Val Leu Leu Ala Val Leu Pro Phe Leu Val Gly Gly Ala	
20 25 30	
ctg ggc aat tcc tgg gtg cgc atc atc gac ttc gcg ctg ctg tac gtg	144
Leu Gly Asn Ser Trp Val Arg Ile Ile Asp Phe Ala Leu Leu Tyr Val	
35 40 45	
atg ctg gcg ctg ggc ctg aac atc gtg gtg ggc ttc gcc ggc ctg ctg	192
Met Leu Ala Leu Gly Leu Asn Ile Val Val Gly Phe Ala Gly Leu Leu	
50 55 60	
gac ctg ggc ttc atc gcc ttc tac gcg atc ggc gcc tat acc tac gcg	240
Asp Leu Gly Phe Ile Ala Phe Tyr Ala Ile Gly Ala Tyr Thr Tyr Ala	
65 70 75 80	
ctg ctg agc tcg ccg cac ttc gac atc cac tgg cta ttc ttc ctc acc	288
Leu Leu Ser Ser Pro His Phe Asp Ile His Trp Leu Phe Phe Leu Thr	
85 90 95	
att ccg ctg ggc gcg gcc ttc gcc tcg ctg ggc ggg gtg ctg ctg ggc	336

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Ile	Pro	Leu	Gly	Ala	Ala	Phe	Ala	Ser	Leu	Gly	Gly	Val	Leu	Leu	Gly		
100			100					105					110				
acg	ccg	gtg	ctg	aag	ctg	aag	ggc	gac	tac	ctg	gcc	atc	gtg	acc	ctg	384	
Thr	Pro	Val	Leu	Lys	Leu	Lys	Gly	Asp	Tyr	Leu	Ala	Ile	Val	Thr	Leu		
115							120					125					
ggc	ttc	ggc	gag	atc	gtg	cgc	atc	ttc	atg	aac	aac	ctg	aac	cag	ccg	432	
Gly	Phe	Gly	Glu	Ile	Val	Arg	Ile	Phe	Met	Asn	Asn	Leu	Asn	Gln	Pro		
130						135					140						
gtc	aac	atc	acc	aac	ggc	ccc	cag	ggc	atc	aac	ctg	atc	gac	ccg	atc	480	
Val	Asn	Ile	Thr	Asn	Gly	Pro	Gln	Gly	Ile	Asn	Leu	Ile	Asp	Pro	Ile		
145					150					155					160		
cac	atc	ggc	ggc	gag	ctg	ggc	cag	acc	atc	gag	ctg	ttc	ggg	ctg		528	
His	Ile	Gly	Gly	Ala	Ser	Leu	Gly	Gln	Thr	Ile	Glu	Leu	Phe	Gly	Leu		
				165					170					175			
agc	ttc	cac	aac	gtc	tac	ctg	tac	tac	tac	ctg	ttc	ctg	gag	ctg	acc	576	
Ser	Phe	His	Asn	Val	Tyr	Leu	Tyr	Tyr	Tyr	Leu	Phe	Leu	Ala	Leu	Thr		
				180				185					190				
gtg	ctg	gtg	gtg	atc	atg	gcc	tgg	cgt	ctg	cag	cac	tcc	cgc	atc	ggc	624	
Val	Leu	Val	Val	Ile	Met	Ala	Trp	Arg	Leu	Gln	His	Ser	Arg	Ile	Gly		
				195			200					205					
cgc	gcc	tgg	gtg	gag	ctg	cgc	gag	gac	gac	atc	gcc	gcc	gag	gag	atg	672	
Arg	Ala	Trp	Val	Ala	Leu	Arg	Glu	Asp	Asp	Ile	Ala	Ala	Ala	Ala	Met		
				210		215				220							
ggc	atc	aac	atc	cgc	aac	atc	aag	ctc	ttg	gcc	ttc	ggc	ctg	ggc	gcc	720	
Gly	Ile	Asn	Ile	Arg	Asn	Ile	Lys	Leu	Leu	Ala	Phe	Gly	Leu	Gly	Ala		
225					230					235					240		
ttg	tcc	ggc	ggc	gtg	gcc	ggc	ggc	ctg	ttc	gcc	tcc	ttc	cag	ggc	ttc	768	
Leu	Ser	Gly	Gly	Val	Ala	Gly	Gly	Leu	Phe	Ala	Ser	Phe	Gln	Gly	Phe		
				245				250					255				
gtg	tcc	ccg	gaa	tcg	ttc	agc	ctg	ctg	gag	tcc	atc	atg	atc	ctg	gcc	816	
Val	Ser	Pro	Glu	Ser	Phe	Ser	Leu	Leu	Glu	Ser	Ile	Met	Ile	Leu	Ala		
				260				265					270				
atg	atc	gtg	ctg	ggc	ggc	atg	ggc	cac	atc	ccg	ggc	gtg	atc	ctg	ggc	864	
Met	Ile	Val	Leu	Gly	Gly	Met	Gly	His	Ile	Pro	Gly	Val	Ile	Leu	Gly		
				275			280					285					
gcc	gtg	gtg	ctg	acc	atc	gag	ccg	gaa	atc	ctg	cgc	gac	gtg	atc	ggc	912	
Ala	Val	Val	Leu	Thr	Ile	Ala	Pro	Glu	Ile	Leu	Arg	Asp	Val	Ile	Gly		
				290		295					300						
ccg	ctg	cag	atg	aag	acc	gtc	ggc	cgc	atg	ctg	atc	gac	ccg	gaa	aac	960	
Pro	Leu	Gln	Met	Lys	Thr	Val	Gly	Arg	Met	Leu	Ile	Asp	Pro	Glu	Asn		
305					310					315					320		
gcc	cgc	atg	ctg	ctg	ttc	ggc	ctg	gag	atg	gtg	gtg	atg	atg	ctg	gtc	1008	
Ala	Arg	Met	Leu	Leu	Phe	Gly	Leu	Ala	Met	Val	Val	Met	Met	Leu	Val		
				325				330						335			
cgt	ccg	gaa	ggg	atg	tgg	ccg	tcc	aag	cgc	cgc	aag	gct	gag	ttc	cag	1056	
Arg	Pro	Glu	Gly	Met	Trp	Pro	Ser	Lys	Arg	Arg	Lys	Ala	Glu	Phe	Gln		
				340				345					350				
cac	gcc	aaa	gaa	gac	gcc	gag	gtg	cag	aaa	ggc	taa					1092	
His	Ala	Lys	Glu	Asp	Ala	Ala	Val	Gln	Lys	Gly							
				355			360										

<210> 663

<211> 363

<212> PRT

<213> Chromobacterium violaceum

<400> 663

Met	Asp	Leu	Asn	His	Leu	Ser	Thr	Gly	Lys	Lys	Met	Ala	Val	Phe	Ala
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Ala	Cys	Ala	Val	Leu	Leu	Ala	Val	Leu	Pro	Phe	Leu	Val	Gly	Gly	Ala
				20				25					30		
Leu	Gly	Asn	Ser	Trp	Val	Arg	Ile	Asp	Phe	Ala	Leu	Leu	Tyr	Val	
				35			40					45			
Met	Leu	Ala	Leu	Gly	Leu	Asn	Ile	Val	Val	Gly	Phe	Ala	Gly	Leu	Leu
						55					60				
Asp	Leu	Gly	Phe	Ile	Ala	Phe	Tyr	Ala	Ile	Gly	Ala	Tyr	Thr	Tyr	Ala
65					70					75					80
Leu	Leu	Ser	Ser	Pro	His	Phe	Asp	Ile	His	Trp	Leu	Phe	Phe	Leu	Thr
				85					90					95	

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Ile Pro Leu Gly Ala Ala Phe Ala Ser Leu Gly Gly Val Leu Leu Gly
 100 110
 Thr Pro Val Leu Lys Leu Lys Gly Asp Tyr Leu Ala Ile Val Thr Leu
 115 125
 Gly Phe Gly Glu Ile Val Arg Ile Phe Met Asn Asn Leu Asn Gln Pro
 130 135 140
 Val Asn Ile Thr Asn Gly Pro Gln Gly Ile Asn Leu Ile Asp Pro Ile
 145 150 155 160
 His Ile Gly Gly Ala Ser Leu Gly Gln Thr Ile Glu Leu Phe Gly Leu
 165 170 175
 Ser Phe His Asn Val Tyr Leu Tyr Tyr Tyr Leu Phe Leu Ala Leu Thr
 180 185 190
 Val Leu Val Val Ile Met Ala Trp Arg Leu Gln His Ser Arg Ile Gly
 195 200 205
 Arg Ala Trp Val Ala Leu Arg Glu Asp Asp Ile Ala Ala Ala Met
 210 215 220
 Gly Ile Asn Ile Arg Asn Ile Lys Leu Leu Ala Phe Gly Leu Gly Ala
 225 230 235 240
 Leu Ser Gly Gly Val Ala Gly Gly Leu Phe Ala Ser Phe Gln Gly Phe
 245 250 255
 Val Ser Pro Glu Ser Phe Ser Leu Leu Glu Ser Ile Met Ile Leu Ala
 260 265 270
 Met Ile Val Leu Gly Gly Met Gly His Ile Pro Gly Val Ile Leu Gly
 275 280 285
 Ala Val Val Leu Thr Ile Ala Pro Glu Ile Leu Arg Asp Val Ile Gly
 290 295 300
 Pro Leu Gln Met Lys Thr Val Gly Arg Met Leu Ile Asp Pro Glu Asn
 305 310 315 320
 Ala Arg Met Leu Leu Phe Gly Leu Ala Met Val Val Met Met Leu Val
 325 330 335 340
 Arg Pro Glu Gly Met Trp Pro Ser Lys Arg Arg Lys Ala Glu Phe Gln
 345 350 355
 His Ala Lys Glu Asp Ala Ala Val Gln Lys Gly 360

<210> 664

<211> 930

<212> DNA

<213> Chromobacterium violaceum

<220>

<221> CDS

<222> (1)..(930)

<400> 664

atg gac att ttt ctg cag caa atc ctg aac ggt ctc gtt ctg ggt agc	48
Met Asp Ile Phe Leu Gln Gln Ile Leu Asn Gly Leu Val Leu Gly Ser	
1 5 10 15	
atc tac gcg ctg atc gcg ctg ggc tac acc atg gtg tac ggg atc atg	96
Ile Tyr Ala Leu Ile Ala Leu Gly Tyr Thr Met Val Tyr Gly Ile Met	
20 25 30	
ggc ctg atc aac ttc gcc cac ggc gaa gtg gtg atg ttc ggc gcc atg	144
Gly Leu Ile Asn Phe Ala His Gly Glu Val Val Met Phe Gly Ala Met	
35 40 45	
gtc acc atc acc gtc atc acc acc ctg atg ggg atg ggc atc aac ctg	192
Val Thr Ile Thr Val Ile Thr Thr Leu Met Gly Met Gly Ile Asn Leu	
50 55 60	
ccg ggg ccg gcg ctg gtg ctg atc ggc ctt ctg gtg gcc att ccc gcc	240
Pro Gly Pro Ala Leu Val Leu Ile Gly Leu Leu Val Ala Ile Pro Ala	
65 70 75 80	
tgc atg ctg ctc ggc ttc acc atc gag cgc gtc gcc tac cgc ccg ttg	288
Cys Met Leu Leu Gly Phe Thr Ile Glu Arg Val Ala Tyr Arg Pro Leu	
85 90 95	
cgg ggc aag cag cgc ctg gcg ccg ctg atc acc gcg atc ggc gtg tcc	336
Arg Gly Lys Gln Arg Leu Ala Pro Leu Ile Thr Ala Ile Gly Val Ser	
100 105 110	
atc gtg ctg caa cag gtc gcc atc ctg atc tgg ggc cgc aac tac atc	384
Ile Val Leu Gln Gln Val Ala Ile Leu Ile Trp Gly Arg Asn Tyr Ile	
115 120 125	

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ccc	ttc	ccg	cag	att	ctg	gac	cat	gat	gtg	gtg	agc	att	ttc	ggc	gcc	432
Pro	Phe	Pro	Gln	Ile	Leu	Asp	His	Asp	Val	Val	Ser	Ile	Phe	Gly	Ala	
	130					135					140					
agc	atc	acc	aag	ctg	cag	atc	gtg	atc	atc	gcg	ctg	tgc	ctg	gcc	atc	480
Ser	Ile	Thr	Lys	Leu	Gln	Ile	Val	Ile	Ile	Ala	Leu	Cys	Leu	Ala	Ile	
145				150						155					160	
atg	gcc	ggc	ctg	ctg	ctg	atg	gtg	gaa	aag	acc	aag	ctc	ggc	cgc	gcc	528
Met	Ala	Gly	Leu	Leu	Leu	Met	Val	Glu	Lys	Thr	Lys	Leu	Gly	Arg	Ala	
				165					170					175		
atg	cgc	gcc	acc	agc	cag	aac	ccg	gcc	gtg	gcc	ggc	ctg	atg	ggc	gtc	576
Met	Arg	Ala	Thr	Ser	Gln	Asn	Pro	Ala	Val	Ala	Gly	Leu	Met	Gly	Val	
			180					185					190			
aac	gtc	aac	acc	atc	atc	tcc	gcc	acc	ttc	gtc	atc	ggg	tcc	ggc	ctg	624
Asn	Val	Asn	Thr	Ile	Ile	Ser	Ala	Thr	Phe	Val	Ile	Gly	Ser	Gly	Leu	
		195					200					205				
ggc	gct	atc	gcc	ggc	gtg	atg	gtg	gcc	acc	aac	tac	gaa	cag	gcc	cac	672
Gly	Ala	Ile	Ala	Gly	Val	Met	Val	Ala	Thr	Asn	Tyr	Glu	Gln	Ala	His	
	210					215					220					
tac	tac	atg	ggc	ttc	atg	atc	ggg	ctg	aag	gcc	ttc	acc	gcc	gcg	gtg	720
Tyr	Tyr	Met	Gly	Phe	Met	Ile	Gly	Leu	Lys	Ala	Phe	Thr	Ala	Ala	Val	
225					230					235					240	
ctg	ggc	ggc	atc	ggc	aac	ctg	ggc	ggc	gcg	gtg	gcc	ggc	ggc	att	ctg	768
Leu	Gly	Gly	Ile	Gly	Asn	Leu	Gly	Gly	Ala	Val	Ala	Gly	Gly	Ile	Leu	
				245					250					255		
ctg	ggc	atc	atc	gaa	agc	ctg	ggc	gcc	ggc	tac	atc	ggc	tcg	ctg	acc	816
Leu	Gly	Ile	Ile	Glu	Ser	Leu	Gly	Ala	Gly	Tyr	Ile	Gly	Ser	Leu	Thr	
			260					265					270			
ggc	ggc	ttc	ctg	ggg	tcc	aac	tac	cag	gac	atc	atc	gcc	ttc	atg	gtg	864
Gly	Gly	Phe	Leu	Gly	Ser	Asn	Tyr	Gln	Asp	Ile	Ile	Ala	Phe	Met	Val	
		275					280					285				
ctg	atc	ctg	gtg	ctg	atc	ttc	cgt	ccg	tcc	ggc	ctg	ctg	ggc	gaa	aaa	912
Leu	Ile	Leu	Val	Leu	Ile	Phe	Arg	Pro	Ser	Gly	Leu	Leu	Gly	Glu	Lys	
	290					295					300					
atg	gcc	gac	cgc	gcc	tga											930
Met	Ala	Asp	Arg	Ala												
305																

<210> 665

<211> 309

<212> PRT

<213> Chromobacterium violaceum

<400> 665

Met	Asp	Ile	Phe	Leu	Gln	Gln	Ile	Leu	Asn	Gly	Leu	Val	Leu	Gly	Ser	
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			20					25					30			
Gly	Leu	Ile	Asn	Phe	Ala	His	Gly	Glu	Val	Val	Met	Phe	Gly	Ala	Met	
			35				40					45				
Val	Thr	Ile	Thr	Val	Ile	Thr	Thr	Leu	Met	Gly	Met	Gly	Ile	Asn	Leu	
	50					55					60					
Pro	Gly	Pro	Ala	Leu	Val	Leu	Ile	Gly	Leu	Leu	Val	Ala	Ile	Pro	Ala	
65				70						75				80		
Cys	Met	Leu	Leu	Gly	Phe	Thr	Ile	Glu	Arg	Val	Ala	Tyr	Arg	Pro	Leu	
			85						90					95		
Arg	Gly	Lys	Gln	Arg	Leu	Ala	Pro	Leu	Ile	Thr	Ala	Ile	Gly	Val	Ser	
			100					105					110			
Ile	Val	Leu	Gln	Gln	Val	Ala	Ile	Leu	Ile	Trp	Gly	Arg	Asn	Tyr	Ile	
		115					120					125				
Pro	Phe	Pro	Gln	Ile	Leu	Asp	His	Asp	Val	Val	Ser	Ile	Phe	Gly	Ala	
	130					135					140					
Ser	Ile	Thr	Lys	Leu	Gln	Ile	Val	Ile	Ile	Ala	Leu	Cys	Leu	Ala	Ile	
145				150						155				160		
Met	Ala	Gly	Leu	Leu	Leu	Met	Val	Glu	Lys	Thr	Lys	Leu	Gly	Arg	Ala	
			165						170					175		
Met	Arg	Ala	Thr	Ser	Gln	Asn	Pro	Ala	Val	Ala	Gly	Leu	Met	Gly	Val	
			180					185					190			
Asn	Val	Asn	Thr	Ile	Ile	Ser	Ala	Thr	Phe	Val	Ile	Gly	Ser	Gly	Leu	
		195					200					205				

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Gly Ala Ile Ala Gly Val Met Val Ala Thr Asn Tyr Glu Gln Ala His
 210 215 220
 Tyr Tyr Met Gly Phe Met Ile Gly Leu Lys Ala Phe Thr Ala Ala Val
 225 230 235 240
 Leu Gly Gly Ile Gly Asn Leu Gly Gly Ala Val Ala Gly Gly Ile Leu
 245 250 255
 Leu Gly Ile Ile Glu Ser Leu Gly Ala Gly Tyr Ile Gly Ser Leu Thr
 260 265 270
 Gly Gly Phe Leu Gly Ser Asn Tyr Gln Asp Ile Ile Ala Phe Met Val
 275 280 285
 Leu Ile Leu Val Leu Ile Phe Arg Pro Ser Gly Leu Leu Gly Glu Lys
 290 295 300
 Met Ala Asp Arg Ala
 305

<210> 666

<211> 1155

<212> DNA

<213> Synechococcus sp

<220>

<221> CDS

<222> (1)..(1155)

<400> 666

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Met	Gln	Leu	Leu	Phe	Glu	Ser	Leu	Phe	Asn	Gly	Val	Ala	Ile	Gly	Ser	
1				5				10						15		
gtc	ttg	ctg	atg	gcc	gcg	ctc	gga	ctg	gcc	att	gtt	ttc	ggc	ctc	atg	96
Val	Leu	Leu	Met	Ala	Ala	Leu	Gly	Leu	Ala	Ile	Val	Phe	Gly	Leu	Met	
			20				25						30			
ggg	gtg	atc	aac	ctc	gcc	cat	ggc	gag	ctg	atc	atg	ctt	ggg	gcc	tac	144
Gly	Val	Ile	Asn	Leu	Ala	His	Gly	Glu	Leu	Ile	Met	Leu	Gly	Ala	Tyr	
		35					40					45				
acc	acc	tac	gtg	gtg	cag	ctg	atc	ttc	aaa	ctg	cct	gtg	ctg	cag	ccg	192
Thr	Thr	Tyr	Val	Val	Gln	Leu	Ile	Phe	Lys	Leu	Pro	Val	Leu	Gln	Pro	
		50				55					60					
gtt	tac	aac	gcc	tac	gtg	ctg	gta	gcg	ctt	ccc	ctg	gcc	ttc	atc	gtc	240
Val	Tyr	Asn	Ala	Tyr	Val	Leu	Val	Ala	Leu	Pro	Leu	Ala	Phe	Ile	Val	
		65			70					75					80	
agc	ggt	gtg	gtc	ggc	atc	ctg	ctt	gaa	cgc	acc	gtg	att	cgc	cgg	ctc	288
Ser	Gly	Val	Val	Gly	Ile	Leu	Leu	Glu	Arg	Thr	Val	Ile	Arg	Arg	Leu	
				85					90					95		
tat	ggc	aac	ccg	ctg	gag	acg	ttg	ctg	gcg	acc	tgg	ggt	gtc	agc	ttg	336
Tyr	Gly	Asn	Pro	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Val	Ser	Leu	
			100					105					110			
att	ctt	cag	cag	ttt	gtg	cgg	agc	gtg	ccc	ctg	gcc	cac	gcc	ggc	ggc	384
Ile	Leu	Gln	Gln	Phe	Val	Arg	Ser	Val	Pro	Leu	Ala	His	Ala	Ala	Gly	
		115					120					125				
ctg	atc	ctg	gcg	ctg	gtg	ctg	ggc	ttt	ggc	ctg	ccg	gtg	atc	ttg	ccg	432
Leu	Ile	Leu	Ala	Leu	Val	Leu	Gly	Phe	Gly	Leu	Pro	Val	Ile	Leu	Pro	
		130				135					140					
cag	cga	ctg	ttt	gac	ggt	gcc	aag	gcg	cgc	ttt	gta	cgc	gct	ggc	agc	480
Gln	Arg	Leu	Phe	Asp	Gly	Ala	Lys	Ala	Arg	Phe	Val	Arg	Ala	Gly	Ser	
				150					155						160	
tgg	gcg	gtt	tcg	gcc	ctc	gca	ggt	gtg	ttg	ctg	gct	ggt	ggc	ctg	gcc	528
Trp	Ala	Val	Ser	Ala	Leu	Ala	Gly	Val	Leu	Ala	Gly	Gly	Gly	Leu	Ala	
				165				170						175		
tca	caa	atc	agt	cgt	atc	gcc	cga	gct	acc	tcc	cgc	aac	gtg	gat	gtc	576
Ser	Gln	Ile	Ser	Arg	Ile	Ala	Arg	Ala	Thr	Ser	Arg	Asn	Val	Asp	Val	
			180					185					190			
acc	gca	ccg	aag	tgg	atg	cgg	gga	ggc	atg	gag	tgg	atg	gac	atc	acc	624
Thr	Ala	Pro	Lys	Trp	Met	Arg	Gly	Gly	Met	Glu	Trp	Met	Asp	Ile	Thr	
		195					200					205				
ttt	cct	gta	ccg	cgc	ctg	gtg	atc	atc	gtg	atc	acg	atc	gtt	gcg	gtg	672
Phe	Pro	Val	Pro	Arg	Leu	Val	Ile	Ile	Val	Ile	Thr	Ile	Val	Ala	Val	
		210			215						220					
gtt	ggg	gtg	acg	tgg	ttc	ctc	aac	aaa	agc	gtg	tgg	ggc	atg	cgc	att	720
Val	Gly	Val	Thr	Trp	Phe	Leu	Asn	Lys	Ser	Val	Trp	Gly	Met	Arg	Ile	

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225	cgt	gcc	gtc	acc	cag	230	aac	cgt	gcg	atg	agt	gat	235	tgc	ctg	ggc	atc	240	ccc	768
Arg	Ala	Val	Thr	Gln	Asn	Arg	Ala	Met	Ser	Asp	Cys	Leu	Gly	Ile	Pro					
				245									250				255			
acg	cag	acg	gtg	gac	gtg	ctc	acc	ttc	ggg	atc	gga	tcc	ggg	ctt	gcc	816				
Thr	Gln	Thr	Val	Asp	Val	Leu	Thr	Phe	Gly	Ile	Gly	Ser	Gly	Leu	Ala					
			260					265					270							
ggg	gtg	gct	ggg	gtt	gca	gtc	tcc	cta	ctc	ggc	tcc	gtt	ggg	ccg	aac	864				
Gly	Val	Ala	Gly	Val	Ala	Val	Ser	Leu	Leu	Gly	Ser	Val	Gly	Pro	Asn					
		275					280					285								
gtc	ggc	ggc	tct	tac	atc	gtc	ggg	tgt	ttc	atg	gtg	gtg	gtg	ctc	ggg	912				
Val	Gly	Gly	Ser	Tyr	Ile	Val	Gly	Cys	Phe	Met	Val	Val	Val	Leu	Gly					
	290					295						300								
ggg	gtc	ggc	aat	ctg	ctc	ggc	acc	gtg	ctc	gcc	tcc	ttt	ggc	att	gga	960				
Gly	Val	Gly	Asn	Leu	Leu	Gly	Thr	Val	Leu	Ala	Ser	Phe	Ala	Ile	Gly					
305				310						315				320						
tgg	ctc	acc	gat	ctg	atc	gga	gct	ggg	cgt	ctg	ctc	acg	atg	tgg	cct	1008				
Trp	Leu	Thr	Asp	Leu	Ile	Gly	Ala	Gly	Arg	Leu	Leu	Thr	Met	Trp	Pro					
			325						330					335						
gac	atg	cca	tct	cct	ctg	gcc	gct	gct	gtg	gag	ttc	ttt	ggc	acc	acg	1056				
Asp	Met	Pro	Ser	Pro	Leu	Ala	Ala	Ala	Val	Glu	Phe	Phe	Ala	Thr	Thr					
			340				345					350								
agc	atg	gcc	cag	gtg	atg	gtg	ttc	gct	ctg	atc	gtg	gtg	ttc	ctg	caa	1104				
Ser	Met	Ala	Gln	Val	Met	Val	Phe	Ala	Leu	Ile	Val	Val	Phe	Leu	Gln					
		355				360						365								
ttc	cgt	ccc	gcg	ggg	ttg	ttc	ccg	cag	aag	gga	cgc	atg	gtg	gag	gcc	1152				
Phe	Arg	Pro	Ala	Gly	Leu	Phe	Pro	Gln	Lys	Gly	Arg	Met	Val	Glu	Ala					
	370				375					380										
tga																1155				

<210> 667

<211> 384

<212> PRT

<213> Synechococcus sp

<400> 667

Met	Gln	Leu	Leu	Phe	Glu	Ser	Leu	Phe	Asn	Gly	Val	Ala	Ile	Gly	Ser
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Val	Leu	Leu	Met	Ala	Ala	Leu	Gly	Leu	Ala	Ile	Val	Phe	Gly	Leu	Met
			20					25					30		
Gly	Val	Ile	Asn	Leu	Ala	His	Gly	Glu	Leu	Ile	Met	Leu	Gly	Ala	Tyr
		35					40					45			
Thr	Thr	Tyr	Val	Val	Gln	Leu	Ile	Phe	Lys	Leu	Pro	Val	Leu	Gln	Pro
	50					55					60				
Val	Tyr	Asn	Ala	Tyr	Val	Leu	Val	Ala	Leu	Pro	Leu	Ala	Phe	Ile	Val
65				70					75					80	
Ser	Gly	Val	Val	Gly	Ile	Leu	Leu	Glu	Arg	Thr	Val	Ile	Arg	Arg	Leu
				85					90				95		
Tyr	Gly	Asn	Pro	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Val	Ser	Leu
		100					105					110			
Ile	Leu	Gln	Gln	Phe	Val	Arg	Ser	Val	Pro	Leu	Ala	His	Ala	Ala	Gly
	115						120					125			
Leu	Ile	Leu	Ala	Leu	Val	Leu	Gly	Phe	Gly	Leu	Pro	Val	Ile	Leu	Pro
	130					135					140				
Gln	Arg	Leu	Phe	Asp	Gly	Ala	Lys	Ala	Arg	Phe	Val	Arg	Ala	Gly	Ser
145				150					155						160
Trp	Ala	Val	Ser	Ala	Leu	Ala	Gly	Val	Leu	Leu	Ala	Gly	Gly	Leu	Ala
			165					170						175	
Ser	Gln	Ile	Ser	Arg	Ile	Ala	Arg	Ala	Thr	Ser	Arg	Asn	Val	Asp	Val
			180					185				190			
Thr	Ala	Pro	Lys	Trp	Met	Arg	Gly	Met	Glu	Trp	Met	Asp	Ile	Thr	
	195						200				205				
Phe	Pro	Val	Pro	Arg	Leu	Val	Ile	Ile	Val	Ile	Thr	Ile	Val	Ala	Val
	210					215					220				
Val	Gly	Val	Thr	Trp	Phe	Leu	Asn	Lys	Ser	Val	Trp	Gly	Met	Arg	Ile
225				230					235						240
Arg	Ala	Val	Thr	Gln	Asn	Arg	Ala	Met	Ser	Asp	Cys	Leu	Gly	Ile	Pro

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Thr	Gln	Thr	Val	245	Asp	Val	Leu	Thr	Phe	250	Gly	Ile	Gly	Ser	Gly	255	Leu	Ala
Gly	Val	Ala	Gly	260	Val	Ala	Val	Ser	Leu	265	Leu	Gly	Ser	Val	Gly	270	Pro	Asn
Val	Gly	Gly	Ser	275	Tyr	Ile	Val	Gly	Cys	280	Phe	Met	Val	Val	Val	Leu	Gly	
Gly	Val	Gly	Asn	290	Leu	Leu	Gly	Thr	Val	295	Leu	Ala	Ser	Phe	Ala	Ile	Gly	
Trp	Leu	Thr	Asp	300	Leu	Ile	Gly	Ala	Gly	305	Arg	Leu	Leu	Thr	Met	Trp	Pro	
Asp	Met	Pro	Ser	310	Pro	Leu	Ala	Ala	Ala	315	Val	Glu	Phe	Phe	Ala	Thr	Thr	
Ser	Met	Ala	Gln	320	Val	Met	Val	Phe	Ala	325	Leu	Ile	Val	Val	Phe	Leu	Gln	
Phe	Arg	Pro	Ala	330	Gly	Leu	Phe	Pro	Gln	335	Lys	Gly	Arg	Met	Val	Glu	Ala	
	370						375						380					

<210> 668

<211> 1155

<212> DNA

<213> *Prochlorococcus marinus* subsp

<220>

<221> CDS

<222> (1)..(1155)

<400> 668

atg	gaa	ttg	ctt	ctt	gat	agt	tta	ttc	aac	ggg	ata	gcg	atc	gga	tca	48
Met	Glu	Leu	Leu	Leu	Asp	Ser	Leu	Phe	Asn	Gly	Ile	Ala	Ile	Gly	Ser	
1				5				10						15		
gtt	tta	cta	gta	gca	gct	ttg	ggc	tta	gct	att	gta	ttt	ggg	ttg	atg	96
Val	Leu	Leu	Val	Ala	Ala	Leu	Gly	Leu	Ala	Ile	Val	Phe	Gly	Leu	Met	
			20				25						30			
ggg	gta	atc	aat	ctt	gca	cat	ggg	gaa	cta	atg	atg	cta	ggg	gct	tac	144
Gly	Val	Ile	Asn	Leu	Ala	His	Gly	Glu	Leu	Met	Met	Leu	Gly	Ala	Tyr	
		35					40					45				
aca	aca	tat	gta	act	caa	tta	att	ttc	aaa	ctc	cca	cta	tta	aaa	ccc	192
Thr	Thr	Tyr	Val	Thr	Gln	Leu	Ile	Phe	Lys	Leu	Pro	Leu	Leu	Lys	Pro	
		50				55					60					
tat	tac	aac	gct	tac	gtt	ata	gtt	tct	ata	ttt	ttt	gca	ttt	att	gtc	240
Tyr	Tyr	Asn	Ala	Tyr	Val	Ile	Val	Ser	Ile	Phe	Phe	Ala	Phe	Ile	Val	
				70						75					80	
agt	gga	gta	gta	gga	ata	ctt	tta	gaa	aaa	act	gta	att	aga	aag	tta	288
Ser	Gly	Val	Val	Gly	Ile	Leu	Leu	Glu	Lys	Thr	Val	Ile	Arg	Lys	Leu	
				85					90					95		
tac	gga	agt	cca	tta	gaa	act	tta	ctt	gca	aca	tggt	gga	gta	agc	ctt	336
Tyr	Gly	Ser	Pro	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Val	Ser	Leu	
			100					105					110			
att	ctt	caa	cag	ttt	gtc	cg	agt	gtt	cct	tta	gct	tat	ggg	aca	gga	384
Ile	Leu	Gln	Gln	Phe	Val	Arg	Ser	Val	Pro	Leu	Ala	Tyr	Gly	Thr	Gly	
		115					120					125				
cta	gta	ata	agt	ctc	ata	ata	ggg	tta	ttt	cta	cca	tca	gta	ttt	tca	432
Leu	Val	Ile	Ser	Leu	Ile	Ile	Gly	Leu	Phe	Leu	Pro	Ser	Val	Phe	Ser	
		130				135					140					
tca	aaa	gta	aaa	gag	tct	ata	aat	ttt	aaa	tat	gta	aaa	ttt	agt	tca	480
Ser	Lys	Val	Lys	Glu	Ser	Ile	Asn	Phe	Lys	Tyr	Val	Lys	Phe	Ser	Ser	
				145		150				155					160	
tggt	ata	ttt	gca	gct	tta	gcg	gga	gtt	ctc	tcc	ggg	aat	tta	att	tca	528
Trp	Ile	Phe	Ala	Ala	Leu	Ala	Gly	Val	Leu	Ser	Gly	Asn	Leu	Ile	Ser	
			165					170						175		
tct	tca	gtt	agc	aaa	tta	agt	cga	gct	agt	gca	aga	aat	gtg	gat	gtc	576
Ser	Ser	Val	Ser	Lys	Leu	Ser	Arg	Ala	Ser	Ala	Arg	Asn	Val	Asp	Val	
			180					185					190			
acg	gct	cca	gct	tggt	atg	agg	ggg	cag	gtt	gaa	atc	ctt	gga	aca	gct	624
Thr	Ala	Pro	Ala	Trp	Met	Arg	Gly	Gln	Val	Glu	Ile	Leu	Gly	Thr	Ala	
		195					200					205				
ttc	cca	aaa	aca	aga	tta	atg	ata	ata	ata	att	act	tta	ata	tct	gtg	672
Phe	Pro	Lys	Thr	Arg	Leu	Met	Ile	Ile	Ile	Ile	Thr	Leu	Ile	Ser	Val	

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210	att gca ata act tta ttt	215	ttg aat caa agt gct	220	tggtggt atg agg ata	720
Ile Ala Ile Thr Leu Phe	Leu Asn Gln Ser Ala Trp Gly Met Arg Ile					
225	aga gca gta act caa aat	230	aga gaa atg agt gac	235	tggtctt gga att tca	768
Arg Ala Val Thr Gln Asn	Arg Glu Met Ser Asp Cys Leu Gly Ile Ser					
245	aca gaa aaa gtt gat gtt	250	gga att ggt tct gga	255	ttg gca	816
Thr Glu Lys Val Asp Val Leu Thr Phe	Gly Ile Gly Ser Gly Leu Ala					
260	ggt gta gca gga gtt gct	265	gta tct ctt ttg gga	270	tcg gtt ggg cct aat	864
Gly Val Ala Gly Val Ala Val Ser	Leu Leu Gly Ser Val Gly Pro Asn					
275	gtt gga gga aat tat ata	280	gtt ggg tgt ttt atg	285	gta gtt tta gga	912
Val Gly Gly Asn Tyr Ile Val Gly Cys Phe Met	Val Val Val Leu Gly					
290	ggt gta ggg aac cta ttg	295	ggt aca att ttt gcc	300	tct ttt gga ata gga	960
Gly Val Gly Asn Leu Leu Gly Thr Ile Phe Ala Ser	Phe Gly Ile Gly					
305	ata atg act gat tta att	310	gga gct ggt cgc ctt	315	tta tca ata tgg cct	1008
Ile Met Thr Asp Leu Ile Gly Ala Gly Arg Leu Leu Ser	Ile Trp Pro					
325	gat atg cct cta cca cta	330	tca aat aca att aat	335	ttc ttt gca act acc	1056
Asp Met Pro Leu Pro Leu Ser Asn Thr	Ile Asn Phe Phe Ala Thr Thr					
340	agt atg gct aga gtt atg	345	att ttt gcg tta ata	350	gta ata ttc ctg caa	1104
Ser Met Ala Arg Val Met Ile Phe Ala Leu Ile Val	Ile Phe Leu Gln					
355	ttc aaa cct act ggt tta	360	ttc ccc cag aaa gga	365	agg atg gtt gag agt	1152
Phe Lys Pro Thr Gly Leu Phe	Pro Gln Lys Gly Arg Met Val Glu Ser					
370	taa	375		380		1155

<210> 669

<211> 384

<212> PRT

<213> Prochlorococcus marinus subsp

<400> 669

Met Glu Leu Leu Leu Asp Ser Leu Phe Asn Gly Ile Ala Ile Gly Ser	1	5	10	15
Val Leu Leu Val Ala Ala Leu Gly Leu Ala Ile Val Phe Gly Leu Met	20	25	30	
Gly Val Ile Asn Leu Ala His Gly Glu Leu Met Met Leu Gly Ala Tyr	35	40	45	
Thr Thr Tyr Val Thr Gln Leu Ile Phe Lys Leu Pro Leu Leu Lys Pro	50	55	60	
Tyr Tyr Asn Ala Tyr Val Ile Val Ser Ile Phe Phe Ala Phe Ile Val	65	70	75	80
Ser Gly Val Val Gly Ile Leu Leu Glu Lys Thr Val Ile Arg Lys Leu	85	90	95	
Tyr Gly Ser Pro Leu Glu Thr Leu Leu Ala Thr Trp Gly Val Ser Leu	100	105	110	
Ile Leu Gln Gln Phe Val Arg Ser Val Pro Leu Ala Tyr Gly Thr Gly	115	120	125	
Leu Val Ile Ser Leu Ile Ile Gly Leu Phe Leu Pro Ser Val Phe Ser	130	135	140	
Ser Lys Val Lys Glu Ser Ile Asn Phe Lys Tyr Val Lys Phe Ser Ser	145	150	155	160
Trp Ile Phe Ala Ala Leu Ala Gly Val Leu Ser Gly Asn Leu Ile Ser	165	170	175	
Ser Ser Val Ser Lys Leu Ser Arg Ala Ser Ala Arg Asn Val Asp Val	180	185	190	
Thr Ala Pro Ala Trp Met Arg Gly Gln Val Glu Ile Leu Gly Thr Ala	195	200	205	
Phe Pro Lys Thr Arg Leu Met Ile Ile Ile Thr Leu Ile Ser Val	210	215	220	

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Ile Ala Ile Thr Leu Phe Leu Asn Gln Ser Ala Trp Gly Met Arg Ile
 225 230 235 240
 Arg Ala Val Thr Gln Asn Arg Glu Met Ser Asp Cys Leu Gly Ile Ser
 245 250 255
 Thr Glu Lys Val Asp Val Leu Thr Phe Gly Ile Gly Ser Gly Leu Ala
 260 265 270
 Gly Val Ala Gly Val Ala Val Ser Leu Gly Ser Val Gly Pro Asn
 275 280 285
 Val Gly Gly Asn Tyr Ile Val Gly Cys Phe Met Val Val Val Leu Gly
 290 295 300
 Gly Val Gly Asn Leu Leu Gly Thr Ile Phe Ala Ser Phe Gly Ile Gly
 305 310 315 320
 Ile Met Thr Asp Leu Ile Gly Ala Gly Arg Leu Leu Ser Ile Trp Pro
 325 330 335
 Asp Met Pro Leu Pro Leu Ser Asn Thr Ile Asn Phe Phe Ala Thr Thr
 340 345 350
 Ser Met Ala Arg Val Met Ile Phe Ala Leu Ile Val Ile Phe Leu Gln
 355 360 365
 Phe Lys Pro Thr Gly Leu Phe Pro Gln Lys Gly Arg Met Val Glu Ser
 370 375 380

<210> 670

<211> 1155

<212> DNA

<213> *Prochlorococcus marinus*

<220>

<221> CDS

<222> (1)..(1155)

<400> 670

atg	caa	ctg	ctt	ctt	gaa	agt	ctt	ttc	aat	ggg	gtg	gcc	atc	ggc	tcg	48
Met	Gln	Leu	Leu	Leu	Glu	Ser	Leu	Phe	Asn	Gly	Val	Ala	Ile	Gly	Ser	
1				5				10						15		
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Val	Leu	Leu	Val	Ala	Ala	Leu	Gly	Leu	Ala	Ile	Val	Phe	Gly	Leu	Met	
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Gly	Val	Ile	Asn	Leu	Ala	His	Gly	Glu	Leu	Ile	Met	Leu	Gly	Ala	Tyr	
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acc	act	tat	gtg	gta	cag	ctg	atc	ttc	aag	ctg	cct	gct	ctg	cag	cct	192
Thr	Thr	Tyr	Val	Val	Gln	Leu	Ile	Phe	Lys	Leu	Pro	Ala	Leu	Gln	Pro	
		50				55					60					
ttc	tac	aac	gct	tat	gtg	ttg	gtg	gcg	att	cct	ctg	gcc	ttc	atc	gtt	240
Phe	Tyr	Asn	Ala	Tyr	Val	Leu	Val	Ala	Ile	Pro	Leu	Ala	Phe	Ile	Val	
	65				70				75						80	
agt	ggg	gtg	gtt	ggg	atc	ttg	cta	gaa	cg	acc	gtg	att	cg	cg	ctc	288
Ser	Gly	Val	Val	Gly	Ile	Leu	Leu	Glu	Arg	Thr	Val	Ile	Arg	Arg	Leu	
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tac	ggc	aac	ccg	ttg	gag	aca	ttg	ttg	gcg	aca	tgg	ggc	gtt	agc	ctg	336
Tyr	Gly	Asn	Pro	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Val	Ser	Leu	
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att	ctg	cag	cag	ttt	gtg	cg	agt	ttt	cca	ttg	gct	tat	gcg	gct	ggc	384
Ile	Leu	Gln	Gln	Phe	Val	Arg	Ser	Phe	Pro	Leu	Ala	Tyr	Ala	Ala	Gly	
		115					120					125				
ttg	gtg	ctg	gcg	tta	gtg	ctt	ggg	ttc	agt	ctg	ccg	atc	att	ctt	cct	432
Leu	Val	Leu	Ala	Leu	Val	Leu	Gly	Phe	Ser	Leu	Pro	Ile	Ile	Leu	Pro	
		130				135					140					
gac	aag	ctt	ttg	cag	ggg	cct	cg	gcc	cg	ttg	gtg	cg	gct	gga	agc	480
Asp	Lys	Leu	Leu	Gln	Gly	Pro	Arg	Ala	Arg	Leu	Val	Arg	Ala	Gly	Ser	
				150					155						160	
tgg	ctt	gtg	tcg	gct	ctg	gct	ggg	gtg	tta	ctg	gcg	ggg	ggg	ttg	gcc	528
Trp	Leu	Val	Ser	Ala	Leu	Ala	Gly	Val	Leu	Ala	Gly	Gly	Gly	Leu	Ala	
				165				170						175		
tct	cag	atc	agt	cg	atc	gct	cg	gcg	acc	tct	cg	aat	gtc	gat	gtc	576
Ser	Gln	Ile	Ser	Arg	Ile	Ala	Arg	Ala	Thr	Ser	Arg	Asn	Val	Asp	Val	
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acg	gca	cct	aag	tgg	atg	cg	ggg	ggg	att	gaa	ctg	tcg	ggc	atg	acc	624
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<212> PRT
<213> Prochlorococcus marinus

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Gly	Val	Ile	Asn	Leu	Ala	His	Gly	Glu	Leu	Ile	Met	Leu	Gly	Ala	Tyr
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Thr	Thr	Tyr	Val	Val	Gln	Leu	Ile	Phe	Lys	Leu	Pro	Ala	Leu	Gln	Pro
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Phe	Tyr	Asn	Ala	Tyr	Val	Leu	Val	Ala	Ile	Pro	Leu	Ala	Phe	Ile	Val
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Ser	Gly	Val	Val	Gly	Ile	Leu	Leu	Glu	Arg	Thr	Val	Ile	Arg	Arg	Leu
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Tyr	Gly	Asn	Pro	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Val	Ser	Leu
			100					105					110		
Ile	Leu	Gln	Gln	Phe	Val	Arg	Ser	Phe	Pro	Leu	Ala	Tyr	Ala	Ala	Gly
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Leu	Val	Leu	Ala	Leu	Val	Leu	Gly	Phe	Ser	Leu	Pro	Ile	Ile	Leu	Pro
	130					135					140				
Asp	Lys	Leu	Leu	Gln	Gly	Pro	Arg	Ala	Arg	Leu	Val	Arg	Ala	Gly	Ser
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Trp	Leu	Val	Ser	Ala	Leu	Ala	Gly	Val	Leu	Leu	Ala	Gly	Gly	Leu	Ala
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Ser	Gln	Ile	Ser	Arg	Ile	Ala	Arg	Ala	Thr	Ser	Arg	Asn	Val	Asp	Val
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Thr	Ala	Pro	Lys	Trp	Met	Arg	Gly	Gly	Ile	Glu	Leu	Ser	Gly	Met	Thr

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Phe	Pro	Val	Pro	Arg	Leu	Val	Ile	Ile	Val	Ile	Thr	Ile	Leu	Ala	Val
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Leu	Gly	Ile	Thr	Trp	Phe	Leu	Asn	Arg	Ser	Val	Trp	Gly	Met	Arg	Ile
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Arg	Ala	Val	Thr	Gln	Asn	Arg	Ser	Met	Ser	Asp	Cys	Leu	Gly	Ile	Ser
				245					250					255	
Thr	Asp	Thr	Val	Asp	Val	Leu	Thr	Phe	Gly	Ile	Gly	Ser	Gly	Leu	Ala
			260					265					270		
Gly	Ile	Ala	Gly	Val	Ala	Val	Ser	Leu	Leu	Gly	Ser	Val	Gly	Pro	Asn
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Val	Gly	Thr	Ser	Tyr	Ile	Val	Gly	Cys	Phe	Met	Val	Val	Val	Leu	Gly
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Gly	Val	Gly	Asn	Leu	Phe	Gly	Thr	Val	Leu	Ala	Ser	Phe	Ala	Ile	Gly
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Val	Leu	Thr	Asp	Leu	Ile	Gly	Ala	Gly	Arg	Leu	Leu	Ser	Ile	Trp	Pro
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Ser	Met	Pro	Ala	Pro	Leu	Ala	Ser	Val	Val	Asp	Phe	Phe	Ala	Thr	Thr
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Ser	Met	Ala	Gln	Val	Met	Val	Phe	Ala	Leu	Ile	Val	Val	Phe	Leu	Gln
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<212> DNA
<213> Bordetella pertussis
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<222> (1) .. (885)

[illegible]

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 <212> DNA
 <213> Bordetella pertussis

<220>
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 <222> (1)..(1797)

<400> 674

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ccg ctg ctg tcg gcc acg ccc gaa ttc atc acg caa ctc aac tac	96
Pro Leu Leu Ser Ala Thr Pro Glu Phe Trp Ile Thr Gln Leu Asn Tyr	
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atc ggc ctg gcc gcc atg gtg gcg ctg ggg ctg gtg ctg ctg acc ggc	144
Ile Gly Leu Ala Ala Met Val Ala Leu Gly Leu Val Leu Leu Thr Gly	
35 40 45	
gtg ggc ggc ctg acc tcg ttc ggc cag gcg gcc ttc gtg ggc ctg ggc	192
Val Gly Gly Leu Thr Ser Phe Gly Gln Ala Ala Phe Val Gly Leu Gly	
50 55 60	
gcc tac acc acg gca ctg ctc acc acg caa tac gac atc tcg ccg tgg	240
Ala Tyr Thr Thr Ala Leu Leu Thr Thr Gln Tyr Asp Ile Ser Pro Trp	
65 70 75 80	
ctg gcg ctg ccg gtg ggc ctg ctg gtg acg gcc gtg gtg gcg ttc ctg	288
Leu Ala Leu Pro Val Gly Leu Leu Val Thr Ala Val Val Ala Phe Leu	
85 90 95	
ctg ggg ctg atc acg ctg cgg ctg tcg ggg cat tat ctg ccg ctg ggc	336
Leu Gly Leu Ile Thr Leu Arg Leu Ser Gly His Tyr Leu Pro Leu Gly	
100 105 110	
acc atc gcc tgg ggg ctc tcg ctg tat tac ctg ttc ggc aac ctg gac	384
Thr Ile Ala Trp Gly Leu Ser Leu Tyr Tyr Leu Phe Gly Asn Leu Asp	
115 120 125	
tgg ctc ggc aag cat gac ggc atc gcc ggc atc gag ccc atc agc ctg	432
Trp Leu Gly Lys His Asp Gly Ile Ala Gly Ile Glu Pro Ile Ser Leu	
130 135 140	
ttc ggc tgg tcg ctg gcc agc gga cgc cat att tac tac ctg atc tgg	480
Phe Gly Trp Ser Leu Ala Ser Gly Arg His Ile Tyr Tyr Leu Ile Trp	
145 150 155 160	
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Val Phe Val Leu Leu Ala Leu Trp Ala Thr Arg Asn Leu Leu Asp Ser	
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cgt ccg ggc cgc gcc atc cgc gcc ctg aag agc ggc gcc ggc atg gcc	576
Arg Pro Gly Arg Ala Ile Arg Ala Leu Lys Ser Gly Ala Gly Met Ala	
180 185 190	
gag tcg atg ggc gtc aat acc ggc atc tac aaa atc gtc atc ttc gtg	624
Glu Ser Met Gly Val Asn Thr Gly Ile Tyr Lys Ile Val Ile Phe Val	
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Gln Arg Ala Val Ser Pro Ser Pro Phe Gly Leu Asn Tyr Gly Ile Glu	
225 230 235 240	
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Tyr Leu Phe Met Ala Val Val Gly Gly Ala Gly His Val Trp Gly Ala	
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ctg ctg ggc tcg gcg gtc atc ctg gga atc aag gac cag ctg cag aac	816
Leu Leu Gly Ser Ala Val Ile Leu Gly Ile Lys Asp Gln Leu Gln Asn	
260 265 270	
atc ctg ccc aag ctg atc gat acc aac gcc aac ttc gaa ctg atc ttc	864
Ile Leu Pro Lys Leu Ile Asp Thr Asn Ala Asn Phe Glu Leu Ile Phe	
275 280 285	
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Phe Gly Val Leu Met Ile Leu Val Leu Gln Tyr Ala Ser Asn Gly Leu	
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Trp Pro Ile Leu Ser Gly Trp Trp Glu Arg Val Thr Gly Ala Ala Gly	
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Arg	Ala	Arg	Pro	Gln	Ala	Gly	Glu	Leu	Val	Leu	Glu	Val	Asp	Ser	Ile	
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cgc	aag	gag	ttc	ggc	ggc	ctg	gtg	gcg	gtc	aac	gac	att	acg	ttc	aag	1104
Arg	Lys	Glu	Phe	Gly	Gly	Leu	Val	Ala	Val	Asn	Asp	Ile	Thr	Phe	Lys	
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Val	Arg	Ala	Gly	Glu	Ile	Met	Gly	Leu	Ile	Gly	Pro	Asn	Gly	Ala	Gly	
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Gly	Gln	Val	Arg	Phe	Leu	Gly	Asp	Arg	Ile	Asp	Gly	Arg	Ser	Ala	Arg	
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Glu	Ile	Ala	Lys	Arg	Gly	Val	Gly	Arg	Thr	Phe	Gln	His	Val	Gln	Leu	
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Leu	Pro	Thr	Met	Leu	Val	Leu	Glu	Asn	Val	Ala	Leu	Gly	Ala	His	Met	
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cgt	tcg	gac	gtg	ggc	gtg	ctg	tcg	ggc	gcc	ttg	cac	agc	gag	cgc	gcc	1392
Arg	Ser	Asp	Val	Gly	Val	Leu	Ser	Gly	Ala	Leu	His	Ser	Glu	Arg	Ala	
	450					455					460					
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Arg	Glu	Ala	Gln	Leu	Leu	His	Glu	Ala	Ala	Gln	Gln	Leu	Gln	Arg	Val	
465					470				475						480	
ggg	ctg	ggc	gac	tat	ctg	tac	gag	cag	gcg	ggc	aac	ctg	gcg	ctg	ggc	1488
Gly	Leu	Gly	Asp	Tyr	Leu	Tyr	Glu	Gln	Ala	Gly	Asn	Leu	Ala	Leu	Gly	
				485				490					495			
cag	caa	cgc	atc	ctg	gaa	atc	gcc	cgc	gcg	ctg	gcg	tgc	gat	ccg	gtg	1536
Gln	Gln	Arg	Ile	Leu	Glu	Ile	Ala	Arg	Ala	Leu	Ala	Cys	Asp	Pro	Val	
			500				505						510			
ctg	ctg	atg	ctc	gac	gag	ccc	agc	ctc	ggg	ctg	gcg	ccg	cgc	atc	gtg	1584
Leu	Leu	Met	Leu	Asp	Glu	Pro	Ser	Leu	Gly	Leu	Ala	Pro	Arg	Ile	Val	
		515					520					525				
cgc	gag	att	ttc	cat	atc	atc	gcc	cgg	ctg	cgc	gaa	acc	ggc	gtg	gcg	1632
Arg	Glu	Ile	Phe	His	Ile	Ile	Ala	Arg	Leu	Arg	Glu	Thr	Gly	Val	Ala	
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atc	ctg	ctg	gtc	gag	cag	aac	gcc	cgc	gcc	gcc	ttg	cag	gtt	gcc	gat	1680
Ile	Leu	Leu	Val	Glu	Gln	Asn	Ala	Arg	Ala	Ala	Leu	Gln	Val	Ala	Asp	
545					550				555						560	
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Tyr	Gly	Tyr	Val	Leu	Glu	Thr	Gly	Glu	Ile	Val	Leu	His	Gly	Pro	Ala	
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cgc	gaa	ctg	gcc	ggc	aat	ccg	cgc	gtc	atc	gag	agc	tac	ctg	ggc	ctg	1776
Arg	Glu	Leu	Ala	Gly	Asn	Pro	Arg	Val	Ile	Glu	Ser	Tyr	Leu	Gly	Leu	
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<211> 598

<212> PRT

<213> Bordetella pertussis

<400> 675

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Ile Gly Leu Ala Ala Met Val Ala Leu Gly Leu Val Leu Leu Thr Gly
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Val Gly Gly Leu Thr Ser Phe Gly Gln Ala Ala Phe Val Gly Leu Gly
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Leu	Gly	Leu	Ile 100	Thr	Leu	Arg	Leu	Ser 105	Gly	His	Tyr	Leu	Pro 110	Leu	Gly
Thr	Ile	Ala 115	Trp	Gly	Leu	Ser	Leu 120	Tyr	Tyr	Leu	Phe	Gly 125	Asn	Leu	Asp
Trp	Leu 130	Gly	Lys	His	Asp	Gly 135	Ile	Ala	Gly	Ile	Glu 140	Pro	Ile	Ser	Leu
Phe 145	Gly	Trp	Ser	Leu	Ala 150	Ser	Gly	Arg	His	Ile 155	Tyr	Tyr	Leu	Ile	Trp 160
Val	Phe	Val	Leu	Leu 165	Ala	Leu	Trp	Ala	Thr 170	Arg	Asn	Leu	Leu	Asp 175	Ser
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Gln 225	Arg	Ala	Val	Ser	Pro 230	Ser	Pro	Phe	Gly	Leu 235	Asn	Tyr	Gly	Ile	Glu 240
Tyr	Leu	Phe	Met	Ala 245	Val	Val	Gly	Gly	Ala 250	Gly	His	Val	Trp	Gly 255	Ala
Leu	Leu	Gly	Ser 260	Ala	Val	Ile	Leu	Gly 265	Ile	Lys	Asp	Gln	Leu 270	Gln	Asn
Ile	Leu	Pro 275	Lys	Leu	Ile	Asp	Thr 280	Asn	Ala	Asn	Phe	Glu 285	Leu	Ile	Phe
Phe	Gly 290	Val	Leu	Met	Ile	Leu 295	Val	Leu	Gln	Tyr	Ala 300	Ser	Asn	Gly	Leu
Trp 305	Pro	Ile	Leu	Ser	Gly 310	Trp	Trp	Glu	Arg	Val 315	Thr	Gly	Ala	Ala	Gly 320
Ser	Arg	Arg	Asn	Met 325	Ala	Pro	Pro	Pro	Gln 330	Ala	Pro	Ala	Leu	Pro 335	His
Arg	Ala	Arg	Pro 340	Gln	Ala	Gly	Glu	Leu 345	Val	Leu	Glu	Val	Asp 350	Ser	Ile
Arg	Lys	Glu	Phe 355	Gly	Gly	Leu	Val 360	Ala	Val	Asn	Asp	Ile 365	Thr	Phe	Lys
Val	Arg 370	Ala	Gly	Glu	Ile	Met 375	Gly	Leu	Ile	Gly	Pro 380	Asn	Gly	Ala	Gly
Lys 385	Ser	Thr	Thr	Phe	Asn 390	Leu	Ile	Ser	Gly	Val 395	Leu	Pro	Ala	Thr	Arg 400
Gly	Gln	Val	Arg	Phe 405	Leu	Gly	Asp	Arg	Ile 410	Asp	Gly	Arg	Ser	Ala 415	Arg
Glu	Ile	Ala	Lys 420	Arg	Gly	Val	Gly	Arg 425	Thr	Phe	Gln	His	Val 430	Gln	Leu
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Arg 465	Glu	Ala	Gln	Leu	Leu 470	His	Glu	Ala	Ala	Gln 475	Gln	Leu	Gln	Arg	Val 480
Gly	Leu	Gly	Asp	Tyr 485	Leu	Tyr	Glu	Gln	Ala 490	Gly	Asn	Leu	Ala	Leu 495	Gly
Gln	Gln	Arg	Ile 500	Leu	Glu	Ile	Ala	Arg 505	Ala	Leu	Ala	Cys	Asp 510	Pro	Val
Leu	Leu	Met 515	Leu	Asp	Glu	Pro	Ser 520	Leu	Gly	Leu	Ala	Pro 525	Arg	Ile	Val
Arg	Glu 530	Ile	Phe	His	Ile	Ile 535	Ala	Arg	Leu	Arg	Glu 540	Thr	Gly	Val	Ala
Ile 545	Leu	Leu	Val	Glu	Gln 550	Asn	Ala	Arg	Ala	Ala 555	Leu	Gln	Val	Ala	Asp 560
Tyr	Gly	Tyr	Val	Leu 565	Glu	Thr	Gly	Glu	Ile 570	Val	Leu	His	Gly	Pro 575	Ala
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 Ala Ile Tyr Gly Leu Ile Gly Val Gly Leu Asn Val Ile Phe Gly Val
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 Leu Arg Val Val Asn Phe Ala His Gly Glu Phe Leu Val Leu Gly Ala
 35 40 45
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 Tyr Phe Ala Tyr Tyr Leu Leu Glu Tyr Ala Gly Ile Asp Pro Leu Leu
 50 55 60
 gca ttg ccg ctg gcc ttc ggc gcc ttc ttc ctg gcc ggc tac gtg ctg 240
 Ala Leu Pro Leu Ala Phe Gly Ala Phe Phe Leu Ala Gly Tyr Val Leu
 65 70 75 80
 tat ttc gtg ctg atc ccg cgc ctg tcc aag gcc gac gac ccc gaa atc 288
 Tyr Phe Val Leu Ile Pro Arg Leu Ser Lys Ala Asp Asp Pro Glu Ile
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 agc tcg ctg ctg ctc atg ttc ggc gtg tcc atc atg ctg gga gcc atc 336
 Ser Ser Leu Leu Met Phe Gly Val Ser Ile Met Leu Gly Ala Ile
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 atg ctg ctg gcc ttc gag gcc gac gca cgt tcg ctg ccc tac gag atc 384
 Met Leu Leu Ala Phe Glu Ala Asp Ala Arg Ser Leu Pro Tyr Glu Ile
 115 120 125
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 Glu Pro Val Phe Phe Lys Ile Gly Pro Val Leu Ile Pro Thr Val Arg
 130 135 140
 ctg atc gcc ctg gcc atc gcg ctg gcc gtg gtc gcc gtg ctg gcc tgg 480
 Leu Ile Ala Leu Ala Ile Ala Leu Ala Val Val Ala Val Leu Ala Trp
 145 150 155 160
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 Phe Leu Tyr Arg Thr Gln Leu Gly Lys Ala Leu Arg Thr Ile Ile Met
 165 170 175
 aac cgc gac gcc gtg cgt atc gtc ggc atc aac gtc gag ccg ctg tcg 576
 Asn Arg Asp Ala Val Arg Ile Val Gly Ile Asn Val Glu Arg Leu Ser
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 gcc gtg gcg ttc ggc ctg ggc atc ggc ctg gcc gcc gtc acg ggc gtg 624
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 ctg gtg gcc atg gtg ttc ccg gca ttt tcc ccc ttc atg ggc aac gac 672
 Leu Val Ala Met Val Phe Pro Ala Phe Ser Pro Phe Met Gly Asn Asp
 210 215 220
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 Tyr Thr Leu Ile Gly Phe Ile Val Ile Val Leu Gly Gly Leu Gly His
 225 230 235 240
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 Pro Val Gly Ala Leu Val Gly Ala Met Leu Phe Gly Val Thr Glu Gln
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 gtt tcg gtg gtg ttc ttc aac ccc tcc atc gcc acg atc tgc ggc ttc 816
 Val Ser Val Val Phe Phe Asn Pro Ser Ile Ala Thr Ile Cys Gly Phe
 260 265 270
 gtg ctg atg gtg gcc atg atc ttc gtg cgg ccc acc ggc ctg ttc ggc 864
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<210> 677

<211> 293

<212> PRT

<213> Bordetella pertussis

<400> 677

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Leu Arg Val Val Asn Phe Ala His Gly Glu Phe Leu Val Leu Gly Ala
35      40      45
Tyr Phe Ala Tyr Tyr Leu Leu Glu Tyr Ala Gly Ile Asp Pro Leu Leu
50      55      60
Ala Leu Pro Leu Ala Phe Gly Ala Phe Phe Leu Ala Gly Tyr Val Leu
65      70      75      80
Tyr Phe Val Leu Ile Pro Arg Leu Ser Lys Ala Asp Asp Pro Glu Ile
85      90      95
Ser Ser Leu Leu Leu Met Phe Gly Val Ser Ile Met Leu Gly Ala Ile
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Met Leu Leu Ala Phe Glu Ala Asp Ala Arg Ser Leu Pro Tyr Glu Ile
115      120      125
Glu Pro Val Phe Phe Lys Ile Gly Pro Val Leu Ile Pro Thr Val Arg
130      135      140
Leu Ile Ala Leu Ala Ile Ala Leu Ala Val Val Ala Val Leu Ala Trp
145      150      155      160
Phe Leu Tyr Arg Thr Gln Leu Gly Lys Ala Leu Arg Thr Ile Ile Met
165      170      175
Asn Arg Asp Ala Val Arg Ile Val Gly Ile Asn Val Glu Arg Leu Ser
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Ala Val Ala Phe Gly Leu Gly Ile Gly Leu Ala Ala Val Thr Gly Val
195      200      205
Leu Val Ala Met Val Phe Pro Ala Phe Ser Pro Phe Met Gly Asn Asp
210      215      220
Tyr Thr Leu Ile Gly Phe Ile Val Ile Val Leu Gly Gly Leu Gly His
225      230      235      240
Pro Val Gly Ala Leu Val Gly Ala Met Leu Phe Gly Val Thr Glu Gln
245      250      255
Val Ser Val Val Phe Phe Asn Pro Ser Ile Ala Thr Ile Cys Gly Phe
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Val Leu Met Val Ala Met Ile Phe Val Arg Pro Thr Gly Leu Phe Gly
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His Arg Ala Leu Arg
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<210> 678

<211> 1950

<212> DNA

<213> Bordetella pertussis

<220>

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<222> (1)..(1950)

<400> 678

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Val Thr Arg Ile Val Asn Phe Ala His Gly Ser Leu Tyr Met Leu Gly
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gtg tac gtg gcg tat tcg atc gtc gag cgc gtg ggc ggc acc gcg ctg      192
Val Tyr Val Ala Tyr Ser Ile Val Glu Arg Val Gly Gly Thr Ala Leu
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Glu	Leu	Phe	Gln	Leu	Leu	Ala	Thr	Phe	Ala	Leu	Val	Leu	Val	Ile	Asn	
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Ala	Pro	Gly	Leu	Thr	Gly	Ala	Ile	Asp	Leu	Leu	Gly	Arg	Arg	Tyr	Pro	
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Leu	Trp	Leu	Leu	Leu	Thr	Arg	Thr	Arg	Trp	Gly	Thr	Leu	Val	Arg	Ala	
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gcc	acg	cag	gac	cgc	gag	atg	ctc	ggc	cgc	ctg	ggc	gtg	aac	cag	gcc	576
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Trp	Leu	Phe	Thr	Gly	Val	Phe	Ala	Leu	Gly	Ala	Met	Leu	Ala	Gly	Leu	
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Lys	Ala	Leu	Cys	Ile	Gly	Leu	Gly	Thr	Val	Thr	Leu	Leu	Gly	Leu	Ser	
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Ile	Ser	Phe	Ser	Lys	Leu	Thr	Leu	Val	Val	Glu	Phe	Ala	Phe	Met	Ala	
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Leu	Val	Leu	Val	Phe	Arg	Pro	Trp	Gly	Leu	Phe	Gly	Arg	Pro	Gln	Gly	
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Ala	Ser	Arg	Asn	Ser	Ala	Pro	Ile	Glu	Ala	Pro	Leu	Arg	Pro	Ala	Ala	
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ccg	cgc	ctg	cgc	atc	ctg	tgg	ggc	gtc	ctg	gcc	tcc	ctg	gcg	gtg		1008
Pro	Arg	Leu	Arg	Ile	Leu	Trp	Gly	Val	Leu	Ala	Ser	Leu	Ala	Val		
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Leu	Pro	Leu	Leu	Ala	Gln	Trp	Leu	Pro	Tyr	Ala	Val	Val	Leu	Thr	Gln	
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Val	Phe	Gly	Trp	Phe	Cys	Val	Arg	Leu	Ser	Gly	Val	Tyr	Leu	Ala	Met	
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Tyr	Ala	Met	Arg	Ala	Gly	Arg	Asp	Ser	Ser	Leu	Arg	Ala	Asp	Ala	Ile	
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Tyr	Trp	Arg	Ala	Leu	Phe	Gly	Gly	Val	Ile	Leu	Leu	Leu	Val	Leu	Val	
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Phe	Pro	Gln	Gly	Ile	Ala	Gly	Phe	Cys	Arg	Gln	Ala	Gly	Gln	Trp	Trp	
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<213> Bordetella pertussis

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Leu	Val 290	Leu	Val	Phe	Arg	Pro 295	Trp	Gly	Leu	Phe	Gly 300	Arg	Pro	Gln	Gly
Ala 305	Ser	Arg	Asn	Ser	Ala 310	Pro	Ile	Glu	Ala	Pro 315	Leu	Arg	Pro	Ala	Ala 320
Pro	Arg	Leu	Arg	Ile 325	Leu	Trp	Gly	Val	Leu 330	Leu	Ala	Ser	Leu	Ala 335	Val
Leu	Pro	Leu	Leu 340	Ala	Gln	Trp	Leu	Pro 345	Tyr	Ala	Val	Val	Leu 350	Thr	Gln
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Gly	Pro 370	Gly	Gly	Met	His	Ser 375	Phe	Gly	His	Ala	Ala 380	Tyr	Phe	Gly	Leu
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Glu	Ala	Ala	Leu	Ala 405	Phe	Ala	Pro	Leu	Val 410	Gly	Ala	Leu	Gly	Ala 415	Leu
Val	Phe	Gly	Trp 420	Phe	Cys	Val	Arg	Leu 425	Ser	Gly	Val	Tyr	Leu 430	Ala	Met
Leu	Thr	Leu 435	Ala	Phe	Ser	Gln	Ile 440	Val	Trp	Ser	Val	Val 445	Phe	Gln	Trp
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Glu 465	Trp	Leu	Ser	Gly	Thr 470	Ala	Tyr	Tyr	Tyr	Leu 475	Ala	Leu	Ala	Val	Val 480
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Tyr	Ala	Met	Arg 500	Ala	Gly	Arg	Asp	Ser 505	Ser	Leu	Arg	Ala	Asp 510	Ala	Ile
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Ile 545	Ser	Pro	Asp	Thr	Met 550	Ala	Val	Ser	Lys	Ser 555	Val	Asp	Gly	Leu	Val 560
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Tyr	Trp	Arg 595	Ala	Leu	Phe	Gly	Gly 600	Val	Ile	Leu	Leu	Leu 605	Val	Leu	Val
Phe	Pro 610	Gln	Gly	Ile	Ala	Gly 615	Phe	Cys	Arg	Gln	Ala 620	Gly	Gln	Trp	Trp
Ser 625	Ala	Arg	Ala	Gly	Lys 630	Asp	Arg	Pro	Pro	Arg 635	Lys	Gly	Gly	Ala	Phe 640
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 Ser Leu Gly Ala Ile Tyr Ala Leu Ile Ala Ile Gly Tyr Thr Met Val
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 Tyr Gly Ile Ile Gly Met Ile Asn Phe Ala His Gly Glu Ile Tyr Met
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 Ile Gly Ala Tyr Val Gly Leu Val Thr Leu Thr Ala Ile Gly Thr Asn
 50 55 60
 agc ggc ctg ccg ctg cct ttc atc atc gcc gcc atg ctg gtg gtc gcc 240
 Ser Gly Leu Pro Leu Pro Phe Ile Ile Ala Ala Met Leu Val Val Ala
 65 70 75 80
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 Ile Phe Val Thr Gly Val Tyr Gly Tyr Ser Val Glu Arg Val Ala Tyr
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 Gly Met Ser Ile Phe Leu Gln Asn Trp Val Ala Leu Gly Gln Gly Ala
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 Arg Asp Met Ala Val Pro Ala Leu Val Ser Gly Ala Val Gln Phe His
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 Met Gly Ser Ser Phe Asp Val Thr Val Pro Tyr Ser Arg Ile Met Ile
 145 150 155 160
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 Phe Val Leu Gly Ala Met Leu Ala Ala Val Gly Gly Val Leu Ile Ala
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 Ile Thr Ile Gly Lys Leu Asn Pro Phe Ile Gly Phe Leu Ala Gly Ile
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 aag gcg ttc acc gcc gcg gtg ctg ggc ggc atc ggc agc att ccc ggc 768
 Lys Ala Phe Thr Ala Ala Val Leu Gly Gly Ile Gly Ser Ile Pro Gly
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 Ala Tyr Ile Ser Ser Gln Tyr Lys Asp Ile Val Ala Phe Ala Leu Leu
 275 280 285
 gtg ctg atc ctg ctg ttc cgt ccc acc ggc ctg ctc ggc aaa cct gag 912
 Val Leu Ile Leu Leu Phe Arg Pro Thr Gly Leu Gly Lys Pro Glu
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 gtg gaa aaa gtc tag 927
 Val Glu Lys Val
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<210> 681

<211> 308

<212> PRT

<213> Bordetella pertussis

<400> 681

Met Ser Asp Leu Ile Pro Gln Leu Thr Gln Gln Phe Phe Asn Gly Leu
 Seite 938

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1          5          10          15
Ser Leu Gly Ala Ile Tyr Ala Leu Ile Ala Ile Gly Tyr Thr Met Val
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Tyr Gly Ile Ile Gly Met Ile Asn Phe Ala His Gly Glu Ile Tyr Met
35
Ile Gly Ala Tyr Val Gly Leu Val Thr Leu Thr Ala Ile Gly Thr Asn
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Ser Gly Leu Pro Leu Pro Phe Ile Ile Ala Ala Met Leu Val Val Ala
65
Ile Phe Val Thr Gly Val Tyr Gly Tyr Ser Val Glu Arg Val Ala Tyr
80
Arg Pro Val Arg Gly Ser Pro Arg Leu Val Ala Leu Ile Ser Ala Ile
100
Gly Met Ser Ile Phe Leu Gln Asn Trp Val Ala Leu Gly Gln Gly Ala
115
Arg Asp Met Ala Val Pro Ala Leu Val Ser Gly Ala Val Gln Phe His
130
Met Gly Ser Ser Phe Asp Val Thr Val Pro Tyr Ser Arg Ile Met Ile
145
Ile Val Val Thr Val Val Leu Met Val Ala Leu Thr Leu Phe Ile Lys
160
Tyr Ser Arg Met Gly Arg Ala Ser Arg Ala Cys Ser Gln Asp Met His
180
Met Ala Asn Leu Leu Gly Ile Asp Thr Asn Arg Val Ile Ser Phe Thr
195
Phe Val Leu Gly Ala Met Leu Ala Ala Val Gly Gly Val Leu Ile Ala
210
Ile Thr Ile Gly Lys Leu Asn Pro Phe Ile Gly Phe Leu Ala Gly Ile
225
Lys Ala Phe Thr Ala Val Leu Gly Gly Ile Gly Ser Ile Pro Gly
240
Ala Met Leu Gly Gly Val Leu Leu Gly Leu Ala Glu Thr Phe Ala Ala
260
Ala Tyr Ile Ser Ser Gln Tyr Lys Asp Ile Val Ala Phe Ala Leu Leu
275
Val Leu Ile Leu Leu Phe Arg Pro Thr Gly Leu Leu Gly Lys Pro Glu
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Val Glu Lys Val
305

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<210> 682
 <211> 1239
 <212> DNA
 <213> Bordetella pertussis

<220>
 <221> CDS
 <222> (1)..(1239)

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<400> 682
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Met Thr Gln Gln Ser Pro Leu Lys Asn Ala Thr Ile Ala Ala Val Met
1          5          10          15
acc gcc gtc atc gtg acg ccg atc ttc ggc ctg cag ctg gtg cgc cag      96
Thr Ala Val Ile Val Thr Pro Ile Phe Gly Leu Gln Leu Val Arg Gln
20
ggc gcg cgc acc ctg atg gag ccg cgc tgg gac ctg gtc gcg ctg gcc      144
Gly Ala Arg Thr Leu Met Glu Pro Arg Trp Asp Leu Val Ala Leu Ala
35
tgc gcg ctg gtt ttt gcg ttc caa ctg ttg cgc ccg tgg att tcc aag      192
Cys Ala Leu Val Phe Ala Phe Gln Leu Leu Arg Pro Trp Ile Ser Lys
50
ccc ttc aag gcg ctg aaa aca ggc ctg ccg acg ctg ccg tcg gcg ctg      240
Pro Phe Lys Ala Leu Lys Thr Gly Leu Pro Thr Leu Pro Ser Ala Leu
65
gcg cgc ggc cac aaa tgg ctg gtc gtg ctg ctg atc gcc gtc tcg gtg      288
Ala Arg Gly His Lys Trp Leu Val Val Leu Leu Ile Ala Val Ser Val
85
atc tgg ccg ttc ttc agc ggg cgc agc tcg gtg gac atc gcc acg ctg      336

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Ile	Trp	Pro	Phe 100	Phe	Ser	Gly	Arg	Ser 105	Ser	Val	Asp	Ile	Ala 110	Thr	Leu	
gtg Val	ctg Leu	atc Ile 115	tac Tyr	gtc Val	atg Met	ctg Leu	ggc Gly 120	ctg Leu	ggg Gly	ctg Leu	aac Asn	atc Ile 125	gtg Val	gtc Val	ggc Gly	384
ttc Phe	gcc Ala 130	ggc Gly	ctg Leu	ctc Leu	gac Asp	ctg Leu 135	ggc Gly	ttc Phe	gtg Val	ggc Gly	ttt Phe 140	tac Tyr	gcg Ala	gtc Val	ggg Gly	432
gcc Ala 145	tat Tyr	acc Thr	tac Tyr	gcc Ala	ttg Leu 150	ctt Leu	tac Tyr	cac His	tgg Trp	ggc Gly 155	ggc Gly	tgg Trp	agc Ser	ttc Phe	tgg Trp 160	480
gaa Glu	gcg Ala	ctg Leu	ccg Pro	ttc Phe 165	tcg Ser	ggc Gly	gcg Ala	gtc Val	gcg Ala 170	gcg Ala	ctg Leu	ttc Phe	ggc Gly	ttc Phe 175	gtg Val	528
ctg Leu	ggc Gly	ttt Phe	ccg Pro 180	gtg Val	ctg Leu	cgc Arg	ctg Leu	cgc Arg 185	ggc Gly	gac Asp	tac Tyr	ctg Leu	gcc Ala 190	atc Ile	gtc Val	576
acg Thr	ctg Leu	ggc Gly 195	ttt Phe	ggc Gly	gaa Glu	atc Ile	atc Ile 200	cgc Arg	ctg Leu	ctg Leu	ctc Leu	atc Ile 205	aac Asn	ctg Leu	aac Asn	624
atg Met	ctg Leu 210	acc Thr	ggc Gly	ggc Gly	ccg Pro	gac Asp 215	ggc Gly	ata Ile	tcc Ser	ggc Gly	ctg Leu 220	ccc Pro	aag Lys	ccc Pro	agc Ser	672
gtg Val 225	ctg Leu	ggc Gly	atg Met	gaa Glu	atg Met 230	gcg Ala	cgc Arg	cgc Arg	gcc Ala	agc Ser 235	acg Thr	gaa Glu	ggc Gly	ggc Gly	cag Gln 240	720
acc Thr	ttc Phe	cat His	gag Glu	atc Ile 245	atg Met	ggc Gly	tgg Trp	act Thr	ttc Phe 250	cag Gln	aac Asn	cag Gln	cac His	atg Met 255	gtg Val	768
atc Ile	tac Tyr	ctg Leu	tac Tyr 260	ctg Leu	atg Met	gcg Ala	ctg Leu	gcg Ala 265	ttg Leu	gcg Ala	ctg Leu	gcg Ala 270	acg Thr	ctg Leu	ttc Phe	816
gtc Val	tcc Ser	acg Thr 275	cgg Arg	ctg Leu	atc Ile	cgc Arg	atg Met 280	ccg Pro	gtg Val	ggg Gly	cgc Arg	gcc Ala 285	tgg Trp	gag Glu	gcg Ala	864
ctg Leu	cgc Arg 290	gaa Glu	gac Asp	gag Glu	atc Ile	gcc Ala 295	tgc Cys	cgc Arg	tcg Ser	ctg Leu	ggc Gly 300	ctg Leu	aac Asn	ccc Pro	acg Thr	912
cgc Arg 305	atc Ile	aag Lys	ctg Leu	tcg Ser	gcc Ala 310	ttc Phe	acg Thr	ctg Leu	ggc Gly	gcc Ala 315	atg Met	ttc Phe	gcc Ala	ggt Gly	ttc Phe 320	960
ggc Gly	ggc Gly	gcc Ala	ttc Phe	ttc Phe 325	gcc Ala	cgc Ala	cgc Arg	cag Gln	ggc Gly 330	atg Met	gtc Val	aac Asn	ccc Pro	gag Glu 335	tcg Ser	1008
ttc Phe	acc Thr	ttc Phe	atc Ile 340	gaa Glu	tcg Ser	gcg Ala	ctg Leu	atc Ile 345	ctg Leu	gcc Ala	atc Ile	gtg Val 350	gtg Val 350	ctg Leu	ggc Gly	1056
ggg Gly	atg Met	ggc Gly 355	tcg Ser	cag Gln	atc Ile	ggg Gly	gtg Val 360	atc Ile	ctg Leu	gcg Ala	gcg Ala	atc Ile 365	ctg Leu	ctg Leu	acg Thr	1104
gtg Val	ctg Leu 370	ccg Pro	gag Glu	ctg Leu	gcg Ala	cgc Arg 375	gag Glu	ttc Phe	gcc Ala	gaa Glu	tac Tyr 380	cgc Arg	atg Met	ctg Leu	atg Met	1152
ttc Phe 385	ggc Gly	ctg Leu	gtg Val	atg Met	gta Val 390	ttg Leu	atg Met	atg Met	atg Met	tgg Trp 395	cgt Arg	ccg Pro	cag Gln	gga Gly	ttg Leu 400	1200
ctg Leu	ccc Pro	atg Met	aag Lys	cgt Arg 405	ccg Pro	cat His	gtg Val	gag Glu	ctg Leu 410	cgc Arg	aaa Lys	tag				1239

<210> 683

$\langle 211 \rangle$ 412

<212> PRT

<213> Bordetella pertussis

<400> 683

Met Thr Gln Gln Ser Pro Leu Lys Asn Ala Thr Ile Ala Ala Val Met
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Thr Ala Val Ile Val Thr Pro Ile Phe Gly Leu Gln Leu Val Arg Gln

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Gly Ala Arg Thr²⁰ Leu Met Glu²⁵ Pro Arg Trp Asp Leu Val³⁰ Ala Leu Ala
 Cys Ala³⁵ Leu Val Phe Ala Phe⁴⁰ Gln Leu Leu Arg Pro Trp⁴⁵ Ile Ser Lys
 Pro Phe⁵⁰ Lys Ala Leu Lys⁵⁵ Thr Gly Leu Pro Thr⁶⁰ Leu Pro Ser Ala Leu
 Ala Arg Gly His⁶⁵ Lys⁷⁰ Trp Leu Val Val⁷⁵ Leu Ile Ala Val Ser⁸⁰ Val
 Ile Trp Pro Phe⁸⁵ Phe Ser Gly Arg Ser⁹⁰ Ser Val Asp Ile Ala Thr Leu
 Val Leu Ile¹⁰⁰ Tyr Val Met Leu Gly¹⁰⁵ Leu Gly Leu Asn Ile Val Val Gly
 Phe Ala¹¹⁰ Gly Leu Leu Asp Leu¹¹⁵ Gly Phe Val Gly Phe Tyr Ala Val Gly
 Ala Tyr Thr Tyr Ala¹²⁰ Leu Leu Tyr His Trp Gly¹²⁵ Gly Trp Ser Phe Trp
 Glu Ala Leu Pro Phe¹³⁰ Ser Gly Ala Val Ala¹³⁵ Leu Phe Gly Phe Val
 Leu Gly Phe Pro¹⁴⁰ Val Leu Arg Leu Arg¹⁴⁵ Gly Asp Tyr Leu Ala Ile Val
 Thr Leu Gly¹⁵⁰ Phe Gly Glu Ile Ile¹⁵⁵ Arg Leu Leu Leu Ile Asn Leu Asn
 Met Leu Thr Gly Gly Pro Asp¹⁶⁰ Gly Ile Ser Gly Leu Pro Lys Pro Ser
 Val Leu Gly Met Glu¹⁶⁵ Met Ala Arg Arg Ala Ser Thr Glu Gly Gly Gln
 Thr Phe His Glu¹⁷⁰ Ile Met Gly Trp Thr Phe¹⁷⁵ Gln Asn Gln His Met Val
 Ile Tyr Leu Tyr¹⁸⁰ Leu Met Ala Leu Ala¹⁸⁵ Leu Ala Leu Ala Thr Leu Phe
 Val Ser Thr Arg Leu¹⁹⁰ Ile Arg Met Pro Val Gly Arg Ala Trp Glu Ala
 Leu Arg Glu Asp Glu¹⁹⁵ Ile Ala Cys Arg Ser Leu Gly Leu Asn Pro Thr
 Arg Ile Lys Leu Ser Ala²⁰⁰ Phe Thr Leu Gly Ala Met Phe Ala Gly Phe
 Gly Gly Ala Phe²⁰⁵ Phe Ala Ala Arg Gln Gly Met Val Asn Pro Glu Ser
 Phe Thr Phe Ile²¹⁰ Glu Ser Ala Leu Ile Leu Ala Ile Val Val Leu Gly
 Gly Met Gly Ser Gln²¹⁵ Ile Gly Val Ile Leu Ala Ala Ile Leu Leu Thr
 Val Leu Pro Glu Leu Ala Arg²²⁰ Glu Phe Ala Glu Tyr Arg Met Leu Met
 Phe Gly Leu Val Met Val²²⁵ Leu Met Met Met Trp Arg Pro Gln Gly Leu
 Leu Pro Met Lys Arg²³⁰ Pro His Val Glu Leu Arg Lys
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<210> 684

<211> 921

<212> DNA

<213> Bordetella pertussis

<220>

<221> CDS

<222> (1)..(921)

<400> 684

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Met	Thr	Phe	Thr	Leu	Ile	Val	Glu	Gln	Leu	Leu	Asn	Gly	Leu	Gln	Phe	
1				5					10					15		
ggg	ttg	atg	ctg	ttt	ctg	att	gcc	gcc	ggc	ctg	acc	ctg	gtg	ttc	ggc	96
Gly	Leu	Met	Leu	Phe	Leu	Ile	Ala	Ala	Gly	Leu	Thr	Leu	Val	Phe	Gly	
			20				25						30			
atc	atg	gac	atc	atg	aat	ctg	gcg	cac	ggc	tcg	ctt	tac	atg	gcc	ggc	144
Ile	Met	Asp	Ile	Met	Asn	Leu	Ala	His	Gly	Ser	Leu	Tyr	Met	Ala	Gly	
		35					40					45				

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gcc tat gtc gcg gcc gaa acc atg cag cgc acc ggg tcc ttc acg gcg      192
Ala Tyr 50 Val Ala Ala Glu Thr 55 Met Gln Arg Thr Gly 60 Ser Phe Thr Ala
gcg gtg ctg gtg gcc gcg ctg gcc acc ggc ctg gtg ggc gcg gtg ctc      240
Ala Val 65 Leu Val Ala Ala Leu Ala Thr Gly Leu Val Gly Ala Val Leu
gag ctc acg ctg atc cgc aag ctg gcg gtg cgc gac cac ctg gcc cag      288
Glu Leu Thr Leu 85 Arg Lys Leu Ala Val 90 Arg Asp His Leu 95 Ala Gln
gtg ctg ggc acc tac gcc gtc atc ctg atc gcc aat gac ctg gtc aag      336
Val Leu Gly Thr 100 Tyr Ala Val Ile Leu Ile Ala Asn Asp Leu Val Lys
atg atc tgg ggg ccg gcg ccc gtc atg ctc aac atg cca gcc gcc ctg      384
Met Ile Trp 115 Gly Pro Ala Pro Val 120 Met Leu Asn Met Pro Ala Ala Leu
tcc ggc ccg gtg gcg ctg ctg ccc gat ctg ctg tat ccg gcc tac cgg      432
Ser Gly 130 Pro Val Arg Leu Leu 135 Pro Asp Leu Leu Tyr 140 Pro Ala Tyr Arg
ctg atg atc atc gtg ttc gcc ggc ctg gcg gcc gcc ggc ctg tac tgg      480
Leu Met Ile Ile Val Phe 150 Gly Leu Ala Ala Ala 155 Ala Gly Leu Tyr Trp
ttc gtg acg gcg acg gcg gcc ggc gtg ctg gtg cgc gcc ggc gcc tcc      528
Phe Val Thr Arg Thr 165 Arg Ala Gly Val Leu Val Arg Ala Gly Ala Ser
aat cgc cag atg gcg acc ctg atg ggc gtg cgc gtg ccc ttg ctg ttc      576
Asn Arg Gln Met Ala Thr Leu Met Gly Val Arg Val Pro Leu Leu Phe
ctg ggc gtg ttc gtg ctg ggc gcg atg ctg gcc gcg gtg gcc ggc gcg      624
Leu Gly Val 195 Phe Val Leu Gly Ala Met Leu Ala Ala Val 205 Ala Gly Ala
ttg ctg ggg ccg gtg acc gcc gtg cag atc ggc atg ggc gag gga atc      672
Leu Leu Gly Pro Val Thr Ala Val Gln Ile Gly Met Gly Glu Gly Ile
ctg atc ctg gtg ctg gtg tgc atc gtc atc ggc ggc atc ggc tcg att      720
Leu Ile Leu Val Leu 230 Cys Ile Val Ile Gly 235 Gly Ile Gly Ser Ile
cgc ggg gcc ttc gtg ggc gcg ctg ctg gtc ggc atg gtc gac acc gcc      768
Arg Gly Ala Phe Val Gly Ala Leu Leu Val Gly Met Val Asp Thr Ala
ggc cgg gcc ttc ctg ccc atg ctg ctg cgc cag gtg ttt ccg ccc gcc      816
Gly Arg Ala Phe 260 Leu Pro Met Leu Leu 265 Arg Gln Val Phe 270 Pro Pro Ala
gtg gct tcc agc gtc ggg ccg acg ctg gcg gcc atc gcg atc tat gtc      864
Val Ala Ser Ser Val Gly Pro Thr 280 Leu Ala Ala Ile Ala Ile Tyr Val
ctg atg gcg ggc gtg ctg gtg ttc cgg ccg gcc ggc ctg ttt ccg gcg      912
Leu Met 290 Ala Gly Val Leu Val 295 Phe Arg Pro Ala Gly Leu Phe Pro Ala
cgc ggg tga
Arg Gly
305

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<210> 685

<211> 306

<212> PRT

<213> Bordetella pertussis

<400> 685

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Met Thr Phe Thr Leu Ile Val Glu Gln Leu Leu Asn Gly Leu Gln Phe
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20      25      30
Ile Met Asp Ile Met Asn Leu Ala His Gly Ser Leu Tyr Met Ala Gly
35      40      45
Ala Tyr Val Ala Ala Glu Thr Met Gln Arg Thr Gly Ser Phe Thr Ala
50      55      60
Ala Val Leu Val Ala Ala Leu Ala Thr Gly Leu Val Gly Ala Val Leu
65      70      75      80
Glu Leu Thr Leu Ile Arg Lys Leu Ala Val Arg Asp His Leu Ala Gln

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				85				90				95			
Val	Leu	Gly	Thr	Tyr	Ala	Val	Ile	Leu	Ile	Ala	Asn	Asp	Leu	Val	Lys
			100					105					110		
Met	Ile	Trp	Gly	Pro	Ala	Pro	Val	Met	Leu	Asn	Met	Pro	Ala	Ala	Leu
		115					120					125			
Ser	Gly	Pro	Val	Arg	Leu	Leu	Pro	Asp	Leu	Leu	Tyr	Pro	Ala	Tyr	Arg
	130					135					140				
Leu	Met	Ile	Ile	Val	Phe	Gly	Leu	Ala	Ala	Ala	Ala	Gly	Leu	Tyr	Trp
	145				150					155					160
Phe	Val	Thr	Arg	Thr	Arg	Ala	Gly	Val	Leu	Val	Arg	Ala	Gly	Ala	Ser
				165					170					175	
Asn	Arg	Gln	Met	Ala	Thr	Leu	Met	Gly	Val	Arg	Val	Pro	Leu	Leu	Phe
			180					185					190		
Leu	Gly	Val	Phe	Val	Leu	Gly	Ala	Met	Leu	Ala	Ala	Val	Ala	Gly	Ala
		195					200					205			
Leu	Leu	Gly	Pro	Val	Thr	Ala	Val	Gln	Ile	Gly	Met	Gly	Glu	Gly	Ile
	210					215					220				
Leu	Ile	Leu	Val	Leu	Val	Cys	Ile	Val	Ile	Gly	Gly	Ile	Gly	Ser	Ile
	225				230					235					240
Arg	Gly	Ala	Phe	Val	Gly	Ala	Leu	Leu	Val	Gly	Met	Val	Asp	Thr	Ala
				245					250					255	
Gly	Arg	Ala	Phe	Leu	Pro	Met	Leu	Leu	Arg	Gln	Val	Phe	Pro	Pro	Ala
			260					265					270		
Val	Ala	Ser	Ser	Val	Gly	Pro	Thr	Leu	Ala	Ala	Ile	Ala	Ile	Tyr	Val
		275					280					285			
Leu	Met	Ala	Gly	Val	Leu	Val	Phe	Arg	Pro	Ala	Gly	Leu	Phe	Pro	Ala
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Arg	Gly														
	305														

<210> 686

<211> 1038

<212> DNA

<213> Bordetella parapertussis

<220>

<221> CDS

<222> (1)..(1038)

<400> 686

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Met	Asp	Ser	Ser	Ile	Ala	Leu	Ile	Leu	Leu	Gln	Asp	Gly	Val	Val	Asn	
	1			5				10					15			
ggc	gcc	att	tat	gcc	ctg	ctg	ggc	atg	gcg	ctg	gta	ctg	ggt	ttc	gcc	96
Gly	Ala	Ile	Tyr	Ala	Leu	Leu	Gly	Met	Ala	Leu	Val	Leu	Val	Phe	Ala	
			20				25					30				
gtc	acg	cgg	gtc	att	ttc	att	ccg	cag	ggc	gag	ttc	gtc	gcc	ttc	ggc	144
Val	Thr	Arg	Val	Ile	Phe	Ile	Pro	Gln	Gly	Glu	Phe	Val	Ala	Phe	Gly	
		35				40					45					
gcc	ctg	aca	ctg	gcc	atg	ctg	gtc	gac	ggc	cgc	gtg	ccg	ggc	acc	gcc	192
Ala	Leu	Thr	Leu	Ala	Met	Leu	Val	Asp	Gly	Arg	Val	Pro	Gly	Thr	Ala	
	50					55					60					
tac	ctg	ctg	ccc	ctg	ctg	ggc	ggc	gtg	tgc	ctg	ctg	ctg	gag	ctg	gtg	240
Tyr	Leu	Leu	Pro	Leu	Leu	Gly	Gly	Val	Cys	Leu	Leu	Leu	Glu	Leu	Val	
	65				70			75						80		
cgc	gcg	ctg	cgc	acc	ggc	gcg	tgg	ggc	gcc	atg	ccc	aag	gtg	ctg	gcc	288
Arg	Ala	Leu	Arg	Thr	Gly	Ala	Trp	Gly	Ala	Met	Pro	Lys	Val	Leu	Ala	
				85				90					95			
ggc	tgc	gtg	gcg	ctg	ccc	ctg	gcg	ctg	ctg	tgg	ctg	acc	gac	agc	tat	336
Gly	Cys	Val	Ala	Leu	Pro	Leu	Ala	Leu	Leu	Trp	Leu	Thr	Asp	Ser	Tyr	
			100				105					110				
gcg	gcg	cag	ggc	acc	tcg	ctg	tgg	ctg	aac	atg	ctg	ctg	acc	ctg	gcc	384
Ala	Ala	Gln	Gly	Thr	Ser	Leu	Trp	Leu	Asn	Met	Leu	Leu	Thr	Leu	Ala	
		115				120						125				
ctg	gtg	atc	ccg	atg	ggg	ccg	atg	gtc	tac	cgc	atc	gtc	tac	cag	ccg	432
Leu	Val	Ile	Pro	Met	Gly	Pro	Met	Val	Tyr	Arg	Ile	Val	Tyr	Gln	Pro	
	130					135					140					
ctg	gcc	gag	gcc	acg	gtg	ctg	gtg	ctg	ctg	atc	gtg	tcg	gtc	gcc	gtg	480
Leu	Ala	Glu	Ala	Thr	Val	Leu	Val	Leu	Leu	Ile	Val	Ser	Val	Ala	Val	

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145	cac	ttc	gcg	tgt	atg	150	ggg	ctg	gcg	ctg	gtg	155	ttc	ggc	gcc	gag	160	ggc		
His	Phe	Ala	Leu	Met	Gly	Gly	Leu	Ala	Leu	Val	Phe	Phe	Gly	Ala	Glu	Gly				
				165								170				175				
tgg	cgt	acg	ccg	gca	ttc	gtc	agc	ggg	cag	gtc	gat	ctc	ggg	ttc	tcg					
Trp	Arg	Thr	Pro	Ala	Phe	Val	Ser	Gly	Gln	Val	Asp	Leu	Gly	Phe	Ser					
			180					185					190							
acc	tgg	tcg	gcg	caa	agc	ctg	ttc	gtg	gcc	acc	tgc	gcg	ctg	ctg						
Thr	Trp	Ser	Ala	Gln	Ser	Leu	Phe	Val	Ala	Thr	Cys	Ala	Leu	Leu						
		195					200				205									
atc	gtg	gcg	ctg	tgg	ctg	ttc	ttc	ggc	aag	acg	ctg	tac	ggc	cgc	gcg					
Ile	Val	Ala	Leu	Trp	Leu	Phe	Phe	Gly	Lys	Thr	Leu	Tyr	Gly	Arg	Ala					
	210					215				220										
ctg	cgg	gcc	acc	gcc	gtg	aac	cgg	cgc	ggc	gcg	cgc	ctg	gtg	ggc	atc					
Leu	Arg	Ala	Thr	Ala	Val	Asn	Arg	Arg	Gly	Ala	Arg	Leu	Val	Gly	Ile					
225				230					235						240					
agc	acc	acc	atg	tcg	ggc	agc	ctg	aca	ttc	acc	ctg	gcg	gtg	tcc	atc					
Ser	Thr	Thr	Met	Ser	Gly	Ser	Leu	Thr	Phe	Thr	Leu	Ala	Val	Ser	Ile					
			245						250					255						
ggc	gcc	atg	tcg	ggc	atg	ctg	atc	gcg	ccc	atc	acc	acc	gtg	tat	tac					
Gly	Ala	Met	Ser	Gly	Met	Leu	Ile	Ala	Pro	Ile	Thr	Thr	Val	Tyr	Tyr					
			260					265					270							
gac	acc	ggc	ttc	ctg	atc	ggc	ctg	aag	ggc	ttc	gtg	ggc	gcc	atc	atc					
Asp	Thr	Gly	Phe	Leu	Ile	Gly	Leu	Lys	Gly	Phe	Val	Gly	Ala	Ile	Ile					
		275					280					285								
ggc	ggc	ctg	gtg	agc	tac	ccg	gtg	gcc	gcg	gcc	ggc	gca	ctg	ctg	gtc					
Gly	Gly	Leu	Val	Ser	Tyr	Pro	Val	Ala	Ala	Ala	Gly	Ala	Leu	Leu	Val					
	290					295				300										
ggc	atc	ctg	gag	gcc	ttc	tcg	tcg	ttc	tgg	gcc	agt	tcg	tac	aaa	gaa					
Gly	Ile	Leu	Glu	Ala	Phe	Ser	Ser	Phe	Trp	Ala	Ser	Ser	Tyr	Lys	Glu					
305				310					315						320					
gtc	atc	gtg	ttc	acc	ctg	att	atc	ccg	gtt	ctg	gtc	tgg	cgt	tcg	ttc					
Val	Ile	Val	Phe	Thr	Leu	Ile	Ile	Pro	Val	Leu	Val	Trp	Arg	Ser	Phe					
				325				330						335						
agc	agc	cgt	cat	gtg	gac	gaa	gag	gaa	taa											
Ser	Ser	Arg	His	Val	Asp	Glu	Glu	Glu												
			340					345												

<210> 687

<211> 345

<212> PRT

<213> Bordetella parapertussis

<400> 687

Met	Asp	Ser	Ser	Ile	Ala	Leu	Ile	Leu	Gln	Asp	Gly	Val	Val	Asn
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Gly	Ala	Ile	Tyr	Ala	Leu	Leu	Gly	Met	Ala	Leu	Val	Leu	Val	Phe
			20					25				30		Ala
Val	Thr	Arg	Val	Ile	Phe	Ile	Pro	Gln	Gly	Glu	Phe	Val	Ala	Gly
		35					40					45		
Ala	Leu	Thr	Leu	Ala	Met	Leu	Val	Asp	Gly	Arg	Val	Pro	Gly	Thr
						55					60			Ala
Tyr	Leu	Leu	Pro	Leu	Leu	Gly	Gly	Val	Cys	Leu	Leu	Leu	Glu	Leu
65				70					75					80
Arg	Ala	Leu	Arg	Thr	Gly	Ala	Trp	Gly	Ala	Met	Pro	Lys	Val	Leu
				85					90					95
Gly	Cys	Val	Ala	Leu	Pro	Leu	Ala	Leu	Trp	Leu	Thr	Asp	Ser	Tyr
			100					105				110		
Ala	Ala	Gln	Gly	Thr	Ser	Leu	Trp	Leu	Asn	Met	Leu	Leu	Thr	Leu
		115					120					125		Ala
Leu	Val	Ile	Pro	Met	Gly	Pro	Met	Val	Tyr	Arg	Ile	Val	Tyr	Gln
	130					135					140			Pro
Leu	Ala	Glu	Ala	Thr	Val	Leu	Val	Leu	Leu	Ile	Val	Ser	Val	Ala
145				150					155					160
His	Phe	Ala	Leu	Met	Gly	Leu	Ala	Leu	Val	Phe	Phe	Gly	Ala	Glu
				165					170					175
Trp	Arg	Thr	Pro	Ala	Phe	Val	Ser	Gly	Gln	Val	Asp	Leu	Gly	Phe
			180					185					190	Ser
Thr	Trp	Ser	Ala	Gln	Ser	Leu	Phe	Val	Val	Ala	Thr	Cys	Ala	Leu

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195 200 205
 Ile Val Ala Leu Trp Leu Phe Phe Gly Lys Thr Leu Tyr Gly Arg Ala
 210 215 220
 Leu Arg Ala Thr Ala Val Asn Arg Arg Gly Ala Arg Leu Val Gly Ile
 225 230 235 240
 Ser Thr Thr Met Ser Gly Ser Leu Thr Phe Thr Leu Ala Val Ser Ile
 245 250 255
 Gly Ala Met Ser Gly Met Leu Ile Ala Pro Ile Thr Thr Val Tyr Tyr
 260 265 270
 Asp Thr Gly Phe Leu Ile Gly Leu Lys Gly Phe Val Gly Ala Ile Ile
 275 280 285
 Gly Gly Leu Val Ser Tyr Pro Val Ala Ala Ala Gly Ala Leu Leu Val
 290 295 300
 Gly Ile Leu Glu Ala Phe Ser Ser Phe Trp Ala Ser Ser Tyr Lys Glu
 305 310 315 320
 Val Ile Val Phe Thr Leu Ile Ile Pro Val Leu Val Trp Arg Ser Phe
 325 330 335
 Ser Ser Arg His Val Asp Glu Glu Glu
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<210> 688

<211> 1839

<212> DNA

<213> Bordetella parapertussis

<220>

<221> CDS

<222> (1)..(1839)

<400> 688

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1 5 10 15	
ccg ctg ctg tcg gcc acg ccc gaa ttc tgg atc acg cag ctc aac tac	96
Pro Leu Leu Ser Ala Thr Pro Glu Phe Trp Ile Thr Gln Leu Asn Tyr	
20 25 30	
atc ggc ctg gcc gcc atg gtg gcg ctg ggg ctg gtg ctg ctg acc ggc	144
Ile Gly Leu Ala Ala Met Val Ala Leu Gly Leu Val Leu Leu Thr Gly	
35 40 45	
gtg ggc ggc ctg acc tcg ttc ggc cag gcg gcc ttc ggc ctg ggc	192
Val Gly Gly Leu Thr Ser Phe Gly Gln Ala Ala Phe Val Gly Leu Gly	
50 55 60	
gcc tac acc acg gcg ctg ctc acc acg caa tac gac atc tcg ccg tgg	240
Ala Tyr Thr Thr Ala Leu Leu Thr Thr Gln Tyr Asp Ile Ser Pro Trp	
65 70 75 80	
ctg gcg ctg ccg gtg ggc ctg ctg gtg acg gcc gtg gtg gcg ttc ctg	288
Leu Ala Leu Pro Val Gly Leu Leu Val Thr Ala Val Val Ala Phe Leu	
85 90 95	
ctg ggg ctg atc acg ctg cgg ctg tcg ggg cat tat ctg ccg ctg ggc	336
Leu Gly Leu Ile Thr Leu Arg Leu Ser Gly His Tyr Leu Pro Leu Gly	
100 105 110	
acc att gcc tgg gga ctc tcg ctg tat tac ctg ttc ggc aac ctg gat	384
Thr Ile Ala Trp Gly Leu Ser Leu Tyr Tyr Leu Phe Gly Asn Leu Asp	
115 120 125	
tgg ctc ggc aag cat gac ggc atc gcc ggc atc gag ccc atc agc ctg	432
Trp Leu Gly Lys His Asp Gly Ile Ala Gly Ile Glu Pro Ile Ser Leu	
130 135 140	
ttc ggc tgg tcg ctg gcc agc gga cgc cat att tac ctg atc tgg	480
Phe Gly Trp Ser Leu Ala Ser Gly Arg His Ile Tyr Tyr Leu Ile Trp	
145 150 155 160	
gtg ttc gtg ctg ctg gcg ctg tgg gcc acg cgc aac ctg ctc gat tcg	528
Val Phe Val Leu Leu Ala Leu Trp Ala Thr Arg Asn Leu Leu Asp Ser	
165 170 175	
cgt ccg ggc cgc gcc atc cgc gcc ctg aag agc ggc gcc ggc atg gcc	576
Arg Pro Gly Arg Ala Ile Arg Ala Leu Lys Ser Gly Ala Gly Met Ala	
180 185 190	
gag tcg atg ggg gtc aat acc ggc atc tac aaa atc gtc atc ttc gtg	624
Glu Ser Met Gly Val Asn Thr Gly Ile Tyr Lys Ile Val Ile Phe Val	
195 200 205	

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tgg	gcg	gcg	ctg	ctg	gcc	tgc	ctg	tgc	ggc	tgg	ctg	tac	gcc	cac	atg	672
Trp	Ala	Ala	Leu	Leu	Ala	Cys	Leu	Ser	Gly	Trp	Leu	Tyr	Ala	His	Met	
	210					215					220					
cag	cgt	gcg	gtc	agc	ccc	agt	ccg	ttc	ggc	ctg	aac	tac	ggc	atc	gaa	720
Gln	Arg	Ala	Val	Ser	Pro	Ser	Pro	Phe	Gly	Leu	Asn	Tyr	Gly	Ile	Glu	
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Tyr	Leu	Phe	Met	Ala	Val	Val	Gly	Gly	Ala	Gly	His	Val	Trp	Gly	Ala	
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Leu	Leu	Gly	Ser	Ala	Val	Ile	Leu	Gly	Ile	Lys	Asp	Gln	Leu	Gln	Asn	
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atc	ctg	ccc	aag	ctg	atc	gat	acc	aac	ggc	aac	ttc	gaa	ctg	atc	ttc	864
Ile	Leu	Pro	Lys	Leu	Ile	Asp	Thr	Asn	Ala	Asn	Phe	Glu	Leu	Ile	Phe	
		275				280						285				
ttc	ggc	gtg	ctg	atg	atc	ctg	gtg	ctg	cag	tac	gcc	agc	aat	ggc	ctg	912
Phe	Gly	Val	Leu	Met	Ile	Leu	Val	Leu	Gln	Tyr	Ala	Ser	Asn	Gly	Leu	
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tgg	ccc	att	ctg	tcg	ggc	tgg	tgg	gag	cg	gtc	acc	ggc	gcg	gcc	ggc	960
Trp	Pro	Ile	Leu	Ser	Gly	Trp	Trp	Glu	Arg	Val	Thr	Gly	Ala	Ala	Gly	
305					310					315					320	
tcg	cgg	cgc	aac	atg	gcg	ccg	ccg	ccg	caa	gcg	ccg	gcg	ctg	ccg	cac	1008
Ser	Arg	Arg	Asn	Met	Ala	Pro	Pro	Pro	Gln	Ala	Pro	Ala	Leu	Pro	His	
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cgc	gcc	cgg	ccg	cag	gcc	ggc	gag	ctg	gtg	ctg	gaa	gtc	gac	agc	atc	1056
Arg	Ala	Arg	Pro	Gln	Ala	Gly	Glu	Leu	Val	Leu	Glu	Val	Asp	Ser	Ile	
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cgc	aag	gag	ttc	ggc	ggc	ctg	gtg	gcg	gtc	aac	gac	att	acg	ttc	aag	1104
Arg	Lys	Glu	Phe	Gly	Gly	Leu	Val	Ala	Val	Asn	Asp	Ile	Thr	Phe	Lys	
		355					360					365				
gtg	cgc	gcc	ggc	gaa	atc	atg	ggc	ctg	atc	ggc	ccc	aac	ggc	gcc	ggc	1152
Val	Arg	Ala	Gly	Glu	Ile	Met	Gly	Leu	Ile	Gly	Pro	Asn	Gly	Ala	Gly	
370						375					380					
aag	agc	acg	acc	ttc	aac	ctg	atc	agc	ggc	gtg	ctg	ccg	gcc	acg	cgc	1200
Lys	Ser	Thr	Thr	Phe	Asn	Leu	Ile	Ser	Gly	Val	Leu	Pro	Ala	Thr	Arg	
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Glu	Ile	Ala	Lys	Arg	Gly	Val	Gly	Arg	Thr	Phe	Gln	His	Val	Gln	Leu	
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Leu	Pro	Thr	Met	Ser	Val	Leu	Glu	Asn	Val	Ala	Leu	Gly	Ala	His	Met	
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cgt	tcg	gac	gtg	ggc	gtg	ctg	tcg	ggc	gcc	ttg	cac	agc	gag	cgc	gcc	1392
Arg	Ser	Asp	Val	Gly	Val	Leu	Ser	Gly	Ala	Leu	His	Ser	Glu	Arg	Ala	
	450					455					460					
cgc	gag	gcc	cag	ctg	ctg	cac	gaa	gcc	gcg	cag	cag	ctg	cag	cgc	gtc	1440
Arg	Glu	Ala	Gln	Leu	Leu	His	Glu	Ala	Ala	Gln	Gln	Leu	Gln	Arg	Val	
465					470					475					480	
ggg	ctg	ggc	gac	tat	ctg	tac	gag	cag	gcg	ggc	aac	ctg	gcg	ctg	ggc	1488
Gly	Leu	Gly	Asp	Tyr	Leu	Tyr	Glu	Gln	Ala	Gly	Asn	Leu	Ala	Leu	Gly	
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cag	cag	cgc	atc	ctg	gaa	atc	gcc	cgc	gcg	ctg	gcg	tgc	gat	ccg	gtg	1536
Gln	Gln	Arg	Ile	Leu	Glu	Ile	Ala	Arg	Ala	Leu	Ala	Cys	Asp	Pro	Val	
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Gln	Glu	Leu	Ala	Lys	Val	Leu	Glu	Gln	Leu	Arg	Ala	Glu	Gly	Leu	Ser	
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atc	ctg	ctg	gtg	gaa	cac	gac	atg	gac	ttt	gtg	atg	cga	ctg	acc	aat	1680
Ile	Leu	Leu	Val	Glu	His	Asp	Met	Asp	Phe	Val	Met	Arg	Leu	Thr	Asn	
545					550					555					560	
cac	ctg	gtg	gtc	atg	gat	ttc	ggc	acc	aag	ctg	gcc	gag	ggc	gtg	ccc	1728
His	Leu	Val	Val	Met	Asp	Phe	Gly	Thr	Lys	Leu	Ala	Glu	Gly	Val	Pro	
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gcc	gat	gtg	cag	aag	aac	ccg	gcg	gtg	ctg	gag	gcc	tat	ctg	ggc	ggt	1776
Ala	Asp	Val	Gln	Lys	Asn	Pro	Ala	Val	Leu	Glu	Ala	Tyr	Leu	Gly	Gly	
			580					585					590			
atc	gac	gac	gat	ctt	ccc	gac	gcc	ggc	cag	ggc	gcg	ccg	gca	gcc	gcc	1824
Ile	Asp	Asp	Asp	Leu	Pro	Asp	Ala	Gly	Gln	Gly	Ala	Pro	Ala	Ala	Ala	
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Gly	Gly	Ala	Gln													
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<210> 689

<211> 612

<212> PRT

<213> Bordetella parapertussis

<400> 689

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Ile	Gly	Leu	Ala	Ala	Met	Val	Ala	Leu	Gly	Leu	Val	Leu	Leu	Thr	Gly	
		35					40					45				
Val	Gly	Gly	Leu	Thr	Ser	Phe	Gly	Gln	Ala	Ala	Phe	Val	Gly	Leu	Gly	
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Ala	Tyr	Thr	Thr	Ala	Leu	Leu	Thr	Thr	Gln	Tyr	Asp	Ile	Ser	Pro	Trp	
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Leu	Ala	Leu	Pro	Val	Gly	Leu	Leu	Val	Thr	Ala	Val	Val	Ala	Phe	Leu	
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Thr	Ile	Ala	Trp	Gly	Leu	Ser	Leu	Tyr	Tyr	Leu	Phe	Gly	Asn	Leu	Asp	
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Trp	Leu	Gly	Lys	His	Asp	Gly	Ile	Ala	Gly	Ile	Glu	Pro	Ile	Ser	Leu	
	130				135						140					
Phe	Gly	Trp	Ser	Leu	Ala	Ser	Gly	Arg	His	Ile	Tyr	Tyr	Leu	Ile	Trp	
145					150					155					160	
Val	Phe	Val	Leu	Leu	Ala	Leu	Trp	Ala	Thr	Arg	Asn	Leu	Leu	Asp	Ser	
				165				170						175		
Arg	Pro	Gly	Arg	Ala	Ile	Arg	Ala	Leu	Lys	Ser	Gly	Ala	Gly	Met	Ala	
			180				185						190			
Glu	Ser	Met	Gly	Val	Asn	Thr	Gly	Ile	Tyr	Lys	Ile	Val	Ile	Phe	Val	
		195					200					205				
Trp	Ala	Ala	Leu	Leu	Ala	Cys	Leu	Ser	Gly	Trp	Leu	Tyr	Ala	His	Met	
	210					215					220					
Gln	Arg	Ala	Val	Ser	Pro	Ser	Pro	Phe	Gly	Leu	Asn	Tyr	Gly	Ile	Glu	
225					230					235					240	
Tyr	Leu	Phe	Met	Ala	Val	Val	Gly	Gly	Ala	Gly	His	Val	Trp	Gly	Ala	
				245					250					255		
Leu	Leu	Gly	Ser	Ala	Val	Ile	Leu	Gly	Ile	Lys	Asp	Gln	Leu	Gln	Asn	
			260					265					270			
Ile	Leu	Pro	Lys	Leu	Ile	Asp	Thr	Asn	Ala	Asn	Phe	Glu	Leu	Ile	Phe	
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Phe	Gly	Val	Leu	Met	Ile	Leu	Val	Leu	Gln	Tyr	Ala	Ser	Asn	Gly	Leu	
	290				295						300					
Trp	Pro	Ile	Leu	Ser	Gly	Trp	Trp	Glu	Arg	Val	Thr	Gly	Ala	Ala	Gly	
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Ser	Arg	Arg	Asn	Met	Ala	Pro	Pro	Pro	Gln	Ala	Pro	Ala	Leu	Pro	His	
				325					330					335		
Arg	Ala	Arg	Pro	Gln	Ala	Gly	Glu	Leu	Val	Leu	Glu	Val	Asp	Ser	Ile	
			340					345					350			
Arg	Lys	Glu	Phe	Gly	Gly	Leu	Val	Ala	Val	Asn	Asp	Ile	Thr	Phe	Lys	
		355					360					365				
Val	Arg	Ala	Gly	Glu	Ile	Met	Gly	Leu	Ile	Gly	Pro	Asn	Gly	Ala	Gly	
	370					375					380					
Lys	Ser	Thr	Thr	Phe	Asn	Leu	Ile	Ser	Gly	Val	Leu	Pro	Ala	Thr	Arg	
385					390					395					400	
Gly	Gln	Val	Arg	Phe	Leu	Gly	Asp	Arg	Ile	Asp	Gly	Arg	Ser	Ala	Arg	
				405					410					415		
Glu	Ile	Ala	Lys	Arg	Gly	Val	Gly	Arg	Thr	Phe	Gln	His	Val	Gln	Leu	

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 435
 Arg Ser Asp Val Gly Val Leu Ser Gly Ala Leu His Ser Glu Arg Ala
 450
 Arg Glu Ala Gln Leu Leu His Glu Ala Ala Gln Gln Leu Gln Arg Val
 465
 Gly Leu Gly Asp Tyr Leu Tyr Glu Gln Ala Gly Asn Leu Ala Leu Gly
 485
 Gln Gln Arg Ile Leu Glu Ile Ala Arg Ala Leu Ala Cys Asp Pro Val
 500
 Leu Leu Leu Leu Asp Glu Pro Ala Ala Gly Leu Arg Tyr Lys Glu Lys
 515
 Gln Glu Leu Ala Lys Val Leu Glu Gln Leu Arg Ala Glu Gly Leu Ser
 530
 Ile Leu Leu Val Glu His Asp Met Asp Phe Val Met Arg Leu Thr Asn
 545
 His Leu Val Val Met Asp Phe Gly Thr Lys Leu Ala Glu Gly Val Pro
 565
 Ala Asp Val Gln Lys Asn Pro Ala Val Leu Glu Ala Tyr Leu Gly Gly
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 Ile Asp Asp Asp Leu Pro Asp Ala Gly Gln Gly Ala Pro Ala Ala Ala
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 Gly Gly Ala Gln
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<211> 873

<212> DNA

<213> Bordetella parapertussis

<220>

<221> CDS

<222> (1)..(873)

<400> 690

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1				5				10						15		
gtc	tac	gcg	ctc	gtc	gcc	ctc	ggg	ttc	gcg	atc	atc	ttc	aac	gcg	acc	96
Val	Tyr	Ala	Leu	Val	Ala	Leu	Gly	Phe	Ala	Ile	Ile	Phe	Asn	Ala	Thr	
			20				25						30			
ggc	gtg	gtg	aac	ttt	gcc	cag	ggc	gag	ttc	gtc	atg	ctg	ggc	ggc	atg	144
Gly	Val	Val	Asn	Phe	Ala	Gln	Gly	Glu	Phe	Val	Met	Leu	Gly	Gly	Met	
		35					40				45					
atc	act	gtc	ttc	gcg	cac	ggc	gcg	ggc	ctg	gcg	ctg	ccg	ctg	gcc	gcg	192
Ile	Thr	Val	Phe	Ala	His	Gly	Ala	Gly	Leu	Ala	Leu	Pro	Leu	Ala	Ala	
		50				55					60					
ctg	ctc	gcc	atc	gcc	gtg	acc	gcc	gcg	aca	ggc	gtg	gcg	ctg	aac	cgc	240
Leu	Leu	Ala	Ile	Ala	Val	Thr	Ala	Ala	Thr	Gly	Val	Ala	Leu	Asn	Arg	
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ctg	gcg	atc	gag	ccg	gcg	Arg	Gly	Ala	Pro	Val	Val	Ser	Leu	Ile	atc	288
Leu	Ala	Ile	Glu	Pro	Ala				90					95		
				85												
atc	acc	atc	ggc	gcc	tcg	atc	ttc	atc	cgg	ggc	gcg	gtg	caa	agc	ctg	336
Ile	Thr	Ile	Gly	Ala	Ser	Ile	Phe	Ile	Arg	Gly	Ala	Val	Gln	Ser	Leu	
			100					105					110			
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Phe	Gly	Lys	Gln	Ile	His	Ser	Leu	Pro	Ala	Phe	Ser	Gly	Asp	Asp	Pro	
		115					120					125				
ata	cac	gtg	ctg	ggc	gcc	acc	atc	ctg	tcg	caa	agc	ctg	tgg	atg	atc	432
Ile	His	Val	Leu	Gly	Ala	Thr	Ile	Leu	Ser	Gln	Ser	Leu	Trp	Met	Ile	
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Gly	Gly	Ala	Val	Ala	Val	Phe	Ile	Val	Leu	Trp	Leu	Phe	Phe	Thr	Arg	
					150				155						160	
aca	ctg	ata	ggc	cgc	gcg	gtg	ctg	gcc	acc	tcg	aac	aac	cgc	ctg	gcg	528
Thr	Leu	Ile	Gly	Arg	Ala	Val	Leu	Ala	Thr	Ser	Asn	Asn	Arg	Leu	Ala	
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Ala	Arg	Leu	Val	Gly	Ile	Asn	Thr	Arg	Phe	Ile	Met	Thr	Leu	Ser	Phe	
		180						185					190			
gcg	ctg	tcg	gcg	gcc	atc	ggc	gcc	ctg	gcc	ggc	gtg	ctg	atc	acg	ccg	624
Ala	Leu	Ser	Ala	Ala	Ile	Gly	Ala	Leu	Ala	Gly	Val	Leu	Ile	Thr	Pro	
		195					200					205				
atc	acg	ctg	act	tcg	tac	gac	gtg	ggc	ctg	acc	ctg	gcg	ctc	aag	ggc	672
Ile	Thr	Leu	Thr	Ser	Tyr	Asp	Val	Gly	Leu	Thr	Leu	Ala	Leu	Lys	Gly	
	210					215					220					
ttt	gcc	gcc	gcc	atg	ctg	ggc	ggc	atg	ggc	agc	ccc	aag	ggc	gcg	ctg	720
Phe	Ala	Ala	Ala	Met	Leu	Gly	Gly	Met	Gly	Ser	Pro	Lys	Gly	Ala	Leu	
225					230					235					240	
gcc	ggc	ggc	att	ctg	ctc	ggc	ctg	ctg	gaa	tcc	ctg	acc	gcc	ggc	tac	768
Ala	Gly	Gly	Ile	Leu	Leu	Gly	Leu	Leu	Glu	Ser	Leu	Thr	Ala	Gly	Tyr	
				245					250					255		
ctg	tcg	tcg	cag	tac	aag	gac	gcg	gcg	gcc	ttc	ctc	acc	att	ctc	gcg	816
Leu	Ser	Ser	Gln	Tyr	Lys	Asp	Ala	Ala	Ala	Phe	Leu	Thr	Ile	Leu	Ala	
			260				265						270			
gtg	ctg	ttc	ttc	atg	ccg	cag	gga	ctg	gga	cac	aag	tcc	acg	gat		864
Val	Leu	Phe	Phe	Met	Pro	Gln	Gly	Leu	Phe	Gly	His	Lys	Ser	Thr	Asp	
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cgc	gta	taa														873
Arg	Val															
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<212> PRT

<213> Bordetella parapertussis

<400> 691

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			20					25					30			
Gly	Val	Val	Asn	Phe	Ala	Gln	Gly	Glu	Phe	Val	Met	Leu	Gly	Gly	Met	
		35					40					45				
Ile	Thr	Val	Phe	Ala	His	Gly	Ala	Gly	Leu	Ala	Leu	Pro	Leu	Ala	Ala	
	50					55					60					
Leu	Leu	Ala	Ile	Ala	Val	Thr	Ala	Ala	Thr	Gly	Val	Ala	Leu	Asn	Arg	
65					70					75					80	
Leu	Ala	Ile	Glu	Pro	Ala	Arg	Gly	Ala	Pro	Val	Val	Ser	Leu	Ile	Ile	
				85					90					95		
Ile	Thr	Ile	Gly	Ala	Ser	Ile	Phe	Ile	Arg	Gly	Ala	Val	Gln	Ser	Leu	
			100					105					110			
Phe	Gly	Lys	Gln	Ile	His	Ser	Leu	Pro	Ala	Phe	Ser	Gly	Asp	Asp	Pro	
		115					120					125				
Ile	His	Val	Leu	Gly	Ala	Thr	Ile	Leu	Ser	Gln	Ser	Leu	Trp	Met	Ile	
	130					135					140					
Gly	Gly	Ala	Val	Ala	Val	Phe	Ile	Val	Leu	Trp	Leu	Phe	Phe	Thr	Arg	
145					150					155					160	
Thr	Leu	Ile	Gly	Arg	Ala	Val	Leu	Ala	Thr	Ser	Asn	Asn	Arg	Leu	Ala	
				165					170					175		
Ala	Arg	Leu	Val	Gly	Ile	Asn	Thr	Arg	Phe	Ile	Met	Thr	Leu	Ser	Phe	
			180					185					190			
Ala	Leu	Ser	Ala	Ala	Ile	Gly	Ala	Leu	Ala	Gly	Val	Leu	Ile	Thr	Pro	
		195					200					205				
Ile	Thr	Leu	Thr	Ser	Tyr	Asp	Val	Gly	Leu	Thr	Leu	Ala	Leu	Lys	Gly	
	210					215					220					
Phe	Ala	Ala	Ala	Met	Leu	Gly	Gly	Met	Gly	Ser	Pro	Lys	Gly	Ala	Leu	
225					230					235					240	
Ala	Gly	Gly	Ile	Leu	Leu	Gly	Leu	Leu	Glu	Ser	Leu	Thr	Ala	Gly	Tyr	
				245					250					255		
Leu	Ser	Ser	Gln	Tyr	Lys	Asp	Ala	Ala	Ala	Phe	Leu	Thr	Ile	Leu	Ala	
			260					265					270			
Val	Leu	Phe	Phe	Met	Pro	Gln	Gly	Leu	Phe	Gly	His	Lys	Ser	Thr	Asp	
		275					280					285				
Arg	Val															
	290															

<210> 692
 <211> 930
 <212> DNA
 <213> Bordetella parapertussis

<220>
 <221> CDS
 <222> (1)..(930)

<400> 692
 atg gat att ttc act caa cag ata atc aat ggc ctg acg ctg ggc agc 48
 Met Asp Ile Phe Thr Gln Gln Ile Ile Asn Gly Leu Thr Leu Gly Ser
 1 5 10 15
 gtg tat gcg ctg gtc gcg ctg ggc tat acg atg gtg tac ggc atc atc 96
 Val Tyr Ala Leu Val Ala Leu Gly Tyr Thr Met Val Tyr Gly Ile Ile
 20 25 30
 ggc ctg atc aac ttc gcg cat ggc gac gtg gtc atg atc ggc gcg atg 144
 Gly Leu Ile Asn Phe Ala His Gly Asp Val Val Met Ile Gly Ala Met
 35 40 45
 gcg gcg acc atg gtc gcc gcc gcc ctg gtg ggc ggc gat ccg tcc acg 192
 Ala Ala Thr Met Val Ala Ala Ala Leu Val Gly Gly Asp Pro Ser Thr
 50 55 60
 tcg gcc ttc gcc gtc ctc gcc gcc ggc ctg ctg gtc tcg gtg ccc ctg 240
 Ser Ala Phe Ala Val Leu Gly Ala Gly Leu Leu Val Ser Val Pro Leu
 65 70 75 80
 tgc atg gcc gtg ggc tgg acc gcc gaa cgc gtg gcg tac cgg ccc ttg 288
 Cys Met Ala Val Gly Trp Thr Ala Glu Arg Val Ala Tyr Arg Pro Leu
 85 90 95
 cgc cgc gcg ccg ctg gcc gcg ctg atc acc gcc atc ggc gta tcc 336
 Arg Arg Ala Pro Arg Leu Ala Ala Leu Ile Thr Ala Ile Gly Val Ser
 100 105 110
 atc atc ctg cag aac gtg gcg atg atg gtg tgg ggc cgc aat tac ctc 384
 Ile Ile Leu Gln Asn Val Ala Met Met Val Trp Gly Arg Asn Tyr Leu
 115 120 125
 aac ttt ccc cag gtg ctc acg ccc gcc gtg ttc gag atc ggc ggg gcg 432
 Asn Phe Pro Gln Val Leu Thr Pro Ala Val Phe Glu Ile Gly Gly Ala
 130 135 140
 cgc atg agc atg ctg cag atc gcc atc gtg gtc atc gcc gcg ctg atc 480
 Arg Met Ser Met Leu Gln Ile Ala Ile Val Val Ile Ala Ala Leu Ile
 145 150 155 160
 atg ggc gcg ctg ctg ctg gtc gtg cac aag acg cgg ctg ggt acc gcc 528
 Met Gly Ala Leu Leu Leu Val Val His Lys Thr Arg Leu Gly Thr Ala
 165 170 175
 atg cgg gcc acc gcg cag aac cgc gaa gtg gcc ggc ctg atg ggc gtg 576
 Met Arg Ala Thr Ala Gln Asn Arg Glu Val Ala Gly Leu Met Gly Val
 180 185 190
 aac atc aac acc gtg atc tcg gcg gcc ttc ctg atc ggt tcg gcg ctg 624
 Asn Ile Asn Thr Val Ile Ser Ala Ala Phe Leu Ile Gly Ser Ala Leu
 195 200 205
 gcg gcc atc gcc gcc atg atg gtc acc acc tat tac ggc gtg tcg cag 672
 Ala Ala Ile Ala Gly Met Met Val Thr Thr Tyr Tyr Gly Val Ser Gln
 210 215 220
 tac acc atg ggc ttc atg ctg ggc ctg aag gcg ttc acc gcg gcg gtg 720
 Tyr Thr Met Gly Phe Met Leu Gly Leu Lys Ala Phe Thr Ala Ala Val
 225 230 235 240
 ctg ggc ggc atc ggc aac ctg gtc ggg gcc atg gcc ggc ggc ctg ctg 768
 Leu Gly Gly Ile Gly Asn Leu Val Gly Ala Met Ala Gly Gly Leu Leu
 245 250 255
 ctg ggc atc att gaa tcg ctg ggc tcg ggc tat atc ggc gac ctg acc 816
 Leu Gly Ile Ile Glu Ser Leu Gly Ser Gly Tyr Ile Gly Asp Leu Thr
 260 265 270
 ggc ggc ttc ctc ggc agc cac tac cag gat gtc ttc gcc ttc gtg gtg 864
 Gly Gly Phe Leu Gly Ser His Tyr Gln Asp Val Phe Ala Phe Val Val
 275 280 285
 ctg gtg atg gtg ctg atc ttc cgg cct tcg ggc ttg ctg ggc gag cgc 912
 Leu Val Met Val Leu Ile Phe Arg Pro Ser Gly Leu Leu Gly Glu Arg
 290 295 300
 gtg gga gac cgg gca tga 930

Val Gly Asp Arg Ala
305

<210> 693

<211> 309

<212> PRT

<213> Bordetella parapertussis

<400> 693

Met Asp Ile Phe Thr Gln Gln Ile Ile Asn Gly Leu Thr Leu Gly Ser
1 5 10 15
Val Tyr Ala Leu Val Ala Leu Gly Tyr Thr Met Val Tyr Gly Ile Ile
20 25 30
Gly Leu Ile Asn Phe Ala His Gly Asp Val Val Met Ile Gly Ala Met
35 40 45
Ala Ala Thr Met Val Ala Ala Ala Leu Val Gly Gly Asp Pro Ser Thr
50 55 60
Ser Ala Phe Ala Val Leu Gly Ala Gly Leu Leu Val Ser Val Pro Leu
65 70 75 80
Cys Met Ala Val Gly Trp Thr Ala Glu Arg Val Ala Tyr Arg Pro Leu
85 90 95
Arg Arg Ala Pro Arg Leu Ala Ala Leu Ile Thr Ala Ile Gly Val Ser
100 105 110
Ile Ile Leu Gln Asn Val Ala Met Met Val Trp Gly Arg Asn Tyr Leu
115 120 125
Asn Phe Pro Gln Val Leu Thr Pro Ala Val Phe Glu Ile Gly Gly Ala
130 135 140
Arg Met Ser Met Leu Gln Ile Ala Ile Val Val Ile Ala Ala Leu Ile
145 150 155 160
Met Gly Ala Leu Leu Val Val His Lys Thr Arg Leu Gly Thr Ala
165 170 175
Met Arg Ala Thr Ala Gln Asn Arg Glu Val Ala Gly Leu Met Gly Val
180 185 190
Asn Ile Asn Thr Val Ile Ser Ala Ala Phe Leu Ile Gly Ser Ala Leu
195 200 205
Ala Ala Ile Ala Gly Met Met Val Thr Thr Tyr Tyr Gly Val Ser Gln
210 215 220
Tyr Thr Met Gly Phe Met Leu Gly Leu Lys Ala Phe Thr Ala Ala Val
225 230 235 240
Leu Gly Gly Ile Gly Asn Leu Val Gly Ala Met Ala Gly Gly Leu Leu
245 250 255
Leu Gly Ile Ile Glu Ser Leu Gly Ser Gly Tyr Ile Gly Asp Leu Thr
260 265 270
Gly Gly Phe Leu Gly Ser His Tyr Gln Asp Val Phe Ala Phe Val Val
275 280 285
Leu Val Met Val Leu Ile Phe Arg Pro Ser Gly Leu Leu Gly Glu Arg
290 295 300
Val Gly Asp Arg Ala
305

<210> 694

<211> 888

<212> DNA

<213> Bordetella parapertussis

<220>

<221> CDS

<222> (1)..(888)

<400> 694

atg aac atc gaa tcc att ctc ggc att ccg atc aat gcg ttc atg ggc	48
Met Asn Ile Glu Ser Ile Leu Gly Ile Pro Ile Asn Ala Phe Met Gly	
1 5 10 15	
cag ttg ctg atg ggg ctg atg aac ggc gcc ttc tac gcc atg ctg agc	96
Gln Leu Leu Met Gly Leu Met Asn Gly Ala Phe Tyr Ala Met Leu Ser	
20 25 30	
ctg ggc ctg gcg atc att ttc ggg ctg ctc aac gtg atc aat ttc ctg	144
Leu Gly Leu Ala Ile Ile Phe Gly Leu Leu Asn Val Ile Asn Phe Leu	
35 40 45	

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cac	ggc	gcc	cag	ttc	atg	gtg	ggg	gcg	ttc	atc	gcc	tgg	atg	ctg	ctg	192
His	Gly	Ala	Gln	Phe	Met	Val	Gly	Ala	Phe	Ile	Ala	Trp	Met	Leu	Leu	
	50					55					60					
gcg	tgg	gcg	ggc	ctg	agc	tac	tgg	gtc	gcc	ctg	ctg	gtg	gcg	ccg	ctg	240
Ala	Trp	Ala	Gly	Leu	Ser	Tyr	Trp	Val	Ala	Leu	Leu	Val	Ala	Pro	Leu	
65					70					75					80	
gtc	gtc	gcg	atc	ggc	gcc	gtg	ttc	gtc	gag	cgc	ctg	ttc	ctg	cgg	cat	288
Val	Val	Ala	Ile	Gly	Ala	Val	Phe	Val	Glu	Arg	Leu	Phe	Leu	Arg	His	
				85					90					95		
ctc	tac	cgt	ctc	gac	cat	ctc	tac	ggc	atg	ctg	ctg	acc	ttc	ggc	ctg	336
Leu	Tyr	Arg	Leu	Asp	His	Leu	Tyr	Gly	Met	Leu	Leu	Thr	Phe	Gly	Leu	
			100					105					110			
atg	ttg	atg	gtc	gag	ggg	ctg	ttt	cgc	agc	ttc	ggc	tcg	tcc	ggg		384
Met	Leu	Met	Val	Glu	Gly	Leu	Phe	Arg	Lys	Ser	Phe	Gly	Ser	Ser	Gly	
		115					120					125				
ctt	gcc	tat	ccc	aat	gtc	atc	ccc	ggc	ggc	atg	aac	ctg	ggt	ttc	atg	432
Leu	Ala	Tyr	Pro	Asn	Val	Ile	Pro	Gly	Gly	Met	Asn	Leu	Gly	Phe	Met	
	130					135					140					
ttc	ctg	ccg	tat	tac	cgg	gcc	tgg	gtc	gtg	gcg	gcc	tcg	ctg	ctc	gtc	480
Phe	Leu	Pro	Tyr	Tyr	Arg	Ala	Trp	Val	Val	Ala	Ala	Ser	Leu	Leu	Val	
145					150					155					160	
tgc	cag	gcc	atc	tgg	ctg	ctg	atc	gag	aag	acg	cgg	ctg	gga	agc	tat	528
Cys	Gln	Ala	Ile	Trp	Leu	Leu	Ile	Glu	Lys	Thr	Arg	Leu	Gly	Ser	Tyr	
				165					170					175		
ctg	cgc	gcg	gcg	acc	gag	aac	ccg	gac	atg	gtg	cgc	gcc	ttc	ggc	atc	576
Leu	Arg	Ala	Ala	Thr	Glu	Asn	Pro	Asp	Met	Val	Arg	Ala	Phe	Gly	Ile	
			180					185					190			
aag	gtt	ccc	gtg	ctg	ctg	acg	ctg	acc	tac	gcg	ttc	ggc	gcg	ggg	ctg	624
Lys	Val	Pro	Val	Leu	Leu	Thr	Leu	Thr	Tyr	Ala	Phe	Gly	Ala	Gly	Leu	
		195					200					205				
gcc	ggc	ctg	gcg	ggc	gtc	atg	gcg	gcg	ccg	atc	tac	cag	gtc	agt	ccg	672
Ala	Gly	Leu	Ala	Gly	Val	Met	Ala	Ala	Pro	Ile	Tyr	Gln	Val	Ser	Pro	
	210					215					220					
ctg	atg	ggc	tcc	aac	ctg	gtc	atc	ctg	gtc	ttc	gcc	gtg	gtg	gtg	atc	720
Leu	Met	Gly	Ser	Asn	Leu	Val	Ile	Leu	Val	Phe	Ala	Val	Val	Val	Ile	
225					230					235					240	
ggc	ggc	atg	ggc	tcg	atc	ctg	ggc	tcg	atc	ctg	acc	ggc	ttc	tcg	ctg	768
Gly	Gly	Met	Gly	Ser	Ile	Leu	Gly	Ser	Ile	Leu	Thr	Gly	Phe	Ser	Leu	
				245					250					255		
ggc	gcc	atc	gaa	ggc	ctg	acc	aaa	ctc	ttc	tac	ccg	cag	gcc	tcg	gcg	816
Gly	Ala	Ile	Glu	Gly	Leu	Thr	Lys	Leu	Phe	Tyr	Pro	Gln	Ala	Ser	Ala	
			260					265					270			
acc	gtg	atc	ttc	ctc	gtg	atg	atc	atc	gtg	ctg	ctc	atc	aag	ccg	acg	864
Thr	Val	Ile	Phe	Leu	Val	Met	Ile	Ile	Val	Leu	Leu	Ile	Lys	Pro	Thr	
		275					280					285				
ggc	ctg	ttc	ggc	aag	gcg	aag	tga									888
Gly	Leu	Phe	Gly	Lys	Ala	Lys										
	290					295										

<210> 695

<211> 295

<212> PRT

<213> Bordetella parapertussis

<400> 695

Met	Asn	Ile	Glu	Ser	Ile	Leu	Gly	Ile	Pro	Ile	Asn	Ala	Phe	Met	Gly	
1				5					10					15		
Gln	Leu	Leu	Met	Gly	Leu	Met	Asn	Gly	Ala	Phe	Tyr	Ala	Met	Leu	Ser	
			20					25					30			
Leu	Gly	Leu	Ala	Ile	Ile	Phe	Gly	Leu	Leu	Asn	Val	Ile	Asn	Phe	Leu	
		35					40					45				
His	Gly	Ala	Gln	Phe	Met	Val	Gly	Ala	Phe	Ile	Ala	Trp	Met	Leu	Leu	
	50					55				60						
Ala	Trp	Ala	Gly	Leu	Ser	Tyr	Trp	Val	Ala	Leu	Leu	Val	Ala	Pro	Leu	
65					70					75					80	
Val	Val	Ala	Ile	Gly	Ala	Val	Phe	Val	Glu	Arg	Leu	Phe	Leu	Arg	His	
				85					90					95		
Leu	Tyr	Arg	Leu	Asp	His	Leu	Tyr	Gly	Met	Leu	Leu	Thr	Phe	Gly	Leu	
			100					105					110			

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Met Leu Met Val Glu Gly Leu Phe Arg Lys Ser Phe Gly Ser Ser Gly
 115 120 125
 Leu Ala Tyr Pro Asn Val Ile Pro Gly Gly Met Asn Leu Gly Phe Met
 130 135 140
 Phe Leu Pro Tyr Tyr Arg Ala Trp Val Val Ala Ala Ser Leu Leu Val
 145 150 155 160
 Cys Gln Ala Ile Trp Leu Leu Ile Glu Lys Thr Arg Leu Gly Ser Tyr
 165 170 175
 Leu Arg Ala Ala Thr Glu Asn Pro Asp Met Val Arg Ala Phe Gly Ile
 180 185 190
 Lys Val Pro Val Leu Leu Thr Leu Thr Tyr Ala Phe Gly Ala Gly Leu
 195 200 205
 Ala Gly Leu Ala Gly Val Met Ala Ala Pro Ile Tyr Gln Val Ser Pro
 210 215 220
 Leu Met Gly Ser Asn Leu Val Ile Leu Val Phe Ala Val Val Val Ile
 225 230 235 240
 Gly Gly Met Gly Ser Ile Leu Gly Ser Ile Leu Thr Gly Phe Ser Leu
 245 250 255
 Gly Ala Ile Glu Gly Leu Thr Lys Leu Phe Tyr Pro Gln Ala Ser Ala
 260 265 270
 Thr Val Ile Phe Leu Val Met Ile Ile Val Leu Leu Ile Lys Pro Thr
 275 280 285
 Gly Leu Phe Gly Lys Ala Lys
 290 295

<210> 696

<211> 876

<212> DNA

<213> Bordetella parapertussis

<220>

<221> CDS

<222> (1)..(876)

<400> 696

atg atg ttc ctg act ctg tta ttg gtg ggt atc gtc agc ggc gtg ctg	48
Met Met Phe Leu Thr Leu Leu Val Gly Ile Val Ser Gly Val Leu	
1 5 10 15	
gga ggg ctg ata ctg gcc ctc ctg tcc acc ggc ttc aac ctt gcc ctc	96
Gly Gly Leu Ile Leu Ala Leu Leu Ser Thr Gly Phe Asn Leu Ala Leu	
20 25 30	
ggg gtg tcc cgc gtc gtg aac ttc cag cac ggc gcc gta gtg ctt tgg	144
Gly Val Ser Arg Val Val Asn Phe Gln His Gly Ala Val Val Leu Trp	
35 40 45	
tcg atg tac gcg gcc tac gtg ctg tgg gag gct acc ggc atc aat ccc	192
Ser Met Tyr Ala Ala Tyr Val Leu Trp Glu Ala Thr Gly Ile Asn Pro	
50 55 60	
tat ctc ggc ctg ctg ctg atc gtg ccg gtg gct ttc gcc atc ggc tac	240
Tyr Leu Gly Leu Leu Leu Ile Val Pro Val Ala Phe Ala Ile Gly Tyr	
65 70 75 80	
ttc ctg cat cgc tgg ctg atc atc cgc tcg ctc cag acc cct gaa gac	288
Phe Leu His Arg Trp Leu Ile Ile Arg Ser Leu Gln Thr Pro Glu Asp	
85 90 95	
agc cag atc ctg ttc tcc atc gga ctg ctg atc gcc ttc cag tac ctg	336
Ser Gln Ile Leu Phe Ser Ile Gly Leu Leu Ile Ala Phe Gln Tyr Leu	
100 105 110	
gcc cag ttc gtc tat tcc acg gac gcc cgc tcg ctg acc gag gaa agc	384
Ala Gln Phe Val Tyr Ser Thr Asp Ala Arg Ser Leu Thr Glu Glu Ser	
115 120 125	
ctg cag cat tcc ctg atc atc ggt ccg gtc atc ctg caa tac acc cgg	432
Leu Gln His Ser Leu Ile Ile Gly Pro Val Ile Leu Gln Tyr Thr Arg	
130 135 140	
ctc gcc gcc gcc gtc ctg ctg gtg ctg ttg ctg cat ctg	480
Leu Ala Ala Ala Val Ser Leu Leu Val Leu Val Leu Leu His Leu	
145 150 155 160	
atg ctg acc cgc acc gat ctg gga cgc aag ctg cat gcg tgc gcc cag	528
Met Leu Thr Arg Thr Asp Leu Gly Arg Lys Leu His Ala Cys Ala Gln	
165 170 175	
aac ccc gtc ggc gcg cgg gtg gcc ggc ctg aac gtc gag cac ctt tcg	576

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Asn	Pro	Val	Gly	Ala	Arg	Val	Ala	Gly	Leu	Asn	Val	Glu	His	Leu	Ser		
gcg	gta	gcg	ctg	ggc	atc	gcg	gcc	gcc	tgc	gcg	gcg	gtc	agc	ggc	acc	624	
Ala	Val	Ala	Leu	Gly	Ile	Ala	Ala	Ala	Cys	Ala	Ala	Val	Ser	Gly	Thr		
		195					200					205					
gcc	ctg	gcc	acc	atg	gcg	ccc	atc	ttc	ccg	gaa	cgg	gcc	ttc	gag	tac	672	
Ala	Leu	Ala	Thr	Met	Ala	Pro	Ile	Phe	Pro	Glu	Arg	Ala	Phe	Glu	Tyr		
		210				215					220						
tcg	ctg	gcc	gcg	gtg	gtg	gtg	tcg	gtg	ctc	ggc	ggg	atg	ggc	agc	atg	720	
Ser	Leu	Ala	Ala	Val	Val	Val	Ser	Val	Leu	Gly	Gly	Met	Gly	Ser	Met		
		225				230				235					240		
agc	ggc	agc	atc	ctg	ggc	gga	ttg	atc	gtg	ggc	gtc	atc	atc	gcc	gtc	768	
Ser	Gly	Ser	Ile	Leu	Gly	Gly	Leu	Ile	Val	Gly	Val	Ile	Ile	Ala	Val		
				245					250					255			
tcg	cag	gtc	acc	ggc	cat	ggc	gat	ctc	gcg	ctc	gcc	atc	gtc	tat	gcg	816	
Ser	Gln	Val	Thr	Gly	His	Gly	Asp	Leu	Ala	Leu	Ala	Ile	Val	Tyr	Ala		
			260				265						270				
ctg	gtt	ttc	ctc	atc	ttc	ctg	gtc	cac	ccg	acg	ggg	ctg	atc	agt	gcg	864	
Leu	Val	Phe	Leu	Ile	Phe	Leu	Val	His	Pro	Thr	Gly	Leu	Ile	Ser	Ala		
		275					280					285					
gtc	aaa	cgt	tga													876	
Val	Lys	Arg															
		290															

<210> 697

<211> 291

<212> PRT

<213> Bordetella parapertussis

<400> 697

Met	Met	Phe	Leu	Thr	Leu	Leu	Leu	Val	Gly	Ile	Val	Ser	Gly	Val	Leu		
1				5					10					15			
Gly	Gly	Leu	Ile	Leu	Ala	Leu	Leu	Ser	Thr	Gly	Phe	Asn	Leu	Ala	Leu		
			20					25					30				
Gly	Val	Ser	Arg	Val	Val	Asn	Phe	Gln	His	Gly	Ala	Val	Val	Leu	Trp		
		35					40					45					
Ser	Met	Tyr	Ala	Ala	Tyr	Val	Leu	Trp	Glu	Ala	Thr	Gly	Ile	Asn	Pro		
		50				55					60						
Tyr	Leu	Gly	Leu	Leu	Leu	Ile	Val	Pro	Val	Ala	Phe	Ala	Ile	Gly	Tyr		
65				70					75					80			
Phe	Leu	His	Arg	Trp	Leu	Ile	Ile	Arg	Ser	Leu	Gln	Thr	Pro	Glu	Asp		
			85					90					95				
Ser	Gln	Ile	Leu	Phe	Ser	Ile	Gly	Leu	Leu	Ile	Ala	Phe	Gln	Tyr	Leu		
			100				105						110				
Ala	Gln	Phe	Val	Tyr	Ser	Thr	Asp	Ala	Arg	Ser	Leu	Thr	Glu	Glu	Ser		
		115					120					125					
Leu	Gln	His	Ser	Leu	Ile	Ile	Gly	Pro	Val	Ile	Leu	Gln	Tyr	Thr	Arg		
		130				135					140						
Leu	Ala	Ala	Ala	Ala	Val	Ser	Leu	Leu	Val	Leu	Val	Leu	Leu	His	Leu		
145				150					155					160			
Met	Leu	Thr	Arg	Thr	Asp	Leu	Gly	Arg	Lys	Leu	His	Ala	Cys	Ala	Gln		
			165					170					175				
Asn	Pro	Val	Gly	Ala	Arg	Val	Ala	Gly	Leu	Asn	Val	Glu	His	Leu	Ser		
			180					185					190				
Ala	Val	Ala	Leu	Gly	Ile	Ala	Ala	Ala	Cys	Ala	Ala	Val	Ser	Gly	Thr		
		195					200					205					
Ala	Leu	Ala	Thr	Met	Ala	Pro	Ile	Phe	Pro	Glu	Arg	Ala	Phe	Glu	Tyr		
		210				215					220						
Ser	Leu	Ala	Ala	Val	Val	Val	Ser	Val	Leu	Gly	Gly	Met	Gly	Ser	Met		
225				230						235				240			
Ser	Gly	Ser	Ile	Leu	Gly	Gly	Leu	Ile	Val	Gly	Val	Ile	Ile	Ala	Val		
			245					250					255				
Ser	Gln	Val	Thr	Gly	His	Gly	Asp	Leu	Ala	Leu	Ala	Ile	Val	Tyr	Ala		
			260				265						270				
Leu	Val	Phe	Leu	Ile	Phe	Leu	Val	His	Pro	Thr	Gly	Leu	Ile	Ser	Ala		
		275					280					285					
Val	Lys	Arg															
		290															

<210> 698
 <211> 882
 <212> DNA
 <213> Bordetella parapertussis

<220>
 <221> CDS
 <222> (1)..(882)

<400> 698
 atg agc gga ctg att atc cag ggc ctg gtc aac ggc ctg atc ctg ggc 48
 Met Ser Gly Leu Ile Ile Gln Gly Leu Val Asn Gly Leu Ile Leu Gly
 1 5 10 15
 gcc atc tac ggc ctg atc ggc gtg ggc ctg aac gtg atc ttc ggc gtg 96
 Ala Ile Tyr Gly Leu Ile Gly Val Gly Leu Asn Val Ile Phe Gly Val
 20 25 30
 ctg cgc gtg gtg aac ttc gcg cac ggc gag ttc ctg gtg ctg ggc gcc 144
 Leu Arg Val Val Asn Phe Ala His Gly Glu Phe Leu Val Leu Gly Ala
 35 40 45
 tat ttt gcg tac tac ctg ctc gaa tac gcc ggc atc ggc ccg ctg ctg 192
 Tyr Phe Ala Tyr Tyr Leu Leu Glu Tyr Ala Gly Ile Gly Pro Leu Leu
 50 55 60
 gca ttg ccg ctg gct ttc ggc gcc ttc ttc ctg gcc ggc tac gtc ctg 240
 Ala Leu Pro Leu Ala Phe Gly Ala Phe Phe Leu Ala Gly Tyr Val Leu
 65 70 75 80
 tat ttc gtg ctg atc ccg cgc ctg tcc aag gcc gac gac ccc gag atc 288
 Tyr Phe Val Leu Ile Pro Arg Leu Ser Lys Ala Asp Asp Pro Glu Ile
 85 90 95
 agc tcg ctg ctg ctg atg ttc ggc gtg tcc atc atg ctg ggg gcc atc 336
 Ser Ser Leu Leu Leu Met Phe Gly Val Ser Ile Met Leu Gly Ala Ile
 100 105 110
 atg ctg ctg gcc ttc gag gcc gac gca cgc tcg ctg ccc tac gaa atc 384
 Met Leu Leu Ala Phe Glu Ala Asp Ala Arg Ser Leu Pro Tyr Glu Ile
 115 120 125
 gaa ccg gtg ttc ttc aag atc gga ccg gtg ctg atc ccg acc gtg cgc 432
 Glu Pro Val Phe Phe Lys Ile Gly Pro Val Leu Ile Pro Thr Val Arg
 130 135 140
 ctg atc gcc ctg gcc atc gcg ctg gcc gtg gtc gcc gta ctg gcc tgg 480
 Leu Ile Ala Leu Ala Ile Ala Leu Ala Val Val Ala Val Leu Ala Trp
 145 150 155 160
 ttc ctg tac cgc acc cag atg ggc aag gcc ctg cgc gcc atc atc atg 528
 Phe Leu Tyr Arg Thr Gln Met Gly Lys Ala Leu Arg Ala Ile Ile Met
 165 170 175
 aac cgc gac gcc gtg cgc atc gtc ggc atc aac gcc gag ccg ctg tcg 576
 Asn Arg Asp Ala Val Arg Ile Val Gly Ile Asn Ala Glu Arg Leu Ser
 180 185 190
 gcc gtg gcg ttc ggc ctg ggc atc ggc ctg gcc gcc gtc acc ggc gtg 624
 Ala Val Ala Phe Gly Leu Gly Ile Gly Leu Ala Ala Val Thr Gly Val
 195 200 205
 ctg gtg gcc atg gtg ttc ccg gcg ttc tct ccc ttc atg ggc aac gac 672
 Leu Val Ala Met Val Phe Pro Ala Phe Ser Pro Phe Met Gly Asn Asp
 210 215 220
 tac acc ctg atc ggc ttc atc gtc atc gtg ctg ggc gga ttg ggc cac 720
 Tyr Thr Leu Ile Gly Phe Ile Val Ile Val Leu Gly Gly Leu Gly His
 225 230 235 240
 ccc gtg ggc gcg ctg gtc ggc gcc atg ctg ttc ggc gtc acc gaa cag 768
 Pro Val Gly Ala Leu Val Gly Ala Met Leu Phe Gly Val Thr Glu Gln
 245 250 255
 gtg tcg gtg gtg ttc ttc aac ccc tcc atc gcc acg atc tgc ggc ttc 816
 Val Ser Val Val Phe Phe Asn Pro Ser Ile Ala Thr Ile Cys Gly Phe
 260 265 270
 gtg ctg atg gtg gcc atg atc ttc gtg cgg ccc acc ggg ctg ttc ggc 864
 Val Leu Met Val Ala Met Ile Phe Val Arg Pro Thr Gly Leu Phe Gly
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 cac cgc gcc ctg cgc tga 882
 His Arg Ala Leu Arg
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<210> 699

<211> 293

<212> PRT

<213> Bordetella parapertussis

<400> 699

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20      25      30
Leu Arg Val Val Asn Phe Ala His Gly Glu Phe Leu Val Leu Gly Ala
35      40      45
Tyr Phe Ala Tyr Tyr Leu Leu Glu Tyr Ala Gly Ile Gly Pro Leu Leu
50      55      60
Ala Leu Pro Leu Ala Phe Gly Ala Phe Phe Leu Ala Gly Tyr Val Leu
65      70      75      80
Tyr Phe Val Leu Ile Pro Arg Leu Ser Lys Ala Asp Asp Pro Glu Ile
85      90      95
Ser Ser Leu Leu Leu Met Phe Gly Val Ser Ile Met Leu Gly Ala Ile
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Met Leu Leu Ala Phe Glu Ala Asp Ala Arg Ser Leu Pro Tyr Glu Ile
115      120      125
Glu Pro Val Phe Phe Lys Ile Gly Pro Val Leu Ile Pro Thr Val Arg
130      135      140
Leu Ile Ala Leu Ala Ile Ala Leu Ala Val Val Ala Val Leu Ala Trp
145      150      155      160
Phe Leu Tyr Arg Thr Gln Met Gly Lys Ala Leu Arg Ala Ile Ile Met
165      170      175
Asn Arg Asp Ala Val Arg Ile Val Gly Ile Asn Ala Glu Arg Leu Ser
180      185      190
Ala Val Ala Phe Gly Leu Gly Ile Gly Leu Ala Ala Val Thr Gly Val
195      200      205
Leu Val Ala Met Val Phe Pro Ala Phe Ser Pro Phe Met Gly Asn Asp
210      215      220
Tyr Thr Leu Ile Gly Phe Ile Val Ile Val Leu Gly Gly Leu Gly His
225      230      235      240
Pro Val Gly Ala Leu Val Gly Ala Met Leu Phe Gly Val Thr Glu Gln
245      250      255
Val Ser Val Val Phe Phe Asn Pro Ser Ile Ala Thr Ile Cys Gly Phe
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Val Leu Met Val Ala Met Ile Phe Val Arg Pro Thr Gly Leu Phe Gly
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His Arg Ala Leu Arg
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<210> 700

<211> 876

<212> DNA

<213> Bordetella parapertussis

<220>

<221> CDS

<222> (1)..(876)

<400> 700

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Met Asp Val Tyr Met Gln Leu Thr Met Asn Ser Leu Gln Ile Ala Ala
1      5      10      15
gcg tac ata ctg ttc tcg ttg ggc ctg acg ctg atc ttc ggc gtc atg      96
Ala Tyr Ile Leu Phe Ser Leu Gly Leu Thr Leu Ile Phe Gly Val Met
20      25      30
cgg atc gtg aac ttc gcg cac ggc gag ttc ttc acc ctg cct ctg ctg      144
Arg Ile Val Asn Phe Ala His Gly Glu Phe Phe Thr Leu Pro Leu Leu
35      40      45
gtc atg ggc gtg ctg gtg ccg ctg ctg gtc ggc gcg cag ctg ccg ctc      192
Val Met Gly Val Leu Val Pro Leu Leu Val Gly Ala Gln Leu Pro Leu
50      55      60
atc gtg tcc tat gcg ctg agc ggc gtg ctg ggc atc gcg gcc acg ctg      240
Ile Val Ser Tyr Ala Leu Ser Gly Val Leu Gly Ile Ala Ala Thr Leu
65      70      75      80

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ctg	ctg	ggc	ggg	ctt	atc	tac	aag	ttc	gcc	ctc	aag	cgc	ttc	ctg	cgc	288
Leu	Leu	Gly	Gly	Leu	Ile	Tyr	Lys	Phe	Ala	Leu	Lys	Arg	Phe	Leu	Arg	
				85					90					95		
gac	atg	acc	ggc	tct	ttc	gtg	gtg	tgc	gtc	ggc	ctc	tcg	ctg	ctg	ctg	336
Asp	Met	Thr	Gly	Ser	Phe	Val	Val	Ser	Val	Gly	Leu	Ser	Leu	Leu	Leu	
			100					105					110			
caa	ggg	gtc	ttc	ctg	gag	act	ttc	ggc	ggc	gtg	ccg	acc	aag	ctg	ccc	384
Gln	Gly	Val	Phe	Leu	Glu	Thr	Phe	Gly	Gly	Val	Pro	Thr	Lys	Leu	Pro	
		115					120					125				
acg	ctg	gtg	gag	ggc	acg	gtg	aac	atc	ctg	ggc	gcg	ttc	gtt	acc	gtc	432
Thr	Leu	Val	Glu	Gly	Thr	Val	Asn	Ile	Leu	Gly	Ala	Phe	Val	Thr	Val	
	130					135				140						
cag	cgc	ctc	atc	atc	acc	ggc	tgc	gcg	ctg	ctg	gtg	gcc	gtg	ttc	atg	480
Gln	Arg	Leu	Ile	Ile	Thr	Gly	Cys	Ala	Leu	Leu	Val	Ala	Val	Phe	Met	
	145				150				155						160	
tgc	tgg	acg	atc	gtt	tcc	agc	cgc	ctg	ggc	aag	gcc	ttg	cgt	gcg	gtg	528
Cys	Trp	Thr	Ile	Val	Ser	Ser	Arg	Leu	Gly	Lys	Ala	Leu	Arg	Ala	Val	
			165					170						175		
gcc	gag	gac	cat	gag	gcc	gcc	atg	ctc	cag	ggc	att	ccc	tac	cgc	cgc	576
Ala	Glu	Asp	His	Glu	Ala	Ala	Met	Leu	Gln	Gly	Ile	Pro	Tyr	Arg	Arg	
			180					185					190			
atc	gcc	ctg	gcc	ggc	ttc	ctc	atc	gcg	acc	gtg	ctc	gcg	gcg	atc	gcc	624
Ile	Ala	Leu	Ala	Gly	Phe	Leu	Ile	Ala	Thr	Val	Leu	Ala	Ala	Ile	Ala	
		195					200					205				
gcg	gtc	ctg	ctt	tcg	ccg	gtc	acg	gta	tcg	agc	ccg	atc	atc	ggc	aac	672
Ala	Val	Leu	Leu	Ser	Pro	Val	Thr	Val	Ser	Ser	Pro	Ile	Ile	Gly	Asn	
	210					215					220					
gac	tac	ctc	atc	cgc	ggc	ttc	atc	gcc	atc	gtg	atc	ggc	ggc	ctg	ggc	720
Asp	Tyr	Leu	Ile	Arg	Gly	Phe	Ile	Ala	Ile	Val	Ile	Gly	Gly	Leu	Gly	
	225				230				235					240		
agc	att	ccc	ggc	gcc	atc	ctg	ggc	agc	gtc	ctg	atc	gcg	gtc	ata	gag	768
Ser	Ile	Pro	Gly	Ala	Ile	Leu	Gly	Ser	Val	Leu	Ile	Ala	Val	Ile	Glu	
			245					250					255			
agc	ctg	ggc	ggg	tat	tac	ttc	gac	ccc	acc	tgg	gcc	acc	atc	acg	atg	816
Ser	Leu	Gly	Gly	Tyr	Tyr	Phe	Asp	Pro	Thr	Trp	Ala	Thr	Ile	Thr	Met	
			260					265					270			
ttc	gcc	ctg	acc	atg	ttt	gta	ctg	ctc	gtt	cgt	ccg	aag	ggg	atc	ctg	864
Phe	Ala	Leu	Thr	Met	Phe	Val	Leu	Leu	Val	Arg	Pro	Lys	Gly	Ile	Leu	
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gga	aat	ggc	taa													876
Gly	Asn	Gly														
	290															

<210> 701

<211> 291

<212> PRT

<213> Bordetella parapertussis

<400> 701

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		20						25					30			
Arg	Ile	Val	Asn	Phe	Ala	His	Gly	Glu	Phe	Phe	Thr	Leu	Pro	Leu	Leu	
		35					40					45				
Val	Met	Gly	Val	Leu	Val	Pro	Leu	Leu	Val	Gly	Ala	Gln	Leu	Pro	Leu	
	50					55					60					
Ile	Val	Ser	Tyr	Ala	Leu	Ser	Gly	Val	Leu	Gly	Ile	Ala	Ala	Thr	Leu	
65					70					75					80	
Leu	Leu	Gly	Gly	Leu	Ile	Tyr	Lys	Phe	Ala	Leu	Lys	Arg	Phe	Leu	Arg	
			85					90						95		
Asp	Met	Thr	Gly	Ser	Phe	Val	Val	Ser	Val	Gly	Leu	Ser	Leu	Leu	Leu	
			100					105					110			
Gln	Gly	Val	Phe	Leu	Glu	Thr	Phe	Gly	Gly	Val	Pro	Thr	Lys	Leu	Pro	
		115					120					125				
Thr	Leu	Val	Glu	Gly	Thr	Val	Asn	Ile	Leu	Gly	Ala	Phe	Val	Thr	Val	
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Gln	Arg	Leu	Ile	Ile	Thr	Gly	Cys	Ala	Leu	Leu	Val	Ala	Val	Phe	Met	
	145				150				155						160	

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Cys Trp Thr Ile Val Ser Ser Arg Leu Gly Lys Ala Leu Arg Ala Val
 165 170 175
 Ala Glu Asp His Glu Ala Ala Met Leu Gln Gly Ile Pro Tyr Arg Arg
 180 185 190
 Ile Ala Leu Ala Gly Phe Leu Ile Ala Thr Val Leu Ala Ala Ile Ala
 195 200 205
 Ala Val Leu Leu Ser Pro Val Thr Val Ser Ser Pro Ile Ile Gly Asn
 210 215 220
 Asp Tyr Leu Ile Arg Gly Phe Ile Ala Ile Val Ile Gly Gly Leu Gly
 225 230 235 240
 Ser Ile Pro Gly Ala Ile Leu Gly Ser Val Leu Ile Ala Val Ile Glu
 245 250 255
 Ser Leu Gly Gly Tyr Tyr Phe Asp Pro Thr Trp Ala Thr Ile Thr Met
 260 265 270
 Phe Ala Leu Thr Met Phe Val Leu Leu Val Arg Pro Lys Gly Ile Leu
 275 280 285
 Gly Asn Gly
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<210> 702

<211> 930

<212> DNA

<213> Bordetella bronchiseptica

<220>

<221> CDS

<222> (1)..(930)

<400> 702

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1				5					10					15		
gca	ttg	ccg	gcc	ctg	ctc	aac	gac	ccg	ttc	atc	acc	cac	ctg	ggc	gtg	96
Ala	Leu	Pro	Ala	Leu	Leu	Asn	Asp	Pro	Phe	Ile	Thr	His	Leu	Gly	Val	
			20					25					30			
cg	g	g	acc	tac	gcc	atc	gta	gtc	atg	ggc	ctg	acg	ctg	ttc	gcc	144
Arg	Ala	Ala	Thr	Tyr	Ala	Ile	Val	Val	Met	Gly	Leu	Thr	Leu	Phe	Ala	
			35				40					45				
ggc	tac	acc	ggc	cag	atc	tcg	ctg	ggg	cac	gcc	gcc	ttc	ttc	ggg	ctg	192
Gly	Tyr	Thr	Gly	Gln	Ile	Ser	Leu	Gly	His	Ala	Ala	Phe	Phe	Gly	Leu	
	50					55				60						
gcc	gcc	tat	ctg	tcg	ggc	atg	atg	gcc	aag	gcc	ggc	gtg	ccc	tac	ctg	240
Ala	Ala	Tyr	Leu	Ser	Gly	Met	Met	Ala	Lys	Ala	Gly	Val	Pro	Tyr	Leu	
					70				75						80	
gta	tcg	gtg	ccg	gtc	gcc	acg	gcc	gca	gtc	ggc	gtg	ctg	ggc	tgc	ctg	288
Val	Ser	Val	Pro	Val	Ala	Thr	Ala	Ala	Val	Gly	Val	Leu	Gly	Cys	Leu	
				85					90					95		
gtc	ggc	atg	ctg	gtg	ctg	cg	acc	agc	ggc	cac	tac	ctg	g	ctg	gcc	336
Val	Gly	Met	Leu	Val	Leu	Arg	Thr	Ser	Gly	His	Tyr	Leu	Ala	Leu	Ala	
			100					105				110				
agc	atc	gcc	gtc	g	gtc	atc	gtg	cag	gtc	atc	atc	aag	aac	agc	acg	384
Ser	Ile	Ala	Val	Ala	Val	Ile	Val	Gln	Val	Ile	Ile	Lys	Asn	Ser	Thr	
			115				120					125				
atc	acc	ggc	ggc	cct	tcc	ggg	ttg	acg	gcc	gtg	ccc	g	ccg	gat	ttc	432
Ile	Thr	Gly	Gly	Pro	Ser	Gly	Leu	Thr	Ala	Val	Pro	Ala	Pro	Asp	Phe	
			130			135					140					
ttc	ggc	tgg	tcg	ctc	acc	agc	gac	ctg	ggc	tac	tac	tac	gtg	ctg		480
Phe	Gly	Trp	Ser	Leu	Thr	Ser	Asp	Leu	Gly	Tyr	Tyr	Tyr	Tyr	Val	Leu	
					150					155					160	
ctg	tgc	atg	ttc	gcc	ggc	ttc	gtc	atc	ctg	cg	cg	gtc	atc	gac	tcg	528
Leu	Cys	Met	Phe	Ala	Gly	Phe	Val	Ile	Leu	Arg	Arg	Val	Ile	Asp	Ser	
				165					170					175		
cg	acc	ggc	gac	gcc	ctg	cag	gcc	atc	gcc	aac	aac	gaa	ctg	gcc	gcc	576
Arg	Thr	Gly	Asp	Ala	Leu	Gln	Ala	Ile	Ala	Asn	Asn	Glu	Leu	Ala	Ala	
			180					185					190			
cag	tcg	ctg	ggc	atc	ccg	gtg	ttc	cg	tac	aag	gtg	ctg	tca	ttc	acc	624
Gln	Ser	Leu	Gly	Ile	Pro	Val	Phe	Arg	Tyr	Lys	Val	Leu	Ser	Phe	Thr	
			195				200					205				
atc	agc	acc	ctg	ttc	g	g	ttc	ggc	acc	ctg	ttc	gtg	cac	tac		672

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Ile	Ser	Thr	Leu	Phe	Ala	Ala	Phe	Ala	Gly	Thr	Leu	Phe	Val	His	Tyr		
210	210					215					220						
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Asp	Gly	Phe	Ile	Asp	Pro	Asp	Arg	Leu	Gly	Ile	His	Val	Ser	Val	Leu		
225					230					235					240		
ttc	ctg	atc	atg	acc	ttc	gtg	ggc	ggc	atc	ggc	aac	atc	tac	ggc	tcg	768	
Phe	Leu	Ile	Met	Thr	Phe	Val	Gly	Gly	Ile	Gly	Asn	Ile	Tyr	Gly	Ser		
				245					250					255			
gtg	atc	ggc	gcc	ttc	gcg	ctg	acc	atc	atc	gag	gag	tac	gcc	cag	gaa	816	
Val	Ile	Gly	Ala	Phe	Ala	Leu	Thr	Ile	Ile	Glu	Glu	Tyr	Ala	Gln	Glu		
			260					265					270				
ttc	ggc	caa	tac	aac	atc	ctg	gtc	tac	ggc	ctg	ctg	ctg	gcg	ctg	gtg	864	
Phe	Gly	Gln	Tyr	Asn	Ile	Leu	Val	Tyr	Gly	Leu	Leu	Leu	Ala	Leu	Val		
		275					280					285					
atc	ctg	ttc	ctg	ccc	aaa	gga	ctg	gtg	gat	ctg	ccc	aac	aag	ctc	aaa	912	
Ile	Leu	Phe	Leu	Pro	Lys	Gly	Leu	Val	Asp	Leu	Pro	Asn	Lys	Leu	Lys		
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Ser	Leu	Arg	Ala	Arg													
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<210> 703

<211> 309

<212> PRT

<213> Bordetella bronchiseptica

<400> 703

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			20					25					30				
Arg	Ala	Ala	Thr	Tyr	Ala	Ile	Val	Val	Met	Gly	Leu	Thr	Leu	Phe	Ala		
		35					40					45					
Gly	Tyr	Thr	Gly	Gln	Ile	Ser	Leu	Gly	His	Ala	Ala	Phe	Phe	Gly	Leu		
	50					55					60						
Ala	Ala	Tyr	Leu	Ser	Gly	Met	Met	Ala	Lys	Ala	Gly	Val	Pro	Tyr	Leu		
65					70				75						80		
Val	Ser	Val	Pro	Val	Ala	Thr	Ala	Ala	Val	Gly	Val	Leu	Gly	Cys	Leu		
			85					90					95				
Val	Gly	Met	Leu	Val	Leu	Arg	Thr	Ser	Gly	His	Tyr	Leu	Ala	Leu	Ala		
			100					105				110					
Ser	Ile	Ala	Val	Ala	Val	Ile	Val	Gln	Val	Ile	Ile	Lys	Asn	Ser	Thr		
		115					120					125					
Ile	Thr	Gly	Gly	Pro	Ser	Gly	Leu	Thr	Ala	Val	Pro	Ala	Pro	Asp	Phe		
	130					135					140						
Phe	Gly	Trp	Ser	Leu	Thr	Ser	Asp	Leu	Gly	Tyr	Tyr	Tyr	Tyr	Val	Leu		
145					150					155					160		
Leu	Cys	Met	Phe	Ala	Gly	Phe	Val	Ile	Leu	Arg	Arg	Val	Ile	Asp	Ser		
			165					170						175			
Arg	Thr	Gly	Asp	Ala	Leu	Gln	Ala	Ile	Ala	Asn	Asn	Glu	Leu	Ala	Ala		
			180				185					190					
Gln	Ser	Leu	Gly	Ile	Pro	Val	Phe	Arg	Tyr	Lys	Val	Leu	Ser	Phe	Thr		
		195					200					205					
Ile	Ser	Thr	Leu	Phe	Ala	Ala	Phe	Ala	Gly	Thr	Leu	Phe	Val	His	Tyr		
	210				215						220						
Asp	Gly	Phe	Ile	Asp	Pro	Asp	Arg	Leu	Gly	Ile	His	Val	Ser	Val	Leu		
225					230					235					240		
Phe	Leu	Ile	Met	Thr	Phe	Val	Gly	Gly	Ile	Gly	Asn	Ile	Tyr	Gly	Ser		
			245						250					255			
Val	Ile	Gly	Ala	Phe	Ala	Leu	Thr	Ile	Ile	Glu	Glu	Tyr	Ala	Gln	Glu		
			260					265					270				
Phe	Gly	Gln	Tyr	Asn	Ile	Leu	Val	Tyr	Gly	Leu	Leu	Leu	Ala	Leu	Val		
		275					280					285					
Ile	Leu	Phe	Leu	Pro	Lys	Gly	Leu	Val	Asp	Leu	Pro	Asn	Lys	Leu	Lys		
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Ser	Leu	Arg	Ala	Arg													
305																	

<210> 704

<211> 873

<212> DNA

<213> Bordetella bronchiseptica

<220>

<221> CDS

<222> (1)..(873)

<400> 704

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acc tat gcc atg atc gcc ctg gcg atc acg ctg gtg ttc cgg gga atg	96
Thr Tyr Ala Met Ile Ala Leu Ala Ile Thr Leu Val Phe Arg Gly Met	
20 25 30	
gac atc atc aac ttc gcg caa ggc gaa atc ttc atg gtg ggg gca ttc	144
Asp Ile Ile Asn Phe Ala Gln Gly Glu Ile Phe Met Val Gly Ala Phe	
35 40 45	
ctg ggc tac gtc ttc cac gtg gac ctg gga ctg tcg atg tgg ctg gcc	192
Leu Gly Tyr Val Phe His Val Asp Leu Gly Leu Ser Met Trp Leu Ala	
50 55 60	
ttt ccg ctg gcc atc gcc tcg gcg ctg gtg ttc ggc tcg ttc ctc gaa	240
Phe Pro Leu Ala Ile Ala Ser Ala Leu Val Phe Gly Ser Phe Leu Glu	
65 70 75 80	
cgg atg ttc atg cgg cgg ctg gaa aac agc aac cag ctc tcg ctg ttc	288
Arg Met Phe Met Arg Arg Leu Glu Asn Ser Asn Gln Leu Ser Leu Phe	
85 90 95	
atg atg acc gtg gcg ctg ttc atc ctg ctg cgc agc gcc gcg caa ctg	336
Met Met Thr Val Ala Leu Phe Ile Leu Leu Arg Ser Ala Ala Gln Leu	
100 105 110	
gtc ttc ggc tcg tcc gcg tac cgc ttt ccg ccg ctg agc gaa cat gcg	384
Val Phe Gly Ser Ser Ala Tyr Arg Phe Pro Pro Leu Ser Glu His Ala	
115 120 125	
gcc tcg atc ggc tcg gtg cgc atc agc gac cag tac ctg atc gtc atc	432
Ala Ser Ile Gly Ser Val Arg Ile Ser Asp Gln Tyr Leu Ile Val Ile	
130 135 140	
ggc atg acg ctg ctc atc atg ctg ctg ctg tac ctg ctg ttc acc cgc	480
Gly Met Thr Leu Leu Ile Met Leu Leu Leu Tyr Leu Leu Phe Thr Arg	
145 150 155 160	
acg ccg ctg ggc ctg tcg gtg cgg gcg gtc gcg cag gac aag acc acc	528
Thr Pro Leu Gly Leu Ser Val Arg Ala Val Ala Gln Asp Lys Thr Thr	
165 170 175	
gcg cgc atg atg ggc atc aac gtt tca cgc atc aac aac ttc acc gtg	576
Ala Arg Met Met Gly Ile Asn Val Ser Arg Ile Asn Asn Phe Thr Val	
180 185 190	
gcg ctg tgc tcg gcg ctg ggc gct gcg gcc ggc atc gtc tac gcg ccg	624
Ala Leu Cys Ser Ala Leu Gly Ala Ala Gly Ile Val Tyr Ala Pro	
195 200 205	
ata gcg gtg ctg tcg ttc gac atg ggc aac ctg atc atg ctc aag ggc	672
Ile Ala Val Leu Ser Phe Asp Met Gly Asn Leu Ile Met Leu Lys Gly	
210 215 220	
ttc acc gcc gcg ctg ctg ggc ggg ctg ggc ctg ctc tcg ggc gcg gtg	720
Phe Thr Ala Ala Leu Leu Gly Gly Leu Gly Leu Leu Ser Gly Ala Val	
225 230 235 240	
ctg ggc gga atc atg ctg ggc gtc atc gag cag ttc ggc acg ctg ttg	768
Leu Gly Gly Ile Met Leu Gly Val Ile Glu Gln Phe Gly Thr Leu Leu	
245 250 255	
atc aac tcc gcc tac aag gat ctg gtc tcg ttc tcg atc ctg ctg ctc	816
Ile Asn Ser Ala Tyr Lys Asp Leu Val Ser Phe Ser Ile Leu Leu Leu	
260 265 270	
atc atc ctg gtc aag ccc aac ggc atc ctg ggc aag aag cag atc aag	864
Ile Ile Leu Val Lys Pro Asn Gly Ile Leu Gly Lys Lys Gln Ile Lys	
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Lys Val	
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<210> 705

<211> 290

<212> PRT

<213> Bordetella bronchiseptica

<400> 705

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 20 25 30
 Asp Ile Ile Asn Phe Ala Gln Gly Glu Ile Phe Met Val Gly Ala Phe
 35 40 45
 Leu Gly Tyr Val Phe His Val Asp Leu Gly Leu Ser Met Trp Leu Ala
 50 55 60
 Phe Pro Leu Ala Ile Ala Ser Ala Leu Val Phe Gly Ser Phe Leu Glu
 65 70 75 80
 Arg Met Phe Met Arg Arg Leu Glu Asn Ser Asn Gln Leu Ser Leu Phe
 85 90 95
 Met Met Thr Val Ala Leu Phe Ile Leu Leu Arg Ser Ala Ala Gln Leu
 100 105 110
 Val Phe Gly Ser Ser Ala Tyr Arg Phe Pro Pro Leu Ser Glu His Ala
 115 120 125
 Ala Ser Ile Gly Ser Val Arg Ile Ser Asp Gln Tyr Leu Ile Val Ile
 130 135 140
 Gly Met Thr Leu Leu Ile Met Leu Leu Tyr Leu Leu Phe Thr Arg
 145 150 155 160
 Thr Pro Leu Gly Leu Ser Val Arg Ala Val Ala Gln Asp Lys Thr Thr
 165 170 175
 Ala Arg Met Met Gly Ile Asn Val Ser Arg Ile Asn Asn Phe Thr Val
 180 185 190
 Ala Leu Cys Ser Ala Leu Gly Ala Ala Gly Ile Val Tyr Ala Pro
 195 200 205
 Ile Ala Val Leu Ser Phe Asp Met Gly Asn Leu Ile Met Leu Lys Gly
 210 215 220
 Phe Thr Ala Ala Leu Leu Gly Gly Leu Gly Leu Ser Gly Ala Val
 225 230 235 240
 Leu Gly Gly Ile Met Leu Gly Val Ile Glu Gln Phe Gly Thr Leu Leu
 245 250 255
 Ile Asn Ser Ala Tyr Lys Asp Leu Val Ser Phe Ser Ile Leu Leu Leu
 260 265 270
 Ile Ile Leu Val Lys Pro Asn Gly Ile Leu Gly Lys Lys Gln Ile Lys
 275 280 285
 Lys Val
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<210> 706

<211> 957

<212> DNA

<213> Bordetella bronchiseptica

<220>

<221> CDS

<222> (1)..(957)

<400> 706

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Met	Arg	Ile	Ser	Ser	Lys	His	Trp	Thr	Leu	Ile	Val	Leu	Ala	Ala	Leu		
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atc	gcc	atc	gcc	ccg	ctg	ttc	ttc	ccc	tcc	ggc	tat	tac	ttc	cgc	gtg		96
Ile	Ala	Ile	Ala	Pro	Leu	Phe	Phe	Pro	Ser	Gly	Tyr	Tyr	Phe	Arg	Val		
			20					25				30					
ggc	tcg	aca	att	ttc	gtc	aac	gcg	ctg	gcg	gtc	acc	ggc	atc	gtc	atc		144
Gly	Ser	Thr	Ile	Phe	Val	Asn	Ala	Leu	Ala	Val	Thr	Gly	Ile	Val	Ile		
		35				40					45						
ctg	acc	ggc	tac	gcc	ggc	cag	atc	agc	ctg	gga	cac	gcg	gga	ttc	gcc		192
Leu	Thr	Gly	Tyr	Ala	Gly	Gln	Ile	Ser	Leu	Gly	His	Ala	Gly	Phe	Ala		
	50				55			60									
ggc	atc	ggc	ggc	tat	gcc	tgc	gcg	ctg	gcg	ccc	gtg	cac	ctc	ggg	ctg		240
Gly	Ile	Gly	Gly	Tyr	Ala	Cys	Ala	Leu	Ala	Pro	Val	His	Leu	Gly	Leu		
65				70				75							80		
ccc	tcg	gcg	ctg	tcg	gtc	gtg	ctg	ggc	gcg	gcc	gtc	tcg	ggc	gcg	ctg		288

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Pro	Ser	Ala	Leu	Ser 85	Val	Val	Leu	Gly	Ala 90	Ala	Val	Ser	Gly	Ala 95	Leu	
gcg	tgg	ctg	gtc	ggc	cg	ccc	atc	ctg	cg	ctg	aag	ggc	tac	tac	ctg	336
Ala	Trp	Leu	Val	Gly	Arg	Pro	Ile	Leu	Arg	Leu	Lys	Gly	Tyr	Tyr	Leu	
			100					105					110			
ggc	gtg	gcc	tcg	ctg	ggc	ttc	ggc	atc	ctg	gtg	gcc	atg	gtg	ctg	aac	384
Gly	Val	Ala	Ser	Leu	Gly	Phe	Gly	Ile	Leu	Val	Ala	Met	Val	Leu	Asn	
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aat	gaa	cg	cag	ctc	acc	aaa	ggg	ccg	gac	ggc	atc	gcc	gtg	ccc	gac	432
Asn	Glu	Arg	Gln	Leu	Thr	Lys	Gly	Pro	Asp	Gly	Ile	Ala	Val	Pro	Asp	
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ccc	ggt	ctg	cg	agc	ctg	ttg	aag	ggc	tgg	ggc	ctg	gac	ctg	tcc	aat	480
Pro	Gly	Leu	Arg	Ser	Leu	Leu	Lys	Gly	Trp	Gly	Leu	Asp	Leu	Ser	Asn	
145					150					155					160	
ggc	cag	ttc	tgg	tac	gcc	atg	acg	ggc	atc	cg	ctg	gtg	atc	ggc	gcc	528
Gly	Gln	Phe	Trp	Tyr	Ala	Met	Thr	Gly	Ile	Ala	Leu	Val	Ile	Gly	Ala	
			165					170						175		
tgg	ctc	cg	ctc	aac	ctc	tac	cac	agc	ccg	aca	ggg	cg	cg	ctg	cg	576
Trp	Leu	Ala	Leu	Asn	Leu	Tyr	His	Ser	Pro	Thr	Gly	Arg	Ala	Leu	Arg	
			180					185					190			
gcg	ctg	cac	ggt	tcg	gag	atc	gcc	gcc	ggc	acc	gtc	ggc	atc	gac	gtg	624
Ala	Leu	His	Gly	Ser	Glu	Ile	Ala	Ala	Gly	Thr	Val	Gly	Ile	Asp	Val	
		195					200					205				
gcg	ggc	gcc	aag	ctc	aag	gcg	ttt	gtc	gtc	tcg	gcc	gtg	tac	gcc	tcg	672
Ala	Gly	Ala	Lys	Leu	Lys	Ala	Phe	Val	Val	Ser	Ala	Val	Tyr	Ala	Ser	
	210					215					220					
gtc	tcg	ggc	tcg	ctg	ctg	gcg	ctg	cag	aac	cg	ttc	atc	acg	ccg	gac	720
Val	Ser	Gly	Ser	Leu	Leu	Ala	Leu	Gln	Asn	Arg	Phe	Ile	Thr	Pro	Asp	
225					230				235						240	
atc	gcg	ggc	ttc	atg	cac	tcg	atc	gaa	atg	gtg	acc	atg	gcg	gtg	ctg	768
Ile	Ala	Gly	Phe	Met	His	Ser	Ile	Glu	Met	Val	Thr	Met	Ala	Val	Leu	
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ggc	ggc	gtc	ggc	tcg	gtc	gcc	ggc	gca	atc	ttc	ggc	gcg	agc	ctg	ctg	816
Gly	Gly	Val	Gly	Ser	Val	Ala	Gly	Ala	Ile	Phe	Gly	Ala	Ser	Leu	Leu	
			260					265					270			
acc	ctg	ctt	ccg	cag	gtg	ctg	acg	gtg	ttc	gcc	gac	tac	gaa	ccc	ctc	864
Thr	Leu	Leu	Pro	Gln	Val	Leu	Thr	Val	Phe	Ala	Asp	Tyr	Glu	Pro	Leu	
		275					280					285				
atc	ctg	ggc	ctg	acc	atg	atg	ctg	gtc	atg	atc	ttc	ctg	ccc	gaa	ggc	912
Ile	Leu	Gly	Leu	Thr	Met	Met	Leu	Val	Met	Ile	Phe	Leu	Pro	Glu	Gly	
		290				295					300					
ctg	gtt	ccg	tcc	atc	atg	cg	acg	ata	cga	gga	agg	aaa	aaa	tga		957
Leu	Val	Pro	Ser	Ile	Met	Arg	Thr	Ile	Arg	Gly	Arg	Lys	Lys			
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<210> 707

<211> 318

<212> PRT

<213> Bordetella bronchiseptica

<400> 707

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Gly	Ser	Thr	Ile	Phe	Val	Asn	Ala	Leu	Ala	Val	Thr	Gly	Ile	Val	Ile	
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Leu	Thr	Gly	Tyr	Ala	Gly	Gln	Ile	Ser	Leu	Gly	His	Ala	Gly	Phe	Ala	
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Gly	Ile	Gly	Gly	Tyr	Ala	Cys	Ala	Leu	Ala	Pro	Val	His	Leu	Gly	Leu	
65					70				75						80	
Pro	Ser	Ala	Leu	Ser	Val	Val	Leu	Gly	Ala	Ala	Val	Ser	Gly	Ala	Leu	
				85					90					95		
Ala	Trp	Leu	Val	Gly	Arg	Pro	Ile	Leu	Arg	Leu	Lys	Gly	Tyr	Tyr	Leu	
			100					105					110			
Gly	Val	Ala	Ser	Leu	Gly	Phe	Gly	Ile	Leu	Val	Ala	Met	Val	Leu	Asn	
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Asn	Glu	Arg	Gln	Leu	Thr	Lys	Gly	Pro	Asp	Gly	Ile	Ala	Val	Pro	Asp	
	130					135					140					

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Pro Gly Leu Arg Ser Leu Leu Lys Gly Trp Gly Leu Asp Leu Ser Asn
 145 150 155 160
 Gly Gln Phe Trp Tyr Ala Met Thr Gly Ile Ala Leu Val Ile Gly Ala
 165 170 175
 Trp Leu Ala Leu Asn Leu Tyr His Ser Pro Thr Gly Arg Ala Leu Arg
 180 185 190
 Ala Leu His Gly Ser Glu Ile Ala Gly Thr Val Gly Ile Asp Val
 195 200 205
 Ala Gly Ala Lys Leu Lys Ala Phe Val Val Ser Ala Val Tyr Ala Ser
 210 215 220
 Val Ser Gly Ser Leu Leu Ala Leu Gln Asn Arg Phe Ile Thr Pro Asp
 225 230 235 240
 Ile Ala Gly Phe Met His Ser Ile Glu Met Val Thr Met Ala Val Leu
 245 250 255
 Gly Gly Val Gly Ser Val Ala Gly Ala Ile Phe Gly Ala Ser Leu Leu
 260 265 270
 Thr Leu Leu Pro Gln Val Leu Thr Val Phe Ala Asp Tyr Glu Pro Leu
 275 280 285
 Ile Leu Gly Leu Thr Met Met Leu Val Met Ile Phe Leu Pro Glu Gly
 290 295 300
 Leu Val Pro Ser Ile Met Arg Thr Ile Arg Gly Arg Lys Lys
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<210> 708

<211> 1950

<212> DNA

<213> Bordetella bronchiseptica

<220>

<221> CDS

<222> (1)..(1950)

<400> 708

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gca	tcg	tcg	ctg	ttc	ctg	gtg	gcg	gcg	ggg	ctt	tcg	ctg	att	ttc	ggc	96
Ala	Ser	Ser	Leu	Phe	Leu	Val	Ala	Ala	Gly	Leu	Ser	Leu	Ile	Phe	Gly	
			20				25						30			
gtg	acg	cgc	atc	gtc	aat	ttc	gcg	cac	ggc	tcg	ctc	tac	atg	ctg	ggc	144
Val	Thr	Arg	Ile	Val	Asn	Phe	Ala	His	Gly	Ser	Leu	Tyr	Met	Leu	Gly	
		35				40						45				
gtg	tac	gtg	gcg	tat	tcg	atc	gtc	gag	cgc	gtg	ggc	ggc	acc	gcg	ctg	192
Val	Tyr	Val	Ala	Tyr	Ser	Ile	Val	Glu	Arg	Val	Gly	Gly	Thr	Ala	Leu	
	50				55					60						
ggc	ttc	tgg	ttc	ggc	ctg	gtg	gcc	gcg	tcg	ctg	gcc	gtc	ggc	gtg	gtg	240
Gly	Phe	Trp	Phe	Gly	Leu	Val	Ala	Ala	Ser	Leu	Ala	Val	Gly	Val	Val	
65				70					75					80		
ggc	gcg	gct	atc	gag	gtc	gtg	ctg	ttg	cgc	cgc	atc	tat	cgc	gcg	ccg	288
Gly	Ala	Ala	Ile	Glu	Val	Val	Leu	Leu	Arg	Arg	Ile	Tyr	Arg	Ala	Pro	
			85					90					95			
gag	ctg	ttc	cag	ctg	ctg	gcg	acc	ttc	gcc	ctg	gtg	ctg	gtc	atc	aac	336
Glu	Leu	Phe	Gln	Leu	Leu	Ala	Thr	Phe	Ala	Leu	Val	Leu	Val	Ile	Asn	
			100					105					110			
gat	gcc	gcg	ctg	tgg	atc	tgg	ggc	gcc	gaa	gac	ctg	ctg	ggg	cgg	cgc	384
Asp	Ala	Ala	Leu	Trp	Ile	Trp	Gly	Ala	Glu	Asp	Leu	Leu	Gly	Arg	Arg	
		115					120					125				
gcg	ccg	ggg	ctg	acc	ggc	gcg	gtc	gac	ctg	ctg	ggc	cgc	cag	tac	ccg	432
Ala	Pro	Gly	Leu	Thr	Gly	Ala	Val	Asp	Leu	Leu	Gly	Arg	Gln	Tyr	Pro	
	130				135						140					
gtc	tac	aac	ctg	gtg	ctg	atc	gtg	atc	ggg	ccg	gtg	gtg	ctg	ggg	ctg	480
Val	Tyr	Asn	Leu	Val	Leu	Ile	Val	Ile	Gly	Pro	Val	Val	Leu	Gly	Leu	
145				150					155					160		
ctc	tgg	ctg	ctg	ctg	acg	cgc	acg	cgc	tgg	ggc	acc	ctg	gtg	cgc	gcg	528
Leu	Trp	Leu	Leu	Leu	Thr	Arg	Thr	Arg	Trp	Gly	Thr	Leu	Val	Arg	Ala	
			165					170						175		
gcc	acg	cag	gac	cgc	gag	atg	ctc	ggc	gcg	ctg	ggc	gtg	aac	cag	gcc	576
Ala	Thr	Gln	Asp	Arg	Glu	Met	Leu	Gly	Ala	Leu	Gly	Val	Asn	Gln	Ala	
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Trp	Leu	Phe	Thr	Gly	Val	Phe	Ala	Leu	Gly	Ala	Met	Leu	Ala	Gly	Leu	
		195					200					205				
ggc	ggc	gcg	ctg	caa	ttg	ccg	gcg	gag	cca	gcc	agc	ctg	agc	ctg	gac	672
Gly	Gly	Ala	Leu	Gln	Leu	Pro	Arg	Glu	Pro	Ala	Ser	Leu	Ser	Leu	Asp	
	210					215					220					
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Leu	Arg	Thr	Ile	Gly	Asp	Ala	Phe	Val	Ile	Val	Val	Gly	Gly	Met		
225					230					235				240		
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Gly	Ser	Ile	Pro	Gly	Ala	Tyr	Val	Ala	Ala	Leu	Ile	Ile	Ala	Glu	Ile	
				245				250						255		
aag	gcg	ctg	tgc	ggc	ctg	ggc	acc	gtg	acc	ctg	ctg	ggc	ttc	agc		816
Lys	Ala	Leu	Cys	Ile	Gly	Leu	Gly	Thr	Val	Thr	Leu	Leu	Gly	Phe	Ser	
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gtg	tcg	ttc	tcc	aag	ctg	acg	ctg	gtg	gtg	gag	ttc	gcc	ttc	atg	gcg	864
Val	Ser	Phe	Ser	Lys	Leu	Thr	Leu	Val	Val	Glu	Phe	Ala	Phe	Met	Ala	
		275					280					285				
ctg	gtg	ctg	gtg	ttc	cgc	ccc	tgg	ggc	ctg	ttc	gga	cgc	ccg	cag	ggc	912
Leu	Val	Leu	Val	Phe	Arg	Pro	Trp	Gly	Leu	Phe	Gly	Arg	Pro	Gln	Gly	
	290					295					300					
gcc	agc	cgc	aac	tcg	gcg	ccc	atc	gag	gcg	ccg	ctg	cgc	ccg	gcc	gcg	960
Ala	Ser	Arg	Asn	Ser	Ala	Pro	Ile	Glu	Ala	Pro	Leu	Arg	Pro	Ala	Ala	
305				310					315						320	
ccg	cgc	ctg	cgc	atc	ctg	tgg	ggc	gtc	ctg	gcc	gcc	ctg	gcg	acg		1008
Pro	Arg	Leu	Arg	Ile	Leu	Trp	Gly	Val	Leu	Leu	Ala	Ala	Leu	Ala	Thr	
				325				330						335		
ctg	ccg	ctg	ctg	gcg	cag	tgg	ctg	ccg	tac	gcg	gtg	gtg	ctg	acg	cag	1056
Leu	Pro	Leu	Leu	Ala	Gln	Trp	Leu	Pro	Tyr	Ala	Val	Val	Leu	Thr	Gln	
			340					345					350			
gac	atc	ctg	atc	gcc	gcg	ctg	ttc	gcc	gtc	agc	ctg	cat	ttc	atg	atg	1104
Asp	Ile	Leu	Ile	Ala	Ala	Leu	Phe	Ala	Val	Ser	Leu	His	Phe	Met	Met	
		355					360					365				
ggg	ccg	ggc	ggc	atg	cat	tcg	ttc	ggc	cac	gcg	gcg	tac	ttc	ggg	ctg	1152
Gly	Pro	Gly	Gly	Met	His	Ser	Phe	Gly	His	Ala	Ala	Tyr	Phe	Gly	Leu	
	370					375				380						
ggc	gcg	tac	ggc	gcg	gcc	ttg	ctg	ctg	aag	gcc	gcc	tcg	ctg	ccc	atg	1200
Gly	Ala	Tyr	Gly	Ala	Ala	Leu	Leu	Leu	Lys	Ala	Ala	Ser	Leu	Pro	Met	
385				390					395						400	
gag	gcc	gcg	ctg	gcc	ttc	gcg	ccg	ctg	gtg	gcc	gcc	ctg	ggc	gcg	ctg	1248
Glu	Ala	Ala	Leu	Ala	Phe	Ala	Pro	Leu	Val	Ala	Ala	Leu	Gly	Ala	Leu	
				405				410						415		
atc	ttc	ggc	tgg	ttc	tgc	gtg	cgc	ctg	tcg	ggc	gtc	tat	ctg	gcc	atg	1296
Ile	Phe	Gly	Trp	Phe	Cys	Val	Arg	Leu	Ser	Gly	Val	Tyr	Leu	Ala	Met	
			420					425					430			
ctg	acc	ctg	gcg	ttc	tcg	cag	atc	gtc	tgg	tcg	gtg	gtg	ttc	cag	tgg	1344
Leu	Thr	Leu	Ala	Phe	Ser	Gln	Ile	Val	Trp	Ser	Val	Val	Phe	Gln	Trp	
		435					440					445				
gac	gac	ttc	acc	ggc	ggc	tcc	aac	ggc	atg	atc	ggc	gtc	tgg	ccg	gcc	1392
Asp	Asp	Phe	Thr	Gly	Gly	Ser	Asn	Gly	Met	Ile	Gly	Val	Trp	Pro	Ala	
	450					455				460						
gag	tgg	ctg	tcc	ggc	acc	gac	tac	tac	tat	ctg	gcg	ctg	gcg	gtg	gtc	1440
Glu	Trp	Leu	Ser	Gly	Thr	Ala	Tyr	Tyr	Tyr	Leu	Ala	Leu	Ala	Val	Val	
465				470						475					480	
gcg	gcc	gcc	gtg	ctg	ggc	ctg	cgg	cgc	gtg	ctg	ttc	tcg	cca	ttc	ggc	1488
Ala	Ala	Ala	Val	Leu	Gly	Leu	Arg	Arg	Val	Leu	Phe	Ser	Pro	Phe	Gly	
				485				490						495		
tac	gca	atg	cgc	gcc	ggg	cgc	gat	tcc	agc	ctg	cgc	gcc	gac	gcc	atc	1536
Tyr	Ala	Met	Arg	Ala	Gly	Arg	Asp	Ser	Ser	Leu	Arg	Ala	Asp	Ala	Ile	
			500				505						510			
ggc	atc	gac	gtc	aag	cgg	gtg	cag	tgg	gcg	gct	ttc	gtg	gtg	gcc	ggc	1584
Gly	Ile	Asp	Val	Lys	Arg	Val	Gln	Trp	Ala	Ala	Phe	Val	Val	Ala	Gly	
		515					520					525				
gcg	ttc	ggc	ggg	ctg	gcc	gga	gcg	ctg	tat	gcg	ttt	tcc	aag	ggc	agc	1632
Ala	Phe	Gly	Gly	Leu	Ala	Gly	Ala	Leu	Tyr	Ala	Phe	Ser	Lys	Gly	Ser	
	530					535				540						
att	tcg	ccc	gac	acc	atg	gcg	gtg	agc	aag	tcg	gtc	gac	ggc	ctg	gtg	1680
Ile	Ser	Pro	Asp	Thr	Met	Ala	Val	Ser	Lys	Ser	Val	Asp	Gly	Leu	Val	
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				565					570					575		
gcg	acg	gcg	ttc	aac	gtg	ctg	cag	gat	tac	atc	atg	cg	gcc	acc	gag	1776
Ala	Thr	Ala	Phe	Asn	Val	Leu	Gln	Asp	Tyr	Ile	Met	Arg	Ala	Thr	Glu	
			580					585					590			
tac	tgg	cg	gcg	ctg	ttc	ggc	ggc	gtc	atc	ctc	ctg	ctg	gtg	ctg	gtg	1824
Tyr	Trp	Arg	Ala	Leu	Phe	Gly	Gly	Val	Ile	Leu	Leu	Leu	Val	Leu	Val	
		595					600					605				
ttc	ccg	caa	ggg	atc	gcg	gga	ttc	tgc	cg	cag	gcg	ggg	caa	tgg	tgg	1872
Phe	Pro	Gln	Gly	Ile	Ala	Gly	Phe	Cys	Arg	Gln	Ala	Gly	Gln	Trp	Trp	
	610					615					620					
agc	gcg	cg	gcc	ggc	aag	gac	cg	ccg	cg	cg	aag	ggc	ggc	gcc	ttc	1920
Ser	Ala	Arg	Ala	Gly	Lys	Asp	Arg	Pro	Pro	Arg	Lys	Gly	Gly	Ala	Phe	
	625				630					635					640	
atc	ggc	gga	ccg	cg	gag	aag	cag	gca	tga							1950
Ile	Gly	Gly	Pro	Arg	Glu	Lys	Gln	Ala								
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<210> 709

<211> 649

<212> PRT

<213> Bordetella bronchiseptica

<400> 709

Met	Asp	Leu	Thr	Gly	Phe	Leu	Ala	Gln	Leu	Leu	Asn	Gly	Leu	Ala	Glu	
1				5					10					15		
Ala	Ser	Ser	Leu	Phe	Leu	Val	Ala	Ala	Gly	Leu	Ser	Leu	Ile	Phe	Gly	
			20					25					30			
Val	Thr	Arg	Ile	Val	Asn	Phe	Ala	His	Gly	Ser	Leu	Tyr	Met	Leu	Gly	
		35					40					45				
Val	Tyr	Val	Ala	Tyr	Ser	Ile	Val	Glu	Arg	Val	Gly	Gly	Thr	Ala	Leu	
	50					55					60					
Gly	Phe	Trp	Phe	Gly	Leu	Val	Ala	Ala	Ser	Leu	Ala	Val	Gly	Val	Val	
65					70					75					80	
Gly	Ala	Ala	Ile	Glu	Val	Val	Leu	Leu	Arg	Arg	Ile	Tyr	Arg	Ala	Pro	
				85					90					95		
Glu	Leu	Phe	Gln	Leu	Leu	Ala	Thr	Phe	Ala	Leu	Val	Leu	Val	Ile	Asn	
			100					105					110			
Asp	Ala	Ala	Leu	Trp	Ile	Trp	Gly	Ala	Glu	Asp	Leu	Leu	Gly	Arg	Arg	
		115					120					125				
Ala	Pro	Gly	Leu	Thr	Gly	Ala	Val	Asp	Leu	Leu	Gly	Arg	Gln	Tyr	Pro	
	130					135					140					
Val	Tyr	Asn	Leu	Val	Leu	Ile	Val	Ile	Gly	Pro	Val	Val	Leu	Gly	Leu	
145					150					155					160	
Leu	Trp	Leu	Leu	Leu	Thr	Arg	Thr	Arg	Trp	Gly	Thr	Leu	Val	Arg	Ala	
				165					170					175		
Ala	Thr	Gln	Asp	Arg	Glu	Met	Leu	Gly	Ala	Leu	Gly	Val	Asn	Gln	Ala	
			180					185					190			
Trp	Leu	Phe	Thr	Gly	Val	Phe	Ala	Leu	Gly	Ala	Met	Leu	Ala	Gly	Leu	
		195					200					205				
Gly	Gly	Ala	Leu	Gln	Leu	Pro	Arg	Glu	Pro	Ala	Ser	Leu	Ser	Leu	Asp	
	210					215					220					
Leu	Arg	Thr	Ile	Gly	Asp	Ala	Phe	Val	Ile	Val	Val	Val	Gly	Gly	Met	
225					230					235					240	
Gly	Ser	Ile	Pro	Gly	Ala	Tyr	Val	Ala	Ala	Leu	Ile	Ile	Ala	Glu	Ile	
				245						250				255		
Lys	Ala	Leu	Cys	Ile	Gly	Leu	Gly	Thr	Val	Thr	Leu	Leu	Gly	Phe	Ser	
			260					265					270			
Val	Ser	Phe	Ser	Lys	Leu	Thr	Leu	Val	Val	Glu	Phe	Ala	Phe	Met	Ala	
		275					280					285				
Leu	Val	Leu	Val	Phe	Arg	Pro	Trp	Gly	Leu	Phe	Gly	Arg	Pro	Gln	Gly	
	290					295					300					
Ala	Ser	Arg	Asn	Ser	Ala	Pro	Ile	Glu	Ala	Pro	Leu	Arg	Pro	Ala	Ala	
305					310					315					320	
Pro	Arg	Leu	Arg	Ile	Leu	Trp	Gly	Val	Leu	Leu	Ala	Ala	Leu	Ala	Thr	
				325					330					335		
Leu	Pro	Leu	Leu	Ala	Gln	Trp	Leu	Pro	Tyr	Ala	Val	Val	Leu	Thr	Gln	
			340					345					350			

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Asp Ile Leu Ile Ala Ala Leu Phe Ala Val Ser Leu His Phe Met Met
 355 360 365
 Gly Pro Gly Gly Met His Ser Phe Gly His Ala Ala Tyr Phe Gly Leu
 370 375 380
 Gly Ala Tyr Gly Ala Ala Leu Leu Leu Lys Ala Ala Ser Leu Pro Met
 385 390 400
 Glu Ala Ala Leu Ala Phe Ala Pro Leu Val Ala Ala Leu Gly Ala Leu
 405 410 415
 Ile Phe Gly Trp Phe Cys Val Arg Leu Ser Gly Val Tyr Leu Ala Met
 420 425 430
 Leu Thr Leu Ala Phe Ser Gln Ile Val Trp Ser Val Val Phe Gln Trp
 435 440 445
 Asp Asp Phe Thr Gly Gly Ser Asn Gly Met Ile Gly Val Trp Pro Ala
 450 455 460
 Glu Trp Leu Ser Gly Thr Ala Tyr Tyr Tyr Leu Ala Leu Ala Val Val
 465 470 475 480
 Ala Ala Ala Val Leu Gly Leu Arg Arg Val Leu Phe Ser Pro Phe Gly
 485 490 495
 Tyr Ala Met Arg Ala Gly Arg Asp Ser Leu Arg Ala Asp Ala Ile
 500 505 510
 Gly Ile Asp Val Lys Arg Val Gln Trp Ala Ala Phe Val Val Ala Gly
 515 520 525
 Ala Phe Gly Gly Leu Ala Gly Ala Leu Tyr Ala Phe Ser Lys Gly Ser
 530 535 540
 Ile Ser Pro Asp Thr Met Ala Val Ser Lys Ser Val Asp Gly Leu Val
 545 550 555 560
 Met Val Leu Leu Gly Gly Ile Gln Thr Leu Ile Gly Pro Val Val Gly
 565 570 575
 Ala Thr Ala Phe Asn Val Leu Gln Asp Tyr Ile Met Arg Ala Thr Glu
 580 585 590
 Tyr Trp Arg Ala Leu Phe Gly Gly Val Ile Leu Leu Leu Val Leu Val
 595 600 605
 Phe Pro Gln Gly Ile Ala Gly Phe Cys Arg Gln Ala Gly Gln Trp Trp
 610 615 620
 Ser Ala Arg Ala Gly Lys Asp Arg Pro Pro Arg Lys Gly Gly Ala Phe
 625 630 635 640
 Ile Gly Gly Pro Arg Glu Lys Gln Ala
 645

<210> 710

<211> 876

<212> DNA

<213> Bordetella bronchiseptica

<220>

<221> CDS

<222> (1)..(876)

<400> 710

atg	gat	aca	gtg	ctg	ttc	gcc	aat	gcc	atc	atc	aat	ggc	gtc	att	gtc	48
Met	Asp	Thr	Val	Leu	Phe	Ala	Asn	Ala	Ile	Ile	Asn	Gly	Val	Ile	Val	
1				5					10					15		
ggg	ttg	ctg	ctg	gcg	tta	ccg	gcc	ttg	gcc	att	acg	ttg	gta	ttc	ggc	96
Gly	Leu	Leu	Leu	Ala	Leu	Pro	Ala	Leu	Ala	Ile	Thr	Leu	Val	Phe	Gly	
			20					25					30			
ata	gcc	cgg	ttt	ccc	aac	gcc	gcc	gcc	ggc	gac	tac	atg	acc	ttc	ggc	144
Ile	Ala	Arg	Phe	Pro	Asn	Ala	Ala	Ala	Gly	Asp	Tyr	Met	Thr	Phe	Gly	
		35				40						45				
gcc	tac	gcg	acc	gtg	gcc	gcg	cag	gcg	ttc	atg	ggc	gcg	tcg	ctg	gtc	192
Ala	Tyr	Ala	Thr	Val	Ala	Ala	Gln	Ala	Phe	Met	Gly	Ala	Ser	Leu	Val	
	50				55					60						
ggc	agc	gcg	atc	gtg	gcg	acg	ctg	gcc	acc	ggg	ctg	ctt	tcc	ctg	ttc	240
Gly	Ser	Ala	Ile	Val	Ala	Thr	Leu	Ala	Thr	Gly	Leu	Leu	Ser	Leu	Phe	
	65				70				75						80	
ttc	tat	ttc	tgg	gtc	ttc	agg	aaa	ctg	gcg	cag	cgc	tcg	ctg	gtg	gcg	288
Phe	Tyr	Phe	Trp	Val	Phe	Arg	Lys	Leu	Ala	Gln	Arg	Ser	Leu	Val	Ala	
				85				90						95		
cgc	ctg	atc	gcc	tcg	atc	ggc	atc	gcc	gtc	agg	gcc	gcc	att			336
Arg	Leu	Ile	Ala	Ser	Ile	Gly	Ile	Ala	Phe	Ala	Val	Arg	Ala	Ala	Ile	

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[illegible]

<210> 711

<211> 291

<212> PRT

<213> Bordetella bronchiseptica

<400> 711

Met 1	Asp	Thr	Val	Leu 5	Phe	Ala	Asn	Ala	Ile 10	Ile	Asn	Gly	Val	Ile 15	Val
Gly	Leu	Leu	Leu	Ala 20	Leu	Pro	Ala	Leu 25	Ala	Ile	Thr	Leu	Val 30	Phe	Gly
Ile	Ala	Arg 35	Phe	Pro	Asn	Ala	Ala 40	Ala	Gly	Asp	Tyr	Met 45	Thr	Phe	Gly
Ala	Tyr 50	Ala	Thr	Val	Ala	Ala 55	Gln	Ala	Phe	Met	Gly 60	Ala	Ser	Leu	Val
Gly 65	Ser	Ala	Ile	Val	Ala 70	Thr	Leu	Ala	Thr	Gly 75	Leu	Leu	Ser	Leu	Phe 80
Phe	Tyr	Phe	Trp	Val 85	Phe	Arg	Lys	Leu	Ala 90	Gln	Arg	Ser	Leu	Val 95	Ala
Arg	Leu	Ile	Ala 100	Ser	Ile	Gly	Ile	Ala 105	Phe	Ala	Val	Arg	Ala 110	Ala	Ile
Thr	Phe	Phe 115	Ala	Gly	His	Gly	Gln 120	Tyr	Thr	Ile	Gln	Ala 125	Pro	Leu	Gln
Arg	Ala 130	Trp	Asn	Phe	Gly	Gly 135	Ile	Arg	Ile	Leu	Pro 140	Leu	Asp	Val	Tyr
Ile 145	Leu	Leu	Ala	Ala 150	Leu	Leu	Ala	Leu	Ala	Phe 155	Met	Phe	Gly	Leu	Leu 160
Tyr	Leu	Ser	Pro	Thr 165	Gly	Arg	Arg	Met	Arg 170	Ala	Val	Ser	Asp	Asn 175	Pro
Gln	Leu	Ala	Ala 180	Val	Gly	Gly	Ile	Gly 185	Val	Arg	Lys	Val	Met 190	Val	Ile
Leu	Trp	Gly	Ile 180	Val	Gly	Val	Phe	Ser	Gly	Leu	Gly	Gly	Val	Leu	Leu

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195
 Gly Ile Lys Ala Thr Val Leu 200
 210 215
 Pro Met Phe Ala Ala Val Ile Leu Gly Gly Val Gly Ser Pro Val Gly
 225 230 235 240
 Ala Val Leu Gly Met Ile Val Phe Gly Ile Ala Gln Glu Ala Ala Thr
 245 250 255
 Leu Tyr Ile Gly Ser Ala Tyr Lys Ile Val Ile Ala Phe Leu Val Leu
 260 265 270
 Leu Val Val Leu Leu Phe Arg Pro Gln Gly Ile Met Gly Arg Val Gln
 275 280 285
 Ala Val Arg
 290

<210> 712

<211> 888

<212> DNA

<213> Bordetella bronchiseptica

<220>

<221> CDS

<222> (1)..(888)

<400> 712

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Met Asn Ile Glu Ser Ile Leu Gly Ile Pro Ile Asn Ala Phe Met Gly	
1 5 10 15	
cag ttg ctg atg ggg ctg atg aac ggc gcc ttc tac gcc atg ctg agc	96
Gln Leu Leu Met Gly Leu Met Asn Gly Ala Phe Tyr Ala Met Leu Ser	
20 25 30	
ctg ggc ctg gcg atc att ttc ggg ctg ctc aac gtg atc aat ttc ctg	144
Leu Gly Leu Ala Ile Ile Phe Gly Leu Leu Asn Val Ile Asn Phe Leu	
35 40 45	
cac ggc gcc cag ttc atg gtg ggg gcg ttc atc gcc tgg atg ctg ctg	192
His Gly Ala Gln Phe Met Val Gly Ala Phe Ile Ala Trp Met Leu Leu	
50 55 60	
gcg tgg gcg ggc ctg agc tac tgg gtc gcc ctg ctg gtg gcg ccg ctg	240
Ala Trp Ala Gly Leu Ser Tyr Trp Val Ala Leu Leu Val Ala Pro Leu	
65 70 75 80	
gtc gtc gcg atc ggc gcc gtg ttc gtc gag cgc ctg ttc ctg cgg cat	288
Val Val Ala Ile Gly Ala Val Phe Val Glu Arg Leu Phe Leu Arg His	
85 90 95	
ctc tac cgt ctc gac cat ctc tac ggc atg ctg ctg acc ttc ggc ctg	336
Leu Tyr Arg Leu Asp His Leu Tyr Gly Met Leu Leu Thr Phe Gly Leu	
100 105 110	
atg ctg atg gtc gag ggg ctg ttt cgc aag agc ttc ggc tcg tcc ggg	384
Met Leu Met Val Glu Gly Leu Phe Arg Lys Ser Phe Gly Ser Ser Gly	
115 120 125	
ctt ccc tat ccc aat gtc atc ccc ggc ggc atg aac ctg ggt ttc atg	432
Leu Pro Tyr Pro Asn Val Ile Pro Gly Gly Met Asn Leu Gly Phe Met	
130 135 140	
ttc ctg ccg tat tac cgg gcc tgg gtc gtg gcg gcc tcg ctg ctc gtc	480
Phe Leu Pro Tyr Tyr Arg Ala Trp Val Val Ala Ala Ser Leu Leu Val	
145 150 155 160	
tgc ctg gcc atc tgg ctg ctg atc gag aag acg cgg ctg ggc agc tat	528
Cys Leu Ala Ile Trp Leu Leu Ile Glu Lys Thr Arg Leu Gly Ser Tyr	
165 170 175	
ctg cgc gcg gcg acc gag aac ccg gac atg gtg cgc gcc ttc ggc atc	576
Leu Arg Ala Ala Thr Glu Asn Pro Asp Met Val Arg Ala Phe Gly Ile	
180 185 190	
aag gtt ccc gtg ctg ctg acg ctg acc tac gcg ttc ggc gcg ggg ctg	624
Lys Val Pro Val Leu Leu Thr Leu Thr Tyr Ala Phe Gly Ala Gly Leu	
195 200 205	
gcc ggc ctg gcg ggc gtc atg gcg gcg ccg atc tac cag gtc agt ccg	672
Ala Gly Leu Ala Gly Val Met Ala Ala Pro Ile Tyr Gln Val Ser Pro	
210 215 220	
ctg atg ggc tcc aac ctg gtc atc ctg gtc ttc gcc gtg gtg gtg atc	720
Leu Met Gly Ser Asn Leu Val Ile Leu Val Phe Ala Val Val Val Ile	
225 230 235 240	

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ggc	ggc	atg	ggc	tcg	atc	ctg	ggc	tcg	atc	ctg	acc	ggc	ttc	tcg	ctg	768
Gly	Gly	Met	Gly	Ser	Ile	Leu	Gly	Ser	Ile	Leu	Thr	Gly	Phe	Ser	Leu	
				245					250					255		
ggc	gcc	atc	gaa	ggc	ctg	acc	aaa	ctc	ttc	tac	ccg	cag	gcc	tcg	gcg	816
Gly	Ala	Ile	Glu	Gly	Leu	Thr	Lys	Leu	Phe	Tyr	Pro	Gln	Ala	Ser	Ala	
			260					265					270			
acc	gtg	atc	ttc	ctc	gtg	atg	atc	gtg	ctg	ctc	atc	aag	ccg	acg		864
Thr	Val	Ile	Phe	Leu	Val	Met	Ile	Val	Leu	Leu	Ile	Lys	Pro	Thr		
		275					280				285					
ggc	ctg	ttc	ggc	aag	gcg	aag	tga									888
Gly	Leu	Phe	Gly	Lys	Ala	Lys										
	290					295										

<210> 713

<211> 295

<212> PRT

<213> Bordetella bronchiseptica

<400> 713

Met	Asn	Ile	Glu	Ser	Ile	Leu	Gly	Ile	Pro	Ile	Asn	Ala	Phe	Met	Gly	
1				5					10					15		
Gln	Leu	Leu	Met	Gly	Leu	Met	Asn	Gly	Ala	Phe	Tyr	Ala	Met	Leu	Ser	
			20					25					30			
Leu	Gly	Leu	Ala	Ile	Ile	Phe	Gly	Leu	Leu	Asn	Val	Ile	Asn	Phe	Leu	
		35					40					45				
His	Gly	Ala	Gln	Phe	Met	Val	Gly	Ala	Phe	Ile	Ala	Trp	Met	Leu	Leu	
	50					55				60						
Ala	Trp	Ala	Gly	Leu	Ser	Tyr	Trp	Val	Ala	Leu	Leu	Val	Ala	Pro	Leu	
65					70					75					80	
Val	Val	Ala	Ile	Gly	Ala	Val	Phe	Val	Glu	Arg	Leu	Phe	Leu	Arg	His	
				85					90					95		
Leu	Tyr	Arg	Leu	Asp	His	Leu	Tyr	Gly	Met	Leu	Leu	Thr	Phe	Gly	Leu	
			100					105					110			
Met	Leu	Met	Val	Glu	Gly	Leu	Phe	Arg	Lys	Ser	Phe	Gly	Ser	Ser	Gly	
		115					120					125				
Leu	Pro	Tyr	Pro	Asn	Val	Ile	Pro	Gly	Gly	Met	Asn	Leu	Gly	Phe	Met	
	130					135					140					
Phe	Leu	Pro	Tyr	Tyr	Arg	Ala	Trp	Val	Val	Ala	Ala	Ser	Leu	Leu	Val	
145					150					155					160	
Cys	Leu	Ala	Ile	Trp	Leu	Leu	Ile	Glu	Lys	Thr	Arg	Leu	Gly	Ser	Tyr	
				165					170					175		
Leu	Arg	Ala	Ala	Thr	Glu	Asn	Pro	Asp	Met	Val	Arg	Ala	Phe	Gly	Ile	
		180						185					190			
Lys	Val	Pro	Val	Leu	Leu	Thr	Leu	Thr	Tyr	Ala	Phe	Gly	Ala	Gly	Leu	
		195					200					205				
Ala	Gly	Leu	Ala	Gly	Val	Met	Ala	Ala	Pro	Ile	Tyr	Gln	Val	Ser	Pro	
	210					215					220					
Leu	Met	Gly	Ser	Asn	Leu	Val	Ile	Leu	Val	Phe	Ala	Val	Val	Val	Ile	
225					230					235					240	
Gly	Gly	Met	Gly	Ser	Ile	Leu	Gly	Ser	Ile	Leu	Thr	Gly	Phe	Ser	Leu	
				245					250					255		
Gly	Ala	Ile	Glu	Gly	Leu	Thr	Lys	Leu	Phe	Tyr	Pro	Gln	Ala	Ser	Ala	
			260					265					270			
Thr	Val	Ile	Phe	Leu	Val	Met	Ile	Ile	Val	Leu	Leu	Ile	Lys	Pro	Thr	
		275					280					285				
Gly	Leu	Phe	Gly	Lys	Ala	Lys										
	290					295										

<210> 714

<211> 867

<212> DNA

<213> Bordetella bronchiseptica

<220>

<221> CDS

<222> (1)..(867)

<400> 714

atg	ttg	atg	caa	atc	ctg	atc	ggc	tcg	ctc	acg	gcc	ggc	gcg	gtc	tac	
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Met 1	Leu	Met	Gln	Ile 5	Leu	Ile	Gly	Ser	Leu 10	Thr	Ala	Gly	Ala	Val 15	Tyr		
gcg Ala	ctg Leu	gtc Val	gcg Ala	ctc Leu	ggg Gly	ttc Phe	gtg Val	ctg Leu	atc Ile	tac Tyr	aag Lys	ggc Gly	acc Thr	ggc Gly	gtg Val	96	
gtg Val	cac His	ttc Phe 35	gag Gly	tac Tyr	ggc Gly	gag Glu	cag Gln 40	ctg Leu	acc Thr	ttc Phe	ggc Gly	gcc Ala 45	tac Tyr	atg Met	gcg Ala	144	
ctg Leu	atc Ile 50	ggc Gly	cag Gln	tcg Ser	ctg Leu	ctg Leu 55	ggg Gly	ctg Leu	ccg Pro	ttc Phe	ggc Gly 60	ctg Leu	gag Ala	ctg Leu	ctg Leu	192	
ttc Phe 65	gag Ala	ctg Leu	gag Ala	gcc Ala	tcg Ser 70	gag Ala	ctg Leu	ctg Leu	ggc Gly	tgg Trp 75	ctg Leu	atc Ile	ttc Phe	ggc Gly	ctg Leu 80	240	
ttc Phe	gcc Ala	ggg Gly	ccg Pro	ctg Leu 85	cgc Arg	cac His	gcc Ala	acg Thr	ctg Leu 90	tgg Trp	acc Thr	cgc Arg	atc Ile	atc Ile 95	gcc Ala	288	
acc Thr	ctg Leu	gcc Ala	atc Ile 100	ggc Gly	atc Ile	gag Ala	ctg Leu	cgc Arg 105	gag Glu	ggg Gly	ctg Leu	cgc Arg	gcc Ala 110	tac Tyr	atg Met	336	
ggg Gly	ccg Pro	acg Thr 115	gcc Ala	tgg Trp	ccg Pro	ttc Phe	ccg Pro 120	ttc Phe	ctg Leu	ctg Leu	tcg Ser	cag Gln 125	cag Gln	gcc Ala	ttc Phe	384	
gag Glu 130	gtg Val	ggc Gly	gag Gly	att Ile	tac Tyr	ctg Leu 135	ccc Val	gag Pro	gag Ala	aac Asn	ctc Leu 140	gag Ala	atc Ile	gcc Ala	ggc Gly	432	
atc Ile 145	gag Ala	gtg Val	ctc Leu	atc Ile	ctg Leu 150	gag Ala	gcc Ala	ctg Leu	ttc Phe	ctg Leu 155	ttc Phe	ctg Leu	gag Glu	cgc Arg	acc Thr 160	480	
ctg Leu	cgc Arg	ggc Gly	aag Lys	gag Ala 165	atc Ile	ctg Leu	tcg Ser	gag Ala 170	tgc Cys	gag Glu	aac Asn	cgc Arg	acc Thr 175	ggc Gly	gcc Ala	528	
agc Ser	ctg Leu	gtc Val	ggc Gly 180	atc Ile	cgc Arg	gtc Val	tcg Ser	cgc Arg 185	gtg Val	tac Tyr	ctg Leu	acc Thr 190	atc Ile	tgg Trp	atc Ile	576	
ctg Leu	gcc Ala	tcg Ser 195	ctg Leu	ctg Leu	gag Ala	gag Ala	gtg Val 200	ggc Ala	atc Ile	ctg Leu	atc Ile 205	gag Ala	gag Ala	ccg Pro	cag Gln	624	
ctc Leu	acg Thr 210	ctc Leu	tcg Ser	ccc Pro	gac Asp	atg Met 215	ggc Gly	atc Ile	atc Ile	gcc Ala	atc Ile 220	aag Lys	ggc Gly	ttc Phe	acg Thr	672	
gag Ala 225	gag Ala	gtc Val	atc Ile	ggc Gly	ggc Gly 230	ttt Phe	gag Ala	agc Ser	ctg Leu	ccc Pro 235	ggc Gly	gag Ala	gtg Val	ctg Leu 240	ggc Gly	720	
ggg Gly	ctg Leu	ctg Leu	ctg Leu	ggc Gly 245	gtg Val	ctc Leu	gaa Glu	ggc Gly	ctg Leu 250	gcc Ala	ggc Gly	gag Ala	tac Tyr	gtg Val 255	tcc Ser	768	
agc Ser	gcc Ala	atg Met 260	aag Lys	gac Asp	gtc Val	atc Ile	agc Ser	tac Tyr 265	gag Ala	gtg Val	ctc Leu	atc Ile 270	ctg Leu	gtg Val	atg Met	816	
ctg Leu	ctg Leu	atg Met 275	ccg Pro	cac His	ggg Gly	ctg Leu	ttt Phe 280	gga Gly	aaa Lys	ctc Leu	atc Ile	gtc Val 285	aaa Lys	aag Lys	gtg Val	864	
tag																867	

<210> 715

<211> 288

<212> PRT

<213> Bordetella bronchiseptica

<400> 715

Met Leu Met Gln Ile Leu Ile Gly Ser Leu Thr Ala Gly Ala Val Tyr
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Ala Leu Val Ala Leu Gly Phe Val Leu Ile Tyr Lys Gly Thr Gly Val
20 25 30
Val His Phe Gly Tyr Gly Glu Gln Leu Thr Phe Gly Ala Tyr Met Ala
35 40 45

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Leu Ile Gly Gln Ser Leu Leu Gly Leu Pro Phe Gly Leu Ala Leu Leu
 50 55 60
 Phe Ala Leu Ala Ala Ser Ala Leu Leu Gly Trp Leu Ile Phe Gly Leu
 65 70 75 80
 Phe Ala Gly Pro Leu Arg His Ala Thr Leu Trp Thr Arg Ile Ile Ala
 85 90 95
 Thr Leu Ala Ile Gly Ile Ala Leu Arg Glu Gly Leu Arg Ala Tyr Met
 100 105 110
 Gly Pro Thr Ala Trp Pro Phe Pro Phe Leu Leu Ser Gln Gln Ala Phe
 115 120 125
 Glu Val Gly Gly Ile Tyr Leu Val Pro Ala Asn Leu Ala Ile Ala Gly
 130 135 140
 Ile Ala Val Leu Ile Leu Ala Ala Leu Phe Leu Phe Leu Glu Arg Thr
 145 150 155 160
 Leu Arg Gly Lys Ala Ile Leu Ser Ala Cys Glu Asn Arg Thr Gly Ala
 165 170 175
 Ser Leu Val Gly Ile Arg Val Ser Arg Val Tyr Leu Thr Ile Trp Ile
 180 185 190
 Leu Ala Ser Leu Leu Ala Ala Val Ala Gly Ile Leu Ile Ala Pro Gln
 195 200 205
 Leu Thr Leu Ser Pro Asp Met Gly Ile Ile Ala Ile Lys Gly Phe Thr
 210 215 220
 Ala Ala Val Ile Gly Gly Phe Ala Ser Leu Pro Gly Ala Val Leu Gly
 225 230 235 240
 Gly Leu Leu Leu Gly Val Leu Glu Gly Leu Ala Gly Ala Tyr Val Ser
 245 250 255
 Ser Ala Met Lys Asp Val Ile Ser Tyr Ala Val Leu Ile Leu Val Met
 260 265 270
 Leu Leu Met Pro His Gly Leu Phe Gly Lys Leu Ile Val Lys Lys Val
 275 280 285

<210> 716

<211> 873

<212> DNA

<213> Bordetella bronchiseptica

<220>

<221> CDS

<222> (1)..(873)

<400> 716

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Met Asn Leu Leu Gln Gln Leu Ile Asn Gly Ile Val Leu Gly His Ala	
1 5 10 15	
tac gcg ctg atc gcc atc ggc tgg acc ctg ctg ctg ggc gtg gcc cgg	96
Tyr Ala Leu Ile Ala Ile Gly Trp Thr Leu Leu Leu Gly Val Ala Arg	
20 25 30	
ctg gtg aac ttc ggc cat ggc cag atg tac atg gtg ggc gcc ttc gtc	144
Leu Val Asn Phe Gly His Gly Gln Met Tyr Met Val Gly Ala Phe Val	
35 40 45	
acc tgg tgg gcc acc acc tcg gcc ggc atg ccc tac ctg ctg gcg ctg	192
Thr Trp Trp Ala Thr Thr Ser Ala Gly Met Pro Tyr Leu Leu Ala Leu	
50 55 60	
ccc acc gcc atg gcg ctg ggc gcg ctg atc ggc ctg gcc atg cag cgc	240
Pro Thr Ala Met Ala Leu Gly Ala Leu Ile Gly Leu Ala Met Gln Arg	
65 70 75 80	
atc atg ctg cgc gcc acc ttc gag cag aac ctg gtg tcc atc atg atc	288
Ile Met Leu Arg Ala Thr Phe Glu Gln Asn Leu Val Ser Ile Met Ile	
85 90 95	
atg acg ctg ggc ttc ggc tac gtc atc cag ggc gcg gcc tcg ctg atc	336
Met Thr Leu Gly Phe Gly Tyr Val Ile Gln Gly Ala Ala Ser Leu Ile	
100 105 110	
ttc ggc tcg acc ggg cag atc ctg gac acc gcc tgg tcg cag cgc gat	384
Phe Gly Ser Thr Gly Gln Ile Leu Asp Thr Ala Trp Ser Gln Arg Asp	
115 120 125	
atc gag gtc ggc gaa ctg tgg gtc acc tgg cag gac gcc gcc atc gtg	432
Ile Glu Val Gly Glu Leu Trp Val Thr Trp Gln Asp Ala Ala Ile Val	
130 135 140	
gtc gcc gcg atc gcc gtg ttc gcc ggc ctg aag tgg ctg ctg gaa ggc	480

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Val 145	Ala	Ala	Ile	Ala	Val 150	Phe	Ala	Gly	Leu	Lys 155	Trp	Leu	Leu	Glu	Gly 160	
tcg	cgc	gcc	gga	cgc	ctg	gtg	cgc	atg	gtg	gcc	gaa	gac	ccg	aag	ctg	528
Ser	Arg	Ala	Gly	Arg	Leu	Val	Arg	Met	Val	Ala	Glu	Asp	Pro	Lys	Leu	
				165					170					175		
gcg	cag	ctg	gcc	ggc	gtc	gac	gtg	cgc	cgc	atc	tac	tat	ggc	gta	ttc	576
Ala	Gln	Leu	Ala	Gly	Val	Asp	Val	Arg	Arg	Ile	Tyr	Tyr	Gly	Val	Phe	
			180					185					190			
gcc	ttc	gag	ggc	gcc	gcg	gtg	gcg	ttt	gcc	gcc	ggc	atg	gtg	gcg	ccg	624
Ala	Phe	Glu	Gly	Ala	Ala	Val	Ala	Phe	Ala	Ala	Gly	Met	Val	Ala	Pro	
		195					200				205					
cgc	acg	ccc	atc	ctc	acc	tcg	atg	ggc	ttc	gag	gaa	gtc	atc	atc	acc	672
Arg	Thr	Pro	Ile	Leu	Thr	Ser	Met	Gly	Phe	Glu	Glu	Val	Ile	Ile	Thr	
	210					215				220						
ttc	gtc	gtg	gtg	gtg	ctg	ggc	ggc	atc	ggc	agc	gtc	acc	ggc	agc	tat	720
Phe	Val	Val	Val	Val	Leu	Gly	Gly	Ile	Gly	Ser	Val	Thr	Gly	Ser	Tyr	
225					230				235						240	
gcc	gcc	ggc	gtg	gcg	ctg	ggc	gtg	ttc	acc	gcc	ctg	ttc	agc	gcc	ctg	768
Ala	Ala	Gly	Val	Ala	Leu	Gly	Val	Phe	Thr	Ala	Leu	Phe	Ser	Ala	Leu	
				245				250						255		
gtc	tcg	ccg	gcc	tac	gcc	acg	gcg	gcc	gcc	ttc	ctg	gtg	ctg	atc	ggc	816
Val	Ser	Pro	Ala	Tyr	Ala	Thr	Ala	Ala	Ala	Phe	Leu	Val	Leu	Ile	Gly	
			260				265						270			
gtg	ctg	gtc	ttg	cgc	ccg	ggc	ggc	ctg	agc	gcc	ggc	gcg	gcg	cgg	ggg	864
Val	Leu	Val	Leu	Arg	Pro	Gly	Gly	Leu	Ser	Ala	Gly	Ala	Ala	Arg	Gly	
		275				280						285				
gtg	cac	tga														873
Val	His															
	290															

<210> 717

<211> 290

<212> PRT

<213> Bordetella bronchiseptica

<400> 717

Met	Asn	Leu	Leu	Gln	Gln	Leu	Ile	Asn	Gly	Ile	Val	Leu	Gly	His	Ala
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Tyr	Ala	Leu	Ile	Ala	Ile	Gly	Trp	Thr	Leu	Leu	Leu	Gly	Val	Ala	Arg
			20					25					30		
Leu	Val	Asn	Phe	Gly	His	Gly	Gln	Met	Tyr	Met	Val	Gly	Ala	Phe	Val
		35					40					45			
Thr	Trp	Trp	Ala	Thr	Thr	Ser	Ala	Gly	Met	Pro	Tyr	Leu	Leu	Ala	Leu
	50					55				60					
Pro	Thr	Ala	Met	Ala	Leu	Gly	Ala	Leu	Ile	Gly	Leu	Ala	Met	Gln	Arg
65				70					75					80	
Ile	Met	Leu	Arg	Ala	Thr	Phe	Glu	Gln	Asn	Leu	Val	Ser	Ile	Met	Ile
				85				90					95		
Met	Thr	Leu	Gly	Phe	Gly	Tyr	Val	Ile	Gln	Gly	Ala	Ala	Ser	Leu	Ile
			100				105						110		
Phe	Gly	Ser	Thr	Gly	Gln	Ile	Leu	Asp	Thr	Ala	Trp	Ser	Gln	Arg	Asp
		115					120					125			
Ile	Glu	Val	Gly	Glu	Leu	Trp	Val	Thr	Trp	Gln	Asp	Ala	Ala	Ile	Val
	130					135					140				
Val	Ala	Ala	Ile	Ala	Val	Phe	Ala	Gly	Leu	Lys	Trp	Leu	Leu	Glu	Gly
145					150				155					160	
Ser	Arg	Ala	Gly	Arg	Leu	Val	Arg	Met	Val	Ala	Glu	Asp	Pro	Lys	Leu
				165				170						175	
Ala	Gln	Leu	Ala	Gly	Val	Asp	Val	Arg	Arg	Ile	Tyr	Tyr	Gly	Val	Phe
			180				185						190		
Ala	Phe	Glu	Gly	Ala	Ala	Val	Ala	Phe	Ala	Ala	Gly	Met	Val	Ala	Pro
		195					200				205				
Arg	Thr	Pro	Ile	Leu	Thr	Ser	Met	Gly	Phe	Glu	Glu	Val	Ile	Ile	Thr
	210					215				220					
Phe	Val	Val	Val	Val	Leu	Gly	Gly	Ile	Gly	Ser	Val	Thr	Gly	Ser	Tyr
225					230				235						240
Ala	Ala	Gly	Val	Ala	Leu	Gly	Val	Phe	Thr	Ala	Leu	Phe	Ser	Ala	Leu
				245				250						255	
Val	Ser	Pro	Ala	Tyr	Ala	Thr	Ala	Ala	Ala	Phe	Leu	Val	Leu	Ile	Gly

Val Leu Val 260
 275 Leu Arg Pro Gly Gly 265
 280 Leu Ser Ala Gly Ala 270
 285 Val His
 290

<210> 718
 <211> 930
 <212> DNA
 <213> Bordetella bronchiseptica

<220>
 <221> CDS
 <222> (1)..(930)

<400> 718
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 Met Gly Phe Phe Leu Glu Thr Leu Phe Gly Gly Leu Met Ser Gly Met
 1 5 10 15
 ctg tac gcg ctg atc ggc ctg ggc ttc gtg ctg atc ttc aag gcc tcg 96
 Leu Tyr Ala Leu Ile Gly Leu Gly Phe Val Leu Ile Phe Lys Ala Ser
 20 25 30
 ggc gtg ttc aac ttc gcc cag ggc gcc atg gtg ctg gtg gcc gcg ctg 144
 Gly Val Phe Asn Phe Ala Gln Gly Ala Met Val Leu Val Ala Ala Leu
 35 40 45
 tcg atg gcg cgg ttc tcc gaa tgg att ccg cag tgg ctg ggc ttc gag 192
 Ser Met Ala Arg Phe Ser Glu Trp Ile Pro Gln Trp Leu Gly Phe Glu
 50 55 60
 aac atg ctg ctg gcc aac gtg ctg gcc ttc atc gtc agc gcg ctg gtc 240
 Asn Met Leu Leu Ala Asn Val Leu Ala Phe Ile Val Ser Ala Leu Val
 65 70 75 80
 atg ttc gtg ctg gcg gtc gcg gtc gag cgc ttc gtg ctg cgc cac ctg 288
 Met Phe Val Leu Ala Val Ala Val Glu Arg Phe Val Leu Arg His Leu
 85 90 95
 gtc aac cag gaa gcc acc acg ctg ctg atg gcc acg ctg ggc atc agc 336
 Val Asn Gln Glu Ala Thr Thr Leu Leu Met Ala Thr Leu Gly Ile Ser
 100 105 110
 tac ttt ctc gac ggc ctg ggg cag atc gcc ttc ggc agc tcg gtc tac 384
 Tyr Phe Leu Asp Gly Leu Gly Gln Ile Ala Phe Gly Ser Ser Val Tyr
 115 120 125
 tcg atc aac gtc ggc atg ccc aag gat ccg gcc atc atc ctc gaa acg 432
 Ser Ile Asn Val Gly Met Pro Lys Asp Pro Ala Ile Ile Leu Glu Thr
 130 135 140
 atg ttc gag ggc ggc ctg ctg atc aac ctg gaa gac ctg acc gcc gcc 480
 Met Phe Glu Gly Gly Leu Leu Ile Asn Leu Glu Asp Leu Thr Ala Ala
 145 150 155 160
 gtg gtg gcg gcc ctg ctg gtg gcc gcg ctg gcg ctg ttc ttc cag tac 528
 Val Val Ala Ala Leu Leu Val Ala Ala Leu Ala Leu Phe Phe Gln Tyr
 165 170 175
 acc tcg acc ggc cgc gcc ctg cgc gcg gtg gcc gac gac cac cag gcg 576
 Thr Ser Thr Gly Arg Ala Leu Arg Ala Val Ala Asp Asp His Gln Ala
 180 185 190
 gcc cag tcc atc ggc atc ccg ctc aac cgc atc tgg gtc att gtc tgg 624
 Ala Gln Ser Ile Gly Ile Pro Leu Asn Arg Ile Trp Val Ile Val Trp
 195 200 205
 agc gtg gcg ggc ctg gtc gcg ctg gtg gcc ggc atc atc tgg ggt tcg 672
 Ser Val Ala Gly Leu Val Ala Leu Val Ala Gly Ile Ile Trp Gly Ser
 210 215 220
 aag ttc ggc gtg cag ttc acc ctg tcg acc gcc gcg ctg cgc gcg ctg 720
 Lys Phe Gly Val Gln Phe Thr Leu Ser Thr Ala Ala Leu Arg Ala Leu
 225 230 235 240
 ccg gtg gtg atc ctg ggc ggg ctg acc tcg gtg ccc ggc gcc atc ctg 768
 Pro Val Val Ile Leu Gly Gly Leu Thr Ser Val Pro Gly Ala Ile Leu
 245 250 255
 ggc gcc ctg atc atc ggg gtg ggc gag aag atg tcg gag gtg tac ctg 816
 Gly Gly Leu Ile Ile Gly Val Gly Glu Lys Met Ser Glu Val Tyr Leu
 260 265 270
 ggg tcg ctc gtg ggc ggc ggc atc gaa atc tgg ttc gcc tat gtg ttg 864
 Gly Ser Leu Val Gly Gly Gly Ile Glu Ile Trp Phe Ala Tyr Val Leu

275 280 285
 gcg ctg gtg ttc ctg ctg ttc cgt ccg caa ggg ctg ttc ggc gag aag 912
 Ala Leu Val Phe Leu Leu Phe Arg Pro Gln Gly Leu Phe Gly Glu Lys
 290 295 300
 atc atc gac cgg gtc tga 930
 Ile Ile Asp Arg Val
 305

<210> 719
 <211> 309
 <212> PRT
 <213> Bordetella bronchiseptica

<400> 719
 Met Gly Phe Phe Leu Glu Thr Leu Phe Gly Gly Leu Met Ser Gly Met
 1 5 10 15
 Leu Tyr Ala Leu Ile Gly Leu Gly Phe Val Leu Ile Phe Lys Ala Ser
 20 25 30
 Gly Val Phe Asn Phe Ala Gln Gly Ala Met Val Leu Val Ala Ala Leu
 35 40 45
 Ser Met Ala Arg Phe Ser Glu Trp Ile Pro Gln Trp Leu Gly Phe Glu
 50 55 60
 Asn Met Leu Leu Ala Asn Val Leu Ala Phe Ile Val Ser Ala Leu Val
 65 70 75 80
 Met Phe Val Leu Ala Val Ala Val Glu Arg Phe Val Leu Arg His Leu
 85 90 95
 Val Asn Gln Glu Ala Thr Thr Leu Leu Met Ala Thr Leu Gly Ile Ser
 100 105 110
 Tyr Phe Leu Asp Gly Leu Gly Gln Ile Ala Phe Gly Ser Val Tyr
 115 120 125
 Ser Ile Asn Val Gly Met Pro Lys Asp Pro Ala Ile Ile Leu Glu Thr
 130 135 140
 Met Phe Glu Gly Gly Leu Leu Ile Asn Leu Glu Asp Leu Thr Ala Ala
 145 150 155 160
 Val Val Ala Ala Leu Val Ala Ala Leu Phe Phe Gln Tyr
 165 170 175
 Thr Ser Thr Gly Arg Ala Leu Arg Ala Val Ala Asp Asp His Gln Ala
 180 185 190
 Ala Gln Ser Ile Gly Ile Pro Leu Asn Arg Ile Trp Val Ile Val Trp
 195 200 205
 Ser Val Ala Gly Leu Val Ala Leu Val Ala Gly Ile Ile Trp Gly Ser
 210 215 220
 Lys Phe Gly Val Gln Phe Thr Leu Ser Thr Ala Ala Leu Arg Ala Leu
 225 230 235 240
 Pro Val Val Ile Leu Gly Gly Leu Thr Ser Val Pro Gly Ala Ile Leu
 245 250 255
 Gly Gly Leu Ile Ile Gly Val Gly Glu Lys Met Ser Glu Val Tyr Leu
 260 265 270
 Gly Ser Leu Val Gly Gly Gly Ile Glu Ile Trp Phe Ala Tyr Val Leu
 275 280 285
 Ala Leu Val Phe Leu Leu Phe Arg Pro Gln Gly Leu Phe Gly Glu Lys
 290 295 300
 Ile Ile Asp Arg Val
 305

<210> 720
 <211> 942
 <212> DNA
 <213> Rhizobium leguminosarum

<220>
 <221> CDS
 <222> (1)..(942)

<400> 720
 atg cag cgt gtt tcg ctc gca tcc agg gga aaa cga cat atg gag tat 48
 Met Gln Arg Val Ser Leu Ala Ser Arg Gly Lys Arg His Met Glu Tyr
 1 5 10 15
 ttc gtc cag cag ctc tta aat ggg ctg acg ctc gga tcc atc tat ggc 96
 Seite 974

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Phe	Val	Gln	Gln	Leu	Leu	Asn	Gly	Leu	Thr	Leu	Gly	Ser	Ile	Tyr	Gly		
ctt	gtg	gct	att	ggc	tat	acg	atg	gtt	tac	ggc	att	atc	ggc	atg	atc		144
Leu	Val	Ala	Ile	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Ile	Gly	Met	Ile		
		35					40					45					
aat	ttc	gcc	cat	ggc	gac	atc	ttc	atg	ctc	ggg	ggg	ttc	gcc	gct	ctt		192
Asn	Phe	Ala	His	Gly	Asp	Ile	Phe	Met	Leu	Gly	Gly	Phe	Ala	Ala	Leu		
	50					55					60						
atc	gtc	ttc	ttc	gtc	ctc	aca	tcc	atc	ttc	gca	ggg	ctc	ccg	gtg	gca		240
Ile	Val	Phe	Phe	Val	Leu	Thr	Ser	Ile	Phe	Ala	Gly	Leu	Pro	Val	Ala		
					70					75					80		
gtt	ctg	ctg	ctg	gcg	atg	ctt	gtc	gtc	gcg	atg	ttg	atg	acg	agc	ttg		288
Val	Leu	Leu	Leu	Ala	Met	Leu	Val	Val	Ala	Met	Leu	Met	Thr	Ser	Leu		
				85					90					95			
tgg	aac	tgg	acg	att	gag	cg	gtc	gca	tac	cgt	ccc	ctg	cg	ggg	tcc		336
Trp	Asn	Trp	Thr	Ile	Glu	Arg	Val	Ala	Tyr	Arg	Pro	Leu	Arg	Gly	Ser		
			100					105					110				
ttc	cg	ctg	g	ccg	ctg	atc	acc	g	atc	ggc	atg	tcg	atc	acg	ctg		384
Phe	Arg	Leu	Ala	Pro	Leu	Ile	Thr	Ala	Ile	Gly	Met	Ser	Ile	Thr	Leu		
		115					120					125					
tcc	aat	ttc	atc	cag	gtg	acg	cag	ggg	cca	cg	aac	aag	ccg	att	ccg		432
Ser	Asn	Phe	Ile	Gln	Val	Thr	Gln	Gly	Pro	Arg	Asn	Lys	Pro	Ile	Pro		
	130					135					140						
ccg	atg	gtg	agc	tcg	gtc	tac	cag	ttc	ggc	aac	att	tcg	gtg	tcg	ctg		480
Pro	Met	Val	Ser	Ser	Val	Tyr	Gln	Phe	Gly	Asn	Ile	Ser	Val	Ser	Leu		
	145				150					155					160		
aaa	cag	atc	atc	atc	atc	gtg	atc	acg	gca	gtg	ctg	ctc	acg	atc	ttc		528
Lys	Gln	Ile	Ile	Ile	Ile	Val	Ile	Thr	Ala	Val	Leu	Leu	Thr	Ile	Phe		
				165					170					175			
tgg	tac	atc	gtc	aat	cg	acc	gca	ctc	ggc	cg	gcc	cag	cg	gcc	act		576
Trp	Tyr	Ile	Val	Asn	Arg	Thr	Ala	Leu	Gly	Arg	Ala	Gln	Arg	Ala	Thr		
			180					185				190					
gag	cag	gat	cg	aag	atg	gca	g	ctg	ctc	ggc	gtc	aac	gtc	gac	cag		624
Glu	Gln	Asp	Arg	Lys	Met	Ala	Ala	Leu	Leu	Gly	Val	Asn	Val	Asp	Gln		
		195				200						205					
acg	atc	tcg	atc	act	ttc	gtt	atg	ggg	g	gca	ctc	gca	gcc	gtc	gcc		672
Thr	Ile	Ser	Ile	Thr	Phe	Val	Met	Gly	Ala	Ala	Leu	Ala	Ala	Val	Ala		
		210				215					220						
ggc	acg	atg	tac	ctg	atg	tat	tat	ggc	gtc	gcc	tcg	ttt	aac	gac	ggc		720
Gly	Thr	Met	Tyr	Leu	Met	Tyr	Tyr	Gly	Val	Ala	Ser	Phe	Asn	Asp	Gly		
		225			230					235				240			
ttc	acg	ccc	ggg	gtg	aag	gcc	ttc	acg	gca	gcc	gtt	ctc	ggc	ggg	atc		768
Phe	Thr	Pro	Gly	Val	Lys	Ala	Phe	Thr	Ala	Ala	Val	Leu	Gly	Gly	Ile		
			245						250					255			
ggg	tcg	tta	ccc	ggc	gcc	gtc	ttc	ggc	ggc	ctc	ctt	atc	ggc	ctt	atc		816
Gly	Ser	Leu	Pro	Gly	Ala	Val	Phe	Gly	Gly	Leu	Leu	Ile	Gly	Leu	Ile		
		260					265					270					
gag	tcg	ctg	tgg	tcg	gca	tac	ttc	acc	atc	gcc	tat	aag	gac	gtc	g		864
Glu	Ser	Leu	Trp	Ser	Ala	Tyr	Phe	Thr	Ile	Ala	Tyr	Lys	Asp	Val	Ala		
		275				280						285					
acc	ttt	g	atc	ctg	gct	ttc	gtg	ttg	atc	ttc	aag	ccg	acc	ggc	atc		912
Thr	Phe	Ala	Ile	Leu	Ala	Phe	Val	Leu	Ile	Phe	Lys	Pro	Thr	Gly	Ile		
		290				295					300						
ctc	ggg	cg	ccg	gaa	gtc	gag	aag	gta	taa								942
Leu	Gly	Arg	Pro	Glu	Val	Glu	Lys	Val									
				305		310											

<210> 721

<211> 313

<212> PRT

<213> Rhizobium leguminosarum

<400> 721

Met	Gln	Arg	Val	Ser	Leu	Ala	Ser	Arg	Gly	Lys	Arg	His	Met	Glu	Tyr		
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Phe	Val	Gln	Gln	Leu	Leu	Asn	Gly	Leu	Thr	Leu	Gly	Ser	Ile	Tyr	Gly		
			20					25					30				
Leu	Val	Ala	Ile	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Ile	Gly	Met	Ile		
		35					40					45					

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Asn Phe Ala His Gly Asp Ile Phe Met Leu Gly Gly Phe Ala Ala Leu
 50 55 60
 Ile Val Phe Phe Val Leu Thr Ser Ile Phe Ala Gly Leu Pro Val Ala
 65 70 75 80
 Val Leu Leu Leu Ala Met Leu Val Val Ala Met Leu Met Thr Ser Leu
 85 90 95
 Trp Asn Trp Thr Ile Glu Arg Val Ala Tyr Arg Pro Leu Arg Gly Ser
 100 105 110
 Phe Arg Leu Ala Pro Leu Ile Thr Ala Ile Gly Met Ser Ile Thr Leu
 115 120 125
 Ser Asn Phe Ile Gln Val Thr Gln Gly Pro Arg Asn Lys Pro Ile Pro
 130 135 140
 Pro Met Val Ser Ser Val Tyr Gln Phe Gly Asn Ile Ser Val Ser Leu
 145 150 155 160
 Lys Gln Ile Ile Ile Ile Val Ile Thr Ala Val Leu Leu Thr Ile Phe
 165 170 175
 Trp Tyr Ile Val Asn Arg Thr Ala Leu Gly Arg Ala Gln Arg Ala Thr
 180 185 190
 Glu Gln Asp Arg Lys Met Ala Ala Leu Leu Gly Val Asn Val Asp Gln
 195 200 205
 Thr Ile Ser Ile Thr Phe Val Met Gly Ala Ala Leu Ala Ala Val Ala
 210 215 220
 Gly Thr Met Tyr Leu Met Tyr Tyr Gly Val Ala Ser Phe Asn Asp Gly
 225 230 235 240
 Phe Thr Pro Gly Val Lys Ala Phe Thr Ala Ala Val Leu Gly Gly Ile
 245 250 255
 Gly Ser Leu Pro Gly Ala Val Phe Gly Gly Leu Leu Ile Gly Leu Ile
 260 265 270
 Glu Ser Leu Trp Ser Ala Tyr Phe Thr Ile Ala Tyr Lys Asp Val Ala
 275 280 285
 Thr Phe Ala Ile Leu Ala Phe Val Leu Ile Phe Lys Pro Thr Gly Ile
 290 295 300
 Leu Gly Arg Pro Glu Val Glu Lys Val
 305 310

<210> 722

<211> 861

<212> DNA

<213> Bacillus cereus

<220>

<221> CDS

<222> (1)..(861)

<400> 722

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1 5 10 15	
ctc att ttt ttg tta gca tca ggt ctt tca ctt att ttt ggt tta atg	96
Leu Ile Phe Leu Leu Ala Ser Gly Leu Ser Leu Ile Phe Gly Leu Met	
20 25 30	
agc gtt tta aac ttt gca cac ggt ggt ttg ttt gca tgg gga gca ttt	144
Ser Val Leu Asn Phe Ala His Gly Gly Leu Phe Ala Trp Gly Ala Phe	
35 40 45	
aca ggt gtt tgg tta ttt aat atg aca gga agt tat ata tta gct tta	192
Thr Gly Val Trp Leu Phe Asn Met Thr Gly Ser Tyr Ile Leu Ala Leu	
50 55 60	
gtt gga gca gta gcc atg gga atg ttc cta gga ttt att tta gaa agg	240
Val Gly Ala Val Ala Met Gly Met Phe Leu Gly Phe Ile Leu Glu Arg	
65 70 75 80	
ttt ctt att agg ccg gta tat gga aat cat gtt cga cag ctg ctc gtt	288
Phe Leu Ile Arg Pro Val Tyr Gly Asn His Val Arg Gln Leu Val	
85 90 95	
acg ctt gga gga atg ctc gtt ctt agt gag tgt att aaa ata ttt tgg	336
Thr Leu Gly Gly Met Leu Val Leu Ser Glu Cys Ile Lys Ile Phe Trp	
100 105 110	
ggg cca aac cct att agt gca aaa tta ccg tta tgg tta caa gga agt	384
Gly Pro Asn Pro Ile Ser Ala Lys Leu Pro Leu Trp Leu Gln Gly Ser	
115 120 125	

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ttt	aca	ttc	gga	ggt	att	ata	tta	att	aaa	tat	cgt	cta	ttt	ggt	att	432
Phe	Thr	Phe	Gly	Gly	Ile	Ile	Leu	Ile	Lys	Tyr	Arg	Leu	Phe	Val	Ile	
	130					135					140					
ttg	att	ggg	ata	att	att	tac	att	gca	cta	cta	cta	tta	ctc	aaa	aag	480
Leu	Ile	Gly	Ile	Ile	Ile	Tyr	Ile	Ala	Leu	Leu	Leu	Leu	Leu	Lys	Lys	
145					150					155					160	
acg	aag	ata	ggt	ctt	atg	atc	cgt	gca	ggt	gta	atg	gat	aaa	gaa	atg	528
Thr	Lys	Ile	Gly	Leu	Met	Ile	Arg	Ala	Gly	Val	Met	Asp	Lys	Glu	Met	
				165					170					175		
ggt	caa	gcg	ctt	ggt	att	aat	gta	aaa	gcg	ata	ttt	tct	ttc	gtc	ttt	576
Val	Gln	Ala	Leu	Gly	Ile	Asn	Val	Lys	Ala	Ile	Phe	Ser	Phe	Val	Phe	
			180					185					190			
tta	tta	ggg	gca	ggg	atg	gca	gct	ttg	gga	gga	ttc	tta	tta	gcg	ccg	624
Leu	Leu	Gly	Ala	Gly	Met	Ala	Ala	Leu	Gly	Gly	Phe	Leu	Leu	Ala	Pro	
		195					200					205				
tat	tcg	ggc	ggt	att	ttc	gcc	gag	atg	ggc	atg	cag	tat	gca	att	tta	672
Tyr	Ser	Gly	Val	Ile	Phe	Ala	Glu	Met	Gly	Met	Gln	Tyr	Ala	Ile	Leu	
210						215					220					
gct	ttt	ata	gta	gta	att	atc	ggt	gga	tta	gga	agc	ggt	caa	ggt	tca	720
Ala	Phe	Ile	Val	Val	Ile	Ile	Gly	Gly	Leu	Gly	Ser	Val	Gln	Gly	Ser	
225					230					235					240	
gct	att	gct	tct	tta	att	gtc	gga	tta	gct	ggt	gct	ttt	aca	gcg	tat	768
Ala	Ile	Ala	Ser	Leu	Ile	Val	Gly	Leu	Ala	Gly	Ala	Phe	Thr	Ala	Tyr	
				245					250					255		
ttt	ata	cca	gat	tta	tca	ctt	gca	att	aat	atg	tta	atg	tta	cta	ttt	816
Phe	Ile	Pro	Asp	Leu	Ser	Leu	Ala	Ile	Asn	Met	Leu	Met	Leu	Leu	Phe	
			260					265					270			
ttc	tta	ata	gtg	aag	cca	act	gga	ctt	ggt	ggt	gaa	aag	ggg	tga		861
Phe	Leu	Ile	Val	Lys	Pro	Thr	Gly	Leu	Val	Gly	Glu	Lys	Gly			
		275					280					285				

<210> 723

<211> 286

<212> PRT

<213> Bacillus cereus

<400> 723

Met	Asp	Val	Leu	Ile	Asn	Leu	Phe	Val	Asn	Gly	Ile	Ser	Thr	Gly	Met	
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Leu	Ile	Phe	Leu	Leu	Ala	Ser	Gly	Leu	Ser	Leu	Ile	Phe	Gly	Leu	Met	
			20					25					30			
Ser	Val	Leu	Asn	Phe	Ala	His	Gly	Gly	Leu	Phe	Ala	Trp	Gly	Ala	Phe	
			35				40					45				
Thr	Gly	Val	Trp	Leu	Phe	Asn	Met	Thr	Gly	Ser	Tyr	Ile	Leu	Ala	Leu	
	50					55				60						
Val	Gly	Ala	Val	Ala	Met	Gly	Met	Phe	Leu	Gly	Phe	Ile	Leu	Glu	Arg	
65					70					75					80	
Phe	Leu	Ile	Arg	Pro	Val	Tyr	Gly	Asn	His	Val	Arg	Gln	Leu	Leu	Val	
				85				90					95			
Thr	Leu	Gly	Gly	Met	Leu	Val	Leu	Ser	Glu	Cys	Ile	Lys	Ile	Phe	Trp	
			100					105					110			
Gly	Pro	Asn	Pro	Ile	Ser	Ala	Lys	Leu	Pro	Leu	Trp	Leu	Gln	Gly	Ser	
		115					120					125				
Phe	Thr	Phe	Gly	Gly	Ile	Ile	Leu	Ile	Lys	Tyr	Arg	Leu	Phe	Val	Ile	
	130					135					140					
Leu	Ile	Gly	Ile	Ile	Ile	Tyr	Ile	Ala	Leu	Leu	Leu	Leu	Leu	Lys	Lys	
145					150					155					160	
Thr	Lys	Ile	Gly	Leu	Met	Ile	Arg	Ala	Gly	Val	Met	Asp	Lys	Glu	Met	
				165					170					175		
Val	Gln	Ala	Leu	Gly	Ile	Asn	Val	Lys	Ala	Ile	Phe	Ser	Phe	Val	Phe	
			180					185					190			
Leu	Leu	Gly	Ala	Gly	Met	Ala	Ala	Leu	Gly	Gly	Phe	Leu	Leu	Ala	Pro	
		195					200					205				
Tyr	Ser	Gly	Val	Ile	Phe	Ala	Glu	Met	Gly	Met	Gln	Tyr	Ala	Ile	Leu	
	210					215					220					
Ala	Phe	Ile	Val	Val	Ile	Ile	Gly	Gly	Leu	Gly	Ser	Val	Gln	Gly	Ser	
225					230					235					240	
Ala	Ile	Ala	Ser	Leu	Ile	Val	Gly	Leu	Ala	Gly	Ala	Phe	Thr	Ala	Tyr	
				245					250					255		

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Phe Ile Pro Asp Leu Ser Leu Ala Ile Asn Met Leu Met Leu Leu Phe
 260 270
 Phe Leu Ile Val Lys Pro Thr Gly Leu Val Gly Glu Lys Gly
 275 280 285

<210> 724

<211> 933

<212> DNA

<213> Streptomyces avermitilis

<220>

<221> CDS

<222> (1)..(933)

<400> 724

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Met	His	Thr	Leu	Pro	Gln	Gln	Leu	Ala	Asn	Gly	Leu	Phe	Leu	Gly	Ser	
1				5				10						15		
atg	tac	ggg	ctg	atc	gcc	atc	ggt	tac	acg	atg	gtg	tac	ggc	atc	gtc	96
Met	Tyr	Gly	Leu	Ile	Ala	Ile	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Val	
			20					25					30			
cag	ctc	atc	aac	ttc	gcc	cac	ggc	gag	atc	ttc	atg	acc	gga	ggc	ttc	144
Gln	Leu	Ile	Asn	Phe	Ala	His	Gly	Glu	Ile	Phe	Met	Thr	Gly	Gly	Phe	
			35				40					45				
ggc	gca	ctc	acg	gtc	tac	ttc	tac	gtc	ctg	cca	gac	ggc	aca	tcc	atg	192
Gly	Ala	Leu	Thr	Val	Tyr	Phe	Tyr	Val	Leu	Pro	Asp	Gly	Thr	Ser	Met	
	50					55					60					
tgg	ata	gcc	ctc	ccg	gcg	atg	ctc	atc	gga	ggc	ggc	ctc	atc	gcc	gta	240
Trp	Ile	Ala	Leu	Pro	Ala	Met	Leu	Ile	Gly	Gly	Gly	Leu	Ile	Ala	Val	
	65				70				75						80	
ctc	atc	gcc	gtc	ggg	gcg	gaa	cgc	ttc	gcc	tac	cgg	ccc	ctg	cgc	ggc	288
Leu	Ile	Ala	Val	Gly	Ala	Glu	Arg	Phe	Ala	Tyr	Arg	Pro	Leu	Arg	Gly	
				85				90						95		
gca	cca	cgc	ctc	gcc	ccc	ctc	atc	acc	gcc	atc	ggc	ctc	tcc	ctc	ggc	336
Ala	Pro	Arg	Leu	Ala	Pro	Leu	Ile	Thr	Ala	Ile	Gly	Leu	Ser	Leu	Gly	
			100				105						110			
ctc	cag	cag	gtg	gtc	ttc	aac	ttc	tac	ccg	gac	gcc	aag	acc	gac	agg	384
Leu	Gln	Gln	Val	Val	Phe	Asn	Phe	Tyr	Pro	Asp	Ala	Lys	Thr	Asp	Arg	
			115				120					125				
acc	ttc	ccc	cag	ctg	ggc	acc	gag	tcc	ttc	aac	atc	ggc	tcc	gtc	cac	432
Thr	Phe	Pro	Gln	Leu	Gly	Thr	Glu	Ser	Phe	Asn	Ile	Gly	Ser	Val	His	
	130					135					140					
atc	cag	agc	ggc	cag	ctc	ttc	atc	atc	atc	gcc	gcc	ccc	atc	tgt	atg	480
Ile	Gln	Ser	Gly	Gln	Leu	Phe	Ile	Ile	Ile	Ala	Ala	Pro	Ile	Cys	Met	
	145				150					155					160	
gcc	gct	ctc	ggc	ttc	gtc	cgc	ctc	tcc	cgc	acc	ggc	cgc	gcc	atg		528
Ala	Ala	Leu	Gly	Phe	Val	Arg	Leu	Ser	Arg	Thr	Gly	Arg	Ala	Met		
				165				170					175			
cag	gcc	acc	gcc	cag	gac	ccg	gac	acc	gcc	cag	ctc	atg	ggc	atc	gac	576
Gln	Ala	Thr	Ala	Gln	Asp	Pro	Asp	Thr	Ala	Gln	Leu	Met	Gly	Ile	Asp	
			180				185						190			
acc	aac	cgc	atc	gtc	atc	gcc	ttc	gcc	atc	ggc	gga	ctc	ttc	gcc		624
Thr	Asn	Arg	Ile	Ile	Val	Ile	Ala	Phe	Ala	Ile	Gly	Gly	Leu	Phe	Ala	
	195					200					205					
gcg	gtc	gcc	gcc	gtc	gcc	tac	ggc	ctg	cgc	tac	ggc	cag	atc	aag	tac	672
Ala	Val	Ala	Ala	Val	Ala	Tyr	Gly	Leu	Arg	Tyr	Gly	Gln	Ile	Lys	Tyr	
	210					215					220					
gac	atg	ggc	ttc	cag	atg	ggc	ctc	aag	gcc	ttc	acc	gcg	gcc	gtc	ctc	720
Asp	Met	Gly	Phe	Gln	Met	Gly	Leu	Lys	Ala	Phe	Thr	Ala	Ala	Val	Leu	
	225				230				235						240	
ggc	ggc	atc	ggc	aac	atc	tac	ggc	gcc	atg	ctc	ggc	gga	gtc	gtc	ctc	768
Gly	Gly	Ile	Gly	Asn	Ile	Tyr	Gly	Ala	Met	Leu	Gly	Gly	Val	Val	Leu	
				245					250					255		
ggc	gtc	gcc	gaa	acc	ctc	gcc	acc	gcc	tac	atc	gac	ggc	atc	ccc	ggc	816
Gly	Val	Ala	Glu	Thr	Leu	Ala	Thr	Ala	Tyr	Ile	Asp	Gly	Ile	Pro	Gly	
			260				265						270			
atg	cag	cag	ctc	ggc	ggc	ggc	agc	tgg	gcc	ccc	gtc	tgg	gcc	ttc	gtc	864
Met	Gln	Gln	Leu	Gly	Gly	Gly	Ser	Trp	Ala	Pro	Val	Trp	Ala	Phe	Val	
		275					280					285				

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ctc ctc atc ctc gta ctg ctg ctg cgg cca caa ggc ctc ctc ggc gaa 912
 Leu Leu Ile Leu Val Leu Leu Leu Arg Pro Gln Gly Leu Leu Gly Glu
 290 295 300
 cgc gtc gcg gac agg gcg tga 933
 Arg Val Ala Asp Arg Ala
 305 310

<210> 725

<211> 310

<212> PRT

<213> Streptomyces avermitilis

<400> 725

Met His Thr Leu Pro Gln Gln Leu Ala Asn Gly Leu Phe Leu Gly Ser
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 Met Tyr Gly Leu Ile Ala Ile Gly Tyr Thr Met Val Tyr Gly Ile Val
 20 25 30
 Gln Leu Ile Asn Phe Ala His Gly Glu Ile Phe Met Thr Gly Gly Phe
 35 40 45
 Gly Ala Leu Thr Val Tyr Phe Tyr Val Leu Pro Asp Gly Thr Ser Met
 50 55 60
 Trp Ile Ala Leu Pro Ala Met Leu Ile Gly Gly Gly Leu Ile Ala Val
 65 70 75 80
 Leu Ile Ala Val Gly Ala Glu Arg Phe Ala Tyr Arg Pro Leu Arg Gly
 85 90 95
 Ala Pro Arg Leu Ala Pro Leu Ile Thr Ala Ile Gly Leu Ser Leu Gly
 100 105 110
 Leu Gln Gln Val Val Phe Asn Phe Tyr Pro Asp Ala Lys Thr Asp Arg
 115 120 125
 Thr Phe Pro Gln Leu Gly Thr Glu Ser Phe Asn Ile Gly Ser Val His
 130 135 140
 Ile Gln Ser Gly Gln Leu Phe Ile Ile Ile Ala Ala Pro Ile Cys Met
 145 150 155 160
 Ala Ala Leu Gly Phe Phe Val Arg Leu Ser Arg Thr Gly Arg Ala Met
 165 170 175
 Gln Ala Thr Ala Gln Asp Pro Asp Thr Ala Gln Leu Met Gly Ile Asp
 180 185 190
 Thr Asn Arg Ile Ile Val Ile Ala Phe Ala Ile Gly Gly Leu Phe Ala
 195 200 205
 Ala Val Ala Ala Val Ala Tyr Gly Leu Arg Tyr Gly Gln Ile Lys Tyr
 210 215 220
 Asp Met Gly Phe Gln Met Gly Leu Lys Ala Phe Thr Ala Ala Val Leu
 225 230 235 240
 Gly Gly Ile Gly Asn Ile Tyr Gly Ala Met Leu Gly Gly Val Val Leu
 245 250 255
 Gly Val Ala Glu Thr Leu Ala Thr Ala Tyr Ile Asp Gly Ile Pro Gly
 260 265 270
 Met Gln Gln Leu Gly Gly Gly Ser Trp Ala Pro Val Trp Ala Phe Val
 275 280 285
 Leu Leu Ile Leu Val Leu Leu Leu Arg Pro Gln Gly Leu Leu Gly Glu
 290 295 300
 Arg Val Ala Asp Arg Ala
 305 310

<210> 726

<211> 891

<212> DNA

<213> Streptomyces avermitilis

<220>

<221> CDS

<222> (1)..(891)

<400> 726

atg agc acc gcc ctg gac acc gta ctg aac ggg ctc gcc ctc ggt tcg 48
 Met Ser Thr Ala Leu Asp Thr Val Leu Asn Gly Leu Ala Leu Gly Ser
 1 5 10 15
 gtc tac gcc ctg gtc gcc ctc ggc ttc gtc atc atc ttc aag gcc tcg 96
 Val Tyr Ala Leu Val Ala Leu Gly Phe Val Ile Ile Phe Lys Ala Ser

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gca	gtg	atg	aac	ttc	gcg	cac	ggc	tcc	ctg	ctg	ctc	ctc	ggc	tat		144
Ala	Val	Met	Asn	Phe	Ala	His	Gly	Ser	Leu	Leu	Leu	Leu	Gly	Gly	Tyr	
		35					40					45				
ctg	acc	gcg	gtg	ctg	cac	gac	cgg	ctc	ggc	ttc	gcg	ggc	gcc	ctc	gcc	192
Leu	Thr	Ala	Val	Leu	His	Asp	Arg	Leu	Gly	Phe	Ala	Gly	Ala	Leu	Ala	
	50					55					60					
ctc	gcg	gtc	ctc	gcc	acc	gcg	gcc	gcc	ggg	ctg	atc	gac	tgg	ctg		240
Leu	Ala	Val	Leu	Ala	Thr	Ala	Ala	Ala	Gly	Leu	Ile	Asp	Trp	Leu		
	65				70				75					80		
ctg	ctg	cgc	cgc	ctc	gac	ccg	cac	gcc	gcg	cac	gta	ctg	acc	atc	ctc	288
Leu	Leu	Arg	Arg	Leu	Asp	Pro	His	Ala	Ala	His	Val	Leu	Thr	Ile	Leu	
				85				90						95		
acc	atc	ggc	gtc	gac	atc	ctg	ctg	atg	acg	gac	ctc	acc	cgc	cgc	atc	336
Thr	Ile	Gly	Val	Asp	Ile	Leu	Leu	Met	Thr	Asp	Leu	Thr	Arg	Arg	Ile	
			100					105					110			
ggc	ggg	gac	ctc	ctc	acc	ctg	ggc	gac	ccc	tgg	ggc	tcc	gac	gtg	acc	384
Gly	Gly	Asp	Leu	Leu	Thr	Leu	Gly	Asp	Pro	Trp	Gly	Ser	Asp	Val	Thr	
		115					120					125				
gag	ctc	ggc	ccg	atc	acc	gtc	gcc	gac	agc	cgg	atc	gcc	tcg	atc	ctg	432
Glu	Leu	Gly	Pro	Ile	Thr	Val	Ala	Asp	Ser	Arg	Ile	Ala	Ser	Ile	Leu	
	130					135					140					
gtg	tca	ctg	gtc	gtc	atc	gcc	gcc	gtc	ttc	gcc	gtc	ttc	cgg	ttc	act	480
Val	Ser	Leu	Val	Val	Ile	Ala	Ala	Val	Phe	Ala	Val	Phe	Arg	Phe	Thr	
	145				150				155						160	
tcg	tgg	ggc	ctg	tcc	ctg	cga	gcc	gcc	gcc	gag	gac	cac	gag	gcc	gcc	528
Ser	Trp	Gly	Leu	Ser	Leu	Arg	Ala	Ala	Ala	Glu	Asp	His	Glu	Ala	Ala	
				165				170						175		
gcg	ctg	atg	ggc	atc	agg	ctc	gcc	cgg	atc	cgg	acc	ctc	gcc	tgg	tgc	576
Ala	Leu	Met	Gly	Ile	Arg	Leu	Ala	Arg	Ile	Arg	Thr	Leu	Ala	Trp	Cys	
			180					185					190			
ctg	gcc	ggc	gcg	ctc	gcc	gcg	ctc	gcc	gcc	gtc	ttc	ctg	gcc	gcc	ttc	624
Leu	Ala	Gly	Ala	Leu	Ala	Ala	Leu	Ala	Ala	Val	Phe	Leu	Ala	Ala	Phe	
		195					200					205				
ccg	gcc	ccc	ggc	ctg	gag	cgc	acc	gga	cag	atc	gcg	ctg	aag	gcc		672
Pro	Ala	Pro	Gly	Leu	Glu	Arg	Thr	Gly	Gln	Ile	Ala	Leu	Lys	Ala		
	210					215				220						
ttc	ccc	gcc	gcg	atc	ctc	ggc	ggc	atg	gcc	tcg	ccg	ccg	ggc	gcg	ctc	720
Phe	Pro	Ala	Ala	Ile	Leu	Gly	Gly	Met	Ala	Ser	Pro	Pro	Gly	Ala	Leu	
				230					235						240	
gag	gga	agc	ctg	ctg	atc	ggc	gtc	acc	gag	gcg	ctg	gcg	gcc	ggc	tac	768
Ala	Gly	Ser	Leu	Leu	Ile	Gly	Val	Thr	Glu	Ala	Leu	Ala	Ala	Gly	Tyr	
				245				250						255		
cag	tcc	gaa	ctc	tcc	gcg	ctc	ggc	gag	ggc	ttc	ggc	gac	gtg	gtg	ccg	816
Gln	Ser	Glu	Leu	Ser	Ala	Leu	Gly	Glu	Gly	Phe	Gly	Asp	Val	Val	Pro	
			260					265					270			
tac	gcc	gtg	atg	gtg	ctg	gtg	ctc	ctc	gtc	cgg	ccc	gcc	ggt	ctc	ttc	864
Tyr	Ala	Val	Met	Val	Leu	Val	Leu	Leu	Val	Arg	Pro	Ala	Gly	Leu	Phe	
		275					280					285				
ggg	acg	agg	gag	gcg	gcc	cgt	gtc	tag								891
Gly	Thr	Arg	Glu	Ala	Ala	Arg	Val									
	290					295										

<210> 727

<211> 296

<212> PRT

<213> Streptomyces avermitilis

<400> 727

Met	Ser	Thr	Ala	Leu	Asp	Thr	Val	Leu	Asn	Gly	Leu	Ala	Leu	Gly	Ser	
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Val	Tyr	Ala	Leu	Val	Ala	Leu	Gly	Phe	Val	Ile	Ile	Phe	Lys	Ala	Ser	
			20					25					30			
Ala	Val	Met	Asn	Phe	Ala	His	Gly	Ser	Leu	Leu	Leu	Leu	Gly	Gly	Tyr	
		35					40					45				
Leu	Thr	Ala	Val	Leu	His	Asp	Arg	Leu	Gly	Phe	Ala	Gly	Ala	Leu	Ala	
	50					55					60					
Leu	Ala	Val	Leu	Ala	Thr	Ala	Ala	Ala	Gly	Leu	Ile	Asp	Trp	Leu		80
	65				70				75							

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Leu Leu Arg Arg Leu Asp Pro His Ala Ala His Val Leu Thr Ile Leu
 85 90
 Thr Ile Gly Val Asp Ile Leu Leu Met Thr Asp Leu Thr Arg Arg Ile
 100 105
 Gly Gly Asp Leu Leu Thr Leu Gly Asp Pro Trp Gly Ser Asp Val Thr
 115 120
 Glu Leu Gly Pro Ile Thr Val Ala Asp Ser Arg Ile Ala Ser Ile Leu
 130 135
 Val Ser Leu Val Val Ile Ala Ala Val Phe Ala Val Phe Arg Phe Thr
 145 150 155
 Ser Trp Gly Leu Ser Leu Arg Ala Ala Ala Glu Asp His Glu Ala Ala
 165 170 175
 Ala Leu Met Gly Ile Arg Leu Ala Arg Ile Arg Thr Leu Ala Trp Cys
 180 185
 Leu Ala Gly Ala Leu Ala Ala Leu Ala Val Phe Leu Ala Ala Phe
 195 200
 Pro Ala Pro Gly Leu Glu Arg Thr Thr Gly Gln Ile Ala Leu Lys Ala
 210 215 220
 Phe Pro Ala Ala Ile Leu Gly Gly Met Ala Ser Pro Pro Gly Ala Leu
 225 230 235
 Ala Gly Ser Leu Leu Ile Gly Val Thr Glu Ala Leu Ala Ala Gly Tyr
 245 250 255
 Gln Ser Glu Leu Ser Ala Leu Gly Glu Gly Phe Gly Asp Val Val Pro
 260 265 270
 Tyr Ala Val Met Val Leu Val Leu Val Arg Pro Ala Gly Leu Phe
 275 280 285
 Gly Thr Arg Glu Ala Ala Arg Val
 290 295

<210> 728

<211> 897

<212> DNA

<213> Streptomyces avermitilis

<220>

<221> CDS

<222> (1)..(897)

<400> 728

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1 5 10 15	
gtt ctg ctg ctc atc gcg ctc ggc ctc tcg ctc acc ttc ggt cag atg	96
Val Leu Leu Leu Ile Ala Leu Gly Leu Ser Leu Thr Phe Gly Gln Met	
20 25 30	
aac gtc atc aac atg gcc cac ggc gag ttc atc atg gcc ggc tac	144
Asn Val Ile Asn Met Ala His Gly Glu Phe Ile Met Ala Gly Ala Tyr	
35 40 45	
acc aca tac gtc ctg cag aag tcc att tcc agc gcc gga ttg tcg ctt	192
Thr Thr Tyr Val Leu Gln Lys Ser Ile Ser Ser Ala Gly Leu Ser Leu	
50 55 60	
ctg gtc gcg ctg ccc gtc gca ttt ctc gtc tcg ggc gca ctc ggg gcg	240
Leu Val Ala Leu Pro Val Ala Phe Leu Val Ser Gly Ala Leu Gly Ala	
65 70 75 80	
ttg ctg gaa tgg ctg ctg atc cgc cgg ctg tat ctg cgg ccg ctc gac	288
Leu Leu Glu Trp Leu Leu Ile Arg Arg Leu Tyr Leu Arg Pro Leu Asp	
85 90 95	
aca ctt ctc gtc acc tgg ggc gtc tcc ctg atg ctc cag caa ctc gcc	336
Thr Leu Leu Val Thr Trp Gly Val Ser Leu Met Leu Gln Gln Leu Ala	
100 105 110	
cgg gac atc ttc ggc gca ccg aat gtg cag aca cgg gcg ccc gag ctc	384
Arg Asp Ile Phe Gly Ala Pro Asn Val Gln Thr Arg Ala Pro Glu Leu	
115 120 125	
ctc acc ggg aac atc acg gtc atc ggc ggt gac gac ccg ctc acc ttc	432
Leu Thr Gly Asn Ile Thr Val Ile Gly Gly Asp Asp Pro Leu Thr Phe	
130 135 140	
gcc aac agc cgg ctg ttc atc ctc ggg ctg gcc atc gcc gcg gtg gtc	480
Ala Asn Ser Arg Leu Phe Ile Leu Gly Leu Ala Ile Ala Ala Val Val	
145 150 155 160	

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gcg	ctg	tcg	ctg	acg	ctg	cgg	ctg	acc	ccg	ctc	ggc	cgg	cgc	atc	cgg	528
Ala	Leu	Ser	Leu	Thr	Leu	Arg	Leu	Thr	Pro	Leu	Gly	Arg	Arg	Ile	Arg	
				165					170					175		
gcc	gtg	gtg	cag	aac	cgg	gat	ctg	gcc	gag	gtg	tcc	ggc	atc	tcc	acc	576
Ala	Val	Val	Gln	Asn	Arg	Asp	Leu	Ala	Glu	Val	Ser	Gly	Ile	Ser	Thr	
			180					185					190			
ggc	cgg	gtc	gat	cgc	acg	gcc	ttc	ttc	atc	ggc	tcc	ggg	ctc	gcc	ggg	624
Gly	Arg	Val	Asp	Arg	Thr	Ala	Phe	Phe	Ile	Gly	Ser	Gly	Leu	Ala	Gly	
		195					200					205				
gtc	gcc	ggg	gtc	gcg	ctg	acg	ctg	gtc	ggg	ccg	atc	ggg	ccc	acc	atg	672
Val	Ala	Gly	Val	Ala	Leu	Thr	Leu	Val	Gly	Pro	Ile	Gly	Pro	Thr	Met	
	210					215					220					
ggc	acc	aac	gtg	atc	atc	gac	gcc	ttc	ctg	gtg	atc	gtg	gtc	ggc	ggc	720
Gly	Thr	Asn	Val	Ile	Ile	Asp	Ala	Phe	Leu	Val	Ile	Val	Val	Gly	Gly	
225					230					235					240	
atc	ggg	cag	ctc	aag	ggc	agt	gtg	atc	gtc	gcc	ttc	gtg	ctc	ggc	gtg	768
Ile	Gly	Gln	Leu	Lys	Gly	Ser	Val	Ile	Val	Ala	Phe	Val	Leu	Gly	Val	
				245					250					255		
ctc	cag	tcg	gtc	ctc	gag	tac	tcg	acc	acg	gtc	agc	gtc	gcg	aag	gtg	816
Leu	Gln	Ser	Val	Leu	Glu	Tyr	Ser	Thr	Thr	Val	Ser	Val	Ala	Lys	Val	
			260					265					270			
ctg	gtg	ctg	gtc	gcc	atc	gtc	gct	ttc	ctc	cag	tgg	cgg	ccc	cag	ggg	864
Leu	Val	Leu	Val	Ala	Ile	Val	Ala	Phe	Leu	Gln	Trp	Arg	Pro	Gln	Gly	
		275					280					285				
ctg	tac	acc	ctg	cgc	acg	agg	agt	ctc	gta	tga						897
Leu	Tyr	Thr	Leu	Arg	Thr	Arg	Ser	Leu	Val							
	290					295										

<210> 729

<211> 298

<212> PRT

<213> Streptomyces avermitilis

<400> 729

Met	Thr	Val	Ile	Phe	Gly	Gln	Thr	Phe	Thr	Gly	Ile	Ser	Ile	Gly	Ala	
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Val	Leu	Leu	Leu	Ile	Ala	Leu	Gly	Leu	Ser	Leu	Thr	Phe	Gly	Gln	Met	
			20					25					30			
Asn	Val	Ile	Asn	Met	Ala	His	Gly	Glu	Phe	Ile	Met	Ala	Gly	Ala	Tyr	
		35					40					45				
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Leu	Leu	Glu	Trp	Leu	Ile	Arg	Arg	Leu	Tyr	Leu	Arg	Pro	Leu	Asp		
			85					90					95			
Thr	Leu	Leu	Val	Thr	Trp	Gly	Val	Ser	Leu	Met	Leu	Gln	Gln	Leu	Ala	
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Arg	Asp	Ile	Phe	Gly	Ala	Pro	Asn	Val	Gln	Thr	Arg	Ala	Pro	Glu	Leu	
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Leu	Thr	Gly	Asn	Ile	Thr	Val	Ile	Gly	Gly	Asp	Asp	Pro	Leu	Thr	Phe	
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Ala	Leu	Ser	Leu	Thr	Leu	Arg	Leu	Thr	Pro	Leu	Gly	Arg	Arg	Ile	Arg	
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Ala	Val	Val	Gln	Asn	Arg	Asp	Leu	Ala	Glu	Val	Ser	Gly	Ile	Ser	Thr	
		180						185					190			
Gly	Arg	Val	Asp	Arg	Thr	Ala	Phe	Phe	Ile	Gly	Ser	Gly	Leu	Ala	Gly	
	195					200						205				
Val	Ala	Gly	Val	Ala	Leu	Thr	Leu	Val	Gly	Pro	Ile	Gly	Pro	Thr	Met	
	210					215					220					
Gly	Thr	Asn	Val	Ile	Ile	Asp	Ala	Phe	Leu	Val	Ile	Val	Val	Gly	Gly	
225				230						235					240	
Ile	Gly	Gln	Leu	Lys	Gly	Ser	Val	Ile	Val	Ala	Phe	Val	Leu	Gly	Val	
			245					250						255		
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 <211> 1005
 <212> DNA
 <213> Tropheryma whipplei

<220>
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 gat gtg gct tcc ttc atc aag ggc ttt ggc ttt gct acg gtt gaa ggc 96
 Asp Val Ala Ser Phe Ile Lys Gly Phe Gly Phe Ala Thr Val Glu Gly
 20 25 30
 ctg act ttc ggt gcc atc tat gca ctg att gcc gtt ggc tat acc gtg 144
 Leu Thr Phe Gly Ala Ile Tyr Ala Leu Ile Ala Val Gly Tyr Thr Val
 35 40 45
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 Val Tyr Gly Val Leu Gly Leu Ile Asn Phe Ala His Ala Gly Val Phe
 50 55 60
 gtt acc ggc tgc tac gcc ctt gta ttt acg ctc tct gcg ctt ggt ttt 240
 Val Thr Gly Cys Tyr Ala Leu Val Phe Thr Leu Ser Ala Leu Gly Phe
 65 70 75 80
 agc tct ttt cct tct aag aag ccc att ttt att gtt ctt att tac gtc 288
 Ser Ser Phe Pro Ser Lys Lys Pro Ile Phe Ile Val Leu Ile Tyr Val
 85 90 95
 ctc atc gcg gtg ttt gtt tcc att ctt gct gct gcc gct gtt gcc ttt 336
 Leu Ile Ala Val Phe Val Ser Ile Leu Ala Ala Ala Val Ala Phe
 100 105 110
 ctt gtt gag cgc gtt gcc tat aag cct ctt agg aag aga aat gcc cct 384
 Leu Val Glu Arg Val Ala Tyr Lys Pro Leu Arg Lys Arg Asn Ala Pro
 115 120 125
 aat ctg gca ttt cta att act gca ata ggt gct tcc ctg acc ata agt 432
 Asn Leu Ala Phe Leu Ile Thr Ala Ile Gly Ala Ser Leu Thr Ile Ser
 130 135 140
 aat tta ttt ttt ctt cgt tcc cca aat cca gag cct gca ctt tct att 480
 Asn Leu Phe Phe Leu Arg Ser Pro Asn Pro Glu Pro Ala Leu Ser Ile
 145 150 155 160
 ttt acc cca gtc cct ttt ttt aaa ttt ttt ggt gca act gtt aca agc 528
 Phe Thr Pro Val Leu Phe Lys Phe Phe Gly Ala Thr Val Thr Ser
 165 170 175
 ttt aat gtg gtg aca att ctg gct gcg gta atc ctg atg ttt ttg gtt 576
 Phe Asn Val Val Thr Ile Leu Ala Ala Val Ile Leu Met Phe Leu Val
 180 185 190
 gac tgg ttc ata agg cgg acc aga ttt ggc agg ggc att aga gct gtg 624
 Asp Trp Phe Ile Arg Arg Thr Arg Phe Gly Arg Gly Ile Arg Ala Val
 195 200 205
 gcg cag gat cct aac act gct tca ctt gtt gga gtg aac ccc gag cgg 672
 Ala Gln Asp Pro Asn Thr Ala Ser Leu Val Gly Val Asn Pro Glu Arg
 210 215 220
 gtt ata gcg ctg act ttt gtt ctt ggt ggt gtt ata gct ggc gct gca 720
 Val Ile Ala Leu Thr Phe Val Leu Gly Gly Val Ile Ala Gly Ala Ala
 225 230 235 240
 agt ctg ttc tat gtt cta aag gtt cct tcg ggt gtt gtg tac aat gcg 768
 Ser Leu Phe Tyr Val Leu Lys Val Pro Ser Gly Val Val Tyr Asn Ala
 245 250 255
 gat att gtt ctc ggt tta aag gct ttt gct gct gcc gtt ctg ggt ggc 816
 Asp Ile Val Leu Gly Leu Lys Ala Phe Ala Ala Ala Val Leu Gly Gly
 260 265 270
 att ggc agc att cgg ggc gct cta ctc gga ggg ctt ctg ctc ggt ctg 864
 Ile Gly Ser Ile Arg Gly Ala Leu Leu Gly Gly Leu Leu Leu Gly Leu
 275 280 285
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Phe	Ser	Asn	Trp	Gly	Ala	Leu	Leu	Leu	Gly	Asn	Ser	Gln	Trp	Gly	Asp		
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Val	Ser	Val	Phe	Val	Leu	Leu	Leu	Leu	Val	Leu	Leu	Phe	Arg	Pro	Ser		
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ggt	atc	ctc	ggc	aga	tct	ggc	ctt	tcg	gct	aaa	agc	agg	atg	tga		1005	
Gly	Ile	Leu	Gly	Arg	Ser	Gly	Leu	Ser	Ala	Lys	Ser	Arg	Met				
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<210> 731

<211> 334

<212> PRT

<213> Tropheryma whipplei

<400> 731

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			20					25					30				
Leu	Thr	Phe	Gly	Ala	Ile	Tyr	Ala	Leu	Ile	Ala	Val	Gly	Tyr	Thr	Val		
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Val	Tyr	Gly	Val	Leu	Gly	Leu	Ile	Asn	Phe	Ala	His	Ala	Gly	Val	Phe		
	50					55					60						
Val	Thr	Gly	Cys	Tyr	Ala	Leu	Val	Phe	Thr	Leu	Ser	Ala	Leu	Gly	Phe		
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Ser	Ser	Phe	Pro	Ser	Lys	Lys	Pro	Ile	Phe	Ile	Val	Leu	Ile	Tyr	Val		
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Leu	Ile	Ala	Val	Phe	Val	Ser	Ile	Leu	Ala	Ala	Ala	Ala	Val	Ala	Phe		
			100					105					110				
Leu	Val	Glu	Arg	Val	Ala	Tyr	Lys	Pro	Leu	Arg	Lys	Arg	Asn	Ala	Pro		
		115					120					125					
Asn	Leu	Ala	Phe	Leu	Ile	Thr	Ala	Ile	Gly	Ala	Ser	Leu	Thr	Ile	Ser		
	130				135						140						
Asn	Leu	Phe	Phe	Leu	Arg	Ser	Pro	Asn	Pro	Glu	Pro	Ala	Leu	Ser	Ile		
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Phe	Asn	Val	Val	Thr	Ile	Leu	Ala	Ala	Val	Ile	Leu	Met	Phe	Leu	Val		
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Ala	Gln	Asp	Pro	Asn	Thr	Ala	Ser	Leu	Val	Gly	Val	Asn	Pro	Glu	Arg		
	210				215						220						
Val	Ile	Ala	Leu	Thr	Phe	Val	Leu	Gly	Gly	Val	Ile	Ala	Gly	Ala	Ala		
225					230					235					240		
Ser	Leu	Phe	Tyr	Val	Leu	Lys	Val	Pro	Ser	Gly	Val	Val	Tyr	Asn	Ala		
				245					250					255			
Asp	Ile	Val	Leu	Gly	Leu	Lys	Ala	Phe	Ala	Ala	Ala	Val	Leu	Gly	Gly		
			260					265					270				
Ile	Gly	Ser	Ile	Arg	Gly	Ala	Leu	Leu	Gly	Gly	Leu	Leu	Leu	Gly	Leu		
		275					280					285					
Phe	Ser	Asn	Trp	Gly	Ala	Leu	Leu	Leu	Gly	Asn	Ser	Gln	Trp	Gly	Asp		
	290					295					300						
Val	Ser	Val	Phe	Val	Leu	Leu	Leu	Leu	Val	Leu	Leu	Phe	Arg	Pro	Ser		
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<212> DNA

<213> Pseudomonas fluorescens

<220>

<221> CDS

<222> (1)..(918)

<400> 732

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48

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Leu	Met	Leu	Phe 20	Leu	Leu	Ala	Ala	Gly 25	Leu	Thr	Leu	Val	Phe 30	Gly	Ile	
atg	gat	atg	atc	aac	ctg	gcc	cat	ggc	tcg	ctg	tac	atg	att	ggg	gca	144
Met	Asp	Met 35	Ile	Asn	Leu	Ala	His 40	Gly	Ser	Leu	Tyr	Met 45	Ile	Gly	Ala	
tac	ctg	acc	gcc	acc	gtc	gct	gag	gcc	agt	ggc	tct	tac	ttc	att	ggc	192
Tyr	Leu	Thr	Ala	Thr	Val	Ala 55	Glu	Ala	Ser	Gly	Ser	Tyr	Phe	Ile	Gly	
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Ile 65	Pro	Val	Ala	Leu	Val 70	Gly	Thr	Ala	Ile	Ile 75	Gly	Met	Val	Leu	Glu 80	
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Ile	Ser	Leu	Phe 85	Arg	Arg	Leu	Tyr	Arg	Arg 90	Asp	His	Leu	Ser	Gln 95	Val	
ctg	gcg	acc	ttt	gca	ctg	atc	ctc	atc	tgt	aac	gag	gcg	gtg	cga	atg	336
Leu	Ala	Thr	Phe 100	Ala	Leu	Ile	Leu	Ile 105	Cys	Asn	Glu	Ala	Val 110	Arg	Met	
atc	tgg	ggg	gta	caa	ccc	att	ccg	ctc	agc	aca	ccg	gcc	gtg	ttc	tcg	384
Ile	Trp	Gly 115	Val	Gln	Pro	Ile	Pro 120	Leu	Ser	Thr	Pro	Ala 125	Val	Phe	Ser	
cgc	ccg	att	gag	ctg	atc	cct	ggg	ctg	cac	tat	tcc	gca	cag	cgg	ttg	432
Arg	Pro 130	Ile	Glu	Leu	Ile	Pro 135	Gly	Leu	His	Tyr	Ser 140	Ala	Gln	Arg	Leu	
atg	att	atc	ggg	gtg	ggg	ctg	gtg	gtc	gcg	atc	tca	atg	tac	ttc	ctg	480
Met 145	Ile	Ile	Gly	Val	Gly 150	Leu	Val	Val	Ala	Ile 155	Ser	Met	Tyr	Phe	Leu 160	
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Val	Ala	Lys	Thr 165	Arg	Gly	Met	Trp	Val 170	Arg	Ala	Gly	Ala	Ser	Asn 175		
cgg	gaa	atg	gcc	acc	acg	atg	ggc	gtg	aac	atc	aaa	tgg	ttg	ttc	acc	576
Arg	Glu	Met	Ala 180	Thr	Thr	Met	Gly	Val 185	Asn	Ile	Lys	Trp	Leu 190	Phe	Thr	
gtg	gtg	ttc	ggg	gta	ggg	gca	gcg	ctg	tgc	gcc	ttg	gct	ggg	gca	atg	624
Val	Val	Phe 195	Gly	Val	Gly	Ala	Ala 200	Leu	Cys	Ala	Leu	Ala 205	Gly	Ala	Met	
ctt	ggg	cca	ttg	ctg	gca	gta	caa	gtt	ggc	atg	ggc	gaa	agc	att	ctg	672
Leu	Gly 210	Pro	Leu	Leu	Ala	Val 215	Gln	Val	Gly	Met	Gly 220	Glu	Ser	Ile	Leu	
att	ctg	gcg	ttt	gtg	gta	gtc	gtc	atc	ggg	ggc	atc	ggc	tcc	atc	agg	720
Ile 225	Leu	Ala	Phe	Val	Val 230	Val	Val	Ile	Gly	Gly 235	Ile	Gly	Ser	Ile	Arg 240	
ggg	gcg	ttt	gtc	ggg	gcg	ctt	ctg	atc	ggc	gcc	gtc	gac	acc	ttg	agc	768
Gly	Ala	Phe	Val 245	Gly	Ala	Leu	Leu	Ile	Gly 250	Ala	Val	Asp	Thr	Leu 255	Ser	
cgt	tca	ctg	ctt	cct	ctg	ttg	ctc	ggc	aag	ttc	cta	tcg	cca	tca	gtg	816
Arg	Ser	Leu	Leu 260	Pro	Leu	Leu	Leu	Gly 265	Lys	Phe	Leu	Ser	Pro 270	Ser	Val	
acc	tcc	tcg	att	ggc	gca	gcc	gtg	gca	tca	atc	atc	att	tac	gtt	ctt	864
Thr	Ser 275	Ile	Gly	Ala	Ala	Val 280	Ala	Ser	Ile	Ile	Ile 285	Tyr	Val	Leu		
atg	gct	gcc	gtg	ctg	ttt	tgg	aag	cca	caa	ggc	ctg	ttt	cct	gct	cgt	912
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Gly 305																

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<211> 305

<212> PRT

<213> Pseudomonas fluorescens

<400> 733

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 Tyr Leu Thr Ala Thr Val Ala Glu Ala Ser Gly Ser Tyr Phe Ile Gly
 50 55 60
 Ile Pro Val Ala Leu Val Gly Thr Ala Ile Ile Gly Met Val Leu Glu
 65 70 75 80
 Ile Ser Leu Phe Arg Arg Leu Tyr Arg Arg Asp His Leu Ser Gln Val
 85 90 95
 Leu Ala Thr Phe Ala Leu Ile Leu Ile Cys Asn Glu Ala Val Arg Met
 100 105 110
 Ile Trp Gly Val Gln Pro Ile Pro Leu Ser Thr Pro Ala Val Phe Ser
 115 120 125
 Arg Pro Ile Glu Leu Ile Pro Gly Leu His Tyr Ser Ala Gln Arg Leu
 130 135 140
 Met Ile Ile Gly Val Gly Leu Val Val Ala Ile Ser Met Tyr Phe Leu
 145 150 155 160
 Val Ala Lys Thr Arg Leu Gly Met Trp Val Arg Ala Gly Ala Ser Asn
 165 170 175
 Arg Glu Met Ala Thr Thr Met Gly Val Asn Ile Lys Trp Leu Phe Thr
 180 185 190
 Val Val Phe Gly Val Gly Ala Ala Leu Cys Ala Leu Ala Gly Ala Met
 195 200 205
 Leu Gly Pro Leu Leu Ala Val Gln Val Gly Met Gly Glu Ser Ile Leu
 210 215 220
 Ile Leu Ala Phe Val Val Val Val Ile Gly Gly Ile Gly Ser Ile Arg
 225 230 235 240
 Gly Ala Phe Val Gly Ala Leu Leu Ile Gly Ala Val Asp Thr Leu Ser
 245 250 255
 Arg Ser Leu Leu Pro Leu Leu Leu Gly Lys Phe Leu Ser Pro Ser Val
 260 265 270
 Thr Ser Ser Ile Gly Ala Ala Val Ala Ser Ile Ile Ile Tyr Val Leu
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 Gly
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<210> 734

<211> 867

<212> DNA

<213> Azoarcus evansii

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<221> CDS

<222> (1)..(867)

<400> 734

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ggc ctg ctg ctg ttc ctc gtg gcc agc ggg ctg acg ctg gtg ttc ggc	96
Gly Leu Leu Leu Phe Leu Val Ala Ser Gly Leu Thr Leu Val Phe Gly	
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atc atg ggc atc atc aac ctc gcg cac ggc agc ttc tac atg gtc ggc	144
Ile Met Gly Ile Ile Asn Leu Ala His Gly Ser Phe Tyr Met Val Gly	
35 40 45	
gcc tac ctc gcg ttc gcg ctc acg agc ctg acc ggc aac ctg atg ctg	192
Ala Tyr Leu Ala Phe Ala Leu Thr Ser Leu Thr Gly Asn Leu Met Leu	
50 55 60	
gcg atc gcg ctg ggg ttg ccg ctg gcc ttc gtg ttc ggc gcg atc ctc	240
Ala Ile Ala Leu Gly Leu Pro Leu Ala Phe Val Phe Gly Ala Ile Leu	
65 70 75 80	
gaa tgg gcg ctg ttc tcg cac ctg tac aag cgc gac cac ctc gaa cag	288
Glu Trp Ala Leu Phe Ser His Leu Tyr Lys Arg Asp His Leu Glu Gln	
85 90 95	
gtg ctg ctg acc tac ggc ctg atc ctg atc ttc gag gag ctg cgc agc	336
Val Leu Leu Thr Tyr Gly Leu Ile Leu Ile Phe Glu Glu Leu Arg Ser	
100 105 110	

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Ser	Ala	Ser	Ile	Pro	Leu	Ser	Asp	Asn	Leu	Ser	Tyr	Pro	Leu	Tyr	Arg	
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ctg	gtg	atc	tcg	gtc	gtg	tgc	ctc	gcg	ctc	gcg	ggc	ggg	ctg	tac	tgg	480
Leu	Val	Ile	Ser	Val	Val	Cys	Leu	Ala	Leu	Ala	Gly	Gly	Leu	Tyr	Trp	
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cgc	acc	gtg	ttt	gcc	ctc	ggt	gtc	gcg	ctc	gcg	gcg	ctg	gcc	ggc	atg	624
Arg	Thr	Val	Phe	Ala	Leu	Gly	Val	Ala	Leu	Ala	Ala	Leu	Ala	Gly	Met	
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Leu	Ala	Ala	Pro	Ile	Ser	Ser	Val	Tyr	Pro	Gly	Met	Gly	Ser	Ser	Val	
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Leu	Ile	Ile	Ser	Phe	Val	Ile	Val	Val	Ile	Gly	Gly	Val	Gly	Ser	Val	
	225				230					235					240	
tgg	ggc	gcg	ctc	gtc	gcg	gcg	ctc	gtg	atc	ggc	ttc	gcg	gac	acc	ttc	768
Trp	Gly	Ala	Leu	Val	Ala	Ala	Leu	Val	Ile	Gly	Phe	Ala	Asp	Thr	Phe	
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ggc	aag	gtg	ctg	ctg	ccc	gat	ctc	gcg	ggc	ctg	atg	gtc	tat	ctc	gtg	816
Gly	Lys	Val	Leu	Leu	Pro	Asp	Leu	Ala	Gly	Leu	Met	Val	Tyr	Leu	Val	
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Met	Ala	Val	Val	Leu	Leu	Trp	Arg	Pro	Glu	Gly	Ile	Phe	Lys	Lys	Ala	
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<211> 288

<212> PRT

<213> Azoarcus evansii

<400> 735

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			20					25					30			
Ile	Met	Gly	Ile	Ile	Asn	Leu	Ala	His	Gly	Ser	Phe	Tyr	Met	Val	Gly	
		35					40					45				
Ala	Tyr	Leu	Ala	Phe	Ala	Leu	Thr	Ser	Leu	Thr	Gly	Asn	Leu	Met	Leu	
	50					55					60					
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Glu	Trp	Ala	Leu	Phe	Ser	His	Leu	Tyr	Lys	Arg	Asp	His	Leu	Glu	Gln	
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Val	Leu	Leu	Thr	Tyr	Gly	Leu	Ile	Leu	Ile	Phe	Glu	Glu	Leu	Arg	Ser	
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Leu	Ala	Val	Gly	Asp	Asp	Val	His	Gly	Val	Thr	Ile	Pro	Glu	Leu	Phe	
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Ser	Ala	Ser	Ile	Pro	Leu	Ser	Asp	Asn	Leu	Ser	Tyr	Pro	Leu	Tyr	Arg	
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Leu	Val	Ile	Ser	Val	Val	Cys	Leu	Ala	Leu	Ala	Gly	Gly	Leu	Tyr	Trp	
	145				150					155					160	
Leu	Ile	Gln	Lys	Thr	Arg	Leu	Gly	Met	Met	Ile	Arg	Ala	Gly	Ser	His	
				165				170						175		
Asp	Arg	Asp	Met	Val	Lys	Ala	Leu	Gly	Ile	Asp	Ile	Asn	Leu	Leu	Tyr	
			180					185					190			
Arg	Thr	Val	Phe	Ala	Leu	Gly	Val	Ala	Leu	Ala	Ala	Leu	Ala	Gly	Met	
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Leu Ala Ala Pro Ile Ser Ser Val Tyr Pro Gly Met Gly Ser Ser Val
 210 215 220
 Leu Ile Ile Ser Phe Val Ile Val Val Ile Gly Gly Val Gly Ser Val
 225 230 235 240
 Trp Gly Ala Leu Val Ala Ala Leu Val Ile Gly Phe Ala Asp Thr Phe
 245 250 255
 Gly Lys Val Leu Leu Pro Asp Leu Ala Gly Leu Met Val Tyr Leu Val
 260 265 270
 Met Ala Val Val Leu Leu Trp Arg Pro Glu Gly Ile Phe Lys Lys Ala
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<210> 736

<211> 894

<212> DNA

<213> *Vibrio parahaemolyticus*

<220>

<221> CDS

<222> (1)..(894)

<400> 736

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1 5 10 15	
ggc atg ttg tat ggc gtg gtc gcc atg tgc ttt gta ctg att tac aaa	96
Gly Met Leu Tyr Gly Val Val Ala Met Cys Phe Val Leu Ile Tyr Lys	
20 25 30	
tca act cag gtg gtg aac ttt gct cag ggt gag ttt cta ctg atc ggc	144
Ser Thr Gln Val Val Asn Phe Ala Gln Gly Glu Phe Leu Leu Ile Gly	
35 40 45	
gcg tgg gtg tgt tgg gct gca ttg gtt cat cta caa ctg cca ttt ttc	192
Ala Trp Val Cys Trp Ala Ala Leu Val His Leu Gln Leu Pro Phe Phe	
50 55 60	
gtc ggc ttc tta ctc acg ctc gcc ttt atg atg gtg ttt ggt atc gcc	240
Val Gly Phe Leu Leu Thr Leu Ala Phe Met Met Val Phe Gly Ile Ala	
65 70 75 80	
gtg caa acc att gtg ctc agg cct tta att ggt gag ccg atc atc tcg	288
Val Gln Thr Ile Val Leu Arg Pro Leu Ile Gly Glu Pro Ile Ile Ser	
85 90 95	
gtg atc atg gtg acg att ggt ttg tcg atg ttc ttc caa gca ctg atg	336
Val Ile Met Val Thr Ile Gly Leu Ser Met Phe Phe Gln Ala Leu Met	
100 105 110	
aag tgg atg ttt ggt gtg tca gcg gtg tcg tac ccg cag gta ttc gaa	384
Lys Trp Met Phe Gly Val Ser Ala Val Ser Tyr Pro Gln Val Phe Glu	
115 120 125	
acc aac gtc gtc aat att ggt ggt ttg aac gta gaa ttt gct tac ata	432
Thr Asn Val Val Asn Ile Gly Gly Leu Asn Val Glu Phe Ala Tyr Ile	
130 135 140	
ctg agc ttg atc ttc tcg atg atc atc atg ggc gcg ttc tac tgg ttc	480
Leu Ser Leu Ile Phe Ser Met Ile Ile Met Gly Ala Phe Tyr Trp Phe	
145 150 155 160	
ttt aaa ttc agc aaa atg ggc ttg gcg atg cgt gcg acc gca ttt aac	528
Phe Lys Phe Ser Lys Met Gly Leu Ala Met Arg Ala Thr Ala Phe Asn	
165 170 175	
cag cag gtc gcc cag agt ctt ggc att tcc atc aag aaa gtg ttt gcg	576
Gln Gln Val Ala Gln Ser Leu Gly Ile Ser Ile Lys Lys Val Phe Ala	
180 185 190	
atc agt tgg gct att tcg gcg atg gta tcc gcg aca gca ggg att gtt	624
Ile Ser Trp Ala Ile Ser Ala Met Val Ser Ala Thr Ala Gly Ile Val	
195 200 205	
atc ggg atc gtc aac ggc gta tcg gac gcg cta tct atc atc ggc atc	672
Ile Gly Ile Val Asn Gly Val Ser Asp Ala Leu Ser Ile Ile Gly Ile	
210 215 220	
aaa gtg ttc cca gcg gtt att tta ggt ggc ttg gat tca gtg gtc ggc	720
Lys Val Phe Pro Ala Val Ile Leu Gly Gly Leu Asp Ser Val Val Gly	
225 230 235 240	
gca atc gtc ggt ggc atc acc atc ggg gtg ctg gaa aac tta gct gag	768
Ala Ile Val Gly Gly Ile Thr Ile Gly Val Leu Glu Asn Leu Ala Glu	
245 250 255	

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ttc	ttt	gat	agc	caa	tac	ctg	caa	gtg	ggg	aac	ctt	tac	aac	atc	gca	816
Phe	Phe	Asp	Ser	Gln	Tyr	Leu	Gln	Val	Gly	Asn	Leu	Tyr	Asn	Ile	Ala	
			260					265					270			
ccg	ttc	tat	gtg	ctg	tta	atc	att	ctt	gcc	ttc	aag	cca	tac	ggc	ctg	864
Pro	Phe	Tyr	Val	Leu	Leu	Ile	Ile	Leu	Ala	Phe	Lys	Pro	Tyr	Gly	Leu	
		275					280					285				
ttt	ggg	acc	aaa	gat	att	gag	cgt	att	taa							894
Phe	Gly	Thr	Lys	Asp	Ile	Glu	Arg	Ile								
	290					295										

<210> 737

<211> 297

<212> PRT

<213> *Vibrio parahaemolyticus*

<400> 737

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			20					25					30			
Ser	Thr	Gln	Val	Val	Asn	Phe	Ala	Gln	Gly	Glu	Phe	Leu	Leu	Ile	Gly	
		35					40					45				
Ala	Trp	Val	Cys	Trp	Ala	Ala	Leu	Val	His	Leu	Gln	Leu	Pro	Phe	Phe	
	50					55					60					
Val	Gly	Phe	Leu	Leu	Thr	Leu	Ala	Phe	Met	Met	Val	Phe	Gly	Ile	Ala	
65					70				75						80	
Val	Gln	Thr	Ile	Val	Leu	Arg	Pro	Leu	Ile	Gly	Glu	Pro	Ile	Ile	Ser	
			85					90						95		
Val	Ile	Met	Val	Thr	Ile	Gly	Leu	Ser	Met	Phe	Phe	Gln	Ala	Leu	Met	
			100					105					110			
Lys	Trp	Met	Phe	Gly	Val	Ser	Ala	Val	Ser	Tyr	Pro	Gln	Val	Phe	Glu	
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Thr	Asn	Val	Val	Asn	Ile	Gly	Gly	Leu	Asn	Val	Glu	Phe	Ala	Tyr	Ile	
	130					135					140					
Leu	Ser	Leu	Ile	Phe	Ser	Met	Ile	Ile	Met	Gly	Ala	Phe	Tyr	Trp	Phe	
145					150					155					160	
Phe	Lys	Phe	Ser	Lys	Met	Gly	Leu	Ala	Met	Arg	Ala	Thr	Ala	Phe	Asn	
			165					170						175		
Gln	Gln	Val	Ala	Gln	Ser	Leu	Gly	Ile	Ser	Ile	Lys	Lys	Val	Phe	Ala	
		180						185					190			
Ile	Ser	Trp	Ala	Ile	Ser	Ala	Met	Val	Ser	Ala	Thr	Ala	Gly	Ile	Val	
		195					200					205				
Ile	Gly	Ile	Val	Asn	Gly	Val	Ser	Asp	Ala	Leu	Ser	Ile	Ile	Gly	Ile	
	210					215					220					
Lys	Val	Phe	Pro	Ala	Val	Ile	Leu	Gly	Gly	Leu	Asp	Ser	Val	Val	Gly	
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Ala	Ile	Val	Gly	Gly	Ile	Thr	Ile	Gly	Val	Leu	Glu	Asn	Leu	Ala	Glu	
			245						250					255		
Phe	Phe	Asp	Ser	Gln	Tyr	Leu	Gln	Val	Gly	Asn	Leu	Tyr	Asn	Ile	Ala	
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Pro	Phe	Tyr	Val	Leu	Leu	Ile	Ile	Leu	Ala	Phe	Lys	Pro	Tyr	Gly	Leu	
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Phe	Gly	Thr	Lys	Asp	Ile	Glu	Arg	Ile								
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<210> 738

<211> 1314

<212> DNA

<213> *Pseudomonas syringae*

<220>

<221> CDS

<222> (1)..(1314)

<400> 738

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Met	Ser	Val	Thr	Ala	Ala	Gly	Pro	Val	Thr	Lys	Pro	Val	Glu	Ile	Lys	
1				5					10					15		
aaa	agc	ctg	atc	gat	gcc	gtc	gtc	gcc	ggg	ctg	ctg	gcg	ctg	atc	gta	96

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Lys	Ser	Leu	Ile 20	Asp	Ala	Val	Val	Ala 25	Gly	Leu	Leu	Ala	Leu 30	Ile	Val		
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Phe	Gly	Pro	Ile	Val	Gly	Ile	Val	Leu	Asp	Gly	Tyr	Ser	Phe	Asn	Leu		
		35					40					45					
caa	ccg	acc	cgt	gtc	gcg	tgg	ctg	gtg	gct	gtg	gtc	atg	gtc	ggg	cgc		192
Gln	Pro	Thr	Arg	Val	Ala	Trp	Leu	Val	Ala	Val	Val	Met	Val	Gly	Arg		
	50					55					60						
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Gln	Ser	Phe	Glu	Ser	Ser	Asp	Ser	Gly	Val	His	Val	Leu	Lys	Pro	Asp		
			85						90					95			
cac	aaa	tcc	agc	ctg	tac	tgg	atc	att	ccg	ctg	ctg	atc	gtg	gtt	gcc		336
His	Lys	Ser	Ser	Leu	Tyr	Trp	Ile	Ile	Pro	Leu	Leu	Ile	Val	Val	Ala		
		100					105						110				
atc	gtg	ttc	ccg	atc	ttc	gcc	aac	aag	tac	atc	ctg	acc	gtg	gtc	att		384
Ile	Val	Phe	Pro	Ile	Phe	Ala	Asn	Lys	Tyr	Ile	Leu	Thr	Val	Val	Ile		
		115					120					125					
ctc	ggg	ctg	atc	tac	gta	ctg	ctg	ggg	ctg	ggc	ctg	aac	atc	gtg	gtc		432
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ggg	ctg	ggc	ggc	ctg	ctc	gat	ctg	ggc	tac	gtc	gcg	ttc	tac	gcc	atc		480
Gly	Leu	Ala	Gly	Leu	Leu	Asp	Leu	Gly	Tyr	Val	Ala	Phe	Tyr	Ala	Ile		
145				150					155						160		
ggg	gct	tat	ggc	ctg	gcg	ctc	ggc	tat	cag	tat	ctg	ggc	ctg	ggg	ttt		528
Gly	Ala	Tyr	Gly	Leu	Ala	Leu	Gly	Tyr	Gln	Tyr	Leu	Gly	Leu	Gly	Phe		
			165						170					175			
tgg	tgc	gcg	tgg	ctg	gca	gcg	atc	gcg	gcg	gcg	ctt	gcc	ggg	tgc			576
Trp	Ser	Ala	Leu	Pro	Ala	Ala	Ile	Ala	Ala	Ala	Leu	Ala	Gly	Cys			
		180					185					190					
att	ctc	ggc	ttt	ccg	gtg	tgg	cgc	atg	cat	ggc	gat	tac	ctg	gcc	atc		624
Ile	Leu	Gly	Phe	Pro	Val	Leu	Arg	Met	His	Gly	Asp	Tyr	Leu	Ala	Ile		
		195					200					205					
gtg	acg	ctg	ggg	ttc	ggc	gaa	atc	atc	cgt	ctg	gtg	ctg	aac	aac	tgg		672
Val	Thr	Leu	Gly	Phe	Gly	Glu	Ile	Ile	Arg	Leu	Val	Leu	Asn	Asn	Trp		
	210				215					220							
cta	tgc	ttc	acg	ggc	ggc	ccg	aat	ggg	gtg	ccg	gtg	ccg	tgc	ccg	acc		720
Leu	Ser	Phe	Thr	Gly	Gly	Pro	Asn	Gly	Val	Pro	Val	Pro	Ser	Pro	Thr		
225				230					235						240		
ttt	ttc	ggc	ctg	gaa	ttc	gga	cgt	cgc	gcc	aaa	gac	ggc	ggg	gtc	ccc		768
Phe	Phe	Gly	Leu	Glu	Phe	Gly	Arg	Arg	Ala	Lys	Asp	Gly	Gly	Val	Pro		
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Ile	His	Glu	Tyr	Phe	Gly	Phe	Asp	Tyr	Asn	Pro	Asp	Leu	Lys	Phe	Ile		
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Phe	Ile	Tyr	Thr	Val	Leu	Phe	Leu	Val	Val	Leu	Ala	Val	Leu	Phe	Ile		
		275				280					285						
aag	cat	cgc	ctg	acc	cgc	atg	ccg	atc	ggg	cgt	gcc	tgg	gaa	gcc	ttg		912
Lys	His	Arg	Leu	Thr	Arg	Met	Pro	Ile	Gly	Arg	Ala	Trp	Glu	Ala	Leu		
	290					295				300							
cgt	gaa	gac	gag	att	gcc	tgc	cgt	tgc	atg	ggc	ctc	aat	cac	gta	ctg		960
Arg	Glu	Asp	Glu	Ile	Ala	Cys	Arg	Ser	Met	Gly	Leu	Asn	His	Val	Leu		
305				310					315						320		
gtc	aag	ctc	tgc	gcg	ttc	acc	ata	ggg	gct	tgc	aca	gcg	ggg	ctt	gcg		1008
Val	Lys	Leu	Ser	Ala	Phe	Thr	Ile	Gly	Ala	Ser	Thr	Ala	Gly	Leu	Ala		
			325					330						335			
ggc	gtg	ttt	ttc	gcc	agc	tac	caa	ggc	ttc	gtc	aac	ccg	acg	tgc	ttc		1056
Gly	Val	Phe	Phe	Ala	Ser	Tyr	Gln	Gly	Phe	Val	Asn	Pro	Thr	Ser	Phe		
		340					345					350					
acc	ttc	ttc	gag	tgc	gcg	ctg	att	ctg	gcc	atc	gtc	gtg	ctg	ggc	ggg		1104
Thr	Phe	Phe	Glu	Ser	Ala	Leu	Ile	Leu	Ala	Ile	Val	Val	Leu	Gly	Gly		
		355				360					365						
atg	ggg	tgc	acc	atc	ggg	gtg	gtg	att	gct	gcg	ttc	gtg	ctc	acc	gtt		1152
Met	Gly	Ser	Thr	Ile	Gly	Val	Val	Ile	Ala	Ala	Phe	Val	Leu	Thr	Val		
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gcg	cct	gaa	ctg	ctg	cgc	agc	ttc	tct	gag	tac	cgc	gtg	ttg	ctg	ttc		1200

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Gly	Ile	Leu	Met	Val 405	Leu	Met	Met	Ile	Trp 410	Arg	Pro	Arg	Gly	Leu 415	Ile	
cgc	atc	agc	cgc	acc	ggg	gtg	aaa	cca	cgc	aag	ggg	gcg	ctg	gtg	aca	1296
Arg	Ile	Ser	Arg 420	Thr	Gly	Val	Lys	Pro 425	Arg	Lys	Gly	Ala	Leu 430	Val	Thr	
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Glu	Gly	Gly 435	Ala	Arg												

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<211> 437

<212> PRT

<213> Pseudomonas syringae

<400> 739

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Phe	Gly	Pro 35	Ile	Val	Gly	Ile	Val 40	Leu	Asp	Gly	Tyr	Ser 45	Phe	Asn	Leu
Gln	Pro 50	Thr	Arg	Val	Ala	Trp 55	Leu	Val	Ala	Val	Val 60	Met	Val	Gly	Arg
Phe 65	Leu	Ile	Ser	Leu	Phe 70	Leu	Gln	Thr	Pro	Arg 75	Gly	Ile	Arg	Met	Ser 80
Gln	Ser	Phe	Glu	Ser 85	Asp	Ser	Gly	Val 90	His	Val	Leu	Lys	Pro 95	Asp	
His	Lys	Ser	Ser 100	Leu	Tyr	Trp	Ile	Ile 105	Pro	Leu	Leu	Ile	Val 110	Val	Ala
Ile	Val	Phe 115	Pro	Ile	Phe	Ala	Asn 120	Lys	Tyr	Ile	Leu	Thr 125	Val	Val	Ile
Leu	Gly 130	Leu	Ile	Tyr	Val	Leu 135	Leu	Gly	Leu	Gly	Leu 140	Asn	Ile	Val	Val
Gly 145	Leu	Ala	Gly	Leu	Leu 150	Asp	Leu	Gly	Tyr	Val 155	Ala	Phe	Tyr	Ala	Ile 160
Gly	Ala	Tyr	Gly	Leu 165	Ala	Leu	Gly	Tyr	Gln 170	Tyr	Leu	Gly	Leu	Gly 175	Phe
Trp	Ser	Ala	Leu 180	Pro	Leu	Ala	Ala	Ile 185	Ala	Ala	Ala	Leu	Ala 190	Gly	Cys
Ile	Leu	Gly 195	Phe	Pro	Val	Leu	Arg 200	Met	His	Gly	Asp	Tyr 205	Leu	Ala	Ile
Val	Thr 210	Leu	Gly	Phe	Gly	Glu 215	Ile	Ile	Arg	Leu	Val 220	Leu	Asn	Asn	Trp
Leu 225	Ser	Phe	Thr	Gly	Gly 230	Pro	Asn	Gly	Val	Pro 235	Val	Pro	Ser	Pro	Thr 240
Phe	Phe	Gly	Leu	Glu 245	Phe	Gly	Arg	Arg	Ala 250	Lys	Asp	Gly	Gly	Val 255	Pro
Ile	His	Glu	Tyr 260	Phe	Gly	Phe	Asp	Tyr 265	Asn	Pro	Asp	Leu	Lys 270	Phe	Ile
Phe	Ile	Tyr 275	Thr	Val	Leu	Phe	Leu 280	Val	Val	Leu	Ala	Val 285	Leu	Phe	Ile
Lys	His 290	Arg	Leu	Thr	Arg	Met 295	Pro	Ile	Gly	Arg	Ala 300	Trp	Glu	Ala	Leu
Arg 305	Glu	Asp	Glu	Ile	Ala 310	Cys	Arg	Ser	Met	Gly 315	Leu	Asn	His	Val	Leu 320
Val	Lys	Leu	Ser	Ala 325	Phe	Thr	Ile	Gly	Ala 330	Ser	Thr	Ala	Gly	Leu 335	Ala
Gly	Val	Phe	Phe 340	Ala	Ser	Tyr	Gln	Gly 345	Phe	Val	Asn	Pro	Thr 350	Ser	Phe
Thr	Phe	Phe 355	Glu	Ser	Ala	Leu	Ile 360	Leu	Ala	Ile	Val	Val 365	Leu	Gly	Gly
Met	Gly 370	Ser	Thr	Ile	Gly	Val 375	Val	Ile	Ala	Ala	Phe	Val 380	Leu	Thr	Val
Ala 385	Pro	Glu	Leu	Leu	Arg 390	Ser	Phe	Ser	Glu	Tyr 395	Arg	Val	Leu	Leu	Phe 400
Gly	Ile	Leu	Met	Val	Leu	Met	Met	Ile	Trp	Arg	Pro	Arg	Gly	Leu	Ile

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Arg Ile Ser Arg 405 Thr Gly Val Lys Pro 410 Arg Lys Gly Ala Leu 415 Thr
 Glu Gly Gly 420 Ala Arg
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 <212> DNA
 <213> Pseudomonas syringae

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 Pro Phe Ala Ala Gln Ala Ser Asp Ala Gly Asp Phe Ala Ala Ala Ser
 20 25 30
 tct tcc cga cag gcc gag ctg ttg gag gcc tgg gca gcc agc ccg gtc 144
 Ser Ser Arg Gln Ala Glu Leu Leu Glu Ala Trp Ala Ala Ser Pro Val
 35 40 45
 cct gaa cgc atc gaa ctg ctg gaa gcg ctg cgc gat ggc cgt gtt gcc 192
 Pro Glu Arg Ile Glu Leu Leu Glu Ala Leu Arg Asp Gly Arg Val Ala
 50 55 60
 gcc gac agt agc aaa cgc gcg tgg atc gaa aac gac aaa tac ggg 240
 Ala Asp Ser Ser Lys Arg Ala Trp Ile Glu Asn Asn Asp Lys Tyr Gly
 65 70 75 80
 gca gtg gat gcg aat gcg cct gcg gct gcc gac gct cca acc cct gac 288
 Ala Val Asp Ala Asn Ala Pro Ala Ala Asp Ala Pro Thr Pro Asp
 85 90 95
 gaa ccg cgc aaa ttg cgc ctg aac aac ccg ctg cgc ggc ctg gtc gat 336
 Glu Pro Arg Lys Leu Arg Leu Asn Asn Arg Leu Arg Gly Leu Val Asp
 100 105 110
 acc gcg ctg gcc agc cac caa ttg ctg gca gcc gac acc agg ctg cgt 384
 Thr Ala Leu Ala Ser His Gln Leu Leu Ala Ala Asp Thr Arg Leu Arg
 115 120 125
 ctt gcg gca gct ttg caa ttg caa aaa agc gcc cgc ccc gcg caa ctg 432
 Leu Ala Ala Ala Leu Gln Leu Gln Lys Ser Ala Arg Pro Ala Gln Leu
 130 135 140
 gat ctg ctg acc cag gcg gtg gcc agc gaa acc gat tcc agc gtt aaa 480
 Asp Leu Leu Thr Gln Arg Val Ala Ser Glu Thr Asp Ser Ser Val Lys
 145 150 155 160
 agc gcg ctg aca ctg gcg ctg gcc aac ctg caa ctg gtc gat tcc agc 528
 Ser Ala Leu Thr Leu Ala Leu Ala Asn Leu Gln Leu Val Asp Ser Ser
 165 170 175
 ccc tcg gtg cgt ctg gcg gca gtg cgc ctg ctc ggc gaa acc ggc gac 576
 Pro Ser Val Arg Leu Ala Ala Val Arg Leu Leu Gly Glu Thr Gly Asp
 180 185 190
 ccg ctg gcg cgt acc cgt ctt gag tcg ctg ctg gcg ccg ggc gtc gaa 624
 Pro Leu Ala Arg Thr Arg Leu Glu Ser Leu Leu Ala Pro Gly Val Glu
 195 200 205
 acc gat gcg tca gtg cgc att gcc gct gaa acc agc ctg gcg cag gtc 672
 Thr Asp Ala Ser Val Arg Ile Ala Ala Glu Thr Ser Leu Ala Gln Val
 210 215 220
 aac cgc aag ctg atg atc ggc gaa gtg ctc ggt cag gcg ttc agc ggc 720
 Asn Arg Lys Leu Met Ile Gly Glu Val Leu Gly Gln Ala Phe Ser Gly
 225 230 235 240
 atg tcg ctg ggc tcg att ctg ttg ttg gcg gcg ctg ggg ctg gca atc 768
 Met Ser Leu Gly Ser Ile Leu Leu Leu Ala Ala Leu Gly Leu Ala Ile
 245 250 255
 acc ttc ggc ctg ctc ggc gtg atc aac atg gcc cac ggc gaa atg ctg 816
 Thr Phe Gly Leu Leu Gly Val Ile Asn Met Ala His Gly Glu Met Leu
 260 265 270
 atg ctg ggt gcc tac tcg acc tac gtg caa ctg atg ctg cag cgc 864
 Met Leu Gly Ala Tyr Ser Thr Tyr Val Val Gln Leu Met Leu Gln Arg

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		275				280			285										
tac	gcg	ccg	ggt	gcc	atc	gag	tac	ccg	ctg	atc	gca	ttg	ccc	gtg					912
Tyr	Ala	Pro	Gly	Ala	Ile	Glu	Tyr	Tyr	Pro	Leu	Ile	Ala	Leu	Pro	Val				
	290					295					300								
gcg	ttt	ttt	gtc	acc	gcc	atg	atc	ggc	atg	gtg	ctg	gag	cgc	acg	gtg				960
Ala	Phe	Phe	Val	Thr	Ala	Met	Ile	Gly	Met	Val	Leu	Glu	Arg	Thr	Val				
305					310					315					320				
att	cg	cat	ttg	tac	ggc	cg	ccg	ctg	gaa	acc	ctg	ctc	gcc	acc	tgg				1008
Ile	Arg	His	Leu	Tyr	Gly	Arg	Pro	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp				
				325					330					335					
ggc	atc	agc	ctg	atg	ctg	atc	cag	gcc	gtg	cg	ctg	gcc	ttc	ggt	gcg				1056
Gly	Ile	Ser	Leu	Met	Leu	Ile	Gln	Ala	Val	Arg	Leu	Ala	Phe	Gly	Ala				
				340				345					350						
caa	aac	gtc	gaa	gtg	gcc	aac	ccg	caa	tgg	ttg	tcc	ggc	ggg	att	cag				1104
Gln	Asn	Val	Glu	Val	Ala	Asn	Pro	Gln	Trp	Leu	Ser	Gly	Gly	Ile	Gln				
		355					360					365							
gtg	ctg	ccc	aat	ctg	gtg	ctg	cct	tac	aac	cg	atc	gtg	atc	atc	gcc				1152
Val	Leu	Pro	Asn	Leu	Val	Leu	Pro	Tyr	Asn	Arg	Ile	Val	Ile	Ile	Ala				
		370				375					380								
ttc	gcg	ctg	ttc	gtg	gtg	ctg	ctg	acc	tgg	ctg	cta	ctg	aac	aag	acc				1200
Phe	Ala	Leu	Phe	Val	Val	Leu	Leu	Thr	Trp	Leu	Leu	Leu	Asn	Lys	Thr				
385					390					395					400				
cg	ctg	ggg	ctg	aac	gtg	cg	gcc	gtg	acc	cag	aac	cg	aac	atg	gcc				1248
Arg	Leu	Gly	Leu	Asn	Val	Arg	Ala	Val	Thr	Gln	Asn	Arg	Asn	Met	Ala				
				405				410						415					
gcc	tgc	tgc	ggc	gtg	ccg	acc	ggg	cg	atc	gac	atg	atg	gcg	ttc	ggg				1296
Ala	Cys	Cys	Gly	Val	Pro	Thr	Gly	Arg	Ile	Asp	Met	Met	Ala	Phe	Gly				
			420				425					430							
ctg	ggc	tca	ggc	att	gca	ggc	ctg	ggc	ggc	gtc	gcc	ctg	agc	cag	atc				1344
Leu	Gly	Ser	Gly	Ile	Ala	Gly	Leu	Gly	Gly	Val	Ala	Leu	Ser	Gln	Ile				
		435				440					445								
ggc	aac	gtc	ggc	cct	gat	ctc	ggc	cag	agc	tac	atc	atc	gac	tcg	ttc				1392
Gly	Asn	Val	Gly	Pro	Asp	Leu	Gly	Gln	Ser	Tyr	Ile	Ile	Asp	Ser	Phe				
		450				455				460									
ctg	gtg	gtg	gtg	ctc	ggt	ggc	gtc	gga	caa	ctg	gcc	ggc	agc	gtg	acg				1440
Leu	Val	Val	Val	Leu	Gly	Gly	Val	Gly	Gln	Leu	Ala	Gly	Ser	Val	Thr				
465					470					475					480				
gcg	gct	ttc	ggg	ctg	ggt	atc	gcc	aac	aag	att	ctc	gaa	ccg	caa	atc				1488
Ala	Ala	Phe	Gly	Leu	Gly	Ile	Ala	Asn	Lys	Ile	Leu	Glu	Pro	Gln	Ile				
				485				490						495					
ggc	gcc	gta	ttg	ggc	aag	atc	ctg	atc	ctg	gcg	ctg	atc	att	ctg	ttt				1536
Gly	Ala	Val	Leu	Gly	Lys	Ile	Leu	Ile	Leu	Ala	Leu	Ile	Ile	Leu	Phe				
			500				505					510							
atc	cag	aaa	cg	ccg	caa	ggc	ctc	ttc	gca	ctg	aaa	gga	cg	gtg	att				1584
Ile	Gln	Lys	Arg	Pro	Gln	Gly	Leu	Phe	Ala	Leu	Lys	Gly	Arg	Val	Ile				
		515					520					525							
gac	tga																		1590
Asp																			

<210> 741

<211> 529

<212> PRT

<213> Pseudomonas syringae

<400> 741

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Pro	Phe	Ala	Ala	Gln	Ala	Ser	Asp	Ala	Gly	Asp	Phe	Ala	Ala	Ala	Ser
			20					25					30		
Ser	Ser	Arg	Gln	Ala	Glu	Leu	Leu	Glu	Ala	Trp	Ala	Ala	Ser	Pro	Val
		35					40					45			
Pro	Glu	Arg	Ile	Glu	Leu	Leu	Glu	Ala	Leu	Arg	Asp	Gly	Arg	Val	Ala
	50					55				60					
Ala	Asp	Ser	Ser	Lys	Arg	Ala	Trp	Ile	Glu	Asn	Asn	Asp	Lys	Tyr	Gly
65					70				75						80
Ala	Val	Asp	Ala	Asn	Ala	Pro	Ala	Ala	Ala	Asp	Ala	Pro	Thr	Pro	Asp
				85				90						95	
Glu	Pro	Arg	Lys	Leu	Arg	Leu	Asn	Asn	Arg	Leu	Arg	Gly	Leu	Val	Asp

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Thr	Ala	Leu	100	Ala	Ser	His	Gln	Leu	105	Leu	Ala	Ala	Asp	Thr	110	Arg	Leu	Arg
Leu	Ala	Ala	115	Ala	Leu	Gln	Leu	120	Gln	Lys	Ser	Ala	Arg	Pro	125	Ala	Gln	Leu
Asp	Leu	Leu	130	Thr	Gln	Arg	Val	Ala	Ser	Glu	Thr	140	Asp	Ser	145	Ser	Val	Lys
Ser	Ala	Leu	145	Thr	Leu	150	Ala	Asn	Leu	155	Gln	Leu	Val	Asp	160	Ser	Ser	Ser
Pro	Ser	Val	165	Arg	Leu	Ala	Ala	Val	Arg	Leu	Leu	Gly	Glu	Thr	175	Gly	Asp	Asp
Pro	Leu	Ala	180	Arg	Thr	Arg	Leu	Glu	Ser	Leu	Leu	Ala	Pro	190	Gly	Val	Glu	Glu
Thr	Asp	Ala	195	Ser	Val	Arg	Ile	Ala	Ala	Glu	Thr	Ser	Leu	205	Ala	Gln	Val	Val
Asn	Arg	Lys	210	Leu	Met	Ile	Gly	Glu	Val	Leu	Gly	Gln	Ala	220	Phe	Ser	Gly	Gly
Met	Ser	Leu	225	Gly	Ser	Ile	Leu	Leu	Leu	Ala	Leu	Gly	Leu	235	Ala	Ile	Ile	Ile
Thr	Phe	Gly	245	Leu	Gly	Val	Ile	Asn	Met	Ala	His	Gly	Glu	250	Met	Leu	Leu	Leu
Met	Leu	Gly	260	Ala	Tyr	Ser	Thr	Tyr	Val	Val	Gln	Leu	Met	265	Leu	Gln	Arg	Arg
Tyr	Ala	Pro	275	Gly	Ala	Ile	Glu	Tyr	Tyr	Pro	Leu	Ile	Ala	280	Leu	Pro	Val	Val
Ala	Phe	Phe	290	Val	Thr	Ala	Met	Ile	Gly	Met	Val	Leu	Glu	300	Arg	Thr	Val	Val
Ile	Arg	His	305	Leu	Tyr	Gly	Arg	Pro	Leu	Glu	Thr	Leu	Leu	315	Ala	Thr	Trp	Trp
Gly	Ile	Ser	325	Leu	Met	Leu	Ile	Gln	Ala	Val	Arg	Leu	Ala	330	Phe	Gly	Ala	Ala
Gln	Asn	Val	340	Glu	Val	Ala	Asn	Pro	Gln	Trp	Leu	Ser	Gly	345	Gly	Ile	Gln	Gln
Val	Leu	Pro	355	Asn	Leu	Val	Leu	Pro	Tyr	Asn	Arg	Ile	Val	360	Ile	Ile	Ala	Ala
Phe	Ala	Leu	370	Phe	Val	Val	Leu	Thr	Trp	Leu	Leu	Asn	Lys	375	Thr	Thr	Thr	Thr
Arg	Leu	Gly	385	Leu	Asn	Val	Arg	Ala	Val	Thr	Gln	Asn	Arg	390	Asn	Met	Ala	Ala
Ala	Cys	Cys	405	Gly	Val	Pro	Thr	Gly	Arg	Ile	Asp	Met	Met	410	Ala	Phe	Gly	Gly
Leu	Gly	Ser	420	Gly	Ile	Ala	Gly	Leu	Gly	Gly	Val	Ala	Leu	425	Ser	Gln	Ile	Ile
Gly	Asn	Val	435	Gly	Pro	Asp	Leu	Gly	Gln	Ser	Tyr	Ile	Ile	440	Asp	Ser	Phe	Phe
Leu	Val	Val	450	Val	Leu	Gly	Gly	Val	Gly	Gln	Leu	Ala	Gly	455	Ser	Val	Thr	Thr
Ala	Ala	Phe	465	Gly	Leu	Gly	Ile	Ala	Asn	Lys	Ile	Leu	Glu	470	Pro	Gln	Ile	Ile
Gly	Ala	Val	485	Gly	Lys	Ile	Leu	Ile	Leu	Ala	Leu	Ile	Ile	490	Leu	Phe	Phe	Phe
Ile	Gln	Lys	500	Arg	Pro	Gln	Gly	Leu	Phe	Ala	Leu	Lys	Gly	505	Arg	Val	Ile	Ile
Asp			515											520				

<210> 742
 <211> 1266
 <212> DNA
 <213> Pseudomonas syringae

<220>
 <221> CDS
 <222> (1)..(1266)

<400> 742
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 Met Ser Lys Ser Phe Lys Gln Ala Leu Phe Ser Ala Ala Leu Val Trp
 1 5 10 15

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gcc Ala	gtg Val	gcc Ala	tac Tyr 20	ccg Pro	gtg Val	ttc Phe	ggc Gly	ctg Leu 25	aaa Lys	ctg Leu	gcg Ala	ttc Phe	tcc Ser 30	ggc Gly	gtg Val	96
acc Thr	ctg Leu	caa Gln 35	gtg Val	cag Gln	aat Asn	gcc Ala	agc Ser 40	ccg Pro	ctg Leu	acc Thr	ctg Leu	acc Thr 45	att Ile	att Ile	gcc Ala	144
gtg Val	tgc Cys 50	tcg Ser	gtg Val	ctg Leu	ctg Leu	ttt Phe 55	ctg Leu	cgc Arg	gtg Val	ctg Leu	ttc Phe 60	gcc Ala	gag Glu	caa Gln	atc Ile	192
agc Ser 65	agc Ser	ctg Leu	cgt Arg	cgc Arg	ggc Gly 70	tcg Ser	gaa Glu	aag Lys	ccg Pro	ctg Leu 75	atc Ile	ccg Pro	cag Gln	aag Lys	acc Thr 80	240
agc Ser	gac Asp	ttc Phe	ctg Leu	act Thr 85	cag Gln	ccg Pro	aaa Lys	acc Thr	cag Gln 90	cgc Arg	tgg Trp	ggc Gly	ctg Leu	gcg Ala 95	gcc Ala	288
ctg Leu	atc Ile	gtg Val	ctg Leu 100	gcc Ala	ttc Phe	atc Ile	tgg Trp	ccg Pro 105	ttc Phe	ttc Phe	ggc Gly	tcg Ser	cgc Arg 110	ggt Gly	gcg Ala	336
gtg Val	gac Asp	atc Ile 115	gac Ala	acg Thr	ctg Leu	atc Ile	ctg Leu 120	atc Ile	tac Tyr	gtc Val	atg Met	ctc Leu 125	ggc Gly	ctg Leu	ggc Gly	384
ctg Leu	aac Asn 130	atc Ile	gtc Val	gtc Val	ggc Gly	ctg Leu 135	gcc Ala	ggc Gly	ctg Leu	ctc Leu	gat Asp 140	ctc Leu	ggc Gly	tac Tyr	gtg Val	432
ggt Gly 145	ttc Phe	tat Tyr	gcg Ala	gtc Val	ggt Gly 150	gcc Ala	tac Tyr	agc Ser	tac Tyr	gcc Ala 155	ctg Leu	ctc Leu	tcc Ser	cat His	tac Tyr 160	480
tac Tyr	ggg Gly	ctc Leu	ggc Gly	ttc Phe 165	tgg Trp	atc Ile	tgc Cys	ctg Leu	ccg Pro 170	att Ile	gcg Ala	ggg Gly	atg Met	atg Met 175	gcg Ala	528
gca Ala	gtg Val	ttc Phe	ggc Gly 180	ttc Phe	ttg Leu	ctg Leu	ggc Gly 185	ttc Phe	ccg Pro	gta Val	ttg Leu	cgt Arg	ttg Leu 190	cgc Arg	ggc Gly	576
gac Asp	tat Tyr	ctg Leu 195	gcc Ala	atc Ile	gtg Val	acg Thr	ctg Leu 200	ggg Gly	ttc Phe	ggc Gly	gag Glu	atc Ile 205	atc Ile	cgt Arg	att Ile	624
ttc Phe 210	ctg Leu	cgt Arg	aac Asn	ctc Leu	acc Thr	gag Glu 215	ttg Leu	acg Thr	ggt Gly	ggc Gly	ccg Pro 220	aat Asn	ggc Gly	atc Ile	agc Ser	672
aac Asn 225	atc Ile	gac Asp	aag Lys	ccg Pro	acc Thr 230	ttt Phe	ttc Phe	ggc Gly	ctg Leu	acg Thr 235	ttc Phe	gag Glu	cgc Arg	aaa Lys	gcg Ala 240	720
gcc Ala	gaa Glu	ggt Gly	atg Met	cag Gln 245	acc Thr	ttt Phe	cac His	gag Glu	tat Tyr 250	ttc Phe	ggc Gly	ctg Leu	ccg Pro	tac Tyr 255	aac Asn	768
tcg Ser	atc Ile	aac Asn 260	aag Lys	ggt Val	gtc Val	ttt Phe	ctc Leu	tac Tyr 265	ctg Leu	atc Ile	gcc Ala	ctg Leu	ctg Leu 270	gca Leu	gca Ala	816
ctg Leu	gcg Ala 275	gcg Ala	ctg Leu	ttc Phe	gtc Val	atc Ile	aac Asn 280	cgt Arg	ctg Leu	ctg Leu	cgc Arg	atg Met 285	ccg Pro	atc Ile	ggc Gly	864
cgg Arg 290	gcc Ala	trp Trp	gag Glu	gcg Ala	ctg Leu	cgt Arg 295	gaa Glu	gac Asp	gaa Glu	atc Ile	gcc Ala 300	tgc Cys	cgc Arg	gcg Ala	ctg Leu	912
ggc Gly 305	ctg Leu	aat Asn	ccg Pro	acc Thr	gtc Val 310	atc Ile	aag Lys	ctg Leu	tcg Ser	gcc Ala 315	ttc Phe	acc Thr	ctg Leu	ggc Gly	gct Ala 320	960
gca Ala	ttc Phe	gcc Ala	ggt Gly	ttc Phe 325	ggc Ala	ggc Gly	agc Ser	ttc Phe	ttc Phe 330	gcg Ala	gcc Ala	cgc Arg	caa Gln 335	ggc Gly	ctg Leu	1008
gtg Val	aca Thr	ccc Pro	gaa Glu 340	tcc Ser	ttc Phe	acc Thr	ttc Phe	atc Ile 345	gag Glu	tcg Ser	gca Ala	atc Ile 350	atc Ile	ctc Leu	gcc Ala	1056
atc Ile	gtt Val	gtg Val 355	ctc Leu	ggt Gly	ggc Gly	atg Met	ggc Gly 360	tcg Ser	caa Gln	ctg Leu	ggc Gly	gtg Val 365	att Ile	ctg Leu	gcg Ala	1104
gcc Ala	att Ile 370	gtg Val	atg Met	atc Ile	ctg Leu	ctg Leu 375	ccg Pro	gaa Glu	ctg Leu	atg Met	cgt Arg 380	gag Glu	ttc Phe	agc Ser	gac Asp	1152

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tac	cgc	atg	ttg	atg	ttc	ggc	gcc	ctg	atg	gtg	ctg	atg	atg	atc	tgg	1200
Tyr	Arg	Met	Leu	Met	Phe	Gly	Ala	Leu	Met	Val	Leu	Met	Met	Ile	Trp	
385					390					395					400	
cgt	cct	caa	ggc	ttc	ctg	ccg	atg	caa	cgg	cct	gaa	atg	aaa	ttg	aaa	1248
Arg	Pro	Gln	Gly	Phe	Leu	Pro	Met	Gln	Arg	Pro	Glu	Met	Lys	Leu	Lys	
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gcg	gag	ctg	ccc	aaa	tag											1266
Ala	Glu	Leu	Pro	Lys												
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<210> 743

<211> 421

<212> PRT

<213> Pseudomonas syringae

<400> 743

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			20					25					30			
Thr	Leu	Gln	Val	Gln	Asn	Ala	Ser	Pro	Leu	Thr	Leu	Thr	Ile	Ile	Ala	
		35					40					45				
Val	Cys	Ser	Val	Leu	Leu	Phe	Leu	Arg	Val	Leu	Phe	Ala	Glu	Gln	Ile	
	50					55					60					
Ser	Ser	Leu	Arg	Arg	Gly	Ser	Glu	Lys	Pro	Leu	Ile	Pro	Gln	Lys	Thr	
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Ser	Asp	Phe	Leu	Thr	Gln	Pro	Lys	Thr	Gln	Arg	Trp	Gly	Leu	Ala	Ala	
				85					90					95		
Leu	Ile	Val	Leu	Ala	Phe	Ile	Trp	Pro	Phe	Phe	Gly	Ser	Arg	Gly	Ala	
			100					105					110			
Val	Asp	Ile	Ala	Thr	Leu	Ile	Leu	Ile	Tyr	Val	Met	Leu	Gly	Leu	Gly	
		115					120					125				
Leu	Asn	Ile	Val	Val	Gly	Leu	Ala	Gly	Leu	Leu	Asp	Leu	Gly	Tyr	Val	
	130					135					140					
Gly	Phe	Tyr	Ala	Val	Gly	Ala	Tyr	Ser	Tyr	Ala	Leu	Leu	Ser	His	Tyr	
145					150					155					160	
Tyr	Gly	Leu	Gly	Phe	Trp	Ile	Cys	Leu	Pro	Ile	Ala	Gly	Met	Met	Ala	
				165					170					175		
Ala	Val	Phe	Gly	Phe	Leu	Leu	Gly	Phe	Pro	Val	Leu	Arg	Leu	Arg	Gly	
			180					185					190			
Asp	Tyr	Leu	Ala	Ile	Val	Thr	Leu	Gly	Phe	Gly	Glu	Ile	Ile	Arg	Ile	
		195					200					205				
Phe	Leu	Arg	Asn	Leu	Thr	Glu	Leu	Thr	Gly	Gly	Pro	Asn	Gly	Ile	Ser	
		210				215					220					
Asn	Ile	Asp	Lys	Pro	Thr	Phe	Phe	Gly	Leu	Thr	Phe	Glu	Arg	Lys	Ala	
225					230					235					240	
Ala	Glu	Gly	Met	Gln	Thr	Phe	His	Glu	Tyr	Phe	Gly	Leu	Pro	Tyr	Asn	
				245					250					255		
Ser	Ile	Asn	Lys	Val	Val	Phe	Leu	Tyr	Leu	Ile	Ala	Leu	Leu	Leu	Ala	
			260					265					270			
Leu	Ala	Ala	Leu	Phe	Val	Ile	Asn	Arg	Leu	Leu	Arg	Met	Pro	Ile	Gly	
		275					280					285				
Arg	Ala	Trp	Glu	Ala	Leu	Arg	Glu	Asp	Glu	Ile	Ala	Cys	Arg	Ala	Leu	
		290				295					300					
Gly	Leu	Asn	Pro	Thr	Val	Ile	Lys	Leu	Ser	Ala	Phe	Thr	Leu	Gly	Ala	
305					310					315					320	
Ala	Phe	Ala	Gly	Phe	Ala	Gly	Ser	Phe	Phe	Ala	Ala	Arg	Gln	Gly	Leu	
				325					330					335		
Val	Thr	Pro	Glu	Ser	Phe	Thr	Phe	Ile	Glu	Ser	Ala	Ile	Ile	Leu	Ala	
			340					345					350			
Ile	Val	Val	Leu	Gly	Gly	Met	Gly	Ser	Gln	Leu	Gly	Val	Ile	Leu	Ala	
		355					360					365				
Ala	Ile	Val	Met	Ile	Leu	Leu	Pro	Glu	Leu	Met	Arg	Glu	Phe	Ser	Asp	
		370				375					380					
Tyr	Arg	Met	Leu	Met	Phe	Gly	Ala	Leu	Met	Val	Leu	Met	Met	Ile	Trp	
385					390					395					400	
Arg	Pro	Gln	Gly	Phe	Leu	Pro	Met	Gln	Arg	Pro	Glu	Met	Lys	Leu	Lys	
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Ala	Glu	Leu	Pro	Lys												

<210> 744
 <211> 924
 <212> DNA
 <213> *Pseudomonas syringae*

<220>
 <221> CDS
 <222> (1)..(924)

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 att ggc agt acg tat gca ttg atc gcc atc ggc tac acg atg gtg tac 96
 Ile Gly Ser Thr Tyr Ala Leu Ile Ala Ile Gly Tyr Thr Met Val Tyr
 20 25 30
 ggc atc att gga atg atc aac ttc gcc cat ggc gag gtg tac atg atc 144
 Gly Ile Ile Gly Met Ile Asn Phe Ala His Gly Glu Val Tyr Met Ile
 35 40 45
 ggt tct tat gtg gcc ttc atg gca ctc gcc ggt ctg gcg atg ctg ggg 192
 Gly Ser Tyr Val Ala Phe Met Ala Leu Ala Gly Leu Ala Met Leu Gly
 50 55 60
 att cat agc ctg ccg ttg ctg atg att gcc ggc ttt gcc gca gcg atc 240
 Ile His Ser Leu Pro Leu Leu Met Ile Ala Gly Phe Ala Ala Ile
 65 70 75 80
 gtc gta acc agc gcc tac gga tac agc atc gag cgt gtg gcc tat cgg 288
 Val Val Thr Ser Ala Tyr Gly Tyr Ser Ile Glu Arg Val Ala Tyr Arg
 85 90 95
 cca ttg cgc aac agc aac cgt ctg att cca ctg att tct gcg atc ggc 336
 Pro Leu Arg Asn Ser Asn Arg Leu Ile Pro Leu Ile Ser Ala Ile Gly
 100 105 110
 atg tcg atc ttt ctg cag aac tcg gtt cag ctt tct cag ggt tcc ggc 384
 Met Ser Ile Phe Leu Gln Asn Ser Val Gln Leu Ser Gln Gly Ser Gly
 115 120 125
 aac ttt gcc atc ccc aac ctg ctg ccc ggc agc ctg tcg ttc ggg ccc 432
 Asn Phe Ala Ile Pro Asn Leu Leu Pro Gly Ser Leu Ser Phe Gly Pro
 130 135 140
 ggt ggt tcg cag gaa gtg ctt att tcc tac atg cag atc gtg gtg ttc 480
 Gly Gly Ser Gln Glu Val Leu Ile Ser Tyr Met Gln Ile Val Val Phe
 145 150 155 160
 gtc gtc acc ctg ctg gcc atg acc ggc ctg acc ctg ttc atc tcc cgc 528
 Val Val Thr Leu Leu Ala Met Thr Gly Leu Thr Leu Phe Ile Ser Arg
 165 170 175
 tcg cga atg ggc cgc gcc tgc cgc gcc tgc gcc gaa gac atg aaa atg 576
 Ser Arg Met Gly Arg Ala Cys Arg Ala Cys Ala Glu Asp Met Lys Met
 180 185 190
 gcc aac ctg ctg ggc atc aac acc aac aac atc att gcc ctg acc ttc 624
 Ala Asn Leu Leu Gly Ile Asn Thr Asn Asn Ile Ile Ala Leu Thr Phe
 195 200 205
 gtg gtc ggc gca ctg gcc gtc gcc ggc atg ctg ctg agc atg 672
 Val Val Gly Ala Leu Ala Val Ala Ala Met Leu Leu Ser Met
 210 215 220
 caa tac ggc gtg atc aac ccg agt gcc ggg ttt ctg gtc ggc ctg aaa 720
 Gln Tyr Gly Val Ile Asn Pro Ser Ala Gly Phe Leu Val Gly Leu Lys
 225 230 235 240
 gcg ttc aca gcg gcg gtg ctg ggc ggt ata gga tcg atc cct ggc gcg 768
 Ala Phe Thr Ala Ala Val Leu Gly Gly Ile Gly Ser Ile Pro Gly Ala
 245 250 255
 gtg ctc ggc ggt ctg gta ttg ggc gtc gcc gag gcg ttc ggt gcc gac 816
 Val Leu Gly Gly Leu Val Leu Gly Val Ala Glu Ala Phe Gly Ala Asp
 260 265 270
 att ttc ggt gat cag tac aag gac gtc gtg gcc ttc ggc ctg ctg gtt 864
 Ile Phe Gly Asp Gln Tyr Lys Asp Val Val Ala Phe Gly Leu Leu Val
 275 280 285
 ctg gtg ctg ctg ttc cga ccg acc ggt att ctg ggt cgt ccg gag gtt 912
 Leu Val Leu Leu Phe Arg Pro Thr Gly Ile Leu Gly Arg Pro Glu Val
 290 295 300

gaa aaa gta tga
Glu Lys Val
305

<210> 745
<211> 307
<212> PRT
<213> *Pseudomonas syringae*

<400> 745
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Gly Ile Ile Gly Met Ile Asn Phe Ala His Gly Glu Val Tyr Met Ile
35 40 45
Gly Ser Tyr Val Ala Phe Met Ala Leu Ala Gly Leu Ala Met Leu Gly
50 55 60
Ile His Ser Leu Pro Leu Met Ile Ala Gly Phe Ala Ala Ala Ile
65 70 75 80
Val Val Thr Ser Ala Tyr Gly Tyr Ser Ile Glu Arg Val Ala Tyr Arg
85 90 95
Pro Leu Arg Asn Ser Asn Arg Leu Ile Pro Leu Ile Ser Ala Ile Gly
100 105 110
Met Ser Ile Phe Leu Gln Asn Ser Val Gln Leu Ser Gln Gly Ser Gly
115 120 125
Asn Phe Ala Ile Pro Asn Leu Leu Pro Gly Ser Leu Ser Phe Gly Pro
130 135 140
Gly Gly Ser Gln Glu Val Leu Ile Ser Tyr Met Gln Ile Val Val Phe
145 150 155 160
Val Val Thr Leu Leu Ala Met Thr Gly Leu Thr Leu Phe Ile Ser Arg
165 170 175
Ser Arg Met Gly Arg Ala Cys Arg Ala Cys Ala Glu Asp Met Lys Met
180 185 190
Ala Asn Leu Leu Gly Ile Asn Thr Asn Asn Ile Ile Ala Leu Thr Phe
195 200 205
Val Val Gly Ala Ala Leu Ala Ala Val Ala Ala Met Leu Leu Ser Met
210 215 220
Gln Tyr Gly Val Ile Asn Pro Ser Ala Gly Phe Leu Val Gly Leu Lys
225 230 235 240
Ala Phe Thr Ala Ala Val Leu Gly Gly Ile Gly Ser Ile Pro Gly Ala
245 250 255
Val Leu Gly Gly Leu Val Leu Gly Val Ala Glu Ala Phe Gly Ala Asp
260 265 270
Ile Phe Gly Asp Gln Tyr Lys Asp Val Val Ala Phe Gly Leu Leu Val
275 280 285
Leu Val Leu Leu Phe Arg Pro Thr Gly Ile Leu Gly Arg Pro Glu Val
290 295 300
Glu Lys Val
305

<210> 746
<211> 882
<212> DNA
<213> *Pseudomonas syringae*

<220>
<221> CDS
<222> (1)..(882)

<400> 746
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1 5 10 15
gcg ctc ggg ctg gca atc att ttc ggc cag atg ggc gtg atc aac atg 96
Ala Leu Gly Leu Ala Ile Ile Phe Gly Gln Met Gly Val Ile Asn Met
20 25 30
gcc cac ggc gag ttt ctg acc gtc ggc gcg tac acc acc tat gtg ctg 144
Ala His Gly Glu Phe Leu Thr Val Gly Ala Tyr Thr Thr Tyr Val Leu
Seite 998

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tcg	acg	35	gtg	cag	acc	tat	40	ccg	tct	atg	cag	45	tac	tac	ttt	192
Ser	Thr	Leu	Val	Gln	Thr	Tyr	Met	Pro	Ser	Met	Gln	Pro	Tyr	Tyr	Phe	
	50					55					60					
ttc	ttc	gcc	att	gcg	ctg	tcg	ttc	gta	gtg	gcg	ggc	tcg	att	ggc	tgg	240
Phe	Phe	Ala	Ile	Ala	Leu	Ser	Phe	Val	Val	Ala	Gly	Ser	Ile	Gly	Trp	
65					70					75					80	
ctg	gtc	gag	cgg	gtg	atg	atc	agc	cgt	ctc	tat	cac	cgg	ccg	ctg	gac	288
Leu	Val	Glu	Arg	Val	Met	Ile	Ser	Arg	Leu	Tyr	His	Arg	Pro	Leu	Asp	
				85					90					95		
aca	ttg	ttg	gcg	acc	tgg	ggt	ttg	tcg	ctg	gta	atg	caa	caa	gcg	ctg	336
Thr	Leu	Leu	Ala	Thr	Trp	Gly	Leu	Ser	Leu	Val	Met	Gln	Gln	Ala	Leu	
			100					105					110			
cgt	tcg	atc	ttc	ggt	gcc	cgg	gaa	gtc	agc	gcc	aac	ccg	ccc	gag	tgg	384
Arg	Ser	Ile	Phe	Gly	Ala	Arg	Glu	Val	Ser	Ala	Asn	Pro	Pro	Glu	Trp	
		115					120					125				
ctg	atg	ggc	gcg	gtc	agc	ctg	agc	gac	acc	atc	gag	att	ccg	cgc	aat	432
Leu	Met	Gly	Ala	Val	Ser	Leu	Ser	Asp	Thr	Ile	Glu	Ile	Pro	Arg	Asn	
		130				135					140					
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Gly	Leu	Phe	Val	Met	Ala	Leu	Thr	Val	Leu	Leu	Thr	Gly	Cys	Ile	Phe	
145					150				155					160		
ctc	atg	ctg	tac	cgc	aca	cgc	tgg	ggc	ctg	cat	gtg	cgg	gca	acg	gtg	528
Leu	Met	Leu	Tyr	Arg	Thr	Arg	Trp	Gly	Leu	His	Val	Arg	Ala	Thr	Val	
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cag	aac	cgg	gtg	atg	agc	cgc	gcc	gtg	ggg	atc	aac	acc	cgc	gaa	gtg	576
Gln	Asn	Arg	Val	Met	Ser	Arg	Ala	Val	Gly	Ile	Asn	Thr	Arg	Glu	Val	
			180					185					190			
gac	cgc	atg	acc	ttt	gcg	ctg	ggg	tgc	ggc	gtg	gcg	ggg	gtg	gcg	ggc	624
Asp	Arg	Met	Thr	Phe	Ala	Leu	Gly	Cys	Gly	Val	Ala	Gly	Val	Ala	Gly	
		195					200					205				
gcg	gcg	ttt	acc	acc	atc	ggc	tcc	acc	ggg	ccg	acg	gcc	ggg	tcg	ctg	672
Ala	Ala	Phe	Thr	Thr	Ile	Gly	Ser	Thr	Gly	Pro	Thr	Ala	Gly	Ser	Leu	
		210				215					220					
tat	atc	gtc	gac	acg	ttt	ctg	gtg	gtg	gtc	ttc	ggc	ggg	gcg	caa	agc	720
Tyr	Ile	Val	Asp	Thr	Phe	Leu	Val	Val	Val	Phe	Gly	Gly	Ala	Gln	Ser	
225					230					235					240	
ctg	ctg	ggc	acg	att	gct	tcg	gcg	ttc	acc	att	gcc	cag	acg	cag	tcg	768
Leu	Leu	Gly	Thr	Ile	Ala	Ser	Ala	Phe	Thr	Ile	Ala	Gln	Thr	Gln	Ser	
				245					250					255		
att	gcc	gag	ttt	ttc	atg	agt	gga	tcg	atg	gcc	aag	gtg	ctg	acc	ctg	816
Ile	Ala	Glu	Phe	Phe	Met	Ser	Gly	Ser	Met	Ala	Lys	Val	Leu	Thr	Leu	
			260					265					270			
tct	gcc	gtg	att	ctg	att	ctg	ctg	atg	cgc	ccg	caa	ggg	ttg	ttc	tca	864
Ser	Ala	Val	Ile	Leu	Ile	Leu	Leu	Met	Arg	Pro	Gln	Gly	Leu	Phe	Ser	
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agc	aaa	gtt	cgc	aag	tag											882
Ser	Lys	Val	Arg	Lys												
	290															

<210> 747

<211> 293

<212> PRT

<213> Pseudomonas syringae

<400> 747

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			20					25					30			
Ala	His	Gly	Glu	Phe	Leu	Thr	Val	Gly	Ala	Tyr	Thr	Thr	Tyr	Val	Leu	
		35					40				45					
Ser	Thr	Leu	Val	Gln	Thr	Tyr	Met	Pro	Ser	Met	Gln	Pro	Tyr	Tyr	Phe	
	50					55					60					
Phe	Phe	Ala	Ile	Ala	Leu	Ser	Phe	Val	Val	Ala	Gly	Ser	Ile	Gly	Trp	
65					70					75					80	
Leu	Val	Glu	Arg	Val	Met	Ile	Ser	Arg	Leu	Tyr	His	Arg	Pro	Leu	Asp	
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Thr	Leu	Leu	Ala	Thr	Trp	Gly	Leu	Ser	Leu	Val	Met	Gln	Gln	Ala	Leu	

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100 105 110
 Arg Ser Ile Phe Gly Ala Arg Glu Val Ser Ala Asn Pro Glu Trp
 115 120 125
 Leu Met Gly Ala Val Ser Leu Ser Asp Thr Ile Glu Ile Pro Arg Asn
 130 135 140
 Gly Leu Phe Val Met Ala Leu Thr Val Leu Leu Thr Gly Cys Ile Phe
 145 150 155 160
 Leu Met Leu Tyr Arg Thr Arg Trp Gly Leu His Val Arg Ala Thr Val
 165 170 175
 Gln Asn Arg Val Met Ser Arg Ala Val Gly Ile Asn Thr Arg Glu Val
 180 185 190
 Asp Arg Met Thr Phe Ala Leu Gly Cys Gly Val Ala Gly Val Ala Gly
 195 200 205
 Ala Ala Phe Thr Thr Ile Gly Ser Thr Gly Pro Thr Ala Gly Ser Leu
 210 215 220
 Tyr Ile Val Asp Thr Phe Leu Val Val Val Phe Gly Gly Ala Gln Ser
 225 230 235 240
 Leu Leu Gly Thr Ile Ala Ser Ala Phe Thr Ile Ala Gln Thr Gln Ser
 245 250 255
 Ile Ala Glu Phe Phe Met Ser Gly Ser Met Ala Lys Val Leu Thr Leu
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 275 280 285
 Ser Lys Val Arg Lys
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<210> 748

<211> 882

<212> DNA

<213> Pseudomonas syringae

<220>

<221> CDS

<222> (1)..(882)

<400> 748

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1 5 10 15	
atg tac tcg ctg gtg gcg att ggc ttt gtg ctg atc tac aag gcc tcg	96
Met Tyr Ser Leu Val Ala Ile Gly Phe Val Leu Ile Tyr Lys Ala Ser	
20 25 30	
ggc gtg ttc aat ttc gct caa ggc gcg atg gtg ctg ttc gcg gca ctg	144
Gly Val Phe Asn Phe Ala Gln Gly Ala Met Val Leu Phe Ala Ala Leu	
35 40 45	
acg ttt gtc agc ctg ctg gag cgt ggc gtg ccg ttc ttc tgg gcg ttt	192
Thr Phe Val Ser Leu Leu Glu Arg Gly Val Pro Phe Phe Trp Ala Phe	
50 55 60	
ctg gcg acg ttg gcg agc atg gcc gtg ctg gca ctg ctg atc gaa aga	240
Leu Ala Thr Leu Ala Ser Met Ala Val Leu Ala Leu Leu Ile Glu Arg	
65 70 75 80	
ctg gtc ctg cgc ccg gtc gtc aac cgg ccg atc atc ttg ttc atg	288
Leu Val Leu Arg Pro Leu Val Asn Arg Pro Pro Ile Ile Leu Phe Met	
85 90 95	
gcc acc ctt ggc ctt tcg tac atg atc gaa ggc ttg gcg caa gcg ttg	336
Ala Thr Leu Gly Leu Ser Tyr Met Ile Glu Gly Leu Ala Gln Ala Leu	
100 105 110	
tgg ggc gcg cag gtg cac ggc ctg gaa ctg ggc att ccc gag cca	384
Trp Gly Ala Gln Val His Gly Leu Glu Leu Gly Ile Pro Asp Glu Pro	
115 120 125	
ctg gaa att cgc ggc atg ctg ctc tcg cag ttc gac ctg ttc gca gcg	432
Leu Glu Ile Arg Gly Met Leu Leu Ser Gln Phe Asp Leu Phe Ala Ala	
130 135 140 145	
ggc acg gct gcg gcg ctg gtg att gcc ctg tcg gtg ctg ttc aac cgc	480
Gly Thr Ala Ala Ala Leu Val Ile Ala Leu Ser Val Leu Phe Asn Arg	
150 155 160	
acg cgg atc ggc ctg tca ttg cgg gcg gtg gcg gat gac ccg ctg gcg	528
Thr Arg Ile Gly Leu Ser Leu Arg Ala Val Ala Asp Asp Pro Leu Ala	
165 170 175	

BPS64510PC-2008083446

tcg	ttg	gcg	gtg	ggt	atc	cgg	ctg	cca	cgc	atc	tgg	gcg	gtg	gtc	tgg	576
Ser	Leu	Ala	Val	Gly	Ile	Arg	Leu	Pro	Arg	Ile	Trp	Ala	Val	Val	Trp	
			180					185					190			
gcc	gtg	gcc	ggg	ttt	gtc	ggg	ctg	gtg	gcc	ggg	ctg	ctt	tgg	ggc	gcg	624
Ala	Val	Ala	Gly	Phe	Val	Gly	Leu	Val	Ala	Gly	Leu	Leu	Trp	Gly	Ala	
		195					200					205				
cgg	ctg	ggg	gtg	cag	ttt	tcc	ctg	tcg	ctg	gtg	gtg	ctc	aag	gca	ctg	672
Arg	Leu	Gly	Val	Gln	Phe	Ser	Leu	Ser	Leu	Val	Val	Leu	Lys	Ala	Leu	
	210					215					220					
ccg	gtg	ctg	atc	atc	ggt	ggg	ttt	tcc	tcg	att	ggc	ggc	gcc	att	gtc	720
Pro	Val	Leu	Ile	Ile	Gly	Gly	Phe	Ser	Ser	Ile	Gly	Gly	Ala	Ile	Val	
	225				230					235					240	
ggc	ggc	ctg	atc	atc	ggc	gcg	tcc	gag	aag	ctg	gcc	gag	att	tac	ctg	768
Gly	Gly	Leu	Ile	Ile	Gly	Ala	Ser	Glu	Lys	Leu	Ala	Glu	Ile	Tyr	Leu	
				245					250					255		
ggg	ccg	atc	atc	ggc	agc	ggt	atc	gaa	aac	tgg	gtg	ccg	tat	gtg	ctg	816
Gly	Pro	Ile	Ile	Gly	Ser	Gly	Ile	Glu	Asn	Trp	Val	Pro	Tyr	Val	Leu	
		260					265						270			
gcg	ctg	ttg	ctg	ctg	ctg	gtt	cgt	cct	gct	ggc	ctg	ttc	ggc	gag	cgg	864
Ala	Leu	Leu	Phe	Leu	Leu	Val	Arg	Pro	Ala	Gly	Leu	Phe	Gly	Glu	Arg	
		275					280					285				
gcg	ata	gag	cgc	gtc	tga											882
Ala	Ile	Glu	Arg	Val												
	290															

<210> 749

<211> 293

<212> PRT

<213> Pseudomonas syringae

<400> 749

Met	Glu	Phe	Phe	Phe	Glu	Val	Leu	Ile	Gly	Gly	Leu	Leu	Ala	Gly	Val	
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			20					25					30			
Gly	Val	Phe	Asn	Phe	Ala	Gln	Gly	Ala	Met	Val	Leu	Phe	Ala	Ala	Leu	
		35					40					45				
Thr	Phe	Val	Ser	Leu	Leu	Glu	Arg	Gly	Val	Pro	Phe	Phe	Trp	Ala	Phe	
	50					55				60						
Leu	Ala	Thr	Leu	Ala	Ser	Met	Ala	Val	Leu	Ala	Leu	Leu	Ile	Glu	Arg	
65					70					75					80	
Leu	Val	Leu	Arg	Pro	Leu	Val	Asn	Arg	Pro	Pro	Ile	Ile	Leu	Phe	Met	
			85						90					95		
Ala	Thr	Leu	Gly	Leu	Ser	Tyr	Met	Ile	Glu	Gly	Leu	Ala	Gln	Ala	Leu	
			100					105					110			
Trp	Gly	Ala	Gln	Val	His	Gly	Leu	Glu	Leu	Gly	Ile	Pro	Asp	Glu	Pro	
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Leu	Glu	Ile	Arg	Gly	Met	Leu	Leu	Ser	Gln	Phe	Asp	Leu	Phe	Ala	Ala	
	130					135					140					
Gly	Thr	Ala	Ala	Ala	Leu	Val	Ile	Ala	Leu	Ser	Val	Leu	Phe	Asn	Arg	
145					150					155					160	
Thr	Arg	Ile	Gly	Leu	Ser	Leu	Arg	Ala	Val	Ala	Asp	Asp	Pro	Leu	Ala	
				165					170					175		
Ser	Leu	Ala	Val	Gly	Ile	Arg	Leu	Pro	Arg	Ile	Trp	Ala	Val	Val	Trp	
			180					185					190			
Ala	Val	Ala	Gly	Phe	Val	Gly	Leu	Val	Ala	Gly	Leu	Leu	Trp	Gly	Ala	
		195					200					205				
Arg	Leu	Gly	Val	Gln	Phe	Ser	Leu	Ser	Leu	Val	Val	Leu	Lys	Ala	Leu	
	210					215					220					
Pro	Val	Leu	Ile	Ile	Gly	Gly	Phe	Ser	Ser	Ile	Gly	Gly	Ala	Ile	Val	
225					230					235					240	
Gly	Gly	Leu	Ile	Ile	Gly	Ala	Ser	Glu	Lys	Leu	Ala	Glu	Ile	Tyr	Leu	
				245					250					255		
Gly	Pro	Ile	Ile	Gly	Ser	Gly	Ile	Glu	Asn	Trp	Val	Pro	Tyr	Val	Leu	
			260					265					270			
Ala	Leu	Leu	Phe	Leu	Leu	Val	Arg	Pro	Ala	Gly	Leu	Phe	Gly	Glu	Arg	
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Ala	Ile	Glu	Arg	Val												
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<210> 750
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 <213> *Pseudomonas syringae*

<220>
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 <222> (1)..(882)

<400> 750

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1				5				10					15			
gca	ctc	ggg	ctg	acc	atc	gtg	ttc	ggc	ctg	atg	ggc	gtg	atc	aac	atg	96
Ala	Leu	Gly	Leu	Thr	Ile	Val	Phe	Gly	Leu	Met	Gly	Val	Ile	Asn	Met	
			20					25					30			
gcc	cac	ggt	gaa	ctg	atg	gcg	atg	ggc	tca	tac	gcg	acc	tac	gtc	act	144
Ala	His	Gly	Glu	Leu	Met	Ala	Met	Gly	Ser	Tyr	Ala	Thr	Tyr	Val	Thr	
			35				40					45				
tca	gtg	gtg	ttt	cag	cgc	tac	ttt	ccc	gag	ctt	atg	ggt	tgg	tac	ttc	192
Ser	Val	Val	Phe	Gln	Arg	Tyr	Phe	Pro	Glu	Leu	Met	Gly	Trp	Tyr	Phe	
	50					55					60					
atc	atc	ggc	atc	ggg	gtg	gcc	ttc	gtg	gtg	acg	ttt	gcc	ttt	ggt	ttt	240
Ile	Ile	Gly	Ile	Gly	Val	Ala	Phe	Val	Val	Thr	Phe	Ala	Phe	Gly	Phe	
	65				70					75					80	
ctg	ctg	gag	cgc	tgt	ttc	att	cgc	ttc	atg	tac	aac	cgc	ccg	ctg	gac	288
Leu	Leu	Glu	Arg	Cys	Phe	Ile	Arg	Phe	Met	Tyr	Asn	Arg	Pro	Leu	Asp	
				85					90					95		
acg	ctg	ctg	gcc	acc	tgg	ggc	ctg	tcg	ctg	gtg	ttg	caa	caa	ctg	ttt	336
Thr	Leu	Leu	Ala	Thr	Trp	Gly	Leu	Ser	Leu	Val	Leu	Gln	Gln	Leu	Phe	
			100					105					110			
cgt	cag	gtg	ttc	ggc	ccc	aag	gaa	gtc	agc	gtg	ccc	act	gtg	cag	tgg	384
Arg	Gln	Val	Phe	Gly	Pro	Lys	Glu	Val	Ser	Val	Pro	Thr	Val	Gln	Trp	
			115				120					125				
ctg	cag	ggc	gct	tgg	aaa	gtc	agc	gag	ggc	ctg	gag	ctg	ccg	ctc	aac	432
Leu	Gln	Gly	Ala	Trp	Lys	Val	Ser	Glu	Gly	Leu	Glu	Leu	Pro	Leu	Asn	
	130					135					140					
cgg	att	ttc	atc	atc	ggc	ctg	acc	ttt	gtc	atc	gcc	gct	gcc	gtg	ttt	480
Arg	Ile	Phe	Ile	Ile	Gly	Leu	Thr	Phe	Val	Ile	Ala	Ala	Ala	Val	Phe	
	145				150					155					160	
gtg	ttt	ctg	tac	cgc	agc	cgc	tgg	ggc	ctg	cgc	att	cgt	gcc	gtg	acc	528
Val	Phe	Leu	Tyr	Arg	Ser	Arg	Trp	Gly	Leu	Arg	Ile	Arg	Ala	Val	Thr	
				165				170						175		
cag	aac	cgg	gcg	atg	gcc	ggt	gcc	gcc	ggg	atc	aat	acc	gcg	cgg	gtc	576
Gln	Asn	Arg	Ala	Met	Ala	Gly	Ala	Ala	Gly	Ile	Asn	Thr	Ala	Arg	Val	
			180				185						190			
gat	tcg	gtg	acg	ttc	gcg	ctg	ggc	tgc	ggc	ctg	gcg	ggt	att	gcc	ggc	624
Asp	Ser	Val	Thr	Phe	Ala	Leu	Gly	Cys	Gly	Leu	Ala	Gly	Ile	Ala	Gly	
			195				200					205				
agc	tcg	ttc	acc	atg	ctc	gcc	tcc	acc	ggt	ccg	gtg	agc	ggc	cag	cag	672
Ser	Ser	Phe	Thr	Met	Leu	Ala	Ser	Thr	Gly	Pro	Val	Ser	Gly	Gln	Gln	
	210					215					220					
tat	ctg	gtg	gac	acc	ttc	atc	gtc	gtc	gtg	ttc	ggc	ggt	ggt	gaa	agc	720
Tyr	Leu	Val	Asp	Thr	Phe	Ile	Val	Val	Val	Phe	Gly	Gly	Val	Glu	Ser	
	225				230					235					240	
tta	ctt	ggc	acg	ttc	ctg	tcg	gcc	ttc	gcc	atc	ggc	cag	acg	cag	atc	768
Leu	Leu	Gly	Thr	Phe	Leu	Ser	Ala	Phe	Ala	Ile	Gly	Gln	Thr	Gln	Ile	
				245				250						255		
tcg	ctg	gaa	tac	ctg	acc	acc	ggt	tcc	atg	gcc	aaa	gcg	atc	acc	ttg	816
Ser	Leu	Glu	Tyr	Leu	Thr	Thr	Gly	Ser	Met	Ala	Lys	Ala	Ile	Thr	Leu	
			260				265					270				
ctg	gtg	gtc	atc	gtg	ctg	ctg	ttc	ctg	ccc	aac	ggc	ctg	ttc	gcc		864
Leu	Val	Val	Ile	Val	Leu	Leu	Phe	Phe	Arg	Pro	Asn	Gly	Leu	Phe	Ala	
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acg	aaa	gtg	aga	cgt	tga											882
Thr	Lys	Val	Arg	Arg												
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<210> 751
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 <212> PRT
 <213> *Pseudomonas syringae*

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 Ala His Gly Glu Leu Met Ala Met Gly Ser Tyr Ala Thr Tyr Val Thr
 35 40 45
 Ser Val Val Phe Gln Arg Tyr Phe Pro Glu Leu Met Gly Trp Tyr Phe
 50 55 60
 Ile Ile Gly Ile Gly Val Ala Phe Val Val Thr Phe Ala Phe Gly Phe
 65 70 75 80
 Leu Leu Glu Arg Cys Phe Ile Arg Phe Met Tyr Asn Arg Pro Leu Asp
 85 90 95
 Thr Leu Leu Ala Thr Trp Gly Leu Ser Leu Val Leu Gln Gln Leu Phe
 100 105 110
 Arg Gln Val Phe Gly Pro Lys Glu Val Ser Val Pro Thr Val Gln Trp
 115 120 125
 Leu Gln Gly Ala Trp Lys Val Ser Glu Gly Leu Glu Leu Pro Leu Asn
 130 135 140
 Arg Ile Phe Ile Ile Gly Leu Thr Phe Val Ile Ala Ala Val Phe
 145 150 155 160
 Val Phe Leu Tyr Arg Ser Arg Trp Gly Leu Arg Ile Arg Ala Val Thr
 165 170 175
 Gln Asn Arg Ala Met Ala Gly Ala Ala Gly Ile Asn Thr Ala Arg Val
 180 185 190
 Asp Ser Val Thr Phe Ala Leu Gly Cys Gly Leu Ala Gly Ile Ala Gly
 195 200 205
 Ser Ser Phe Thr Met Leu Ala Ser Thr Gly Pro Val Ser Gly Gln Gln
 210 215 220
 Tyr Leu Val Asp Thr Phe Ile Val Val Val Phe Gly Gly Val Glu Ser
 225 230 235 240
 Leu Leu Gly Thr Phe Leu Ser Ala Phe Ala Ile Gly Gln Thr Gln Ile
 245 250 255
 Ser Leu Glu Tyr Leu Thr Thr Gly Ser Met Ala Lys Ala Ile Thr Leu
 260 265 270
 Leu Val Val Ile Val Leu Leu Phe Arg Pro Asn Gly Leu Phe Ala
 275 280 285
 Thr Lys Val Arg Arg
 290

<210> 752
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 <212> DNA
 <213> *Pseudomonas putida*

<220>
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 <222> (1)..(915)

<400> 752
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 Met Asp Gly Ile Phe Leu Gln Gln Leu Val Asn Gly Leu Thr Leu Gly
 1 5 10 15
 tcg gtc tat ggc ctg atc gcc atc ggc tac aca atg gtc tat ggc att 96
 Ser Val Tyr Gly Leu Ile Ala Ile Gly Tyr Thr Met Val Tyr Gly Ile
 20 25 30
 atc ggc atg atc aac ttc gcg cac ggc gag gtg tac atg atc tcc gct 144
 Ile Gly Met Ile Asn Phe Ala His Gly Glu Val Tyr Met Ile Ser Ala
 35 40 45
 tac ctc gcg gcg atc agc ctg gca ttg ctg gct tac ttc ggt gtc gaa 192
 Tyr Leu Ala Ala Ile Ser Leu Ala Leu Leu Ala Tyr Phe Gly Val Glu
 50 55 60
 tcg ttc ccc ctg ctg atg ctg ggc acc ttg ttg ttc acc atc gtc gtc 240
 Ser Phe Pro Leu Leu Met Leu Gly Thr Leu Leu Phe Thr Ile Val Val

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65	acc	ggc	gtt	tat	ggg	ttc	acc	atc	gag	cgc	atc	gcc	tac	aaa	ccg	ctg	288
	Thr	Gly	Val	Tyr	Gly	Phe	Thr	Ile	Glu	Arg	Ile	Ala	Tyr	Lys	Pro	Leu	
					85					90					95		
	cgt	aac	tcc	acc	cgc	ctg	gca	ccg	ctg	atc	agt	gcc	atc	ggc	att	tcg	336
	Arg	Asn	Ser	Thr	Arg	Leu	Ala	Pro	Leu	Ile	Ser	Ala	Ile	Gly	Ile	Ser	
				100					105					110			
	ctg	atc	ctg	cag	aac	tac	gca	cag	atc	agc	cag	ggc	gcc	cgc	cag	caa	384
	Leu	Ile	Leu	Gln	Asn	Tyr	Ala	Gln	Ile	Ser	Gln	Gly	Ala	Arg	Gln	Gln	
				115				120					125				
	ggc	gtg	cca	acc	ctg	ctg	gaa	ggc	gcc	atg	cgt	gtc	gaa	gtc	ggg	tcc	432
	Gly	Val	Pro	Thr	Leu	Leu	Glu	Gly	Ala	Met	Arg	Val	Glu	Val	Gly	Ser	
							135					140					
	ggc	ttc	gtg	caa	ctg	act	acc	aag	atc	ttc	atc	ctg	gtg	gcg	gcc	480	
	Gly	Phe	Val	Gln	Leu	Thr	Tyr	Lys	Ile	Phe	Ile	Leu	Val	Ala	Ala		
	145				150					155					160		
	ttt	gtc	ggc	atg	ggc	ctg	ctg	acc	tac	gtg	atc	aag	tac	acc	aag	ctc	528
	Phe	Val	Gly	Met	Gly	Leu	Leu	Thr	Tyr	Val	Ile	Lys	Tyr	Thr	Lys	Leu	
					165					170					175		
	ggc	cgc	atg	tgc	cgt	gct	acc	cag	caa	gac	cgc	aag	atg	gcc	tcg	atc	576
	Gly	Arg	Met	Cys	Arg	Ala	Thr	Gln	Gln	Asp	Arg	Lys	Met	Ala	Ser	Ile	
				180					185					190			
	ctg	ggg	atc	aac	acc	gac	cgg	gta	atc	tcc	tac	gtg	ttc	gtc	atc	ggg	624
	Leu	Gly	Ile	Asn	Thr	Asp	Arg	Val	Ile	Ser	Tyr	Val	Phe	Val	Ile	Gly	
								200					205				
	gca	gtg	atg	gcc	gcc	ctg	gcc	ggc	gtg	ctc	atc	acc	atg	aac	tac	ggc	672
	Ala	Val	Met	Ala	Ala	Leu	Ala	Gly	Val	Leu	Ile	Thr	Met	Asn	Tyr	Gly	
							215					220					
	acc	ttc	gac	ttc	tac	gcc	ggc	ttc	atc	atc	ggg	atc	aag	gcg	ttc	act	720
	Thr	Phe	Asp	Phe	Tyr	Ala	Gly	Phe	Ile	Ile	Gly	Ile	Lys	Ala	Phe	Thr	
	225					230					235					240	
	gcc	gca	gtg	ctc	ggg	ggg	atc	ggc	tcg	ctg	ccg	ggg	gcc	atg	ctc	ggc	768
	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ser	Leu	Pro	Gly	Ala	Met	Leu	Gly	
					245				250						255		
	ggg	atc	atc	ctg	gga	att	tcc	gag	tcg	ctg	ttc	tca	ggc	ctg	atc	aac	816
	Gly	Ile	Ile	Leu	Gly	Ile	Ser	Glu	Ser	Leu	Phe	Ser	Gly	Leu	Ile	Asn	
					260				265					270			
	tcc	gac	tac	aag	gat	gtg	ttc	agc	ttc	tcg	ctg	ctg	gtg	atg	atc	ctt	864
	Ser	Asp	Tyr	Lys	Asp	Val	Phe	Ser	Phe	Ser	Leu	Leu	Val	Met	Ile	Leu	
								280					285				
	atc	ttc	cgc	cca	caa	ggc	ctg	ggg	cgc	ccg	ctc	gtg	gct	aag	gtg		912
	Ile	Phe	Arg	Pro	Gln	Gly	Leu	Leu	Gly	Arg	Pro	Leu	Val	Ala	Lys	Val	
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	tga																915

<210> 753

<211> 304

<212> PRT

<213> Pseudomonas putida

<400> 753

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			20					25					30		
Ile	Gly	Met	Ile	Asn	Phe	Ala	His	Gly	Glu	Val	Tyr	Met	Ile	Ser	Ala
							40					45			
Tyr	Leu	Ala	Ala	Ile	Ser	Leu	Ala	Leu	Leu	Ala	Tyr	Phe	Gly	Val	Glu
							55				60				
Ser	Phe	Pro	Leu	Leu	Met	Leu	Gly	Thr	Leu	Leu	Phe	Thr	Ile	Val	Val
					70				75						80
Thr	Gly	Val	Tyr	Gly	Phe	Thr	Ile	Glu	Arg	Ile	Ala	Tyr	Lys	Pro	Leu
				85					90					95	
Arg	Asn	Ser	Thr	Arg	Leu	Ala	Pro	Leu	Ile	Ser	Ala	Ile	Gly	Ile	Ser
			100					105					110		
Leu	Ile	Leu	Gln	Asn	Tyr	Ala	Gln	Ile	Ser	Gln	Gly	Ala	Arg	Gln	Gln
			115				120					125			

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Gly	Val	Pro	Thr	Leu	Leu	Glu	Gly	Ala	Met	Arg	Val	Glu	Val	Gly	Ser
130						135					140				
Gly	Phe	Val	Gln	Leu	Thr	Tyr	Thr	Lys	Ile	Phe	Ile	Leu	Val	Ala	Ala
145					150					155					160
Phe	Val	Gly	Met	Gly	Leu	Leu	Thr	Tyr	Val	Ile	Lys	Tyr	Thr	Lys	Leu
				165					170					175	
Gly	Arg	Met	Cys	Arg	Ala	Thr	Gln	Gln	Asp	Arg	Lys	Met	Ala	Ser	Ile
			180					185					190		
Leu	Gly	Ile	Asn	Thr	Asp	Arg	Val	Ile	Ser	Tyr	Val	Phe	Val	Ile	Gly
		195					200					205			
Ala	Val	Met	Ala	Ala	Leu	Ala	Gly	Val	Leu	Ile	Thr	Met	Asn	Tyr	Gly
	210					215					220				
Thr	Phe	Asp	Phe	Tyr	Ala	Gly	Phe	Ile	Ile	Gly	Ile	Lys	Ala	Phe	Thr
225					230					235					240
Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ser	Leu	Pro	Gly	Ala	Met	Leu	Gly
				245					250					255	
Gly	Ile	Ile	Leu	Gly	Ile	Ser	Glu	Ser	Leu	Phe	Ser	Gly	Leu	Ile	Asn
			260					265					270		
Ser	Asp	Tyr	Lys	Asp	Val	Phe	Ser	Phe	Ser	Leu	Leu	Val	Met	Ile	Leu
		275					280					285			
Ile	Phe	Arg	Pro	Gln	Gly	Leu	Leu	Gly	Arg	Pro	Leu	Val	Ala	Lys	Val
	290					295					300				

<210> 754

<211> 1308

<212> DNA

<213> Pseudomonas putida

<220>

<221> CDS

<222> (1)..(1308)

<400> 754

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Met	Asn	Met	Ser	Val	Ala	Lys	Thr	Ala	Ser	Ile	Ser	Glu	Thr	Lys	Gly	
1				5				10						15		
ttc	gac	ctt	aaa	cgc	agc	ctg	ctg	gag	acc	att	gtc	gct	ggc	ctg	ctg	96
Phe	Asp	Leu	Lys	Arg	Ser	Leu	Leu	Glu	Thr	Ile	Val	Ala	Gly	Leu	Leu	
			20					25					30			
gca	ctt	atc	gtg	ttt	ggg	ccg	gtc	gtt	ggg	gtg	gtg	ctc	gac	ggc	tac	144
Ala	Leu	Ile	Val	Phe	Gly	Pro	Val	Val	Gly	Val	Val	Leu	Asp	Gly	Tyr	
		35				40						45				
acc	ttc	aat	gcc	gag	ccg	cgc	cgc	gtg	gcc	tgg	ctg	gtc	ggc	ggg	gtg	192
Thr	Phe	Asn	Ala	Glu	Pro	Arg	Arg	Val	Ala	Trp	Leu	Val	Gly	Gly	Val	
	50					55				60						
atg	gtg	ggg	cgc	ttc	ctg	ctc	agc	ctg	ttc	ctg	cag	act	gcc	ccc	ggg	240
Met	Val	Gly	Arg	Phe	Leu	Leu	Ser	Leu	Phe	Leu	Gln	Thr	Ala	Pro	Gly	
	65				70				75						80	
cag	cgc	atg	ctc	ctg	ggc	ttc	gac	agc	ggg	ggc	tcg	ggc	gtg	cat	gtg	288
Gln	Arg	Met	Leu	Leu	Gly	Phe	Asp	Ser	Gly	Gly	Ser	Gly	Val	His	Val	
				85				90						95		
acc	gca	ccg	gac	tac	aag	tcg	cgc	ctg	cgt	tac	atc	atc	ccc	gcg	ctg	336
Thr	Ala	Pro	Asp	Tyr	Lys	Ser	Arg	Leu	Arg	Tyr	Ile	Ile	Pro	Ala	Leu	
			100					105					110			
atc	gtg	att	gcc	atc	gtt	ttc	ccg	atc	ttc	gcc	aac	aag	tac	ctg	ctg	384
Ile	Val	Ile	Ala	Ile	Val	Phe	Pro	Ile	Phe	Ala	Asn	Lys	Tyr	Leu	Leu	
		115					120					125				
acc	gtg	gtc	atc	ctc	ggc	ctg	atc	tac	gta	ttg	ctg	ggc	ctt	ggc	ctg	432
Thr	Val	Val	Ile	Leu	Gly	Leu	Ile	Tyr	Val	Leu	Leu	Gly	Leu	Gly	Leu	
	130				135						140					
aac	atc	gtg	gtc	ggc	ctg	gcc	ggc	ctg	ctc	gac	ctg	ggg	tac	gtg	gcg	480
Asn	Ile	Val	Val	Gly	Leu	Ala	Gly	Leu	Leu	Asp	Leu	Gly	Tyr	Val	Ala	
	145				150					155					160	
ttc	tat	gcc	atc	ggg	gcc	tac	ggc	ctg	gcg	ctg	ggg	tac	cag	tac	ctg	528
Phe	Tyr	Ala	Ile	Gly	Ala	Tyr	Gly	Leu	Ala	Leu	Gly	Tyr	Gln	Tyr	Leu	
				165				170						175		
ggg	ctg	ggc	ttc	tgg	agc	gtg	ctg	ccg	ctg	gcg	gcc	atc	gct	gcg	gcg	576
Gly	Leu	Gly	Phe	Trp	Ser	Val	Leu	Pro	Leu	Ala	Ala	Ile	Ala	Ala	Ala	
			180					185					190			

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ctg	gcg	ggg	tgc	atc	ctc	ggc	ttc	ccg	gtg	ttg	cgc	atg	cac	ggt	gac	624
Leu	Ala	Gly	Cys	Ile	Leu	Gly	Phe	Pro	Val	Leu	Arg	Met	His	Gly	Asp	
		195					200					205				
tac	ctg	gcg	atc	gtg	acg	ctg	ggc	ttt	ggc	gag	atc	att	cgc	ctg	gtg	672
Tyr	Leu	Ala	Ile	Val	Thr	Leu	Gly	Phe	Gly	Glu	Ile	Ile	Arg	Leu	Val	
	210					215					220					
ctg	aac	aac	tgg	cta	tcg	ttc	acc	ggt	ggc	ccc	aac	ggc	atg	ccg	gca	720
Leu	Asn	Asn	Trp	Leu	Ser	Phe	Thr	Gly	Gly	Pro	Asn	Gly	Met	Pro	Ala	
225					230					235					240	
cct	tca	ccc	acc	ttc	ttc	ggc	ctt	gag	ttc	ggc	cgc	cgg	gcc	aag	gat	768
Pro	Ser	Pro	Thr	Phe	Phe	Gly	Leu	Glu	Phe	Gly	Arg	Arg	Ala	Lys	Asp	
				245					250					255		
ggc	ggg	gtg	ccg	atc	cac	gag	ttc	ttc	ggc	ttc	gag	tac	aac	gcc	agc	816
Gly	Gly	Val	Pro	Ile	His	Glu	Phe	Phe	Gly	Phe	Glu	Tyr	Asn	Ala	Ser	
			260				265						270			
ctc	aag	ttc	gtg	ttc	atc	tac	gcg	gtg	ctg	ttc	atg	gtc	gtg	ctg	gca	864
Leu	Lys	Phe	Val	Phe	Ile	Tyr	Ala	Val	Leu	Phe	Met	Val	Val	Leu	Ala	
		275					280					285				
gtg	ctg	tac	atc	aag	cat	cgc	ctg	act	cgc	atg	ccg	gtc	ggc	cgg	gcc	912
Val	Leu	Tyr	Ile	Lys	His	Arg	Leu	Thr	Arg	Met	Pro	Val	Gly	Arg	Ala	
	290					295					300					
tgg	gaa	gcg	ctg	cgc	gaa	gac	gag	att	gcc	tgc	cgt	tcg	atg	ggc	ctg	960
Trp	Glu	Ala	Leu	Arg	Glu	Asp	Glu	Ile	Ala	Cys	Arg	Ser	Met	Gly	Leu	
305					310				315						320	
aac	cac	gtg	ctg	gtc	aag	ctg	tcg	gcc	ttt	acc	ctg	ggc	gcc	tcg	act	1008
Asn	His	Val	Leu	Val	Lys	Leu	Ser	Ala	Phe	Thr	Leu	Gly	Ala	Ser	Thr	
				325					330					335		
gcc	ggt	ctg	gcc	ggg	gtg	ttc	ttc	gcc	acc	tac	cag	ggc	ttc	gtc	aac	1056
Ala	Gly	Leu	Ala	Gly	Val	Phe	Phe	Ala	Thr	Tyr	Gln	Gly	Phe	Val	Asn	
			340					345					350			
ccg	tcg	tcg	ttc	aca	ttt	ttc	gag	tcg	gcg	ctg	atc	ctc	gcc	atc	gtc	1104
Pro	Ser	Ser	Phe	Thr	Phe	Phe	Glu	Ser	Ala	Leu	Ile	Leu	Ala	Ile	Val	
		355					360					365				
gtg	ctg	ggt	ggc	atg	ggc	tcg	acc	gtg	ggt	gtg	gtc	atc	gcg	gcg	ttc	1152
Val	Leu	Gly	Gly	Met	Gly	Ser	Thr	Val	Gly	Val	Val	Ile	Ala	Ala	Phe	
	370					375					380					
gtg	ctg	acc	gtg	gcg	ccg	gaa	ctg	ctg	cgc	agc	ttc	tcc	gag	tac	cgg	1200
Val	Leu	Thr	Val	Ala	Pro	Glu	Leu	Leu	Arg	Ser	Phe	Ser	Glu	Tyr	Arg	
385					390				395						400	
gtg	ctg	ctg	ttc	ggc	gtg	ctg	atg	gtg	ctg	atg	atg	atc	tgg	cga	ccg	1248
Val	Leu	Leu	Phe	Gly	Val	Leu	Met	Val	Leu	Met	Met	Ile	Trp	Arg	Pro	
				405				410						415		
cgt	ggg	ctg	atc	cgt	atc	agc	cgt	acc	ggt	gtg	acc	cca	cgt	aaa	gga	1296
Arg	Gly	Leu	Ile	Arg	Ile	Ser	Arg	Thr	Gly	Val	Thr	Pro	Arg	Lys	Gly	
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gtg	gcg	cca	tga													1308
Val	Ala	Pro														
		435														

<210> 755

<211> 435

<212> PRT

<213> Pseudomonas putida

<400> 755

Met	Asn	Met	Ser	Val	Ala	Lys	Thr	Ala	Ser	Ile	Ser	Glu	Thr	Lys	Gly	
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Phe	Asp	Leu	Lys	Arg	Ser	Leu	Leu	Glu	Thr	Ile	Val	Ala	Gly	Leu	Leu	
			20					25					30			
Ala	Leu	Ile	Val	Phe	Gly	Pro	Val	Val	Gly	Val	Val	Leu	Asp	Gly	Tyr	
		35					40					45				
Thr	Phe	Asn	Ala	Glu	Pro	Arg	Val	Ala	Trp	Leu	Val	Gly	Gly	Val		
		50				55				60						
Met	Val	Gly	Arg	Phe	Leu	Leu	Ser	Leu	Phe	Leu	Gln	Thr	Ala	Pro	Gly	
65					70					75					80	
Gln	Arg	Met	Leu	Leu	Gly	Phe	Asp	Ser	Gly	Gly	Ser	Gly	Val	His	Val	
			85					90						95		
Thr	Ala	Pro	Asp	Tyr	Lys	Ser	Arg	Leu	Arg	Tyr	Ile	Ile	Pro	Ala	Leu	
			100					105					110			

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Ile Val Ile Ala Ile Val Phe Pro Ile Phe Ala Asn Lys Tyr Leu Leu
 115 120 125
 Thr Val Val Ile Leu Gly Leu Ile Tyr Val Leu Leu Gly Leu Gly Leu
 130 135 140
 Asn Ile Val Val Gly Leu Ala Gly Leu Leu Asp Leu Gly Tyr Val Ala
 145 150 155 160
 Phe Tyr Ala Ile Gly Ala Tyr Gly Leu Ala Leu Gly Tyr Gln Tyr Leu
 165 170 175
 Gly Leu Gly Phe Trp Ser Val Leu Pro Leu Ala Ala Ile Ala Ala Ala
 180 185 190
 Leu Ala Gly Cys Ile Leu Gly Phe Pro Val Leu Arg Met His Gly Asp
 195 200 205
 Tyr Leu Ala Ile Val Thr Leu Gly Phe Gly Glu Ile Ile Arg Leu Val
 210 215 220
 Leu Asn Asn Trp Leu Ser Phe Thr Gly Gly Pro Asn Gly Met Pro Ala
 225 230 235 240
 Pro Ser Pro Thr Phe Phe Gly Leu Glu Phe Gly Arg Arg Ala Lys Asp
 245 250 255
 Gly Gly Val Pro Ile His Glu Phe Phe Gly Phe Glu Tyr Asn Ala Ser
 260 265 270
 Leu Lys Phe Val Phe Ile Tyr Ala Val Leu Phe Met Val Val Leu Ala
 275 280 285
 Val Leu Tyr Ile Lys His Arg Leu Thr Arg Met Pro Val Gly Arg Ala
 290 295 300
 Trp Glu Ala Leu Arg Glu Asp Glu Ile Ala Cys Arg Ser Met Gly Leu
 305 310 315 320
 Asn His Val Leu Val Lys Leu Ser Ala Phe Thr Leu Gly Ala Ser Thr
 325 330 335
 Ala Gly Leu Ala Gly Val Phe Phe Ala Thr Tyr Gln Gly Phe Val Asn
 340 345 350
 Pro Ser Ser Phe Thr Phe Phe Glu Ser Ala Leu Ile Leu Ala Ile Val
 355 360 365
 Val Leu Gly Gly Met Gly Ser Thr Val Gly Val Val Ile Ala Ala Phe
 370 375 380
 Val Leu Thr Val Ala Pro Glu Leu Leu Arg Ser Phe Ser Glu Tyr Arg
 385 390 395 400
 Val Leu Leu Phe Gly Val Leu Met Val Leu Met Met Ile Trp Arg Pro
 405 410 415
 Arg Gly Leu Ile Arg Ile Ser Arg Thr Gly Val Thr Pro Arg Lys Gly
 420 425 430
 Val Ala Pro
 435

<210> 756

<211> 1041

<212> DNA

<213> Pseudomonas putida

<220>

<221> CDS

<222> (1)..(1041)

<400> 756

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1				5				10						15		
gaa	gcc	ctg	ctg	cag	ccc	gat	gca	gaa	cta	gac	ccg	ggc	gtg	cg	aca	96
Glu	Ala	Leu	Leu	Gln	Pro	Asp	Ala	Glu	Leu	Asp	Pro	Gly	Val	Arg	Thr	
			20					25					30			
gcc	gcc	gaa	acg	agc	ctg	gcc	cag	gtc	aag	cg	aaa	ctg	ctg	cta	ggc	144
Ala	Ala	Glu	Thr	Ser	Leu	Ala	Gln	Val	Lys	Arg	Lys	Leu	Leu	Leu	Gly	
		35					40					45				
gaa	ctg	ctc	ggc	cag	gcc	ttc	agc	ggc	ctg	tcg	ctg	ggc	tcg	gtc	ctg	192
Glu	Leu	Leu	Gly	Gln	Ala	Phe	Ser	Gly	Leu	Ser	Leu	Gly	Ser	Val	Leu	
	50					55					60					
ctg	ctg	gca	gcg	ctg	ggc	ctt	gcg	atc	acc	ttc	ggc	ctg	ctc	ggg	gtg	240
Leu	Leu	Ala	Ala	Leu	Gly	Leu	Ala	Ile	Thr	Phe	Gly	Leu	Leu	Gly	Val	
	65				70					75				80		
atc	aac	atg	gcc	cat	ggc	gag	atg	ttg	atg	ctc	ggc	gcc	tac	agc	acc	288

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Ile	Asn	Met	Ala	His 85	Gly	Glu	Met	Leu	Met 90	Leu	Gly	Ala	Tyr	Ser 95	Thr		
tac	atg	gtc	cag	gta	ctg	ctg	cag	cgc	ttc	gcc	cca	ggc	gcc	atc	gag	336	
Tyr	Met	Val	Gln	Val	Leu	Leu	Gln	Arg	Phe	Ala	Pro	Gly	Ala	Ile	Glu		
			100					105					110				
ttc	tac	ccg	ctg	att	gcc	ctg	ccg	gtg	gcc	ttc	gcc	gtc	agt	gcc	ggg	384	
Phe	Tyr	Pro	Leu	Ile	Ala	Leu	Pro	Val	Ala	Phe	Ala	Val	Ser	Ala	Gly		
		115					120					125					
gta	ggc	atg	gcg	ctg	gag	cgc	acg	gtg	atc	cgc	cac	ctg	tac	ggc	cgc	432	
Val	Gly	Met	Ala	Leu	Glu	Arg	Thr	Val	Ile	Arg	His	Leu	Tyr	Gly	Arg		
	130					135					140						
cca	ctg	gaa	acc	ctg	ctg	gcc	acc	tgg	ggc	atc	agc	ctg	atc	ctg	atc	480	
Pro	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Ile	Ser	Leu	Ile	Leu	Ile		
	145				150					155					160		
cag	gcc	atc	cgc	ctg	ctg	ttc	ggc	gcg	cag	aac	gtc	gag	gtg	agc	aac	528	
Gln	Ala	Ile	Arg	Leu	Leu	Phe	Gly	Ala	Gln	Asn	Val	Glu	Val	Ser	Asn		
			165				170							175			
ccg	gcc	tgg	ctg	tct	ggc	ggc	atc	cag	ctg	cta	ccc	aac	ctg	gtg	ctg	576	
Pro	Ala	Trp	Leu	Ser	Gly	Gly	Ile	Gln	Leu	Leu	Pro	Asn	Leu	Val	Leu		
			180				185						190				
ccg	tac	aac	cgc	ctg	gtc	atc	atc	ggc	ttc	gcc	ctg	gcc	gtg	gtg	ctg	624	
Pro	Tyr	Asn	Arg	Leu	Val	Ile	Ile	Gly	Phe	Ala	Leu	Ala	Val	Val	Leu		
		195				200						205					
ctt	acc	tgg	ctg	ctg	ctc	aac	cgt	acc	cgg	ttg	ggt	ctg	aac	gtg	cgc	672	
Leu	Thr	Trp	Leu	Leu	Leu	Asn	Arg	Thr	Arg	Leu	Gly	Leu	Asn	Val	Arg		
	210					215					220						
gca	gtc	acc	cag	aac	cgc	aac	atg	gcc	gcc	tgc	tgc	ggc	gtg	tcc	acc	720	
Ala	Val	Thr	Gln	Asn	Arg	Asn	Met	Ala	Ala	Cys	Cys	Gly	Val	Ser	Thr		
	225				230					235				240			
ggg	cgc	gtc	gac	atg	ctc	gcc	ttt	ggc	ctt	ggc	tcg	ggc	atc	gca	ggg	768	
Gly	Arg	Val	Asp	Met	Leu	Ala	Phe	Gly	Leu	Gly	Ser	Gly	Ile	Ala	Gly		
			245					250					255				
ctc	ggt	ggc	gtg	gct	tta	agc	cag	gtg	ggc	aac	gtc	ggc	ccg	gac	ctg	816	
Leu	Gly	Gly	Val	Ala	Leu	Ser	Gln	Val	Gly	Asn	Val	Gly	Pro	Asp	Leu		
			260				265						270				
ggc	cag	agc	tac	atc	atc	gat	tcg	ttc	ctg	gtg	gtg	gtg	ctc	ggc	ggc	864	
Gly	Gln	Ser	Tyr	Ile	Ile	Asp	Ser	Phe	Leu	Val	Val	Val	Leu	Gly	Gly		
		275				280						285					
gtc	ggg	cag	ctg	gcc	ggt	agc	ctc	tgg	gcc	gcg	ttc	ggc	ctg	ggc	atc	912	
Val	Gly	Gln	Leu	Ala	Gly	Ser	Leu	Trp	Ala	Ala	Phe	Gly	Leu	Gly	Ile		
	290					295					300						
gcc	aac	aag	ctg	ctg	gag	ccg	cag	atc	ggt	gcc	gta	ctc	ggc	aag	atc	960	
Ala	Asn	Lys	Leu	Leu	Glu	Pro	Gln	Ile	Gly	Ala	Val	Leu	Gly	Lys	Ile		
	305				310				315					320			
ctc	atc	ctt	gcg	ttg	atc	att	ctg	ttc	atc	cag	aaa	cgc	ccg	caa	ggc	1008	
Leu	Ile	Leu	Ala	Leu	Ile	Ile	Leu	Phe	Ile	Gln	Lys	Arg	Pro	Gln	Gly		
			325					330						335			
ctg	ttc	gcc	ctc	aag	gga	cgg	gta	atc	gac	tga						1041	
Leu	Phe	Ala	Leu	Lys	Gly	Arg	Val	Ile	Asp								
			340					345									

<210> 757

<211> 346

<212> PRT

<213> Pseudomonas putida

<400> 757

Met	Arg	Leu	Leu	Gly	Glu	Thr	Gly	Asp	Pro	Leu	Ala	Arg	Thr	Arg	Leu		
1				5					10					15			
Glu	Ala	Leu	Leu	Gln	Pro	Asp	Ala	Glu	Leu	Asp	Pro	Gly	Val	Arg	Thr		
			20					25					30				
Ala	Ala	Glu	Thr	Ser	Leu	Ala	Gln	Val	Lys	Arg	Lys	Leu	Leu	Gly			
		35					40					45					
Glu	Leu	Leu	Gly	Gln	Ala	Phe	Ser	Gly	Leu	Ser	Leu	Gly	Ser	Val	Leu		
	50					55					60						
Leu	Leu	Ala	Ala	Leu	Gly	Leu	Ala	Ile	Thr	Phe	Gly	Leu	Leu	Gly	Val		
	65				70				75					80			
Ile	Asn	Met	Ala	His	Gly	Glu	Met	Leu	Met	Leu	Gly	Ala	Tyr	Ser	Thr		
				85					90					95			

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Tyr Met Val Gln Val Leu Leu Gln Arg Phe Ala Pro Gly Ala Ile Glu
100 105 110
Phe Tyr Pro Leu Ile Ala Leu Pro Val Ala Phe Ala Val Ser Ala Gly
115 120 125
Val Gly Met Ala Leu Glu Arg Thr Val Ile Arg His Leu Tyr Gly Arg
130 135 140
Pro Leu Glu Thr Leu Leu Ala Thr Trp Gly Ile Ser Leu Ile Leu Ile
145 150 155 160
Gln Ala Ile Arg Leu Leu Phe Gly Ala Gln Asn Val Glu Val Ser Asn
165 170 175
Pro Ala Trp Leu Ser Gly Gly Ile Gln Leu Leu Pro Asn Leu Val Leu
180 185 190
Pro Tyr Asn Arg Leu Val Ile Ile Gly Phe Ala Leu Ala Val Val Leu
195 200 205
Leu Thr Trp Leu Leu Leu Asn Arg Thr Arg Leu Gly Leu Asn Val Arg
210 215 220
Ala Val Thr Gln Asn Arg Asn Met Ala Ala Cys Cys Gly Val Ser Thr
225 230 235 240
Gly Arg Val Asp Met Leu Ala Phe Gly Leu Gly Ser Gly Ile Ala Gly
245 250 255
Leu Gly Gly Val Ala Leu Ser Gln Val Gly Asn Val Gly Pro Asp Leu
260 265 270
Gly Gln Ser Tyr Ile Ile Asp Ser Phe Leu Val Val Val Leu Gly Gly
275 280 285
Val Gly Gln Leu Ala Gly Ser Leu Trp Ala Ala Phe Gly Leu Gly Ile
290 295 300
Ala Asn Lys Leu Leu Glu Pro Gln Ile Gly Ala Val Leu Gly Lys Ile
305 310 315 320
Leu Ile Leu Ala Leu Ile Ile Leu Phe Ile Gln Lys Arg Pro Gln Gly
325 330 335
Leu Phe Ala Leu Lys Gly Arg Val Ile Asp
340 345

<210> 758

<211> 882

<212> DNA

<213> Pseudomonas putida

<220>

<221> CDS

<222> (1)..(882)

<400> 758

atg aac ttc ttc ctg gag acc ttg atc ggc ggc ttg ctc gcc ggg acc	48
Met Asn Phe Phe Leu 5 Glu Thr Leu Ile Gly 10 Gly Leu Leu Ala Gly 15 Thr	
ctg tat tcg ctg gtg gcc atc ggc ttc gtg ctg atc tac aag gcc agc	96
Leu Tyr Ser Leu Val Ala Ile Gly Phe Val Leu Ile Tyr Lys 30 Ala Ser	
ggc gtg ttc aac ttt gcc cag ggc gcg atg ctg ctg ttt gct gcg ctg	144
Gly Val Phe 35 Asn Phe Ala Gln Gly 40 Ala Met Leu Leu Phe 45 Ala Ala Leu	
aca ttc gtt agc ttg cac gag cag ggc ctg ccg ttc gcc ctg gcg ttg	192
Thr Phe Val Ser Leu His Glu 55 Gln Gly Leu Pro Phe 60 Ala Leu Ala Leu	
gcc ctg acc gta ctg gtg atg atc gtc ggc gcg ctg ctg atc gag cgc	240
Ala Leu Thr Val Leu Val 70 Met Ile Val Gly 75 Ala Leu Leu Ile Glu Arg 80	
ctg gtg ctg cgg ccc ctg gtc aat cgc tcg cag atc acc ctg ttc atg	288
Leu Val Leu Arg Pro 85 Leu Val Asn Arg Ser 90 Gln Ile Thr Leu Phe Met 95	
gcc acc ctt ggc ctg tcg ttc atc atc gag ggc ctg gcc cag ggc ttg	336
Ala Thr Leu Gly 100 Leu Ser Phe Ile Ile 105 Glu Gly Leu Ala 110 Gln Gly Leu	
atg ggc gcc cag gta cgt gcg ctg gat ctg ggc atc gag gac gtc ccg	384
Met Gly Ala Gln Val Arg Ala Leu 120 Asp Leu Gly Ile 125 Glu Asp Val Pro	
ctg ttc gtc ggc gag ctg atg agc cag ttc gac cta gtc gcc tct	432
Leu Phe Val Gly Glu Leu Met Ile Ser Gln Phe Asp Leu Val Ala Ser	

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130	135	140	
ggc gtt tcc gcc ttg ttg gca gtg ctg gcg ctg ttc aac aag	480		
Gly Val Ser Ala Leu Leu Val Ala Val Leu Ala Leu Leu Phe Asn Lys			
145	150	155	160
acc cgc atc ggt gtg gcc ttg cgt gcg gtg gcc gac gat acc cgc gcg	528		
Thr Arg Ile Gly Val Ala Leu Arg Ala Val Ala Asp Asp Thr Arg Ala			
165	170	175	
gcg ctg tcg ctg ggc atc aac ctc aac cgc atc tgg cag atc gtc tgg	576		
Ala Leu Ser Leu Gly Ile Asn Leu Asn Arg Ile Trp Gln Ile Val Trp			
180	185	190	
gcc gtg gcc ggc atg gtc ggg ctg gtg gcc ggg ctg ctc tgg ggg gcg	624		
Ala Val Ala Gly Met Val Gly Leu Val Ala Gly Leu Leu Trp Gly Ala			
195	200	205	
cgc cag ggg gtg cag ttc tcg ctc tcg ctg gta gtg ctc aag gcg ctg	672		
Arg Gln Gly Val Gln Phe Ser Leu Ser Leu Val Val Leu Lys Ala Leu			
210	215	220	
ccg gtg ctg atc atc ggc ggc ttc acc tca att ggc gga gcc atc gtc	720		
Pro Val Leu Ile Ile Gly Gly Phe Thr Ser Ile Gly Gly Ala Ile Val			
225	230	235	240
ggc ggg ctg atc gtc ggc gcc gcc gag aac ctc gcc gaa gcc tac atc	768		
Gly Gly Leu Ile Val Gly Ala Ala Glu Asn Leu Ala Glu Ala Tyr Ile			
245	250	255	
ggc cca ctg atc ggc ggc ggc atc acg ccc tgg ttc gct tat ttc ctc	816		
Gly Pro Leu Ile Gly Gly Gly Ile Thr Pro Trp Phe Ala Tyr Phe Leu			
260	265	270	
gcc ctg ata ttc ctt tac atc cgt ccg gcc ggc ctg ttc ggc gac cgg	864		
Ala Leu Ile Phe Leu Tyr Ile Arg Pro Ala Gly Leu Phe Gly Asp Arg			
275	280	285	
gcc atc gaa cgg gta tga	882		
Ala Ile Glu Arg Val			
290			

<210> 759

<211> 293

<212> PRT

<213> Pseudomonas putida

<400> 759

Met Asn Phe Phe Leu Glu Thr Leu Ile Gly Gly Leu Leu Ala Gly Thr	
1	5
Leu Tyr Ser Leu Val Ala Ile Gly Phe Val Leu Ile Tyr Lys Ala Ser	
20	25
Gly Val Phe Asn Phe Ala Gln Gly Ala Met Leu Leu Phe Ala Ala Leu	
35	40
Thr Phe Val Ser Leu His Glu Gln Gly Leu Pro Phe Ala Leu Ala Leu	
50	55
Ala Leu Thr Val Leu Val Met Ile Val Gly Ala Leu Leu Ile Glu Arg	
65	70
Leu Val Leu Arg Pro Leu Val Asn Arg Ser Gln Ile Thr Leu Phe Met	
85	90
Ala Thr Leu Gly Leu Ser Phe Ile Ile Glu Gly Leu Ala Gln Gly Leu	
100	105
Met Gly Ala Gln Val Arg Ala Leu Asp Leu Gly Ile Glu Asp Val Pro	
115	120
Leu Phe Val Gly Glu Leu Met Ile Ser Gln Phe Asp Leu Val Ala Ser	
130	135
Gly Val Ser Ala Leu Leu Val Ala Val Leu Ala Leu Leu Phe Asn Lys	
145	150
Thr Arg Ile Gly Val Ala Leu Arg Ala Val Ala Asp Asp Thr Arg Ala	
165	170
Ala Leu Ser Leu Gly Ile Asn Leu Asn Arg Ile Trp Gln Ile Val Trp	
180	185
Ala Val Ala Gly Met Val Gly Leu Val Ala Gly Leu Leu Trp Gly Ala	
195	200
Arg Gln Gly Val Gln Phe Ser Leu Ser Leu Val Val Leu Lys Ala Leu	
210	215
Pro Val Leu Ile Ile Gly Gly Phe Thr Ser Ile Gly Gly Ala Ile Val	
225	230
Gly Gly Leu Ile Val Gly Ala Ala Glu Asn Leu Ala Glu Ala Tyr Ile	
235	240

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Gly Pro Leu Ile 245 Gly Gly Gly Ile Thr 250 Trp Phe Ala Tyr 255
 260
 Ala Leu Ile Phe Leu Tyr Ile Arg 265 Pro Ala Gly Leu Phe 270
 275
 Ala Ile Glu Arg Val 280
 290

<210> 760

<211> 924

<212> DNA

<213> Pseudomonas putida

<220>

<221> CDS

<222> (1)..(924)

<400> 760

atg	cct	gag	atc	tac	cat	ttc	ttc	caa	caa	ctg	ggt	aat	gga	ttg	acc	48
Met	Pro	Glu	Ile	Tyr	His	Phe	Phe	Gln	Gln	Leu	Val	Asn	Gly	Leu	Thr	
1				5				10						15		
atc	ggc	agc	acc	tat	gcc	ttg	atc	gcc	atc	ggc	tac	acg	atg	gtg	tac	96
Ile	Gly	Ser	Thr	Tyr	Ala	Leu	Ile	Ala	Ile	Gly	Tyr	Thr	Met	Val	Tyr	
			20					25					30			
ggc	atc	att	ggc	atg	atc	aac	ttc	gcc	cac	ggc	gag	gtg	tac	atg	atc	144
Gly	Ile	Ile	Gly	Met	Ile	Asn	Phe	Ala	His	Gly	Glu	Val	Tyr	Met	Ile	
		35					40					45				
ggt	tcc	tac	gtg	gcc	ttc	atc	gcc	ctg	gcg	ggc	ctg	gcc	atg	atg	ggt	192
Gly	Ser	Tyr	Val	Ala	Phe	Ile	Ala	Leu	Ala	Gly	Leu	Ala	Met	Met	Gly	
		50				55					60					
atc	cat	tcg	ctg	ccg	atc	ctg	atg	acc	gtc	gcc	ttc	gtc	gcg	acg	atc	240
Ile	His	Ser	Leu	Pro	Ile	Leu	Met	Thr	Val	Ala	Phe	Val	Ala	Thr	Ile	
				70					75						80	
ttc	gtc	acc	agt	gcc	tat	ggc	tac	agt	atc	gaa	cgg	ggt	gcc	tac	cgc	288
Phe	Val	Thr	Ser	Ala	Tyr	Gly	Tyr	Ser	Ile	Glu	Arg	Val	Ala	Tyr	Arg	
				85					90					95		
ccc	ctg	cgc	aac	agc	aac	cgt	ctg	atc	ccg	ctg	att	tct	gcc	atc	ggc	336
Pro	Leu	Arg	Asn	Ser	Asn	Arg	Leu	Ile	Pro	Leu	Ile	Ser	Ala	Ile	Gly	
			100					105					110			
atg	tcg	atc	ttc	ctg	cag	aac	acg	gtc	ttg	ctt	tcg	cag	gac	tcc	aag	384
Met	Ser	Ile	Phe	Leu	Gln	Asn	Thr	Val	Leu	Leu	Ser	Gln	Asp	Ser	Lys	
		115					120					125				
gac	aag	tcc	atc	ccc	aac	ctg	atc	ccc	ggg	agt	ttc	tcc	tcc	ggg	cca	432
Asp	Lys	Ser	Ile	Pro	Asn	Leu	Ile	Pro	Gly	Ser	Phe	Ser	Phe	Gly	Pro	
		130				135					140					
ggc	ggt	gct	gaa	gaa	gta	ctg	atc	agc	tac	atg	caa	atc	ctg	gtg	ttc	480
Gly	Gly	Ala	Glu	Glu	Val	Leu	Ile	Ser	Tyr	Met	Gln	Ile	Leu	Val	Phe	
					150					155					160	
gtc	gtc	acc	ctg	gtg	gcc	atg	acc	ctg	ctc	acc	ctg	ttc	atc	tct	cgt	528
Val	Val	Thr	Leu	Val	Ala	Met	Thr	Leu	Leu	Thr	Leu	Phe	Ile	Ser	Arg	
				165				170						175		
tcc	cgc	cta	ggc	cgc	gcc	tgc	cgc	gcc	tgc	gag	gac	atc	aag	atg		576
Ser	Arg	Leu	Gly	Arg	Ala	Cys	Arg	Ala	Cys	Ala	Glu	Asp	Ile	Lys	Met	
			180					185				190				
gcc	aac	ctg	ctg	ggc	atc	aac	acc	aac	aac	atc	atc	gcc	ctc	acc	ttc	624
Ala	Asn	Leu	Leu	Gly	Ile	Asn	Thr	Asn	Asn	Ile	Ile	Ala	Leu	Thr	Phe	
		195					200					205				
gtc	atc	ggt	ggc	ggc	ctg	gct	ggc	gtg	gcg	ggc	gtg	ctg	agc	atg		672
Val	Ile	Gly	Ala	Ala	Leu	Ala	Ala	Val	Ala	Ala	Val	Leu	Leu	Ser	Met	
		210				215					220					
cag	tac	ggg	gtg	atc	aac	ccc	aac	gcc	ggt	ttc	ctg	gtg	ggc	ctg	aag	720
Gln	Tyr	Gly	Val	Ile	Asn	Pro	Asn	Ala	Gly	Phe	Leu	Val	Gly	Leu	Lys	
					230				235						240	
gct	ttc	acc	gcg	gcg	gta	ctg	ggt	ggc	atc	ggc	agc	atc	ccg	ggc	gcc	768
Ala	Phe	Thr	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ser	Ile	Pro	Gly	Ala	
				245				250						255		
atg	ctc	ggc	ggg	ctg	gtg	ctg	ggc	gtg	gcc	gaa	gcg	ttc	ggt	gcc	gat	816
Met	Leu	Gly	Gly	Leu	Val	Leu	Gly	Val	Ala	Glu	Ala	Phe	Gly	Ala	Asp	
			260					265					270			

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atc ttc ggc gac cag tac aag gac gtg gtg gca ttc ggc ttg ttg gtt 864
 ile phe gly asp gln tyr lys asp val val ala phe gly leu leu val
 275 280 285
 ctt gtc ctg cta ttc cgg ccg acc ggc att ctg ggc cgc ccg gag gtt 912
 leu val leu leu phe arg pro thr gly ile leu gly arg pro glu val
 290 295 300
 gaa aaa gta tga 924
 glu lys val
 305

<210> 761
 <211> 307
 <212> PRT
 <213> Pseudomonas putida

<400> 761
 Met Pro Glu Ile Tyr His Phe Phe Gln Gln Leu Val Asn Gly Leu Thr
 1 5 10 15
 ile gly ser thr tyr ala leu ile ala ile gly tyr thr met val tyr
 20 25 30
 gly ile ile gly met ile asn phe ala his gly glu val tyr met ile
 35 40 45
 gly ser tyr val ala phe ile ala leu ala gly leu ala met met gly
 50 55 60
 ile his ser leu pro ile leu met thr val ala phe val ala thr ile
 65 70 75 80
 phe val thr ser ala tyr gly tyr ser ile glu arg val ala tyr arg
 85 90 95
 pro leu arg asn ser asn arg leu ile pro leu ile ser ala ile gly
 100 105 110
 met ser ile phe leu gln asn thr val leu leu ser gln asp ser lys
 115 120 125
 asp lys ser ile pro asn leu ile pro gly ser phe ser phe gly pro
 130 135 140
 gly gly ala glu glu val leu ile ser tyr met gln ile leu val phe
 145 150 155 160
 val val thr leu val ala met thr leu leu thr leu phe ile ser arg
 165 170 175
 ser arg leu gly arg ala cys arg ala cys ala glu asp ile lys met
 180 185 190
 ala asn leu leu gly ile asn thr asn asn ile ile ala leu thr phe
 195 200 205
 val ile gly ala ala leu ala ala val ala ala val leu leu ser met
 210 215 220
 gln tyr gly val ile asn pro asn ala gly phe leu val gly leu lys
 225 230 235 240
 ala phe thr ala ala val leu gly gly ile gly ser ile pro gly ala
 245 250 255
 met leu gly gly leu val leu gly val ala glu ala phe gly ala asp
 260 265 270
 ile phe gly asp gln tyr lys asp val val ala phe gly leu leu val
 275 280 285
 leu val leu leu phe arg pro thr gly ile leu gly arg pro glu val
 290 295 300
 glu lys val
 305

<210> 762
 <211> 1257
 <212> DNA
 <213> Pseudomonas putida

<220>
 <221> CDS
 <222> (1)..(1257)

<400> 762
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 Met Asn Arg Asn Leu Lys Gln Ala Phe Phe Ser Ala Leu Leu Val Trp

48

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1															5															10															15	
gcc Ala	gtg Val	gcc Ala	ttc Phe 20	ccg Pro	gta Val	ctg Leu	ggc Gly	ctg Leu 25	aaa Lys	ctg Leu	agc Ser	atc Ile	gac Asp 30	ggc Gly	atc Ile	96																														
agc Ser	ctg Leu	gtc Val 35	gtg Val	cac His	agt Ser	cag Gln	ggc Gly 40	tcg Ser	ttc Phe	acc Thr	atc Ile	agc Ser 45	atc Ile	atc Ile	gcc Ala	144																														
gtg Val	tgt Cys 50	tcc Ser	gtg Val	ctg Leu	atg Met	ttc Phe 55	ctg Leu	cgc Arg	gtg Val	ctg Leu	ttc Phe 60	gac Asp	aag Lys	cag Gln	tgg Trp	192																														
agt Ser 65	tcg Ser	gtg Val	atg Met	ggc Gly	cgc Arg 70	cga Arg	tcg Ser	gat Asp	cgc Arg 75	aag Lys	ctg Leu	atc Ile	ccc Pro	ccg Pro	gca Ala 80	240																														
gtc Val	agc Ser	aac Asn	tac Tyr	ctc Leu 85	acc Thr	ctg Leu	ccc Pro	aag Lys	acc Thr 90	cag Gln	cgc Arg	tat Tyr	gtc Val	atc Ile 95	atc Ile	288																														
ggg Gly	ttg Leu	atc Ile	gtg Val 100	gtg Val	gca Ala	ctg Leu	gta Val	tgg Trp 105	ccg Pro	ttc Phe	ttc Phe	ggc Gly	tct Ser 110	cgt Arg	ggt Gly	336																														
gcg Ala	gtc Val	gac Asp 115	att Ile	gcc Ala	acg Thr	ctg Leu	atc Ile 120	ctg Leu	atc Ile	tac Tyr	gtg Val	ttg Leu 125	ctg Leu	ggc Gly	ctg Leu	384																														
ggc Gly	ctg Leu 130	aat Asn	atc Ile	gtg Val	gtc Val	ggt Gly 135	ctg Leu	gcg Ala	ggc Gly	ctg Leu	ctc Leu 140	gac Asp	ctc Leu	ggc Gly	tac Tyr	432																														
gtg Val 145	ggc Gly	ttc Phe	tat Tyr	gcc Ala	gtc Val 150	ggt Gly	gcc Ala	tac Tyr	agc Ser	tac Tyr 155	gcc Ala	atg Met	ctc Leu	tcg Ser	cat His 160	480																														
tac Tyr	ctg Leu	ggc Gly	tgg Trp	agc Ser 165	ttc Phe	tgg Trp	gtg Val	tgc Cys 170	ctg Leu	ccg Pro	att Ile	gcc Ala	ggc Gly	ctg Leu 175	atg Met	528																														
gct Ala	gcc Ala	acg Thr	ttc Phe 180	ggc Gly	ttc Phe	ctg Leu	ctc Leu	ggc Gly 185	ttc Phe	ccg Pro	gtg Val	ctg Leu	cgc Arg 190	ctg Leu	cgt Arg	576																														
ggt Gly	gac Asp	tac Tyr 195	ctg Leu	gcg Ala	atc Ile	gtg Val	acc Thr 200	ctc Leu	ggt Gly	ttc Phe	ggt Gly	gag Glu 205	atc Ile	atc Ile	cgc Arg	624																														
ctg Leu	ttc Phe 210	ctg Leu	cgt Arg	aac Asn	ctc Leu	acc Thr 215	gac Asp	tgg Trp	acc Thr	ggc Gly 220	ggc Gly	ccc Pro	aac Asn	ggc Gly	atc Ile	672																														
agc Ser 225	aac Asn	atc Ile	ccc Pro	aag Lys	ccg Pro 230	gag Glu	ttc Phe	ttc Phe	ggc Gly 235	ctg Leu	acc Thr	ttc Phe	gaa Glu	cgc Arg	cgt Arg 240	720																														
gcg Ala	gcc Ala	gag Glu	ggc Gly	atg Met 245	cag Gln	acc Thr	ttc Phe	cac His	gag Glu 250	ttc Phe	ttc Phe	ggg Gly	ctg Leu	caa Gln 255	tac Tyr	768																														
aac Asn	tcg Ser	atc Ile	aac Asn 260	aag Lys	gtc Val	atc Ile	ttc Phe	ctg Leu 265	tat Tyr	ctg Leu	gtg Val	gcc Ala 270	ctg Leu	ctg Leu	ctg Leu	816																														
gcc Ala	ctg Leu	ctg Leu 275	gcg Ala	ttg Leu	ttc Phe	gtg Val 280	atc Ile	aac Asn	cgc Arg	ctg Leu	ctg Leu	cgc Arg 285	atg Met	ccg Pro	atc Ile	864																														
ggc Gly	cgt Arg 290	gcc Ala	tgg Trp	gaa Glu	gcc Ala	ctg Leu 295	cgt Arg	gaa Glu	gac Asp	gag Glu	atc Ile 300	gcc Ala	tgc Cys	cgt Arg	gct Ala	912																														
ctg Leu 305	ggc Gly	ctg Leu	aac Asn	ccg Pro	acc Thr 310	gtg Val	atc Ile	aag Lys	ctc Leu	tcg Ser 315	gca Ala	ttc Phe	acc Thr	ctg Leu	ggt Gly 320	960																														
gcc Ala	tgc Cys	ttc Phe	gcc Ala	ggc Gly 325	ttc Phe	gcc Ala	ggc Gly	agc Ser	ttc Phe 330	ttc Phe	gcc Ala	gcg Ala	cgc Arg	caa Gln 335	ggc Gly	1008																														
ctg Leu	gtg Val	acg Thr	ccg Pro 340	gag Glu	tcg Ser	ttc Phe	acc Thr	ttc Phe 345	atc Ile	gag Glu	tcg Ser	gcg Ala	atc Ile 350	atc Ile	ctc Leu	1056																														
gcc Ala	atc Ile	gtc Val 355	gtg Val	ctg Leu	ggt Gly	ggc Gly	atg Met 360	ggt Gly	tca Ser	caa Gln	ctg Leu	ggc Gly 365	gtg Val	att Ile	ctc Leu	1104																														
gcg Ala	gcc Ala	atc Ile	gtg Val	atg Met	atc Ile	ctg Leu	ctg Leu	cct Pro	gag Glu	ctg Leu	atg Met	cgt Arg	gag Glu	ttc Phe	agc Ser	1152																														

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370	gaa	tac	cgc	atg	ctg	atg	ttc	ggt	gcg	ctg	atg	gtg	ttg	atg	atg	atc	1200
	Glu	Tyr	Arg	Met	Leu	Met	Phe	Gly	Ala	Leu	Met	Val	Leu	Met	Met	Ile	
385	tg	cg	cc	caa	ggc	ctg	ctg	cct	atg	caa	cgt	cca	cac	atg	gag	ctg	1248
	Trp	Arg	Pro	Gln	Gly	Leu	Leu	Pro	Met	Gln	Arg	Pro	His	Met	Glu	Leu	
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<210> 763

<211> 418

<212> PRT

<213> Pseudomonas putida

<400> 763

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			20					25					30		
Ser	Leu	Val	Val	His	Ser	Gln	Gly	Ser	Phe	Thr	Ile	Ser	Ile	Ile	Ala
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Val	Cys	Ser	Val	Leu	Met	Phe	Leu	Arg	Val	Leu	Phe	Asp	Lys	Gln	Trp
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Ser	Ser	Val	Met	Gly	Arg	Arg	Ser	Asp	Arg	Lys	Leu	Ile	Pro	Pro	Ala
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Val	Ser	Asn	Tyr	Leu	Thr	Leu	Pro	Lys	Thr	Gln	Arg	Tyr	Val	Ile	Ile
			85						90					95	
Gly	Leu	Ile	Val	Ala	Leu	Val	Trp	Pro	Phe	Phe	Gly	Ser	Arg	Gly	
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Ala	Val	Asp	Ile	Ala	Thr	Leu	Ile	Leu	Ile	Tyr	Val	Leu	Leu	Gly	Leu
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Gly	Leu	Asn	Ile	Val	Val	Gly	Leu	Ala	Gly	Leu	Leu	Asp	Leu	Gly	Tyr
	130					135					140				
Val	Gly	Phe	Tyr	Ala	Val	Gly	Ala	Tyr	Ser	Tyr	Ala	Met	Leu	Ser	His
145				150						155					160
Tyr	Leu	Gly	Trp	Ser	Phe	Trp	Val	Cys	Leu	Pro	Ile	Ala	Gly	Leu	Met
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Ala	Ala	Thr	Phe	Gly	Phe	Leu	Leu	Gly	Phe	Pro	Val	Leu	Arg	Leu	Arg
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Leu	Phe	Leu	Arg	Asn	Leu	Thr	Asp	Trp	Thr	Gly	Gly	Pro	Asn	Gly	Ile
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Ser	Asn	Ile	Pro	Lys	Pro	Glu	Phe	Phe	Gly	Leu	Thr	Phe	Glu	Arg	Arg
225				230						235					240
Ala	Ala	Glu	Gly	Met	Gln	Thr	Phe	His	Glu	Phe	Phe	Gly	Leu	Gln	Tyr
			245						250					255	
Asn	Ser	Ile	Asn	Lys	Val	Ile	Phe	Leu	Tyr	Leu	Val	Ala	Leu	Leu	Leu
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Ala	Leu	Leu	Ala	Leu	Phe	Val	Ile	Asn	Arg	Leu	Leu	Arg	Met	Pro	Ile
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Gly	Arg	Ala	Trp	Glu	Ala	Leu	Arg	Glu	Asp	Glu	Ile	Ala	Cys	Arg	Ala
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Leu	Gly	Leu	Asn	Pro	Thr	Val	Ile	Lys	Leu	Ser	Ala	Phe	Thr	Leu	Gly
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Ala	Cys	Phe	Ala	Gly	Phe	Ala	Gly	Ser	Phe	Phe	Ala	Ala	Arg	Gln	Gly
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Ala	Ile	Val	Val	Leu	Gly	Gly	Met	Gly	Ser	Gln	Leu	Gly	Val	Ile	Leu
		355					360					365			
Ala	Ala	Ile	Val	Met	Ile	Leu	Leu	Pro	Glu	Leu	Met	Arg	Glu	Phe	Ser
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Glu	Tyr	Arg	Met	Leu	Met	Phe	Gly	Ala	Leu	Met	Val	Leu	Met	Met	Ile
385				390						395					400
Trp	Arg	Pro	Gln	Gly	Leu	Leu	Pro	Met	Gln	Arg	Pro	His	Met	Glu	Leu
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Arg Arg

<210> 764
 <211> 861
 <212> DNA
 <213> *Pseudomonas putida*

<220>
 <221> CDS
 <222> (1)..(861)

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 atg atc tac ttc ctc atc gcc gta ggc ctg acg atc att ttc ggc ctg 96
 Met Ile Tyr Phe Leu Ile Ala Val Gly Leu Thr Ile Ile Phe Gly Leu
 20 25 30
 ctc aac ttc gtc aac ttc gcc cac ggc gcg ttt ttc ttg ctg ggc gcc 144
 Leu Asn Phe Val Asn Phe Ala His Gly Ala Phe Phe Leu Leu Gly Ala
 35 40 45
 tac ctg tgc tac acc gcc gtg gcc gtc acc ggc aac ttc tgg ctg gcg 192
 Tyr Leu Cys Tyr Thr Ala Val Ala Val Thr Gly Asn Phe Trp Leu Ala
 50 55 60
 ctg ctg att gcg cca ctg gtg gtg gcc gcg ctg gcc tgg gcg gtc gag 240
 Leu Leu Ile Ala Pro Leu Val Val Ala Ala Leu Ala Trp Ala Val Glu
 65 70 75 80
 cgc ctg ttg atc aaa cgc atc tac cac ctg ccg cac acc ttc cag atc 288
 Arg Leu Leu Ile Lys Arg Ile Tyr His Leu Pro His Thr Phe Gln Ile
 85 90 95
 ctc gtc acc ctc ggc atc gcg ctg atc atc cag gaa gcg tcg gtg ctg 336
 Leu Val Thr Leu Gly Ile Ala Leu Ile Ile Gln Glu Ala Ser Val Leu
 100 105 110
 atc tgg ggc ccg gtg ggc aaa aac att gcc gtg cca ccc gaa ctg cgc 384
 Ile Trp Gly Pro Val Gly Lys Asn Ile Ala Val Pro Pro Glu Leu Arg
 115 120 125
 ggg gtg ctg ata ctc ggc gac ttc atc tac ccc tac tac cgc ttg ttc 432
 Gly Val Leu Ile Leu Gly Asp Phe Ile Tyr Pro Tyr Tyr Arg Leu Phe
 130 135 140
 ctg atc ggc ttc gca gcg ctg atc ggt att gcc ctg tgg ctg ctg ctg 480
 Leu Ile Gly Phe Ala Ala Leu Ile Gly Ile Gly Leu Trp Leu Leu Leu
 145 150 155 160
 gaa cgc acc cgt ttc ggc gca ctg gtg cgg gcc ggt agc gaa agc acc 528
 Glu Arg Thr Arg Phe Gly Ala Leu Val Arg Ala Gly Ser Glu Ser Thr
 165 170 175
 gag acc gtg tcg ctg ttg ggc acc aac att ttc cgc ctg ttc tcc ctg 576
 Glu Thr Val Ser Leu Leu Gly Thr Asn Ile Phe Arg Leu Phe Ser Leu
 180 185 190
 aca ttc gcc ctg ggc gtg ggc ctg gca ggt gtg gcg ggt gtg cta ttt 624
 Thr Phe Ala Leu Gly Val Gly Leu Ala Gly Val Ala Gly Val Leu Phe
 195 200 205
 gcg ccg cta cgg ggc gcc cag ccc ttc gtc ggc ccg gaa atc ctc ggc 672
 Ala Pro Leu Arg Gly Ala Gln Pro Phe Val Gly Pro Glu Ile Leu Gly
 210 215 220
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 Ile Ala Phe Val Val Val Val Ile Gly Gly Met Gly Ser Phe Gly Gly
 225 230 235 240
 gcg ctg gtt ggc ggc ctg ctg gtg ggt gtg gtg caa agc atg atg acc 768
 Ala Leu Val Gly Gly Leu Leu Val Gly Val Val Gln Ser Met Met Thr
 245 250 255
 agt ctc tgg ccg caa ggc gcc agc ctg atg atc tac ggc gcc atg gca 816
 Ser Leu Trp Pro Gln Gly Ala Ser Leu Met Ile Tyr Gly Ala Met Ala
 260 265 270
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<210> 765

<211> 286

<212> PRT

<213> *Pseudomonas putida*

<400> 765

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      20      25      30
Leu Asn Phe Val Asn Phe Ala His Gly Ala Phe Phe Leu Leu Gly Ala
      35      40      45
Tyr Leu Cys Tyr Thr Ala Val Ala Val Thr Gly Asn Phe Trp Leu Ala
      50      55      60
Leu Leu Ile Ala Pro Leu Val Val Ala Ala Leu Ala Trp Ala Val Glu
65      70      75      80
Arg Leu Leu Ile Lys Arg Ile Tyr His Leu Pro His Thr Phe Gln Ile
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Leu Val Thr Leu Gly Ile Ala Leu Ile Ile Gln Glu Ala Ser Val Leu
      100      105      110
Ile Trp Gly Pro Val Gly Lys Asn Ile Ala Val Pro Pro Glu Leu Arg
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Gly Val Leu Ile Leu Gly Asp Phe Ile Tyr Pro Tyr Tyr Arg Leu Phe
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Glu Arg Thr Arg Phe Gly Ala Leu Val Arg Ala Gly Ser Glu Ser Thr
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Glu Thr Val Ser Leu Leu Gly Thr Asn Ile Phe Arg Leu Phe Ser Leu
      180      185      190
Thr Phe Ala Leu Gly Val Gly Leu Ala Gly Val Ala Gly Val Leu Phe
      195      200      205
Ala Pro Leu Arg Gly Ala Gln Pro Phe Val Gly Pro Glu Ile Leu Gly
      210      215      220
Ile Ala Phe Val Val Val Val Ile Gly Gly Met Gly Ser Phe Gly Gly
225      230      235      240
Ala Leu Val Gly Gly Leu Leu Val Gly Val Val Gln Ser Met Met Thr
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<210> 766

<211> 879

<212> DNA

<213> *Lactobacillus plantarum*

<220>

<221> CDS

<222> (1)..(879)

<400> 766

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atc tac gcg tta ttg gcg cta ggc tac acg atg gtt tat ggc att atc      96
Ile Tyr Ala Leu Leu Ala Leu Gly Tyr Thr Met Val Tyr Gly Ile Ile
      20      25      30
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Lys Leu Ile Asn Phe Ala His Gly Asp Ile Tyr Met Leu Gly Ala Phe
      35      40      45
tgg ggc tat tac agt ttg aag tca cta cac ttt aac ttt gtt gcg gcg      192
Trp Gly Tyr Tyr Ser Leu Lys Ser Leu His Phe Asn Phe Val Ala Ala
      50      55      60
ctc ctg tcc gca atg gtg atc tgc gca gtt agt ggt gtg att att gaa      240
Leu Leu Ser Ala Met Val Ile Cys Ala Val Ser Gly Val Ile Ile Glu
      65      70      75      80
tat ttc gcg tac cgc cca tta cgc cat tca ccg cga att acc gcg cta      288
Tyr Phe Ala Tyr Arg Pro Leu Arg His Ser Pro Arg Ile Thr Ala Leu

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															100																105																110	
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Phe	Val	Gly	Ala	Ser	Ala	Arg	Ser	Phe	Pro	Gln	Ala	Ile	Lys	Val	Val																																	
															115																120																125	
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Thr	Tyr	His	Trp	Gly	Gly	Leu	Arg	Val	Ser	Asn	Val	Gln	Leu	Leu	Ile																																	
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cgt	acc	aaa	atg	ggg	aaa	gca	atg	cgg	gcc	gtt	tct	gtt	gat	ccc	gaa	528																																
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Ala	Ala	Gln	Leu	Val	Gly	Ile	Asn	Leu	Asn	His	Thr	Ile	Ser	Phe	Thr																																	
															180																185																190	
ttc	gca	tta	ggg	tct	gca	atg	gcc	ggc	gct	gcc	gga	gtc	ttg	att	ggc	624																																
Phe	Ala	Leu	Gly	Ser	Ala	Met	Ala	Gly	Ala	Ala	Gly	Val	Leu	Ile	Gly																																	
															195																200																205	
cta	tac	tat	aat	tcg	att	gat	ccg	ttg	atg	ggc	atg	acg	ccc	ggg	atc	672																																
Leu	Tyr	Tyr	Asn	Ser	Ile	Asp	Pro	Leu	Met	Gly	Met	Thr	Pro	Gly	Ile																																	
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aag	gcc	ttt	gtc	gca	gcc	gtg	att	ggg	att	ggg	tct	gtg	cct	ggg		720																																
Lys	Ala	Phe	Val	Ala	Ala	Val	Ile	Gly	Gly	Ile	Gly	Ser	Val	Pro	Gly																																	
															225																230																235	
gct	tca	ttg	ggg	ggc	ttt	att	atc	ggc	atc	ctg	gag	act	ggg	gtt	cag	768																																
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															245																250																255	
gcg	att	ggc	cta	tcc	gca	tac	aag	gac	gcg	gtg	gtt	tac	ttt	gtc	tta	816																																
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															275																280																285	
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Lys	Glu	Lys	Val																																													
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<211> 292

<212> PRT

<213> Lactobacillus plantarum

<400> 767

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Lys	Leu	Ile	Asn	Phe	Ala	His	Gly	Asp	Ile	Tyr	Met	Leu	Gly	Ala	Phe																																	
			35				40					45																																				
Trp	Gly	Tyr	Tyr	Ser	Leu	Lys	Ser	Leu	His	Phe	Asn	Phe	Val	Ala	Ala																																	
			50			55					60																																					
Leu	Leu	Ser	Ala	Met	Val	Ile	Cys	Ala	Val	Ser	Gly	Val	Ile	Ile	Glu																																	
65					70					75					80																																	
Tyr	Phe	Ala	Tyr	Arg	Pro	Leu	Arg	His	Ser	Pro	Arg	Ile	Thr	Ala	Leu																																	
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Ile	Thr	Ala	Ile	Gly	Val	Ser	Phe	Leu	Leu	Glu	Asn	Gly	Met	Ser	Tyr																																	
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Phe	Val	Gly	Ala	Ser	Ala	Arg	Ser	Phe	Pro	Gln	Ala	Ile	Lys	Val	Val																																	
			115				120					125																																				
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			130			135					140																																					
Leu	Gly	Thr	Ala	Cys	Leu	Leu	Met	Ile	Leu	Leu	Glu	Leu	Ile	Ile	Lys																																	
145					150					155					160																																	
Arg	Thr	Lys	Met	Gly	Lys	Ala	Met	Arg	Ala	Val	Ser	Val	Asp	Pro	Glu																																	
															165																170																175	

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 Phe Ala Leu Gly Ser Ala Met Ala Gly Ala Ala Gly Val Leu Ile Gly
 195 200 205
 Leu Tyr Tyr Asn Ser Ile Asp Pro Leu Met Gly Met Thr Pro Gly Ile
 210 215 220
 Lys Ala Phe Val Ala Ala Val Ile Gly Gly Ile Gly Ser Val Pro Gly
 225 230 235 240
 Ala Ser Leu Gly Gly Phe Ile Ile Gly Ile Leu Glu Thr Gly Val Gln
 245 250 255
 Ala Ile Gly Leu Ser Ala Tyr Lys Asp Ala Val Val Tyr Phe Val Leu
 260 265 270
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 275 280 285
 Lys Glu Lys Val
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<211> 963

<212> DNA

<213> Lactobacillus plantarum

<220>

<221> CDS

<222> (1)..(963)

<400> 768

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Ile	Gly	Phe	Val	Val	Ile	Asp	Gly	Leu	Glu	Leu	Met	Gly	Val	Ile	Asn	
			20					25					30			
tcg	ttt	att	gaa	aat	atg	ctg	gtg	acg	att	ggt	atc	aac	ggt	ata	ttg	144
Ser	Phe	Ile	Glu	Asn	Met	Leu	Val	Thr	Ile	Gly	Ile	Asn	Val	Ile	Leu	
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gcg	gtg	gga	ctc	aat	ctg	att	att	ggg	ttt	gca	ggc	cag	ttc	tcg	ctt	192
Ala	Val	Gly	Leu	Asn	Leu	Ile	Ile	Gly	Phe	Ala	Gly	Gln	Phe	Ser	Leu	
	50					55				60						
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Gly	His	Val	Gly	Phe	Met	Ala	Ile	Gly	Ala	Tyr	Ala	Thr	Gly	Ile	Met	
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Thr	Gln	Thr	Met	Ala	Thr	Pro	Ala	Gly	Phe	Tyr	Leu	Ser	Met	Ile	Val	
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Gly	Met	Val	Ile	Ala	Met	Val	Ala	Ala	Val	Ile	Val	Gly	Ile	Pro	Thr	
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Leu	Arg	Leu	Arg	Gly	Asp	Tyr	Leu	Ala	Ile	Ala	Thr	Met	Gly	Ala	Ala	
		115					120					125				
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Glu	Ile	Ile	Arg	Ile	Leu	Ile	Asn	Asn	Leu	Lys	Ile	Thr	Asn	Gly	Ala	
	130					135				140						
gcg	ggg	tta	ttc	aat	atc	ccg	gca	ctt	gct	tcg	tgg	gca	acg	gtg	tac	480
Ala	Gly	Leu	Phe	Asn	Ile	Pro	Ala	Leu	Ala	Ser	Trp	Ala	Thr	Val	Tyr	
	145				150					155					160	
gtc	tta	atg	tgt	ctg	aca	acg	att	atc	acg	gtc	aac	ttt	att	cac	agt	528
Val	Leu	Met	Cys	Leu	Thr	Thr	Ile	Ile	Thr	Val	Asn	Phe	Ile	His	Ser	
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cgc	ggt	ggt	cgg	gcc	gtg	atg	gct	gtg	cgg	gat	gat	gaa	ctg	gcg	gct	576
Arg	Gly	Gly	Arg	Ala	Val	Met	Ala	Val	Arg	Asp	Asp	Glu	Leu	Ala	Ala	
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ggt	gcc	atg	gga	atc	aat	acg	acg	cgc	tgg	aag	ttg	gcc	gct	ttc	gtc	624
Gly	Ala	Met	Gly	Ile	Asn	Thr	Thr	Arg	Trp	Lys	Leu	Ala	Ala	Phe	Val	
		195					200					205				
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Phe	Gly	Ala	Ala	Thr	Ala	Ile	Ile	Gly	Gly	Ser	Leu	His	Ala	Ala	Tyr	
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225					230					235					240	
att	ctg	att	att	gtc	gta	ctc	ggt	ggg	gtc	ggc	agt	att	acc	ggg	act	768
Ile	Leu	Ile	Ile	Val	Val	Leu	Gly	Gly	Val	Gly	Ser	Ile	Thr	Gly	Thr	
				245					250					255		
ttc	gta	gcc	gca	atc	gta	tta	gga	gcg	ctc	gac	acg	atc	tta	caa	aac	816
Phe	Val	Ala	Ala	Ile	Val	Leu	Gly	Ala	Leu	Asp	Thr	Ile	Leu	Gln	Asn	
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ttc	ggt	acg	atc	cga	atg	att	att	tat	tca	ttg	gca	ctg	att	ttg	att	864
Phe	Gly	Thr	Ile	Arg	Met	Ile	Ile	Tyr	Ser	Leu	Ala	Leu	Ile	Leu	Ile	
		275				280						285				
atg	att	ttt	aag	cca	gcc	gga	ctg	tta	gga	acg	tgg	gag	ttc	tca	ttc	912
Met	Ile	Phe	Lys	Pro	Ala	Gly	Leu	Leu	Gly	Thr	Trp	Glu	Phe	Ser	Phe	
	290					295					300					
acg	cgt	cta	ttc	aga	cgg	cga	tca	act	aag	gag	gcg	ggt	aac	cat	gag	960
Thr	Arg	Leu	Phe	Arg	Arg	Arg	Ser	Thr	Lys	Glu	Ala	Val	Asn	His	Glu	
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<210> 769

<211> 320

<212> PRT

<213> Lactobacillus plantarum

<400> 769

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Gly	His	Val	Gly	Phe	Met	Ala	Ile	Gly	Ala	Tyr	Ala	Thr	Gly	Ile	Met	
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Thr	Gln	Thr	Met	Ala	Thr	Pro	Ala	Gly	Phe	Tyr	Leu	Ser	Met	Ile	Val	
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Gly	Met	Val	Ile	Ala	Met	Val	Ala	Ala	Val	Ile	Val	Gly	Ile	Pro	Thr	
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Leu	Arg	Leu	Arg	Gly	Asp	Tyr	Leu	Ala	Ile	Ala	Thr	Met	Gly	Ala	Ala	
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Glu	Ile	Ile	Arg	Ile	Leu	Ile	Asn	Asn	Leu	Lys	Ile	Thr	Asn	Gly	Ala	
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Arg	Gly	Gly	Arg	Ala	Val	Met	Ala	Val	Arg	Asp	Asp	Glu	Leu	Ala	Ala	
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Gly	Ala	Met	Gly	Ile	Asn	Thr	Thr	Arg	Trp	Lys	Leu	Ala	Ala	Phe	Val	
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Phe	Gly	Ala	Ala	Thr	Ala	Ala	Ile	Gly	Gly	Ser	Leu	His	Ala	Ala	Tyr	
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Phe	Val	Ala	Ala	Ile	Val	Leu	Gly	Ala	Leu	Asp	Thr	Ile	Leu	Gln	Asn	
			260					265					270			
Phe	Gly	Thr	Ile	Arg	Met	Ile	Ile	Tyr	Ser	Leu	Ala	Leu	Ile	Leu	Ile	
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Met	Ile	Phe	Lys	Pro	Ala	Gly	Leu	Leu	Gly	Thr	Trp	Glu	Phe	Ser	Phe	
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<210> 770
 <211> 876
 <212> DNA
 <213> Bradyrhizobium japonicum

<220>
 <221> CDS
 <222> (1)..(876)

<400> 770
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 gtc tac ggc ctg atc gcg ctc ggc ttc gtg ctg gtc tac aag gcg acc 96
 Val Tyr Gly Leu Ile Ala Leu Gly Phe Val Leu Val Tyr Lys Ala Thr
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 gag gtc gtc aac ttc gcc cag ggc gac ctg atg atg ctg ggc ggc ttc 144
 Glu Val Val 35 Asn Phe Ala Gln Gly 40 Asp Leu Met Met Leu Gly Gly Phe
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 ttc gcc ttc acc ttc atc ggc atg atg ggc ctg aac tac tgg atc ggc 192
 Phe Ala Phe Thr Phe Ile Gly Met Met Gly Leu Asn Tyr Trp Ile Gly
 50 55 60
 ttt gcc ggt gcg gtg gcc gcg atg gcg ctg ttc ggc atg ctg gcc gaa 240
 Phe Ala Gly Ala Val Ala 70 Ala Met Ala Leu Phe 75 Gly Met Leu Ala Glu
 65 80
 cgc gtg gtg gtg cgg ccg atc ctc ggc tat ccg caa ttc tcc atc atc 288
 Arg Val Val Val Arg Pro Ile Leu Gly Tyr 90 Pro Gln Phe Ser Ile Ile
 85 95
 atg gcg acc atc ggc ctc ggc tac ttc ctg cgc tcg atc gcc ggc atg 336
 Met Ala Thr 100 Gly Leu Gly Tyr 105 Leu Arg Ser Ile 110 Ala Gly Met
 atc tgg ggc acc gat gat ctg aag atc gag acg ccg ttc agc cag ggc 384
 Ile Trp Gly Thr Asp Asp Leu Lys 120 Ile Glu Thr Pro Phe Ser Gln Gly
 115 125
 gtg ctg cgc atc ggc tcg ctg gtg ctc gcc tac gac aag ctc tcg gtg 432
 Val 130 Arg Ile Gly Ser Leu Val Leu Ala Tyr 140 Asp Lys Leu Ser Val
 135 140
 atc gcg gcg acg atg atc ctg tgc acg ctg ctc tgg ctc ttc ttc aac 480
 Ile Ala Ala Thr Met Ile 150 Leu Cys Thr Leu Leu Trp Leu Phe Phe Asn
 145 155 160
 agg acc acg ctc ggc acc gcg atg cgc gcc agt tcc gag aac atg ctg 528
 Arg Thr Thr Leu Gly Thr Ala Met Arg Ala Ser Ser Glu Asn Met Leu
 165 170 175
 gcg gcc tat tac atg ggc atc ccg gtc aag gcg gtg gtg tcg atc gtc 576
 Ala Ala Tyr Tyr Met Gly Ile Pro Val 185 Lys Arg Val Val Ser Ile Val
 180 190
 tgg gcg atc agc gcg gcg gtc gcg acc tgc gcc ggc gtg ctg gcg 624
 Trp Ala Ile Ser Ala Ala Val Ala Thr Cys Ala Gly Val Leu Leu Ala
 195 200 205
 ccg atc acc ttc att cac tcc aat gtc ggc ctc gtg ctc ggc ctc aag 672
 Pro Ile Thr Phe Ile His Ser Asn Val Gly Leu Val 220 Leu Gly Leu Lys
 210 215 220
 gca ttc ccc gcc gca gtc ctc ggc ggc ttc ggc tcg atc ccc ggc gcg 720
 Ala Phe Pro Ala Ala Val Leu Gly Gly Phe Gly Ser Ile Pro Gly Ala
 225 230 235 240
 gtg gtc ggc ggc gtc ctg atc ggc gtg atc gag agc atg gcc ggc ttc 768
 Val Val Gly Gly Val Leu Ile Gly Val 250 Glu Ser Met Ala Gly Phe
 245 255
 tat ctg gcc gag ggc tgg aag gac gtc gcg ccg tac gtc gtg ctg ctc 816
 Tyr Leu Ala Glu Gly Trp Lys Asp Val 265 Ala Pro Tyr Val Val Leu Leu
 260 265 270
 gcc gtg ctg ctg aag ccc gaa ggc ctg ttc ggc ctt cac gtc cgc 864
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 aag aag gtc tga 876
 Lys Lys Val
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<210> 771

<211> 291

<212> PRT

<213> Bradyrhizobium japonicum

<400> 771

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Glu Val Val Asn Phe Ala Gln Gly Asp Leu Met Met Leu Gly Gly Phe
35      40      45
Phe Ala Phe Thr Phe Ile Gly Met Met Gly Leu Asn Tyr Trp Ile Gly
50      55      60
Phe Ala Gly Ala Val Ala Ala Met Ala Leu Phe Gly Met Leu Ala Glu
65      70      75      80
Arg Val Val Val Arg Pro Ile Leu Gly Tyr Pro Gln Phe Ser Ile Ile
85      90      95
Met Ala Thr Ile Gly Leu Gly Tyr Phe Leu Arg Ser Ile Ala Gly Met
100     105     110
Ile Trp Gly Thr Asp Asp Leu Lys Ile Glu Thr Pro Phe Ser Gln Gly
115     120     125
Val Leu Arg Ile Gly Ser Leu Val Leu Ala Tyr Asp Lys Leu Ser Val
130     135     140
Ile Ala Ala Thr Met Ile Leu Cys Thr Leu Leu Trp Leu Phe Phe Asn
145     150     155     160
Arg Thr Thr Leu Gly Thr Ala Met Arg Ala Ser Ser Glu Asn Met Leu
165     170     175
Ala Ala Tyr Tyr Met Gly Ile Pro Val Lys Arg Val Val Ser Ile Val
180     185     190
Trp Ala Ile Ser Ala Ala Val Ala Thr Cys Ala Gly Val Leu Ala
195     200     205
Pro Ile Thr Phe Ile His Ser Asn Val Gly Leu Val Leu Gly Leu Lys
210     215     220
Ala Phe Pro Ala Ala Val Leu Gly Gly Phe Gly Ser Ile Pro Gly Ala
225     230     235     240
Val Val Gly Gly Val Leu Ile Gly Val Ile Glu Ser Met Ala Gly Phe
245     250     255
Tyr Leu Ala Glu Gly Trp Lys Asp Val Ala Pro Tyr Val Val Leu Leu
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<210> 772

<211> 1770

<212> DNA

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<220>

<221> CDS

<222> (1)..(1770)

<400> 772

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Ile Pro Phe Val Pro Gly Met Pro Pro Phe Trp Ile Val Leu Leu Asp	
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aat atc ggc ctt gcc gcc ctc gtc gcg atg ggc ctc gtg ctg ctg acg	144
Asn Ile Gly Leu Ala Ala Leu Val Ala Met Gly Leu Val Leu Leu Thr	
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ggc gtc ggc ggc ctg acc tcg ttc gga caa gcc gcc ttc gtc ggc ttc	192
Gly Val Gly Gly Leu Thr Ser Phe Gly Gln Ala Ala Phe Val Gly Phe	
50 55 60	
ggc gcc tac acc acc gcg gtg ctg tcg acg agc tac ggc ctg tcg ccc	240
Gly Ala Tyr Thr Thr Ala Val Leu Ser Thr Ser Tyr Gly Leu Ser Pro	
65 70 75 80	

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Trp	Leu	Thr	Leu	Pro	Leu	Ser	Leu	Val	Val	Ser	Gly	Ser	Leu	Ala	Val	
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ctg	ctt	ggc	ctc	gtc	acc	gtc	cgc	ctc	tcc	ggc	cac	tat	ctg	ccg	ctc	336
Leu	Leu	Gly	Leu	Val	Thr	Val	Arg	Leu	Ser	Gly	His	Tyr	Leu	Pro	Leu	
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ggc	acg	ctc	gcc	tgg	ggg	ctc	ggc	ctg	ttc	tat	ctc	ttc	agc	aag	ctg	384
Gly	Thr	Leu	Ala	Trp	Gly	Leu	Gly	Leu	Phe	Tyr	Leu	Phe	Ser	Lys	Leu	
			115					120				125				
gag	ttt	ttg	ggc	cgc	aac	gac	ggc	atc	tcg	gcg	atc	ccg	ccg	ctg	tcg	432
Glu	Phe	Leu	Gly	Arg	Asn	Asp	Gly	Ile	Ser	Ala	Ile	Pro	Pro	Leu	Ser	
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atc	ggc	gcg	ttc	aag	atg	ctc	tcg	ccc	ggc	tcg	atc	tac	tac	gcg	atc	480
Ile	Gly	Ala	Phe	Lys	Met	Leu	Ser	Pro	Gly	Ser	Ile	Tyr	Tyr	Ala	Ile	
	145				150					155					160	
tgg	gtc	gcc	gtg	atc	ctc	tcg	gcc	ctg	ctc	acg	atg	aac	ctg	ctg	gac	528
Trp	Val	Ala	Val	Ile	Leu	Ser	Ala	Leu	Leu	Thr	Met	Asn	Leu	Leu	Asp	
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Ser	Arg	Thr	Gly	Arg	Ala	Ile	Arg	Ala	Leu	Arg	Arg	Gly	His	Val	Ala	
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gcc	gag	gcg	ttc	ggc	gtg	cac	acg	ccg	cgg	gca	aag	cta	ctg	gtg	ttc	624
Ala	Glu	Ala	Phe	Gly	Val	His	Thr	Pro	Arg	Ala	Lys	Leu	Leu	Val	Phe	
			195				200					205				
atc	cac	ggc	gcg	gtg	cta	gcc	ggt	ctc	tcc	ggc	tgg	ctc	tat	gcc	cac	672
Ile	His	Ala	Ala	Val	Leu	Ala	Gly	Leu	Ser	Gly	Trp	Leu	Tyr	Ala	His	
	210				215						220					
ctt	cag	cgc	gcg	gtg	aac	ccg	acg	ccg	ttc	ggc	gca	cag	gcc	ggc	atc	720
Leu	Gln	Arg	Ala	Val	Asn	Pro	Thr	Pro	Phe	Gly	Ala	Gln	Ala	Gly	Ile	
	225				230					235					240	
gaa	tat	ctc	ttc	atc	gcg	gtg	gtc	ggc	ggc	ggc	ggc	tat	gtc	tgg	ggc	768
Glu	Tyr	Leu	Phe	Ile	Ala	Val	Val	Gly	Gly	Ala	Gly	Tyr	Val	Trp	Gly	
				245				250						255		
ggc	gtg	ctg	ggc	gcg	gcg	atc	gtc	gtg	gtc	ctg	aaa	gag	gtg	ctg	caa	816
Gly	Val	Leu	Gly	Ala	Ala	Ile	Val	Val	Val	Leu	Lys	Glu	Val	Leu	Gln	
			260				265						270			
agc	tat	ctg	ccg	ctg	ctc	ctg	ccg	ggt	tcc	ggc	cag	gtc	gag	acc	atc	864
Ser	Tyr	Leu	Pro	Leu	Leu	Leu	Pro	Gly	Ser	Gly	Gln	Val	Glu	Thr	Ile	
		275					280					285				
gtg	ttc	ggc	atc	atg	ctg	gtg	gcg	ctg	ttg	caa	ctc	gcg	ccc	ggc	ggc	912
Val	Phe	Gly	Ile	Met	Leu	Val	Ala	Leu	Leu	Gln	Leu	Ala	Pro	Gly	Gly	
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Val	Trp	Pro	Trp	Leu	Met	Ser	Phe	Leu	Pro	Glu	Pro	Thr	Arg	Gly	Arg	
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aag	ccg	gac	acc	tcg	ctg	aag	ctg	gag	cag	cgc	acc	cgc	gcg	ccc	ggc	1008
Lys	Pro	Asp	Thr	Ser	Leu	Lys	Leu	Glu	Gln	Arg	Thr	Arg	Ala	Pro	Gly	
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gaa	gcc	agc	gtc	ctg	ctc	cag	gtc	gag	aag	gca	cgc	aag	caa	ttc	ggc	1056
Glu	Ala	Ser	Val	Leu	Leu	Gln	Val	Glu	Lys	Ala	Arg	Lys	Gln	Phe	Gly	
			340				345						350			
ggc	gtg	atc	gcg	gtc	aac	aac	gtt	tcc	gag	gtc	cag	gcc	cgc	gag		1104
Gly	Val	Ile	Ala	Val	Asn	Asn	Val	Ser	Phe	Glu	Val	Gln	Ala	Arg	Glu	
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atc	gtc	gcg	ctg	atc	ggg	ccg	aac	ggc	gcc	ggc	aag	agc	acg	acg	ttc	1152
Ile	Val	Ala	Leu	Ile	Gly	Pro	Asn	Gly	Ala	Gly	Lys	Ser	Thr	Thr	Phe	
	370					375					380					
aac	ctg	atc	acc	ggc	gtg	ctg	tcg	gcg	acc	tca	ggc	tcg	atc	tcg	gtg	1200
Asn	Leu	Ile	Thr	Gly	Val	Leu	Ser	Ala	Thr	Ser	Gly	Ser	Ile	Ser	Val	
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ctt	ggc	aag	agg	ctc	gac	aac	gcg	ccg	ccg	cag	gag	atc	gtc	aag	ctc	1248
Leu	Gly	Lys	Arg	Leu	Asp	Asn	Ala	Pro	Pro	Gln	Glu	Ile	Val	Lys	Leu	
				405				410						415		
ggc	atc	tcc	cgc	acc	ttc	cag	cac	gtg	aag	ctg	gtc	ccc	gac	atg	acc	1296
Gly	Ile	Ser	Arg	Thr	Phe	Gln	His	Val	Lys	Leu	Val	Pro	Asp	Met	Thr	
			420					425					430			
gtg	ctg	gag	aac	gtc	gct	atc	ggc	gcg	cat	ctg	cgc	ggt	cat	tcg	ggg	1344
Val	Leu	Glu	Asn	Val	Ala	Ile	Gly	Ala	His	Leu	Arg	Gly	His	Ser	Gly	
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Pro	Ile	Ser	Ser	Met	Leu	Arg	Leu	Asp	Arg	Ala	Asp	Glu	Ala	Lys	Leu	
	450					455					460					
ctc	gcc	gag	gcc	gca	cgc	cag	atc	gag	cgc	gtc	ggg	ctt	gcc	gac	cag	1440
Leu	Ala	Glu	Ala	Ala	Arg	Gln	Ile	Glu	Arg	Val	Gly	Leu	Ala	Asp	Gln	
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atg	cac	cag	ctc	gca	ggg	tcg	ctc	tcg	ctc	ggc	cag	cag	cgc	atc	gtc	1488
Met	His	Gln	Leu	Ala	Gly	Ser	Leu	Ser	Leu	Gly	Gln	Gln	Arg	Ile	Val	
				485					490					495		
gag	atc	gcg	cgc	gcg	ctg	tgc	gtc	gat	ccg	atg	ctg	ctg	ctg	ctc	gac	1536
Glu	Ile	Ala	Arg	Ala	Leu	Cys	Val	Asp	Pro	Met	Leu	Leu	Leu	Leu	Asp	
			500					505					510			
gag	ccg	gcc	ggc	ggc	ctg	cgc	cac	atg	gag	aag	cag	cag	ctt	gcc	agg	1584
Glu	Pro	Ala	Ala	Gly	Leu	Arg	His	Met	Glu	Lys	Gln	Gln	Leu	Ala	Arg	
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ctg	ctg	cgc	gaa	ttg	cgc	gac	ggc	ggc	atg	agc	gtg	ctg	ctg	gtc	gag	1632
Leu	Leu	Arg	Glu	Leu	Arg	Asp	Gly	Gly	Met	Ser	Val	Leu	Leu	Val	Glu	
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cac	gac	atg	ggc	ttt	gtc	atg	aac	ctc	gcc	gac	cgc	atc	gtc	gtg	ctc	1680
His	Asp	Met	Gly	Phe	Val	Met	Asn	Leu	Ala	Asp	Arg	Ile	Val	Val	Leu	
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gat	ttc	ggc	acc	aag	atc	gcg	gag	ggc	acg	ccc	gcc	acg	atc	aag	acc	1728
Asp	Phe	Gly	Thr	Lys	Ile	Ala	Glu	Gly	Thr	Pro	Ala	Thr	Ile	Lys	Thr	
				565					570					575		
aat	ccc	gaa	gtg	atc	aag	gcc	tat	ctc	gga	gtg	gcg	gca	tga			1770
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<211> 589

<212> PRT

<213> Bradyrhizobium japonicum

<400> 773

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Asn	Ile	Gly	Leu	Ala	Ala	Leu	Val	Ala	Met	Gly	Leu	Val	Leu	Leu	Thr	
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Gly	Val	Gly	Gly	Leu	Thr	Ser	Phe	Gly	Gln	Ala	Ala	Phe	Val	Gly	Phe	
	50					55				60						
Gly	Ala	Tyr	Thr	Thr	Ala	Val	Leu	Ser	Thr	Ser	Tyr	Gly	Leu	Ser	Pro	
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Trp	Leu	Thr	Leu	Pro	Leu	Ser	Leu	Val	Val	Ser	Gly	Ser	Leu	Ala	Val	
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Gly	Thr	Leu	Ala	Trp	Gly	Leu	Gly	Leu	Phe	Tyr	Leu	Phe	Ser	Lys	Leu	
	115					120					125					
Glu	Phe	Leu	Gly	Arg	Asn	Asp	Gly	Ile	Ser	Ala	Ile	Pro	Pro	Leu	Ser	
	130					135					140					
Ile	Gly	Ala	Phe	Lys	Met	Leu	Ser	Pro	Gly	Ser	Ile	Tyr	Tyr	Ala	Ile	
145				150					155						160	
Trp	Val	Ala	Val	Ile	Leu	Ser	Ala	Leu	Leu	Thr	Met	Asn	Leu	Leu	Asp	
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Ser	Arg	Thr	Gly	Arg	Ala	Ile	Arg	Ala	Leu	Arg	Arg	Gly	His	Val	Ala	
		180						185					190			
Ala	Glu	Ala	Phe	Gly	Val	His	Thr	Pro	Arg	Ala	Lys	Leu	Leu	Val	Phe	
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Ile	His	Ala	Ala	Val	Leu	Ala	Gly	Leu	Ser	Gly	Trp	Leu	Tyr	Ala	His	
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Leu	Gln	Arg	Ala	Val	Asn	Pro	Thr	Pro	Phe	Gly	Ala	Gln	Ala	Gly	Ile	
225					230					235					240	
Glu	Tyr	Leu	Phe	Ile	Ala	Val	Val	Gly	Gly	Ala	Gly	Tyr	Val	Trp	Gly	
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Gly	Val	Leu	Gly	Ala	Ala	Ile	Val	Val	Val	Leu	Lys	Glu	Val	Leu	Gln	
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Ser	Tyr	Leu	Pro	Leu	Leu	Leu	Pro	Gly	Ser	Gly	Gln	Val	Glu	Thr	Ile	

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 Val Trp Pro Trp Leu Met Ser 300 Thr Arg Ala Pro Gly
 305 Lys Pro Asp Thr Ser 310 Leu Lys Leu Glu Gln Arg Thr Arg Ala Pro Gly
 325 Leu Gln Val Glu Lys Ala Arg Lys Gln Phe Gly
 340 Val Ile Ala Val Asn Asn Val Ser Phe Glu Val Gln Ala Arg Glu
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 370 Leu Ile Thr Gly Val 375 Leu Ser Ala Thr Ser Gly Ser Ile Ser Val
 385 Leu Gly Lys Arg Leu 390 Asp Asn Ala Pro Pro Gln Glu Ile Val Lys Leu
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 435 Ile Ser Ser Met Leu Arg 440 Leu Asp Arg Ala Asp Glu Ala Lys Leu
 450 Ala Glu Ala Ala Arg 455 Gln Ile Glu Arg Val Gly Leu Ala Asp Gln
 465 Met His Gln Leu Ala 470 Gly Ser Leu Ser Leu Gly Gln Gln Arg Ile Val
 485 Glu Ile Ala Arg Ala Leu Cys Val Asp 490 Pro Met Leu Leu Leu Leu Asp
 500 Glu Pro Ala Ala Gly Leu Arg His 505 Met Glu Lys Gln Gln Ala Arg
 515 Leu Leu Arg Glu Leu Arg Asp 520 Gly Gly Met Ser Val Leu Leu Val Glu
 530 His Asp Met Gly Phe Val 535 Met Asn Leu Ala Asp Arg Ile Val Val Leu
 545 Asp Phe Gly Thr Lys 550 Ile Ala Glu Gly Thr 555 Pro Ala Thr Ile Lys Thr
 565 Asn Pro Glu Val Ile Lys Ala Tyr Leu 570 Gly Val Ala Ala
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<210> 774

<211> 1026

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(1026)

<400> 774

atg	ctg	ttc	ctg	gtg	cag	gac	ggc	atc	acc	aat	ggc	gcg	atc	tat	gcg	48
Met	Leu	Phe	Leu	Val	Gln	Asp	Gly	Ile	Thr	Asn	Gly	Ala	Ile	Tyr	Ala	
1				5				10					15			
ctg	ctc	ggc	ctc	gcg	ctg	gtg	ctg	gtg	ttc	gcc	ggt	acc	cgc	gtg	atc	96
Leu	Leu	Gly	Leu	Ala	Leu	Val	Leu	Val	Phe	Ala	Val	Thr	Arg	Val	Ile	
			20				25						30			
ctc	att	ccc	cag	ggc	gag	ttc	gtt	acc	ggc	gcg	ctg	acc	tat	gcc		144
Leu	Ile	Pro	Gln	Gly	Glu	Phe	Val	Thr	Tyr	Gly	Ala	Leu	Thr	Tyr	Ala	
		35					40					45				
tcg	ctg	gcc	gcg	ggc	cag	atg	ccg	ggc	acg	gca	aag	ctc	gcg	ctc	gcc	192
Ser	Leu	Ala	Ala	Gly	Gln	Met	Pro	Gly	Thr	Ala	Lys	Leu	Ala	Leu	Ala	
		50				55					60					
ctc	ggc	atc	ggc	gcc	ttc	ggc	ttc	gac	ctg	ttc	gtg	gcc	cgc	aag	gcg	240
Leu	Gly	Ile	Gly	Ala	Phe	Gly	Phe	Asp	Leu	Phe	Val	Ala	Arg	Lys	Ala	
		65			70				75						80	
ctg	cat	ggc	cgg	ctg	atc	ctg	cgc	agc	gtc	ctc	acc	aat	atc	gtg	ctg	288
Leu	His	Gly	Arg	Leu	Ile	Leu	Arg	Ser	Val	Leu	Thr	Asn	Ile	Val	Leu	
			85						90					95		
ccg	gcc	atc	gtg	ctg	gcg	ctg	aca	atc	tac	ttc	gcc	gcc	cag	aag	ccg	336

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Pro	Ala	Ile	Val	Leu	Ala	Leu	Thr	Ile	Tyr	Phe	Ala	Ala	Gln	Lys	Pro		
ccg	gtg	gcg	gtc	tgc	atc	gcg	ctg	tgc	ctg	gtg	atc	gtg	gcg	atg	atc		384
Pro	Val	Ala	Val	Cys	Ile	Ala	Leu	Ser	Leu	Val	Ile	Val	Ala	Met	Ile		
		115					120					125					
ggc	ctg	tat	ctc	tac	cg	atc	gcg	ttc	cag	ccg	ctg	gcg	cac	acc	tcg		432
Gly	Leu	Tyr	Leu	Tyr	Arg	Ile	Ala	Phe	Gln	Pro	Leu	Ala	His	Thr	Ser		
		130					135					140					
gtg	ctg	gtg	ctg	ctg	atc	gcc	tcc	gtg	ggc	gtc	cac	ctc	gcg	ctg	cag		480
Val	Leu	Val	Leu	Leu	Ile	Ala	Ser	Val	Gly	Val	His	Leu	Ala	Leu	Gln		
		145				150					155				160		
gga	ctg	ggc	ctg	ctg	ttc	ttc	ggc	gcc	gag	ggc	cag	cg	gga	cct	gcc		528
Gly	Leu	Gly	Leu	Leu	Phe	Phe	Gly	Ala	Glu	Gly	Gln	Arg	Gly	Pro	Ala		
						165			170					175			
gtg	ctg	tcc	ggc	tct	ttc	acc	gcc	ggc	gcg	ctg	cgt	ttc	acc	ggc	cag		576
Val	Leu	Ser	Gly	Ser	Phe	Thr	Ala	Gly	Ala	Leu	Arg	Phe	Thr	Gly	Gln		
			180					185					190				
agc	atc	acc	gtc	tac	gcc	atc	acc	atc	gcc	ttc	atc	gtc	ggg	ctc	tgg		624
Ser	Ile	Thr	Val	Tyr	Ala	Ile	Thr	Ile	Ala	Phe	Ile	Val	Gly	Leu	Trp		
		195					200					205					
ctg	ttc	ttc	ggc	ctg	acg	ctc	tac	ggc	aag	gcg	ctg	cg	gcg	acc	gcc		672
Leu	Phe	Phe	Gly	Leu	Thr	Leu	Tyr	Gly	Lys	Ala	Leu	Arg	Ala	Thr	Ala		
		210				215					220						
gtg	aac	cg	cta	ggg	gcg	cg	ctc	gct	ggc	atc	cg	acc	acg	ctg	tcg		720
Val	Asn	Arg	Leu	Gly	Ala	Arg	Leu	Ala	Gly	Ile	Arg	Thr	Thr	Leu	Ser		
		225			230					235				240			
ggg	cag	atc	gcc	ttc	ctg	ctg	gcg	tcc	gtc	atc	ggc	gcg	ctg	tcg	ggc		768
Gly	Gln	Ile	Ala	Phe	Leu	Leu	Ala	Ser	Val	Ile	Gly	Ala	Leu	Ser	Gly		
						245			250					255			
atc	atg	atc	gtg	ccg	atc	acg	acg	ctc	tat	tac	gac	agc	ggc	ttc	ctg		816
Ile	Met	Ile	Val	Pro	Ile	Thr	Thr	Leu	Tyr	Tyr	Asp	Ser	Gly	Phe	Leu		
			260					265					270				
atc	ggg	ctg	aag	ggt	ttc	gtt	gcc	gcg	atc	atc	ggc	ggc	ctc	gtc	agc		864
Ile	Gly	Leu	Lys	Gly	Phe	Val	Ala	Ala	Ile	Ile	Gly	Gly	Leu	Val	Ser		
		275					280					285					
tac	ccc	ctc	acc	gcc	gtc	gcc	gcg	ctg	gtc	gtc	ggc	atc	gtc	gag	gcg		912
Tyr	Pro	Leu	Thr	Ala	Val	Ala	Ala	Leu	Val	Val	Gly	Ile	Val	Glu	Ala		
		290				295					300						
ttc	tcg	tcc	ttc	tac	gcc	tcc	aac	tac	aag	gaa	gtg	atc	gtc	ttc	atg		960
Phe	Ser	Ser	Phe	Tyr	Ala	Ser	Asn	Tyr	Lys	Glu	Val	Ile	Val	Phe	Met		
		305			310					315				320			
ctg	ctg	atc	ccc	gtg	ctg	ctg	ctg	cg	tcg	ctc	gcc	gcg	ccc	gcg	gtc		1008
Leu	Leu	Ile	Pro	Val	Leu	Leu	Leu	Arg	Ser	Leu	Ala	Ala	Pro	Ala	Val		
						325			330					335			
gag	gaa	gag	aag	gac	tga												1026
Glu	Glu	Glu	Lys	Asp													
			340														

<210> 775

<211> 341

<212> PRT

<213> Bradyrhizobium japonicum

<400> 775

Met Leu Phe Leu Val Gln Asp Gly Ile Thr Asn Gly Ala Ile Tyr Ala
1 5 10 15
Leu Leu Gly Leu Ala Leu Val Leu Val Phe Ala Val Thr Arg Val Ile
20 25 30
Leu Ile Pro Gln Gly Glu Phe Val Thr Tyr Gly Ala Leu Thr Tyr Ala
35 40 45
Ser Leu Ala Ala Gly Gln Met Pro Gly Thr Ala Lys Leu Ala Leu Ala
50 55 60
Leu Gly Ile Gly Ala Phe Gly Phe Asp Leu Phe Val Ala Arg Lys Ala
65 70 75 80
Leu His Gly Arg Leu Ile Leu Arg Ser Val Leu Thr Asn Ile Val Leu
85 90 95
Pro Ala Ile Val Leu Ala Leu Thr Ile Tyr Phe Ala Ala Gln Lys Pro
100 105 110
Pro Val Ala Val Cys Ile Ala Leu Ser Leu Val Ile Val Ala Met Ile

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115 120 125
 Gly Leu Tyr Leu Tyr Arg Ile Ala Phe Gln Pro Leu Ala His Thr Ser
 130 135 140
 Val Leu Val Leu Leu Ile Ala Ser Val Gly Val His Leu Ala Leu Gln
 145 150 155 160
 Gly Leu Gly Leu Leu Phe Phe Gly Ala Glu Gly Gln Arg Gly Pro Ala
 165 170 175
 Val Leu Ser Gly Ser Phe Thr Ala Gly Ala Leu Arg Phe Thr Gly Gln
 180 185 190
 Ser Ile Thr Val Tyr Ala Ile Thr Ile Ala Phe Ile Val Gly Leu Trp
 195 200 205
 Leu Phe Phe Gly Leu Thr Leu Tyr Gly Lys Ala Leu Arg Ala Thr Ala
 210 215 220
 Val Asn Arg Leu Gly Ala Arg Leu Ala Gly Ile Arg Thr Thr Leu Ser
 225 230 235 240
 Gly Gln Ile Ala Phe Leu Leu Ala Ser Val Ile Gly Ala Leu Ser Gly
 245 250 255
 Ile Met Ile Val Pro Ile Thr Thr Leu Tyr Tyr Asp Ser Gly Phe Leu
 260 265 270
 Ile Gly Leu Lys Gly Phe Val Ala Ala Ile Ile Gly Gly Leu Val Ser
 275 280 285
 Tyr Pro Leu Thr Ala Val Ala Ala Leu Val Val Gly Ile Val Glu Ala
 290 295 300
 Phe Ser Ser Phe Tyr Ala Ser Asn Tyr Lys Glu Val Ile Val Phe Met
 305 310 315 320
 Leu Leu Ile Pro Val Leu Leu Leu Arg Ser Leu Ala Ala Pro Ala Val
 325 330 335
 Glu Glu Glu Lys Asp
 340

<210> 776

<211> 879

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(879)

<400> 776

atg	gag	ctt	ttc	acc	aat	caa	gtg	ctg	gcc	ggc	atc	gcc	acg	ggc	gcg	48
Met	Glu	Leu	Phe	Thr	Asn	Gln	Val	Leu	Ala	Gly	Ile	Ala	Thr	Gly	Ala	
1				5				10						15		
atc	tat	gcc	tgc	atg	gcg	ctc	gcc	gtg	gtc	atg	atc	tac	cag	gcc	atc	96
Ile	Tyr	Ala	Cys	Met	Ala	Leu	Ala	Val	Val	Met	Ile	Tyr	Gln	Ala	Ile	
			20					25					30			
gac	cat	ctc	aac	ttc	gcg	cag	ggc	gag	atg	gcg	atg	ttc	tcg	acc	ttc	144
Asp	His	Leu	Asn	Phe	Ala	Gln	Gly	Glu	Met	Ala	Met	Phe	Ser	Thr	Phe	
			35				40					45				
atc	tcc	tgg	cag	ctg	atg	cag	tgg	ggc	atc	ccc	tac	tgg	gcc	gct	ttc	192
Ile	Ser	Trp	Gln	Leu	Met	Gln	Trp	Gly	Ile	Pro	Tyr	Trp	Ala	Ala	Phe	
			50			55					60					
gtc	atc	acg	ctg	gcg	ctc	tcc	ttc	gtc	ggc	ggc	atc	gcg	atc	gag	cgc	240
Val	Ile	Thr	Leu	Ala	Leu	Ser	Phe	Val	Gly	Gly	Ile	Ala	Ile	Glu	Arg	
			65		70				75					80		
atc	ctg	ttc	aag	ccg	ctg	gcg	aag	gcg	ccc	gtg	ctg	acc	aac	gtc	gcc	288
Ile	Leu	Phe	Lys	Pro	Leu	Ala	Lys	Ala	Pro	Val	Leu	Thr	Asn	Val	Ala	
				85					90					95		
ggc	ttc	atc	gcg	ctg	ttc	gcg	atc	atc	aac	tcc	tcg	gcc	ggc	ctg	atc	336
Gly	Phe	Ile	Ala	Leu	Phe	Ala	Ile	Ile	Asn	Ser	Ser	Ala	Gly	Leu	Ile	
			100				105						110			
tgg	gac	ttc	acc	atc	aag	caa	tat	ccg	acc	ccg	ttc	ggc	tct	tcg	ccg	384
Trp	Asp	Phe	Thr	Ile	Lys	Gln	Tyr	Pro	Thr	Pro	Phe	Gly	Ser	Ser	Pro	
			115				120					125				
ttc	ctc	ggc	agc	cag	ctg	atc	tcg	acc	cac	cag	gcc	ggc	atg	atc	ggc	432
Phe	Leu	Gly	Ser	Gln	Leu	Ile	Ser	Thr	His	Gln	Ala	Gly	Met	Ile	Gly	
			130			135					140					
gtc	acc	gtg	ctg	ctg	ctg	ctc	ggc	ctg	tat	ttc	ttc	ttc	cag	tac	acg	480
Val	Thr	Val	Leu	Leu	Leu	Leu	Gly	Leu	Tyr	Phe	Phe	Phe	Gln	Tyr	Thr	

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145	cg	g	g	ct	gc	at	cg	gc	gc	gc	tc	gt	cc	ga	tc	gc	528
Arg	Ile	Gly	Leu	Ala	Met	Arg	Ala	Ala	Ala	Ser	Val	Pro	Glu	Ser	Ala		
				165					170						175		
cg	ct	gt	gg	at	aa	ac	ag	tg	at	gc	ct	gg	tg	gg		576	
Arg	Leu	Val	Gly	Ile	Asn	Thr	Ser	Trp	Met	Ile	Ala	Leu	Gly	Trp	Gly		
			180					185					190				
at	gc	tc	gc	at	gg	tc	at	gc	gg	at	ct	at	gc	cc	gt	624	
Met	Ala	Ser	Ala	Ile	Gly	Ser	Ile	Ala	Gly	Met	Leu	Ile	Ala	Pro	Val		
		195					200					205					
gt	tt	ct	ga	cc	aa	at	at	gg	gg	gt	tt	at	ta	gg	tt	672	
Val	Phe	Leu	Glu	Pro	Asn	Met	Met	Gly	Gly	Val	Leu	Ile	Tyr	Gly	Phe		
	210					215				220							
gc	gc	gc	gt	ct	gg	ga	ct	ac	ag	cc	tt	gg	gc	gt	gt	720	
Ala	Ala	Ala	Val	Leu	Gly	Gly	Leu	Thr	Ser	Pro	Phe	Gly	Ala	Val	Val		
225				230						235					240		
gg	gg	tt	ct	gt	gg	at	tt	ga	aa	ct	gc	gg	ac	ta	at	768	
Gly	Gly	Phe	Leu	Val	Gly	Ile	Phe	Glu	Asn	Leu	Ala	Gly	Thr	Tyr	Ile		
			245					250					255				
cc	gg	gt	gg	aa	ga	ct	aa	ct	cc	at	gc	ct	gc	ct	at	816	
Pro	Gly	Val	Gly	Asn	Glu	Leu	Lys	Leu	Pro	Ile	Ala	Leu	Ala	Leu	Ile		
			260					265					270				
at	tc	gt	ct	gt	gt	aa	cc	gc	gg	ct	tt	gg	cg	ca	at	864	
Ile	Ser	Val	Leu	Val	Val	Lys	Pro	Ala	Gly	Leu	Phe	Gly	Arg	His	Ile		
		275					280					285					
gt	aa	cg	gt	tg												879	
Val	Lys	Arg	Val														
	290																

<210> 777

<211> 292

<212> PRT

<213> Bradyrhizobium japonicum

<400> 777

Met	Glu	Leu	Phe	Thr	Asn	Gln	Val	Leu	Ala	Gly	Ile	Ala	Thr	Gly	Ala	
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Ile	Tyr	Ala	Cys	Met	Ala	Leu	Ala	Val	Val	Met	Ile	Tyr	Gln	Ala	Ile	
			20					25					30			
Asp	His	Leu	Asn	Phe	Ala	Gln	Gly	Glu	Met	Ala	Met	Phe	Ser	Thr	Phe	
		35					40					45				
Ile	Ser	Trp	Gln	Leu	Met	Gln	Trp	Gly	Ile	Pro	Tyr	Trp	Ala	Ala	Phe	
		50				55					60					
Val	Ile	Thr	Leu	Ala	Leu	Ser	Phe	Val	Gly	Gly	Ile	Ala	Ile	Glu	Arg	
65				70					75					80		
Ile	Leu	Phe	Lys	Pro	Leu	Ala	Lys	Ala	Pro	Val	Leu	Thr	Asn	Val	Ala	
			85					90					95			
Gly	Phe	Ile	Ala	Leu	Phe	Ala	Ile	Ile	Asn	Ser	Ser	Ala	Gly	Leu	Ile	
			100					105					110			
Trp	Asp	Phe	Thr	Ile	Lys	Gln	Tyr	Pro	Thr	Pro	Phe	Gly	Ser	Ser	Pro	
		115					120					125				
Phe	Leu	Gly	Ser	Gln	Leu	Ile	Ser	Thr	His	Gln	Ala	Gly	Met	Ile	Gly	
	130					135					140					
Val	Thr	Val	Leu	Leu	Leu	Leu	Gly	Leu	Tyr	Phe	Phe	Phe	Gln	Tyr	Thr	
145				150						155					160	
Arg	Ile	Gly	Leu	Ala	Met	Arg	Ala	Ala	Ala	Ser	Val	Pro	Glu	Ser	Ala	
				165					170					175		
Arg	Leu	Val	Gly	Ile	Asn	Thr	Ser	Trp	Met	Ile	Ala	Leu	Gly	Trp	Gly	
			180					185					190			
Met	Ala	Ser	Ala	Ile	Gly	Ser	Ile	Ala	Gly	Met	Leu	Ile	Ala	Pro	Val	
		195					200					205				
Val	Phe	Leu	Glu	Pro	Asn	Met	Met	Gly	Gly	Val	Leu	Ile	Tyr	Gly	Phe	
	210					215					220					
Ala	Ala	Ala	Val	Leu	Gly	Gly	Leu	Thr	Ser	Pro	Phe	Gly	Ala	Val	Val	
225				230						235					240	
Gly	Gly	Phe	Leu	Val	Gly	Ile	Phe	Glu	Asn	Leu	Ala	Gly	Thr	Tyr	Ile	
			245					250					255			
Pro	Gly	Val	Gly	Asn	Glu	Leu	Lys	Leu	Pro	Ile	Ala	Leu	Ala	Leu	Ile	
			260					265					270			

Ile Ser Val Leu Val Val Lys Pro Ala Gly Leu Phe Gly Arg His Ile
 275 280 285
 Val Lys Arg Val
 290

<210> 778

<211> 1665

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(1665)

<400> 778

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Met	Val	Gln	Leu	His	Thr	Pro	Leu	Pro	Leu	Thr	Ile	Ile	Val	Val	Ala	
1				5					10					15		
gtg	gcc	gca	gcg	ctg	gtc	ggg	ctg	atc	atc	gag	cgg	ttc	ggc	ctg	cgg	96
Val	Ala	Ala	Ala	Leu	Val	Gly	Leu	Ile	Ile	Glu	Arg	Phe	Gly	Leu	Arg	
			20					25					30			
ccg	ctc	cag	aac	tcg	gtg	cgc	atc	gcg	ccg	ctg	ctc	gcg	acc	atc	ggc	144
Pro	Leu	Gln	Asn	Ser	Val	Arg	Ile	Ala	Pro	Leu	Leu	Ala	Thr	Ile	Gly	
			35				40					45				
atc	agc	ttc	gtg	ctc	gac	cag	ctg	gtg	atg	ctg	acg	ttc	tcg	ccg	aac	192
Ile	Ser	Phe	Val	Leu	Asp	Gln	Leu	Val	Met	Leu	Thr	Phe	Ser	Pro	Asn	
	50					55					60					
ccg	cgt	gcg	ctg	ccg	agc	cag	tgt	ccg	gac	gtc	cgc	ttc	cag	atc	ggc	240
Pro	Arg	Ala	Leu	Pro	Ser	Gln	Leu	Pro	Asp	Val	Arg	Phe	Gln	Ile	Gly	
	65				70				75						80	
ggc	ggc	acg	atc	ggg	ccg	ctc	gat	ctg	ctc	atc	gcc	ggc	gtc	ggc	atc	288
Gly	Gly	Thr	Ile	Gly	Pro	Leu	Asp	Leu	Leu	Ile	Ala	Gly	Val	Gly	Ile	
			85					90					95			
acc	agc	gcg	ctg	ctg	ttc	gtg	ttc	ctg	cgc	tac	agc	aag	ctc	ggc		336
Thr	Ser	Ala	Leu	Leu	Phe	Val	Phe	Leu	Arg	Tyr	Ser	Lys	Leu	Gly		
			100				105					110				
tgg	gcg	gtg	cgc	gcc	acg	gcg	cag	gac	cgc	gat	gcc	gcg	atg	cag	atg	384
Trp	Ala	Val	Arg	Ala	Thr	Ala	Gln	Asp	Arg	Asp	Ala	Ala	Met	Gln	Met	
			115				120					125				
ggc	gtc	gat	gtc	aac	cgc	gtc	aat	cag	gcg	gtg	ttc	ggc	atc	gcc	gcg	432
Gly	Val	Asp	Val	Asn	Arg	Val	Asn	Gln	Ala	Val	Phe	Gly	Ile	Ala	Ala	
	130					135					140					
gcg	ctc	ggc	ggc	gtc	tcc	ggc	atg	ctg	gtc	ggc	atg	tac	tac	aac	cag	480
Ala	Leu	Gly	Gly	Val	Ser	Gly	Met	Leu	Val	Gly	Met	Tyr	Tyr	Asn	Gln	
	145				150					155					160	
atc	gac	acc	gcg	atg	agc	ctt	cag	gcg	aca	ctc	aag	ggc	gtc	gtc	gcc	528
Ile	Asp	Thr	Ala	Met	Ser	Leu	Gln	Ala	Thr	Leu	Lys	Gly	Val	Val	Ala	
				165					170					175		
gaa	gtc	gtc	ggc	ggc	gcc	ggc	aac	gtg	ccg	ggc	gcg	gtg	atc	ggg	agc	576
Glu	Val	Val	Gly	Gly	Ala	Gly	Asn	Val	Pro	Gly	Ala	Val	Ile	Gly	Ser	
			180					185					190			
ctg	ttg	ctg	gga	ctg	gtc	gaa	agc	tac	ggc	gta	gcc	gtg	ttc	ggc	acc	624
Leu	Leu	Leu	Gly	Leu	Val	Glu	Ser	Tyr	Gly	Val	Ala	Val	Phe	Gly	Thr	
			195				200					205				
agc	tac	cgc	aat	ctg	ttc	gcg	ttc	ctg	ctg	ctg	gtc	gtc	gtg	ctg	gtg	672
Ser	Tyr	Arg	Asn	Leu	Phe	Ala	Phe	Leu	Leu	Leu	Val	Val	Val	Leu	Val	
	210					215					220					
ttg	cgg	ccg	aac	ggc	ctg	ttc	gcc	agc	gcg	cgg	cag	gcg	ccg	ccc	gag	720
Leu	Arg	Pro	Asn	Gly	Leu	Phe	Ala	Ser	Ala	Arg	Gln	Ala	Pro	Pro	Glu	
	225				230					235					240	
ccg	ctc	acc	ggg	act	ttc	atc	gcg	ccg	agc	cgg	ccg	gtg	cgc	att	ccg	768
Pro	Leu	Thr	Gly	Thr	Phe	Ile	Ala	Pro	Ser	Arg	Pro	Val	Arg	Ile	Pro	
				245					250					255		
cgc	tgg	gcg	ctg	ctg	gtg	gcg	gcc	gct	gcc	ttt	gcg	atc	ctg	ccg	ctg	816
Arg	Trp	Ala	Leu	Leu	Val	Ala	Ala	Ala	Ala	Phe	Ala	Ile	Leu	Pro	Leu	
			260					265					270			
ttc	ccg	gtg	tcc	ttc	tac	gtg	ctc	cag	acc	ctg	atc	aac	gcc	tgg	ctg	864
Phe	Pro	Val	Ser	Phe	Tyr	Val	Leu	Gln	Thr	Leu	Ile	Asn	Ala	Trp	Leu	
		275					280					285				

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ctc	ggc	atg	ctc	gcg	ctc	agc	ctc	acg	ctc	gtt	gca	ggc	acg	atc	ggg	912
Leu	Gly	Met	Leu	Ala	Leu	Ser	Leu	Thr	Leu	Val	Ala	Gly	Thr	Ile	Gly	
	290					295					300					
cag	gtc	tcg	ctt	gga	cat	gcg	gcg	ctg	ctc	gcg	atc	ggc	gcc	tac	acg	960
Gln	Val	Ser	Leu	Gly	His	Ala	Ala	Leu	Leu	Ala	Ile	Gly	Ala	Tyr	Thr	
305					310					315					320	
tcc	gcg	ctg	ctg	tcg	ctg	agc	ttc	gcc	gtt	ccc	gtc	ggc	ctc	gcc	atc	1008
Ser	Ala	Leu	Leu	Ser	Leu	Ser	Phe	Ala	Val	Pro	Val	Gly	Leu	Ala	Ile	
				325					330					335		
atc	ggc	ggc	ggc	ctg	atg	agc	gct	gcg	ctc	ggc	acc	gct	ctg	atc	tcg	1056
Ile	Gly	Gly	Gly	Leu	Met	Ser	Ala	Ala	Leu	Gly	Thr	Ala	Leu	Ile	Ser	
			340					345					350			
ccg	tcg	ttc	cgc	ctg	cgc	ggg	cac	tac	gtc	tcg	atc	gcg	acg	ctc	gcc	1104
Pro	Ser	Phe	Arg	Leu	Arg	Gly	His	Tyr	Val	Ser	Ile	Ala	Thr	Leu	Ala	
		355					360					365				
atc	ggc	gag	atc	gtg	tcg	ctg	gtg	atc	ttg	aac	tgg	gag	agc	gtc	acg	1152
Ile	Gly	Glu	Ile	Val	Ser	Leu	Val	Ile	Leu	Asn	Trp	Glu	Ser	Val	Thr	
	370					375					380					
cgc	ggg	ccg	atc	ggc	atc	tcc	ggc	att	ccg	ccg	ctg	tcg	ctg	ttc	ggc	1200
Arg	Gly	Pro	Ile	Gly	Ile	Ser	Gly	Ile	Pro	Pro	Leu	Ser	Leu	Phe	Gly	
385					390				395						400	
tac	gac	ctc	gtc	agc	ccg	tcg	tcg	gtc	tac	tgg	ttc	agc	ctt	gcg	gtc	1248
Tyr	Asp	Leu	Val	Ser	Pro	Ser	Ser	Val	Tyr	Trp	Phe	Ser	Leu	Ala	Val	
				405					410					415		
atg	gtc	gtt	ctg	gcg	ctg	ctc	cag	gcg	cgc	ctg	ctc	ggc	tcg	cat	ctc	1296
Met	Val	Val	Leu	Ala	Leu	Leu	Gln	Ala	Arg	Leu	Leu	Gly	Ser	His	Leu	
			420					425					430			
ggc	cgc	agc	ttt	cgc	gcc	atc	cgc	gac	gac	gac	atc	gcc	gcg	cgc	gcc	1344
Gly	Arg	Ser	Phe	Arg	Ala	Ile	Arg	Asp	Asp	Asp	Ile	Ala	Ala	Arg	Ala	
		435					440					445				
tac	ggc	ctc	agc	ctg	aac	cgc	tac	aaa	tcg	ctg	gcc	ttc	atc	ttc	ggc	1392
Tyr	Gly	Leu	Ser	Leu	Asn	Arg	Tyr	Lys	Ser	Leu	Ala	Phe	Ile	Phe	Gly	
	450					455					460					
ggg	ttt	gcg	gcg	ggt	gtc	agc	ggc	ggc	atc	gcc	gcg	cat	ctc	tat	tcc	1440
Gly	Phe	Ala	Ala	Gly	Val	Ser	Gly	Gly	Ile	Ala	Ala	His	Leu	Tyr	Ser	
465					470					475					480	
tac	atc	aac	cac	gag	acc	ttc	aac	acg	cag	cag	tcc	atc	ctg	gcg	ctg	1488
Tyr	Ile	Asn	His	Glu	Thr	Phe	Asn	Thr	Gln	Gln	Ser	Ile	Leu	Ala	Leu	
				485					490					495		
acg	gtc	gtg	atc	ctc	ggc	gga	ctc	ggc	aat	gtc	gtc	ggc	gcc	atc	gtc	1536
Thr	Val	Val	Ile	Leu	Gly	Gly	Leu	Gly	Asn	Val	Val	Gly	Ala	Ile	Val	
			500					505					510			
gga	tcg	gtg	gcg	ctg	gtc	ggc	ctg	ccc	gaa	ttg	ttc	cgg	atc	gcg	gcg	1584
Gly	Ser	Val	Ala	Leu	Val	Gly	Leu	Pro	Glu	Leu	Phe	Arg	Ile	Ala	Ala	
		515					520					525				
gag	tac	cgc	atc	ctg	atc	tac	ggc	atc	gtg	ctg	ctg	ctg	ctg	gtg	cgg	1632
Glu	Tyr	Arg	Ile	Leu	Ile	Tyr	Gly	Ile	Val	Leu	Leu	Leu	Leu	Val	Arg	
	530					535					540					
ttc	agg	ccg	cag	ggc	ctg	ttg	ggg	acg	atg	tga						1665
Phe	Arg	Pro	Gln	Gly	Leu	Leu	Gly	Thr	Met							
545					550											

<210> 779

<211> 554

<212> PRT

<213> Bradyrhizobium japonicum

<400> 779

Met	Val	Gln	Leu	His	Thr	Pro	Leu	Pro	Leu	Thr	Ile	Ile	Val	Val	Ala	
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Val	Ala	Ala	Ala	Leu	Val	Gly	Leu	Ile	Ile	Glu	Arg	Phe	Gly	Leu	Arg	
			20					25					30			
Pro	Leu	Gln	Asn	Ser	Val	Arg	Ile	Ala	Pro	Leu	Leu	Ala	Thr	Ile	Gly	
		35					40					45				
Ile	Ser	Phe	Val	Leu	Asp	Gln	Leu	Val	Met	Leu	Thr	Phe	Ser	Pro	Asn	
		50				55					60					
Pro	Arg	Ala	Leu	Pro	Ser	Gln	Leu	Pro	Asp	Val	Arg	Phe	Gln	Ile	Gly	
65					70					75					80	
Gly	Gly	Thr	Ile	Gly	Pro	Leu	Asp	Leu	Leu	Ile	Ala	Gly	Val	Gly	Ile	

Thr	Ser	Ala	Leu	Leu	Leu	Phe	Val	Phe	Leu	Arg	Tyr	Ser	Lys	Leu	Gly
Trp	Ala	Val	Leu	Ala	Thr	Ala	Gln	Asp	Arg	Asp	Ala	Ala	Met	Gln	Met
Gly	Val	Asp	Val	Asn	Arg	Val	Asn	Gln	Ala	Val	Phe	Gly	Ile	Ala	Ala
Ala	Leu	Gly	Gly	Val	Ser	Gly	Met	Leu	Val	Gly	Met	Tyr	Tyr	Asn	Gln
Ile	Asp	Thr	Ala	Met	Ser	Leu	Gln	Ala	Thr	Leu	Lys	Gly	Val	Val	Ala
Glu	Val	Val	Gly	Gly	Ala	Gly	Asn	Val	Pro	Gly	Ala	Val	Ile	Gly	Ser
Leu	Leu	Leu	Gly	Leu	Val	Glu	Ser	Tyr	Gly	Val	Ala	Val	Phe	Gly	Thr
Ser	Tyr	Arg	Asn	Leu	Phe	Ala	Phe	Leu	Leu	Leu	Val	Val	Val	Leu	Val
Leu	Arg	Pro	Asn	Gly	Leu	Phe	Ala	Ser	Ala	Arg	Gln	Ala	Pro	Pro	Glu
Pro	Leu	Thr	Gly	Thr	Phe	Ile	Ala	Pro	Ser	Arg	Pro	Val	Arg	Ile	Pro
Arg	Trp	Ala	Leu	Leu	Val	Ala	Ala	Ala	Ala	Phe	Ala	Ile	Leu	Pro	Leu
Phe	Pro	Val	Ser	Phe	Tyr	Val	Leu	Gln	Thr	Leu	Ile	Asn	Ala	Trp	Leu
Leu	Gly	Met	Leu	Ala	Leu	Ser	Leu	Thr	Leu	Val	Ala	Gly	Thr	Ile	Gly
Gln	Val	Ser	Leu	Gly	His	Ala	Ala	Leu	Leu	Ala	Ile	Gly	Ala	Tyr	Thr
Ser	Ala	Leu	Leu	Ser	Leu	Ser	Phe	Ala	Val	Pro	Val	Gly	Leu	Ala	Ile
Ile	Gly	Gly	Gly	Leu	Met	Ser	Ala	Ala	Leu	Gly	Thr	Ala	Leu	Ile	Ser
Pro	Ser	Phe	Arg	Leu	Arg	Gly	His	Tyr	Val	Ser	Ile	Ala	Thr	Leu	Ala
Ile	Gly	Glu	Ile	Val	Ser	Leu	Val	Ile	Leu	Asn	Trp	Glu	Ser	Val	Thr
Arg	Gly	Pro	Ile	Gly	Ile	Ser	Gly	Ile	Pro	Pro	Leu	Ser	Leu	Phe	Gly
Tyr	Asp	Leu	Val	Ser	Pro	Ser	Ser	Val	Tyr	Trp	Phe	Ser	Leu	Ala	Val
Met	Val	Val	Leu	Ala	Leu	Leu	Gln	Ala	Arg	Leu	Leu	Gly	Ser	His	Leu
Gly	Arg	Ser	Phe	Arg	Ala	Ile	Arg	Asp	Asp	Asp	Ile	Ala	Ala	Arg	Ala
Tyr	Gly	Leu	Ser	Leu	Asn	Arg	Tyr	Lys	Ser	Leu	Ala	Phe	Ile	Phe	Gly
Gly	Phe	Ala	Ala	Gly	Val	Ser	Gly	Gly	Ile	Ala	Ala	His	Leu	Tyr	Ser
Tyr	Ile	Asn	His	Glu	Thr	Phe	Asn	Thr	Gln	Gln	Ser	Ile	Leu	Ala	Leu
Thr	Val	Val	Ile	Leu	Gly	Gly	Leu	Gly	Asn	Val	Val	Gly	Ala	Ile	Val
Gly	Ser	Val	Ala	Leu	Val	Gly	Leu	Pro	Glu	Leu	Phe	Arg	Ile	Ala	Ala
Glu	Tyr	Arg	Ile	Leu	Ile	Tyr	Gly	Ile	Val	Leu	Leu	Leu	Leu	Val	Arg
Phe	Arg	Pro	Gln	Gly	Leu	Leu	Gly	Thr	Met						

<220>
<221> CDS
<222> (1)..(882)

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<400> 780

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Met 1	Gln	Ala	Phe	Leu ₅	Asp	Ile	Phe	Asp	Ile ₁₀	Tyr	Leu	Leu	Glu	Ala ₁₅	Val			
	atc	aac	ggg	atc	ctg	ctc	ggc	ggc	gtg	ctg	gcg	ctg	ctt	gcg	ctc	ggg	96	
Ile	Asn	Gly	Ile ₂₀	Leu	Leu	Gly	Gly	Val ₂₅	Leu	Ala	Leu	Leu	Ala ₃₀	Leu	Gly			
	ctc	aat	ctg	atc	ttc	ggc	gtc	atc	gac	gtg	acc	tgg	atc	tgc	tat	gcc	144	
Leu	Asn	Leu ₃₅	Ile	Phe	Gly	Val	Ile ₄₀	Asp	Val	Thr	Trp	Ile ₄₅	Cys	Tyr	Ala			
	gag	ctc	gtg	atg	atc	ggc	atg	tac	gcc	atg	tat	ttc	atg	gtg	cag	tat	192	
Glu	Leu ₅₀	Val	Met	Ile	Gly	Met ₅₅	Tyr	Ala	Met	Tyr	Phe ₆₀	Met	Val	Gln	Tyr			
	tac	ggc	gtc	agc	tat	ttc	gtc	gcg	gcg	ccg	ttc	acc	att	ctt	ctt	gtc	240	
Tyr ₆₅	Gly	Val	Ser	Tyr	Phe ₇₀	Val	Ala	Ala	Pro	Phe ₇₅	Thr	Thr	Ile	Leu	Leu ₈₀	Val		
	gcg	ctg	ctc	ggc	gcc	gcg	ctg	cat	tac	ctc	gtg	atc	gcg	ccg	ctg	ctc	288	
Ala	Leu	Leu	Gly ₈₅	Ala	Ala	Leu	His	Tyr	Leu ₉₀	Val	Ile	Ala	Pro	Leu ₉₅	Leu	Leu		
	acc	gcg	ccg	ccg	atc	aac	cag	ttg	cta	cca	acc	ggg	ggc	gtg	ctg	ttc	336	
Thr	Ala	Pro	Pro ₁₀₀	Ile	Asn	Gln	Leu	Leu ₁₀₅	Ala	Thr	Gly	Gly	Val ₁₁₀	Leu	Phe			
	gtg	ctc	cag	agt	ttt	gcg	acc	gtt	gcc	ttc	ggc	atc	gac	ttc	cgc	aat	384	
Val	Leu	Gln ₁₁₅	Ser	Phe	Ala	Thr	Val ₁₂₀	Ala	Phe	Gly	Ile	Asp ₁₂₅	Phe	Arg	Asn			
	ctc	ggc	atc	cgC	ctg	ccg	gtg	ctc	gcc	ttc	ggc	gac	aat	ttc	agc	432		
Leu	Gly ₁₃₀	Ile	Arg	Leu	Pro	Val ₁₃₅	Leu	Ala	Phe	Gly	Asp ₁₄₀	Met	Asn	Phe	Ser			
	tac	gca	cga	ctc	ctg	tCG	ttt	ctg	gct	gcg	ctg	gtc	ggc	atg	gtc	gcc	480	
Tyr ₁₄₅	Ala	Arg	Leu	Leu	Ser ₁₅₀	Phe	Leu	Ala	Ala ₁₅₅	Leu	Val	Gly	Met	Val	Ala ₁₆₀			
	gtc	tac	ctg	ttc	atg	acg	cgC	acc	ttc	acg	gga	acc	gcg	atc	cgC	gcg	528	
Val	Tyr	Leu	Phe ₁₆₅	Met	Thr	Arg	Thr	Phe ₁₇₀	Thr	Gly	Thr	Ala	Ile ₁₇₅	Arg	Ala			
	atc	tCG	cag	gac	cgG	cag	atc	atg	gcg	ctg	atg	ggc	gtc	gat	acg	aag	576	
Ile	Ser	Gln ₁₈₀	Asp	Arg	Gln	Ile	Met	Ala ₁₈₅	Leu	Met	Gly	Val ₁₉₀	Asp	Thr	Lys			
	aag	ctc	tac	ctc	atc	acc	tCG	gcg	ctc	ggc	ggc	gcg	ctc	gca	ggc	ctc	624	
Lys	Leu	Tyr ₁₉₅	Leu	Ile	Thr	Ser	Ala ₂₀₀	Leu	Gly	Gly	Gly	Ala ₂₀₅	Leu	Ala	Gly	Leu		
	gcc	gcc	tGC	ctg	ctg	gtg	ctg	caa	tac	gac	gtg	cac	ccc	ttc	gtc	ggc	672	
Ala	Ala ₂₁₀	Cys	Leu	Leu	Val ₂₁₅	Leu	Gln ₂₂₀	Tyr	Asp	Val	His ₂₂₅	Pro	Phe	Val	Gly			
	ctg	tCC	ttc	ggg	ccg	atc	acc	ttc	ctg	atc	tgc	gtg	ctc	ggg	ggc	ctc	720	
Leu ₂₂₅	Ser	Phe	Gly	Pro	Ile ₂₃₀	Thr	Phe	Leu	Ile	Cys ₂₃₅	Val	Leu	Gly	Gly	Leu ₂₄₀			
	ggc	aat	ttc	atc	ggc	ttc	atc	gcc	gcc	ttc	gtg	ttc	gcc	gag	atc	768		
Gly	Asn	Phe ₂₄₅	Ile	Gly														

<210> 781

<211> 293

<212> PRT

<213> Bradyrhizobium japonicum

<400> 781

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Ile Asn Gly Ile Leu Leu Gly Gly Val Leu Ala Leu Leu Ala Leu Gly
20 25 30

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Leu Asn Leu Ile Phe Gly Val Ile Asp Val Thr Trp Ile Cys Tyr Ala
 35 40 45
 Glu Leu Val Met Ile Gly Met Tyr Ala Met Tyr Phe Met Val Gln Tyr
 50 55 60
 Tyr Gly Val Ser Tyr Phe Val Ala Ala Pro Phe Thr Ile Leu Leu Val
 65 70 75 80
 Ala Leu Leu Gly Ala Leu His Tyr Leu Val Ile Ala Pro Leu Leu
 85 90 95
 Thr Ala Pro Pro Ile Asn Gln Leu Leu Ala Thr Gly Gly Val Leu Phe
 100 105 110
 Val Leu Gln Ser Phe Ala Thr Val Ala Phe Gly Ile Asp Phe Arg Asn
 115 120 125
 Leu Gly Ile Arg Leu Pro Val Leu Ala Phe Gly Asp Met Asn Phe Ser
 130 135 140
 Tyr Ala Arg Leu Leu Ser Phe Leu Ala Ala Leu Val Gly Met Val Ala
 145 150 155 160
 Val Tyr Leu Phe Met Thr Arg Thr Phe Thr Gly Thr Ala Ile Arg Ala
 165 170 175
 Ile Ser Gln Asp Arg Gln Ile Met Ala Leu Met Gly Val Asp Thr Lys
 180 185 190
 Lys Leu Tyr Leu Ile Thr Ser Ala Leu Gly Gly Ala Leu Ala Gly Leu
 195 200 205
 Ala Ala Cys Leu Leu Val Leu Gln Tyr Asp Val His Pro Phe Val Gly
 210 215 220
 Leu Ser Phe Gly Pro Ile Thr Phe Leu Ile Cys Val Leu Gly Gly Leu
 225 230 235 240
 Gly Asn Phe Ile Gly Gly Phe Ile Ala Ala Phe Val Phe Ala Glu Ile
 245 250 255
 Ile Ser Leu Gly Gly Leu Phe Ser Asp Leu Glu Trp Gly Tyr Val Leu
 260 265 270
 Ala Phe Ala Phe Phe Ile Val Met Met Phe Ile Arg Pro Ala Gly Leu
 275 280 285
 Leu Ala Arg Arg Arg
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<210> 782

<211> 855

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(855)

<400> 782

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Met Glu Ala Leu Leu Phe Thr Gln Gly Leu Asn Val Ile Tyr Glu Ala	
1 5 10 15	
ctg atc ctt gcg atc ttg gtc ctc ggc ctg gcc gtc gtg atg ggc ttg	96
Leu Ile Leu Ala Ile Leu Val Leu Gly Leu Ala Val Val Met Gly Leu	
20 25 30	
ttg aac gtc ctg aac atc gcg cat ggc gag ttc atc atg ata ggc gcg	144
Leu Asn Val Leu Asn Ile Ala His Gly Glu Phe Ile Met Ile Gly Ala	
35 40 45	
tat gcc gcc tac gtg gtg caa agg gca ggc ctt cca tat ttg ctc gca	192
Tyr Ala Ala Tyr Val Val Gln Arg Ala Gly Leu Pro Tyr Leu Leu Ala	
50 55 60	
gtg ccg gcc gcg gcg ctg gtt tgt ggg gcc atc ggc ttt gtc gtg gag	240
Val Pro Ala Ala Ala Leu Val Cys Gly Ala Ile Gly Phe Val Val Glu	
65 70 75 80	
cga tgc ctg ata agg cca ttg cac tac gaa ccg ttc gag acg ctc ctg	288
Arg Cys Leu Ile Arg Pro Leu His Tyr Glu Pro Phe Glu Thr Leu Leu	
85 90 95	
gcg acc tgg ggg ctg gga ctg ctg ctt cgc aag tgc gtc gag ctt gcg	336
Ala Thr Trp Gly Leu Gly Leu Leu Leu Arg Lys Cys Val Glu Leu Ala	
100 105 110	
ttt ggc cgc ggt tat cgc agc gtc gag ata cca atc ggt ggt tcg ttg	384
Phe Gly Arg Gly Tyr Arg Ser Val Glu Ile Pro Ile Gly Ser Leu	
115 120 125	

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agc	ctc	ttt	ggt	gaa	tcc	tat	cca	gcg	tac	cga	ttg	gtg	ctg	atg	gcg	432
Ser	Leu	Phe	Gly	Glu	Ser	Tyr	Pro	Ala	Tyr	Arg	Leu	Val	Leu	Met	Ala	
	130					135					140					
gtc	gcc	gcc	ttg	gta	ctt	gcc	ggc	ctg	ttc	atc	tgg	tac	cgc	cgc	gct	480
Val	Ala	Ala	Leu	Val	Leu	Ala	Gly	Leu	Phe	Ile	Trp	Tyr	Arg	Arg	Ala	
145					150					155					160	
ccg	acc	ggg	gct	cgg	atc	cgt	gcc	atg	gtc	ggc	aat	ccc	gtg	ctt	gcg	528
Pro	Thr	Gly	Ala	Arg	Ile	Arg	Ala	Met	Val	Gly	Asn	Pro	Val	Leu	Ala	
				165					170					175		
gag	gcg	gtc	ggt	atc	caa	acg	cgt	gaa	ctc	gcg	cga	aac	acc	ttc	gtc	576
Glu	Ala	Val	Gly	Ile	Gln	Thr	Arg	Glu	Leu	Ala	Arg	Asn	Thr	Phe	Val	
			180					185					190			
acg	ggc	acc	gca	ttg	gca	ggt	gtc	gcc	ggc	gtc	atg	gtc	gcg	ccg	ctc	624
Thr	Gly	Thr	Ala	Leu	Ala	Gly	Val	Ala	Gly	Val	Met	Val	Ala	Pro	Leu	
		195					200					205				
acg	ccg	gtc	gaa	cca	ttc	atg	ggg	ctc	act	ttc	atc	gtg	aac	tca	ttc	672
Thr	Pro	Val	Glu	Pro	Phe	Met	Gly	Leu	Thr	Phe	Ile	Val	Asn	Ser	Phe	
	210					215					220					
ttc	gcg	ctg	gtg	gtc	ggc	gga	atg	gga	acg	gta	tcg	ggc	ctg	ttc	gct	720
Phe	Ala	Leu	Val	Val	Gly	Gly	Met	Gly	Thr	Val	Ser	Gly	Leu	Phe	Ala	
225					230					235					240	
ggc	gcg	act	atc	atc	ggt	ggt	ctg	caa	agc	ggt	cta	tcg	gcc	gcc	gtc	768
Gly	Ala	Thr	Ile	Ile	Gly	Gly	Leu	Gln	Ser	Val	Leu	Ser	Ala	Ala	Val	
				245					250					255		
agc	ccg	acc	tcg	gcc	tat	ctt	gcg	atg	ctc	ctc	atc	tcc	atc	ctc	ttc	816
Ser	Pro	Thr	Ser	Ala	Tyr	Leu	Ala	Met	Leu	Leu	Ile	Ser	Ile	Leu	Phe	
			260					265					270			
ctc	tgg	cag	cga	ccc	cgt	ggc	cta	ttt	cct	cgt	ccg	taa				855
Leu	Trp	Gln	Arg	Pro	Arg	Gly	Leu	Phe	Pro	Arg	Pro					
		275					280									

<210> 783

<211> 284

<212> PRT

<213> Bradyrhizobium japonicum

<400> 783

Met	Glu	Ala	Leu	Leu	Phe	Thr	Gln	Gly	Leu	Asn	Val	Ile	Tyr	Glu	Ala	
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Leu	Ile	Leu	Ala	Ile	Leu	Val	Leu	Gly	Leu	Ala	Val	Val	Met	Gly	Leu	
			20					25					30			
Leu	Asn	Val	Leu	Asn	Ile	Ala	His	Gly	Glu	Phe	Ile	Met	Ile	Gly	Ala	
		35					40					45				
Tyr	Ala	Ala	Tyr	Val	Val	Gln	Arg	Ala	Gly	Leu	Pro	Tyr	Leu	Leu	Ala	
	50					55				60						
Val	Pro	Ala	Ala	Ala	Leu	Val	Cys	Gly	Ala	Ile	Gly	Phe	Val	Val	Glu	
65					70					75					80	
Arg	Cys	Leu	Ile	Arg	Pro	Leu	His	Tyr	Glu	Pro	Phe	Glu	Thr	Leu	Leu	
				85					90					95		
Ala	Thr	Trp	Gly	Leu	Gly	Leu	Leu	Leu	Arg	Lys	Cys	Val	Glu	Leu	Ala	
			100					105					110			
Phe	Gly	Arg	Gly	Tyr	Arg	Ser	Val	Glu	Ile	Pro	Ile	Gly	Gly	Ser	Leu	
		115					120					125				
Ser	Leu	Phe	Gly	Glu	Ser	Tyr	Pro	Ala	Tyr	Arg	Leu	Val	Leu	Met	Ala	
	130					135					140					
Val	Ala	Ala	Leu	Val	Leu	Ala	Gly	Leu	Phe	Ile	Trp	Tyr	Arg	Arg	Ala	
145					150					155					160	
Pro	Thr	Gly	Ala	Arg	Ile	Arg	Ala	Met	Val	Gly	Asn	Pro	Val	Leu	Ala	
				165					170					175		
Glu	Ala	Val	Gly	Ile	Gln	Thr	Arg	Glu	Leu	Ala	Arg	Asn	Thr	Phe	Val	
			180					185					190			
Thr	Gly	Thr	Ala	Leu	Ala	Gly	Val	Ala	Gly	Val	Met	Val	Ala	Pro	Leu	
		195					200					205				
Thr	Pro	Val	Glu	Pro	Phe	Met	Gly	Leu	Thr	Phe	Ile	Val	Asn	Ser	Phe	
	210					215					220					
Phe	Ala	Leu	Val	Val	Gly	Gly	Met	Gly	Thr	Val	Ser	Gly	Leu	Phe	Ala	
225					230					235					240	
Gly	Ala	Thr	Ile	Ile	Gly	Gly	Leu	Gln	Ser	Val	Leu	Ser	Ala	Ala	Val	
				245					250					255		

Ser Pro Thr Ser Ala Tyr Leu Ala Met Leu Leu Ile Ser Ile Leu Phe
 260 265 270
 Leu Trp Gln Arg Pro Arg Gly Leu Phe Pro Arg Pro
 275 280

<210> 784

<211> 867

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(867)

<400> 784

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Met	Gln	Ile	Ala	Ala	Glu	Thr	Leu	Leu	Asn	Gly	Leu	Met	Leu	Gly	Ala	
1				5					10					15		
ctt	tac	gcg	ctg	ttc	gga	ctt	ggt	ctg	agc	ttg	agc	gtc	ggg	gtc	atg	96
Leu	Tyr	Ala	Leu	Phe	Gly	Leu	Gly	Leu	Ser	Leu	Ser	Val	Gly	Val	Met	
			20					25					30			
cgc	atg	atc	aac	atc	gcc	cat	ggc	gat	ctg	atc	gtc	gtc	ggg	gcc	tac	144
Arg	Met	Ile	Asn	Ile	Ala	His	Gly	Asp	Leu	Ile	Val	Val	Gly	Ala	Tyr	
			35				40					45				
ctg	acc	agt	gtc	gtc	atg	agc	gga	gcg	ggc	gtc	ggt	gcc	ttt	acc	gcg	192
Leu	Thr	Ser	Val	Val	Met	Ser	Gly	Ala	Gly	Val	Gly	Ala	Phe	Thr	Ala	
	50					55					60					
ttg	ctc	gtg	gtc	att	ccg	gtg	atg	ttc	gcg	ctc	ggt	tgg	atc	ctc	cag	240
Leu	Leu	Val	Val	Ile	Pro	Val	Met	Phe	Ala	Leu	Gly	Trp	Ile	Leu	Gln	
	65				70					75					80	
atc	atc	ctg	ctc	aac	cgt	gtc	gtc	gga	aaa	gat	gct	ttg	gct	ccg	ctt	288
Ile	Ile	Leu	Leu	Asn	Arg	Val	Val	Gly	Lys	Asp	Ala	Leu	Ala	Pro	Leu	
				85					90					95		
ctt	ctg	acg	ttc	ggc	ctc	tcc	atc	gtc	ttg	cag	aac	ggt	ctt	cag	gag	336
Leu	Leu	Thr	Phe	Gly	Leu	Ser	Ile	Val	Leu	Gln	Asn	Val	Leu	Gln	Glu	
			100					105					110			
atc	ttc	acc	gcg	gat	acg	cga	agc	tta	cag	gcc	ggt	gat	ctc	gca	ggt	384
Ile	Phe	Thr	Ala	Asp	Thr	Arg	Ser	Leu	Gln	Ala	Gly	Asp	Leu	Ala	Gly	
			115				120					125				
ctc	ggg	ttc	aac	ggt	ttt	ggc	ggt	tcc	att	gga	ggt	ctt	ccc	ctc	gtc	432
Leu	Gly	Phe	Asn	Val	Phe	Gly	Val	Ser	Ile	Gly	Val	Leu	Pro	Leu	Val	
	130					135					140					
tct	gcg	ctc	gcg	agc	atc	gcg	ctg	ctc	ggc	gcg	acg	cat	tgg	ctc	gtc	480
Ser	Ala	Leu	Ala	Ser	Ile	Ala	Leu	Leu	Gly	Ala	Thr	His	Trp	Leu	Val	
	145				150				155						160	
ggt	cac	acc	cat	ttc	ggg	cgt	cag	gca	cgc	gcc	gtg	tcg	gat	gat	ccg	528
Gly	His	Thr	His	Phe	Gly	Arg	Gln	Ala	Arg	Ala	Val	Ser	Asp	Asp	Pro	
				165				170						175		
ggc	acc	gcg	agg	ctg	gtc	ggt	gtg	aac	gat	aga	cgt	ttg	ttt	gga	att	576
Gly	Thr	Ala	Arg	Leu	Val	Gly	Val	Asn	Asp	Arg	Arg	Leu	Phe	Gly	Ile	
			180					185					190			
gta	acc	ggc	gtc	atc	ttt	tcg	atg	atc	ggt	gtg	gca	gcg	gtg	ctc	tac	624
Val	Thr	Gly	Val	Ile	Phe	Ser	Met	Ile	Gly	Val	Ala	Ala	Val	Leu	Tyr	
		195					200					205				
gct	ctc	cgg	acg	ccc	ttt	tcg	cca	acg	gct	gga	ccc	gag	cgg	ctt	ctc	672
Ala	Leu	Arg	Thr	Pro	Phe	Ser	Pro	Thr	Ala	Gly	Pro	Glu	Arg	Leu	Leu	
	210					215					220					
tat	tcg	ttc	gag	gcg	gta	gtg	ctc	ggt	ggg	ctc	ggc	aat	gtc	tgg	ggt	720
Tyr	Ser	Phe	Glu	Ala	Val	Val	Leu	Gly	Gly	Leu	Gly	Asn	Val	Trp	Gly	
	225				230					235					240	
acg	ttg	ttc	ggc	gga	ctc	gtg	atc	ggc	gtc	gca	cag	ctt	ttc	ggc	gcc	768
Thr	Leu	Phe	Gly	Gly	Leu	Val	Ile	Gly	Val	Ala	Gln	Leu	Phe	Gly	Ala	
				245					250					255		
aag	atc	gcc	tct	ggt	ctc	ggt	ccc	ttc	ttc	ggc	cat	ctc	gca	ttt	ctc	816
Lys	Ile	Ala	Ser	Gly	Leu	Gly	Pro	Phe	Phe	Gly	His	Leu	Ala	Phe	Leu	
			260					265					270			
gtg	gca	ctg	ctc	gcc	cgt	ccc	cag	ggc	ttg	ttc	gga	aag	gcg	ccg	tca	864
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<210> 785
 <211> 288
 <212> PRT
 <213> Bradyrhizobium japonicum

<400> 785
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 Arg Met Ile Asn Ile Ala His Gly Asp Leu Ile Val Val Gly Ala Tyr
 35 40 45
 Leu Thr Ser Val Val Met Ser Gly Ala Gly Val Gly Ala Phe Thr Ala
 50 55 60
 Leu Leu Val Val Ile Pro Val Met Phe Ala Leu Gly Trp Ile Leu Gln
 65 70 75 80
 Ile Ile Leu Leu Asn Arg Val Val Gly Lys Asp Ala Leu Ala Pro Leu
 85 90 95
 Leu Leu Thr Phe Gly Leu Ser Ile Val Leu Gln Asn Val Leu Gln Glu
 100 105 110
 Ile Phe Thr Ala Asp Thr Arg Ser Leu Gln Ala Gly Asp Leu Ala Gly
 115 120 125
 Leu Gly Phe Asn Val Phe Gly Val Ser Ile Gly Val Leu Pro Leu Val
 130 135 140
 Ser Ala Leu Ala Ser Ile Ala Leu Leu Gly Ala Thr His Trp Leu Val
 145 150 155 160
 Gly His Thr His Phe Gly Arg Gln Ala Arg Ala Val Ser Asp Asp Pro
 165 170 175
 Gly Thr Ala Arg Leu Val Gly Val Asn Asp Arg Arg Leu Phe Gly Ile
 180 185 190
 Val Thr Gly Val Ile Phe Ser Met Ile Gly Val Ala Ala Val Leu Tyr
 195 200 205
 Ala Leu Arg Thr Pro Phe Ser Pro Thr Ala Gly Pro Glu Arg Leu Leu
 210 215 220
 Tyr Ser Phe Glu Ala Val Val Leu Gly Gly Leu Gly Asn Val Trp Gly
 225 230 235 240
 Thr Leu Phe Gly Gly Leu Val Ile Gly Val Ala Gln Leu Phe Gly Ala
 245 250 255
 Lys Ile Ala Ser Gly Leu Gly Pro Phe Phe Gly His Leu Ala Phe Leu
 260 265 270
 Val Ala Leu Leu Ala Arg Pro Gln Gly Leu Phe Gly Lys Ala Pro Ser
 275 280 285

<210> 786
 <211> 867
 <212> DNA
 <213> Bradyrhizobium japonicum

<220>
 <221> CDS
 <222> (1)..(867)

<400> 786
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 cag tac gcg ctg ctc gcc ctt ggc ttc acc ctg gtc ttc ggc atc ctg 96
 Gln Tyr Ala Leu Leu Ala Leu Gly Phe Thr Leu Val Phe Gly Ile Leu
 20 25 30
 ggc gtg gtc aac ttc gct cac ggc ggc ttc tac gtc ctc ggc ggg tat 144
 Gly Val Val Asn Phe Ala His Gly Gly Phe Tyr Val Leu Gly Gly Tyr
 35 40 45
 ctc gcc tac tcg tca atg gcg ttc ctg ggc gcg ccg tac ctg atc gcg 192
 Leu Ala Tyr Ser Ser Met Ala Phe Leu Gly Ala Pro Tyr Leu Ile Ala
 50 55 60

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gtg	atc	gtt	gcg	gcg	ctg	ggt	aca	gcc	gcg	ctc	gga	tac	ctg	ttc	gag	240
Val	Ile	Val	Ala	Ala	Leu	Gly	Thr	Ala	Ala	Leu	Gly	Tyr	Leu	Phe	Glu	
65					70					75					80	
cgc	ttc	ctg	ctc	gat	cga	ctg	gtc	aat	gac	cac	ctt	tca	acg	ctc	atg	288
Arg	Phe	Leu	Leu	Asp	Arg	Leu	Val	Asn	Asp	His	Leu	Ser	Thr	Leu	Met	
				85					90					95		
ctg	acg	ctc	gga	ttg	tac	ctg	atg	atg	tcg	agc	ggc	ctc	ctt	gcc	gtt	336
Leu	Thr	Leu	Gly	Leu	Tyr	Leu	Met	Met	Ser	Ser	Gly	Leu	Leu	Ala	Val	
			100					105					110			
ttc	ggg	ccg	caa	tcg	ccc	gcg	ttc	acc	ttt	ccc	ttg	acc	ggt	gtc	ctg	384
Phe	Gly	Pro	Gln	Ser	Pro	Ala	Phe	Thr	Phe	Pro	Leu	Thr	Gly	Val	Leu	
		115					120					125				
cgc	tgg	cac	ggg	ttc	ttc	att	ccg	atc	gaa	aac	ctc	gtg	gtt	ctc	gtc	432
Arg	Trp	His	Gly	Phe	Phe	Ile	Pro	Ile	Glu	Asn	Leu	Val	Val	Leu	Val	
	130					135					140					
gta	tgc	ctg	gtc	ggc	ata	tcc	tcg	gtg	tac	gcg	ctg	atg	tat	cgc	agt	480
Val	Cys	Leu	Val	Gly	Ile	Ser	Ser	Val	Tyr	Ala	Leu	Met	Tyr	Arg	Ser	
145					150					155					160	
gac	ttc	ggc	cgc	gcg	ctt	cgc	gct	ctc	gcc	gat	cgg	gcc	gtg	gcg		528
Asp	Phe	Gly	Arg	Ala	Leu	Arg	Ala	Leu	Ala	Asp	Asp	Arg	Ala	Val	Ala	
				165					170					175		
acc	gct	cag	ggc	ctg	agg	ccg	aaa	ctc	ctg	ttt	ccc	gcg	gcg	ttt	gcg	576
Thr	Ala	Gln	Gly	Leu	Arg	Pro	Lys	Leu	Leu	Phe	Pro	Ala	Ala	Phe	Ala	
			180					185					190			
ctg	gcg	acc	gga	ctt	gcg	gga	ctc	acg	ggc	gcg	ctg	gtc	acg	ccg	atc	624
Leu	Ala	Thr	Gly	Leu	Ala	Gly	Leu	Thr	Gly	Ala	Leu	Val	Thr	Pro	Ile	
		195					200					205				
ctt	tcg	ctt	gcg	cca	cac	gtt	ggc	gat	ccc	gtg	ctg	gcg	acc	tca	ttt	672
Leu	Ser	Leu	Ala	Pro	His	Val	Gly	Asp	Pro	Val	Leu	Ala	Thr	Ser	Phe	
		210				215					220					
ctc	atc	gtg	atc	ctc	ggc	ggt	ctc	ggg	agc	atc	gga	ggg	gcg	acc	gct	720
Leu	Ile	Val	Ile	Leu	Gly	Gly	Leu	Gly	Ser	Ile	Gly	Gly	Ala	Thr	Ala	
225					230				235						240	
gcg	gcg	ttc	ctc	gtg	ggg	atg	gtg	gag	gcg	ttt	tcg	gcc	gtc	tac	ctc	768
Ala	Ala	Phe	Leu	Val	Gly	Met	Val	Glu	Ala	Phe	Ser	Ala	Val	Tyr	Leu	
				245					250					255		
gga	ggg	tca	aag	ggc	gcc	ttg	gtg	ctg	ttt	gta	ctc	gtg	ctt	ctc	atg	816
Gly	Gly	Ser	Lys	Gly	Ala	Leu	Val	Leu	Phe	Val	Leu	Val	Leu	Leu	Met	
			260					265					270			
ctc	gtg	gtg	aag	ccc	gcg	ggt	ctg	ttc	ggt	cag	cgt	gtg	cgt	gga	gcc	864
Leu	Val	Val	Lys	Pro	Ala	Gly	Leu	Phe	Gly	Gln	Arg	Val	Arg	Gly	Ala	
		275					280					285				
tga																867

<210> 787

<211> 288

<212> PRT

<213> Bradyrhizobium japonicum

<400> 787

Met	Glu	Gly	Ile	Val	Ala	Thr	Leu	Leu	Ile	Gly	Val	Ser	Leu	Gly	Ala	
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Gln	Tyr	Ala	Leu	Leu	Ala	Leu	Gly	Phe	Thr	Leu	Val	Phe	Gly	Ile	Leu	
			20					25					30			
Gly	Val	Val	Asn	Phe	Ala	His	Gly	Gly	Phe	Tyr	Val	Leu	Gly	Gly	Tyr	
			35				40					45				
Leu	Ala	Tyr	Ser	Ser	Met	Ala	Phe	Leu	Gly	Ala	Pro	Tyr	Leu	Ile	Ala	
			50			55					60					
Val	Ile	Val	Ala	Ala	Leu	Gly	Thr	Ala	Ala	Leu	Gly	Tyr	Leu	Phe	Glu	
65					70					75					80	
Arg	Phe	Leu	Leu	Asp	Arg	Leu	Val	Asn	Asp	His	Leu	Ser	Thr	Leu	Met	
				85					90					95		
Leu	Thr	Leu	Gly	Leu	Tyr	Leu	Met	Met	Ser	Ser	Gly	Leu	Leu	Ala	Val	
			100					105					110			
Phe	Gly	Pro	Gln	Ser	Pro	Ala	Phe	Thr	Phe	Pro	Leu	Thr	Gly	Val	Leu	
		115					120					125				
Arg	Trp	His	Gly	Phe	Phe	Ile	Pro	Ile	Glu	Asn	Leu	Val	Val	Leu	Val	

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Val	130	Cys	Leu	Val	Gly	Ile	135	Ser	Ser	Val	Tyr	Ala	140	Leu	Met	Tyr	Arg	Ser
145						150						155						160
Asp	Phe	Gly	Arg	Ala	165	Leu	Arg	Ala	Leu	Ala	Asp	Asp	Arg	Ala	Val	Ala		
Thr	Ala	Gln	Gly	Leu	Arg	Pro	Lys	Leu	Leu	Phe	Pro	Ala	Ala	175	Phe	Ala		
Leu	Ala	Thr	180	Gly	Leu	Ala	Gly	Leu	185	Thr	Gly	Ala	Leu	Val	190	Thr	Pro	Ile
Leu	Ser	Leu	195	Ala	Pro	His	Val	Gly	200	Asp	Pro	Val	Leu	Ala	205	Thr	Ser	Phe
210							215						220					
Leu	Ile	Val	Ile	Leu	Gly	Gly	Leu	Gly	Ser	Ile	Gly	Gly	Ala	Thr	Ala			
225					230					235								
Ala	Ala	Phe	Leu	Val	Gly	Met	Val	Glu	Ala	Phe	Ser	Ala	Val	Tyr	240	Leu		
				245					250						255			
Gly	Gly	Ser	Lys	Gly	Ala	Leu	Val	Leu	Phe	Val	Leu	Val	Leu	Leu	Met			
Leu	Val	Val	260	Lys	Pro	Ala	Gly	Leu	265	Phe	Gly	Gln	Arg	Val	270	Gly	Ala	
			275				280							285				

<210> 788

<211> 882

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(882)

<400> 788

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Met	Thr	Met	Asp	Leu	Ser	Leu	Thr	Ile	Met	Gln	Leu	Leu	Ser	Gly	Ile	
1				5				10						15		
gcc	ctt	ggg	gcg	gtc	ctg	gtg	atc	act	gcg	ctt	gga	ttg	acg	atc	gtg	96
Ala	Leu	Gly	Ala	Val	Leu	Val	Ile	Thr	Ala	Leu	Gly	Leu	Thr	Ile	Val	
			20					25					30			
ttc	ggc	atg	ctc	ggg	gtg	gtg	aat	ttc	gcc	cat	ggc	gcg	ctg	ttc	atg	144
Phe	Gly	Met	Leu	Gly	Val	Val	Asn	Phe	Ala	His	Gly	Ala	Leu	Phe	Met	
		35					40				45					
atc	ggg	gcc	tat	gct	ggg	ctg	tat	ctg	gcg	tcg	ctc	acc	gga	agc	ttc	192
Ile	Gly	Ala	Tyr	Ala	Gly	Leu	Tyr	Leu	Ala	Ser	Leu	Thr	Gly	Ser	Phe	
	50				55						60					
tgg	tgg	gga	ctg	ctg	ctc	gct	ccc	atc	ctg	atc	ggc	gcc	ttc	ggc	atg	240
Trp	Trp	Gly	Leu	Leu	Leu	Ala	Pro	Ile	Leu	Ile	Gly	Ala	Phe	Gly	Met	
	65			70				75						80		
ctg	atc	gag	ttc	gtc	ctg	atc	cgc	agg	ctc	tat	gga	cgc	tcg	gtc	gac	288
Leu	Ile	Glu	Phe	Val	Leu	Ile	Arg	Arg	Leu	Tyr	Gly	Arg	Ser	Val	Asp	
				85				90						95		
gat	ccg	ttg	ctg	ctc	acc	ttc	ggc	ctc	agc	tac	atc	ctc	gtc	gaa	ggt	336
Asp	Pro	Leu	Leu	Leu	Thr	Phe	Gly	Leu	Ser	Tyr	Ile	Leu	Val	Glu	Gly	
			100				105						110			
gtg	cgc	atc	gtg	ttc	ggg	agc	gac	ggc	att	ccg	ttt	cca	acc	ccg	ccg	384
Val	Arg	Ile	Val	Phe	Gly	Ser	Asp	Gly	Ile	Pro	Phe	Pro	Thr	Pro	Pro	
		115					120					125				
caa	ctg	gtc	ggc	gtg	ctt	gat	ctc	ggc	atc	ggc	ttc	ttc	ccg	cgc	tac	432
Gln	Leu	Val	Gly	Val	Leu	Asp	Leu	Gly	Ile	Gly	Phe	Phe	Pro	Arg	Tyr	
	130					135					140					
cgc	ctg	ttc	gtc	atc	cgc	ctg	gtg	gcc	gtg	gtg	ctg	ctg	gtg	ctc	tgg	480
Arg	Leu	Phe	Val	Ile	Ala	Leu	Val	Ala	Val	Val	Leu	Leu	Val	Leu	Trp	
	145				150					155					160	
ctg	acg	ctg	gaa	aag	tcc	cgc	ata	ggc	ttg	atc	gtg	cgc	gcc	ggc	gcg	528
Leu	Thr	Leu	Glu	Lys	Ser	Arg	Ile	Gly	Leu	Ile	Val	Arg	Ala	Gly	Ala	
				165				170						175		
cgc	gat	ccc	acc	atc	atg	cag	gtg	ctc	ggc	gtc	gat	atc	ggc	cgg	gtc	576
Arg	Asp	Pro	Thr	Ile	Met	Gln	Val	Leu	Gly	Val	Asp	Ile	Gly	Arg	Val	
			180					185					190			
tgg	ctt	gcg	atc	ttc	ggc	ctc	ggc	gtc	ggg	ctc	gcc	gcg	ctc	ggc	ggc	624
Trp	Leu	Ala	Ile	Phe	Gly	Leu	Gly	Val	Gly	Leu	Ala	Ala	Leu	Gly	Gly	
		195					200					205				

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gtg	ctc	gcc	ggt	ccc	atg	cgc	agc	gtc	aat	ccg	gag	atg	ggc	tcg	ctc	672
Val	Leu	Ala	Gly	Pro	Met	Arg	Ser	Val	Asn	Pro	Glu	Met	Gly	Ser	Leu	
	210					215					220					
gtg	ctt	gcg	gag	gcg	ttc	gtg	gtg	acc	gtg	atc	ggg	ggc	ctt	ggg	tcg	720
Val	Leu	Ala	Glu	Ala	Phe	Val	Val	Thr	Val	Ile	Gly	Gly	Leu	Gly	Ser	
225					230					235					240	
atc	gtc	ggg	gct	gtc	gtt	gcc	ggc	ctc	atg	gtc	ggc	ata	tcc	atc	agc	768
Ile	Val	Gly	Ala	Val	Val	Ala	Gly	Leu	Met	Val	Gly	Ile	Ser	Ile	Ser	
				245					250					255		
atg	gtc	gcg	ctg	ttc	gcc	cct	gag	atg	gcg	acc	atc	gtc	atg	ttc	gcg	816
Met	Val	Ala	Leu	Phe	Ala	Pro	Glu	Met	Ala	Thr	Ile	Val	Met	Phe	Ala	
			260					265					270			
ctg	atg	gcg	gtg	gtg	ctg	ctg	atc	cgc	ccg	cag	ggc	ctg	ttc	ggc	gtc	864
Leu	Met	Ala	Val	Val	Leu	Leu	Ile	Arg	Pro	Gln	Gly	Leu	Phe	Gly	Val	
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aga	ggg	agg	acc	gcg	tga											882
Arg	Gly	Arg	Thr	Ala												
	290															

<210> 789

<211> 293

<212> PRT

<213> Bradyrhizobium japonicum

<400> 789

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			20					25					30			
Phe	Gly	Met	Leu	Gly	Val	Val	Asn	Phe	Ala	His	Gly	Ala	Leu	Phe	Met	
		35					40					45				
Ile	Gly	Ala	Tyr	Ala	Gly	Leu	Tyr	Leu	Ala	Ser	Leu	Thr	Gly	Ser	Phe	
		50				55					60					
Trp	Trp	Gly	Leu	Leu	Leu	Ala	Pro	Ile	Leu	Ile	Gly	Ala	Phe	Gly	Met	
65				70					75						80	
Leu	Ile	Glu	Phe	Val	Leu	Ile	Arg	Arg	Leu	Tyr	Gly	Arg	Ser	Val	Asp	
				85					90					95		
Asp	Pro	Leu	Leu	Leu	Thr	Phe	Gly	Leu	Ser	Tyr	Ile	Leu	Val	Glu	Gly	
		100						105					110			
Val	Arg	Ile	Val	Phe	Gly	Ser	Asp	Gly	Ile	Pro	Phe	Pro	Thr	Pro	Pro	
		115					120					125				
Gln	Leu	Val	Gly	Val	Leu	Asp	Leu	Gly	Ile	Gly	Phe	Phe	Pro	Arg	Tyr	
		130				135					140					
Arg	Leu	Phe	Val	Ile	Ala	Leu	Val	Ala	Val	Val	Leu	Leu	Val	Leu	Trp	
145					150				155						160	
Leu	Thr	Leu	Glu	Lys	Ser	Arg	Ile	Gly	Leu	Ile	Val	Arg	Ala	Gly	Ala	
				165					170					175		
Arg	Asp	Pro	Thr	Ile	Met	Gln	Val	Leu	Gly	Val	Asp	Ile	Gly	Arg	Val	
		180						185					190			
Trp	Leu	Ala	Ile	Phe	Gly	Leu	Gly	Val	Gly	Leu	Ala	Ala	Leu	Gly	Gly	
		195					200					205				
Val	Leu	Ala	Gly	Pro	Met	Arg	Ser	Val	Asn	Pro	Glu	Met	Gly	Ser	Leu	
		210				215					220					
Val	Leu	Ala	Glu	Ala	Phe	Val	Val	Thr	Val	Ile	Gly	Gly	Leu	Gly	Ser	
225					230					235					240	
Ile	Val	Gly	Ala	Val	Val	Ala	Gly	Leu	Met	Val	Gly	Ile	Ser	Ile	Ser	
				245					250					255		
Met	Val	Ala	Leu	Phe	Ala	Pro	Glu	Met	Ala	Thr	Ile	Val	Met	Phe	Ala	
		260						265					270			
Leu	Met	Ala	Val	Val	Leu	Leu	Ile	Arg	Pro	Gln	Gly	Leu	Phe	Gly	Val	
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Arg	Gly	Arg	Thr	Ala												
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<210> 790

<211> 918

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(918)

<400> 790

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Met Asp Tyr Phe Ala Gln Gln Leu Ile Asn Gly Leu Val Leu Gly Ser	
1 5 10 15	
atc tac ggc ctg atc gcg atc ggc tac acg atg gtc tac ggc atc gtc	96
Ile Tyr Gly Leu Ile Ala Ile Gly Tyr Thr Met Val Tyr Gly Ile Val	
20 25 30	
ggc atg atc aac ttc gcc cat ggc gac gtc ttc atg atc ggc ggc ttc	144
Gly Met Ile Asn Phe Ala His Gly Asp Val Phe Met Ile Gly Gly Phe	
35 40 45	
atc gcc ctg atc acc ttc ctg atc ctg atc tcg ctc ggc ctg acc gcg	192
Ile Ala Leu Ile Thr Phe Leu Ile Leu Ile Ser Leu Gly Leu Thr Ala	
50 55 60	
atc ccg gtg atc ctg ctc gtc gtg ctg ctg gtc gcg atg gcg atc acg	240
Ile Pro Val Ile Leu Val Val Leu Leu Val Ala Met Ala Ile Thr	
65 70 75 80	
gcg ctc tat ggc tgg acc atc gag cgc atc gcc tac cgg ccg ctg ccg	288
Ala Leu Tyr Gly Trp Thr Ile Glu Arg Ile Ala Tyr Arg Pro Leu Arg	
85 90 95	
cat tcc ttc cgt ctc gct ccg atg ctg ctg gcg atc ggc atg tcg ttc	336
His Ser Phe Arg Leu Ala Pro Met Leu Ser Ala Ile Gly Met Ser Phe	
100 105 110	
gtg ctg acc aac tat tcg cag gtg gcg caa ggc gcc cgc gtc aag ccg	384
Val Leu Thr Asn Tyr Ser Gln Val Ala Gln Gly Ala Arg Val Lys Pro	
115 120 125	
atc ccg ccc ttc atc acc ggc ggc tac acg ctg cat gag agc gcg gac	432
Ile Pro Pro Phe Ile Thr Gly Gly Tyr Thr Leu His Glu Ser Ala Asp	
130 135 140	
ggc ttc gtc atc cag ctc tcc aac atc cag atc atg gtg gtc atc acc	480
Gly Phe Val Ile Gln Leu Ser Asn Ile Gln Ile Met Val Val Ile Thr	
145 150 155 160	
acc atc gtg ctg ctg gcg atc ttc acc tgg ctg gtg tcg cac acg ccg	528
Thr Ile Val Leu Leu Ala Ile Phe Thr Trp Leu Val Ser His Thr Arg	
165 170 175	
ctc ggg cgc gac atg cgc gcc tgc gag cag gac cag acc atg gcg gcc	576
Leu Gly Arg Asp Met Arg Ala Cys Glu Gln Asp Gln Thr Met Ala Ala	
180 185 190	
ctg ctg ggc gtc gac gtc gac cgc acc atc tcc atg acc ttc gtg atc	624
Leu Leu Gly Val Asp Val Asp Arg Thr Ile Ser Met Thr Phe Val Ile	
195 200 205	
ggc gcc gcg ctc gcc gcg gtc gcg ggt ttc atg tac ctg ctc tat tac	672
Gly Ala Ala Leu Ala Ala Val Ala Gly Phe Met Tyr Leu Leu Tyr Tyr	
210 215 220	
ggt ctg gtc gat ttc ttc atg ggc ttc gtc gcc ggc atc aag gcc ttc	720
Gly Leu Val Asp Phe Phe Met Gly Phe Val Ala Gly Ile Lys Ala Phe	
225 230 235 240	
acg gcg gcc gtg ctc ggc gga atc ggc tcg ctg ccg ggc gcc atg ctc	768
Thr Ala Ala Val Leu Gly Gly Ile Gly Ser Leu Pro Gly Ala Met Leu	
245 250 255	
ggc ggt ctt gcg atc ggc ctg atc gag acg ttc tgg tcg gcc tat ttc	816
Gly Gly Leu Ala Ile Gly Leu Ile Glu Thr Phe Trp Ser Ala Tyr Phe	
260 265 270	
tcg gtc gaa tac aag gac gtc gcg gca ttc tcg atc ctg atc gtc gtg	864
Ser Val Glu Tyr Lys Asp Val Ala Ala Phe Ser Ile Leu Ile Val Val	
275 280 285	
ctg atc ttc atg ccg acc ggc ctg ctc ggc cgt ccc gaa gtc gaa aaa	912
Leu Ile Phe Met Pro Thr Gly Leu Leu Gly Arg Pro Glu Val Glu Lys	
290 295 300	
gtc tga	918
Val	
305	

<210> 791

<211> 305

<212> PRT

<213> Bradyrhizobium japonicum

<400> 791

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Met Asp Tyr Phe Ala Gln Gln Leu Ile Asn Gly Leu Val Leu Gly Ser
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Ile Tyr Gly Leu Ile Ala Ile Gly Tyr Thr Met Val Tyr Gly Ile Val
20      25      30
Gly Met Ile Asn Phe Ala His Gly Asp Val Phe Met Ile Gly Gly Phe
35      40      45
Ile Ala Leu Ile Thr Phe Leu Ile Leu Ile Ser Leu Gly Leu Thr Ala
50      55      60
Ile Pro Val Ile Leu Leu Val Val Leu Leu Val Ala Met Ala Ile Thr
65      70      75      80
Ala Leu Tyr Gly Trp Thr Ile Glu Arg Ile Ala Tyr Arg Pro Leu Arg
85      90      95
His Ser Phe Arg Leu Ala Pro Met Leu Ser Ala Ile Gly Met Ser Phe
100     105     110
Val Leu Thr Asn Tyr Ser Gln Val Ala Gln Gly Ala Arg Val Lys Pro
115     120     125
Ile Pro Pro Phe Ile Thr Gly Gly Tyr Thr Leu His Glu Ser Ala Asp
130     135     140
Gly Phe Val Ile Gln Leu Ser Asn Ile Gln Ile Met Val Val Ile Thr
145     150     155     160
Thr Ile Val Leu Leu Ala Ile Phe Thr Trp Leu Val Ser His Thr Arg
165     170     175
Leu Gly Arg Asp Met Arg Ala Cys Glu Gln Asp Gln Thr Met Ala Ala
180     185     190
Leu Leu Gly Val Asp Val Asp Arg Thr Ile Ser Met Thr Phe Val Ile
195     200     205
Gly Ala Ala Leu Ala Ala Val Ala Gly Phe Met Tyr Leu Leu Tyr Tyr
210     215     220
Gly Leu Val Asp Phe Phe Met Gly Phe Val Ala Gly Ile Lys Ala Phe
225     230     235     240
Thr Ala Ala Val Leu Gly Gly Ile Gly Ser Leu Pro Gly Ala Met Leu
245     250     255
Gly Gly Leu Ala Ile Gly Leu Ile Glu Thr Phe Trp Ser Ala Tyr Phe
260     265     270
Ser Val Glu Tyr Lys Asp Val Ala Ala Phe Ser Ile Leu Ile Val Val
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Leu Ile Phe Met Pro Thr Gly Leu Leu Gly Arg Pro Glu Val Glu Lys
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Val
305

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<210> 792

<211> 870

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(870)

<400> 792

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Met	Gln	Ala	Leu	Tyr	Ala	Gln	Leu	Leu	Val	Gly	Leu	Ile	Asn	Gly	Ser	
1				5				10					15			
ttc	tac	gcg	ctg	ctc	agt	ctc	ggg	ctt	gcc	gtg	atc	ttc	ggc	atg	ctc	96
Phe	Tyr	Ala	Leu	Leu	Ser	Leu	Gly	Leu	Ala	Val	Ile	Phe	Gly	Met	Leu	
			20				25					30				
aac	atc	atc	aat	ttc	gcc	cac	ggc	gct	ctc	tac	atg	atg	ggc	gcc	ttc	144
Asn	Ile	Ile	Asn	Phe	Ala	His	Gly	Ala	Leu	Tyr	Met	Met	Gly	Ala	Phe	
			35				40				45					
gtc	gcc	tat	ttc	ctg	ctg	aac	aat	gat	tat	ctc	agt	atc	ggc	tac	tgg	192
Val	Ala	Tyr	Phe	Leu	Leu	Asn	Asn	Asp	Tyr	Leu	Ser	Ile	Gly	Tyr	Trp	
			50			55				60						
ccg	gca	ttg	atc	gtc	gct	ccg	atc	gtc	gtc	ggc	atc	ttc	ggc	atg	atc	240
Pro	Ala	Leu	Ile	Val	Ala	Pro	Ile	Val	Val	Gly	Ile	Phe	Gly	Met	Ile	
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ctg	gaa	cgg	acc	atg	ctg	caa	tgg	ctg	acc	ggg	ctt	gac	cat	ctc	tac	288
Leu	Glu	Arg	Thr	Met	Leu	Gln	Trp	Leu	Thr	Gly	Leu	Asp	His	Leu	Tyr	
				85					90					95		
ggc	ctg	ctg	ctg	acc	ttc	ggc	att	gcg	ctg	atc	gtg	cag	ggc	gtg	ttc	336
Gly	Leu	Leu	Leu	Thr	Phe	Gly	Ile	Ala	Leu	Ile	Val	Gln	Gly	Val	Phe	
			100					105					110			
cag	aac	tat	ttt	gga	tcg	tcg	ggc	ctg	cct	tat	gcc	att	cct	gac	cag	384
Gln	Asn	Tyr	Phe	Gly	Ser	Ser	Gly	Leu	Pro	Tyr	Ala	Ile	Pro	Asp	Gln	
		115					120					125				
ctc	aag	ggc	ggc	atg	aat	ctc	ggc	ttc	atg	ttc	ctt	ccg	gtc	tat	cgc	432
Leu	Lys	Gly	Gly	Met	Asn	Leu	Gly	Phe	Met	Phe	Leu	Pro	Val	Tyr	Arg	
	130					135					140					
ggc	tgg	gtc	gtc	gtg	ttc	tcg	ctt	atc	gtg	tgt	ctg	gcg	acc	tgg	tac	480
Gly	Trp	Val	Val	Val	Phe	Ser	Leu	Ile	Val	Cys	Leu	Ala	Thr	Trp	Tyr	
145					150					155					160	
ctg	atc	gag	aag	acg	cgg	ctc	ggc	gct	tac	ctc	cgc	gcc	gcg	acc	gaa	528
Leu	Ile	Glu	Lys	Thr	Arg	Leu	Gly	Ala	Tyr	Leu	Arg	Ala	Ala	Thr	Glu	
				165					170						175	
aac	ccg	acg	ctg	gtc	cgc	gcc	ttc	ggc	ata	aac	gtg	ccg	cgc	atg	atc	576
Asn	Pro	Thr	Leu	Val	Arg	Ala	Phe	Gly	Ile	Asn	Val	Pro	Arg	Met	Ile	
			180					185					190			
acg	ctg	acc	tac	ggt	ctc	ggc	gtc	ggc	ctt	gcc	gcg	ctc	gcc	ggc	gtg	624
Thr	Leu	Thr	Tyr	Gly	Leu	Gly	Val	Gly	Leu	Ala	Ala	Leu	Ala	Gly	Val	
			195				200					205				
ctc	tcg	gcg	ccg	atc	aac	cag	gtg	cgg	ccg	ctg	atg	ggc	gcc	gac	ctc	672
Leu	Ser	Ala	Pro	Ile	Asn	Gln	Val	Arg	Pro	Leu	Met	Gly	Ala	Asp	Leu	
	210					215					220					
atc	atc	gtc	gtg	ttt	gcc	gtg	gtg	gtg	atc	ggc	ggc	atg	gga	tcg	atc	720
Ile	Ile	Val	Val	Phe	Ala	Val	Val	Val	Ile	Gly	Gly	Met	Gly	Ser	Ile	
225					230					235					240	
atg	ggc	tcg	atc	atc	acc	ggt	ttc	gct	ctc	ggc	gtg	atc	gag	ggc	ctg	768
Met	Gly	Ser	Ile	Ile	Thr	Gly	Phe	Ala	Leu	Gly	Val	Ile	Glu	Gly	Leu	
				245				250						255		
acc	aag	tat	ttc	tac	ccc	gag	gcc	tcc	aac	acc	gtc	gtg	ttc	gtg	ctg	816
Thr	Lys	Tyr	Phe	Tyr	Pro	Glu	Ala	Ser	Asn	Thr	Val	Val	Phe	Val	Leu	
			260					265					270			
atg	gtg	ctg	gtg	ctc	ttg	gtg	aag	cca	tcg	gga	ttg	acg	gga	agg	gcg	864
Met	Val	Leu	Val	Leu	Leu	Val	Lys	Pro	Ser	Gly	Leu	Thr	Gly	Arg	Ala	
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gcc	tga															870
Ala																

<210> 793

<211> 289

<212> PRT

<213> Bradyrhizobium japonicum

<400> 793

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			20				25					30				
Asn	Ile	Ile	Asn	Phe	Ala	His	Gly	Ala	Leu	Tyr	Met	Met	Gly	Ala	Phe	
		35					40					45				
Val	Ala	Tyr	Phe	Leu	Leu	Asn	Asp	Tyr	Leu	Ser	Ile	Gly	Tyr	Trp		
	50					55				60						
Pro	Ala	Leu	Ile	Val	Ala	Pro	Ile	Val	Val	Gly	Ile	Phe	Gly	Met	Ile	
65					70					75					80	
Leu	Glu	Arg	Thr	Met	Leu	Gln	Trp	Leu	Thr	Gly	Leu	Asp	His	Leu	Tyr	
				85					90					95		
Gly	Leu	Leu	Leu	Thr	Phe	Gly	Ile	Ala	Leu	Ile	Val	Gln	Gly	Val	Phe	
			100					105					110			
Gln	Asn	Tyr	Phe	Gly	Ser	Ser	Gly	Leu	Pro	Tyr	Ala	Ile	Pro	Asp	Gln	
		115					120					125				
Leu	Lys	Gly	Gly	Met	Asn	Leu	Gly	Phe	Met	Phe	Leu	Pro	Val	Tyr	Arg	
	130					135					140					
Gly	Trp	Val	Val	Val	Phe	Ser	Leu	Ile	Val	Cys	Leu	Ala	Thr	Trp	Tyr	160
145					150					155						

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Leu Ile Glu Lys Thr Arg Leu Gly Ala Tyr Leu Arg Ala Ala Thr Glu
 165 170 175
 Asn Pro Thr Leu Val Arg Ala Phe Gly Ile Asn Val Pro Arg Met Ile
 180 185 190
 Thr Leu Thr Tyr Gly Leu Gly Val Gly Leu Ala Ala Leu Ala Gly Val
 195 200 205
 Leu Ser Ala Pro Ile Asn Gln Val Arg Pro Leu Met Gly Ala Asp Leu
 210 215 220
 Ile Ile Val Val Phe Ala Val Val Val Ile Gly Gly Met Gly Ser Ile
 225 230 235 240
 Met Gly Ser Ile Ile Thr Gly Phe Ala Leu Gly Val Ile Glu Gly Leu
 245 250 255
 Thr Lys Tyr Phe Tyr Pro Glu Ala Ser Asn Thr Val Val Phe Val Leu
 260 265 270
 Met Val Leu Val Leu Leu Val Lys Pro Ser Gly Leu Thr Gly Arg Ala
 275 280 285
 Ala

<210> 794

<211> 1890

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(1890)

<400> 794

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tcg ctg ttc ctg gtg gcc tcg ggc ctg tcg atc atc ttt ggc gtg acg	96
Ser Leu Phe Leu Val Ala Ser Gly Leu Ser Ile Ile Phe Gly Val Thr	
20 25 30	
cgg atc gtg aat ttc gcg cat ggc gcc ttc tac atg atc ggc gca tac	144
Arg Ile Val Asn Phe Ala His Gly Ala Phe Tyr Met Ile Gly Ala Tyr	
35 40 45	
atc gcc ttc acg ctg acc gag cgg ctt tcg ggc gcg ttc ggt ttc tgg	192
Ile Ala Phe Thr Leu Thr Glu Arg Leu Ser Gly Ala Phe Gly Phe Trp	
50 55 60	
ggc agt atc gtc gcg gcc gcg ctg gcc gtg gcg ctg atc ggc gtc atc	240
Gly Ser Ile Val Ala Ala Ala Leu Ala Val Ala Leu Ile Gly Val Ile	
65 70 75 80	
gtc gag atg gtg ctg ctc cgc cgc atc tat cat gcg ccc gaa ttg ttc	288
Val Glu Met Val Leu Arg Arg Ile Tyr His Ala Pro Glu Leu Phe	
85 90 95	
cag ctg ctc gcg acc ttc ggt ctg acc ctg atg gtc gag gac ctc gtc	336
Gln Leu Leu Ala Thr Phe Gly Leu Thr Leu Met Val Glu Asp Leu Val	
100 105 110	
gtg ctg atc tgg ggg ccc gac gat ctc gtc ggc cgc cgc gcg ccg ggc	384
Val Leu Ile Trp Gly Pro Asp Asp Leu Val Gly Arg Arg Ala Pro Gly	
115 120 125	
ttc aag ggc gcg atc gat ttc ttc ggc cag aac atc ccg agc tat gac	432
Phe Lys Gly Ala Ile Asp Phe Phe Gly Gln Asn Ile Pro Ser Tyr Asp	
130 135 140	
ctg ttc ctg atc ggg ctc ggc ccg gtc gtg ctc ggc att ctc tgg ctg	480
Leu Phe Leu Ile Gly Leu Gly Pro Val Val Leu Gly Ile Leu Trp Leu	
145 150 155 160	
ctg ttc cag cgc acg cgc tgg ggc gtg ctg gtg cgc gcg gca acg cag	528
Leu Phe Gln Arg Thr Arg Trp Gly Val Leu Val Arg Ala Ala Thr Gln	
165 170 175	
gac cgc gac atg gtc gcg gct ctc ggc gtc aat cag aaa tgg ttg ttc	576
Asp Arg Asp Met Val Ala Ala Leu Gly Val Asn Gln Lys Trp Leu Phe	
180 185 190	
acg tcg gtg ttc gcg gtc ggc gtc ttc ctc gca gcg ctc ggc ggc gcg	624
Thr Ser Val Phe Ala Val Gly Val Phe Leu Ala Ala Leu Gly Gly Ala	
195 200 205	
ctc cag atc ccg cgc gat gcc gtg cat cac gcg atg gat ctg cgc atc	672

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Leu	Gln	Ile	Pro	Arg	Asp	Ala	Val	His	His	Ala	Met	Asp	Leu	Arg	Ile	
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Ile	Val	Glu	Val	Phe	Val	Val	Val	Val	Ile	Gly	Gly	Leu	Gly	Ser	Ile	
225					230					235					240	
gtc	ggc	gcc	ttc	gtc	gcg	gcg	gtg	ctg	gtc	tcc	gag	ctc	aac	gcc	ttc	768
Val	Gly	Ala	Phe	Val	Ala	Ala	Val	Leu	Val	Ser	Glu	Leu	Asn	Ala	Phe	
				245				250						255		
ggc	atc	ctg	atc	ttc	ccg	aag	atc	tcc	atc	atc	ctg	gtc	ttc	ctg	gtg	816
Gly	Ile	Leu	Ile	Phe	Pro	Lys	Ile	Ser	Ile	Ile	Leu	Val	Phe	Leu	Val	
			260					265					270			
atg	gcg	gtg	gtg	ctg	atc	gtc	cg	ccc	tgg	ggc	ctg	ttc	ggc	aag	ccg	864
Met	Ala	Val	Val	Leu	Ile	Val	Arg	Pro	Trp	Gly	Leu	Phe	Gly	Lys	Pro	
		275					280					285				
gag	gcg	gcc	gcg	cg	aag	acg	ccg	ggg	ctc	acc	gtc	aat	ccc	tgg	cg	912
Glu	Ala	Ala	Ala	Arg	Lys	Thr	Pro	Gly	Leu	Thr	Val	Asn	Pro	Trp	Arg	
		290				295					300					
ccg	ctg	tcg	tcg	aac	gag	cg	ctg	gcc	gcg	ctg	gca	acg	ctc	gtc	att	960
Pro	Leu	Ser	Ser	Asn	Glu	Arg	Leu	Ala	Ala	Leu	Ala	Thr	Leu	Val	Ile	
305					310					315					320	
gcc	gca	acg	ctg	ccg	ctg	ttc	gcc	ggc	aac	tac	gcg	ctg	acc	gtc	ggc	1008
Ala	Ala	Thr	Leu	Pro	Leu	Phe	Ala	Gly	Asn	Tyr	Ala	Leu	Thr	Val	Gly	
				325				330						335		
tcg	gag	atc	gcg	atc	ttc	gtg	atc	ttc	gcc	gtc	agc	ctg	cac	ttc	ctg	1056
Ser	Glu	Ile	Ala	Ile	Phe	Val	Ile	Phe	Ala	Val	Ser	Leu	His	Phe	Leu	
			340					345					350			
atg	tcg	gtc	ggg	gga	ctc	gcg	tct	ttc	ggc	cac	gcc	gcc	tat	ttc	ggc	1104
Met	Ser	Val	Gly	Gly	Leu	Ala	Ser	Phe	Gly	His	Ala	Ala	Tyr	Phe	Gly	
		355					360					365				
ctc	ggc	gcc	tac	ggc	atc	gcc	ttc	ctc	gcc	aag	atg	gcc	gga	ctg	ccg	1152
Leu	Gly	Ala	Tyr	Gly	Ile	Ala	Phe	Leu	Ala	Lys	Met	Ala	Gly	Leu	Pro	
	370					375					380					
atg	atc	gtc	tgc	ctg	tgg	ctc	ggg	ccg	ctg	ctc	ggc	tgc	atg	ggc	gcc	1200
Met	Ile	Val	Cys	Leu	Leu	Leu	Gly	Pro	Leu	Leu	Gly	Cys	Met	Gly	Ala	
					390					395					400	
gcg	gtg	ttc	ggc	ttc	ttc	gcc	gtg	cag	ctc	tcc	ggc	gtc	tac	ttt	gcg	1248
Ala	Val	Phe	Gly	Phe	Phe	Ala	Val	Gln	Leu	Ser	Gly	Val	Tyr	Phe	Ala	
				405				410						415		
atg	ctg	acg	ctc	gcc	ttt	gcc	cag	atc	gtc	tgg	tcg	atc	gcg	ttc	caa	1296
Met	Leu	Thr	Leu	Ala	Phe	Ala	Gln	Ile	Val	Trp	Ser	Ile	Ala	Phe	Gln	
				420				425					430			
tgg	gtg	agc	gtc	acc	ggc	ggc	gac	aac	ggc	att	ctg	ggc	gtc	tgg	ccg	1344
Trp	Val	Ser	Val	Thr	Gly	Gly	Asp	Asn	Gly	Ile	Leu	Gly	Val	Trp	Pro	
		435				440						445				
gaa	aaa	tgg	gcg	gcg	agc	ccg	tcg	cac	ttc	tat	tgg	ctg	gcg	ctc	ggc	1392
Glu	Lys	Trp	Ala	Ala	Ser	Pro	Ser	His	Phe	Tyr	Trp	Leu	Ala	Leu	Gly	
		450				455					460					
gtc	gcg	gcg	ctc	gtc	acg	gtc	gcg	ctg	cg	gcc	atg	gtg	ttc	tcg	ccg	1440
Val	Ala	Ala	Leu	Val	Thr	Val	Ala	Leu	Arg	Ala	Met	Val	Phe	Ser	Pro	
				470				475							480	
ttc	ggc	tac	gcg	ctg	cg	gcc	acg	cg	gac	tcg	ctc	ctg	cg	agc	gaa	1488
Phe	Gly	Tyr	Ala	Leu	Arg	Ala	Thr	Arg	Asp	Ser	Leu	Leu	Arg	Ser	Glu	
				485					490					495		
gcg	atc	ggg	atc	aac	gcc	aag	cg	atc	cag	tgg	acc	gcc	ttc	gtg	atc	1536
Ala	Ile	Gly	Ile	Asn	Ala	Lys	Arg	Ile	Gln	Trp	Thr	Ala	Phe	Val	Ile	
			500					505					510			
gcg	ggc	acg	acc	gcc	ggc	atc	ggc	ggc	gcg	ctg	ttc	gcc	tat	ctc	aag	1584
Ala	Gly	Thr	Thr	Ala	Gly	Ile	Gly	Gly	Ala	Leu	Phe	Ala	Tyr	Leu	Lys	
		515					520					525				
ggc	agc	gtc	ttc	ccg	gac	aat	ctc	ggc	atc	tcg	ctt	tcg	gtc	gac	gcg	1632
Gly	Ser	Val	Phe	Pro	Asp	Asn	Leu	Gly	Ile	Ser	Leu	Ser	Val	Asp	Ala	
		530				535					540					
ctg	gtc	atg	gtg	ctg	ctc	ggc	gtc	gag	acg	gtg	tcg	ggc	gcg	gtg		1680
Leu	Val	Met	Val	Leu	Leu	Gly	Gly	Val	Glu	Thr	Val	Ser	Gly	Ala	Val	
				550					555						560	
atc	ggc	gcc	atc	gtc	tac	aag	gcg	ctc	aac	atc	tgg	ctg	gtc	agc	cag	1728
Ile	Gly	Ala	Ile	Val	Tyr	Lys	Ala	Leu	Asn	Ile	Trp	Leu	Val	Ser	Gln	
				565					570					575		
acc	gac	ctg	tcg	aag	ctc	gtg	ctc	ggc	ggc	ttc	atc	gtg	ctg	atc	gtc	1776

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Thr	Asp	Leu	Ser	Lys	Leu	Val	Leu	Gly	Gly	Phe	Ile	Val	Leu	Ile	Val		
gtc	gtc	ttt	ccc	aag	ggc	atc	gtc	ggc	atg	ctg	gag	atg	ctg	gcg	cag		1824
Val	Val	Phe	Pro	Lys	Gly	Ile	Val	Gly	Met	Leu	Glu	Met	Leu	Ala	Gln		
		595					600					605					
cgt	cgc	agg	aag	aca	tcg	ccg	ccg	gga	tct	ccc	ttg	ctt	gcc	aag	ccg		1872
Arg	Arg	Arg	Lys	Thr	Ser	Pro	Pro	Gly	Ser	Pro	Leu	Leu	Ala	Lys	Pro		
		610				615					620						
atc	gag	tcc	gcc	gaa	tga												1890
Ile	Glu	Ser	Ala	Glu													
625																	

<210> 795

<211> 629

<212> PRT

<213> Bradyrhizobium japonicum

<400> 795

Met	Ala	Phe	Tyr	Val	Val	Gln	Phe	Leu	Thr	Gly	Leu	Ala	Ser	Ala	Ala		
1				5					10					15			
Ser	Leu	Phe	Leu	Val	Ala	Ser	Gly	Leu	Ser	Ile	Ile	Phe	Gly	Val	Thr		
			20					25					30				
Arg	Ile	Val	Asn	Phe	Ala	His	Gly	Ala	Phe	Tyr	Met	Ile	Gly	Ala	Tyr		
		35					40					45					
Ile	Ala	Phe	Thr	Leu	Thr	Glu	Arg	Leu	Ser	Gly	Ala	Phe	Gly	Phe	Trp		
	50					55					60						
Gly	Ser	Ile	Val	Ala	Ala	Ala	Leu	Ala	Val	Ala	Leu	Ile	Gly	Val	Ile		
65				70					75						80		
Val	Glu	Met	Val	Leu	Arg	Arg	Ile	Tyr	His	Ala	Pro	Glu	Leu	Phe			
			85					90					95				
Gln	Leu	Leu	Ala	Thr	Phe	Gly	Leu	Thr	Leu	Met	Val	Glu	Asp	Leu	Val		
			100					105					110				
Val	Leu	Ile	Trp	Gly	Pro	Asp	Asp	Leu	Val	Gly	Arg	Arg	Ala	Pro	Gly		
		115					120					125					
Phe	Lys	Gly	Ala	Ile	Asp	Phe	Phe	Gly	Gln	Asn	Ile	Pro	Ser	Tyr	Asp		
	130					135					140						
Leu	Phe	Leu	Ile	Gly	Leu	Gly	Pro	Val	Val	Leu	Gly	Ile	Leu	Trp	Leu		
145					150					155					160		
Leu	Phe	Gln	Arg	Thr	Arg	Trp	Gly	Val	Leu	Val	Arg	Ala	Ala	Thr	Gln		
			165					170						175			
Asp	Arg	Asp	Met	Val	Ala	Ala	Leu	Gly	Val	Asn	Gln	Lys	Trp	Leu	Phe		
			180					185					190				
Thr	Ser	Val	Phe	Ala	Val	Gly	Val	Phe	Leu	Ala	Ala	Leu	Gly	Gly	Ala		
		195					200					205					
Leu	Gln	Ile	Pro	Arg	Asp	Ala	Val	His	His	Ala	Met	Asp	Leu	Arg	Ile		
	210				215						220						
Ile	Val	Glu	Val	Phe	Val	Val	Val	Ile	Gly	Gly	Leu	Gly	Ser	Ile			
225				230					235					240			
Val	Gly	Ala	Phe	Val	Ala	Ala	Val	Leu	Val	Ser	Glu	Leu	Asn	Ala	Phe		
			245					250					255				
Gly	Ile	Leu	Ile	Phe	Pro	Lys	Ile	Ser	Ile	Ile	Leu	Val	Phe	Leu	Val		
		260						265					270				
Met	Ala	Val	Val	Leu	Ile	Val	Arg	Pro	Trp	Gly	Leu	Phe	Gly	Lys	Pro		
		275					280					285					
Glu	Ala	Ala	Ala	Arg	Lys	Thr	Pro	Gly	Leu	Thr	Val	Asn	Pro	Trp	Arg		
	290				295						300						
Pro	Leu	Ser	Ser	Asn	Glu	Arg	Leu	Ala	Ala	Leu	Ala	Thr	Leu	Val	Ile		
305				310						315					320		
Ala	Ala	Thr	Leu	Pro	Leu	Phe	Ala	Gly	Asn	Tyr	Ala	Leu	Thr	Val	Gly		
			325					330					335				
Ser	Glu	Ile	Ala	Ile	Phe	Val	Ile	Phe	Ala	Val	Ser	Leu	His	Phe	Leu		
		340						345					350				
Met	Ser	Val	Gly	Gly	Leu	Ala	Ser	Phe	Gly	His	Ala	Ala	Tyr	Phe	Gly		
		355					360					365					
Leu	Gly	Ala	Tyr	Gly	Ile	Ala	Phe	Leu	Ala	Lys	Met	Ala	Gly	Leu	Pro		
	370				375						380						
Met	Ile	Val	Cys	Leu	Leu	Leu	Gly	Pro	Leu	Leu	Gly	Cys	Met	Gly	Ala		
385				390						395					400		
Ala	Val	Phe	Gly	Phe	Phe	Ala	Val	Gln	Leu	Ser	Gly	Val	Tyr	Phe	Ala		

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Met Leu Thr Leu⁴⁰⁵ Ala Phe Ala Gln Ile⁴¹⁰ Val Trp Ser Ile Ala⁴¹⁵ Phe Gln
 Trp Val Ser Val⁴²⁰ Thr Gly Gly Asp⁴²⁵ Asn Gly Ile Leu Gly Val⁴³⁰ Trp Pro
 Glu Lys⁴³⁵ Trp Ala Ala Ser Pro⁴⁴⁰ Ser His Phe Tyr Trp⁴⁴⁵ Leu Ala Leu Gly
 Val⁴⁵⁰ Ala Ala Leu Val Thr⁴⁵⁵ Val Ala Leu Arg Ala⁴⁶⁰ Met Val Phe Ser Pro
 Phe Gly Tyr Ala Leu⁴⁶⁵ Arg Ala Thr Arg Asp⁴⁷⁰ Ser Leu Leu Arg Ser Glu
 Ala Ile Gly Ile⁴⁷⁵ Asn Ala Lys Arg Ile⁴⁸⁰ Gln Trp Thr Ala Phe⁴⁸⁵ Val Ile
 Ala Gly Thr⁴⁹⁰ Thr Ala Gly Ile Gly⁴⁹⁵ Ala Leu Phe Ala⁵⁰⁰ Tyr Leu Lys
 Gly Ser Val⁵⁰⁵ Phe Pro Asp Asn⁵¹⁰ Leu Gly Ile Ser Leu⁵¹⁵ Ser Val Asp Ala
 Leu Val⁵²⁰ Met Val Leu Leu⁵²⁵ Gly Gly Val Glu Thr⁵³⁰ Val Ser Gly Ala Val
 Ile Gly Ala Ile⁵³⁵ Val Tyr Lys Ala Leu Asn⁵⁴⁰ Ile Trp Leu Val Ser Gln
 Thr Asp Leu Ser⁵⁴⁵ Lys Leu Val Leu Gly⁵⁵⁰ Gly Phe Ile Val Leu⁵⁵⁵ Ile Val
 Val Val Phe⁵⁶⁰ Pro Lys Gly Ile Val⁵⁶⁵ Gly Met Leu Glu Met⁵⁷⁰ Leu Ala Gln
 Arg Arg Arg Lys Thr Ser Pro⁵⁷⁵ Pro Gly Ser Pro Leu⁵⁸⁰ Leu Ala Lys Pro
 Ile Glu Ser Ala Glu⁵⁸⁵
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<210> 796

<211> 930

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(930)

<400> 796

atg	acg	cgg	gca	aat	ccg	ctt	gcg	cca	tcg	cg	ggc	cca	aat	ccg	aaa	48
Met	Thr	Arg	Ala	Asn	Pro	Leu	Ala	Pro	Ser	Arg	Gly	Pro	Asn	Pro	Lys	
1				5				10						15		
acg	gat	gac	gcc	atg	ctc	gac	atg	atc	ctg	tcg	cag	gcc	gtc	aat	ggc	96
Thr	Asp	Asp	Ala	Met	Leu	Asp	Met	Ile	Leu	Ser	Gln	Ala	Val	Asn	Gly	
			20					25					30			
ctt	gtg	ctc	ggc	ttt	ctc	tac	gtt	ctg	atc	gcg	atc	ggc	ctg	tcg	atc	144
Leu	Val	Leu	Gly	Phe	Leu	Tyr	Val	Leu	Ile	Ala	Ile	Gly	Leu	Ser	Ile	
		35					40					45				
atc	ttc	ggc	atg	ctc	ggc	atc	gtc	aat	ttc	gcg	cat	ggc	gcc	ttc	ttc	192
Ile	Phe	Gly	Met	Leu	Gly	Ile	Val	Asn	Phe	Ala	His	Gly	Ala	Phe	Phe	
		50				55					60					
gcc	gtc	ggc	gcc	tat	ctc	gct	tat	gcc	ctg	gcc	aag	gag	ttc	ggc	tgg	240
Ala	Val	Gly	Ala	Tyr	Leu	Ala	Tyr	Ala	Leu	Ala	Lys	Glu	Phe	Gly	Trp	
		65			70			75							80	
tgg	ggg	gcg	ctt	gcc	gcg	ccg	ctg	ttg	acc	ggc	gcg	atc	ggc	gtc	gtc	288
Trp	Gly	Ala	Leu	Ala	Ala	Pro	Leu	Leu	Thr	Gly	Ala	Ile	Gly	Val	Val	
			85					90						95		
gtc	gag	atg	gtc	ctg	atc	cgg	cac	ctc	tat	ggc	aag	gaa	ccg	ctg	ctc	336
Val	Glu	Met	Val	Leu	Ile	Arg	His	Leu	Tyr	Gly	Lys	Glu	Pro	Leu	Leu	
			100				105						110			
ggg	ctg	atc	ttg	acc	ttc	gcg	ctc	gca	ctg	ctg	gcg	gag	gcg	gtg	ttg	384
Gly	Leu	Ile	Leu	Thr	Phe	Ala	Leu	Ala	Leu	Leu	Ala	Glu	Ala	Val	Leu	
		115					120					125				
cgg	ctg	atc	ttc	ggc	ggc	gcg	ccc	gtg	ccc	ttc	gct	gcg	ccg	aaa	ttc	432
Arg	Leu	Ile	Phe	Gly	Gly	Ala	Pro	Val	Pro	Phe	Ala	Ala	Pro	Lys	Phe	
		130				135					140					
ctg	gcc	ggc	ttc	gtc	gaa	tac	ggc	ccg	atc	ctg	atc	acc	aaa	tac	agg	480
Leu	Ala	Gly	Phe	Val	Glu	Tyr	Gly	Pro	Ile	Leu	Ile	Thr	Lys	Tyr	Arg	

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145	atg	ttc	gtg	ctg	ctc	150	acc	gcg	ctg	acg	155	gtc	gcg	ttc	160	528
Met	Phe	Val	Leu	Leu	Thr	Thr	Thr	Ala	Leu	Thr	Leu	Val	Ala	Phe	Trp	gcc
				165						170					175	
ttt	ctc	gcc	tac	acg	cct	tac	ggc	cgg	atc	atc	cgc	gcc	ggg	tcg	cgt	576
Phe	Leu	Ala	Tyr	Thr	Pro	Tyr	Gly	Arg	Ile	Ile	Arg	Ala	Gly	Ser	Arg	
			180					185					190			
gat	ccg	gag	atg	gtc	ggc	cta	ctc	ggc	atc	aac	ctg	ccg	atc	gtc	ttt	624
Asp	Pro	Glu	Met	Val	Gly	Leu	Leu	Gly	Ile	Asn	Leu	Pro	Ile	Val	Phe	
		195					200					205				
agc	ggc	gtg	ttc	ggc	atg	ggt	tgc	ctg	ctc	gcc	ggc	ctc	ggc	ggg	ctc	672
Ser	Gly	Val	Phe	Gly	Met	Gly	Cys	Leu	Leu	Ala	Gly	Leu	Gly	Gly	Leu	
	210					215					220					
ttg	gcg	gca	ccg	ctc	tgg	acc	atc	acg	ccg	tcg	atg	gcg	gcg	ggc	gcc	720
Leu	Ala	Ala	Pro	Leu	Trp	Thr	Ile	Thr	Pro	Ser	Met	Ala	Ala	Gly	Ala	
	225				230					235					240	
atc	atg	ccg	gct	ttc	gtg	atc	gtc	acc	atc	ggc	ggc	ctc	ggc	tcc	ttc	768
Ile	Met	Pro	Ala	Phe	Val	Ile	Val	Thr	Ile	Gly	Gly	Leu	Gly	Ser	Phe	
				245					250					255		
ctg	ggt	gcc	gtc	gtg	ggc	ggc	ctc	ctg	gtc	ggc	atc	acc	acg	gcg	atg	816
Leu	Gly	Ala	Val	Val	Ala	Gly	Leu	Leu	Val	Gly	Ile	Thr	Thr	Ala	Met	
			260				265					270				
acc	atc	cag	ttc	cag	ccg	gaa	tgg	tcg	ggc	gca	gcc	atg	tac	atc	ctg	864
Thr	Ile	Gln	Phe	Gln	Pro	Glu	Trp	Ser	Gly	Ala	Ala	Met	Tyr	Ile	Leu	
		275					280					285				
atg	gcc	gcc	att	ctc	ctc	gtc	cgc	ccg	cgc	gga	ctg	ttc	ggc	gaa	cgc	912
Met	Ala	Ala	Ile	Leu	Leu	Val	Arg	Pro	Arg	Gly	Leu	Phe	Gly	Glu	Arg	
	290					295					300					
tgg	gag	aga	ttc	gag	tga											930
Trp	Glu	Arg	Phe	Glu												
	305															

<210> 797

<211> 309

<212> PRT

<213> Bradyrhizobium japonicum

<400> 797

Met	Thr	Arg	Ala	Asn	Pro	Leu	Ala	Pro	Ser	Arg	Gly	Pro	Asn	Pro	Lys
1				5					10					15	
Thr	Asp	Asp	Ala	Met	Leu	Asp	Met	Ile	Leu	Ser	Gln	Ala	Val	Asn	Gly
			20					25					30		
Leu	Val	Leu	Gly	Phe	Leu	Tyr	Val	Leu	Ile	Ala	Ile	Gly	Leu	Ser	Ile
		35					40					45			
Ile	Phe	Gly	Met	Leu	Gly	Ile	Val	Asn	Phe	Ala	His	Gly	Ala	Phe	Phe
	50					55					60				
Ala	Val	Gly	Ala	Tyr	Leu	Ala	Tyr	Ala	Leu	Ala	Lys	Glu	Phe	Gly	Trp
65					70					75					80
Trp	Gly	Ala	Leu	Ala	Ala	Pro	Leu	Leu	Thr	Gly	Ala	Ile	Gly	Val	Val
			85						90					95	
Val	Glu	Met	Val	Leu	Ile	Arg	His	Leu	Tyr	Gly	Lys	Glu	Pro	Leu	Leu
			100					105					110		
Gly	Leu	Ile	Leu	Thr	Phe	Ala	Leu	Ala	Leu	Leu	Ala	Glu	Ala	Val	Leu
	115					120						125			
Arg	Leu	Ile	Phe	Gly	Gly	Ala	Pro	Val	Pro	Phe	Ala	Ala	Pro	Lys	Phe
	130					135					140				
Leu	Ala	Gly	Phe	Val	Glu	Tyr	Gly	Pro	Ile	Leu	Ile	Thr	Lys	Tyr	Arg
145					150					155					160
Met	Phe	Val	Leu	Leu	Thr	Thr	Ala	Leu	Thr	Leu	Val	Ala	Phe	Trp	Ala
			165						170					175	
Phe	Leu	Ala	Tyr	Thr	Pro	Tyr	Gly	Arg	Ile	Ile	Arg	Ala	Gly	Ser	Arg
			180					185					190		
Asp	Pro	Glu	Met	Val	Gly	Leu	Leu	Gly	Ile	Asn	Leu	Pro	Ile	Val	Phe
		195					200					205			
Ser	Gly	Val	Phe	Gly	Met	Gly	Cys	Leu	Leu	Ala	Gly	Leu	Gly	Gly	Leu
	210					215					220				
Leu	Ala	Ala	Pro	Leu	Trp	Thr	Ile	Thr	Pro	Ser	Met	Ala	Ala	Gly	Ala
225					230					235					240
Ile	Met	Pro	Ala	Phe	Val	Ile	Val	Thr	Ile	Gly	Gly	Leu	Gly	Ser	Phe

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Leu Gly Ala Val²⁴⁵ Val Ala Gly Leu²⁵⁰ Val Gly Ile Thr Thr²⁵⁵ Ala Met
 Thr Ile Gln Phe²⁶⁰ Gln Pro Glu Trp²⁶⁵ Ser Gly Ala Ala Met Tyr²⁷⁰ Ile Leu
 Met Ala Ala Ile Leu Leu Val²⁸⁰ Arg Pro Arg Gly Leu²⁸⁵ Phe Gly Glu Arg
 Trp²⁹⁰ Glu Arg Phe Glu
 305

<210> 798

<211> 873

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(873)

<400> 798

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Met	Phe	Tyr	Thr	Ile	Ile	Glu	Gln	Val	Val	Asn	Gly	Ile	Val	Ser	Gly	
1				5				10					15			
tcg	gtc	tat	gcg	atc	ggt	gcg	gtc	ggc	atg	acg	atg	att	ttt	ggc	gtg	96
Ser	Val	Tyr	Ala	Ile	Val	Ala	Val	Gly	Met	Thr	Met	Ile	Phe	Gly	Val	
			20					25					30			
ctg	cg	gcc	atc	aac	ttc	gcg	cat	ggc	gaa	tac	tat	atg	ctc	ggc	acc	144
Leu	Arg	Ala	Ile	Asn	Phe	Ala	His	Gly	Glu	Tyr	Tyr	Met	Leu	Gly	Thr	
			35				40					45				
ttc	ggg	gcc	tgg	ttc	gcc	atc	gaa	tat	ttc	gac	ctg	cct	tat	ccg	gta	192
Phe	Gly	Ala	Trp	Phe	Ala	Ile	Glu	Tyr	Phe	Asp	Leu	Pro	Tyr	Pro	Val	
	50					55					60					
gca	gtc	gtg	atc	ggt	gtg	ggt	gcc	acc	gcc	gtc	atc	gcc	gtc	gtg	gtc	240
Ala	Val	Val	Ile	Gly	Val	Val	Ala	Thr	Ala	Val	Ile	Ala	Val	Val	Val	
	65				70					75					80	
ggc	aat	ttc	gtg	atg	cag	cg	atc	gtc	gga	gcg	ccg	gcc	gag	gcc	ggc	288
Gly	Asn	Phe	Val	Met	Gln	Arg	Ile	Val	Gly	Ala	Pro	Ala	Glu	Ala	Gly	
				85					90					95		
gtg	ctc	gcg	acc	ctc	ggc	gtc	gcg	ctg	atc	ctg	cag	aac	acc	gtc	atc	336
Val	Leu	Ala	Thr	Leu	Gly	Val	Ala	Leu	Ile	Leu	Gln	Asn	Thr	Val	Ile	
			100					105					110			
ctg	gtg	ttc	ggt	ggc	agc	tac	aag	ttc	ttc	tcc	ggc	ggc	tat	atc	gag	384
Leu	Val	Phe	Gly	Gly	Ser	Tyr	Lys	Phe	Phe	Ser	Gly	Gly	Tyr	Ile	Glu	
			115				120					125				
ccg	gtg	acg	ctg	ttc	ggt	ttc	aca	ctg	gcc	gag	cag	cg	atc	ctg	atc	432
Pro	Val	Thr	Leu	Phe	Gly	Phe	Thr	Leu	Ala	Glu	Gln	Arg	Ile	Leu	Ile	
			130			135					140					
atc	atc	gtc	agc	ctc	atc	gtg	ttc	gtc	ggc	ctc	gag	ctg	atg	gtc	acc	480
Ile	Ile	Val	Ser	Leu	Ile	Val	Phe	Val	Gly	Leu	Glu	Leu	Met	Val	Thr	
				150					155					160		
tac	agc	cg	atg	ggc	aag	gcg	atg	cg	gcg	gtg	tcg	cag	aac	atc	gaa	528
Tyr	Ser	Arg	Met	Gly	Lys	Ala	Met	Arg	Ala	Val	Ser	Gln	Asn	Ile	Glu	
				165					170					175		
tgc	tgc	gct	gtg	gtc	ggt	atc	gac	gtc	cgt	cac	atc	gcg	ctc	tgg	acc	576
Cys	Cys	Ala	Val	Val	Gly	Ile	Asp	Val	Arg	His	Ile	Ala	Leu	Trp	Thr	
			180					185					190			
ttc	atc	ctc	ggg	gct	ggg	ttg	gcg	ctc	tcg	ggc	gtg	ttg	act	gcg		624
Phe	Ile	Leu	Gly	Ala	Gly	Leu	Ala	Ala	Leu	Ser	Gly	Val	Leu	Thr	Ala	
			195				200					205				
ccc	gtg	aac	gtc	agc	gtc	tac	ggc	ggc	atg	ggc	gag	ctc	atc	acc	ttc	672
Pro	Val	Asn	Val	Ser	Val	Tyr	Gly	Gly	Met	Gly	Glu	Leu	Ile	Thr	Phe	
			210			215					220					
aag	acg	ctg	ccc	atc	atc	atg	ggc	gga	ctc	ggc	aac	gtc	cg	ggc		720
Lys	Thr	Leu	Pro	Ile	Ile	Ile	Met	Gly	Gly	Leu	Gly	Asn	Val	Arg	Gly	
				230					235						240	
acg	ttc	gtc	gcg	gcg	atg	atc	ctc	ggt	atc	gcg	gag	agc	ctg	ggt	gcc	768
Thr	Phe	Val	Ala	Ala	Met	Ile	Leu	Gly	Ile	Ala	Glu	Ser	Leu	Val	Ala	
				245					250					255		
acc	tat	gtc	ggg	ctg	cag	ttc	cg	gac	acc	gtg	gga	ttt	gcg	acc	ctc	816

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Thr	Tyr	Val	Gly	Leu	Gln	Phe	Arg	Asp	Thr	Val	Gly	Phe	Ala	Thr	Leu		
			260					265					270				
atg	ctg	gtg	ctg	atg	tgg	cgt	ccg	cac	ggg	ctc	ttc	tcc	gcg	cag	gcc	864	
Met	Leu	Val	Leu	Met	Trp	Arg	Pro	His	Gly	Leu	Phe	Ser	Ala	Gln	Ala		
		275					280					285					
cgc	ttc	tga														873	
Arg	Phe																
	290																

<210> 799

<211> 290

<212> PRT

<213> Bradyrhizobium japonicum

<400> 799

Met	Phe	Tyr	Thr	Ile	Ile	Glu	Gln	Val	Val	Asn	Gly	Ile	Val	Ser	Gly		
1				5					10					15			
Ser	Val	Tyr	Ala	Ile	Val	Ala	Val	Gly	Met	Thr	Met	Ile	Phe	Gly	Val		
			20					25					30				
Leu	Arg	Ala	Ile	Asn	Phe	Ala	His	Gly	Glu	Tyr	Tyr	Met	Leu	Gly	Thr		
		35					40					45					
Phe	Gly	Ala	Trp	Phe	Ala	Ile	Glu	Tyr	Phe	Asp	Leu	Pro	Tyr	Pro	Val		
	50					55					60						
Ala	Val	Val	Ile	Gly	Val	Ala	Thr	Ala	Val	Ile	Ala	Val	Val	Val			
65				70					75					80			
Gly	Asn	Phe	Val	Met	Gln	Arg	Ile	Val	Gly	Ala	Pro	Ala	Glu	Ala	Gly		
			85						90				95				
Val	Leu	Ala	Thr	Leu	Gly	Val	Ala	Leu	Ile	Leu	Gln	Asn	Thr	Val	Ile		
		100						105				110					
Leu	Val	Phe	Gly	Gly	Ser	Tyr	Lys	Phe	Phe	Ser	Gly	Gly	Tyr	Ile	Glu		
		115					120					125					
Pro	Val	Thr	Leu	Phe	Gly	Phe	Thr	Leu	Ala	Glu	Gln	Arg	Ile	Leu	Ile		
	130					135					140						
Ile	Ile	Val	Ser	Leu	Ile	Val	Phe	Val	Gly	Leu	Glu	Leu	Met	Val	Thr		
145				150						155				160			
Tyr	Ser	Arg	Met	Gly	Lys	Ala	Met	Arg	Ala	Val	Ser	Gln	Asn	Ile	Glu		
			165						170				175				
Cys	Cys	Ala	Val	Val	Gly	Ile	Asp	Val	Arg	His	Ile	Ala	Leu	Trp	Thr		
		180						185					190				
Phe	Ile	Leu	Gly	Ala	Gly	Leu	Ala	Ala	Leu	Ser	Gly	Val	Leu	Thr	Ala		
		195					200					205					
Pro	Val	Asn	Val	Ser	Val	Tyr	Gly	Gly	Met	Gly	Glu	Leu	Ile	Thr	Phe		
	210					215					220						
Lys	Thr	Leu	Pro	Ile	Ile	Ile	Met	Gly	Gly	Leu	Gly	Asn	Val	Arg	Gly		
225				230						235					240		
Thr	Phe	Val	Ala	Ala	Met	Ile	Leu	Gly	Ile	Ala	Glu	Ser	Leu	Val	Ala		
			245						250					255			
Thr	Tyr	Val	Gly	Leu	Gln	Phe	Arg	Asp	Thr	Val	Gly	Phe	Ala	Thr	Leu		
		260						265					270				
Met	Leu	Val	Leu	Met	Trp	Arg	Pro	His	Gly	Leu	Phe	Ser	Ala	Gln	Ala		
		275					280					285					
Arg	Phe																
	290																

<210> 800

<211> 1044

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(1044)

<400> 800

atg	acg	agt	gac	atc	gca	gcc	att	ctt	gcg	atc	gac	ggg	atc	gcc	acc	48	
Met	Thr	Ser	Asp	Ile	Ala	Ala	Ile	Leu	Ala	Ile	Asp	Gly	Ile	Ala	Thr		
1				5					10					15			
ggc	gca	gtc	tat	gcg	ctg	gtg	gcg	atc	ggg	acc	gtc	ctc	atc	ttc	acg	96	
Gly	Ala	Val	Tyr	Ala	Leu	Val	Ala	Ile	Gly	Thr	Val	Leu	Ile	Phe	Thr		

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gtg	acc	agg	20	atc	ttc	att	ccc	25	ggc	gac	atc	gcc	30	ttc	acc	
Val	Thr	Arg	Val	Ile	Phe	Ile	Pro	Phe	Gly	Asp	Ile	Ala	Gcg	Phe	Thr	144
		35					40					45				
gcg	ctg	acg	ctg	gcg	gcc	ctc	gat	gcg	aag	cg	ttt	ccg	ggc	acg	ggg	192
Ala	Leu	Thr	Leu	Ala	Ala	Leu	Asp	Ala	Lys	Arg	Phe	Pro	Gly	Thr	Gly	
	50					55					60					
gcg	ctg	gtg	gtc	atc	ctg	gcc	tgc	ctt	gcg	acc	ctg	atc	gag	atc	atc	240
Ala	Leu	Val	Val	Ile	Leu	Ala	Cys	Leu	Ala	Thr	Leu	Ile	Glu	Ile	Ile	
	65				70					75					80	
tcg	ctg	gta	cg	gcc	ggc	gaa	acc	cg	ctg	ctg	ccg	cg	gcg	ctc	ttg	288
Ser	Leu	Val	Arg	Ala	Gly	Glu	Thr	Arg	Leu	Leu	Pro	Arg	Ala	Leu	Leu	
				85					90					95		
ttc	tac	ctc	gtg	ctt	ccg	gtg	gcc	gtg	gtt	ggc	ctc	gcc	tgg	ctg	acg	336
Phe	Tyr	Leu	Val	Leu	Pro	Val	Ala	Val	Val	Gly	Leu	Ala	Trp	Leu	Thr	
			100					105					110			
atg	cg	gcc	gat	cct	ccg	ctc	gcc	gtc	agg	ctc	gtg	ctt	gcc	ttg	atg	384
Met	Arg	Ala	Asp	Pro	Pro	Leu	Ala	Val	Arg	Leu	Val	Leu	Ala	Leu	Met	
		115					120					125				
ctg	atc	acg	ccg	atc	gct	ccg	ctg	ctg	gat	cg	atc	gtc	ttc	cg	ccc	432
Leu	Ile	Thr	Pro	Ile	Ala	Pro	Leu	Leu	Asp	Arg	Ile	Val	Phe	Arg	Pro	
	130				135						140					
atc	gcg	gac	gga	acg	gtg	ttg	ttg	ctc	ctg	acg	gtc	tcg	gtc	gcg	ctg	480
Ile	Ala	Asp	Gly	Thr	Val	Leu	Leu	Leu	Leu	Thr	Val	Ser	Val	Ala	Leu	
	145				150					155					160	
cat	ttc	gcg	ctg	gtg	ggc	ctg	ggg	ctg	ctg	ttc	ttc	gga	cct	gaa	ggc	528
His	Phe	Ala	Leu	Val	Gly	Leu	Gly	Leu	Leu	Phe	Phe	Gly	Pro	Glu	Gly	
				165				170						175		
gtc	aga	acc	gaa	ccg	ctg	acg	tcg	ttg	tcg	gcc	gag	ttc	gcc	ggc	gtg	576
Val	Arg	Thr	Glu	Pro	Leu	Thr	Ser	Leu	Ser	Ala	Glu	Phe	Ala	Gly	Val	
			180					185					190			
ctg	gtc	tcg	ggc	cag	acc	atg	ctg	atc	gtg	atc	gca	gcc	ctc	gtc	ttc	624
Leu	Val	Ser	Gly	Gln	Thr	Met	Leu	Ile	Val	Ile	Ala	Ala	Leu	Val	Phe	
		195					200					205				
agt	ggc	ctg	ctc	ttt	ctc	ttc	ttc	gac	ttc	acg	ctg	gtc	gga	aaa	tcg	672
Ser	Gly	Leu	Leu	Phe	Leu	Phe	Phe	Asp	Phe	Thr	Leu	Val	Gly	Lys	Ser	
	210					215					220					
ctg	cgt	gcc	acc	gcc	gtg	aac	cg	acc	ggc	tcc	cg	ctg	atg	gga	ata	720
Leu	Arg	Ala	Thr	Ala	Val	Asn	Arg	Thr	Gly	Ser	Arg	Leu	Met	Gly	Ile	
	225				230					235					240	
cg	ccc	gcc	cg	gcc	ggc	acg	atc	gcc	tat	ctg	ctg	ggc	tcg	ctg	atg	768
Arg	Pro	Ala	Arg	Ala	Gly	Thr	Ile	Ala	Tyr	Leu	Leu	Gly	Ser	Leu	Met	
				245					250					255		
gcc	ggc	gta	tcg	ggc	atc	ctg	atc	gca	ccg	gtc	aac	acc	gtg	ttc	tac	816
Ala	Gly	Val	Ser	Gly	Ile	Leu	Ile	Ala	Pro	Val	Asn	Thr	Val	Phe	Tyr	
			260					265					270			
gat	tcc	ggc	ttc	ctg	atc	ggc	ctc	aag	gcc	ttc	gtc	ggc	gcc	atc	gtc	864
Asp	Ser	Gly	Phe	Leu	Ile	Gly	Leu	Lys	Ala	Phe	Val	Gly	Ala	Ile	Val	
		275					280					285				
ggc	ggc	atg	acc	agc	tat	ccc	ggc	gcg	gcg	atc	ggc	gcc	gtc	ggc	gtc	912
Gly	Gly	Met	Thr	Ser	Tyr	Pro	Gly	Ala	Ala	Ile	Gly	Ala	Val	Gly	Val	
	290					295					300					
ggt	att	ctc	gaa	agc	ttc	gca	tcc	ttc	gag	agc	agc	gcg	ctg	aag	gac	960
Gly	Ile	Leu	Glu	Ser	Phe	Ala	Ser	Phe	Glu	Ser	Ser	Ala	Leu	Lys	Asp	
	305				310					315					320	
gtc	atc	gtg	ttc	tcg	ctt	ctg	atc	ccg	atc	ctg	atc	tgg	cga	tcg	ctc	1008
Val	Ile	Val	Phe	Ser	Leu	Leu	Ile	Pro	Ile	Leu	Ile	Trp	Arg	Ser	Leu	
				325					330					335		
gcc	tcg	ctg	cat	tcc	gag	gag	gag	atc	gag	gaa	tga					1044
Ala	Ser	Leu	His	Ser	Glu	Glu	Glu	Ile	Glu	Glu						
			340					345								

<210> 801

<211> 347

<212> PRT

<213> Bradyrhizobium japonicum

<400> 801

Met Thr Ser Asp Ile Ala Ala Ile Leu Ala Ile Asp Gly Ile Ala Thr

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1 Gly Ala Val Tyr 5 Ala Leu Val Ala Ile 10 Gly Thr Val Leu Ile 15 Phe Thr
 20 Val Thr Arg Val Ile Phe Ile Pro Phe Gly Asp Ile Ala Ala Phe Thr
 35 Ala Leu Thr Leu Ala Ala Leu 40 Asp Ala Lys Arg Phe Pro Gly Thr Gly
 50 Ala Leu Val Val Ile Leu 55 Cys Leu Ala Thr 60 Leu Ile Glu Ile Ile
 65 Ser Leu Val Arg Ala 70 Gly Glu Thr Arg Leu Leu Pro Arg Ala Leu Leu
 85 Phe Tyr Leu Val Leu Pro Val Ala Val 90 Gly Leu Ala Trp Leu Thr
 100 Met Arg Ala Asp Pro Pro Leu Ala 105 Val Arg Leu Val Leu Ala Leu Met
 115 Leu Ile Thr Pro Ile Ala Pro Leu Leu Asp Arg Ile Val Phe Arg Pro
 130 Ile Ala Asp Gly Thr Val 135 Leu Leu Leu Thr Val Ser Val Ala Leu
 145 His Phe Ala Leu Val 150 Gly Leu Gly Leu Leu Phe Phe Gly Pro Glu Gly
 165 Val Arg Thr Glu Pro Leu Thr Ser Leu 170 Ser Ala Glu Phe Ala Gly Val
 180 Leu Val Ser Gly Gln Thr Met Leu 185 Ile Val Ile Ala Ala Leu Val Phe
 195 Ser Gly Leu Leu Phe Leu Phe 200 Phe Asp Phe Thr Leu Val Gly Lys Ser
 210 Leu Arg Ala Thr Ala Val Asn Arg Thr Gly Ser Arg Leu Met Gly Ile
 225 Arg Pro Ala Arg Ala 230 Gly Thr Ile Ala Tyr 235 Leu Leu Gly Ser Leu Met
 245 Ala Gly Val Ser Gly Ile Leu Ile Ala Pro Val Asn Thr Val Phe Tyr
 260 Asp Ser Gly Phe Leu Ile Gly Leu 265 Lys Ala Phe Val Gly Ala Ile Val
 275 Gly Gly Met Thr Ser Tyr Pro 280 Gly Ala Ala Ile Gly Ala Val Gly Val
 290 Gly Ile Leu Glu Ser Phe 300 Ala Ser Phe Glu Ser Ser Ala Leu Lys Asp
 305 Val Ile Val Phe Ser 310 Leu Leu Ile Pro Ile 315 Leu Ile Trp Arg Ser Leu
 325 Ala Ser Leu His Ser Glu Glu Glu Ile 330 Glu Glu
 340 345

<210> 802

<211> 1011

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(1011)

<400> 802

atg	agc	cgt	ttc	atc	gaa	cgc	cat	ccc	gcc	tgg	gcg	ctg	atc	tcg	atc	48
Met	Ser	Arg	Phe	Ile	Glu	Arg	His	Pro	Ala	Trp	Ala	Leu	Ile	Ser	Ile	
1				5				10						15		
atc	gcg	atc	gcc	atc	gcg	ctg	tgg	ctg	atc	ttc	gca	gtc	tgg	ccg	ccg	96
Ile	Ala	Ile	Ala	Ile	Ala	Leu	Trp	Leu	Ile	Phe	Ala	Val	Trp	Pro	Pro	
			20					25					30			
ggc	ctc	gaa	gag	gca	atc	ggg	cgc	aag	cgc	gtc	ttc	ctc	aac	gcc	gtc	144
Gly	Leu	Glu	Glu	Ala	Ile	Gly	Arg	Lys	Arg	Val	Phe	Leu	Asn	Ala	Val	
		35					40					45				
ttc	aac	ggc	atc	acg	ctc	ggc	ggg	ctc	tac	ttc	ctc	gtc	gcg	agc	ggc	192
Phe	Asn	Gly	Ile	Thr	Leu	Gly	Gly	Leu	Tyr	Phe	Leu	Val	Ala	Ser	Gly	
	50					55				60						
ttc	acg	ctg	atc	ttc	ggc	ctg	atg	cgc	aac	gtc	aac	ctg	gcg	cac	ggc	240
Phe	Thr	Leu	Ile	Phe	Gly	Leu	Met	Arg	Asn	Val	Asn	Leu	Ala	His	Gly	
65					70					75					80	

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tct	ctc	tat	ctg	ttc	ggc	ggc	tat	gtc	ggc	tac	gcc	atc	agc	aca	gcc	288
Ser	Leu	Tyr	Leu	Phe	Gly	Gly	Tyr	Val	Gly	Tyr	Ala	Ile	Ser	Thr	Ala	
				85					90					95		
acc	ggc	tcc	tgg	ctc	ctc	agc	ttc	atc	gtt	gcc	ttc	gtc	ctg	act	gca	336
Thr	Gly	Ser	Trp	Leu	Leu	Ser	Phe	Ile	Val	Ala	Phe	Val	Leu	Thr	Ala	
			100					105					110			
ctg	gtc	ggc	gtg	ctg	ctt	cag	gtg	atc	gtg	ttc	cgg	cgc	atg	gaa	ggc	384
Leu	Val	Gly	Val	Leu	Leu	Gln	Val	Ile	Val	Phe	Arg	Arg	Met	Glu	Gly	
			115				120					125				
cag	gac	ctc	agg	cag	acc	atg	gtg	acg	atc	ggg	ctc	tcg	atc	gtg	ttt	432
Gln	Asp	Leu	Arg	Gln	Thr	Met	Val	Thr	Ile	Gly	Leu	Ser	Ile	Val	Phe	
			130			135				140						
gcc	gac	ctg	atg	ctc	tgg	gcc	tgc	ggc	ggc	gac	ttc	tac	cag	atc	cag	480
Ala	Asp	Leu	Met	Leu	Trp	Ala	Cys	Gly	Gly	Asp	Phe	Tyr	Gln	Ile	Gln	
					150					155					160	
acc	ccg	agc	tgg	ctg	atc	ggg	ccc	gtg	gac	ctg	ccg	ctg	atc	acg	gcg	528
Thr	Pro	Ser	Trp	Leu	Ile	Gly	Pro	Val	Asp	Leu	Pro	Leu	Ile	Thr	Ala	
				165				170						175		
gtg	aaa	tcc	tcg	ggc	gag	ccg	gtc	tat	ctc	cga	tat	ccg	gtg	gtg	ccg	576
Val	Lys	Ser	Ser	Gly	Glu	Pro	Val	Tyr	Leu	Arg	Tyr	Pro	Val	Val	Arg	
			180					185					190			
ctg	gtg	atc	ttc	gcg	gcg	tcc	gtc	gtg	atc	ggc	gtc	ggc	atg	tgg	ctc	624
Leu	Val	Ile	Phe	Ala	Ala	Ser	Val	Val	Ile	Gly	Val	Gly	Met	Trp	Leu	
			195				200					205				
gcg	ctc	aac	cgc	acc	cgg	atc	ggc	atg	atc	atc	cgc	gcc	ggc	gtc	gac	672
Ala	Leu	Asn	Arg	Thr	Arg	Ile	Gly	Met	Ile	Ile	Arg	Ala	Gly	Val	Asp	
			210			215					220					
gat	cgc	gac	atg	ctg	gcc	gcc	acc	ggc	gtg	cgc	atc	cag	ctc	gtc	ttc	720
Asp	Arg	Asp	Met	Leu	Ala	Ala	Thr	Gly	Val	Arg	Ile	Gln	Leu	Val	Phe	
					230					235				240		
gtg	ctg	gtg	ttc	gcg	ttc	ggc	gcc	ggg	ctc	gcc	ggc	atc	gct	ggc	gtc	768
Val	Leu	Val	Phe	Ala	Phe	Gly	Ala	Gly	Leu	Ala	Gly	Ile	Ala	Gly	Val	
				245				250					255			
gtc	ggc	ggc	acc	ttc	cag	tcg	ctg	tcc	ccc	ggc	gag	gac	att	cgt	ttc	816
Val	Gly	Gly	Thr	Phe	Gln	Ser	Leu	Ser	Pro	Gly	Glu	Asp	Ile	Arg	Phe	
			260					265					270			
ctg	ctg	gcc	tcg	ctg	gtg	gtg	gtg	atc	gtc	ggc	ggc	atg	ggc	tcg	atc	864
Leu	Leu	Ala	Ser	Leu	Val	Val	Val	Ile	Val	Gly	Gly	Met	Gly	Ser	Ile	
			275				280					285				
ccc	ggt	gcg	gcg	ctc	ggt	gcg	ctc	atc	atc	ggc	ctc	gcc	gag	cag	ctc	912
Pro	Gly	Ala	Ala	Leu	Gly	Ala	Leu	Ile	Ile	Gly	Leu	Ala	Glu	Gln	Leu	
			290			295					300					
ggc	tcg	gtc	tac	atc	ccg	acc	tac	gcc	atc	gtc	gtg	acc	ttt	ctg	atc	960
Gly	Ser	Val	Tyr	Ile	Pro	Thr	Tyr	Ala	Ile	Val	Val	Thr	Phe	Leu	Ile	
					310					315				320		
atg	gtg	ctg	gtg	ctg	gca	atc	cgg	ccg	cag	ggc	ctc	ctg	gcg	agg	cgc	1008
Met	Val	Leu	Val	Leu	Ala	Ile	Arg	Pro	Gln	Gly	Leu	Leu	Ala	Arg	Arg	
				325					330					335		
tga																1011

<210> 803

<211> 336

<212> PRT

<213> Bradyrhizobium japonicum

<400> 803

Met	Ser	Arg	Phe	Ile	Glu	Arg	His	Pro	Ala	Trp	Ala	Leu	Ile	Ser	Ile	
1				5					10					15		
Ile	Ala	Ile	Ala	Ile	Ala	Leu	Trp	Leu	Ile	Phe	Ala	Val	Trp	Pro	Pro	
			20					25					30			
Gly	Leu	Glu	Glu	Ala	Ile	Gly	Arg	Lys	Arg	Val	Phe	Leu	Asn	Ala	Val	
			35				40					45				
Phe	Asn	Gly	Ile	Thr	Leu	Gly	Gly	Leu	Tyr	Phe	Leu	Val	Ala	Ser	Gly	
			50			55				60						
Phe	Thr	Leu	Ile	Phe	Gly	Leu	Met	Arg	Asn	Val	Asn	Leu	Ala	His	Gly	
					70				75					80		
Ser	Leu	Tyr	Leu	Phe	Gly	Gly	Tyr	Val	Gly	Tyr	Ala	Ile	Ser	Thr	Ala	

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85 90 95
 Thr Gly Ser Trp Leu Leu Ser Phe Ile Val Ala Phe Val Leu Thr Ala
 100 105 110
 Leu Val Gly Val Leu Leu Gln Val Ile Val Phe Arg Arg Met Glu Gly
 115 120 125
 Gln Asp Leu Arg Gln Thr Met Val Thr Ile Gly Leu Ser Ile Val Phe
 130 135 140
 Ala Asp Leu Met Leu Trp Ala Cys Gly Gly Asp Phe Tyr Gln Ile Gln
 145 150 155
 Thr Pro Ser Trp Leu Ile Gly Pro Val Asp Leu Pro Leu Ile Thr Ala
 165 170 175
 Val Lys Ser Ser Gly Glu Pro Val Tyr Leu Arg Tyr Pro Val Val Arg
 180 185 190
 Leu Val Ile Phe Ala Ala Ser Val Val Ile Gly Val Gly Met Trp Leu
 195 200 205
 Ala Leu Asn Arg Thr Arg Ile Gly Met Ile Ile Arg Ala Gly Val Asp
 210 215 220
 Asp Arg Asp Met Leu Ala Ala Thr Gly Val Arg Ile Gln Leu Val Phe
 225 230 235
 Val Leu Val Phe Ala Phe Gly Ala Gly Leu Ala Gly Ile Ala Gly Val
 245 250 255
 Val Gly Gly Thr Phe Gln Ser Leu Ser Pro Gly Glu Asp Ile Arg Phe
 260 265 270
 Leu Leu Ala Ser Leu Val Val Val Ile Val Gly Gly Met Gly Ser Ile
 275 280 285
 Pro Gly Ala Ala Leu Gly Ala Leu Ile Ile Gly Leu Ala Glu Gln Leu
 290 295 300
 Gly Ser Val Tyr Ile Pro Thr Tyr Ala Ile Val Val Thr Phe Leu Ile
 305 310 315
 Met Val Leu Val Leu Ala Ile Arg Pro Gln Gly Leu Leu Ala Arg Arg
 325 330 335

<210> 804

<211> 1047

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(1047)

<400> 804

atg	aga	ata	gcc	ctc	acc	att	ctc	gcc	gtc	gcg	gcc	ctt	gcc	tcg	gtg	48
Met	Arg	Ile	Ala	Leu	Thr	Ile	Leu	Ala	Val	Ala	Ala	Leu	Ala	Ser	Val	
1				5				10					15			
ccg	ctc	tgg	ctg	cgc	gat	ccc	tat	ctc	ctc	aac	gcg	ctg	atc	acg	acc	96
Pro	Leu	Trp	Leu	Arg	Asp	Pro	Tyr	Leu	Leu	Asn	Ala	Leu	Ile	Thr	Thr	
			20					25					30			
gga	atc	ttc	gtc	atc	ggc	gcg	atg	agc	ctc	aat	ctc	ctg	ctc	ggc	ttc	144
Gly	Ile	Phe	Val	Ile	Gly	Ala	Met	Ser	Leu	Asn	Leu	Leu	Leu	Gly	Phe	
		35					40					45				
acc	ggg	cag	ctc	agc	ctc	ggc	cac	atc	gcc	ttc	ttc	ggc	atc	ggc	gcc	192
Thr	Gly	Gln	Leu	Ser	Leu	Gly	His	Ile	Ala	Phe	Phe	Gly	Ile	Gly	Ala	
	50					55					60					
tat	gtc	agc	gcg	ctg	aca	tcg	ctc	ggt	ttc	gac	atc	ggg	ctg	ccc	gga	240
Tyr	Val	Ser	Ala	Leu	Thr	Ser	Leu	Gly	Phe	Asp	Ile	Gly	Leu	Pro	Gly	
	65				70					75					80	
gac	ctg	cgc	ctt	gtt	cac	acg	ccg	tgg	ccg	ccc	att	gtg	ggc	ttc	gtg	288
Asp	Leu	Arg	Leu	Val	His	Thr	Pro	Trp	Pro	Pro	Ile	Val	Gly	Phe	Val	
			85					90						95		
ctc	gcg	atc	ctc	atc	gcc	ggg	ctg	tgc	ggt	tat	ttc	gtc	ggg	ctg	ctc	336
Leu	Ala	Ile	Leu	Ile	Ala	Gly	Leu	Cys	Gly	Tyr	Phe	Val	Gly	Leu	Leu	
			100					105					110			
tcg	ttc	cgc	gtt	cgc	ggc	gcc	tat	ttc	gtc	att	gtc	acg	atc	tcc	ttc	384
Ser	Phe	Arg	Val	Arg	Gly	Ala	Tyr	Phe	Val	Ile	Val	Thr	Ile	Ser	Phe	
		115					120					125				
gcc	gaa	gtc	gtg	cgg	ctc	gtc	gcg	ctg	aac	tgg	gtc	gag	ttg	acg	caa	432
Ala	Glu	Val	Val	Arg	Leu	Val	Ala	Leu	Asn	Trp	Val	Glu	Leu	Thr	Gln	
	130					135					140					

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ggc	cct	ctg	gcg	ctg	acc	aac	att	ccc	tcc	atc	gcg	ctg	ccg	ttg	ccc	480
Gly	Pro	Leu	Ala	Leu	Thr	Asn	Ile	Pro	Ser	Ile	Ala	Leu	Pro	Leu	Pro	
145					150					155					160	
ggc	ctc	agt	gag	ctg	acg	ctg	cg	acc	aag	atg	cag	aac	tac	tat	ctc	528
Gly	Leu	Ser	Glu	Leu	Thr	Leu	Arg	Thr	Lys	Met	Gln	Asn	Tyr	Tyr	Leu	
				165					170					175		
gtg	ctg	gtc	gtg	gct	ctc	atc	gcc	tat	ctc	ctg	atc	gcg	cgt	ctc	gtt	576
Val	Leu	Val	Val	Ala	Leu	Ile	Ala	Tyr	Leu	Leu	Ile	Ala	Arg	Leu	Val	
				180				185					190			
cat	tcc	cat	ttc	ggc	cg	g	atg	cg	gga	ttg	atg	gag	aat	gag	acg	624
His	Ser	His	Phe	Gly	Arg	Ala	Met	Arg	Gly	Leu	Met	Glu	Asn	Glu	Thr	
		195					200					205				
ctc	g	gtc	tcc	gtc	ggt	atc	gac	gtg	acc	aag	acg	ctg	acg	ctg	g	672
Leu	Ala	Val	Ser	Val	Gly	Ile	Asp	Val	Thr	Lys	Thr	Leu	Thr	Leu	Ala	
	210					215					220					
g	gtg	att	tcc	gcc	g	atc	gct	ggc	gcc	gcc	ggc	agc	ctc	tat	g	720
Ala	Val	Ile	Ser	Ala	Ala	Ile	Ala	Gly	Ala	Ala	Gly	Ser	Leu	Tyr	Ala	
225				230					235						240	
cac	tat	atc	cg	atc	atc	gat	ccg	gaa	gtg	ttt	gcc	ttc	atc	aac	acc	768
His	Tyr	Ile	Arg	Ile	Ile	Asp	Pro	Glu	Val	Phe	Ala	Phe	Ile	Asn	Thr	
				245				250						255		
gtc	acc	atg	gtg	atc	atg	gtc	atc	agt	ggc	ggc	aag	ggc	tcg	ctg	g	816
Val	Thr	Met	Val	Ile	Met	Val	Ile	Ser	Gly	Gly	Lys	Gly	Ser	Leu	Ala	
			260					265					270			
ggg	ccc	gtc	gtc	ggc	ggc	ctg	atc	ttc	ggg	ctg	ctg	cca	gtc	g	ctg	864
Gly	Pro	Val	Val	Gly	Gly	Leu	Ile	Phe	Gly	Leu	Leu	Pro	Val	Ala	Leu	
		275					280					285				
cgt	ccg	atc	atg	g	ccg	gag	g	caa	tgg	atc	gcc	tat	ggc	ggc	gtg	912
Arg	Pro	Ile	Met	Ala	Pro	Glu	Ala	Gln	Trp	Ile	Ala	Tyr	Gly	Gly	Val	
	290					295					300					
ctg	atc	gcc	atc	ctg	ttc	gtg	ctg	ccg	cg	ggc	atc	gtg	ccc	tcg	ctc	960
Leu	Ile	Ala	Ile	Leu	Phe	Val	Leu	Pro	Arg	Gly	Ile	Val	Pro	Ser	Leu	
305					310					315					320	
g	cag	cga	ttt	cg	agg	aga	cg	agc	ggc	acg	acg	g	ctg	g	ccg	1008
Ala	Gln	Arg	Phe	Arg	Arg	Arg	Arg	Ser	Gly	Thr	Thr	Ala	Leu	Ala	Pro	
				325					330					335		
gtg	gcc	ctc	gcc	gag	aca	g	gtc	aag	gag	cg	g	tga				1047
Val	Ala	Leu	Ala	Glu	Thr	Ala	Val	Lys	Glu	Arg	Ala					
			340					345								

<210> 805

<211> 348

<212> PRT

<213> Bradyrhizobium japonicum

<400> 805

Met	Arg	Ile	Ala	Leu	Thr	Ile	Leu	Ala	Val	Ala	Ala	Leu	Ala	Ser	Val	
1				5					10					15		
Pro	Leu	Trp	Leu	Arg	Asp	Pro	Tyr	Leu	Leu	Asn	Ala	Leu	Ile	Thr	Thr	
			20					25					30			
Gly	Ile	Phe	Val	Ile	Gly	Ala	Met	Ser	Leu	Asn	Leu	Leu	Leu	Gly	Phe	
		35					40					45				
Thr	Gly	Gln	Leu	Ser	Leu	Gly	His	Ile	Ala	Phe	Phe	Gly	Ile	Gly	Ala	
	50					55					60					
Tyr	Val	Ser	Ala	Leu	Thr	Ser	Leu	Gly	Phe	Asp	Ile	Gly	Leu	Pro	Gly	
65					70					75					80	
Asp	Leu	Arg	Leu	Val	His	Thr	Pro	Trp	Pro	Pro	Ile	Val	Gly	Phe	Val	
				85					90					95		
Leu	Ala	Ile	Leu	Ile	Ala	Gly	Leu	Cys	Gly	Tyr	Phe	Val	Gly	Leu	Leu	
			100					105					110			
Ser	Phe	Arg	Val	Arg	Gly	Ala	Tyr	Phe	Val	Ile	Val	Thr	Ile	Ser	Phe	
		115					120					125				
Ala	Glu	Val	Val	Arg	Leu	Val	Ala	Leu	Asn	Trp	Val	Glu	Leu	Thr	Gln	
	130					135					140					
Gly	Pro	Leu	Ala	Leu	Thr	Asn	Ile	Pro	Ser	Ile	Ala	Leu	Pro	Leu	Pro	
145					150					155					160	
Gly	Leu	Ser	Glu	Leu	Thr	Leu	Arg	Thr	Lys	Met	Gln	Asn	Tyr	Tyr	Leu	
				165					170					175		
Val	Leu	Val	Val	Ala	Leu	Ile	Ala	Tyr	Leu	Leu	Ile	Ala	Arg	Leu	Val	

His	Ser	His	180					185					190		
			Phe	Gly	Arg	Ala	Met	Arg	Gly	Leu	Met	Glu	Asn	Glu	Thr
		195					200					205			
Leu	Ala	Val	Ser	Val	Gly	Ile	Asp	Val	Thr	Lys	Thr	Leu	Thr	Leu	Ala
		210				215					220				
Ala	Val	Ile	Ser	Ala	Ala	Ile	Ala	Gly	Ala	Ala	Gly	Ser	Leu	Tyr	Ala
225				230						235					240
His	Tyr	Ile	Arg	Ile	Ile	Asp	Pro	Glu	Val	Phe	Ala	Phe	Ile	Asn	Thr
				245					250					255	
Val	Thr	Met	Val	Ile	Met	Val	Ile	Ser	Gly	Gly	Lys	Gly	Ser	Leu	Ala
			260					265					270		
Gly	Pro	Val	Val	Gly	Gly	Leu	Ile	Phe	Gly	Leu	Leu	Pro	Val	Ala	Leu
		275					280					285			
Arg	Pro	Ile	Met	Ala	Pro	Glu	Ala	Gln	Trp	Ile	Ala	Tyr	Gly	Gly	Val
		290				295					300				
Leu	Ile	Ala	Ile	Leu	Phe	Val	Leu	Pro	Arg	Gly	Ile	Val	Pro	Ser	Leu
305					310					315					320
Ala	Gln	Arg	Phe	Arg	Arg	Arg	Arg	Ser	Gly	Thr	Thr	Ala	Leu	Ala	Pro
				325					330					335	
Val	Ala	Leu	Ala	Glu	Thr	Ala	Val	Lys	Glu	Arg	Ala				
			340					345							

<213> *Bradyrhizobium japonicum*

<222> (1) .. (903)

atg Met 1	gat Asp	ctc Leu	gac Asp	gcg Ala 5	ctc Leu	gcc Ala	ggc Gly	tgc Cys	ctc Leu 10	tcc Ser	agc Ser	tcc Ser	gcc Ala	tgc Cys 15	ctg Leu
gtg Val	acg Thr	caa Gln	acc Thr 20	acc Thr	agc Ser	ggc Gly	ctc Leu	atc Ile 25	atc Ile	ggc Gly	atg Met	ctg Leu	ctg Leu 30	ttt Phe	ctg Leu
gtc Val	gcg Ala	gtc Val 35	ggg Gly	ctg Leu	acg Thr	ctg Leu	atc Ile 40	ttc Phe	ggg Gly	gtg Val	ctc Leu	aag Lys 45	gtc Val	gtc Val	aat Asn
ttc Phe	agc Ser 50	cac His	ggc Gly	gcc Ala	ttc Phe	tat Tyr 55	atg Met	ttc Phe	ggc Gly	gcc Ala	tat Tyr 60	ttt Phe	gcg Ala	atg Met	acg Thr
gcc Ala 65	tat Tyr	cat His	ctc Leu	acc Thr	gac Asp 70	agc Ser	ttt Phe	gcg Ala	ctg Leu	gcg Ala 75	atg Met	ctg Leu	gcg Ala	ggg Gly 80	gcg Ala
ggc Gly	ggc Gly	acc Thr	gcc Ala	atc Ile 85	ctc Leu	ggc Gly	ctg Leu	atc Ile 90	ttc Phe	gag Glu	cgc Arg	gtc Val	ttc Phe	atg Met 95	agc Ser
cgc Arg	gtc Val	tat Tyr	ggc Gly 100	gcc Ala	gac Asp	gtc Val	ttg Leu	atg Met 105	cag Gln	ctc Leu	ctc Leu	gtc Val	tgc Cys 110	tac Tyr	gcc Ala
ttc Phe	gtg Val	ctg Leu 115	atc Ile	ttc Phe	gat Asp	gat Asp	gtc Val 120	gtg Val	cgc Arg	atc Ile	atc Ile	tgg Trp 125	ggc Gly	ccc Pro	gag Glu
ttc Phe	aag Lys 130	tcg Ser	atg Met	ggc Gly	atg Met	cct Pro 135	gcg Ala	gcg Ala	ttc Phe	cag Gln	gtg Val 140	atg Met	ccg Pro	ctg Leu	ttc Phe
atc Ile 145	gcc Ala	ggc Gly	ggc Gly	gtg Val 150	gtg Val	ccg Pro	cct Pro	tat Tyr	tac Tyr	ctg Leu 155	ctg Leu	ctg Leu	atc Ile	ggc Gly	gtc Val 160
gcg Ala	ctc Leu	gtc Val	gcg Ala	gcc Ala 165	atc Ile	gtg Val	ctc Leu	ggc Gly	att Ile 170	ggg Gly	ctg Leu	tcg Ser	cgc Arg	agc Ser 175	cgc Arg
att Ile	ggc Gly	aag Lys	gtg Val 180	atc Ile	cgc Arg	gcc Ala	gcc Ala	gcg Ala 185	cac His	aat Asn	ccc Pro	ggc Gly	atg Met 190	gtg Val	tcg Ser
gcg	ctc	ggc	atc	aac	acc	ggc	ctg	atc	tat	ggc	ggc	gtg	ttc	gcg	ctc

BPS64510PC-2008083446

Ala	Leu	Gly	Ile	Asn	Thr	Gly	Leu	Ile	Tyr	Gly	Gly	Val	Phe	Ala	Leu		
ggc	ggc	atg	ctg	gcg	ggg	ctg	gct	ggg	gca	ctt	gcc	gcg	ccg	gtg	cgc	672	
Gly	Gly	Met	Leu	Ala	Gly	Leu	Ala	Gly	Ala	Leu	Ala	Ala	Pro	Val	Arg		
tcg	ctc	acc	ccc	ggc	atg	gga	ttc	tcg	gtg	ctg	atc	gaa	tcc	ttc	atc	720	
Ser	Leu	Thr	Pro	Gly	Met	Gly	Phe	Ser	Val	Leu	Ile	Glu	Ser	Phe	Ile		
gtc	acc	gtg	atc	ggc	ggc	atg	ggc	tcg	atc	ctg	ggc	gca	ctg	atc	ggc	768	
Val	Thr	Val	Ile	Gly	Gly	Met	Gly	Ser	Ile	Leu	Gly	Ala	Leu	Ile	Gly		
gcg	ctg	ctg	atc	ggc	ctg	atc	cgc	tcg	ttc	ggc	tcg	ctc	ggc	ttt	ccc	816	
Ala	Leu	Leu	Ile	Gly	Leu	Ile	Arg	Ser	Phe	Gly	Ser	Leu	Gly	Phe	Pro		
ctg	ttc	acg	gaa	ggg	ctg	atg	tac	ctg	ttc	atg	gtg	atc	gtg	ctg	gtc	864	
Leu	Phe	Thr	Glu	Gly	Leu	Met	Tyr	Leu	Phe	Met	Val	Ile	Val	Leu	Val		
tcc	aag	ccc	acc	ggc	ctg	ttc	ggc	aag	gag	gcg	gca	tga				903	
Ser	Lys	Pro	Thr	Gly	Leu	Phe	Gly	Lys	Glu	Ala	Ala						

<210> 807

<211> 300

<212> PRT

<213> Bradyrhizobium japonicum

<400> 807

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			20					25					30				
Val	Ala	Val	Gly	Leu	Thr	Leu	Ile	Phe	Gly	Val	Leu	Lys	Val	Val	Asn		
		35					40					45					
Phe	Ser	His	Gly	Ala	Phe	Tyr	Met	Phe	Gly	Ala	Tyr	Phe	Ala	Met	Thr		
	50					55					60						
Ala	Tyr	His	Leu	Thr	Asp	Ser	Phe	Ala	Leu	Ala	Met	Leu	Ala	Gly	Ala		
65					70					75					80		
Gly	Gly	Thr	Ala	Ile	Leu	Gly	Leu	Ile	Phe	Glu	Arg	Val	Phe	Met	Ser		
			85					90						95			
Arg	Val	Tyr	Gly	Ala	Asp	Val	Leu	Met	Gln	Leu	Leu	Val	Cys	Tyr	Ala		
			100					105					110				
Phe	Val	Leu	Ile	Phe	Asp	Asp	Val	Val	Arg	Ile	Ile	Trp	Gly	Pro	Glu		
		115				120						125					
Phe	Lys	Ser	Met	Gly	Met	Pro	Ala	Ala	Phe	Gln	Val	Met	Pro	Leu	Phe		
	130					135					140						
Ile	Ala	Gly	Gly	Val	Val	Pro	Pro	Tyr	Tyr	Leu	Leu	Leu	Ile	Gly	Val		
145					150					155					160		
Ala	Leu	Val	Ala	Ala	Ile	Val	Leu	Gly	Ile	Gly	Leu	Ser	Arg	Ser	Arg		
			165					170						175			
Ile	Gly	Lys	Val	Ile	Arg	Ala	Ala	Ala	His	Asn	Pro	Gly	Met	Val	Ser		
		180						185					190				
Ala	Leu	Gly	Ile	Asn	Thr	Gly	Leu	Ile	Tyr	Gly	Gly	Val	Phe	Ala	Leu		
		195					200					205					
Gly	Gly	Met	Leu	Ala	Gly	Leu	Ala	Gly	Ala	Leu	Ala	Ala	Pro	Val	Arg		
	210					215					220						
Ser	Leu	Thr	Pro	Gly	Met	Gly	Phe	Ser	Val	Leu	Ile	Glu	Ser	Phe	Ile		
225					230					235					240		
Val	Thr	Val	Ile	Gly	Gly	Met	Gly	Ser	Ile	Leu	Gly	Ala	Leu	Ile	Gly		
			245						250					255			
Ala	Leu	Leu	Ile	Gly	Leu	Ile	Arg	Ser	Phe	Gly	Ser	Leu	Gly	Phe	Pro		
			260					265					270				
Leu	Phe	Thr	Glu	Gly	Leu	Met	Tyr	Leu	Phe	Met	Val	Ile	Val	Leu	Val		
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Ser	Lys	Pro	Thr	Gly	Leu	Phe	Gly	Lys	Glu	Ala	Ala						
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<210> 808

<211> 906

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(906)

<400> 808

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1				5					10					15		
cag	agt	ctc	gcg	agc	ggc	ctg	ctc	atg	ggc	ctg	ctc	tac	gga	ctg	atc	96
Gln	Ser	Leu	Ala	Ser	Gly	Leu	Leu	Met	Gly	Leu	Leu	Tyr	Gly	Leu	Ile	
			20					25					30			
gcc	gtc	ggc	ctc	gcg	ctg	atc	ttc	ggc	ctg	atg	gac	gtc	gtg	aac	ttc	144
Ala	Val	Gly	Leu	Ala	Leu	Ile	Phe	Gly	Leu	Met	Asp	Val	Val	Asn	Phe	
		35					40					45				
gcc	cat	ggc	gag	ttc	ctg	atg	atc	gcg	atg	tat	gtg	agc	ttc	ttc	ctg	192
Ala	His	Gly	Glu	Phe	Leu	Met	Ile	Ala	Met	Tyr	Val	Ser	Phe	Phe	Leu	
	50					55					60					
ttc	gcg	ttc	ttc	gcc	atc	gac	ccc	ctg	ctg	tcg	gcg	ccg	ctg	gtc	gcc	240
Phe	Ala	Phe	Phe	Ala	Ile	Asp	Pro	Leu	Leu	Ser	Ala	Pro	Leu	Val	Ala	
	65				70					75					80	
gcg	gcc	ctg	ttc	gtg	ttc	ggg	gcg	gtc	gtc	tac	ctc	ttg	att	gta	cgc	288
Ala	Ala	Leu	Phe	Val	Phe	Gly	Ala	Val	Val	Tyr	Leu	Leu	Ile	Val	Arg	
				85					90					95		
ttc	gcg	atg	cgc	gcc	aag	gca	aac	gcc	ggc	atg	gtg	cag	atc	ttc	tcg	336
Phe	Ala	Met	Arg	Ala	Lys	Ala	Asn	Ala	Gly	Met	Val	Gln	Ile	Phe	Ser	
			100					105					110			
acc	ttc	ggc	ctt	gcc	atc	gtg	atg	cgc	ggg	ctc	gcg	cag	ttc	ttc	ttc	384
Thr	Phe	Gly	Leu	Ala	Ile	Val	Met	Arg	Gly	Leu	Ala	Gln	Phe	Phe	Phe	
		115					120					125				
acg	ccg	gac	tat	cgc	agc	att	ccg	cag	tcc	tgg	ctc	ggc	ggc	aag	acg	432
Thr	Pro	Asp	Tyr	Arg	Ser	Ile	Pro	Gln	Ser	Trp	Leu	Gly	Gly	Lys	Thr	
	130					135					140					
atc	tcg	atc	ggc	ggc	atc	ttc	ctg	ccg	gag	ccg	cag	ttg	atc	ggc	gcg	480
Ile	Ser	Ile	Gly	Gly	Ile	Phe	Leu	Pro	Glu	Pro	Gln	Leu	Ile	Gly	Ala	
	145				150				155						160	
ctg	gtc	tcg	atc	gcg	gct	ttc	gcc	ggc	ctc	tat	ttc	ttc	atc	aac	cgc	528
Leu	Val	Ser	Ile	Ala	Ala	Phe	Ala	Gly	Leu	Tyr	Phe	Phe	Ile	Asn	Arg	
				165				170						175		
act	gac	ttc	ggc	cgc	gcg	ctc	gaa	gcc	acc	cgc	gaa	gat	ccc	ggg	gca	576
Thr	Asp	Phe	Gly	Arg	Ala	Leu	Glu	Ala	Thr	Arg	Glu	Asp	Pro	Gly	Ala	
			180					185					190			
gtc	gca	ctc	gtc	ggc	atc	gac	aag	aac	cgc	gtg	ttc	gcg	ctg	ggc	tgg	624
Val	Ala	Leu	Val	Gly	Ile	Asp	Lys	Asn	Arg	Val	Phe	Ala	Leu	Gly	Trp	
		195					200					205				
ggc	ctg	ggc	ggc	gca	ctg	gtc	ggt	ctc	gcc	ggc	gcg	atc	atg	gcg	gtg	672
Gly	Leu	Gly	Ala	Ala	Leu	Val	Gly	Leu	Ala	Gly	Ala	Ile	Met	Ala	Val	
	210					215					220					
ttc	ttc	tac	atc	tat	ccg	gac	gtc	ggc	gcc	tcc	ttc	gcg	ctg	atc	gcc	720
Phe	Phe	Tyr	Ile	Tyr	Pro	Asp	Val	Gly	Ala	Ser	Phe	Ala	Leu	Ile	Ala	
	225				230					235					240	
tat	gtc	acg	gtt	gcg	ctc	ggt	ggt	ttc	ggc	agt	gtg	ttc	ggc	gcg	ttc	768
Tyr	Val	Thr	Val	Ala	Leu	Gly	Gly	Phe	Gly	Ser	Val	Phe	Gly	Ala	Phe	
				245				250						255		
gcc	ggc	ggc	atc	gtc	ggc	ctc	gtc	gag	gcg	acc	acc	gcc	ctg	gtg		816
Ala	Gly	Gly	Ile	Val	Gly	Leu	Val	Glu	Ala	Thr	Thr	Ala	Leu	Val		
			260				265					270				
ctg	ccg	cct	tcg	ctg	aaa	tcg	gtc	ggc	atc	tac	gcg	gtc	tat	ctg	ctc	864
Leu	Pro	Pro	Ser	Leu	Lys	Ser	Val	Gly	Ile	Tyr	Ala	Val	Tyr	Leu	Leu	
		275					280					285				
gtc	gtc	ttc	atc	cgg	ccg	cgc	ggc	ctg	ttc	gga	tcg	atg	tga			906
Val	Val	Phe	Ile	Arg	Pro	Arg	Gly	Leu	Phe	Gly	Ser	Met				
	290					295					300					

<210> 809

<211> 301

<212> PRT

<213> Bradyrhizobium japonicum

<400> 809

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      20      25      30
Ala Val Gly Leu Ala Leu Ile Phe Gly Leu Met Asp Val Val Asn Phe
      35      40      45
Ala His Gly Glu Phe Leu Met Ile Ala Met Tyr Val Ser Phe Phe Leu
      50      55      60
Phe Ala Phe Phe Ala Ile Asp Pro Leu Leu Ser Ala Pro Leu Val Ala
65      70      75      80
Ala Ala Leu Phe Val Phe Gly Ala Val Val Tyr Leu Leu Ile Val Arg
      85      90      95
Phe Ala Met Arg Ala Lys Ala Asn Ala Gly Met Val Gln Ile Phe Ser
      100      105      110
Thr Phe Gly Leu Ala Ile Val Met Arg Gly Leu Ala Gln Phe Phe Phe
      115      120      125
Thr Pro Asp Tyr Arg Ser Ile Pro Gln Ser Trp Leu Gly Gly Lys Thr
      130      135      140
Ile Ser Ile Gly Gly Ile Phe Leu Pro Glu Pro Gln Leu Ile Gly Ala
145      150      155      160
Leu Val Ser Ile Ala Ala Phe Ala Gly Leu Tyr Phe Phe Ile Asn Arg
      165      170      175
Thr Asp Phe Gly Arg Ala Leu Glu Ala Thr Arg Glu Asp Pro Gly Ala
      180      185      190
Val Ala Leu Val Gly Ile Asp Lys Asn Arg Val Phe Ala Leu Gly Trp
      195      200      205
Gly Leu Gly Ala Ala Leu Val Gly Leu Ala Gly Ala Ile Met Ala Val
      210      215      220
Phe Phe Tyr Ile Tyr Pro Asp Val Gly Ala Ser Phe Ala Leu Ile Ala
225      230      235      240
Tyr Val Thr Val Ala Leu Gly Gly Phe Gly Ser Val Phe Gly Ala Phe
      245      250      255
Ala Gly Gly Ile Ile Val Gly Leu Val Glu Ala Thr Thr Ala Leu Val
      260      265      270
Leu Pro Pro Ser Leu Lys Ser Val Gly Ile Tyr Ala Val Tyr Leu Leu
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Val Val Phe Ile Arg Pro Arg Gly Leu Phe Gly Ser Met
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<210> 810

<211> 1170

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(1170)

<400> 810

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ttc ctg ctg gtt gtc gcc gcg ctg ggc gtg ctg atc ccg ttg tcc aac      96
Phe Leu Leu Val Val Ala Ala Leu Gly Val Leu Ile Pro Leu Ser Asn
      20      25      30
ctg ctg ctg ccc gcg ggc tcg ttc ctg caa gtg ccg acc tat ctg gtc      144
Leu Leu Leu Pro Ala Gly Ser Phe Leu Gln Val Pro Thr Tyr Leu Val
      35      40      45
gcg ctc tgg ggc aag tat gtc tgt tac gcc atc ctg gcg ctc gcg atc      192
Ala Leu Trp Gly Lys Tyr Val Cys Tyr Ala Ile Leu Ala Leu Ala Ile
      50      55      60
gac ctg atc tgg ggc tat tgc ggc atc ctc tcg ctc ggc cac ggc gct      240
Asp Leu Ile Trp Gly Tyr Cys Gly Ile Leu Ser Leu Gly His Gly Ala
      65      70      75      80
ttc ttc gcg ctc ggc ggc tac gcg atg ggc atg tac ctg atg cgg cag      288
Phe Phe Ala Leu Gly Gly Tyr Ala Met Gly Met Tyr Leu Met Arg Gln
      85      90      95

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Ile	Gly	Thr	Arg	Gly	Val	Tyr	Gly	Asn	Pro	Ile	Leu	Pro	Asp	Phe	Met	
			100					105					110			
gtg	ttc	ctg	aac	tat	tcg	aag	ctg	ccc	tgg	tac	tgg	tac	ggc	ttc	gac	384
Val	Phe	Leu	Asn	Tyr	Ser	Lys	Leu	Pro	Trp	Tyr	Trp	Tyr	Gly	Phe	Asp	
		115					120					125				
atg	ttc	tgg	ttc	gcc	gcg	ctg	atg	gtg	ctg	gtc	gtg	ccg	ggc	ctg	ctc	432
Met	Phe	Trp	Phe	Ala	Ala	Leu	Met	Val	Leu	Val	Val	Pro	Gly	Leu	Leu	
		130				135					140					
gcc	ttc	tgc	ttc	ggc	tgg	ctc	gcc	ttc	cgc	tcc	cgc	gtc	acc	ggc	gtg	480
Ala	Phe	Cys	Phe	Gly	Trp	Leu	Ala	Phe	Arg	Ser	Arg	Val	Thr	Gly	Val	
		145			150					155					160	
tat	ctg	tcg	atc	atc	acg	cag	gcg	atg	acc	tat	gcg	ctg	ctg	ctc	gcc	528
Tyr	Leu	Ser	Ile	Ile	Thr	Gln	Ala	Met	Thr	Tyr	Ala	Leu	Leu	Leu	Ala	
				165					170					175		
ttc	ttc	cgc	aac	gat	ttc	ggc	ttc	ggc	ggc	aac	aac	ggc	ctg	acc	gac	576
Phe	Phe	Arg	Asn	Asp	Phe	Gly	Phe	Gly	Gly	Asn	Asn	Gly	Leu	Thr	Asp	
			180					185					190			
ttc	aag	gac	att	ttg	ggc	ttc	aac	gtg	cag	gcg	gaa	ggg	act	cgc	gcc	624
Phe	Lys	Asp	Ile	Leu	Gly	Phe	Asn	Val	Gln	Ala	Glu	Gly	Thr	Arg	Ala	
		195					200					205				
gcg	ctg	ttc	gcg	ctg	agc	tgc	ctg	gcg	ctg	atc	ctg	ggc	ttc	ctg	gtc	672
Ala	Leu	Phe	Ala	Leu	Ser	Cys	Leu	Ala	Leu	Ile	Leu	Gly	Phe	Leu	Val	
		210				215					220					
tgc	cgc	gcc	atc	gtc	tcg	tcc	aag	ctc	ggc	aag	gtg	ctg	atc	gcg	gtg	720
Cys	Arg	Ala	Ile	Val	Ser	Ser	Lys	Leu	Gly	Lys	Val	Leu	Ile	Ala	Val	
		225			230				235						240	
cgt	gat	gcg	gaa	tcg	cgc	acc	cgc	ttc	ctc	ggc	tac	cgg	gtc	gaa	tcc	768
Arg	Asp	Ala	Glu	Ser	Arg	Thr	Arg	Phe	Leu	Gly	Tyr	Arg	Val	Glu	Ser	
			245						250					255		
tac	aag	ctg	ttc	gtg	ttc	acg	gtg	tcg	gcc	tgc	atg	gcc	ggc	gtt	gcc	816
Tyr	Lys	Leu	Phe	Val	Phe	Thr	Val	Ser	Ala	Cys	Met	Ala	Gly	Val	Ala	
			260				265						270			
ggc	gcg	ctc	tac	gtg	ccg	cag	gtc	ggc	atc	atc	aat	ccg	agc	gaa	ttc	864
Gly	Ala	Leu	Tyr	Val	Pro	Gln	Val	Gly	Ile	Ile	Asn	Pro	Ser	Glu	Phe	
		275				280						285				
gcg	ccg	ggc	aat	tcg	atc	gag	gcg	gtg	atc	tgg	gtc	gcg	gtc	ggc	ggc	912
Ala	Pro	Gly	Asn	Ser	Ile	Glu	Ala	Val	Ile	Trp	Val	Ala	Val	Gly	Gly	
		290				295					300					
cgc	ggc	acg	ctg	gtc	ggc	gcg	gcg	ctc	ggc	gcc	gtc	gtc	gtc	aac	tat	960
Arg	Gly	Thr	Leu	Val	Gly	Ala	Ala	Leu	Gly	Ala	Val	Val	Val	Asn	Tyr	
		305			310				315						320	
gcc	aag	acg	ttc	ttc	acc	tct	ggc	atg	ctg	gcg	ccg	tac	tgg	ctg	ttc	1008
Ala	Lys	Thr	Phe	Phe	Thr	Ser	Gly	Met	Leu	Ala	Pro	Tyr	Trp	Leu	Phe	
				325				330						335		
atg	ctc	ggc	gcg	ctg	ttc	atc	ctg	gtg	acg	ctg	ctg	ctg	ccc	aag	ggc	1056
Met	Leu	Gly	Ala	Leu	Phe	Ile	Leu	Val	Thr	Leu	Leu	Leu	Pro	Lys	Gly	
			340				345						350			
atc	gtc	ggc	acc	ttc	aac	acc	tgg	tgg	gac	gcg	tcg	aag	gaa	aaa	cgt	1104
Ile	Val	Gly	Thr	Phe	Asn	Thr	Trp	Trp	Asp	Ala	Ser	Lys	Glu	Lys	Arg	
		355					360					365				
ccc	gcg	gcg	acc	acg	gcg	agt	gcc	gcg	gcc	gag	gac	ggc	gtc	acc	gaa	1152
Pro	Ala	Ala	Thr	Thr	Ala	Ser	Ala	Ala	Ala	Glu	Asp	Gly	Val	Thr	Glu	
		370				375					380					
cca	aag	atg	gcg	gag	tag											1170
Pro	Lys	Met	Ala	Glu												

<210> 811

<211> 389

<212> PRT

<213> Bradyrhizobium japonicum

<400> 811

Met	Thr	Pro	His	Met	Leu	Thr	Arg	Ser	Leu	Asp	Arg	Ser	Ala	Thr	Ile	
1				5					10					15		
Phe	Leu	Leu	Val	Val	Ala	Ala	Leu	Gly	Val	Leu	Ile	Pro	Leu	Ser	Asn	
			20					25					30			
Leu	Leu	Leu	Pro	Ala	Gly	Ser	Phe	Leu	Gln	Val	Pro	Thr	Tyr	Leu	Val	

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35 40 45
 Ala Leu Trp Gly Lys Tyr Val Cys Tyr Ala Ile Leu Ala Leu Ala Ile
 50 55 60
 Asp Leu Ile Trp Gly Tyr Cys Gly Ile Leu Ser Leu Gly His Gly Ala
 65 70 75 80
 Phe Phe Ala Leu Gly Gly Tyr Ala Met Gly Met Tyr Leu Met Arg Gln
 85 90 95
 Ile Gly Thr Arg Gly Val Tyr Gly Asn Pro Ile Leu Pro Asp Phe Met
 100 105 110
 Val Phe Leu Asn Tyr Ser Lys Leu Pro Trp Tyr Trp Tyr Gly Phe Asp
 115 120 125
 Met Phe Trp Phe Ala Ala Leu Met Val Leu Val Val Pro Gly Leu Leu
 130 135 140
 Ala Phe Cys Phe Gly Trp Leu Ala Phe Arg Ser Arg Val Thr Gly Val
 145 150 155 160
 Tyr Leu Ser Ile Ile Thr Gln Ala Met Thr Tyr Ala Leu Leu Leu Ala
 165 170 175
 Phe Phe Arg Asn Asp Phe Gly Phe Gly Asn Asn Gly Leu Thr Asp
 180 185 190
 Phe Lys Asp Ile Leu Gly Phe Asn Val Gln Ala Glu Gly Thr Arg Ala
 195 200 205
 Ala Leu Phe Ala Leu Ser Cys Leu Ala Leu Ile Leu Gly Phe Leu Val
 210 215 220
 Cys Arg Ala Ile Val Ser Lys Leu Gly Lys Val Leu Ile Ala Val
 225 230 235 240
 Arg Asp Ala Glu Ser Arg Thr Arg Phe Leu Gly Tyr Arg Val Glu Ser
 245 250 255
 Tyr Lys Leu Phe Val Phe Thr Val Ser Ala Cys Met Ala Gly Val Ala
 260 265 270
 Gly Ala Leu Tyr Val Pro Gln Val Gly Ile Ile Asn Pro Ser Glu Phe
 275 280 285
 Ala Pro Gly Asn Ser Ile Glu Ala Val Ile Trp Val Ala Val Gly Gly
 290 295 300
 Arg Gly Thr Leu Val Gly Ala Ala Leu Gly Ala Val Val Val Asn Tyr
 305 310 315 320
 Ala Lys Thr Phe Phe Thr Ser Gly Met Leu Ala Pro Tyr Trp Leu Phe
 325 330 335
 Met Leu Gly Ala Leu Phe Ile Leu Val Thr Leu Leu Leu Pro Lys Gly
 340 345 350
 Ile Val Gly Thr Phe Asn Thr Trp Trp Asp Ala Ser Lys Glu Lys Arg
 355 360 365
 Pro Ala Ala Thr Thr Ala Ser Ala Ala Ala Glu Asp Gly Val Thr Glu
 370 375 380
 Pro Lys Met Ala Glu
 385

<210> 812

<211> 1608

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(1608)

<400> 812

atg cca gct aat ttg tcc gcc cgc ctc tgt tcg ctc ctg ctc tcg ttg	48
Met Pro Ala Asn Leu Ser Ala Arg Leu Cys Ser Leu Leu Leu Ser Leu	
1 5 10 15	
ttc ctg atc gcg ttc gca ctg ccg gcc ttc gcc ggt ccg ttc gag gat	96
Phe Leu Ile Ala Phe Ala Leu Pro Ala Phe Ala Gly Pro Phe Glu Asp	
20 25 30	
gcg gtc gcc aaa ttc gcc aac gat gat tat tcc gac acg gaa gag gcg	144
Ala Val Ala Lys Phe Ala Asn Asp Asp Tyr Ser Asp Thr Glu Glu Ala	
35 40 45	
atc ggc gtg gtc gcg agc agc gcc aat ccg ctg gcc ttc ccc atc atc	192
Ile Gly Val Val Ala Ser Ser Gly Asn Pro Leu Ala Phe Pro Ile Ile	
50 55 60	
agc gcg ctc cag gac gcc cgc ctc atg gcc gat ccg gac agc aag aag	240

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Ser 65	Ala	Leu	Gln	Asp	Gly 70	Arg	Leu	Met	Ala	Asp 75	Pro	Asp	Ser	Lys	Lys 80	
gtt Val	tac Tyr	gtc Val	acc Thr	ggc Gly 85	acc Thr	gac Asp	ggc Gly	aag Lys	tcg Ser 90	atc Ile	gat Asp	gtc Val	gcg Ala	acc Thr 95	ggc Gly	288
cag Gln	gcg Ala	gtg Val	gcc Ala 100	agc Ser	gtt Val	ccc Pro	gac Asp	agt Ser 105	gcg Ala	agc Ser	gcg Ala	gtc Val	cgc Arg 110	ctc Leu	aac Asn	336
aac Asn	cgt Arg	ctt Leu 115	cgc Arg	cgc Arg	agc Ser	gtc Val	gat Asp 120	gcc Ala	gcg Ala	gtc Val	ggc Gly 125	agc Ser	ctg Leu	acg Thr	ctt Leu	384
cag Gln	tcg Ser 130	ccg Pro	gac Asp	gtc Val	gga Gly 135	acg Thr	cgc Arg	ctc Leu	cag Gln	gcc Ala 140	gcg Gln	caa Gln	tcc Ser	gtc Val	ttc Phe	432
aag Lys 145	tcg Ser	cat His	gag Glu	gag Glu	acc Thr 150	gcg Ala	ctc Leu	gaa Glu	gcc Ala	gtc Val 155	gat Asp	gcc Ala	gcg Ala	ctc Leu	gcc Ala 160	480
aag Lys	gaa Glu	acc Thr	aac Asn	aaa Lys 165	tca Ser	gtc Val	aag Lys	gct Ala	acg Thr 170	ctc Leu	ggc Gly	gaa Glu	gcc Ala	cgc Arg 175	gcg Ala	528
gcg Ala	atc Ile	ctg Leu	ctg Leu 180	ttc Phe	aag Lys	ccg Pro	gac Asp	gcc Ala 185	acc Thr	gag Glu	gtc Val	gag Glu	aag Lys 190	ctc Leu	gag Glu	576
gcc Ala	gtc Val	gcc Ala 195	acc Thr	ctc Leu	agg Arg	gcg Ala	cgc Arg 200	ggc Gly	gac Asp	cag Gln	gag Glu	gcg Ala 205	atg Met	gcg Ala	ctg Leu	624
ctc Leu	acc Thr 210	ggc Gly	atg Met	ggc Gly	gac Asp	cag Gln 215	ccg Pro	gcc Ala	tcg Ser	gtg Val 220	acc Thr	aag Lys	gcc Ala	gcc Ala	gcg Ala	672
agt Ser 225	gcg Ala	atc Ile	ggc Gly	tcg Ser	atc Ile 230	cag Gln	agt Ser	tcg Ser	ctc Leu	gcg Ala 235	gtc Val	tgg Trp	tcc Ser	acg Thr	gtg Val 240	720
cag Gln	aat Asn	gcc Ala	tgg Trp 245	tac Tyr	ggc Gly	ctc Leu	tcg Ser	ctc Leu	ggc Gly 250	tca Ser	gtg Val	ctg Leu	ctg Leu	ctc Leu 255	gcg Ala	768
gcg Ala	atc Ile	ggg Gly	ctt Leu 260	gcc Ala	atc Ile	acc Thr	ttc Phe	ggc Gly 265	gtg Val	atg Met	ggc Gly	gtc Val	atc Ile 270	aac Asn	atg Met	816
gcc Ala	cac His	ggc Gly 275	gaa Glu	atg Met	gtg Val	atg Met	tta Leu 280	ggg Gly	gcc Ala	tac Tyr	acc Thr	acc Thr 285	ttc Phe	gtg Val	gtg Val	864
cag Gln	gag Glu 290	gtg Val	atc Ile	cgc Arg	acc Thr	cgc Arg 295	tat Tyr	ccc Pro	ggc Gly	ctg Leu	ttc Phe 300	gac Asp	tat Tyr	tcc Ser	ttg Leu	912
ctg Leu 305	atc Ile	gcc Ala	gtg Val	ccg Pro	ctg Leu 310	gcc Ala	ttt Phe	ctc Leu	gtc Val 315	gcc Ala	ggc Gly	gcg Ala	atc Ile	ggc Gly	gtg Val 320	960
ttg Leu	atc Ile	gag Glu	cgc Arg	agc Ser 325	atc Ile	att Ile	cgc Arg	ttc Phe	ctc Leu 330	tac Tyr	ggc Gly	cggt Arg	ccg Pro	ctg Leu 335	gag Glu	1008
acg Thr	ctg Leu	ctg Leu	gcg Ala 340	acc Thr	tgg Trp	ggc Gly	ctg Leu	tcg Ser 345	ctg Leu	gtg Val	ctc Leu	cag Gln 350	cag Gln	gcg Ala	gtc Val	1056
cgc Arg	acc Thr 355	atg Met	ttc Phe	ggc Gly	ccg Pro	acc Thr	aac Asn 360	cgc Arg	gag Glu	gtc Val	ggc Gly 365	aac Asn 365	ccc Pro	tcc Ser	tgg Trp	1104
atg Met	agc Ser 370	ggc Gly	gcc Ala	ttc Phe	gag Glu	ctc Leu 375	ggc Gly	cag Gln	atc Ile	acc Thr	att Ile 380	acc Thr	tat Tyr	aac Asn	cggt Arg	1152
ctc Leu 385	tgg Trp	atc Ile	ctc Leu	tgc Cys	ttc Phe 390	acg Thr	ctc Leu	gcc Ala	gtg Val 395	ttc Phe	gcg Ala	atc Ile	ctg Leu	ctc Leu	gcg Ala 400	1200
atg Met	ctg Leu	cgct Arg	tac Tyr 405	acc Thr	gcg Ala	ctg Leu	ggc Gly	ctg Leu	gag Glu 410	atg Met	cgct Arg	gcg Ala	gtg Val 415	acg Thr	cag Gln	1248
aac Asn	cggt Arg	cgct Arg	atg Met 420	gcg Ala	gcc Ala	tcg Ser	atg Met	ggc Gly 425	atc Ile	gcc Ala	acc Thr	tcg Ser 430	cgct Arg	gtc Val	gac Asp	1296
gcg	ctc	acc	ttc	ggc	ctg	ggt	tcg	ggc	att	gcc	ggc	atc	gcc	ggc	gtg	1344

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Ala	Leu	Thr	Phe	Gly	Leu	Gly	Ser	Gly	Ile	Ala	Gly	Ile	Ala	Gly	Val		
		435					440					445					
gcg	ctg	tcg	cag	atc	gac	aat	gtc	agt	ccc	aat	ctc	ggc	cag	agc	tac		1392
Ala	Leu	Ser	Gln	Ile	Asp	Asn	Val	Ser	Pro	Asn	Leu	Gly	Gln	Ser	Tyr		
		450				455					460						
atc	atc	gac	agc	ttc	atg	gtc	gtg	gtg	ttc	ggc	ggg	gtc	ggc	aat	ctc		1440
Ile	Ile	Asp	Ser	Phe	Met	Val	Val	Val	Phe	Gly	Gly	Val	Gly	Asn	Leu		
		465			470					475					480		
tgg	ggc	acg	ctg	gtc	ggc	gcc	ttc	acg	ctc	ggc	atc	gcc	aac	aag	ttc		1488
Trp	Gly	Thr	Leu	Val	Gly	Ala	Phe	Thr	Leu	Gly	Ile	Ala	Asn	Lys	Phe		
				485					490					495			
ctg	gag	ccg	gtc	gca	ggc	gcc	gtg	ctc	ggc	aag	atc	gcc	atc	ctg	gtt		1536
Leu	Glu	Pro	Val	Ala	Gly	Ala	Val	Leu	Gly	Lys	Ile	Ala	Ile	Leu	Val		
			500					505					510				
ctc	atc	atc	ctt	ttc	att	caa	aag	cgg	ccg	cgc	ggt	ctg	ttc	gcg	ctc		1584
Leu	Ile	Ile	Leu	Phe	Ile	Gln	Lys	Arg	Pro	Arg	Gly	Leu	Phe	Ala	Leu		
		515					520					525					
aag	ggc	cgt	gcg	gtg	gaa	gca	tga										1608
Lys	Gly	Arg	Ala	Val	Glu	Ala											
		530				535											

<210> 813

<211> 535

<212> PRT

<213> Bradyrhizobium japonicum

<400> 813

Met	Pro	Ala	Asn	Leu	Ser	Ala	Arg	Leu	Cys	Ser	Leu	Leu	Leu	Ser	Leu		
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Phe	Leu	Ile	Ala	Phe	Ala	Leu	Pro	Ala	Phe	Ala	Gly	Pro	Phe	Glu	Asp		
			20					25					30				
Ala	Val	Ala	Lys	Phe	Ala	Asn	Asp	Asp	Tyr	Ser	Asp	Thr	Glu	Glu	Ala		
		35					40					45					
Ile	Gly	Val	Val	Ala	Ser	Ser	Gly	Asn	Pro	Leu	Ala	Phe	Pro	Ile	Ile		
	50					55					60						
Ser	Ala	Leu	Gln	Asp	Gly	Arg	Leu	Met	Ala	Asp	Pro	Asp	Ser	Lys	Lys		
65				70					75						80		
Val	Tyr	Val	Thr	Gly	Thr	Asp	Gly	Lys	Ser	Ile	Asp	Val	Ala	Thr	Gly		
			85					90						95			
Gln	Ala	Val	Ala	Ser	Val	Pro	Asp	Ser	Ala	Ser	Ala	Val	Arg	Leu	Asn		
			100					105					110				
Asn	Arg	Leu	Arg	Arg	Ser	Val	Asp	Ala	Ala	Val	Gly	Ser	Leu	Thr	Leu		
		115					120					125					
Gln	Ser	Pro	Asp	Val	Gly	Thr	Arg	Leu	Gln	Ala	Ala	Gln	Ser	Val	Phe		
	130					135				140							
Lys	Ser	His	Glu	Glu	Thr	Ala	Leu	Glu	Ala	Val	Asp	Ala	Ala	Leu	Ala		
145				150					155					160			
Lys	Glu	Thr	Asn	Lys	Ser	Val	Lys	Ala	Thr	Leu	Gly	Glu	Ala	Arg	Ala		
			165					170						175			
Ala	Ile	Leu	Leu	Phe	Lys	Pro	Asp	Ala	Thr	Glu	Val	Glu	Lys	Leu	Glu		
		180					185						190				
Ala	Val	Ala	Thr	Leu	Arg	Ala	Arg	Gly	Asp	Gln	Glu	Ala	Met	Ala	Leu		
		195					200					205					
Leu	Thr	Gly	Met	Gly	Asp	Gln	Pro	Ala	Ser	Val	Thr	Lys	Ala	Ala	Ala		
	210					215					220						
Ser	Ala	Ile	Gly	Ser	Ile	Gln	Ser	Ser	Leu	Ala	Val	Trp	Ser	Thr	Val		
225				230						235					240		
Gln	Asn	Ala	Trp	Tyr	Gly	Leu	Ser	Leu	Gly	Ser	Val	Leu	Leu	Leu	Ala		
			245						250					255			
Ala	Ile	Gly	Leu	Ala	Ile	Thr	Phe	Gly	Val	Met	Gly	Val	Ile	Asn	Met		
		260					265						270				
Ala	His	Gly	Glu	Met	Val	Met	Leu	Gly	Ala	Tyr	Thr	Thr	Phe	Val	Val		
		275					280					285					
Gln	Glu	Val	Ile	Arg	Thr	Arg	Tyr	Pro	Gly	Leu	Phe	Asp	Tyr	Ser	Leu		
	290					295					300						
Leu	Ile	Ala	Val	Pro	Leu	Ala	Phe	Leu	Val	Ala	Gly	Ala	Ile	Gly	Val		
305					310					315					320		
Leu	Ile	Glu	Arg	Ser	Ile	Ile	Arg	Phe	Leu	Tyr	Gly	Arg	Pro	Leu	Glu		
			325						330					335			

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Thr Leu Leu Ala Thr Trp Gly Leu Ser Leu Val Leu Gln Gln Ala Val
 340 345 350
 Arg Thr Met Phe Gly Pro Thr Asn Arg Glu Val Gly Asn Pro Ser Trp
 355 360 365
 Met Ser Gly Ala Phe Glu Leu Gly Gln Ile Thr Ile Thr Tyr Asn Arg
 370 375 380
 Leu Trp Ile Leu Cys Phe Thr Leu Ala Val Phe Ala Ile Leu Leu Ala
 385 390 395 400
 Met Leu Arg Tyr Thr Ala Leu Gly Leu Glu Met Arg Ala Val Thr Gln
 405 410 415
 Asn Arg Arg Met Ala Ala Ser Met Gly Ile Ala Thr Ser Arg Val Asp
 420 425 430
 Ala Leu Thr Phe Gly Leu Gly Ser Gly Ile Ala Gly Ile Ala Gly Val
 435 440 445
 Ala Leu Ser Gln Ile Asp Asn Val Ser Pro Asn Leu Gly Gln Ser Tyr
 450 455 460
 Ile Ile Asp Ser Phe Met Val Val Val Phe Gly Gly Val Gly Asn Leu
 465 470 475 480
 Trp Gly Thr Leu Val Gly Ala Phe Thr Leu Gly Ile Ala Asn Lys Phe
 485 490 495
 Leu Glu Pro Val Ala Gly Ala Val Leu Gly Lys Ile Ala Ile Leu Val
 500 505 510
 Leu Ile Ile Leu Phe Ile Gln Lys Arg Pro Arg Gly Leu Phe Ala Leu
 515 520 525
 Lys Gly Arg Ala Val Glu Ala
 530 535

<210> 814

<211> 876

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(876)

<400> 814

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Met Ser Asn Leu Phe Asp Leu Leu Val Ala Gly Leu Ala Thr Gly Ala	
1 5 10 15	
atc tat gca ctg gtc gcg gtc ggc ttc acg ctg ctg tgg cag acc tcg	96
Ile Tyr Ala Leu Val Ala Val Gly Phe Thr Leu Leu Trp Gln Thr Ser	
20 25 30	
cag acc atc aat ttc gcg cag ggc gag ttc gtg atg ctg ccg gcg ttc	144
Gln Thr Ile Asn Phe Ala Gln Gly Glu Phe Val Met Leu Pro Ala Phe	
35 40 45	
ctg atg ctc gcg acg atg cat gtt ggc gcg ccg ttc tgg ctc gcg atc	192
Leu Met Leu Ala Thr Met His Val Gly Ala Pro Phe Trp Leu Ala Ile	
50 55 60	
atc ctc ggc atc ctg ctc tcg atg atc ctg ctc ggc ctc gcc ttc aag	240
Ile Leu Gly Ile Leu Leu Ser Met Ile Leu Leu Gly Leu Ala Phe Lys	
65 70 75 80	
atg ctg ctg gtc gat ccg atg atg cgc cat ggc gtg ctg ccg ctg gcg	288
Met Leu Leu Val Asp Pro Met Met Arg His Gly Val Leu Pro Leu Ala	
85 90 95	
atc gcg acc atg gcg ctg gcg atc ggc atc aag gaa tcg gtg aag cag	336
Ile Ala Thr Met Ala Leu Ala Ile Gly Ile Lys Glu Ser Val Lys Gln	
100 105 110	
ttc ttc agc gcg gag gcc tcg ccc ttc ccc tcg atc gtg ccg acc ggc	384
Phe Phe Ser Ala Glu Ala Ser Pro Phe Pro Ser Ile Val Pro Thr Gly	
115 120 125	
gat atc tcc atc ctc ggc cac gcc gtc tcg ctg caa agc atc ggc gtc	432
Asp Ile Ser Ile Leu Gly His Ala Val Ser Leu Gln Ser Ile Gly Val	
130 135 140	
ctc gtc gtc gcc att ctt gca gtc ttc ggc ctg acc tcg ctc ctc aac	480
Leu Val Val Ala Ile Leu Ala Val Phe Gly Leu Thr Ser Leu Leu Asn	
145 150 155 160	
cgc acc tcg ctc ggc cac cag atg cag gcg gcc gcc cag aat ccg acg	528
Arg Thr Ser Leu Gly His Gln Met Gln Ala Ala Ala Gln Asn Pro Thr	

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gtg	gcg	cg	atc	165	ggc	gtg	ccc	gtg	170	gag	cg	atg	atc	ctg	175	acc	576
Val	Ala	Arg	Ile	Ile	Gly	Val	Pro	Val	Glu	Arg	Met	Ile	Leu	Leu	Leu	Thr	
ttc	ctg	atc	aac	180	gcc	ttc	ctg	gtc	185	gag	gag	tcg	ctg	ctg	atc	acg	624
Phe	Leu	Ile	Asn	Ala	Phe	Leu	Val	Ala	Leu	Ala	Ser	Leu	Leu	Ile	Thr		
ccg	att	tac	ctc	195	gag	aaa	ttc	tcg	200	gag	gag	gtg	ctg	ggc	cag	gcc	672
Pro	Ile	Tyr	Leu	Ala	Lys	Phe	Ser	Ser	Gly	Glu	Val	Leu	Gly	Gln	Ala		
gcc	ttc	atc	gag	210	gag	atc	gtc	ggc	215	gag	aac	cag	gtg	cg	ggc	gag	720
Ala	Phe	Ile	Ala	Ala	Ile	Val	Gly	Gly	Phe	Asn	Gln	Val	Arg	Gly	Ala		
225				230					235						240		
atc	gag	ggc	ggc	245	ctg	ttg	atc	ggc	250	gag	aac	ctc	gag	gca	agc		768
Ile	Ala	Gly	Gly	Leu	Leu	Ile	Gly	Val	Leu	Asp	Asn	Leu	Ala	Ala	Ser		
tac	gtc	tcg	acg	260	caa	tac	cg	gag	265	gtg	ccg	ctg	atc	ttc	ctg	atc	816
Tyr	Val	Ser	Thr	Gln	Tyr	Arg	Ala	Ala	Val	Pro	Leu	Ile	Phe	Leu	Ile		
gtc	gtc	atc	ctg	275	ttc	cg	ccg	caa	280	gag	ctc	ggc	cg	ggc	gag	gag	864
Val	Val	Ile	Leu	Phe	Arg	Pro	Gln	Gly	Leu	Leu	Gly	Arg	Ala	Glu	Glu		
cg	acg	gta	tga														876
Arg	Thr	Val															
290																	

<210> 815

<211> 291

<212> PRT

<213> Bradyrhizobium japonicum

<400> 815

Met	Ser	Asn	Leu	Phe	Asp	Leu	Leu	Val	Ala	Gly	Leu	Ala	Thr	Gly	Ala		
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Ile	Tyr	Ala	Leu	Val	Ala	Val	Gly	Phe	Thr	Leu	Leu	Trp	Gln	Thr	Ser		
			20					25					30				
Gln	Thr	Ile	Asn	Phe	Ala	Gln	Gly	Glu	Phe	Val	Met	Leu	Pro	Ala	Phe		
		35					40					45					
Leu	Met	Leu	Ala	Thr	Met	His	Val	Gly	Ala	Pro	Phe	Trp	Leu	Ala	Ile		
	50					55					60						
Ile	Leu	Gly	Ile	Leu	Leu	Ser	Met	Ile	Leu	Leu	Gly	Leu	Ala	Phe	Lys		
65				70						75					80		
Met	Leu	Leu	Val	Asp	Pro	Met	Met	Arg	His	Gly	Val	Leu	Pro	Leu	Ala		
			85					90						95			
Ile	Ala	Thr	Met	Ala	Leu	Ala	Ile	Gly	Ile	Lys	Glu	Ser	Val	Lys	Gln		
			100					105					110				
Phe	Phe	Ser	Ala	Glu	Ala	Ser	Pro	Phe	Pro	Ser	Ile	Val	Pro	Thr	Gly		
		115					120					125					
Asp	Ile	Ser	Ile	Leu	Gly	His	Ala	Val	Ser	Leu	Gln	Ser	Ile	Gly	Val		
	130					135					140						
Leu	Val	Val	Ala	Ile	Leu	Ala	Val	Phe	Gly	Leu	Thr	Ser	Leu	Leu	Asn		
145				150					155						160		
Arg	Thr	Ser	Leu	Gly	His	Gln	Met	Gln	Ala	Ala	Ala	Gln	Asn	Pro	Thr		
			165					170					175				
Val	Ala	Arg	Ile	Ile	Gly	Val	Pro	Val	Glu	Arg	Met	Ile	Leu	Leu	Thr		
			180					185					190				
Phe	Leu	Ile	Asn	Ala	Phe	Leu	Val	Ala	Leu	Ala	Ser	Leu	Leu	Ile	Thr		
		195					200					205					
Pro	Ile	Tyr	Leu	Ala	Lys	Phe	Ser	Ser	Gly	Glu	Val	Leu	Gly	Gln	Ala		
	210					215					220						
Ala	Phe	Ile	Ala	Ala	Ile	Val	Gly	Gly	Phe	Asn	Gln	Val	Arg	Gly	Ala		
225				230					235						240		
Ile	Ala	Gly	Gly	Leu	Ile	Gly	Val	Leu	Asp	Asn	Leu	Ala	Ala	Ser			
			245					250					255				
Tyr	Val	Ser	Thr	Gln	Tyr	Arg	Ala	Ala	Val	Pro	Leu	Ile	Phe	Leu	Ile		
			260					265					270				
Val	Val	Ile	Leu	Phe	Arg	Pro	Gln	Gly	Leu	Leu	Gly	Arg	Ala	Glu	Glu		
		275					280					285					
Arg	Thr	Val															

290

<210> 816
 <211> 1011
 <212> DNA
 <213> Bradyrhizobium japonicum

<220>
 <221> CDS
 <222> (1)..(1011)

<400> 816
 atg aca gaa ctt gcc gca aac gat ccg ctg ccg aag ccg aag cgc gac 48
 Met Thr Glu Leu Ala Ala Asn Asp Pro Leu Pro Lys Pro Lys Arg Asp
 1 5 10 15
 atc gcg ccg atc ctg ctg ccg atc gcg ctc gcc ctc ctg gtg atc ccg 96
 Ile Ala Pro Ile Leu Leu Pro Ile Ala Leu Ala Leu Val Ile Pro
 20 25 30
 ctg gtc ggc tcg ccc agc acc tgg ctg acg ctg acc gcc gcg agc ctc 144
 Leu Val Gly Ser Pro Ser Thr Trp Leu Thr Leu Thr Ala Ala Ser Leu
 35 40 45
 gcc atg ggc atg atg atc ttc atc atg gcc tcc ggg ctg acg ctg gtg 192
 Ala Met Gly Met Met Ile Phe Ile Met Ala Ser Gly Leu Thr Leu Val
 50 55 60
 ttc ggc ctg atg gac gtg ctc aat ttc ggt cat ggc gcc ttc atc gcc 240
 Phe Gly Leu Met Asp Val Leu Asn Phe Gly His Gly Ala Phe Ile Ala
 65 70 75 80
 gtc ggc gcc tat gtc gca acc ctg gtg ctg gca ccg ttt gcg gcg tcc 288
 Val Gly Ala Tyr Val Ala Thr Leu Val Leu Ala Pro Phe Ala Ala Ser
 85 90 95
 att cag gcc gat tcg ctc tgg atg aac ctc gcg gtg ctg gcg ccg gct 336
 Ile Gln Ala Asp Ser Leu Trp Met Asn Leu Ala Val Leu Ala Pro Ala
 100 105 110
 gcg ctg ctg tcg atg gcg gtg tcc ggc gcg ctc ggc ctg gtc gtc gag 384
 Ala Leu Leu Ser Met Ala Val Ser Gly Ala Leu Gly Leu Val Val Glu
 115 120 125
 cgc gtg ctg atc ctg ccg gtc tac ggc cag cat ctg aag cag atc ctg 432
 Arg Val Leu Ile Leu Pro Val Tyr Gly Gln His Leu Lys Gln Ile Leu
 130 135 140
 atg acg acc ggc ggc ctg atc gtc gcc gag cag acg ctc tat gcg ctg 480
 Met Thr Thr Gly Gly Leu Ile Val Ala Glu Gln Thr Leu Tyr Ala Leu
 145 150 155 160
 tgg ggg ccg cag atc atc ccg atg ccg ctg ccc acc tcg ctg cgc ggc 528
 Trp Gly Pro Gln Ile Ile Pro Met Pro Leu Pro Thr Ser Leu Arg Gly
 165 170 175
 tcc ttc atc ctc ggc gac gtc gcg atc gcc aag tac cgc gtg ctg gcg 576
 Ser Phe Ile Leu Gly Asp Val Ala Ile Ala Lys Tyr Arg Val Leu Ala
 180 185 190
 acg ctg atc ggc ctt gcc gtc ttc atc gcg atc cag ctc gtg ctc aac 624
 Thr Leu Ile Gly Leu Ala Val Phe Ile Ala Ile Gln Leu Val Leu Asn
 195 200 205
 cgc acc aag ctc ggc ctg ctg atc cgc gcc ggg gtc gag aac cgc gag 672
 Arg Thr Lys Leu Gly Leu Leu Ile Arg Ala Gly Val Glu Asn Arg Glu
 210 215 220
 atg gtc gag gcg ctc ggc tat cgc atc cgc cgc ctg ttc ctc ggc gtg 720
 Met Val Glu Ala Leu Gly Tyr Arg Ile Arg Arg Leu Phe Leu Gly Val
 225 230 235 240
 ttc atg acg ggc tcc gcg ctc gca ggc ctc ggc gga gtg atg tgg gcg 768
 Phe Met Thr Gly Ser Ala Leu Ala Gly Leu Gly Gly Val Met Trp Ala
 245 250 255
 ctc tat cgc gag cag gtc cac gcc tcc atg agc gac gac ctc acc gtg 816
 Leu Tyr Arg Glu Gln Val His Ala Ser Met Ser Asp Asp Leu Thr Val
 260 265 270
 ctg atc ttc atc gtc gtc atc atc ggc ggc ctc ggg tcg atc ggc ggc 864
 Leu Ile Phe Ile Val Val Ile Ile Gly Gly Leu Gly Ser Ile Gly Gly
 275 280 285
 tgc ttc atc ggc gcg atc ctg gtg gcg atg gtc gcc aat tac ggc ggc 912
 Cys Phe Ile Gly Ala Ile Leu Val Ala Met Val Ala Asn Tyr Gly Gly
 290 295 300

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ttc	ctg	gtg	ccg	aaa	ctc	gcc	ctc	gtc	tcc	aac	atc	ctg	ctg	atg	gtc	960
Phe	Leu	Val	Pro	Lys	Leu	Ala	Leu	Val	Ser	Asn	Ile	Leu	Leu	Met	Val	
305					310					315					320	
gcc	att	ctg	atg	tgg	cgg	ccg	cgc	ggc	ctc	tat	gcg	gtg	acc	agc	cga	1008
Ala	Ile	Leu	Met	Trp	Arg	Pro	Arg	Gly	Leu	Tyr	Ala	Val	Thr	Ser	Arg	
				325					330					335		
tga																1011

<210> 817

<211> 336

<212> PRT

<213> Bradyrhizobium japonicum

<400> 817

Met	Thr	Glu	Leu	Ala	Ala	Asn	Asp	Pro	Leu	Pro	Lys	Pro	Lys	Arg	Asp	
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Ile	Ala	Pro	Ile	Leu	Leu	Pro	Ile	Ala	Leu	Ala	Leu	Leu	Val	Ile	Pro	
			20					25					30			
Leu	Val	Gly	Ser	Pro	Ser	Thr	Trp	Leu	Thr	Leu	Thr	Ala	Ala	Ser	Leu	
		35					40					45				
Ala	Met	Gly	Met	Met	Ile	Phe	Ile	Met	Ala	Ser	Gly	Leu	Thr	Leu	Val	
	50					55					60					
Phe	Gly	Leu	Met	Asp	Val	Leu	Asn	Phe	Gly	His	Gly	Ala	Phe	Ile	Ala	
65					70				75						80	
Val	Gly	Ala	Tyr	Val	Ala	Thr	Leu	Val	Leu	Ala	Pro	Phe	Ala	Ala	Ser	
				85					90					95		
Ile	Gln	Ala	Asp	Ser	Leu	Trp	Met	Asn	Leu	Ala	Val	Leu	Ala	Pro	Ala	
			100					105					110			
Ala	Leu	Leu	Ser	Met	Ala	Val	Ser	Gly	Ala	Leu	Gly	Leu	Val	Val	Glu	
		115					120					125				
Arg	Val	Leu	Ile	Leu	Pro	Val	Tyr	Gly	Gln	His	Leu	Lys	Gln	Ile	Leu	
	130					135					140					
Met	Thr	Thr	Gly	Gly	Leu	Ile	Val	Ala	Glu	Gln	Thr	Leu	Tyr	Ala	Leu	
145					150					155					160	
Trp	Gly	Pro	Gln	Ile	Ile	Pro	Met	Pro	Leu	Pro	Thr	Ser	Leu	Arg	Gly	
			165						170					175		
Ser	Phe	Ile	Leu	Gly	Asp	Val	Ala	Ile	Ala	Lys	Tyr	Arg	Val	Leu	Ala	
			180					185					190			
Thr	Leu	Ile	Gly	Leu	Ala	Val	Phe	Ile	Ala	Ile	Gln	Leu	Val	Leu	Asn	
		195					200					205				
Arg	Thr	Lys	Leu	Gly	Leu	Leu	Ile	Arg	Ala	Gly	Val	Glu	Asn	Arg	Glu	
	210					215					220					
Met	Val	Glu	Ala	Leu	Gly	Tyr	Arg	Ile	Arg	Arg	Leu	Phe	Leu	Gly	Val	
225					230					235					240	
Phe	Met	Thr	Gly	Ser	Ala	Leu	Ala	Gly	Leu	Gly	Gly	Val	Met	Trp	Ala	
				245					250					255		
Leu	Tyr	Arg	Glu	Gln	Val	His	Ala	Ser	Met	Ser	Asp	Asp	Leu	Thr	Val	
			260					265					270			
Leu	Ile	Phe	Ile	Val	Val	Ile	Ile	Gly	Gly	Leu	Gly	Ser	Ile	Gly	Gly	
		275					280					285				
Cys	Phe	Ile	Gly	Ala	Ile	Leu	Val	Ala	Met	Val	Ala	Asn	Tyr	Gly	Gly	
	290					295					300					
Phe	Leu	Val	Pro	Lys	Leu	Ala	Leu	Val	Ser	Asn	Ile	Leu	Leu	Met	Val	
305					310					315					320	
Ala	Ile	Leu	Met	Trp	Arg	Pro	Arg	Gly	Leu	Tyr	Ala	Val	Thr	Ser	Arg	
				325					330					335		

<210> 818

<211> 858

<212> DNA

<213> Bradyrhizobium japonicum

<220>

<221> CDS

<222> (1)..(858)

<400> 818

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atg	gct	aac	gcg	ttc	gtc	gcg	gag	atc	ctg	agg	ttt	ggc	gcg	48		
Met	Ala	Asn	Ala	Phe	Val	Ala	Glu	Ile	Leu	Ser	Phe	Gly	Ala			
1				5			10				15					
atc	atc	gtc	ctg	atc	gtg	ctg	ggg	ctc	ggg	atc	atc	gcc	agg	atg	atg	96
Ile	Ile	Val	Leu	Ile	Val	Leu	Gly	Leu	Gly	Ile	Ile	Ala	Ser	Met	Met	
			20				25					30				
ggc	atc	ttc	aac	ttc	gcg	caa	gga	gag	ttc	gtc	ctg	ctc	ggg	gcc	tac	144
Gly	Ile	Phe	Asn	Phe	Ala	Gln	Gly	Glu	Phe	Val	Leu	Leu	Gly	Ala	Tyr	
		35					40				45					
atc	acc	tat	ctc	gcc	tac	gcc	ggg	ggc	ctg	ccg	atc	tgg	gcc	ggc	atg	192
Ile	Thr	Tyr	Leu	Ala	Tyr	Ala	Gly	Gly	Leu	Pro	Ile	Trp	Ala	Gly	Met	
	50					55				60						
gtc	gcg	gcg	ccc	ttc	gtg	gtc	ggc	gag	ctc	ggc	ttt	gtg	ctg	gag	gag	240
Val	Ala	Ala	Pro	Phe	Val	Val	Gly	Ala	Leu	Gly	Phe	Val	Leu	Glu	Ala	
	65				70					75					80	
ctg	atc	atc	cg	cg	ttc	tac	gcc	gag	ccg	atc	gtg	gag	atg	ctc	ggc	288
Leu	Ile	Ile	Arg	Arg	Phe	Tyr	Ala	Ala	Pro	Ile	Val	Ala	Met	Leu	Gly	
				85					90					95		
acc	tat	gag	ctc	ggc	ctg	atc	atc	cg	gaa	tcc	gtg	cg	ggc	ctg	atc	336
Thr	Tyr	Ala	Leu	Gly	Leu	Ile	Ile	Arg	Glu	Ser	Val	Arg	Gly	Leu	Ile	
			100					105					110			
ggc	ggc	ttc	tat	ctc	acc	gtg	ccc	gag	ccg	atc	ggc	ggc	tcc	atc	gac	384
Gly	Gly	Phe	Tyr	Leu	Thr	Val	Pro	Glu	Pro	Ile	Gly	Gly	Ser	Ile	Asp	
		115					120					125				
atc	ggc	gag	atg	cac	atc	tgc	gca	tgg	cg	ttc	acc	atc	atc	gtc	atc	432
Ile	Gly	Ala	Met	His	Ile	Ser	Ala	Trp	Arg	Phe	Thr	Ile	Ile	Val	Ile	
	130					135					140					
acg	ctg	ctg	gtg	atg	ggc	ggc	tgc	tat	ctc	ctg	ctc	tct	cg	acg	agg	480
Thr	Leu	Leu	Val	Met	Gly	Gly	Cys	Tyr	Leu	Leu	Leu	Ser	Arg	Thr	Ser	
	145				150					155					160	
ttc	ggc	ctg	cg	gtc	cg	gcc	acg	ctg	gaa	aat	ccc	tcc	ctg	gag	cg	528
Phe	Gly	Leu	Arg	Val	Arg	Ala	Thr	Leu	Glu	Asn	Pro	Ser	Leu	Ala	Arg	
			165						170					175		
gcc	tcc	ggc	atc	tcc	acg	ccg	ctg	atc	tat	ggc	ggc	acc	ttt	ggc	ttc	576
Ala	Ser	Gly	Ile	Ser	Thr	Pro	Leu	Ile	Tyr	Gly	Ala	Thr	Phe	Ala	Phe	
			180					185					190			
ggc	gag	gag	ctc	gcc	ggc	ctt	gcc	ggc	gag	ctg	atc	gtg	cct	gtc	ttc	624
Gly	Ala	Ala	Leu	Ala	Gly	Leu	Ala	Gly	Ala	Leu	Ile	Val	Pro	Val	Phe	
		195				200						205				
agg	ctg	ttc	ggc	gat	ctc	ggc	ctg	cg	ttc	ctg	atc	cag	ggc	ttt	gtc	672
Ser	Leu	Phe	Ala	Asp	Leu	Gly	Leu	Arg	Phe	Leu	Ile	Gln	Gly	Phe	Val	
	210					215					220					
ggc	gtc	atg	gtc	ggc	ggc	gtc	ggc	tcc	ttc	atc	ggg	ccg	gtg	gag	ggc	720
Ala	Val	Met	Val	Gly	Gly	Val	Gly	Ser	Phe	Ile	Gly	Pro	Val	Ala	Gly	
	225				230					235					240	
ggc	ggc	gtc	atc	ggc	acg	ctg	agg	ggc	gag	ctg	ccc	tgg	gtg	atg	gag	768
Ala	Gly	Val	Ile	Gly	Thr	Leu	Ser	Ala	Ala	Leu	Pro	Trp	Val	Met	Ala	
				245				250						255		
ccc	gtc	gtc	ggc	gac	gtc	ctc	gtc	ttt	gtg	ctc	ggc	att	atc	ttc	atc	816
Pro	Val	Val	Ala	Asp	Val	Leu	Val	Phe	Val	Leu	Ala	Ile	Ile	Phe	Ile	
			260					265					270			
aaa	ttc	cg	ccg	cag	ggc	ctc	atc	gct	ggc	aaa	ggg	gtt	tag			858
Lys	Phe	Arg	Pro	Gln	Gly	Leu	Ile	Ala	Gly	Lys	Gly	Val				
		275					280					285				

<210> 819

<211> 285

<212> PRT

<213> Bradyrhizobium japonicum

<400> 819

Met	Ala	Asn	Ala	Phe	Val	Ala	Ala	Phe	Glu	Ile	Leu	Ser	Phe	Gly	Ala
1				5				10					15		
Ile	Ile	Val	Leu	Ile	Val	Leu	Gly	Leu	Gly	Ile	Ile	Ala	Ser	Met	Met
			20					25				30			
Gly	Ile	Phe	Asn	Phe	Ala	Gln	Gly	Glu	Phe	Val	Leu	Leu	Gly	Ala	Tyr
		35					40				45				
Ile	Thr	Tyr	Leu	Ala	Tyr	Ala	Gly	Gly	Leu	Pro	Ile	Trp	Ala	Gly	Met
	50					55				60					

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Val Ala Ala Pro Phe Val Val Gly Ala Leu Gly Phe Val Leu Glu Ala
 65 70 75 80
 Leu Ile Ile Arg Arg Phe Tyr Ala Ala Pro Ile Val Ala Met Leu Gly
 85 90 95
 Thr Tyr Ala Leu Gly Leu Ile Ile Arg Glu Ser Val Arg Gly Leu Ile
 100 105 110
 Gly Gly Phe Tyr Leu Thr Val Pro Glu Pro Ile Gly Gly Ser Ile Asp
 115 120 125
 Ile Gly Ala Met His Ile Ser Ala Trp Arg Phe Thr Ile Ile Val Ile
 130 135 140
 Thr Leu Leu Val Met Gly Gly Cys Tyr Leu Leu Leu Ser Arg Thr Ser
 145 150 155 160
 Phe Gly Leu Arg Val Arg Ala Thr Leu Glu Asn Pro Ser Leu Ala Arg
 165 170 175
 Ala Ser Gly Ile Ser Thr Pro Leu Ile Tyr Gly Ala Thr Phe Ala Phe
 180 185 190
 Gly Ala Ala Leu Ala Gly Leu Ala Gly Ala Leu Ile Val Pro Val Phe
 195 200 205
 Ser Leu Phe Ala Asp Leu Gly Leu Arg Phe Leu Ile Gly Phe Val
 210 215 220
 Ala Val Met Val Gly Gly Val Gly Ser Phe Ile Gly Pro Val Ala Gly
 225 230 235 240
 Ala Gly Val Ile Gly Thr Leu Ser Ala Ala Leu Pro Trp Val Met Ala
 245 250 255
 Pro Val Val Ala Asp Val Leu Val Phe Val Leu Ala Ile Ile Phe Ile
 260 265 270
 Lys Phe Arg Pro Gln Gly Leu Ile Ala Gly Lys Gly Val
 275 280 285

<210> 820

<211> 1617

<212> DNA

<213> Yersinia pestis

<220>

<221> CDS

<222> (1)..(1617)

<400> 820

atg atg agt ggg cct atg aaa tcg tta att cct gtt tgg aat agg gca	48
Met Met Ser Gly Pro Met Lys Ser Leu Ile Pro Val Trp Asn Arg Ala	
1 5 10 15	
atc aat tat gtg ttc agg ccg atg ata ggt ctg tta ctg ggc tta tcg	96
Ile Asn Tyr Val Phe Arg Pro Met Ile Gly Leu Leu Leu Gly Leu Ser	
20 25 30	
atg tcg gca atg gca ggg cca gca cag gat ttt gtt gcg gcg aat cgt	144
Met Ser Ala Met Ala Gly Pro Ala Gln Asp Phe Val Ala Ala Asn Arg	
35 40 45	
gca cag cag gcc aca tta tta caa cag tgg gca acg gaa cct gat gct	192
Ala Gln Gln Ala Thr Leu Leu Gln Gln Trp Ala Thr Glu Pro Asp Ala	
50 55 60	
agc cga tta cct ctt ttg cag gcg cta aaa caa gaa aca gta gtg gta	240
Ser Arg Leu Pro Leu Leu Gln Ala Leu Lys Gln Glu Thr Val Val Val	
65 70 75 80	
gac agt gcc ggc caa gcg ttt att aaa aat aat caa agt att aat tcg	288
Asp Ser Ala Gly Gln Ala Phe Ile Lys Asn Asn Gln Ser Ile Asn Ser	
85 90 95	
ctg gaa ggc caa tcg caa ccg acc ggt acg ctg aaa aaa atc tgg ctc	336
Leu Glu Gly Gln Ser Gln Pro Thr Gly Thr Leu Lys Lys Ile Trp Leu	
100 105 110	
aac aac cgg tta cgt atc ttg atc gcc aat gcc ctg gcg gca caa cgc	384
Asn Asn Arg Leu Arg Ile Leu Ile Ala Asn Ala Leu Ala Ala Gln Arg	
115 120 125	
tta gtc agt gac gat gaa acc gtg cgt tta cag gcg gca gtt gaa tta	432
Leu Val Ser Asp Asp Glu Thr Val Arg Leu Gln Ala Ala Val Glu Leu	
130 135 140	
caa cgg cag gca cag agc gat caa cta ccg ctg ctg aat caa cgc ctg	480
Gln Arg Gln Ala Gln Ser Asp Gln Leu Pro Leu Leu Asn Gln Arg Leu	
145 150 155 160	

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aag Lys	tgt Leu	gaa Glu	acg Thr	gac Asp 165	agt Ser	cag Gln	gtc Val	aaa Lys	gag Glu 170	gca Ala	tgt Leu	agc Ser	att Ile	gca Ala 175	ctc Leu	528
gcc Ala	aat Asn	tta Leu	caa Gln 180	ctg Leu	acg Thr	gac Asp	agt Ser	aat Asn 185	ccg Pro	cag Gln	gtg Val	cgt Arg	ctg Leu 190	aat Asn	gcc Ala	576
gtg Val	caa Gln 195	tgt Leu	ttg Leu	ggg Gly	caa Gln	tca Ser	ggt Gly 200	tca Ser	ccg Pro	caa Gln	act Thr	caa Gln 205	tca Ser	cgg Arg	ctg Leu	624
caa Gln 210	agt Ser	tta Leu	acc Thr	gat Asp	acg Thr	cag Gln 215	gtt Val	gaa Glu	ccg Pro	aat Asn	gaa Glu 220	cag Gln	gtc Val	cga Arg	gcc Ala	672
gca Ala 225	gca Ala	gcc Ala	acc Thr	agt Ser	ttg Leu 230	aaa Lys	cag Gln	ata Ile	caa Gln	cat His 235	cgg Arg	ttg Leu	atg Met	att Ile	ggg Gly 240	720
gag Glu	gtt Val	att Ile	ggg Gly	cag Gln 245	gta Val	ttt Phe	agc Ser	gga Gly	cta Leu 250	tca Ser	ttg Leu	ggt Gly	tca Ser	atc Ile 255	tta Leu	768
ctg Leu	ctg Leu	gcg Ala	gca Ala 260	ttg Leu	ggg Gly	tta Leu	gct Ala	atc Ile 265	acc Thr	ggt Tyr	ggt Gly	tta Leu 270	ctg Leu	ggg Gly	gtg Val	816
atc Ile	aat Asn	atg Met 275	gcg Ala	cat His	ggt Gly	gaa Glu	atg Met 280	ctg Leu	atg Met	ttg Leu	gga Gly	gcc Ala 285	tat Tyr	tcc Ser	gcc Ala	864
tat Tyr	ctg Leu 290	gtg Val	caa Gln	tcg Ser	cta Leu	ttc Phe 295	caa Gln	caa Gln	ttt Phe	gcc Ala 300	cca Pro	cac His	tgg Trp	ctg Leu	gca Ala	912
ctt Leu 305	tat Tyr	cca Pro	tta Leu	atc Ile	gct Ala 310	cta Leu	ccg Pro	gtt Val	gcg Ala	ttc Phe 315	ttt Phe	att Ile	act Thr	gcg Ala	ggc Gly 320	960
att Ile	ggt Gly	atg Met	gcg Ala	ttg Leu 325	gaa Glu	cgc Arg	acg Thr	gtg Val 330	att Ile	cgg Arg	cat His	ctg Leu	tat Tyr	ggc Gly 335	cgc Arg	1008
ccg Pro	ttg Leu	gaa Glu	aca Thr 340	ctg Leu	cta Leu	gcg Ala	acg Thr	tgg Trp 345	ggg Gly	atc Ile	agc Ser	ctg Leu	atg Met 350	ttg Leu	att Ile	1056
cag Gln	ggg Gly	atc Ile	cgc Arg	atg Met	ttg Leu	ttt Phe	ggc Gly 360	cca Pro	cag Gln	aat Asn	ttg Leu	gaa Glu 365	ggt Val	gct Ala	aac Asn	1104
cct Pro	gca Ala 370	tgg Trp	ctg Leu	tcc Ser	ggt Gly	ggg Gly 375	gtt Val	cag Gln	gtt Val	tta Leu	cct Pro 380	aat Asn	ctg Leu	ggt Val	tta Leu	1152
ccg Pro 385	tgg Trp	aat Asn	cgg Arg	atc Ile	gcg Ala 390	gtg Val	att Ile	gca Ala	ttt Phe	gtc Val 395	att Ile	att Ile	ggt Val	ttg Leu	cta Leu 400	1200
ctc Leu	aca Thr	tgg Trp	ttg Leu	ctg Leu	ctg Leu	aat Asn	aaa Lys	acc Thr	cgc Arg	ctt Leu 410	ggg Gly	ctg Leu	caa Gln	gtc Val 415	cgt Arg	1248
gca Ala	gtg Val	aca Thr	caa Gln 420	aat Asn	cgg Arg	gca Ala	atg Met	gcg Ala 425	gcc Ala	tgc Cys	tgc Cys	gga Gly	gtg Val 430	gct Ala	acg Thr	1296
ggg Gly	cgg Arg	gtt Val 435	gat Asp	atg Met	ctg Leu	gca Ala	ttc Phe 440	gtt Gly	ttg Leu	ggt Gly	tct Ser	ggt Gly 445	att Ile	gca Ala	ggg Gly	1344
ctt Leu	ggc Gly 450	ggt Gly	gta Val	gca Ala	ctc Leu	tcg Ser	caa Gln	ttg Leu	ggc Gly	aat Asn	gtc Val 460	ggc Gly	ccg Pro	gaa Glu	tta Leu	1392
ggg Gly 465	cag Gln	ggt Gly	tat Tyr	atc Ile 470	atc Ile	gac Asp	tcc Ser	ttc Phe	ttg Leu	gtg Val 475	gtc Val	gtc Val	cta Leu	ggt Gly	ggc Gly 480	1440
gtc Val	ggg Gly	caa Gln	tta Leu	gct Ala 485	ggc Gly	agt Ser	gtg Val	gtt Val	gcc Ala 490	gca Ala	tta Leu	ggt Gly	ctg Leu	ggg Gly 495	atg Met	1488
ttg Leu	aat Asn	aaa Lys	att Ile 500	ttg Leu	gaa Glu	cca Pro	caa Gln	att Ile 505	ggc Gly	gca Ala	gta Val	ttg Leu	ggc Gly 510	aaa Lys	atc Ile	1536
ctg Leu	att Ile	tta Leu 515	gtg Val	ctg Leu	atc Ile	att Ile	tta Leu 520	ttt Phe	att Ile	caa Gln	aaa Lys	cga Arg 525	ccg Pro	cag Gln	ggt Gly	1584

ctg ttt gcc ctt aag ggc agg gtg agt gac taa
 Leu Phe Ala Leu Lys Gly Arg Val Ser Asp
 530 535

<210> 821
 <211> 538
 <212> PRT
 <213> Yersinia pestis

<400> 821
 Met Met Ser Gly Pro Met Lys Ser Leu Ile Pro Val Trp Asn Arg Ala
 1 5 10 15
 Ile Asn Tyr Val Phe Arg Pro Met Ile Gly Leu Leu Leu Gly Leu Ser
 20 25 30
 Met Ser Ala Met Ala Gly Pro Ala Gln Asp Phe Val Ala Ala Asn Arg
 35 40 45
 Ala Gln Gln Ala Thr Leu Leu Gln Gln Trp Ala Thr Glu Pro Asp Ala
 50 55 60
 Ser Arg Leu Pro Leu Leu Gln Ala Leu Lys Gln Glu Thr Val Val Val
 65 70 75 80
 Asp Ser Ala Gly Gln Ala Phe Ile Lys Asn Asn Gln Ser Ile Asn Ser
 85 90 95
 Leu Glu Gly Gln Ser Gln Pro Thr Gly Thr Leu Lys Lys Ile Trp Leu
 100 105 110
 Asn Asn Arg Leu Arg Ile Leu Ile Ala Asn Ala Leu Ala Ala Gln Arg
 115 120 125
 Leu Val Ser Asp Asp Glu Thr Val Arg Leu Gln Ala Ala Val Glu Leu
 130 135 140
 Gln Arg Gln Ala Gln Ser Asp Gln Leu Pro Leu Leu Asn Gln Arg Leu
 145 150 155 160
 Lys Leu Glu Thr Asp Ser Gln Val Lys Glu Ala Leu Ser Ile Ala Leu
 165 170 175
 Ala Asn Leu Gln Leu Thr Asp Ser Asn Pro Gln Val Arg Leu Asn Ala
 180 185 190
 Val Gln Leu Leu Gly Gln Ser Gly Ser Pro Gln Thr Gln Ser Arg Leu
 195 200 205
 Gln Ser Leu Thr Asp Thr Gln Val Glu Pro Asn Glu Gln Val Arg Ala
 210 215 220
 Ala Ala Ala Thr Ser Leu Lys Gln Ile Gln His Arg Leu Met Ile Gly
 225 230 235 240
 Glu Val Ile Gly Gln Val Phe Ser Gly Leu Ser Leu Gly Ser Ile Leu
 245 250 255
 Leu Leu Ala Ala Leu Gly Leu Ala Ile Thr Tyr Gly Leu Leu Gly Val
 260 265 270
 Ile Asn Met Ala His Gly Glu Met Leu Met Leu Gly Ala Tyr Ser Ala
 275 280 285
 Tyr Leu Val Gln Ser Leu Phe Gln Gln Phe Ala Pro His Trp Leu Ala
 290 295 300
 Leu Tyr Pro Leu Ile Ala Leu Pro Val Ala Phe Phe Ile Thr Ala Gly
 305 310 315 320
 Ile Gly Met Ala Leu Glu Arg Thr Val Ile Arg His Leu Tyr Gly Arg
 325 330 335
 Pro Leu Glu Thr Leu Leu Ala Thr Trp Gly Ile Ser Leu Met Leu Ile
 340 345 350
 Gln Gly Ile Arg Met Leu Phe Gly Pro Gln Asn Leu Glu Val Ala Asn
 355 360 365
 Pro Ala Trp Leu Ser Gly Gly Val Gln Val Leu Pro Asn Leu Val Leu
 370 375 380
 Pro Trp Asn Arg Ile Ala Val Ile Ala Phe Val Ile Ile Val Leu Leu
 385 390 395 400
 Leu Thr Trp Leu Leu Leu Asn Lys Thr Arg Leu Gly Leu Gln Val Arg
 405 410 415
 Ala Val Thr Gln Asn Arg Ala Met Ala Ala Cys Cys Gly Val Ala Thr
 420 425 430
 Gly Arg Val Asp Met Leu Ala Phe Gly Leu Gly Ser Gly Ile Ala Gly
 435 440 445
 Leu Gly Gly Val Ala Leu Ser Gln Leu Gly Asn Val Gly Pro Glu Leu
 450 455 460
 Gly Gln Gly Tyr Ile Ile Asp Ser Phe Leu Val Val Val Leu Gly Gly

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465 Val Gly Gln Leu Ala 470 Gly Ser Val Val Ala 475 Leu Gly Leu Gly 480 Met
 Leu Asn Lys Ile Leu 485 Glu Pro Gln Ile 490 Gly Ala Val Leu Gly 495 Lys Ile
 Leu Ile Leu 500 Val Leu Ile Ile Leu 505 Phe Ile Gln Lys Arg 510 Pro Gln Gly
 Leu Phe 515 Ala Leu Lys Gly Arg 520 Val Ser Asp 525
 Leu 530 Arg 535

<210> 822

<211> 936

<212> DNA

<213> *Synechococcus elongatus*

<220>

<221> CDS

<222> (1)..(936)

<400> 822

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Met Val Thr Asn Ala 5 Leu Gln Val Leu Val 10 Asp Gly Leu Ala Thr 15 Gly	
agt gtt tat gcc att ttg gcc ctc ggc tat acc ctt gtc ttc tcg att	96
Ser Val Tyr Ala 20 Ile Phe Ala Leu Gly 25 Tyr Thr Leu Val Phe 30 Ser Ile	
ttg ggc atc att aac ttt gct cac ggc gct gtt ttt gcc ctt ggg gct	144
Leu Gly Ile 35 Ile Asn Phe Ala His 40 Gly Ala Val Phe Ala 45 Leu Gly Ala	
tat ctc acc tat gcc ctc ttg gga gga cgc ttt ggc ttt aat ggc ctg	192
Tyr Leu Thr Tyr Ala Leu Leu 55 Gly Gly Arg Phe Gly 60 Phe Asn Gly Leu	
ttg gcc aat ggg cag ctt ccc gtt gcc ttg ccc ttt gcc ccg gcc ttg	240
Leu Ala Asn Gly Gln Leu 70 Pro Val Ala Leu Pro 75 Phe Ala Pro Ala Leu 80	
gcc ttg agt gcc ctt ggc tgt ggg ctg ttg ggg gtg ggc att gac tgg	288
Ala Leu Ser Ala Leu 85 Gly Cys Gly Leu Leu 90 Gly Val Gly Ile Asp Trp 95	
att gtc ttt cga ccg ttg cgg cag cag ggc acc gat acc ctc ttg acg	336
Ile Val Phe Arg 100 Pro Leu Arg Gln 105 Gly Thr Asp Thr 110 Leu Thr	
gtg gtg gcc agt ctt ggc gct gcc gtt ttc ctc acc aac ttg atc cag	384
Val Val Ala Ser Leu Gly Ala Ala 120 Val Phe Leu Thr Asn 125 Leu Ile Gln	
tat tta gtg ggt gcc gaa gtc tat acc tat ccc gat caa ctc tgg ggt	432
Tyr Leu Val Gly Ala Glu 135 Tyr Thr Tyr Pro Asp Gln Leu Trp Gly 140	
gga ttg ccc ctt acc ctg caa tgg ggg gac att acc ctg cgc act agc	480
Gly Leu Pro Leu Thr 150 Leu Gln Trp Gly Asp 155 Ile Thr Leu Arg Thr Ser 160	
caa ttg att atc ttt gcc gtg gcc gtg gtt ttg atg att gcc ctg acc	528
Gln Leu Ile Ile 165 Phe Ala Val Ala Val 170 Leu Met Ile Ala 175 Thr	
tat tgg gtg aaa ggg acg cgc atg ggg aaa gga ttg cag gcc gtg gct	576
Tyr Trp Val Lys 180 Gly Thr Arg Met Gly Lys Gly Leu Gln Ala Val Ala 190	
gaa aat cca act gcc gcc aca ttg ctg ggc att gat ggc gat cgc att	624
Glu Asn Pro 195 Thr Ala Ala Thr Leu 200 Leu Gly Ile Asp Gly 205 Asp Arg Ile	
att caa gtg aca ttt ttt gtt agc agt gct ttg gct gct gtt gct ggc	672
Ile Gln Val Thr Phe Phe Val 215 Ser Ser Ala Leu Ala Ala Val Ala Gly 220	
acc ctc atc gcc ttg agt gtt ggg att aca gga cca cag ttt ggg gtg	720
Thr Leu Ile Ala Leu Ser 230 Val Gly Ile Thr Gly Pro Gln Phe Gly Val 240	
atc ttt ggc ctc aag ggg tta gcg gtg att gtt ctg ggg ggc ctc ggc	768
Ile Phe Gly Leu Lys 245 Gly Leu Ala Val Ile Val Leu Gly Gly Leu Gly 255	
agt tta cca ggg aca atg ttg gcc ggc ttt ttg ctg gga ttg gtg gag	816

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Ser	Leu	Pro	Gly	Thr	Met	Leu	Ala	Gly	Phe	Leu	Leu	Gly	Leu	Val	Glu		
			260					265					270				
gca	atg	gtg	cct	gcg	gct	gct	tcg	ggg	ttt	cgc	gat	gct	gct	gcc	ttt	864	
Ala	Met	Val	Pro	Ala	Ala	Ala	Ser	Gly	Phe	Arg	Asp	Ala	Ala	Ala	Phe		
		275					280					285					
gcc	atc	ctt	ttc	cta	gtg	ctg	ctg	gcg	cgc	ccc	caa	ggg	ctc	ttg	ggt	912	
Ala	Ile	Leu	Phe	Leu	Val	Leu	Leu	Ala	Arg	Pro	Gln	Gly	Leu	Leu	Gly		
	290					295					300						
cag	ccc	ccc	gtt	gaa	aaa	gtc	tag									936	
Gln	Pro	Pro	Val	Glu	Lys	Val											
305					310												

<210> 823

<211> 311

<212> PRT

<213> Synechococcus elongatus

<400> 823

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Ser	Val	Tyr	Ala	Ile	Phe	Ala	Leu	Gly	Tyr	Thr	Leu	Val	Phe	Ser	Ile		
			20					25					30				
Leu	Gly	Ile	Ile	Asn	Phe	Ala	His	Gly	Ala	Val	Phe	Ala	Leu	Gly	Ala		
		35					40					45					
Tyr	Leu	Thr	Tyr	Ala	Leu	Leu	Gly	Gly	Arg	Phe	Gly	Phe	Asn	Gly	Leu		
	50					55					60						
Leu	Ala	Asn	Gly	Gln	Leu	Pro	Val	Ala	Leu	Pro	Phe	Ala	Pro	Ala	Leu		
65					70				75						80		
Ala	Leu	Ser	Ala	Leu	Gly	Cys	Gly	Leu	Leu	Gly	Val	Gly	Ile	Asp	Trp		
			85					90					95				
Ile	Val	Phe	Arg	Pro	Leu	Arg	Gln	Gln	Gly	Thr	Asp	Thr	Leu	Leu	Thr		
			100					105					110				
Val	Val	Ala	Ser	Leu	Gly	Ala	Ala	Val	Phe	Leu	Thr	Asn	Leu	Ile	Gln		
		115					120					125					
Tyr	Leu	Val	Gly	Ala	Glu	Val	Tyr	Thr	Tyr	Pro	Asp	Gln	Leu	Trp	Gly		
	130					135					140						
Gly	Leu	Pro	Leu	Thr	Leu	Gln	Trp	Gly	Asp	Ile	Thr	Leu	Arg	Thr	Ser		
145					150					155					160		
Gln	Leu	Ile	Ile	Phe	Ala	Val	Ala	Val	Val	Leu	Met	Ile	Ala	Leu	Thr		
			165					170						175			
Tyr	Trp	Val	Lys	Gly	Thr	Arg	Met	Gly	Lys	Gly	Leu	Gln	Ala	Val	Ala		
			180					185					190				
Glu	Asn	Pro	Thr	Ala	Ala	Thr	Leu	Leu	Gly	Ile	Asp	Gly	Asp	Arg	Ile		
		195					200					205					
Ile	Gln	Val	Thr	Phe	Phe	Val	Ser	Ser	Ala	Leu	Ala	Ala	Val	Ala	Gly		
	210					215					220						
Thr	Leu	Ile	Ala	Leu	Ser	Val	Gly	Ile	Thr	Gly	Pro	Gln	Phe	Gly	Val		
225					230					235					240		
Ile	Phe	Gly	Leu	Lys	Gly	Leu	Ala	Val	Ile	Val	Leu	Gly	Gly	Leu	Gly		
			245						250					255			
Ser	Leu	Pro	Gly	Thr	Met	Leu	Ala	Gly	Phe	Leu	Leu	Gly	Leu	Val	Glu		
			260					265					270				
Ala	Met	Val	Pro	Ala	Ala	Ala	Ser	Gly	Phe	Arg	Asp	Ala	Ala	Ala	Phe		
		275					280					285					
Ala	Ile	Leu	Phe	Leu	Val	Leu	Leu	Ala	Arg	Pro	Gln	Gly	Leu	Leu	Gly		
	290					295					300						
Gln	Pro	Pro	Val	Glu	Lys	Val											
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<210> 824

<211> 870

<212> DNA

<213> Synechococcus elongatus

<220>

<221> CDS

<222> (1)..(870)

<400> 824

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Met	Asp	Ile	Gln	Leu	Ile	Gln	Leu	Phe	Val	Asn	Gly	Leu	Ala	Val	Gly	
1				5				10						15		
agt	att	att	gcc	ctt	gca	gcc	gtg	ggt	tta	acg	ctc	acc	ttt	ggc	att	96
Ser	Ile	Ile	Ala	Leu	Ala	Ala	Val	Gly	Leu	Thr	Leu	Thr	Phe	Gly	Ile	
			20				25						30			
ttg	cg	ctg	ccc	aac	ttt	gcc	cat	ggt	gat	ttc	atg	acg	gcg	gga	gcc	144
Leu	Arg	Leu	Pro	Asn	Phe	Ala	His	Gly	Asp	Phe	Met	Thr	Ala	Gly	Ala	
			35				40					45				
tac	ctg	acg	ttg	gtg	gcc	aat	gca	aca	gga	ctg	aat	att	tgg	ctc	tca	192
Tyr	Leu	Thr	Leu	Val	Ala	Asn	Ala	Thr	Gly	Leu	Asn	Ile	Trp	Leu	Ser	
			50			55					60					
atg	gcg	att	ggg	ggc	ttg	ggg	acg	gcc	ggg	ttg	atg	ctc	cta	agt	gag	240
Met	Ala	Ile	Gly	Gly	Leu	Gly	Thr	Ala	Gly	Leu	Met	Leu	Leu	Ser	Glu	
					70					75					80	
aag	ctc	ctg	tgg	cag	ccg	atg	cg	gat	cg	cg	gca	acc	tca	aca	act	288
Lys	Leu	Leu	Trp	Gln	Pro	Met	Arg	Asp	Arg	Arg	Ala	Thr	Ser	Thr	Thr	
				85				90						95		
ctg	att	att	att	tcc	atc	ggt	ctg	tca	ttc	ctg	ctg	cg	aat	gct	gtg	336
Leu	Ile	Ile	Ile	Ser	Ile	Gly	Leu	Ser	Phe	Leu	Leu	Arg	Asn	Ala	Val	
				100				105					110			
atc	ctc	att	tgg	ggc	agt	gaa	aac	caa	acc	tat	cg	cta	ccc	gtc	atc	384
Ile	Leu	Ile	Trp	Gly	Ser	Glu	Asn	Gln	Thr	Tyr	Arg	Leu	Pro	Val	Ile	
				115			120					125				
cct	gcc	ctt	gat	gtt	ggc	ggg	gtg	aaa	att	att	tac	tcg	aag	gtg	att	432
Pro	Ala	Leu	Asp	Val	Gly	Gly	Val	Lys	Ile	Ile	Tyr	Ser	Lys	Val	Ile	
				130		135					140					
gta	atg	att	ttg	gcg	gtg	gta	gcg	atc	gcc	act	gtg	cat	ttg	atc	ctc	480
Val	Met	Ile	Leu	Ala	Val	Val	Ala	Ile	Ala	Thr	Val	His	Leu	Ile	Leu	
				145		150				155					160	
caa	cg	acc	aag	gta	ggc	aag	gcc	atg	cga	gcc	gta	gct	gat	gat	ctc	528
Gln	Arg	Thr	Lys	Val	Gly	Lys	Ala	Met	Arg	Ala	Val	Ala	Asp	Asp	Leu	
				165				170						175		
gac	ttg	gcg	cg	gtt	tcc	ggg	att	gat	gtc	gag	tgg	gtg	gtg	ctg	tgc	576
Asp	Leu	Ala	Arg	Val	Ser	Gly	Ile	Asp	Val	Glu	Trp	Val	Val	Leu	Cys	
				180				185					190			
act	tgg	ctt	ttg	gca	ggg	gta	ctc	aca	ggg	gtg	gcg	ggg	ggt	ctc	tat	624
Thr	Trp	Leu	Leu	Ala	Gly	Val	Leu	Thr	Gly	Val	Ala	Gly	Gly	Leu	Tyr	
				195			200					205				
ggc	ctg	att	acc	gct	gtg	cg	cca	acg	atg	ggt	tgg	ttt	ttg	atc	ttg	672
Gly	Leu	Ile	Thr	Ala	Val	Arg	Pro	Thr	Met	Gly	Trp	Phe	Leu	Ile	Leu	
				210		215					220					
ccc	ctc	ttt	gcc	agt	gtg	att	ctg	ggt	ggc	att	ggt	aac	ccc	tac	ggg	720
Pro	Leu	Phe	Ala	Ser	Val	Ile	Leu	Gly	Gly	Ile	Gly	Asn	Pro	Tyr	Gly	
				225		230				235					240	
gcg	atc	gcc	ggc	gcc	ctg	atc	att	ggt	gtt	gcc	caa	gag	atg	agt	aca	768
Ala	Ile	Ala	Gly	Ala	Leu	Ile	Ile	Gly	Val	Ala	Gln	Glu	Met	Ser	Thr	
				245				250						255		
cg	atg	atc	cct	gct	gaa	tac	aag	ctg	gct	gtt	gcc	cta	ggg	atg	atg	816
Arg	Met	Ile	Pro	Ala	Glu	Tyr	Lys	Leu	Ala	Val	Ala	Leu	Gly	Met	Met	
			260					265					270			
atg	gca	gtg	ctt	tta	gtg	cg	ccc	caa	ggg	cta	ttt	cg	ggc	acc	ctc	864
Met	Ala	Val	Leu	Leu	Val	Arg	Pro	Gln	Gly	Leu	Phe	Arg	Gly	Thr	Leu	
			275				280					285				
agc	tag															870
Ser																

<210> 825

<211> 289

<212> PRT

<213> Synechococcus elongatus

<400> 825

Met	Asp	Ile	Gln	Leu	Ile	Gln	Leu	Phe	Val	Asn	Gly	Leu	Ala	Val	Gly	
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Ser	Ile	Ile	Ala	Leu	Ala	Ala	Val	Gly	Leu	Thr	Leu	Thr	Phe	Gly	Ile	
			20					25					30			
Leu	Arg	Leu	Pro	Asn	Phe	Ala	His	Gly	Asp	Phe	Met	Thr	Ala	Gly	Ala	

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Tyr Leu Thr³⁵ Leu Val Ala Asn⁴⁰ Ala Thr Gly Leu Asn⁴⁵ Ile Trp Leu Ser
 Met Ala Ile Gly Gly Leu Gly⁵⁵ Thr Ala Gly Leu Met⁶⁰ Leu Leu Ser Glu⁶⁵
 Lys Leu Leu Trp Gln⁷⁰ Pro Met Arg Asp Arg⁷⁵ Ala Thr Ser Thr Thr⁸⁰
 Leu Ile Ile Ile Ser⁸⁵ Ile Gly Leu Ser Phe⁹⁰ Leu Leu Arg Asn⁹⁵ Ala Val
 Ile Leu Ile Trp Gly Ser Glu Asn¹⁰⁰ Gln Thr Tyr Arg Leu Pro Val Ile¹⁰⁵
 Pro Ala Leu Asp Val Gly Gly¹¹⁰ Val Lys Ile Ile Tyr Ser Lys Val Ile¹¹⁵
 Val Met Ile Leu Ala Val¹²⁰ Val Ala Ile Ala Thr Val His Leu Ile Leu¹²⁵
 Gln Arg Thr Lys Val¹³⁰ Gly Lys Ala Met Arg¹³⁵ Ala Val Ala Asp Asp¹⁴⁰ Leu
 Asp Leu Ala Arg Val¹⁴⁵ Ser Gly Ile Asp¹⁵⁰ Val Glu Trp Val Val¹⁵⁵ Leu Cys
 Thr Trp Leu Leu Ala Gly Val¹⁶⁰ Leu Thr Gly Val Ala Gly¹⁶⁵ Gly Leu Tyr
 Gly Leu Ile Thr Ala Val¹⁷⁰ Arg Pro Thr Met Gly Trp Phe¹⁷⁵ Leu Ile Leu
 Pro Leu Phe Ala Ser Val¹⁸⁰ Ile Leu Gly Gly Ile Gly¹⁸⁵ Asn Pro Tyr Gly¹⁹⁰
 Ala Ile Ala Gly Ala Leu Ile Ile Gly¹⁹⁵ Val Ala Gln Glu Met Ser Thr²⁰⁰
 Arg Met Ile Pro Ala Glu Tyr Lys Leu²⁰⁵ Ala Val Ala Leu Gly Met Met²¹⁰
 Met Ala Val²¹⁵ Leu Leu Val Arg Pro²²⁰ Gln Gly Leu Phe Arg²²⁵ Gly Thr Leu
 Ser

<210> 826

<211> 1170

<212> DNA

<213> Synechococcus elongatus

<220>

<221> CDS

<222> (1)..(1170)

<400> 826

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Met Pro Lys Leu Ser ⁵ Gln Phe Ser Phe ¹⁰ Pro Lys Asp Arg Leu Ser ¹⁵ Gly	
cgc gag tta atg gtg gtg gct gcc ctt gct cta atc ctg att ttc gtg	96
Arg Glu Leu Met ²⁰ Val Val Ala Ala Leu ²⁵ Ala Leu Ile Leu Ile Phe Val ³⁰	
atg cca tct ctg ttg ccg ggg ttt cgc ttg gat tta ctg cac cgc tat	144
Met Pro Ser ³⁵ Leu Leu Pro Gly ⁴⁰ Phe Arg Leu Asp Leu ⁴⁵ His Arg Tyr	
ctg gct ctg gcg att gtg gct ttg gga ata gat ctg att tgg ggt ttt	192
Leu Ala Leu Ala Ile Val ⁵⁰ Ala Leu Gly ⁵⁵ Ile Asp Leu Ile Trp Gly Phe ⁶⁰	
acg gga ttg ctt agc ctt ggc cat ggc att ttc ttt gcc ttg ggg ggg	240
Thr Gly Leu Leu Ser ⁶⁵ Gly His Gly ⁷⁰ Ile Phe ⁷⁵ Phe Ala Leu Gly ⁸⁰ Gly	
tac gcg atc gcc atg cat tta aaa cta cag gta ccc gcc act gcc tct	288
Tyr Ala Ile Ala Met ⁸⁵ His Leu Lys Leu ⁹⁰ Gln Val Pro Ala Thr Ala Ser ⁹⁵	
agc tcc cta cca gat ttt atg tcc ctc tat ggt gtc acg gag ttg ccg	336
Ser Ser Leu Pro ¹⁰⁰ Asp Phe Met Ser Leu ¹⁰⁵ Tyr Gly Val Thr Glu Leu Pro ¹¹⁰	
tggttttggttatccccttccttacccttggtgttggtgca gca gtg	384
Trp Phe Trp Tyr Pro Phe Tyr Ser ¹¹⁵ Phe Thr Phe Ala Val ¹²⁰ Ala Ala Val ¹²⁵	
gtg ctg atc cca gcc cta ttg ggg gca ctc ttg ggg tac ctt gtc ttt	432

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Val	Leu	Ile	Pro	Ala	Leu	Leu	Gly	Ala	Leu	Leu	Gly	Tyr	Leu	Val	Phe	
130	130				135	135				140	140					
cgc	aac	cgg	atc	cgt	ggg	gtc	tat	ttc	tct	atc	ctt	act	caa	gcg	gcc	480
Arg	Asn	Arg	Ile	Arg	Gly	Val	Tyr	Phe	Ser	Ile	Leu	Thr	Gln	Ala	Ala	
145					150					155					160	
att	atc	gtc	ttt	tat	aac	ttc	ttt	aat	ggt	cag	caa	aag	ctc	ttt	aac	528
Ile	Ile	Val	Phe	Tyr	Asn	Phe	Phe	Asn	Gly	Gln	Gln	Lys	Leu	Phe	Asn	
				165					170					175		
ggc	acc	aat	ggc	ctg	aca	gat	ttt	caa	acc	ctg	ctg	ggg	ttc	cct	gta	576
Gly	Thr	Asn	Gly	Leu	Thr	Asp	Phe	Gln	Thr	Leu	Leu	Gly	Phe	Pro	Val	
			180					185					190			
cgc	aat	gcc	cag	acc	cag	tat	tgg	ttc	tat	gtc	cta	aca	gtg	att	ttc	624
Arg	Asn	Ala	Gln	Thr	Gln	Tyr	Trp	Phe	Tyr	Val	Leu	Thr	Val	Ile	Phe	
		195					200					205				
ttg	gcc	ttg	gcg	tat	ctt	ctc	tgc	cgt	tgg	ctg	aca	atg	gga	cgc	ttt	672
Leu	Ala	Leu	Ala	Tyr	Leu	Leu	Cys	Arg	Trp	Leu	Thr	Met	Gly	Arg	Phe	
210					215					220						
ggc	cgc	cta	ctg	gtc	gcc	atc	cgc	gat	gat	gaa	gcc	cgt	gtc	cgt	ttc	720
Gly	Arg	Leu	Leu	Val	Ala	Ile	Arg	Asp	Asp	Glu	Ala	Arg	Val	Arg	Phe	
225					230					235					240	
tcg	gga	tac	aac	ccg	acc	agc	tat	aag	gta	ctc	ggt	ttt	gcc	att	tcc	768
Ser	Gly	Tyr	Asn	Pro	Thr	Ser	Tyr	Lys	Val	Leu	Val	Phe	Ala	Ile	Ser	
				245					250					255		
gct	gcc	tta	gca	gga	atc	ggt	ggc	gcc	ttc	act	ttg	cgc	acc	ggc		816
Ala	Ala	Leu	Ala	Gly	Ile	Gly	Gly	Ala	Phe	Phe	Leu	Arg	Thr	Gly		
			260					265					270			
atc	att	tca	cca	cgg	gcg	atg	gac	att	gcc	ttc	tca	att	gag	atg	gtg	864
Ile	Ile	Ser	Pro	Arg	Ala	Met	Asp	Ile	Ala	Phe	Ser	Ile	Glu	Met	Val	
		275					280					285				
atc	tgg	gtg	gcg	ggt	ggc	ggt	cgt	gcc	agc	ctc	att	gga	gct	gtc	ctg	912
Ile	Trp	Val	Ala	Val	Gly	Gly	Arg	Ala	Ser	Leu	Ile	Gly	Ala	Val	Leu	
	290				295					300						
gga	gca	ctc	ttg	gtc	aac	ttt	gct	cgc	agt	ctg	ttg	agt	gag	cag	ttt	960
Gly	Ala	Leu	Leu	Val	Asn	Phe	Ala	Arg	Ser	Leu	Leu	Ser	Glu	Gln	Phe	
305					310					315					320	
gcc	gat	att	tgg	ctc	ttt	ttc	caa	ggg	gcc	ctg	ttt	tta	att	gtg	gtg	1008
Ala	Asp	Ile	Trp	Leu	Phe	Phe	Gln	Gly	Ala	Leu	Phe	Leu	Ile	Val	Val	
				325					330					335		
ttg	gca	ctc	cct	acg	gga	att	ggt	ggc	tgg	ctg	cgc	act	gaa	gcc	ccc	1056
Leu	Ala	Leu	Pro	Thr	Gly	Ile	Val	Gly	Trp	Leu	Arg	Thr	Glu	Ala	Pro	
			340					345					350			
aac	ctg	att	gcg	aaa	ctc	ttg	ggg	cga	cca	caa	ccc	ctg	gca	aca	tat	1104
Asn	Leu	Ile	Ala	Lys	Leu	Leu	Gly	Arg	Pro	Gln	Pro	Leu	Ala	Thr	Tyr	
		355					360					365				
cca	gag	ttg	gag	ttt	gat	ccc	gag	gtg	caa	tat	gag	cgt	gaa	gtt	ctc	1152
Pro	Glu	Leu	Glu	Phe	Asp	Pro	Glu	Val	Gln	Tyr	Glu	Arg	Glu	Val	Leu	
	370					375					380					
gaa	cag	gag	ggc	aaa	taa											1170
Glu	Gln	Glu	Gly	Lys												
385																

<210> 827

<211> 389

<212> PRT

<213> Synechococcus elongatus

<400> 827

Met	Pro	Lys	Leu	Ser	Gln	Phe	Ser	Phe	Pro	Lys	Asp	Arg	Leu	Ser	Gly	
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Arg	Glu	Leu	Met	Val	Val	Ala	Ala	Leu	Ala	Leu	Ile	Leu	Ile	Phe	Val	
			20					25					30			
Met	Pro	Ser	Leu	Leu	Pro	Gly	Phe	Arg	Leu	Asp	Leu	Leu	His	Arg	Tyr	
		35				40						45				
Leu	Ala	Leu	Ala	Ile	Val	Ala	Leu	Gly	Ile	Asp	Leu	Ile	Trp	Gly	Phe	
	50					55					60					
Thr	Gly	Leu	Leu	Ser	Leu	Gly	His	Gly	Ile	Phe	Phe	Ala	Leu	Gly	Gly	
65					70				75						80	
Tyr	Ala	Ile	Ala	Met	His	Leu	Lys	Leu	Gln	Val	Pro	Ala	Thr	Ala	Ser	
				85					90					95		

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Ser Ser Leu Pro Asp Phe Met Ser Leu Tyr Gly Val Thr Glu Leu Pro
 100 105 110
 Trp Phe Trp Tyr Pro Phe Tyr Ser Phe Thr Phe Ala Val Ala Ala Val
 115 120 125
 Val Leu Ile Pro Ala Leu Leu Gly Tyr Leu Val Phe
 130 135 140
 Arg Asn Arg Ile Arg Gly Val Tyr Phe Ser Ile Leu Thr Gln Ala Ala
 145 150 155 160
 Ile Ile Val Phe Tyr Asn Phe Phe Asn Gly Gln Gln Lys Leu Phe Asn
 165 170 175
 Gly Thr Asn Gly Leu Thr Asp Phe Gln Thr Leu Leu Gly Phe Pro Val
 180 185 190
 Arg Asn Ala Gln Thr Gln Tyr Trp Phe Tyr Val Leu Thr Val Ile Phe
 195 200 205
 Leu Ala Leu Ala Tyr Leu Leu Cys Arg Trp Leu Thr Met Gly Arg Phe
 210 215 220
 Gly Arg Leu Leu Val Ala Ile Arg Asp Asp Glu Ala Arg Val Arg Phe
 225 230 235 240
 Ser Gly Tyr Asn Pro Thr Ser Tyr Lys Val Leu Val Phe Ala Ile Ser
 245 250 255
 Ala Ala Leu Ala Gly Ile Gly Gly Ala Phe Phe Thr Leu Arg Thr Gly
 260 265 270
 Ile Ile Ser Pro Arg Ala Met Asp Ile Ala Phe Ser Ile Glu Met Val
 275 280 285
 Ile Trp Val Ala Val Gly Gly Arg Ala Ser Leu Ile Gly Ala Val Leu
 290 295 300
 Gly Ala Leu Leu Val Asn Phe Ala Arg Ser Leu Leu Ser Glu Gln Phe
 305 310 315 320
 Ala Asp Ile Trp Leu Phe Phe Gln Gly Ala Leu Phe Leu Ile Val Val
 325 330 335
 Leu Ala Leu Pro Thr Gly Ile Val Gly Trp Leu Arg Thr Glu Ala Pro
 340 345 350
 Asn Leu Ile Ala Lys Leu Leu Gly Arg Pro Gln Pro Leu Ala Thr Tyr
 355 360 365
 Pro Glu Leu Glu Phe Asp Pro Glu Val Gln Tyr Glu Arg Glu Val Leu
 370 375 380
 Glu Gln Glu Gly Lys
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<210> 828

<211> 1158

<212> DNA

<213> Synechococcus elongatus

<220>

<221> CDS

<222> (1)..(1158)

<400> 828

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Met	Thr	Phe	Leu	Leu	Glu	Ser	Val	Phe	Asn	Gly	Met	Ser	Ile	Gly	Ala	
1				5				10					15			
gtg	ttg	ctg	tta	acc	gca	cta	ggg	ctg	gcg	att	gtc	ttt	ggg	att	atg	96
Val	Leu	Leu	Leu	Thr	Ala	Leu	Gly	Leu	Ala	Ile	Val	Phe	Gly	Ile	Met	
			20				25						30			
ggc	gtg	att	aac	ctt	gcc	cac	ggg	gaa	ctg	atg	atg	ctg	gga	gcc	tac	144
Gly	Val	Ile	Asn	Leu	Ala	His	Gly	Glu	Leu	Met	Met	Leu	Gly	Ala	Tyr	
		35					40					45				
act	acc	ttc	gtg	gta	caa	aat	ggc	ttc	cgt	caa	ttg	gga	gag	ggg	tgg	192
Thr	Thr	Phe	Val	Val	Gln	Asn	Gly	Phe	Arg	Gln	Leu	Gly	Glu	Gly	Trp	
		50				55					60					
ttt	gat	act	tat	cta	tta	ata	gca	gtg	ccc	tta	gcc	ttt	gcc	gtg	gca	240
Phe	Asp	Thr	Tyr	Leu	Leu	Ile	Ala	Val	Pro	Leu	Ala	Phe	Ala	Val	Ala	
		65			70				75						80	
gcg	ggg	atc	ggg	ctc	gtt	ctt	gag	cgg	gga	gtc	att	cgc	tat	ctc	tat	288
Ala	Gly	Ile	Gly	Leu	Val	Leu	Glu	Arg	Gly	Val	Ile	Arg	Tyr	Leu	Tyr	
			85						90					95		
ggg	cgc	ccc	ctc	gaa	acc	ctc	ttg	gcc	act	tgg	ggc	gtg	agt	ttg	atc	336
Gly	Arg	Pro	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Trp	Gly	Val	Ser	Leu	Ile	

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ctg	caa	cag	100	gtg	cgc	agt	att	105	agg	cag	atg	act	110	caa	atc	
Leu	Gln	Gln	115	Val	Arg	Ser	Ile	120	Ser	Gln	Met	Thr	125	Leu	Gln	Ile
																384
gcc	ctc	ttt	tgc	ctg	ctc	ttc	ttt	ggg	ggc	cgc	tgg	ctc	ctc	tcc	aag	
Ala	Leu	Phe	Cys	Leu	Leu	Phe	Phe	Gly	Gly	Arg	Trp	Leu	Leu	Ser	Lys	432
cgg	acg	atc	gct	cct	cgt	tgg	cag	gct	tgg	gta	acg	cca	ctg	tta	ctg	
Arg	Thr	Ile	Ala	Pro	Arg	Trp	Gln	Ala	Trp	Val	Thr	Pro	Leu	Leu	Leu	480
acg	ctc	tct	gtc	gga	att	gcc	ctg	aca	gcg	ggc	ctc	gtg	gct	ggg	agc	
Thr	Leu	Ser	Val	Gly	Ile	Ala	Leu	Thr	Ala	Gly	Leu	Val	Ala	Gly	Ser	528
gcg	gtg	ggg	ctg	gca	atg	aca	aag	ccc	tgg	ttt	ggg	gct	cag	ggg	gtg	
Ala	Val	Gly	Leu	Ala	Met	Thr	Lys	Pro	Trp	Phe	Gly	Ala	Gln	Gly	Val	576
gat	gtg	act	gct	cct	agt	tgg	ctg	cgg	gga	ggg	gta	agt	gtc	tgg	ggg	
Asp	Val	Thr	Ala	Pro	Ser	Trp	Leu	Arg	Gly	Gly	Val	Ser	Val	Trp	Gly	624
atg	cag	ttt	ccc	ttg	gtg	cgc	ctc	ttt	att	att	gcc	ctg	aca	gca	gtg	
Met	Gln	Phe	Pro	Leu	Val	Arg	Leu	Phe	Ile	Ile	Ala	Leu	Thr	Ala	Val	672
tgt	ttg	gtg	gca	att	tac	ctc	ttt	ctt	ctg	cga	tct	caa	tgg	ggg	cta	
Cys	Leu	Val	Ala	Ile	Tyr	Leu	Phe	Leu	Leu	Arg	Ser	Gln	Trp	Gly	Leu	720
cgg	att	cgc	gcc	gtg	act	caa	aac	cgc	agt	atg	agt	gcc	tgc	atg	ggg	
Arg	Ile	Arg	Ala	Val	Thr	Gln	Asn	Arg	Ser	Met	Ser	Ala	Cys	Met	Gly	768
att	ccc	acc	caa	acg	gtt	gat	gcc	ctc	acc	ttt	gcc	ctt	ggc	tct	ggg	
Ile	Pro	Thr	Gln	Thr	Val	Asp	Ala	Leu	Thr	Phe	Ala	Leu	Gly	Ser	Gly	816
ttg	gcg	ggg	gta	gca	ggc	tgt	gcc	att	agc	ctc	ttg	ggg	tct	gta	agt	
Leu	Ala	Gly	Val	Ala	Gly	Cys	Ala	Ile	Ser	Leu	Leu	Gly	Ser	Val	Ser	864
ccg	aat	acg	ggg	cag	aac	tac	att	ggt	gaa	gcc	ttc	atg	ggt	ggt	ggt	
Pro	Asn	Thr	Gly	Gln	Asn	Tyr	Ile	Val	Glu	Ala	Phe	Met	Val	Val	Val	912
gtg	ggg	ggg	gtc	ggc	aaa	att	gtc	ggt	tca	att	gtg	gct	gcc	ctt	ggc	
Val	Gly	Gly	Val	Gly	Lys	Ile	Val	Gly	Ser	Ile	Val	Ala	Ala	Leu	Gly	960
att	ggc	ttt	gtc	aac	tac	gtc	atc	ggt	tcg	ggg	ttg	atg	acc	cgc	ttt	
Ile	Gly	Phe	Val	Asn	Tyr	Val	Ile	Gly	Ser	Gly	Leu	Met	Thr	Arg	Phe	1008
ctt	gaa	ccg	caa	aca	gca	gtg	ttt	gac	ttc	ttt	gaa	ttt	ttt	gcc	agt	
Leu	Glu	Pro	Gln	Thr	Ala	Val	Phe	Asp	Phe	Phe	Glu	Phe	Phe	Ala	Ser	1056
acc	agc	atg	gca	cgg	gtg	atg	gtc	ttc	atc	ctc	atc	att	gct	ttc	ctg	
Thr	Ser	Met	Ala	Arg	Val	Met	Val	Phe	Ile	Leu	Ile	Ile	Ala	Phe	Leu	1104
caa	ctg	cgt	ccc	gct	ggg	ctt	ttt	cca	caa	aaa	gga	cgg	acg	gtc	gat	
Gln	Leu	Arg	Pro	Ala	Gly	Leu	Phe	Pro	Gln	Lys	Gly	Arg	Thr	Val	Asp	1152
gcc	taa															1158
Ala																
385																

<210> 829

<211> 385

<212> PRT

<213> Synechococcus elongatus

<400> 829

Met	Thr	Phe	Leu	Leu	Glu	Ser	Val	Phe	Asn	Gly	Met	Ser	Ile	Gly	Ala	
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Val	Leu	Leu	Leu	Thr	Ala	Leu	Gly	Leu	Ala	Ile	Val	Phe	Gly	Ile	Met	
				20				25					30			
Gly	Val	Ile	Asn	Leu	Ala	His	Gly	Glu	Leu	Met	Met	Leu	Gly	Ala	Tyr	
				35			40					45				
Thr	Thr	Phe	Val	Val	Gln	Asn	Gly	Phe	Arg	Gln	Leu	Gly	Glu	Gly	Trp	

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50 55 60
 Phe Asp Thr Tyr Leu Leu Ile Ala Val Pro Leu Ala Phe Ala Val Ala
 65 70 75 80
 Ala Gly Ile Gly Leu Val Leu Glu Arg Gly Val Ile Arg Tyr Leu Tyr
 85 90 95
 Gly Arg Pro Leu Glu Thr Leu Leu Ala Thr Trp Gly Val Ser Leu Ile
 100 105 110
 Leu Gln Gln Leu Val Arg Ser Ile Ser Trp Gln Met Thr Leu Gln Ile
 115 120 125
 Ala Leu Phe Cys Leu Leu Phe Phe Gly Gly Arg Trp Leu Leu Ser Lys
 130 135 140
 Arg Thr Ile Ala Pro Arg Trp Gln Ala Trp Val Thr Pro Leu Leu Leu
 145 150 155 160
 Thr Leu Ser Val Gly Ile Ala Leu Thr Ala Gly Leu Val Ala Gly Ser
 165 170 175
 Ala Val Gly Leu Ala Met Thr Lys Pro Trp Phe Gly Ala Gln Gly Val
 180 185 190
 Asp Val Thr Ala Pro Ser Trp Leu Arg Gly Gly Val Ser Val Trp Gly
 195 200 205
 Met Gln Phe Pro Leu Val Arg Leu Phe Ile Ile Ala Leu Thr Ala Val
 210 215 220
 Cys Leu Val Ala Ile Tyr Leu Phe Leu Leu Arg Ser Gln Trp Gly Leu
 225 230 235 240
 Arg Ile Arg Ala Val Thr Gln Asn Arg Ser Met Ser Ala Cys Met Gly
 245 250 255
 Ile Pro Thr Gln Thr Val Asp Ala Leu Thr Phe Ala Leu Gly Ser Gly
 260 265 270
 Leu Ala Gly Val Ala Gly Cys Ala Ile Ser Leu Leu Gly Ser Val Ser
 275 280 285
 Pro Asn Thr Gly Gln Asn Tyr Ile Val Glu Ala Phe Met Val Val Val
 290 295 300
 Val Gly Gly Val Gly Lys Ile Val Gly Ser Ile Val Ala Ala Leu Gly
 305 310 315 320
 Ile Gly Phe Val Asn Tyr Val Ile Gly Ser Gly Leu Met Thr Arg Phe
 325 330 335
 Leu Glu Pro Gln Thr Ala Val Phe Asp Phe Phe Glu Phe Phe Ala Ser
 340 345 350
 Thr Ser Met Ala Arg Val Met Val Phe Ile Leu Ile Ile Ala Phe Leu
 355 360 365
 Gln Leu Arg Pro Ala Gly Leu Phe Pro Gln Lys Gly Arg Thr Val Asp
 370 375 380
 Ala
 385

<210> 830

<211> 870

<212> DNA

<213> Streptococcus mutans

<220>

<221> CDS

<222> (1)..(870)

<400> 830

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Met	Leu	Gln	Gln	Leu	Ile	Asn	Gly	Leu	Ile	Leu	Gly	Ser	Val	Tyr	Ala	
1				5				10						15		
ctg	tta	gcc	ctt	ggg	tat	acc	atg	ggt	tat	gga	att	att	aag	tta	att	96
Leu	Leu	Ala	Leu	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Ile	Lys	Leu	Ile	
			20					25					30			
aac	ttt	gcc	cat	gga	gat	att	tat	atg	atg	gga	gcc	ttt	att	ggg	tat	144
Asn	Phe	Ala	His	Gly	Asp	Ile	Tyr	Met	Met	Gly	Ala	Phe	Ile	Gly	Tyr	
			35				40					45				
ttt	ctt	att	aca	aaa	tat	cat	atg	aat	ttc	ttt	gtg	gct	ctt	gtg	ctg	192
Phe	Leu	Ile	Thr	Lys	Tyr	His	Met	Asn	Phe	Phe	Val	Ala	Leu	Val	Leu	
			50			55					60					
acg	atg	gtc	tta	aca	gct	atc	tta	ggg	ggt	gtg	att	gaa	ttt	ctg	gct	240
Thr	Met	Val	Leu	Thr	Ala	Ile	Leu	Gly	Val	Val	Ile	Glu	Phe	Leu	Ala	
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tat	cgt	cct	ttg	cgg	aat	tcg	aca	cgt	atc	gct	gct	ttg	att	act	gcc	288
Tyr	Arg	Pro	Leu	Arg	Asn	Ser	Thr	Arg	Ile	Ala	Ala	Leu	Ile	Thr	Ala	
				85				90						95		
att	ggt	ggt	tct	ttt	ttt	ctc	gaa	tac	agt	atg	ggt	cgt	tta	ggt	ggt	336
Ile	Gly	Val	Ser	Phe	Phe	Leu	Glu	Tyr	Ser	Met	Val	Arg	Leu	Val	Gly	
			100				105						110			
gcc	aat	aaa	cat	gct	ttt	ccc	caa	acc	ctt	gct	aca	gtg	aaa	tat	aat	384
Ala	Asn	Lys	His	Ala	Phe	Pro	Gln	Thr	Leu	Ala	Thr	Val	Lys	Tyr	Asn	
		115					120					125				
tta	ggt	cct	ggt	agt	gta	acc	aat	gta	caa	ctc	atc	att	tta	gga	gtc	432
Leu	Gly	Pro	Val	Ser	Val	Thr	Asn	Val	Gln	Leu	Ile	Ile	Leu	Gly	Val	
	130					135					140					
tct	atc	ttc	ttg	atg	ttg	gct	ttg	cag	ttt	att	gtc	caa	aaa	act	aaa	480
Ser	Ile	Phe	Leu	Met	Leu	Ala	Leu	Gln	Phe	Ile	Val	Gln	Lys	Thr	Lys	
145					150					155					160	
atg	ggt	aaa	gcc	atg	cgt	gcc	ggt	tca	ggt	gac	agt	gat	gct	gcg	cag	528
Met	Gly	Lys	Ala	Met	Arg	Ala	Val	Ser	Val	Asp	Ser	Asp	Ala	Ala	Gln	
				165				170					175			
tta	atg	gga	atc	ggt	aat	agt	act	att	agt	ttt	acc	ttt	gct	ttt	Leu	576
Leu	Met	Gly	Ile	Asn	Val	Asn	Ser	Thr	Ile	Ser	Phe	Thr	Phe	Ala	Leu	
			180					185				190				
ggt	tct	gca	ctt	gct	ggt	gct	ggt	ggt	gtc	ttg	att	gga	ctt	tat	tat	624
Gly	Ser	Ala	Leu	Ala	Gly	Ala	Gly	Gly	Val	Leu	Ile	Gly	Leu	Tyr	Tyr	
		195					200					205				
aat	tct	ggt	gat	cca	ctg	atg	gga	atg	ggt	ccc	ggt	att	aaa	gcc	ttt	672
Asn	Ser	Val	Asp	Pro	Leu	Met	Gly	Met	Val	Pro	Gly	Ile	Lys	Ala	Phe	
		210				215				220						
gtc	gcc	gct	ggt	tta	ggc	ggt	att	ggt	att	att	cca	ggt	gca	gct	gtc	720
Val	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ile	Ile	Pro	Gly	Ala	Ala	Val	
225					230					235					240	
ggg	ggc	ttt	atg	att	ggt	ctt	tta	gag	acg	ttt	tct	ggt	tct	atc	ggt	768
Gly	Gly	Phe	Met	Ile	Gly	Leu	Leu	Glu	Thr	Phe	Ser	Val	Ser	Ile	Gly	
				245				250						255		
ctt	gca	agt	tac	aag	gat	gca	ggt	gtc	tat	gca	gtg	ctt	atc	att	atc	816
Leu	Ala	Ser	Tyr	Lys	Asp	Ala	Val	Val	Tyr	Ala	Val	Leu	Ile	Ile	Ile	
			260					265					270			
ctt	tta	gta	aga	cca	gct	ggt	att	tta	gga	aaa	aat	gtg	aaa	gag	aag	864
Leu	Leu	Val	Arg	Pro	Ala	Gly	Ile	Leu	Gly	Lys	Asn	Val	Lys	Glu	Lys	
		275					280					285				
gtg	taa															870
Val																

<210> 831

<211> 289

<212> PRT

<213> Streptococcus mutans

<400> 831

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Leu	Leu	Ala	Leu	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Ile	Lys	Leu	Ile	
			20					25					30			
Asn	Phe	Ala	His	Gly	Asp	Ile	Tyr	Met	Met	Gly	Ala	Phe	Ile	Gly	Tyr	
		35					40					45				
Phe	Leu	Ile	Thr	Lys	Tyr	His	Met	Asn	Phe	Phe	Val	Ala	Leu	Val	Leu	
	50					55					60					
Thr	Met	Val	Leu	Thr	Ala	Ile	Leu	Gly	Val	Val	Ile	Glu	Phe	Leu	Ala	
65					70				75						80	
Tyr	Arg	Pro	Leu	Arg	Asn	Ser	Thr	Arg	Ile	Ala	Ala	Leu	Ile	Thr	Ala	
				85					90					95		
Ile	Gly	Val	Ser	Phe	Phe	Leu	Glu	Tyr	Ser	Met	Val	Arg	Leu	Val	Gly	
			100					105				110				
Ala	Asn	Lys	His	Ala	Phe	Pro	Gln	Thr	Leu	Ala	Thr	Val	Lys	Tyr	Asn	
		115					120					125				
Leu	Gly	Pro	Val	Ser	Val	Thr	Asn	Val	Gln	Leu	Ile	Ile	Leu	Gly	Val	
	130					135					140					
Ser	Ile	Phe	Leu	Met	Leu	Ala	Leu	Gln	Phe	Ile	Val	Gln	Lys	Thr	Lys	160
145					150					155						

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Met	Gly	Lys	Ala	Met	Arg	Ala	Val	Ser	Val	Asp	Ser	Asp	Ala	Ala	Gln
				165					170					175	
Leu	Met	Gly	Ile	Asn	Val	Asn	Ser	Thr	Ile	Ser	Phe	Thr	Phe	Ala	Leu
			180					185					190		
Gly	Ser	Ala	Leu	Ala	Gly	Ala	Gly	Gly	Val	Leu	Ile	Gly	Leu	Tyr	Tyr
		195					200					205			
Asn	Ser	Val	Asp	Pro	Leu	Met	Gly	Met	Val	Pro	Gly	Ile	Lys	Ala	Phe
		210				215					220				
Val	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ile	Ile	Pro	Gly	Ala	Ala	Val
					230					235					240
Gly	Gly	Phe	Met	Ile	Gly	Leu	Leu	Glu	Thr	Phe	Ser	Val	Ser	Ile	Gly
				245					250					255	
Leu	Ala	Ser	Tyr	Lys	Asp	Ala	Val	Val	Tyr	Ala	Val	Leu	Ile	Ile	Ile
			260					265					270		
Leu	Leu	Val	Arg	Pro	Ala	Gly	Ile	Leu	Gly	Lys	Asn	Val	Lys	Glu	Lys
		275					280					285			
Val															

<210> 832

<211> 957

<212> DNA

<213> Streptococcus mutans

<220>

<221> CDS

<222> (1)..(957)

<400> 832

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1				5				10						15		
atc	atc	ttt	ttt	ctt	ctt	ttt	gga	ctt	att	agt	gct	ggt	atc	ata	gat	96
Ile	Ile	Phe	Phe	Leu	Leu	Phe	Gly	Leu	Ile	Ser	Ala	Gly	Ile	Ile	Asp	
			20					25					30			
att	tac	tat	act	caa	att	ctc	atg	gga	att	ggg	att	agt	att	atc	atg	144
Ile	Tyr	Tyr	Thr	Gln	Ile	Leu	Met	Gly	Ile	Gly	Ile	Ser	Ile	Ile	Met	
			35				40					45				
gca	ctc	gga	acc	aac	tta	gtt	ctt	ggc	ttt	tct	gga	cag	ctc	tct	ctt	192
Ala	Leu	Gly	Thr	Asn	Leu	Val	Leu	Gly	Phe	Ser	Gly	Gln	Leu	Ser	Leu	
			50			55					60					
gga	caa	gct	ggc	ttt	atg	gcc	att	ggt	gct	tat	gca	act	gct	att	tta	240
Gly	Gln	Ala	Gly	Phe	Met	Ala	Ile	Gly	Ala	Tyr	Ala	Thr	Ala	Ile	Leu	
				70				75							80	
aca	act	caa	aat	cct	act	tat	gca	ggt	ttc	tat	tta	tcc	att	att	gtc	288
Thr	Thr	Gln	Asn	Pro	Thr	Tyr	Ala	Gly	Phe	Tyr	Leu	Ser	Ile	Ile	Val	
				85				90						95		
ggt	atg	ata	gtg	act	gca	acg	gtt	gcc	ttg	ggt	ggt	ggg	att	cca	aca	336
Gly	Met	Ile	Val	Thr	Ala	Thr	Val	Ala	Leu	Val	Val	Gly	Ile	Pro	Thr	
			100				105					110				
ctt	cgt	ttg	aag	ggt	gat	tac	tta	gct	att	gca	act	ctt	ggt	gta	gct	384
Leu	Arg	Leu	Lys	Gly	Asp	Tyr	Leu	Ala	Ile	Ala	Thr	Leu	Gly	Val	Ala	
			115				120					125				
gaa	att	atc	cgt	aaa	ctg	att	gaa	aat	ggt	ggt	gat	ttg	act	aat	ggt	432
Glu	Ile	Ile	Arg	Lys	Leu	Ile	Glu	Asn	Gly	Gly	Asp	Leu	Thr	Asn	Gly	
			130			135					140					
tct	agg	gga	att	atg	gga	att	ctc	aaa	tac	acc	act	tgg	cca	gtc	gtc	480
Ser	Arg	Gly	Ile	Met	Gly	Ile	Leu	Lys	Tyr	Thr	Thr	Trp	Pro	Val	Val	
					150				155						160	
ttt	gtt	ttc	gtt	gtt	ttg	att	acc	att	ttt	gtg	tta	aat	tat	ctg	agg	528
Phe	Val	Phe	Val	Val	Leu	Ile	Thr	Ile	Phe	Val	Leu	Asn	Tyr	Leu	Arg	
				165					170					175		
agt	cct	atg	gga	aga	gaa	gta	ctt	gcg	ggt	cgt	gaa	gat	gaa	att	gca	576
Ser	Pro	Met	Gly	Arg	Glu	Val	Leu	Ala	Val	Arg	Glu	Asp	Glu	Ile	Ala	
			180					185					190			
gca	gaa	gct	atg	ggg	gtg	aat	acg	aca	aaa	att	aag	gta	ctt	act	ttt	624
Ala	Glu	Ala	Met	Gly	Val	Asn	Thr	Thr	Lys	Ile	Lys	Val	Leu	Thr	Phe	
			195				200					205				
atg	att	gct	gca	gta	att	tcc	agc	att	gca	ggt	tcc	ctt	tat	gtc	ggt	672

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Met	Ile	Ala	Ala	Val	Ile	Ser	Ser	Ile	Ala	Gly	Ser	Leu	Tyr	Val	Gly	
210	210					215				220						
tat	att	ggt	aca	gtc	gct	cct	aaa	gat	ttt	acc	att	atg	aaa	tca	att	720
Tyr	Ile	Gly	Thr	Val	Ala	Pro	Lys	Asp	Phe	Thr	Ile	Met	Lys	Ser	Ile	
225					230					235					240	
gat	ttt	ctt	atc	gtg	gct	gtt	ctt	ggt	gga	ctt	ggc	tca	gta	aca	gga	768
Asp	Phe	Leu	Ile	Val	Ala	Val	Leu	Gly	Gly	Leu	Gly	Ser	Val	Thr	Gly	
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act	att	gtg	gct	gct	gtt	gtt	ttg	ggt	atc	ctc	aat	atg	ttc	ttg	caa	816
Thr	Ile	Val	Ala	Ala	Val	Val	Leu	Gly	Ile	Leu	Asn	Met	Phe	Leu	Gln	
			260					265					270			
aat	gta	tca	gat	att	cgt	atg	att	atc	tat	tcg	tta	gct	tta	att	ttg	864
Asn	Val	Ser	Asp	Ile	Arg	Met	Ile	Ile	Tyr	Ser	Leu	Ala	Leu	Ile	Leu	
			275				280					285				
gtt	atg	gtc	ttt	aga	cca	ggc	ggt	ctt	tta	gga	aca	tggt	gaa	ttc	agt	912
Val	Met	Val	Phe	Arg	Pro	Gly	Gly	Leu	Leu	Gly	Thr	Trp	Glu	Phe	Ser	
	290					295					300					
ttt	tca	aga	ctt	ttc	gct	aaa	aaa	gct	aag	gag	ggc	gac	aaa	tag		957
Phe	Ser	Arg	Leu	Phe	Ala	Lys	Lys	Ala	Lys	Glu	Gly	Asp	Lys			
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<210> 833

<211> 318

<212> PRT

<213> Streptococcus mutans

<400> 833

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Ile	Ile	Phe	Phe	Leu	Leu	Phe	Gly	Leu	Ile	Ser	Ala	Gly	Ile	Ile	Asp	
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Ile	Tyr	Tyr	Thr	Gln	Ile	Leu	Met	Gly	Ile	Gly	Ile	Ser	Ile	Ile	Met	
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Thr	Thr	Gln	Asn	Pro	Thr	Tyr	Ala	Gly	Phe	Tyr	Leu	Ser	Ile	Ile	Val	
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Gly	Met	Ile	Val	Thr	Ala	Thr	Val	Ala	Leu	Val	Val	Gly	Ile	Pro	Thr	
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Leu	Arg	Leu	Lys	Gly	Asp	Tyr	Leu	Ala	Ile	Ala	Thr	Leu	Gly	Val	Ala	
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Glu	Ile	Ile	Arg	Lys	Leu	Ile	Glu	Asn	Gly	Gly	Asp	Leu	Thr	Asn	Gly	
	130					135					140					
Ser	Arg	Gly	Ile	Met	Gly	Ile	Leu	Lys	Tyr	Thr	Thr	Trp	Pro	Val	Val	
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Phe	Val	Phe	Val	Val	Leu	Ile	Thr	Ile	Phe	Val	Leu	Asn	Tyr	Leu	Arg	
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	210					215					220					
Tyr	Ile	Gly	Thr	Val	Ala	Pro	Lys	Asp	Phe	Thr	Ile	Met	Lys	Ser	Ile	
225					230					235					240	
Asp	Phe	Leu	Ile	Val	Ala	Val	Leu	Gly	Gly	Leu	Gly	Ser	Val	Thr	Gly	
				245					250					255		
Thr	Ile	Val	Ala	Ala	Val	Val	Leu	Gly	Ile	Leu	Asn	Met	Phe	Leu	Gln	
			260					265					270			
Asn	Val	Ser	Asp	Ile	Arg	Met	Ile	Ile	Tyr	Ser	Leu	Ala	Leu	Ile	Leu	
		275					280					285				
Val	Met	Val	Phe	Arg	Pro	Gly	Gly	Leu	Leu	Gly	Thr	Trp	Glu	Phe	Ser	
	290					295					300					
Phe	Ser	Arg	Leu	Phe	Ala	Lys	Lys	Ala	Lys	Glu	Gly	Asp	Lys			
305					310					315						

<210> 834

<211> 870

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1)..(870)

<400> 834

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1 5 10 15	
tta ctt gcc tta gga tat act atg gta tat ggc att att aag ctg att	96
Leu Leu Ala Leu Gly Tyr Thr Met Val Tyr Gly Ile Ile Lys Leu Ile	
20 25 30	
aat ttt gct cat ggg gac atc tat atg atg ggc gct ttc atg ggc tat	144
Asn Phe Ala His Gly Asp Ile Tyr Met Met Gly Ala Phe Met Gly Tyr	
35 40 45	
tat ttg att aat cat ctt cat ctt aat ttt ttc cta gct tta tta att	192
Tyr Leu Ile Asn His Leu His Leu Asn Phe Phe Leu Ala Leu Leu Ile	
50 55 60	
gca atg ctg ggg tct gct ttc cta ggt gtt gta att gaa tat tta gct	240
Ala Met Leu Gly Ser Ala Phe Leu Gly Val Val Ile Glu Tyr Leu Ala	
65 70 75 80	
tat cgt cca ctg aga aaa tca act aga att gcc gcg tta att aca gct	288
Tyr Arg Pro Leu Arg Lys Ser Thr Arg Ile Ala Ala Leu Ile Thr Ala	
85 90 95	
att ggt gtt tct ttt ctt ttg gag tac ggg atg gta tac ctt gtt gga	336
Ile Gly Val Ser Phe Leu Leu Glu Tyr Gly Met Val Tyr Leu Val Gly	
100 105 110	
gcg gat act agg gca ttt ccg caa gcc att cat act gtt aaa tat aat	384
Ala Asp Thr Arg Ala Phe Pro Gln Ala Ile His Thr Val Lys Tyr Asn	
115 120 125	
tta gga ccg ata act ata acc aat gtt cag ctc atc att tta ggt att	432
Leu Gly Pro Ile Thr Ile Asn Val Gln Leu Ile Leu Gly Ile	
130 135 140	
gcg cta tta cta atg ctt act tta cag ttc atc gtt caa aaa act aaa	480
Ala Leu Leu Leu Met Leu Thr Leu Gln Phe Ile Val Gln Lys Thr Lys	
145 150 155 160	
atg ggg aaa gct atg aga gct tta tca gtg gat agc gat gcc gca caa	528
Met Gly Lys Ala Met Arg Ala Leu Ser Val Asp Ser Asp Ala Ala Gln	
165 170 175	
ttg atg gga att aat gtt aac cgt acc att agt ttt aca ttt gcg ctg	576
Leu Met Gly Ile Asn Val Asn Arg Thr Ile Ser Phe Thr Phe Ala Leu	
180 185 190	
ggg tct gct tta gct gga gca ggt gga gta ctg att ggg ctt tat tat	624
Gly Ser Ala Leu Ala Gly Ala Gly Val Leu Ile Gly Leu Tyr Tyr	
195 200 205	
aat tct gtt caa cct ctt atg ggg gta act cca ggg ttg aaa gca ttt	672
Asn Ser Val Gln Pro Leu Met Gly Val Thr Pro Gly Leu Lys Ala Phe	
210 215 220	
gtt gca gct gtc tta ggt ggt att ggt atc att ccg gga gcg gct atc	720
Val Ala Ala Val Leu Gly Gly Ile Gly Ile Ile Pro Gly Ala Ala Ile	
225 230 235 240	
ggt ggt ttt gtt att ggc att tta gaa act tta gcg act gca ctt ggt	768
Gly Gly Phe Val Ile Gly Ile Leu Glu Thr Leu Ala Thr Ala Leu Gly	
245 250 255	
gtg tca gat ttt cga gat ggt atc gtt tat gct att tta att ctc att	816
Val Ser Asp Phe Arg Asp Gly Ile Val Tyr Ala Ile Leu Ile Leu Ile	
260 265 270	
ttc ttg atc cgt cca gca gga att ctt gga aaa aat att aag gag aag	864
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275 280 285	
gtc tag	870
Val	

<210> 835

<211> 289

<212> PRT

<213> Streptococcus agalactiae

<400> 835

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20      25      30
Asn Phe Ala His Gly Asp Ile Tyr Met Met Gly Ala Phe Met Gly Tyr
35      40      45
Tyr Leu Ile Asn His Leu His Leu Asn Phe Phe Leu Ala Leu Leu Ile
50      55      60
Ala Met Leu Gly Ser Ala Phe Leu Gly Val Val Ile Glu Tyr Leu Ala
65      70      75      80
Tyr Arg Pro Leu Arg Lys Ser Thr Arg Ile Ala Ala Leu Ile Thr Ala
85      90      95
Ile Gly Val Ser Phe Leu Leu Glu Tyr Gly Met Val Tyr Leu Val Gly
100     105     110
Ala Asp Thr Arg Ala Phe Pro Gln Ala Ile His Thr Val Lys Tyr Asn
115     120     125
Leu Gly Pro Ile Thr Ile Thr Asn Val Gln Leu Ile Ile Leu Gly Ile
130     135     140
Ala Leu Leu Leu Met Leu Thr Leu Gln Phe Ile Val Gln Lys Thr Lys
145     150     155     160
Met Gly Lys Ala Met Arg Ala Leu Ser Val Asp Ser Asp Ala Ala Gln
165     170     175
Leu Met Gly Ile Asn Val Asn Arg Thr Ile Ser Phe Thr Phe Ala Leu
180     185     190
Gly Ser Ala Leu Ala Gly Ala Gly Val Leu Ile Gly Leu Tyr Tyr
195     200     205
Asn Ser Val Gln Pro Leu Met Gly Val Thr Pro Gly Leu Lys Ala Phe
210     215     220
Val Ala Ala Val Leu Gly Gly Ile Gly Ile Ile Pro Gly Ala Ala Ile
225     230     235     240
Gly Gly Phe Val Ile Gly Ile Leu Glu Thr Leu Ala Thr Ala Leu Gly
245     250     255
Val Ser Asp Phe Arg Asp Gly Ile Val Tyr Ala Ile Leu Ile Leu Ile
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<210> 836

<211> 954

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1)..(954)

<400> 836

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1      5      10      15
tta ggt tat ctc ttg att agc gtg cta ata tct atg ggt ata ttt aac      96
Leu Gly Tyr Leu Leu Ile Ser Val Leu Ile Ser Met Gly Ile Phe Asn
20      25      30
ctc tat cat att caa att att gaa aca att ggg att aat gtt att tta      144
Leu Tyr His Ile Gln Ile Ile Glu Thr Ile Gly Ile Asn Val Ile Leu
35      40      45
gca gtt ggt ttg aac cta att gta ggt tgt tgc gga cag ttt tca cta      192
Ala Val Gly Leu Asn Leu Ile Val Gly Cys Ser Gly Gln Phe Ser Leu
50      55      60
gga cat gca ggt ttc atg gct att ggc gct tat gca gtt gct att atc      240
Gly His Ala Gly Phe Met Ala Ile Gly Ala Tyr Ala Val Ala Ile Ile
65      70      75      80
ggc gtt aaa atg cca act tat gta ggt ttt ttg ata gct ata ctt gtt      288

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Gly	Val	Lys	Met	Pro 85	Thr	Tyr	Val	Gly	Phe 90	Leu	Ile	Ala	Ile	Leu 95	Val	
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ttg Leu	aga Arg	cta Leu 115	aaa Lys	ggt Gly	gat Asp	tat Tyr	tta Leu 120	gct Ala	ata Ile	gct Ala	act Thr	tta Leu 125	ggt Gly	gtt Val	gct Ala	384
gag Glu	att Ile 130	atc Ile	cgt Arg	att Ile	ttg Leu	ttg Leu 135	gtt Val	aat Asn	gga Gly	ggt Gly	gat Asp 140	att Ile	acg Thr	aat Asn	ggt Gly	432
gct Ala 145	gcg Ala	ggt Gly	atc Ile	atg Met	ggg Gly 150	att Ile	ccg Pro	cct Pro	ttt Phe	aca Thr 155	acc Thr	tgg Trp	tct Ser	tta Leu	gtt Val 160	480
tat Tyr	ggg Gly	gtg Val	gca Ala	gtt Val 165	gtg Val	agt Ser	ctt Leu	atc Ile	ctt Leu 170	gca Ala	atg Met	aat Asn	ttt Phe	ttg Leu 175	cgt Arg	528
agt Ser	ccc Pro	tta Leu	ggg Gly 180	cgt Arg	aat Asn	aca Thr	att Ile	gct Ala 185	ata Ile	cga Arg	gaa Glu	gat Asp	gaa Glu 190	att Ile	gca Ala	576
gca Ala	gag Glu	tct Ser 195	atg Met	ggt Gly	gtg Val	gat Asp	aca Thr 200	aca Thr	aaa Lys	gtg Val	aaa Lys	gta Val 205	att Ile	gtt Val	ttt Phe	624
gtt Val	ttt Phe 210	gga Gly	gct Ala	att Ile	tta Leu	gct Ala 215	tct Ser	atc Ile	gct Ala	ggt Gly	agt Ser 220	tta Leu	cag Gln	gct Ala	ggc Gly	672
tac Tyr 225	gtt Val	gga Gly	act Thr	gtt Val	atg Met 230	cca Pro	aaa Lys	gac Asp	ttt Phe	tca Ser 235	ttt Phe	atg Met	atg Met	tct Ser	gtc Val 240	720
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aca Thr	gtt Val	tta Leu	gca Ala 260	gca Ala	att Ile	tta Leu	tta Leu	gga Gly 265	tta Leu	ttg Leu	aat Asn	atg Met	tta Leu 270	cta Leu	caa Gln	816
gac Asp	tac Tyr	gct Ala 275	tct Ser	gtt Val	cga Arg	atg Met	att Ile 280	atc Ile	tat Tyr	gct Ala	tta Leu	gct Ala 285	ctg Leu	att Ile	tta Leu	864
att Ile	atg Met 290	att Ile	ttt Phe	aga Arg	cct Pro	agc Ser 295	ggt Gly	tta Leu	tta Leu	gga Gly	acg Thr 300	aag Lys	gag Glu	tta Leu	act Thr	912
cta Leu 305	tct Ser	cat His	cta Leu	ttt Phe	cgt Arg 310	aag Lys	acg Thr	agt Ser	aag Lys	gga Gly 315	ggc Gly	aat Asn	tag			954

<210> 837

<211> 317

<212> PRT

<213> Streptococcus agalactiae

<400> 837

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			20					25					30			
Leu	Tyr	His	Ile	Gln	Ile	Ile	Glu	Thr	Ile	Gly	Ile	Asn	Val	Ile	Leu	
		35					40					45				
Ala	Val	Gly	Leu	Asn	Leu	Ile	Val	Gly	Cys	Ser	Gly	Gln	Phe	Ser	Leu	
	50					55					60					
Gly	His	Ala	Gly	Phe	Met	Ala	Ile	Gly	Ala	Tyr	Ala	Val	Ala	Ile	Ile	
65					70					75					80	
Gly	Val	Lys	Met	Pro	Thr	Tyr	Val	Gly	Phe	Leu	Ile	Ala	Ile	Leu	Val	
				85					90					95		
Gly	Thr	Leu	Val	Ala	Gly	Gly	Ile	Ala	Leu	Gly	Val	Gly	Ile	Pro	Thr	
			100					105					110			
Leu	Arg	Leu	Lys	Gly	Asp	Tyr	Leu	Ala	Ile	Ala	Thr	Leu	Gly	Val	Ala	
		115					120					125				
Glu	Ile	Ile	Arg	Ile	Leu	Leu	Val	Asn	Gly	Gly	Asp	Ile	Thr	Asn	Gly	
	130					135					140					

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Tyr Gly Val Ala Val 165 Val Ser Leu Ile Leu 170 Ala Met Asn Phe Leu Arg 175
Ser Pro Leu Gly 180 Arg Asn Thr Ile Ala 185 Ile Arg Glu Asp Glu Ile Ala 190
Ala Glu Ser 195 Met Gly Val Asp Thr 200 Thr Lys Val Lys Val 205 Ile Val Phe
Val Phe 210 Gly Ala Ile Leu Ala 215 Ser Ile Ala Gly Ser Leu Gln Ala Gly 220
Tyr Val 225 Gly Thr Val Met 230 Pro Lys Asp Phe Ser 235 Phe Met Met Ser Val 240
Asn Val 245 Leu Ile Ile Val Val Leu Gly Gly 250 Leu Gly Ser Met Thr 255 Gly
Thr Val 260 Leu Ala Ala Ile Leu Leu Gly 265 Leu Leu Asn Met Leu Leu Gln 270
Asp Tyr 275 Ala Ser Val Arg Met Ile 280 Ile Tyr Ala Leu Ala 285 Leu Ile Leu
Ile Met 290 Ile Phe Arg Pro Ser 295 Gly Leu Leu Gly Thr 300 Lys Glu Leu Thr
Leu Ser 305 His Leu Phe Arg 310 Lys Thr Ser Lys Gly 315 Gly Asn

<210> 838

<211> 987

<212> DNA

<213> Oceanobacillus iheyensis

<220>

<221> CDS

<222> (1)..(987)

<400> 838

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gtt	gct	att	ctc	ttc	cct	cta	ttc	acc	caa	aat	aat	tac	tat	att	cat	96
Val	Ala	Ile	Leu	Phe	Pro	Leu	Phe	Thr	Gln	Asn	Asn	Tyr	Tyr	Ile	His	
			20				25						30			
gtc	atg	acg	cta	tcg	ttt	ata	tgg	atg	atc	gcc	gta	tat	gga	tta	aat	144
Val	Met	Thr	Leu	Ser	Phe	Ile	Trp	Met	Ile	Ala	Val	Tyr	Gly	Leu	Asn	
		35				40					45					
ata	ctg	gcg	gga	tat	acc	ggt	tat	tta	tca	ttg	gct	cat	gct	gga	ttc	192
Ile	Leu	Ala	Gly	Tyr	Thr	Gly	Tyr	Leu	Ser	Leu	Ala	His	Ala	Gly	Phe	
	50					55				60						
ttt	gca	att	gga	gca	tat	gca	tta	ggc	tta	cta	acc	gta	aag	gca	gaa	240
Phe	Ala	Ile	Gly	Ala	Tyr	Ala	Leu	Gly	Leu	Leu	Thr	Val	Lys	Ala	Glu	
	65				70				75						80	
gtg	ggt	ttt	tgg	cta	gct	tta	att	tta	gca	cca	att	ata	aca	aca	atc	288
Val	Gly	Phe	Trp	Leu	Ala	Leu	Ile	Leu	Ala	Pro	Ile	Ile	Thr	Thr	Ile	
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Ile	Gly	Phe	Gly	Ile	Gly	Leu	Ile	Ala	Leu	Arg	Thr	Lys	Glu	His	Phe	
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Phe	Ala	Ile	Tyr	Thr	Leu	Cys	Val	Gly	Tyr	Val	Ile	Tyr	Leu	Leu	Ile	
		115					120					125				
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Asp	Lys	Trp	Asp	Ser	Leu	Thr	Glu	Gly	Val	Arg	Gly	Leu	Met	Gly	Ile	
	130					135					140					
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Pro	Leu	Pro	Ser	Asp	Ile	Gly	Pro	Ile	Ser	Phe	Glu	Ser	Asn	Ile	Ala	
	145				150					155					160	
caa	tac	tat	ttc	att	tta	atc	gta	ttg	ctt	ttc	tct	att	ttc	gtg	att	528
Gln	Tyr	Tyr	Phe	Ile	Leu	Ile	Val	Leu	Leu	Phe	Ser	Ile	Phe	Val	Ile	
			165					170						175		
tat	aga	att	gta	aat	tcc	ata	gtc	gga	aaa	aag	cta	atc	gca	att	cgt	576
Tyr	Arg	Ile	Val	Asn	Ser	Ile	Val	Gly	Lys	Lys	Leu	Ile	Ala	Ile	Arg	
			180					185					190			

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Asn	Ser	Glu	Gln	Leu	Ala	Leu	Ser	Leu	Gly	Ile	Ser	Thr	Lys	Lys	Asn	
		195					200					205				
aaa	cta	ctt	gct	ttt	gta	tta	tct	acg	ttt	ttt	gca	gga	tta	gcg	ggt	672
Lys	Leu	Leu	Ala	Phe	Val	Leu	Ser	Thr	Phe	Phe	Ala	Gly	Leu	Ala	Gly	
	210					215					220					
gcg	tta	tat	gca	agt	ttt	ata	cgg	ttc	cta	ggt	cca	gat	atc	ggt	tct	720
Ala	Leu	Tyr	Ala	Ser	Phe	Ile	Arg	Phe	Leu	Gly	Pro	Asp	Ile	Gly	Ser	
225					230					235					240	
aca	aat	ata	aca	ttt	gat	cta	ctc	atg	tat	tta	att	gtc	gga	ggt	att	768
Thr	Asn	Ile	Thr	Phe	Asp	Leu	Leu	Met	Tyr	Leu	Ile	Val	Gly	Gly	Ile	
				245					250					255		
ggt	aca	tta	tct	ggt	ccg	att	ata	ggt	act	cta	tta	gtc	gta	tgg	ctt	816
Gly	Thr	Leu	Ser	Gly	Pro	Ile	Ile	Gly	Thr	Leu	Leu	Val	Val	Trp	Leu	
			260					265					270			
tct	caa	aat	cta	caa	ttc	tta	caa	gat	tat	cga	atg	cta	ata	ttt	ggt	864
Ser	Gln	Asn	Leu	Gln	Phe	Leu	Gln	Asp	Tyr	Arg	Met	Leu	Ile	Phe	Gly	
		275					280					285				
cca	tta	ttg	gca	ctg	tta	atc	att	ttc	tcc	cct	cga	ggt	att	gta	ggt	912
Pro	Leu	Leu	Ala	Leu	Leu	Ile	Ile	Phe	Ser	Pro	Arg	Gly	Ile	Val	Gly	
	290					295					300					
atg	ttc	tct	agc	atg	aag	caa	aac	atc	caa	caa	aaa	aga	gat	tta	cgg	960
Met	Phe	Ser	Ser	Met	Lys	Gln	Asn	Ile	Gln	Gln	Lys	Arg	Asp	Leu	Arg	
305					310					315					320	
caa	aaa	caa	cta	aaa	aaa	gaa	gcg	tag								987
Gln	Lys	Gln	Leu	Lys	Lys	Glu	Ala									
				325												

<210> 839

<211> 328

<212> PRT

<213> Oceanobacillus iheyensis

<400> 839

Met	Ile	Lys	Asn	Asn	Thr	Gln	Lys	Tyr	Ile	Val	Ile	Gly	Leu	Leu	Met	
1				5					10					15		
Val	Ala	Ile	Leu	Phe	Pro	Leu	Phe	Thr	Gln	Asn	Asn	Tyr	Tyr	Ile	His	
			20					25					30			
Val	Met	Thr	Leu	Ser	Phe	Ile	Trp	Met	Ile	Ala	Val	Tyr	Gly	Leu	Asn	
		35					40					45				
Ile	Leu	Ala	Gly	Tyr	Thr	Gly	Tyr	Leu	Ser	Leu	Ala	His	Ala	Gly	Phe	
	50					55					60					
Phe	Ala	Ile	Gly	Ala	Tyr	Ala	Leu	Gly	Leu	Leu	Thr	Val	Lys	Ala	Glu	
65					70					75					80	
Val	Gly	Phe	Trp	Leu	Ala	Leu	Ile	Leu	Ala	Pro	Ile	Ile	Thr	Thr	Ile	
				85					90					95		
Ile	Gly	Phe	Gly	Ile	Gly	Leu	Ile	Ala	Leu	Arg	Thr	Lys	Glu	His	Phe	
			100					105					110			
Phe	Ala	Ile	Tyr	Thr	Leu	Cys	Val	Gly	Tyr	Val	Ile	Tyr	Leu	Leu	Ile	
		115					120					125				
Asp	Lys	Trp	Asp	Ser	Leu	Thr	Glu	Gly	Val	Arg	Gly	Leu	Met	Gly	Ile	
	130					135					140					
Pro	Leu	Pro	Ser	Asp	Ile	Gly	Pro	Ile	Ser	Phe	Glu	Ser	Asn	Ile	Ala	
145					150					155					160	
Gln	Tyr	Tyr	Phe	Ile	Leu	Ile	Val	Leu	Leu	Phe	Ser	Ile	Phe	Val	Ile	
				165					170					175		
Tyr	Arg	Ile	Val	Asn	Ser	Ile	Val	Gly	Lys	Lys	Leu	Ile	Ala	Ile	Arg	
			180					185					190			
Asn	Ser	Glu	Gln	Leu	Ala	Leu	Ser	Leu	Gly	Ile	Ser	Thr	Lys	Lys	Asn	
		195					200					205				
Lys	Leu	Leu	Ala	Phe	Val	Leu	Ser	Thr	Phe	Phe	Ala	Gly	Leu	Ala	Gly	
	210					215					220					
Ala	Leu	Tyr	Ala	Ser	Phe	Ile	Arg	Phe	Leu	Gly	Pro	Asp	Ile	Gly	Ser	
225					230					235					240	
Thr	Asn	Ile	Thr	Phe	Asp	Leu	Leu	Met	Tyr	Leu	Ile	Val	Gly	Gly	Ile	
				245					250					255		
Gly	Thr	Leu	Ser	Gly	Pro	Ile	Ile	Gly	Thr	Leu	Leu	Val	Val	Trp	Leu	
			260					265					270			
Ser	Gln	Asn	Leu	Gln	Phe	Leu	Gln	Asp	Tyr	Arg	Met	Leu	Ile	Phe	Gly	

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275
 Pro Leu Leu Ala Leu Leu Ile Phe Ser Pro Arg Gly Ile Val Gly
 290 285
 Met Phe Ser Ser Met Lys Gln Asn Ile Gln Lys Arg Asp Leu Arg
 305 300
 Gln Lys Gln Leu Lys Lys Glu Ala
 315 320

<210> 840

<211> 864

<212> DNA

<213> Oceanobacillus iheyensis

<220>

<221> CDS

<222> (1)..(864)

<400> 840

atg	gag	ata	tta	ata	caa	cag	tta	ttc	aat	ggg	tta	acg	atc	ggg	agt	48
Met	Glu	Ile	Leu	Ile	Gln	Gln	Leu	Phe	Asn	Gly	Leu	Thr	Ile	Gly	Ser	
1				5				10						15		
gta	tat	agt	tta	gta	gca	tta	ggg	ctc	aca	ctt	gtt	tat	gga	att	ttg	96
Val	Tyr	Ser	Leu	Val	Ala	Leu	Gly	Leu	Thr	Leu	Val	Tyr	Gly	Ile	Leu	
			20					25					30			
cat	gta	ccc	aat	ttt	gct	cat	gga	gcc	att	tat	atg	att	ggg	ggc	tac	144
His	Val	Pro	Asn	Phe	Ala	His	Gly	Ala	Ile	Tyr	Met	Ile	Gly	Gly	Tyr	
		35					40					45				
gta	aca	tta	acg	atg	atg	gtc	tat	ttg	gga	tta	tct	tat	tgg	cta	tcg	192
Val	Thr	Leu	Thr	Met	Met	Val	Tyr	Leu	Gly	Leu	Ser	Tyr	Trp	Leu	Ser	
		50				55					60					
atg	ctt	att	tct	gta	tta	gta	gtt	gga	acc	cta	gca	tta	tta	atg	gaa	240
Met	Leu	Ile	Ser	Val	Leu	Val	Val	Gly	Thr	Leu	Ala	Leu	Leu	Met	Glu	
65				70				75						80		
cgt	ctt	ata	ttc	cat	cct	cta	aga	aat	tct	atc	tcc	att	aat	agt	atg	288
Arg	Leu	Ile	Phe	His	Pro	Leu	Arg	Asn	Ser	Ile	Ser	Ile	Asn	Ser	Met	
			85					90						95		
att	gct	gca	att	gga	atg	ttg	tta	ttt	tta	gaa	gcg	ttt	gct	cag	ctg	336
Ile	Ala	Ala	Ile	Gly	Met	Leu	Leu	Phe	Leu	Glu	Ala	Phe	Ala	Gln	Leu	
			100					105					110			
ttc	tgg	ggg	cca	gat	ttt	cga	gag	atg	cca	aca	cca	tac	aat	gaa	gta	384
Phe	Trp	Gly	Pro	Asp	Phe	Arg	Glu	Met	Pro	Thr	Pro	Tyr	Asn	Glu	Val	
		115					120					125				
gtc	aat	gta	ttt	gga	tta	aca	ttt	acg	gtt	cag	aga	atc	ttg	att	gtt	432
Val	Asn	Val	Phe	Gly	Leu	Thr	Phe	Thr	Val	Gln	Arg	Ile	Leu	Ile	Val	
		130				135					140					
gtg	gca	gca	att	gtt	gtt	atg	ata	tta	ctt	tat	gct	ttt	ctt	aag	aaa	480
Val	Ala	Ala	Ile	Val	Val	Met	Ile	Leu	Leu	Tyr	Ala	Phe	Leu	Lys	Lys	
145				150						155				160		
acg	ttt	ata	ggg	cga	act	atc	att	gca	ttg	tcg	caa	aat	cga	gaa	ggg	528
Thr	Phe	Ile	Gly	Arg	Thr	Ile	Ile	Ala	Leu	Ser	Gln	Asn	Arg	Glu	Gly	
			165					170						175		
gcg	ttt	ttg	gtt	ggg	att	aat	gcg	aat	aaa	gta	gcg	atg	ttg	act	ttc	576
Ala	Phe	Leu	Val	Gly	Ile	Asn	Ala	Asn	Lys	Val	Ala	Met	Leu	Thr	Phe	
			180					185					190			
ttt	ata	gct	ggc	gct	tta	gcg	gca	att	gca	gca	tca	ctt	aca	tcg	cca	624
Phe	Ile	Ala	Gly	Ala	Leu	Ala	Ala	Ile	Ala	Ala	Ser	Leu	Thr	Ser	Pro	
		195					200					205				
atc	aat	ctt	gta	ttt	ccc	ggc	atg	gga	cac	ctc	gtt	atc	tta	aag	gca	672
Ile	Asn	Leu	Val	Phe	Pro	Gly	Met	Gly	His	Leu	Val	Ile	Leu	Lys	Ala	
		210				215					220					
ttt	gtt	att	att	att	atc	ggg	ggg	atg	ggg	agt	ata	cct	ggg	gct	att	720
Phe	Val	Ile	Ile	Ile	Ile	Gly	Gly	Met	Gly	Ser	Ile	Pro	Gly	Ala	Ile	
225					230					235				240		
gta	ggg	ggg	tat	att	tta	gga	ttt	agt	gaa	agt	att	ggg	gca	acc	tat	768
Val	Gly	Gly	Tyr	Ile	Leu	Gly	Phe	Ser	Glu	Ser	Ile	Gly	Ala	Thr	Tyr	
			245					250					255			
atc	tct	agt	gat	tat	aaa	gat	att	att	gct	ttc	gtt	ctt	ctg	atc	att	816
Ile	Ser	Ser	Asp	Tyr	Lys	Asp	Ile	Ile	Ala	Phe	Val	Leu	Ile	Ile		
			260					265					270			

att ctc tct atc aag cct aat ggc ata ttt gct aag ggg gaa cac 861
 ile leu ser ile lys pro asn gly ile phe ala lys gly glu his
 275 280 285
 taa 864

<210> 841
 <211> 287
 <212> PRT
 <213> *Oceanobacillus iheyensis*

<400> 841
 Met Glu Ile Leu Ile Gln Gln Leu Phe Asn Gly Leu Thr Ile Gly Ser
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 Val Tyr Ser Leu Val Ala Leu Gly Leu Thr Leu Val Tyr Gly Ile Leu
 20 25 30
 His Val Pro Asn Phe Ala His Gly Ala Ile Tyr Met Ile Gly Gly Tyr
 35 40 45
 Val Thr Leu Thr Met Met Val Tyr Leu Gly Leu Ser Tyr Trp Leu Ser
 50 55 60
 Met Leu Ile Ser Val Leu Val Val Gly Thr Leu Ala Leu Leu Met Glu
 65 70 75 80
 Arg Leu Ile Phe His Pro Leu Arg Asn Ser Ile Ser Ile Asn Ser Met
 85 90 95
 Ile Ala Ala Ile Gly Met Leu Leu Phe Leu Glu Ala Phe Ala Gln Leu
 100 105 110
 Phe Trp Gly Pro Asp Phe Arg Glu Met Pro Thr Pro Tyr Asn Glu Val
 115 120 125
 Val Asn Val Phe Gly Leu Thr Phe Thr Val Gln Arg Ile Leu Ile Val
 130 135 140
 Val Ala Ala Ile Val Val Met Ile Leu Leu Tyr Ala Phe Leu Lys Lys
 145 150 155 160
 Thr Phe Ile Gly Arg Thr Ile Ile Ala Leu Ser Gln Asn Arg Glu Gly
 165 170 175
 Ala Phe Leu Val Gly Ile Asn Ala Asn Lys Val Ala Met Leu Thr Phe
 180 185 190
 Phe Ile Ala Gly Ala Leu Ala Ala Ile Ala Ala Ser Leu Thr Ser Pro
 195 200 205
 Ile Asn Leu Val Phe Pro Gly Met Gly His Leu Val Ile Leu Lys Ala
 210 215 220
 Phe Val Ile Ile Ile Ile Gly Gly Met Gly Ser Ile Pro Gly Ala Ile
 225 230 235 240
 Val Gly Gly Tyr Ile Leu Gly Phe Ser Glu Ser Ile Gly Ala Thr Tyr
 245 250 255
 Ile Ser Ser Asp Tyr Lys Asp Ile Ile Ala Phe Val Leu Leu Ile Ile
 260 265 270
 Ile Leu Ser Ile Lys Pro Asn Gly Ile Phe Ala Lys Gly Glu His
 275 280 285

<210> 842
 <211> 885
 <212> DNA
 <213> *Corynebacterium efficiens*

<220>
 <221> CDS
 <222> (1)..(885)

<400> 842
 atg gac att cta ctc aat cag cta gta gcg ggc ctg tca gtg ggg tcc 48
 Met Asp Ile Leu Leu Asn Gln Leu Val Ala Gly Leu Ser Val Gly Ser
 1 5 10 15
 gtt ctg ctg ctg gtg gcg gtt ggt ctt tcc ctg acc ttc ggt cag atg 96
 Val Leu Leu Leu Val Ala Val Gly Leu Ser Leu Thr Phe Gly Gln Met
 20 25 30
 ggg gtc atc aac atg gcc cac ggc gag ttc atc atg gtt ggg gcc tac 144
 Gly Val Ile Asn Met Ala His Gly Glu Phe Ile Met Val Gly Ala Tyr
 35 40 45

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acg	gcc	ttc	gtt	gtg	cag	ggg	ggt	atc	aac	tct	gca	ggg	ttc	tcg	ctt	192
Thr	Ala	Phe	Val	Val	Gln	Gly	Val	Ile	Asn	Ser	Ala	Gly	Phe	Ser	Leu	
	50					55					60					
ttg	atc	agt	att	cca	ctg	gca	ttt	gcc	atc	gga	ggg	ctc	ctc	ggg	ggt	240
Leu	Ile	Ser	Ile	Pro	Leu	Ala	Phe	Ala	Ile	Gly	Gly	Leu	Leu	Gly	Val	
65					70					75					80	
ctc	ctt	gaa	cag	acc	ttg	cta	cgc	cat	ctc	tac	cac	cgg	cct	ttg	gac	288
Leu	Leu	Glu	Gln	Thr	Leu	Leu	Arg	His	Leu	Tyr	His	Arg	Pro	Leu	Asp	
				85					90					95		
aca	ctg	ctt	gcg	acc	ttt	ggc	ggt	ctg	atc	ctg	cag	cag	ctg	gcc	336	
Thr	Leu	Leu	Ala	Thr	Phe	Gly	Val	Gly	Leu	Ile	Leu	Gln	Gln	Leu	Ala	
			100					105					110			
agg	gat	att	ttc	ggc	gca	cca	gca	gta	cgt	gcg	cct	gaa	tgg		384	
Arg	Asp	Ile	Phe	Gly	Ala	Pro	Ala	Val	Asp	Val	Arg	Ala	Pro	Glu	Trp	
		115					120					125				
ttg	cgt	ggg	cat	acc	gaa	att	ctg	ggg	act	ctg	gtg	ccg	gtg	tcc	cga	432
Leu	Arg	Gly	His	Thr	Glu	Ile	Leu	Gly	Thr	Leu	Val	Pro	Val	Ser	Arg	
	130					135					140					
ctg	ttc	att	ctc	ttt	ctc	gcc	ttg	gcc	tca	gtg	gcc	gga	ttg	gcg	gtg	480
Leu	Phe	Ile	Leu	Phe	Leu	Ala	Leu	Ala	Ser	Val	Ala	Gly	Leu	Ala	Val	
145					150					155					160	
ttt	ctc	aac	cgt	tcc	atc	tgg	ggt	cgg	aga	atc	agg	gca	gtc	gtg	atc	528
Phe	Leu	Asn	Arg	Ser	Ile	Trp	Gly	Arg	Arg	Ile	Arg	Ala	Val	Val	Ile	
				165					170					175		
aat	cgc	gat	ctc	gcc	gag	act	aat	ggc	atc	aat	acc	cgg	gcc	acg	gac	576
Asn	Arg	Asp	Leu	Ala	Glu	Thr	Asn	Gly	Ile	Asn	Thr	Arg	Ala	Thr	Asp	
			180					185					190			
cgt	atg	acc	ttt	ttt	atc	ggg	tct	ggt	ctc	gcc	gga	att	gca	ggc	gtc	624
Arg	Met	Thr	Phe	Phe	Ile	Gly	Ser	Gly	Leu	Ala	Gly	Ile	Ala	Gly	Val	
		195					200					205				
gcc	atc	act	ctc	att	gga	gcc	acc	ggg	ccg	acc	atc	ggg	cag	aac	tac	672
Ala	Ile	Thr	Leu	Ile	Gly	Ala	Thr	Gly	Pro	Thr	Ile	Gly	Gln	Asn	Tyr	
	210				215						220					
att	gtc	gac	gct	ttc	ctt	gtc	gtg	gcc	gcg	ggt	gga	atc	ggc	aag	atc	720
Ile	Val	Asp	Ala	Phe	Leu	Val	Val	Ala	Ala	Gly	Gly	Ile	Gly	Lys	Ile	
225					230					235					240	
aag	ggc	gcg	gtg	atc	atg	gcg	ttt	ggt	ctg	ggc	ata	atg	caa	gcc	ttc	768
Lys	Gly	Ala	Val	Ile	Met	Ala	Phe	Val	Leu	Gly	Ile	Met	Gln	Ala	Phe	
			245					250					255			
att	gag	tac	tca	acc	ggt	gcg	agt	att	gcg	aag	ttc	att	gtg	ctg	att	816
Ile	Glu	Tyr	Ser	Thr	Gly	Ala	Ser	Ile	Ala	Lys	Phe	Ile	Val	Leu	Ile	
			260				265						270			
gca	gtg	gtc	gcc	ttt	ctt	cag	ttc	cgc	ccc	caa	ggg	ctg	ttt	caa	acc	864
Ala	Val	Val	Ala	Phe	Leu	Gln	Phe	Arg	Pro	Gln	Gly	Leu	Phe	Gln	Thr	
		275					280					285				
cga	aca	agg	agc	ctc	gta	tga										885
Arg	Thr	Arg	Ser	Leu	Val											
	290															

<210> 843

<211> 294

<212> PRT

<213> Corynebacterium efficiens

<400> 843

Met	Asp	Ile	Leu	Leu	Asn	Gln	Leu	Val	Ala	Gly	Leu	Ser	Val	Gly	Ser
1				5					10					15	
Val	Leu	Leu	Leu	Val	Ala	Val	Gly	Leu	Ser	Leu	Thr	Phe	Gly	Gln	Met
			20					25					30		
Gly	Val	Ile	Asn	Met	Ala	His	Gly	Glu	Phe	Ile	Met	Val	Gly	Ala	Tyr
		35					40					45			
Thr	Ala	Phe	Val	Val	Gln	Gly	Val	Ile	Asn	Ser	Ala	Gly	Phe	Ser	Leu
	50					55					60				
Leu	Ile	Ser	Ile	Pro	Leu	Ala	Phe	Ala	Ile	Gly	Gly	Leu	Leu	Gly	Val
65					70					75					80
Leu	Leu	Glu	Gln	Thr	Leu	Leu	Arg	His	Leu	Tyr	His	Arg	Pro	Leu	Asp
				85					90					95	
Thr	Leu	Leu	Ala	Thr	Phe	Gly	Val	Gly	Leu	Ile	Leu	Gln	Gln	Leu	Ala
			100					105					110		

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Arg Asp Ile Phe Gly Ala Pro Ala Val Asp Val Arg Ala Pro Glu Trp
 115 120 125
 Leu Arg Gly His Thr Glu Ile Leu Gly Thr Leu Val Pro Val Ser Arg
 130 135 140
 Leu Phe Ile Leu Phe Leu Ala Leu Ala Ser Val Ala Gly Leu Ala Val
 145 150 155 160
 Phe Leu Asn Arg Ser Ile Trp Gly Arg Arg Ile Arg Ala Val Val Ile
 165 170 175
 Asn Arg Asp Leu Ala Glu Thr Asn Gly Ile Asn Thr Arg Ala Thr Asp
 180 185 190
 Arg Met Thr Phe Phe Ile Gly Ser Gly Leu Ala Gly Ile Ala Gly Val
 195 200 205
 Ala Ile Thr Leu Ile Gly Ala Thr Gly Pro Thr Ile Gly Gln Asn Tyr
 210 215 220
 Ile Val Asp Ala Phe Leu Val Val Ala Ala Gly Gly Ile Gly Lys Ile
 225 230 235 240
 Lys Gly Ala Val Ile Met Ala Phe Val Leu Gly Ile Met Gln Ala Phe
 245 250 255
 Ile Glu Tyr Ser Thr Gly Ala Ser Ile Ala Lys Phe Ile Val Leu Ile
 260 265 270
 Ala Val Val Ala Phe Leu Gln Phe Arg Pro Gln Gly Leu Phe Gln Thr
 275 280 285
 Arg Thr Arg Ser Leu Val
 290

<210> 844

<211> 870

<212> DNA

<213> Brucella suis

<220>

<221> CDS

<222> (1)..(870)

<400> 844

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gcc tac gca atc ctt ggc gtg tgc gcc atc ttc acc tac agg ctg gtg	96
Ala Tyr Ala Ile Leu Gly Val Cys Ala Ile Phe Thr Tyr Arg Leu Val	
20 25 30	
gcc gtg gtc aat ttc acc gga gcc gcc atc gga gcc atc ggc aca ttc	144
Ala Val Val Asn Phe Thr Gly Ala Ala Ile Gly Ala Ile Gly Thr Phe	
35 40 45	
atc atg gtg gcg ctg ttc ggg gcg ggc gtg ccg ctg gta ctt gcc gtg	192
Ile Met Val Ala Leu Phe Gly Ala Gly Val Pro Leu Val Leu Ala Val	
50 55 60	
ctt ctc ggc att gcg gcc ggc gcg ctt gcg ggc atc ctc gtc ggc ctt	240
Leu Leu Gly Ile Ala Ala Gly Ala Leu Ala Gly Ile Leu Val Gly Leu	
65 70 75 80	
gtc atg acc aca tgg ttt gcc aat gcc aac gcc tcg acc aag gcc gcc	288
Val Met Thr Thr Trp Phe Ala Asn Ala Asn Ala Ser Thr Lys Ala Ala	
85 90 95	
gtc aca gca gca ctt ctg gtc ggc atc att gcc gtg ggc ctg cgc ctt	336
Val Thr Ala Ala Leu Leu Val Gly Ile Ile Ala Val Gly Leu Arg Leu	
100 105 110	
acc ggc ggc cag cac ccg cat tat ttc ccc gaa gtc att tcc ggc tcg	384
Thr Gly Gly Gln His Pro His Tyr Phe Pro Glu Val Ile Ser Gly Ser	
115 120 125	
gcc ttc cgg ctg gcg ggt gtg gaa gtg acc tgg gct gcg gtg ctg acg	432
Ala Phe Arg Leu Ala Gly Val Glu Val Thr Trp Ala Ala Val Leu Thr	
130 135 140	
ctt gtg ctt tcc gtc gcc ttt acc att ctc acc gag caa ttc ctt gcg	480
Leu Val Leu Ser Val Ala Phe Thr Ile Leu Thr Glu Gln Phe Leu Ala	
145 150 155 160	
cgc acg cgc acc ggc ctg caa ttg cgc gca ctg tcg caa agg ccc atg	528
Arg Thr Arg Thr Gly Leu Gln Leu Arg Ala Leu Ser Gln Arg Pro Met	
165 170 175	
gcg gcg gaa ctg atc ggc att tgc gtg cgt ctt ctg gcg ctt ggc gtc	576

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Ala	Ala	Glu	Leu	Ile	Gly	Ile	Cys	Val	Arg	Leu	Leu	Ala	Leu	Gly	Val		
			180					185					190				
tgg	gcc	gtc	acc	ggc	gcg	gtc	aca	gcc	ttc	gcg	ctg	atg	gtg	atc	gcg	624	
Trp	Ala	Val	Thr	Gly	Ala	Val	Thr	Ala	Phe	Ala	Leu	Met	Val	Ile	Ala		
		195					200					205					
cca	ctg	cgt	tcg	ccg	gat	ttc	gcg	tca	ctc	agc	ctt	ctc	gtc	gtt	ccg	672	
Pro	Leu	Arg	Ser	Pro	Asp	Phe	Ala	Ser	Leu	Ser	Leu	Leu	Val	Val	Pro		
		210				215					220						
gcc	ctt	gct	gcg	gca	ctg	atc	ggc	gcc	ttc	tca	agc	ttt	cgc	gca	gca	720	
Ala	Leu	Ala	Ala	Ala	Leu	Ile	Gly	Ala	Phe	Ser	Ser	Phe	Arg	Ala	Ala		
225					230					235					240		
ctt	gct	ggc	ggc	gtg	ctg	atc	ggc	att	ctg	gaa	ggc	gcc	gtc	agc	acc	768	
Leu	Ala	Gly	Gly	Val	Leu	Ile	Gly	Ile	Leu	Glu	Gly	Ala	Val	Ser	Thr		
				245					250					255			
atc	gat	atc	gtc	agc	caa	tat	cgc	agc	acc	gtg	cct	ttc	ttc	gtc	att	816	
Ile	Asp	Ile	Val	Ser	Gln	Tyr	Arg	Ser	Thr	Val	Pro	Phe	Phe	Val	Ile		
			260				265						270				
ctt	gcc	gtc	ctt	ctg	tgg	tcg	caa	cgg	gga	gcc	cgc	tgg	gat	gaa	gca	864	
Leu	Ala	Val	Leu	Leu	Trp	Ser	Gln	Arg	Gly	Ala	Arg	Trp	Asp	Glu	Ala		
		275					280					285					
cgc	tag															870	
Arg																	

<210> 845

<211> 289

<212> PRT

<213> Brucella suis

<400> 845

Met	Ser	Ser	Leu	Phe	Ser	Ala	Ala	Val	Ala	Gly	Leu	Ser	Ala	Gly	Gly		
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Ala	Tyr	Ala	Ile	Leu	Gly	Val	Cys	Ala	Ile	Phe	Thr	Tyr	Arg	Leu	Val		
			20					25					30				
Ala	Val	Val	Asn	Phe	Thr	Gly	Ala	Ala	Ile	Gly	Ala	Ile	Gly	Thr	Phe		
		35					40					45					
Ile	Met	Val	Ala	Leu	Phe	Gly	Ala	Gly	Val	Pro	Leu	Val	Leu	Ala	Val		
	50					55					60						
Leu	Leu	Gly	Ile	Ala	Ala	Gly	Ala	Leu	Ala	Gly	Ile	Leu	Val	Gly	Leu		
65				70					75					80			
Val	Met	Thr	Thr	Trp	Phe	Ala	Asn	Ala	Asn	Ala	Ser	Thr	Lys	Ala	Ala		
				85					90					95			
Val	Thr	Ala	Ala	Leu	Leu	Val	Gly	Ile	Ile	Ala	Val	Gly	Leu	Arg	Leu		
			100					105					110				
Thr	Gly	Gly	Gln	His	Pro	His	Tyr	Phe	Pro	Glu	Val	Ile	Ser	Gly	Ser		
		115					120					125					
Ala	Phe	Arg	Leu	Ala	Gly	Val	Glu	Val	Thr	Trp	Ala	Ala	Val	Leu	Thr		
	130					135					140						
Leu	Val	Leu	Ser	Val	Ala	Phe	Thr	Ile	Leu	Thr	Glu	Gln	Phe	Leu	Ala		
145				150					155					160			
Arg	Thr	Arg	Thr	Gly	Leu	Gln	Leu	Arg	Ala	Leu	Ser	Gln	Arg	Pro	Met		
			165					170					175				
Ala	Ala	Glu	Leu	Ile	Gly	Ile	Cys	Val	Arg	Leu	Leu	Ala	Leu	Gly	Val		
		180						185					190				
Trp	Ala	Val	Thr	Gly	Ala	Val	Thr	Ala	Phe	Ala	Leu	Met	Val	Ile	Ala		
		195					200					205					
Pro	Leu	Arg	Ser	Pro	Asp	Phe	Ala	Ser	Leu	Ser	Leu	Leu	Val	Val	Pro		
	210					215					220						
Ala	Leu	Ala	Ala	Ala	Leu	Ile	Gly	Ala	Phe	Ser	Ser	Phe	Arg	Ala	Ala		
225					230					235					240		
Leu	Ala	Gly	Gly	Val	Leu	Ile	Gly	Ile	Leu	Glu	Gly	Ala	Val	Ser	Thr		
			245						250					255			
Ile	Asp	Ile	Val	Ser	Gln	Tyr	Arg	Ser	Thr	Val	Pro	Phe	Phe	Val	Ile		
			260					265					270				
Leu	Ala	Val	Leu	Leu	Trp	Ser	Gln	Arg	Gly	Ala	Arg	Trp	Asp	Glu	Ala		
		275					280					285					
Arg																	

<210> 846
 <211> 888
 <212> DNA
 <213> Brucella suis

<220>
 <221> CDS
 <222> (1)..(888)

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Met Val Met Ile Phe 5 Gly Ile Pro Leu Gln 10 Ala Leu Leu Arg Gln 15 Leu
1
ctg gtc ggc ctc atc aat ggc tcc ttc tat gcc atg ctg agc ctc ggc      96
Leu Val Gly Leu Ile Asn Gly Ser Phe 25 Tyr Ala Met Leu Ser 30 Leu Gly
20
ctt gcc atc atc ttc ggg ctt ctg cgc atc atc aat ttc gcc cat ggc      144
Leu Ala Ile 35 Ile Phe Gly Leu Leu 40 Arg Ile Ile Asn Phe 45 Ala His Gly
35
gcg caa tat atg ctg ggt gct ttc gtc ggc tat ctc ctg ttg agc tgg      192
Ala Gln Tyr Met Leu Gly Ala Phe Val Gly Tyr Leu Leu Leu Ser Trp
50
ctc ggc atc agc tac tgg ccg gcg ctg gtc ctc gcg ccc ctc atc gtc      240
Leu Gly Ile Ser Tyr Trp 70 Pro Ala Leu Val Leu 75 Ala Pro Leu Ile Val
65
ggg ctc ggc ggc gcg atc atc gag cgc gtg gcg ctg tcg cgg ctt tac      288
Gly Leu Gly Gly Ala Ile Ile Glu Arg Val 90 Ala Leu Ser Arg Leu Tyr
85
aat ctc gat ccg ctc tat ggc ctg ctg ttc acc ttc ggc ctg gcg ctg      336
Asn Leu Asp Pro 100 Leu Tyr Gly Leu Leu 105 Phe Thr Phe Gly 110 Ala Leu
100
gtg atc gaa ggc acg ttc cgc tat tat tat ggt gct gcc gga cag ccc      384
Val Ile Glu Gly Thr Phe Arg Tyr 120 Tyr Tyr Tyr Gly Ala Ala Gly Gln Pro
115
tat gcg gtg ccg ccg tcc ctt gcg ggc ggc cgt aat ctc ggc ttc atg      432
Tyr Ala Val Pro Pro Ser Leu 135 Ala Gly Gly Arg Asn Leu Gly Phe Met
130
ttc ctg ccg aac tat cgc gcc tgg gtg gtc gtt gcc tcg ctc ttc gtc      480
Phe Leu Pro Asn Tyr Arg 150 Ala Trp Val Val Val Ala Ser Leu Phe Val
145
tgt ctt ggc acc tgg ctt ctg atc gaa aag acc aag ctt ggc gct tac      528
Cys Leu Gly Thr Trp 165 Leu Leu Ile Glu Lys 170 Thr Lys Leu Gly Ala Tyr
165
ttg cgg gcc gca acc gaa aac ccg aca ctg gtg aaa gcc ttt ggc atc      576
Leu Arg Ala 180 Thr Glu Asn Pro Thr 185 Leu Val Lys Ala Phe Gly Ile
180
aac gtg ccg ctg ctt tta acc ttc acc tat gcg ctg ggt tcg gcc ctt      624
Asn Val Pro Leu Leu Leu Thr Phe 200 Thr Tyr Ala Leu Gly Ser Ala Leu
195
gcc ggt ctt gcg ggc atc atg gcc gcg ccg atc tat cag gtc agc ccg      672
Ala Gly Leu Ala Gly Ile Met 215 Ala Ala Pro Ile Tyr 220 Gln Val Ser Pro
210
ctg atg ggt tcc aac atc att atc gtg gtc ttt gcc gtg gtg gtg gtc      720
Leu Met Gly Ser Asn Ile Ile Ile Val Val Phe Ala Val Val Val Val
225
ggc ggc atg ggc tca atc ctc ggc gcc atc atc acc ggc tat gtg ctg      768
Gly Gly Met Gly Ser 245 Ile Leu Gly Ala Ile 250 Ile Thr Gly Tyr Val Leu
245
gga att gcg gaa ggc ctt acc aag gtc ttc tac ccg gaa gct tcc agc      816
Gly Ile Ala Glu Gly Leu Thr Lys Val Phe Tyr Pro Glu Ala Ser Ser
260
atc gtc gtc ttc gtt atc atg gca atc gtc ctt ctg gtt cga ccc gcc      864
Ile Val Val Phe Val Ile Met Ala Ile Val Leu Leu 285 Arg Pro Ala
275
gga ctg ttc ggc aag gag gcc tga      888
Gly Leu Phe Gly Lys Glu Ala 295
290

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<210> 847

<211> 295
 <212> PRT
 <213> Brucella suis

<400> 847
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 Leu Ala Ile Ile Phe Gly Leu Leu Arg Ile Ile Asn Phe Ala His Gly
 35 40 45
 Ala Gln Tyr Met Leu Gly Ala Phe Val Gly Tyr Leu Leu Ser Trp
 50 55 60
 Leu Gly Ile Ser Tyr Trp Pro Ala Leu Val Leu Ala Pro Leu Ile Val
 65 70 75 80
 Gly Leu Gly Gly Ala Ile Ile Glu Arg Val Ala Leu Ser Arg Leu Tyr
 85 90 95
 Asn Leu Asp Pro Leu Tyr Gly Leu Leu Phe Thr Phe Gly Leu Ala Leu
 100 105 110
 Val Ile Glu Gly Thr Phe Arg Tyr Tyr Tyr Gly Ala Ala Gly Gln Pro
 115 120 125
 Tyr Ala Val Pro Pro Ser Leu Ala Gly Gly Arg Asn Leu Gly Phe Met
 130 135 140
 Phe Leu Pro Asn Tyr Arg Ala Trp Val Val Val Ala Ser Leu Phe Val
 145 150 155 160
 Cys Leu Gly Thr Trp Leu Leu Ile Glu Lys Thr Lys Leu Gly Ala Tyr
 165 170 175
 Leu Arg Ala Ala Thr Glu Asn Pro Thr Leu Val Lys Ala Phe Gly Ile
 180 185 190
 Asn Val Pro Leu Leu Leu Thr Phe Thr Tyr Ala Leu Gly Ser Ala Leu
 195 200 205
 Ala Gly Leu Ala Gly Ile Met Ala Ala Pro Ile Tyr Gln Val Ser Pro
 210 215 220
 Leu Met Gly Ser Asn Ile Ile Ile Val Val Phe Ala Val Val Val Val
 225 230 235 240
 Gly Gly Met Gly Ser Ile Leu Gly Ala Ile Ile Thr Gly Tyr Val Leu
 245 250 255
 Gly Ile Ala Glu Gly Leu Thr Lys Val Phe Tyr Pro Glu Ala Ser Ser
 260 265 270
 Ile Val Val Phe Val Ile Met Ala Ile Val Leu Leu Val Arg Pro Ala
 275 280 285
 Gly Leu Phe Gly Lys Glu Ala
 290 295

<210> 848
 <211> 870
 <212> DNA
 <213> Brucella suis

<220>
 <221> CDS
 <222> (1)..(870)

<400> 848
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 gtg ctt ttc gtc atc tcc atc ggc ctt tcc gtc acc atg ggc ctg atg 96
 Val Leu Phe Val Ile Ser Ile Gly Leu Ser Val Thr Met Gly Leu Met 20 25 30
 cgc gtc gtc aat ctg gca cat ggc gcc ttt gcg atg atc ggt ggc tat 144
 Arg Val Val Asn Leu Ala His Gly Ala Phe Ala Met Ile Gly Gly Tyr 35 40 45
 ttc gca tcc tat gcc gca caa cag ctt ggc ctc aat tat ggc ttt gcg 192
 Phe Ala Ser Tyr Ala Ala Gln Gln Leu Gly Leu Asn Tyr Gly Phe Ala 50 55 60
 atc atc att gcg gtc gtc ggc acg atg att atc gcc gtg ccg gtg gaa 240
 Ile Ile Ile Ala Val Val Gly Thr Met Ile Ile Ala Val Pro Val Glu 65 70 75 80

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agg	ctg	ctt	tac	cgc	cgt	atc	tat	ggg	gca	ccg	gaa	ttg	aca	cag	gta	288
Arg	Leu	Leu	Tyr	Arg	Arg	Ile	Tyr	Gly	Ala	Pro	Glu	Leu	Thr	Gln	Val	
				85				90						95		
ttg	atg	acc	att	ggc	gtc	acg	ttc	tgc	atc	atc	ggc	atc	acc	aat	tat	336
Leu	Met	Thr	Ile	Gly	Val	Thr	Phe	Cys	Ile	Ile	Gly	Ile	Thr	Asn	Tyr	
			100					105					110			
att	ttc	ggc	ccg	acg	ctg	aag	acc	att	ccc	ctg	ccg	gaa	atg	ctg	cgc	384
Ile	Phe	Gly	Pro	Thr	Leu	Lys	Thr	Ile	Pro	Leu	Pro	Glu	Met	Leu	Arg	
		115					120					125				
ggc	tcg	gtc	gat	ctc	ggc	ttt	cac	gct	att	gca	aag	cac	cgc	att	ttc	432
Gly	Ser	Val	Asp	Leu	Gly	Phe	His	Ala	Ile	Ala	Lys	His	Arg	Ile	Phe	
	130					135					140					
gct	atc	ggc	tgc	ggc	ctc	ggc	gtg	gca	gtc	ggc	cta	tgg	tac	gcc	gtc	480
Ala	Ile	Gly	Cys	Gly	Leu	Ala	Val	Ala	Val	Gly	Leu	Trp	Tyr	Ala	Val	
145					150					155					160	
gag	cgc	acc	gct	ttc	ggc	gtg	aaa	ctg	cgc	gct	gcc	gtc	gat	aat	gcc	528
Glu	Arg	Thr	Ala	Phe	Gly	Val	Lys	Leu	Arg	Ala	Ala	Val	Asp	Asn	Ala	
			165					170						175		
aat	atg	gcg	gca	ctc	ggc	gtg	cgt	acc	gag	atc	gtc	tat	gcg	gtg		576
Asn	Met	Ala	Ala	Ala	Leu	Gly	Val	Arg	Thr	Glu	Ile	Val	Tyr	Ala	Val	
			180				185						190			
agc	ttt	gcg	ctc	gcc	atc	ggg	ctt	gcg	gcc	ttc	ggc	ggc	gtg	gtc	ggc	624
Ser	Phe	Ala	Leu	Ala	Ile	Gly	Leu	Ala	Ala	Phe	Gly	Gly	Val	Val	Gly	
		195					200					205				
gcg	gag	ctt	ttg	ccc	gtc	gaa	ccc	tat	tat	gcg	ctg	cgc	tac	atg	gtg	672
Ala	Glu	Leu	Leu	Pro	Val	Glu	Pro	Tyr	Tyr	Ala	Leu	Arg	Tyr	Met	Val	
	210					215					220					
act	ttc	ctt	gtc	gtg	gtt	tcg	gtc	ggc	ggg	gcc	ggg	tct	atc	ccc	ggc	720
Thr	Phe	Leu	Val	Val	Val	Ser	Val	Gly	Gly	Ala	Gly	Ser	Ile	Pro	Gly	
225					230				235						240	
gca	ctc	gtc	gcc	tgc	ctg	ttg	ctc	ggc	gca	atc	gac	acg	acc	ggg	cgt	768
Ala	Leu	Val	Ala	Cys	Leu	Leu	Leu	Gly	Ala	Ile	Asp	Thr	Thr	Gly	Arg	
			245					250						255		
tac	ctc	gca	ccc	gaa	tat	ggc	gaa	ttc	ttc	ttt	tat	ctg	gcg	gtg	atc	816
Tyr	Leu	Ala	Pro	Glu	Tyr	Gly	Glu	Phe	Phe	Phe	Tyr	Leu	Ala	Val	Ile	
			260				265						270			
gtg	atc	gtt	acc	ctg	ttc	ccg	cgc	ggc	ctt	gca	gga	agg	ctg	gcc	cgc	864
Val	Ile	Val	Thr	Leu	Phe	Pro	Arg	Gly	Leu	Ala	Gly	Arg	Leu	Ala	Arg	
		275					280					285				
aaa	tga															870
Lys																

<210> 849

<211> 289

<212> PRT

<213> Brucella suis

<400> 849

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Val	Leu	Phe	Val	Ile	Ser	Ile	Gly	Leu	Ser	Val	Thr	Met	Gly	Leu	Met	
			20					25					30			
Arg	Val	Val	Asn	Leu	Ala	His	Gly	Ala	Phe	Ala	Met	Ile	Gly	Gly	Tyr	
		35					40					45				
Phe	Ala	Ser	Tyr	Ala	Ala	Gln	Leu	Gly	Leu	Asn	Tyr	Gly	Phe	Ala		
	50					55				60						
Ile	Ile	Ile	Ala	Val	Val	Gly	Thr	Met	Ile	Ile	Ala	Val	Pro	Val	Glu	
65					70				75						80	
Arg	Leu	Leu	Tyr	Arg	Arg	Ile	Tyr	Gly	Ala	Pro	Glu	Leu	Thr	Gln	Val	
			85					90						95		
Leu	Met	Thr	Ile	Gly	Val	Thr	Phe	Cys	Ile	Ile	Gly	Ile	Thr	Asn	Tyr	
			100					105					110			
Ile	Phe	Gly	Pro	Thr	Leu	Lys	Thr	Ile	Pro	Leu	Pro	Glu	Met	Leu	Arg	
		115					120					125				
Gly	Ser	Val	Asp	Leu	Gly	Phe	His	Ala	Ile	Ala	Lys	His	Arg	Ile	Phe	
	130					135					140					
Ala	Ile	Gly	Cys	Gly	Leu	Ala	Val	Ala	Val	Gly	Leu	Trp	Tyr	Ala	Val	
145					150					155					160	

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Glu Arg Thr Ala Phe Gly Val Lys Leu Arg Ala Ala Val Asp Asn Ala
 165 170 175
 Asn Met Ala Ala Ala Leu Gly Val Arg Thr Glu Ile Val Tyr Ala Val
 180 185 190
 Ser Phe Ala Leu Ala Ile Gly Leu Ala Ala Phe Gly Gly Val Val Gly
 195 200 205
 Ala Glu Leu Leu Pro Val Glu Pro Tyr Tyr Ala Leu Arg Tyr Met Val
 210 215 220
 Thr Phe Leu Val Val Val Ser Val Gly Gly Ala Gly Ser Ile Pro Gly
 225 230 235 240
 Ala Leu Val Ala Cys Leu Leu Leu Gly Ala Ile Asp Thr Thr Gly Arg
 245 250 255
 Tyr Leu Ala Pro Glu Tyr Gly Glu Phe Phe Tyr Leu Ala Val Ile
 260 265 270
 Val Ile Val Thr Leu Phe Pro Arg Gly Leu Ala Gly Arg Leu Ala Arg
 275 280 285
 Lys

<210> 850

<211> 885

<212> DNA

<213> Brucella suis

<220>

<221> CDS

<222> (1)..(885)

<400> 850

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1 5 10 15	
cta ttc gcg att gtc gcc gtc ggc ctg acg ctc atc ttc ggc atc gtc	96
Leu Phe Ala Ile Val Ala Val Gly Leu Thr Leu Ile Phe Gly Ile Val	
20 25 30	
aag gtc gtg aat ttc gct cat ggc gaa ttc ctg atg gcg ggc atg ttc	144
Lys Val Val Asn Phe Ala His Gly Glu Phe Leu Met Ala Gly Met Phe	
35 40 45	
gtg acg tgg ctg ata acc aca aag ctg ggg ctt cat cct tat gcg gcg	192
Val Thr Trp Leu Ile Thr Thr Lys Leu Gly Leu His Pro Tyr Ala Ala	
50 55 60	
gtt atc att gtt ctg cct gcg atg ttc att ctg ggt gcg ctg acc cag	240
Val Ile Ile Val Leu Pro Ala Met Phe Ile Leu Gly Ala Leu Thr Gln	
65 70 75 80	
cgc ctt ctc att cag ccg cta atg gct tct gat gac ggt cat gca cag	288
Arg Leu Leu Ile Gln Pro Leu Met Ala Ser Asp Asp Gly His Ala Gln	
85 90 95	
att ttc gca acc gtt ggc ctg tcc acg gcg atg att aat ctg gcc ctg	336
Ile Phe Ala Thr Val Gly Leu Ser Thr Ala Met Ile Asn Leu Ala Leu	
100 105 110	
ctg atc ttc ggt gcg gat ata gcc aat aca ccg aat ttc gga ctg cgg	384
Leu Ile Phe Gly Ala Asp Ile Ala Asn Thr Pro Asn Phe Gly Leu Arg	
115 120 125	
acc cca atc gaa atc ggg ccg ctt cgc gta ctt acc ggg cag gtc ttt	432
Thr Pro Ile Glu Ile Gly Pro Leu Arg Val Leu Thr Gly Gln Val Phe	
130 135 140	
att ttt ctg ggc gcc att gtg ctt gtc gtt gcg ctt caa ctg ttc ctg	480
Ile Phe Leu Gly Ala Ile Val Leu Val Val Ala Leu Gln Leu Phe Leu	
145 150 155 160	
aag aac agc cag act ggc cgc gca atc cgc gcc gtt gct cag cat cgc	528
Lys Asn Ser Gln Thr Gly Arg Ala Ile Arg Ala Val Ala Gln His Arg	
165 170 175	
agt gcg gcg gaa ttg atg ggg gtc aat gtt tcg cgc atc tac att ctc	576
Ser Ala Ala Glu Leu Met Gly Val Asn Val Ser Arg Ile Tyr Ile Leu	
180 185 190	
tgt ttt ggc ctg gga gcc gcc tgt gtc gga ctg gct gcg gtt ctg att	624
Cys Phe Gly Leu Gly Ala Ala Cys Val Gly Leu Ala Ala Val Leu Ile	
195 200 205	
gca ccg ctc tat ccg act tct tca aat atc ggc acc tat ttc gtg ctg	672

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Ala	Pro	Leu	Tyr	Pro	Thr	Ser	Ser	Asn	Ile	Gly	Thr	Tyr	Phe	Val	Leu		
210	210					215					220						
acg	gcc	ttc	gtg	gtt	gtg	gtg	ctc	ggg	ggc	ctt	ggc	tcg	atc	cct	gga		720
Thr	Ala	Phe	Val	Val	Val	Val	Leu	Gly	Gly	Leu	Gly	Ser	Ile	Pro	Gly		
225					230					235					240		
gcc	ttc	gtt	ggg	gcg	ctg	atc	atc	ggc	gtg	atc	gac	acc	atg	tcg	ggc		768
Ala	Phe	Val	Gly	Ala	Leu	Ile	Ile	Gly	Val	Ile	Asp	Thr	Met	Ser	Gly		
				245					250					255			
tac	tac	atc	gga	tca	gac	ctg	cgg	gaa	gcc	gtc	gta	ttc	ggc	att	ttc		816
Tyr	Tyr	Ile	Gly	Ser	Asp	Leu	Arg	Glu	Ala	Val	Val	Phe	Gly	Ile	Phe		
			260					265					270				
ctc	ctg	atc	ctc	atc	ctc	aag	cct	tct	ggc	ctc	ttt	ggc	aag	cag	ctt		864
Leu	Leu	Ile	Leu	Ile	Leu	Lys	Pro	Ser	Gly	Leu	Phe	Gly	Lys	Gln	Leu		
		275					280					285					
aat	ctt	tcg	cat	ttg	tcc	tga											885
Asn	Leu	Ser	His	Leu	Ser												
290																	

<210> 851

<211> 294

<212> PRT

<213> Brucella suis

<400> 851

Met	Thr	Thr	Phe	Leu	Gln	Ile	Leu	Leu	Asn	Gly	Leu	Met	Leu	Gly	Gly		
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Leu	Phe	Ala	Ile	Val	Ala	Val	Gly	Leu	Thr	Leu	Ile	Phe	Gly	Ile	Val		
			20					25					30				
Lys	Val	Val	Asn	Phe	Ala	His	Gly	Glu	Phe	Leu	Met	Ala	Gly	Met	Phe		
			35				40					45					
Val	Thr	Trp	Leu	Ile	Thr	Thr	Lys	Leu	Gly	Leu	His	Pro	Tyr	Ala	Ala		
			50			55					60						
Val	Ile	Ile	Val	Leu	Pro	Ala	Met	Phe	Ile	Leu	Gly	Ala	Leu	Thr	Gln		
65				70					75					80			
Arg	Leu	Leu	Ile	Gln	Pro	Leu	Met	Ala	Ser	Asp	Asp	Gly	His	Ala	Gln		
			85						90					95			
Ile	Phe	Ala	Thr	Val	Gly	Leu	Ser	Thr	Ala	Met	Ile	Asn	Leu	Ala	Leu		
			100					105				110					
Leu	Ile	Phe	Gly	Ala	Asp	Ile	Ala	Asn	Thr	Pro	Asn	Phe	Gly	Leu	Arg		
		115					120				125						
Thr	Pro	Ile	Glu	Ile	Gly	Pro	Leu	Arg	Val	Leu	Thr	Gly	Gln	Val	Phe		
			130			135					140						
Ile	Phe	Leu	Gly	Ala	Ile	Val	Leu	Val	Val	Ala	Leu	Gln	Leu	Phe	Leu		
145				150					155					160			
Lys	Asn	Ser	Gln	Thr	Gly	Arg	Ala	Ile	Arg	Ala	Val	Ala	Gln	His	Arg		
			165					170					175				
Ser	Ala	Ala	Glu	Leu	Met	Gly	Val	Asn	Val	Ser	Arg	Ile	Tyr	Ile	Leu		
			180					185					190				
Cys	Phe	Gly	Leu	Gly	Ala	Ala	Cys	Val	Gly	Leu	Ala	Ala	Val	Leu	Ile		
		195					200				205						
Ala	Pro	Leu	Tyr	Pro	Thr	Ser	Ser	Asn	Ile	Gly	Thr	Tyr	Phe	Val	Leu		
						215					220						
Thr	Ala	Phe	Val	Val	Val	Val	Leu	Gly	Gly	Leu	Gly	Ser	Ile	Pro	Gly		
225				230						235				240			
Ala	Phe	Val	Gly	Ala	Leu	Ile	Ile	Gly	Val	Ile	Asp	Thr	Met	Ser	Gly		
				245					250					255			
Tyr	Tyr	Ile	Gly	Ser	Asp	Leu	Arg	Glu	Ala	Val	Val	Phe	Gly	Ile	Phe		
			260					265					270				
Leu	Leu	Ile	Leu	Ile	Leu	Lys	Pro	Ser	Gly	Leu	Phe	Gly	Lys	Gln	Leu		
		275					280					285					
Asn	Leu	Ser	His	Leu	Ser												
290																	

<210> 852

<211> 909

<212> DNA

<213> Brucella suis

<220>

<221> CDS

<222> (1)..(909)

<400> 852

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atc tat ggc ctg atc gcc atc ggt tat acg atg gtc tat ggc att atc	96
Ile Tyr Gly Leu 20 Ile Ala Ile Gly Tyr 25 Thr Met Val Tyr Gly 30 Ile Ile	
ggc atg atc aac ttt gct cat ggc gat atc ttc atg ctc ggc gcg ttc	144
Gly Met Ile 35 Asn Phe Ala His Gly 40 Asp Ile Phe Met Leu Gly 45 Ala Phe	
atg gcg ctg att gtt ttc ctc att atc acg acc ttc acc gga atg ctg	192
Met Ala Leu Ile Val Phe Leu 55 Ile Ile Thr Thr Phe 60 Thr Gly Met Leu	
ccg gtt gca ctg atg ctg ctt ttg atg atg atc gtc gcc atg ctt ctg	240
Pro Val Ala Leu Met Leu 70 Leu Leu Met Met Ile Val Ala Met Leu 80	
acg ggt ctg tgg agc tgg gcg atc gag cgc gtg gcc tat cga ccg ctg	288
Thr Gly Leu Trp Ser 85 Trp Ala Ile Glu Arg 90 Val Ala Tyr Arg Pro Leu 95	
cgt ggt tcg ttc cgc ctt gcg ccg ctg atc acg gct atc ggc atg tcg	336
Arg Gly Ser Phe 100 Arg Leu Ala Pro 105 Ile Thr Ala Ile Gly 110 Met Ser	
att gcc ttg tcg aac ttc gtt cag gtc acg cag ggt ccg cgc aac aag	384
Ile Ala Leu Ser Asn Phe Val Gln Val Thr Gln Gly Pro Arg Asn Lys 125	
ccg gtt ccc cag ctt ctg aat ggt tcc tac gag ctg ttc ggc agc ggc	432
Pro Val Pro Gln Leu Leu 135 Asn Gly Ser Tyr Glu 140 Phe Gly Ser Gly	
gtc acg atc tcg ctc aag cag atc gtg gtg atc gtg gtt acg gca ata	480
Val Thr Ile Ser Leu Lys 150 Gln Ile Val Val Ile Val Val Thr Ala Ile 160	
ttg ctc acg atc ttc tgg tat gtc gtc aac cgc acc tcg ctg ggc gcg	528
Leu Leu Thr Ile Phe 165 Trp Tyr Val Val Asn 170 Arg Thr Ser Leu Gly 175 Arg	
gcg caa agg gct tgc gag cag gat cgc aag atg gcg gcc ctt ctt ggc	576
Ala Gln Arg Ala Cys Glu Gln Asp Arg Lys Met Ala Ala Leu Leu Gly 190	
atc aat gtc gac cgt gtc atc tcg acc ttc gtg atg ggc gcc atg	624
Ile Asn Val Asp Arg Val Ile Ser Leu Thr Phe Val Met Gly Ala Met 205	
ctg gcg gcc gta gcc ggg acg ctt tac ctc tcc ttc tat ggc gtg att	672
Leu Ala Ala Val Ala Gly Thr 215 Leu Tyr Leu Ser Phe Tyr Gly Val Ile 220	
tcg ttc gct gac ggg ttc atc ccc ggt gtg aag gcg ttc acg gcg gcg	720
Ser Phe Ala Asp Gly Phe 230 Ile Pro Gly Val Lys 235 Ala Phe Thr Ala Ala 240	
gtt ctg ggc ggc atc ggc tcg ctt ccg ggc gct gtt gtc ggc ggc ttg	768
Val Leu Gly Gly Ile 245 Gly Ser Leu Pro Gly Ala Val Val Gly Gly Leu 255	
ctt atc ggt ctc atc gaa gcg ttg tgg tcg gcc tat ttc tcg atc gac	816
Leu Ile Gly Leu Ile Glu Ala Leu Trp 265 Ser Ala Tyr Phe Ser Ile Asp 270	
tac aag gac gtc gcc gcg ttc tcg atc ctg gct atc gtg ctg atc ttc	864
Tyr Lys Asp Val Ala Ala Phe Ser 280 Ile Leu Ala Ile Val Leu Ile Phe 285	
atg ccg tcc ggc att ctt ggc cga cct gaa gtc gaa aag gtg taa	909
Met Pro Ser Gly Ile Leu Gly 295 Arg Pro Glu Val Glu Lys Val 300	

<210> 853

<211> 302

<212> PRT

<213> Brucella suis

<400> 853

Met Glu Tyr Phe Phe Gln Gln Val Ile Asn Gly Leu Ala Leu Gly Ser

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1      5      10      15
Ile Tyr Gly Leu Ile Ala Ile Gly Tyr Thr Met Val Tyr Gly Ile Ile
20      25      30
Gly Met Ile Asn Phe Ala His Gly Asp Ile Phe Met Leu Gly Ala Phe
35      40      45
Met Ala Leu Ile Val Phe Leu Ile Ile Thr Thr Phe Thr Gly Met Leu
50      55      60
Pro Val Ala Leu Met Leu Leu Met Met Ile Val Ala Met Leu Leu
65      70      75
Thr Gly Leu Trp Ser Trp Ala Ile Glu Arg Val Ala Tyr Arg Pro Leu
85      90      95
Arg Gly Ser Phe Arg Leu Ala Pro Leu Ile Thr Ala Ile Gly Met Ser
100     105     110
Ile Ala Leu Ser Asn Phe Val Gln Val Thr Gln Gly Pro Arg Asn Lys
115     120     125
Pro Val Pro Gln Leu Leu Asn Gly Ser Tyr Glu Leu Phe Gly Ser Gly
130     135     140
Val Thr Ile Ser Leu Lys Gln Ile Val Val Ile Val Val Thr Ala Ile
145     150     155
Leu Leu Thr Ile Phe Trp Tyr Val Val Asn Arg Thr Ser Leu Gly Arg
165     170     175
Ala Gln Arg Ala Cys Glu Gln Asp Arg Lys Met Ala Ala Leu Leu Gly
180     185     190
Ile Asn Val Asp Arg Val Ile Ser Leu Thr Phe Val Met Gly Ala Met
195     200     205
Leu Ala Ala Val Ala Gly Thr Leu Tyr Leu Ser Phe Tyr Gly Val Ile
210     215     220
Ser Phe Ala Asp Gly Phe Ile Pro Gly Val Lys Ala Phe Thr Ala Ala
225     230     235
Val Leu Gly Gly Ile Gly Ser Leu Pro Gly Ala Val Val Gly Gly Leu
245     250     255
Leu Ile Gly Leu Ile Glu Ala Leu Trp Ser Ala Tyr Phe Ser Ile Asp
260     265     270
Tyr Lys Asp Val Ala Ala Phe Ser Ile Leu Ala Ile Val Leu Ile Phe
275     280     285
Met Pro Ser Gly Ile Leu Gly Arg Pro Glu Val Glu Lys Val
290     295     300

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<210> 854

<211> 1077

<212> DNA

<213> Bifidobacterium longum

<220>

<221> CDS

<222> (1)..(1077)

<400> 854

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Met Leu Ser Thr Lys Gln Ser Tyr Leu Val Cys Phe Ile Gly Ile Leu
1      5      10      15
gcc gcg ttc ggc atc gtg atg gcg ctg tgc gaa tcc ggc ttg gcc gac      96
Ala Ala Phe Gly Ile Val Met Ala Leu Cys Glu Ser Gly Leu Ala Asp
20      25      30
tcc tac atc aag ggc atc atg atg acc gcg tgc atc gcc atc atc atg      144
Ser Tyr Ile Lys Gly Ile Met Met Thr Ala Cys Ile Ala Ile Ile Met
35      40      45
acc acc tcc ctg aac ctc acc atc ggc gtg ctc ggc cag ctg acg ctg      192
Thr Thr Ser Leu Asn Leu Thr Ile Gly Val Leu Gly Gln Leu Thr Leu
50      55      60
ggc tgc tgc ggt ttc gag gcc atc ggc gcc tac gtg gcc gca ctg acc      240
Gly Cys Cys Gly Phe Glu Ala Ile Gly Ala Tyr Val Ala Ala Leu Thr
65      70      75
tcc aaa tac atg gtc gcc gcc ggc att gcc atc gac ccc acc gcc cgc      288
Ser Lys Tyr Met Val Ala Ala Gly Ile Ala Ile Asp Pro Thr Ala Arg
85      90      95
ttc ctg ctc acc acg ctg atc ggc ggc gtg gtg gcc tgc gtg ttc ggc      336
Phe Leu Leu Thr Thr Leu Ile Gly Gly Val Val Ala Cys Val Phe Gly
100

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atc	ctg	atc	ggc	att	cct	gcc	ctg	cga	ctg	cac	ggc	gac	tac	ctg	gcc	384
Ile	Leu	Ile	Gly	Ile	Pro	Ala	Leu	Arg	Leu	His	Gly	Asp	Tyr	Leu	Ala	
		115					120				125					
atc	atc	acg	ctg	ggc	ttc	ggt	gag	atc	atc	cgc	gtg	atc	atc	cag	aac	432
Ile	Ile	Thr	Leu	Gly	Phe	Gly	Glu	Ile	Ile	Arg	Val	Ile	Ile	Gln	Asn	
	130					135					140					
ctc	aag	gta	gcc	ggc	ggc	atg	ggc	ctc	gac	aag	ggc	gcc	gcc	gga	cag	480
Leu	Lys	Val	Ala	Gly	Gly	Met	Gly	Leu	Asp	Lys	Gly	Ala	Ala	Gly	Gln	
145					150					155					160	
gcg	ctg	atc	ggc	atc	gaa	cgc	acc	gcc	aac	ctg	tac	gtc	gtg	ttc	tgg	528
Ala	Leu	Ile	Gly	Ile	Glu	Arg	Thr	Ala	Asn	Leu	Tyr	Val	Val	Phe	Trp	
				165					170					175		
atc	atg	gtg	gtc	acc	gtg	gtc	gtg	ctc	ttc	atg	ttc	ggc	cgc	tcc	cgt	576
Ile	Met	Val	Val	Thr	Val	Val	Val	Leu	Phe	Met	Phe	Gly	Arg	Ser	Arg	
			180					185					190			
tac	ggc	cgt	gcg	gtc	aag	gcc	atc	cgc	gac	gac	gag	atc	gcc	gcc	ggc	624
Tyr	Gly	Arg	Ala	Val	Lys	Ala	Ile	Arg	Asp	Asp	Glu	Ile	Ala	Ala	Gly	
		195					200					205				
gcc	tcc	gga	ctc	aac	acc	acg	ctc	aag	gtg	ctc	gtc	ttc	gcg	atc		672
Ala	Ser	Gly	Leu	Asn	Thr	Thr	Tyr	Leu	Lys	Val	Leu	Val	Phe	Ala	Ile	
	210					215					220					
tcc	gcg	ttc	ttc	gcg	ggc	atc	gcc	ggc	ggt	atc	ttc	gcc	cag	tac	atc	720
Ser	Ala	Phe	Phe	Ala	Gly	Ile	Ala	Gly	Gly	Ile	Phe	Ala	Gln	Tyr	Ile	
225					230					235					240	
ggc	tcg	ctc	aac	ccc	acc	atg	gcc	ggt	tgg	ctc	aac	tcc	atc	aac	tac	768
Gly	Ser	Leu	Asn	Pro	Thr	Met	Ala	Gly	Trp	Leu	Asn	Ser	Ile	Asn	Tyr	
				245					250					255		
gtg	atc	atg	gtg	gtg	ttc	ggc	ggc	atg	ggt	tcg	ctc	acc	ggc	tcg	atc	816
Val	Ile	Met	Val	Val	Phe	Gly	Gly	Met	Gly	Ser	Leu	Thr	Gly	Ser	Ile	
			260					265					270			
gtc	tcc	gcc	atc	ggc	ctg	acc	atc	ctg	ccc	gag	ctg	ctg	cgc	gcc	ttc	864
Val	Ser	Ala	Ile	Gly	Leu	Thr	Ile	Leu	Pro	Glu	Leu	Leu	Arg	Ala	Phe	
		275					280					285				
gcc	gac	tac	cgt	atg	ctc	gcc	tac	tcg	gtg	gtg	ctg	gtg	ctc	gtc	atg	912
Ala	Asp	Tyr	Arg	Met	Leu	Ala	Tyr	Ser	Val	Val	Leu	Val	Leu	Val	Met	
	290					295					300					
atc	ttc	cgc	ccg	cag	ggc	atc	ttc	gga	tcc	tgg	gag	ttc	tca	ctg	ccg	960
Ile	Phe	Arg	Pro	Gln	Gly	Ile	Phe	Gly	Ser	Trp	Glu	Phe	Ser	Leu	Pro	
305					310					315					320	
cgt	ctg	gtc	aac	cgc	atg	ctg	ttc	cgc	ggc	gcc	gcc	ggc	aag	ggc	gcg	1008
Arg	Leu	Val	Asn	Arg	Met	Leu	Phe	Arg	Gly	Ala	Ala	Gly	Lys	Gly	Ala	
				325					330					335		
aaa	ccc	gcg	gcc	agc	gcc	aag	cag	cat	gac	cag	tcc	gac	gac	aag	acc	1056
Lys	Pro	Ala	Ala	Ser	Ala	Lys	Gln	His	Asp	Gln	Ser	Asp	Asp	Lys	Thr	
			340					345					350			
gtg	aag	gag	gcc	tca	cga	tga										1077
Val	Lys	Glu	Ala	Ser	Arg											
		355														

<210> 855

<211> 358

<212> PRT

<213> Bifidobacterium longum

<400> 855

Met	Leu	Ser	Thr	Lys	Gln	Ser	Tyr	Leu	Val	Cys	Phe	Ile	Gly	Ile	Leu	
1				5					10					15		
Ala	Ala	Phe	Gly	Ile	Val	Met	Ala	Leu	Cys	Glu	Ser	Gly	Leu	Ala	Asp	
			20					25					30			
Ser	Tyr	Ile	Lys	Gly	Ile	Met	Met	Thr	Ala	Cys	Ile	Ala	Ile	Ile	Met	
		35					40					45				
Thr	Thr	Ser	Leu	Asn	Leu	Thr	Ile	Gly	Val	Leu	Gly	Gln	Leu	Thr	Leu	
		50				55					60					
Gly	Cys	Cys	Gly	Phe	Glu	Ala	Ile	Gly	Ala	Tyr	Val	Ala	Ala	Leu	Thr	
65					70					75					80	
Ser	Lys	Tyr	Met	Val	Ala	Ala	Gly	Ile	Ala	Ile	Asp	Pro	Thr	Ala	Arg	
				85					90					95		
Phe	Leu	Leu	Thr	Leu	Ile	Gly	Gly	Val	Val	Ala	Cys	Val	Phe	Gly		
			100				105						110			

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Ile Leu Ile Gly Ile Pro Ala Leu Arg Leu His Gly Asp Tyr Leu Ala
 115 120
 Ile Ile Thr Leu Gly Phe Gly Glu Ile Ile Arg Val Ile Ile Gln Asn
 130 135 140
 Leu Lys Val Ala Gly Gly Met Gly Leu Asp Lys Gly Ala Ala Gly Gln
 145 150 155 160
 Ala Leu Ile Gly Ile Glu Arg Thr Ala Asn Leu Tyr Val Val Phe Trp
 165 170 175
 Ile Met Val Val Thr Val Val Val Leu Phe Met Phe Gly Arg Ser Arg
 180 185 190
 Tyr Gly Arg Ala Val Lys Ala Ile Arg Asp Asp Glu Ile Ala Ala Gly
 195 200 205
 Ala Ser Gly Leu Asn Thr Thr Tyr Leu Lys Val Leu Val Phe Ala Ile
 210 215 220
 Ser Ala Phe Phe Ala Gly Ile Ala Gly Gly Ile Phe Ala Gln Tyr Ile
 225 230 235 240
 Gly Ser Leu Asn Pro Thr Met Ala Gly Trp Leu Asn Ser Ile Asn Tyr
 245 250 255
 Val Ile Met Val Phe Gly Gly Met Gly Ser Leu Thr Gly Ser Ile
 260 265 270
 Val Ser Ala Ile Gly Leu Thr Ile Leu Pro Glu Leu Leu Arg Ala Phe
 275 280 285
 Ala Asp Tyr Arg Met Leu Ala Tyr Ser Val Val Leu Val Leu Val Met
 290 295 300
 Ile Phe Arg Pro Gln Gly Ile Phe Gly Ser Trp Glu Phe Ser Leu Pro
 305 310 315 320
 Arg Leu Val Asn Arg Met Leu Phe Arg Gly Ala Ala Gly Lys Gly Ala
 325 330 335
 Lys Pro Ala Ala Ser Ala Lys Gln His Asp Gln Ser Asp Asp Lys Thr
 340 345 350
 Val Lys Glu Ala Ser Arg
 355

<210> 856

<211> 927

<212> DNA

<213> Bifidobacterium longum

<220>

<221> CDS

<222> (1)..(927)

<400> 856

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1 5 10 15	
aaa atc ggc agc gtg tac gcg ctg gtg gca ttg ggc tac acc atg gtc	96
Lys Ile Gly Ser Val Tyr Ala Leu Val Ala Leu Gly Tyr Thr Met Val	
20 25 30	
tac ggc atc atc cga ctg atc aac ttt gcc cac ggc gat ttc atc atg	144
Tyr Gly Ile Ile Arg Leu Ile Asn Phe Ala His Gly Asp Phe Ile Met	
35 40 45	
gtc gga gcc tac gtg ctc atg ctc acc att ccg gcc atc gtg gcc atg	192
Val Gly Ala Tyr Val Leu Met Leu Thr Ile Pro Ala Ile Val Ala Met	
50 55 60	
gga ctg ccc gcc tgg gtg gcg gtc att ccc gcc atc ctg gta tgc gtg	240
Gly Leu Pro Ala Trp Val Ala Val Ile Pro Ala Ile Leu Val Cys Val	
65 70 75 80	
gcc gtc ggc gtg atc gtc gaa aag gcc gcc tat aag ccg gtg cgt gaa	288
Ala Val Gly Val Ile Val Glu Lys Ala Ala Tyr Lys Pro Val Arg Glu	
85 90 95	
aag ggc aac tcc atg acc gcc ctg atc acc gcc atc gcc atg tcg ttg	336
Lys Gly Asn Ser Met Thr Ala Leu Ile Thr Ala Ile Ala Met Ser Leu	
100 105 110	
ctg ctg gag aac ggc tca cag gcc atc ttc ggc gcc gac ttc cag acc	384
Leu Leu Glu Asn Gly Ser Gln Ala Ile Phe Gly Ala Asp Phe Gln Thr	
115 120 125	
gtc ccg acc atc ttc cac ctg tcc atc gcg ttc ggc aag ctc aag	432
Val Pro Thr Ile Phe His Leu Pro Ser Ile Ala Phe Gly Lys Leu Lys	

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130	ctg	ccg	gga	gac	acc	ctg	135	ctg	acc	atc	gtc	atc	140	ctg	gtc	atc	atg	480
Leu	Pro	Gly	Asp	Thr	Thr	Leu	Leu	Thr	Ile	Val	Ile	Gly	Leu	Val	Ile	Met		
145	gtg	ggc	ctg	cag	ctg	150	ttc	gtc	aaa	ttc	acc	agg	155	cag	ggc	aag	gcc	atg
Val	Gly	Leu	Gln	Leu	Phe	Val	Phe	Val	Lys	Phe	Thr	Arg	Gln	Gly	Lys	Ala	Met	
				165							170					175		
cgc	gcc	gtc	tcc	gaa	gac	aag	gag	gcc	gcc	gtg	ctc	atg	ggg	atc	aac		576	
Arg	Ala	Val	Ser	Glu	Asp	Lys	Glu	Ala	Ala	Val	Leu	Met	Gly	Ile	Asn			
			180					185					190					
gtg	aac	tcc	acc	atc	gcc	ctg	aca	ttc	gcc	atc	ggc	tcc	ggg	ctg	gcc		624	
Val	Asn	Ser	Thr	Ile	Ala	Leu	Thr	Phe	Ala	Ile	Gly	Ser	Gly	Leu	Ala			
			195				200					205						
gcg	gtc	gcc	tcg	ctg	atg	tac	tgc	gcc	gcc	tac	ccg	cag	gtc	tcg	cct		672	
Ala	Val	Ala	Ser	Leu	Met	Tyr	Cys	Ala	Ala	Tyr	Pro	Gln	Val	Ser	Pro			
			210			215					220							
atg	atg	ggc	gcc	atg	ctg	ggc	ctg	aag	gcg	ttc	gtc	gcc	gcc	gtg	ctc		720	
Met	Met	Gly	Ala	Met	Leu	Gly	Leu	Lys	Ala	Phe	Val	Ala	Ala	Val	Leu			
					230					235					240			
ggc	ggc	att	ggg	tcc	atc	ccg	ggc	gcc	atg	atc	ggg	ggg	ctg	gcc	atc		768	
Gly	Gly	Ile	Gly	Ser	Ile	Pro	Gly	Ala	Met	Ile	Gly	Gly	Leu	Ala	Ile			
				245				250						255				
ggg	ctg	atc	gaa	agc	ctg	acc	aag	gcg	tat	atc	ggc	acc	atc	acg	gcg		816	
Gly	Leu	Ile	Glu	Ser	Leu	Thr	Lys	Ala	Tyr	Ile	Gly	Thr	Ile	Thr	Ala			
			260					265				270						
ggc	atc	atc	acc	tcg	gcg	ttc	tcc	gac	gcc	atc	gtg	ttc	gcc	atc	ctg		864	
Gly	Ile	Ile	Thr	Ser	Ala	Phe	Ser	Asp	Ala	Ile	Val	Phe	Ala	Ile	Leu			
			275				280					285						
atc	atc	gtg	ctg	ctc	gtc	aaa	ccg	tcc	ggc	att	atg	ggc	aag	aac	gaa		912	
Ile	Ile	Val	Leu	Leu	Val	Lys	Pro	Ser	Gly	Ile	Met	Gly	Lys	Asn	Glu			
						295					300							
ggg	gag	aag	gtc	tga													927	
Gly	Glu	Lys	Val															
305																		

<210> 857

<211> 308

<212> PRT

<213> Bifidobacterium longum

<400> 857

Met	Thr	Asp	Gln	Ile	Ile	Met	Phe	Ile	Ser	Gln	Leu	Phe	Asn	Gly	Leu	
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Lys	Ile	Gly	Ser	Val	Tyr	Ala	Leu	Val	Ala	Leu	Gly	Tyr	Thr	Met	Val	
			20					25					30			
Tyr	Gly	Ile	Ile	Arg	Leu	Ile	Asn	Phe	Ala	His	Gly	Asp	Phe	Ile	Met	
			35				40					45				
Val	Gly	Ala	Tyr	Val	Leu	Met	Leu	Thr	Ile	Pro	Ala	Ile	Val	Ala	Met	
			50			55					60					
Gly	Leu	Pro	Ala	Trp	Val	Ala	Val	Ile	Pro	Ala	Ile	Leu	Val	Cys	Val	
65				70					75					80		
Ala	Val	Gly	Val	Ile	Val	Glu	Lys	Ala	Ala	Tyr	Lys	Pro	Val	Arg	Glu	
				85				90						95		
Lys	Gly	Asn	Ser	Met	Thr	Ala	Leu	Ile	Thr	Ala	Ile	Ala	Met	Ser	Leu	
			100					105					110			
Leu	Leu	Glu	Asn	Gly	Ser	Gln	Ala	Ile	Phe	Gly	Ala	Asp	Phe	Gln	Thr	
			115				120					125				
Val	Pro	Thr	Ile	Phe	His	Leu	Pro	Ser	Ile	Ala	Phe	Gly	Lys	Leu	Lys	
			130			135					140					
Leu	Pro	Gly	Asp	Thr	Leu	Leu	Thr	Ile	Val	Ile	Gly	Leu	Val	Ile	Met	
145					150					155				160		
Val	Gly	Leu	Gln	Leu	Phe	Val	Lys	Phe	Thr	Arg	Gln	Gly	Lys	Ala	Met	
				165					170					175		
Arg	Ala	Val	Ser	Glu	Asp	Lys	Glu	Ala	Ala	Val	Leu	Met	Gly	Ile	Asn	
			180					185					190			
Val	Asn	Ser	Thr	Ile	Ala	Leu	Thr	Phe	Ala	Ile	Gly	Ser	Gly	Leu	Ala	
			195				200					205				
Ala	Val	Ala	Ser	Leu	Met	Tyr	Cys	Ala	Ala	Tyr	Pro	Gln	Val	Ser	Pro	
						215					220					
210																

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Met Met Gly Ala Met Leu Gly Leu Lys Ala Phe Val Ala Ala Val Leu
 225 230 235 240
 Gly Gly Ile Gly Ser Ile Pro Gly Ala Met Ile Gly Gly Leu Ala Ile
 245 250 255
 Gly Leu Ile Glu Ser Leu Thr Lys Ala Tyr Ile Gly Thr Ile Thr Ala
 260 265 270
 Gly Ile Ile Thr Ser Ala Phe Ser Asp Ala Ile Val Phe Ala Ile Leu
 275 280 285
 Ile Ile Val Leu Leu Val Lys Pro Ser Gly Ile Met Gly Lys Asn Glu
 290 295 300
 Gly Glu Lys Val
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<210> 858

<211> 822

<212> DNA

<213> Pseudomonas resinovorans

<220>

<221> CDS

<222> (1)..(822)

<400> 858

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Met Gly Val Ile Asn Leu Ala His Gly Ala Phe Tyr Met Val Gly Ala	
1 5 10 15	
ttc tgc gcg gcc tac acc gcg tcg ctg agc ggc tcg ttc tgg ctc gcc	96
Phe Cys Ala Ala Tyr Thr Ala Ser Leu Ser Gly Ser Phe Trp Leu Ala	
20 25 30	
ggg ttg gcg gcg gtg atc ggc tcg gcc ctg tac ggg ctg ctg atc gaa	144
Gly Leu Ala Ala Val Ile Gly Ser Ala Leu Tyr Gly Leu Leu Ile Glu	
35 40 45	
acc agc atc atg cgc cgc ctc tac aac cgc gat cac ctc gac cag gta	192
Thr Ser Ile Met Arg Arg Leu Tyr Asn Arg Asp His Leu Asp Gln Val	
50 55 60	
ctg gcc acc ctg gcg gtg gtg ttc ttc acc aac gag tta atc acc gtg	240
Leu Ala Thr Leu Ala Val Val Phe Phe Thr Asn Glu Leu Ile Thr Val	
65 70 75 80	
ctg ttc ggc cgc agc cca ccg gcc atg ccc acg ccc gag tgg tat tcg	288
Leu Phe Gly Arg Ser Pro Pro Ala Met Pro Thr Pro Glu Trp Tyr Ser	
85 90 95	
agc ttc gtc gaa gtg ctg ccg ggg ttg atg tac ccg gtc agc cgc ttg	336
Ser Phe Val Glu Val Leu Pro Gly Leu Met Tyr Pro Val Ser Arg Leu	
100 105 110	
ctg ttc atc gcc gcc ggg gcc gtg gcg atc gcc atg tgg ctg ctg	384
Leu Phe Ile Ala Ala Gly Ala Val Val Ala Ile Ala Met Trp Leu Leu	
115 120 125	
ata aac cac acg cgc ctg ggc atg ctg atc cgc gcc ggg gcc gac gac	432
Ile Asn His Thr Arg Leu Gly Met Leu Ile Arg Ala Gly Ala Asp Asp	
130 135 140	
cac gaa atg gtc ggc gcc ctg ggg gtg aac atc gca cgc ctg tac acc	480
His Glu Met Val Gly Ala Leu Gly Val Asn Ile Ala Arg Leu Tyr Thr	
145 150 155 160	
ctg gtg ttc gtg ttc ggc tgc gtg ctt tgc ggc ctc gcc ggg ttc atg	528
Leu Val Phe Val Phe Gly Cys Val Leu Cys Gly Leu Ala Gly Phe Met	
165 170 175	
gcc gca ccc ttg ctg tgc gtg gaa atc ggc atg ggt gaa aag gtc ttg	576
Ala Ala Pro Leu Leu Ser Val Glu Ile Gly Met Gly Glu Lys Val Leu	
180 185 190	
att acc acc ttc gtg gtc atc gtg gtc ggc ggt gtc ggc tcg gtg cgc	624
Ile Thr Thr Phe Val Val Ile Val Val Gly Gly Val Gly Ser Val Arg	
195 200 205	
ggc gcc ctg gcc ggg gcc ttg ctg atc ggc atg gtc gat ggc ctg ggg	672
Gly Ala Leu Ala Gly Ala Leu Leu Ile Gly Met Val Asp Gly Leu Gly	
210 215 220	
cgt gcc tac atc ccg caa ttg ctg gac caa ctg ttg ccc gcc gaa gtc	720
Arg Ala Tyr Ile Pro Gln Leu Leu Asp Gln Leu Leu Pro Ala Glu Val	
225 230 235 240	
agc ggc acc ctg agc ggc ggg ctg att tcc gcc agc gcc tac atc gtc	768

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Ser	Gly	Thr	Leu	Ser	Gly	Gly	Leu	Ile	Ser	Ala	Ser	Ala	Tyr	Ile	Val		
atg	gcc	gtg	gtg	ttg	ctg	gtc	cgc	ccc	cgc	ggc	ctg	ctg	ccc	gcc	cgt		816
Met	Ala	Val	Val	Leu	Leu	Val	Arg	Pro	Arg	Gly	Leu	Leu	Pro	Ala	Arg		
			260					265					270				
gcc	tga																822
Ala																	

<210> 859

<211> 273

<212> PRT

<213> Pseudomonas resinovorans

<400> 859

Met	Gly	Val	Ile	Asn	Leu	Ala	His	Gly	Ala	Phe	Tyr	Met	Val	Gly	Ala		
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Phe	Cys	Ala	Ala	Tyr	Thr	Ala	Ser	Leu	Ser	Gly	Ser	Phe	Trp	Leu	Ala		
			20					25					30				
Gly	Leu	Ala	Ala	Val	Ile	Gly	Ser	Ala	Leu	Tyr	Gly	Leu	Leu	Ile	Glu		
		35					40					45					
Thr	Ser	Ile	Met	Arg	Arg	Leu	Tyr	Asn	Arg	Asp	His	Leu	Asp	Gln	Val		
	50					55					60						
Leu	Ala	Thr	Leu	Ala	Val	Val	Phe	Phe	Thr	Asn	Glu	Leu	Ile	Thr	Val		
65					70					75					80		
Leu	Phe	Gly	Arg	Ser	Pro	Pro	Ala	Met	Pro	Thr	Pro	Glu	Trp	Tyr	Ser		
				85					90					95			
Ser	Phe	Val	Glu	Val	Leu	Pro	Gly	Leu	Met	Tyr	Pro	Val	Ser	Arg	Leu		
			100					105					110				
Leu	Phe	Ile	Ala	Ala	Gly	Ala	Val	Val	Ala	Ile	Ala	Met	Trp	Leu	Leu		
		115					120					125					
Ile	Asn	His	Thr	Arg	Leu	Gly	Met	Leu	Ile	Arg	Ala	Gly	Ala	Asp	Asp		
	130					135					140						
His	Glu	Met	Val	Gly	Ala	Leu	Gly	Val	Asn	Ile	Ala	Arg	Leu	Tyr	Thr		
145					150					155					160		
Leu	Val	Phe	Val	Phe	Gly	Cys	Val	Leu	Cys	Gly	Leu	Ala	Gly	Phe	Met		
				165					170					175			
Ala	Ala	Pro	Leu	Leu	Ser	Val	Glu	Ile	Gly	Met	Gly	Glu	Lys	Val	Leu		
			180					185					190				
Ile	Thr	Thr	Phe	Val	Val	Ile	Val	Val	Gly	Gly	Val	Gly	Ser	Val	Arg		
		195					200						205				
Gly	Ala	Leu	Ala	Gly	Ala	Leu	Leu	Ile	Gly	Met	Val	Asp	Gly	Leu	Gly		
	210					215					220						
Arg	Ala	Tyr	Ile	Pro	Gln	Leu	Leu	Asp	Gln	Leu	Leu	Pro	Ala	Glu	Val		
225					230					235					240		
Ser	Gly	Thr	Leu	Ser	Gly	Gly	Leu	Ile	Ser	Ala	Ser	Ala	Tyr	Ile	Val		
				245					250					255			
Met	Ala	Val	Val	Leu	Leu	Val	Arg	Pro	Arg	Gly	Leu	Leu	Pro	Ala	Arg		
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Ala																	

<210> 860

<211> 1080

<212> DNA

<213> Corynebacterium glutamicum

<220>

<221> CDS

<222> (1)..(1080)

<400> 860

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Met	Ser	Thr	Gln	Leu	Lys	Leu	Lys	Lys	Pro	Ala	Lys	Lys	Lys	Thr	Thr		
1				5					10					15			
ccg	aaa	ctt	agc	gtc	gta	aat	gct	ccc	acg	ctg	cgc	act	gcg	gcg	ttg		96
Pro	Lys	Leu	Ser	Val	Val	Asn	Ala	Pro	Thr	Leu	Arg	Thr	Ala	Ala	Leu		
			20					25					30				
ggc	ctg	gcc	gcg	ctc	gct	gcg	gta	ttg	ctg	tgc	gcc	ccg	ctc	ttt	tta		144

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Gly	Leu	Ala	Ala	Leu	Ala	Ala	Val	Leu	Leu	Cys	Ala	Pro	Leu	Phe	Leu		
tcc	aca	ttc	cag	ctg	acg	ttg	atg	tcg	cgc	ttg	gtg	tgt	tat	gcg	atc	192	
Ser	Thr	Phe	Gln	Leu	Thr	Leu	Met	Ser	Arg	Leu	Val	Cys	Tyr	Ala	Ile		
	50					55					60						
gtc	gca	gtc	ggc	atc	ggg	ctg	gcg	tgg	ggc	aga	ggc	ggc	atg	ctc	acg	240	
Val	Ala	Val	Gly	Ile	Gly	Leu	Ala	Trp	Gly	Arg	Gly	Gly	Met	Leu	Thr		
	65				70					75					80		
ctg	ggg	caa	ggc	gtg	ttc	ttt	gga	atc	ggc	gcg	tac	atc	atg	gcc	atg	288	
Leu	Gly	Gln	Gly	Val	Phe	Phe	Gly	Ile	Gly	Ala	Tyr	Ile	Met	Ala	Met		
				85					90					95			
cac	atg	ctg	tac	agc	gat	tcg	cag	att	ttt	ggg	acc	aca	gtt	ccg	caa	336	
His	Met	Leu	Tyr	Ser	Asp	Ser	Gln	Ile	Phe	Gly	Thr	Thr	Val	Pro	Gln		
			100					105					110				
tgg	tgg	tcc	att	ttt	gcc	aac	ccg	gca	gtc	gca	ctc	atc	gca	gtt	gtg	384	
Trp	Trp	Ser	Ile	Phe	Ala	Asn	Pro	Ala	Val	Ala	Leu	Ile	Ala	Val	Val		
		115					120					125					
gcg	ctt	ccc	ggc	atc	gtg	gct	ttt	gtg	ctc	ggc	ttc	tcc	att	ttc	aaa	432	
Ala	Leu	Pro	Gly	Ile	Val	Ala	Phe	Val	Leu	Gly	Phe	Ser	Ile	Phe	Lys		
	130					135					140						
cga	cgc	atc	aaa	ggc	gcc	tac	ttt	gcc	atc	gtg	aac	caa	gcg	ctc	gcc	480	
Arg	Arg	Ile	Lys	Gly	Ala	Tyr	Phe	Ala	Ile	Val	Asn	Gln	Ala	Leu	Ala		
				150				155							160		
gca	gct	gtt	gtg	gtg	ttg	ctg	gtc	gga	caa	gat	tcc	ctt	gga	ggt	ggt	528	
Ala	Ala	Val	Val	Val	Leu	Leu	Val	Gly	Gln	Asp	Ser	Leu	Gly	Gly	Gly		
				165				170					175				
tcc	aat	ggt	ctt	tcc	gga	ttt	cga	tcg	ttc	atg	ggt	ttt	gcc	gtc	tac	576	
Ser	Asn	Gly	Leu	Ser	Gly	Phe	Arg	Ser	Phe	Met	Gly	Phe	Ala	Val	Tyr		
			180					185					190				
gac	ccc	atc	aac	cgc	atc	atg	ttt	tac	ttc	acc	gca	gtg	gga	ggt	ctc	624	
Asp	Pro	Ile	Asn	Arg	Ile	Met	Phe	Tyr	Phe	Thr	Ala	Val	Gly	Val	Leu		
		195					200					205					
ttg	gct	ttg	gtg	gct	atc	tca	tat	tgg	ctc	atg	cgc	agc	cgc	tat	gga	672	
Leu	Ala	Leu	Val	Ala	Ile	Ser	Tyr	Trp	Leu	Met	Arg	Ser	Arg	Tyr	Gly		
	210					215					220						
gaa	ctg	ctc	gtg	gcc	acc	aga	gat	gca	gaa	gaa	cgc	gtc	cga	ttc	ctc	720	
Glu	Leu	Leu	Val	Ala	Thr	Arg	Asp	Ala	Glu	Glu	Arg	Val	Arg	Phe	Leu		
	225				230				235						240		
gga	tat	gat	ccc	gca	ttg	atc	aaa	acc	gcc	gca	tat	gtc	att	gct	gcg	768	
Gly	Tyr	Asp	Pro	Ala	Leu	Ile	Lys	Thr	Ala	Ala	Tyr	Val	Ile	Ala	Ala		
				245				250					255				
atg	att	gcc	gga	atc	gcc	gga	gcg	ctg	ttc	gtg	ccg	atc	gtg	ggc	atc	816	
Met	Ile	Ala	Gly	Ile	Ala	Gly	Ala	Leu	Phe	Val	Pro	Ile	Val	Gly	Ile		
			260				265					270					
att	tca	ccc	gca	gaa	atc	ggc	gtg	cca	tca	atc	gtg	ttc	gtg	atc		864	
Ile	Ser	Pro	Ala	Glu	Ile	Gly	Val	Val	Pro	Ser	Ile	Val	Phe	Val	Ile		
		275					280					285					
gcc	gtc	gcc	gct	ggt	ggc	agg	gca	tcc	cta	ttc	ggt	ccc	gta	ggt	ggc	912	
Ala	Val	Ala	Ala	Gly	Gly	Arg	Ala	Ser	Leu	Phe	Gly	Pro	Val	Val	Gly		
	290					295					300						
gcg	ctg	gtg	ctg	ggc	tgg	gtg	gaa	tcc	aca	ctt	gct	caa	act	ttc	ccc	960	
Ala	Leu	Val	Leu	Gly	Trp	Val	Glu	Ser	Thr	Leu	Ala	Gln	Thr	Phe	Pro		
	305				310					315					320		
agc	atg	tgg	tcc	tat	ttc	cag	ggt	gcg	atc	ctg	ggt	ctc	gtg	atc	gtg	1008	
Ser	Met	Trp	Ser	Tyr	Phe	Gln	Gly	Ala	Ile	Leu	Val	Leu	Val	Ile	Val		
				325				330						335			
ttg	ctg	ccg	ggc	gga	att	gct	tca	att	aaa	ctt	tcc	gcg	ctc	aaa	aat	1056	
Leu	Leu	Pro	Gly	Gly	Ile	Ala	Ser	Ile	Lys	Leu	Ser	Ala	Leu	Lys	Asn		
			340					345					350				
aag	gcc	agg	aag	gcc	acc	tca	tag									1080	
Lys	Ala	Arg	Lys	Ala	Thr	Ser											
		355															

<210> 861

<211> 359

<212> PRT

<213> Corynebacterium glutamicum

<400> 861

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Met Ser Thr Gln Leu Lys Leu Lys Lys Pro Ala Lys Lys Lys Thr Thr
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 Pro Lys Leu Ser Val Val Asn Ala Pro Thr Leu Arg Thr Ala Ala Leu
 20 25 30
 Gly Leu Ala Ala Leu Ala Ala Val Leu Leu Cys Ala Pro Leu Phe Leu
 35 40 45
 Ser Thr Phe Gln Leu Thr Leu Met Ser Arg Leu Val Cys Tyr Ala Ile
 50 55 60
 Val Ala Val Gly Ile Gly Leu Ala Trp Gly Arg Gly Gly Met Leu Thr
 65 70 75 80
 Leu Gly Gln Gly Val Phe Phe Gly Ile Gly Ala Tyr Ile Met Ala Met
 85 90 95
 His Met Leu Tyr Ser Asp Ser Gln Ile Phe Gly Thr Thr Val Pro Gln
 100 105 110
 Trp Trp Ser Ile Phe Ala Asn Pro Ala Val Ala Leu Ile Ala Val Val
 115 120 125
 Ala Leu Pro Gly Ile Val Ala Phe Val Leu Gly Phe Ser Ile Phe Lys
 130 135 140
 Arg Arg Ile Lys Gly Ala Tyr Phe Ala Ile Val Asn Gln Ala Leu Ala
 145 150 155 160
 Ala Ala Val Val Val Leu Leu Val Gly Gln Gln Asp Ser Leu Gly Gly
 165 170 175
 Ser Asn Gly Leu Ser Gly Phe Arg Ser Phe Met Gly Phe Ala Val Tyr
 180 185 190
 Asp Pro Ile Asn Arg Ile Met Phe Tyr Phe Thr Ala Val Gly Val Leu
 195 200 205
 Leu Ala Leu Val Ala Ile Ser Tyr Trp Leu Met Arg Ser Arg Tyr Gly
 210 215 220
 Glu Leu Leu Val Ala Thr Arg Asp Ala Glu Glu Arg Val Arg Phe Leu
 225 230 235 240
 Gly Tyr Asp Pro Ala Leu Ile Lys Thr Ala Ala Tyr Val Ile Ala Ala
 245 250 255
 Met Ile Ala Gly Ile Ala Gly Ala Leu Phe Val Pro Ile Val Gly Ile
 260 265 270
 Ile Ser Pro Ala Glu Ile Gly Val Val Pro Ser Ile Val Phe Val Ile
 275 280 285
 Ala Val Ala Ala Gly Gly Arg Ala Ser Leu Phe Gly Pro Val Val Gly
 290 295 300
 Ala Leu Val Leu Gly Trp Val Glu Ser Thr Leu Ala Gln Thr Phe Pro
 305 310 315 320
 Ser Met Trp Ser Tyr Phe Gln Gly Ala Ile Leu Val Leu Val Ile Val
 325 330 335
 Leu Leu Pro Gly Gly Ile Ala Ser Ile Lys Leu Ser Ala Leu Lys Asn
 340 345 350
 Lys Ala Arg Lys Ala Thr Ser
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<210> 862

<211> 885

<212> DNA

<213> Corynebacterium glutamicum

<220>

<221> CDS

<222> (1)..(885)

<400> 862

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Met	Asp	Ile	Leu	Leu	Asn	Gln	Leu	Val	Ala	Gly	Leu	Ser	Val	Gly	Ser	
1				5				10					15			
gtc	ctt	cta	tgt	gtc	gca	gtg	gga	tgt	tca	ctg	acc	ttt	gga	cag	atg	96
Val	Leu	Leu	Leu	Val	Ala	Val	Gly	Leu	Ser	Leu	Thr	Phe	Gly	Gln	Met	
			20					25					30			
ggc	gtt	att	aat	atg	gcg	cac	gga	gag	ttc	atc	atg	gtc	ggc	gca	tac	144
Gly	Val	Ile	Asn	Met	Ala	His	Gly	Glu	Phe	Ile	Met	Val	Gly	Ala	Tyr	
		35					40					45				
acc	gca	tat	gtg	gtg	cag	ctg	gtc	gtc	ggg	tct	gcc	ggg	tta	tcc	cta	192
Thr	Ala	Tyr	Val	Val	Gln	Leu	Val	Val	Gly	Ser	Ala	Gly	Leu	Ser	Leu	
	50					55					60					

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ctg	atc	agc	att	ccg	ctg	gcc	ttt	att	atc	ggg	ggg	ctt	ttc	gga	ggt	240
Leu	Ile	Ser	Ile	Pro	Leu	Ala	Phe	Ile	Ile	Gly	Gly	Leu	Phe	Gly	Val	
65					70					75					80	
ctc	ctc	gaa	caa	ttc	ctg	ctg	aag	tat	ctt	tat	cac	agg	cca	cta	gac	288
Leu	Leu	Glu	Gln	Phe	Leu	Leu	Lys	Tyr	Leu	Tyr	His	Arg	Pro	Leu	Asp	
				85					90					95		
acg	ctg	ctg	gcc	aca	ttc	ggg	gtc	ggg	ttg	atc	ctt	cag	cag	ctg	gcc	336
Thr	Leu	Leu	Ala	Thr	Phe	Gly	Val	Gly	Leu	Ile	Leu	Gln	Gln	Leu	Ala	
			100					105					110			
cga	aac	att	ttc	gga	gct	ccc	gca	gtg	gat	gtc	agg	gca	ccg	gaa	ttt	384
Arg	Asn	Ile	Phe	Gly	Ala	Pro	Ala	Val	Asp	Val	Arg	Ala	Pro	Glu	Phe	
		115					120					125				
ctc	cg	gga	aac	gtc	gaa	gtt	cta	ggc	gtc	ttg	gtg	ccg	acc	gcg	cga	432
Leu	Arg	Gly	Asn	Val	Glu	Val	Leu	Gly	Val	Leu	Val	Pro	Thr	Ala	Arg	
	130					135					140					
cta	ttc	atc	ctg	gcg	ctg	gcc	atc	gca	tca	gtg	act	gca	cta	gct	gtg	480
Leu	Phe	Ile	Leu	Ala	Leu	Ala	Ile	Ala	Ser	Val	Thr	Ala	Leu	Ala	Val	
145					150					155					160	
ttc	cta	aat	cg	act	gcc	tgg	ggc	cga	cg	atc	cg	gcc	gtg	gtt	ctg	528
Phe	Leu	Asn	Arg	Thr	Ala	Trp	Gly	Arg	Arg	Ile	Arg	Ala	Val	Val	Leu	
				165					170					175		
aac	cg	gac	ctc	gcg	gaa	acc	gca	ggg	att	gat	acc	cga	gct	act	gac	576
Asn	Arg	Asp	Leu	Ala	Glu	Thr	Ala	Gly	Ile	Asp	Thr	Arg	Ala	Thr	Asp	
			180					185					190			
cga	atg	acg	ttc	ttt	gtg	ggc	tcc	ggg	ctt	gcc	gga	atc	gcc	ggg	gta	624
Arg	Met	Thr	Phe	Phe	Val	Gly	Ser	Gly	Leu	Ala	Gly	Ile	Ala	Gly	Val	
		195					200					205				
gct	atc	aca	ttg	att	ggc	gcg	acc	ggc	ccc	acc	atc	ggg	cag	aac	tac	672
Ala	Ile	Thr	Leu	Ile	Gly	Ala	Thr	Gly	Pro	Thr	Ile	Gly	Gln	Asn	Tyr	
		210				215					220					
atc	gtg	gat	gcc	ttc	ctt	gtt	gtt	gcc	gcc	ggg	ggc	atc	ggc	cg	gtg	720
Ile	Val	Asp	Ala	Phe	Leu	Val	Val	Ala	Ala	Gly	Gly	Ile	Gly	Arg	Val	
225					230					235					240	
aag	ggc	gct	gtg	atc	atg	gct	ttc	gtg	ctg	gga	att	act	caa	gca	ttc	768
Lys	Gly	Ala	Val	Ile	Met	Ala	Phe	Val	Leu	Gly	Ile	Thr	Gln	Ala	Phe	
				245					250					255		
gtg	gaa	tat	acg	aca	ggg	gcg	agc	atc	gcg	aag	ttc	atc	gta	ctc	atc	816
Val	Glu	Tyr	Thr	Thr	Gly	Ala	Ser	Ile	Ala	Lys	Phe	Ile	Val	Leu	Ile	
			260					265					270			
gct	gtt	gtt	gcc	ttc	ctg	cag	ttt	agg	cct	caa	gga	ctc	ttc	caa	acc	864
Ala	Val	Val	Ala	Phe	Leu	Gln	Phe	Arg	Pro	Gln	Gly	Leu	Phe	Gln	Thr	
		275					280					285				
caa	act	agg	agc	ctc	gta	tag										885
Gln	Thr	Arg	Ser	Leu	Val											
	290															

<210> 863

<211> 294

<212> PRT

<213> Corynebacterium glutamicum

<400> 863

Met	Asp	Ile	Leu	Leu	Asn	Gln	Leu	Val	Ala	Gly	Leu	Ser	Val	Gly	Ser	
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Val	Leu	Leu	Leu	Val	Ala	Val	Gly	Leu	Ser	Leu	Thr	Phe	Gly	Gln	Met	
			20					25					30			
Gly	Val	Ile	Asn	Met	Ala	His	Gly	Glu	Phe	Ile	Met	Val	Gly	Ala	Tyr	
		35					40					45				
Thr	Ala	Tyr	Val	Val	Gln	Leu	Val	Val	Gly	Ser	Ala	Gly	Leu	Ser	Leu	
		50				55					60					
Leu	Ile	Ser	Ile	Pro	Leu	Ala	Phe	Ile	Ile	Gly	Gly	Leu	Phe	Gly	Val	
65					70					75					80	
Leu	Leu	Glu	Gln	Phe	Leu	Leu	Lys	Tyr	Leu	Tyr	His	Arg	Pro	Leu	Asp	
				85					90					95		
Thr	Leu	Leu	Ala	Thr	Phe	Gly	Val	Gly	Leu	Ile	Leu	Gln	Gln	Leu	Ala	
			100					105					110			
Arg	Asn	Ile	Phe	Gly	Ala	Pro	Ala	Val	Asp	Val	Arg	Ala	Pro	Glu	Phe	
		115					120					125				
Leu	Arg	Gly	Asn	Val	Glu	Val	Leu	Gly	Val	Leu	Val	Pro	Thr	Ala	Arg	

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130 135 140
 Leu Phe Ile Leu Ala Leu Ala Ile Ala Ser Val Thr Ala Leu Ala Val
 145 150 155 160
 Phe Leu Asn Arg Thr Ala Trp Gly Arg Arg Ile Arg Ala Val Val Leu
 165 170 175
 Asn Arg Asp Leu Ala Glu Thr Ala Gly Ile Asp Thr Arg Ala Thr Asp
 180 185 190
 Arg Met Thr Phe Phe Val Gly Ser Gly Leu Ala Gly Ile Ala Gly Val
 195 200 205
 Ala Ile Thr Leu Ile Gly Ala Thr Gly Pro Thr Ile Gly Gln Asn Tyr
 210 215 220
 Ile Val Asp Ala Phe Leu Val Val Ala Ala Gly Gly Ile Gly Arg Val
 225 230 235 240
 Lys Gly Ala Val Ile Met Ala Phe Val Leu Gly Ile Thr Gln Ala Phe
 245 250 255
 Val Glu Tyr Thr Thr Gly Ala Ser Ile Ala Lys Phe Ile Val Leu Ile
 260 265 270
 Ala Val Val Ala Phe Leu Gln Phe Arg Pro Gln Gly Leu Phe Gln Thr
 275 280 285
 Gln Thr Arg Ser Leu Val
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<210> 864

<211> 927

<212> DNA

<213> Fusobacterium nucleatum

<220>

<221> CDS

<222> (1)..(927)

<400> 864

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1				5					10					15		
tta	ctt	caa	ata	att	aat	ggt	tta	caa	ata	gga	agt	atc	tat	gct	cta	96
Leu	Leu	Gln	Ile	Ile	Asn	Gly	Leu	Gln	Ile	Gly	Ser	Ile	Tyr	Ala	Leu	
			20					25					30			
gtg	tct	tta	gga	tat	aca	atg	gta	tat	ggt	ata	gca	caa	ctt	att	aac	144
Val	Ser	Leu	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Ala	Gln	Leu	Ile	Asn	
			35				40					45				
ttt	gca	cat	ggt	gat	att	ata	atg	ata	ggg	gca	tat	act	tca	ctt	ttt	192
Phe	Ala	His	Gly	Asp	Ile	Ile	Met	Ile	Gly	Ala	Tyr	Thr	Ser	Leu	Phe	
			50			55					60					
tca	att	cca	tta	ttc	aca	tca	atg	ggt	tta	cca	atc	tgg	aca	aca	gtt	240
Ser	Ile	Pro	Leu	Phe	Thr	Ser	Met	Gly	Leu	Pro	Ile	Trp	Thr	Thr	Val	
			65		70					75					80	
att	cca	gca	ata	att	att	tgt	gca	gtt	ata	ggt	tgc	tta	gct	gaa	aga	288
Ile	Pro	Ala	Ile	Ile	Ile	Cys	Ala	Val	Ile	Gly	Cys	Leu	Ala	Glu	Arg	
				85				90						95		
ata	gca	tat	aga	cca	ctt	aga	aat	tca	cca	agg	ata	tca	aat	tta	ata	336
Ile	Ala	Tyr	Arg	Pro	Leu	Arg	Asn	Ser	Pro	Arg	Ile	Ser	Asn	Leu	Ile	
			100					105					110			
act	gct	att	gga	gtt	agt	tta	ttt	ata	gaa	aat	gtc	ttt	atg	aag	gta	384
Thr	Ala	Ile	Gly	Val	Ser	Leu	Phe	Ile	Glu	Asn	Val	Phe	Met	Lys	Val	
			115				120					125				
ttt	aca	cca	aat	aca	aga	tca	ttt	cct	aaa	att	ttt	aat	caa	gca	cca	432
Phe	Thr	Pro	Asn	Thr	Arg	Ser	Phe	Pro	Lys	Ile	Phe	Asn	Gln	Ala	Pro	
			130			135					140					
ata	act	ttt	gga	aat	gga	ata	aat	att	agt	ttc	gga	gct	gct	ata	act	480
Ile	Thr	Phe	Gly	Asn	Gly	Ile	Asn	Ile	Ser	Phe	Gly	Ala	Ala	Ile	Thr	
				150					155						160	
ata	ctt	aca	aca	gtt	att	tta	tct	gtg	gga	tta	caa	tta	ttt	atg	aaa	528
Ile	Leu	Thr	Thr	Val	Ile	Leu	Ser	Val	Gly	Leu	Gln	Leu	Phe	Met	Lys	
				165				170								
aaa	act	aaa	tat	gga	aaa	gct	atg	ata	gca	aca	agt	caa	gat	tat	gca	576
Lys	Thr	Lys	Tyr	Gly	Lys	Ala	Met	Ile	Ala	Thr	Ser	Gln	Asp	Tyr	Ala	
			180					185					190			
gct	tct	gaa	tta	gtt	gga	ata	aat	gta	gat	aga	aca	gta	caa	tta	aca	624

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Ala	Ser	Glu	Leu	Val	Gly	Ile	Asn	Val	Asp	Arg	Thr	Val	Gln	Leu	Thr		
195							200					205					
ttt	gca	ata	ggg	agt	gga	ctt	gca	gca	gta	ggg	tct	gta	tta	tat	gtt	672	
Phe	Ala	Ile	Gly	Ser	Gly	Leu	Ala	Ala	Val	Gly	Ser	Val	Leu	Tyr	Val		
210						215					220						
tca	gct	tat	cca	caa	ata	caa	cct	tta	atg	ggg	tca	atg	ctt	gga	ata	720	
Ser	Ala	Tyr	Pro	Gln	Ile	Gln	Pro	Leu	Met	Gly	Ser	Met	Leu	Gly	Ile		
225					230					235					240		
aag	gcc	ttt	att	gca	gca	gtt	tta	ggg	ggg	att	gga	ata	ctg	cca	ggg	768	
Lys	Ala	Phe	Ile	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ile	Leu	Pro	Gly		
				245				250						255			
gct	gtt	tta	ggg	gga	ttt	ata	tta	gga	att	gtt	gaa	agt	tta	aca	aga	816	
Ala	Val	Leu	Gly	Phe	Ile	Leu	Gly	Ile	Val	Glu	Ser	Leu	Thr	Arg			
			260				265						270				
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Ala	Tyr	Leu	Ser	Ser	Gln	Leu	Ala	Asp	Ala	Phe	Val	Phe	Ser	Ile	Leu		
			275				280					285					
att	ata	gtt	tta	tta	ttt	aaa	cct	act	gga	ata	ctt	gga	aag	aat	gta	912	
Ile	Ile	Val	Leu	Leu	Phe	Lys	Pro	Thr	Gly	Ile	Leu	Gly	Lys	Asn	Val		
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Lys	Glu	Lys	Val														
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<210> 865

<211> 308

<212> PRT

<213> Fusobacterium nucleatum

<400> 865

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			20					25					30				
Val	Ser	Leu	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Ala	Gln	Leu	Ile	Asn		
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Phe	Ala	His	Gly	Asp	Ile	Ile	Met	Ile	Gly	Ala	Tyr	Thr	Ser	Leu	Phe		
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Ser	Ile	Pro	Leu	Phe	Thr	Ser	Met	Gly	Leu	Pro	Ile	Trp	Thr	Thr	Val		
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Ile	Pro	Ala	Ile	Ile	Ile	Cys	Ala	Val	Ile	Gly	Cys	Leu	Ala	Glu	Arg		
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Ile	Ala	Tyr	Arg	Pro	Leu	Arg	Asn	Ser	Pro	Arg	Ile	Ser	Asn	Leu	Ile		
			100				105						110				
Thr	Ala	Ile	Gly	Val	Ser	Leu	Phe	Ile	Glu	Asn	Val	Phe	Met	Lys	Val		
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Lys	Thr	Lys	Tyr	Gly	Lys	Ala	Met	Ile	Ala	Thr	Ser	Gln	Asp	Tyr	Ala		
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Ala	Ser	Glu	Leu	Val	Gly	Ile	Asn	Val	Asp	Arg	Thr	Val	Gln	Leu	Thr		
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Phe	Ala	Ile	Gly	Ser	Gly	Leu	Ala	Ala	Val	Gly	Ser	Val	Leu	Tyr	Val		
			210			215					220						
Ser	Ala	Tyr	Pro	Gln	Ile	Gln	Pro	Leu	Met	Gly	Ser	Met	Leu	Gly	Ile		
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Lys	Ala	Phe	Ile	Ala	Ala	Val	Leu	Gly	Gly	Ile	Gly	Ile	Leu	Pro	Gly		
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Ala	Val	Leu	Gly	Phe	Ile	Leu	Gly	Ile	Val	Glu	Ser	Leu	Thr	Arg			
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Ala	Tyr	Leu	Ser	Ser	Gln	Leu	Ala	Asp	Ala	Phe	Val	Phe	Ser	Ile	Leu		
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Ile	Ile	Val	Leu	Leu	Phe	Lys	Pro	Thr	Gly	Ile	Leu	Gly	Lys	Asn	Val		
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 <212> DNA
 <213> *Fusobacterium nucleatum*

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 <222> (1)..(858)

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 Gly Cys Leu Gly Gln Ile Thr Leu Gly His Ala Gly Phe Met Ser Ile
 20 25 30
 gga gca tat aca gca gca ctt tta act aag tct ggt ctt cta tca ggt 144
 Gly Ala Tyr Thr Ala Ala Leu Leu Thr Lys Ser Gly Leu Leu Ser Gly
 35 40 45
 tat cca ggc tat gtt gta gct ttg ata att gga gga ctt gta gca gga 192
 Tyr Pro Gly Tyr Val Val Ala Leu Ile Ile Gly Gly Leu Val Ala Gly
 50 55 60
 ata att ggt ttt ata ata gga ata cct gct tta aga ctt aca gga gat 240
 Ile Ile Gly Phe Ile Ile Gly Ile Pro Ala Leu Arg Leu Thr Thr Gly Asp
 65 70 75 80
 tat ctt gct att ata act ctg gct ttt gga gaa att ata aga gta ttg 288
 Tyr Leu Ala Ile Ile Thr Leu Ala Phe Gly Glu Ile Ile Arg Val Leu
 85 90 95
 att gaa tat ttt aaa ttt aca ggt gga gca caa gga tta aca ggt ata 336
 Ile Glu Tyr Phe Lys Phe Thr Gly Gly Ala Gln Gly Leu Thr Thr Gly Ile
 100 105 110
 cca aga gta aat aat ttt act ttg ata tat ttt ata aca ata ttt tca 384
 Pro Arg Val Asn Asn Phe Thr Leu Ile Tyr Phe Ile Thr Ile Phe Ser
 115 120 125
 gtt ata ttt atg tat tca gtt atg aca agt aga cat ggt agg gca gtc 432
 Val Ile Phe Met Tyr Ser Val Met Thr Ser Arg His Gly Arg Ala Val
 130 135 140
 tta gct att cgt gaa gat gaa ata gca agt gga gct tct gga ata aat 480
 Leu Ala Ile Arg Glu Asp Glu Ile Ala Ser Gly Ala Ser Gly Ile Asn
 145 150 155 160
 aca aca tat tat aaa act ttt gcc ttt gta cta tca gca ata ttt gct 528
 Thr Thr Tyr Tyr Lys Thr Phe Ala Phe Val Leu Ser Ala Ile Phe Ala
 165 170 175
 ggt ata gca ggt gga att tat gca cat aat tta gga att tta ggt gca 576
 Gly Ile Ala Gly Gly Ile Tyr Ala His Asn Leu Gly Ile Leu Gly Ala
 180 185 190
 aaa caa ttc gac tat aat tat tca ata aat ata ctt gtt atg gtt gta 624
 Lys Gln Phe Asp Tyr Asn Tyr Ser Ile Asn Ile Leu Val Met Val Val
 195 200 205
 ctt ggt gga atg gga agt ttc aca ggt tca ata tta tca gca ata gtt 672
 Leu Gly Gly Met Gly Ser Phe Thr Gly Ser Ile Leu Ser Ala Ile Val
 210 215 220
 ctt act att tta cca gaa gtt tta aga agt ttt gca gaa tat aga atg 720
 Leu Thr Ile Leu Pro Glu Val Leu Arg Ser Phe Ala Glu Tyr Arg Met
 225 230 235 240
 ata gtt tac cca tta att tta att ata atg atg tta ttt aga cca aaa 768
 Ile Val Tyr Pro Leu Ile Leu Ile Ile Met Met Leu Phe Arg Pro Lys
 245 250 255
 gga tta ctt ggt aga gaa gaa ttt caa ata agt aaa ata att tca tat 816
 Gly Leu Leu Gly Arg Glu Glu Phe Gln Ile Ser Lys Ile Ile Ser Tyr
 260 265 270
 ttt act aaa aaa ttg aaa aga ggt gaa gta aat gga aaa taa 858
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<210> 867
 <211> 285

<212> PRT

<213> *Fusobacterium nucleatum*

<400> 867

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Gly Ala Tyr Thr Ala Ala Leu Leu Thr Lys Ser Gly Leu Leu Ser Gly
35      40      45
Tyr Pro Gly Tyr Val Val Ala Leu Ile Ile Gly Gly Leu Val Ala Gly
50      55      60
Ile Ile Gly Phe Ile Ile Gly Ile Pro Ala Leu Arg Leu Thr Gly Asp
65      70      75      80
Tyr Leu Ala Ile Ile Thr Leu Ala Phe Gly Glu Ile Ile Arg Val Leu
85      90      95
Ile Glu Tyr Phe Lys Phe Thr Gly Gly Ala Gln Gly Leu Thr Gly Ile
100      105      110
Pro Arg Val Asn Asn Phe Thr Leu Ile Tyr Phe Ile Thr Ile Phe Ser
115      120      125
Val Ile Phe Met Tyr Ser Val Met Thr Ser Arg His Gly Arg Ala Val
130      135      140
Leu Ala Ile Arg Glu Asp Glu Ile Ala Ser Gly Ala Ser Gly Ile Asn
145      150      155      160
Thr Thr Tyr Tyr Lys Thr Phe Ala Phe Val Leu Ser Ala Ile Phe Ala
165      170      175
Gly Ile Ala Gly Gly Ile Tyr Ala His Asn Leu Gly Ile Leu Gly Ala
180      185      190
Lys Gln Phe Asp Tyr Asn Tyr Ser Ile Asn Ile Leu Val Met Val Val
195      200      205
Leu Gly Gly Met Gly Ser Phe Thr Gly Ser Ile Leu Ser Ala Ile Val
210      215      220
Leu Thr Ile Leu Pro Glu Val Leu Arg Ser Phe Ala Glu Tyr Arg Met
225      230      235      240
Ile Val Tyr Pro Leu Ile Leu Ile Ile Met Met Leu Phe Arg Pro Lys
245      250      255
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Phe Thr Lys Lys Leu Lys Arg Gly Glu Val Asn Gly Lys
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<210> 868

<211> 873

<212> DNA

<213> *Rhizobium leguminosarum*

<220>

<221> CDS

<222> (1)..(873)

<400> 868

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Ser Val Tyr Ala Ile Val Ala Val Gly Met Thr Met Ile Phe Gly Val
20      25      30
ctg aga gcc atc aat ttt gct cac ggc gaa tac tac atg ctc ggc acg      144
Leu Arg Ala Ile Asn Phe Ala His Gly Glu Tyr Tyr Met Leu Gly Thr
35      40      45
ttc ggg gcc tgg ttt gcg atc gat tat ctc ggc ctg tcc tac gaa gtg      192
Phe Gly Ala Trp Phe Ala Ile Asp Tyr Leu Gly Leu Ser Tyr Glu Val
50      55      60
tcg att gtc gtg ggc gtt ctt gcg aca atc gcc gtt gcc tat gtg gtc      240
Ser Ile Val Val Gly Val Leu Ala Thr Ile Ala Val Ala Tyr Val Val
65      70      75      80
ggg caa ctc gtc atg cgc cgg atg gtc ggc gcg ccc gcg gag tcg ggc      288
Gly Gln Leu Val Met Arg Arg Met Val Gly Ala Pro Ala Glu Ser Gly
85      90      95

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			100					105					110			
ctc	gtc	ttc	ggc	gga	ggc	tac	aag	ttc	ttc	gcc	gga	ggc	tat	atc	gaa	384
Leu	Val	Phe	Gly	Gly	Gly	Tyr	Lys	Phe	Phe	Ala	Gly	Gly	Tyr	Ile	Glu	
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Pro	Val	Ser	Ile	Leu	Gly	Phe	Ser	Leu	Ala	Glu	Gln	Arg	Ile	Leu	Ile	
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ctc	gtc	gtc	tgc	ctg	tgt	gta	ttc	atc	ggc	ctc	gaa	ctg	atg	gtc	agc	480
Leu	Val	Val	Cys	Leu	Leu	Val	Phe	Ile	Gly	Leu	Glu	Leu	Met	Val	Ser	
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Tyr	Thr	Arg	Leu	Gly	Met	Ala	Met	Arg	Ala	Val	Ser	Gln	Asn	Val	Glu	
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tgc	tgc	agc	gtc	gtc	ggc	atc	gat	gtg	cca	cag	gtg	gtg	ctt	cga	acc	576
Cys	Cys	Ser	Val	Val	Gly	Ile	Asp	Val	Pro	Gln	Val	Val	Leu	Arg	Thr	
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Phe	Met	Leu	Gly	Ala	Ala	Leu	Ala	Ala	Leu	Ser	Gly	Val	Leu	Thr	Ala	
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Pro	Val	Asn	Val	Ser	Val	Tyr	Gly	Gly	Met	Gly	Glu	Leu	Ile	Thr	Phe	
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aag	acg	ctg	ccg	atc	att	atc	atg	ggc	ggt	ttg	ggg	aat	gtg	cgt	gga	720
Lys	Thr	Leu	Pro	Ile	Ile	Ile	Met	Gly	Gly	Leu	Gly	Asn	Val	Arg	Gly	
225					230					235					240	
act	ttc	gtc	gcg	gcg	atg	atc	ctt	ggc	ggt	gcc	gag	agc	ctg	gtc	gcc	768
Thr	Phe	Val	Ala	Ala	Met	Ile	Leu	Gly	Val	Ala	Glu	Ser	Leu	Val	Ala	
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acc	tat	gtc	ggc	tgt	caa	ttc	cgc	gac	acg	ggg	tcg	ttc	gcc	acg	ctg	816
Thr	Tyr	Val	Gly	Leu	Gln	Phe	Arg	Asp	Thr	Gly	Ser	Phe	Ala	Thr	Leu	
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atc	ctg	atg	ctg	atg	tgg	cga	ccg	cat	ggc	ctc	ttt	tcg	acg	cag	gcg	864
Ile	Leu	Met	Leu	Met	Trp	Arg	Pro	His	Gly	Leu	Phe	Ser	Thr	Gln	Ala	
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cgc	ttc	tag														873
Arg	Phe															
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<210> 869

<211> 290

<212> PRT

<213> Rhizobium leguminosarum

<400> 869

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Phe	Gly	Ala	Trp	Phe	Ala	Ile	Asp	Tyr	Leu	Gly	Leu	Ser	Tyr	Glu	Val	
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Ser	Ile	Val	Val	Gly	Val	Leu	Ala	Thr	Ile	Ala	Val	Ala	Tyr	Val	Val	
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Gly	Gln	Leu	Val	Met	Arg	Arg	Met	Val	Gly	Ala	Pro	Ala	Glu	Ser	Gly	
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Val	Leu	Ala	Thr	Leu	Gly	Ile	Ala	Leu	Ile	Leu	Gln	Asn	Thr	Ile	Ile	
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Leu	Val	Phe	Gly	Gly	Gly	Tyr	Lys	Phe	Phe	Ala	Gly	Gly	Tyr	Ile	Glu	
		115					120					125				
Pro	Val	Ser	Ile	Leu	Gly	Phe	Ser	Leu	Ala	Glu	Gln	Arg	Ile	Leu	Ile	
	130					135					140					
Leu	Val	Val	Cys	Leu	Leu	Val	Phe	Ile	Gly	Leu	Glu	Leu	Met	Val	Ser	
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Tyr	Thr	Arg	Leu	Gly	Met	Ala	Met	Arg	Ala	Val	Ser	Gln	Asn	Val	Glu	
				165					170					175		
Cys	Cys	Ser	Val	Val	Gly	Ile	Asp	Val	Pro	Gln	Val	Val	Leu	Arg	Thr	

Phe	Met	Leu	180 Gly	Ala	Ala	Leu	Ala	185 Ala	Leu	Ser	Gly	Val	190 Leu	Thr	Ala
Pro	Val	Asn	195 Val	Ser	Val	Tyr	200 Gly	Gly	Met	Gly	Glu	205 Leu	Ile	Thr	Phe
Lys	Thr	Leu	Pro	Ile	Ile	Ile	Met	Gly	Gly	Leu	Gly	Asn	Val	Arg	Gly
225 Thr	Phe	Val	Ala	Ala	Met	Ile	Leu	Gly	Val	Ala	Glu	Ser	Leu	Val	Ala
Thr	Tyr	Val	Gly	Leu	Gln	Phe	Arg	Asp	Thr	Gly	Ser	Phe	Ala	Thr	Leu
Ile	Leu	Met	Leu	Met	Trp	Arg	Pro	His	Gly	Leu	Phe	Ser	Thr	Gln	Ala
Arg	Phe	275 290					280					285			

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<213> Burkholderia cepacia

<220>
<221> CDS
<222> (1)..(885)

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Gly	Phe	Val	Tyr	Ala	Leu	Ile	Ala	Val	Gly	Ile	Ala	Val	Ile	Phe	Arg		
			20					25					30				
ggc	agc	cac	atc	atc	aac	gcc	atg	cag	ggc	gag	ttt	gcg	gtc	gtt	gga		144
Gly	Ser	His	Ile	Ile	Asn	Ala	Met	Gln	Gly	Glu	Phe	Ala	Val	Val	Gly		
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Ala	Leu	Val	Ala	Val	Phe	Ala	Leu	Thr	Lys	Ser	Gly	Leu	Pro	Tyr	Trp		
	50					55					60						
ctg	gca	gca	ctg	ctg	ggc	gtg	gct	gcc	ggc	gcg	gcc	atc	ggc	gcg	gcg		240
Leu	Ala	Ala	Leu	Leu	Gly	Val	Ala	Ala	Gly	Ala	Ala	Ile	Gly	Ala	Ala		
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att	gac	gtc	ctc	ttc	gtg	cgt	ccc	atg	aag	cgg	cgc	aac	gcc	agt	gag		288
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gaa	agc	ttc	ctg	ctc	ctg	acc	atc	ggc	ctc	gcg	ttt	acg	ttg	tca	gcc		336
Glu	Ser	Phe	Leu	Leu	Leu	Thr	Ile	Gly	Leu	Ala	Phe	Thr	Leu	Ser	Ala		
			100					105					110				
gct	gcc	ctc	tac	ttc	acc	ggc	cgc	gat	tcg	cac	ctg	ttg	cct	tcc	tat		384
Ala	Ala	Leu	Tyr	Phe	Thr	Gly	Arg	Asp	Ser	His	Leu	Leu	Pro	Ser	Tyr		
			115				120					125					
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Ala	Glu	Gly	Val	Val	Glu	Ile	Ala	Gly	Ala	Thr	Ile	Pro	Lys	His	Ala		
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ctt	tgg	ctg	atc	ctg	atc	tcg	ttg	ctg	gtg	gtg	ggc	ggg	ttg	agg	ctt		480
Leu	Trp	Leu	Ile	Leu	Ile	Ser	Leu	Leu	Val	Val	Gly	Gly	Leu	Arg	Leu		
	145				150				155					160			
ttc	tat	cgc	aag	acg	ctt	ttg	ggc	ctg	tcc	atg	gcg	gcc	gct	tct	gcc		528
Phe	Tyr	Arg	Lys	Thr	Leu	Leu	Gly	Leu	Ser	Met	Ala	Ala	Ala	Ser	Ala		
				165					170					175			
gat	ccg	gac	ggc	gcc	acc	acg	acc	ggc	atc	gat	gtg	aac	cgg	gct	cgg		576
Asp	Pro	Asp	Gly	Ala	Thr	Thr	Thr	Gly	Ile	Asp	Val	Asn	Arg	Ala	Arg		
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Thr	Leu	Lys	Gly	Phe	Ala	Ala	Ala	Ile	Leu	Gly	Gly	Ile	Ala	Asn	Pro		
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Ile	Gly	Ala	Val	Leu	Gly	Gly	Leu	Met	Ile	Gly	Leu	Ile	Glu	Ser	Leu		
				245					250					255			
gcc	gca	gtt	gta	ttc	cca	tcc	ggc	tac	cgg	gat	gcc	gtt	gcg	atg	gcg		816
Ala	Ala	Val	Val	Phe	Pro	Ser	Gly	Tyr	Arg	Asp	Ala	Val	Ala	Met	Ala		
			260					265					270				
ttc	ctg	atc	ctc	atc	atg	atc	gtc	atg	ccg	aat	ggg	ttg	atc	ggc	cga		864
Phe	Leu	Ile	Leu	Ile	Met	Ile	Val	Met	Pro	Asn	Gly	Leu	Ile	Gly	Arg		
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Ala	Gly	Arg	Ala	Gly	Gly												
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<210> 871

<211> 294

<212> PRT

<213> Burkholderia cepacia

<400> 871

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			20					25					30				
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Leu	Ala	Ala	Leu	Leu	Gly	Val	Ala	Ala	Gly	Ala	Ala	Ile	Gly	Ala	Ala		
65					70				75						80		
Ile	Asp	Val	Leu	Phe	Val	Arg	Pro	Met	Lys	Arg	Arg	Asn	Ala	Ser	Glu		
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Glu	Ser	Phe	Leu	Leu	Thr	Ile	Gly	Leu	Ala	Phe	Thr	Leu	Ser	Ala			
			100				105					110					
Ala	Ala	Leu	Tyr	Phe	Thr	Gly	Arg	Asp	Ser	His	Leu	Leu	Pro	Ser	Tyr		
		115					120					125					
Ala	Glu	Gly	Val	Val	Glu	Ile	Ala	Gly	Ala	Thr	Ile	Pro	Lys	His	Ala		
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Leu	Trp	Leu	Ile	Leu	Ile	Ser	Leu	Leu	Val	Val	Gly	Gly	Leu	Arg	Leu		
145					150					155					160		
Phe	Tyr	Arg	Lys	Thr	Leu	Leu	Gly	Leu	Ser	Met	Ala	Ala	Ala	Ser	Ala		
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			180					185					190				
Leu	Tyr	Thr	Phe	Leu	Leu	Gly	Gly	Ala	Val	Gly	Ala	Leu	Ala	Gly	Ile		
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Leu	Val	Thr	Pro	Leu	Ile	Ala	Met	Asn	Tyr	His	Ile	Gly	Ile	Val	Tyr		
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Thr	Leu	Lys	Gly	Phe	Ala	Ala	Ala	Ile	Leu	Gly	Gly	Ile	Ala	Asn	Pro		
225					230					235					240		
Ile	Gly	Ala	Val	Leu	Gly	Gly	Leu	Met	Ile	Gly	Leu	Ile	Glu	Ser	Leu		
				245					250					255			
Ala	Ala	Val	Val	Phe	Pro	Ser	Gly	Tyr	Arg	Asp	Ala	Val	Ala	Met	Ala		
			260					265					270				
Phe	Leu	Ile	Leu	Ile	Met	Ile	Val	Met	Pro	Asn	Gly	Leu	Ile	Gly	Arg		
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<210> 872

<211> 1827

<212> DNA

<213> Ralstonia solanacearum

<220>

<221> CDS

<222> (1)..(1827)

<400> 872

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ctg	tcg	cgc	aac	cgc	ctg	ctg	acg	gcg	gct	ttc	gtg	atc	ggg	ctg	gcg	96
Leu	Ser	Arg	Asn	Arg	Leu	Leu	Thr	Ala	Ala	Phe	Val	Ile	Gly	Leu	Ala	
			20					25					30			
ctg	ctg	ccg	gtg	ctg	ccc	acg	ccc	gag	ttc	tgg	atc	acg	ctg	ctc	aac	144
Leu	Leu	Pro	Val	Leu	Pro	Thr	Pro	Glu	Phe	Trp	Ile	Thr	Leu	Leu	Asn	
		35					40					45				
tac	atc	ggg	ctg	tat	agc	ctg	gtg	gcg	ctc	ggc	ctg	gtg	ctg	ctg	acc	192
Tyr	Ile	Gly	Leu	Tyr	Ser	Leu	Val	Ala	Leu	Gly	Leu	Val	Leu	Leu	Thr	
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Gly	Val	Gly	Gly	Leu	Thr	Ser	Phe	Gly	Gln	Ala	Ala	Phe	Val	Gly	Leu	
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ggc	gcc	tac	agc	acg	gcg	tac	ctg	agc	acg	caa	tac	ggc	ctg	tcc	ccg	288
Gly	Ala	Tyr	Ser	Thr	Ala	Tyr	Leu	Ser	Thr	Gln	Tyr	Gly	Leu	Ser	Pro	
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tgg	atc	ggc	ctg	ctg	gcg	ggg	ctg	gcg	atc	acg	gtg	gcg	tcc	gcc	tac	336
Trp	Ile	Gly	Leu	Leu	Ala	Gly	Leu	Ala	Ile	Thr	Val	Ala	Ser	Ala	Tyr	
			100				105					110				
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Val	Ile	Gly	Leu	Ile	Thr	Met	Arg	Met	Ser	Gly	His	Tyr	Leu	Pro	Leu	
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Ala	Thr	Ile	Ala	Trp	Gly	Leu	Ser	Leu	Phe	Phe	Leu	Phe	Gly	Asn	Leu	
	130				135				140							
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Leu	Leu	Gly	Lys	Pro	Leu	Gln	Thr	Gly	Arg	Glu	Met	Phe	Tyr	Leu	Ile	
			165					170					175			
tgg	gcc	gtg	gtg	gtg	gtg	gcc	gtg	ctg	gcg	gtg	cag	aac	ctg	ctg	aat	576
Trp	Ala	Val	Val	Val	Val	Ala	Val	Leu	Ala	Val	Gln	Asn	Leu	Leu	Asn	
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tcg	cgt	ccg	ggc	cgc	gcc	atc	cgc	gcg	ctc	aag	ggc	ggc	ggc	acc	atg	624
Ser	Arg	Pro	Gly	Arg	Ala	Ile	Arg	Ala	Leu	Lys	Gly	Gly	Gly	Thr	Met	
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gcc	gag	gcg	atg	ggc	gtg	aac	acg	gcg	tgg	atg	aag	gtg	atc	ttc		672
Ala	Glu	Ala	Met	Gly	Val	Asn	Thr	Ala	Trp	Met	Lys	Val	Val	Ile	Phe	
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Val	Ala	Ala	Ala	Ile	Leu	Ala	Cys	Ile	Ser	Gly	Phe	Leu	Tyr	Ala	His	
225					230					235				240		
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gaa	tac	ctg	ttc	atg	gcc	gtg	gtg	ggc	ggg	gtg	ggg	cac	gtg	tgg	ggc	816
Glu	Tyr	Leu	Phe	Met	Ala	Val	Val	Gly	Gly	Val	Gly	His	Val	Trp	Gly	
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Ala	Val	Leu	Gly	Ala	Gly	Leu	Leu	Thr	Ile	Leu	Lys	Asp	Ser	Leu	Gln	
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aac	ctg	ctg	ccc	aag	ctg	ctc	ggc	tcc	acc	ggc	aac	ttc	gag	atc	atc	912
Asn	Leu	Leu	Pro	Lys	Leu	Leu	Gly	Ser	Thr	Gly	Asn	Phe	Glu	Ile	Ile	
	290				295						300					
gtg	ttc	ggc	gtg	ctg	ctg	gtg	ctg	ctg	cag	tac	gcg	cgc	gac	ggc		960
Val	Phe	Gly	Val	Leu	Leu	Val	Leu	Leu	Gln	Tyr	Ala	Arg	Asp	Gly		
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gtg	tgg	ccg	ttt	ctc	cgc	cgg	ctg	ttt	ccg	tcc	gcg	ccg	gcc	gcc	cgc	1008
Val	Trp	Pro	Phe	Leu	Arg	Arg	Leu	Phe	Pro	Ser	Ala	Pro	Ala	Ala	Arg	
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Ala	Pro	Ala	Asp	Ala	Pro	Ala	Leu	Arg	Gln	Arg	Glu	Lys	Pro	Arg	Ala	
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ggc	gaa	ctc	gtc	ctc	gac	gtg	cgc	gac	gtg	cgc	aag	gaa	ttc	ggc	ggg	1104
Gly	Glu	Leu	Val	Leu	Asp	Val	Arg	Ala	Val	Arg	Lys	Glu	Phe	Gly	Gly	

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ggc	gag	cgc	atc	agc	ggc	aag	cct	tcg	cgc	gag	atc	gtc	cgg	cgc	ggc		1296
Gly	Glu	Arg	Ile	Ser	Gly	Lys	Pro	Ser	Arg	Glu	Ile	Val	Arg	Arg	Gly		
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Ile	Gly	Arg	Thr	Phe	Gln	His	Val	Gln	Leu	Leu	Pro	Gly	Met	Thr	Val		
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Leu	Glu	Asn	Val	Ala	Leu	Gly	Ala	His	Leu	Arg	Gly	Asp	Phe	Ala	Ala		
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Gln	Gly	Gly	Val	Leu	Ala	Ser	Val	Ala	Arg	Met	Asn	Arg	His	Glu	Glu		
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Gln	Lys	Leu	Leu	Phe	Glu	Ala	Arg	Cys	Gln	Leu	Glu	Arg	Val	Gly	Leu		
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Arg	Ile	Leu	Glu	Ile	Ala	Arg	Ala	Leu	Cys	Cys	Asp	Pro	Ala	Leu	Leu		
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Leu	Leu	Asp	Glu	Pro	Ala	Ala	Gly	Leu	Arg	Tyr	Lys	Glu	Lys	Gln	Ala		
	530				535					540							
ctg	ggc	gcg	ctg	ctg	gcc	agg	ctc	agg	ggc	gag	ggc	atg	agc	gtg	ctg		1680
Leu	Ala	Ala	Leu	Leu	Ala	Arg	Leu	Arg	Ala	Glu	Gly	Met	Ser	Val	Leu		
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ctg	gtc	gag	cac	gac	atg	gat	ttc	gtc	atg	aac	ctc	acc	gac	cgg	ctg		1728
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gtg	gtg	atg	gag	ttc	ggc	acc	agg	atc	ggc	gag	ggc	gtg	ccg	cag	gac		1776
Val	Val	Met	Glu	Phe	Gly	Thr	Arg	Ile	Ala	Glu	Gly	Val	Pro	Gln	Asp		
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gtg	cag	cgg	gat	ccg	gcg	gtg	ctg	gaa	gcg	tac	ctg	ggc	ggc	gtg	gaa		1824
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<213> Ralstonia solanacearum

<400> 873

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Trp	Ile	Gly	Leu	Leu	Ala	Gly	Leu	Ala	Ile	Thr	Val	Ala	Ser	Ala	Tyr	

Val	Ile	Gly	Leu	Ile	Thr	Met	Arg	Met	Ser	Gly	His	Tyr	Leu	Pro	Leu
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Trp	Ala	Val	Val	Val	Val	Ala	Val	Leu	Ala	Val	Gln	Asn	Leu	Leu	Asn
Ser	Arg	Pro	Gly	Arg	Ala	Ile	Arg	Ala	Leu	Lys	Gly	Gly	Gly	Thr	Met
Ala	Glu	Ala	Met	Gly	Val	Asn	Thr	Ala	Trp	Met	Lys	Val	Val	Ile	Phe
Val	Ala	Ala	Ala	Ile	Leu	Ala	Cys	Ile	Ser	Gly	Phe	Leu	Tyr	Ala	His
Leu	Gln	Arg	Ala	Val	Asn	Pro	Thr	Pro	Phe	Gly	Leu	Asn	Tyr	Gly	Ile
Glu	Tyr	Leu	Phe	Met	Ala	Val	Val	Gly	Gly	Val	Gly	His	Val	Trp	Gly
Ala	Val	Leu	Gly	Ala	Gly	Leu	Leu	Thr	Ile	Leu	Lys	Asp	Ser	Leu	Gln
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Val	Phe	Gly	Val	Leu	Leu	Val	Leu	Leu	Leu	Gln	Tyr	Ala	Arg	Asp	Gly
Val	Trp	Pro	Phe	Leu	Arg	Arg	Leu	Phe	Pro	Ser	Ala	Pro	Ala	Ala	Arg
Ala	Pro	Ala	Asp	Ala	Pro	Ala	Leu	Arg	Gln	Arg	Glu	Lys	Pro	Arg	Ala
Gly	Glu	Leu	Val	Leu	Asp	Val	Arg	Ala	Val	Arg	Lys	Glu	Phe	Gly	Gly
Leu	Val	Ala	Val	Asn	Asp	Val	Ser	Phe	Gln	Val	Arg	Ala	Gly	Glu	Ile
Ile	Gly	Leu	Ile	Gly	Pro	Asn	Gly	Ala	Gly	Lys	Ser	Thr	Thr	Phe	Asn
Leu	Val	Thr	Gly	Val	Leu	Pro	Val	Thr	Arg	Gly	Glu	Val	Leu	Tyr	Arg
Gly	Glu	Arg	Ile	Ser	Gly	Lys	Pro	Ser	Arg	Glu	Ile	Val	Arg	Arg	Gly
Ile	Gly	Arg	Thr	Phe	Gln	His	Val	Gln	Leu	Leu	Pro	Gly	Met	Thr	Val
Leu	Glu	Asn	Val	Ala	Leu	Gly	Ala	His	Leu	Arg	Gly	Asp	Phe	Ala	Ala
Gln	Gly	Gly	Val	Leu	Ala	Ser	Val	Ala	Arg	Met	Asn	Arg	His	Glu	Glu
Gln	Lys	Leu	Leu	Phe	Glu	Ala	Arg	Cys	Gln	Leu	Glu	Arg	Val	Gly	Leu
Ala	Asp	Cys	Met	Tyr	Gln	Glu	Ala	Gly	Ser	Leu	Ala	Leu	Gly	Gln	Gln
Arg	Ile	Leu	Glu	Ile	Ala	Arg	Ala	Leu	Cys	Cys	Asp	Pro	Ala	Leu	Leu
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Leu	Ala	Ala	Leu	Leu	Ala	Arg	Leu	Arg	Ala	Glu	Gly	Met	Ser	Val	Leu
Leu	Val	Glu	His	Asp	Met	Asp	Phe	Val	Met	Asn	Leu	Thr	Asp	Arg	Leu
Val	Val	Met	Glu	Phe	Gly	Thr	Arg	Ile	Ala	Glu	Gly	Val	Pro	Gln	Asp
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<221> CDS

<222> (1)..(900)

<400> 874

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acg ctg ggc atc aat gcg ctg ctg gcg ctg tcc atc tac ctg acg ctg	96
Thr Leu Gly Ile Asn Ala Leu Leu Ala Leu Ser Ile Tyr Leu Thr Leu	
20 25 30	
tcg tgc ggc ctg ctg gcg atg gcc aat gcg gcc ttc atg ggc atc ggg	144
Ser Cys Gly Leu Leu Ala Met Ala Asn Ala Ala Phe Met Gly Ile Gly	
35 40 45	
gcc tac acc tcc gca ctg ctg acg atg aat gcc gag atg ccg ttc ccg	192
Ala Tyr Thr Ser Ala Leu Leu Thr Met Asn Ala Glu Met Pro Phe Pro	
50 55 60	
gtg gcg ctg ctg ggc ggc atg ctg gca ccg gcc gtg gtg gcc gtc atc	240
Val Ala Leu Leu Gly Gly Met Leu Ala Pro Ala Val Val Ala Val Ile	
65 70 75 80	
atc ggc cgg ccg acg ctg cgg ttg tgc ggc gtg tac ctc gcc atg gcg	288
Ile Gly Arg Pro Thr Leu Arg Leu Ser Gly Val Tyr Leu Ala Met Ala	
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Thr Leu Gly Phe Gly Glu Val Val Arg Val Leu Ile Leu Asn Thr Glu	
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Ser Trp Thr Gly Gly Ala Leu Gly Leu Asn Gly Ile Pro Gln Leu Thr	
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Glu Trp Trp His Val Ala Leu Ala Val Ala Leu Thr Leu Phe Val Leu	
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gcg cgc ctg cgc cgc tcc aag gtc ggc cgc gcg ttc gag gcc atc aag	480
Ala Arg Leu Arg Arg Ser Lys Val Gly Arg Ala Phe Glu Ala Ile Lys	
145 150 155 160	
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Glu Asp Glu Thr Ala Ala Gly Leu Met Gly Ile Asn Val Ala Gly Thr	
165 170 175	
aag ctg ctg gcc ttt gtg ctg ggg gcg atg atc gcc ggc ctg gca ggc	576
Lys Leu Leu Ala Phe Val Leu Gly Ala Met Ile Ala Gly Leu Ala Gly	
180 185 190	
gca ctc aac gcg cat ctc acg ttc ttc atc ggc ccg gcg gag ttc ggc	624
Ala Leu Asn Ala His Leu Thr Phe Phe Ile Gly Pro Ala Glu Phe Gly	
195 200 205	
ttc gac cgc ggc gtg gag atc ctg acc atg gcg atc ctg ggc ggc acc	672
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210 215 220	
aac ggc ctc acc ggg ccg gtg ctg ggc agc gtg atc ctg tcg ctg ctg	720
Asn Gly Leu Thr Gly Pro Val Leu Gly Ser Val Ile Leu Ser Leu Leu	
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ccg gaa ctg ctg cgc gcg ttc aag gat ttc cgc ctg gtg gtc aac ggc	768
Pro Glu Leu Leu Arg Ala Phe Lys Asp Phe Arg Leu Val Val Asn Gly	
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Leu Ile Leu Met Leu Ile Val Leu Phe Leu Pro Lys Gly Ile Trp Asp	
260 265 270	
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Pro Ala Arg Phe Ala Arg Trp Phe Gly Met Lys Arg Gly Gly Thr Met	
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<211> 299

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<213> Ralstonia solanacearum

<400> 875

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 Ala Tyr Thr Ser Ala Leu Leu Thr Met Asn Ala Glu Met Pro Phe Pro
 50 55 60
 Val Ala Leu Leu Gly Gly Met Leu Ala Pro Ala Val Val Ala Val Ile
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 85 90 95
 Thr Leu Gly Phe Gly Glu Val Val Arg Val Leu Ile Leu Asn Thr Glu
 100 105 110
 Ser Trp Thr Gly Gly Ala Leu Gly Leu Asn Gly Ile Pro Gln Leu Thr
 115 120 125
 Glu Trp Trp His Val Ala Leu Ala Val Ala Leu Thr Leu Phe Val Leu
 130 135 140
 Ala Arg Leu Arg Arg Ser Lys Val Gly Arg Ala Phe Glu Ala Ile Lys
 145 150 155 160
 Glu Asp Glu Thr Ala Ala Gly Leu Met Gly Ile Asn Val Ala Gly Thr
 165 170 175
 Lys Leu Leu Ala Phe Val Leu Gly Ala Met Ile Ala Gly Leu Ala Gly
 180 185 190
 Ala Leu Asn Ala His Leu Thr Phe Phe Ile Gly Pro Ala Glu Phe Gly
 195 200 205
 Phe Asp Arg Gly Val Glu Ile Leu Thr Met Ala Ile Leu Gly Gly Thr
 210 215 220
 Asn Gly Leu Thr Gly Pro Val Leu Gly Ser Val Ile Leu Ser Leu Leu
 225 230 235 240
 Pro Glu Leu Leu Arg Ala Phe Lys Asp Phe Arg Leu Val Val Asn Gly
 245 250 255
 Leu Ile Leu Met Leu Ile Val Leu Phe Leu Pro Lys Gly Ile Trp Asp
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<210> 876

<211> 882

<212> DNA

<213> Ralstonia solanacearum

<220>

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<222> (1)..(882)

<400> 876

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gcg	tgt	ttc	gcg	ctg	gga	ttc	acg	ctg	gtt	ttc	ggc	atc	ctg	ggc	gtg	96
Ala	Leu	Phe	Ala	Leu	Gly	Phe	Thr	Leu	Val	Phe	Gly	Ile	Leu	Gly	Val	
			20					25					30			
atc	aac	ctg	tcg	cac	ggc	gca	gtg	ttc	atg	ctg	ggc	gcc	tac	gcg	gcg	144
Ile	Asn	Leu	Ser	His	Gly	Ala	Val	Phe	Met	Leu	Gly	Ala	Tyr	Ala	Ala	
			35				40					45				
ctg	cag	ttc	gtg	gcg	cat	ttc	gaa	ctg	ccg	ctg	tgg	gcg	gcg	ctg	ctg	192
Leu	Gln	Phe	Val	Ala	His	Phe	Glu	Leu	Pro	Leu	Trp	Ala	Ala	Leu	Leu	
			50			55					60					
gtc	ggc	ttt	gcc	gca	agc	ggc	gtg	gcg	ggc	ctc	atc	atc	gat	gtg	ctg	240
Val	Gly	Phe	Ala	Ala	Ser	Gly	Val	Ala	Gly	Leu	Ile	Ile	Asp	Val	Leu	
					70					75					80	
ctg	ctg	cg	ccg	ctg	cg	cg	cg	aac	gct	ccc	cac	ctg	atc	ccg	atg	288
Leu	Leu	Arg	Pro	Leu	Arg	Arg	Arg	Asn	Ala	Pro	His	Leu	Ile	Pro	Met	
				85					90					95		
atc	gcc	acc	atc	ggc	gcg	ggc	atc	gcc	atc	aac	aac	gcc	atg	cag	ggc	336
Ile	Ala	Thr	Ile	Gly	Ala	Gly	Ile	Ala	Ile	Asn	Asn	Ala	Met	Gln	Gly	

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gtg	ttc	ggc	100	gag	aac	ctg	cgc	105	ccg	gcc	ggg	ctc	110	tcc	gat	384
Val	Phe	Gly	115	Ala	Glu	Asn	Leu	Arg	Pro	Ala	Gly	Leu	125	Val	Ser	Asp
gcg	tcg	ctc	gac	ctg	ggc	ggt	ggt	cac	ctg	acg	ccg	ctg	gag	ctg	ggc	432
Ala	Ser	Leu	Asp	Leu	Gly	Gly	Val	His	Leu	Thr	Pro	Leu	Glu	Leu	Gly	
atc	atc	gtg	ctg	tcg	ttc	gcg	ctg	atg	gcg	gcg	ctg	atg	ctg	ctg	ctc	480
Ile	Ile	Val	Leu	Ser	Phe	Ala	Leu	Met	Ala	Ala	Leu	Met	Leu	Leu	Leu	
145					150					155					160	
aag	cg	acg	cag	ctg	ggc	cg	cg	ctg	cg	gcc	atc	g	gag	tcg	ccc	528
Lys	Arg	Thr	Gln	Leu	Gly	Arg	Ala	Leu	Arg	Ala	Ile	Ala	Glu	Ser	Pro	
				165					170					175		
aag	g	g	g	ctg	ctg	ggc	atc	a	g	g	ctg	ttc	ctg	ctg		576
Lys	Ala	Ala	Ala	Leu	Leu	Gly	Ile	Asn	Val	Glu	Gly	Leu	Phe	Leu	Leu	
				180				185					190			
acg	tcg	ttc	g	g	g	g	ctg	g	g	ctg	gcc	ggc	gtg	ctg	att	624
Thr	Ser	Phe	Ala	Ala	Ala	Ala	Leu	Gly	Gly	Leu	Ala	Gly	Val	Leu	Ile	
		195					200					205				
ggc	ctg	tat	tcg	aac	g	gtg	ttt	ccg	ctg	atg	ggc	cag	ccg	atg	ctg	672
Gly	Leu	Tyr	Ser	Asn	Ala	Val	Phe	Pro	Leu	Met	Gly	Gln	Pro	Met	Leu	
		210				215					220					
cac	aag	ggc	atc	g	gtc	atc	atc	ctg	ggc	ggc	ctg	ggc	gac	att	cgc	720
His	Lys	Gly	Ile	Ala	Val	Ile	Ile	Leu	Gly	Gly	Leu	Gly	Asp	Ile	Arg	
225					230					235					240	
ggc	g	atg	ctg	ggc	ggg	ctg	ttc	ctc	ggg	ttc	gcc	gag	gtg	ctg	tcg	768
Gly	Ala	Met	Leu	Gly	Gly	Leu	Phe	Leu	Gly	Phe	Ala	Glu	Val	Leu	Ser	
				245				250						255		
gtg	gcc	tac	atc	ggc	tcg	acc	atg	cg	gac	g	gtg	g	ttc	ggc	ctg	816
Val	Ala	Tyr	Ile	Gly	Ser	Thr	Met	Arg	Asp	Ala	Val	Ala	Phe	Gly	Leu	
			260					265					270			
ctg	ttc	ctg	atc	ctg	ctg	gtg	cg	ccg	caa	ggg	ctg	ttc	ggc	aag	gtg	864
Leu	Phe	Leu	Ile	Leu	Leu	Val	Arg	Pro	Gln	Gly	Leu	Phe	Gly	Lys	Val	
		275					280					285				
ctc	gaa	cg	aag	gcc	tga											882
Leu	Glu	Arg	Lys	Ala												
		290														

<210> 877

<211> 293

<212> PRT

<213> Ralstonia solanacearum

<400> 877

Met	Leu	Glu	Gln	Gln	Leu	Val	Asn	Ala	Leu	Ser	Leu	Gly	Cys	Val	Tyr	
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Ala	Leu	Phe	Ala	Leu	Gly	Phe	Thr	Leu	Val	Phe	Gly	Ile	Leu	Gly	Val	
			20					25					30			
Ile	Asn	Leu	Ser	His	Gly	Ala	Val	Phe	Met	Leu	Gly	Ala	Tyr	Ala	Ala	
		35				40						45				
Leu	Gln	Phe	Val	Ala	His	Phe	Glu	Leu	Pro	Leu	Trp	Ala	Ala	Leu	Leu	
		50				55				60						
Val	Gly	Phe	Ala	Ala	Ser	Gly	Val	Ala	Gly	Leu	Ile	Ile	Asp	Val	Leu	
65					70					75					80	
Leu	Leu	Arg	Pro	Leu	Arg	Arg	Arg	Asn	Ala	Pro	His	Leu	Ile	Pro	Met	
				85				90						95		
Ile	Ala	Thr	Ile	Gly	Ala	Gly	Ile	Ala	Ile	Asn	Asn	Ala	Met	Gln	Gly	
			100					105					110			
Val	Phe	Gly	Ala	Glu	Asn	Leu	Arg	Phe	Pro	Ala	Gly	Leu	Val	Ser	Asp	
		115					120					125				
Ala	Ser	Leu	Asp	Leu	Gly	Gly	Val	His	Leu	Thr	Pro	Leu	Glu	Leu	Gly	
		130				135					140					
Ile	Ile	Val	Leu	Ser	Phe	Ala	Leu	Met	Ala	Ala	Leu	Met	Leu	Leu	Leu	
145					150					155					160	
Lys	Arg	Thr	Gln	Leu	Gly	Arg	Ala	Leu	Arg	Ala	Ile	Ala	Glu	Ser	Pro	
				165					170					175		
Lys	Ala	Ala	Ala	Leu	Leu	Gly	Ile	Asn	Val	Glu	Gly	Leu	Phe	Leu	Leu	
			180					185					190			
Thr	Ser	Phe	Ala	Ala	Ala	Ala	Leu	Gly	Gly	Leu	Ala	Gly	Val	Leu	Ile	

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195
 Gly Leu Tyr Ser Asn Ala Val Phe Pro Leu Met Gly Gln Pro Met Leu
 210 215 220
 His Lys Gly Ile Ala Val Ile Ile Leu Gly Gly Leu Gly Asp Ile Arg
 225 230 235 240
 Gly Ala Met Leu Gly Gly Leu Phe Leu Gly Phe Ala Glu Val Leu Ser
 245 250 255
 Val Ala Tyr Ile Gly Ser Thr Met Arg Asp Ala Val Ala Phe Gly Leu
 260 265 270
 Leu Phe Leu Ile Leu Leu Val Arg Pro Gln Gly Leu Phe Gly Lys Val
 275 280 285
 Leu Glu Arg Lys Ala

<210> 878

<211> 942

<212> DNA

<213> Ralstonia solanacearum

<220>

<221> CDS

<222> (1)..(942)

<400> 878

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Met	Ser	Ser	Gly	Ala	Cys	Arg	Ala	Ala	Pro	Ala	Thr	Val	Ser	Phe	Ser	
1				5					10					15		
cga	tac	gtg	atg	gaa	atc	ttc	ggc	gtt	ccg	cta	ccg	gcc	atg	ctc	agc	96
Arg	Tyr	Val	Met	Glu	Ile	Phe	Gly	Val	Pro	Leu	Pro	Ala	Met	Leu	Ser	
			20					25					30			
cag	ctg	ttg	ctg	ggc	ctg	gtc	aac	ggt	tcc	ttc	tac	gcg	atg	ctg	agc	144
Gln	Leu	Leu	Leu	Gly	Leu	Val	Asn	Gly	Ser	Phe	Tyr	Ala	Met	Leu	Ser	
			35				40					45				
ctg	ggc	ctt	gcg	gtc	atc	ttc	ggg	ctg	ctc	aac	gtc	atc	aat	ttc	gcg	192
Leu	Gly	Leu	Ala	Val	Ile	Phe	Gly	Leu	Leu	Asn	Val	Ile	Asn	Phe	Ala	
			50			55					60					
cac	ggc	gcg	ctg	ttc	atg	ctg	ggc	gcc	gtg	ctc	acc	tgg	atg	ggc	ctg	240
His	Gly	Ala	Leu	Phe	Met	Leu	Gly	Ala	Val	Leu	Thr	Trp	Met	Gly	Leu	
					70				75					80		
tcg	tat	ctc	gac	ctg	ccg	tac	tgg	gtg	atg	ctg	gtg	gcc	gcg	ccg	ctc	288
Ser	Tyr	Leu	Asp	Leu	Pro	Tyr	Trp	Val	Met	Leu	Val	Ala	Ala	Pro	Leu	
				85					90					95		
gcg	gtc	ggc	gtg	gtg	ggc	gtg	gtg	atc	gaa	cgc	acc	atg	ctg	cgc	ttc	336
Ala	Val	Gly	Val	Val	Gly	Val	Val	Ile	Glu	Arg	Thr	Met	Leu	Arg	Phe	
			100				105						110			
atc	tac	aag	ctc	gac	cac	ctc	tac	ggc	ctg	ctg	ctg	acg	ctg	ggc	gtg	384
Ile	Tyr	Lys	Leu	Asp	His	Leu	Tyr	Gly	Leu	Leu	Leu	Thr	Leu	Gly	Val	
			115				120					125				
acg	cta	gtc	atc	gaa	ggc	gtg	ttc	cgt	gcc	gtc	tac	ggt	gtg	tcg	ggc	432
Thr	Leu	Val	Ile	Glu	Gly	Val	Phe	Arg	Ala	Val	Tyr	Gly	Val	Ser	Gly	
			130			135					140					
ctg	ccg	tat	tcg	acg	ccc	gag	ctg	ctg	tcc	ggc	acc	gat	ctc	ggc		480
Leu	Pro	Tyr	Ser	Thr	Pro	Glu	Leu	Leu	Ser	Gly	Ala	Thr	Asp	Leu	Gly	
					150					155				160		
ttc	atg	gtg	ctg	ccc	aac	tat	cgg	gcc	tgg	gtg	gtg	gtg	gcg	tcg	ctg	528
Phe	Met	Val	Leu	Pro	Asn	Tyr	Arg	Ala	Trp	Val	Val	Val	Ala	Ser	Leu	
				165					170					175		
acg	gtg	tgc	ttc	gcc	acc	tgg	ttc	atg	atc	gag	aag	acc	aag	ctg	ggt	576
Thr	Val	Cys	Phe	Ala	Thr	Trp	Phe	Met	Ile	Glu	Lys	Thr	Lys	Leu	Gly	
				180				185					190			
gcc	tac	ctg	cgc	gct	ggc	acc	gag	aac	ccc	aag	ctg	gtc	gag	gcc	ttc	624
Ala	Tyr	Leu	Arg	Ala	Gly	Thr	Glu	Asn	Pro	Lys	Leu	Val	Glu	Ala	Phe	
				195			200					205				
ggc	gtc	aat	gtg	ccg	ctg	atg	gtc	acg	ctc	acc	tat	ggc	ttc	ggc	gtg	672
Gly	Val	Asn	Val	Pro	Leu	Met	Val	Thr	Leu	Thr	Tyr	Gly	Phe	Gly	Val	
			210			215					220					
gcg	ctg	gcg	gcg	ttc	gcc	ggc	gtg	ctg	gcc	gcg	ccc	gtg	atc	cag	atc	720
Ala	Leu	Ala	Ala	Phe	Ala	Gly	Val	Leu	Ala	Ala	Pro	Val	Ile	Gln	Ile	
					230				235						240	

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tcg	ccg	ctg	atg	ggg	cag	aac	atg	atc	atc	acc	gtg	ttc	gcg	gtg	gtg	768
Ser	Pro	Leu	Met	Gly	Gln	Asn	Met	Ile	Ile	Thr	Val	Phe	Ala	Val	Val	
				245					250					255		
gtg	atc	ggc	ggc	atg	ggg	tcg	atc	ctc	ggc	tcg	atc	gtc	acc	ggc	ctg	816
Val	Ile	Gly	Gly	Met	Gly	Ser	Ile	Leu	Gly	Ser	Ile	Val	Thr	Gly	Leu	
			260					265					270			
ggg	ctg	ggc	gtg	atc	gag	ggg	ctg	acc	aag	gtg	gtc	tat	ccg	cag	gcc	864
Gly	Leu	Gly	Val	Ile	Glu	Gly	Leu	Thr	Lys	Val	Val	Tyr	Pro	Gln	Ala	
			275				280					285				
tcg	tcc	acc	gtg	gtg	ttc	gtg	atc	atg	gcg	ctg	gtg	ttg	ctg	gtg	cgc	912
Ser	Ser	Thr	Val	Val	Phe	Val	Ile	Met	Ala	Leu	Val	Leu	Leu	Val	Arg	
	290					295					300					
ccg	gcg	ggc	ctg	ttc	ggc	aga	gag	aaa	taa							942
Pro	Ala	Gly	Leu	Phe	Gly	Arg	Glu	Lys								
305					310											

<210> 879

<211> 313

<212> PRT

<213> Ralstonia solanacearum

<400> 879

Met	Ser	Ser	Gly	Ala	Cys	Arg	Ala	Ala	Pro	Ala	Thr	Val	Ser	Phe	Ser	
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Arg	Tyr	Val	Met	Glu	Ile	Phe	Gly	Val	Pro	Leu	Pro	Ala	Met	Leu	Ser	
			20					25					30			
Gln	Leu	Leu	Leu	Gly	Leu	Val	Asn	Gly	Ser	Phe	Tyr	Ala	Met	Leu	Ser	
			35				40					45				
Leu	Gly	Leu	Ala	Val	Ile	Phe	Gly	Leu	Leu	Asn	Val	Ile	Asn	Phe	Ala	
	50					55					60					
His	Gly	Ala	Leu	Phe	Met	Leu	Gly	Ala	Val	Leu	Thr	Trp	Met	Gly	Leu	
65					70					75				80		
Ser	Tyr	Leu	Asp	Leu	Pro	Tyr	Trp	Val	Met	Leu	Val	Ala	Ala	Pro	Leu	
				85					90					95		
Ala	Val	Gly	Val	Gly	Val	Val	Ile	Glu	Arg	Thr	Met	Leu	Arg	Phe		
			100				105					110				
Ile	Tyr	Lys	Leu	Asp	His	Leu	Tyr	Gly	Leu	Leu	Thr	Leu	Gly	Val		
		115					120					125				
Thr	Leu	Val	Ile	Glu	Gly	Val	Phe	Arg	Ala	Val	Tyr	Gly	Val	Ser	Gly	
	130					135					140					
Leu	Pro	Tyr	Ser	Thr	Pro	Glu	Leu	Leu	Ser	Gly	Ala	Thr	Asp	Leu	Gly	
145					150					155					160	
Phe	Met	Val	Leu	Pro	Asn	Tyr	Arg	Ala	Trp	Val	Val	Val	Ala	Ser	Leu	
				165					170					175		
Thr	Val	Cys	Phe	Ala	Thr	Trp	Phe	Met	Ile	Glu	Lys	Thr	Lys	Leu	Gly	
			180					185					190			
Ala	Tyr	Leu	Arg	Ala	Gly	Thr	Glu	Asn	Pro	Lys	Leu	Val	Glu	Ala	Phe	
		195					200					205				
Gly	Val	Asn	Val	Pro	Leu	Met	Val	Thr	Leu	Thr	Tyr	Gly	Phe	Gly	Val	
	210					215					220					
Ala	Leu	Ala	Ala	Phe	Ala	Gly	Val	Leu	Ala	Ala	Pro	Val	Ile	Gln	Ile	
225					230					235					240	
Ser	Pro	Leu	Met	Gly	Gln	Asn	Met	Ile	Ile	Thr	Val	Phe	Ala	Val	Val	
				245					250					255		
Val	Ile	Gly	Gly	Met	Gly	Ser	Ile	Leu	Gly	Ser	Ile	Val	Thr	Gly	Leu	
			260					265					270			
Gly	Leu	Gly	Val	Ile	Glu	Gly	Leu	Thr	Lys	Val	Val	Tyr	Pro	Gln	Ala	
		275					280					285				
Ser	Ser	Thr	Val	Val	Phe	Val	Ile	Met	Ala	Leu	Val	Leu	Leu	Val	Arg	
	290					295					300					
Pro	Ala	Gly	Leu	Phe	Gly	Arg	Glu	Lys								
305					310											

<210> 880

<211> 936

<212> DNA

<213> Ralstonia solanacearum

<220>

<221> CDS

<222> (1)..(936)

<400> 880

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Met	Asp	Ile	Phe	Ile	Gln	Gln	Ile	Val	Asn	Gly	Leu	Val	Leu	Gly	Ser	
1				5					10					15		
att	tac	gcg	ctg	atc	gca	ctt	ggc	tac	acc	atg	gtc	tac	ggc	att	ctc	96
Ile	Tyr	Ala	Leu	Ile	Ala	Leu	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Leu	
			20					25					30			
ggc	atc	atc	aac	ttc	gcc	cac	ggc	gat	gtc	ctg	atg	atc	ggc	gcg	atg	144
Gly	Ile	Ile	Asn	Phe	Ala	His	Gly	Asp	Val	Leu	Met	Ile	Gly	Ala	Met	
			35				40					45				
tcc	gca	ctg	acc	gcc	atc	aac	ttc	ctc	cag	aag	ttc	ttc	ccc	aac	ctg	192
Ser	Ala	Leu	Thr	Ala	Ile	Asn	Phe	Leu	Gln	Lys	Phe	Phe	Pro	Asn	Leu	
			50			55					60					
cct	gac	tgg	ctg	acg	ctg	gtc	ctg	gcg	ctg	ctg	ttt	gcg	atg	ccg	gtc	240
Pro	Asp	Trp	Leu	Thr	Leu	Val	Leu	Ala	Leu	Leu	Phe	Ala	Met	Pro	Val	
			65			70					75				80	
tgc	gcc	gtc	gtc	gca	tac	acc	atc	gaa	cgg	gtc	gcc	tac	cgg	ccg	ctg	288
Cys	Ala	Val	Val	Ala	Tyr	Thr	Ile	Glu	Arg	Val	Ala	Tyr	Arg	Pro	Leu	
				85					90					95		
cgc	aat	gcg	ccg	cgc	ttg	gcg	ccg	ctg	atc	acc	gcc	atc	ggc	gtg	tcg	336
Arg	Asn	Ala	Pro	Arg	Leu	Ala	Pro	Leu	Ile	Thr	Ala	Ile	Gly	Val	Ser	
			100					105					110			
atc	gtg	ctg	cag	acc	ctg	gcg	atg	atg	atc	tgg	tcg	cgc	aac	ccg	ctg	384
Ile	Val	Leu	Gln	Thr	Leu	Ala	Met	Met	Ile	Trp	Ser	Arg	Asn	Pro	Leu	
			115				120					125				
acc	ttc	ccg	caa	ctg	ctg	ccc	tcg	tcg	ccg	atc	gac	atc	ggc	tcg	acc	432
Thr	Phe	Pro	Gln	Leu	Leu	Pro	Ser	Ser	Pro	Ile	Asp	Ile	Gly	Ser	Thr	
			130			135					140					
ggc	gcg	acg	atc	acg	ggc	aag	gag	atc	gcc	atc	atc	ctg	gtg	tcg	ctg	480
Gly	Ala	Thr	Ile	Thr	Gly	Lys	Glu	Ile	Ala	Ile	Ile	Leu	Val	Ser	Leu	
				150					155						160	
gcg	gtc	atg	acc	ggg	ctg	acg	ctg	ctg	gtc	aac	cgc	acc	aag	ctc	ggc	528
Ala	Val	Met	Thr	Gly	Leu	Thr	Leu	Leu	Val	Asn	Arg	Thr	Lys	Leu	Gly	
				165					170					175		
cgc	gcc	atg	cgc	gcc	act	gcc	gag	aac	cag	cgc	gtg	gcc	ggc	ctg	atg	576
Arg	Ala	Met	Arg	Ala	Thr	Ala	Glu	Asn	Gln	Arg	Val	Ala	Gly	Leu	Met	
			180					185					190			
ggc	gtt	aac	ccc	aac	ttc	gtc	atc	tcc	gac	acg	ttc	atg	atc	ggc	gct	624
Gly	Val	Asn	Pro	Asn	Phe	Val	Ile	Ser	Ala	Thr	Phe	Met	Ile	Gly	Ala	
			195				200					205				
gcc	atg	gca	gcc	gtc	gcc	ggc	gtg	atg	atg	gcc	acc	aac	tac	ggc	aat	672
Ala	Met	Ala	Ala	Val	Ala	Gly	Val	Met	Met	Ala	Thr	Asn	Tyr	Gly	Asn	
			210			215					220					
gcc	cac	ttc	tac	atg	ggc	ttc	att	ccc	ggc	ctg	aag	gcg	ttc	acc	gcc	720
Ala	His	Phe	Tyr	Met	Gly	Phe	Ile	Pro	Gly	Leu	Lys	Ala	Phe	Thr	Ala	
				230					235						240	
gcg	gtg	ctg	ggc	ggc	atc	ggc	aac	ctg	gcg	ggc	gcc	atg	gtg	ggc	ggt	768
Ala	Val	Leu	Gly	Gly	Ile	Gly	Asn	Leu	Ala	Gly	Ala	Met	Val	Gly	Gly	
				245					250					255		
gtg	ctg	ctg	ggc	ctg	atc	gag	gcc	ctg	ggt	gcc	ggc	tat	atc	ggc	gat	816
Val	Leu	Leu	Gly	Leu	Ile	Glu	Ala	Leu	Gly	Ala	Gly	Tyr	Ile	Gly	Asp	
			260					265					270			
ctg	act	ggc	ggt	gtg	ttc	ggt	tcg	aac	tac	cag	gat	gtg	ttc	gcg	ttc	864
Leu	Thr	Gly	Gly	Val	Phe	Gly	Ser	Asn	Tyr	Gln	Asp	Val	Phe	Ala	Phe	
			275				280					285				
att	gtg	ctg	att	tgc	gtg	ctg	ctg	ttc	cgc	ccg	tcc	ggc	atc	atg	ggc	912
Ile	Val	Leu	Ile	Cys	Val	Leu	Leu	Phe	Arg	Pro	Ser	Gly	Ile	Met	Gly	
			290			295					300					
gaa	cgc	gtt	gca	gac	cgt	gca	taa									936
Glu	Arg	Val	Ala	Asp	Arg	Ala										
					310											
305																

<210> 881

<211> 311

<212> PRT

<213> Ralstonia solanacearum

<400> 881

Met Asp Ile Phe Ile Gln Gln Ile Val Asn Gly Leu Val Leu Gly Ser
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 Ile Tyr Ala Leu Ile Ala Leu Gly Tyr Thr Met Val Tyr Gly Ile Leu
 20 25 30
 Gly Ile Ile Asn Phe Ala His Gly Asp Val Leu Met Ile Gly Ala Met
 35 40 45
 Ser Ala Leu Thr Ala Ile Asn Phe Leu Gln Lys Phe Phe Pro Asn Leu
 50 55 60
 Pro Asp Trp Leu Thr Leu Val Leu Ala Leu Leu Phe Ala Met Pro Val
 65 70 75 80
 Cys Ala Val Val Ala Tyr Thr Ile Glu Arg Val Ala Tyr Arg Pro Leu
 85 90 95
 Arg Asn Ala Pro Arg Leu Ala Pro Leu Ile Thr Ala Ile Gly Val Ser
 100 105 110
 Ile Val Leu Gln Thr Leu Ala Met Met Ile Trp Ser Arg Asn Pro Leu
 115 120 125
 Thr Phe Pro Gln Leu Leu Pro Ser Ser Pro Ile Asp Ile Gly Ser Thr
 130 135 140
 Gly Ala Thr Ile Thr Gly Lys Glu Ile Ala Ile Ile Leu Val Ser Leu
 145 150 155 160
 Ala Val Met Thr Gly Leu Thr Leu Leu Val Asn Arg Thr Lys Leu Gly
 165 170 175
 Arg Ala Met Arg Ala Thr Ala Glu Asn Gln Arg Val Ala Gly Leu Met
 180 185 190
 Gly Val Asn Pro Asn Phe Val Ile Ser Ala Thr Phe Met Ile Gly Ala
 195 200 205
 Ala Met Ala Ala Val Ala Gly Val Met Met Ala Thr Asn Tyr Gly Asn
 210 215 220
 Ala His Phe Tyr Met Gly Phe Ile Pro Gly Leu Lys Ala Phe Thr Ala
 225 230 235 240
 Ala Val Leu Gly Gly Ile Gly Asn Leu Ala Gly Ala Met Val Gly Gly
 245 250 255
 Val Leu Leu Gly Leu Ile Glu Ala Leu Gly Ala Gly Tyr Ile Gly Asp
 260 265 270
 Leu Thr Gly Gly Val Phe Gly Ser Asn Tyr Gln Asp Val Phe Ala Phe
 275 280 285
 Ile Val Leu Ile Cys Val Leu Leu Phe Arg Pro Ser Gly Ile Met Gly
 290 295 300
 Glu Arg Val Ala Asp Arg Ala
 305 310

<210> 882

<211> 1137

<212> DNA

<213> Ralstonia solanacearum

<220>

<221> CDS

<222> (1)..(1137)

<400> 882

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Met	Thr	Glu	Thr	Ala	Thr	Glu	Phe	Lys	Ala	Pro	Lys	Lys	Thr	Arg	Ala	
1				5				10						15		
gcg	ctt	ctc	ggc	ttc	ttc	gtc	ctc	gcc	atc	ttc	gcc	ccg	ttc	ctc	gtg	96
Ala	Leu	Leu	Gly	Phe	Phe	Val	Leu	Ala	Ile	Phe	Ala	Pro	Phe	Leu	Val	
			20					25					30			
ggc	gcc	gtc	ggc	ggg	aac	tac	tgg	gta	cgc	gtg	ctg	gac	ttc	gca	ctg	144
Gly	Ala	Val	Gly	Gly	Asn	Tyr	Trp	Val	Arg	Val	Leu	Asp	Phe	Ala	Leu	
			35				40					45				
ctg	tac	atc	atg	ctg	gcc	ctg	ggc	ctg	aac	atc	gtg	gtg	ggg	ttt	gcc	192
Leu	Tyr	Ile	Met	Leu	Ala	Leu	Gly	Leu	Asn	Ile	Val	Val	Gly	Phe	Ala	
			50			55		60								
ggc	ctg	ctc	gac	ctg	ggc	tac	atc	gcg	ttc	tac	gcg	gtg	ggc	gcc	tac	240
Gly	Leu	Leu	Asp	Leu	Gly	Tyr	Ile	Ala	Phe	Tyr	Ala	Val	Gly	Ala	Tyr	
65				70				75						80		
atg	atg	gcg	ctg	ctg	ggc	tcg	ccg	cac	ctg	acc	aac	cag	ttc	gag	tgg	288

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Met	Met	Ala	Leu	Leu	Gly	Ser	Pro	His	Leu	Thr	Asn	Gln	Phe	Glu	Trp	
atc	cat	cag	ctg	ttc	ccg	aac	ggg	ctg	cat	ctg	ctg	atc	tgg	tgg	gtg	336
Ile	His	Gln	Leu	Phe	Pro	Asn	Gly	Leu	His	Leu	Leu	Ile	Trp	Trp	Val	
			100					105					110			
atc	ccg	ctg	ggc	gcg	ggg	ctg	gcg	gcg	ctg	ttc	ggc	atc	ctg	ctg	ggg	384
Ile	Pro		Gly	Ala	Gly	Leu	Ala	Ala	Leu	Phe	Gly	Ile	Leu	Leu	Gly	
		115					120					125				
gcg	ccg	acg	ctc	aag	ctg	cg	ggc	gac	tac	ctc	gcc	atc	gtg	acg	ctg	432
Ala	Pro	Thr	Leu	Lys	Leu	Arg	Gly	Asp	Tyr	Leu	Ala	Ile	Val	Thr	Leu	
	130					135					140					
ggc	ttc	ggc	gag	atc	atc	cg	atc	ttc	atg	aac	aac	ctc	gac	cg	ccg	480
Gly	Phe	Gly	Glu	Ile	Ile	Arg	Ile	Phe	Met	Asn	Asn	Leu	Asp	Arg	Pro	
145				150					155						160	
gtg	aac	atc	acc	aac	ggt	ccg	aag	ggc	gtc	aac	ctg	atc	gag	ccg	gtc	528
Val	Asn	Ile	Thr	Asn	Gly	Pro	Lys	Gly	Val	Asn	Leu	Ile	Glu	Pro	Val	
			165					170					175			
aag	ctc	ttc	ggg	ttc	gac	ttc	tcg	aag	cg	cat	gac	atc	ttc	ggc	atc	576
Lys	Leu	Phe	Gly	Phe	Asp	Phe	Ser	Lys	Arg	His	Asp	Ile	Phe	Gly	Ile	
			180					185					190			
cac	ttc	gag	ccg	gtg	cac	atg	tac	tac	tac	ctg	ttc	gtg	ctg	ctg	gcg	624
His	Phe	Glu	Pro	Val	His	Met	Tyr	Tyr	Tyr	Leu	Phe	Val	Leu	Leu	Ala	
	195					200						205				
atg	ggc	atc	atc	acg	gtg	tgc	ctg	cg	ctg	cag	aac	tcg	cg	atc	ggt	672
Met	Gly	Ile	Ile	Thr	Val	Cys	Leu	Arg	Leu	Gln	Asn	Ser	Arg	Ile	Gly	
	210					215					220					
cgt	gca	tgg	gtt	gcc	atc	cg	gag	gac	gag	atc	gcc	gcc	aag	gcc	atg	720
Arg	Ala	Trp	Val	Ala	Ile	Arg	Glu	Asp	Glu	Ile	Ala	Ala	Lys	Ala	Met	
225				230					235						240	
gag	atc	aac	acc	cg	aac	atc	aag	ctg	ctg	cg	ttc	gcc	atg	ggt	cg	768
Gly	Ile	Asn	Thr	Arg	Asn	Ile	Lys	Leu	Leu	Ala	Phe	Ala	Met	Gly	Ala	
				245				250					255			
tcg	ttc	ggc	ggc	gtg	tcg	ggg	gcg	atg	ttc	gcg	tcg	ttc	cag	ggc	ttc	816
Ser	Phe	Gly	Gly	Val	Ser	Gly	Ala	Met	Phe	Ala	Ser	Phe	Gln	Gly	Phe	
			260					265					270			
gtg	tcg	ccg	gaa	tcg	ttc	gtg	ctg	tgg	gag	tcg	atc	tac	atc	ctg	gcc	864
Val	Ser	Pro	Glu	Ser	Phe	Val	Leu	Trp	Glu	Ser	Ile	Tyr	Ile	Leu	Ala	
	275						280					285				
atc	gtg	gtg	ctg	ggc	ggc	atg	ggc	cat	atc	ccg	ggc	gtg	atc	ctg	ggc	912
Ile	Val	Val	Leu	Gly	Gly	Met	Gly	His	Ile	Pro	Gly	Val	Ile	Leu	Gly	
	290					295					300					
ggc	atc	ctg	ctg	gtg	ggc	ttc	cag	gaa	ctg	ctg	cg	gcg	ctg	gcc	gag	960
Gly	Ile	Leu	Leu	Val	Gly	Phe	Gln	Glu	Leu	Leu	Arg	Ala	Leu	Ala	Glu	
305				310				315							320	
ccg	atc	cag	aac	aag	ctg	ttc	ggc	cac	gtg	atc	gtg	gaa	gcg	gaa	gtg	1008
Pro	Ile	Gln	Asn	Lys	Leu	Phe	Gly	His	Val	Ile	Val	Glu	Ala	Glu	Val	
				325				330					335			
ctg	cgt	cag	ctg	ctg	ttc	ggc	ctg	gcg	atg	gtg	ggg	gtg	atg	ctg	tat	1056
Leu	Arg	Gln	Leu	Leu	Phe	Gly	Leu	Ala	Met	Val	Gly	Val	Met	Leu	Tyr	
			340				345						350			
cg	ccc	g	ggc	ctg	tgg	ccc	tcg	ccg	cg	aag	gaa	gac	cg	ccg	cag	1104
Arg	Pro	Ala	Gly	Leu	Trp	Pro	Ser	Pro	Arg	Lys	Glu	Asp	Arg	Pro	Gln	
		355					360					365				
aag	g	cg	gtc	ggt	ggt	tgt	tcc	cg	atc	tga						1137
Lys	Ala	Arg	Val	Gly	Gly	Leu	Ser	Arg	Ile							
	370					375										

<210> 883

<211> 378

<212> PRT

<213> Ralstonia solanacearum

<400> 883

Met Thr Glu Thr Ala Thr Glu Phe Lys Ala Pro Lys Lys Thr Arg Ala

1 5 10 15

Ala Leu Leu Gly Phe Phe Val Leu Ala Ile Phe Ala Pro Phe Leu Val

20 25 30

Gly Ala Val Gly Gly Asn Tyr Trp Val Arg Val Leu Asp Phe Ala Leu

35 40 45

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Leu Tyr Ile Met Leu Ala Leu Gly Leu Asn Ile Val Val Gly Phe Ala
 50 55 60
 Gly Leu Leu Asp Leu Gly Tyr Ile Ala Phe Tyr Ala Val Gly Ala Tyr
 65 70 75 80
 Met Met Ala Leu Leu Gly Ser Pro His Leu Thr Asn Gln Phe Glu Trp
 85 90 95
 Ile His Gln Leu Phe Pro Asn Gly Leu His Leu Leu Ile Trp Trp Val
 100 105 110
 Ile Pro Leu Gly Ala Gly Leu Ala Ala Leu Phe Gly Ile Leu Leu Gly
 115 120 125
 Ala Pro Thr Leu Lys Leu Arg Gly Asp Tyr Leu Ala Ile Val Thr Leu
 130 135 140
 Gly Phe Gly Glu Ile Ile Arg Ile Phe Met Asn Asn Leu Asp Arg Pro
 145 150 155 160
 Val Asn Ile Thr Asn Gly Pro Lys Gly Val Asn Leu Ile Glu Pro Val
 165 170 175
 Lys Leu Phe Gly Phe Asp Phe Ser Lys Arg His Asp Ile Phe Gly Ile
 180 185 190
 His Phe Glu Pro Val His Met Tyr Tyr Tyr Leu Phe Val Leu Leu Ala
 195 200 205
 Met Gly Ile Ile Thr Val Cys Leu Arg Leu Gln Asn Ser Arg Ile Gly
 210 215 220
 Arg Ala Trp Val Ala Ile Arg Glu Asp Glu Ile Ala Ala Lys Ala Met
 225 230 235 240
 Gly Ile Asn Thr Arg Asn Ile Lys Leu Leu Ala Phe Ala Met Gly Ala
 245 250 255
 Ser Phe Gly Gly Val Ser Gly Ala Met Phe Ala Ser Phe Gln Gly Phe
 260 265 270
 Val Ser Pro Glu Ser Phe Val Leu Trp Glu Ser Ile Tyr Ile Leu Ala
 275 280 285
 Ile Val Val Leu Gly Gly Met Gly His Ile Pro Gly Val Ile Leu Gly
 290 295 300
 Gly Ile Leu Leu Val Gly Phe Gln Glu Leu Leu Arg Ala Leu Ala Glu
 305 310 315 320
 Pro Ile Gln Asn Lys Leu Phe Gly His Val Ile Val Glu Ala Glu Val
 325 330 335
 Leu Arg Gln Leu Leu Phe Gly Leu Ala Met Val Gly Val Met Leu Tyr
 340 345 350
 Arg Pro Ala Gly Leu Trp Pro Ser Pro Arg Lys Glu Asp Arg Pro Gln
 355 360 365
 Lys Ala Arg Val Gly Gly Leu Ser Arg Ile
 370 375

<210> 884

<211> 870

<212> DNA

<213> Ralstonia solanacearum

<220>

<221> CDS

<222> (1)..(870)

<400> 884

atg	ctc	agc	gca	ctg	ggc	gtg	ctg	ttc	gac	ggg	ctg	gcc	tac	ggc	tgc	48
Met	Leu	Ser	Ala	Leu	Gly	Val	Leu	Phe	Asp	Gly	Leu	Ala	Tyr	Gly	Cys	
1				5				10						15		
ctg	ctg	ttc	ctg	atc	ggc	atc	ggc	ctg	tgc	gtg	acg	atg	ggc	ctg	atg	96
Leu	Leu	Phe	Leu	Ile	Gly	Ile	Gly	Leu	Ser	Val	Thr	Met	Gly	Leu	Met	
			20					25					30			
cgc	ttc	atc	aac	ctc	gcg	cac	ggg	gcc	ttc	gcc	atg	gcg	ggc	ggc	tac	144
Arg	Phe	Ile	Asn	Leu	Ala	His	Gly	Ala	Phe	Ala	Met	Ala	Gly	Gly	Tyr	
		35					40					45				
gtg	tgc	gtg	gtg	ctg	atg	aac	cgc	ctc	ggc	atg	ccg	ttc	ctg	gcc	acg	192
Val	Cys	Val	Val	Leu	Met	Asn	Arg	Leu	Gly	Met	Pro	Phe	Leu	Ala	Thr	
	50				55						60					
ctg	ccg	atc	gcc	ttc	ctg	gcc	acc	gcc	gcc	gcc	ggc	ttc	gtg	ctg	gag	240
Leu	Pro	Ile	Ala	Phe	Leu	Ala	Thr	Ala	Ala	Ala	Gly	Phe	Val	Leu	Glu	
65					70					75					80	
cgc	acg	cta	tac	cgg	cgg	ctc	tat	cgc	gcc	agc	ccg	ctc	gac	cag	gtg	288

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Arg	Thr	Leu	Tyr	Arg ₈₅	Arg	Leu	Tyr	Arg	Ala ₉₀	Ser	Pro	Leu	Asp	Gln ₉₅	Val		
ctg	ttc	tcc	atc	gcg	ctc	gtc	ttc	atg	gcc	atg	gcg	ggc	gcc	acc	tat	336	
Leu	Phe	Ser	Ile ₁₀₀	Ala	Leu	Val	Phe	Met ₁₀₅	Ala	Met	Ala	Gly	Ala	Thr	Tyr		
gtc	tgg	ggg	ccg	tcg	cag	cag	ccg	gtg	gag	ctg	ccg	gac	gcg	ctg	cgc	384	
Val	Trp	Gly ₁₁₅	Pro	Ser	Gln	Gln	Pro ₁₂₀	Val	Glu	Leu	Pro	Asp ₁₂₅	Ala	Leu	Arg		
ggg	caa	tgg	cgc	gtg	ttc	gat	acg	ggg	ctc	gaa	gtc	ggg	cgc	tac	cgc	432	
Gly	Gln ₁₃₀	Leu	Arg	Val	Phe	Asp ₁₃₅	Thr	Gly	Leu	Glu	Val ₁₄₀	Gly	Arg	Tyr	Arg		
ttg	ttc	ctg	gtc	ggc	gtg	gtg	gtc	gtg	ctg	acg	gcg	ctg	ctg	gcc	tgg	480	
Leu	Phe	Leu	Val	Gly ₁₅₀	Val	Val	Val	Val	Leu	Thr ₁₅₅	Ala	Leu	Leu	Ala	Trp ₁₆₀		
ctg	atc	gag	cgc	acg	cgc	ttc	ggc	gcg	cgg	gtg	cgg	gcg	tcg	gtg	gac	528	
Leu	Ile	Glu	Arg	Thr ₁₆₅	Arg	Phe	Gly	Ala	Arg ₁₇₀	Val	Arg	Ala	Ser	Val ₁₇₅	Asp		
aac	cag	cag	gcc	gcg	gcc	ggg	ctc	ggc	atc	aac	gtg	ggc	ctg	gtg	ttc	576	
Asn	Gln	Gln	Ala ₁₈₀	Ala	Ala	Gly	Leu	Gly ₁₈₅	Ile	Asn	Val	Gly	Leu ₁₉₀	Val	Phe		
tcg	gtc	acg	ttc	gcg	ctg	ggc	tcg	ggg	ctg	gcc	ggc	ctg	ggc	ggc	gga	624	
Ser	Val ₁₉₅	Thr	Phe	Ala	Leu	Gly	Ser ₂₀₀	Gly	Leu	Ala	Gly	Leu ₂₀₅	Gly	Gly	Gly		
ctg	ggc	atc	gac	gtg	ctc	ggt	ctc	gat	ccg	gcg	ttc	ccg	atc	aag	tac	672	
Leu	Gly ₂₁₀	Ile	Asp	Val	Leu	Gly ₂₁₅	Leu	Asp	Pro	Ala	Phe ₂₂₀	Pro	Ile	Lys	Tyr		
atg	gtg	tat	ttc	ctg	ctc	gtg	gtg	gcg	gtg	ggc	ggc	gcg	ggc	tcg	atc	720	
Met	Val	Tyr	Phe	Leu	Leu ₂₃₀	Val	Val	Ala	Val	Gly ₂₃₅	Gly	Ala	Gly	Ser	Ile ₂₄₀		
aag	ggg	acg	ctg	ctg	gcg	gcc	ctg	gtg	ctg	ggc	gtg	ttc	gac	gtg	gcg	768	
Lys	Gly	Thr	Leu	Leu ₂₄₅	Ala	Ala	Leu	Val	Leu ₂₅₀	Gly	Val	Phe	Asp	Val ₂₅₅	Ala		
ggc	aag	tac	tac	gtg	ccc	gaa	gtc	ggc	gca	ttc	gtc	atc	tac	ggg	ttg	816	
Gly	Lys	Tyr	Tyr ₂₆₀	Val	Pro	Glu	Val	Gly ₂₆₅	Ala	Phe	Val	Ile	Tyr ₂₇₀	Gly	Leu		
atg	gtg	ctg	ctg	ctg	gcg	ctg	ttt	ccg	ggc	ggc	ctg	ctg	ggg	agg	cgc	864	
Met	Val	Leu	Leu	Leu	Ala	Leu	Phe ₂₈₀	Pro	Gly	Gly	Leu	Leu ₂₈₅	Gly	Arg	Arg		
gca	tga															870	
Ala																	

<210> 885

<211> 289

<212> PRT

<213> Ralstonia solanacearum

<400> 885

Met	Leu	Ser	Ala	Leu ₅	Gly	Val	Leu	Phe	Asp ₁₀	Gly	Leu	Ala	Tyr	Gly ₁₅	Cys		
Leu	Leu	Phe	Leu ₂₀	Ile	Gly	Ile	Gly	Leu ₂₅	Ser	Val	Thr	Met	Gly ₃₀	Leu	Met		
Arg	Phe	Ile ₃₅	Asn	Leu	Ala	His	Gly ₄₀	Ala	Phe	Ala	Met	Ala ₄₅	Gly	Gly	Tyr		
Val	Cys ₅₀	Val	Val	Leu	Met	Asn ₅₅	Arg	Leu	Gly	Met	Pro ₆₀	Phe	Leu	Ala	Thr		
Leu	Pro	Ile	Ala	Phe	Leu ₇₀	Ala	Thr	Ala	Ala	Ala ₇₅	Gly	Phe	Val	Leu	Glu ₈₀		
Arg	Thr	Leu	Tyr	Arg ₈₅	Arg	Leu	Tyr	Arg	Ala ₉₀	Ser	Pro	Leu	Asp	Gln ₉₅	Val		
Leu	Phe	Ser	Ile ₁₀₀	Ala	Leu	Val	Phe	Met ₁₀₅	Ala	Met	Ala	Gly	Ala ₁₁₀	Thr	Tyr		
Val	Trp	Gly ₁₁₅	Pro	Ser	Gln	Gln	Pro ₁₂₀	Val	Glu	Leu	Pro	Asp ₁₂₅	Ala	Leu	Arg		
Gly	Gln ₁₃₀	Leu	Arg	Val	Phe	Asp ₁₃₅	Thr	Gly	Leu	Glu	Val ₁₄₀	Gly	Arg	Tyr	Arg		
Leu	Phe	Leu	Val	Gly	Val ₁₅₀	Val	Val	Val	Leu	Thr ₁₅₅	Ala	Leu	Leu	Ala	Trp ₁₆₀		
Leu	Ile	Glu	Arg	Thr	Arg	Phe	Gly	Ala	Arg	Val	Arg	Ala	Ser	Val	Asp		

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165 170 175
 Asn Gln Gln Ala Ala Gly Leu Gly Ile Asn Val Gly Leu Val Phe
 180 185 190
 Ser Val Thr Phe Ala Leu Gly Ser Gly Leu Ala Gly Leu Gly Gly Gly
 195 200 205
 Leu Gly Ile Asp Val Leu Gly Leu Asp Pro Ala Phe Pro Ile Lys Tyr
 210 215 220
 Met Val Tyr Phe Leu Leu Val Val Ala Val Gly Gly Ala Gly Ser Ile
 225 230 235 240
 Lys Gly Thr Leu Leu Ala Ala Leu Val Leu Gly Val Phe Asp Val Ala
 245 250 255
 Gly Lys Tyr Tyr Val Pro Glu Val Gly Ala Phe Val Ile Tyr Gly Leu
 260 265 270
 Met Val Leu Leu Ala Leu Phe Pro Gly Gly Leu Leu Gly Arg Arg
 275 280 285
 Ala

<210> 886

<211> 1617

<212> DNA

<213> Ralstonia solanacearum

<220>

<221> CDS

<222> (1)..(1617)

<400> 886

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Met Ala Met Thr Arg Phe Leu Ala Ala Leu Leu Cys Ala Leu Cys Leu	
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gtt gcc acg cct gcc gca tcg gca tgg gcg gcc gga caa ccg ctg acc	96
Val Ala Thr Pro Ala Ala Ser Ala Trp Ala Ala Gly Gln Pro Leu Thr	
20 25 30	
cag gcc gat ctc aag ccg ctg gcc gaa gac gac ttc gac gcc aag gtg	144
Gln Ala Asp Leu Lys Pro Leu Ala Glu Asp Asp Phe Asp Ala Lys Val	
35 40 45	
aag gtg ctc aac gcc ctg gcc gcc gcg ccc gcc gaa cag gcc ggc ccc	192
Lys Val Leu Asn Ala Leu Ala Ala Pro Ala Glu Gln Ala Gly Pro	
50 55 60	
atc ctg cgg gcg ttg cag aat gat gcg ctg ttc tat gcg ccc gct gcc	240
Ile Leu Arg Ala Leu Gln Asn Asp Ala Leu Phe Tyr Ala Pro Ala Ala	
65 70 75 80	
ggc atg ctg cgc cag gag ggc gag cgt tat ctc gat gcg atc agc ggc	288
Gly Met Leu Arg Gln Glu Gly Glu Arg Tyr Leu Asp Ala Ile Ser Gly	
85 90 95	
cag ccg gtt gcc atg aag gcc gat gac ctg caa gcg ctg acg ctg aac	336
Gln Pro Val Ala Met Lys Ala Asp Asp Leu Gln Ala Leu Thr Leu Asn	
100 105 110	
aat gcc ctg cgc gcc cag gtg gac agc gcg gcc agc ggc ttc gtg ctg	384
Asn Ala Leu Arg Ala Gln Val Asp Ser Ala Ala Ser Gly Phe Val Leu	
115 120 125	
cag tcg ccc gac cgg gcc gtg cgc gcg cag gcc atc gat acg ctg ctg	432
Gln Ser Pro Asp Arg Ala Val Arg Ala Gln Ala Ile Asp Thr Leu Leu	
130 135 140	
gcg cat ccc gag acg gca tcg cgc acg gtg gtc gat gcg gcg cgc aag	480
Ala His Pro Glu Thr Ala Ser Arg Thr Val Val Asp Ala Ala Arg Lys	
145 150 155 160	
cag gag acc gat ccc gaa ctg cgg acc cgc ctg cat ctg ctg tgg gcc	528
Gln Glu Thr Asp Pro Glu Leu Arg Thr Arg Leu His Leu Leu Trp Ala	
165 170 175	
aac ctg gcg ctc gac gac ggc tcg cct gcc gag aag ctc gaa gcg ctc	576
Asn Leu Ala Leu Asp Asp Gly Ser Pro Ala Glu Lys Leu Glu Ala Leu	
180 185 190	
agg ctg ctc gcc ggc gat acc aac ccg cag acc cgc cag cgc atc gcg	624
Arg Leu Leu Ala Gly Asp Thr Asn Pro Gln Thr Arg Gln Arg Ile Ala	
195 200 205	
ccg ctg ctc gcc aag gac agc gcc gac gac gtg ctg cgc gcc gct	672
Pro Leu Leu Ala Lys Asp Ser Gly Ala Asp Asp Val Leu Arg Ala Ala	

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210	gcc	ctg	cag	gcg	ctg	gac	215	ctt	gcc	gcg	cag	220	gag	720
Ala	Arg	Gln	Ala	Leu	Asp	Asn	Leu	Ala	Ala	Gln	Arg	Lys	Ala	Glu
225	ctg	atc	ggc	aac	ctg	ttc	230	gcc	ggc	ctg	agg	ctg	ttg	768
Leu	Ile	Gly	Asn	Leu	Phe	Ala	Gly	Leu	Ser	Leu	Gly	Ser	Val	Leu
245	ctg	gcc	gcg	ctg	ggg	ctg	gcg	atc	acc	tac	ggc	ctg	atc	816
Leu	Ala	Ala	Leu	Gly	Leu	Ala	Ile	Thr	Tyr	Gly	Leu	Ile	Gly	Val
260	aac	atg	gcg	cac	ggt	gag	ttc	ctg	atg	atc	ggc	gcg	tat	gcc
Asn	Met	Ala	His	Gly	Glu	Phe	Leu	Met	Ile	Gly	Ala	Tyr	Ala	Thr
275	gtg	gtg	cag	acg	ctt	ttt	280	cgc	aac	cat	ttc	cct	gcg	gag
Val	Val	Gln	Thr	Leu	Phe	Arg	Asn	His	Phe	Pro	Ala	Ala	Phe	Asp
290	tat	ctg	ccc	gcc	gcg	ctg	ccg	gcc	gcg	ttc	ctg	gcc	gag	gtc
Tyr	Leu	Pro	Ala	Ala	Leu	Pro	Ala	Ala	Phe	Leu	Ala	Ala	Ala	Val
305	ggc	ttc	gtg	ctg	gag	cgc	atg	gtg	ctg	cgc	cac	ctg	tac	ggc
Gly	Phe	Val	Leu	Glu	Arg	Met	Val	Leu	Arg	His	Leu	Tyr	Gly	Arg
325	ctg	gag	acg	ctg	ctc	gcc	acc	ttc	ggc	gtc	agg	ctg	ctg	ctg
Leu	Glu	Thr	Leu	Leu	Ala	Thr	Phe	Gly	Val	Ser	Leu	Leu	Leu	Met
340	gcc	gtg	cgc	agg	gtg	ttc	ggt	gcg	cag	aac	gtg	gag	gtg	gag
Ala	Val	Arg	Ser	Val	Phe	Gly	Ala	Gln	Asn	Val	Glu	Val	Ala	Asn
355	agg	tgg	atg	agg	ggc	ggc	atc	gag	ctg	tat	ccg	ggg	ctg	atc
Ser	Trp	Met	Ser	Gly	Gly	Ile	Ala	Leu	Tyr	Pro	Gly	Leu	Ile	Leu
370	tat	aac	cgg	ctg	gtg	atc	ctg	gcc	ttc	gag	ctg	gtg	gtc	acg
Tyr	Asn	Arg	Leu	Val	Ile	Leu	Ala	Phe	Ala	Leu	Val	Val	Val	Thr
385	gag	tgg	gag	gtg	ctc	aac	cgc	acg	cgg	ctg	ggc	ctg	ttc	gtg
Ala	Trp	Ala	Val	Leu	Asn	Arg	Thr	Arg	Leu	Gly	Leu	Phe	Val	Arg
405	acc	acg	cag	aac	cgc	gcc	atg	gag	gag	tgc	gtg	ggc	gtg	cgg
Thr	Thr	Gln	Asn	Arg	Ala	Met	Ala	Ala	Ala	Cys	Val	Gly	Val	Arg
420	aag	gtg	gac	agg	tac	gcc	ttc	gag	ttc	ggc	gag	ggc	atc	ggc
Lys	Val	Asp	Ser	Tyr	Ala	Phe	Ala	Phe	Gly	Ala	Gly	Ile	Ala	Gly
435	ggc	ggc	tgc	gag	ctg	tgc	cag	atc	ggc	aat	gtg	ggg	ccg	gac
Gly	Gly	Cys	Ala	Leu	Ser	Gln	Ile	Gly	Asn	Val	Gly	Gly	Pro	Asp
450	cag	ggc	tac	atc	atc	gat	tcc	ttc	atg	gag	gtg	gtg	ctg	ggc
Gln	Gly	Tyr	Ile	Ile	Asp	Ser	Phe	Met	Ala	Val	Val	Val	Leu	Gly
465	ggg	cag	ctg	gcc	ggc	acc	atc	gtc	ggc	gag	ttc	ggg	ctg	ggg
Gly	Gln	Leu	Ala	Gly	Thr	Ile	Val	Gly	Ala	Phe	Gly	Leu	Gly	Leu
485	aac	aag	tgc	atc	gag	ccg	ttc	tat	ggc	gag	gtg	ctg	gag	aag
Asn	Lys	Cys	Ile	Glu	Pro	Phe	Tyr	Gly	Gly	Ala	Val	Leu	Ala	Lys
500	gtg	ctg	gtg	ctg	atc	gtg	ctg	ttc	atc	cag	aag	cgt	ccg	cag
Val	Leu	Val	Leu	Ile	Val	Leu	Phe	Ile	Gln	Lys	Arg	Pro	Gln	Gly
515	ttc	gcc	ctc	aag	ggc	cgc	agg	gag	gcc	tga				
Phe	Ala	Leu	Lys	Gly	Arg	Ser	Ala	Glu	Ala					
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<210> 887

<211> 538

<212> PRT

<213> Ralstonia solanacearum

<400> 887

Met Ala Met Thr Arg Phe Leu Ala Ala Leu Leu Cys Ala Leu Cys Leu

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	Gln	Ala	Asp	Leu	Lys	Pro	Leu	Ala	Glu	Asp	Asp	Phe	Asp	Ala	Lys	Val		
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	Lys	Val	Leu	Asn	Ala	Leu	Ala	Ala	Pro	Ala	Glu	Gln	Ala	Gly	Pro			
		50					55				60							
	Ile	Leu	Arg	Ala	Leu	Gln	Asn	Asp	Ala	Leu	Phe	Tyr	Ala	Pro	Ala	Ala		
	65					70					75							
	Gly	Met	Leu	Arg	Gln	Glu	Gly	Glu	Arg	Tyr	Leu	Asp	Ala	Ile	Ser	Gly		
					85					90					95			
	Gln	Pro	Val	Ala	Met	Lys	Ala	Asp	Asp	Leu	Gln	Ala	Leu	Thr	Leu	Asn		
				100					105						110			
	Asn	Ala	Leu	Arg	Ala	Gln	Val	Asp	Ser	Ala	Ala	Ser	Gly	Phe	Val	Leu		
			115					120					125					
	Gln	Ser	Pro	Asp	Arg	Ala	Val	Arg	Ala	Gln	Ala	Ile	Asp	Thr	Leu	Leu		
		130					135					140						
	Ala	His	Pro	Glu	Thr	Ala	Ser	Arg	Thr	Val	Val	Asp	Ala	Ala	Arg	Lys		
	145					150					155							
	Gln	Glu	Thr	Asp	Pro	Glu	Leu	Arg	Thr	Arg	Leu	His	Leu	Leu	Trp	Ala		
				165						170					175			
	Asn	Leu	Ala	Leu	Asp	Asp	Gly	Ser	Pro	Ala	Glu	Lys	Leu	Glu	Ala	Leu		
			180						185					190				
	Arg	Leu	Leu	Ala	Gly	Asp	Thr	Asn	Pro	Gln	Thr	Arg	Gln	Arg	Ile	Ala		
			195					200					205					
	Pro	Leu	Leu	Ala	Lys	Asp	Ser	Gly	Ala	Asp	Asp	Val	Leu	Arg	Ala	Ala		
		210					215					220						
	Ala	Arg	Gln	Ala	Leu	Asp	Asn	Leu	Ala	Ala	Gln	Ala	Arg	Lys	Ala	Glu		
	225					230					235					240		
	Leu	Ile	Gly	Asn	Leu	Phe	Ala	Gly	Leu	Ser	Leu	Gly	Ser	Val	Leu	Leu		
				245						250					255			
	Leu	Ala	Ala	Leu	Gly	Leu	Ala	Ile	Thr	Tyr	Gly	Leu	Ile	Gly	Val	Ile		
				260					265					270				
	Asn	Met	Ala	His	Gly	Glu	Phe	Leu	Met	Ile	Gly	Ala	Tyr	Ala	Thr	Tyr		
			275					280					285					
	Val	Val	Gln	Thr	Leu	Phe	Arg	Asn	His	Phe	Pro	Ala	Ala	Phe	Asp	Trp		
		290					295					300						
	Tyr	Leu	Pro	Ala	Ala	Leu	Pro	Ala	Ala	Phe	Leu	Ala	Ala	Ala	Val	Val		
	305					310					315					320		
	Gly	Phe	Val	Leu	Glu	Arg	Met	Val	Leu	Arg	His	Leu	Tyr	Gly	Arg	Pro		
					325					330					335			
	Leu	Glu	Thr	Leu	Leu	Ala	Thr	Phe	Gly	Val	Ser	Leu	Leu	Leu	Met	Gln		
				340					345					350				
	Ala	Val	Arg	Ser	Val	Phe	Gly	Ala	Gln	Asn	Val	Glu	Val	Ala	Asn	Pro		
			355					360					365					
	Ser	Trp	Met	Ser	Gly	Gly	Ile	Ala	Leu	Tyr	Pro	Gly	Leu	Ile	Leu	Pro		
		370					375					380						
	Tyr	Asn	Arg	Leu	Val	Ile	Leu	Ala	Phe	Ala	Leu	Val	Val	Val	Thr	Leu		
	385					390					395					400		
	Ala	Trp	Ala	Val	Leu	Asn	Arg	Thr	Arg	Leu	Gly	Leu	Phe	Val	Arg	Ala		
				405						410					415			
	Thr	Thr	Gln	Asn	Arg	Ala	Met	Ala	Ala	Cys	Val	Gly	Val	Arg	Thr	Trp		
				420					425					430				
	Lys	Val	Asp	Ser	Tyr	Ala	Phe	Ala	Phe	Gly	Ala	Gly	Ile	Ala	Gly	Leu		
			435					440					445					
	Gly	Gly	Cys	Ala	Leu	Ser	Gln	Ile	Gly	Asn	Val	Gly	Pro	Asp	Leu	Gly		
		450					455					460						
	Gln	Gly	Tyr	Ile	Ile	Asp	Ser	Phe	Met	Ala	Val	Val	Leu	Gly	Gly	Val		
	465					470					475					480		
	Gly	Gln	Leu	Ala	Gly	Thr	Ile	Val	Gly	Ala	Phe	Gly	Leu	Gly	Leu	Ile		
				485						490					495			
	Asn	Lys	Cys	Ile	Glu	Pro	Phe	Tyr	Gly	Ala	Val	Leu	Ala	Lys	Ile	Phe		
				500					505					510				
	Val	Leu	Val	Leu	Ile	Val	Leu	Phe	Ile	Gln	Lys	Arg	Pro	Gln	Gly	Leu		
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	Phe	Ala	Leu	Lys	Gly	Arg	Ser	Ala	Glu	Ala								
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<211> 948

<212> DNA

<213> *Ralstonia solanacearum*

<220>

<221> CDS

<222> (1)..(948)

<400> 888

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1 5 10 15	
ctg ctg ttc atg ctg tcg tcg ggc ctg acg ctg atc ttc agc atg atg	96
Leu Leu Phe Met Leu Ser Ser Gly Leu Thr Leu Ile Phe Ser Met Met	
20 25 30	
ggc gtc ctc aac ttc gcg cat gcc agc ttc tac atg ctg ggc gcg tac	144
Gly Val Leu Asn Phe Ala His Ala Ser Phe Tyr Met Leu Gly Ala Tyr	
35 40 45	
ttc gcc tac gtc gtc agc gga tac ctg ggc ttc tgg gcc gcg ctg atc	192
Phe Ala Tyr Val Val Ser Gly Tyr Leu Gly Phe Trp Ala Ala Leu Ile	
50 55 60	
gtg gcg ccg ctg ctg gtg ggc gcg ctg ggg gcg ctg gtc gag cgc ttc	240
Val Ala Pro Leu Leu Val Gly Ala Leu Gly Ala Leu Val Glu Arg Phe	
65 70 75 80	
ggc ctg gcg acg gtg cac gcg tac ggc cat gtc gcc gag ctg ctg ttc	288
Gly Leu Arg Thr Val His Arg Tyr Gly His Val Ala Glu Leu Leu Phe	
85 90 95	
acc ttc ggc ctg gcc tac ctg atc gaa gag ggc gtg aag ctg gtg tgg	336
Thr Phe Gly Leu Ala Tyr Leu Ile Glu Glu Gly Val Lys Leu Val Trp	
100 105 110	
ggc ctg ccg gcc gtg ccg tac gcg gtg ccc gag gcg ctg gac ggg ccg	384
Gly Leu Pro Ala Val Pro Tyr Arg Val Pro Glu Ala Leu Asp Gly Pro	
115 120 125	
ctg ttc acg ctg ttc acc tcg tcc ttc ccg aag tac cgc gcc ttc atg	432
Leu Phe Thr Leu Phe Thr Ser Phe Pro Lys Tyr Arg Ala Phe Met	
130 135 140	
atg ctg gtg tcg ctg ctg atg ctg gtg ggc atc ttc ctg ctg ctc acg	480
Met Leu Val Ser Leu Leu Met Leu Val Gly Ile Phe Leu Leu Leu Thr	
145 150 155 160	
cgc acg gcg atc ggc ctg gtc atc cag gcg gcg ctg acg cat ccg gac	528
Arg Thr Arg Ile Gly Leu Val Ile Gln Ala Ala Leu Thr His Pro Asp	
165 170 175	
atg gtc gag gcg ctc ggt cac aac gtg ccg gcg gtc ttc atg ctg gtg	576
Met Val Glu Ala Leu Gly His Asn Val Pro Arg Val Phe Met Leu Val	
180 185 190	
ttc ggc ggg ggc tgc gcg ctg gcc ggc ctg gcc gga gtg atc ggc ggc	624
Phe Gly Gly Gly Cys Ala Leu Ala Gly Leu Ala Gly Val Ile Gly Gly	
195 200 205	
aac gcg ttc gtg acc gag ccg tcg atg gcg gcg gcg gtc ggg tcg atc	672
Asn Ala Phe Val Thr Glu Pro Ser Met Ala Ala Ala Val Gly Ser Ile	
210 215 220	
gtc ttc gtg gtg gcg gtg ggc ggc atg ggc ttc ctg gtg ggc gcc	720
Val Phe Val Val Ala Val Val Gly Gly Met Gly Ser Leu Val Gly Ala	
225 230 235 240	
ttc atc gcc tcg ctg ctg atc ggt tgc atc cag acc ttt gcc gtc acg	768
Phe Ile Ala Ser Leu Leu Ile Gly Cys Ile Gln Thr Phe Ala Val Thr	
245 250 255	
ctc gat gtg tcg gtg acg agc ctg ctg ggc aag ctc ggt gtc gcg ctc	816
Leu Asp Val Ser Val Thr Ser Leu Leu Gly Lys Leu Gly Val Ala Leu	
260 265 270	
aac ccg gac gtg ccg ctg atc tcc gtg tgg aac ctg acc atc gcg cag	864
Asn Pro Asp Val Pro Leu Ile Ser Val Trp Asn Leu Thr Ile Ala Gln	
275 280 285	
gtg gcg ccg gtg ctg ccg tac ctg ctg ctg gtg ctg atg ctg atc ttc	912
Val Ala Pro Val Leu Pro Tyr Leu Leu Leu Val Leu Met Leu Ile Phe	
290 295 300	
cgc ccg gcg ggg ctg atg ggc acg ccg gag gga taa	948
Arg Pro Arg Gly Leu Met Gly Thr Arg Glu Gly	
305 310 315	

<210> 889
 <211> 315
 <212> PRT
 <213> *Ralstonia solanacearum*

<400> 889
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 20 25 30
 Gly Val Leu Asn Phe Ala His Ala Ser Phe Tyr Met Leu Gly Ala Tyr
 35 40 45
 Phe Ala Tyr Val Val Ser Gly Tyr Leu Gly Phe Trp Ala Ala Leu Ile
 50 55 60
 Val Ala Pro Leu Leu Val Gly Ala Leu Gly Ala Leu Val Glu Arg Phe
 65 70 75 80
 Gly Leu Arg Thr Val His Arg Tyr Gly His Val Ala Glu Leu Leu Phe
 85 90 95
 Thr Phe Gly Leu Ala Tyr Leu Ile Glu Glu Gly Val Lys Leu Val Trp
 100 105 110
 Gly Leu Pro Ala Val Pro Tyr Arg Val Pro Glu Ala Leu Asp Gly Pro
 115 120 125
 Leu Phe Thr Leu Phe Thr Ser Ser Phe Pro Lys Tyr Arg Ala Phe Met
 130 135 140
 Met Leu Val Ser Leu Leu Met Leu Val Gly Ile Phe Leu Leu Leu Thr
 145 150 155 160
 Arg Thr Arg Ile Gly Leu Val Ile Gln Ala Ala Leu Thr His Pro Asp
 165 170 175
 Met Val Glu Ala Leu Gly His Asn Val Pro Arg Val Phe Met Leu Val
 180 185 190
 Phe Gly Gly Gly Cys Ala Leu Ala Gly Leu Ala Gly Val Ile Gly Gly
 195 200 205
 Asn Ala Phe Val Thr Glu Pro Ser Met Ala Ala Ala Val Gly Ser Ile
 210 215 220
 Val Phe Val Val Ala Val Val Gly Gly Met Gly Ser Leu Val Gly Ala
 225 230 235 240
 Phe Ile Ala Ser Leu Leu Ile Gly Cys Ile Gln Thr Phe Ala Val Thr
 245 250 255
 Leu Asp Val Ser Val Thr Ser Leu Leu Gly Lys Leu Gly Val Ala Leu
 260 265 270
 Asn Pro Asp Val Pro Leu Ile Ser Val Trp Asn Leu Thr Ile Ala Gln
 275 280 285
 Val Ala Pro Val Leu Pro Tyr Leu Leu Leu Val Leu Met Leu Ile Phe
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 Arg Pro Arg Gly Leu Met Gly Thr Arg Glu Gly
 305 310 315

<210> 890
 <211> 960
 <212> DNA
 <213> *Pyrobaculum aerophilum*

<220>
 <221> CDS
 <222> (1)..(960)

<400> 890
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 att ttc tct aat att tac gta ctc ctc agc cta ggc cta aac ctc acg 96
 Ile Phe Ser Asn Ile Tyr Val Leu Ser Leu Gly Leu Asn Leu Thr 20 25 30
 20 25 30
 tac ata act act aag atc ccc tca ttt gcg cac ggg gat tta gcc aca 144
 Tyr Ile Thr Thr Lys Ile Pro Ser Phe Ala His Gly Asp Leu Ala Thr 35 40 45
 35 40 45
 ata ggg gct tat gtg agc tat tat act att gta ttt cta cta tta cct 192
 Ile Gly Ala Tyr Val Ser Tyr Tyr Thr Ile Val Phe Leu Leu Leu Pro 290 295 300

	50					55					60						
ttt	gga	cta	tcc	gct	agt	ata	tat	tta	acc	ttc	ccc	ctc	gta	gct	cta		240
Phe	Gly	Leu	Ser	Ala	Ser	Ile	Tyr	Leu	Thr	Phe	Pro	Leu	Val	Ala	Leu		
65					70					75					80		
gtc	aca	ggt	ctt	gtg	gct	ttg	gca	act	tat	ata	gca	gtt	ttt	aga	cct		288
Val	Thr	Gly	Leu	Val	Ala	Leu	Ala	Thr	Tyr	Ile	Ala	Val	Phe	Arg	Pro		
				85					90					95			
atg	atc	agg	aga	ggg	gcc	gga	att	acg	cca	cta	atg	atc	gct	tca	ttt		336
Met	Ile	Arg	Arg	Gly	Ala	Gly	Ile	Thr	Pro	Leu	Met	Ile	Ala	Ser	Phe		
			100					105					110				
ggt	gta	cac	tac	gtt	tta	ttt	gca	ata	gtg	gcc	att	atc	gcc	gat	tat		384
Gly	Val	His	Tyr	Val	Leu	Phe	Ala	Ile	Val	Ala	Ile	Ile	Ala	Asp	Tyr		
		115					120				125						
act	cgg	aac	acc	tac	caa	att	ctt	agc	aga	aat	gtc	ctc	tta	agc	cgg		432
Thr	Arg	Asn	Thr	Tyr	Gln	Ile	Leu	Ser	Arg	Asn	Val	Leu	Leu	Ser	Arg		
	130					135					140						
tgg	gag	ttt	att	tgg	ccg	ggc	aca	gac	ttc	ttg	acc	tcg	tct	cta	ata		480
Trp	Glu	Phe	Ile	Trp	Pro	Gly	Thr	Asp	Phe	Leu	Thr	Ser	Ser	Leu	Ile		
145					150				155						160		
aat	acc	act	att	ata	gtc	att	gta	gtc	act	ctg	tta	tta	tac	ttt	tta		528
Asn	Thr	Thr	Ile	Ile	Val	Ile	Val	Val	Thr	Leu	Leu	Leu	Tyr	Phe	Leu		
				165					170					175			
ttg	tac	aga	act	aga	tat	gga	gta	ata	atg	agg	gcc	agc	att	gac	aac		576
Leu	Tyr	Arg	Thr	Arg	Tyr	Gly	Val	Ile	Met	Arg	Ala	Ser	Ile	Asp	Asn		
			180					185					190				
tta	tac	cta	gct	aaa	gca	gtt	ggg	att	aat	ata	gag	aga	gta	ttc	gca		624
Leu	Tyr	Leu	Ala	Lys	Ala	Val	Gly	Ile	Asn	Ile	Glu	Arg	Val	Phe	Ala		
		195				200					205						
gtg	gcg	tgg	cta	tta	ata	ggg	gcg	gtg	acg	ggg	ata	gca	ggg	atc	tat		672
Val	Ala	Trp	Leu	Leu	Ile	Gly	Ala	Val	Thr	Gly	Ile	Ala	Gly	Ile	Tyr		
	210					215				220							
atg	gct	atg	ttc	ttc	ccc	act	gaa	gag	ctc	ggc	tgg	ctt	agg	cta			720
Met	Ala	Met	Phe	Phe	Pro	Met	Glu	Glu	Leu	Gly	Trp	Leu	Arg	Leu			
225					230				235					240			
cct	gtt	att	ttc	gtg	gct	tct	gtc	gtc	ggc	ggt	ctc	tcc	agt	ata	tac		768
Pro	Val	Ile	Phe	Val	Ala	Ser	Val	Val	Gly	Gly	Leu	Ser	Ser	Ile	Tyr		
				245					250					255			
ggc	gca	gtg	ctt	ggc	gga	tat	gtc	gtc	ggc	cta	agc	cta	gtc	cta	ggc		816
Gly	Ala	Val	Leu	Gly	Gly												

<210> 891
<211> 319
<212> PRT
<213> Pyrobaculum aerophilum

<400> 891
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Ile Phe Ser Asn Ile Tyr Val Leu Leu Ser Leu Gly Leu Asn Leu Thr
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Tyr Ile Thr Thr Lys Ile Pro Ser Phe Ala His Gly Asp Leu Ala Thr
35 40 45
Ile Gly Ala Tyr Val Ser Tyr Tyr Thr Ile Val Phe Leu Leu Leu Pro
50 55 60
Phe Gly Leu Ser Ala Ser Ile Tyr Leu Thr Phe Pro Leu Val Ala Leu
65 70 75 80

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Val Thr Gly Leu Val Ala Leu Ala Thr Tyr Ile Ala Val Phe Arg Pro
 85 90 95
 Met Ile Arg Arg Gly Ala Gly Ile Thr Pro Leu Met Ile Ala Ser Phe
 100 105 110
 Gly Val His Tyr Val Leu Phe Ala Ile Val Ala Ile Ala Asp Tyr
 115 120 125
 Thr Arg Asn Thr Tyr Gln Ile Leu Ser Arg Asn Val Leu Leu Ser Arg
 130 135 140
 Trp Glu Phe Ile Trp Pro Gly Thr Asp Phe Leu Thr Ser Ser Leu Ile
 145 150 155 160
 Asn Thr Thr Ile Ile Val Ile Val Val Thr Leu Leu Leu Tyr Phe Leu
 165 170 175
 Leu Tyr Arg Thr Arg Tyr Gly Val Ile Met Arg Ala Ser Ile Asp Asn
 180 185 190
 Leu Tyr Leu Ala Lys Ala Val Gly Ile Asn Ile Glu Arg Val Phe Ala
 195 200 205
 Val Ala Trp Leu Leu Ile Gly Ala Val Thr Gly Ile Ala Gly Ile Tyr
 210 215 220
 Met Ala Met Phe Phe Pro Met Thr Glu Glu Leu Gly Trp Leu Arg Leu
 225 230 235 240
 Pro Val Ile Phe Val Ala Ser Val Val Gly Gly Leu Ser Ser Ile Tyr
 245 250 255
 Gly Ala Val Leu Gly Gly Tyr Val Val Gly Leu Ser Leu Val Leu Gly
 260 265 270
 Ala Thr Tyr Ile Leu Thr Pro Leu Gly Val Pro Thr Glu Phe Gln Leu
 275 280 285
 Val Ile Pro Phe Ala Phe Val Ile Ala Ile Leu Leu Phe Ala Pro Gln
 290 295 300
 Gly Leu Ala Gly Ile Ile Ser Ser Ile Ala Gln Lys Val Arg Lys
 305 310 315

<210> 892

<211> 960

<212> DNA

<213> Pyrobaculum aerophilum

<220>

<221> CDS

<222> (1)..(960)

<400> 892

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Met Ala Lys Trp Tyr Val Phe Ile Val Leu Val Ala Trp Ile Val Ile	
1 5 10 15	
tct tct ttt tat ttt ccg cgc gaa gtc gca gat gcg tta gta tac gcc	96
Ser Ser Phe Tyr Phe Pro Arg Glu Val Ala Asp Ala Leu Val Tyr Ala	
20 25 30	
tca gtt tta gtg ctc gca tca gtc ggc ttg aca tta acc tac cag acc	144
Ser Val Leu Val Leu Ala Ser Val Gly Leu Thr Leu Thr Tyr Gln Thr	
35 40 45	
act aaa gtg cct aac ttc gcg cac gga gtt ttt ata aac ctc ggc gtg	192
Thr Lys Val Pro Asn Phe Ala His Gly Val Phe Ile Asn Leu Gly Val	
50 55 60	
atg gcc gcc ctc aca gtg gcg cag att tat aaa aca tct cct tat gcg	240
Met Ala Ala Leu Thr Val Ala Gln Ile Tyr Lys Thr Ser Pro Tyr Ala	
65 70 75 80	
gcg ttg ccc ctg gcc gtg gtc ttg tca act gca tct tca ctc gcc ttg	288
Ala Leu Pro Leu Ala Val Val Leu Ser Thr Ala Ser Ser Leu Ala Leu	
85 90 95	
tat ttt ttc ctc ctc ccg ctt tat aag agg caa agc ccg ccg gag gtt	336
Tyr Phe Phe Leu Leu Pro Leu Tyr Lys Arg Gln Ser Pro Pro Glu Val	
100 105 110	
atg atg atg gcc aca atg gct tat aac ata gtc ttt ata gga gtt tta	384
Met Met Met Ala Thr Met Ala Tyr Asn Ile Val Phe Ile Gly Val Leu	
115 120 125	
aac gcg tat gcg gat tgg ata ggg aga gct gcc ggt att ttc act agg	432
Asn Ala Tyr Ala Asp Trp Ile Gly Arg Ala Ala Gly Ile Phe Thr Arg	
130 135 140	
ggg att acc tta agg ccc tac gac gtg gaa ata ctc ggc acc gcc ggc	480

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Gly 145	Ile	Thr	Leu	Arg	Pro 150	Tyr	Asp	Val	Glu	Ile 155	Leu	Gly	Thr	Ala	Gly 160	
gtt	tac	ata	tta	gcc	cca	ctg	acg	gcc	tcc	gcg	atc	tcc	ctc	gcc	ctt	528
Val	Tyr	Ile	Leu	Ala 165	Pro	Leu	Thr	Ala	Ser 170	Ala	Ile	Ser	Leu	Ala 175	Leu	
tac	ctt	ttt	tta	aaa	aca	aaa	atc	ggc	act	gcg	ctg	agg	gcc	gcg	gtt	576
Tyr	Leu	Phe	Leu 180	Lys	Thr	Lys	Ile	Gly 185	Thr	Ala	Leu	Arg	Ala 190	Ala	Val	
gag	aac	gag	gaa	ctg	gcc	agg	acc	ttg	ggg	ata	aac	gtt	gaa	agg	atg	624
Glu	Asn	Glu	Glu 195	Leu	Ala	Arg	Thr 200	Leu	Gly	Ile	Asn	Val 205	Glu	Arg	Met	
tac	gca	att	gcc	tgg	gca	ata	tcg	ggc	gcc	gtc	gcc	ggc	gtt	gcg	ggg	672
Tyr	Ala 210	Ile	Ala	Trp	Ala 215	Ile	Ser	Gly	Ala	Val 220	Ala	Gly 225	Val	Ala	Gly	
gtt	ttt	ctg	cct	ttg	tac	ata	gag	gct	acg	cct	gac	gtt	ggg	tgg	ctc	720
Val	Phe	Leu	Pro	Leu 225	Tyr 230	Ile	Glu	Ala	Thr	Pro 235	Asp	Val	Gly	Trp	Leu 240	
ctc	ctc	gcg	agc	ttc	ttc	gcg	gcg	agt	ata	gtg	ggg	ggt	ttg	aat	aat	768
Leu	Leu	Ala	Ser 245	Phe	Phe	Ala	Ala	Ser	Ile 250	Val	Gly	Gly	Leu	Asn 255	Asn	
atc	tac	ggg	gcg	ttg	gcc	gga	ggg	gtt	tta	atg	ggc	ttt	gtg	gag	ctg	816
Ile	Tyr	Gly 260	Ala	Leu	Ala	Gly	Gly	Val 265	Leu	Met	Gly	Phe 270	Val	Glu	Leu	
ctc	ggc	act	att	caa	ttc	gca	gcg	ctt	tta	aac	gcc	ctt	ttc	gct	acg	864
Leu	Gly 275	Thr	Ile	Gln	Phe	Ala 280	Ala	Leu	Leu	Asn	Ala 285	Leu	Phe	Ala	Thr	
cct	cag	tac	caa	gtc	acc	gcc	tac	agg	cct	cta	gtg	ccg	ttg	ctc	gca	912
Pro	Gln 290	Tyr	Gln	Val	Thr 295	Ala	Tyr	Arg	Pro	Leu 300	Val	Pro	Leu	Leu	Ala	
ata	gcc	att	act	cta	ctc	ata	tcc	cct	aaa	gga	ctg	ttg	ggg	cga		957
Ile 305	Ala	Ile	Thr	Leu 310	Leu 315	Ile	Ser	Pro	Lys	Gly 315	Leu	Leu	Gly	Arg		
tga																960

<210> 893

<211> 319

<212> PRT

<213> Pyrobaculum aerophilum

<400> 893

Met	Ala	Lys	Trp	Tyr	Val	Phe	Ile	Val	Leu	Val	Ala	Trp	Ile	Val	Ile	
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Ser	Ser	Phe	Tyr	Phe	Pro	Arg	Glu	Val	Ala	Asp	Ala	Leu	Val	Tyr	Ala	
			20					25					30			
Ser	Val	Leu	Val	Leu	Ala	Ser	Val	Gly	Leu	Thr	Leu	Thr	Tyr	Gln	Thr	
		35					40					45				
Thr	Lys	Val	Pro	Asn	Phe	Ala	His	Gly	Val	Phe	Ile	Asn	Leu	Gly	Val	
		50				55				60						
Met	Ala	Ala	Leu	Thr	Val	Ala	Gln	Ile	Tyr	Lys	Thr	Ser	Pro	Tyr	Ala	
65					70					75					80	
Ala	Leu	Pro	Leu	Ala	Val	Val	Leu	Ser	Thr	Ala	Ser	Ser	Leu	Ala	Leu	
				85					90					95		
Tyr	Phe	Phe	Leu	Leu	Pro	Leu	Tyr	Lys	Arg	Gln	Ser	Pro	Pro	Glu	Val	
			100					105					110			
Met	Met	Met	Ala	Thr	Met	Ala	Tyr	Asn	Ile	Val	Phe	Ile	Gly	Val	Leu	
		115					120					125				
Asn	Ala	Tyr	Ala	Asp	Trp	Ile	Gly	Arg	Ala	Ala	Gly	Ile	Phe	Thr	Arg	
		130				135					140					
Gly	Ile	Thr	Leu	Arg	Pro	Tyr	Asp	Val	Glu	Ile	Leu	Gly	Thr	Ala	Gly	
145					150					155					160	
Val	Tyr	Ile	Leu	Ala	Pro	Leu	Thr	Ala	Ser	Ala	Ile	Ser	Leu	Ala	Leu	
				165					170					175		
Tyr	Leu	Phe	Leu	Lys	Thr	Lys	Ile	Gly	Thr	Ala	Leu	Arg	Ala	Ala	Val	
			180					185					190			
Glu	Asn	Glu	Glu	Leu	Ala	Arg	Thr	Leu	Gly	Ile	Asn	Val	Glu	Arg	Met	
		195					200					205				
Tyr	Ala	Ile	Ala	Trp	Ala	Ile	Ser	Gly	Ala	Val	Ala	Gly	Val	Ala	Gly	

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210
 Val Phe Leu Pro Leu Tyr 215
 225 Leu Leu Ala Ser Phe Phe Ile Glu Ala Thr Pro Asp Val Gly Trp Leu
 230 235 240
 Ile Tyr Gly Ala Leu Ala Gly Gly Val Leu Met Gly Phe Val Glu Leu
 245 250 255
 Leu Gly Thr 260 Gln Phe Ala Ala 265 Leu Leu Asn Ala Leu Phe Ala Thr
 270 275 285
 Pro Gln Tyr Gln Val Thr Ala Tyr Arg Pro Leu Val Pro Leu Leu Ala
 280 290 300
 Ile Ala Ile Thr Leu Leu Ile Ser Pro Lys Gly Leu Leu Gly Arg
 305 310 315

<210> 894

<211> 873

<212> DNA

<213> Pyrobaculum aerophilum

<220>

<221> CDS

<222> (1)..(873)

<400> 894

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Met Asp Ile Ile Pro Tyr Phe Leu Thr Gly Leu Val Ile Gly Ser Ile	
1 5 10 15	
tac ggc ttg acg acg ctg ggg ctt agc ctt att ttt ggc gtg ttg cgt	96
Tyr Gly Leu Thr Leu Gly Leu Ser Leu Ile Phe Gly Val Leu Arg	
20 25 30	
gtg gca aat gtg gcc cac gga tcg ttt ata atg att ggg gcg tac gtg	144
Val Ala Asn Val Ala His Gly Ser Phe Ile Met Ile Gly Ala Tyr Val	
35 40 45	
gct tat acc ttt ttc gtg gca tgg gca att ccg ccg att gtc tca gca	192
Ala Tyr Thr Phe Phe Val Ala Trp Ala Ile Pro Ile Val Ser Ala	
50 55 60	
acg gcg gct ttg tta ata gga atg gcg gct ggg tat tta gta tac gta	240
Thr Ala Ala Leu Leu Ile Gly Met Ala Ala Gly Tyr Leu Val Tyr Val	
65 70 75 80	
ggc gtt atc aag cct ctt gga aaa gcc gag ctg aac ata tta gtt gcc	288
Gly Val Ile Lys Pro Leu Gly Lys Ala Glu Leu Asn Ile Leu Val Ala	
85 90 95	
cta ttt gcc cta ggg gcg ttg ctg gca gag gtg gcg agg ctg att tgg	336
Leu Phe Ala Leu Gly Ala Leu Leu Ala Glu Val Ala Arg Leu Ile Trp	
100 105 110	
ggc ccc gat ttc gtg ggc tat agg tgg agt ata ggc tct ata gaa atc	384
Gly Pro Asp Phe Val Gly Tyr Arg Trp Ser Ile Gly Ser Ile Glu Ile	
115 120 125	
gca ggc ctc cag ctg gag atc aca aag ctg atg ggg gcc gtg gcc tct	432
Ala Gly Leu Gln Leu Glu Ile Thr Lys Leu Met Gly Ala Val Ala Ser	
130 135 140	
ctg ata atc gcc gta ttg tta gag ttg acg ttg agg cgg acg tac ttc	480
Leu Ile Ile Ala Val Leu Leu Glu Leu Thr Leu Arg Arg Thr Tyr Phe	
145 150 155 160	
ggc cgc gct att aag gca gta gtt caa gac cca ata ggc gca atg gta	528
Gly Arg Ala Ile Lys Ala Val Val Gln Asp Pro Ile Gly Ala Met Val	
165 170 175	
gtg ggg ata aac gtg gag aga ata ctg gct tta agc gcc gcc gtt gga	576
Val Gly Ile Asn Val Glu Arg Ile Leu Ala Leu Ser Ala Ala Val Gly	
180 185 190	
ata ggc gta acc gca tta gga gga gtg ttg cta acg ttg ttc ata cca	624
Ile Gly Val Thr Ala Leu Gly Gly Val Leu Leu Thr Leu Phe Ile Pro	
195 200 205	
gtt ggg att aac cct tac atg ggc ggg ccc tat acc cta ata ggc ttt	672
Val Gly Ile Asn Pro Tyr Met Gly Gly Pro Tyr Thr Leu Ile Gly Phe	
210 215 220	
gtc att gca gtt ttg ggc ggg ctc ggc tct gta atg ggg gct tac att	720
Val Ile Ala Val Leu Gly Gly Leu Gly Ser Val Met Gly Ala Tyr Ile	
225 230 235 240	

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gcc ggg ttg ttg ttt gga gtt ttc gag tca gtg ggg ttt tac gtc ttc 768
 Ala Gly Leu Leu Phe 245 Gly Val Phe Glu 250 Ser Val Gly Phe Tyr 255 Val Phe
 tcg tcg ctg ggc ttc gcc gag ccg tca caa atg gcg ctt ttc tta tcc 816
 Ser Ser Leu Gly 260 Phe Ala Glu Pro Ser 265 Gln Met Ala Leu Phe 270 Leu Ser
 ttt gta ctg ctg ttg cta ctg tta ttc aag cct aca ggt ctg ttt 864
 Phe Val 275 Leu Leu Leu Leu 280 Leu Phe Lys Pro 285 Thr Gly Leu Phe
 agg ata tga 873
 Arg Ile 290

<210> 895

<211> 290

<212> PRT

<213> Pyrobaculum aerophilum

<400> 895

Met Asp Ile Ile Pro Tyr Phe Leu Thr Gly Leu Val Ile Gly Ser Ile
 1 5 10 15
 Tyr Gly Leu Thr Thr Leu Gly Leu Ser Leu Ile Phe Gly Val Leu Arg
 20 25 30
 Val Ala Asn Val Ala His Gly Ser Phe Ile Met Ile Gly Ala Tyr Val
 35 40 45
 Ala Tyr Thr Phe Phe Val Ala Trp Ala Ile Pro Pro Ile Val Ser Ala
 50 55 60
 Thr Ala Ala Leu Leu Ile Gly Met Ala Ala Gly Tyr Leu Val Tyr Val
 65 70 75 80
 Gly Val Ile Lys Pro 85 Leu Gly Lys Ala Glu 90 Leu Asn Ile Leu Val 95 Ala
 Leu Phe Ala Leu Gly Ala Leu Leu Ala Glu Val Ala Arg Leu Ile Trp
 100 105 110
 Gly Pro Asp Phe Val Gly Tyr Arg Trp Ser Ile Gly Ser Ile Glu Ile
 115 120 125
 Ala Gly Leu Gln Leu Glu Ile Thr Lys Leu Met Gly Ala Val Ala Ser
 130 135 140
 Leu Ile Ile Ala Val Leu Leu Glu Leu Thr Leu Arg Arg Thr Tyr Phe
 145 150 155 160
 Gly Arg Ala Ile Lys 165 Ala Val Val Gln Asp 170 Pro Ile Gly Ala Met Val
 Val Gly Ile Asn Val Glu Arg Ile Leu Ala Leu Ser Ala Ala Val Gly
 180 185 190
 Ile Gly Val Thr Ala Leu Gly Gly Val Leu Leu Thr Leu Phe Ile Pro
 195 200 205
 Val Gly Ile Asn Pro Tyr Met Gly Gly Pro Tyr Thr Leu Ile Gly Phe
 210 215 220
 Val Ile Ala Val Leu Gly Gly Leu Gly Ser Val Met Gly Ala Tyr Ile
 225 230 235 240
 Ala Gly Leu Leu Phe Gly Val Phe Glu Ser Val Gly Phe Tyr Val Phe
 245 250 255
 Ser Ser Leu Gly Phe Ala Glu Pro Ser 265 Gln Met Ala Leu Phe 270 Leu Ser
 Phe Val 275 Leu Leu Leu Leu 280 Leu Phe Lys Pro 285 Thr Gly Leu Phe
 Arg Ile 290

<210> 896

<211> 888

<212> DNA

<213> Rhizobium meliloti

<220>

<221> CDS

<222> (1)..(888)

<400> 896

atg acg atg att ttc gga att ccc ctc cag gcc ttc ctc ggg cag ctg
 48
 Seite 1135

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Met 1	Thr	Met	Ile	Phe 5	Gly	Ile	Pro	Leu	Gln 10	Ala	Phe	Leu	Gly	Gln 15	Leu	
ctg	atc	ggg	ctc	atc	aac	ggc	tcc	ttc	tat	gcg	ctc	ctg	agc	ctc	ggc	96
Leu	Ile	Gly	Leu	Ile	Asn	Gly	Ser	Phe	Tyr	Ala	Leu	Leu	Ser	Leu	Gly	
			20					25					30			
ctc	gcc	atc	atc	ttc	ggg	ctc	ctg	cgc	gtc	atc	aac	ttc	gcc	cac	ggt	144
Leu	Ala	Ile	Ile	Phe	Gly	Leu	Leu	Arg	Val	Ile	Asn	Phe	Ala	His	Gly	
			35					40					45			
gcg	cag	tat	atg	ctc	ggc	gcc	ttc	atg	gcc	tgg	ctg	ctg	ctc	tcc	tat	192
Ala	Gln	Tyr	Met	Leu	Gly	Ala	Phe	Met	Ala	Trp	Leu	Leu	Leu	Ser	Tyr	
			50			55						60				
ttg	ggc	atc	ggc	tat	tgg	ccg	gcg	ctc	att	ctc	gcg	ccc	ctt	ctc	gtc	240
Leu	Gly	Ile	Gly	Tyr	Trp	Pro	Ala	Leu	Ile	Leu	Ala	Pro	Leu	Leu	Val	
			65			70				75					80	
ggc	ctc	atc	ggc	gcc	gtt	atc	gaa	cgc	acg	atg	ctg	aga	cgg	ctc	tat	288
Gly	Leu	Ile	Gly	Ala	Val	Ile	Glu	Arg	Thr	Met	Leu	Arg	Arg	Leu	Tyr	
				85					90					95		
acg	ctc	gat	ccg	ctc	tac	ggc	ctc	ctc	ttc	acc	ttc	ggc	ctg	gcg	ctc	336
Thr	Leu	Asp	Pro	Leu	Tyr	Gly	Leu	Leu	Phe	Thr	Phe	Gly	Leu	Ala	Leu	
			100					105					110			
acc	atc	gaa	ggc	acc	ttc	cgc	tat	ctc	tac	ggc	gcg	tcc	ggc	cag	ccc	384
Thr	Ile	Glu	Gly	Thr	Phe	Arg	Tyr	Leu	Tyr	Gly	Ala	Ser	Gly	Gln	Pro	
			115				120					125				
tat	gcg	acg	ccg	gcg	ctg	ctt	atg	ggc	ggg	gcc	aat	ctc	ggc	ttc	atg	432
Tyr	Ala	Thr	Pro	Ala	Leu	Leu	Met	Gly	Gly	Ala	Asn	Leu	Gly	Phe	Met	
			130			135					140					
ttc	ctg	cca	atc	tat	cgc	ggc	tgg	gtc	atc	gtc	ttt	tcg	ctg	gtg	atc	480
Phe	Leu	Pro	Ile	Tyr	Arg	Gly	Trp	Val	Ile	Val	Phe	Ser	Leu	Val	Ile	
					150				155					160		
tgc	ctc	ggc	acc	tgg	ctc	atg	atc	gag	aag	acc	aag	ctc	ggc	tcc	tat	528
Cys	Leu	Gly	Thr	Trp	Leu	Met	Ile	Glu	Lys	Thr	Lys	Leu	Gly	Ser	Tyr	
				165					170					175		
ctg	cgc	gcc	gct	acg	gag	aat	ccg	gtc	ctg	gtg	caa	tcc	ttc	ggc	atc	576
Leu	Arg	Ala	Ala	Thr	Glu	Asn	Pro	Val	Leu	Val	Gln	Ser	Phe	Gly	Ile	
			180					185					190			
aac	gtg	ccc	ttt	ctg	ctg	acg	ctg	acc	tac	ggg	ctc	ggc	gcg	gct	ctc	624
Asn	Val	Pro	Phe	Leu	Leu	Thr	Leu	Thr	Tyr	Gly	Leu	Gly	Ala	Ala	Leu	
			195				200					205				
gcc	gca	att	gcc	gga	gtt	ctc	gcg	gcg	ccg	atc	tac	cag	gtc	tcg	ccg	672
Ala	Ala	Ile	Ala	Gly	Val	Leu	Ala	Ala	Pro	Ile	Tyr	Gln	Val	Ser	Pro	
			210			215					220					
ctg	atg	gga	tcg	aac	atc	atc	atc	gtc	gtc	ttc	gca	gtg	gtc	gtc	gtc	720
Leu	Met	Gly	Ser	Asn	Ile	Ile	Ile	Val	Val	Phe	Ala	Val	Val	Val	Val	
				230						235				240		
ggc	ggc	atg	ggc	tcg	atc	atg	ggc	gcg	atc	gtc	acc	ggt	tat	ctg	ctg	768
Gly	Gly	Met	Gly	Ser	Ile	Met	Gly	Ala	Ile	Val	Thr	Gly	Tyr	Leu	Leu	
				245					250				255			
ggc	atc	gcc	gaa	gga	ctg	acc	aag	gtc	ttc	tat	ccg	gag	gcc	tcc	aac	816
Gly	Ile	Ala	Glu	Gly	Leu	Thr	Lys	Val	Phe	Tyr	Pro	Glu	Ala	Ser	Asn	
			260					265					270			
atc	gtg	atc	ttc	gtg	atc	atg	gcc	atc	gtt	ctc	ctg	ctg	agg	ccc	gcg	864
Ile	Val	Ile	Phe	Val	Ile	Met	Ala	Ile	Val	Leu	Leu	Leu	Arg	Pro	Ala	
			275				280					285				
ggt	ctc	ttc	ggt	cgg	gat	gct	tga									888
Gly	Leu	Phe	Gly	Arg	Asp	Ala										
			290			295										

<210> 897

<211> 295

<212> PRT

<213> Rhizobium meliloti

<400> 897

Met 1	Thr	Met	Ile	Phe 5	Gly	Ile	Pro	Leu	Gln 10	Ala	Phe	Leu	Gly	Gln 15	Leu	
Leu	Ile	Gly	Leu	Ile	Asn	Gly	Ser	Phe	Tyr	Ala	Leu	Leu	Ser	Leu	Gly	
			20					25					30			
Leu	Ala	Ile	Ile	Phe	Gly	Leu	Leu	Arg	Val	Ile	Asn	Phe	Ala	His	Gly	
			35					40				45				

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Ala Gln Tyr Met Leu Gly Ala Phe Met Ala Trp Leu Leu Ser Tyr
 50 55 60
 Leu Gly Ile Gly Tyr Trp Pro Ala Leu Ile Leu Ala Pro Leu Leu Val
 65 70 75 80
 Gly Leu Ile Gly Ala Val Ile Glu Arg Thr Met Leu Arg Arg Leu Tyr
 85 90 95
 Thr Leu Asp Pro Leu Tyr Gly Leu Leu Phe Thr Phe Gly Leu Ala Leu
 100 105 110
 Thr Ile Glu Gly Thr Phe Arg Tyr Leu Tyr Gly Ala Ser Gly Gln Pro
 115 120 125
 Tyr Ala Thr Pro Ala Leu Leu Met Gly Gly Ala Asn Leu Gly Phe Met
 130 135 140
 Phe Leu Pro Ile Tyr Arg Gly Trp Val Ile Val Phe Ser Leu Val Ile
 145 150 155 160
 Cys Leu Gly Thr Trp Leu Met Ile Glu Lys Thr Lys Leu Gly Ser Tyr
 165 170 175
 Leu Arg Ala Ala Thr Glu Asn Pro Val Leu Val Gln Ser Phe Gly Ile
 180 185 190
 Asn Val Pro Phe Leu Leu Thr Leu Thr Tyr Gly Leu Gly Ala Ala Leu
 195 200 205
 Ala Ala Ile Ala Gly Val Leu Ala Ala Pro Ile Tyr Gln Val Ser Pro
 210 215 220
 Leu Met Gly Ser Asn Ile Ile Val Val Phe Ala Val Val Val Val
 225 230 235 240
 Gly Gly Met Gly Ser Ile Met Gly Ala Ile Val Thr Gly Tyr Leu Leu
 245 250 255
 Gly Ile Ala Glu Gly Leu Thr Lys Val Phe Tyr Pro Glu Ala Ser Asn
 260 265 270
 Ile Val Ile Phe Val Ile Met Ala Ile Val Leu Leu Leu Arg Pro Ala
 275 280 285
 Gly Leu Phe Gly Arg Asp Ala
 290 295

<210> 898

<211> 891

<212> DNA

<213> Rhizobium meliloti

<220>

<221> CDS

<222> (1)..(891)

<400> 898

atg gct ttc gcg atc cag ttc gtc atc gac gtc ctg agc ctc ggc ggc	48
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1 5 10 15	
gcc tat gcg ctc atg gca ctc ggc ctc gtc atc atc tac ggc atc ctg	96
Ala Tyr Ala Leu Met Ala Leu Gly Leu Val Ile Ile Tyr Gly Ile Leu	
20 25 30	
cgc ctc gtg aac ttc gcc tat ggc gaa ctc atc atg gtg gcc ggc tac	144
Arg Leu Val Asn Phe Ala Tyr Gly Glu Leu Ile Met Val Ala Gly Tyr	
35 40 45	
acg atg ttt ctc gcc agc ggc tcg ggc ctg ccc tgg atc gtc atg gcg	192
Thr Met Phe Leu Ala Ser Gly Ser Gly Leu Pro Trp Ile Val Met Ala	
50 55 60	
gtg ctc gcc gtc ggc atg gcc atc ctc ttc ggc atc atc acc gac tat	240
Val Leu Ala Val Gly Met Ala Ile Leu Phe Gly Ile Ile Thr Asp Tyr	
65 70 75 80	
gcc gcc ttc cgt ccg gtg cgg gcc aaa tcg gtg acg gcg gtg ctg atc	288
Ala Ala Phe Arg Pro Val Arg Ala Lys Ser Val Thr Ala Val Leu Ile	
85 90 95	
aca tcc ttc gcc ttc tcc aac ctg ctg cag aac gcg gcg ctc ctc ttc	336
Thr Ser Phe Ala Phe Ser Asn Leu Leu Gln Asn Ala Ala Leu Leu Phe	
100 105 110	
atc tcg ccg gcg cct cgc aac gtg ccg ctc ccg gat atc ttc tcg cag	384
Ile Ser Pro Arg Pro Arg Asn Val Pro Leu Pro Asp Ile Phe Ser Gln	
115 120 125	
acc gtc tcg atc ggc ggt gcg atc acc ccg gtc cgc aat ctc atc acc	432
Thr Val Ser Ile Gly Gly Ala Ile Thr Pro Val Arg Asn Leu Ile Thr	

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130	atc ggc ggc tcc atc gca	135	ctc gcc ggc gtc	140	ttc ctg atg cgc	480
Ile Ala Ala Ser Ile Ala	Leu Leu Ala Gly Val Ala Phe Leu Met Arg					
145	agg acg acg ctc ggc	150	atc gcc atg cgc gca ggc ggc acg aac ttc acc	155	thr thr leu gly ile ala met arg ala ala thr asn phe thr	528
Arg Thr Thr Leu Gly	Ile Ala Met Arg Ala Ala Thr Asn Phe Thr					
165	atg gcg cgc atg ctg gga gtg ccg gcg	170	aac ctc atc atc tgc tcc gcc	175	thr thr leu gly val pro ala asn leu ile ile ser ser ala	576
Met Ala Arg Met Leu Gly Val Pro Ala Asn Leu Ile Ile Ser Ser Ala						
180	ttc gcc ctt tcc ggc ttc ctc gcc ggc gtc gtc ggc att ctc tgg atc	185	gag gag ctc gag ccg ctg ctc	190	thr thr leu gly val val gly ile leu trp ile	624
Phe Ala Leu Ser Gly Phe Leu Ala Gly Val Val Gly Ile Leu Trp Ile						
195	ggc cgc atc ggc acc gtc gtt ccg ggc atc ggc ctg gag ccg ctg ctc	200	gag gag ctc gag ccg ctg ctc	205	thr thr leu gly val val gly ile leu trp ile	672
Gly Arg Ile Gly Thr Val Val Pro Gly Ile Ile Gly Leu Glu Pro Leu Leu						
210	gtc gcc ttc atc gcc acg gtc atc ggc ggc atg cgg agc ctg ccc ggc	215	gag gag ctc gag ccg ctg ctc	220	thr thr leu gly val val gly ile leu trp ile	720
Val Ala Phe Ile Ala Thr Val Ile Gly Gly Met Arg Ser Leu Pro Gly						
225	gcc gtt gtc ggg ggc ttc ctg ctc gcc ctc atc gac acc acg ctc aac	230	gag gag ctc gag ccg ctg ctc	235	thr thr leu gly val val gly ile leu trp ile	768
Ala Val Val Gly Gly Phe Leu Leu Ala Leu Ile Asp Thr Thr Leu Asn						
245	tac acc ctg tgc cag gac ctg ctg aaa ttc cgc gac gcc ttc acc ttc	250	gag gag ctc gag ccg ctg ctc	255	thr thr leu gly val val gly ile leu trp ile	816
Tyr Thr Leu Ser Gln Asp Leu Leu Lys Phe Arg Asp Ala Phe Thr Phe						
260	agc ctc gtc atc ctg atc ctg ctc tgg cgc ccc gac ggc ctc atc agg	265	gag gag ctc gag ccg ctg ctc	270	thr thr leu gly val val gly ile leu trp ile	864
Ser Leu Val Ile Leu Ile Leu Leu Trp Arg Pro Asp Gly Leu Ile Arg						
275	ggt ccg gcg agc gga cag cgg acc tga	280	gag gag ctc gag ccg ctg ctc	285	thr thr leu gly val val gly ile leu trp ile	891
Gly Pro Ala Ser Gly Gln Arg Thr						
290		295				

<210> 899

<211> 296

<212> PRT

<213> Rhizobium meliloti

<400> 899

Met Ala Phe Ala Ile Gln Phe Val Ile Asp Val Leu Ser Leu Gly Gly	1	5	10	15
Ala Tyr Ala Leu Met Ala Leu Gly Leu Val Ile Ile Tyr Gly Ile Leu	20	25	30	35
Arg Leu Val Asn Phe Ala Tyr Gly Glu Leu Ile Met Val Ala Gly Tyr	40	45	50	55
Thr Met Phe Leu Ala Ser Gly Ser Gly Leu Pro Trp Ile Val Met Ala	60	65	70	75
Val Leu Ala Val Gly Met Ala Ile Leu Phe Gly Ile Ile Thr Asp Tyr	80	85	90	95
Ala Ala Phe Arg Pro Val Arg Ala Lys Ser Val Thr Ala Val Leu Ile	100	105	110	115
Thr Ser Phe Ala Phe Ser Asn Leu Leu Gln Asn Ala Ala Leu Phe	120	125	130	135
Ile Ser Pro Arg Pro Arg Asn Val Pro Leu Pro Asp Ile Phe Ser Gln	140	145	150	155
Thr Val Ser Ile Gly Gly Ala Ile Thr Pro Val Arg Asn Leu Ile Thr	160	165	170	175
Ile Ala Ala Ser Ile Ala Leu Leu Ala Gly Val Ala Phe Leu Met Arg	180	185	190	195
Arg Thr Thr Leu Gly Ile Ala Met Arg Ala Ala Ala Thr Asn Phe Thr	200	205	210	215
Met Ala Arg Met Leu Gly Val Pro Ala Asn Leu Ile Ile Ser Ser Ala	220	225	230	235
Phe Ala Leu Ser Gly Phe Leu Ala Gly Val Val Gly Ile Leu Trp Ile	240	245	250	255
Gly Arg Ile Gly Thr Val Val Pro Gly Ile Gly Leu Glu Pro Leu Leu	260	265	270	275
Val Ala Phe Ile Ala Thr Val Ile Gly Gly Met Arg Ser Leu Pro Gly	280	285	290	295
Ala Val Val Gly Gly Phe Leu Leu Ala Leu Ile Asp Thr Thr Leu Asn				

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Tyr Thr Leu Ser²⁴⁵ Gln Asp Leu Leu Lys²⁵⁰ Phe Arg Asp Ala Phe²⁵⁵ Thr Phe
 Ser Leu Val²⁶⁰ Ile Leu Ile Leu Leu Trp²⁶⁵ Arg Pro Asp Gly²⁷⁰ Leu Ile Arg
 Gly Pro²⁷⁵ Ala Ser Gly Gln Arg²⁸⁰ Thr
 Gly Pro²⁹⁰ Arg²⁹⁵

<210> 900

<211> 903

<212> DNA

<213> Rhizobium meliloti

<220>

<221> CDS

<222> (1)..(903)

<400> 900

atg	gag	tat	ttt	gtc	cag	cag	ctc	gtc	aac	ggg	ctg	acg	ctt	ggg	tct	48
Met	Glu	Tyr	Phe	Val	Gln	Gln	Leu	Val	Asn	Gly	Leu	Thr	Leu	Gly	Ser	
1				5				10					15			
att	tat	ggt	atg	atc	gcg	atc	ggt	tat	acc	atg	gtc	tac	ggc	atc	atc	96
Ile	Tyr	Gly	Met	Ile	Ala	Ile	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Ile	
			20					25					30			
ggc	atg	atc	aac	ttc	gcc	cac	ggc	gat	att	ttc	atg	ctt	ggc	ggc	ttt	144
Gly	Met	Ile	Asn	Phe	Ala	His	Gly	Asp	Ile	Phe	Met	Leu	Gly	Gly	Phe	
			35				40					45				
gcc	gca	tgt	atc	gtc	ttc	tgt	ctt	ctc	acg	aca	ttt	att	gcc	ggc	gtg	192
Ala	Ala	Leu	Ile	Val	Phe	Leu	Leu	Leu	Thr	Thr	Phe	Ile	Ala	Gly	Val	
			50			55						60				
ccg	gtt	gta	ctg	gcg	ctt	tgt	atc	atg	atg	gtc	gtc	ggg	atg	ctg	acg	240
Pro	Val	Val	Leu	Ala	Leu	Leu	Ile	Met	Met	Val	Val	Gly	Met	Leu	Thr	
			65		70			75							80	
gct	gcg	ctt	tgg	aac	tgg	acc	atc	gag	cg	gtg	gcc	tat	cg	ccg	ctt	288
Ala	Ala	Leu	Trp	Asn	Trp	Thr	Ile	Glu	Arg	Val	Ala	Tyr	Arg	Pro	Leu	
				85				90						95		
cg	ggc	tcc	ttc	cgt	ctg	gcg	ccg	ctg	atc	acg	gcg	atc	ggc	atg	tcg	336
Arg	Gly	Ser	Phe	Arg	Leu	Ala	Pro	Leu	Ile	Thr	Ala	Ile	Gly	Met	Ser	
			100				105						110			
atc	gtg	ctg	tcg	aac	ttc	att	cag	gtg	acg	cag	ggg	ccg	cg	aac	aag	384
Ile	Val	Leu	Ser	Asn	Phe	Ile	Gln	Val	Thr	Gln	Gly	Pro	Arg	Asn	Lys	
			115				120					125				
ccg	atc	ccg	ccg	ctg	gtc	tcc	tcg	gtc	tat	gac	ctg	ttc	ggc	atc	tcg	432
Pro	Ile	Pro	Pro	Leu	Val	Ser	Ser	Val	Tyr	Asp	Leu	Phe	Gly	Ile	Ser	
			130			135					140					
gtt	tcg	ctg	aag	cag	atc	atc	gtc	gtc	atc	acg	gca	atc	ctg	ctt		480
Val	Ser	Leu	Lys	Gln	Ile	Ile	Val	Val	Ile	Thr	Ala	Ile	Leu	Leu		
			145		150			155						160		
tcg	gtc	ttc	tgg	tac	atc	gtc	aac	cga	act	ccg	ctc	gga	cga	gcc	cag	528
Ser	Val	Phe	Trp	Tyr	Ile	Val	Asn	Arg	Thr	Pro	Leu	Gly	Arg	Ala	Gln	
				165				170						175		
cgt	gcg	acc	gaa	cag	gac	cg	aag	atg	gca	gca	ttg	ctc	ggg	gtc	gat	576
Arg	Ala	Thr	Glu	Gln	Asp	Arg	Lys	Met	Ala	Ala	Leu	Leu	Gly	Val	Asp	
			180				185						190			
gtc	gat	cg	aca	atc	tcg	gtg	acc	ttc	atc	atg	gga	gcc	gca	ctc	gcc	624
Val	Asp	Arg	Thr	Ile	Ser	Val	Thr	Phe	Ile	Met	Gly	Ala	Ala	Leu	Ala	
			195				200					205				
gcc	gtc	gcc	ggg	acg	atg	tac	ctg	atg	tat	tac	ggc	gtg	gtc	gtg	ttc	672
Ala	Val	Ala	Gly	Thr	Met	Tyr	Leu	Met	Tyr	Tyr	Gly	Val	Val	Val	Phe	
			210			215					220					
acc	gac	ggg	ttc	gct	ccg	ggg	gtc	aag	gcg	ttt	acc	gct	gcc	gtt	ctc	720
Thr	Asp	Gly	Phe	Ala	Pro	Gly	Val	Lys	Ala	Phe	Thr	Ala	Ala	Val	Leu	
			225		230				235					240		
ggg	ggg	atc	ggg	tcg	ctg	ccc	ggc	gcc	gtg	ctc	ggc	ggc	ttg	ctg	atc	768
Gly	Gly	Ile	Gly	Ser	Leu	Pro	Gly	Ala	Val	Leu	Gly	Gly	Leu	Leu	Ile	
				245				250						255		
ggg	ctc	atc	gag	tcg	ctg	tgg	tcc	gcc	tac	ttc	acc	atc	gac	tac	aag	816
Gly	Leu	Ile	Glu	Ser	Leu	Trp	Ser	Ala	Tyr	Phe	Thr	Ile	Asp	Tyr	Lys	
			260					265					270			

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gat	gtc	gcg	acc	ttc	tcg	att	ctc	gcg	atc	gtc	ctg	atc	ttc	aag	ccg	864
Asp	Val	Ala	Thr	Phe	Ser	Ile	Leu	Ala	Ile	Val	Leu	Ile	Phe	Lys	Pro	
		275					280					285				
tcg	ggt	att	ctc	gga	cga	ccg	gaa	gtc	gag	aag	gta	tag				903
Ser	Gly	Ile	Leu	Gly	Arg	Pro	Glu	Val	Glu	Lys	Val					
	290					295					300					

<210> 901

<211> 300

<212> PRT

<213> Rhizobium meliloti

<400> 901

Met	Glu	Tyr	Phe	Val	Gln	Gln	Leu	Val	Asn	Gly	Leu	Thr	Leu	Gly	Ser	
1				5					10					15		
Ile	Tyr	Gly	Met	Ile	Ala	Ile	Gly	Tyr	Thr	Met	Val	Tyr	Gly	Ile	Ile	
		20						25					30			
Gly	Met	Ile	Asn	Phe	Ala	His	Gly	Asp	Ile	Phe	Met	Leu	Gly	Gly	Phe	
		35					40					45				
Ala	Ala	Leu	Ile	Val	Phe	Leu	Leu	Leu	Thr	Thr	Phe	Ile	Ala	Gly	Val	
	50					55					60					
Pro	Val	Val	Leu	Ala	Leu	Leu	Ile	Met	Met	Val	Val	Gly	Met	Leu	Thr	
65					70				75					80		
Ala	Ala	Leu	Trp	Asn	Trp	Thr	Ile	Glu	Arg	Val	Ala	Tyr	Arg	Pro	Leu	
			85						90					95		
Arg	Gly	Ser	Phe	Arg	Leu	Ala	Pro	Leu	Ile	Thr	Ala	Ile	Gly	Met	Ser	
			100					105					110			
Ile	Val	Leu	Ser	Asn	Phe	Ile	Gln	Val	Thr	Gln	Gly	Pro	Arg	Asn	Lys	
	115						120					125				
Pro	Ile	Pro	Pro	Leu	Val	Ser	Ser	Val	Tyr	Asp	Leu	Phe	Gly	Ile	Ser	
	130					135					140					
Val	Ser	Leu	Lys	Gln	Ile	Ile	Ile	Val	Val	Ile	Thr	Ala	Ile	Leu	Leu	
145				150					155					160		
Ser	Val	Phe	Trp	Tyr	Ile	Val	Asn	Arg	Thr	Pro	Leu	Gly	Arg	Ala	Gln	
			165					170					175			
Arg	Ala	Thr	Glu	Gln	Asp	Arg	Lys	Met	Ala	Ala	Leu	Leu	Gly	Val	Asp	
		180						185					190			
Val	Asp	Arg	Thr	Ile	Ser	Val	Thr	Phe	Ile	Met	Gly	Ala	Ala	Leu	Ala	
	195						200					205				
Ala	Val	Ala	Gly	Thr	Met	Tyr	Leu	Met	Tyr	Tyr	Gly	Val	Val	Val	Phe	
	210					215					220					
Thr	Asp	Gly	Phe	Ala	Pro	Gly	Val	Lys	Ala	Phe	Thr	Ala	Ala	Val	Leu	
225				230					235					240		
Gly	Gly	Ile	Gly	Ser	Leu	Pro	Gly	Ala	Val	Leu	Gly	Gly	Leu	Leu	Ile	
			245					250					255			
Gly	Leu	Ile	Glu	Ser	Leu	Trp	Ser	Ala	Tyr	Phe	Thr	Ile	Asp	Tyr	Lys	
		260						265					270			
Asp	Val	Ala	Thr	Phe	Ser	Ile	Leu	Ala	Ile	Val	Leu	Ile	Phe	Lys	Pro	
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Ser	Gly	Ile	Leu	Gly	Arg	Pro	Glu	Val	Glu	Lys	Val					
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<210> 902

<211> 897

<212> DNA

<213> Rhizobium meliloti

<220>

<221> CDS

<222> (1)..(897)

<400> 902

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Met	Ala	Tyr	Phe	Leu	Gln	Gln	Ile	Ala	Asn	Ala	Val	Pro	Val	Ala	Ala	
1				5				10						15		
ctt	tat	gcg	gcg	ctc	gcc	ttc	gga	tac	gcg	atc	gcc	ttt	gct	gtc	aca	96
Leu	Tyr	Ala	Ala	Leu	Ala	Phe	Gly	Tyr	Ala	Ile	Ala	Phe	Ala	Val	Thr	
		20					25					30				
cgg	cgg	gcg	gac	ctg	acc	tat	ggc	gcg	ctc	ttc	gcc	ttt	gcc	ggg	caa	144

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Arg	Arg	Ala ₃₅	Asp	Leu	Thr	Tyr	Gly ₄₀	Ala	Leu	Phe	Ala	Phe ₄₅	Ala	Gly	Gln		
atc	ttc	gtg	ctc	ttc	gcg	gat	gtc	ggc	tgg	aac	cgg	ctg	tgg	ctg	gta	192	
Ile	Phe ₅₀	Val	Leu	Phe	Ala	Asp ₅₅	Val	Gly	Trp	Asn	Arg ₆₀	Leu	Trp	Leu	Val		
ctg	ccg	gcg	gcg	ctc	ggg	ctc	ggg	gcg	aca	gcg	gcg	ctc	gca	ttc	ggg	240	
Leu ₆₅	Pro	Ala	Ala	Leu	Gly ₇₀	Leu	Gly	Ala	Thr	Ala ₇₅	Ala	Leu	Ala	Phe	Gly ₈₀		
cta	ggt	gcc	ggt	ctt	att	gcc	ggc	cgc	tac	gtc	atg	cgg	ccc	ctg	gct	288	
Leu	Gly	Ala	Gly	Leu ₈₅	Ile	Ala	Gly	Arg	Tyr ₉₀	Val	Met	Arg	Pro	Leu ₉₅	Ala		
ttt	tcc	tcc	gcc	aat	gcc	gtg	gtc	gtc	gcc	tgc	ctc	gga	agc	ctg	ctg	336	
Phe	Ser	Ser	Ala ₁₀₀	Asn	Ala	Val	Val	Val ₁₀₅	Ala	Ser	Leu	Gly	Ser ₁₁₀	Leu	Leu		
gtg	ctg	atg	gaa	acg	gcc	cgg	ctc	gcc	tcc	gac	acc	aga	agc	ctc	tgg	384	
Val	Leu	Met ₁₁₅	Glu	Thr	Ala	Arg	Leu ₁₂₀	Ala	Ser	Asp	Thr	Arg ₁₂₅	Ser	Leu	Trp		
ctg	ccg	ccc	ttc	ctg	aac	gac	gtg	gtg	gtg	ttc	tgg	ccg	aac	cct	gcc	432	
Leu ₁₃₀	Pro	Pro	Phe	Leu	Asn	Asp ₁₃₅	Val	Val	Val	Phe	Trp ₁₄₀	Pro	Asn	Pro	Ala		
ttt	ccg	gtc	gcg	ctg	acg	gtc	gtg	cag	ctc	gtc	aac	acc	gcg	ctc	atg	480	
Phe ₁₄₅	Pro	Val	Ala	Leu	Thr ₁₅₀	Val	Val	Gln	Leu	Val ₁₅₅	Asn	Thr	Ala	Leu	Met ₁₆₀		
atg	gcc	ctt	gtc	gcc	ggc	ggc	cat	tgg	ctg	ttg	acc	cgt	tcc	tat	gca	528	
Met	Ala	Leu	Val ₁₆₅	Ala	Gly	Gly	His	Trp ₁₇₀	Leu	Leu	Thr	Arg	Ser	Tyr ₁₇₅	Ala		
ggc	cgc	tac	tgg	cgc	gcc	gtt	tcc	gag	gat	cgc	aag	gcc	gcc	gcg	ctt	576	
Gly	Arg	Tyr ₁₈₀	Trp	Arg	Ala	Val	Ser	Glu ₁₈₅	Asp	Arg	Lys	Ala ₁₉₀	Ala	Ala	Leu		
tgc	ggc	atc	gat	ccg	gga	gcg	gtc	tat	atc	gcc	gcc	tat	ggc	gtg	gcg	624	
Cys	Gly ₁₉₅	Ile	Asp	Pro	Gly	Ala	Val ₂₀₀	Tyr	Ile	Ala	Ala	Tyr ₂₀₅	Gly	Val	Ala		
tcg	ctg	atc	gct	gcg	ttc	tgc	ggg	att	ctc	gct	gct	tcc	tat	tac	ggc	672	
Ser	Leu ₂₁₀	Ile	Ala	Ala	Phe	Cys ₂₁₅	Gly	Ile	Leu	Ala	Ala ₂₂₀	Ser	Tyr	Tyr	Gly		
aac	atg	gat	ttc	ggc	acc	ggg	ctg	acc	ttc	ggg	gtc	aag	gtc	ctg	ttc	720	
Asn ₂₂₅	Met	Asp	Phe	Gly	Thr ₂₃₀	Gly	Leu	Thr	Phe	Gly ₂₃₅	Val	Lys	Val	Leu	Phe ₂₄₀		
atc	gcc	gcc	atc	ggc	ggg	cag	act	tcg	ccg	tta	ttc	gcg	gca	ctg	ggc	768	
Ile	Ala	Ala	Ile	Gly ₂₄₅	Gly	Gln	Thr	Ser	Pro ₂₅₀	Leu	Phe	Ala	Ala	Leu ₂₅₅	Gly		
gca	gcc	ggc	atc	ggc	ctc	atg	gag	acg	gtg	tgg	agc	gcc	tat	gga	ccc	816	
Ala	Ala	Gly ₂₆₀	Ile	Gly	Leu	Met	Glu ₂₆₅	Thr	Val	Trp	Ser	Ala ₂₇₀	Tyr	Gly	Pro		
atc	ctc	tgg	cgg	gac	ttc	gcc	ata	ttc	ggc	ttt	ctg	gtg	atc	gtg	ctc	864	
Ile	Leu ₂₇₅	Trp	Arg	Asp	Phe	Ala	Ile ₂₈₀	Phe	Gly	Phe	Leu	Val ₂₈₅	Ile	Val	Leu		
gtg	gtc	acg	cgc	cgg	gaa	aag	atc	att	ccc	tga						897	
Val ₂₉₀	Val	Thr	Arg	Arg	Glu	Lys ₂₉₅	Ile	Ile	Pro								

<210> 903

<211> 298

<212> PRT

<213> Rhizobium meliloti

<400> 903

Met	Ala	Tyr	Phe	Leu ₅	Gln	Gln	Ile	Ala	Asn ₁₀	Ala	Val	Pro	Val	Ala ₁₅	Ala		
Leu	Tyr	Ala ₂₀	Ala	Leu	Ala	Phe	Gly	Tyr ₂₅	Ala	Ile	Ala	Phe	Ala ₃₀	Val	Thr		
Arg	Arg	Ala ₃₅	Asp	Leu	Thr	Tyr	Gly ₄₀	Ala	Leu	Phe	Ala	Phe ₄₅	Ala	Gly	Gln		
Ile	Phe ₅₀	Val	Leu	Phe	Ala	Asp ₅₅	Val	Gly	Trp	Asn	Arg ₆₀	Leu	Trp	Leu	Val		
Leu ₆₅	Pro	Ala	Ala	Leu	Gly ₇₀	Leu	Gly	Ala	Thr	Ala ₇₅	Ala	Leu	Ala	Phe	Gly ₈₀		
Leu	Gly	Ala	Gly	Leu ₈₅	Ile	Ala	Gly	Arg	Tyr ₉₀	Val	Met	Arg	Pro	Leu ₉₅	Ala		

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Phe Ser Ser Ala Asn Ala Val Val Val Ala Ser Leu Gly Ser Leu Leu
 100 105 110
 Val Leu Met Glu Thr Ala Arg Leu Ala Ser Asp Thr Arg Ser Leu Trp
 115 120 125
 Leu Pro Pro Phe Leu Asn Asp Val Val Val Phe Trp Pro Asn Pro Ala
 130 135 140
 Phe Pro Val Ala Leu Thr Val Val Gln Leu Val Asn Thr Ala Leu Met
 145 150 155 160
 Met Ala Leu Val Ala Gly Gly His Trp Leu Leu Thr Arg Ser Tyr Ala
 165 170 175
 Gly Arg Tyr Trp Arg Ala Val Ser Glu Asp Arg Lys Ala Ala Ala Leu
 180 185 190
 Cys Gly Ile Asp Pro Gly Ala Val Tyr Ile Ala Ala Tyr Gly Val Ala
 195 200 205
 Ser Leu Ile Ala Ala Phe Cys Gly Ile Leu Ala Ala Ser Tyr Tyr Gly
 210 215 220
 Asn Met Asp Phe Gly Thr Gly Leu Thr Phe Gly Val Lys Val Leu Phe
 225 230 235 240
 Ile Ala Ala Ile Gly Gln Thr Ser Pro Leu Phe Ala Ala Leu Gly
 245 250 255
 Ala Ala Gly Ile Gly Leu Met Glu Thr Val Trp Ser Ala Tyr Gly Pro
 260 265 270
 Ile Leu Trp Arg Asp Phe Ala Ile Phe Gly Phe Leu Val Ile Val Leu
 275 280 285
 Val Val Thr Arg Arg Glu Lys Ile Ile Pro
 290 295

<210> 904

<211> 942

<212> DNA

<213> Synechococcus sp

<220>

<221> CDS

<222> (1)..(942)

<400> 904

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1 5 10 15	
tat gcc ctg ttt gcc ttg ggg tat acc ttg gtc ttt tcg atc ctg ggg	96
Tyr Ala Leu Phe Ala Leu Gly Tyr Thr Leu Val Phe Ser Ile Leu Gly	
20 25 30	
gtc att aac ttt gcc cat ggt gcc gtt ttt acc ctc ggt gcc tac ctg	144
Val Ile Asn Phe Ala His Gly Ala Val Phe Thr Leu Gly Ala Tyr Leu	
35 40 45	
act tac gct cta gtg ggt ggg cgt ttc agc ttc aac ggg ttg ctc gcc	192
Thr Tyr Ala Leu Val Gly Gly Arg Phe Ser Phe Asn Gly Leu Leu Ala	
50 55 60	
aat gcc gcg ctg ccc ttc agt ttg ccg ttc gcc ttg gct ctg ctg ctc	240
Asn Ala Ala Leu Pro Phe Ser Leu Pro Phe Ala Leu Ala Leu Leu Leu	
65 70 75 80	
ggc agt ttg ctg gcc ggc ggt gcc agc ctc ttg att gag caa gtg gcc	288
Gly Ser Leu Leu Ala Gly Gly Ala Ser Leu Leu Ile Glu Gln Val Ala	
85 90 95	
ttt cgt ccc ctg cgc cgc cgc caa gcg gat ccc ctc cta acc ctg atc	336
Phe Arg Pro Leu Arg Arg Arg Gln Ala Asp Pro Leu Leu Thr Leu Ile	
100 105 110	
tcc agc ctt ggc gtg gcg gtg ttt atc gtc aat ttg att caa atc ttg	384
Ser Ser Leu Gly Val Ala Val Phe Ile Val Asn Leu Ile Gln Ile Leu	
115 120 125	
gtg gga gcc gag att tac acc ttc cca agc aac atc tac ggc gac cta	432
Val Gly Ala Glu Ile Tyr Thr Phe Pro Ser Asn Ile Tyr Gly Asp Leu	
130 135 140	
ccc agt gcc atc aac tta ggc agc agc gat cgc ccg atc cag atc cgc	480
Pro Ser Ala Ile Asn Leu Gly Ser Ser Asp Arg Pro Ile Gln Ile Arg	
145 150 155 160	
acg gtg caa atc atc ctg ttt gtc gtg gcg atc gcg atg ttc agt ctg	528
Thr Val Gln Ile Ile Leu Phe Val Val Ala Ile Ala Met Phe Ser Leu	

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ctg	act	tgg	ctg	165	aat	ggc	acc	cgc	ggt	ggc	cat	gcc	ctg	175	aaa	gct	576
Leu	Thr	Trp	Leu	180	Ile	Asn	Gly	Thr	Arg	Val	Gly	His	Ala	190	Leu	Lys	Ala
ggt	gcc	gaa	gat	gcc	acc	acc	gct	agc	ctg	ctg	ggc	atc	gat	ccc	gat	624	
Val	Ala	Glu	Asp	Ala	Thr	Thr	Ala	Ser	Leu	Leu	Gly	Ile	Asp	Pro	Asp		
cgc	tac	atc	cgg	ctg	acc	ttc	ctg	agt	ggc	gtc	ctt	ggg	ggg	ttg	672		
Arg	Tyr	Ile	Arg	Leu	Thr	Phe	Phe	Leu	Ser	Gly	Val	Leu	Gly	Gly	Leu		
gcg	ggc	acc	ttg	gtc	ggt	acc	agt	gtc	agt	atc	acc	ggc	ccc	tat	ttc	720	
Ala	Gly	Thr	Leu	Val	Gly	Thr	Ser	Val	Ser	Ile	Thr	Gly	Pro	Tyr	Phe		
225					230					235					240		
ggg	att	gcc	tac	ggg	ctg	aaa	ggc	ctg	agt	gtg	atg	gtc	tta	ggg	gga	768	
Gly	Ile	Ala	Tyr	Gly	Leu	Lys	Gly	Leu	Ser	Val	Met	Val	Leu	Gly	Gly		
				245					250					255			
ctc	ggc	aat	att	ccc	ggc	acg	att	gcg	ggc	ggc	ttg	ttg	ttg	ggg	ctg	816	
Leu	Gly	Asn	Ile	Pro	Gly	Thr	Ile	Ala	Gly	Gly	Leu	Leu	Leu	Gly	Leu		
				260				265					270				
gcg	gaa	gct	tgg	gtg	ccg	cca	caa	tgg	tcg	ggc	tat	cgc	gat	gcc	ggt	864	
Ala	Glu	Ala	Trp	Val	Pro	Pro	Gln	Trp	Ser	Gly	Tyr	Arg	Asp	Ala	Val		
				275			280					285					
gcc	ttt	gcg	ctg	cta	ttt	gcc	atg	ctc	ttg	atc	cgt	ccc	cag	ggc	ttg	912	
Ala	Phe	Ala	Leu	Leu	Phe	Ala	Met	Leu	Leu	Ile	Arg	Pro	Gln	Gly	Leu		
	290					295					300						
ttt	agt	cgt	gct	cgg	aca	gag	aag	gtg	tag							942	
Phe	Ser	Arg	Ala	Arg	Thr	Glu	Lys	Val									
305					310												

<210> 905

<211> 313

<212> PRT

<213> Synechococcus sp

<400> 905

Met	Asp	Trp	Leu	Gln	Pro	Leu	Ile	Asn	Gly	Leu	Ala	Ile	Gly	Gly	Val	
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Tyr	Ala	Leu	Phe	Ala	Leu	Gly	Tyr	Thr	Leu	Val	Phe	Ser	Ile	Leu	Gly	
			20					25					30			
Val	Ile	Asn	Phe	Ala	His	Gly	Ala	Val	Phe	Thr	Leu	Gly	Ala	Tyr	Leu	
		35					40					45				
Thr	Tyr	Ala	Leu	Val	Gly	Gly	Arg	Phe	Ser	Phe	Asn	Gly	Leu	Leu	Ala	
		50			55						60					
Asn	Ala	Ala	Leu	Pro	Phe	Ser	Leu	Pro	Phe	Ala	Leu	Ala	Leu	Leu	Leu	
65				70					75					80		
Gly	Ser	Leu	Leu	Ala	Gly	Gly	Ala	Ser	Leu	Ile	Glu	Gln	Val	Ala		
			85					90					95			
Phe	Arg	Pro	Leu	Arg	Arg	Arg	Gln	Ala	Asp	Pro	Leu	Leu	Thr	Leu	Ile	
		100					105						110			
Ser	Ser	Leu	Gly	Val	Ala	Val	Phe	Ile	Val	Asn	Leu	Ile	Gln	Ile	Leu	
		115					120					125				
Val	Gly	Ala	Glu	Ile	Tyr	Thr	Phe	Pro	Ser	Asn	Ile	Tyr	Gly	Asp	Leu	
	130					135					140					
Pro	Ser	Ala	Ile	Asn	Leu	Gly	Ser	Ser	Asp	Arg	Pro	Ile	Gln	Ile	Arg	
145				150					155					160		
Thr	Val	Gln	Ile	Ile	Leu	Phe	Val	Val	Ala	Ile	Ala	Met	Phe	Ser	Leu	
			165					170					175			
Leu	Thr	Trp	Leu	Ile	Asn	Gly	Thr	Arg	Val	Gly	His	Ala	Leu	Lys	Ala	
		180						185					190			
Val	Ala	Glu	Asp	Ala	Thr	Thr	Ala	Ser	Leu	Leu	Gly	Ile	Asp	Pro	Asp	
		195					200					205				
Arg	Tyr	Ile	Arg	Leu	Thr	Phe	Phe	Leu	Ser	Gly	Val	Leu	Gly	Gly	Leu	
	210					215					220					
Ala	Gly	Thr	Leu	Val	Gly	Thr	Ser	Val	Ser	Ile	Thr	Gly	Pro	Tyr	Phe	
225					230					235					240	
Gly	Ile	Ala	Tyr	Gly	Leu	Lys	Gly	Leu	Ser	Val	Met	Val	Leu	Gly	Gly	
			245						250				255			
Leu	Gly	Asn	Ile	Pro	Gly	Thr	Ile	Ala	Gly	Gly	Leu	Leu	Leu	Gly	Leu	
			260					265					270			

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Ala Glu Ala Trp Val Pro Pro Gln Trp Ser Gly Tyr Arg Asp Ala Val
 275 280 285
 Ala Phe Ala Leu Leu Phe Ala Met Leu Leu Ile Arg Pro Gln Gly Leu
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 Phe Ser Arg Ala Arg Thr Glu Lys Val
 305 310

<210> 906

<211> 1011

<212> DNA

<213> Rhizobium loti

<220>

<221> CDS

<222> (1)..(1011)

<400> 906

atg	cca	aat	ggt	gga	acg	cga	aca	agg	acg	cgg	cgc	tcc	cgg	tcc	tcg	48
Met	Pro	Asn	Gly	Gly	Thr	Arg	Thr	Arg	Thr	Arg	Arg	Ser	Arg	Ser	Ser	
1			5					10					15			
cac	agg	gcg	gtc	agg	ttc	cgg	cca	aca	agt	aga	aac	ccc	agc	aag	cga	96
His	Arg	Ala	Val	Arg	Phe	Arg	Pro	Thr	Ser	Arg	Asn	Pro	Ser	Lys	Arg	
			20					25				30				
agt	ggt	cgc	gct	gat	gcg	acc	act	tct	acg	ccg	cag	agg	tgg	tcg	acg	144
Ser	Gly	Arg	Ala	Asp	Ala	Thr	Thr	Ser	Thr	Pro	Gln	Arg	Trp	Ser	Thr	
		35					40					45				
ctc	atg	caa	atc	gtc	ctg	aat	tgt	ctc	tcg	ctc	acg	tcg	ttc	tac	ctt	192
Leu	Met	Gln	Ile	Val	Leu	Asn	Cys	Leu	Ser	Leu	Thr	Ser	Phe	Tyr	Leu	
	50					55					60					
tgc	ttc	gcc	ctg	ggc	ctg	gca	ttg	gtg	ttc	gga	gtg	atg	cgg	atc	atc	240
Cys	Phe	Ala	Leu	Gly	Leu	Ala	Leu	Val	Phe	Gly	Val	Met	Arg	Ile	Ile	
	65				70					75				80		
aac	ttc	gct	cac	ggc	gag	ttc	ttc	atg	atc	ggc	gcc	tac	gcg	acg	tat	288
Asn	Phe	Ala	His	Gly	Glu	Phe	Phe	Met	Ile	Gly	Ala	Tyr	Ala	Thr	Tyr	
			85					90						95		
ttg	tgc	gtc	gcc	acc	ctt	gca	ccc	caa	atc	gga	gga	cca	agc	gcc	tgg	336
Leu	Cys	Val	Ala	Thr	Leu	Ala	Pro	Gln	Ile	Gly	Gly	Pro	Ser	Ala	Trp	
			100					105					110			
ctc	gtc	ggc	gca	atc	gtg	gca	gca	ggg	ata	acc	ggg	ctg	cta	ggg	gcc	384
Leu	Val	Gly	Ala	Ile	Val	Ala	Ala	Gly	Ile	Thr	Gly	Leu	Leu	Gly	Ala	
		115					120					125				
gtg	ctt	tac	agg	acg	gtg	gtc	gtt	cca	ttg	gct	gac	aag	ccg	ctt	gcg	432
Val	Leu	Tyr	Arg	Thr	Val	Val	Val	Pro	Leu	Ala	Asp	Lys	Pro	Leu	Ala	
	130				135						140					
att	ttc	att	gcg	acg	ctc	gcg	ctc	tcg	tac	gtt	ctg	cag	acg	att	gtc	480
Ile	Phe	Ile	Ala	Thr	Leu	Ala	Leu	Ser	Tyr	Val	Leu	Gln	Thr	Ile	Val	
	145				150					155				160		
gtc	cag	ata	ttc	ggt	ccg	gtt	ggc	ctc	tcc	atc	tcg	ccc	cca	ctg	cgc	528
Val	Gln	Ile	Phe	Gly	Pro	Val	Gly	Leu	Ser	Ile	Ser	Pro	Pro	Leu	Arg	
			165					170						175		
ggc	gtc	gtg	agc	gtg	gga	ggg	gca	atc	ctc	cca	gcc	tcg	cgg	gca	atg	576
Gly	Val	Val	Ser	Val	Gly	Gly	Ala	Ile	Leu	Pro	Ala	Ser	Arg	Ala	Met	
			180					185					190			
gtc	att	gta	gcc	gcg	gcc	gcc	ctt	tca	ata	ggt	tta	tgg	atc	tac	ctc	624
Val	Ile	Val	Ala	Ala	Ala	Ala	Leu	Ser	Ile	Gly	Leu	Trp	Ile	Tyr	Leu	
		195					200					205				
atg	aga	act	gaa	tca	ggt	cgt	cgc	atc	cgc	gcg	gtc	gct	cag	aat	cct	672
Met	Arg	Thr	Glu	Ser	Gly	Arg	Arg	Ile	Arg	Ala	Val	Ala	Gln	Asn	Pro	
	210				215						220					
cga	ggc	gca	ttg	ctg	cag	ggc	att	aag	acg	cgg	aat	gtt	ggc	aat	ctg	720
Arg	Gly	Ala	Leu	Leu	Gln	Gly	Ile	Lys	Thr	Arg	Asn	Val	Gly	Asn	Leu	
	225				230					235					240	
acg	ctg	att	atc	gga	tcg	ggg	atc	gca	ggc	atc	tgc	ggg	gca	gcg	atg	768
Thr	Leu	Ile	Ile	Gly	Ser	Gly	Ile	Ala	Gly	Ile	Cys	Gly	Ala	Ala	Met	
			245					250						255		
gga	ccg	ata	agc	cag	ata	tcg	ccc	tac	atg	ggt	ggt	cct	gct	ctc	tgg	816
Gly	Pro	Ile	Ser	Gln	Ile	Ser	Pro	Tyr	Met	Gly	Gly	Pro	Ala	Leu	Trp	
			260					265					270			
aaa	gcg	ttc	atc	atc	ata	att	gtg	ggc	ggg	atc	ggc	aat	gtc	tgg	gga	864

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Lys	Ala	Phe	Ile	Ile	Ile	Ile	Val	Gly	Gly	Ile	Gly	Asn	Val	Trp	Gly		
		275					280					285					
gcg	gtg	gcg	gcg	gcg	gca	atc	ttt	ggg	gtg	ctt	gat	aca	ctt	atg	tcg	912	
Ala	Val	Ala	Ala	Ala	Ala	Ile	Phe	Gly	Val	Leu	Asp	Thr	Leu	Met	Ser		
		290				295					300						
cag	ttc	ggc	ggc	ggg	cgc	ttt	ctt	gct	ctg	acg	agt	gcg	gcc	atc	atg	960	
Gln	Phe	Gly	Gly	Gly	Arg	Phe	Leu	Ala	Leu	Thr	Ser	Ala	Ala	Ile	Met		
305					310					315					320		
ctg	ttc	gtc	ctt	agc	gta	aaa	ccc	tcc	ggg	cta	ttc	ggg	gaa	aaa	gaa	1008	
Leu	Phe	Val	Leu	Ser	Val	Lys	Pro	Ser	Gly	Leu	Phe	Gly	Glu	Lys	Glu		
				325					330					335			
tga																1011	

<210> 907

<211> 336

<212> PRT

<213> Rhizobium loti

<400> 907

Met	Pro	Asn	Gly	Gly	Thr	Arg	Thr	Arg	Thr	Arg	Arg	Ser	Arg	Ser	Ser		
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His	Arg	Ala	Val	Arg	Phe	Arg	Pro	Thr	Ser	Arg	Asn	Pro	Ser	Lys	Arg		
			20					25					30				
Ser	Gly	Arg	Ala	Asp	Ala	Thr	Thr	Ser	Thr	Pro	Gln	Arg	Trp	Ser	Thr		
		35					40					45					
Leu	Met	Gln	Ile	Val	Leu	Asn	Cys	Leu	Ser	Leu	Thr	Ser	Phe	Tyr	Leu		
	50					55					60						
Cys	Phe	Ala	Leu	Gly	Leu	Ala	Leu	Val	Phe	Gly	Val	Met	Arg	Ile	Ile		
65					70					75					80		
Asn	Phe	Ala	His	Gly	Glu	Phe	Phe	Met	Ile	Gly	Ala	Tyr	Ala	Thr	Tyr		
			85						90					95			
Leu	Cys	Val	Ala	Thr	Leu	Ala	Pro	Gln	Ile	Gly	Gly	Pro	Ser	Ala	Trp		
		100						105					110				
Leu	Val	Gly	Ala	Ile	Val	Ala	Ala	Gly	Ile	Thr	Gly	Leu	Leu	Gly	Ala		
		115					120					125					
Val	Leu	Tyr	Arg	Thr	Val	Val	Val	Pro	Leu	Ala	Asp	Lys	Pro	Leu	Ala		
	130					135					140						
Ile	Phe	Ile	Ala	Thr	Leu	Ala	Leu	Ser	Tyr	Val	Leu	Gln	Thr	Ile	Val		
145					150					155					160		
Val	Gln	Ile	Phe	Gly	Pro	Val	Gly	Leu	Ser	Ile	Ser	Pro	Pro	Leu	Arg		
			165					170						175			
Gly	Val	Val	Ser	Val	Gly	Gly	Ala	Ile	Leu	Pro	Ala	Ser	Arg	Ala	Met		
		180						185					190				
Val	Ile	Val	Ala	Ala	Ala	Ala	Leu	Ser	Ile	Gly	Leu	Trp	Ile	Tyr	Leu		
		195					200					205					
Met	Arg	Thr	Glu	Ser	Gly	Arg	Arg	Ile	Arg	Ala	Val	Ala	Gln	Asn	Pro		
	210					215					220						
Arg	Gly	Ala	Leu	Leu	Gln	Gly	Ile	Lys	Thr	Arg	Asn	Val	Gly	Asn	Leu		
225					230					235					240		
Thr	Leu	Ile	Ile	Gly	Ser	Gly	Ile	Ala	Gly	Ile	Cys	Gly	Ala	Ala	Met		
			245						250					255			
Gly	Pro	Ile	Ser	Gln	Ile	Ser	Pro	Tyr	Met	Gly	Gly	Pro	Ala	Leu	Trp		
		260						265					270				
Lys	Ala	Phe	Ile	Ile	Ile	Ile	Val	Gly	Gly	Ile	Gly	Asn	Val	Trp	Gly		
		275					280					285					
Ala	Val	Ala	Ala	Ala	Ala	Ile	Phe	Gly	Val	Leu	Asp	Thr	Leu	Met	Ser		
	290					295					300						
Gln	Phe	Gly	Gly	Gly	Arg	Phe	Leu	Ala	Leu	Thr	Ser	Ala	Ala	Ile	Met		
305					310					315					320		
Leu	Phe	Val	Leu	Ser	Val	Lys	Pro	Ser	Gly	Leu	Phe	Gly	Glu	Lys	Glu		
				325					330					335			

<210> 908

<211> 897

<212> DNA

<213> Rhizobium loti

<220>

<221> CDS

<222> (1)..(897)

<400> 908

atg	agc	aac	cag	atc	atc	cag	ggc	atc	ctg	ctt	ggc	ggc	tac	tat	gcg	48
Met	Ser	Asn	Gln	Ile	Ile	Gln	Gly	Ile	Leu	Leu	Gly	Gly	Tyr	Tyr	Ala	
1				5				10					15			
ctg	atc	gcc	tgc	ggc	ctg	tcc	ttc	atg	ttc	tcg	gtg	atg	cgc	atc	atc	96
Leu	Ile	Ala	Cys	Gly	Leu	Ser	Phe	Met	Phe	Ser	Val	Met	Arg	Ile	Ile	
			20					25					30			
aac	ctc	gcc	cat	ggc	agc	ctc	gcc	gtg	ttc	gcg	gcc	ttt	gcg	ctg	tgg	144
Asn	Leu	Ala	His	Gly	Ser	Leu	Ala	Val	Phe	Ala	Ala	Phe	Ala	Leu	Trp	
			35				40					45				
tgg	ctg	gcc	tcg	cgg	ttc	cat	gtc	tcg	ccg	ttt	gtc	ggc	ctg	ctc	atc	192
Trp	Leu	Ala	Ser	Arg	Phe	His	Val	Ser	Pro	Phe	Val	Gly	Leu	Leu	Ile	
	50				55					60						
gtg	ctg	ccg	ctg	atg	gcg	gcg	atc	ggc	tgg	gcg	ctg	cag	cgc	ttc	ttg	240
Val	Leu	Pro	Leu	Met	Ala	Ala	Ile	Gly	Trp	Ala	Leu	Gln	Arg	Phe	Leu	
	65				70				75						80	
ctc	gag	cgc	agc	gcg	cgc	ggc	ggt	gcg	ctg	ctg	ccg	atc	ctg	acc	acg	288
Leu	Glu	Arg	Ser	Ala	Arg	Gly	Gly	Ala	Leu	Leu	Pro	Ile	Leu	Thr	Thr	
				85				90						95		
ttt	ggg	ctg	gcc	atc	gtc	atc	gac	aac	atg	ctg	ttc	gag	cag	ttc	ggc	336
Phe	Gly	Leu	Ala	Ile	Val	Ile	Asp	Asn	Met	Leu	Phe	Glu	Gln	Phe	Gly	
			100					105					110			
gcc	gac	acc	cgc	tca	ctg	gca	ccc	tat	atc	ggc	agc	ctg	tcc	tat	gat	384
Ala	Asp	Thr	Arg	Ser	Leu	Ala	Pro	Tyr	Ile	Gly	Ser	Leu	Ser	Tyr	Asp	
			115				120					125				
tcc	tgg	gag	tgg	ccg	ggc	agc	atc	tat	gtc	ggc	aag	ctg	gcc	gtg	atc	432
Ser	Trp	Glu	Trp	Pro	Gly	Ser	Ile	Tyr	Val	Gly	Lys	Leu	Ala	Val	Ile	
	130				135						140					
atg	ttc	gcc	acc	gcc	gtg	atc	ctg	ctg	gga	ggg	ctg	cag	ctg	ttc	ctc	480
Met	Phe	Ala	Thr	Ala	Val	Ile	Leu	Leu	Gly	Gly	Leu	Gln	Leu	Phe	Leu	
	145				150					155					160	
acc	cgc	acc	cgg	ctt	ggc	cgc	tcg	atc	cgc	gca	acg	tcg	gaa	gat	tcc	528
Thr	Arg	Thr	Arg	Leu	Gly	Arg	Ser	Ile	Arg	Ala	Thr	Ser	Glu	Asp	Ser	
				165					170					175		
gac	acg	gcc	ggc	ctg	gtc	ggc	gtc	gat	gcg	cgt	cgc	gcc	aat	gcc	ata	576
Asp	Thr	Ala	Gly	Leu	Val	Gly	Val	Asp	Ala	Arg	Arg	Ala	Asn	Ala	Ile	
			180					185					190			
gcc	gct	tcc	atc	gcc	atg	gtc	acg	gtc	ggc	ctt	gcc	ggc	gcg	ttc	ctg	624
Ala	Ala	Ser	Ile	Ala	Met	Val	Thr	Val	Gly	Leu	Ala	Gly	Ala	Phe	Leu	
		195					200					205				
ggc	atg	cgc	gcc	acc	ttc	gat	ccc	tat	gcc	ggc	gcg	ccg	caa	ctg	ctg	672
Gly	Met	Arg	Ala	Thr	Phe	Asp	Pro	Tyr	Ala	Gly	Ala	Pro	Gln	Leu	Leu	
	210					215						220				
ttc	gct	ttc	gaa	gcc	gca	gtg	atc	ggc	ggc	gcc	ggt	tcg	ctg	tgg	ggc	720
Phe	Ala	Phe	Glu	Ala	Ala	Val	Ile	Gly	Gly	Ala	Gly	Ser	Leu	Trp	Gly	
	225				230					235					240	
acg	ctg	gtc	ggc	ggc	atc	gtg	ctg	gcg	ctt	gcg	cag	aca	ctt	ggc	gcg	768
Thr	Leu	Val	Gly	Gly	Ile	Val	Leu	Ala	Leu	Ala	Gln	Thr	Leu	Gly	Ala	
				245					250					255		
caa	gtg	cat	ccg	caa	ggc	ttt	ctg	atc	ggc	ggc	cac	acg	gtg	ttc	ctc	816
Gln	Val	His	Pro	Gln	Gly	Phe	Leu	Ile	Gly	Gly	His	Thr	Val	Phe	Leu	
			260				265						270			
gtc	gtg	ctc	ttc	gtg	cgg	ctg	tcc	acg	tcg	ggc	ctt	ggc	ctg	cgc	ggc	864
Val	Val	Leu	Phe	Val	Arg	Leu	Ser	Thr	Ser	Gly	Leu	Gly	Leu	Arg	Gly	
			275				280					285				
ctg	ttg	cgc	ctt	cct	tcc	cgg	agc	gcg	tca	tga						897
Leu	Leu	Arg	Leu	Pro	Ser	Arg	Ser	Ala	Ser							
	290					295										

<210> 909

<211> 298

<212> PRT

<213> Rhizobium loti

<400> 909

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Met Ser Asn Gln Ile Ile Gln Gly Ile Leu Leu Gly Gly Tyr Tyr Ala
 1 15
 Leu Ile Ala Cys Gly Leu Ser Phe Met Phe Ser Val Met Arg Ile Ile
 20 30
 Asn Leu Ala His Gly Ser Leu Ala Val Phe Ala Ala Phe Ala Leu Trp
 35 40 45
 Trp Leu Ala Ser Arg Phe His Val Ser Pro Phe Val Gly Leu Leu Ile
 50 55 60
 Val Leu Pro Leu Met Ala Ala Ile Gly Trp Ala Leu Gln Arg Phe Leu
 65 70 75 80
 Leu Glu Arg Ser Ala Arg Gly Gly Ala Leu Leu Pro Ile Leu Thr Thr
 85 90 95
 Phe Gly Leu Ala Ile Val Ile Asp Asn Met Leu Phe Glu Gln Phe Gly
 100 105 110
 Ala Asp Thr Arg Ser Leu Ala Pro Tyr Ile Gly Ser Leu Ser Tyr Asp
 115 120 125
 Ser Trp Glu Trp Pro Gly Ser Ile Tyr Val Gly Lys Leu Ala Val Ile
 130 135 140
 Met Phe Ala Thr Ala Val Ile Leu Leu Gly Gly Leu Gln Leu Phe Leu
 145 150 155 160
 Thr Arg Thr Arg Leu Gly Arg Ser Ile Arg Ala Thr Ser Glu Asp Ser
 165 170 175
 Asp Thr Ala Gly Leu Val Gly Val Asp Ala Arg Arg Ala Asn Ala Ile
 180 185 190
 Ala Ala Ser Ile Ala Met Val Thr Val Gly Leu Ala Gly Ala Phe Leu
 195 200 205
 Gly Met Arg Ala Thr Phe Asp Pro Tyr Ala Gly Ala Pro Gln Leu Leu
 210 215 220
 Phe Ala Phe Glu Ala Ala Val Ile Gly Gly Ala Gly Ser Leu Trp Gly
 225 230 235 240
 Thr Leu Val Gly Gly Ile Val Leu Ala Leu Ala Gln Thr Leu Gly Ala
 245 250 255
 Gln Val His Pro Gln Gly Phe Leu Ile Gly Gly His Thr Val Phe Leu
 260 265 270
 Val Val Leu Phe Val Arg Leu Ser Thr Ser Gly Leu Gly Leu Arg Gly
 275 280 285
 Leu Leu Arg Leu Pro Ser Arg Ser Ala Ser
 290 295

<210> 910

<211> 909

<212> DNA

<213> Rhizobium loti

<220>

<221> CDS

<222> (1)..(909)

<400> 910

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Met Ser Leu Gln Phe Val Val Asp Gly Leu Leu Thr Gly Ser Met Ile	
1 5 10 15	
ggc ctt ggc gcc att ggc gtg acg ctg acc tat tcg atc ctg cgc ttc	96
Gly Leu Gly Ala Ile Gly Val Thr Leu Thr Tyr Ser Ile Leu Arg Phe	
20 25 30	
tcg aat ttt gcc cat ggc gac ttc atg gcc tgg ggc acc tat gcg acg	144
Ser Asn Phe Ala His Gly Asp Phe Met Ala Trp Gly Thr Tyr Ala Thr	
35 40 45	
ctc gcc gtc gtc agc gcc att ggt gcc acc ttc ggc aag gta gca ccc	192
Leu Ala Val Val Ser Ala Ile Gly Ala Thr Phe Gly Lys Val Ala Pro	
50 55 60	
atc gcg ccg ctg tcc ttc ggc tgg ccg ctc ctg gtt gcg ctg gtc gtc	240
Ile Ala Pro Leu Ser Phe Gly Trp Pro Leu Leu Val Ala Leu Val Val	
65 70 75 80	
ggc atg gcc ttc acc gcc ttg ctg gcc ctg ctg ctc gac aga gtg ctg	288
Gly Met Ala Phe Thr Ala Leu Leu Ala Leu Leu Leu Asp Arg Val Leu	
85 90 95	
ttc tcg cgg ctg cgc tcc cag ggc cag gcg att atc gtg gtg atg gcg	336
Phe Ser Arg Leu Arg Ser Gln Gly Gln Ala Ile Ile Val Val Met Ala	

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			100							105							110				
agc	ttc	ggt	gcc	tcg	atg	gcg	ttg	agg	agc	ctg	ctc	gaa	ttc	acc	ttc				384		
Ser	Phe	Gly	Ala	Ser	Met	Ala	Leu	Arg	Ser	Leu	Leu	Glu	Phe	Thr	Phe						
			115							120											
agc	tcg	cgg	ccg	acc	tat	ttc	agc	cgg	gcg	atc	cag	att	gcc	atg	ccg				432		
Ser	Ser	Arg	Pro	Thr	Tyr	Phe	Ser	Arg	Ala	Ile	Gln	Ile	Ala	Met	Pro						
			130							135											
gtc	ggc	ttc	ggc	atc	cgc	gtc	acc	ccc	gac	cag	atc	gcg	ctt	ctg	ctg				480		
Val	Gly	Phe	Gly	Ile	Arg	Val	Thr	Pro	Asp	Gln	Ile	Ala	Leu	Leu	Leu						
			145							150											
ctg	acc	acg	gtg	ctg	gtg	ctc	ggc	gtg	cat	ctg	ttg	atg	acg	cgc	acg				528		
Leu	Thr	Thr	Val	Leu	Val	Leu	Gly	Val	His	Leu	Leu	Met	Thr	Arg	Thr						
			165							170											
cag	acc	ggc	cgc	gcc	atg	cag	gcg	ctc	agc	cag	aac	gcg	gcg	ctg	gcc				576		
Gln	Thr	Gly	Arg	Ala	Met	Gln	Ala	Leu	Ser	Gln	Asn	Ala	Ala	Leu	Ala						
			180							185											
cgc	atc	gtc	ggc	atc	gac	gtc	gcc	agc	gtc	gtg	cgc	gtc	acc	tgg	atc				624		
Arg	Ile	Val	Gly	Ile	Asp	Val	Ala	Ser	Val	Val	Arg	Val	Thr	Trp	Ile						
			195							200											
atc	ggc	ggc	gcg	ctc	gcc	tgc	gtc	gcc	ggc	gtg	atg	atc	ggc	atc	ctg				672		
Ile	Gly	Gly	Ala	Leu	Ala	Cys	Val	Ala	Gly	Val	Met	Ile	Gly	Ile	Leu						
			210							215											
gtg	cag	atc	cgt	ccg	ttc	atg	ggc	ttc	gac	atg	ctg	ctg	ccg	atg	ttc				720		
Val	Gln	Ile	Arg	Pro	Phe	Met	Gly	Phe	Asp	Met	Leu	Leu	Pro	Met	Phe						
			225							230											
gcc	gcc	gcc	atc	ctc	ggc	ggc	atc	ggc	agc	att	ccg	ggt	gcg	gtg	ctc				768		
Ala	Ala	Ala	Ile	Leu	Gly	Gly	Ile	Gly	Ser	Ile	Pro	Gly	Ala	Val	Leu						
			245							250											
ggc	ggg	ctg	atc	atc	ggg	ctc	gcc	gag	gcc	ggc	gcg	gtg	cag	ctg	atc				816		
Gly	Gly	Leu	Ile	Ile	Gly	Leu	Ala	Glu	Ala	Gly	Ala	Val	Gln	Leu	Ile						
			260							265											
ggc	gcc	gaa	tgg	cgc	gcc	gcc	gtc	tcc	ttc	atc	atc	ctg	atg	gcg	gtg				864		
Gly	Ala	Glu	Trp	Arg	Ala	Ala	Val	Ser	Phe	Ile	Ile	Leu	Met	Ala	Val						
			275							280											
ctg	ttc	gtg	cgg	ccg	atc	ggc	ctt	ttc	gga	gtt	cgg	gaa	aga	tga					909		
Leu	Phe	Val	Arg	Pro	Ile	Gly	Leu	Phe	Gly	Val	Arg	Glu	Arg								
			290							295											

<210> 911

<211> 302

<212> PRT

<213> Rhizobium loti

<400> 911

Met Ser Leu Gln Phe Val Val Asp Gly Leu Leu Thr Gly Ser Met Ile
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Gly Leu Gly Ala Ile Gly Val Thr Leu Thr Tyr Ser Ile Leu Arg Phe
20 25 30
Ser Asn Phe Ala His Gly Asp Phe Met Ala Trp Gly Thr Tyr Ala Thr
35 40 45
Leu Ala Val Val Ser Ala Ile Gly Ala Thr Phe Gly Lys Val Ala Pro
50 55 60
Ile Ala Pro Leu Ser Phe Gly Trp Pro Leu Leu Val Ala Leu Val Val
65 70 75 80
Gly Met Ala Phe Thr Ala Leu Leu Ala Leu Leu Asp Arg Val Leu
85 90 95
Phe Ser Arg Leu Arg Ser Gln Gly Gln Ala Ile Ile Val Val Met Ala
100 105 110
Ser Phe Gly Ala Ser Met Ala Leu Arg Ser Leu Leu Glu Phe Thr Phe
115 120 125
Ser Ser Arg Pro Thr Tyr Phe Ser Arg Ala Ile Gln Ile Ala Met Pro
130 135 140
Val Gly Phe Gly Ile Arg Val Thr Pro Asp Gln Ile Ala Leu Leu Leu
145 150 155 160
Leu Thr Thr Val Leu Val Leu Gly Val His Leu Leu Met Thr Arg Thr
165 170 175
Gln Thr Gly Arg Ala Met Gln Ala Leu Ser Gln Asn Ala Ala Leu Ala
180 185 190
Arg Ile Val Gly Ile Asp Val Ala Ser Val Val Arg Val Thr Trp Ile

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195
 Ile Gly Ala Leu Ala Cys 200 Val Ala Gly Val Met 205 Ile Gly Ile Leu
 210 Gly 215 Phe Met Gly Phe Asp Met 220 Leu Leu Pro Met Phe
 225 Val Gln Ile Arg Pro 230 Gly Gly Ile Gly Ser 235 Ile Pro Gly Ala Val Leu
 Ala Ala Ala Ile Leu 245 Gly Leu Ala Glu 250 Ala Gly Ala Val Gln 255 Ile
 Gly Gly Leu Ile 260 Gly Leu Ala Val Ser Phe Ile Ile Leu Met Ala Val
 Gly Ala Glu Trp Arg Ala Ala Val 265 Ser Phe Ile Ile Leu Met Ala Val
 275 Arg Pro Ile Gly 280 Leu Phe Gly Val Arg 285 Glu Arg
 Leu Phe Val 290 Gly 295 300

<210> 912

<211> 900

<212> DNA

<213> Rhizobium loti

<220>

<221> CDS

<222> (1)..(900)

<400> 912

atg atc gcc gat ttc gac tac cag ttc ttc atc gaa gtg ctc gtc ggc	48
Met Ile Ala Asp Phe Asp Tyr Gln Phe Phe Ile Glu Val Leu Val Gly	
1 5 10 15	
ggc ctg ctc tcc ggc gtc atg tac tcg ctg gtc gcg atc ggc ttc gtg	96
Gly Leu Leu Ser Gly Val Met Tyr Ser Leu Val Ala Ile Gly Phe Val	
20 25 30	
ctg atc tac aag aca tca ggc gtg ctc aat ttc gcg caa ggc gcg ctg	144
Leu Ile Tyr Lys Thr Ser Gly Val Leu Asn Phe Ala Gln Gly Ala Leu	
35 40 45	
ctc ttg ttc gcg gca ctc acc ttc gtc agc ctc gtc gaa cgc ggt gtt	192
Leu Leu Phe Ala Ala Leu Thr Phe Val Ser Leu Val Glu Arg Gly Val	
50 55 60	
ccc ttc gcg ctg gcg ctg gtg gcc acc ttc gcc atc atg gtg gcg atc	240
Pro Phe Ala Leu Ala Leu Val Ala Thr Phe Ala Ile Met Val Ala Ile	
65 70 75 80	
ggc atc gcc atc gag cgc acg gtg ctc agg ccg ctc acc aac aag ccg	288
Gly Ile Ala Ile Glu Arg Thr Val Leu Arg Pro Leu Thr Asn Lys Pro	
85 90 95	
ccg atc acg ctc ttc atg gcc acg ctc ggc ctg tcc tac atc atc gag	336
Pro Ile Thr Leu Phe Met Ala Thr Leu Gly Leu Ser Tyr Ile Ile Glu	
100 105 110	
ggc gcc gcc cag ttg atc tgg ggc acg cag gtc cat ggc gac ctc	384
Gly Ala Ala Gln Leu Ile Trp Gly Thr Gln Val His Gly Leu Asp Leu	
115 120 125	
ggc atc gag gat gtg ccg ctg gaa gtc ggc ggt gtg ctg atc agc cag	432
Gly Ile Glu Asp Val Pro Leu Glu Val Gly Gly Val Leu Ile Ser Gln	
130 135 140	
ttc gac atc ttc gcg gct gtg gtc gcc gcc ggc atg gtt ctg ctg ctg	480
Phe Asp Ile Phe Ala Ala Val Val Ala Ala Gly Met Val Leu Leu Leu	
145 150 155 160	
tcg ctg ttc ttc cgc tac acc cgc atc ggc ctc tcc ttc cgc gcc gtc	528
Ser Leu Phe Phe Arg Tyr Thr Arg Ile Gly Leu Ser Phe Arg Ala Val	
165 170 175	
gcc gac gat cag ttc gcc gcc cta gcg gtc ggc ctc agg ctg ccg ctg	576
Ala Asp Asp Gln Phe Ala Ala Leu Ala Val Gly Leu Arg Leu Pro Leu	
180 185 190	
atc tgg gcg acc gtc tgg gcc gcg gcc ggc ctc gtc gcg ctg gtc gcg	624
Ile Trp Ala Thr Val Trp Ala Ala Ala Gly Leu Val Ala Leu Val Ala	
195 200 205	
gga ctg ctc tgg ggc gcc cgc ctc ggc gtg cag ttc tca ctg tcc ctg	672
Gly Leu Leu Trp Gly Ala Arg Leu Gly Val Gln Phe Ser Leu Ser Leu	
210 215 220	
gtg gtg ctc aag gcg ctg ccg gtg ctg gtg ctt ggc ggc ttc gat tcg	720
Val Val Leu Lys Ala Leu Pro Val Leu Val Leu Gly Gly Phe Asp Ser	
225 230 235 240	

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atc	ctc	ggc	gcc	atc	gtc	ggc	ggc	ctc	ttg	atc	ggc	gcc	agc	gag	aag	768
Ile	Leu	Gly	Ala	Ile	Val	Gly	Gly	Leu	Leu	Ile	Gly	Ala	Ser	Glu	Lys	
				245				250						255		
ctc	gcc	gag	gtc	tat	atc	ggc	gac	tat	ttc	ggc	ggc	ggc	atc	gag	agc	816
Leu	Ala	Glu	Val	Tyr	Ile	Gly	Asp	Tyr	Phe	Gly	Gly	Gly	Ile	Glu	Ser	
			260					265						270		
tgg	ttc	gcc	tat	gtc	gtg	gcg	ctt	gcc	ttc	ctc	ctg	atc	cgt	ccc	tcc	864
Trp	Phe	Ala	Tyr	Val	Val	Ala	Leu	Ala	Phe	Leu	Leu	Ile	Arg	Pro	Ser	
		275					280					285				
ggc	ctg	ttc	ggc	cag	aag	ctc	gtg	gag	agg	gtc	tga					900
Gly	Leu	Phe	Gly	Gln	Lys	Leu	Val	Glu	Arg	Val						
	290					295										

<210> 913

<211> 299

<212> PRT

<213> Rhizobium loti

<400> 913

Met	Ile	Ala	Asp	Phe	Asp	Tyr	Gln	Phe	Phe	Ile	Glu	Val	Leu	Val	Gly	
1				5				10						15		
Gly	Leu	Leu	Ser	Gly	Val	Met	Tyr	Ser	Leu	Val	Ala	Ile	Gly	Phe	Val	
			20					25					30			
Leu	Ile	Tyr	Lys	Thr	Ser	Gly	Val	Leu	Asn	Phe	Ala	Gln	Gly	Ala	Leu	
		35					40					45				
Leu	Leu	Phe	Ala	Ala	Leu	Thr	Phe	Val	Ser	Leu	Val	Glu	Arg	Gly	Val	
	50				55						60					
Pro	Phe	Ala	Leu	Ala	Leu	Val	Ala	Thr	Phe	Ala	Ile	Met	Val	Ala	Ile	
65				70					75					80		
Gly	Ile	Ala	Ile	Glu	Arg	Thr	Val	Leu	Arg	Pro	Leu	Thr	Asn	Lys	Pro	
			85					90					95			
Pro	Ile	Thr	Leu	Phe	Met	Ala	Thr	Leu	Gly	Leu	Ser	Tyr	Ile	Ile	Glu	
		100						105					110			
Gly	Ala	Ala	Gln	Leu	Ile	Trp	Gly	Thr	Gln	Val	His	Gly	Leu	Asp	Leu	
	115						120					125				
Gly	Ile	Glu	Asp	Val	Pro	Leu	Glu	Val	Gly	Gly	Val	Leu	Ile	Ser	Gln	
	130					135					140					
Phe	Asp	Ile	Phe	Ala	Ala	Val	Val	Ala	Ala	Gly	Met	Val	Leu	Leu	Leu	
145				150					155					160		
Ser	Leu	Phe	Phe	Arg	Tyr	Thr	Arg	Ile	Gly	Leu	Ser	Phe	Arg	Ala	Val	
			165					170					175			
Ala	Asp	Asp	Gln	Phe	Ala	Ala	Leu	Ala	Val	Gly	Leu	Arg	Leu	Pro	Leu	
		180					185						190			
Ile	Trp	Ala	Thr	Val	Trp	Ala	Ala	Ala	Gly	Leu	Val	Ala	Leu	Val	Ala	
	195					200						205				
Gly	Leu	Leu	Trp	Gly	Ala	Arg	Leu	Gly	Val	Gln	Phe	Ser	Leu	Ser	Leu	
	210					215					220					
Val	Val	Leu	Lys	Ala	Leu	Pro	Val	Leu	Val	Leu	Gly	Gly	Phe	Asp	Ser	
225				230				235						240		
Ile	Leu	Gly	Ala	Ile	Val	Gly	Gly	Leu	Leu	Ile	Gly	Ala	Ser	Glu	Lys	
			245					250					255			
Leu	Ala	Glu	Val	Tyr	Ile	Gly	Asp	Tyr	Phe	Gly	Gly	Gly	Ile	Glu	Ser	
		260					265						270			
Trp	Phe	Ala	Tyr	Val	Val	Ala	Leu	Ala	Phe	Leu	Leu	Ile	Arg	Pro	Ser	
		275					280					285				
Gly	Leu	Phe	Gly	Gln	Lys	Leu	Val	Glu	Arg	Val						
	290					295										

<210> 914

<211> 906

<212> DNA

<213> Rhizobium loti

<220>

<221> CDS

<222> (1)..(906)

<400> 914

atg	ctc	tat	ttc	ttc	cag	cag	gtg	ctg	aac	ggg	ctg	cat	tcc	ggc	gcg	48
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Met 1	Leu	Tyr	Phe	Phe 5	Gln	Gln	Val	Leu	Asn 10	Gly	Leu	His	Ser	Gly 15	Ala		
ctc	tat	gcg	tgt	ctc	gcc	ttc	ggc	tac	gtg	ctg	atc	aac	ggc	atc	ctg	96	
Leu	Tyr	Ala	Leu 20	Leu	Ala	Phe	Gly	Tyr 25	Val	Leu	Ile	Asn	Gly 30	Ile	Leu		
cac	cg	acc	aac	ctc	gcc	tat	ggc	g	ctg	ttc	gcc	ttc	agc	gga	cag	144	
His	Arg	Thr 35	Asn	Leu	Ala	Tyr	Gly 40	Ala	Leu	Phe	Ala	Phe 45	Ser	Gly	Gln		
gca	atg	atc	ctg	agc	gtc	gcc	ttc	ggc	tac	cag	gtg	ctg	tgg	ctg	acg	192	
Ala	Met 50	Ile	Leu	Ser	Val	Ala 55	Phe	Gly	Tyr	Gln	Val 60	Leu	Trp	Leu	Thr		
ctg	ctg	gtg	tgc	gtg	ctg	ttc	ggc	gtg	gtc	g	gca	ttc	ctt	tat	gcc	240	
Leu	Leu	Val	Ser	Val	Leu 70	Phe	Gly	Val	Val	Ala 75	Ala	Phe	Leu	Tyr	Ala 80		
gcg	ctg	atc	agc	cat	gtc	ctg	tgc	cg	agc	gtc	ttc	gaa	ccg	ttg	gcc	288	
Ala	Leu	Ile	Ser	His 85	Val	Leu	Ser	Arg	Ser 90	Val	Phe	Glu	Pro	Leu	Ala		
gac	cg	tgc	ccc	aac	gcc	atc	gtg	gtg	acg	acg	ctg	ggc	atc	ctg	atc	336	
Asp	Arg	Ser	Pro 100	Asn	Ala	Ile	Val	Val 105	Thr	Thr	Leu	Gly 110	Ile	Leu	Ile		
gtg	ctg	tgc	gaa	gca	agt	cg	atc	gcg	gcc	gac	acg	cat	gat	ctg	tgg	384	
Val	Leu	Ser 115	Glu	Ala	Ser	Arg	Ile 120	Ala	Ala	Asp	Thr	His 125	Asp	Leu	Trp		
ctg	ccg	cca	atg	ctg	gca	cag	ccc	atc	g	gtt	ttc	gcc	gaa	ggc	ggc	432	
Leu	Pro 130	Pro	Met	Leu	Ala	Gln 135	Pro	Ile	Val	Phe	Ala 140	Glu	Gly	Ala	Gly		
ttc	aag	gcg	acg	ctg	acg	ctg	atc	cag	gtg	ctc	gac	tgc	gcg	gtg	gtg	480	
Phe 145	Lys	Ala	Thr	Leu	Thr 150	Leu	Ile	Gln	Val	Leu 155	Asp	Cys	Ala	Val	Val 160		
ctg	gcg	gcg	gtc	gca	ctc	gcc	acc	tca	gcg	ttt	gcc	cg	tcc	agc	ttc	528	
Leu	Ala	Ala	Val	Ala 165	Leu	Ala	Thr	Ser	Ala 170	Phe	Ala	Arg	Ser	Ser	Phe		
ggc	cg	cg	tgg	cg	gcc	gtg	tcc	gac	gac	ccg	cg	gcc	gcc	gcc	ctg	576	
Gly	Arg	Arg	Trp 180	Arg	Ala	Val	Ser	Asp 185	Asp	Pro	Arg	Ala 190	Ala	Ala	Leu		
tgc	ggc	gtc	gac	gtg	cg	ggc	gtg	ttc	cg	cat	gcc	gtg	ctg	ctc	ggc	624	
Cys	Gly	Val 195	Asp	Val	Arg	Gly	Val 200	Phe	Arg	His	Ala 205	Val	Leu	Leu	Gly		
ggc	ttt	tgc	gcc	gcg	ctg	gcc	ggc	gtc	atg	gcc	agc	ctc	tac	tac	ggc	672	
Gly	Phe 210	Cys	Ala	Ala	Leu	Ala 215	Gly	Val	Met	Ala 220	Ser	Leu	Tyr	Tyr	Gly		
aat	gtc	agc	ttc	ggt	tcc	ggc	ctc	gtc	tat	ggc	ctg	aag	atc	ctg	ttc	720	
Asn 225	Val	Ser	Phe	Gly 230	Ser	Gly	Leu	Val	Tyr	Gly 235	Leu	Lys	Ile	Leu	Phe 240		
gtg	acg	gcg	gtc	ggc	tat	ctc	tgc	ccg	cca	cg	gca	gcg	ctt	ggc	768		
Val	Thr	Ala	Val	Gly 245	Gly	Tyr	Leu	Ser	Pro 250	Pro	Arg	Ala	Ala	Leu	Gly		
gcg	gcc	gcc	ttc	ggc	atg	gcc	gaa	tca	ctg	tgg	gcc	ggt	tat	ttc	ccg	816	
Ala	Ala	Ala	Phe 260	Gly	Met	Ala	Glu	Ser 265	Leu	Trp	Ala	Gly 270	Tyr	Phe	Pro		
atc	gaa	tgg	cg	gat	gcg	tgg	atg	tat	ctg	ttc	ctg	gtg	gcc	atg	ctg	864	
Ile	Glu 275	Trp	Arg	Asp	Ala	Trp 280	Met	Tyr	Leu	Phe	Leu	Val 285	Ala	Met	Leu		
atc	ctc	atc	ggc	gcc	ggt	cg	gac	acc	ggc	aag	gtc	gtc	tga			906	
Ile	Leu 290	Ile	Gly	Ala	Gly 295	Arg	Asp	Thr	Gly	Lys	Val 300	Val					

<210> 915

<211> 301

<212> PRT

<213> Rhizobium loti

<400> 915

Met 1	Leu	Tyr	Phe	Phe 5	Gln	Gln	Val	Leu	Asn 10	Gly	Leu	His	Ser	Gly 15	Ala		
Leu	Tyr	Ala	Leu 20	Leu	Ala	Phe	Gly	Tyr 25	Val	Leu	Ile	Asn	Gly 30	Ile	Leu		
His	Arg	Thr 35	Asn	Leu	Ala	Tyr	Gly 40	Ala	Leu	Phe	Ala	Phe 45	Ser	Gly	Gln		

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Ala Met Ile Leu Ser Val Ala Phe Gly Tyr Gln Val Leu Trp Leu Thr
 50 55 60
 Leu Leu Val Ser Val Leu Phe Gly Val Val Ala Ala Phe Leu Tyr Ala
 65 70 75 80
 Ala Leu Ile Ser His Val Leu Ser Arg Ser Val Phe Glu Pro Leu Ala
 85 90 95
 Asp Arg Ser Pro Asn Ala Ile Val Val Thr Thr Leu Gly Ile Leu Ile
 100 105 110
 Val Leu Ser Glu Ala Ser Arg Ile Ala Ala Asp Thr His Asp Leu Trp
 115 120 125
 Leu Pro Pro Met Leu Ala Gln Pro Ile Val Phe Ala Glu Gly Ala Gly
 130 135 140
 Phe Lys Ala Thr Leu Thr Leu Ile Gln Val Leu Asp Cys Ala Val Val
 145 150 155 160
 Leu Ala Ala Val Ala Leu Ala Thr Ser Ala Phe Ala Arg Ser Ser Phe
 165 170 175
 Gly Arg Arg Trp Arg Ala Val Ser Asp Asp Pro Arg Ala Ala Leu
 180 185 190
 Cys Gly Val Asp Val Arg Gly Val Phe Arg His Ala Val Leu Gly
 195 200 205
 Gly Phe Cys Ala Ala Leu Ala Gly Val Met Ala Ser Leu Tyr Tyr Gly
 210 215 220
 Asn Val Ser Phe Gly Ser Gly Leu Val Tyr Gly Leu Lys Ile Leu Phe
 225 230 235 240
 Val Thr Ala Val Gly Gly Tyr Leu Ser Pro Pro Arg Ala Ala Leu Gly
 245 250 255
 Ala Ala Ala Phe Gly Met Ala Glu Ser Leu Trp Ala Gly Tyr Phe Pro
 260 265 270
 Ile Glu Trp Arg Asp Ala Trp Met Tyr Leu Phe Leu Val Ala Met Leu
 275 280 285
 Ile Leu Ile Gly Ala Gly Arg Asp Thr Gly Lys Val Val
 290 295 300

<210> 916

<211> 882

<212> DNA

<213> Rhizobium loti

<220>

<221> CDS

<222> (1)..(882)

<400> 916

atg cac ttc gga ccg cat ctc ctc ctt gcc gcc ctc gaa ggc ctc gtc	48
Met His Phe Gly Pro His Leu Leu Leu Ala Ala Leu Glu Gly Leu Val	
1 5 10 15	
aca tca gcc gtg ctg gcg ctg acg gcg ctt gga ctg tcg ctg gtg ttc	96
Thr Ser Ala Val Leu Ala Leu Thr Ala Leu Gly Leu Ser Leu Val Phe	
20 25 30	
ggc gtg atg cgg gtg gtc aac gtc gcg cat ggc gag ttc ttc atg ctg	144
Gly Val Met Arg Val Val Asn Val Ala His Gly Glu Phe Phe Met Leu	
35 40 45	
ggc gcc gtg ctc gcc tgg gca atc aca tca gca atc ggc ggc cat ccg	192
Gly Ala Val Leu Ala Trp Ala Ile Thr Ser Ala Ile Gly Gly His Pro	
50 55 60	
gcg ctc ggc ttc cta gcg gcg ctg gtg atc gcg ccg ctg atc gtc ggt	240
Ala Leu Gly Phe Leu Ala Ala Leu Val Ile Ala Pro Leu Ile Val Gly	
65 70 75 80	
gcc att gcg ctg gtc gcc gaa ccg ctg gtg ttg cgc ccg ctg aac tac	288
Ala Ile Ala Leu Val Ala Glu Arg Leu Val Leu Arg Arg Leu Asn Tyr	
85 90 95	
aat ccg gaa gcc acc atc gtt gcc acc atc ggc atg ctt tac atc atc	336
Asn Pro Glu Ala Thr Ile Val Ala Thr Ile Gly Met Leu Tyr Ile Ile	
100 105 110	
cag cag ctg gca ctg agc ttc tat ggt ccc gaa gcg ccg ccg gtg gag	384
Gln Gln Leu Ala Leu Ser Phe Tyr Gly Pro Glu Ala Arg Pro Val Glu	
115 120 125	
ccg ccg ttc agc tac cgc atc ttg ccg tgg ttc ggc tat tcc ggc	432
Pro Pro Phe Ser Tyr Arg Ile Leu Leu Pro Trp Phe Gly Tyr Ser Gly	

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130	135	140		
tac aaa ctg tcg atc att gcc tcg gcg ctt ctg atc gct aca	480			
Tyr Lys Leu Ser Ile Ile Ala Ala Ser Ala Leu Leu Ile Ala Thr				
145	150	155	160	
tgg ctg gtg ctg acg cgc acc agg atc ggc ctg atc atg cgc gcc acg	528			
Trp Leu Val Leu Thr Arg Thr Arg Ile Gly Leu Ile Met Arg Ala Thr				
165	170	175		
cag tat gac agc gag acg gcg caa gct ttc ggc att ccg gtc gac cgc	576			
Gln Tyr Asp Ser Glu Thr Ala Gln Ala Phe Gly Ile Pro Val Asp Arg				
180	185	190		
gtc tat ggc ggc gtc ttc gcg ctc ggc gcc atg ctg gcg gac atc gcc	624			
Val Tyr Gly Gly Val Phe Ala Leu Gly Ala Met Leu Ala Ala Ile Ala				
195	200	205		
gcg gtg ctg atc gtg ccg atc agc cag gcg cat tac ctg atg ggg cag	672			
Ala Val Leu Ile Val Pro Ile Ser Gln Ala His Tyr Leu Met Gly Gln				
210	215	220		
gat ccg ctg ctc ttg tcc ttc atc gtc gtc atc atc ggc ggc ctc ggc	720			
Asp Pro Leu Leu Leu Ser Phe Ile Val Val Ile Ile Gly Gly Leu Gly				
225	230	235	240	
tcg ctg cgc ggc acc gtc gtc gcc gcc gtg ctg atc ggc ctg tcc gac	768			
Ser Leu Arg Gly Thr Val Val Ala Ala Val Leu Ile Gly Leu Ser Asp				
245	250	255		
ggc atc atc tcg atg ttc ttc tcg ccg acc ttg gcc aag atg atc gcc	816			
Gly Ile Ile Ser Met Phe Phe Ser Pro Thr Leu Ala Lys Met Ile Ala				
260	265	270		
acg ctg ctg gtc gcc atg gtg ctg gtg ttc cgc ccg caa ggc ctg ttc	864			
Thr Leu Leu Val Ala Met Val Leu Val Phe Arg Pro Gln Gly Leu Phe				
275	280	285		
ggg acg gca gcg cga tga	882			
Gly Thr Ala Ala Arg				
290				

<210> 917

<211> 293

<212> PRT

<213> Rhizobium loti

<400> 917

Met His Phe Gly Pro His Leu Leu Leu Ala Ala Leu Glu Gly Leu Val	
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Thr Ser Ala Val Leu Ala Leu Thr Ala Leu Gly Leu Ser Leu Val Phe	
20 25 30	
Gly Val Met Arg Val Val Asn Val Ala His Gly Glu Phe Phe Met Leu	
35 40 45	
Gly Ala Val Leu Ala Trp Ala Ile Thr Ser Ala Ile Gly Gly His Pro	
50 55 60	
Ala Leu Gly Phe Leu Ala Ala Leu Val Ile Ala Pro Leu Ile Val Gly	
65 70 75 80	
Ala Ile Ala Leu Val Ala Glu Arg Leu Val Leu Arg Arg Leu Asn Tyr	
85 90 95	
Asn Pro Glu Ala Thr Ile Val Ala Thr Ile Gly Met Leu Tyr Ile Ile	
100 105 110	
Gln Gln Leu Ala Leu Ser Phe Tyr Gly Pro Glu Ala Arg Pro Val Glu	
115 120 125	
Pro Pro Phe Ser Tyr Arg Ile Leu Leu Pro Trp Phe Gly Tyr Ser Gly	
130 135 140	
Tyr Lys Leu Ser Ile Ile Ala Ala Ser Ala Leu Leu Ile Ala Thr	
145 150 155 160	
Trp Leu Val Leu Thr Arg Thr Arg Ile Gly Leu Ile Met Arg Ala Thr	
165 170 175	
Gln Tyr Asp Ser Glu Thr Ala Gln Ala Phe Gly Ile Pro Val Asp Arg	
180 185 190	
Val Tyr Gly Gly Val Phe Ala Leu Gly Ala Met Leu Ala Ala Ile Ala	
195 200 205	
Ala Val Leu Ile Val Pro Ile Ser Gln Ala His Tyr Leu Met Gly Gln	
210 215 220	
Asp Pro Leu Leu Leu Ser Phe Ile Val Val Ile Ile Gly Gly Leu Gly	
225 230 235 240	
Ser Leu Arg Gly Thr Val Val Ala Ala Val Leu Ile Gly Leu Ser Asp	

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Gly Ile Ile Ser 245 Met Phe Phe Ser Pro 250 Thr Leu Ala Lys Met 255
 Thr Leu Leu Val 260 Ala Met Val Leu Val Phe Arg Pro Gln 270 Gly Leu Phe
 Gly Thr Ala Ala Arg 280 285

<210> 918

<211> 963

<212> DNA

<213> Rhizobium loti

<220>

<221> CDS

<222> (1)..(963)

<400> 918

atg	agc	gaa	gct	tcg	ccg	gca	aag	gct	tat	gcg	ctg	cat	ctc	ggc	gtc	48
Met	Ser	Glu	Ala	Ser	Pro	Ala	Lys	Ala	Tyr	Ala	Leu	His	Leu	Gly	Val	
1				5				10						15		
atc	gcg	ctg	ctc	ttc	gtg	ctg	agc	ttc	ggt	ctg	ccc	gaa	tac	tat	cac	96
Ile	Ala	Leu	Leu	Phe	Val	Leu	Ser	Phe	Val	Leu	Pro	Glu	Tyr	Tyr	His	
			20					25					30			
ggc	ctg	ctc	gcc	cgc	atc	atg	gtg	ctg	gcg	gtg	ttc	gcc	atg	ggc	tac	144
Gly	Leu	Leu	Ala	Arg	Ile	Met	Val	Leu	Ala	Val	Phe	Ala	Met	Gly	Tyr	
			35				40					45				
aac	atg	ctg	ttc	ggc	tat	gtc	ggc	ctg	ctc	agc	ctc	ggc	cat	gcc	atg	192
Asn	Met	Leu	Phe	Gly	Tyr	Val	Gly	Leu	Leu	Ser	Leu	Gly	His	Ala	Met	
			50			55					60					
ttc	ttc	ggc	gcc	ggg	ctt	tac	ggc	gcc	ggc	ctt	gcc	atc	atc	cag	ctc	240
Phe	Phe	Gly	Ala	Gly	Leu	Tyr	Gly	Ala	Gly	Leu	Ala	Ile	Ile	Gln	Leu	
			65		70				75					80		
ggc	tgg	ggc	gtg	ccc	ctg	gcc	ttc	ctc	ggc	ggg	att	gcc	agc	ggc	gcg	288
Gly	Trp	Gly	Val	Pro	Leu	Ala	Phe	Leu	Gly	Gly	Ile	Ala	Ser	Gly	Ala	
				85				90						95		
ggt	ctg	gcg	ctg	gtg	atc	ggc	ctg	ctg	gcg	ttg	cgc	gcc	acg	ggc	gtc	336
Val	Leu	Ala	Leu	Val	Ile	Gly	Leu	Leu	Ala	Leu	Arg	Ala	Thr	Gly	Val	
			100				105					110				
gcc	ttc	atg	atc	gtc	acc	atg	atg	ttc	gcg	cag	gtg	ttt	tat	ctc	ctg	384
Ala	Phe	Met	Ile	Val	Thr	Met	Met	Phe	Ala	Gln	Val	Phe	Tyr	Leu	Leu	
			115			120						125				
atc	ctc	tac	ttc	gcg	gca	tgg	acc	ggc	ggc	gat	cag	ggc	cag	gtc	gtg	432
Ile	Leu	Tyr	Phe	Ala	Ala	Trp	Thr	Gly	Gly	Asp	Gln	Gly	Gln	Val	Val	
			130			135				140						
ccg	cag	ccg	gcg	cgc	gcc	ctc	aat	ctc	ggc	gca	acc	tcg	ctc	gac	ctc	480
Pro	Gln	Pro	Ala	Arg	Ala	Leu	Asn	Leu	Gly	Ala	Thr	Ser	Leu	Asp	Leu	
			145		150				155					160		
acc	aac	ccg	acc	gtg	cgc	tac	atg	agc	gcg	ctc	gtg	ctg	ttc	tcg	ctc	528
Thr	Asn	Pro	Thr	Val	Arg	Tyr	Met	Ser	Ala	Leu	Val	Leu	Phe	Ser	Leu	
				165				170						175		
gtg	ctt	ctg	ctc	acg	ctg	gcc	gtc	gtc	cgc	tct	cgc	tat	ggc	cgc	gtg	576
Val	Leu	Leu	Leu	Thr	Leu	Ala	Val	Val	Arg	Ser	Arg	Tyr	Gly	Arg	Val	
			180				185						190			
ctc	gtc	gcc	atc	cgc	gag	aat	gag	gag	cgc	acc	aag	atg	ctg	ggc	tac	624
Leu	Val	Ala	Ile	Arg	Glu	Asn	Glu	Glu	Arg	Thr	Lys	Met	Leu	Gly	Tyr	
			195			200						205				
gac	acc	ttc	tcc	aac	aag	ctc	atc	gcc	gtg	gtc	gtc	tcc	ggc	acg	atc	672
Asp	Thr	Phe	Ser	Asn	Lys	Leu	Ile	Ala	Val	Val	Val	Ser	Gly	Thr	Ile	
			210		215						220					
tgc	gcg	gcg	tcg	ggt	gcc	gcc	tat	gcg	ctg	ctg	ttc	ggc	tat	gtc	ggc	720
Cys	Ala	Ala	Ser	Gly	Ala	Ala	Tyr	Ala	Leu	Leu	Phe	Gly	Tyr	Val	Gly	
			225		230				235					240		
tcg	agc	ttc	gcg	tcg	gtg	cag	tat	tcg	atc	ctg	ccg	ctg	ctg	tgg	gtc	768
Ser	Ser	Phe	Ala	Ser	Val	Gln	Tyr	Ser	Ile	Leu	Pro	Leu	Leu	Trp	Val	
				245				250						255		
ttg	ctc	ggc	ggt	gcc	gcc	acg	acg	cta	ggg	ccg	ctg	atc	ggc	acc	gtc	816
Leu	Leu	Gly	Gly	Ala	Ala	Thr	Thr	Leu	Gly	Pro	Leu	Ile	Gly	Thr	Val	
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ttc	atg	tac	tat	gtc	atc	gac	gtc	tcc	agc	ggc	tac	acc	tcg	gcc	tat	864
Phe	Met	Tyr	Tyr	Val	Ile	Asp	Val	Ser	Ser	Gly	Tyr	Thr	Ser	Ala	Tyr	
		275					280					285				
ctc	ctg	atc	gtc	ggc	att	gcg	ctc	atc	ctg	ctg	gtg	ctg	ttt	ttc	ccg	912
Leu	Leu	Ile	Val	Gly	Ile	Ala	Leu	Ile	Leu	Leu	Val	Leu	Phe	Phe	Pro	
	290					295					300					
aaa	ggc	att	ctc	ggc	agc	atc	cgc	cag	cgc	tgg	ctc	ggg	tgg	ctg	cca	960
Lys	Gly	Ile	Leu	Gly	Ser	Ile	Arg	Gln	Arg	Trp	Leu	Gly	Trp	Leu	Pro	
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tga																963

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 <212> PRT
 <213> Rhizobium loti

<400> 919
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 Gly Leu Leu Ala Arg Ile Met Val Leu Ala Val Phe Ala Met Gly Tyr
 35 40 45
 Asn Met Leu Phe Gly Tyr Val Gly Leu Leu Ser Leu Gly His Ala Met
 50 55 60
 Phe Phe Gly Ala Gly Leu Tyr Gly Ala Gly Leu Ala Ile Ile Gln Leu
 65 70 75 80
 Gly Trp Gly Val Pro Leu Ala Phe Leu Gly Gly Ile Ala Ser Gly Ala
 85 90 95
 Val Leu Ala Leu Val Ile Gly Leu Leu Ala Leu Arg Ala Thr Gly Val
 100 105 110
 Ala Phe Met Ile Val Thr Met Met Phe Ala Gln Val Phe Tyr Leu Leu
 115 120 125
 Ile Leu Tyr Phe Ala Ala Trp Thr Gly Gly Asp Gln Gly Gln Val Val
 130 135 140
 Pro Gln Pro Ala Arg Ala Leu Asn Leu Gly Ala Thr Ser Leu Asp Leu
 145 150 155 160
 Thr Asn Pro Thr Val Arg Tyr Met Ser Ala Leu Val Leu Phe Ser Leu
 165 170 175
 Val Leu Leu Leu Thr Leu Ala Val Val Arg Ser Arg Tyr Gly Arg Val
 180 185 190
 Leu Val Ala Ile Arg Glu Asn Glu Glu Arg Thr Lys Met Leu Gly Tyr
 195 200 205
 Asp Thr Phe Ser Asn Lys Leu Ile Ala Val Val Val Ser Gly Thr Ile
 210 215 220
 Cys Ala Ala Ser Gly Ala Ala Tyr Ala Leu Leu Phe Gly Tyr Val Gly
 225 230 235 240
 Ser Ser Phe Ala Ser Val Gln Tyr Ser Ile Leu Pro Leu Leu Trp Val
 245 250 255
 Leu Leu Gly Gly Ala Ala Thr Thr Leu Gly Pro Leu Ile Gly Thr Val
 260 265 270
 Phe Met Tyr Tyr Val Ile Asp Val Ser Ser Gly Tyr Thr Ser Ala Tyr
 275 280 285
 Leu Leu Ile Val Gly Ile Ala Leu Ile Leu Leu Val Leu Phe Phe Pro
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 Lys Gly Ile Leu Gly Ser Ile Arg Gln Arg Trp Leu Gly Trp Leu Pro
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 <212> DNA
 <213> Agrobacterium tumefaciens

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 <222> (1)..(867)

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acc att att ctt ttc agc atc ggt ctc gct gtc gtg ttc ggg atg atg      96
Thr Ile Ile Leu Phe Ser Ile Gly Leu Ala Val Val Phe Gly Met Met
20      25      30
cgc gtc atc aat ctc gcg cat ggc gaa ttc atc atg ctc ggc gcg tat      144
Arg Val Ile Asn Leu Ala His Gly Glu Phe Ile Met Leu Gly Ala Tyr
35      40      45
ggt gcg ctc aaa agc tac gag gcc ggt ctg aac ctc tgg gtc ggc atg      192
Gly Ala Leu Lys Ser Tyr Glu Ala Gly Leu Asn Leu Trp Val Gly Met
50      55      60
ctg atc gtc gcg ccg ctt gtc tcc gcc att tac ggg ctc gtc gtc gag      240
Leu Ile Val Ala Pro Leu Val Ser Ala Ile Tyr Gly Leu Val Val Glu
65      70      75      80
cgc atc ctg atc cgg cgc ctt tac ggc cgt ctg atc gat act ctg ttg      288
Arg Ile Leu Ile Arg Arg Leu Tyr Gly Arg Leu Ile Asp Thr Leu Leu
85      90      95
gcg aca tgg ggg ctg agt ctt ttt acg gtc ggc atg gtg acg atg atc      336
Ala Thr Trp Gly Leu Ser Leu Phe Thr Val Gly Met Val Thr Met Ile
100      105      110
ttc gga aat acc gcc gga agc gtc ccc acg cca ttg tcg acg cta cag      384
Phe Gly Asn Thr Ala Gly Ser Val Pro Thr Pro Leu Ser Thr Leu Gln
115      120      125
atc ggc cag tac ggc ctt ggt att tac aat ctg ttt atc gtc gcc atc      432
Ile Gly Gln Tyr Gly Leu Gly Ile Tyr Asn Leu Phe Ile Val Ala Ile
130      135      140
acg ggt gtc gtg ctt ctg gcg ata tac ctc gtg ctg aaa cgg acc aat      480
Thr Gly Val Val Leu Leu Ala Ile Tyr Leu Val Leu Lys Arg Thr Asn
145      150      155      160
ctg ggg acg ctc gcg cgc ggc acc atg cag gat gcc gat atg gtg gct      528
Leu Gly Thr Leu Ala Arg Gly Thr Met Gln Asp Ala Asp Met Val Ala
165      170      175
gcc ctc ggc tat aat ccg aag aca gtc gct gcg acc ttc gcc ata      576
Ala Leu Gly Tyr Asn Pro Lys Thr Val Tyr Ala Ala Thr Phe Ala Ile
180      185      190
ggc gca gcc ctc gcg ggc ctt gcc ggt gga ttg ctt gcc ccg gta acc      624
Gly Ala Ala Leu Ala Gly Leu Ala Gly Gly Leu Leu Ala Pro Val Thr
195      200      205
ggc atc att ccg acc atg ggg gct gcc ttc gtg gcg aag gcc ttc atc      672
Gly Ile Ile Pro Thr Met Gly Ala Ala Phe Val Ala Lys Ala Phe Ile
210      215      220
acc gtc atc tcc ggc ggc gcg gcg atc ata ctt ggt aca ggg tct acg      720
Thr Val Ile Ser Gly Gly Ala Ala Ile Ile Leu Gly Thr Gly Ser Thr
225      230      235      240
gcc gcg atc ttc ggt gcc atc aac cag atc gtg aca ttc gtt tcc aca      768
Ala Ala Ile Phe Gly Ala Ile Asn Gln Ile Val Thr Phe Val Ser Thr
245      250      255
cct gtt ctc ggt gaa gct gcc ctt ctt ctg gcg gcg ata ttg ctt ttg      816
Pro Val Leu Gly Glu Ala Ala Leu Leu Leu Ala Ala Ile Leu Leu Leu
260      265      270
cgc atg ttg ccg aat ggc ctg tcc gga cgc ttt ttc aaa ggg ggc gta      864
Arg Met Leu Pro Asn Gly Leu Ser Ser Gly Arg Phe Phe Lys Gly Gly Val
275      280      285
taa
867

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<210> 921
<211> 288
<212> PRT
<213> Agrobacterium tumefaciens

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1      5      10      15
Thr Ile Ile Leu Phe Ser Ile Gly Leu Ala Val Val Phe Gly Met Met
20      25      30

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Arg Val Ile Asn Leu Ala His Gly Glu Phe Ile Met Leu Gly Ala Tyr
 35 40 45
 Gly Ala Leu Lys Ser Tyr Glu Ala Gly Leu Asn Leu Trp Val Gly Met
 50 55 60
 Leu Ile Val Ala Pro Leu Val Ser Ala Ile Tyr Gly Leu Val Val Glu
 65 70 75 80
 Arg Ile Leu Ile Arg Arg Leu Tyr Gly Arg Leu Ile Asp Thr Leu Leu
 85 90 95
 Ala Thr Trp Gly Leu Ser Leu Phe Thr Val Gly Met Val Thr Met Ile
 100 105 110
 Phe Gly Asn Thr Ala Gly Ser Val Pro Thr Pro Leu Ser Thr Leu Gln
 115 120 125
 Ile Gly Gln Tyr Gly Leu Gly Ile Tyr Asn Leu Phe Ile Val Ala Ile
 130 135 140
 Thr Gly Val Val Leu Leu Ala Ile Tyr Leu Val Leu Lys Arg Thr Asn
 145 150 155 160
 Leu Gly Thr Leu Ala Arg Gly Thr Met Gln Asp Ala Asp Met Val Ala
 165 170 175
 Ala Leu Gly Tyr Asn Pro Lys Thr Val Tyr Ala Ala Thr Phe Ala Ile
 180 185 190
 Gly Ala Ala Leu Ala Gly Leu Ala Gly Gly Leu Leu Ala Pro Val Thr
 195 200 205
 Gly Ile Ile Pro Thr Met Gly Ala Ala Phe Val Ala Lys Ala Phe Ile
 210 215 220
 Thr Val Ile Ser Gly Gly Ala Ala Ile Ile Leu Gly Thr Gly Ser Thr
 225 230 235 240
 Ala Ala Ile Phe Gly Ala Ile Asn Gln Ile Val Thr Phe Val Ser Thr
 245 250 255
 Pro Val Leu Gly Glu Ala Ala Leu Leu Leu Ala Ala Ile Leu Leu Leu
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 Arg Met Leu Pro Asn Gly Leu Ser Gly Arg Phe Phe Lys Gly Gly Val
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<210> 922

<211> 1716

<212> DNA

<213> Pseudomonas resinovorans

<220>

<221> CDS

<222> (1)..(1716)

<400> 922

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ttc tgc cgg cct aca ccg cgt cct gag cgg ctc gtt ctg gct cgc cgg	96
Phe Cys Arg Pro Thr Pro Arg Pro Glu Arg Leu Val Leu Ala Arg Arg	
20 25 30	
gtt ggc agc gga tca tcc gct cgg ccc tat acg cgc tgc tta tcg aaa	144
Val Gly Ser Gly Ser Ser Ala Arg Pro Tyr Thr Arg Cys Leu Ser Lys	
35 40 45	
cca gca tca tgc gcc gcc tct aca aca gcg atc acc tcg acc agg tac	192
Pro Ala Ser Cys Ala Ala Ser Thr Thr Ala Ile Thr Ser Thr Arg Tyr	
50 55 60	
tgg ccc acc ctg gcg gtg gtg ttc ttc acc aac gag tta atc acc gtg	240
Trp Pro Thr Leu Ala Val Val Phe Phe Thr Asn Glu Leu Ile Thr Val	
65 70 75 80	
ctg ttc ggc cgc agc cca ccg gcc atg ccc acg ccc gag tgg tat tcg	288
Leu Phe Gly Arg Ser Pro Pro Ala Met Pro Thr Pro Glu Trp Tyr Ser	
85 90 95	
agc ttc gtc gaa gtg ctg ccg ggg ttg atg tac ccg gtc agc cgc ttg	336
Ser Phe Val Glu Val Leu Pro Gly Leu Met Tyr Pro Val Ser Arg Leu	
100 105 110	
ctg ttc atc gcc gcc ggg gcc gtg gtg gcg atc gcc atg tgg ctg ctg	384
Leu Phe Ile Ala Ala Gly Ala Val Val Ala Ile Ala Met Trp Leu Leu	
115 120 125	
ata aac cac acg cgc ctg gcc atg ctg atc cgc gcc ggg gcc gac gac	432
Ile Asn His Thr Arg Leu Gly Met Leu Ile Arg Ala Gly Ala Asp Asp	

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130	cac	gaa	atg	gtc	ggc	gcc	135	ctg	ggg	gtg	aac	atc	140	gca	cgc	ctg	tac	acc	480
145	His	Glu	Met	Val	Gly	Ala	150	Leu	Gly	Val	Asn	Ile	155	Ala	Arg	Leu	Tyr	Thr	
	ctg	gtg	ttc	gtg	ttc	ggc	165	tcc	gtg	ctt	tgc	ggc	170	ctc	gcc	ggg	ttc	atg	528
	Leu	Val	Phe	Val	Phe	Gly	180	Ser	Val	Leu	Cys	Gly	185	Leu	Ala	Gly	Phe	Met	
	gcc	gca	ccc	ttg	ctg	tcg	190	gtg	gaa	atc	ggc	atg	195	ggt	gaa	aag	gtc	ttg	576
	Ala	Ala	Pro	Leu	Leu	Ser	200	Val	Glu	Ile	Gly	Met	205	Gly	Glu	Lys	Val	Leu	
	att	acc	acc	ttc	gtg	gtc	210	atc	gtg	gtc	ggc	ggt	215	gtc	ggc	tcg	gtg	cgc	624
	Ile	Thr	Thr	Phe	Val	Val	220	Ile	Val	Val	Gly	Gly	225	Val	Gly	Ser	Val	Arg	
	ggc	gcc	ctg	gcc	ggg	gcc	230	ttg	ctg	atc	ggc	atg	235	gtc	gat	ggc	ctg	ggg	672
	Gly	Ala	Leu	Ala	Gly	Ala	240	Leu	Leu	Ile	Gly	Met	245	Val	Asp	Gly	Leu	Gly	
	cgt	gcc	tac	atc	ccg	caa	250	ttg	ctg	gac	caa	ctg	255	ttg	ccc	gcc	gaa	gtc	720
	Arg	Ala	Tyr	Ile	Pro	Gln	260	Leu	Leu	Asp	Gln	Leu	265	Leu	Pro	Ala	Glu	Val	
	225	agg	ggc	acc	ctg	agg	230	ggg	ctg	att	tcc	ggc	235	agg	ggc	tac	atc	gtc	768
	Ser	Gly	Thr	Leu	Ser	Gly	245	Gly	Leu	Ile	Ser	Ala	250	Ser	Ala	Tyr	Ile	Val	
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	Met	Ala	Val	Val	Leu	Leu	265	Val	Arg	Pro	Arg	Gly	270	Leu	Leu	Pro	Ala	Arg	
	gcc	ttg	agg	aga	acc	cca	280	tgt	tcc	cgt	cga	gtc	285	ctg	atc	gac	ctg	ctt	864
	Ala	Leu	Arg	Arg	Thr	Pro	285	Cys	Ser	Arg	Arg	Val	290	Leu	Ile	Asp	Leu	Leu	
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	Cys	Leu	Ala	Thr	Phe	Ala	300	Leu	Pro	Leu	Leu	Ala	305	Ser	Leu	Leu	Leu	His	
	gaa	ccc	ttt	ctg	gtc	agg	310	ctg	ttt	acg	cgc	ctg	315	gcg	atc	tac	ggc	atg	960
	Glu	Pro	Phe	Leu	Val	Ser	315	Leu	Phe	Thr	Arg	Leu	320	Ala	Ile	Tyr	Gly	Met	
	305	ggc	ggc	ggc	agg	ctg	320	gac	ctg	ctg	atc	ggc	325	tat	ggc	gcg	atg	att	1008
	Ala	Ala	Ala	Ser	Leu	Asp	325	Leu	Leu	Ile	Gly	Tyr	330	Gly	Ala	Met	Ile	agg	
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	Phe	Gly	His	Ala	Ala	Phe	340	Gly	Leu	Gly	Gly	Tyr	345	Val	Val	Gly	Val	Val	
	atc	ggt	ttt	cac	acc	tcc	345	ttg	ggc	ccg	ctg	tgg	350	ggc	tgg	gac	ggt	ggt	1104
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	tcc	aac	agg	gcg	ctg	ctc	360	gtt	tgg	ccg	ctg	tcg	365	ctg	ctg	gtg	tgt	gcg	1152
	Ser	Asn	Ser	Ala	Leu	Leu	365	Val	Trp	Pro	Leu	Ser	370	Leu	Leu	Val	Cys	Ala	
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	Leu	Phe	Ala	Val	Val	Val	380	Gly	Tyr	Leu	Ser	Leu	385	Arg	Thr	Ser	Gly	Val	
	385	caa	ttc	atc	atg	att	390	acc	ctg	gcg	ttc	ggc	395	cag	atg	ctc	tat	ttc	1248
	Gln	Phe	Ile	Met	Ile	Thr	395	Leu	Ala	Phe	Gln	Gly	400	Gln	Met	Leu	Tyr	Phe	
	ctc	agt	tcg	ctg	tcg	ctg	405	tat	ggc	ggc	gac	gac	410	ggc	att	ttg	ctc	agg	1296
	Leu	Ser	Ser	Leu	Ser	Leu	410	Tyr	Gly	Gly	Asp	Asp	415	Gly	Ile	Leu	Leu	Ser	
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	Glu	Arg	Asn	Thr	Leu	Pro	425	Gly	Ile	Asp	Leu	Asp	430	Asn	Pro	Val	Gln	Phe	
	tac	tac	ctg	tgc	ctg	ggc	435	ttg	gtg	gct	tgg	ctg	440	ctg	ctg	ttc	tgc	cgg	1392
	Tyr	Tyr	Leu	Cys	Leu	Gly	440	Leu	Val	Ala	Trp	Leu	445	Leu	Leu	Phe	Cys	Arg	
	450	cgc	ctg	gtc	aat	tcg	455	ttc	ggc	tac	gtg	ctg	460	cgc	ggc	ctc	aag	caa	1440
	Arg	Leu	Val	Asn	Ser	Arg	460	Phe	Gly	Tyr	Val	Leu	465	Arg	Gly	Leu	Lys	Gln	
	465	agg	gaa	cgg	cgc	agg	470	atc	agg	ctg	ggc	cac	475	ccg	ctg	cgc	tat	cgc	1488
	Ser	Glu	Arg	Arg	Ser	Ile	475	Ser	Leu	Gly	Leu	His	480	Pro	Leu	Arg	Tyr	Arg	
	ctc	ggg	gcg	ttt	gtc	atc	485	ggc	ggt	gtc	ggg	ggc	490	ctg	gcg	ggc	att	att	1536
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Leu	Trp	Ala	Asn	Tyr	Ala	Met	Phe	Val	Ser	Pro	Asp	Met	Gly	Ala	Trp	
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cac	aag	tcc	ggc	gaa	ctg	atg	gcg	atg	gtc	atc	ctc	ggc	ggc	gtc	ggc	1632
His	Lys	Ser	Gly	Glu	Leu	Met	Ala	Met	Val	Ile	Leu	Gly	Gly	Val	Gly	
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acc	ctg	ctg	ggg	ccg	gtc	ctc	ggc	gcc	gcc	gtg	tac	ctg	ggc	ctg	gaa	1680
Thr	Leu	Leu	Gly	Pro	Val	Leu	Gly	Ala	Ala	Val	Tyr	Leu	Gly	Leu	Glu	
545					550					555					560	
cag	tgc	tca	gcc	tgt	gga	ccg	agc	act	ggc	tgc	tga					1716
Gln	Cys	Ser	Ala	Cys	Gly	Pro	Ser	Thr	Gly	Cys						
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<211> 571

<212> PRT

<213> Pseudomonas resinovorans

<400> 923

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			20					25					30			
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		35					40					45				
Pro	Ala	Ser	Cys	Ala	Ala	Ser	Thr	Thr	Ala	Ile	Thr	Ser	Thr	Arg	Tyr	
	50					55				60						
Trp	Pro	Thr	Leu	Ala	Val	Val	Phe	Phe	Thr	Asn	Glu	Leu	Ile	Thr	Val	
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Leu	Phe	Gly	Arg	Ser	Pro	Pro	Ala	Met	Pro	Thr	Pro	Glu	Trp	Tyr	Ser	
				85					90					95		
Ser	Phe	Val	Glu	Val	Leu	Pro	Gly	Leu	Met	Tyr	Pro	Val	Ser	Arg	Leu	
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Leu	Phe	Ile	Ala	Ala	Gly	Ala	Val	Val	Ala	Ile	Ala	Met	Trp	Leu	Leu	
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Ile	Asn	His	Thr	Arg	Leu	Gly	Met	Leu	Ile	Arg	Ala	Gly	Ala	Asp	Asp	
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His	Glu	Met	Val	Gly	Ala	Leu	Gly	Val	Asn	Ile	Ala	Arg	Leu	Tyr	Thr	
145					150				155						160	
Leu	Val	Phe	Val	Phe	Gly	Ser	Val	Leu	Cys	Gly	Leu	Ala	Gly	Phe	Met	
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		195					200						205			
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	210					215					220					
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225					230				235						240	
Ser	Gly	Thr	Leu	Ser	Gly	Gly	Leu	Ile	Ser	Ala	Ser	Ala	Tyr	Ile	Val	
				245					250					255		
Met	Ala	Val	Val	Leu	Leu	Val	Arg	Pro	Arg	Gly	Leu	Leu	Pro	Ala	Arg	
			260					265					270			
Ala	Leu	Arg	Arg	Thr	Pro	Cys	Ser	Arg	Arg	Val	Leu	Ile	Asp	Leu	Leu	
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Cys	Leu	Ala	Thr	Phe	Ala	Leu	Leu	Pro	Leu	Leu	Ala	Ser	Leu	Leu	His	
	290					295					300					
Glu	Pro	Phe	Leu	Val	Ser	Leu	Phe	Thr	Arg	Leu	Ala	Ile	Tyr	Gly	Met	
305					310					315					320	
Ala	Ala	Ala	Ser	Leu	Asp	Leu	Leu	Ile	Gly	Tyr	Gly	Ala	Met	Ile	Ser	
				325					330					335		
Phe	Gly	His	Ala	Ala	Phe	Phe	Gly	Leu	Gly	Gly	Tyr	Val	Val	Gly	Val	
			340					345					350			
Ile	Gly	Phe	His	Thr	Ser	Gln	Ala	Leu	Pro	Leu	Trp	Gly	Trp	Asp	Gly	
		355					360					365				
Ser	Asn	Ser	Ala	Leu	Leu	Val	Trp	Pro	Leu	Ser	Leu	Leu	Val	Cys	Ala	
	370					375					380					
Leu	Phe	Ala	Val	Val	Val	Gly	Tyr	Leu	Ser	Leu	Arg	Thr	Ser	Gly	Val	

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385	Gln	Phe	Ile	Met	Ile	390	Thr	Leu	Ala	Phe	Gly	395	Gln	Met	Leu	Tyr	Phe	400	Val
					405						410						415		
	Leu	Ser	Ser	Leu	Ser	Leu	Tyr	Gly	Gly	Asp	Asp	Gly	Ile	Leu	Leu	Ser			
				420					425						430				
	Glu	Arg	Asn	Thr	Leu	Pro	Gly	Ile	Asp	Leu	Asp	Asn	Pro	Val	Gln	Phe			
			435					440					445						
	Tyr	Tyr	Leu	Cys	Leu	Gly	Leu	Val	Ala	Trp	Leu	Leu	Phe	Cys	Arg				
		450					455				460								
	Arg	Leu	Val	Asn	Ser	Arg	Phe	Gly	Tyr	Val	Leu	Arg	Gly	Leu	Lys	Gln			
	465					470					475					480			
	Ser	Glu	Arg	Arg	Ser	Ile	Ser	Leu	Gly	Leu	His	Pro	Leu	Arg	Tyr	Arg			
					485					490					495				
	Leu	Gly	Ala	Phe	Val	Ile	Ala	Gly	Val	Gly	Gly	Gly	Leu	Ala	Gly	Ile			
			500						505					510					
	Leu	Trp	Ala	Asn	Tyr	Ala	Met	Phe	Val	Ser	Pro	Asp	Met	Gly	Ala	Trp			
		515						520					525						
	His	Lys	Ser	Gly	Glu	Leu	Met	Ala	Met	Val	Ile	Leu	Gly	Gly	Val	Gly			
		530					535					540							
	Thr	Leu	Leu	Gly	Pro	Val	Leu	Gly	Ala	Ala	Val	Tyr	Leu	Gly	Leu	Glu			
	545					550					555					560			
	Gln	Cys	Ser	Ala	Cys	Gly	Pro	Ser	Thr	Gly	Cys								
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<210> 924

<211> 873

<212> DNA

<213> Streptomyces coelicolor

<220>

<221> CDS

<222> (1)..(873)

<400> 924

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Met	Ser	Gln	Phe	Phe	Asp	Phe	Thr	Leu	Ser	Gly	Leu	Gly	Ala	Gly	Thr	
1				5					10					15		
acc	tac	gca	ctg	gtc	ggg	ctt	ggg	gtc	gcc	ctg	gtg	tac	caa	gtc	acc	96
Thr	Tyr	Ala	Leu	Val	Gly	Leu	Gly	Val	Ala	Leu	Val	Tyr	Gln	Val	Thr	
			20					25					30			
ggc	gtg	atc	aac	ttc	gcg	cag	ggc	gac	ttc	gtc	atg	ctc	ggc	ggg	ctg	144
Gly	Val	Ile	Asn	Phe	Ala	Gln	Gly	Asp	Phe	Val	Met	Leu	Gly	Gly	Leu	
		35					40					45				
ggc	tgc	gcg	gtg	ctg	cac	gag	gcg	ggc	acg	ccc	ctg	tgg	gcg	gcg	gcc	192
Gly	Cys	Ala	Val	Leu	His	Glu	Ala	Gly	Thr	Pro	Leu	Trp	Ala	Ala	Ala	
	50					55				60						
ctg	acc	gcg	atc	gcc	gcc	acc	gct	gcc	gtc	ggt	gcc	ctg	ctg	gat	ctc	240
Leu	Thr	Ala	Ile	Ala	Ala	Thr	Ala	Ala	Val	Gly	Ala	Leu	Leu	Asp	Leu	
	65				70					75					80	
gtc	gtc	gtc	cga	cga	gcc	cgg	gac	gcc	gac	ggc	gaa	cgg	ctc	atc	atc	288
Val	Val	Val	Arg	Arg	Ala	Arg	Asp	Ala	Asp	Gly	Glu	Arg	Leu	Ile	Ile	
				85					90					95		
ttg	acg	atc	ggc	gcc	tcg	gtg	acc	ctt	gag	ggc	gcg	gcg	ctc	ctc	gtg	336
Leu	Thr	Ile	Gly	Ala	Ser	Val	Thr	Leu	Glu	Gly	Ala	Ala	Leu	Leu	Val	
			100					105					110			
ttc	ggc	ccc	gac	tcc	cac	ttc	gtc	ccg	tcc	ttc	tcc	gag	ggc	cgc	gcg	384
Phe	Gly	Pro	Asp	Ser	His	Phe	Val	Pro	Ser	Phe	Ser	Glu	Gly	Arg	Ala	
		115					120					125				
ttc	gag	gtg	ttc	ggc	gcc	cat	gtg	gtc	cgc	cag	tac	gtg	tgg	tgc	ggg	432
Phe	Glu	Val	Phe	Gly	Ala	His	Val	Val	Arg	Gln	Tyr	Val	Trp	Cys	Gly	
		130				135					140					
gtg	gcc	act	ggg	gtg	gcg	gtc	ctg	ctg	atg	tgg	ctg	ttc	ctc	acc	aga	480
Val	Ala	Thr	Gly	Val	Ala	Val	Leu	Leu	Met	Trp	Leu	Phe	Leu	Thr	Arg	
	145				150					155					160	
acc	ctg	tgg	ggc	acc	gcg	atg	cgc	gcc	acg	gcc	atg	gag	ccg	gag	gcg	528
Thr	Leu	Trp	Gly	Thr	Ala	Met	Arg	Ala	Thr	Ala	Met	Glu	Pro	Glu	Ala	
				165					170					175		
gtc	cgc	ctc	gtg	ggt	gtc	tcg	ccg	gcc	cgg	atg	agc	ctg	ctg	gcg	ttc	576
Val	Arg	Leu	Val	Gly	Val	Ser	Pro	Ala	Arg	Met	Ser	Leu	Leu	Ala	Phe	

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			180					185				190					
acc	ctg	gcc	gcg	gcg	ctc	ggc	gcg	ctc	gcc	gga	gtg	ttc	ctg	gct	ccg		624
Thr	Leu	Ala	Ala	Ala	Leu	Gly	Ala	Leu	Ala	Gly	Val	Phe	Leu	Ala	Pro		
		195					200					205					
ctc	cag	ccg	ccg	gac	gcg	tcc	gtg	ggc	atc	ccc	ttc	ggg	ctc	aag	ggc		672
Leu	Gln	Pro	Pro	Asp	Ala	Ser	Val	Gly	Ile	Pro	Phe	Gly	Leu	Lys	Gly		
	210					215					220						
ttc	acc	gcg	gcg	gtc	atc	ggc	gga	ctc	gtc	tcc	ccg	gcg	ggg	gcc	gtg		720
Phe	Thr	Ala	Ala	Val	Ile	Gly	Gly	Leu	Val	Ser	Pro	Ala	Gly	Ala	Val		
	225				230					235					240		
gcc	ggc	ggg	ctg	ctg	gtc	gga	ctg	gtg	gag	gcg	ttc	gcc	acc	gga	tat		768
Ala	Gly	Gly	Leu	Leu	Val	Gly	Leu	Val	Glu	Ala	Phe	Ala	Thr	Gly	Tyr		
					245				250					255			
ctc	agc	agc	gag	tac	aag	gac	acg	ctc	acc	tac	ggg	ctg	ctg	ctc	gcg		816
Leu	Ser	Ser	Glu	Tyr	Lys	Asp	Thr	Leu	Thr	Tyr	Gly	Leu	Leu	Leu	Ala		
			260					265				270					
gtg	ctg	ctg	ctg	cgg	ccc	acc	ggg	ctg	ctg	cgc	cgg	gcg	tcg	gtg	gtg		864
Val	Leu	Leu	Leu	Arg	Pro	Thr	Gly	Leu	Leu	Arg	Arg	Ala	Ser	Val	Val		
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cgg	gta	tga															873
Arg	Val																
	290																

<210> 925

<211> 290

<212> PRT

<213> Streptomyces coelicolor

<400> 925

Met	Ser	Gln	Phe	Phe	Asp	Phe	Thr	Leu	Ser	Gly	Leu	Gly	Ala	Gly	Thr		
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			20					25					30				
Gly	Val	Ile	Asn	Phe	Ala	Gln	Gly	Asp	Phe	Val	Met	Leu	Gly	Gly	Leu		
		35					40					45					
Gly	Cys	Ala	Val	Leu	His	Glu	Ala	Gly	Thr	Pro	Leu	Trp	Ala	Ala	Ala		
	50					55					60						
Leu	Thr	Ala	Ile	Ala	Ala	Thr	Ala	Ala	Val	Gly	Ala	Leu	Leu	Asp	Leu		
65					70				75					80			
Val	Val	Val	Arg	Arg	Ala	Arg	Asp	Ala	Asp	Gly	Glu	Arg	Leu	Ile	Ile		
			85					90					95				
Leu	Thr	Ile	Gly	Ala	Ser	Val	Thr	Leu	Glu	Gly	Ala	Ala	Leu	Leu	Val		
		100					105						110				
Phe	Gly	Pro	Asp	Ser	His	Phe	Val	Pro	Ser	Phe	Ser	Glu	Gly	Arg	Ala		
		115					120					125					
Phe	Glu	Val	Phe	Gly	Ala	His	Val	Val	Arg	Gln	Tyr	Val	Trp	Cys	Gly		
	130					135				140							
Val	Ala	Thr	Gly	Val	Ala	Val	Leu	Leu	Met	Trp	Leu	Phe	Leu	Thr	Arg		
145					150				155					160			
Thr	Leu	Trp	Gly	Thr	Ala	Met	Arg	Ala	Thr	Ala	Met	Glu	Pro	Glu	Ala		
			165					170					175				
Val	Arg	Leu	Val	Gly	Val	Ser	Pro	Ala	Arg	Met	Ser	Leu	Leu	Ala	Phe		
		180					185					190					
Thr	Leu	Ala	Ala	Ala	Leu	Gly	Ala	Leu	Ala	Gly	Val	Phe	Leu	Ala	Pro		
		195					200					205					
Leu	Gln	Pro	Pro	Asp	Ala	Ser	Val	Gly	Ile	Pro	Phe	Gly	Leu	Lys	Gly		
	210					215					220						
Phe	Thr	Ala	Ala	Val	Ile	Gly	Gly	Leu	Val	Ser	Pro	Ala	Gly	Ala	Val		
225					230					235					240		
Ala	Gly	Gly	Leu	Leu	Val	Gly	Leu	Val	Glu	Ala	Phe	Ala	Thr	Gly	Tyr		
			245						250				255				
Leu	Ser	Ser	Glu	Tyr	Lys	Asp	Thr	Leu	Thr	Tyr	Gly	Leu	Leu	Ala			
			260					265				270					
Val	Leu	Leu	Leu	Arg	Pro	Thr	Gly	Leu	Leu	Arg	Arg	Ala	Ser	Val	Val		
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Arg	Val																
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<211> 900
 <212> DNA
 <213> Streptomyces coelicolor

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 gtg tac gcc ctg atc gcc ctc ggc ttc acc atc ttc aag gcc tcc 96
 Val Tyr Ala Leu Ile Ala Leu Gly Phe Val Thr Ile Phe Lys Ala Ser
 20 25 30
 gga gtc ctg agc ttc acc cac ggc tcg ctg ctg ctg ctc ggc ggg tac 144
 Gly Val Leu Ser Phe Thr His Gly Ser Leu Leu Leu Leu Gly Gly Tyr
 35 40 45
 ctc gtc gcc gtc ctc cac gac gac ctc ggc ttc gcc ggg gca ctc gcc 192
 Leu Val Ala Val Leu His Asp Asp Leu Gly Phe Ala Gly Ala Leu Ala
 50 55 60
 gtc gcg gtg ctc gtg acg gcg gcc gtg gcc ggg gcc ctg gac cgg ctg 240
 Val Ala Val Leu Val Thr Ala Ala Val Ala Gly Ala Leu Asp Arg Leu
 65 70 75 80
 gtg ctg caa cgc gtc gcc ggg agc gac ccg cac gcc gcc cac gtc cag 288
 Val Leu Gln Arg Val Gly Gly Ser Asp Pro His Ala Ala His Val Gln
 85 90 95
 acc atc gtc acc atc ggc gtc gac atc gtc ctg gtc acc gac ctc gcc 336
 Thr Ile Val Thr Ile Gly Val Asp Ile Val Leu Val Thr Asp Leu Ala
 100 105 110
 cgg cgc atc ggc ggc gac ctg ctg ccg ctc ggc gac ccc tgg ggc tcc 384
 Arg Arg Ile Gly Gly Asp Leu Leu Pro Leu Gly Asp Pro Trp Gly Ser
 115 120 125
 gcc gtg acc gac ctc ggc ccg gtg acc gtg gcc gac agc cgc atc gcc 432
 Ala Val Thr Asp Leu Gly Pro Val Thr Val Ala Asp Ser Arg Ile Ala
 130 135 140
 gcg atc ctg gtg tcc gcc gtc gcc atc ggc ggc gcc ttc gcc ctc ttc 480
 Ala Ile Leu Val Ser Ala Val Ala Ile Gly Gly Ala Phe Ala Leu Phe
 145 150 155 160
 cgg tac acc ccc tgg ggc ctg tcg ctg cgc gcg gcc gag gac cgg 528
 Arg Tyr Thr Pro Trp Gly Leu Ser Leu Arg Ala Ala Ala Glu Asp Arg
 165 170 175
 gag gcc gcc gcc ctc atg ggc gta cgc ctc acc cgc gta cgc acc gcc 576
 Glu Ala Ala Ala Leu Met Gly Val Arg Leu Thr Arg Val Arg Thr Ala
 180 185 190
 gcc tgg tgc ctg gcc ggc gcc ctc gcc ctc gcc gcc gtc ttc ctg 624
 Ala Trp Cys Leu Ala Gly Ala Leu Ala Ala Leu Ala Val Phe Leu
 195 200 205
 gtc gcc ttc ccg gcg ccc ggc ctc gaa cgc acc acc ggc cag atc gcg 672
 Val Ala Phe Pro Ala Pro Gly Leu Glu Arg Thr Thr Gly Gln Ile Ala
 210 215 220
 ctg aag gcc ttc ccc gcc ggc atc ctc ggc ggc atg acc tcc ccg gtc 720
 Leu Lys Ala Phe Pro Ala Ala Ile Leu Gly Gly Met Thr Ser Pro Val
 225 230 235 240
 ggc gcc ctg gtc ggc agc atg ctg atc ggc ctc acc gag gcg ttc gtc 768
 Gly Ala Leu Val Gly Ser Met Leu Ile Gly Leu Thr Glu Ala Phe Val
 245 250 255
 gcc ggt tac cag tcc gac ctg cac gtc ctc ggc gag gcc ttc ggc gac 816
 Ala Gly Tyr Gln Ser Asp Leu His Val Leu Gly Glu Gly Phe Gly Asp
 260 265 270
 gtc gct ccg tac gcc gtg atg gtg ctg gtg ctg ctg gtg cgt ccg gcc 864
 Val Ala Pro Tyr Ala Val Met Val Leu Val Leu Leu Val Arg Pro Ala
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 gga ctc ttc gcg gcg aag gga gcg gcc cgt gtc tga 900
 Gly Leu Phe Ala Ala Lys Gly Ala Ala Arg Val
 290 295

<210> 927
 <211> 299

<212> PRT

<213> Streptomyces coelicolor

<400> 927

Met Thr Gly Phe Leu Asp Ser Leu Leu Gly Gly Leu Ala Leu Gly Ser
 1 Val Tyr Ala Leu Ile Ala Leu Gly Phe Val Thr Ile Phe Lys Ala Ser
 20 Gly Val Leu Ser Phe Thr His Gly Ser Leu Leu Leu Leu Gly Gly Tyr
 35 Leu Val Ala Val Leu His Asp Asp Leu Gly Phe Ala Gly Ala Leu Ala
 50 Val Ala Val Leu Val Thr Ala Ala Val Ala Gly Ala Leu Asp Arg Leu
 65 Val Leu Gln Arg Val Gly Gly Ser Asp Pro His Ala Ala His Val Gln
 80 Thr Ile Val Thr Ile Gly Val Asp Ile Val Leu Val Thr Asp Leu Ala
 100 Arg Arg Ile Gly Gly Asp Leu Leu Pro Leu Gly Asp Pro Trp Gly Ser
 115 Ala Val Thr Asp Leu Gly Pro Val Thr Val Ala Asp Ser Arg Ile Ala
 130 Ala Ile Leu Val Ser Ala Val Ala Ile Gly Gly Ala Phe Ala Leu Phe
 145 Arg Tyr Thr Pro Trp Gly Leu Ser Leu Arg Ala Ala Glu Asp Arg
 160 Glu Ala Ala Ala Leu Met Gly Val Arg Leu Thr Arg Val Arg Thr Ala
 175 Ala Trp Cys Leu Ala Gly Ala Leu Ala Ala Leu Ala Val Phe Leu
 190 Val Ala Phe Pro Ala Pro Gly Leu Glu Arg Thr Thr Gly Gln Ile Ala
 205 Leu Lys Ala Phe Pro Ala Ala Ile Leu Gly Gly Met Thr Ser Pro Val
 220 Gly Ala Leu Val Gly Ser Met Leu Ile Gly Leu Thr Glu Ala Phe Val
 235 Ala Gly Tyr Gln Ser Asp Leu His Val Leu Gly Glu Gly Phe Gly Asp
 250 Val Ala Pro Tyr Ala Val Met Val Leu Val Leu Leu Val Arg Pro Ala
 265 Gly Leu Phe Ala Ala Lys Gly Ala Ala Arg Val
 280 290 295

<210> 928

<211> 26

<212> DNA

<213> Artificial sequence

<220>

<223> primer

<400> 928

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<210> 930

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<222> (24)..(127)

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<221> Variant

<222> (128)..(215)

<223> Xaa in position 128 to 215 is any or no amino acid

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<221> Variant

<222> (217)..(220)

<223> Xaa in position 217 to 220 is any amino acid

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<221> Variant

<222> (222)..(232)

<223> Xaa in position 222 to 232 is any amino acid

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<221> Variant

<222> (234)..(254)

<223> Xaa in position 234 to 254 is any amino acid

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<221> Variant

<222> (256)..(281)

<223> Xaa in position 256 to 281 is any amino acid

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<221> Variant

<222> (282)..(287)

<223> Xaa in position 282 to 287 is any or no amino acid

<220>

<221> Variant

<222> (290)..(294)

<223> Xaa in position 290 to 294 is any amino acid

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<221> Variant

<222> (296)..(331)

<223> Xaa in position 296 to 331 is any amino acid

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<222> (332)..(361)

<223> Xaa in position 332 to 361 is any or no amino acid

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<221> Variant

<222> (363)..(363)

<223> Xaa in position 363 is any amino acid

<400> 930

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1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa

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20 25 30
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 35 40 45
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 50 55 60
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 65 70 75 80
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 85 90 95
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 100 105 110
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 115 120 125
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 130 135 140
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 145 150 155 160
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 165 170 175
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 180 185 190
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 195 200 205
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Ala Xaa Xaa Xaa
 210 215 220
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 225 230 235 240
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Xaa
 245 250 255
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 260 265 270
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly
 275 280 285
 Gly Xaa Xaa Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 290 295 300
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 305 310 315 320
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 325 330 335
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 340 345 350
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 355 360

<210> 931
 <211> 43
 <212> PRT
 <213> Artificial sequence

<220>
 <223> protein pattern

<220>
 <221> Variant
 <222> (1)..(1)
 <223> Xaa in position 1 is Thr, Ser, Met or Trp

<220>
 <221> Variant
 <222> (2)..(3)
 <223> Xaa in position 2 to 3 is any amino acid

<220>
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 <222> (5)..(8)
 <223> Xaa in position 5 to 8 is any amino acid

<220>

<221> Variant
 <222> (9)..(9)
 <223> Xaa in position 9 is Ala, Ser or Gly

 <220>
 <221> Variant
 <222> (10)..(10)
 <223> Xaa in position 10 is Val, Thr, Ala, Ile, Leu, Gly, Cys or Ser

 <220>
 <221> Variant
 <222> (11)..(20)
 <223> Xaa in position 11 to 20 is any amino acid

 <220>
 <221> Variant
 <222> (22)..(30)
 <223> Xaa in position 22 to 30 is any amino acid

 <220>
 <221> Variant
 <222> (31)..(31)
 <223> Xaa in position 31 is Thr, Ala, Val, Ser, Gly, Ile or Leu

 <220>
 <221> Variant
 <222> (32)..(32)
 <223> Xaa in position 32 is Phe, Trp, Tyr, Val, Ala or Leu

 <220>
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 <222> (33)..(38)
 <223> Xaa in position 33 to 38 is any amino acid

 <220>
 <221> Variant
 <222> (39)..(39)
 <223> Xaa in position 39 is Ala, Gly, Ser, Thr, Val or Cys

 <220>
 <221> Variant
 <222> (40)..(40)
 <223> Xaa in position 40 is Gly, Ala, Ser, Leu or Cys

 <220>
 <221> Variant
 <222> (41)..(41)
 <223> Xaa in position 41 is Leu, Val, Ile, Phe, Ala, Met or Thr

 <220>
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 <222> (42)..(42)
 <223> Xaa in position 42 is Ala, Gly, Ser or Thr

 <220>
 <221> Variant
 <222> (43)..(43)
 <223> Xaa in position 43 is Gly, Ala or Ser

 <400> 931
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 Xaa Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 20 25 30
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 35 40

<210> 932

<211> 80
<212> PRT
<213> Artificial sequence

<220>
<223> protein pattern

<220>
<221> Variant
<222> (1)..(1)
<223> Xaa in position 1 is Val, Ile, Ala, Leu, Ser, Thr or Met

<220>
<221> Variant
<222> (2)..(2)
<223> Xaa in position 2 is Leu, Val, Ile, Phe, Ala or Met

<220>
<221> Variant
<222> (5)..(9)
<223> Xaa in position 5 to 9 is any amino acid

<220>
<221> Variant
<222> (10)..(10)
<223> Xaa in position 10 is Gly, Val, Ala or Leu

<220>
<221> Variant
<222> (11)..(13)
<223> Xaa in position 11 to 13 is any amino acid

<220>
<221> Variant
<222> (14)..(14)
<223> Xaa in position 14 is Gly, Ala, Ser, Thr or Met

<220>
<221> Variant
<222> (15)..(15)
<223> Xaa in position 15 is Gly, Ala, Ser, Thr or Cys

<220>
<221> Variant
<222> (16)..(16)
<223> Xaa in position 16 is any amino acid

<220>
<221> Variant
<222> (17)..(17)
<223> Xaa in position 17 is Leu, Ile, Val, Gly, Ala, Phe, Ser, Met or Thr

<220>
<221> Variant
<222> (18)..(18)
<223> Xaa in position 18 is Leu, Ile, Val, Phe or Met

<220>
<221> Variant
<222> (19)..(37)
<223> Xaa in position 19 to 37 is any amino acid

<220>
<221> Variant
<222> (38)..(67)
<223> Xaa in position 38 to 67 is any or no amino acid

<220>
<221> Variant

<222> (68)..(68)
 <223> Xaa in position 68 is Leu, Ile, Val, Ala, Phe, Thr or Met

 <220>
 <221> Variant
 <222> (69)..(69)
 <223> Xaa in position 69 is Leu, Met, Ile, Val, Phe, Ala or Thr

 <220>
 <221> Variant
 <222> (70)..(70)
 <223> Xaa in position 70 is Ile, Val, Leu, Ala, Phe or Met

 <220>
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 <222> (71)..(72)
 <223> Xaa in position 71 to 72 is any amino acid

 <220>
 <221> Variant
 <222> (73)..(73)
 <223> Xaa in position 73 is Leu, Met, Ile, Val or Phe

 <220>
 <221> Variant
 <222> (74)..(76)
 <223> Xaa in position 74 to 76 is any amino acid

 <220>
 <221> Variant
 <222> (77)..(77)
 <223> Xaa in position 77 is Pro, Ser or Arg

 <220>
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 <222> (78)..(78)
 <223> Xaa in position 78 is any amino acid

 <220>
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 <222> (79)..(79)
 <223> Xaa in position 79 is Gly, Ser, Ala or Arg

 <220>
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 <222> (80)..(80)
 <223> Xaa in position 80 is Leu, Ile, Met, Val, Phe, Ser, Ala or Thr

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Ile	Ile	Asp	Leu	Pro	Cys	Arg	Ile	Ala	Lys	Gly	Cys	Lys	Tyr	Cys	Asn
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Arg	Asp	Asp	Ala	Ala	Ser	Cys	Leu	Val	Arg	Phe	Gly	Leu	Asp	Arg	Glu
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Tyr	Leu	Val	Asp	Leu	Val	Gly	Lys	Pro	Gly	His	Leu	Trp	Glu	Pro	Asp
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Phe	Pro	Arg	Pro	Lys	Pro	Val	Glu	Pro	Ala	Val	Asp	Phe	Arg	Leu	Leu
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gcc	aaa	caa	tat	ttc	tcc	gat	agc	cag	tct	ctt	aat	ctt	gtt	ttc	gat
Ala	Lys	Gln	Tyr	Phe	Ser	Asp	Ser	Gln	Ser	Leu	Asn	Leu	Val	Phe	Asp
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Pro	Ala	Ser	Asp	Asp	Met	Gly	Phe	Ser	Met	Phe	His	Arg	Gln	Tyr	Asp
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Leu	Pro	Pro	Ser	Ala	Asn	Met	Pro	Pro	Gln	Asn	Met	Met	Arg	Ala	Ser
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Asn	Gln	Ile	Glu	Ala	Ala	Pro	Met	Asn	Ala	Pro	Pro	Ile	Ser	Gln	Pro
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Val	Pro	Asn	Arg	Ala	Asn	Arg	Glu	Leu	Gly	Leu	Asp	Gly	Asp	Asp	Met
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Asp	Ile	Pro	Trp	Cys	Asp	Leu	Asn	Ile	Lys	Glu	Lys	Ile	Gly	Ala	Gly
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Ser	Phe	Gly	Thr	Val	His	Arg	Ala	Glu	Trp	His	Gly	Ser	Asp	Val	Ala
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Val	Lys	Ile	Leu	Met	Glu	Gln	Asp	Phe	His	Ala	Glu	Arg	Val	Asn	Glu
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Phe	Leu	Arg	Glu	Val	Ala	Ile	Met	Lys	Arg	Leu	Arg	His	Pro	Asn	Ile
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Phe	Leu	Ser	Ser	Lys	Ser	Ala	Ala	Gly	Thr	Pro	Glu	Trp	Met	Ala	Pro
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Arg	Leu	Glu	Ile	Pro	Arg	Asn 775	Leu	Asn	Pro	Gln	Val	Ala	Ala	Ile	Ile		
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gag	gg	tgt	tg	acc	aat	gag	cca	tg	aag	cgt	cca	tca	ttt	gca	act		2400
Glu	Gly	Cys	Trp	Thr	Asn 790	Glu	Pro	Trp	Lys	Arg	Pro	Ser	Phe	Ala	Thr 800		
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<213> Arabidopsis thaliana

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Tyr	Asp	Ser	Leu	Ser	Ser	Glu	Asn	Arg	Ser	Asn	His	Asn	Ser	Gly	Asn		
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Thr	Gly	Lys	Ala	Lys	Ala	Glu	Arg	Gly	Gly	Phe	Asp	Trp	Asp	Pro	Ser		
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			260					265					270				
Ala	Ile	Ile	Val	Asp	Arg	Arg	Ser	Asp	Pro	Ala	Phe	Lys	Glu	Leu	His		
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Val	Asp	Gln	Leu	Ala	Lys	Leu	Ile	Cys	Asn	Arg	Met	Gly	Gly	Pro	Val		
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 Ile Ile Asp Leu Pro Cys Arg Ile Ala Lys Gly Cys Lys Tyr Cys Asn
 370 375 380
 Arg Asp Asp Ala Ala Ser Cys Leu Val Arg Phe Gly Leu Asp Arg Glu
 385 390 395 400
 Tyr Leu Val Asp Leu Val Gly Lys Pro Gly His Leu Trp Glu Pro Asp
 405 410 415
 Ser Leu Leu Asn Gly Pro Ser Ser Ile Ser Ile Ser Ser Pro Leu Arg
 420 425 430
 Phe Pro Arg Pro Lys Pro Val Glu Pro Ala Val Asp Phe Arg Leu Leu
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 Ala Lys Gln Tyr Phe Ser Asp Ser Gln Ser Leu Asn Leu Val Phe Asp
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 Pro Ala Ser Asp Asp Met Gly Phe Ser Met Phe His Arg Gln Tyr Asp
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 485 490 495
 Leu Pro Pro Ser Ala Asn Met Pro Pro Gln Asn Met Met Arg Ala Ser
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 Asn Gln Ile Glu Ala Ala Pro Met Asn Ala Pro Pro Ile Ser Gln Pro
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 Ser Phe Gly Thr Val His Arg Ala Glu Trp His Gly Ser Asp Val Ala
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 Val Lys Ile Leu Met Glu Gln Asp Phe His Ala Glu Arg Val Asn Glu
 580 585 590
 Phe Leu Arg Glu Val Ala Ile Met Lys Arg Leu Arg His Pro Asn Ile
 595 600 605
 Val Leu Phe Met Gly Ala Val Thr Gln Pro Pro Asn Leu Ser Ile Val
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 Thr Glu Tyr Leu Ser Arg Gly Ser Leu Tyr Arg Leu Leu His Lys Ser
 625 630 635 640
 Gly Ala Arg Glu Gln Leu Asp Glu Arg Arg Arg Leu Ser Met Ala Tyr
 645 650 655
 Asp Val Ala Lys Gly Met Asn Tyr Leu His Asn Arg Asn Pro Pro Ile
 660 665 670
 Val His Arg Asp Leu Lys Ser Pro Asn Leu Leu Val Asp Lys Lys Tyr
 675 680 685
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 690 695 700
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 Glu Val Leu Arg Asp Glu Pro Ser Asn Glu Lys Ser Asp Val Tyr Ser
 725 730 735
 Phe Gly Val Ile Leu Trp Glu Leu Ala Thr Leu Gln Gln Pro Trp Gly
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 Asn Leu Asn Pro Ala Gln Val Val Ala Ala Val Gly Phe Lys Cys Lys
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 Arg Leu Glu Ile Pro Arg Asn Leu Asn Pro Gln Val Ala Ala Ile Ile
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 Glu Gly Cys Trp Thr Asn Glu Pro Trp Lys Arg Pro Ser Phe Ala Thr
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Gly Thr Ser Ser Ser Ser Ser Leu Ser Met Thr Leu Ser Ser Thr Asn	
gcg tta tcg ttt ttg tcg aaa gga tgg aga gag gta tgg gat tca gca	144
Ala Leu Ser 35 Phe Leu Ser Lys Gly 40 Trp Arg Glu Val Trp 45 Asp Ser Ala	
gat gcg gat ttg cag ctg atg cga gac aga gct aac tct gtt aag aat	192
Asp Ala Asp Leu Gln Leu Met 55 Arg Asp Arg Ala Asn Ser Val Lys Asn	
cta gca tca acg ttc gat aga gag atc gag aat ttc ctc aat aac tcg	240
Leu Ala Ser Thr Phe Asp 70 Arg Glu Ile Glu Asn 75 Phe Leu Asn Asn Ser 80	
gcg agg tct gcg ttt ccc gtt ggt tca cca tcg gcg tcg tct ttc tca	288
Ala Arg Ser Ala Phe 85 Pro Val Gly Ser Pro 90 Ser Ala Ser Ser Phe 95 Ser	
aat gaa att ggt atc atg aag aag ctt cag ccg aag att tcg gag ttt	336
Asn Glu Ile Gly 100 Ile Met Lys Lys 105 Leu Gln Pro Lys Ile 110 Ser Glu Phe	
cgt agg gtt tat tcg gcg ccg gag att agt cgc aag gtt atg gag aga	384
Arg Arg Val Tyr Ser Ala Pro Glu Ile Ser Arg Lys Val Met Glu Arg	
tgg gga cct gcg aga gcg aag ctt gga atg gat cta tcg gcg att aag	432
Trp Gly Pro Ala Arg Ala Lys 135 Leu Gly Met Asp Leu Ser Ala Ile Lys	
aag gcg att gtg tct gag atg gaa ttg gat gag cgt cag gga gtt ttg	480
Lys Ala Ile Val Ser Glu Met Glu Leu Asp Glu Arg Gln Gly Val Leu 160	
gag atg agt aga ttg agg aga cgg cgt aat agt gat agg gtt agg ttt	528
Glu Met Ser Arg Leu 165 Arg Arg Arg Arg Asn 170 Ser Asp Arg Val Arg 175 Phe	
acg gag ttt ttc gcg gag gct gag aga gat gga gaa gct tat ttc ggt	576
Thr Glu Phe Phe 180 Ala Glu Ala Glu Arg 185 Asp Gly Glu Ala Tyr 190 Phe Gly	
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Asp Trp Glu Pro Ile Arg Ser Leu 200 Lys Ser Arg Phe Lys 205 Glu Phe Glu	
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Lys Arg Ser Ser Leu Glu Ile 215 Leu Ser Gly Phe Lys Asn Ser Glu Phe	
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Val Glu Lys Leu Lys Thr 230 Ser Phe Lys Ser Ile Tyr Lys Glu Thr Asp 240	
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Asp Thr Cys Asp Arg Ile Val Glu 280 Ser Leu Cys Lys Cys 285 Lys Ser Gln	
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Gln Leu Trp Arg Leu Pro Ser 295 Ala Gln Ala Ser Asp 300 Leu Ile Glu Asn	
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Asp Asn His Gly Val Asp 310 Leu Asp Met Arg Ile Ala Ser Val Leu Gln 320	
agc aca gga cac cat tat gat ggt ggg ttt tgg act gat ttt gtg aag	1008
Ser Thr Gly His His 325 Tyr Asp Gly Gly Phe 330 Trp Thr Asp Phe Val Lys	
cct gag aca ccg gaa aac aaa agg cat gtg gca att gtt aca aca gct	1056
Pro Glu Thr Pro Glu Asn Lys Arg His Val Ala Ile Val Thr Thr Ala	

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gca Ala	aca Thr 530	caa Gln	gat Asp	tta Leu	cca Pro	aag Lys 535	tct Ser	gtt Val	gta Val	tgc Cys	aat Asn 540	gtc Val	cat His	ggt Gly	gtc Val	1632		
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cgt Arg	ggt Gly	gaa Glu	caa Gln	gct Ala 565	ttc Phe	tca Ser	aaa Lys	ggt Gly 570	gca Ala	tac Tyr	ttc Phe	tta Leu	gga Gly 575	aaa Lys	atg Met	1728		
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gat Asp	gca Ala 610	gtc Val	gag Glu	gtc Val	caa Gln	cgt Arg 615	gca Ala	gca Ala	aag Lys	aaa Lys	cat His 620	gac Asp	ttg Leu	aat Asn	ctc Leu	1872		
aat Asn 625	ttc Phe	ctc Leu	aaa Lys	gga Gly	agg Arg 630	gac Asp	cac His	gct Ala	gac Asp	gat Asp 635	gct Ala	ctt Leu	cac His	aag Lys	tac Tyr 640	1920		
aaa Lys	gtg Val	ttc Phe	ata Ile	aac Asn 645	ccc Pro	agc Ser	atc Ile	agc Ser	gat Asp 650	gtt Val	cta Leu	tgc Cys	aca Thr	gca Ala 655	acc Thr	1968		
gca Ala	gaa Glu	gca Ala	cta Leu 660	gcc Ala	atg Met	ggg Gly	aag Lys	ttt Phe 665	gtg Val	gtg Val	tgt Cys	gca Ala	gat Asp 670	cac His	cct Pro	2016		
tca Ser	aac Asn	gaa Glu 675	ttc Phe	ttt Phe	aga Arg	tca Ser	ttc Phe 680	ccg Pro	aac Asn	tgc Cys	tta Leu	act Thr 685	tac Tyr	aaa Lys	aca Thr	2064		
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cta Leu	cct Pro	ctc Leu	act Thr	cct Pro	gaa Glu	caa Gln	atg Met	tac Tyr	aat Asn	ctc Leu	tct Ser	tgg Trp	gaa Glu	gca Ala	gca Ala	2160		

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	Gly	Glu	Gly	Gly	Arg	Lys	Met	Arg	Lys	Ser	Arg	Ser	Val	Pro	Ser	Phe					
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	ggg	aac	gat	ttc	ttg	aga	cta	tgc	act	gga	gca	aca	cca	aga	aca	aaa				2352	
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<211> 808

<212> PRT

<213> Arabidopsis thaliana

<400> 936

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Ala	Leu	Ser	Phe	Leu	Ser	Lys	Gly	Trp	Arg	Glu	Val	Trp	Asp	Ser	Ala
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Ala	Arg	Ser	Ala	Phe	Pro	Val	Gly	Ser	Pro	Ser	Ala	Ser	Ser	Phe	Ser
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Asn	Glu	Ile	Gly	Ile	Met	Lys	Lys	Leu	Gln	Pro	Lys	Ile	Ser	Glu	Phe
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Trp	Gly	Pro	Ala	Arg	Ala	Lys	Leu	Gly	Met	Asp	Leu	Ser	Ala	Ile	Lys
	130					135					140				
Lys	Ala	Ile	Val	Ser	Glu	Met	Glu	Leu	Asp	Glu	Arg	Gln	Gly	Val	Leu
145					150					155					160
Glu	Met	Ser	Arg	Leu	Arg	Arg	Arg	Arg	Asn	Ser	Asp	Arg	Val	Arg	Phe
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Thr	Glu	Phe	Phe	Ala	Glu	Ala	Glu	Arg	Asp	Gly	Glu	Ala	Tyr	Phe	Gly
		180						185					190		
Asp	Trp	Glu	Pro	Ile	Arg	Ser	Leu	Lys	Ser	Arg	Phe	Lys	Glu	Phe	Glu
		195					200					205			
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Val	Glu	Lys	Leu	Lys	Thr	Ser	Phe	Lys	Ser	Ile	Tyr	Lys	Glu	Thr	Asp
225					230					235					240
Glu	Ala	Lys	Asp	Val	Pro	Pro	Leu	Asp	Val	Pro	Glu	Leu	Leu	Ala	Cys
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Leu	Val	Arg	Gln	Ser	Glu	Pro	Phe	Leu	Asp	Gln	Ile	Gly	Val	Arg	Lys
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Ser	Thr	Gly	His	His	Tyr	Asp	Gly	Gly	Phe	Trp	Thr	Asp	Phe	Val	Lys
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Pro	Glu	Thr	Pro	Glu	Asn	Lys	Arg	His	Val	Ala	Ile	Val	Thr	Thr	Ala

Ser	Leu	Pro	340 Trp	Met	Thr	Gly	Thr	345 Ala	Val	Asn	Pro	Leu	350 Phe	Arg	Ala
Ala	Tyr	355 Leu	Ala	Lys	Ala	Ala	360 Lys	Gln	Ser	Val	Thr	365 Leu	Val	Val	Pro
Trp	Leu	Cys	Glu	Ser	Asp	Gln	Glu	Leu	Val	Tyr	Pro	Asn	Asn	Leu	Thr
385 Phe	Ser	Ser	Pro	Glu	405 Glu	Gln	Glu	Ser	Tyr	410 Ile	Arg	Lys	Trp	Leu	400 Glu
Glu	Arg	Ile	Gly	Phe	Lys	Ala	Asp	Phe	Lys	Ile	Ser	Phe	Tyr	Pro	Gly
Lys	Phe	Ser	Lys	Glu	Arg	Arg	Ser	Ile	Phe	Pro	Ala	Gly	Asp	Thr	Ser
Gln	Phe	Ile	Ser	Ser	Lys	Asp	Ala	Asp	Ile	Ala	Ile	Leu	Glu	Glu	Pro
Glu	His	Leu	Asn	Trp	Tyr	470 Ile	His	Gly	Lys	Arg	Trp	Thr	Asp	Lys	Phe
Asn	His	Val	Val	Gly	485 Ile	Val	His	Thr	Asn	Tyr	Leu	Glu	Tyr	Ile	Lys
Arg	Glu	Lys	Asn	Gly	Ala	Leu	Gln	Ala	Phe	Phe	Val	Asn	His	Val	Asn
Asn	Trp	Val	Thr	Arg	Ala	Tyr	Cys	Asp	Lys	Val	Leu	Arg	Leu	Ser	Ala
Ala	Thr	Gln	Asp	Leu	Pro	Lys	Ser	Val	Val	Cys	Asn	Val	His	Gly	Val
Asn	Pro	Lys	Phe	Leu	Met	Ile	Gly	Glu	Lys	Ile	Ala	Glu	Glu	Arg	Ser
545 Arg	Gly	Glu	Gln	Ala	Phe	Ser	Lys	Gly	Ala	Tyr	Phe	Leu	Gly	Lys	Met
Val	Trp	Ala	Lys	Gly	Tyr	Arg	Glu	Leu	Ile	Asp	Leu	Met	Ala	Lys	His
Lys	Ser	Glu	Leu	Gly	Ser	Phe	Asn	Leu	Asp	Val	Tyr	Gly	Asn	Gly	Glu
Asp	Ala	Val	Glu	Val	Gln	Arg	Ala	Ala	Lys	Lys	His	Asp	Leu	Asn	Leu
Asn	Phe	Leu	Lys	Gly	Arg	Asp	His	Ala	Asp	Asp	Ala	Leu	His	Lys	Tyr
625 Lys	Val	Phe	Ile	Asn	Pro	Ser	Ile	Ser	Asp	Val	Leu	Cys	Thr	Ala	Thr
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Ser	Asn	Glu	Phe	Phe	Arg	Ser	Phe	Pro	Asn	Cys	Leu	Thr	Tyr	Lys	Thr
Ser	Glu	Asp	Phe	Val	Ser	Lys	Val	Gln	Glu	Ala	Met	Thr	Lys	Glu	Pro
Leu	Pro	Leu	Thr	Pro	Glu	Gln	Met	Tyr	Asn	Leu	Ser	Trp	Glu	Ala	Ala
705 Thr	Gln	Arg	Phe	Met	Glu	Tyr	Ser	Asp	Leu	Asp	Lys	Ile	Leu	Asn	Asn
Gly	Glu	Gly	Gly	Arg	Lys	Met	Arg	Lys	Ser	Arg	Ser	Val	Pro	Ser	Phe
Asn	Glu	Val	Val	Asp	Gly	Gly	Leu	Ala	Phe	Ser	His	Tyr	Val	Leu	Thr
Gly	Asn	Asp	Phe	Leu	Arg	Leu	Cys	Thr	Gly	Ala	Thr	Pro	Arg	Thr	Lys
Asp	Tyr	Asp	Asn	Gln	His	Cys	Lys	Asp	Leu	Asn	Leu	Val	Pro	Pro	His
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 tcg tgg gag ata ctg aaa caa gac atc ccc aaa tac agc ctt cac ttc 96
 Ser Trp Glu Ile Leu Lys Gln Asp Ile Pro Lys Tyr Ser Leu His Phe
 20 25 30
 ttc tca cag ata ctg gag ata gca cca gca gca aaa ggc ttg ttc tct 144
 Phe Ser Gln Ile Leu Glu Ile Ala Pro Ala Ala Lys Gly Leu Phe Ser
 35 40 45
 ttc cta aga gac tca gat gaa gtc cct cac aac aat cct aaa ctc aaa 192
 Phe Leu Arg Asp Ser Asp Glu Val Pro His Asn Asn Pro Lys Leu Lys
 50 55 60
 gct cat gct gtt aaa gtc ttc aag atg aca tgt gaa aca gct ata cag 240
 Ala His Ala Val Lys Val Phe Lys Met Thr Cys Glu Thr Ala Ile Gln
 65 70 75 80
 ctg agg gag gaa gga aag gtg gta gtg gct gac aca acc ctc caa tat 288
 Leu Arg Glu Glu Gly Lys Val Val Val Ala Asp Thr Thr Leu Gln Tyr
 85 90 95
 tta ggc tca att cat ctc aaa agc ggc gtt att gac cct cac ttc gag 336
 Leu Gly Ser Ile His Leu Lys Ser Gly Val Ile Asp Pro His Phe Glu
 100 105 110
 gtg gtg aaa gaa gct ttg cta agg aca ttg aaa gag ggg ttg ggg gag 384
 Val Val Lys Glu Ala Leu Leu Arg Thr Leu Lys Glu Gly Leu Gly Glu
 115 120 125
 aaa tac aat gaa gaa gtg gaa ggt gct tgg tct caa gct tat gat cac 432
 Lys Tyr Asn Glu Glu Val Glu Gly Ala Trp Ser Gln Ala Tyr Asp His
 130 135 140
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 35 40 45
 Phe Leu Arg Asp Ser Asp Glu Val Pro His Asn Asn Pro Lys Leu Lys
 50 55 60
 Ala His Ala Val Lys Val Phe Lys Met Thr Cys Glu Thr Ala Ile Gln
 65 70 75 80
 Leu Arg Glu Glu Gly Lys Val Val Val Ala Asp Thr Thr Leu Gln Tyr
 85 90 95
 Leu Gly Ser Ile His Leu Lys Ser Gly Val Ile Asp Pro His Phe Glu
 100 105 110
 Val Val Lys Glu Ala Leu Leu Arg Thr Leu Lys Glu Gly Leu Gly Glu
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<400> 939

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cta	aca	agg	cgc	cct	tac	act	gcc	cgt	gac	gtg	gtg	gct	cta	cgt	ggc	144
Leu	Thr	Arg	Arg	Pro	Tyr	Thr	Ala	Arg	Asp	Val	Val	Ala	Leu	Arg	Gly	
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cat	ctc	aag	caa	ggc	tat	gct	tcg	aac	gag	atg	gct	aag	aag	ctg	tgg	192
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	65				70					75					80	
gga	gcg	ttg	gac	cct	gtt	cag	gtg	acc	atg	atg	gct	aaa	cat	ttg	gac	288
Gly	Ala	Leu	Asp	Pro	Val	Gln	Val	Thr	Met	Met	Ala	Lys	His	Leu	Asp	
				85					90					95		
acc	atc	tat	gtc	tct	ggg	tgg	cag	tgc	tcc	act	cac	aca	tcc	act		336
Thr	Ile	Tyr	Val	Ser	Gly	Trp	Gln	Cys	Ser	Ser	Thr	His	Thr	Ser	Thr	
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Asn	Glu	Pro	Gly	Pro	Asp	Leu	Ala	Asp	Tyr	Pro	Tyr	Asp	Thr	Val	Pro	
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Asn	Lys	Val	Glu	His	Leu	Phe	Phe	Ala	Gln	Gln	Tyr	His	Asp	Arg	Lys	
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Gln	Arg	Glu	Ala	Arg	Met	Ser	Met	Ser	Arg	Glu	Glu	Arg	Thr	Lys	Thr	
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Pro	Phe	Val	Asp	Tyr	Leu	Lys	Pro	Ile	Ile	Ala	Asp	Gly	Asp	Thr	Gly	
				165				170						175		
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Phe	Gly	Gly	Thr	Ala	Thr	Val	Lys	Leu	Cys	Lys	Leu	Phe	Val	Glu		
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aga	ggc	gcc	gct	ggg	gtc	cac	atc	gag	gac	cag	tcc	tcc	gtc	acc	aag	624
Arg	Gly	Ala	Ala	Gly	Val	His	Ile	Glu	Asp	Gln	Ser	Ser	Val	Thr	Lys	
	195						200				205					
aag	tgt	ggc	cac	atg	gcc	gga	aag	gtc	ctc	gtg	gca	gtc	agc	gaa	cac	672
Lys	Cys	Gly	His	Met	Ala	Gly	Lys	Val	Leu	Val	Ala	Val	Ser	Glu	His	
	210				215					220						
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Ile	Asn	Arg	Leu	Val	Ala	Ala	Arg	Leu	Gln	Phe	Asp	Val	Met	Gly	Thr	
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gag	acc	gtc	ctt	gtt	gct	aga	aca	gat	gcg	gtc	gca	gct	act	ctg	atc	768
Glu	Thr	Val	Leu	Val	Ala	Arg	Thr	Asp	Ala	Val	Ala	Ala	Thr	Leu	Ile	
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cag	tcg	aac	att	gac	gcg	agg	gac	cac	cag	ttc	atc	ctc	ggg	gcc	act	816
Gln	Ser	Asn	Ile	Asp	Ala	Arg	Asp	His	Gln	Phe	Ile	Leu	Gly	Ala	Thr	
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Asn	Pro	Ser	Leu	Arg	Gly	Lys	Ser	Leu	Ser	Ser	Leu	Leu	Ala	Glu	Gly	
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Met	Thr	Val	Gly	Lys	Asn	Gly	Pro	Ala	Leu	Gln	Ser	Ile	Glu	Asp	Gln	
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tgg	ctt	ggc	tcg	gcc	ggg	ctt	atg	act	ttc	tcg	gaa	gct	gtc	gtg	cag	960
Trp	Leu	Gly	Ser	Ala	Gly	Leu	Met	Thr	Phe	Ser	Glu	Ala	Val	Val	Gln	
	305				310					315					320	
gcc	atc	aag	cgc	atg	aac	ctc	aac	gag	aac	gag	aag	aat	cag	aga	ctg	1008
Ala	Ile	Lys	Arg	Met	Asn	Leu	Asn	Glu	Asn	Glu	Lys	Asn	Gln	Arg	Leu	
				325					330					335		
agc	gag	tgg	tta	acc	cat	gca	agg	tat	gag	aac	tgc	ctg	tca	aat	gag	1056
Ser	Glu	Trp	Leu	Thr	His	Ala	Arg	Tyr	Glu	Asn	Cys	Leu	Ser	Asn	Glu	
			340					345					350			
caa	ggc	cga	gtg	tta	gca	gca	aaa	ctt	ggg	gtg	aca	gat	ctt	ttc	tgg	1104
Gln	Gly	Arg	Val	Leu	Ala	Ala	Lys	Leu	Gly	Val	Thr	Asp	Leu	Phe	Trp	
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	370					375					380					
tcg	gtc	gca	gcg	gcc	gtg	gtc	cgt	ggc	tgg	gcc	ttt	gca	cag	atc	gca	1200
Ser	Val	Ala	Ala	Ala	Val	Val	Arg	Gly	Trp	Ala	Phe	Ala	Gln	Ile	Ala	
385					390					395					400	
gac	atc	atc	tgg	atg	gaa	acg	gca	agc	cct	gat	ctc	aat	gaa	tgc	acc	1248
Asp	Ile	Ile	Trp	Met	Glu	Thr	Ala	Ser	Pro	Asp	Leu	Asn	Glu	Cys	Thr	
				405					410					415		
caa	ttc	gcc	gaa	ggg	atc	aag	tcc	aag	aca	ccg	gag	gtc	atg	ctc	gcc	1296
Gln	Phe	Ala	Glu	Gly	Ile	Lys	Ser	Lys	Thr	Pro	Glu	Val	Met	Leu	Ala	
			420					425					430			
tac	aat	ctc	tcg	ccg	tcc	ttc	aac	tgg	gac	gct	tcc	ggg	atg	acg	gat	1344
Tyr	Asn	Leu	Ser	Pro	Ser	Phe	Asn	Trp	Asp	Ala	Ser	Gly	Met	Thr	Asp	
		435					440					445				
cag	cag	atg	gtt	gag	ttc	att	ccg	cgg	att	gct	agg	ctc	gga	tat	tgt	1392
Gln	Gln	Met	Val	Glu	Phe	Ile	Pro	Arg	Ile	Ala	Arg	Leu	Gly	Tyr	Cys	
450					455					460						
tgg	cag	ttc	ata	acg	ctt	gcg	ggg	ttc	cat	gcg	gat	gct	ctt	gtg	gtt	1440
Trp	Gln	Phe	Ile	Thr	Leu	Ala	Gly	Phe	His	Ala	Asp	Ala	Leu	Val	Val	
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Asp	Thr	Phe	Ala	Lys	Asp	Tyr	Ala	Arg	Arg	Gly	Met	Leu	Ala	Tyr	Val	
				485					490					495		
gag	agg	ata	caa	aga	gaa	gag	agg	acc	cat	ggg	gtt	gac	act	ttg	gct	1536
Glu	Arg	Ile	Gln	Arg	Glu	Glu	Arg	Thr	His	Gly	Val	Asp	Thr	Leu	Ala	
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His	Gln	Lys	Trp	Ser	Gly	Ala	Asn	Tyr	Tyr	Asp	Arg	Tyr	Leu	Lys	Thr	
		515					520					525				
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Val	Gln	Gly	Gly	Ile	Ser	Ser	Thr	Ala	Ala	Met	Gly	Lys	Gly	Val	Thr	
530					535					540						
gaa	gaa	cag	ttc	aag	gag	agt	tgg	aca	agg	ccg	gga	gct	gat	gga	atg	1680
Glu	Glu	Gln	Phe	Lys	Glu	Ser	Trp	Thr	Arg	Pro	Gly	Ala	Asp	Gly	Met	
545					550					555					560	
ggg	gaa	ggg	act	agc	ctt	gtg	gtc	gcc	aag	tca	aga	atg	taa			1722
Gly	Glu	Gly	Thr	Ser	Leu	Val	Val	Ala	Lys	Ser	Arg	Met				
				565					570							

<210> 940

<211> 573

<212> PRT

<213> Arabidopsis thaliana

<400> 940

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Ala	Glu	Val	Ala	Glu	Val	Gln	Thr	Trp	Trp	Ser	Ser	Glu	Arg	Phe	Lys	
			20					25					30			
Leu	Thr	Arg	Arg	Pro	Tyr	Thr	Ala	Arg	Asp	Val	Val	Ala	Leu	Arg	Gly	
		35					40					45				
His	Leu	Lys	Gln	Gly	Tyr	Ala	Ser	Asn	Glu	Met	Ala	Lys	Lys	Leu	Trp	
	50					55				60						
Arg	Thr	Leu	Lys	Ser	His	Gln	Ala	Asn	Gly	Thr	Ala	Ser	Arg	Thr	Phe	
65					70					75					80	
Gly	Ala	Leu	Asp	Pro	Val	Gln	Val	Thr	Met	Met	Ala	Lys	His	Leu	Asp	
			85						90					95		
Thr	Ile	Tyr	Val	Ser	Gly	Trp	Gln	Cys	Ser	Ser	Thr	His	Thr	Ser	Thr	
			100					105					110			
Asn	Glu	Pro	Gly	Pro	Asp	Leu	Ala	Asp	Tyr	Pro	Tyr	Asp	Thr	Val	Pro	
		115					120					125				
Asn	Lys	Val	Glu	His	Leu	Phe	Phe	Ala	Gln	Gln	Tyr	His	Asp	Arg	Lys	
	130					135					140					
Gln	Arg	Glu	Ala	Arg	Met	Ser	Met	Ser	Arg	Glu	Glu	Arg	Thr	Lys	Thr	
145					150					155					160	
Pro	Phe	Val	Asp	Tyr	Leu	Lys	Pro	Ile	Ile	Ala	Asp	Gly	Asp	Thr	Gly	
			165					170						175		
Phe	Gly	Gly	Thr	Thr	Ala	Thr	Val	Lys	Leu	Cys	Lys	Leu	Phe	Val	Glu	

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Arg Gly Ala 180
 195
 Lys Cys Gly His Met Ala Gly 185
 210 200
 Ile Asn Arg Leu Val Ala Ala Arg Leu Gln Phe 190
 225 230 235
 Glu Thr Val Leu Val Ala Arg Thr Asp Ala Val Ala Ala Thr Leu 190
 245 250 255
 Gln Ser Asn Ile Asp Ala Arg Asp His Gln Phe Ile Leu Gly Ala Thr
 260 265 270
 Asn Pro Ser Leu Arg Gly Lys Ser Leu Ser Ser Leu Leu Ala Glu Gly
 275 280 285
 Met Thr Val Gly Lys Asn Gly Pro Ala Leu Gln Ser Ile Glu Asp Gln
 290 295 300
 Trp Leu Gly Ser Ala Gly Leu Met Thr Phe Ser Glu Ala Val Val Gln
 305 310 315
 Ala Ile Lys Arg Met Asn Leu Asn Glu Asn Glu Lys Asn Gln Arg Leu
 325 330 335
 Ser Glu Trp Leu Thr His Ala Arg Tyr Glu Asn Cys Leu Ser Asn Glu
 340 345 350
 Gln Gly Arg Val Leu Ala Ala Lys Leu Gly Val Thr Asp Leu Phe Trp
 355 360 365
 Asp Trp Asp Leu Pro Arg Thr Arg Glu Gly Phe Tyr Arg Phe Gln Gly
 370 375 380
 Ser Val Ala Ala Ala Val Val Arg Gly Trp Ala Phe Ala Gln Ile Ala
 385 390 395
 Asp Ile Ile Trp Met Glu Thr Ala Ser Pro Asp Leu Asn Glu Cys Thr
 405 410 415
 Gln Phe Ala Glu Gly Ile Lys Ser Lys Thr Pro Glu Val Met Leu Ala
 420 425 430
 Tyr Asn Leu Ser Pro Ser Phe Asn Trp Asp Ala Ser Gly Met Thr Asp
 435 440 445
 Gln Gln Met Val Glu Phe Ile Pro Arg Ile Ala Arg Leu Gly Tyr Cys
 450 455 460
 Trp Gln Phe Ile Thr Leu Ala Gly Phe His Ala Asp Ala Leu Val Val
 465 470 475
 Asp Thr Phe Ala Lys Asp Tyr Ala Arg Arg Gly Met Leu Ala Tyr Val
 485 490 495
 Glu Arg Ile Gln Arg Glu Glu Arg Thr His Gly Val Asp Thr Leu Ala
 500 505 510
 His Gln Lys Trp Ser Gly Ala Asn Tyr Tyr Asp Arg Tyr Leu Lys Thr
 515 520 525
 Val Gln Gly Gly Ile Ser Ser Thr Ala Ala Met Gly Lys Gly Val Thr
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 Gly Glu Gly Thr Ser Leu Val Val Ala Lys Ser Arg Met
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<210> 941

<211> 1551

<212> DNA

<213> Arabidopsis thaliana

<220>

<221> CDS

<222> (1)..(1551)

<400> 941

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Met	Asp	Gly	Ala	Gly	Glu	Ser	Arg	Leu	Gly	Gly	Asp	Gly	Gly	Gly	Asp	
1				5				10					15			
ggt	tct	gtt	gga	gtt	cag	atc	cga	caa	aca	cgg	atg	cta	ccg	gat	ttt	96
Gly	Ser	Val	Gly	Val	Gln	Ile	Arg	Gln	Thr	Arg	Met	Leu	Pro	Asp	Phe	
			20					25				30				
ctc	cag	agc	gtg	aat	ctc	aag	tat	gtg	aaa	tta	ggt	tac	cat	tac	tta	144
Leu	Gln	Ser	Val	Asn	Leu	Lys	Tyr	Val	Lys	Leu	Gly	Tyr	His	Tyr	Leu	
		35					40					45				

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atc	tca	aat	ctc	ttg	act	ctc	tgt	tta	ttc	cct	ctc	gcc	gtt	gtt	atc	192
Ile	Ser	Asn	Leu	Leu	Thr	Leu	Cys	Leu	Phe	Pro	Leu	Ala	Val	Val	Ile	
	50					55					60					
tcc	gtc	gaa	gcc	tct	cag	atg	aac	cca	gat	gat	ctc	aaa	cag	ctc	tgg	240
Ser	Val	Glu	Ala	Ser	Gln	Met	Asn	Pro	Asp	Asp	Leu	Lys	Gln	Leu	Trp	
65				70					75						80	
atc	cat	cta	caa	tac	aat	ctg	gtt	agt	atc	atc	atc	tgt	tca	gcg	att	288
Ile	His	Leu	Gln	Tyr	Asn	Leu	Val	Ser	Ile	Ile	Ile	Cys	Ser	Ala	Ile	
				85					90					95		
cta	gtc	ttc	ggg	tta	acg	gtt	tat	gtt	atg	acc	cga	cct	aga	ccc	gtt	336
Leu	Val	Phe	Gly	Leu	Thr	Val	Tyr	Val	Met	Thr	Arg	Pro	Arg	Pro	Val	
			100				105						110			
tac	ttg	gtt	gat	ttc	tct	tgt	tat	ctc	cca	cct	gat	cac	ctc	aaa	gct	384
Tyr	Leu	Val	Asp	Phe	Ser	Cys	Tyr	Leu	Pro	Pro	Asp	His	Leu	Lys	Ala	
		115					120					125				
cct	tac	gct	cgg	ttc	atg	gaa	cat	tct	aga	ctc	acc	gga	gat	ttc	gat	432
Pro	Tyr	Ala	Arg	Phe	Met	Glu	His	Ser	Arg	Leu	Thr	Gly	Asp	Phe	Asp	
						135					140					
gac	tct	gct	ctc	gag	ttt	cgc	aag	atc	ctt	gag	cgt	tct	ggg	tta		480
Asp	Ser	Ala	Leu	Glu	Phe	Gln	Arg	Lys	Ile	Leu	Glu	Arg	Ser	Gly	Leu	
145				150					155					160		
ggg	gaa	gac	act	tat	gtc	cct	gaa	gct	atg	cat	tat	gtt	cca	ccg	aga	528
Gly	Glu	Asp	Thr	Tyr	Val	Pro	Glu	Ala	Met	His	Tyr	Val	Pro	Pro	Arg	
				165					170					175		
att	tca	atg	gct	gct	gct	aga	gaa	gaa	gct	gaa	caa	gtc	atg	ttt	ggg	576
Ile	Ser	Met	Ala	Ala	Ala	Arg	Glu	Glu	Ala	Glu	Gln	Val	Met	Phe	Gly	
			180					185					190			
gct	tta	gat	aac	ctt	ttc	gct	aac	act	aat	gtg	aaa	cca	aag	gat	att	624
Ala	Leu	Asp	Asn	Leu	Phe	Ala	Asn	Thr	Asn	Val	Lys	Pro	Lys	Asp	Ile	
			195				200					205				
gga	atc	ctt	gtt	gtg	aat	tgt	agt	ctc	ttt	aat	cca	act	cct	tcg	tta	672
Gly	Ile	Leu	Val	Val	Asn	Cys	Ser	Leu	Phe	Asn	Pro	Thr	Pro	Ser	Leu	
						215					220					
tct	gca	atg	att	gtg	aac	aag	tat	aag	ctt	aga	ggg	aac	att	aga	agc	720
Ser	Ala	Met	Ile	Val	Asn	Lys	Tyr	Lys	Leu	Arg	Gly	Asn	Ile	Arg	Ser	
225					230				235						240	
tac	aat	cta	ggc	ggg	atg	ggg	tgc	agc	gcg	gga	gtt	atc	gct	gtg	gat	768
Tyr	Asn	Leu	Gly	Gly	Met	Gly	Cys	Ser	Ala	Gly	Val	Ile	Ala	Val	Asp	
				245					250					255		
ctt	gct	aaa	gac	atg	ttg	ttg	gta	cat	agg	aac	act	tat	gcg	gtt	gtt	816
Leu	Ala	Lys	Asp	Met	Leu	Leu	Val	His	Arg	Asn	Thr	Tyr	Ala	Val	Val	
			260					265					270			
gtt	tct	act	gag	aac	att	act	cag	aat	tgg	tat	ttt	ggg	aac	aag	aaa	864
Val	Ser	Thr	Glu	Asn	Ile	Thr	Gln	Asn	Trp	Tyr	Phe	Gly	Asn	Lys	Lys	
			275				280					285				
tcg	atg	ttg	ata	ccg	aac	tgc	ttg	cga	gtt	ggg	ggc	tct	gcg	gtt		912
Ser	Met	Leu	Ile	Pro	Asn	Cys	Leu	Phe	Arg	Val	Gly	Gly	Ser	Ala	Val	
						295					300					
ttg	cta	tcg	aac	aag	tcg	agg	gac	aag	aga	cgg	tct	aag	tac	agg	ctt	960
Leu	Leu	Ser	Asn	Lys	Ser	Arg	Asp	Lys	Arg	Arg	Ser	Lys	Tyr	Arg	Leu	
305				310						315					320	
gta	cat	gta	gtc	agg	act	cac	cgt	gga	gca	gat	gat	aaa	gct	ttc	cgt	1008
Val	His	Val	Val	Arg	Thr	His	Arg	Gly	Ala	Asp	Asp	Lys	Ala	Phe	Arg	
				325					330					335		
tgt	gtt	tat	caa	gag	cag	gat	gat	aca	ggg	aga	acc	ggg	gtt	tcg	ttg	1056
Cys	Val	Tyr	Gln	Glu	Gln	Asp	Asp	Thr	Gly	Arg	Thr	Gly	Val	Ser	Leu	
				340				345					350			
tcg	aaa	gat	cta	atg	gcg	att	gca	ggg	gaa	act	ctc	aaa	acc	aat	atc	1104
Ser	Lys	Asp	Leu	Met	Ala	Ile	Ala	Gly	Glu	Thr	Leu	Lys	Thr	Asn	Ile	
				355			360					365				
act	aca	ttg	ggg	cct	ctt	gtt	cta	ccg	ata	agt	gag	cag	att	ccc	ttc	1152
Thr	Thr	Leu	Gly	Pro	Leu	Val	Leu	Pro	Ile	Ser	Glu	Gln	Ile	Pro	Phe	
						375					380					
ttt	atg	act	cta	gtt	gtg	aag	aag	ctc	ttt	aac	ggg	aaa	gtg	aaa	ccg	1200
Phe	Met	Thr	Leu	Val	Val	Lys	Lys	Leu	Phe	Asn	Gly	Lys	Val	Lys	Pro	
385				390						395					400	
tat	atc	ccg	gat	ttc	aaa	ctt	gct	ttc	gag	cat	ttc	tgt	atc	cat	gct	1248
Tyr	Ile	Pro	Asp	Phe	Lys	Leu	Ala	Phe	Glu	His	Phe	Cys	Ile	His	Ala	
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ggt	gga	aga	gct	gtg	atc	gat	gag	tta	gag	aag	aat	ctg	cag	ctt	tca	1296
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			420				425						430			
cca	gtt	cat	gtc	gag	gct	tcg	agg	atg	act	ctt	cat	cga	ttt	ggt	aac	1344
Pro	Val	His	Val	Glu	Ala	Ser	Arg	Met	Thr	Leu	His	Arg	Phe	Gly	Asn	
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aca	tct	tcg	agc	tcc	att	tgg	tat	gaa	ttg	gct	tac	att	gaa	gcg	aag	1392
Thr	Ser	Ser	Ser	Ser	Ile	Trp	Tyr	Glu	Leu	Ala	Tyr	Ile	Glu	Ala	Lys	
	450					455					460					
gga	agg	atg	cga	aga	ggt	aat	cgt	ggt	tgg	caa	atc	gcg	ttc	gga	agt	1440
Gly	Arg	Met	Arg	Arg	Gly	Asn	Arg	Val	Trp	Gln	Ile	Ala	Phe	Gly	Ser	
465					470					475					480	
gga	ttt	aaa	tgt	aat	agc	gcg	att	tgg	gaa	gca	tta	agg	cat	gtg	aaa	1488
Gly	Phe	Lys	Cys	Asn	Ser	Ala	Ile	Trp	Glu	Ala	Leu	Arg	His	Val	Lys	
				485					490					495		
cct	tcg	aac	aac	agt	cct	tgg	gaa	gat	tgt	att	gac	aag	tat	ccg	gta	1536
Pro	Ser	Asn	Asn	Ser	Pro	Trp	Glu	Asp	Cys	Ile	Asp	Lys	Tyr	Pro	Val	
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Thr	Leu	Ser	Tyr													
		515														

<210> 942

<211> 516

<212> PRT

<213> Arabidopsis thaliana

<400> 942

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			20					25					30			
Leu	Gln	Ser	Val	Asn	Leu	Lys	Tyr	Val	Lys	Leu	Gly	Tyr	His	Tyr	Leu	
		35					40					45				
Ile	Ser	Asn	Leu	Leu	Thr	Leu	Cys	Leu	Phe	Pro	Leu	Ala	Val	Val	Ile	
	50					55					60					
Ser	Val	Glu	Ala	Ser	Gln	Met	Asn	Pro	Asp	Asp	Leu	Lys	Gln	Leu	Trp	
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Ile	His	Leu	Gln	Tyr	Asn	Leu	Val	Ser	Ile	Ile	Ile	Cys	Ser	Ala	Ile	
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Leu	Val	Phe	Gly	Leu	Thr	Val	Tyr	Val	Met	Thr	Arg	Pro	Arg	Pro	Val	
			100					105					110			
Tyr	Leu	Val	Asp	Phe	Ser	Cys	Tyr	Leu	Pro	Pro	Asp	His	Leu	Lys	Ala	
		115					120					125				
Pro	Tyr	Ala	Arg	Phe	Met	Glu	His	Ser	Arg	Leu	Thr	Gly	Asp	Phe	Asp	
	130					135					140					
Asp	Ser	Ala	Leu	Glu	Phe	Gln	Arg	Lys	Ile	Leu	Glu	Arg	Ser	Gly	Leu	
145					150					155					160	
Gly	Glu	Asp	Thr	Tyr	Val	Pro	Glu	Ala	Met	His	Tyr	Val	Pro	Pro	Arg	
				165					170					175		
Ile	Ser	Met	Ala	Ala	Ala	Arg	Glu	Glu	Ala	Glu	Gln	Val	Met	Phe	Gly	
			180					185					190			
Ala	Leu	Asp	Asn	Leu	Phe	Ala	Asn	Thr	Asn	Val	Lys	Pro	Lys	Asp	Ile	
		195					200					205				
Gly	Ile	Leu	Val	Val	Asn	Cys	Ser	Leu	Phe	Asn	Pro	Thr	Pro	Ser	Leu	
	210				215						220					
Ser	Ala	Met	Ile	Val	Asn	Lys	Tyr	Lys	Leu	Arg	Gly	Asn	Ile	Arg	Ser	
225					230					235					240	
Tyr	Asn	Leu	Gly	Gly	Met	Gly	Cys	Ser	Ala	Gly	Val	Ile	Ala	Val	Asp	
				245					250					255		
Leu	Ala	Lys	Asp	Met	Leu	Leu	Val	His	Arg	Asn	Thr	Tyr	Ala	Val	Val	
			260					265					270			
Val	Ser	Thr	Glu	Asn	Ile	Thr	Gln	Asn	Trp	Tyr	Phe	Gly	Asn	Lys	Lys	
		275					280					285				
Ser	Met	Leu	Ile	Pro	Asn	Cys	Leu	Phe	Arg	Val	Gly	Gly	Ser	Ala	Val	
	290					295					300					
Leu	Leu	Ser	Asn	Lys	Ser	Arg	Asp	Lys	Arg	Arg	Ser	Lys	Tyr	Arg	Leu	
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Cys Val Tyr Gln 325 Glu Gln Asp Asp Thr 330 Gly Arg Thr Gly Val 335 Ser Leu
 Ser Lys Asp Leu 340 Met Ala Ile Ala Gly Glu Thr Leu Lys Thr Asn Ile
 Thr Thr Leu Gly Pro Leu Val 355 Leu Pro Ile Ser Glu Gln Ile Pro Phe
 Phe 370 Met Thr Leu Val Val 375 Lys Lys Leu Phe Asn Gly Lys Val Lys Pro
 385 Tyr Ile Pro Asp Phe 390 Lys Leu Ala Phe Glu His Phe Cys Ile His Ala
 Gly Gly Arg Ala Val Ile Asp Glu Leu Glu Lys Asn Leu Gln Leu Ser
 Pro Val His Val Glu Ala Ser Arg Met Thr Leu His Arg Phe Gly Asn
 Thr Ser Ser Ser Ser Ile Trp Tyr Glu Leu Ala Tyr Ile Glu Ala Lys
 Gly Arg Met Arg Arg Gly Asn Arg Val Trp Gln Ile Ala Phe Gly Ser
 465 Gly Phe Lys Cys Asn Ser Ala Ile Trp Glu Ala Leu Arg His Val Lys
 Pro Ser Asn Asn Ser Pro Trp Glu Asp Cys Ile Asp Lys Tyr Pro Val
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<210> 943

<211> 1551

<212> DNA

<213> Arabidopsis thaliana

<220>

<221> CDS

<222> (1)..(1551)

<400> 943

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Gly Ser Val Gly 20 Val Gln Ile Arg 25 Thr Arg Met Leu 30 Asp Phe	
ctt caa tct gtt aat ctc aaa tac gta aaa ctt ggg tat cac tat ttg	144
Leu Gln Ser 35 Val Asn Leu Lys Tyr 40 Val Lys Leu Gly Tyr 45 His Tyr Leu	
att tcc aat ctc ctt acc ctt tgc ctg ttt cca ctg gcc gtc gtg att	192
Ile Ser Asn Leu Leu Thr Leu 55 Cys Leu Phe Pro Leu 60 Ala Val Val Ile	
tcc gtg gaa gct tca caa atg aat ccc gat gac tta aaa caa cta tgg	240
Ser Val Glu Ala Ser Gln Met Asn Pro Asp Asp Leu Lys Gln Leu Trp 80	
atc cac ttg caa tat aac tta gtc tct att ata atc tgt tca gca att	288
Ile His Leu Gln Tyr 85 Asn Leu Val Ser Ile 90 Ile Ile Cys Ser Ala Ile	
ttg gtt ttt ggt ctg act gtc tac gtg atg act aga ccc aga cct gtt	336
Leu Val Phe Gly 100 Leu Thr Val Tyr 105 Val Met Thr Arg Pro Arg Pro Val	
tat ctc gtg gat ttt tct tgt tac tta ccc cca gac cat ctt aaa gca	384
Tyr Leu Val Asp Phe Ser Cys Tyr 120 Leu Pro Pro Asp His Leu Lys Ala	
cct tac gca agg ttt atg gag cat agc cgt ctc act gga gac ttt gac	432
Pro Tyr Ala Arg Phe Met Glu His Ser Arg Leu Thr 140 Gly Asp Phe Asp	
gat tct gcg ctg gag ttc cag agg aaa atc ttg gag cga tca gga ttg	480
Asp Ser Ala Leu Glu Phe 150 Gln Arg Lys Ile Leu Glu Arg Ser Gly Leu 160	
gga gaa gac act tat gtg cct gag gct atg cac tac gtt cca cct agg	528
Gly Glu Asp Thr 165 Val Pro Glu Ala Met 170 His Tyr Val Pro 175 Arg	

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gca Ala	ctt Leu	gac Asp 195	aat Asn	ctt Leu	ttc Phe	gct Ala	aac Asn 200	act Thr	aac Asn	ggt Val	aaa Lys	ccc Pro 205	aag Lys	gat Asp	ata Ile	624
ggc Gly	att Ile 210	ctt Leu	gtc Val	gtg Val	aac Asn	tgt Cys 215	tcc Ser	ctc Leu	ttc Phe	aat Asn 220	ccc Pro	acc Thr	cct Pro	tca Ser	ctt Leu	672
tca Ser 225	gct Ala	atg Met	atc Ile	gtt Val	aac Asn 230	aaa Lys	tac Tyr	aag Lys	ctg Leu	agg Arg 235	gga Gly	aat Asn	att Ile	cgc Arg	tcg Ser 240	720
tac Tyr	aat Asn	ttg Leu	ggg Gly	ggt Gly 245	atg Met	gga Gly	tgc Cys	tca Ser	gct Ala 250	gga Gly	gtt Val	atc Ile	gca Ala	gta Val 255	gat Asp	768
ttg Leu	gcc Ala	aag Lys	gat Asp 260	atg Met	ctc Leu	cta Leu	gtc Val	cac His 265	agg Arg	aac Asn	acg Thr	tac Tyr	gct Ala 270	gtg Val	gtt Val	816
gtg Val	agt Ser	acc Thr 275	gaa Glu	aac Asn	ata Ile	aca Thr	cag Gln 280	aat Asn	tgg Trp	tat Tyr	ttc Phe 285	gga Gly	aac Asn	aag Lys	aag Lys	864
tcc Ser	atg Met 290	ctc Leu	atc Ile	cca Pro	aac Asn	tgc Cys 295	ttg Leu	ttt Phe	aga Arg	ggt Val	gga Gly 300	ggg Gly	tct Ser	gct Ala	gta Val	912
tta Leu 305	ctc Leu	agc Ser	aat Asn	aag Lys	tcg Ser 310	agg Arg	gac Asp	aaa Lys	aga Arg	cgg Arg 315	agt Ser	aaa Lys	tat Tyr	cg Arg	ttg Leu 320	960
gtt Val	cat His	gtt Val	gtg Val	cgg Arg 325	aca Thr	cac His	cga Arg	ggt Gly	gca Ala 330	gac Asp	gat Asp	aag Lys	gca Ala	ttc Phe 335	cg Arg	1008
tgc Cys	gtc Val	tat Tyr	cag Gln 340	gag Glu	caa Gln	gat Asp	gat Asp	acc Thr 345	ggc Gly	aga Arg	aca Thr	ggt Gly 350	gtg Val	tct Ser	ctg Leu	1056
agt Ser	aaa Lys	gac Asp 355	tta Leu	atg Met	gct Ala	atc Ile	gcc Ala 360	ggc Gly	gaa Glu	aca Thr	ttg Leu 365	aaa Lys	aca Thr	aat Asn	ata Ile	1104
act Thr	aca Thr 370	ctc Leu	ggc Gly	cca Pro	ttg Leu	gta Val 375	ctt Leu	ccg Pro	att Ile	tca Ser	gag Glu 380	caa Gln	att Ile	cca Pro	ttc Phe	1152
ttt Phe 385	atg Met	act Thr	ctc Leu	gta Val 390	gtt Val 390	aag Lys	aaa Lys	ttg Leu	ttc Phe	aac Asn 395	ggt Gly	aag Lys	gtt Val	aag Lys	cct Pro 400	1200
tat Tyr	ata Ile	cca Pro	gat Asp 405	ttc Phe	aag Lys	cta Leu	gcg Ala	ttt Phe	gaa Glu 410	cat His	ttt Phe	tgt Cys	att Ile	cat His 415	gct Ala	1248
ggg Gly	gga Gly	cga Arg	gct Ala 420	gtt Val	atc Ile	gat Asp	gaa Glu 425	ctc Leu	gaa Glu	aag Lys	aat Asn	ctt Leu	caa Gln 430	ttg Leu	agt Ser	1296
cct Pro	gtt Val	cat His 435	gtc Val	gaa Glu	gcc Ala	tcc Ser	agg Arg 440	atg Met	acc Thr	ctt Leu	cat His	agg Arg 445	ttc Phe	ggt Gly	aac Asn	1344
acc Thr	tct Ser 450	agc Ser	tct Ser	agt Ser	att Ile	tgg Trp 455	gaa Glu	ctt Leu	gct Ala	tat Tyr 460	atc Ile	gag Glu	gag Glu	gag Ala	aag Lys	1392
gga Gly 465	cg Arg	atg Met	aga Arg	cg Arg	ggt Gly 470	aac Asn	cg Arg	gtg Val	tgg Trp	cag Gln 475	att Ile	gca Ala	ttc Phe	ggg Gly	agt Ser 480	1440
ggc Gly	ttt Phe	aag Lys	tgc Cys	aac Asn 485	tct Ser	gct Ala	ata Ile	tgg Trp	gaa Glu 490	gcc Ala	tta Leu	cg Arg	cac His	gtt Val 495	aag Lys	1488
cca Pro	agc Ser	aac Asn	aat Asn 500	tct Ser	cca Pro	tgg Trp	gag Glu	gat Asp 505	tgt Cys	atc Ile	gat Asp	aag Lys	tac Tyr 510	ccg Pro	gtg Val	1536
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<211> 516

<212> PRT

<213> Arabidopsis thaliana

<400> 944

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Ile Ser Asn Leu Leu Thr Leu Cys Leu Phe Pro Leu Ala Val Val Ile
50      55      60
Ser Val Glu Ala Ser Gln Met Asn Pro Asp Asp Leu Lys Gln Leu Trp
65      70      75      80
Ile His Leu Gln Tyr Asn Leu Val Ser Ile Ile Ile Cys Ser Ala Ile
85      90      95
Leu Val Phe Gly Leu Thr Val Tyr Val Met Thr Arg Pro Arg Pro Val
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Tyr Leu Val Asp Phe Ser Cys Tyr Leu Pro Pro Asp His Leu Lys Ala
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130     135     140
Asp Ser Ala Leu Glu Phe Gln Arg Lys Ile Leu Glu Arg Ser Gly Leu
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180     185     190
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195     200     205
Gly Ile Leu Val Val Asn Cys Ser Leu Phe Asn Pro Thr Pro Ser Leu
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Ser Ala Met Ile Val Asn Lys Tyr Lys Leu Arg Gly Asn Ile Arg Ser
225     230     235     240
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245     250     255
Leu Ala Lys Asp Met Leu Leu Val His Arg Asn Thr Tyr Ala Val Val
260     265     270
Val Ser Thr Glu Asn Ile Thr Gln Asn Trp Tyr Phe Gly Asn Lys Lys
275     280     285
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Val His Val Val Arg Thr His Arg Gly Ala Asp Asp Lys Ala Phe Arg
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Cys Val Tyr Gln Glu Gln Asp Asp Thr Gly Arg Thr Gly Val Ser Leu
340     345     350
Ser Lys Asp Leu Met Ala Ile Ala Gly Glu Thr Leu Lys Thr Asn Ile
355     360     365
Thr Thr Leu Gly Pro Leu Val Leu Pro Ile Ser Glu Gln Ile Pro Phe
370     375     380
Phe Met Thr Leu Val Val Lys Lys Leu Phe Asn Gly Lys Val Lys Pro
385     390     395     400
Tyr Ile Pro Asp Phe Lys Leu Ala Phe Glu His Phe Cys Ile His Ala
405     410     415
Gly Gly Arg Ala Val Ile Asp Glu Leu Glu Lys Asn Leu Gln Leu Ser
420     425     430
Pro Val His Val Glu Ala Ser Arg Met Thr Leu His Arg Phe Gly Asn
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Thr Ser Ser Ser Ile Trp Tyr Glu Leu Ala Tyr Ile Glu Ala Lys
450     455     460
Gly Arg Met Arg Arg Gly Asn Arg Val Trp Gln Ile Ala Phe Gly Ser
465     470     475     480
Gly Phe Lys Cys Asn Ser Ala Ile Trp Glu Ala Leu Arg His Val Lys
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Thr Leu Ser Tyr

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 tta gcc atg gtt cat gtc tct gtt tca gtt ccg ttc gta gtg ttt cct 96
 Leu Ala Met Val His Val Ser Val Ser Val Pro Phe Val Val Phe Pro
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 gaa atc gga aca caa tgt tct gat gct cca aat gct aac ttc aca cag 144
 Glu Ile Gly Thr Gln Cys Ser Asp Ala Pro Asn Ala Asn Phe Thr Gln
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 ctt ctc agt aac ctc tct agc tca cct ggc ttt tgc ata gaa att ggc 192
 Leu Leu Ser Asn Leu Ser Ser Ser Pro Gly Phe Cys Ile Glu Ile Gly
 50 55 60
 gag gga aat cca ata ggc gct tca tgg tta ata cca ctt aca caa caa 240
 Glu Gly Asn Pro Ile Gly Ala Ser Trp Leu Ile Pro Leu Thr Gln Gln
 65 70 75 80
 gcg gaa gta gcg tgt gat aag gtg acg cag atg gaa gag ttg agt caa 288
 Ala Glu Val Ala Cys Asp Lys Val Thr Gln Met Glu Glu Leu Ser Gln
 85 90 95
 gga tac aac att gtt gga aga gct cag ggg agc tta gtg gct cga ggc 336
 Gly Tyr Asn Ile Val Gly Arg Ala Gln Gly Ser Leu Val Ala Arg Gly
 100 105 110
 tta atc gag ttc tgc gaa ggt ggg cct cct gtt cac aac tat ata tcc 384
 Leu Ile Glu Phe Cys Glu Gly Gly Pro Pro Val His Asn Tyr Ile Ser
 115 120 125
 ttg gct ggt cct cat gct ggc acc gcc gat ctt ctt cgg tgt aat act 432
 Leu Ala Gly Pro His Ala Gly Thr Ala Asp Leu Leu Arg Cys Asn Thr
 130 135 140
 tct ggc tta att tgt gac ata gca aat ggg ata ggc aag gaa aat ccc 480
 Ser Gly Leu Ile Cys Asp Ile Ala Asn Gly Ile Gly Lys Glu Asn Pro
 145 150 155 160
 tac agc gac ttt gtt caa gat aat ctt gct cct agt ggt tat ttc aaa 528
 Tyr Ser Asp Phe Val Gln Asp Asn Leu Ala Pro Ser Gly Tyr Phe Lys
 165 170 175
 aac cct aaa aat gtg aca ggg tac ctg aaa gac tgt cag tat ttc cct 576
 Asn Pro Lys Asn Val Thr Gly Tyr Leu Lys Asp Cys Gln Tyr Leu Pro
 180 185 190
 aag ctt aac aat gag aga cca tac gaa aga aac aca act tac aaa gac 624
 Lys Leu Asn Asn Glu Arg Pro Tyr Glu Arg Asn Thr Thr Tyr Lys Asp
 195 200 205
 cgt ttc gca agt tta cag aac ctg gtt ttt gtc ctg ttt gag aac gat 672
 Arg Phe Ala Ser Leu Gln Asn Leu Val Phe Val Leu Phe Glu Asn Asp
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 225 230 235 240
 ggt gac tta aca cat gtt ctc cct gtt caa gag aca aag ctc tat ata 768
 Gly Asp Leu Thr His Val Leu Pro Val Gln Glu Thr Lys Leu Tyr Ile
 245 250 255
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 Glu Asp Trp Ile Gly Leu Lys Ala Leu Val Val Ala Gly Lys Val Gln
 260 265 270 275
 ttt gtg aat gta acc ggt gac cac tta ata atg gcg gac gaa gat ctc 864
 Phe Val Asn Val Thr Gly Asp His Leu Ile Met Ala Asp Glu Asp Leu
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 gtc aaa tac gtc gta cct ctt ctc cag gat caa cag tct gcc cca cca 912
 Val Lys Tyr Val Val Pro Leu Gln Asp Gln Ser Ala Pro Pro
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<211> 316

<212> PRT

<213> Arabidopsis thaliana

<400> 946

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 35 40 45
 Leu Leu Ser Asn Leu Ser Ser Ser Pro Gly Phe Cys Ile Glu Ile Gly
 50 55 60
 Glu Gly Asn Pro Ile Gly Ala Ser Trp Leu Ile Pro Leu Thr Gln Gln
 65 70 75 80
 Ala Glu Val Ala Cys Asp Lys Val Thr Gln Met Glu Glu Leu Ser Gln
 85 90 95
 Gly Tyr Asn Ile Val Gly Arg Ala Gln Gly Ser Leu Val Ala Arg Gly
 100 105 110
 Leu Ile Glu Phe Cys Glu Gly Gly Pro Pro Val His Asn Tyr Ile Ser
 115 120 125
 Leu Ala Gly Pro His Ala Gly Thr Ala Asp Leu Leu Arg Cys Asn Thr
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 Ser Gly Leu Ile Cys Asp Ile Ala Asn Gly Ile Gly Lys Glu Asn Pro
 145 150 155 160
 Tyr Ser Asp Phe Val Gln Asp Asn Leu Ala Pro Ser Gly Tyr Phe Lys
 165 170 175
 Asn Pro Lys Asn Val Thr Gly Tyr Leu Lys Asp Cys Gln Tyr Leu Pro
 180 185 190
 Lys Leu Asn Asn Glu Arg Pro Tyr Glu Arg Asn Thr Thr Tyr Lys Asp
 195 200 205
 Arg Phe Ala Ser Leu Gln Asn Leu Val Phe Val Leu Phe Glu Asn Asp
 210 215 220
 Thr Val Ile Val Pro Lys Glu Ser Ser Trp Phe Gly Phe Tyr Pro Asp
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 245 250 255
 Glu Asp Trp Ile Gly Leu Lys Ala Leu Val Val Ala Gly Lys Val Gln
 260 265 270
 Phe Val Asn Val Thr Gly Asp His Leu Ile Met Ala Asp Glu Asp Leu
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 Pro Cys Arg Ser Phe Thr Arg Lys Pro Leu Ile Arg Pro Pro Leu Ser
 20 25 30
 ggt ctg cgt ctc ccc ggt gat acc cca ttg ttt cgt tcc gga ctt
 Gly Leu Arg Leu Pro Gly Asp Thr Lys Pro Leu Phe Arg Ser Gly Leu
 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315

48

96

144

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Glu	Ser	Asp	Gln	Leu	Gly	Asp	Asp	Asp	His	Ser	Lys	Gly	Ile	Asp	Arg	
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atc	cat	aac	ttg	cag	aat	gtg	gaa	gat	aag	cag	aag	aaa	gca	agc	cag	288
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ctt	aag	aaa	aga	gtg	atc	ttt	ggt	att	ggc	att	ggt	tta	cct	ggt	gga	336
Leu	Lys	Lys	Arg	Val	Ile	Phe	Gly	Ile	Gly	Ile	Gly	Leu	Pro	Val	Gly	
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Cys	Val	Val	Leu	Ala	Gly	Gly	Trp	Val	Phe	Thr	Val	Ala	Leu	Ala	Ser	
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Ser	Val	Phe	Ile	Gly	Ser	Arg	Glu	Tyr	Phe	Glu	Leu	Val	Arg	Ser	Arg	
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Cys	Ser	Val	Ile	Cys	Ala	Leu	Met	Pro	Ile	Leu	Thr	Leu	Tyr	Phe	Gly	
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Asn	Ile	Asp	Ile	Leu	Val	Thr	Ser	Ala	Ala	Phe	Val	Val	Ala	Ile	Ala	
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Leu	Leu	Val	Gln	Arg	Gly	Ser	Pro	Arg	Phe	Ala	Gln	Leu	Ser	Ser	Thr	
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Met	Phe	Gly	Leu	Phe	Tyr	Cys	Gly	Tyr	Leu	Pro	Ser	Phe	Trp	Val	Lys	
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Leu	Arg	Cys	Gly	Leu	Ala	Ala	Pro	Ala	Leu	Asn	Thr	Gly	Ile	Gly	Arg	
225					230					235					240	
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Thr	Trp	Pro	Ile	Leu	Leu	Gly	Gly	Gln	Ala	His	Trp	Thr	Val	Gly	Leu	
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gtg	gca	aca	ttg	att	tct	ttc	agc	ggt	gta	att	gcg	aca	gac	aca	ttt	816
Val	Ala	Thr	Leu	Ile	Ser	Phe	Ser	Gly	Val	Ile	Ala	Thr	Asp	Thr	Phe	
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Ala	Phe	Leu	Gly	Gly	Lys	Thr	Phe	Gly	Arg	Thr	Pro	Leu	Thr	Ser	Ile	
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Ser	Pro	Lys	Lys	Thr	Trp	Glu	Gly	Thr	Ile	Val	Gly	Leu	Val	Gly	Cys	
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ata	gcc	att	acc	ata	tta	ctc	tct	aaa	tat	ctc	agt	tgg	cca	caa	tct	960
Ile	Ala	Ile	Thr	Ile	Leu	Leu	Ser	Lys	Tyr	Leu	Ser	Trp	Pro	Gln	Ser	
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ctg	ttc	agc	tca	gta	gct	ttt	ggg	ttt	ctt	aac	ttc	ttt	ggg	tca	gtc	1008
Leu	Phe	Ser	Ser	Val	Ala	Phe	Gly	Phe	Leu	Asn	Phe	Phe	Gly	Ser	Val	
				325				330						335		
ttt	ggt	gat	ctt	act	gaa	tca	atg	atc	aag	cgt	gat	gct	ggc	gtc	aaa	1056
Phe	Gly	Asp	Leu	Thr	Glu	Ser	Met	Ile	Lys	Arg	Asp	Ala	Gly	Val	Lys	
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Asp	Ser	Gly	Ser	Leu	Ile	Pro	Gly	His	Gly	Gly	Ile	Leu	Asp	Arg	Val	
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gat	agt	tac	att	ttc	acc	ggc	gca	tta	gct	tat	tca	ttc	atc	aaa	aca	1152
Asp	Ser	Tyr	Ile	Phe	Thr	Gly	Ala	Leu	Ala	Tyr	Ser	Phe	Ile	Lys	Thr	
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<213> Arabidopsis thaliana

<400> 948

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35      40      45
Gly Arg Ile Ser Val Ser Arg Arg Phe Leu Thr Ala Val Ala Arg Ala
50      55      60
Glu Ser Asp Gln Leu Gly Asp Asp Asp His Ser Lys Gly Ile Asp Arg
65      70      75      80
Ile His Asn Leu Gln Asn Val Glu Asp Lys Gln Lys Lys Ala Ser Gln
85      90      95
Leu Lys Lys Arg Val Ile Phe Gly Ile Gly Ile Gly Leu Pro Val Gly
100     105     110
Cys Val Val Leu Ala Gly Gly Trp Val Phe Thr Val Ala Leu Ala Ser
115     120     125
Ser Val Phe Ile Gly Ser Arg Glu Tyr Phe Glu Leu Val Arg Ser Arg
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145     150     155     160
Cys Ser Val Ile Cys Ala Leu Met Pro Ile Leu Thr Leu Tyr Phe Gly
165     170     175     180
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Leu Leu Val Gln Arg Gly Ser Pro Arg Phe Ala Gln Leu Ser Ser Thr
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Thr Trp Pro Ile Leu Gly Gly Gln Ala His Trp Thr Val Gly Leu
245     250     255
Val Ala Thr Leu Ile Ser Phe Ser Gly Val Ile Ala Thr Asp Thr Phe
260     265     270
Ala Phe Leu Gly Gly Lys Thr Phe Gly Arg Thr Pro Leu Thr Ser Ile
275     280     285
Ser Pro Lys Lys Thr Trp Glu Gly Thr Ile Val Gly Leu Val Gly Cys
290     295     300
Ile Ala Ile Thr Ile Leu Leu Ser Lys Tyr Leu Ser Trp Pro Gln Ser
305     310     315     320
Leu Phe Ser Ser Val Ala Phe Gly Phe Leu Asn Phe Phe Gly Ser Val
325     330     335
Phe Gly Asp Leu Thr Glu Ser Met Ile Lys Arg Asp Ala Gly Val Lys
340     345     350
Asp Ser Gly Ser Leu Ile Pro Gly His Gly Gly Ile Leu Asp Arg Val
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<211> 2871

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<400> 949

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Ser	Asn	Arg	Leu	Gly	Asp	Gly	Ser	Asn	Arg	Phe	Pro	Arg	Thr	Gly	Thr	
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Thr	Lys	Ala	Arg	Ala	Ile	Leu	Ser	Pro	Val	Ser	Asp	Pro	Ala	Ala	Ser	
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Thr	Glu	Ala	Cys	Gln	Gln	Tyr	Gln	Ile	Ala	Gly	Lys	Lys	Leu	Pro	Glu	
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Ile	Gly	Ala	Ser	Leu	Ala	Asp	Pro	Ser	Lys	Pro	Leu	Leu	Leu	Ser	Val	
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cgc	tcc	ggc	gcc	gcc	atc	tca	atg	cct	ggt	atg	atg	gac	act	gta	ctt	576
Arg	Ser	Gly	Ala	Ala	Ile	Ser	Met	Pro	Gly	Met	Met	Asp	Thr	Val	Leu	
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Asn	Leu	Gly	Leu	Asn	Asp	Gln	Val	Val	Val	Gly	Leu	Ala	Ala	Lys	Ser	
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His	Val	Glu	Val	Lys	Ala	Val	Glu	Asp	Tyr	Thr	Phe	Leu	Asn	Ser	Ser	
	305				310					315					320	
tat	gtg	cct	gtg	ttg	aag	cag	tta	gaa	tct	gcg	aat	ctt	cag	aag	ttt	1008
Tyr	Val	Pro	Val	Leu	Lys	Gln	Leu	Glu	Ser	Ala	Asn	Leu	Gln	Lys	Phe	
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tat	ttc	gag	aat	aag	ctc	gag	aat	gcg	acg	aaa	gat	acc	acg	aat	atg	1056
Tyr	Phe	Glu	Asn	Lys	Leu	Glu	Asn	Ala	Thr	Lys	Asp	Thr	Thr	Asn	Met	
			340					345					350			
aag	ttc	agg	aac	ccc	aag	tat	tta	tct	ata	ttg	aat	cac	ttg	agg	ttt	1104
Lys	Phe	Arg	Asn	Pro	Lys	Tyr	Leu	Ser	Ile	Leu	Asn	His	Leu	Arg	Phe	
		355					360					365				
tat	tta	ccc	gag	atg	tac	ccg	aaa	cta	cat	agg	ata	ctg	ttt	ttg	gac	1152
Tyr	Leu	Pro	Glu	Met	Tyr	Pro	Lys	Leu	His	Arg	Ile	Leu	Phe	Leu	Asp	
	370					375					380					
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Asp	Asp	Val	Val	Val	Gln	Lys	Asp	Leu	Thr	Gly	Leu	Trp	Glu	Ile	Asp	
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atg	gat	ggg	aaa	gtg	aat	gga	gct	gta	gag	act	tgt	ttt	ggg	tcg	ttt	1248
Met	Asp	Gly	Lys	Val	Asn	Gly	Ala	Val	Glu	Thr	Cys	Phe	Gly	Ser	Phe	
				405					410					415		
cat	cgg	tac	gct	caa	tac	atg	aat	ttc	tca	cat	cct	ttg	atc	aaa	gag	1296
His	Arg	Tyr	Ala	Gln	Tyr	Met	Asn	Phe	Ser	His	Pro	Leu	Ile	Lys	Glu	
			420					425					430			
aag	ttt	aat	ccc	aaa	gca	tgt	gcg	tgg	gcg	tat	gga	atg	aac	ttc	ttt	1344
Lys	Phe	Asn	Pro	Lys	Ala	Cys	Ala	Trp	Ala	Tyr	Gly	Met	Asn	Phe	Phe	
		435					440					445				
gat	ctt	gat	gct	tgg	aga	aga	gag	aag	tgc	aca	gaa	gaa	tat	cac	tac	1392
Asp	Leu	Asp	Ala	Trp	Arg	Arg	Glu	Lys	Cys	Thr	Glu	Glu	Tyr	His	Tyr	
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Trp	Gln	Asn	Leu	Asn	Glu	Asn	Arg	Ala	Leu	Trp	Lys	Leu	Gly	Thr	Leu	
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cca	ccg	gga	ctg	atc	acc	ttt	tac	tca	acc	aca	aag	ccg	ctg	gac	aaa	1488
Pro	Pro	Gly	Leu	Ile	Thr	Phe	Tyr	Ser	Thr	Thr	Lys	Pro	Leu	Asp	Lys	
				485					490					495		
tca	tgg	cat	gtg	ctt	ggg	ctg	ggt	tac	aat	ccg	agc	att	agc	atg	gat	1536
Ser	Trp	His	Val	Leu	Gly	Leu	Gly	Tyr	Asn	Pro	Ser	Ile	Ser	Met	Asp	
			500					505					510			
gag	atc	cgc	aac	gct	gca	gtg	gta	cac	ttc	aac	ggt	aac	atg	aag	cca	1584
Glu	Ile	Arg	Asn	Ala	Ala	Val	Val	His	Phe	Asn	Gly	Asn	Met	Lys	Pro	
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Trp	Leu	Asp	Ile	Ala	Met	Asn	Gln	Phe	Arg	Pro	Leu	Trp	Thr	Lys	His	
	530					535					540					
gtc	gac	tat	gac	ctc	gag	ttt	ggt	cag	gct	tgc	aat	ttt	ggc	ctc	tga	1680
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<211> 559

<212> PRT

<213> Arabidopsis thaliana

<400> 952

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Phe	Leu	Phe	Thr	Leu	Ser	Phe	Phe	Ala	Ser	Asp	Ser	Asn	Asp	Ser		
		35					40				45					
Pro	Asp	Leu	Leu	Leu	Pro	Gly	Val	Glu	Tyr	Ser	Asn	Gly	Val	Gly	Ser	
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Arg	Arg	Ser	Met	Leu	Asp	Ile	Lys	Ser	Asp	Pro	Leu	Lys	Pro	Arg	Leu	
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Ile	Gln	Ile	Arg	Lys	Gln	Ala	Asp	Asp	His	Arg	Ser	Leu	Ala	Leu	Ala	
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Tyr	Ala	Ser	Tyr	Ala	Arg	Lys	Leu	Lys	Leu	Glu	Asn	Ser	Lys	Leu	Val	
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Arg	Ile	Phe	Ala	Asp	Leu	Ser	Arg	Asn	Tyr	Thr	Asp	Leu	Ile	Asn	Lys	
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Pro	Thr	Tyr	Arg	Ala	Leu	Tyr	Asp	Ser	Asp	Gly	Ala	Ser	Ile	Glu	Glu	
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Ser	Val	Leu	Arg	Gln	Phe	Glu	Lys	Glu	Val	Lys	Glu	Arg	Ile	Lys	Met	
145					150					155					160	
Thr	Arg	Gln	Val	Ile	Ala	Glu	Ala	Lys	Glu	Ser	Phe	Asp	Asn	Gln	Leu	
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Lys	Ile	Gln	Lys	Leu	Lys	Asp	Thr	Ile	Phe	Ala	Val	Asn	Glu	Gln	Leu	
			180					185					190			
Thr	Asn	Ala	Lys	Lys	Gln	Gly	Ala	Phe	Ser	Ser	Leu	Ile	Ala	Ala	Lys	
		195					200					205				
Ser	Ile	Pro	Lys	Gly	Leu	His	Cys	Leu	Ala	Met	Arg	Leu	Met	Glu	Glu	
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Arg	Ile	Ala	His	Pro	Glu	Lys	Tyr	Thr	Asp	Glu	Gly	Lys	Asp	Arg	Pro	
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Arg	Glu	Leu	Glu	Asp	Pro	Asn	Leu	Tyr	His	Tyr	Ala	Ile	Phe	Ser	Asp	
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Asn	Val	Ile	Ala	Ala	Ser	Val	Val	Val	Asn	Ser	Ala	Val	Lys	Asn	Ala	
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Lys	Glu	Pro	Trp	Lys	His	Val	Phe	His	Val	Val	Thr	Asp	Lys	Met	Asn	
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Leu	Gly	Ala	Met	Gln	Val	Met	Phe	Lys	Leu	Lys	Glu	Tyr	Lys	Gly	Ala	
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Tyr	Phe	Glu	Asn	Lys	Leu	Glu	Asn	Ala	Thr	Lys	Asp	Thr	Thr	Asn	Met	
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Lys	Phe	Arg	Asn	Pro	Lys	Tyr	Leu	Ser	Ile	Leu	Asn	His	Leu	Arg	Phe	
		355					360					365				
Tyr	Leu	Pro	Glu	Met	Tyr	Pro	Lys	Leu	His	Arg	Ile	Leu	Phe	Leu	Asp	
	370					375					380					
Asp	Asp	Val	Val	Val	Gln	Lys	Asp	Leu	Thr	Gly	Leu	Trp	Glu	Ile	Asp	
385					390					395					400	
Met	Asp	Gly	Lys	Val	Asn	Gly	Ala	Val	Glu	Thr	Cys	Phe	Gly	Ser	Phe	
				405					410					415		
His	Arg	Tyr	Ala	Gln	Tyr	Met	Asn	Phe	Ser	His	Pro	Leu	Ile	Lys	Glu	
			420					425					430			
Lys	Phe	Asn	Pro	Lys	Ala	Cys	Ala	Trp	Ala	Tyr	Gly	Met	Asn	Phe	Phe	
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 Trp Gln Asn Leu Asn Glu Asn Arg Ala Leu Trp Lys Leu Gly Thr Leu
 465 470 475 480
 Pro Pro Gly Leu Ile Thr Phe Tyr Ser Thr Thr Lys Pro Leu Asp Lys
 485 490 495
 Ser Trp His Val Leu Gly Leu Gly Tyr Asn Pro Ser Ile Ser Met Asp
 500 505 510
 Glu Ile Arg Asn Ala Ala Val Val His Phe Asn Gly Asn Met Lys Pro
 515 520 525
 Trp Leu Asp Ile Ala Met Asn Gln Phe Arg Pro Leu Trp Thr Lys His
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<211> 1482

<212> DNA

<213> Arabidopsis thaliana

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<400> 953

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ttc acc ttc tca tct cga cca cgc tcc aat tac atc gtg atg tcc gcc	96
Phe Thr Phe Ser Arg Pro Arg Ser Asn Tyr Ile Val Met Ser Ala	
20 25 30	
gtc cga tct aac tct gct tcg acg tgt cct ata ctg acc aag ttt cag	144
Val Arg Ser Asn Ser Ala Ser Thr Cys Pro Ile Leu Thr Lys Phe Gln	
35 40 45	
aaa gac tgc gcc act cct aca ccg tac cta cgc aac gta gcc aac gcc	192
Lys Asp Cys Ala Thr Pro Thr Pro Tyr Leu Arg Asn Val Ala Asn Ala	
50 55 60	
att gct gat gac atg cga gat ggt cta gct gtt gaa gga gga gga gat	240
Ile Ala Asp Asp Met Arg Asp Gly Leu Ala Val Glu Gly Gly Gly Asp	
65 70 75 80	
ctc gag atg atc ttg act ttt gtt gac gct ttg cct tct ggg aat gag	288
Leu Glu Met Ile Leu Thr Phe Val Asp Ala Leu Pro Ser Gly Asn Glu	
85 90 95	
gaa ggg ttg ttc tat gca ttg gat tta gga ggt aca aat ttt cgg gtg	336
Glu Gly Leu Phe Tyr Ala Leu Asp Leu Gly Gly Thr Asn Phe Arg Val	
100 105 110	
cgt agc gtg caa tta gga gga aag aaa gag cga gtc tta gct acc gaa	384
Arg Ser Val Gln Leu Gly Gly Lys Lys Glu Arg Val Leu Ala Thr Glu	
115 120 125	
tct gaa caa ata tct att tct caa aag ctt atg att ggt aca agt gag	432
Ser Glu Gln Ile Ser Ile Ser Gln Lys Leu Met Ile Gly Thr Ser Glu	
130 135 140	
gag ctt ttc ggg ttc att gct tca aag ctt gca aat ttt gtt gca aag	480
Glu Leu Phe Gly Phe Ile Ala Ser Lys Leu Ala Asn Phe Val Ala Lys	
145 150 155 160	
gag aag cca ggt cgg ttt ctt tta gaa gaa ggg agg aaa agg gag tta	528
Glu Lys Pro Gly Arg Phe Leu Leu Glu Gly Arg Lys Arg Glu Leu	
165 170 175	
ggg ttt acc ttt tca ttc cct gtg aag caa acc tct att gat tca ggc	576
Gly Phe Thr Phe Ser Phe Pro Val Lys Gln Thr Ser Ile Asp Ser Gly	
180 185 190	
aca tta agc aaa tgg act aaa ggc ttt aaa gtg tct gga atg gaa gga	624
Thr Leu Ser Lys Trp Thr Lys Gly Phe Lys Val Ser Gly Met Glu Gly	
195 200 205	
aaa aat gtg gtt gct tgt tta aat gaa gct atg gaa gca cat gga ctc	672
Lys Asn Val Val Ala Cys Leu Asn Glu Ala Met Glu Ala His Gly Leu	
210 215 220	
gat atg cga gtt tct gct gta aat gat gga gga aca tta gct	720
Asp Met Arg Val Ser Ala Leu Val Asn Asp Gly Val Gly Thr Leu Ala	

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Thr	Gly	Thr	Asn	Ala	Cys	Tyr	Val	Glu	Gln	Lys	His	Ala	Ile	Pro	Lys					
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Leu	Arg	Ser	Lys	Ser	Ser	Ser	Gly	Thr	Thr	Ile	Ile	Asn	Thr	Glu	Trp					
gga	ggg	ttc	tct	aag	att	ctt	ccg	caa	acc	att	ttt	gac	cta	gag	atg				912	
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gat	gag	aca	agc	ctg	aat	cct	ggt	gaa	cat	tta	tat	gag	aag	atg	atc				960	
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305	ggg	atg	tac	ctt	ggt	gaa	att	gta	agg	agg	ggt	ttg	ctc	cat	atg				1008	
tca	Gly	Met	Tyr	Leu	Gly	Glu	Ile	Val	Arg	Arg	Val	Leu	Leu	His	Met					
Ser				325					330					335						
tgt	gaa	act	agt	gac	ttg	ttt	gga	cac	ttc	gct	cct	gcc	aaa	ctc	tcc				1056	
Cys	Glu	Thr	Ser	Asp	Leu	Phe	Gly	His	Phe	Ala	Pro	Ala	Lys	Leu	Ser					
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Thr	Pro	Leu	Ala	Leu	Arg	Thr	Glu	His	Leu	Cys	Lys	Met	Gln	Glu	Asp					
aat	aca	gat	gat	ctt	cgg	gat	ggt	gga	tca	atc	cta	tac	gac	ttt	tta				1152	
Asn	Thr	Asp	Asp	Leu	Arg	Asp	Val	Gly	Ser	Ile	Leu	Tyr	Asp	Phe	Leu					
370					375						380									
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Asp	Val	Glu	Ala	Asn	Met	Asn	Ala	Arg	Arg	Arg	Val	Val	Glu	Val	Cys					
385				390						395					400					
gac	aca	gta	gtg	aaa	cgc	gga	ggg	cgt	cta	gca	gga	gct	ggt	ata	gtg				1248	
Asp	Thr	Val	Val	Lys	Arg	Gly	Gly	Arg	Leu	Ala	Gly	Ala	Gly	Ile	Val					
gca	att	ctg	gag	aag	att	gaa	aaa	gat	act	aaa	aga	atg	ggt	tca	ggt				1296	
Ala	Ile	Leu	Glu	Lys	Ile	Glu	Lys	Asp	Thr	Lys	Arg	Met	Gly	Ser	Gly					
aaa	aga	acc	gtt	gtg	gct	atg	gac	ggt	gca	ctg	tat	gag	aag	tac	cca				1344	
Lys	Arg	Thr	Val	Val	Ala	Met	Asp	Gly	Ala	Leu	Tyr	Glu	Lys	Tyr	Pro					
caa	tat	cga	cag	tat	atg	caa	gac	gca	cta	gtc	gag	ctt	ggc	cat					1392	
Gln	Tyr	Arg	Gln	Tyr	Met	Gln	Asp	Ala	Leu	Val	Glu	Leu	Leu	Gly	His					
450					455					460										
aag	ctt	gca	agt	cac	gtc	gcg	atc	aaa	cat	acc	aaa	gac	gtg	tct	ggg				1440	
Lys	Leu	Ala	Ser	His	Val	Ala	Ile	Lys	His	Thr	Lys	Asp	Val	Ser	Gly					
465					470					475					480					
ctc	ggt	gct	gct	ctt	ttg	gcg	gcc	act	aac	tcc	att	tac	tag						1482	
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<211> 493

<212> PRT

<213> Arabidopsis thaliana

<400> 954

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Lys	Asp	Cys	Ala	Thr	Pro	Thr	Pro	Tyr	Leu	Arg	Asn	Val	Ala	Asn	Ala
	50					55				60					
Ile	Ala	Asp	Asp	Met	Arg	Asp	Gly	Leu	Ala	Val	Glu	Gly	Gly	Gly	Asp
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Glu	Gly	Leu	Phe	Tyr	Ala	Leu	Asp	Leu	Gly	Gly	Thr	Asn	Phe	Arg	Val

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 Glu Leu Phe Gly Phe Ile Ala Ser Lys Leu Ala Asn Phe Val Ala Lys
 145 150 155 160
 Glu Lys Pro Gly Arg Phe Leu Leu Glu Glu Gly Arg Lys Arg Glu Leu
 165 170 175
 Gly Phe Thr Phe Ser Phe Pro Val Lys Gln Thr Ser Ile Asp Ser Gly
 180 185 190
 Thr Leu Ser Lys Trp Thr Lys Gly Phe Lys Val Ser Gly Met Glu Gly
 195 200 205
 Lys Asn Val Val Ala Cys Leu Asn Glu Ala Met Glu Ala His Gly Leu
 210 215 220
 Asp Met Arg Val Ser Ala Leu Val Asn Asp Gly Val Gly Thr Leu Ala
 225 230 235 240
 Gly Ala Arg Tyr Trp Asp Glu Asp Val Met Val Gly Val Ile Leu Gly
 245 250 255
 Thr Gly Thr Asn Ala Cys Tyr Val Glu Gln Lys His Ala Ile Pro Lys
 260 265 270
 Leu Arg Ser Lys Ser Ser Ser Gly Thr Thr Ile Ile Asn Thr Glu Trp
 275 280 285
 Gly Gly Phe Ser Lys Ile Leu Pro Gln Thr Ile Phe Asp Leu Glu Met
 290 295 300
 Asp Glu Thr Ser Leu Asn Pro Gly Glu His Leu Tyr Glu Lys Met Ile
 305 310 315 320
 Ser Gly Met Tyr Leu Gly Glu Ile Val Arg Arg Val Leu Leu His Met
 325 330 335
 Cys Glu Thr Ser Asp Leu Phe Gly His Phe Ala Pro Ala Lys Leu Ser
 340 345 350
 Thr Pro Leu Ala Leu Arg Thr Glu His Leu Cys Lys Met Gln Glu Asp
 355 360 365
 Asn Thr Asp Asp Leu Arg Asp Val Gly Ser Ile Leu Tyr Asp Phe Leu
 370 375 380
 Asp Val Glu Ala Asn Met Asn Ala Arg Arg Arg Val Val Glu Val Cys
 385 390 395 400
 Asp Thr Val Val Lys Arg Gly Gly Arg Leu Ala Gly Ala Gly Ile Val
 405 410 415
 Ala Ile Leu Glu Lys Ile Glu Lys Asp Thr Lys Arg Met Gly Ser Gly
 420 425 430
 Lys Arg Thr Val Val Ala Met Asp Gly Ala Leu Tyr Glu Lys Tyr Pro
 435 440 445
 Gln Tyr Arg Gln Tyr Met Gln Asp Ala Leu Val Glu Leu Leu Gly His
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<212> DNA

<213> Arabidopsis thaliana

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<400> 955

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cct	ccc	aca	aca	aca	aca	aca	aca	atg	tct	tct	tct	ctc	cga	tct	acc	96
Pro	Pro	Thr	Thr	Thr	Thr	Thr	Thr	Met	Ser	Ser	Ser	Leu	Arg	Ser	Thr	
			20					25					30			
acc	gcc	gct	tct	ctt	ctc	ctc	cgc	tcc	tcc	tcc	tcc	tcc	tcc	aga	tcc	144
Thr	Ala	Ala	Ser	Leu	Leu	Leu	Arg	Ser	Ser	Ser	Ser	Ser	Ser	Arg	Ser	
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Val	Ser	Ser	Pro	Arg	Leu	Ser	Ser	Ser	Ser	Ser	Leu	Ser	Gln	Lys	Lys	
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Asp	Ile	Lys	Glu	Leu	Leu	Ser	Thr	Lys	Phe	Cys	His	Pro	Ile	Leu	Val	
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Trp	Pro	Gln	Arg	Gly	Gly	Ala	Asn	Gly	Ser	Leu	Arg	Phe	Asp	Ile	Glu	
145				150						155					160	
ctt	aaa	cat	gct	gct	aac	gct	ggg	ctt	gtg	aat	gct	tta	aac	ttg	att	528
Leu	Lys	His	Ala	Ala	Asn	Ala	Gly	Leu	Val	Asn	Ala	Leu	Asn	Leu	Ile	
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Lys	Asp	Ile	Lys	Glu	Lys	Tyr	Ser	Gly	Ile	Ser	Tyr	Ala	Asp	Leu	Phe	
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cag	tta	gct	agt	gct	act	gct	ata	gag	gaa	gct	gga	gga	ccg	aaa	ata	624
Gln	Leu	Ala	Ser	Ala	Thr	Ala	Ile	Glu	Glu	Ala	Gly	Gly	Pro	Lys	Ile	
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Pro	Met	Lys	Tyr	Gly	Arg	Val	Asp	Ala	Ser	Gly	Pro	Glu	Asp	Cys	Pro	
	210			215							220					
gaa	gaa	gga	agg	ctt	cca	gat	gct	ggg	cct	cct	tca	cct	gct	act	cat	720
Glu	Glu	Gly	Arg	Leu	Pro	Asp	Ala	Gly	Pro	Pro	Ser	Pro	Ala	Thr	His	
225				230					235						240	
ctc	aga	gaa	gtt	ttt	tac	aga	atg	gga	tta	gat	gac	aag	gac	ata	gtt	768
Leu	Arg	Glu	Val	Phe	Tyr	Arg	Met	Gly	Leu	Asp	Asp	Lys	Asp	Ile	Val	
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gca	tta	tct	ggg	gct	cac	acg	tta	gga	aga	tct	agg	cca	gaa	cgt	agt	816
Ala	Leu	Ser	Gly	Ala	His	Thr	Leu	Gly	Arg	Ser	Arg	Pro	Glu	Arg	Ser	
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ggg	tgg	ggg	aag	cct	gag	acg	aag	tac	acg	aaa	gaa	gga	cct	gga	gca	864
Gly	Trp	Gly	Lys	Pro	Glu	Thr	Lys	Tyr	Thr	Lys	Glu	Gly	Pro	Gly	Ala	
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cca	gga	gga	cag	tca	tgg	aca	cca	gag	tgg	ctg	aag	ttt	gat	aat	tct	912
Pro	Gly	Gly	Gln	Ser	Trp	Thr	Pro	Glu	Trp	Leu	Lys	Phe	Asp	Asn	Ser	
	290					295					300					
tac	ttc	aag	gag	atc	aag	gaa	aag	aga	gat	gaa	gat	ctc	ctt	gtc	cta	960
Tyr	Phe	Lys	Glu	Ile	Lys	Glu	Lys	Arg	Asp	Glu	Asp	Leu	Leu	Val	Leu	
305				310					315						320	
ccc	act	gat	gct	gcc	atc	ttc	gaa	gat	tct	tct	ttc	aag	gtc	tat	gct	1008
Pro	Thr	Asp	Ala	Ala	Ile	Phe	Glu	Asp	Ser	Ser	Phe	Lys	Val	Tyr	Ala	
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gaa	aag	tat	gct	gca	gat	cag	gat	gca	ttt	ttc	aag	gat	tac	gct	gta	1056
Glu	Lys	Tyr	Ala	Ala	Asp	Gln	Asp	Ala	Phe	Phe	Lys	Asp	Tyr	Ala	Val	
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gcc	cat	gcg	aag	ctc	agc	aat	ctt	gga	gca	gaa	ttt	aac	cct	ccg	gag	1104
Ala	His	Ala	Lys	Leu	Ser	Asn	Leu	Gly	Ala	Glu	Phe	Asn	Pro	Pro	Glu	
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<213> Arabidopsis thaliana

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      35      40      45
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      50      55      60
Val Ser Ser Pro Arg Leu Ser Ser Ser Ser Ser Leu Ser Gln Lys Lys
65      70      75      80
Tyr Arg Ile Ala Ser Val Asn Arg Ser Phe Asn Ser Thr Thr Ala Ala
      85      90      95
Thr Lys Ser Ser Ser Ser Asp Pro Asp Gln Leu Lys Asn Ala Arg Glu
      100      105      110
Asp Ile Lys Glu Leu Leu Ser Thr Lys Phe Cys His Pro Ile Leu Val
      115      120      125
Arg Leu Gly Trp His Asp Ala Gly Thr Tyr Asn Lys Asn Ile Lys Glu
130      135      140
Trp Pro Gln Arg Gly Gly Ala Asn Gly Ser Leu Arg Phe Asp Ile Glu
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Leu Lys His Ala Ala Asn Ala Gly Leu Val Asn Ala Leu Asn Leu Ile
      165      170      175
Lys Asp Ile Lys Glu Lys Tyr Ser Gly Ile Ser Tyr Ala Asp Leu Phe
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Gln Leu Ala Ser Ala Thr Ala Ile Glu Glu Ala Gly Gly Pro Lys Ile
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Pro Met Lys Tyr Gly Arg Val Asp Ala Ser Gly Pro Glu Asp Cys Pro
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Glu Glu Gly Arg Leu Pro Asp Ala Gly Pro Pro Ser Pro Ala Thr His
225      230      235      240
Leu Arg Glu Val Phe Tyr Arg Met Gly Leu Asp Asp Lys Asp Ile Val
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Ala Leu Ser Gly Ala His Thr Leu Gly Arg Ser Arg Pro Glu Arg Ser
      260      265      270
Gly Trp Gly Lys Pro Glu Thr Lys Tyr Thr Lys Glu Gly Pro Gly Ala
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Pro Gly Gly Gln Ser Trp Thr Pro Glu Trp Leu Lys Phe Asp Asn Ser
290      295      300
Tyr Phe Lys Glu Ile Lys Glu Lys Arg Asp Glu Asp Leu Leu Val Leu
305      310      315      320
Pro Thr Asp Ala Ala Ile Phe Glu Asp Ser Ser Phe Lys Val Tyr Ala
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Glu Lys Tyr Ala Ala Asp Gln Asp Ala Phe Phe Lys Asp Tyr Ala Val
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Gly Ile Val Ile
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<223> n is a, g, c or t

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cca ttc gca ctg gat gct ttg gag ccg cat atg agc aaa caa act ctg
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48

96

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Glu	Phe	His	Trp	Gly	Lys	His	His	Arg	Ala	Tyr	Val	Asp	Asn	Leu	Lys		
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Lys	Gln	Val	Leu	Gly	Thr	Glu	Leu	Glu	Gly	Lys	Pro	Leu	Glu	His	Ile		
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Ile	His	Ser	Thr	Tyr	Asn	Asn	Gly	Asp	Leu	Leu	Pro	Ala	Phe	Asn	Asn		
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Ala	Ala	Gln	Ala	Trp	Asn	His	Glu	Phe	Phe	Trp	Glu	Ser	Met	Lys	Pro		
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ggt	ggt	gga	gga	aaa	cca	tca	gga	gag	ctt	ctt	gct	ttg	ctt	gaa	aga	336	
Gly	Gly	Gly	Gly	Lys	Pro	Ser	Gly	Glu	Leu	Leu	Ala	Leu	Leu	Glu	Arg		
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gat	ttc	act	tct	tat	gag	aag	ttc	tat	gaa	gag	ttc	aat	gct	gct	gca	384	
Asp	Phe	Thr	Ser	Tyr	Glu	Lys	Phe	Tyr	Glu	Glu	Phe	Asn	Ala	Ala	Ala		
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gcc	act	cag	ttt	gga	gct	ggc	tgg	gcc	tgg	ctt	gct	tat	tca	aat	gaa	432	
Ala	Thr	Gln	Phe	Gly	Ala	Gly	Trp	Ala	Trp	Leu	Ala	Tyr	Ser	Asn	Glu		
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aaa	ctc	aaa	gta	gtg	aaa	act	ccc	aat	gct	gtg	aat	ccc	ctt	gtg	ctc	480	
Lys	Leu	Lys	Val	Val	Lys	Thr	Pro	Asn	Ala	Val	Asn	Pro	Leu	Val	Leu		
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Gly	Ser	Phe	Pro	Leu	Leu	Thr	Ile	Asp	Val	Trp	Glu	His	Ala	Tyr	Tyr		
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ctt	gac	ttc	cag	aac	cga	aga	cca	gat	tac	ata	aag	aca	ttc	atg	acc	576	
Leu	Asp	Phe	Gln	Asn	Arg	Arg	Pro	Asp	Tyr	Ile	Lys	Thr	Phe	Met	Thr		
			180					185					190				
aat	ctt	gtg	tct	tgg	gaa	gct	gta	agt	gcc	aga	ctt	gag	gcc	gcc	aag	624	
Asn	Leu	Val	Ser	Trp	Glu	Ala	Val	Ser	Ala	Arg	Leu	Glu	Ala	Ala	Lys		
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<213> Arabidopsis thaliana

<400> 958

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			20					25					30				
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Lys	Gln	Val	Leu	Gly	Thr	Glu	Leu	Glu	Gly	Lys	Pro	Leu	Glu	His	Ile		
		50				55					60						
Ile	His	Ser	Thr	Tyr	Asn	Asn	Gly	Asp	Leu	Leu	Pro	Ala	Phe	Asn	Asn	80	
65					70				75								
Ala	Ala	Gln	Ala	Trp	Asn	His	Glu	Phe	Phe	Trp	Glu	Ser	Met	Lys	Pro		
				85				90						95			
Gly	Gly	Gly	Gly	Lys	Pro	Ser	Gly	Glu	Leu	Leu	Ala	Leu	Leu	Glu	Arg		
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Lys	Leu	Lys	Val	Val	Lys	Thr	Pro	Asn	Ala	Val	Asn	Pro	Leu	Val	Leu		
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Gly	Ser	Phe	Pro	Leu	Leu	Thr	Ile	Asp	Val	Trp	Glu	His	Ala	Tyr	Tyr		
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Leu	Asp	Phe	Gln	Asn	Arg	Arg	Pro	Asp	Tyr	Ile	Lys	Thr	Phe	Met	Thr		
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<211> 2656

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<400> 959

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tcatgccgac tggtagggtc gagactatgc gtgaatgggt ttatgacgct atctctgctc      180

aacgcaatga gtcctctct cttttctcca ggtttcttct taaccctctc gctctctctc      240

cctgagcctt gcttataaat gc atg tgt gtt gtg att ggt ctc aag tca tgg      292
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                        1         5         10
gta atg gtt ttg gtt gtt atc ttt att aga tat gta gcc cag gga aag      340
Val Met Val Leu Val Val Ile Phe Ile Arg Tyr Val Ala Gln Gly Lys
                        15         20         25
ggg ata ttg cag tcc cac cag ctg att gat gag ttc ctt aag act gtg      388
Gly Ile Leu Gln Ser His Gln Leu Ile Asp Glu Phe Leu Lys Thr Val
                        30         35         40
aaa gtt gat gga aca tta gaa gat ctt aac aaa agt cca ttc atg aaa      436
Lys Val Asp Gly Thr Leu Glu Asp Leu Asn Lys Ser Pro Phe Met Lys
                        45         50         55
gtt ctg cag tct gca gag gaa gcc ata gtt ttg cct cca ttt gtt gct      484
Val Leu Gln Ser Ala Glu Glu Ala Ile Val Leu Pro Pro Phe Val Ala
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Leu Ala Ile Arg Pro Arg Pro Gly Val Arg Glu Tyr Val Arg Val Asn
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Val Tyr Glu Leu Ser Val Asp His Leu Thr Val Ser Glu Tyr Leu Arg
                        95         100         105
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Phe Lys Glu Glu Leu Val Asn Gly His Ala Asn Gly Asp Tyr Leu Leu
                        110         115         120
gaa ctt gat ttt gaa cct ttc aat gca aca ttg cct cgc cca act cgt      676
Glu Leu Asp Phe Glu Pro Phe Asn Ala Thr Leu Pro Arg Pro Thr Arg
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tca tca tcc att ggg aat ggg gtt cag ttc ctc aat cgt cac ctc tct      724
Ser Ser Ser Ile Gly Asn Gly Val Gln Phe Leu Asn Arg His Leu Ser
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tca att atg ttc cgt aac aaa gaa agc atg gag cct ttg ctt gag ttt      772
Ser Ile Met Phe Arg Asn Lys Glu Ser Met Glu Pro Leu Leu Glu Phe
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ctc cgc act cac aaa cat gat ggc cgt cct atg atg ctg aat gat cga      820
Leu Arg Thr His Lys His Asp Gly Arg Pro Met Met Leu Asn Asp Arg
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Ile Gln Asn Ile Pro Ile Leu Gln Gly Ala Leu Ala Arg Ala Glu Glu
                        190         195         200
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Phe Leu Ser Lys Leu Pro Leu Ala Thr Pro Tyr Ser Glu Phe Glu Phe
                        205         210         215

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aag Lys 235	gtt Val	tca Ser	gaa Glu	atg Met	gtg Val 240	cat His	ctt Leu	ctt Leu	ctg Leu	gac Asp 245	ata Ile	ctc Leu	cag Gln	gca Ala	cct Pro 250	1012
gat Asp	cct Pro	tct Ser	gtc Val	ttg Leu 255	gag Glu	acg Thr	ttt Phe	cta Leu	gga Gly 260	agg Arg	att Ile	cct Pro	atg Met	gtg Val 265	ttc Phe	1060
aat Asn	gtt Val	gtg Val	att Ile 270	ttg Leu	tct Ser	ccg Pro	cat His	ggt Gly 275	tac Tyr	ttt Phe	ggc Gly	caa Gln	gcc Ala 280	aat Asn	gtc Val	1108
ttg Leu	ggt Gly	ctg Leu 285	cct Pro	gat Asp	act Thr	ggt Gly	gga Gly 290	cag Gln	gtt Val	gtc Val	tac Tyr	att Ile 295	ctt Leu	gat Asp	caa Gln	1156
gta Val	cgt Arg 300	gca Ala	ttg Leu	gaa Glu	aat Asn	gag Glu 305	atg Met	ctc Leu	ctt Leu	agg Arg	ata Ile 310	cag Gln	aag Lys	caa Gln	gga Gly	1204
ctg Leu 315	gaa Glu	gtt Val	att Ile	cca Pro	aag Lys 320	att Ile	ctc Leu	att Ile	gta Val	aca Thr 325	aga Arg	ctg Leu	cta Leu	ccc Pro	gaa Glu 330	1252
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ctt Leu	cgc Arg	aag Lys 365	tgg Trp	atc Ile	tca Ser	agg Arg	ttt Phe 370	gat Asp	gtc Val	tgg Trp	cca Pro	tac Tyr 375	ctg Leu	gag Glu	act Thr	1396
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cca Pro 395	aat Asn	ctc Leu	atc Ile	att Ile	ggc Gly 400	aac Asn	tac Tyr	agt Ser	gat Asp	gga Gly 405	aat Asn	ctc Leu	gtt Val	gct Ala	tct Ser 410	1492
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gaa Glu	gat Asp	aag Lys 445	tat Tyr	cac His	ttt Phe	tca Ser	agt Ser 450	cag Gln	ttc Phe	act Thr	gca Ala 455	gat Asp	cta Leu	att Ile	gcc Ala	1636
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atg Met	cct Pro	ggt Gly	ctt Leu	tac Tyr 495	cga Arg	gtt Val	gtt Val	cat His	gga Gly 500	att Ile	gat Asp	gtc Val	ttt Phe	gat Asp 505	cct Pro	1780
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agc Ser 555	gac Asp	caa Gln	tcg Ser	aag Lys	cca Pro 560	atc Ile	atc Ile	ttc Phe	tct Ser	atg Met 565	gca Ala	aga Arg	ctt Leu	gac Asp	agg Arg 570	1972
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Glu	Asp 50	Leu	Asn	Lys	Ser	Pro 55	Phe	Met	Lys	Val	Leu 60	Gln	Ser	Ala	Glu
Glu 65	Ala	Ile	Val	Leu	Pro 70	Pro	Phe	Val	Ala	Leu 75	Ala	Ile	Arg	Pro	Arg 80
Pro	Gly	Val	Arg 85	Glu	Tyr	Val	Arg	Val	Asn 90	Val	Tyr	Glu	Leu 95	Ser	Val
Asp	His	Leu	Thr 100	Val	Ser	Glu	Tyr	Leu 105	Arg	Phe	Lys	Glu	Glu 110	Leu	Val
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Phe	Asn 130	Ala	Thr	Leu	Pro	Arg 135	Pro	Thr	Arg	Ser	Ser 140	Ser	Ile	Gly	Asn
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Leu	Gln	Gly	Ala	Leu	Ala	Arg	Ala	Glu	Glu	Phe	Leu	Ser	Lys	Leu	Pro
Leu	Ala	Thr	Pro	Tyr	Ser	Glu	Phe	Glu	Phe	Glu	Leu	Gln	Gly	Met	Gly
Phe	Glu	Arg	Gly	Trp	Gly	Asp	Thr	Ala	Gln	Lys	Val	Ser	Glu	Met	Val
His	Leu	Leu	Leu	Asp	Ile	Leu	Gln	Ala	Pro	Asp	Pro	Ser	Val	Leu	Glu
Thr	Phe	Leu	Gly	Arg	Ile	Pro	Met	Val	Phe	Asn	Val	Val	Ile	Leu	Ser
Pro	His	Gly	Tyr	Phe	Gly	Gln	Ala	Asn	Val	Leu	Gly	Leu	Pro	Asp	Thr
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Glu	Met	Leu	Leu	Arg	Ile	Gln	Lys	Gln	Gly	Leu	Glu	Val	Ile	Pro	Lys
Ile	Leu	Ile	Val	Thr	Arg	Leu	Leu	Pro	Glu	Ala	Lys	Gly	Thr	Thr	Cys
Asn	Gln	Arg	Leu	Glu	Arg	Val	Ser	Gly	Thr	Glu	His	Ala	His	Ile	Leu
Arg	Ile	Pro	Phe	Arg	Thr	Glu	Lys	Gly	Ile	Leu	Arg	Lys	Trp	Ile	Ser
Arg	Phe	Asp	Val	Trp	Pro	Tyr	Leu	Glu	Thr	Phe	Ala	Glu	Asp	Ala	Ser
Asn	Glu	Ile	Ser	Ala	Glu	Leu	Gln	Gly	Val	Pro	Asn	Leu	Ile	Ile	Gly
Asn	Tyr	Ser	Asp	Gly	Asn	Leu	Val	Ala	Ser	Leu	Leu	Ala	Ser	Lys	Leu
Gly	Val	Ile	Gln	Cys	Asn	Ile	Ala	His	Ala	Leu	Glu	Lys	Thr	Lys	Tyr
Pro	Glu	Ser	Asp	Ile	Tyr	Trp	Arg	Asn	His	Glu	Asp	Lys	Tyr	His	Phe
Ser	Ser	Gln	Phe	Thr	Ala	Asp	Leu	Ile	Ala	Met	Asn	Asn	Ala	Asp	Phe
Ile	Ile	Thr	Ser	Thr	Tyr	Gln	Glu	Ile	Ala	Gly	Ser	Lys	Asn	Asn	Val
Gly	Gln	Tyr	Glu	Ser	His	Thr	Ala	Phe	Thr	Met	Pro	Gly	Leu	Tyr	Arg
Val	Val	His	Gly	Ile	Asp	Val	Phe	Asp	Pro	Lys	Phe	Asn	Met	Val	Ser
Pro	Gly	Ala	Asp	Met	Thr	Ile	Tyr	Phe	Pro	Tyr	Ser	Asp	Lys	Glu	Arg
Arg	Leu	Thr	Ala	Leu	His	Glu	Ser	Ile	Glu	Glu	Leu	Leu	Phe	Ser	Ala
Glu	Gln	Asn	Asp	Glu	His	Val	Gly	Leu	Leu	Ser	Asp	Gln	Ser	Lys	Pro
Ile	Ile	Phe	Ser	Met	Ala	Arg	Leu	Asp	Arg	Val	Lys	Asn	Leu	Thr	Gly
Leu	Val	Glu	Cys	Tyr	Ala	Lys	Asn	Ser	Lys	Leu	Arg	Glu	Leu	Ala	Asn
Leu	Val	Ile	Val	Gly	Gly	Tyr	Ile	Asp	Glu	Asn	Gln	Ser	Arg	Asp	Arg
Glu	Glu	Met	Ala	Glu	Ile	Gln	Lys	Met	His	Ser	Leu	Ile	Glu	Gln	Tyr
Asp	Leu	His	Gly	Glu	Phe	Arg	Trp	Ile	Ala	Ala	Gln	Met	Asn	Arg	Ala
Arg	Asn	Gly	Glu	Leu	Tyr	Arg	Tyr	Ile	Ala	Asp	Thr	Lys	Gly	Val	Phe
Val	Gln	Pro	Ala	Phe	Tyr	Glu	Ala	Phe	Gly	Leu	Thr	Val	Val	Glu	Ser
Met	Thr	Cys	Ala	Leu	Pro	Thr	Phe	Ala	Thr	Cys	His	Gly	Gly	Pro	Ala
Glu	Ile	Ile	Glu	Asn	Gly	Val	Ser	Gly	Phe	His	Ile	Asp	Pro	Tyr	His
Pro	Asp	Gln	Val	Ala	Ala	Thr	Leu	Val	Ser	Phe	Phe	Glu	Thr	Cys	Asn

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705 Thr Asn Pro Asn His 710 Trp Val Lys Ile Ser 715 Glu Gly Gly Leu Lys 720
 Ile Tyr Glu Arg Tyr Thr Trp Lys Lys Tyr Ser Glu Arg Leu Leu Thr
 Leu Ala Gly Val Tyr Ala Phe Trp Lys His Val Ser Lys Leu Glu Arg
 Arg Glu Thr Arg Arg Tyr Leu Glu Met Phe Tyr Ser Leu Lys Phe Arg
 Asp Leu Ala Asn Ser Ile Pro Leu Ala Thr Asp Glu Asn
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<210> 961

<211> 1293

<212> DNA

<213> Arabidopsis thaliana

<220>

<221> CDS

<222> (1)..(1293)

<400> 961

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tct	ggt	tct	tct	tct	act	act	act	tcc	tct	cct	att	cag	tcg	gag	gct	96
Ser	Val	Ser	Ser	Ser	Thr	Thr	Thr	Ser	Ser	Pro	Ile	Gln	Ser	Glu	Ala	
				20				25					30			
cca	agg	cct	aaa	cga	gcc	aaa	agg	gct	aag	aaa	tct	tct	cct	tct	ggt	144
Pro	Arg	Pro	Lys	Arg	Ala	Lys	Arg	Ala	Lys	Lys	Ser	Ser	Pro	Ser	Gly	
				35				40					45			
gat	aaa	tct	cat	aac	ccg	aca	agc	cct	gct	tct	acc	cga	cgc	agc	tct	192
Asp	Lys	Ser	His	Asn	Pro	Thr	Ser	Pro	Ala	Ser	Thr	Arg	Arg	Ser	Ser	
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atc	tac	aga	gga	gtc	act	aga	cat	aga	tgg	act	ggg	aga	ttc	gag	gct	240
Ile	Tyr	Arg	Gly	Val	Thr	Arg	His	Arg	Trp	Thr	Gly	Arg	Phe	Glu	Ala	
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cat	ctt	tgg	gac	aaa	agc	tct	tgg	aat	tcg	att	cag	aac	aag	aaa	ggc	288
His	Leu	Trp	Asp	Lys	Ser	Ser	Trp	Asn	Ser	Ile	Gln	Asn	Lys	Lys	Gly	
				85				90						95		
aaa	caa	gtt	tat	ctg	gga	gca	tat	gac	agt	gaa	gaa	gca	gca	gca	cat	336
Lys	Gln	Val	Tyr	Leu	Gly	Ala	Tyr	Asp	Ser	Glu	Glu	Ala	Ala	Ala	His	
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acg	tac	gat	ctg	gct	gct	ctc	aag	tac	tgg	gga	ccc	gac	acc	atc	ttg	384
Thr	Tyr	Asp	Leu	Ala	Ala	Leu	Lys	Tyr	Trp	Gly	Pro	Asp	Thr	Ile	Leu	
				115			120					125				
aat	ttt	ccg	gca	gag	acg	tac	aca	aag	gaa	ttg	gaa	gaa	atg	cag	aga	432
Asn	Phe	Pro	Ala	Glu	Thr	Tyr	Thr	Lys	Glu	Leu	Glu	Glu	Met	Gln	Arg	
				130			135				140					
gtg	aca	aag	gaa	gaa	tat	ttg	gct	tct	ctc	cgc	cgc	cag	agc	agt	ggt	480
Val	Thr	Lys	Glu	Glu	Tyr	Leu	Ala	Ser	Leu	Arg	Arg	Gln	Ser	Ser	Gly	
				145			150				155				160	
ttc	tcc	aga	ggc	gtc	tct	aaa	tat	cgc	ggc	gtc	gct	agg	cat	cac	cac	528
Phe	Ser	Arg	Gly	Val	Ser	Lys	Tyr	Arg	Gly	Val	Ala	Arg	His	His	His	
				165				170						175		
aac	gga	aga	tgg	gag	gct	cgg	atc	gga	aga	gtg	ttt	ggg	aac	aag	tac	576
Asn	Gly	Arg	Trp	Glu	Ala	Arg	Ile	Gly	Arg	Val	Phe	Gly	Asn	Lys	Tyr	
				180				185					190			
ttg	tac	ctc	ggc	acc	tat	aat	acg	cag	gag	gaa	gct	gct	gca	gca	tat	624
Leu	Tyr	Leu	Gly	Thr	Tyr	Asn	Thr	Gln	Glu	Glu	Ala	Ala	Ala	Ala	Tyr	
				195			200					205				
gac	atg	gct	gcg	att	gag	tat	cga	ggc	gca	aac	gcg	ggt	act	aat	ttc	672
Asp	Met	Ala	Ala	Ile	Glu	Tyr	Arg	Gly	Ala	Asn	Ala	Val	Thr	Asn	Phe	
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gac	att	agt	aat	tac	att	gac	cgg	tta	aag	aag	aaa	ggt	ggt	ttc	ccg	720
Asp	Ile	Ser	Asn	Tyr	Ile	Asp	Arg	Leu	Lys	Lys	Lys	Gly	Val	Phe	Pro	
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ttc	cct	gtg	aac	caa	gct	aac	cat	caa	gag	ggt	att	ctt	ggt	gaa	gcc	768
Phe	Pro	Val	Asn	Gln	Ala	Asn	His	Gln	Glu	Gly	Ile	Leu	Val	Glu	Ala	

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Lys	Gln	Glu	Val	260	Glu	Thr	Arg	Glu	Ala	265	Lys	Glu	Glu	Pro	Arg	270	Glu	
gtg	aaa	caa	cag	tac	gtg	gaa	gaa	cca	ccg	caa	gaa	gaa	gaa	gag	aag			864
Val	Lys	Gln	Gln	Tyr	Val	Glu	Glu	Pro	Pro	Gln	Glu	Glu	Glu	Glu	Lys			
gaa	gaa	gag	aaa	gca	gag	caa	caa	gaa	gca	gag	att	gta	gga	tat	tca			912
Glu	Glu	Glu	Lys	Ala	Glu	Gln	Gln	Glu	Ala	Glu	Ile	Val	Gly	Tyr	Ser			
gaa	gaa	gca	gca	gtg	gtc	aat	tgc	tgc	ata	gac	tct	tca	acc	ata	atg			960
Glu	Glu	Ala	Ala	Val	Val	Asn	Cys	Cys	Ile	Asp	Ser	Ser	Thr	Ile	Met			
305					310					315					320			
gaa	atg	gat	cgt	tgt	ggg	gac	aac	aat	gag	ctg	gct	tgg	aac	ttc	tgt			1008
Glu	Met	Asp	Arg	Cys	Gly	Asp	Asn	Asn	Glu	Leu	Ala	Trp	Asn	Phe	Cys			
				325					330					335				
atg	atg	gat	aca	ggg	ttt	tct	ccg	ttt	ttg	act	gat	cag	aat	ctc	gcg			1056
Met	Met	Asp	Thr	Gly	Phe	Ser	Pro	Phe	Leu	Thr	Asp	Gln	Asn	Leu	Ala			
				340				345					350					
aat	gag	aat	ccc	ata	gag	tat	ccg	gag	cta	ttc	aat	gag	tta	gca	ttt			1104
Asn	Glu	Asn	Pro	Ile	Glu	Tyr	Pro	Glu	Leu	Phe	Asn	Glu	Leu	Ala	Phe			
				355				360					365					
gag	gac	aac	atc	gac	ttc	atg	ttc	gat	gat	ggg	aag	cac	gag	tgc	ttg			1152
Glu	Asp	Asn	Ile	Asp	Phe	Met	Phe	Asp	Asp	Gly	Lys	His	Glu	Cys	Leu			
				370		375					380							
aac	ttg	gaa	aat	ctg	gat	tgt	tgc	gtg	gtg	gga	aga	gag	agc	cca	ccc			1200
Asn	Leu	Glu	Asn	Leu	Asp	Cys	Cys	Val	Val	Gly	Arg	Glu	Ser	Pro	Pro			
385				390						395					400			
tct	tct	tct	tca	cca	ttg	tct	tgc	tta	tct	act	gac	tct	gct	tca	tca			1248
Ser	Ser	Ser	Ser	Pro	Leu	Ser	Cys	Leu	Ser	Thr	Asp	Ser	Ala	Ser	Ser			
				405				410						415				
aca	aca	aca	aca	aca	acc	tcg	gtt	tct	tgt	aac	tat	ttg	gtc	tga				1293
Thr	Thr	Thr	Thr	Thr	Thr	Ser	Val	Ser	Cys	Asn	Tyr	Leu	Val					
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<210> 962

<211> 430

<212> PRT

<213> Arabidopsis thaliana

<400> 962

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				20				25					30					
Pro	Arg	Pro	Lys	Arg	Ala	Lys	Arg	Ala	Lys	Lys	Ser	Ser	Pro	Ser	Gly			
				35				40					45					
Asp	Lys	Ser	His	Asn	Pro	Thr	Ser	Pro	Ala	Ser	Thr	Arg	Arg	Ser	Ser			
				50			55				60							
Ile	Tyr	Arg	Gly	Val	Thr	Arg	His	Arg	Trp	Thr	Gly	Arg	Phe	Glu	Ala			
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His	Leu	Trp	Asp	Lys	Ser	Ser	Trp	Asn	Ser	Ile	Gln	Asn	Lys	Lys	Gly			
				85				90					95					
Lys	Gln	Val	Tyr	Leu	Gly	Ala	Tyr	Asp	Ser	Glu	Glu	Ala	Ala	Ala	His			
				100				105					110					
Thr	Tyr	Asp	Leu	Ala	Ala	Leu	Lys	Tyr	Trp	Gly	Pro	Asp	Thr	Ile	Leu			
				115			120					125						
Asn	Phe	Pro	Ala	Glu	Thr	Tyr	Thr	Lys	Glu	Leu	Glu	Glu	Met	Gln	Arg			
				130		135					140							
Val	Thr	Lys	Glu	Glu	Tyr	Leu	Ala	Ser	Leu	Arg	Arg	Gln	Ser	Ser	Gly			
145				150						155					160			
Phe	Ser	Arg	Gly	Val	Ser	Lys	Tyr	Arg	Gly	Val	Ala	Arg	His	His	His			
				165				170					175					
Asn	Gly	Arg	Trp	Glu	Ala	Arg	Ile	Gly	Arg	Val	Phe	Gly	Asn	Lys	Tyr			
				180				185					190					
Leu	Tyr	Leu	Gly	Thr	Tyr	Asn	Thr	Gln	Glu	Glu	Ala	Ala	Ala	Ala	Tyr			
				195			200					205						
Asp	Met	Ala	Ala	Ile	Glu	Tyr	Arg	Gly	Ala	Asn	Ala	Val	Thr	Asn	Phe			
				210		215					220							

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Asp Ile Ser Asn Tyr Ile Asp Arg Leu Lys Lys Lys Gly Val Phe Pro
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 Phe Pro Val Asn Gln Ala Asn His Gln Glu Gly Ile Leu Val Glu Ala
 245 250 255
 Lys Gln Glu Val Glu Thr Arg Glu Ala Lys Glu Glu Pro Arg Glu Glu
 260 265 270
 Val Lys Gln Gln Tyr Val Glu Glu Pro Pro Gln Glu Glu Glu Lys
 275 280 285
 Glu Glu Glu Lys Ala Glu Gln Gln Glu Ala Glu Ile Val Gly Tyr Ser
 290 295 300
 Glu Glu Ala Ala Val Val Asn Cys Cys Ile Asp Ser Ser Thr Ile Met
 305 310 315 320
 Glu Met Asp Arg Cys Gly Asp Asn Asn Glu Leu Ala Trp Asn Phe Cys
 325 330 335
 Met Met Asp Thr Gly Phe Ser Pro Phe Leu Thr Asp Gln Asn Leu Ala
 340 345 350
 Asn Glu Asn Pro Ile Glu Tyr Pro Glu Leu Phe Asn Glu Leu Ala Phe
 355 360 365
 Glu Asp Asn Ile Asp Phe Met Phe Asp Asp Gly Lys His Glu Cys Leu
 370 375 380
 Asn Leu Glu Asn Leu Asp Cys Cys Val Val Gly Arg Glu Ser Pro Pro
 385 390 395 400
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<210> 963

<211> 726

<212> DNA

<213> Brassica napus

<220>

<221> CDS

<222> (1)..(726)

<400> 963

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atc aag act aag gcg aag cca cca cat cag atc agt cac atg aga ccg	96
Ile Lys Thr Lys Ala Lys Pro Pro His Gln Ile Ser His Met Arg Pro	
20 25 30	
tct ccg gcg gct cag ccg gta ctt aaa tgt ccg agg tgt gat tcc gtc	144
Ser Pro Ala Ala Gln Pro Val Leu Lys Cys Pro Arg Cys Asp Ser Val	
35 40 45	
aac acc aag ttc tgt tac tac aac tac agc tta tct cag cca cgc	192
Asn Thr Lys Phe Cys Tyr Tyr Asn Asn Tyr Ser Leu Ser Gln Pro Arg	
50 55 60	
cac tac tgc aaa aac tgt cgc cgt tac tgg aca cgt ggc gga acc cta	240
His Tyr Cys Lys Asn Cys Arg Arg Tyr Trp Thr Arg Gly Gly Thr Leu	
65 70 75 80	
cgt aac gtc ccc atc ggt ggt cca acc aga aac aag aac aag cct tct	288
Arg Asn Val Pro Ile Gly Gly Pro Thr Arg Asn Lys Asn Lys Pro Ser	
85 90 95	
agc ctc caa gtc atc tct tct cca cct ccg att gta gcg cca ttg tcg	336
Ser Leu Gln Val Ile Ser Ser Pro Pro Ile Val Ala Pro Leu Ser	
100 105 110	
tct cac gag ctc gtt gat ggg ttt cgt atg aac aga gcg atg ata gac	384
Ser His Glu Leu Val Asp Gly Phe Arg Met Asn Arg Ala Met Ile Asp	
115 120 125	
cct tct tcg acg gcg ttt cca ggt gga ttc tcc ggc tac atg ttt tcg	432
Pro Ser Ser Thr Ala Phe Pro Gly Gly Phe Ser Gly Tyr Met Phe Ser	
130 135 140	
ttg gat cct aac tac aat ctt gca tct tct tct atc gag tct ttg agt	480
Leu Asp Pro Asn Tyr Asn Leu Ala Ser Ser Ser Ile Glu Ser Leu Ser	
145 150 155 160	
tct tta aac caa gat ttg cac cag aag ctt cag caa cag aga ctc ttc	528
Ser Leu Asn Gln Asp Leu His Gln Lys Leu Gln Gln Arg Leu Phe	

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act	tcc	atg	ttt	165	caa	gat	tct	cca	170	ggt	atg	ttt	cat	175	aac	ggt	576
Thr	Ser	Met	Phe	Gln	Gln	Asp	Ser	Pro	Pro	Val	Met	Phe	His	Asn	Val		
			180						185					190			
gag	cta	ctt	cct	cct	tcg	aca	gcg	aca	acg	gag	tgg	gct	ttc	gat	aga	624	
Glu	Leu	Leu	Pro	Pro	Ser	Thr	Ala	Thr	Thr	Glu	Trp	Ala	Phe	Asp	Arg		
		195					200					205					
tca	gcc	att	ggg	gaa	gca	aca	agt	ggc	agt	aat	gaa	aac	aat	ggg	gaa	672	
Ser	Ala	Ile	Gly	Glu	Ala	Thr	Ser	Gly	Ser	Asn	Glu	Asn	Asn	Gly	Glu		
	210					215					220						
cgt	gag	ggg	aat	tta	gga	agt	tgg	tac	tat	aat	cct	aat	aat	tct	atg	720	
Arg	Glu	Gly	Asn	Leu	Gly	Ser	Trp	Tyr	Tyr	Asn	Pro	Asn	Asn	Ser	Met		
225					230					235					240		
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Pro																	

<210> 964

<211> 241

<212> PRT

<213> Brassica napus

<400> 964

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			20					25					30				
Ser	Pro	Ala	Ala	Gln	Pro	Val	Leu	Lys	Cys	Pro	Arg	Cys	Asp	Ser	Val		
		35					40					45					
Asn	Thr	Lys	Phe	Cys	Tyr	Tyr	Asn	Asn	Tyr	Ser	Leu	Ser	Gln	Pro	Arg		
	50					55					60						
His	Tyr	Cys	Lys	Asn	Cys	Arg	Arg	Tyr	Trp	Thr	Arg	Gly	Gly	Thr	Leu		
65				70					75					80			
Arg	Asn	Val	Pro	Ile	Gly	Gly	Pro	Thr	Arg	Asn	Lys	Asn	Lys	Pro	Ser		
				85				90						95			
Ser	Leu	Gln	Val	Ile	Ser	Ser	Pro	Pro	Pro	Ile	Val	Ala	Pro	Leu	Ser		
		100					105						110				
Ser	His	Glu	Leu	Val	Asp	Gly	Phe	Arg	Met	Asn	Arg	Ala	Met	Ile	Asp		
		115				120						125					
Pro	Ser	Thr	Ala	Phe	Pro	Gly	Gly	Phe	Ser	Gly	Tyr	Met	Phe	Ser			
	130				135					140							
Leu	Asp	Pro	Asn	Tyr	Asn	Leu	Ala	Ser	Ser	Ser	Ile	Glu	Ser	Leu	Ser		
145					150					155				160			
Ser	Leu	Asn	Gln	Asp	Leu	His	Gln	Lys	Leu	Gln	Gln	Gln	Arg	Leu	Phe		
			165						170					175			
Thr	Ser	Met	Phe	Gln	Gln	Asp	Ser	Pro	Pro	Val	Met	Phe	His	Asn	Val		
		180						185					190				
Glu	Leu	Leu	Pro	Pro	Ser	Thr	Ala	Thr	Thr	Glu	Trp	Ala	Phe	Asp	Arg		
		195					200					205					
Ser	Ala	Ile	Gly	Glu	Ala	Thr	Ser	Gly	Ser	Asn	Glu	Asn	Asn	Gly	Glu		
	210					215					220						
Arg	Glu	Gly	Asn	Leu	Gly	Ser	Trp	Tyr	Tyr	Asn	Pro	Asn	Asn	Ser	Met		
225					230					235					240		
Pro																	

<210> 965

<211> 2412

<212> DNA

<213> Brassica napus

<220>

<221> CDS

<222> (1)..(2412)

<400> 965

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Met	Glu	Met	Pro	Gly	Ala	Arg	Arg	Ser	Asn	Tyr	Thr	Leu	Leu	Ser	Gln		
1				5				10						15			

48

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ttc	ccc	gac	gac	cag	gtc	tcc	gtc	tcc	gtc	acc	gga	gct	cct	ccg	cct	96
Phe	Pro	Asp	Asp	Gln	Val	Ser	Val	Ser	Val	Thr	Gly	Ala	Pro	Pro	Pro	
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cac	tat	gac	tcc	tcc	ttg	tcg	agc	gcc	agc	aac	aac	aac	agc	ggc	aac	144
His	Tyr	Asp	Ser	Ser	Leu	Ser	Ser	Ala	Ser	Asn	Asn	Asn	Ser	Gly	Asn	
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Asn	Gly	Lys	Ser	Lys	Ser	Gly	Phe	Asp	Trp	Asp	His	His	Pro	Ser	Gly	
	50					55					60					
ggc	ggt	ggt	gat	cac	agg	ccg	ccg	aat	cgg	gct	ggg	aat	atg	tac	tct	240
Gly	Gly	Gly	Asp	His	Arg	Pro	Pro	Asn	Arg	Ala	Gly	Asn	Met	Tyr	Ser	
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tcg	tcg	ctt	ggt	ttg	cag	agg	caa	tcg	agc	ggg	agc	agc	ttc	ggc	gag	288
Ser	Ser	Leu	Gly	Leu	Gln	Arg	Gln	Ser	Ser	Gly	Ser	Ser	Phe	Gly	Glu	
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agc	tcg	ctg	tcc	ggg	gat	tac	tat	gtg	cct	acg	ctc	tcc	gcg	gcg	ggt	336
Ser	Ser	Leu	Ser	Gly	Asp	Tyr	Tyr	Val	Pro	Thr	Leu	Ser	Ala	Ala	Gly	
			100					105					110			
aac	gag	atc	gaa	atg	ggt	ggg	ttt	cct	caa	gac	gtc	ggg	tta	ggt	gat	384
Asn	Glu	Ile	Glu	Met	Val	Gly	Phe	Pro	Gln	Asp	Val	Gly	Leu	Gly	Asp	
		115					120					125				
tcg	agg	atg	cag	atg	ggg	atg	gat	tcg	gct	gga	ggt	tcg	tcg	tct	ggg	432
Ser	Arg	Met	Gln	Met	Gly	Met	Asp	Ser	Ala	Gly	Gly	Ser	Ser	Ser	Gly	
	130					135					140					
aag	agc	tgg	gcg	cag	cag	acg	gag	gag	agt	tat	cag	ctg	cag	ctt	gcg	480
Lys	Ser	Trp	Ala	Gln	Gln	Thr	Glu	Glu	Ser	Tyr	Gln	Leu	Gln	Leu	Ala	
	145				150					155					160	
ttg	gcg	ttg	agg	ctt	tcc	tcg	gag	gct	act	tgc	gct	gat	gat	ccg	aac	528
Leu	Ala	Leu	Arg	Leu	Ser	Ser	Glu	Ala	Thr	Cys	Ala	Asp	Asp	Pro	Asn	
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Phe	Leu	Asp	Pro	Val	Pro	Asp	Glu	Ser	Ala	Leu	Arg	Thr	Ser	Pro	Ser	
			180					185					190			
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Ser	Ala	Glu	Thr	Val	Ser	His	Arg	Phe	Trp	Val	Asn	Gly	Cys	Leu	Ser	
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Tyr	Tyr	Asp	Lys	Val	Pro	Asp	Gly	Phe	Tyr	Met	Thr	Asp	Gly	Leu	Asp	
	210					215					220					
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Pro	Tyr	Ile	Trp	Thr	Leu	Cys	Ile	Asp	Leu	Asn	Glu	Ser	Gly	Arg	Ile	
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Pro	Ser	Ile	Glu	Ser	Leu	Arg	Ala	Ile	Asp	Ser	Gly	Val	Asp	Ser	Ser	
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Leu	Glu	Ala	Ile	Leu	Val	Asp	Arg	Arg	Val	Asp	Pro	Ala	Phe	Lys	Glu	
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Leu	His	Asn	Arg	Val	His	Asp	Ile	Ser	Cys	Ser	Cys	Ile	Thr	Thr	Lys	
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Glu	Val	Val	Asp	Gln	Leu	Ala	Lys	Leu	Ile	Cys	Asn	Arg	Met	Gly	Gly	
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Ser	Val	Ile	Met	Gly	Glu	Asp	Glu	Leu	Val	Pro	Met	Trp	Lys	Glu	Cys	
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gct	gac	ata	ata	gat	tta	ccc	tgt	cga	atc	gca	aag	ggg	tgc	aaa	tat	1104
Ala	Asp	Ile	Ile	Asp	Leu	Pro	Cys	Arg	Ile	Ala	Lys	Gly	Cys	Lys	Tyr	
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tgt	aat	aga	gac	gat	gct	gcg	tcg	tgc	ctt	gtc	agg	ttt	ggg	ctt	gat	1152
Cys	Asn	Arg	Asp	Asp	Ala	Ala	Ser	Cys	Leu	Val	Arg	Phe	Gly	Leu	Asp	
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cct Pro	gat Asp	tcc Ser	ttg Leu	cta Leu 405	aat Asn	ggt Gly	ccc Pro	tcg Ser	act Thr 410	atc Ile	tca Ser	att Ile	tca Ser	tca Ser	cct Pro	1248
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gaa Glu	cta Leu	gcc Ala 435	aag Lys	cag Gln	tac Tyr	ttc Phe	acc Thr 440	gac Asp	agt Ser	gaa Glu	tct Ser	ctt Leu	aat Asn	ctt Leu	gtt Val	1344
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gct Ala	aaa Lys	gga Gly	atg Met	aat Asn 645	tat Tyr	ctc Leu	cat His	aat Asn	cg Arg 650	aat Asn	cct Pro	ccg Pro	att Ile	gta Val 655	cat His	1968
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<212> PRT

<213> Brassica napus

<400> 966

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His	Tyr	Asp	Ser	Ser	Leu	Ser	Ser	Ala	Ser	Asn	Asn	Asn	Ser	Gly	Asn	
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Ser	Ser	Leu	Ser	Gly	Asp	Tyr	Tyr	Val	Pro	Thr	Leu	Ser	Ala	Ala	Gly	
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Pro	Ser	Ile	Glu	Ser	Leu	Arg	Ala	Ile	Asp	Ser	Gly	Val	Asp	Ser	Ser	
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Arg	Glu	Tyr	Leu	Val	Asp	Leu	Val	Gly	Lys	Pro	Gly	His	Leu	Trp	Glu	
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 Leu Arg Phe Pro Arg Pro Arg Pro Val Glu Pro Ala Val Asp Phe Arg
 420 425 430
 Glu Leu Ala Lys Gln Tyr Phe Thr Asp Ser Glu Ser Leu Asn Leu Val
 435 440 445
 Phe Asp Pro Ala Ser Asp Asp Ile Gly Phe Ser Met Phe His Arg Gly
 450 455 460
 Gly Glu Asn Asp Gly Ser Ala Glu Asn Gly Gly Gly Ser Val Pro Pro
 465 470 475 480
 Gly Ala Asn Met Pro Pro Gln Asn Ile Met Arg Ala Ser Asn Gln Val
 485 490 495
 Gln Asp Ala Val Pro Ile Asn Ala Pro Pro Ile Asn Gln Pro Val Val
 500 505 510
 Asn Arg Ala Asn Arg Asp Leu Gly Leu Asp Gly Asp Asp Met Asp Ile
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 Pro Trp Cys Asp Leu Asn Ile Lys Glu Lys Ile Gly Ala Gly Ser Phe
 530 535 540
 Gly Thr Val His Arg Ala Glu Trp His Gly Ser Asp Val Ala Val Lys
 545 550 555 560
 Ile Leu Met Glu Gln Asp Phe His Ala Glu Arg Val Asn Glu Phe Leu
 565 570 575
 Arg Glu Val Ala Ile Met Lys Arg Leu Arg His Pro Asn Ile Val Leu
 580 585 590
 Phe Met Gly Ala Val Thr Gln Pro Asn Leu Ser Ile Val Thr Glu
 595 600 605
 Tyr Leu Ser Arg Gly Ser Leu Phe Arg Leu Leu His Lys Ser Gly Ala
 610 615 620
 Arg Glu Gln Leu Asp Glu Arg Arg Arg Leu Ser Met Ala Tyr Asp Val
 625 630 635 640
 Ala Lys Gly Met Asn Tyr Leu His Asn Arg Asn Pro Pro Ile Val His
 645 650 655
 Arg Asp Leu Lys Ser Pro Asn Leu Leu Val Asp Lys Lys Tyr Thr Val
 660 665 670
 Lys Val Cys Asp Phe Gly Leu Ser Arg Leu Lys Ala Ser Thr Phe Leu
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 Ser Ser Lys Ser Ala Ala Gly Thr Pro Glu Trp Met Ala Pro Glu Val
 690 695 700
 Leu Arg Asp Glu Gln Ser Asn Glu Lys Ser Asp Val Tyr Ser Phe Gly
 705 710 715 720
 Val Ile Leu Trp Glu Leu Ala Thr Leu Gln Gln Pro Trp Gly Asn Leu
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 Asn Pro Ala Gln Val Val Ala Ala Val Gly Phe Lys Asn Lys Arg Leu
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 Glu Ile Pro Arg Asn Leu Asn Pro Gln Val Ala Ala Ile Ile Glu Gly
 755 760 765
 Cys Trp Thr Asn Glu Pro Trp Lys Arg Pro Ser Phe Ala Thr Ile Met
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<220>

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<222> (1)..(2412)

<400> 967

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48

96

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agt Ser	tcg Ser	ctc Leu	gga Gly	tta Leu 85	cag Gln	cgc Arg	caa Gln	agt Ser	tcc Ser 90	ggt Gly	agc Ser	tca Ser	ttc Phe	ggg Gly 95	gaa Glu	288
tct Ser	tcc Ser	ctc Leu	agt Ser 100	gga Gly	gac Asp	tac Tyr	tat Tyr	gtt Val 105	cca Pro	act Thr	ctt Leu	agt Ser	gct Ala 110	gcg Ala	gga Gly	336
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tct Ser	aga Arg 130	atg Met	caa Gln	atg Met	gga Gly	atg Met 135	gat Asp	tct Ser	gcc Ala	ggg Gly	ggc Gly 140	tcc Ser	tca Ser	tcc Ser	gga Gly	432
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Leu	Arg	Phe	Pro	Arg	Pro	Arg	Pro	Val	Glu	Pro	Ala	Val	Asp	Phe	Arg	
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Phe	Met	Gly	Ala	Val	Thr	Gln	Pro	Pro	Asn	Leu	Ser	Ile	Val	Thr	Glu	
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Leu	Arg	Asp	Glu	Gln	Ser	Asn	Glu	Lys	Ser	Asp	Val	Tyr	Ser	Phe	Gly	
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Val	Ile	Leu	Trp	Glu	Leu	Ala	Thr	Leu	Gln	Gln	Pro	Trp	Gly	Asn	Leu	
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Asn	Pro	Ala	Gln	Val	Val	Ala	Ala	Val	Gly	Phe	Lys	Asn	Lys	Arg	Leu	
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Glu	Ile	Pro	Arg	Asn	Leu	Asn	Pro	Gln	Val	Ala	Ala	Ile	Ile	Glu	Gly	
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<213> Brassica napus

<400> 968

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Tyr	Tyr	Asp	Lys	Val	Pro	Asp	Gly	Phe	Tyr	Met	Thr	Asp	Gly	Leu	Asp	
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 Phe Asp Pro Ala Ser Asp Asp Ile Gly Phe Ser Met Phe His Arg Gly
 450 455 460
 Gly Glu Asn Asp Gly Ser Ala Glu Asn Gly Gly Gly Ser Val Pro Pro
 465 470 475
 Gly Ala Asn Met Pro Gln Asn Ile Met Arg Ala Ser Asn Gln Val
 485 490 495
 Gln Asp Ala Val Pro Ile Asn Ala Pro Pro Ile Asn Gln Pro Val Val
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 Asn Arg Ala Asn Arg Asp Leu Gly Leu Asp Gly Asp Asp Met Asp Ile
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 Pro Trp Cys Asp Leu Asn Ile Lys Glu Lys Ile Gly Ala Gly Ser Phe
 530 535 540
 Gly Thr Val His Arg Ala Glu Trp His Gly Ser Asp Val Ala Val Lys
 545 550 555
 Ile Leu Met Glu Gln Asp Phe His Ala Glu Arg Val Asn Glu Phe Leu
 565 570 575
 Arg Glu Val Ala Ile Met Lys Arg Leu Arg His Pro Asn Ile Val Leu
 580 585 590
 Phe Met Gly Ala Val Thr Gln Pro Pro Asn Leu Ser Ile Val Thr Glu
 595 600 605
 Tyr Leu Ser Arg Gly Ser Leu Phe Arg Leu Leu His Lys Ser Gly Ala
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 Arg Glu Gln Leu Asp Glu Arg Arg Arg Leu Ser Met Ala Tyr Asp Val
 625 630 635
 Ala Lys Gly Met Asn Tyr Leu His Asn Arg Asn Pro Pro Ile Val His
 645 650 655
 Arg Asp Leu Lys Ser Pro Asn Leu Leu Val Asp Lys Lys Tyr Thr Val
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 Lys Val Cys Asp Phe Gly Leu Ser Arg Leu Lys Ala Ser Thr Phe Leu
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 Ser Ser Lys Ser Ala Ala Gly Thr Pro Glu Trp Met Ala Pro Glu Val
 690 695 700
 Leu Arg Asp Glu Gln Ser Asn Glu Lys Ser Asp Val Tyr Ser Phe Gly
 705 710 715
 Val Ile Leu Trp Glu Leu Ala Thr Leu Gln Gln Pro Trp Gly Asn Leu
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 Asn Pro Ala Gln Val Val Ala Ala Val Gly Phe Lys Asn Lys Arg Leu
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 Glu Ile Pro Arg Asn Leu Asn Pro Gln Val Ala Ala Ile Ile Glu Gly
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 Cys Trp Thr Asn Glu Pro Trp Lys Arg Pro Ser Phe Ala Thr Ile Met
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<220>

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<400> 969

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Lys	Ile	Ser	Glu	Phe	Arg	Arg	Val	Tyr	Ser	Ala	Pro	Glu	Ile	Ser	Arg	
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Arg	Glu	Gly	Val	Leu	Glu	Met	Arg	Arg	Arg	Arg	Asp	Arg	Asp	Arg	Phe	
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Thr	Pro	Glu	Ser	Lys	Arg	His	Val	Ala	Ile	Val	Thr	Thr	Ala	Ser	Leu	
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gtg Val	atc Ile	gat Asp 755	gga Gly	gga Gly	ttg Leu	gcg Ala	ttc Phe 760	aca Thr	cac His	tat Tyr	gtt Val	ctc Leu 765	aca Thr	ggg Gly	aat Asn	2304
gat Asp	ttc Phe 770	ttg Leu	aga Arg	cta Leu	tgc Cys	agt Ser 775	gga Gly	gca Ala	aca Thr	cca Pro	aaa Lys 780	aca Thr	aaa Lys	gac Asp	tat Tyr	2352

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gat	aag	caa	cat	tgc	aag	gat	ctg	aaa	ctt	gtt	cca	cct	caa	gct	cac	2400
Asp	Lys	Gln	His	Cys	Lys	Asp	Leu	Lys	Leu	Val	Pro	Pro	Gln	Ala	His	
785					790					795					800	
aag	cca	gtc	tac	ggc	tgg	tag										2421
Lys	Pro	Val	Tyr	Gly	Trp											
				805												

<210> 970

<211> 806

<212> PRT

<213> Brassica napus

<400> 970

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Gly	Ile	Thr	Phe	Ser	Ser	Ser	Ser	Ser	Ser	Pro	Ser	Leu	Ser	Met	Met	
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Leu	Ser	Ser	Thr	Asn	Ala	Phe	Ser	Leu	Leu	Ser	Lys	Gly	Trp	Arg	Glu	
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Val	Arg	Asp	Ser	Ala	Asp	Ala	Asp	Leu	Gln	Leu	Met	Arg	Lys	Arg	Ala	
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Asn	Ser	Val	Lys	Asn	Leu	Ala	Ser	Thr	Phe	Asp	Arg	Glu	Ile	Glu	Asn	
65				70						75					80	
Phe	Leu	Asn	Asn	Ser	Ala	Met	Ser	Ala	Phe	Pro	Val	Val	Ser	Ser	Ser	
			85						90				95			
Pro	Ser	Ala	Phe	Gly	Asn	Glu	Ile	Gly	Ile	Met	Lys	Lys	Leu	Glu	Pro	
		100						105					110			
Lys	Ile	Ser	Glu	Phe	Arg	Arg	Val	Tyr	Ser	Ala	Pro	Glu	Ile	Ser	Arg	
		115					120					125				
Lys	Val	Met	Glu	Arg	Trp	Gly	Pro	Ala	Lys	Ala	Lys	Leu	Gly	Ile	Asp	
	130					135					140					
Leu	Ser	Ala	Ile	Lys	Lys	Ala	Ile	Val	Ser	Glu	Met	Asp	Leu	Asp	Glu	
145				150						155					160	
Arg	Glu	Gly	Val	Leu	Glu	Met	Arg	Arg	Arg	Arg	Asp	Arg	Asp	Arg	Phe	
			165					170						175		
Arg	Glu	Phe	Tyr	Ala	Glu	Gly	Glu	Gly	Glu	Gly	Ser	Phe	Gly	Asp	Trp	
		180						185					190			
Lys	Pro	Ile	Arg	Ser	Leu	Lys	Ser	Arg	Phe	Lys	Glu	Phe	Glu	Lys	Arg	
		195					200					205				
Ser	Ser	Leu	Glu	Leu	Leu	Ile	Gly	Phe	Lys	Asn	Ser	Glu	Leu	Val	Glu	
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Lys	Leu	Lys	Ala	Ser	Phe	Gln	Ser	Leu	Tyr	Lys	Glu	Thr	Asp	Glu	Ala	
225				230						235					240	
Lys	Asp	Val	Pro	Pro	Leu	Asp	Val	Pro	Glu	Leu	Leu	Ala	Ser	Leu	Val	
			245						250					255		
Arg	Gln	Ser	Glu	Pro	Phe	Leu	Asp	Gln	Ile	Gly	Val	Arg	Lys	Asp	Leu	
		260						265					270			
Cys	Asp	Arg	Val	Val	Glu	Asn	Leu	Tyr	Lys	Cys	Lys	Ser	Gln	His	Leu	
	275					280						285				
Trp	Arg	Leu	Pro	Ser	Ala	Gln	Thr	Ser	Asp	Leu	Val	Glu	Asn	Asp	Asn	
	290					295					300					
His	Val	Asp	Asp	Leu	Asp	Thr	Arg	Ile	Ala	Ser	Val	Leu	Gln	Ser	Thr	
305				310						315					320	
Gly	His	His	Tyr	Asp	Gly	Gly	Phe	Trp	Thr	Asp	Phe	Leu	Lys	Pro	Glu	
			325						330					335		
Thr	Pro	Glu	Ser	Lys	Arg	His	Val	Ala	Ile	Val	Thr	Thr	Ala	Ser	Leu	
			340					345					350			
Pro	Trp	Met	Thr	Gly	Thr	Ala	Val	Asn	Pro	Leu	Phe	Arg	Ala	Ala	Tyr	
		355					360					365				
Leu	Ala	Lys	Ser	Ala	Lys	Gln	Ser	Val	Thr	Leu	Val	Val	Pro	Trp	Leu	
	370					375					380					
Cys	Glu	Ser	Asp	Gln	Glu	Leu	Val	Tyr	Pro	Asn	Leu	Thr	Phe	Ser		
385				390						395				400		
Ser	Pro	Glu	Glu	Gln	Glu	Ser	Tyr	Ile	Arg	Thr	Trp	Leu	Glu	Glu	Arg	
			405					410					415			
Ile	Gly	Phe	Lys	Ala	Asp	Phe	Lys	Ile	Ser	Phe	Tyr	Pro	Gly	Lys	Phe	
		420						425					430			
Ser	Lys	Glu	Arg	Arg	Ser	Ile	Phe	Pro	Ala	Gly	Asp	Thr	Ser	Gln	Phe	
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Ile Pro Ser Lys Asp Ala Asp Ile Ala Ile Leu Glu Glu Pro Glu His
 450 455 460
 Leu Asn Trp Tyr His His Gly Lys Arg Trp Thr Asp Lys Phe Asn His
 465 470 475 480
 Val Val Gly Ile Val His Thr Asn Tyr Leu Glu Tyr Ile Lys Arg Glu
 485 490 495
 Lys His Gly Ala Ile Gln Ala Phe Phe Val Asn His Val Asn Asn Trp
 500 505 510
 Val Thr Arg Ala Tyr Cys Asp Lys Val Leu Arg Leu Ser Gly Ala Thr
 515 520 525
 Gln Asp Leu Pro Lys Ser Val Ile Cys Asn Val His Gly Val Asn Pro
 530 535 540
 Lys Phe Leu Met Ile Gly Glu Lys Ile Ala Glu Glu Ser Ser Arg Gly
 545 550 555 560
 Glu Gln Ala Phe Ser Lys Gly Ala Tyr Phe Leu Gly Lys Met Val Trp
 565 570 575
 Ala Lys Gly Tyr Arg Glu Leu Ile Asp Leu Met Ala Lys His Lys Ser
 580 585 590
 Asp Leu Gly Ser Phe Asn Leu Asp Val Tyr Gly Asn Gly Glu Asp Ala
 595 600 605
 Val Glu Val Gln Arg Ala Ala Gln Lys Leu Asp Leu Asn Leu Asn Phe
 610 615 620
 Leu Lys Gly Arg Asp His Ala Asp Asp Ala Leu His Lys Tyr Lys Val
 625 630 635 640
 Phe Ile Asn Pro Ser Ile Ser Asp Val Leu Cys Thr Ala Thr Ala Glu
 645 650 655
 Ala Leu Ala Met Gly Lys Phe Val Val Cys Ala Asp His Pro Ser Asn
 660 665 670
 Glu Phe Phe Arg Ser Phe Pro Asn Cys Leu Thr Tyr Lys Thr Ser Glu
 675 680 685
 Asp Phe Val Asn Lys Val Lys Glu Ala Met Ser Lys Glu Pro Leu Pro
 690 695 700
 Leu Thr Pro Glu Gln Met Tyr Asn Leu Ser Trp Glu Ala Ala Thr Gln
 705 710 715 720
 Arg Phe Met Glu Tyr Ser Asp Leu Asp Lys Ile Leu Asn Asp Glu Asp
 725 730 735
 Gly Gly Lys Arg Met Arg Lys Ser Arg Ser Val Pro Ser Phe Asp Glu
 740 745 750
 Val Ile Asp Gly Gly Leu Ala Phe Thr His Tyr Val Leu Thr Gly Asn
 755 760 765
 Asp Phe Leu Arg Leu Cys Ser Gly Ala Thr Pro Lys Thr Lys Asp Tyr
 770 775 780
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 Lys Pro Val Tyr Gly Trp
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<210> 971

<211> 2421

<212> DNA

<213> Brassica napus

<220>

<221> CDS

<222> (1)..(2421)

<400> 971

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ggc	att	acc	ttc	tca	tct	agt	tca	tcg	tct	ccc	tct	ctt	agt	atg	atg	96
Gly	Ile	Thr	Phe	Ser	Ser	Ser	Ser	Ser	Ser	Pro	Ser	Leu	Ser	Met	Met	
			20					25				30				
ctt	tct	agc	act	aat	gca	ttt	tcc	ctt	ttg	agt	aag	gga	tgg	aga	gaa	144
Leu	Ser	Ser	Thr	Asn	Ala	Phe	Ser	Leu	Leu	Ser	Lys	Gly	Trp	Arg	Glu	
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gtg	cgc	gat	tcc	gca	gat	gcg	gat	cta	caa	ctg	atg	cga	aag	cgc	gct	192
Val	Arg	Asp	Ser	Ala	Asp	Ala	Asp	Leu	Gln	Leu	Met	Arg	Lys	Arg	Ala	
	50					55					60					

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aat Asn 65	agt Ser	gtt Val	aag Lys	aac Asn	cta Leu 70	gct Ala	tct Ser	acg Thr	ttt Phe	gac Asp 75	aga Arg	gaa Glu	ata Ile	gag Glu	aat Asn 80	240
ttc Phe	ctc Leu	aat Asn	aac Asn	tct Ser 85	gca Ala	atg Met	tcc Ser	gca Ala	ttc Phe 90	cca Pro	gta Val	gtg Val	tca Ser	tct Ser 95	agt Ser	288
cct Pro	agt Ser	gcc Ala	ttt Phe 100	ggg Gly	aac Asn	gaa Glu	att Ile	gga Gly 105	att Ile	atg Met	aag Lys	aag Lys	ctc Leu 110	gag Glu	cct Pro	336
aaa Lys	atc Ile	tca Ser 115	gag Glu	ttt Phe	agg Arg	cgg Arg	gtg Val 120	tac Tyr	agt Ser	gca Ala	cct Pro	gaa Glu 125	att Ile	agc Ser	cgc Arg	384
aaa Lys	gtc Val 130	atg Met	gaa Glu	aga Arg	tgg Trp	ggg Gly 135	cct Pro	gct Ala	aaa Lys	gcc Ala	aag Lys 140	ttg Leu	ggg Gly	atc Ile	gac Asp	432
ttg Leu 145	tca Ser	gca Ala	atc Ile	aag Lys	aaa Lys 150	gcc Ala	att Ile	gtt Val	agt Ser	gaa Glu 155	atg Met	gat Asp	ttg Leu	gat Asp	gag Glu 160	480
aga Arg	gaa Glu	ggc Gly	gtc Val	ttg Leu 165	gaa Glu	atg Met	aga Arg	cga Arg	cgt Arg 170	cgc Arg	gat Asp	aga Arg	gac Asp	cgt Arg 175	ttc Phe	528
agg Arg	gaa Glu	ttt Phe	tat Tyr 180	gct Ala	gag Glu	ggc Gly	gag Glu	gga Gly 185	gaa Glu	ggg Gly	tca Ser	ttc Phe	ggg Gly 190	gac Asp	tgg Trp	576
aag Lys	ccc Pro	att Ile 195	agg Arg	tct Ser	ctt Leu	aaa Lys	tca Ser 200	agg Arg	ttt Phe	aaa Lys	gag Glu	ttt Phe 205	gag Glu	aag Lys	aga Arg	624
agt Ser	tct Ser 210	tta Leu	gag Glu	ctt Leu	ctg Leu	atc Ile 215	ggc Gly	ttt Phe	aag Lys	aat Asn	tca Ser 220	gag Glu	ctg Leu	gtt Val	gag Glu	672
aaa Lys 225	ttg Leu	aag Lys	gca Ala	tct Ser	ttt Phe 230	cag Gln	agc Ser	ttg Leu	tat Tyr	aaa Lys 235	gaa Glu	acc Thr	gat Asp	gaa Glu	gct Ala 240	720
aag Lys	gac Asp	gtc Val	ccg Pro	cct Pro 245	ctg Leu	gat Asp	gtc Val	cca Pro	gaa Glu 250	ctc Leu	ctt Leu	gcc Ala	tcg Ser	ctt Leu 255	gtg Val	768
agg Arg	caa Gln	tca Ser	gag Glu 260	cca Pro	ttt Phe	ctc Leu	gat Asp	cag Gln 265	ata Ile	ggg Gly	gtt Val	cgt Arg	aaa Lys 270	gac Asp	tta Leu	816
tgt Cys	gat Asp	aga Arg 275	gtt Val	gtg Val	gaa Glu	aat Asn	ctc Leu 280	tac Tyr	aag Lys	tgc Cys	aag Lys	tcc Ser 285	cag Gln	cat His	cta Leu	864
tgg Trp 290	agg Arg	ctt Leu	ccc Pro	agt Ser	gcc Ala	cag Gln 295	acc Thr	tct Ser	gat Asp	cta Leu	gtt Val 300	gag Glu	aac Asn	gat Asp	aat Asn	912
cat His 305	gtt Val	gat Asp	gac Asp	ctt Leu	gat Asp 310	act Thr	aga Arg	ata Ile	gca Ala	tca Ser 315	gta Val	cta Leu	caa Gln	tct Ser	aca Thr 320	960
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act Thr	cct Pro	gag Glu	agc Ser 340	aaa Lys	cgc Arg	cat His	gtt Val	gcc Ala 345	att Ile	gtt Val	aca Thr	acc Thr	gcc Ala 350	tct Ser	tta Leu	1056
cca Pro	tgg Trp	atg Met 355	aca Thr	ggc Gly	aca Thr	gct Ala	gtt Val 360	aac Asn	ccc Pro	ctc Leu	ttc Phe	agg Arg 365	gca Ala	gcg Ala	tat Tyr	1104
ctc Leu	gct Ala 370	aaa Lys	tct Ser	gct Ala	aag Lys	cag Gln 375	agt Ser	gtc Val	acc Thr	tta Leu	gtt Val 380	gtc Val	cca Pro	tgg Trp	ttg Leu	1152
tgc Cys 385	gaa Glu	tct Ser	gat Asp	cag Gln	gag Glu 390	ctt Leu	gtg Val	tac Tyr	cct Pro	aac Asn 395	aat Asn	ttg Leu	act Thr	ttc Phe	agt Ser 400	1200
tcg Ser	ccg Pro	gag Glu	gaa Glu	cag Gln 405	gag Glu	tca Ser	tac Tyr	ata Ile	aga Arg 410	aca Thr	tgg Trp	ctc Leu	gaa Glu	gag Glu 415	agg Arg	1248
atc Ile	ggg Gly	ttc Phe	aag Lys 420	gct Ala	gac Asp	ttc Phe	aaa Lys	atc Ile 425	tct Ser	ttt Phe	tac Tyr	ccc Pro	ggg Gly 430	aag Lys	ttt Phe	1296

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att Ile	cct Pro	tca Ser 450	aaa Lys	gat Asp	gca Ala	gac Asp 455	att Ile	gca Ala	ata Ile	ttg Leu	gaa Glu 460	gag Glu	cct Pro	gaa Glu	cac His	1392
cta Leu 465	aat Asn	tgg Trp	tat Tyr	cac His	cat His 470	gga Gly	aaa Lys	cgt Arg	tgg Trp	acc Thr 475	gac Asp	aag Lys	ttt Phe	aac Asn	cac His 480	1440
gtt Val	gtg Val	ggg Gly	atc Ile	gtg Val 485	cat His	aca Thr	aac Asn	tat Tyr	ttg Leu 490	gag Glu	tac Tyr	att Ile	aaa Lys	cgt Arg 495	gag Glu	1488
aaa Lys	cac His	ggg Gly	gca Ala 500	att Ile	cag Gln	gcc Ala	ttt Phe	ttc Phe 505	gtt Val	aac Asn	cat His	ggt Val	aac Asn 510	aat Asn	tgg Trp	1536
gtt Val	acc Thr	aga Arg 515	gct Ala	tat Tyr	tgc Cys	gat Asp	aag Lys 520	gtg Val	ctc Leu	cgt Arg	ttg Leu	tcc Ser 525	ggg Gly	gca Ala	aca Thr	1584
caa Gln	gat Asp 530	ctc Leu	cca Pro	aag Lys	agt Ser	gta Val 535	att Ile	tgt Cys	aac Asn	gtg Val	cac His 540	gga Gly	ggt Val	aat Asn	cca Pro	1632
aaa Lys 545	ttc Phe	ctc Leu	atg Met	ata Ile	ggg Gly 550	gag Glu	aag Lys	att Ile	gcc Ala	gaa Glu 555	gag Glu	tcc Ser	agc Ser	aga Arg	gga Gly 560	1680
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gat Asp	ttg Leu	gga Gly	agc Ser	ttt Phe	aac Asn	ctt Leu	gac Asp 600	gtt Val	tac Tyr	ggg Gly	aac Asn	ggg Gly 605	gaa Glu	gat Asp	gcc Ala	1824
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ctt Leu 625	aag Lys	gga Gly	agg Arg	gac Asp	cac His 630	gct Ala	gat Asp	gac Asp	gcc Ala	ttg Leu 635	cat His	aaa Lys	tac Tyr	aag Lys	gtg Val 640	1920
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gct Ala	ctt Leu	gca Ala	atg Met 660	ggg Gly	aaa Lys	ttt Phe	gtc Val	gta Val 665	tgc Cys	gct Ala	gac Asp	cat His 670	cca Pro	tct Ser	aat Asn	2016
gaa Glu	ttt Phe	ttc Phe 675	aga Arg	tca Ser	ttt Phe	ccc Pro	aac Asn 680	tgc Cys	cta Leu	act Thr	tat Tyr	aag Lys 685	aca Thr	tca Ser	gag Glu	2064
gat Asp	ttc Phe 690	gtg Val	aac Asn	aaa Lys	gtc Val	aaa Lys 695	gag Glu	gcg Ala	atg Met	agc Ser	aag Lys 700	gag Glu	ccc Pro	ctt Leu	cct Pro	2112
ctc Leu 705	act Thr	cca Pro	gaa Glu	caa Gln	atg Met 710	tat Tyr	aac Asn	ttg Leu	tcc Ser	tgg Trp 715	gaa Glu	gcc Ala	gct Ala	act Thr	caa Gln 720	2160
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ggc Gly	gga Gly	aag Lys	cga Arg 740	atg Met	cgg Arg	aag Lys	tct Ser	aga Arg 745	tcc Ser	gtg Val	cca Pro	tcc Ser	ttc Phe 750	gac Asp	gag Glu	2256
gtg Val	ata Ile	gac Asp 755	ggc Gly	ggg Gly	ctc Leu	gct Ala	ttt Phe 760	act Thr	cac His	tat Tyr	gta Val	ctg Leu 765	act Thr	ggg Gly	aat Asn	2304
gat Asp	ttc Phe 770	ctg Leu	agg Arg	ctg Leu	tgt Cys	agc Ser 775	gga Gly	gcc Ala	acc Thr	cct Pro	aag Lys 780	act Thr	aag Lys	gac Asp	tac Tyr	2352
gat Asp 785	aaa Lys	caa Gln	cac His	tgt Cys	aag Lys 790	gac Asp	tta Leu	aag Lys	ctg Leu	gta Val 795	cct Pro	ccg Pro	caa Gln	gct Ala	cat His 800	2400

aag cca gtg tat ggt tgg taa
 Lys Pro Val Tyr Gly Trp
 805

<210> 972
 <211> 806
 <212> PRT
 <213> Brassica napus

<400> 972
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 35 40 45
 Val Arg Asp Ser Ala Asp Ala Asp Leu Gln Leu Met Arg Lys Arg Ala
 50 55 60
 Asn Ser Val Lys Asn Leu Ala Ser Thr Phe Asp Arg Glu Ile Glu Asn
 65 70 75 80
 Phe Leu Asn Asn Ser Ala Met Ser Ala Phe Pro Val Val Ser Ser Ser
 85 90 95
 Pro Ser Ala Phe Gly Asn Glu Ile Gly Ile Met Lys Lys Leu Glu Pro
 100 105 110
 Lys Ile Ser Glu Phe Arg Arg Val Tyr Ser Ala Pro Glu Ile Ser Arg
 115 120 125
 Lys Val Met Glu Arg Trp Gly Pro Ala Lys Ala Lys Leu Gly Ile Asp
 130 135 140
 Leu Ser Ala Ile Lys Lys Ala Ile Val Ser Glu Met Asp Leu Asp Glu
 145 150 155 160
 Arg Glu Gly Val Leu Glu Met Arg Arg Arg Arg Asp Arg Asp Arg Phe
 165 170 175
 Arg Glu Phe Tyr Ala Glu Gly Glu Gly Glu Gly Ser Phe Gly Asp Trp
 180 185 190
 Lys Pro Ile Arg Ser Leu Lys Ser Arg Phe Lys Glu Phe Glu Lys Arg
 195 200 205
 Ser Ser Leu Glu Leu Leu Ile Gly Phe Lys Asn Ser Glu Leu Val Glu
 210 215 220
 Lys Leu Lys Ala Ser Phe Gln Ser Leu Tyr Lys Glu Thr Asp Glu Ala
 225 230 235 240
 Lys Asp Val Pro Pro Leu Asp Val Pro Glu Leu Leu Ala Ser Leu Val
 245 250 255
 Arg Gln Ser Glu Pro Phe Leu Asp Gln Ile Gly Val Arg Lys Asp Leu
 260 265 270
 Cys Asp Arg Val Val Glu Asn Leu Tyr Lys Cys Lys Ser Gln His Leu
 275 280 285
 Trp Arg Leu Pro Ser Ala Gln Thr Ser Asp Leu Val Glu Asn Asp Asn
 290 295 300
 His Val Asp Asp Leu Asp Thr Arg Ile Ala Ser Val Leu Gln Ser Thr
 305 310 315 320
 Gly His His Tyr Asp Gly Gly Phe Trp Thr Asp Phe Leu Lys Pro Glu
 325 330 335
 Thr Pro Glu Ser Lys Arg His Val Ala Ile Val Thr Thr Ala Ser Leu
 340 345 350
 Pro Trp Met Thr Gly Thr Ala Val Asn Pro Leu Phe Arg Ala Ala Tyr
 355 360 365
 Leu Ala Lys Ser Ala Lys Gln Ser Val Thr Leu Val Pro Trp Leu
 370 375 380
 Cys Glu Ser Asp Gln Glu Leu Val Tyr Pro Asn Asn Leu Thr Phe Ser
 385 390 395 400
 Ser Pro Glu Glu Gln Glu Ser Tyr Ile Arg Thr Trp Leu Glu Glu Arg
 405 410 415
 Ile Gly Phe Lys Ala Asp Phe Lys Ile Ser Phe Tyr Pro Gly Lys Phe
 420 425 430
 Ser Lys Glu Arg Arg Ser Ile Phe Pro Ala Gly Asp Thr Ser Gln Phe
 435 440 445
 Ile Pro Ser Lys Asp Ala Asp Ile Ala Ile Leu Glu Glu Pro Glu His
 450 455 460
 Leu Asn Trp Tyr His His Gly Lys Arg Trp Thr Asp Lys Phe Asn His

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465 Val Val Gly Ile Val 470 His Thr Asn Tyr Leu 475 Glu Tyr Ile Lys Arg 480 Glu
 Lys His Gly Ala Ile 485 Gln Ala Phe Phe 490 Val Asn His Val Asn 495 Asn Trp
 Val Thr Arg Ala Tyr Cys Asp Lys 500 Val Leu Arg Leu Ser 510 Gly Ala Thr
 Gln Asp 515 Leu Pro Lys Ser Val 520 Ile Cys Asn Val His 525 Gly Val Asn Pro
 Lys Phe 530 Leu Met Ile Gly 535 Glu Lys Ile Ala Glu 540 Glu Ser Ser Arg Gly
 545 Glu Gln Ala Phe Ser 550 Lys Gly Ala Tyr Phe 555 Leu Gly Lys Met Val Trp
 Ala Lys Gly Tyr 560 Arg Glu Leu Ile Asp 570 Leu Met Ala Lys His 575 Lys Ser
 Asp Leu Gly 580 Ser Phe Asn Leu Asp 585 Val Tyr Gly Asn Gly 590 Glu Asp Ala
 Val Glu Val Gln Arg Ala 600 Gln Lys Leu Asp 605 Asn Leu Asn Phe
 Leu Lys Gly Arg Asp 610 His Ala Asp Asp Ala Leu His Lys Tyr Lys Val
 625 Phe Ile Asn Pro Ser 630 Ile Ser Asp Val Leu 635 Cys Thr Ala Thr Ala Glu
 Ala Leu Ala Met 640 Gly Lys Phe Val Val 645 Cys Ala Asp His Pro Ser Asn
 Glu Phe Phe Arg Ser Phe Pro Asn Cys Leu Thr Tyr Lys Thr Ser Glu
 Asp Phe Val Asn Lys Val Lys 650 Glu Ala Met Ser Lys 655 Glu Pro Leu Pro
 Leu Thr Pro Glu Gln Met 660 Tyr Asn Leu Ser Trp 665 Glu Ala Ala Thr Gln
 705 Arg Phe Met Glu Tyr Ser Asp Leu Asp Lys 670 Ile Leu Asn Asp Glu Asp
 Gly Gly Lys Arg Met Arg Lys Ser Arg 675 Val Pro Ser Phe Asp Glu
 Val Ile Asp 680 Gly Gly Leu Ala Phe Thr His Tyr Val Leu Thr Gly Asn
 Asp Phe Leu Arg Leu Cys Ser 685 Gly Ala Thr Pro Lys Thr Lys Asp Tyr
 770 Asp Lys Gln His Cys Lys 775 Asp Leu Lys Leu Val 780 Pro Pro Gln Ala His
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<210> 973

<211> 1191

<212> DNA

<213> Brassica napus

<220>

<221> CDS

<222> (1)..(1191)

<400> 973

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Met	Ala	Ser	Phe	Ala	Lys	Val	Cys	Thr	Tyr	Asn	Lys	Pro	Val	Pro	Val	
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tta	acg	act	tct	ctc	tgt	aaa	tgc	tca	tgc	cgt	gta	tcc	act	aag	aaa	96
Leu	Thr	Thr	Ser	Leu	Cys	Lys	Cys	Ser	Cys	Arg	Val	Ser	Thr	Lys	Lys	
			20					25				30				
acc	cta	aat	ctc	cca	cct	ttc	tcc	gat	tac	tcg	agc	tta	cgt	ctg	gtc	144
Thr	Leu	Asn	Leu	Pro	Pro	Phe	Ser	Asp	Tyr	Ser	Ser	Leu	Arg	Leu	Val	
			35				40					45				
cgt	gat	gcc	aaa	acc	gaa	cct	ttg	ttt	ctt	tcc	cgc	ctt	ggg	cgg	att	192
Arg	Asp	Ala	Lys	Thr	Glu	Pro	Leu	Phe	Leu	Ser	Arg	Leu	Gly	Arg	Ile	
			50			55					60					
cct	gtt	aaa	cgg	cgt	ttc	ctc	acg	gcc	gtt	act	cga	gct	gaa	tcg	aac	240
Pro	Val	Lys	Arg	Arg	Phe	Leu	Thr	Ala	Val	Thr	Arg	Ala	Glu	Ser	Asn	
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aag Lys	aaa Lys	gca Ala	agc Ser 100	cag Gln	ctt Leu	aag Lys	aaa Lys	aga Arg 105	gtc Val	atc Ile	ttt Phe	ggt Gly	ggt Val 110	gcc Ala	att Ile	336
ggg Gly	tta Leu	cct Pro 115	ggt Val	gga Gly	ggt Gly	ggt Val	gtc Val 120	tta Leu	gct Ala	gga Gly	gga Gly	tgg Trp 125	ggt Val	ttc Phe	aca Thr	384
tta Leu	gcc Ala 130	ttg Leu	gca Ala	gct Ala	tct Ser	ggt Val 135	ttc Phe	atc Ile	ggt Gly	tct Ser	cgt Arg 140	gaa Glu	tat Tyr	ttc Phe	gag Glu	432
ctc Leu 145	ggt Val	aga Arg	agc Ser	aga Arg	ggc Gly 150	ata Ile	gct Ala	aag Lys	gga Gly	atg Met 155	act Thr	cct Pro	cct Pro	cct Pro	aga Arg 160	480
tac Tyr	gta Val	tca Ser	cgt Arg	ttt Phe 165	tgc Cys	tcc Ser	ggt Val	ata Ile	tgt Cys 170	gct Ala	ctt Leu	atg Met	ccc Pro	ata Ile 175	ctt Leu	528
aca Thr	ctg Leu	tac Tyr	tat Tyr 180	ggt Gly	aac Asn	att Ile	gat Asp	ata Ile 185	tgg Trp	gtg Val	aca Thr	tgc Cys	gca Ala 190	gcg Ala	ttt Phe	576
ggt Val	ggt Val	gca Ala 195	atg Met	gct Ala	ttg Leu	tta Leu	gta Val 200	cag Gln	aga Arg	gga Gly	aac Asn	cca Pro 205	cgt Arg	ttt Phe	tct Ser	624
cag Gln	ctt Leu	agt Ser	agt Ser	acg Thr	atg Met	ttt Phe 215	ggc Gly	ttg Leu	ttt Phe	tac Tyr	tgt Cys 220	ggc Gly	tat Tyr	ctc Leu	cct Pro	672
tgt Cys 225	ttc Phe	tgg Trp	ggt Val	aag Lys	ctt Leu 230	cgt Arg	tgt Cys	ggt Gly	tta Leu	gct Ala 235	gct Ala	cct Pro	gcg Ala	ctc Leu	aac Asn 240	720
act Thr	gga Gly	att Ile	gca Ala	agg Arg 245	act Thr	tgg Trp	cca Pro	att Ile	ttt Phe 250	ctt Leu	ggt Gly	ggt Gly	cca Pro 255	cct Pro	cag Gln	768
tgg Trp	acg Thr	gtg Val	gga Gly 260	ctc Leu	gtg Val	gca Ala	acg Thr	ttg Leu 265	att Ile	tca Ser	ttc Phe	agt Ser	ggt Gly 270	gtg Val	att Ile	816
gcc Ala	aca Thr	gac Asp 275	aca Thr	ttt Phe	gct Ala	ttc Phe	ctc Leu 280	ggt Gly	ggc Gly	aag Lys	gct Ala	ttt Phe 285	ggt Gly	agg Arg	aca Thr	864
cct Pro	ctt Leu 290	act Thr	agt Ser	att Ile	agt Ser	ccc Pro 295	aag Lys	aag Lys	aca Thr	tgg Trp	gaa Glu 300	ggg Gly	act Thr	ttt Phe	gct Ala	912
gga Gly 305	ctt Leu	ggt Val	ggc Gly	tgt Cys	ata Ile 310	gtc Val	att Ile	acc Thr	att Ile	cta Leu 315	ctc Leu	tct Ser	aag Lys	tct Ser	ctg Leu 320	960
tct Ser	tgg Trp	cct Pro	cag Gln	tct Ser 325	ctg Leu	ttc Phe	agc Ser	tcc Ser	att Ile 330	gct Ala	ttt Phe	ggg Gly	ttt Phe 335	att Ile	aac Asn	1008
ttc Phe	ttt Phe	ggg Gly	tca Ser 340	gtc Val	ttt Phe	ggt Gly	gat Asp 345	ctt Leu	act Thr	gaa Glu	tca Ser	atg Met	atc Ile 350	aaa Lys	cgt Arg	1056
gat Asp	gct Ala	ggc Gly 355	gtc Val	aaa Lys	gac Asp	tct Ser	ggt Gly 360	tca Ser	att Leu	atc Ile	cct Pro	gga Gly 365	cat His	ggt Gly	gga Gly	1104
ata Ile	ttg Leu 370	gac Asp	agg Arg	ggt Val	gat Asp	agt Ser 375	tac Tyr	att Ile	ttc Phe	acc Thr	ggt Gly 380	gca Ala	tta Leu	gca Ala	tac Tyr	1152
tcg Ser 385	ttc Phe	atc Ile	aaa Lys	aca Thr	tcc Ser 390	ctt Leu	aga Arg	ctt Leu	tac Tyr	gga Gly 395	ggt Val	tga				1191

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<211> 396

<212> PRT

<213> Brassica napus

<400> 974

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 Thr Leu Asn₃₅ Leu Pro Pro Phe Ser₄₀ Asp Tyr Ser Ser Leu₄₅ Arg Leu Val
 Arg Asp₅₀ Ala Lys Thr Glu Pro₅₅ Leu Phe Leu Ser Arg₆₀ Leu Gly Arg Ile
 Pro Val₆₅ Lys Arg Arg Phe₇₀ Leu Thr Ala Val Thr₇₅ Arg Ala Glu Ser Asn₈₀
 Gln Leu Gly Gly Asp₈₅ Thr Ser Glu Asn Val₉₀ Glu Glu Glu Glu Lys₉₅ Gln
 Lys Lys Ala Ser₁₀₀ Gln Leu Lys Lys Arg₁₀₅ Val Ile Phe Gly Val₁₁₀ Ala Ile
 Gly Leu Pro₁₁₅ Val Gly Gly Val₁₂₀ Leu Ala Gly Gly Trp₁₂₅ Val Phe Thr
 Leu Ala Leu Ala Ala Ser₁₃₅ Val Phe Ile Gly Ser Arg₁₄₀ Glu Tyr Phe Glu
 Leu Val₁₄₅ Arg Ser Arg Gly₁₅₀ Ile Ala Lys Gly Met₁₅₅ Thr Pro Pro Pro Arg₁₆₀
 Tyr Val₁₆₅ Ser Arg Phe₁₇₀ Cys Ser Val Ile Cys₁₇₅ Ala Leu Met Pro Ile₁₈₀ Leu
 Thr Leu Tyr Tyr₁₈₅ Gly Asn Ile Asp₁₉₀ Ile Trp Val Thr Cys₁₉₅ Ala Ala Phe
 Val Val₂₀₀ Ala Met Ala Leu Leu Val₂₀₅ Gln Arg Gly Asn Pro₂₁₀ Arg Phe Ser
 Gln Leu₂₁₅ Ser Ser Thr Met Phe₂₂₀ Gly Leu Phe Tyr Cys₂₂₅ Gly Tyr Leu Pro
 Cys Phe Trp Val₂₃₀ Lys Leu Arg Cys Gly Leu Ala₂₃₅ Ala Pro Ala Leu Asn₂₄₀
 Thr Gly Ile Ala Arg₂₄₅ Thr Trp Pro Ile Phe₂₅₀ Leu Gly Gly Pro₂₅₅ Pro Gln
 Trp Thr Val₂₆₀ Gly Leu Val Ala Thr₂₆₅ Leu Ile Ser Phe Ser Gly₂₇₀ Val Ile
 Ala Thr Asp₂₇₅ Thr Phe Ala Phe Leu₂₈₀ Gly Gly Lys Ala Phe₂₈₅ Gly Arg Thr
 Pro Leu Thr Ser Ile Ser Pro₂₉₅ Lys Lys Thr Trp Glu₃₀₀ Gly Thr Phe Ala
 Gly Leu Val Gly Cys Ile Val Ile Thr Ile Leu Leu Ser Lys Ser Leu₃₂₀
 Ser Trp Pro Gln Ser₃₂₅ Leu Phe Ser Ser Ile₃₃₀ Ala Phe Gly Phe Ile₃₃₅ Asn
 Phe Phe Gly Ser₃₄₀ Val Phe Gly Asp Leu₃₄₅ Thr Glu Ser Met Ile₃₅₀ Lys Arg
 Asp Ala Gly Val Lys Asp Ser Gly₃₆₀ Ser Leu Ile Pro Gly₃₆₅ His Gly Gly
 Ile Leu Asp Arg Val Asp Ser₃₇₅ Tyr Ile Phe Thr Gly₃₈₀ Ala Leu Ala Tyr
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<212> DNA

<213> Brassica napus

<220>

<221> CDS

<222> (1)..(2418)

<400> 975

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1				5				10					15			
aac	gaa	acg	ctc	gct	gct	caa	aga	aac	gaa	gtc	ctt	gcc	tta	ctt	tcc	96
Asn	Glu	Thr	Leu	Ala	Ala	Gln	Arg	Asn	Glu	Val	Leu	Ala	Leu	Leu	Ser	
			20					25				30				
agg	gtt	gaa	ggc	aaa	ggt	aaa	ggc	atc	ttg	caa	caa	aac	cag	atc	att	144
Arg	Val	Glu	Gly	Lys	Gly	Lys	Gly	Ile	Leu	Gln	Gln	Asn	Gln	Ile	Ile	
		35					40					45				
gct	gaa	ttc	gag	gct	ttg	cct	gaa	gaa	acc	cag	aag	aag	att	gaa	ggt	192

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Ala	Glu	Phe	Glu	Ala	Leu	Pro	Glu	Glu	Thr	Gln	Lys	Lys	Ile	Glu	Gly	
ggt	gct	ttc	ttc	gac	ctt	ctc	aaa	acc	act	cag	gaa	gca	ata	gtg	ttg	240
Gly	Ala	Phe	Phe	Asp	Leu	Leu	Lys	Thr	Thr	Gln	Glu	Ala	Ile	Val	Leu	
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cca	cca	tgg	gtt	gct	ctt	gct	gtg	agg	cca	agg	cct	ggt	ggt	tgg	gag	288
Pro	Pro	Trp	Val	Ala	Leu	Ala	Val	Arg	Pro	Arg	Pro	Gly	Val	Trp	Glu	
				85					90					95		
tac	ata	aga	gtc	aat	ctc	cat	gct	ctt	ggt	ggt	gag	gag	ctt	aca	cct	336
Tyr	Ile	Arg	Val	Asn	Leu	His	Ala	Leu	Val	Val	Glu	Glu	Leu	Thr	Pro	
			100				105						110			
gct	gag	ttt	ctt	cat	ttc	aag	gaa	gag	ctt	ggt	gat	gga	ggt	aag	aac	384
Ala	Glu	Phe	Leu	His	Phe	Lys	Glu	Glu	Leu	Val	Asp	Gly	Val	Lys	Asn	
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ggt	gat	ttc	acg	ctt	gag	ctt	gac	ttt	gag	ccg	ttt	aat	gcc	tct	gtc	432
Gly	Asp	Phe	Thr	Leu	Glu	Leu	Asp	Phe	Glu	Pro	Phe	Asn	Ala	Ser	Val	
130					135					140						
cct	cgc	cca	acg	ctc	ccc	aag	tac	att	gga	gat	ggt	ggt	gag	ttt	ctc	480
Pro	Arg	Pro	Thr	Leu	Pro	Lys	Tyr	Ile	Gly	Asp	Gly	Val	Glu	Phe	Leu	
145					150				155						160	
aac	cgt	cac	ctc	tcg	gct	aag	ctc	ttc	cat	gac	aag	gag	agt	ttg	ctt	528
Asn	Arg	His	Leu	Ser	Ala	Lys	Leu	Phe	His	Asp	Lys	Glu	Ser	Leu	Leu	
				165					170					175		
cct	ttg	ctc	aag	ttc	ctt	cga	cta	cac	agc	tac	cag	gga	aag	acc	ctg	576
Pro	Leu	Leu	Lys	Phe	Leu	Arg	Leu	His	Ser	Tyr	Gln	Gly	Lys	Thr	Leu	
			180					185					190			
atg	ctg	aac	gag	aga	gtt	caa	aac	ctc	aac	aat	ctg	caa	cac	atc	ttg	624
Met	Leu	Asn	Glu	Arg	Val	Gln	Asn	Leu	Asn	Asn	Leu	Gln	His	Ile	Leu	
		195				200						205				
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Arg	Lys	Ala	Glu	Glu	Tyr	Leu	Ala	Gly	Leu	Ser	Pro	Glu	Thr	Pro	Tyr	
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Glu	Asp	Phe	Glu	Ala	Lys	Phe	Glu	Glu	Ile	Gly	Leu	Glu	Arg	Gly	Trp	
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gga	aac	aat	gcc	gag	cgt	gtc	ctt	gac	atg	atc	cgt	ctt	ctt	ttg	gac	768
Gly	Asn	Asn	Ala	Glu	Arg	Val	Leu	Asp	Met	Ile	Arg	Leu	Leu	Leu	Asp	
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ctc	ctc	gag	gcc	cct	gac	cct	tgc	act	cta	gag	aac	ttt	ctt	ggg	aga	816
Leu	Leu	Glu	Ala	Pro	Asp	Pro	Cys	Thr	Leu	Glu	Asn	Phe	Leu	Gly	Arg	
			260				265						270			
gtc	cct	atg	gtg	ttc	aac	gtt	gtc	atc	ctc	tct	cca	cat	ggt	tac	ttt	864
Val	Pro	Met	Val	Phe	Asn	Val	Val	Ile	Leu	Ser	Pro	His	Gly	Tyr	Phe	
		275				280						285				
gct	cag	gac	aat	gtt	ctt	ggt	tac	cct	gac	act	ggt	ggt	cag	gtt	gtt	912
Ala	Gln	Asp	Asn	Val	Leu	Gly	Tyr	Pro	Asp	Thr	Gly	Gly	Gln	Val	Val	
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Tyr	Ile	Leu	Asp	Gln	Val	Arg	Ala	Met	Glu	Thr	Glu	Met	Leu	Gln	Arg	
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Ile	Gln	Gln	Gln	Gly	Leu	Asn	Ile	Thr	Pro	Arg	Ile	Leu	Ile	Leu	Thr	
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aga	ctg	ctc	cct	gat	gca	gta	gga	acc	aca	tgt	ggt	gag	cgt	ctt	gag	1056
Arg	Leu	Leu	Pro	Asp	Ala	Val	Gly	Thr	Thr	Cys	Gly	Glu	Arg	Leu	Glu	
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Arg	Val	Asp	Gly	Ser	Glu	Tyr	Cys	Asp	Ile	Leu	Arg	Val	Pro	Phe	Arg	
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Thr	Glu	Lys	Gly	Ile	Val	Arg	Lys	Trp	Ile	Ser	Arg	Phe	Glu	Val	Trp	
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Pro	Tyr	Leu	Glu	Thr	Tyr	Thr	Glu	Asp	Ala	Ala	Val	Glu	Leu	Ala	Lys	
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Glu	Leu	Lys	Gly	Lys	Pro	Asp	Leu	Ile	Ile	Gly	Asn	Tyr	Ser	Asp	Gly	
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Thr	Ile	Ala 435	His	Ala	Leu	Glu	Lys 440	Thr	Lys	Tyr	Pro	Asp 445	Ser	Asp	Ile		
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Tyr	Trp 450	Lys	Lys	Leu	Asp	Asp 455	Lys	Tyr	His	Phe	460	Cys	Gln	Phe	Thr		
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Glu	Ala	Phe 675	Gly	Leu	Thr	Val	Val 680	Glu	Ala	Met	Thr	Cys 685	Gly	Leu	Pro		
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Lys	Ser	Gly	Phe	His	Ile 710	Asp	Pro	Tyr	His	Gly 715	Asp	Gln	Ala	Ala	Asp 720		
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Trp	Gln 755	Ile	Tyr	Ser	Gln	Arg	Leu 760	Leu	Thr	Leu	Thr	Gly 765	Val	Tyr	Gly		
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Phe	Trp 770	Lys	His	Val	Ser	Asn 775	Leu	Asp	Arg	Leu	Glu 780	Ser	Arg	Arg	Tyr		
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Leu	Glu	Met	Phe	Tyr	Ala	Leu	Lys	Tyr	Arg	Pro	Leu	Ala	Gln	Ala	Val
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2418

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 Arg Val Glu₃₅ Gly Lys Gly Lys Gly₄₀ Ile Leu Gln Gln Asn₄₅ Gln Ile Ile
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 Gly Ala Phe Phe Asp Leu₇₀ Leu Lys Thr Thr Gln Glu Ala Ile Val Leu₈₀
 65 Pro Pro Trp Val₈₅ Ala Leu Ala Val Arg Pro₉₀ Arg Pro Gly Val Trp Glu
 Tyr Ile Arg Val₁₀₀ Asn Leu His Ala Leu₁₀₅ Val Val Glu Glu Leu Thr Pro
 Ala Glu Phe₁₁₅ Leu His Phe Lys Glu₁₂₀ Glu Leu Val Asp Gly Val Lys Asn
 Gly Asp₁₃₀ Phe Thr Leu Glu Leu₁₃₅ Asp Phe Glu Pro Phe₁₄₀ Asn Ala Ser Val
 145 Pro Arg Pro Thr Leu Pro₁₅₀ Lys Tyr Ile Gly Asp₁₅₅ Gly Val Glu Phe Leu
 Asn Arg His Leu Ser₁₆₅ Ala Lys Leu Phe His₁₇₀ Asp Lys Glu Ser Leu Leu
 Pro Leu Leu Lys₁₈₀ Phe Leu Arg Leu His₁₈₅ Ser Tyr Gln Gly Lys₁₉₀ Thr Leu
 Met Leu Asn Glu Arg Val Gln Asn₂₀₀ Leu Asn Asn Leu Gln His Ile Leu
 Arg Lys₂₁₀ Ala Glu Glu Tyr Leu₂₁₅ Ala Gly Leu Ser Pro Glu Thr Pro Tyr
 Glu Asp Phe Glu Ala Lys₂₃₀ Phe Glu Glu Ile Gly₂₃₅ Leu Glu Arg Gly Trp
 225 Gly Asn Asn Ala Glu Arg Val Leu Asp Met₂₅₀ Ile Arg Leu Leu Leu Asp
 Leu Leu Glu Ala Pro Asp Pro Cys Thr₂₆₅ Leu Glu Asn Phe Leu Gly Arg
 Val Pro Met₂₇₅ Val Phe Asn Val Val₂₈₀ Ile Leu Ser Pro His Gly Tyr Phe
 Ala Gln Asp Asn Val Leu Gly Tyr Pro Asp Thr Gly₃₀₀ Gly Gln Val Val
 Tyr Ile Leu Asp Gln Val Arg Ala Met Glu Thr₃₁₅ Glu Met Leu Gln Arg
 305 Ile Gln Gln Gln Gly Leu Asn Ile Thr Pro Arg Ile Leu Ile Leu Thr
 Arg Leu Leu Pro Asp Ala Val Gly Thr₃₄₅ Thr Cys Gly Glu Arg Leu Glu
 Arg Val Asp Gly Ser Glu Tyr Cys₃₆₀ Asp Ile Leu Arg Val Pro Phe Arg
 Thr Glu Lys Gly Ile Val Arg Lys Trp Ile Ser Arg Phe Glu Val Trp
 370 Tyr Leu Glu Thr Tyr Thr Glu Asp Ala Ala Val Glu Leu Ala Lys
 385 Glu Leu Lys Gly Lys₄₀₅ Pro Asp Leu Ile Ile Gly Asn Tyr Ser Asp Gly
 Asn Leu Val Ala Ser Leu Leu Ala His₄₂₅ Lys Leu Gly Val Thr Gln Cys
 Thr Ile Ala His Ala Leu Glu Lys Thr Lys Tyr Pro Asp Ser Asp Ile
 435 Tyr Trp Lys Lys Leu Asp Asp Lys Tyr His Phe Ser Cys Gln Phe Thr

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450
 Ala Asp Leu Phe Ala Met 455
 465 Leu Gln Glu Ile Ala Gly Ser Lys Asp Thr Val Gly Gln Tyr Glu Ser 480
 His Thr Ala Phe Thr Leu Pro Gly Leu Tyr Arg Val Val His Gly Ile 495
 Asp Val Phe 500 Asp Pro Lys Phe Asn 505 Ile Val Ser Pro Gly 510 Ala Asp Met 525
 Ser Ile Tyr Phe Pro Tyr Thr Glu Glu Lys Arg Arg Leu Thr Lys Phe 535
 His 545 Pro Glu Ile Glu Glu Leu Leu Tyr Ser Asn Val Glu Asn Glu Glu 555
 His Leu Cys Val Leu 565 Lys Asp Lys Lys Lys 570 Pro Ile Leu Phe Thr Met 575
 Ala Arg Leu Asp Arg Val Lys Asn Leu Ser Gly Leu Val Glu Trp Tyr 585
 Gly Lys Asn 595 Lys Arg Leu Arg Glu Leu Val Asn Leu Val Val Val Gly 605
 Gly Asp Arg Arg Lys Glu Ser Lys Asp Asn Glu Glu Lys Ala Glu Met 610
 Lys 625 Lys Met Tyr Asp Leu Ile Glu Glu Tyr Lys Leu Asn Gly Gln Phe 635
 Arg Trp Ile Ser Ser 645 Gln Met Asn Arg Val Arg Asn Gly Glu Leu Tyr 655
 Arg Tyr Ile Cys Asp Thr Lys Gly Ala Phe Val Gln Pro Ala Leu Tyr 660
 Glu Ala Phe Gly Leu Thr Val Val Glu Ala Met Thr Cys Gly Leu Pro 670
 Thr Phe 675 Ala Thr Cys Lys Gly 680 Gly Pro Ala Glu Ile Val His Gly 695
 Lys 705 Ser Gly Phe His Ile Asp Pro Tyr His Gly Asp Gln Ala Ala Asp 710
 Thr Leu Ala Asp Phe Phe Ala Lys Cys Lys Glu Asp Pro Ser His Trp 725
 Asp Gln Ile Ser 740 Lys Gly Gly Leu Gln Arg Ile Glu Glu Lys Tyr Thr 750
 Trp Gln Ile Tyr Ser Gln Arg Leu Leu Thr Leu Thr Gly Val Tyr Gly 755
 Phe Trp 770 Lys His Val Ser Asn Leu Asp Arg Leu Glu Ser Arg Arg Tyr 780
 Leu Glu Met Phe Tyr Ala Leu Lys Tyr Arg Pro Leu Ala Gln Ala Val 795
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<210> 977

<211> 1248

<212> DNA

<213> Brassica napus

<220>

<221> CDS

<222> (1)..(1248)

<400> 977

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Ser Ser Ala Cys Ile Leu Pro Thr Gln Pro Glu Thr Pro Arg Pro Lys	
20 25 30	
cga gcc aaa agg gct aag aaa tct tct att cct act gat gtt aaa cca	144
Arg Ala Lys Arg Ala Lys Lys Ser Ser Ile Pro Thr Asp Val Lys Pro	
35 40 45	
cag aat ccc acc agt cct gcc tcc acc aga cgc agc tct atc tac aga	192
Gln Asn Pro Thr Ser Pro Ala Ser Thr Arg Arg Ser Ser Ile Tyr Arg	
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gga gtc act aga cat aga tgg aca ggg aga tac gag gct cat cta tgg	240

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tat Tyr	ctg Leu	gga Gly	gca Ala 100	tat Tyr	gac Asp	agc Ser	gag Glu	gaa Glu 105	gca Ala	gca Ala	gcg Ala	cat His 110	acg Thr 110	tac Tyr	gat Asp	336
cta Leu	gct Ala	gct Ala 115	ctc Leu	aag Lys	tac Tyr	tgg Trp	ggt Gly 120	ccc Pro	gac Asp	acc Thr	atc Ile	ttg Leu 125	aac Asn	ttt Phe	ccg Pro	384
gct Ala	gag Glu 130	acg Thr	tac Tyr	aca Thr	aag Lys	gag Glu 135	ttg Leu	gag Glu	gag Glu	atg Met	cag Gln 140	aga Arg	tgt Cys	aca Thr	aag Lys	432
gaa Glu 145	gag Glu	tat Tyr	ttg Leu	gct Ala	tct Ser 150	ctc Leu	cgc Arg	cgc Arg	cag Gln	agc Ser 155	agt Ser	ggc Gly	ttc Phe	tct Ser	aga Arg 160	480
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tgg Trp	gaa Glu	gct Ala	agg Arg 180	att Ile	gga Gly	agg Arg	gtg Val	ttt Phe 185	gga Gly	aac Asn	aag Lys	tac Tyr 190	ttg Leu 190	tac Tyr	ctc Leu	576
ggc Gly	act Thr	tat Tyr 195	aat Asn	acg Thr	cag Gln	gag Glu	gaa Glu 200	gct Ala	gca Ala	gct Ala	gca Ala	tat Tyr 205	gac Asp	atg Met	gcg Ala	624
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aac Asn 225	tac Tyr	atc Ile	gac Asp	cgg Arg	tta Leu 230	aaa Lys	aaa Lys	ggc Gly	gtc Val 235	cca Phe	ttc Phe	cct Pro	gtg Val 240			720
agc Ser	caa Gln	gcc Ala	aat Asn	cat His 245	caa Gln	gaa Glu	gct Ala	gtt Val	ctt Leu 250	gct Ala	gaa Glu	gcc Ala	aaa Lys	caa Gln 255	gaa Glu	768
gtg Val	gaa Glu	gct Ala	aaa Lys 260	gaa Glu	gag Glu	cct Pro	aca Thr	gaa Glu 265	gaa Glu	gtg Val	aag Lys	cag Gln 270	tgt Cys	gtc Val	gaa Glu	816
aaa Lys	gaa Glu	gaa Glu 275	ccg Pro	caa Gln	gaa Glu	gct Ala	aaa Lys 280	gaa Glu	gag Glu	aag Lys	act Thr	gag Glu 285	aaa Lys	aaa Lys	caa Gln	864
caa Gln 290	caa Gln	caa Gln	gaa Glu	gtg Val	gag Glu	gag Glu 295	gag Glu	gtg Val	gtc Val	act Thr	tgc Cys 300	tgc Cys	att Ile	gat Asp	tct Ser	912
tcg Ser 305	gag Glu	agc Ser	aat Asn	gag Glu	ctg Leu 310	gct Ala	tgg Trp	gac Asp	ttc Phe	tgt Cys 315	atg Met	atg Met	gat Asp	tca Ser	ggg Gly 320	960
ttt Phe	gct Ala	ccg Pro	ttt Phe 325	ttg Leu	acg Thr	gat Asp	tca Ser	aat Asn	ctc Leu 330	tcg Ser	agt Ser	gag Glu	aat Asn	ccc Pro 335	att Ile	1008
gag Glu	tat Tyr	cct Pro 340	gag Glu	ctt Leu	ttc Phe	aat Asn	gag Glu	atg Met 345	ggg Gly	ttt Phe	gag Glu	gat Asp	aac Asn 350	att Ile	gac Asp	1056
ttc Phe	atg Met	ttc Phe 355	gag Glu	gaa Glu	ggg Gly	aag Lys	caa Gln 360	gac Asp	tgc Cys	ttg Leu	agc Ser	ttg Leu 365	gag Glu	aat Asn	ctg Leu	1104
gat Asp	tgt Cys 370	tgc Cys	gat Asp	ggt Gly	gtt Val	gtt Val 375	gtg Val	gga Gly	aga Arg	gag Glu 380	agc Ser	cca Pro	act Thr	tca Ser		1152
ttg Leu 385	tcg Ser	tct Ser	tca Ser	ccg Pro	ttg Leu 390	tct Ser	tgc Cys	ttg Leu	tct Ser	act Thr 395	gac Asp	tct Ser	gct Ala	tca Ser 400		1200
aca Thr	aca Thr	aca Thr	aca Thr 405	aca Thr	ata Ile	acc Thr	tct Ser	gtt Val	tct Ser 410	tgt Cys	aac Asn	tat Tyr	tct Ser	gtc Val 415	tga	1248

<210> 978

<211> 415

<212> PRT

<213> Brassica napus

<400> 978

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35      40      45
Gln Asn Pro Thr Ser Pro Ala Ser Thr Arg Arg Ser Ser Ile Tyr Arg
50      55      60
Gly Val Thr Arg His Arg Trp Thr Gly Arg Tyr Glu Ala His Leu Trp
65      70      75
Asp Lys Ser Ser Trp Asn Ser Ile Gln Asn Lys Lys Gly Lys Gln Val
85      90      95
Tyr Leu Gly Ala Tyr Asp Ser Glu Glu Ala Ala Ala His Thr Tyr Asp
100     105     110
Leu Ala Ala Leu Lys Tyr Trp Gly Pro Asp Thr Ile Leu Asn Phe Pro
115     120     125
Ala Glu Thr Tyr Thr Lys Glu Leu Glu Glu Met Gln Arg Cys Thr Lys
130     135     140
Glu Glu Tyr Leu Ala Ser Leu Arg Arg Gln Ser Ser Gly Phe Ser Arg
145     150     155
Gly Val Ser Lys Tyr Arg Gly Val Ala Arg His His Asn Gly Arg
165     170     175
Trp Glu Ala Arg Ile Gly Arg Val Phe Gly Asn Lys Tyr Leu Tyr Leu
180     185     190
Gly Thr Tyr Asn Thr Gln Glu Glu Ala Ala Ala Tyr Asp Met Ala
195     200     205
Ala Ile Glu Tyr Arg Gly Ala Asn Ala Val Thr Asn Phe Asp Ile Ser
210     215     220
Asn Tyr Ile Asp Arg Leu Lys Lys Lys Gly Val Phe Pro Phe Pro Val
225     230     235
Ser Gln Ala Asn His Gln Glu Ala Val Leu Ala Glu Ala Lys Gln Glu
245     250     255
Val Glu Ala Lys Glu Glu Pro Thr Glu Glu Val Lys Gln Cys Val Glu
260     265     270
Lys Glu Glu Pro Gln Glu Ala Lys Glu Glu Lys Thr Glu Lys Lys Gln
275     280     285
Gln Gln Gln Glu Val Glu Glu Ala Val Val Thr Cys Cys Ile Asp Ser
290     295     300
Ser Glu Ser Asn Glu Leu Ala Trp Asp Phe Cys Met Met Asp Ser Gly
305     310     315
Phe Ala Pro Phe Leu Thr Asp Ser Asn Leu Ser Ser Glu Asn Pro Ile
325     330     335
Glu Tyr Pro Glu Leu Phe Asn Glu Met Gly Phe Glu Asp Asn Ile Asp
340     345     350
Phe Met Phe Glu Glu Gly Lys Gln Asp Cys Leu Ser Leu Glu Asn Leu
355     360     365
Asp Cys Cys Asp Gly Val Val Val Val Gly Arg Glu Ser Pro Thr Ser
370     375     380
Leu Ser Ser Ser Pro Leu Ser Cys Leu Ser Thr Asp Ser Ala Ser Ser
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Thr Thr Thr Thr Thr Ile Thr Ser Val Ser Cys Asn Tyr Ser Val
405     410     415

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<210> 979

<211> 1248

<212> DNA

<213> Brassica napus

<220>

<221> CDS

<222> (1)..(1248)

<400> 979

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Met Lys Arg Pro Leu Thr Thr Ser Pro Ser Thr Ser Ser Thr Ser
1      5      10      15

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aga	gct	aag	aga	gcc	aag	aag	tcc	tca	atc	cct	acg	gac	gta	aag	cca	144
Arg	Ala	Lys	Arg	Ala	Lys	Lys	Ser	Ser	Ile	Pro	Thr	Asp	Val	Lys	Pro	
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caa	aat	ccc	act	tct	cct	gct	agt	acc	cgt	aga	agt	tca	atc	tat	cga	192
Gln	Asn	Pro	Thr	Ser	Pro	Ala	Ser	Thr	Arg	Arg	Ser	Ser	Ile	Tyr	Arg	
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Gly	Val	Thr	Arg	His	Arg	Trp	Thr	Gly	Arg	Tyr	Glu	Ala	His	Leu	Trp	
	65				70					75					80	
gac	aag	agt	tct	tgg	aac	tca	att	cag	aat	aag	aaa	ggg	aaa	cag	gtg	288
Asp	Lys	Ser	Ser	Trp	Asn	Ser	Ile	Gln	Asn	Lys	Lys	Gly	Lys	Gln	Val	
				85					90					95		
tat	ctt	ggg	gcg	tac	gat	tca	gaa	gag	gct	gcc	gct	cat	act	tat	gac	336
Tyr	Leu	Gly	Ala	Tyr	Asp	Ser	Glu	Glu	Ala	Ala	Ala	His	Thr	Tyr	Asp	
			100					105					110			
tta	gca	gcc	ttg	aag	tac	tgg	gga	ccc	gat	acc	att	ttg	aat	ttc	cct	384
Leu	Ala	Ala	Leu	Lys	Tyr	Trp	Gly	Pro	Asp	Thr	Ile	Leu	Asn	Phe	Pro	
		115					120					125				
gct	gaa	act	tac	aca	aag	gag	tta	gag	gaa	atg	cag	cgt	tgc	aca	aag	432
Ala	Glu	Thr	Tyr	Thr	Lys	Glu	Leu	Glu	Glu	Met	Gln	Arg	Cys	Thr	Lys	
	130					135					140					
gaa	gag	tac	ctt	gca	agt	ctg	agg	aga	caa	tct	tca	ggc	ttc	tca	cgc	480
Glu	Glu	Tyr	Leu	Ala	Ser	Leu	Arg	Arg	Gln	Ser	Ser	Gly	Phe	Ser	Arg	
	145				150					155					160	
ggg	gtt	agc	aaa	tat	cgt	ggg	gtt	gct	cga	cac	cat	cac	aac	ggc	agg	528
Gly	Val	Ser	Lys	Tyr	Arg	Gly	Val	Ala	Arg	His	His	His	Asn	Gly	Arg	
				165					170					175		
tgg	gaa	gca	agg	ata	ggc	aga	gtt	ttt	ggc	aac	aag	tat	ttg	tat	ctt	576
Trp	Glu	Ala	Arg	Ile	Gly	Arg	Val	Phe	Gly	Asn	Lys	Tyr	Leu	Tyr	Leu	
			180					185					190			
gga	aca	tac	aat	aca	caa	gag	gaa	gca	gct	gca	gcc	tac	gac	atg	gct	624
Gly	Thr	Tyr	Asn	Thr	Gln	Glu	Glu	Ala	Ala	Ala	Ala	Tyr	Asp	Met	Ala	
		195					200					205				
gca	atc	gag	tat	cgc	gga	gcc	aac	gcc	gtc	act	aat	ttt	gat	atc	agt	672
Ala	Ile	Glu	Tyr	Arg	Gly	Ala	Asn	Ala	Val	Thr	Asn	Phe	Asp	Ile	Ser	
	210				215						220					
aac	tac	att	gat	aga	ctt	aag	aag	aaa	gga	gtg	ttc	cca	ttt	cct	gtt	720
Asn	Tyr	Ile	Asp	Arg	Leu	Lys	Lys	Lys	Gly	Val	Phe	Pro	Phe	Pro	Val	
	225				230					235					240	
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Ser	Gln	Ala	Asn	His	Gln	Glu	Ala	Val	Leu	Ala	Glu	Ala	Lys	Gln	Glu	
				245					250					255		
gtt	gag	gca	aag	gag	gaa	cca	aca	gaa	gag	gtg	aaa	caa	tgc	gtt	gag	816
Val	Glu	Ala	Lys	Glu	Glu	Pro	Thr	Glu	Glu	Val	Lys	Gln	Cys	Val	Glu	
			260					265					270			
aaa	gag	gaa	cct	cag	gaa	gct	aag	gaa	gag	aaa	act	gag	aag	aaa	caa	864
Lys	Glu	Glu	Pro	Gln	Glu	Ala	Lys	Glu	Glu	Lys	Thr	Glu	Lys	Lys	Gln	
		275					280					285				
cag	caa	cag	gaa	gtg	gaa	gag	gct	gtt	gtg	acg	tgc	tgt	ata	gat	tca	912
Gln	Gln	Gln	Glu	Val	Glu	Glu	Ala	Val	Val	Thr	Cys	Cys	Ile	Asp	Ser	
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tcg	gag	agc	aac	gaa	ttg	gcc	tgg	gat	ttc	tgc	atg	atg	gat	tcc	gga	960
Ser	Glu	Ser	Asn	Glu	Leu	Ala	Trp	Asp	Phe	Cys	Met	Met	Asp	Ser	Gly	
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Phe	Ala	Pro	Phe	Leu	Thr	Asp	Ser	Asn	Leu	Ser	Ser	Glu	Asn	Pro	Ile	
				325					330					335		
gaa	tac	cca	gag	ctt	ttc	aac	gaa	atg	ggg	ttc	gag	gat	aac	ata	gac	1056
Glu	Tyr	Pro	Glu	Leu	Phe	Asn	Glu	Met	Gly	Phe	Glu	Asp	Asn	Ile	Asp	
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Phe	Met	Phe	Glu	Glu	Gly	Lys	Gln	Asp	Cys	Leu	Ser	Leu	Glu	Asn	Leu	
		355					360					365				
gat	tgt	tgc	gat	ggg	gtc	gtg	gtt	gtc	ggg	agg	gaa	agt	ccc	act	tcc	1152
Asp	Cys	Cys	Asp	Gly	Val	Val	Val	Val	Gly	Arg	Glu	Ser	Pro	Thr	Ser	
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ctc	tcg	tct	agc	cca	ctc	tca	tgt	ttg	tct	act	gac	agt	gcg	tcc	tct	1200
Leu	Ser	Ser	Ser	Pro	Leu	Ser	Cys	Leu	Ser	Thr	Asp	Ser	Ala	Ser	Ser	
385					390					395					400	
aca	acc	aca	acc	aca	att	act	tcg	gta	tcc	tgt	aat	tat	tct	gtt	taa	1248
Thr	Thr	Thr	Thr	Thr	Ile	Thr	Ser	Val	Ser	Cys	Asn	Tyr	Ser	Val		
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<210> 980

<211> 415

<212> PRT

<213> Brassica napus

<400> 980

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			20					25					30			
Arg	Ala	Lys	Arg	Ala	Lys	Lys	Ser	Ile	Pro	Thr	Asp	Val	Lys	Pro		
		35					40				45					
Gln	Asn	Pro	Thr	Ser	Pro	Ala	Ser	Thr	Arg	Arg	Ser	Ser	Ile	Tyr	Arg	
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Gly	Val	Thr	Arg	His	Arg	Trp	Thr	Gly	Arg	Tyr	Glu	Ala	His	Leu	Trp	
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Asp	Lys	Ser	Ser	Trp	Asn	Ser	Ile	Gln	Asn	Lys	Lys	Gly	Lys	Gln	Val	
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Tyr	Leu	Gly	Ala	Tyr	Asp	Ser	Glu	Glu	Ala	Ala	Ala	His	Thr	Tyr	Asp	
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Leu	Ala	Ala	Leu	Lys	Tyr	Trp	Gly	Pro	Asp	Thr	Ile	Leu	Asn	Phe	Pro	
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Ala	Glu	Thr	Tyr	Thr	Lys	Glu	Leu	Glu	Glu	Met	Gln	Arg	Cys	Thr	Lys	
	130					135					140					
Glu	Glu	Tyr	Leu	Ala	Ser	Leu	Arg	Arg	Gln	Ser	Ser	Gly	Phe	Ser	Arg	
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Gly	Val	Ser	Lys	Tyr	Arg	Gly	Val	Ala	Arg	His	His	His	Asn	Gly	Arg	
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Trp	Glu	Ala	Arg	Ile	Gly	Arg	Val	Phe	Gly	Asn	Lys	Tyr	Leu	Tyr	Leu	
			180					185					190			
Gly	Thr	Tyr	Asn	Thr	Gln	Glu	Glu	Ala	Ala	Ala	Ala	Tyr	Asp	Met	Ala	
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Ala	Ile	Glu	Tyr	Arg	Gly	Ala	Asn	Ala	Val	Thr	Asn	Phe	Asp	Ile	Ser	
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Asn	Tyr	Ile	Asp	Arg	Leu	Lys	Lys	Lys	Gly	Val	Phe	Pro	Phe	Pro	Val	
225					230					235					240	
Ser	Gln	Ala	Asn	His	Gln	Glu	Ala	Val	Leu	Ala	Glu	Ala	Lys	Gln	Glu	
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Val	Glu	Ala	Lys	Glu	Glu	Pro	Thr	Glu	Val	Lys	Gln	Cys	Val	Glu		
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Lys	Glu	Glu	Pro	Gln	Glu	Ala	Lys	Glu	Glu	Lys	Thr	Glu	Lys	Lys	Gln	
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Gln	Gln	Gln	Glu	Val	Glu	Glu	Ala	Val	Val	Thr	Cys	Cys	Ile	Asp	Ser	
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Ser	Glu	Ser	Asn	Glu	Leu	Ala	Trp	Asp	Phe	Cys	Met	Met	Asp	Ser	Gly	
305					310					315					320	
Phe	Ala	Pro	Phe	Leu	Thr	Asp	Ser	Asn	Leu	Ser	Ser	Glu	Asn	Pro	Ile	
				325					330					335		
Glu	Tyr	Pro	Glu	Leu	Phe	Asn	Glu	Met	Gly	Phe	Glu	Asp	Asn	Ile	Asp	
			340					345					350			
Phe	Met	Phe	Glu	Glu	Gly	Lys	Gln	Asp	Cys	Leu	Ser	Leu	Glu	Asn	Leu	
		355					360					365				
Asp	Cys	Cys	Asp	Gly	Val	Val	Val	Val	Gly	Arg	Glu	Ser	Pro	Thr	Ser	
	370					375					380					
Leu	Ser	Ser	Ser	Pro	Leu	Ser	Cys	Leu	Ser	Thr	Asp	Ser	Ala	Ser	Ser	
385					390					395					400	
Thr	Thr	Thr	Thr	Thr	Ile	Thr	Ser	Val	Ser	Cys	Asn	Tyr	Ser	Val		
				405					410					415		

<210> 981

<211> 1296

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (1)..(1296)

<223> transl_table=11

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cca ttg aaa tct gtt gcc ctg ata ctg gcg gga gga cgt ggt acc cgc	96
Pro Leu Lys Ser Val Ala Leu Ile Leu Ala Gly Gly Arg Gly Thr Arg	
20 25 30	
ctg aag gat tta acc aat aag cga gca aaa ccg gcc gta cac ttc ggc	144
Leu Lys Asp Leu Thr Asn Lys Arg Ala Lys Pro Ala Val His Phe Gly	
35 40 45	
ggt aag ttc cgc att atc gac ttt gcg ctg tct aac tgc atc aac tcc	192
Gly Lys Phe Arg Ile Ile Asp Phe Ala Leu Ser Asn Cys Ile Asn Ser	
50 55 60	
ggg atc cgt cgt atg ggc gtg atc acc cag tac cag tcc cac act ctg	240
Gly Ile Arg Arg Met Gly Val Ile Thr Gln Tyr Gln Ser His Thr Leu	
65 70 75 80	
gtg cag cac att cag cgc ggc tgg tca ttc ttc aat gaa gaa atg aac	288
Val Gln His Ile Gln Arg Gly Trp Ser Phe Phe Asn Glu Glu Met Asn	
85 90 95	
gag ttt gtc gat ctg ctg cca gca cag cag aga atg aaa ggg gaa aac	336
Glu Phe Val Asp Leu Leu Pro Ala Gln Gln Arg Met Lys Gly Glu Asn	
100 105 110	
tgg tat cgc ggc acc gca gat gcg gtc acc caa aac ctc gac att atc	384
Trp Tyr Arg Gly Thr Ala Asp Ala Val Thr Gln Asn Leu Asp Ile Ile	
115 120 125	
cgc cgt tat aaa gcg gaa tac gtg gtg atc ctg gcg ggc gac cat atc	432
Arg Arg Tyr Lys Ala Glu Tyr Val Val Ile Leu Ala Gly Asp His Ile	
130 135 140	
tac aag caa gac tac tcg cgt atg ctt atc gat cac gtc gaa aaa ggc	480
Tyr Lys Gln Asp Tyr Ser Arg Met Leu Ile Asp His Val Glu Lys Gly	
145 150 155 160	
gca cgt tgc acc gtt gct tgt atg cca gta ccg att gaa gaa gcc tcc	528
Ala Arg Cys Thr Val Ala Cys Met Pro Val Pro Ile Glu Glu Ala Ser	
165 170 175	
gca ttt ggc gtt atg gcg gtt gat gag aac gat aaa att atc gaa ttc	576
Ala Phe Gly Val Met Ala Val Asp Glu Asn Asp Lys Ile Ile Glu Phe	
180 185 190	
gtt gaa aaa cct gct aac ccg ccg tca atg ccg aac gat ccg agc aaa	624
Val Glu Lys Pro Ala Asn Pro Pro Ser Met Pro Asn Asp Pro Ser Lys	
195 200 205	
tct ctg gcg agt atg ggt atc tac gtc ttt gac gcc gac tat ctg tat	672
Ser Leu Ala Ser Met Gly Ile Tyr Val Phe Asp Ala Asp Tyr Leu Tyr	
210 215 220	
gaa ctg ctg gaa gaa gac gat cgc gat gag aac tcc agc cac gac ttt	720
Glu Leu Leu Glu Glu Asp Asp Arg Asp Glu Asn Ser Ser His Asp Phe	
225 230 235 240	
ggc aaa gat ttg att ccc aag atc acc gaa gcc ggt ctg gcc tat gcg	768
Gly Lys Asp Leu Ile Pro Lys Ile Thr Glu Ala Gly Leu Ala Tyr Ala	
245 250 255	
cac ccg ttc ccg ctc tct tgc gta caa tcc gac ccg gat gcc gag ccg	816
His Pro Phe Pro Leu Ser Cys Val Gln Ser Asp Pro Asp Ala Glu Pro	
260 265 270	
tac tgg cgc gat gtg ggt acg ctg gaa gct tac tgg aaa gcg aac ctc	864
Tyr Trp Arg Asp Val Gly Thr Leu Glu Ala Tyr Trp Lys Ala Asn Leu	
275 280 285	
gat ctg gcc tct gtg gtg gac aaa ctg gat atg tac gat cgc aat tgg	912
Asp Leu Ala Ser Val Val Asp Lys Leu Asp Met Tyr Asp Arg Asn Trp	
290 295 300	
cca att cgc acc tac aat gaa tca tta ccg cca gcg aaa ttc gtg cag	960
Pro Ile Arg Thr Tyr Asn Glu Ser Leu Pro Pro Ala Lys Phe Val Gln	
305 310 315 320	
gat cgc tcc ggt agc cac ggg atg acc ctt aac tca ctg gtt tcc ggc	1008

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Asp	Arg	Ser	Gly	Ser	His	Gly	Met	Thr	Leu	Asn	Ser	Leu	Val	Ser	Gly	
ggt	tgt	gtg	atc	tcc	ggt	tcg	gtg	gtg	gtg	cag	tcc	gtt	ctg	ttc	tcg	1056
Gly	Cys	Val	Ile	Ser	Gly	Ser	Val	Val	Val	Gln	Ser	Val	Leu	Phe	Ser	
			340				345						350			
cgc	gtt	cgc	gtg	aat	tca	ttc	tgc	aac	att	gat	tcc	gcc	gta	ttg	tta	1104
Arg	Val	Arg	Val	Asn	Ser	Phe	Cys	Asn	Ile	Asp	Ser	Ala	Val	Leu	Leu	
			355				360					365				
ccg	gaa	gta	tgg	gta	ggt	cgc	tcg	tgc	cgt	ctg	cgc	cgc	tgc	gtc	atc	1152
Pro	Glu	Val	Trp	Val	Gly	Arg	Ser	Cys	Arg	Leu	Arg	Arg	Cys	Val	Ile	
	370					375					380					
gat	cgt	gct	tgt	gtt	att	ccg	gaa	ggc	atg	gtg	att	ggt	gaa	aac	gca	1200
Asp	Arg	Ala	Cys	Val	Ile	Pro	Glu	Gly	Met	Val	Ile	Gly	Glu	Asn	Ala	
	385				390					395					400	
gag	gaa	gat	gca	cgt	cgt	ttc	tat	cgt	tca	gaa	gaa	ggc	atc	gtg	ctg	1248
Glu	Glu	Asp	Ala	Arg	Arg	Phe	Tyr	Arg	Ser	Glu	Glu	Gly	Ile	Val	Leu	
			405					410						415		
gta	acg	cgc	gaa	atg	cta	cgg	aag	tta	ggg	cat	aaa	cag	gag	cga	taa	1296
Val	Thr	Arg	Glu	Met	Leu	Arg	Lys	Leu	Gly	His	Lys	Gln	Glu	Arg		
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<210> 982

<211> 431

<212> PRT

<213> Escherichia coli

<400> 982

Met	Val	Ser	Leu	Glu	Lys	Asn	Asp	His	Leu	Met	Leu	Ala	Arg	Gln	Leu	
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Pro	Leu	Lys	Ser	Val	Ala	Leu	Ile	Leu	Ala	Gly	Gly	Arg	Gly	Thr	Arg	
			20					25					30			
Leu	Lys	Asp	Leu	Thr	Asn	Lys	Arg	Ala	Lys	Pro	Ala	Val	His	Phe	Gly	
		35					40					45				
Gly	Lys	Phe	Arg	Ile	Ile	Asp	Phe	Ala	Leu	Ser	Asn	Cys	Ile	Asn	Ser	
	50					55					60					
Gly	Ile	Arg	Arg	Met	Gly	Val	Ile	Thr	Gln	Tyr	Gln	Ser	His	Thr	Leu	
65				70					75						80	
Val	Gln	His	Ile	Gln	Arg	Gly	Trp	Ser	Phe	Phe	Asn	Glu	Glu	Met	Asn	
			85						90					95		
Glu	Phe	Val	Asp	Leu	Leu	Pro	Ala	Gln	Gln	Arg	Met	Lys	Gly	Glu	Asn	
			100					105					110			
Trp	Tyr	Arg	Gly	Thr	Ala	Asp	Ala	Val	Thr	Gln	Asn	Leu	Asp	Ile	Ile	
		115					120					125				
Arg	Arg	Tyr	Lys	Ala	Glu	Tyr	Val	Val	Ile	Leu	Ala	Gly	Asp	His	Ile	
	130					135					140					
Tyr	Lys	Gln	Asp	Tyr	Ser	Arg	Met	Leu	Ile	Asp	His	Val	Glu	Lys	Gly	
145					150					155					160	
Ala	Arg	Cys	Thr	Val	Ala	Cys	Met	Pro	Val	Pro	Ile	Glu	Glu	Ala	Ser	
			165						170					175		
Ala	Phe	Gly	Val	Met	Ala	Val	Asp	Glu	Asn	Asp	Lys	Ile	Ile	Glu	Phe	
		180						185					190			
Val	Glu	Lys	Pro	Ala	Asn	Pro	Pro	Ser	Met	Pro	Asn	Asp	Pro	Ser	Lys	
		195					200					205				
Ser	Leu	Ala	Ser	Met	Gly	Ile	Tyr	Val	Phe	Asp	Ala	Asp	Tyr	Leu	Tyr	
	210				215						220					
Glu	Leu	Leu	Glu	Glu	Asp	Arg	Asp	Glu	Asn	Ser	Ser	His	Asp	Phe		
225					230				235					240		
Gly	Lys	Asp	Leu	Ile	Pro	Lys	Ile	Thr	Glu	Ala	Gly	Leu	Ala	Tyr	Ala	
			245						250					255		
His	Pro	Phe	Pro	Leu	Ser	Cys	Val	Gln	Ser	Asp	Pro	Asp	Ala	Glu	Pro	
		260						265					270			
Tyr	Trp	Arg	Val	Gly	Thr	Leu	Glu	Ala	Tyr	Trp	Lys	Ala	Asn	Leu		
		275				280						285				
Asp	Leu	Ala	Ser	Val	Val	Asp	Lys	Leu	Asp	Met	Tyr	Asp	Arg	Asn	Trp	
	290					295					300					
Pro	Ile	Arg	Thr	Tyr	Asn	Glu	Ser	Leu	Pro	Pro	Ala	Lys	Phe	Val	Gln	
305					310					315					320	
Asp	Arg	Ser	Gly	Ser	His	Gly	Met	Thr	Leu	Asn	Ser	Leu	Val	Ser	Gly	
				325					330					335		

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Gly Cys Val Ile Ser Gly Ser Val Val Val Gln Ser Val Leu Phe Ser
 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425 430
 Arg Val Arg Val Asn Ser Phe Cys Asn Ile Asp Ser Ala Val Leu Leu
 Pro Glu Val Trp Val Gly Arg Ser Cys Arg Leu Arg Arg Cys Val Ile
 Asp Arg Ala Cys Val Ile Pro Glu Gly Met Val Ile Gly Glu Asn Ala
 Glu Glu Asp Ala Arg Arg Phe Tyr Arg Ser Glu Glu Gly Ile Val Leu
 Val Thr Arg Glu Met Leu Arg Lys Leu Gly His Lys Gln Glu Arg

<210> 983

<211> 780

<212> DNA

<213> Helianthus annuus

<220>

<221> CDS

<222> (1)..(780)

<400> 983

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Met Asn Arg Met Ile Glu Ala Trp Asn Ala Ile Pro Asp Val Pro Glu	
1 5 10 15	
tca cat tct tct aaa ggt gat atg gca gaa gaa tct gat cat ata caa	96
Ser His Ser Ser Lys Gly Asp Met Ala Glu Glu Ser Asp His Ile Gln	
20 25 30	
aat cca cca aaa aca cct tat ata atg agt aag cga act aca acg aga	144
Asn Pro Pro Lys Thr Pro Tyr Ile Met Ser Lys Arg Thr Thr Thr Arg	
35 40 45	
aga aat tcg ctt gag aat agc agc agg aaa act gtt cca gcc atg ttc	192
Arg Asn Ser Leu Glu Asn Ser Ser Arg Lys Thr Val Pro Ala Met Phe	
50 55 60	
agt aag ctg gat cgc aag aaa ccc gtt aat cag aaa ctc gac act gct	240
Ser Lys Leu Asp Arg Lys Lys Pro Val Asn Gln Lys Leu Asp Thr Ala	
65 70 75 80	
gag gtt cat atg aaa cac gaa aca aaa cgg gcc gtt ttt agt gaa att	288
Glu Val His Met Lys His Glu Thr Lys Arg Ala Val Phe Ser Glu Ile	
85 90 95	
tct gat gaa aag atg caa gaa tct cga tat aat gaa gat aga tcg agt	336
Ser Asp Glu Lys Met Gln Glu Ser Arg Tyr Asn Glu Asp Arg Ser Ser	
100 105 110	
tcc aaa gtt gtg ggg agc aat ggc gga ttg aat acc aac tct gtt gaa	384
Ser Lys Val Val Gly Ser Asn Gly Gly Leu Asn Thr Asn Ser Val Glu	
115 120 125	
caa gaa tcc gag gac tta tct ttg atc cgc aat caa ctt gct caa atc	432
Gln Glu Ser Glu Asp Leu Ser Leu Ile Arg Asn Gln Leu Ala Gln Ile	
130 135 140	
gag acc caa caa tcc aat tta tat gat ctc ctc gag aaa ttt atc ggg	480
Glu Thr Gln Gln Ser Asn Leu Tyr Asp Leu Glu Lys Phe Ile Gly	
145 150 155 160	
agc tcg ctg aac ggg atg caa tct ctg gag tct cgt gtg cgc ggt gta	528
Ser Ser Leu Asn Gly Met Gln Ser Leu Glu Ser Arg Val Arg Gly Val	
165 170 175	
gag tca aca ctc gag att tca ttt gag tta gca aag tca act gga	576
Glu Ser Thr Leu Asp Glu Ile Ser Phe Asp Leu Ala Lys Ser Thr Gly	
180 185 190	
cag gtg tcg aat ccg gaa ccc acc ttg tgt tgt aag tta cca ggt gca	624
Gln Val Ser Asn Pro Glu Pro Thr Leu Cys Cys Lys Leu Pro Gly Ala	
195 200 205	
gat ctt att agc tct aaa ctc ttg aag aaa tca gaa atc caa cag tac	672
Asp Leu Ile Ser Ser Lys Leu Trp Lys Lys Ser Glu Ile Gln Gln Tyr	
210 215 220	
cca tct gtc aag aac aag gat ctt gaa tca ttc aac ttt caa acc acc	720
Pro Ser Val Lys Asn Lys Asp Leu Glu Ser Phe Asn Phe Gln Thr Thr	
225 230 235 240	
gga ttc cat ctc cgt gcc ggg cta att aag aac cca ttg gcc gag gtg	768

Gly Phe His Leu Arg Ala Gly Leu Ile Lys Asn Pro Leu Ala Glu Val
 245 250 255
 cac caa ata tga
 His Gln Ile

780

<210> 984
 <211> 259
 <212> PRT
 <213> Helianthus annuus

<400> 984
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 Ser His Ser Ser Lys Gly Asp Met Ala Glu Glu Ser Asp His Ile Gln
 20 25 30
 Asn Pro Pro Lys Thr Pro Tyr Ile Met Ser Lys Arg Thr Thr Thr Arg
 35 40 45
 Arg Asn Ser Leu Glu Asn Ser Ser Arg Lys Thr Val Pro Ala Met Phe
 50 55 60
 Ser Lys Leu Asp Arg Lys Lys Pro Val Asn Gln Lys Leu Asp Thr Ala
 65 70 75 80
 Glu Val His Met Lys His Glu Thr Lys Arg Ala Val Phe Ser Glu Ile
 85 90 95
 Ser Asp Glu Lys Met Gln Glu Ser Arg Tyr Asn Glu Asp Arg Ser Ser
 100 105 110
 Ser Lys Val Val Gly Ser Asn Gly Gly Leu Asn Thr Asn Ser Val Glu
 115 120 125
 Gln Glu Ser Glu Asp Leu Ser Leu Ile Arg Asn Gln Leu Ala Gln Ile
 130 135 140
 Glu Thr Gln Gln Ser Asn Leu Tyr Asp Leu Leu Glu Lys Phe Ile Gly
 145 150 155 160
 Ser Ser Leu Asn Gly Met Gln Ser Leu Glu Ser Arg Val Arg Gly Val
 165 170 175
 Glu Ser Thr Leu Asp Glu Ile Ser Phe Asp Leu Ala Lys Ser Thr Gly
 180 185 190
 Gln Val Ser Asn Pro Glu Pro Thr Leu Cys Cys Lys Leu Pro Gly Ala
 195 200 205
 Asp Leu Ile Ser Ser Lys Leu Trp Lys Lys Ser Glu Ile Gln Gln Tyr
 210 215 220
 Pro Ser Val Lys Asn Lys Asp Leu Glu Ser Phe Asn Phe Gln Thr Thr
 225 230 235 240
 Gly Phe His Leu Arg Ala Gly Leu Ile Lys Asn Pro Leu Ala Glu Val
 245 250 255
 His Gln Ile

<210> 985
 <211> 1422
 <212> DNA
 <213> Physcomitrella patens

<220>
 <221> CDS
 <222> (1)..(1422)

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 Met Glu Pro Arg Val Gly Asn Lys Tyr Arg Leu Gly Arg Lys Ile Gly
 1 5 10 15
 agt ggt tcc ttt ggt gag atc tac ctg ggg acc aat ctc gtg act cat 96
 Ser Gly Ser Phe Gly Glu Ile Tyr Leu Gly Thr Asn Leu Val Thr His
 20 25 30
 gag gag gtc ggc atc aag ctg gag agc atc aag gcc aag cat cca caa 144
 Glu Glu Val Gly Ile Lys Leu Glu Ser Ile Lys Ala Lys His Pro Gln
 35 40 45
 ttg ctt tat gag tcc aag ttg tac cgt att ctt caa gga gga act ggg 192
 Leu Leu Tyr Glu Ser Lys Leu Tyr Arg Ile Leu Gln Gly Gly Thr Gly
 50 55 60

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att Ile 65	ccc Pro	aac Asn	atc Ile	aga Arg	tgg Trp 70	tac Tyr	gga Gly	att Ile	gaa Glu	gga Gly 75	gac Asp	tat Tyr	aat Asn	gtg Val	atg Met 80	240
gtt Val	ctt Leu	gat Asp	ctt Leu	ctg Leu 85	gga Gly	ccc Pro	agt Ser	ctt Leu	gaa Glu 90	gat Asp	ctt Leu	ttc Phe	aat Asn	ttc Phe 95	tgc Cys	288
agc Ser	cgg Arg	aaa Lys	ttc Phe 100	tct Ser	ttg Leu	aag Lys	aca Thr	gtt Val 105	ctc Leu	atg Met	ctt Leu	gcc Ala	gac Asp 110	cag Gln	ctg Leu	336
atc Ile	aat Asn	cga Arg 115	gtg Val	gag Glu	tat Tyr	gtg Val	cat His 120	gcc Ala	aag Lys	agt Ser	ttc Phe	ctc Leu 125	cac His	agg Arg	gac Asp	384
ata Ile	aag Lys 130	cct Pro	gac Asp	aat Asn	ttc Phe	ttg Leu 135	atg Met	ggg Gly	cta Leu	ggc Gly 140	agg Arg	cga Ala	gca Ala	aat Asn	cag Gln	432
gtc Val 145	tat Tyr	atg Met	att Ile	gac Asp	ttt Phe 150	ggt Gly	ctt Leu	gca Ala	aag Lys	aag Lys 155	tat Tyr	cgc Arg	gat Asp	ccc Pro	act Thr 160	480
act Thr	cat His	cag Gln	cac His	att Ile 165	cct Pro	tat Tyr	aga Arg	gag Glu	aac Asn 170	aaa Lys	aat Asn	ctt Leu	act Thr	gga Gly 175	acc Thr	528
gct Ala	cga Arg	tat Tyr	gca Ala 180	agt Ser	atc Ile	aac Asn	act Thr	cat His 185	ctt Leu	ggt Gly	att Ile	gaa Glu	caa Gln 190	agc Ser	agg Arg	576
aga Arg	gat Asp	gat Asp 195	ctg Leu	gag Glu	tct Ser	ctt Leu	gga Gly 200	tat Tyr	gtt Val	ctc Leu	atg Met	tat Tyr 205	ttc Phe	ttg Leu	aga Arg	624
ggc Gly	agc Ser 210	ctg Leu	cct Pro	tgg Trp	caa Gln	gga Gly 215	atg Met	aaa Lys	gca Ala	gga Gly	acc Thr 220	aag Lys	aag Lys	cag Gln	aag Lys	672
tat Tyr 225	gaa Glu	aaa Lys	atc Ile	agt Ser	gag Glu 230	aaa Lys	aag Lys	atg Met	tcc Ser	acc Thr 235	cct Pro	ata Ile	gag Glu	ttc Phe	ctt Leu 240	720
tgt Cys	aaa Lys	gct Ala	tac Tyr	ccg Pro 245	tct Ser	gag Glu	ttt Phe	gct Ala	tca Ser 250	tac Tyr	ttc Phe	cac His	tac Tyr	tgt Cys 255	cgg Arg	768
tct Ser	ctt Leu	cgg Arg	ttc Phe 260	gat Asp	gac Asp	aaa Lys	ccg Pro	gac Asp 265	tat Tyr	gct Ala	tac Tyr	ctg Leu 270	aag Lys	aga Arg	att Ile	816
ttc Phe	cga Arg 275	gat Asp	ctc Leu	ttc Phe	att Ile	cgt Arg	gag Glu 280	ggt Gly	ttt Phe	cag Gln	ttt Phe	gat Asp 285	tat Tyr	gtt Val	ttc Phe	864
gac Asp 290	tgg Trp	acg Thr	att Ile	ttg Leu	aag Lys	tat Tyr 295	cag Gln	caa Gln	aca Thr	cat His	ttt Phe 300	tct Ser	ggt Gly	ggt Gly	cct Pro	912
ctc Leu 305	cgt Arg	cca Pro	gcg Ala	gct Ala	gcg Ala 310	gga Gly	ggt Gly	tca Ser	agt Ser 315	gga Gly	gca Ala	gca Ala	gca Ala	gca Ala 320		960
gcg Ala	gca Ala	gca Ala	gga Gly	att Ile 325	ggt Gly	aca Thr	gtc Val	cca Pro	aga Arg 330	gac Asp	gcc Ala	cag Gln	cga Arg	gca Ala 335	att Ile	1008
gag Glu	cct Pro	act Thr 340	gat Asp	gtt Val	gcc Ala	gct Ala	cga Arg	act Thr 345	cga Arg	atg Met	gtt Val	ggt Gly 350	gcg Ala	act Thr	cgc Arg	1056
tct Ser	agt Ser	gga Gly 355	tta Leu	aat Asn	cca Pro	ctg Leu	gac Asp 360	gcg Ala	tca Ser	aag Lys	cat His	aag Lys 365	agt Ser	act Thr	agc Ser	1104
cca Pro	gat Asp 370	gaa Glu	gcc Ala	gct Ala	tct Ser	aag Lys 375	gac Asp	ata Ile	gcc Ala	ctt Leu	agc Ser 380	ggt Gly	ctt Leu	gca Ala	gaa Glu	1152
cca Pro 385	gag Glu	cgc Arg	acg Thr	cat His	gct Ala 390	tct Ser	tcg Ser	ttt Phe	gtg Val	cgg Arg 395	ggg Gly	agc Ser	tca Ser	tca Ser	tca Ser 400	1200
agg Arg	aga Arg	gct Ala	gtt Val 405	gtt Val	gga Gly	tgt Cys	gct Ala	agg Arg	cca Pro 410	gca Ala	ggg Gly	tca Ser	aca Thr	gag Glu 415	gcg Ala	1248
gga Gly	gat Asp	gga Gly	acg Thr 420	cgg Arg	gtg Val	ttg Leu	gct Ala	ggc Gly 425	aaa Lys	atg Met	ggc Gly	ccc Pro	act Thr 430	agc Ser	ctg Leu	1296

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cgc	aca	tca	gca	gga	atg	cag	agg	agc	tct	ccg	gtg	gca	tct	acg	gat	1344
Arg	Thr	Ser	Ala	Gly	Met	Gln	Arg	Ser	Ser	Pro	Val	Ala	Ser	Thr	Asp	
		435					440					445				
ccc	aag	cgg	acg	gga	cga	gat	tct	tat	gct	gga	aac	tcc	gga	aga	aat	1392
Pro	Lys	Arg	Thr	Gly	Arg	Asp	Ser	Tyr	Ala	Gly	Asn	Ser	Gly	Arg	Asn	
	450					455					460					
cct	agt	tcc	tct	cga	aat	tcg	aaa	gag	tga							1422
Pro	Ser	Ser	Ser	Arg	Asn	Ser	Lys	Glu								
465					470											

<210> 986

<211> 473

<212> PRT

<213> Physcomitrella patens

<400> 986

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Ser	Gly	Ser	Phe	Gly	Glu	Ile	Tyr	Leu	Gly	Thr	Asn	Leu	Val	Thr	His	
			20					25					30			
Glu	Glu	Val	Gly	Ile	Lys	Leu	Glu	Ser	Ile	Lys	Ala	Lys	His	Pro	Gln	
		35					40					45				
Leu	Leu	Tyr	Glu	Ser	Lys	Leu	Tyr	Arg	Ile	Leu	Gln	Gly	Gly	Thr	Gly	
	50					55					60					
Ile	Pro	Asn	Ile	Arg	Trp	Tyr	Gly	Ile	Glu	Gly	Asp	Tyr	Asn	Val	Met	
65					70					75					80	
Val	Leu	Asp	Leu	Leu	Gly	Pro	Ser	Leu	Glu	Asp	Leu	Phe	Asn	Phe	Cys	
			85						90					95		
Ser	Arg	Lys	Phe	Ser	Leu	Lys	Thr	Val	Leu	Met	Leu	Ala	Asp	Gln	Leu	
			100					105					110			
Ile	Asn	Arg	Val	Glu	Tyr	Val	His	Ala	Lys	Ser	Phe	Leu	His	Arg	Asp	
	115						120					125				
Ile	Lys	Pro	Asp	Asn	Phe	Leu	Met	Gly	Leu	Gly	Arg	Arg	Ala	Asn	Gln	
	130				135						140					
Val	Tyr	Met	Ile	Asp	Phe	Gly	Leu	Ala	Lys	Lys	Tyr	Arg	Asp	Pro	Thr	
145					150					155					160	
Thr	His	Gln	His	Ile	Pro	Tyr	Arg	Glu	Asn	Lys	Asn	Leu	Thr	Gly	Thr	
			165						170					175		
Ala	Arg	Tyr	Ala	Ser	Ile	Asn	Thr	His	Leu	Gly	Ile	Glu	Gln	Ser	Arg	
			180					185					190			
Arg	Asp	Asp	Leu	Glu	Ser	Leu	Gly	Tyr	Val	Leu	Met	Tyr	Phe	Leu	Arg	
		195					200					205				
Gly	Ser	Leu	Pro	Trp	Gln	Gly	Met	Lys	Ala	Gly	Thr	Lys	Lys	Gln	Lys	
	210				215						220					
Tyr	Glu	Lys	Ile	Ser	Glu	Lys	Lys	Met	Ser	Thr	Pro	Ile	Glu	Phe	Leu	
225					230					235					240	
Cys	Lys	Ala	Tyr	Pro	Ser	Glu	Phe	Ala	Ser	Tyr	Phe	His	Tyr	Cys	Arg	
			245						250					255		
Ser	Leu	Arg	Phe	Asp	Asp	Lys	Pro	Asp	Tyr	Ala	Tyr	Leu	Lys	Arg	Ile	
			260					265					270			
Phe	Arg	Asp	Leu	Phe	Ile	Arg	Glu	Gly	Phe	Gln	Phe	Asp	Tyr	Val	Phe	
		275					280					285				
Asp	Trp	Thr	Ile	Leu	Lys	Tyr	Gln	Gln	Thr	His	Phe	Ser	Gly	Gly	Pro	
	290				295						300					
Leu	Arg	Pro	Ala	Ala	Ala	Ala	Gly	Gly	Ser	Ser	Gly	Ala	Ala	Ala	Ala	
305					310					315					320	
Ala	Ala	Ala	Gly	Ile	Gly	Thr	Val	Pro	Arg	Asp	Ala	Gln	Arg	Ala	Ile	
			325						330					335		
Glu	Pro	Thr	Asp	Val	Ala	Ala	Arg	Thr	Arg	Met	Val	Gly	Ala	Thr	Arg	
			340					345					350			
Ser	Ser	Gly	Leu	Asn	Pro	Leu	Asp	Ala	Ser	Lys	His	Lys	Ser	Thr	Ser	
		355					360					365				
Pro	Asp	Glu	Ala	Ala	Ser	Lys	Asp	Ile	Ala	Leu	Ser	Gly	Leu	Ala	Glu	
	370					375					380					
Pro	Glu	Arg	Thr	His	Ala	Ser	Ser	Phe	Val	Arg	Gly	Ser	Ser	Ser	Ser	
385					390					395					400	
Arg	Arg	Ala	Val	Val	Gly	Cys	Ala	Arg	Pro	Ala	Gly	Ser	Thr	Glu	Ala	
			405						410					415		
Gly	Asp	Gly	Thr	Arg	Val	Leu	Ala	Gly	Lys	Met	Gly	Pro	Thr	Ser	Leu	

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420
 Arg Thr Ser Ala Gly Met Gln Arg Ser Ser Pro Val Ala Ser Thr Asp
 435
 Pro Lys Arg Thr Gly Arg Asp Ser Tyr Ala Gly Asn Ser Gly Arg Asn
 450
 Pro Ser Ser Ser Arg Asn Ser Lys Glu
 465
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<210> 987

<211> 1176

<212> DNA

<213> Saccharomyces cerevisiae

<220>

<221> CDS

<222> (1)..(1176)

<400> 987

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Met	Ser	Ala	Ala	Ala	Asp	Arg	Leu	Asn	Leu	Thr	Ser	Gly	His	Leu	Asn	
1				5					10					15		
gct	ggg	aga	aag	aga	agt	tcc	tct	tct	ggt	tct	ttg	aag	gct	gcc	gaa	96
Ala	Gly	Arg	Lys	Arg	Ser	Ser	Ser	Ser	Val	Ser	Leu	Lys	Ala	Ala	Glu	
			20					25					30			
aag	cct	ttc	aag	gtt	act	gtg	att	gga	tct	ggg	aac	tgg	ggg	act	act	144
Lys	Pro	Phe	Lys	Val	Thr	Val	Ile	Gly	Ser	Gly	Asn	Trp	Gly	Thr	Thr	
		35				40						45				
att	gcc	aag	gtg	gtt	gcc	gaa	aat	tgt	aag	gga	tac	cca	gaa	gtt	ttc	192
Ile	Ala	Lys	Val	Val	Ala	Glu	Asn	Cys	Lys	Gly	Tyr	Pro	Glu	Val	Phe	
	50					55					60					
gct	cca	ata	gta	caa	atg	tgg	gtg	ttc	gaa	gaa	gag	atc	aat	ggg	gaa	240
Ala	Pro	Ile	Val	Gln	Met	Trp	Val	Phe	Glu	Glu	Glu	Ile	Asn	Gly	Glu	
	65				70				75					80		
aaa	ttg	act	gaa	atc	ata	aat	act	aga	cat	caa	aac	gtg	aaa	tac	ttg	288
Lys	Leu	Thr	Glu	Ile	Ile	Asn	Thr	Arg	His	Gln	Asn	Val	Lys	Tyr	Leu	
			85					90						95		
cct	ggc	atc	act	cta	ccc	gac	aat	ttg	ggt	gct	aat	cca	gac	ttg	att	336
Pro	Gly	Ile	Thr	Leu	Pro	Asp	Asn	Leu	Val	Ala	Asn	Pro	Asp	Leu	Ile	
			100					105					110			
gat	tca	gtc	aag	gat	gtc	gac	atc	gtc	ttc	aac	att	cca	cat	caa		384
Asp	Ser	Val	Lys	Asp	Val	Asp	Ile	Val	Phe	Asn	Ile	Pro	His	Gln		
		115				120						125				
ttt	ttg	ccc	cgt	atc	tgt	agc	caa	ttg	aaa	ggg	cat	ggt	gat	tca	cac	432
Phe	Leu	Pro	Arg	Ile	Cys	Ser	Gln	Leu	Lys	Gly	His	Val	Asp	Ser	His	
	130				135					140						
gtc	aga	gct	atc	tcc	tgt	cta	aag	ggg	ttt	gaa	ggt	gct	aaa	ggg		480
Val	Arg	Ala	Ile	Ser	Cys	Leu	Lys	Gly	Phe	Glu	Val	Gly	Ala	Lys	Gly	
	145				150			155						160		
gtc	caa	ttg	cta	tcc	tct	tac	atc	act	gag	gaa	cta	ggg	att	caa	tgt	528
Val	Gln	Leu	Leu	Ser	Ser	Tyr	Ile	Thr	Glu	Glu	Leu	Gly	Ile	Gln	Cys	
			165					170					175			
ggg	gct	cta	tct	ggg	gct	aac	att	gcc	act	gaa	gtc	gct	caa	gaa	cac	576
Gly	Ala	Leu	Ser	Gly	Ala	Asn	Ile	Ala	Thr	Glu	Val	Ala	Gln	Glu	His	
			180					185					190			
ttg	tct	gaa	aca	aca	gtt	gct	tac	cac	att	cca	aag	gat	ttc	aga	ggc	624
Trp	Ser	Glu	Thr	Thr	Val	Ala	Tyr	His	Ile	Pro	Lys	Asp	Phe	Arg	Gly	
		195					200					205				
gag	ggc	aag	gac	gtc	gac	cat	aag	ggt	cta	aag	gcc	ttg	ttc	cac	aga	672
Glu	Gly	Lys	Asp	Val	Asp	His	Lys	Val	Leu	Lys	Ala	Leu	Phe	His	Arg	
	210				215			220								
cct	tac	ttc	cac	gtt	agt	gtc	atc	gaa	gat	ggt	gct	ggg	atc	tcc	atc	720
Pro	Tyr	Phe	His	Val	Ser	Val	Ile	Glu	Asp	Val	Ala	Gly	Ile	Ser	Ile	
	225				230				235					240		
tgt	ggg	gct	ttg	aag	aac	gtt	gtt	gcc	tta	ggg	tgt	ggg	ttc	gtc	gaa	768
Cys	Gly	Ala	Leu	Lys	Asn	Val	Val	Ala	Leu	Gly	Cys	Gly	Phe	Val	Glu	
			245					250					255			
ggg	cta	ggc	tgg	ggg	aac	aac	gct	tct	gct	gcc	atc	caa	aga	gtc	ggg	816
Gly	Leu	Gly	Trp	Gly	Asn	Asn	Ala	Ser	Ala	Ala	Ile	Gln	Arg	Val	Gly	
			260					265					270			

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ttg ggt gag atc atc aga ttc ggt caa atg ttt ttc cca gaa tct aga	864
Leu Gly Glu Ile Ile Arg Phe Gly Gln Met Phe Phe Pro Glu Ser Arg	
gaa gaa aca tac tac caa gag tct gct ggt gtt gct gat ttg atc acc	912
Glu Glu Thr Tyr Tyr Gln Glu Ser Ala Gly Val Ala Asp Leu Ile Thr	
acc tgc gct ggt ggt aga aac gtc aag gtt gct agg cta atg gct act	960
Thr Cys Ala Gly Gly Arg Asn Val Lys Val Ala Arg Leu Met Ala Thr	
tct ggt aag gac gcc tgg gaa tgt gaa aag gag ttg ttg aat ggc caa	1008
Ser Gly Lys Asp Ala Trp Glu Cys Glu Lys Glu Leu Leu Asn Gly Gln	
tcc gct caa ggt tta att acc tgc aaa gaa gtt cac gaa tgg ttg gaa	1056
Ser Ala Gln Gly Leu Ile Thr Cys Lys Glu Val His Glu Trp Leu Glu	
aca tgt ggc tct gtc gaa gac ttc cca tta ttt gaa gcc gta tac caa	1104
Thr Cys Gly Ser Val Glu Asp Phe Pro Leu Phe Glu Ala Val Tyr Gln	
atc gtt tac aac aac tac cca atg aag aac ctg ccg gac atg att gaa	1152
Ile Val Tyr Asn Asn Tyr Pro Met Lys Asn Leu Pro Asp Met Ile Glu	
gaa tta gat cta cat gaa gat tag	1176
Glu Leu Asp Leu His Glu Asp	

<210> 988

<211> 391

<212> PRT

<213> Saccharomyces cerevisiae

<400> 988

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20 25 30	
Lys Pro Phe Lys Val Thr Val Ile Gly Ser Gly Asn Trp Gly Thr Thr	
35 40 45	
Ile Ala Lys Val Val Ala Glu Asn Cys Lys Gly Tyr Pro Glu Val Phe	
50 55 60	
Ala Pro Ile Val Gln Met Trp Val Phe Glu Glu Glu Ile Asn Gly Glu	
65 70 75 80	
Lys Leu Thr Glu Ile Ile Asn Thr Arg His Gln Asn Val Lys Tyr Leu	
85 90 95	
Pro Gly Ile Thr Leu Pro Asp Asn Leu Val Ala Asn Pro Asp Leu Ile	
100 105 110	
Asp Ser Val Lys Asp Val Asp Ile Val Phe Asn Ile Pro His Gln	
115 120 125	
Phe Leu Pro Arg Ile Cys Ser Gln Leu Lys Gly His Val Asp Ser His	
130 135 140	
Val Arg Ala Ile Ser Cys Leu Lys Gly Phe Glu Val Gly Ala Lys Gly	
145 150 155 160	
Val Gln Leu Leu Ser Tyr Ile Thr Glu Leu Gly Ile Gln Cys	
165 170 175	
Gly Ala Leu Ser Gly Ala Asn Ile Ala Thr Glu Val Ala Gln Glu His	
180 185 190	
Trp Ser Glu Thr Thr Val Ala Tyr His Ile Pro Lys Asp Phe Arg Gly	
195 200 205	
Glu Gly Lys Asp Val Asp His Lys Val Leu Lys Ala Phe His Arg	
210 215 220	
Pro Tyr Phe His Val Ser Val Ile Glu Asp Val Ala Gly Ile Ser Ile	
225 230 235 240	
Cys Gly Ala Leu Lys Asn Val Val Ala Leu Gly Cys Gly Phe Val Glu	
245 250 255	
Gly Leu Gly Trp Gly Asn Asn Ala Ser Ala Ala Ile Gln Arg Val Gly	
260 265 270	
Leu Gly Glu Ile Ile Arg Phe Gly Gln Met Phe Phe Pro Glu Ser Arg	
275 280 285	
Glu Glu Thr Tyr Tyr Gln Glu Ser Ala Gly Val Ala Asp Leu Ile Thr	
290 295 300	

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Thr Cys Ala Gly Gly Arg Asn Val Lys Val Ala Arg Leu Met Ala Thr
 305 Ser Gly Lys Asp Ala 310 Trp Glu Cys Glu Lys 315 Glu Leu Leu Asn Gly 320
 Ser Ala Gln Gly 325 Leu Ile Thr Cys Lys 330 Glu Val His Glu Trp 335 Leu Glu
 Thr Cys Gly 340 Ser Val Glu Asp Phe 345 Pro Leu Phe Glu Ala 350 Val Tyr Gln
 Ile Val 355 Tyr Asn Asn Tyr Pro 360 Met Lys Asn Leu Pro 365 Asp Met Ile Glu
 Glu 370 Leu Asp Leu His Glu 375 Asp
 385 390

<210> 989

<211> 912

<212> DNA

<213> *Saccharomyces cerevisiae*

<220>

<221> CDS

<222> (1)..(912)

<400> 989

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gta ctg gcg ctt gca ggc tgt ggc ttt tac ggt gta atc gcc tct atc	96
Val Leu Ala Leu Ala Gly Cys Gly Phe Tyr Gly Val Ile Ala Ser Ile	
20 25 30	
ctt tgc acg tta atc ggt aag caa cat ttg gct ctg tgg att act gcg	144
Leu Cys Thr Leu Ile Gly Lys Gln His Leu Ala Leu Trp Ile Thr Ala	
35 40 45	
cgt tgt ttt tac cat gtc atg aaa ttg atg ctt ggc ctt gac gtc aag	192
Arg Cys Phe Tyr His Val Met Lys Leu Met Leu Gly Leu Asp Val Lys	
50 55 60	
gtc gtt ggc gag gag aat ttg gcc aag aag cca tat att atg att gcc	240
Val Val Gly Glu Glu Asn Leu Ala Lys Lys Pro Tyr Ile Met Ile Ala	
65 70 75 80	
aat cac caa tcc acc ttg gat atc ttc atg tta ggt agg att ttc ccc	288
Asn His Gln Ser Thr 85 Leu Asp Ile Phe Met 90 Leu Gly Arg Ile Phe Pro	
95	
cct ggt tgc aca gtt act gcc aag aag tct ttg aaa tac gtc ccc ttt	336
Pro Gly Cys Thr Val Thr Ala Lys Lys Ser Leu Lys Tyr Val Pro Phe	
100 105 110	
ctg ggt tgg ttc atg gct ttg agt ggt aca tat ttc tta gac aga tct	384
Leu Gly Trp Phe Met Ala Leu Ser Gly Thr Tyr Phe Leu Asp Arg Ser	
115 120 125	
aaa agg caa gaa gcc att gac acc ttg aat aaa ggt tta gaa aat gtt	432
Lys Arg Gln Glu Ala Ile Asp Thr Leu Asn Lys Gly Leu Glu Asn Val	
130 135 140	
aag aaa aac aag cgt gct cta tgg gtt ttt cct gag ggt acc agg tct	480
Lys Lys Asn Lys Arg Ala Leu Trp Val Phe Pro Glu Gly Thr Arg Ser	
145 150 155 160	
tac acg agt gag ctg aca atg ttg cct ttc aag aag ggt gct ttc cat	528
Tyr Thr Ser Glu Leu Thr Met Leu Pro Phe Lys Lys Gly Ala Phe His	
165 170 175	
ttg gca caa cag ggt aag atc ccc att gtt cca gtg gtt gtt tcc aat	576
Leu Ala Gln Gln Gly Lys Ile Pro Ile Val Pro Val Val Val Ser Asn	
180 185 190	
acc agt act tta gta agt cct aaa tat ggg gtc ttc aac aga ggc tgt	624
Thr Ser Thr Leu Val Ser Pro Lys Tyr Gly Val Phe Asn Arg Gly Cys	
195 200 205	
atg att gtt aga att tta aaa cct att tca acc gag aac tta aca aag	672
Met Ile Val Arg Ile Leu Lys Pro Ile Ser Thr Glu Asn Leu Thr Lys	
210 215 220	
gac aaa att ggt gaa ttt gct gaa aaa gtt aga gat caa atg gtt gac	720
Asp Lys Ile Gly Glu Phe Ala Glu Lys Val Arg Asp Gln Met Val Asp	
225 230 235 240	
act ttg aag gag att ggc tac tct ccc gcc atc aac gat aca acc ctc	768

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Thr	Leu	Lys	Glu	Ile	Gly	Tyr	Ser	Pro	Ala	Ile	Asn	Asp	Thr	Thr	Leu		
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cca	cca	caa	gct	att	gag	tat	gcc	gct	ctt	caa	cat	gac	aag	aaa	gtg		816
Pro	Pro	Gln	Ala	Ile	Glu	Tyr	Ala	Ala	Leu	Gln	His	Asp	Lys	Lys	Val		
			260					265					270				
aac	aag	aaa	atc	aag	aat	gag	cct	gtg	cct	tct	gtc	agc	att	agc	aac		864
Asn	Lys	Lys	Ile	Lys	Asn	Glu	Pro	Val	Pro	Ser	Val	Ser	Ile	Ser	Asn		
		275					280					285					
gat	gtc	aat	acc	cat	aac	gaa	ggg	tca	tct	gta	aaa	aag	atg	cat	taa		912
Asp	Val	Asn	Thr	His	Asn	Glu	Gly	Ser	Ser	Val	Lys	Lys	Met	His			
	290					295					300						

<210> 990

<211> 303

<212> PRT

<213> Saccharomyces cerevisiae

<400> 990

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Val	Leu	Ala	Leu	Ala	Gly	Cys	Gly	Phe	Tyr	Gly	Val	Ile	Ala	Ser	Ile		
			20					25					30				
Leu	Cys	Thr	Leu	Ile	Gly	Lys	Gln	His	Leu	Ala	Leu	Trp	Ile	Thr	Ala		
		35					40					45					
Arg	Cys	Phe	Tyr	His	Val	Met	Lys	Leu	Met	Leu	Gly	Leu	Asp	Val	Lys		
	50					55					60						
Val	Val	Gly	Glu	Glu	Asn	Leu	Ala	Lys	Lys	Pro	Tyr	Ile	Met	Ile	Ala		
65					70				75						80		
Asn	His	Gln	Ser	Thr	Leu	Asp	Ile	Phe	Met	Leu	Gly	Arg	Ile	Phe	Pro		
				85				90						95			
Pro	Gly	Cys	Thr	Val	Thr	Ala	Lys	Lys	Ser	Leu	Lys	Tyr	Val	Pro	Phe		
			100					105					110				
Leu	Gly	Trp	Phe	Met	Ala	Leu	Ser	Gly	Thr	Tyr	Phe	Leu	Asp	Arg	Ser		
		115					120					125					
Lys	Arg	Gln	Glu	Ala	Ile	Asp	Thr	Leu	Asn	Lys	Gly	Leu	Glu	Asn	Val		
	130					135					140						
Lys	Lys	Asn	Lys	Arg	Ala	Leu	Trp	Val	Phe	Pro	Glu	Gly	Thr	Arg	Ser		
145					150				155						160		
Tyr	Thr	Ser	Glu	Leu	Thr	Met	Leu	Pro	Phe	Lys	Lys	Gly	Ala	Phe	His		
				165					170					175			
Leu	Ala	Gln	Gln	Gly	Lys	Ile	Pro	Ile	Val	Pro	Val	Val	Val	Ser	Asn		
		180						185					190				
Thr	Ser	Thr	Leu	Val	Ser	Pro	Lys	Tyr	Gly	Val	Phe	Asn	Arg	Gly	Cys		
		195					200					205					
Met	Ile	Val	Arg	Ile	Leu	Lys	Pro	Ile	Ser	Thr	Glu	Asn	Leu	Thr	Lys		
	210					215					220						
Asp	Lys	Ile	Gly	Glu	Phe	Ala	Glu	Lys	Val	Arg	Asp	Gln	Met	Val	Asp		
225					230					235					240		
Thr	Leu	Lys	Glu	Ile	Gly	Tyr	Ser	Pro	Ala	Ile	Asn	Asp	Thr	Thr	Leu		
				245					250					255			
Pro	Pro	Gln	Ala	Ile	Glu	Tyr	Ala	Ala	Leu	Gln	His	Asp	Lys	Lys	Val		
			260					265					270				
Asn	Lys	Lys	Ile	Lys	Asn	Glu	Pro	Val	Pro	Ser	Val	Ser	Ile	Ser	Asn		
		275					280					285					
Asp	Val	Asn	Thr	His	Asn	Glu	Gly	Ser	Ser	Val	Lys	Lys	Met	His			
	290					295					300						

<210> 991

<211> 1717

<212> DNA

<213> Saccharomyces cerevisiae

<220>

<221> CDS

<222> (1)..(1716)

<220>

<221> misc_feature

<222> (1717)..(1717)

<223> n is a, g, c or t

<400> 991

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Met	Asn	Asp	Pro	Arg	Glu	Ile	Leu	Ala	Val	Asp	Pro	Tyr	Asn	Asn	Ile	
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act	tct	gat	gaa	gag	gat	gag	caa	gcc	atc	gcg	aga	gaa	ctt	gaa	ttt	96
Thr	Ser	Asp	Glu	Glu	Asp	Glu	Gln	Ala	Ile	Ala	Arg	Glu	Leu	Glu	Phe	
			20					25					30			
atg	gaa	cga	aag	agg	cag	gcc	tta	gtg	gaa	cga	tta	aaa	aga	aag	caa	144
Met	Glu	Arg	Lys	Arg	Gln	Ala	Leu	Val	Glu	Arg	Leu	Lys	Arg	Lys	Gln	
		35				40						45				
gaa	ttt	aag	aaa	ccc	cag	gat	cct	aat	ttt	gaa	gcc	atc	gag	gta	cct	192
Glu	Phe	Arg	Lys	Pro	Gln	Asp	Pro	Asn	Phe	Glu	Ala	Ile	Glu	Val	Pro	
	50					55					60					
caa	tct	cct	acc	aaa	aac	cgt	gtg	aaa	gtg	ggg	tct	cat	aat	gct	aca	240
Gln	Ser	Pro	Thr	Lys	Asn	Arg	Val	Lys	Val	Gly	Ser	His	Asn	Ala	Thr	
	65				70					75					80	
caa	caa	ggc	aca	aaa	ttc	gaa	ggt	tcg	aat	att	aat	gaa	gta	agg	tta	288
Gln	Gln	Gly	Thr	Lys	Phe	Glu	Gly	Ser	Asn	Ile	Asn	Glu	Val	Arg	Leu	
				85					90					95		
tct	caa	tta	cag	cag	caa	cca	aaa	cca	cca	gct	agt	aca	acc	aca	tac	336
Ser	Gln	Leu	Gln	Gln	Gln	Pro	Lys	Pro	Pro	Ala	Ser	Thr	Thr	Thr	Tyr	
			100					105					110			
ttt	atg	gag	aaa	ttt	caa	aac	gca	aag	aag	aac	gaa	gat	aaa	caa	att	384
Phe	Met	Glu	Lys	Phe	Gln	Asn	Ala	Lys	Lys	Asn	Glu	Asp	Lys	Gln	Ile	
		115					120					125				
gcc	aag	ttt	gaa	agc	atg	atg	aat	gca	aga	gta	cat	acg	ttc	agt	acc	432
Ala	Lys	Phe	Glu	Ser	Met	Met	Asn	Ala	Arg	Val	His	Thr	Phe	Ser	Thr	
	130					135					140					
gat	gag	aag	aaa	tat	gtg	ccg	ata	atc	aca	aac	gaa	tta	gaa	agc	ttt	480
Asp	Glu	Lys	Lys	Tyr	Val	Pro	Ile	Ile	Thr	Asn	Glu	Leu	Glu	Ser	Phe	
	145				150					155					160	
tca	aat	ctt	tgg	gtt	aaa	aag	agg	tac	ata	cct	gaa	gat	gac	tta	aaa	528
Ser	Asn	Leu	Trp	Val	Lys	Lys	Arg	Tyr	Ile	Pro	Glu	Asp	Asp	Leu	Lys	
				165					170					175		
cgg	gct	ttg	cat	gag	atc	aaa	atc	ctt	cgg	ttg	ggc	aaa	ctt	ttt	gct	576
Arg	Ala	Leu	His	Glu	Ile	Lys	Ile	Leu	Arg	Leu	Gly	Lys	Leu	Phe	Ala	
			180					185					190			
aaa	att	cgc	cca	cct	aaa	ttt	caa	gag	cct	gaa	tac	gcc	aac	tgg	gcc	624
Lys	Ile	Arg	Pro	Pro	Lys	Phe	Gln	Glu	Pro	Glu	Tyr	Ala	Asn	Trp	Ala	
		195					200					205				
acc	gta	ggc	ctc	att	agc	cac	aaa	tcg	gac	atc	aaa	ttt	aca	tca	tct	672
Thr	Val	Gly	Leu	Ile	Ser	His	Lys	Ser	Asp	Ile	Lys	Phe	Thr	Ser	Ser	
	210					215					220					
gaa	aag	cca	gtc	aaa	ttc	ttc	atg	ttc	acc	ata	acg	gac	ttt	cag	cat	720
Glu	Lys	Pro	Val	Lys	Phe	Phe	Met	Phe	Thr	Ile	Thr	Asp	Phe	Gln	His	
	225				230					235					240	
aca	cta	gat	gtt	tat	atc	ttc	ggg	aaa	aag	ggg	gta	gaa	aga	tat	tat	768
Thr	Leu	Asp	Val	Tyr	Ile	Phe	Gly	Lys	Lys	Gly	Val	Glu	Arg	Tyr	Tyr	
				245				250						255		
aat	ctt	cgc	ctg	ggt	gat	gtg	ata	gca	ata	tta	aac	cca	gaa	gta	cta	816
Asn	Leu	Arg	Leu	Gly	Asp	Val	Ile	Ala	Ile	Leu	Asn	Pro	Glu	Val	Leu	
			260					265					270			
cca	tgg	aga	ccc	tca	ggg	cga	gga	aat	ttt	atc	aaa	tcc	ttc	aac	ctt	864
Pro	Trp	Arg	Pro	Ser	Gly	Arg	Gly	Asn	Phe	Ile	Lys	Ser	Phe	Asn	Leu	
		275					280					285				
cga	att	agt	cat	gac	ttc	aaa	tgt	atc	ctg	gag	ata	ggg	tca	agt	aga	912
Arg	Ile	Ser	His	Asp	Phe	Lys	Cys	Ile	Leu	Glu	Ile	Gly	Ser	Ser	Arg	
	290				295						300					
gat	tta	ggg	tgg	tgt	ccc	ata	gtg	aat	aaa	aag	act	cac	aaa	aaa	tgt	960
Asp	Leu	Gly	Trp	Cys	Pro	Ile	Val	Asn	Lys	Lys	Thr	His	Lys	Lys	Cys	
	305				310					315					320	
ggc	tct	ccc	att	aac	ata	tct	ctt	cat	aag	tgt	tgc	gat	tac	cat	aga	1008
Gly	Ser	Pro	Ile	Asn	Ile	Ser	Leu	His	Lys	Cys	Cys	Asp	Tyr	His	Arg	
				325					330					335		
gaa	gtg	caa	ttt	cgt	gga	aca	agt	gct	aaa	aga	att	gaa	tta	aat	ggg	1056
Glu	Val	Gln	Phe	Arg	Gly	Thr	Ser	Ala	Lys	Arg	Ile	Glu	Leu	Asn	Gly	
			340					345					350			

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ggg	tac	gcc	ttg	ggc	gcg	cct	acg	aaa	gtg	gac	tct	caa	cca	agc	cta	1104
Gly	Tyr	Ala	Leu	Gly	Ala	Pro	Thr	Lys	Val	Asp	Ser	Gln	Pro	Ser	Leu	
		355					360					365				
tat	aag	gcc	aaa	ggg	gaa	aac	ggg	ttt	aat	ata	atc	aaa	ggg	act	cgt	1152
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Lys	Arg	Leu	Ser	Glu	Glu	Glu	Glu	Arg	Leu	Lys	Lys	Ser	Ser	His	Asn	
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Glu	Thr	Lys	Lys	Ser	Thr	Ala	Leu	Ser	Arg	Glu	Leu	Gly	Lys	Ile	Met	
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Arg	Arg	Arg	Glu	Ser	Ser	Gly	Leu	Glu	Asp	Lys	Ser	Val	Gly	Glu	Arg	
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Gln	Lys	Met	Lys	Arg	Thr	Thr	Glu	Ser	Ala	Leu	Gln	Thr	Gly	Leu	Ile	
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Gln	Arg	Leu	Gly	Phe	Asp	Pro	Thr	His	Gly	Lys	Ile	Ser	Gln	Val	Leu	
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Ile	Leu	Ala	Pro	Ser	Lys	Asn	Glu	Trp	Phe	Lys	Lys	Arg	Ser	His	Arg	
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Glu	Glu	Val	Trp	Gln	Lys	His	Phe	Gly	Ser	Lys	Glu	Thr	Lys	Glu	Thr	
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tct	gac	ggg	agt	gcc	agc	gat	ctt	gag	ata	ata	taa					1717
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<210> 992

<211> 571

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 992

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Gln	Ser	Pro	Thr	Lys	Asn	Arg	Val	Lys	Val	Gly	Ser	His	Asn	Ala	Thr	
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Gln	Gln	Gly	Thr	Lys	Phe	Glu	Gly	Ser	Asn	Ile	Asn	Glu	Val	Arg	Leu	
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Ser	Gln	Leu	Gln	Gln	Gln	Pro	Lys	Pro	Pro	Ala	Ser	Thr	Thr	Thr	Tyr	
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Phe	Met	Glu	Lys	Phe	Gln	Asn	Ala	Lys	Lys	Asn	Glu	Asp	Lys	Gln	Ile	
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 Lys Ile Arg Pro Pro Lys Phe Gln Glu Pro Glu Tyr Ala Asn Trp Ala
 195 200 205
 Thr Val Gly Leu Ile Ser His Lys Ser Asp Ile Lys Phe Thr Ser Ser
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 Glu Lys Pro Val Lys Phe Phe Met Phe Thr Ile Thr Asp Phe Gln His
 225 230 235 240
 Thr Leu Asp Val Tyr Ile Phe Gly Lys Lys Gly Val Glu Arg Tyr Tyr
 245 250 255
 Asn Leu Arg Leu Gly Asp Val Ile Ala Ile Leu Asn Pro Glu Val Leu
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 Pro Trp Arg Pro Ser Gly Arg Gly Asn Phe Ile Lys Ser Phe Asn Leu
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 Arg Ile Ser His Asp Phe Lys Cys Ile Leu Glu Ile Gly Ser Ser Arg
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 Asp Leu Gly Trp Cys Pro Ile Val Asn Lys Lys Thr His Lys Lys Cys
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 Gly Ser Pro Ile Asn Ile Ser Leu His Lys Cys Cys Asp Tyr His Arg
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 Gly Tyr Ala Leu Gly Ala Pro Thr Lys Val Asp Ser Gln Pro Ser Leu
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 Tyr Lys Ala Lys Gly Glu Asn Gly Phe Asn Ile Ile Lys Gly Thr Arg
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 Lys Arg Leu Ser Glu Glu Glu Arg Leu Lys Lys Ser Ser His Asn
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 Phe Thr Asn Ser Asn Ser Ala Lys Ala Phe Phe Asp Glu Lys Phe Gln
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 Glu Thr Lys Lys Ser Thr Ala Leu Ser Arg Glu Leu Gly Lys Ile Met
 435 440 445
 Arg Arg Arg Glu Ser Ser Gly Leu Glu Asp Lys Ser Val Gly Glu Arg
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 Gln Lys Met Lys Arg Thr Thr Glu Ser Ala Leu Gln Thr Gly Leu Ile
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 Gln Arg Leu Gly Phe Asp Pro Thr His Gly Lys Ile Ser Gln Val Leu
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 Lys Ser Ser Val Ser Gly Ser Glu Pro Lys Asn Asn Leu Leu Gly Lys
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 Lys Lys Thr Val Ile Asn Asp Leu Leu His Tyr Lys Lys Glu Lys Val
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<210> 993

<211> 811

<212> DNA

<213> synthetic construct

<400> 993

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<210> 994

<211> 626

<212> DNA

<213> Brassica napus

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<210> 995

<211> 1906

<212> DNA

<213> Brassica napus

<400> 995

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<210> 996

<211> 1063

<212> DNA

<213> Linum usitatissimum

<400> 996

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<210> 997

<211> 2769

<212> DNA

<213> Vicia faba

<400> 997

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<211> 1318

<212> DNA

<213> Arabidopsis thaliana

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<211> 674

<212> DNA

<213> Vicia faba

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<211> 2563

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<213> Vicia faba

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<210> 1008

<211> 400

<212> DNA

<213> *Arabidopsis thaliana*

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<210> 1009

<211> 357

<212> DNA

<213> *Arabidopsis thaliana*

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<211> 979

<212> DNA

<213> *Arabidopsis thaliana*

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ggcgggaatc	tgtagggaga	ttttcgtcac	tcggatttca	ttttgttttg	tttcaaaacg	720
tgaatagcaa	tagatggatg	ggaatagatt	cgctaaaatc	tttggtgggt	taatggataa	780
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ggccataaca	gtataacatg	attcatgatc	aagagttctg	ctaaaaacaa	aaaatcaata	900
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<211> 216

<212> DNA

<213> *Cauliflower mosaic virus*

<400> 1011

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tttgtaaaat	acttctatca	ataaaatttc	taattcctaa	aaccaaatac	cagtactaaa	180
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<210> 1012

<211> 235

<212> DNA

<213> *Solanum tuberosum*

<400> 1012

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tgttgtaaaa	taaacacctg	ctaagggtata	tctatctata	tttttagcatg	gctttctcaa	120

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taaattgtct	ttccttatcg	tttactatct	tataccta	aatgaaataa	taatatcaca	180
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 <211> 297
 <212> DNA
 <213> Vicia faba

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catatgtgtt	tcgataaaaa	aatcaaaaata	aattgagatt	tattcgaaat	acaatgaaag	180
tttgagata	tgagatatgt	ttctacaaaa	taataactta	aaactcaact	atatgcta	240
gtttttcttg	gtgtgtttca	tagaaaattg	tatccgtttc	ttagaaaatg	ctcgttaa	297

<210> 1014
 <211> 194
 <212> DNA
 <213> Agrobacterium tumefaciens

<400> 1014						
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 <212> DNA
 <213> Pisum sativum

<400> 1015						
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ttttcgctat	cgaactgtga	aatggaaaatg	gatggagaag	agttaatgaa	tgatatggtc	240
cttttggttca	ttctcaaatt	aatattat	gttttttctc	ttatttggtg	tgtgttgaat	300
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 <213> Arabidopsis thaliana

<220>
 <221> CDS
 <222> (1)..(1722)

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gct gaa gtt gca gaa gtt cag act tgg tgg tct tct gag agg ttc aag	96					
Ala Glu Val Ala Glu Val Gln Thr Trp Trp Ser Ser Glu Arg Phe Lys						
20 25 30						
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Leu Thr Arg Arg Pro Tyr Thr Ala Arg Asp Val Val Ala Leu Arg Gly						
35 40 45						
cat ctt aag caa gga tac gct agt aac gag atg gct aag aag ctt tgg	192					
His Leu Lys Gln Gly Tyr Ala Ser Asn Glu Met Ala Lys Lys Leu Trp						
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aga act cta aag tca cat caa gct aac ggt act gct tca cga aca ttt	240					
Arg Thr Leu Lys Ser His Gln Ala Asn Gly Thr Ala Ser Arg Thr Phe						

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Gly	Ala	Leu	Asp	Pro	Pro	Val	Gln	Val	Thr	Met	Met	Ala	Lys	His	Leu	Asp	288			
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act	atc	tac	ggt	tct	ggt	tgg	caa	tgc	tca	agt	act	cac	act	tcc	act					
Thr	Ile	Tyr	Val	Ser	Gly	Trp	Gln	Cys	Ser	Ser	Thr	His	Thr	Ser	Thr					
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Asn	Glu	Pro	Gly	Pro	Asp	Leu	Ala	Asp	Tyr	Pro	Tyr	Asp	Thr	Val	Pro					
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aac	aag	ggt	gag	cac	ctt	ttc	ttc	gct	caa	caa	tac	cac	gac	aga	aag					
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cag	aga	gag	gct	aga	atg	agt	atg	tca	aga	gaa	gag	aga	act	aag	act					
Gln	Arg	Glu	Ala	Arg	Met	Ser	Met	Ser	Arg	Glu	Glu	Arg	Thr	Lys	Thr					
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cca	ttc	ggt	gat	tac	ctt	aag	cct	ata	att	gca	gac	gga	gat	act	gga					
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Phe	Gly	Gly	Thr	Thr	Ala	Thr	Val	Lys	Leu	Cys	Lys	Leu	Phe	Val	Glu					
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Gln	Ser	Asn	Ile	Asp	Ala	Arg	Asp	His	Gln	Phe	Ile	Leu	Gly	Ala	Thr					
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Asn	Pro	Ser	Leu	Arg	Gly	Lys	Ser	Leu	Ser	Ser	Leu	Leu	Ala	Glu	Gly					
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Ser	Glu	Trp	Leu	Thr	His	Ala	Arg	Tyr	Glu	Asn	Cys	Leu	Ser	Asn	Glu					
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gat	tgg	gat	ctt	cct	aga	aca	aga	gaa	gga	ttc	tac	aga	ttc	caa	gga					
Asp	Trp	Asp	Leu	Pro	Arg	Thr	Arg	Glu	Gly	Phe	Tyr	Arg	Phe	Gln	Gly					
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Ser	Val	Ala	Ala	Ala	Val	Val	Arg	Gly	Trp	Ala	Phe	Ala	Gln	Ile	Ala					
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Asp	Ile	Ile	Trp	Met	Glu	Thr	Ala	Ser	Pro	Asp	Leu	Asn	Glu	Cys	Thr					
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Gln	Phe	Ala	Glu	Gly	Ile	Lys	Ser	Lys	Thr	Pro	Glu	Val	Met	Leu	Ala					
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Tyr	Asn	Leu	Ser	Pro	Ser	Phe	Asn	Trp	Asp	Ala	Ser	Gly	Met	Thr	Asp					

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Glu	Arg	Ile	Gln	Arg	Glu	Glu	Arg	Thr	His	Gly	Val	Asp	Thr	Leu	Ala	
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cat	cag	aaa	tgg	tct	gga	gct	aac	tac	gac	aga	tac	ctg	aag	aca		1584
His	Gln	Lys	Trp	Ser	Gly	Ala	Asn	Tyr	Tyr	Asp	Arg	Tyr	Leu	Lys	Thr	
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gtt	caa	ggt	ggg	ata	tct	tca	act	gct	gca	atg	gga	aaa	gga	gtg	aca	1632
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Glu	Glu	Gln	Phe	Lys	Glu	Ser	Trp	Thr	Arg	Pro	Gly	Ala	Asp	Gly	Met	
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<211> 573

<212> PRT

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<400> 1017

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Phe	Gly	Gly	Thr	Thr	Ala	Thr	Val	Lys	Leu	Cys	Lys	Leu	Phe	Val	Glu
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Arg	Gly	Ala	Gly	Val	His	Ile	Glu	Asp	Gln	Ser	Ser	Val	Thr	Lys	
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Lys	Cys	Gly	His	Met	Ala	Gly	Lys	Val	Leu	Val	Ala	Val	Ser	Glu	His
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Glu	Thr	Val	Leu	Val	Ala	Arg	Thr	Asp	Ala	Val	Ala	Ala	Thr	Leu	Ile
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Gln	Ser	Asn	Ile	Asp	Ala	Arg	Asp	His	Gln	Phe	Ile	Leu	Gly	Ala	Thr
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 Ala Ile Lys Arg Met Asn Leu Asn Glu Asn Glu Lys Asn Gln Arg Leu
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 Ser Glu Trp Leu Thr His Ala Arg Tyr Glu Asn Cys Leu Ser Asn Glu
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 Gln Gly Arg Val Leu Ala Ala Lys Leu Gly Val Thr Asp Leu Phe Trp
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 Asp Trp Asp Leu Pro Arg Thr Arg Glu Gly Phe Tyr Arg Phe Gln Gly
 370 375 380
 Ser Val Ala Ala Ala Val Val Arg Gly Trp Ala Phe Ala Gln Ile Ala
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 405 410 415
 Gln Phe Ala Glu Gly Ile Lys Ser Lys Thr Pro Glu Val Met Leu Ala
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 Tyr Asn Leu Ser Pro Ser Phe Asn Trp Asp Ala Ser Gly Met Thr Asp
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 Gln Gln Met Val Glu Phe Ile Pro Arg Ile Ala Arg Leu Gly Tyr Cys
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 Asp Thr Phe Ala Lys Asp Tyr Ala Arg Arg Gly Met Leu Ala Tyr Val
 485 490 495
 Glu Arg Ile Gln Arg Glu Glu Arg Thr His Gly Val Asp Thr Leu Ala
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 His Gln Lys Trp Ser Gly Ala Asn Tyr Tyr Asp Arg Tyr Leu Lys Thr
 515 520 525
 Val Gln Gly Gly Ile Ser Ser Thr Ala Ala Met Gly Lys Gly Val Thr
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 <212> DNA
 <213> Brassica napus

<220>
 <221> CDS
 <222> (1)..(1191)

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 20 25 30
 aca ctc aac ctt cct cca ttc tct gac tac tct tct ctt cga ctt gtc 144
 Thr Leu Asn Leu Pro Pro Phe Ser Asp Tyr Ser Ser Leu Arg Leu Val
 35 40 45
 aga gat gct aag act gaa cca ctt ttc ctc tca aga ctt gga cgt att 192
 Arg Asp Ala Lys Thr Glu Pro Leu Phe Leu Ser Arg Leu Gly Arg Ile
 50 55 60
 cct gtt aag cga aga ttc cta act gct gtg act aga gct gag tca aac 240
 Pro Val Lys Arg Arg Phe Leu Thr Ala Val Thr Arg Ala Glu Ser Asn
 65 70 75 80
 caa cta gga ggt gat aca tct gag aac gtt gaa gaa gag gaa aag cag 288
 Gln Leu Gly Gly Asp Thr Ser Glu Asn Val Glu Glu Glu Glu Lys Gln
 85 90 95
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 Lys Lys Ala Ser Gln Leu Lys Lys Arg Val Ile Phe Gly Val Ala Ile
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																	165																		170																		175																																			
acc	ctt	tac	tac	ggg	aac	att	gat	att	tgg	ggt	act	tgt	gct	gca	ttt		576																																																																							
Thr	Leu	Tyr	Tyr	Gly	Asn	Ile	Asp	Ile	Trp	Val	Thr	Cys	Ala	Ala	Phe																																																																									
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Gln	Leu	Ser	Ser	Thr	Met	Phe	Gly	Leu	Phe	Tyr	Cys	Gly	Tyr	Leu	Pro																																																																									
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tgt	ttc	tgg	gtt	aag	ctc	aga	tgt	gga	ctt	gct	gct	cct	gca	ctt	aac		720																																																																							
Cys	Phe	Trp	Val	Lys	Leu	Arg	Cys	Gly	Leu	Ala	Ala	Pro	Ala	Leu	Asn																																																																									
																	225																		230																		235																		240																	
act	gga	atc	gct	aga	act	tgg	cct	att	ttc	ctt	ggg	gga	cct	cca	caa		768																																																																							
Thr	Gly	Ile	Ala	Arg	Thr	Trp	Pro	Ile	Phe	Leu	Gly	Gly	Pro	Pro	Gln																																																																									
																	245																		250																		255																																			
tgg	act	gtt	ggg	ctt	gtt	gct	acc	ctt	att	tca	ttc	tct	gga	gtc	ata		816																																																																							
Trp	Thr	Val	Gly	Leu	Val	Ala	Thr	Leu	Ile	Ser	Phe	Ser	Gly	Val	Ile																																																																									
																	260																		265																		270																																			
gct	act	gac	act	ttc	gct	ttc	ctt	gga	ggg	aag	gct	ttt	gga	aga	act		864																																																																							
Ala	Thr	Asp	Thr	Phe	Ala	Phe	Leu	Gly	Gly	Lys	Ala	Phe	Gly	Arg	Thr																																																																									
																	275																		280																		285																																			
cct	ctt	act	tca	atc	tct	ccc	aag	aag	act	tgg	gaa	gga	act	ttc	gct		912																																																																							
Pro	Leu	Thr	Ser	Ile	Ser	Pro	Lys	Lys	Thr	Trp	Glu	Gly	Thr	Phe	Ala																																																																									
																	290																		295																		300																																			
gga	tta	gtt	ggg	tgt	atc	gtc	atc	act	atc	ctg	cta	tca	aag	tcc	ctt		960																																																																							
Gly	Leu	Val	Gly	Cys	Ile	Val	Ile	Thr	Ile	Leu	Leu	Ser	Lys	Ser	Leu																																																																									
																	305																		310																		315																		320																	
tct	tgg	cct	caa	tcc	ttg	ttc	agc	tct	atc	gca	ttc	ggg	ttc	atc	aac		1008																																																																							
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																	325																		330																		335																																			
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Thr	Leu	Asn	Leu	Pro	Pro	Phe	Ser	Asp	Tyr	Ser	Ser	Leu	Arg	Leu	Val	
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Arg	Asp	Ala	Lys	Thr	Glu	Pro	Leu	Phe	Leu	Ser	Arg	Leu	Gly	Arg	Ile	
	50					55					60					
Pro	Val	Lys	Arg	Arg	Phe	Leu	Thr	Ala	Val	Thr	Arg	Ala	Glu	Ser	Asn	
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 85 90 95
 Lys Lys Ala Ser Gln Leu Lys Lys Arg Val Ile Phe Gly Val Ala Ile
 100 105 110
 Gly Leu Pro Val Gly Gly Val Val Leu Ala Gly Gly Trp Val Phe Thr
 115 120 125
 Leu Ala Leu Ala Ala Ser Val Phe Ile Gly Ser Arg Glu Tyr Phe Glu
 130 135 140
 Leu Val Arg Ser Arg Gly Ile Ala Lys Gly Met Thr Pro Pro Pro Arg
 145 150 155 160
 Tyr Val Ser Arg Phe Cys Ser Val Ile Cys Ala Leu Met Pro Ile Leu
 165 170 175
 Thr Leu Tyr Tyr Gly Asn Ile Asp Ile Trp Val Thr Cys Ala Phe
 180 185 190
 Val Val Ala Met Ala Leu Leu Val Gln Arg Gly Asn Pro Arg Phe Ser
 195 200 205
 Gln Leu Ser Ser Thr Met Phe Gly Leu Phe Tyr Cys Gly Tyr Leu Pro
 210 215 220
 Cys Phe Trp Val Lys Leu Arg Cys Gly Leu Ala Ala Pro Ala Leu Asn
 225 230 235 240
 Thr Gly Ile Ala Arg Thr Trp Pro Ile Phe Leu Gly Gly Pro Pro Gln
 245 250 255
 Trp Thr Val Gly Leu Val Ala Thr Leu Ile Ser Phe Ser Gly Val Ile
 260 265 270
 Ala Thr Asp Thr Phe Ala Phe Leu Gly Gly Lys Ala Phe Gly Arg Thr
 275 280 285
 Pro Leu Thr Ser Ile Ser Pro Lys Lys Thr Trp Glu Gly Thr Phe Ala
 290 295 300
 Gly Leu Val Gly Cys Ile Val Ile Thr Ile Leu Ser Lys Ser Leu
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 Ser Trp Pro Gln Ser Leu Phe Ser Ser Ile Ala Phe Gly Phe Ile Asn
 325 330 335
 Phe Phe Gly Ser Val Phe Gly Asp Leu Thr Glu Ser Met Ile Lys Arg
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 Asp Ala Gly Val Lys Asp Ser Gly Ser Leu Ile Pro Gly His Gly Gly
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 aac gag act tta gct gca caa aga aac gag gtt ctt gca ctt ctg tct 96
 Asn Glu Thr Leu Ala Ala Gln Arg Asn Glu Val Leu Ala Leu Leu Ser
 20 25 30
 aga gtt gag gga aaa gga aag gga att ctt cag cag aac cag att atc 144
 Arg Val Glu Gly Lys Gly Lys Gly Ile Leu Gln Gln Asn Gln Ile Ile
 35 40 45
 gct gag ttc gaa gct tta cct gag gaa act caa aag aag att gag ggt 192
 Ala Glu Phe Glu Ala Leu Pro Glu Glu Thr Gln Lys Lys Ile Glu Gly
 50 55 60
 gga gct ttc ttc gat ctt ctt aag acc act caa gag gct att gtt ctt 240
 Gly Ala Phe Phe Asp Leu Leu Lys Thr Thr Gln Glu Ala Ile Val Leu
 65 70 75 80
 cca cct tgg gtt gca ctt gct gtt aga cct aga cct gga gtt tgg gag 288
 Pro Pro Trp Val Ala Leu Ala Val Arg Pro Arg Pro Gly Val Trp Glu
 85 90 95

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tac Tyr	att Ile	aga Arg	gtg Val 100	aat Asn	cta Leu	cat His	gct Ala	ctt Leu 105	gtt Val	gtt Val	gaa Glu	gag Glu	ctt Leu 110	act Thr	cct Pro	336
gct Ala	gaa Glu	ttc Phe 115	ctt Leu	cat His	ttc Phe	aag Lys	gaa Glu 120	gag Glu	ttg Leu	gtt Val	gat Asp	ggt Gly 125	ggt Val	aag Lys	aac Asn	384
gga Gly	gat Asp 130	ttc Phe	act Thr	ctt Leu	gag Glu	ctc Leu 135	gat Asp	ttc Phe	gag Glu	cct Pro	ttc Phe 140	aac Asn	gct Ala	tct Ser	gtt Val	432
cct Pro 145	aga Arg	cct Pro	act Thr	ctt Leu	cca Pro 150	aag Lys	tac Tyr	atc Ile	gga Gly	gat Asp 155	gga Gly	ggt Val	gag Glu	ttt Phe	cta Leu 160	480
aac Asn	aga Arg	cat His	ctt Leu	tca Ser 165	gct Ala	aag Lys	ctt Leu	ttc Phe	cac His 170	gat Asp	aag Lys	gag Glu	tct Ser	ctt Leu 175	ctt Leu	528
cct Pro	ctt Leu	ctt Leu	aag Lys 180	ttc Phe	cta Leu	aga Arg	ctt Leu	cat His 185	tct Ser	tac Tyr	caa Gln	gga Gly 190	aag Lys	act Thr	ctt Leu	576
atg Met	ctt Leu	aac Asn 195	gag Glu	aga Arg	gtt Val	cag Gln	aac Asn 200	ctt Leu	aac Asn	aac Asn	cta Leu 205	cag Gln	cat His	att Ile	ctt Leu	624
aga Arg	aag Lys 210	gct Ala	gaa Glu	gag Glu	tac Tyr	ctt Leu 215	gct Ala	gga Gly	ctt Leu	tct Ser	cct Pro 220	gaa Glu	act Thr	cct Pro	tac Tyr	672
gag Glu 225	gat Asp	ttc Phe	gag Glu	gct Ala	aag Lys 230	ttc Phe	gaa Glu	gag Glu	att Ile	gga Gly 235	ctt Leu	gag Glu	aga Arg	gga Gly	tgg Trp 240	720
gga Gly	aac Asn	aac Asn	gct Ala	gaa Glu 245	aga Arg	gtt Val	cta Leu	gat Asp	atg Met 250	atc Ile	aga Arg	ctt Leu	ctg Leu	ctt Leu 255	gat Asp	768
ctt Leu	ctt Leu	gag Glu	gct Ala 260	cct Pro	gat Asp	cct Pro	tgt Cys	act Thr 265	ctt Leu	gag Glu	aac Asn	ttc Phe 270	ctt Leu	gga Gly	aga Arg	816
gtt Val	cct Pro	atg Met 275	gtt Val	ttc Phe	aac Asn	gtt Val	gtg Val 280	att Ile	ctt Leu	tct Ser	cct Pro	cat His 285	gga Gly	tac Tyr	ttc Phe	864
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act Thr	att Ile	gca Ala 435	cat His	gct Ala	cta Leu	gag Glu	aag Lys 440	act Thr	aag Lys	tac Tyr	cct Pro	gat Asp 445	tct Ser	gat Asp	atc Ile	1344
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ctt Leu	caa Gln	gag Glu	att Ile	gct Ala 485	gga Gly	tct Ser	aaa Lys	gat Asp	act Thr 490	ggt Val	gga Gly	caa Gln	tac Tyr	gag Glu 495	tct Ser	1488
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gga Gly	aag Lys	aac Asn 595	aag Lys	aga Arg	ctg Leu	aga Arg	gag Glu 600	tta Leu	ggt Val	aac Asn	ctc Leu	ggt Val 605	ggt Val	ggt Val	ggt Gly	1824
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gaa Glu	gct Ala	ttc Phe 675	gga Gly	ctt Leu	act Thr	ggt Val 680	gag Glu	gct Ala	atg Met	aca Thr	tgt Cys 685	gga Gly	ctt Leu	cca Pro		2064
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aag Lys 705	tct Ser	gga Gly	ttc Phe	cac His	att Ile 710	gat Asp	cct Pro	tac Tyr	cac His	gga Gly 715	gat Asp	caa Gln	gct Ala	gct Ala	gac Asp 720	2160
act Thr	cta Leu	gct Ala	gat Asp	ttc Phe 725	ttc Phe	gca Ala	aag Lys	tgt Cys	aag Lys 730	gag Glu	gat Asp	cct Pro	tct Ser	cat His 735	tgg Trp	2208
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ctt Leu 785	gag Glu	atg Met	ttc Phe	tac Tyr	gct Ala 790	ctt Leu	aag Lys	tac Tyr	aga Arg	cct Pro 795	tta Leu	gct Ala	caa Gln	gca Ala	gtt Val 800	2400
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<211> 805

<212> PRT

<213> Brassica napus

<400> 1021

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Arg Val Glu Gly Lys Gly Lys Gly Ile Leu Gln Gln Asn Gln Ile Ile
35      40      45
Ala Glu Phe Glu Ala Leu Pro Glu Glu Thr Gln Lys Lys Ile Glu Gly
50      55      60
Gly Ala Phe Phe Asp Leu Leu Lys Thr Thr Gln Glu Ala Ile Val Leu
65      70      75      80
Pro Pro Trp Val Ala Leu Ala Val Arg Pro Arg Pro Gly Val Trp Glu
85      90      95
Tyr Ile Arg Val Asn Leu His Ala Leu Val Val Glu Glu Leu Thr Pro
100      105      110
Ala Glu Phe Leu His Phe Lys Glu Glu Leu Val Asp Gly Val Lys Asn
115      120      125
Gly Asp Phe Thr Leu Glu Leu Asp Phe Glu Pro Phe Asn Ala Ser Val
130      135      140
Pro Arg Pro Thr Leu Pro Lys Tyr Ile Gly Asp Gly Val Glu Phe Leu
145      150      155      160
Asn Arg His Leu Ser Ala Lys Leu Phe His Asp Lys Glu Ser Leu Leu
165      170      175      180
Pro Leu Leu Lys Phe Leu Arg Leu His Ser Tyr Gln Gly Lys Thr Leu
185      190      195
Met Leu Asn Glu Arg Val Gln Asn Leu Asn Asn Leu Gln His Ile Leu
200      205
Arg Lys Ala Glu Glu Tyr Leu Ala Gly Leu Ser Pro Glu Thr Pro Tyr
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Glu Asp Phe Glu Ala Lys Phe Glu Glu Ile Gly Leu Glu Arg Gly Trp
225      230      235      240
Gly Asn Asn Ala Glu Arg Val Leu Asp Met Ile Arg Leu Leu Leu Asp
245      250      255
Leu Leu Glu Ala Pro Asp Pro Cys Thr Leu Glu Asn Phe Leu Gly Arg
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Val Pro Met Val Phe Asn Val Val Ile Leu Ser Pro His Gly Tyr Phe
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Ala Gln Asp Asn Val Leu Gly Tyr Pro Asp Thr Gly Gly Gln Val Val
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Tyr Ile Leu Asp Gln Val Arg Ala Met Glu Thr Glu Met Leu Gln Arg
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Ile Gln Gln Gln Gly Leu Asn Ile Thr Pro Arg Ile Leu Ile Leu Thr
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Thr Glu Lys Gly Ile Val Arg Lys Trp Ile Ser Arg Phe Glu Val Trp
370      375      380
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Thr Ile Ala His Ala Leu Glu Lys Thr Lys Tyr Pro Asp Ser Asp Ile
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Ala Asp Leu Phe Ala Met Asn His Thr Asp Phe Ile Ile Thr Ser Thr
465      470      475      480
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His Thr Ala Phe Thr Leu Pro Gly Leu Tyr Arg Val Val His Gly Ile
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Asp Val Phe Asp Pro Lys Phe Asn Ile Val Ser Pro Gly Ala Asp Met

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 690 Lys Ser Gly Phe His Ile 695 Asp Pro Tyr His Gly Asp Gln Ala Ala Asp
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 740 Trp Gln Ile Tyr Ser Gln Arg Leu 745 Leu Thr Leu Thr Gly Val Tyr Gly
 755 Phe Trp Lys His Val Ser Asn 760 Leu Asp Arg Leu Glu Ser Arg Arg Tyr
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<211> 1422

<212> DNA

<213> Physcomitrella patens

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<221> CDS

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Ser Gly Ser Phe 20 Gly Glu Ile Tyr Leu 25 Gly Thr Asn Leu Val 30 Thr His	
gaa gag gtt gga att aag ctt gag tct atc aag gct aaa cat cct caa	144
Glu Glu Val 35 Gly Ile Lys Leu Glu 40 Ser Ile Lys Ala Lys 45 His Pro Gln	
ctg ctt tac gag tct aag ctt tac cga atc ctt caa ggt gga act gga	192
Leu Leu Tyr Glu Ser Lys Leu Tyr Arg Ile Leu Gln Gly Gly Thr Gly	
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Ile 65 Pro Asn Ile Arg Trp 70 Tyr Gly Ile Glu Gly 75 Asp Tyr Asn Val Met 80	
gtt ctc gat ctt ttg gga cct tct ctt gag gac ctt ttc aac ttc tgt	288
Val Leu Asp Leu Leu 85 Gly Pro Ser Leu Glu 90 Asp Leu Phe Asn Phe Cys 95	
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gtt Val 145	tac Tyr	atg Met	atc Ile	gat Asp	ttc Phe 150	gga Gly	cta Leu	gca Ala	aag Lys	aag Lys 155	tat Tyr	aga Arg	gat Asp	cct Pro	aca Thr 160	480
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aga Arg	gat Asp	gat Asp 195	cta Leu	gag Glu	tct Ser	ctt Leu	gga Gly 200	tac Tyr	gtc Val	ctt Leu	atg Met 205	tac Tyr	ttc Phe	cta Leu	aga Arg	624
gga Gly	tct Ser 210	ctt Leu	cct Pro	tgg Trp	caa Gln	gga Gly 215	atg Met	aaa Lys	gct Ala	gga Gly	aca Thr 220	aag Lys	aag Lys	caa Gln	aag Lys	672
tac Tyr 225	gag Glu	aag Lys	atc Ile	tca Ser	gag Glu 230	aag Lys	aag Lys	atg Met	tca Ser	act Thr 235	cca Pro	att Ile	gag Glu	ttc Phe	cta Leu 240	720
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gat Asp	tgg Trp 290	act Thr	atc Ile	ctt Leu	aag Lys	tac Tyr 295	cag Gln	caa Gln	act Thr	cac His	ttt Phe 300	tct Ser	gga Gly	gga Gly	cct Pro	912
ttg Leu 305	aga Arg	cca Pro	gct Ala	gca Ala 310	gca Ala	gct Ala	ggt Gly	gga Gly	tct Ser	tct Ser 315	gga Gly	gca Ala	gct Ala	gcc Ala 320	gct Ala	960
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tct Ser	tct Ser	gga Gly 355	ctt Leu	aac Asn	cct Pro	ctt Leu	gat Asp 360	gct Ala	tca Ser	aag Lys	cac His 365	aag Lys 365	tct Ser	act Thr	tct Ser	1104
cct Pro	gat Asp 370	gaa Glu	gca Ala	gct Ala	agt Ser	aag Lys 375	gat Asp	ata Ile	gct Ala	ctt Leu	tct Ser 380	gga Gly	ctt Leu	gct Ala	gaa Glu	1152
cct Pro 385	gag Glu	aga Arg	aca Thr	cat His	gct Ala 390	tcc Ser	agt Ser	ttc Phe	gtt Val	aga Arg 395	gga Gly	tct Ser	tct Ser	tct Ser	tct Ser 400	1200
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gga Gly	gat Asp	ggt Gly	act Thr 420	aga Arg	gtt Val	ctt Leu	gct Ala	gga Gly 425	aag Lys	atg Met	gga Gly	ccc Pro	act Thr 430	tct Ser	ctt Leu	1296
aga Arg	act Thr	tct Ser 435	gct Ala	gga Gly	atg Met	caa Gln	cga Arg 440	tct Ser	tct Ser	cct Pro	gtc Val	gct Ala 445	tct Ser	act Thr	gat Asp	1344
cct Pro	aag Lys 450	aga Arg	act Thr	gga Gly	aga Arg	gat Asp 455	tct Ser	tac Tyr	gct Ala	gga Gly	aac Asn 460	tct Ser	gga Gly	aga Arg	aac Asn	1392
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 35 40 45
 Leu Leu Tyr Glu Ser Lys Leu Tyr Arg Ile Leu Gln Gly Gly Thr Gly
 50 55 60
 Ile Pro Asn Ile Arg Trp Tyr Gly Ile Glu Gly Asp Tyr Asn Val Met
 65 70 75 80
 Val Leu Asp Leu Leu Gly Pro Ser Leu Glu Asp Leu Phe Asn Phe Cys
 85 90 95
 Ser Arg Lys Phe Ser Leu Lys Thr Val Leu Met Leu Ala Asp Gln Leu
 100 105 110
 Ile Asn Arg Val Glu Tyr Val His Ala Lys Ser Phe Leu His Arg Asp
 115 120 125
 Ile Lys Pro Asp Asn Phe Leu Met Gly Leu Gly Arg Arg Ala Asn Gln
 130 135 140
 Val Tyr Met Ile Asp Phe Gly Leu Ala Lys Lys Tyr Arg Asp Pro Thr
 145 150 155 160
 Thr His Gln His Ile Pro Tyr Arg Glu Asn Lys Asn Leu Thr Gly Thr
 165 170 175
 Ala Arg Tyr Ala Ser Ile Asn Thr His Leu Gly Ile Glu Gln Ser Arg
 180 185 190
 Arg Asp Asp Leu Glu Ser Leu Gly Tyr Val Leu Met Tyr Phe Leu Arg
 195 200 205
 Gly Ser Leu Pro Trp Gln Gly Met Lys Ala Gly Thr Lys Lys Gln Lys
 210 215 220
 Tyr Glu Lys Ile Ser Glu Lys Lys Met Ser Thr Pro Ile Glu Phe Leu
 225 230 235 240
 Cys Lys Ala Tyr Pro Ser Glu Phe Ala Ser Tyr Phe His Tyr Cys Arg
 245 250 255
 Ser Leu Arg Phe Asp Asp Lys Pro Asp Tyr Ala Tyr Leu Lys Arg Ile
 260 265 270
 Phe Arg Asp Leu Phe Ile Arg Glu Gly Phe Gln Phe Asp Tyr Val Phe
 275 280 285
 Asp Trp Thr Ile Leu Lys Tyr Gln Gln Thr His Phe Ser Gly Gly Pro
 290 295 300
 Leu Arg Pro Ala Ala Ala Gly Gly Ser Ser Gly Ala Ala Ala Ala
 305 310 315 320
 Ala Ala Ala Gly Ile Gly Thr Val Pro Arg Asp Ala Gln Arg Ala Ile
 325 330 335
 Glu Pro Thr Asp Val Ala Ala Arg Thr Arg Met Val Gly Ala Thr Arg
 340 345 350
 Ser Ser Gly Leu Asn Pro Leu Asp Ala Ser Lys His Lys Ser Thr Ser
 355 360 365
 Pro Asp Glu Ala Ala Ser Lys Asp Ile Ala Leu Ser Gly Leu Ala Glu
 370 375 380
 Pro Glu Arg Thr His Ala Ser Ser Phe Val Arg Gly Ser Ser Ser Ser
 385 390 395 400
 Arg Arg Ala Val Val Gly Cys Ala Arg Pro Ala Gly Ser Thr Glu Ala
 405 410 415
 Gly Asp Gly Thr Arg Val Leu Ala Gly Lys Met Gly Pro Thr Ser Leu
 420 425 430
 Arg Thr Ser Ala Gly Met Gln Arg Ser Ser Pro Val Ala Ser Thr Asp
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<211> 1176

<212> DNA

<213> *Saccharomyces cerevisiae*

<220>

<221> CDS

<222> (1)..(1176)

<400> 1024

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gca gga aga aag aga tct tct agt tct tca cta aag gca gct gag	96
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aaa cct ttc aag gtc act gtt atc gga tct ggg aat tgg ggt act act	144
Lys Pro Phe Lys Val Thr Val Ile Gly Ser Gly Asn Trp Gly Thr Thr	
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atc gct aag gtt gtt gct gag aac tgt aag gga tat cct gag gtt ttc	192
Ile Ala Lys Val Val Ala Glu Asn Cys Lys Gly Tyr Pro Glu Val Phe	
50 55 60	
gct cct ata gtg cag atg tgg gtt ttc gaa gag gag ata aac ggt gaa	240
Ala Pro Ile Val Gln Met Trp Val Phe Glu Glu Glu Ile Asn Gly Glu	
65 70 75 80	
aag ctg aca gag att atc aac act agg cat cag aac gtg aag tac tta	288
Lys Leu Thr Glu Ile Ile Asn Thr Arg His Gln Asn Val Lys Tyr Leu	
85 90 95	
cca ggg ata act ctt cct gat aac ctt gtt gct aac cct gat cta atc	336
Pro Gly Ile Thr Leu Pro Asp Asn Leu Val Ala Asn Pro Asp Leu Ile	
100 105 110	
gac agc gtt aag gac gtg gat ata att gtg ttc aac att cca cat cag	384
Asp Ser Val Lys Asp Val Asp Ile Ile Val Phe Asn Ile Pro His Gln	
115 120 125	
ttc ctt cct aga atc tgt tca caa ctt aag ggt cat gtc gat tca cat	432
Phe Leu Pro Arg Ile Cys Ser Gln Leu Lys Gly His Val Asp Ser His	
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gtt cga gct atc tca tgc ctt aag gga ttc gag gtt ggt gca aaa ggt	480
Val Arg Ala Ile Ser Cys Leu Lys Gly Phe Glu Val Gly Ala Lys Gly	
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Val Gln Leu Leu Ser Tyr Ile Thr Glu Glu Leu Gly Ile Gln Cys	
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Gly Ala Leu Ser Gly Ala Asn Ile Ala Thr Glu Val Ala Gln Glu His	
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Trp Ser Glu Thr Thr Val Ala Tyr His Ile Pro Lys Asp Phe Arg Gly	
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Glu Gly Lys Asp Val Asp His Lys Val Leu Lys Ala Leu Phe His Arg	
210 215 220	
cct tac ttc cac gtt tct gtg att gag gat gtt gct ggg ata tct att	720
Pro Tyr Phe His Val Ser Val Ile Glu Asp Val Ala Gly Ile Ser Ile	
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Cys Gly Ala Leu Lys Asn Val Val Ala Leu Gly Cys Gly Phe Val Glu	
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gga ctt ggt tgg ggt aac aac gct tct gct gct atc caa aga gtt gga	816
Gly Leu Gly Trp Gly Asn Asn Ala Ser Ala Ala Ile Gln Arg Val Gly	
260 265 270	
ctt gga gag att att agg ttc ggt cag atg ttc ttt cct gag tct aga	864
Leu Gly Glu Ile Ile Arg Phe Gly Gln Met Phe Phe Pro Glu Ser Arg	
275 280 285	
gag gag act tac tac caa gaa tct gct ggt gtt gct gac ctt att acc	912
Glu Glu Thr Tyr Tyr Gln Glu Ser Ala Gly Val Ala Asp Leu Ile Thr	
290 295 300 305	
act tgt gct gga gga aga aac gtc aag gtt gct aga ctg atg gct act	960
Thr Cys Ala Gly Gly Arg Asn Val Lys Val Ala Arg Leu Met Ala Thr	
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Ile	Val	Tyr	Asn	Asn	Tyr	Pro	Met	Lys	Asn	Leu	Pro	Asp	Met	Ile	Glu	
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Trp	Ser	Glu	Thr	Thr	Val	Ala	Tyr	His	Ile	Pro	Lys	Asp	Phe	Arg	Gly	
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Cys	Gly	Ala	Leu	Lys	Asn	Val	Val	Ala	Leu	Gly	Cys	Gly	Phe	Val	Glu	
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Thr	Cys	Ala	Gly	Gly	Arg	Asn	Val	Lys	Val	Ala	Arg	Leu	Met	Ala	Thr	
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380

Glu
385

Leu

Asp

Leu

Hi S

Glu

375

Asp

390