

SEQUENCE LISTING

<110> Dr. Dr. Ruediger Flaig & MA Iren Lange-Flaig
 <120> Spektral verbesserte und stickstoffautotrophe Photosynthese
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 <151> 2007-11-13
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			20					25					30		
Phe	Leu	Thr	Ala	Val	Ser	Glu	Leu	Thr	Gly	Lys	Ala	Ile	Pro	Glu	Glu
			35				40						45		
Leu	Glu	Ile	Glu	Arg	Gly	Arg	Leu	Val	Asp	Ala	Ile	Thr	Asp	Ser	Tyr
	50					55					60				
Ala	Trp	Ile	His	Gly	Lys	Lys	Phe	Ala	Ile	Tyr	Gly	Asp	Pro	Asp	Leu
65					70					75					80
Ile	Ile	Ser	Ile	Thr	Ser	Phe	Leu	Leu	Glu	Met	Gly	Ala	Glu	Pro	Val
				85					90					95	
His	Ile	Leu	Cys	Asn	Asn	Gly	Asp	Asp	Thr	Phe	Lys	Lys	Glu	Met	Glu
			100					105					110		
Ala	Ile	Leu	Ala	Ala	Ser	Pro	Phe	Gly	Lys	Glu	Ala	Lys	Val	Trp	Ile
			115				120						125		
Gln	Lys	Asp	Leu	Trp	His	Phe	Arg	Ser	Leu	Leu	Phe	Thr	Glu	Pro	Val
	130					135					140				
Asp	Phe	Phe	Ile	Gly	Asn	Ser	Tyr	Gly	Lys	Tyr	Leu	Trp	Arg	Asp	Thr
145					150					155					160
Ser	Ile	Pro	Met	Val	Arg	Ile	Gly	Tyr	Pro	Leu	Phe	Asp	Arg	His	His
				165					170					175	
Leu	His	Arg	Tyr	Ser	Thr	Leu	Gly	Tyr	Gln	Gly	Gly	Leu	Asn	Ile	Leu
			180					185					190		
Asn	Trp	Val	Val	Asn	Thr	Leu	Leu	Asp	Glu	Met	Asp	Arg	Ser	Thr	Asn
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Ile	Thr	Gly	Lys	Thr	Asp	Ile	Ser	Phe	Asp	Leu	Ile	Arg			

209 210 211 212 213 214 215 216 217 218 219 220 221

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Cys	Ala	Ala	Gln	Ser	Ile	Ala	Asp	Leu	Ala	Ala	Ala	Asn	Leu	Ser	Thr
			20					25					30		
Glu	Asp	Ser	Lys	Ser	Ala	Gln	Leu	Ile	Ser	Ala	Asp	Ser	Ser	Asp	Asp
		35					40					45			
Ala	Ser	Asp	Ser	Ser	Val	Glu	Ser	Val	Asp	Ala	Ala	Ser	Ser	Asp	Val
	50					55					60				
Ser	Gly	Ser	Ser	Val	Glu	Ser	Val	Asp	Val	Ser	Gly	Ser	Ser	Leu	Glu
65					70					75					80
Ser	Val	Asp	Val	Ser	Gly	Ser	Ser	Leu	Glu	Ser	Val	Asp	Asp	Ser	Ser
				85					90					95	
Glu	Asp	Ser	Glu	Glu	Glu	Glu	Leu	Arg	Ile	Leu	Ser	Ser	Lys	Lys	Ser
			100					105					110		
Gly	Ser	Tyr	Tyr	Ser	Tyr	Gly	Thr	Lys	Lys	Ser	Gly	Ser	Tyr	Ser	Gly
		115					120					125			
Tyr	Ser	Thr	Lys	Lys	Ser	Ala	Ser	Arg	Arg	Ile	Leu	Ser	Ser	Lys	Lys
	130					135					140				
Ser	Gly	Ser	Tyr	Ser	Gly	Tyr	Ser	Thr	Lys	Lys	Ser	Gly	Ser	Arg	Arg
145					150					155					160
Ile	Leu	Ser	Ser	Lys	Lys	Ser	Gly	Ser	Tyr	Ser	Gly	Ser	Lys	Gly	Ser
				165					170					175	
Lys	Arg	Arg	Ile	Leu	Ser	Ser	Lys	Lys	Ser	Gly	Ser	Tyr	Ser	Gly	Ser
			180					185					190		
Lys	Gly	Ser	Lys	Arg	Arg	Asn	Leu	Ser	Ser	Lys	Lys	Ser	Gly	Ser	Tyr
		195					200					205			
Ser	Gly	Ser	Lys	Gly	Ser	Lys	Arg	Arg	Ile	Leu	Ser	Ser	Lys	Lys	Ser
	210					215					220				
Gly	Ser	Tyr	Ser	Gly	Ser	Lys	Gly	Ser	Lys	Arg	Arg	Asn	Leu	Ser	Ser
225					230					235					240
Lys	Lys	Ser	Gly	Ser	Tyr	Ser	Gly	Ser	Lys	Gly	Ser	Lys	Arg	Arg	Ile
				245					250					255	
Leu	Ser	Gly	Gly	Leu	Arg	Gly	Ser	Met							
257	258	259	260	261	262	263	264	265							

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 <223> Tensidomimetisches Peptid
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Ala Ala
 17 18

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 <213> Alcanivorax borkumensis
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 <223> Rubredoxin
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Met	Ala	Lys	Tyr	Gln	Cys	Pro	Asp	Cys	Glu	Tyr	Ile	Tyr	Asp	Glu	Val
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Ala	Gly	His	Pro	His	Glu	Gly	Phe	Pro	Pro	Gly	Thr	Ser	Trp	Glu	Thr
			20					25					30		
Ile	Pro	Glu	Glu	Trp	Ala	Cys	Pro	Asp	Cys	Ala	Val	Arg	Asp	Lys	Ala
		35					40					45			
Asp	Phe	Val	Val	Ile	Glu	Ser	Gly	Ser	Ala	Ser	Pro	Ala	Ser	Gly	Ala
	50					55					60				
Ala	Thr	Pro	Glu	Val	Arg	Thr	Ala	Thr	Thr	Pro	Pro	Lys	Ala	Glu	Ala
65					70					75				80	
Ser	Pro	Gln	Lys	Ser	Thr	Gly	Ala	Ser	Thr	Pro	Ser	Ala	Asn	Asn	Lys
				85					90					95	
Ala	Lys	Ala	Lys	Ala	Lys	Ala	Lys	Pro	Ala	Arg	Ala	Lys	Ser	Ser	Lys
			100					105					110		
Asp	Ser	Thr	Gly	Lys	Glu	Thr	Thr	Phe	Arg	Lys	Trp	Ile	Cys	Ile	Thr
		115					120					125			
Cys	Gly	His	Ile	Tyr	Asp	Glu	Ala	Leu	Gly	Asp	Glu	Thr	Glu	Gly	Phe
	130					135					140				
Ala	Pro	Gly	Thr	Leu	Phe	Glu	Asp	Ile	Pro	Asp	Asp	Trp	Cys	Cys	Pro
145					150					155					160
Asp	Cys	Gly	Ala	Thr	Lys	Glu	Asp	Tyr	Val	Leu	His	Glu	Asp		
161	162	163	164	165	166	167	168	169	170	171	172	173	174		

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

Val Met Ser Asn 305	Leu Ile Leu Phe 310	His Leu Gln Arg 315	His Ser Asp His 320
His Ala His Pro 325	Thr Arg Ser Tyr 325	Gln Ser Leu Arg 330	Asp Phe Ser Asp 335
Leu Pro Thr Leu 340	Pro Thr Gly Tyr 345	Pro Gly Met Phe 345	Phe Val Ala Phe 350
Phe Pro Ser Trp 355	Phe Arg Ser Leu 360	Met Asp Asp Arg 365	Val Met Glu Trp 365
Ala His Gly Asp 370	Ile Asn Lys Ile 375	Gln Ile Gln Pro 380	Gly Met Arg Glu 385
Phe Tyr Glu Gln 385	Lys Phe Gly Val 390	Lys Gly Ser Glu 395	Ser Pro Asp Thr 400
Thr Val Ala Lys 401 402 403 404			

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Met Val Ser Lys 1	Gly Glu Glu Val 5	Ile Lys Glu Phe 10	Met Arg Phe Lys 15
Glu His Met Glu 20	Gly Ser Val Asn 25	Gly His Glu Phe 25	Glu Ile Glu Gly 30
Glu Gly Glu Gly 35	Arg Pro Tyr Glu 40	Gly Thr Gln Thr 45	Ala Arg Leu Lys 45
Val Thr Lys Gly 50	Gly Pro Leu Pro 55	Phe Ala Trp Asp 60	Ile Leu Ser Pro 60
Gln Ile Ser Lys 65	Ala Tyr Val Lys 70	His Pro Ala Asp 75	Ile Pro Asp Tyr 80
Leu Lys Leu Ser 85	Phe Pro Glu Gly 85	Phe Lys Trp Glu 90	Arg Val Met Asn 95
Phe Glu Asp Gly 100	Gly Val Val Thr 105	Val Thr Gln Asp 105	Ser Ser Leu Gln 110
Asp Gly Glu Phe 115	Ile Tyr Lys Val 120	Lys Val Arg Gly 125	Thr Asn Phe Pro 125
Ser Asp Gly Pro 130	Val Met Gln Lys 135	Lys Thr Met Gly 140	Trp Glu Ala Ser 140
Ser Glu Arg Met 145	Tyr Pro Glu Asp 150	Gly Ala Leu Lys 155	Gly Glu Met Lys 160
Met Arg Leu Arg 165	Leu Lys Asp Gly 165	Gly His Tyr Asp 170	Ala Glu Val Lys 175

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

225

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 <213> *Ralstonia metallidurans*
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 <223> quecksilberbindendes Protein
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Met	Pro	Pro	Ser	Pro	Leu	Ala	Ala	Val	Val	Ala	Pro	Val	Trp	Ala	Ala
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Thr	Gln	Thr	Val	Thr	Leu	Ser	Val	Pro	Gly	Met	Thr	Cys	Ser	Ala	Cys
			20					25					30		
Pro	Ile	Thr	Val	Lys	Lys	Ala	Ile	Ser	Lys	Val	Glu	Gly	Val	Ser	Lys
			35				40					45			
Val	Asp	Val	Thr	Phe	Glu	Thr	Arg	Gln	Ala	Val	Val	Thr	Phe	Asp	Asp
	50					55					60				
Ala	Lys	Thr	Ser	Val	Gln	Lys	Leu	Thr	Lys	Ala	Thr	Ala	Asp	Ala	Gly
65					70					75					80
Tyr	Pro	Ser	Ser	Val	Lys	Gln									
81	82	83	84	85	86	87									

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 <223> Leaderpeptid der Cytochrom-c-Oxydase
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Met	Leu	Ser	Leu	Arg	Gln	Ser	Ile	Arg	Phe	Phe	Lys	Pro	Ala	Thr	Arg
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Thr	Leu	Cys	Ser	Ser	Arg	Tyr	Leu	Leu							
17	18	19	20	21	22	23	24	25							

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 <213> *Chlamydomonas reinhardtii*
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 <223> Leaderpeptid der Citratsynthase
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Met	Leu	Ala	Thr	Ala	Ala	Ser	Lys	Leu	Gly	Leu	Thr	Gly	Leu	Gly	Ile
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Gln	Ala	Ile	Ser	Ala	Val	Gly	Asn	Ser	Ile	Arg	Gln	Phe	Ser	Ser	
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

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 <213> Lemna gibba
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 <223> Leaderpeptid eines Lichtsammelproteins
 <400> 11

Met	Ala	Ala	Ser	Met	Ala	Leu	Ser	Ser	Pro	Ser	Leu	Val	Gly	Lys	Ala
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Val	Lys	Leu	Ala	Pro	Ala	Ala	Ser	Glu	Val	Phe	Gly	Glu	Gly	Arg	Val
			20					25					30		

<210> 12
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 <212> PRT
 <213> Chlamydomonas reinhardtii
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 <223> Leaderpeptid eines sezernierten Proteins
 <400> 12

Met	Ala	Pro	Cys	Lys	Arg	Arg	Ala	Ala	Cys	Gly	Ala	Leu	Leu	Leu	Leu
1				5					10					15	
Ser	Ala	Leu	Val	Val	Cys	Phe	Ser	Pro	Ala	Ala	Glu	Ala	Ser	Ala	Arg
			20					25					30		
Arg	Leu	Asn													
33	34	35													

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 <213> Corynebacterium glutamicum
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 <223> Glutaminsynthase
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Ile	Lys	Phe	Val	Arg	Leu	Trp	Phe	Thr	Asp	Ile	Leu	Gly	His	Leu	Lys
			20					25					30		
Ser	Val	Val	Val	Ala	Pro	Ala	Glu	Leu	Glu	Ser	Ala	Leu	Glu	Glu	Gly
			35				40					45			
Ile	Gly	Phe	Asp	Gly	Ser	Ala	Ile	Glu	Gly	Tyr	Ala	Arg	Ile	Ser	Glu
	50					55				60					
Ala	Asp	Thr	Ile	Ala	Arg	Pro	Asp	Pro	Ser	Thr	Phe	Gln	Val	Leu	Pro
65					70					75				80	
Leu	Glu	Ala	Gly	Ile	Ser	Lys	Leu	Gln	Ala	Ala	Arg	Leu	Phe	Cys	Asp
				85				90						95	
Val	Thr	Met	Pro	Asp	Gly	Gln	Pro	Ser	Phe	Ser	Asp	Pro	Arg	Gln	Val

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

433 434 435 436 437 438 439 440 441 442 443 444 445 446

<210> 14
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Met Gly Lys Gly	Ala Gly Arg Asp	Lys Tyr Glu Pro	Thr Ala Thr Ser
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Glu His Gly Thr	Lys Lys Lys Lys	Ala Lys Glu Arg	Asp Met Asp Glu
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Leu Lys Lys Glu	Ile Ser Met Asp	Asp His Lys Leu	Ser Leu Asp Glu
35	40		45
Leu His Arg Lys	Tyr Gly Thr Asp	Leu Ser Arg Gly	Leu Thr Thr Ala
50	55	60	
Arg Ala Ala Glu	Ile Leu Ala Arg	Asp Gly Pro Asn	Thr Leu Thr Pro
65	70	75	80
Pro Pro Thr Thr	Pro Glu Trp Val	Lys Phe Cys Arg	Gln Leu Phe Gly
	85	90	95
Gly Phe Ser Leu	Leu Leu Trp Ile	Gly Ser Leu Leu	Cys Phe Leu Ala
100		105	110
Tyr Gly Ile Thr	Ser Val Met Glu	Gly Glu Pro Asn	Ser Asp Asn Leu
115	120		125
Tyr Leu Gly Val	Val Leu Ala Ala	Val Val Ile Ile	Thr Gly Cys Phe
130	135	140	
Ser Tyr Tyr Gln	Glu Ala Lys Ser	Ser Lys Ile Met	Glu Ser Phe Lys
145	150	155	160
Asn Met Val Pro	Gln Gln Ala Leu	Val Val Arg Asn	Gly Glu Lys Met
	165	170	175
Ser Ile Asn Ala	Glu Gly Val Val	Val Gly Asp Leu	Val Glu Val Lys
180		185	190
Gly Gly Asp Arg	Ile Pro Ala Asp	Leu Arg Ile Ile	Ser Ala His Gly
195	200		205
Cys Lys Val Asp	Asn Ser Ser Leu	Thr Gly Glu Ser	Glu Pro Gln Thr
210	215	220	
Arg Ser Pro Asp	Phe Ser Asn Glu	Asn Pro Leu Glu	Thr Arg Asn Ile
225	230	235	240
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Thr Asp Ser Tyr 100	Ala Trp Ile His	Gly Lys Lys Phe 105	Ala Ile Tyr Gly 110
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Lys Val Trp Ile	Gln Lys Asp Leu 165	Trp His Phe Arg 170	Ser Leu Leu Phe 175
Thr Glu Pro Val 180	Asp Phe Phe Ile	Gly Asn Ser Tyr 185	Gly Lys Tyr Leu 190
Trp Arg Asp Thr 195	Ser Ile Pro Met 200	Val Arg Ile Gly	Tyr Pro Leu Phe 205
Asp Arg His His 210	Leu His Arg Tyr 215	Ser Thr Leu Gly 220	Tyr Gln Gly Gly
Leu Asn Ile Leu 225	Asn Trp Val Val 230	Asn Thr Leu Leu 235	Asp Glu Met Asp 240
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Glu Gly Thr Gln	Thr Ala Lys Leu	Lys Val Thr Lys	Gly Gly Pro Leu
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Gly Val Val Thr	Val Thr Gln Asp	Ser Ser Leu Gln	Asp Gly Glu Phe
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Val Met Gln Lys	Lys Thr Met Gly	Trp Glu Ala Ser	Ser Glu Arg Met
	405	410	415
Tyr Pro Glu Asp	Gly Ala Leu Lys	Gly Glu Ile Lys	Met Arg Leu Lys
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Leu Lys Asp Gly	Gly His Tyr Asp	Ala Glu Val Lys	Thr Thr Tyr Met
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Ala Lys Lys Pro	Val Gln Leu Pro	Gly Ala Tyr Lys	Thr Asp Ile Lys
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Leu Asp Ile Thr	Ser His Asn Glu	Asp Tyr Thr Ile	Val Glu Leu Tyr
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Tyr Glu Leu Asp 405	Glu Pro Ala Glu 405	Asp Asp Ile Ser 410	Asn Leu Ser Phe 415
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Gln Ala Leu Arg 435	Gln Met Glu Lys 440	Ser Glu Leu Val 445	Ala Asp Ile Leu 445
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 1260
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<210> 22
 <211> 3091
 <212> DNA
 <213> Synthetische Sequenz
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 <223> ATPase aus Gallus gallus
 <400> 22

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 240
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3091

<210> 23

<211> 826

<212> DNA

<213> Synthetische Sequenz

<220>

<223> Silaffin aus *Cylindrotheca* sp.

<400> 23

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300
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 826

<210> 24
 <211> 117
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> sezernierbares schwermetallbindendes Protein
 <400> 24

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Ser	Ala	Leu	Val	Val	Cys	Phe	Ser	Pro	Ala	Ala	Glu	Ala	Ser	Arg	Pro
			20					25					30		
Pro	Ser	Pro	Leu	Ala	Ala	Val	Val	Ala	Pro	Val	Trp	Ala	Ala	Thr	Gln
		35					40					45			
Thr	Val	Thr	Leu	Ser	Val	Pro	Gly	Met	Thr	Cys	Ser	Ala	Cys	Pro	Ile
	50					55					60				
Thr	Val	Lys	Lys	Ala	Ile	Ser	Lys	Val	Glu	Gly	Val	Ser	Lys	Val	Asp
65					70					75					80
Val	Thr	Phe	Glu	Thr	Arg	Gln	Ala	Val	Val	Thr	Phe	Asp	Asp	Ala	Lys
				85				90						95	
Thr	Ser	Val	Gln	Lys	Leu	Thr	Lys	Ala	Thr	Ala	Asp	Ala	Gly	Tyr	Pro
			100					105					110		
Ser	Ser	Val	Lys	Gln											
113	114	115	116	117											

<210> 25
 <211> 378
 <212> DNA
 <213> Synthetische Sequenz
 <220>
 <223> sezernierbares schwermetallbindendes Protein
 <400> 25

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 360

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378

<210> 26
<211> 232
<212> DNA
<213> Synthetische Sequenz
<220>
<223> an essentiellen Aminosaeuren reiches Protein
<400> 26

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120
qcwlilllllv vivlvltylv pllmmvillv vmlvfvvvp tyrkntlthq vkkylyikqv
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232

<210> 27
<211> 724
<212> DNA
<213> Synthetische Sequenz
<220>
<223> an essentiellen Aminosaeuren reiches Protein
<400> 27

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120
cccagtacca gaccctgatg aagaccaagc tggacaagta cgtgcccattg cacctgcact
180
tccccaaagcc cgtgccccac gacccccccg agaagaagat caggagcgtg acctactaca
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724

<210> 28
<211> 51
<212> PRT
<213> Synthetische Sequenz
<220>

<223> sezernierbares oberflaechenaktives Peptid
 <400> 28

Met	Ala	Pro	Cys	Lys	Arg	Arg	Ala	Ala	Cys	Gly	Ala	Leu	Leu	Leu	Leu
1				5					10					15	
Ser	Ala	Leu	Val	Val	Cys	Phe	Ser	Pro	Ala	Ala	Glu	Ala	Ser	Arg	Arg
			20					25					30		
Asn	Arg	Glu	Gln	Asp	Asn	Pro	Leu	Leu	Leu	Leu	Val	Val	Val	Val	Ala
			35				40					45			
Ala	Ala	Ala													
49	50	51													

<210> 29
 <211> 188
 <212> DNA
 <213> Synthetische Sequenz
 <220>
 <223> sezernierbares oberflaechenaktives Peptid
 <400> 29

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188
  
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<210> 30
 <211> 22
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> sezernierbares oberflaechenaktives Peptid, reife Form
 <400> 30

Ser	Arg	Arg	Asn	Arg	Glu	Gln	Asp	Asn	Pro	Leu	Leu	Leu	Leu	Val	Val
1				5					10					15	
Val	Val	Ala	Ala	Ala	Ala										
17	18	19	20	21	22										

<210> 31
 <211> 9
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 31

Thr	Gln	Val	Leu	Arg	Pro	Phe	Gly	Val
1	2	3	4	5	6	7	8	9

<210> 32
 <211> 8
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 32

Glu	Pro	Val	His	Ile	Leu	Cys	Asn
1	2	3	4	5	6	7	8

<210> 33
 <211> 8
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 33

Leu	Asn	Trp	Val	Val	Asn	Thr	Leu
1	2	3	4	5	6	7	8

<210> 34
 <211> 11
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 34

Gly	Gly	Val	Val	Thr	Val	Thr	Gln	Asp	Ser	Ser
1	2	3	4	5	6	7	8	9	10	11

<210> 35
 <211> 9
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 35

Lys	Lys	Pro	Val	Gln	Leu	Pro	Gly	Ala
1	2	3	4	5	6	7	8	9

<210> 36
 <211> 28
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 36

Ile	Lys	Phe	Val	Arg	Leu	Trp	Phe	Thr	Asp	Ile	Leu	Gly	His	Leu	Lys
1				5					10					15	

Ser	Val	Val	Val	Ala	Pro	Ala	Glu	Leu	Glu	Ser	Ala
17	18	19	20	21	22	23	24	25	26	27	28

<210> 37
 <211> 10
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 37

Glu	Ile	Glu	Phe	Tyr	Leu	Val	Gln	Ser	Leu
1	2	3	4	5	6	7	8	9	10

<210> 38
 <211> 10
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 38

Arg	Ser	Ala	Leu	Val	Arg	Val	Pro	Thr	Tyr
1	2	3	4	5	6	7	8	9	10

<210> 39
 <211> 24
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 39

Asn	Leu	Tyr	Leu	Gly	Val	Val	Leu	Ala	Ala	Val	Val	Ile	Ile	Thr	Gly
1				5					10						15

Cys	Phe	Ser	Tyr	Tyr	Gln	Glu	Ala
17	18	19	20	21	22	23	24

<210> 40
 <211> 28
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 40

Arg	Lys	Ile	Val	Glu	Phe	Thr	Cys	His	Thr	Ala	Phe	Phe	Val	Ser	Ile
1				5					10					15	

Val	Val	Val	Gln	Trp	Ala	Asp	Leu	Ile	Ile	Cys	Lys
17	18	19	20	21	22	23	24	25	26	27	28

<210> 41
 <211> 13
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 41

Ala	Glu	Gly	Val	Val	Val	Gly	Asp	Leu	Val	Glu	Val	Lys
1	2	3	4	5	6	7	8	9	10	11	12	13

<210> 42
 <211> 26
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 42

Thr	Ala	Ile	Phe	Pro	Leu	Leu	Phe	Thr	Ala	Val	Gly	Tyr	Cys	Ala	Ala
1				5					10					15	

Gln	Ser	Ile	Ala	Asp	Leu	Ala	Ala	Ala	Asn
17	18	19	20	21	22	23	24	25	26

<210> 43
 <211> 7
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 43

Ser	Ala	Gln	Leu	Ile	Ser	Ala
1	2	3	4	5	6	7

<210> 44
 <211> 7
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 44

Leu	Arg	Ile	Leu	Ser	Ser	Lys
1	2	3	4	5	6	7

<210> 46
 <211> 88
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> sezernierbares schwermetallbindendes Protein, reife Form
 <400> 46

Ser	Arg	Pro	Pro	Ser	Pro	Leu	Ala	Ala	Val	Val	Ala	Pro	Val	Trp	Ala
1				5					10					15	
Ala	Thr	Gln	Thr	Val	Thr	Leu	Ser	Val	Pro	Gly	Met	Thr	Cys	Ser	Ala
			20					25					30		
Cys	Pro	Ile	Thr	Val	Lys	Lys	Ala	Ile	Ser	Lys	Val	Glu	Gly	Val	Ser
		35					40					45			
Lys	Val	Asp	Val	Thr	Phe	Glu	Thr	Arg	Gln	Ala	Val	Val	Thr	Phe	Asp
	50					55					60				
Asp	Ala	Lys	Thr	Ser	Val	Gln	Lys	Leu	Thr	Lys	Ala	Thr	Ala	Asp	Ala
65					70					75					80
Gly	Tyr	Pro	Ser	Ser	Val	Lys	Gln								
81	82	83	84	85	86	87	88								

<210> 48
 <211> 24
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 48

Cys	Lys	Arg	Arg	Ala	Ala	Cys	Gly	Ala	Leu	Leu	Leu	Leu	Ser	Ala	Leu
1				5					10					15	
Val	Val	Cys	Phe	Ser	Pro	Ala	Ala								
17	18	19	20	21	22	23	24								

<210> 49
 <211> 8
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 49

Arg	Gln	Ala	Val	Val	Thr	Phe	Asp
1	2	3	4	5	6	7	8

<210> 50
 <211> 9
 <212> PRT
 <213> Synthetische Sequenz
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 <223> immunogenes Teilpeptid
 <400> 50

Lys	Thr	Ser	Val	Gln	Lys	Leu	Thr	Lys
1	2	3	4	5	6	7	8	9

<210> 51
 <211> 10
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 51

Tyr	Tyr	Lys	Tyr	Gln	Leu	Val	Leu	Lys	Leu
1	2	3	4	5	6	7	8	9	10

<210> 52
 <211> 17
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 52

Thr	His	Gln	Val	Lys	Lys	Tyr	Leu	Tyr	Ile	Lys	Gln	Val	Leu	Met	Thr
1				5					10					15	

Met
 17

<210> 53
 <211> 16
 <212> PRT
 <213> Synthetische Sequenz
 <220>
 <223> immunogenes Teilpeptid
 <400> 53

Asp	Lys	Tyr	Val	Met	His	Leu	His	Phe	Pro	Lys	Pro	Val	Pro	His	Asp
1				5					10					15	

<210> 56
 <211> 10
 <212> PRT
 <213> Synthetische Sequenz
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 <223> immunogenes Teilpeptid
 <400> 56

Asn	Pro	Leu	Leu	Leu	Leu	Val	Val	Val	Ala
1	2	3	4	5	6	7	8	9	10

<210> 57
 <211> 213
 <212> DNA
 <213> Synthetische Sequenz
 <220>
 <223> durch Chrysamoeba leicht aufnehmbares Protein, variable Sequenz (D = G, A oder T; N = G, A, T oder C)
 <400> 57

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 60
 dnndnndnnd nndnndnndn ndnndnnccc gggggggggc ccdtdtdtdt dtdtdtdtdt
 120
 dtdtdtdtdt tddtdtdtdt dtdtdtdtdt dtdtdtdtdt tddtdtdtdt dtdtdtdtdt
 180
 dtdtdtdtdt tdtaataggg gggggggggg ggg
 213

<210> 58
 <211> 15
 <212> DNA
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 <220>
 <223> PCR-Primer
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 15

<210> 59
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 <212> DNA
 <213> Synthetische Sequenz
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 <223> PCR-Primer
 <400> 59

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 15

<210> 60
 <211> 27
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 <213> Synthetische Sequenz
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 27

<210> 61
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 <212> DNA
 <213> Synthetische Sequenz
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 <223> PCR-Primer
 <400> 61

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 27

<210> 62
 <211> 151
 <212> DNA
 <213> Kreuzbluetler-Tobamovirus crTMV

<220>
 <223> IRES-Sequenz
 <400> 62

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 60
 aagattggag gaagggatgt gattagtaag tataagtata gaccagagaa gtacgccggt
 120
 cctgattcgt tacttaataa agaagaaaat g
 151

<210> 63
 <211> 663
 <212> PRT
 <213> *Saccharomyces cerevisiae*
 <220>
 <223> Glutamintransporter
 <400> 63

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

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

				565				570				575			
Ile	Ala	Pro	Ile	Gly	Gly	Gly	Gly	Lys	Leu	Ser	Ala	Gln	Ser	Phe	Phe
			580					585					590		
Glu	Asn	Tyr	Leu	Ala	Met	Pro	Ile	Leu	Ile	Ala	Leu	Tyr	Ile	Phe	Tyr
			595				600					605			
Lys	Val	Trp	Lys	Lys	Asp	Trp	Ser	Leu	Phe	Ile	Pro	Ala	Asp	Lys	Val
			610				615				620				
Asp	Leu	Val	Ser	His	Arg	Asn	Ile	Phe	Asp	Glu	Glu	Leu	Leu	Lys	Gln
			625				630				635				640
Glu	Asp	Glu	Glu	Tyr	Lys	Glu	Arg	Leu	Arg	Asn	Gly	Pro	Tyr	Trp	Lys
				645							650				655
Arg	Val	Leu	Asp	Phe	Trp	Cys									
657	658	659	660	661	662	663									