

## SEQUENCE LISTING

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<120> Meningitis vaccines comprising subtilinases

<130> IDM1478

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&lt;170&gt; BiSSAP 1.2

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**<211> 1082**

<212> PRT

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<400> 1

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&lt;211&gt; 3249

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&lt;213&gt; Neisseria meningitidis

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&lt;211&gt; 824

&lt;212&gt; PRT

&lt;213&gt; Neisseria meningitidis

&lt;400&gt; 3

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Ile Asn Ala Pro Pro Pro Asn Leu His Thr Gly Asp Phe Pro Asn Pro
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Asn Asp Ala Tyr Lys Asn Leu Ile Asn Leu Lys Pro Ala Ile Glu Ala
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165     170     175
Lys Glu Ile Gly His Ile Asp Leu Val Ser His Ile Ile Gly Gly Arg
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His Ile Met Asn Thr Asn Asp Glu Thr Lys Asn Glu Met Met Val Ala
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 755 760 765  
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&lt;210&gt; 4

&lt;211&gt; 824

&lt;212&gt; PRT

&lt;213&gt; Neisseria meningitidis

&lt;400&gt; 4

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Met	Ser	Asn	Asp	Asn	Leu	Arg	Thr	Thr	Leu	Leu	Thr	Thr	Ala	Gln	Asp								
			420					425					430										
Ile	Gly	Ala	Val	Gly	Val	Asp	Ser	Lys	Phe	Gly	Trp	Gly	Leu	Leu	Asp								
		435					440					445											
Ala	Gly	Lys	Ala	Met	Asn	Gly	Pro	Ala	Ser	Phe	Pro	Phe	Gly	Asp	Phe								
		450				455					460												
Thr	Ala	Asp	Thr	Lys	Gly	Thr	Ser	Asp	Ile	Ala	Tyr	Ser	Phe	Arg	Asn								
465					470					475					480								
Asp	Ile	Ser	Gly	Thr	Gly	Gly	Leu	Ile	Lys	Lys	Gly	Gly	Ser	Gln	Leu								
				485					490					495									
Gln	Leu	His	Gly	Asn	Asn	Thr	Tyr	Thr	Gly	Lys	Thr	Ile	Ile	Glu	Gly								
			500					505					510										
Gly	Ser	Leu	Val	Leu	Tyr	Gly	Asn	Asn	Lys	Ser	Asp	Met	Arg	Val	Glu								
		515					520					525											
Thr	Lys	Gly	Ala	Leu	Ile	Tyr	Asn	Gly	Ala	Ala	Ser	Gly	Gly	Ser	Leu								
		530				535					540												
Asn	Ser	Asp	Gly	Ile	Val	Tyr	Leu	Ala	Asp	Thr	Asp	Gln	Ser	Gly	Ala								
545					550					555					560								
Asn	Glu	Thr	Val	His	Ile	Lys	Gly	Ser	Leu	Gln	Leu	Asp	Gly	Lys	Gly								
				565					570					575									
Thr	Leu	Tyr	Thr	Arg	Leu	Gly	Lys	Leu	Leu	Lys	Val	Asp	Gly	Thr	Ala								
			580					585					590										
Ile	Ile	Gly	Gly	Lys	Leu	Tyr	Met	Ser	Ala	Arg	Gly	Lys	Gly	Ala	Gly								
		595					600					605											
Tyr	Leu	Asn	Ser	Thr	Gly	Arg	Arg	Val	Pro	Phe	Leu	Ser	Ala	Ala	Lys								
		610				615					620												
Ile	Gly	Gln	Asp	Tyr	Ser	Phe	Phe	Thr	Asn	Ile	Glu	Thr	Asp	Gly	Gly								
625					630				635			</											

<210> 5



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<211> 1053  
 <212> PRT  
 <213> Neisseria meningitidis

<400> 5

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

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450	455	460
Thr Ala Asp Thr Lys Gly	Thr Ser Asp Ile Ala Tyr Ser Phe Arg Asn	
465	470	475
Asp Ile Ser Gly Thr Gly Gly Leu Ile Lys Lys Gly Gly Ser Gln Leu		480
	485	490
Gln Leu His Gly Asn Asn Thr Tyr Thr Gly Lys Thr Ile Ile Glu Gly		495
	500	505
Gly Ser Leu Val Leu Tyr Gly Asn Asn Lys Ser Asp Met Arg Val Glu		510
	515	520
Thr Lys Gly Ala Leu Ile Tyr Asn Gly Ala Ala Ser Gly Gly Ser Leu		525
	530	535
Asn Ser Asp Gly Ile Val Tyr Leu Ala Asp Thr Asp Gln Ser Gly Ala		540
545	550	555
Asn Glu Thr Val His Ile Lys Gly Ser Leu Gln Leu Asp Gly Lys Gly		560
	565	570
Thr Leu Tyr Thr Arg Leu Gly Lys Leu Leu Lys Val Asp Gly Thr Ala		575
	580	585
Ile Ile Gly Gly Lys Leu Tyr Met Ser Ala Arg Gly Lys Gly Ala Gly		590
	595	600
Tyr Leu Asn Ser Thr Gly Arg Arg Val Pro Phe Leu Ser Ala Ala Lys		605
	610	615
Ile Gly Gln Asp Tyr Ser Phe Phe Thr Asn Ile Glu Thr Asp Gly Gly		620
625	630	635
Leu Leu Ala Ser Leu Asp Ser Val Glu Lys Thr Ala Gly Ser Glu Gly		640
	645	650
Asp Thr Leu Ser Tyr Tyr Val Arg Arg Gly Asn Ala Ala Arg Thr Ala		655
	660	665
Ser Ala Ala His Ser Ala Pro Ala Gly Leu Lys His Ala Val Glu		670
	675	680
Gln Gly Gly Ser Asn Leu Glu Asn Leu Met Val Glu Leu Asp Ala Ser		685
	690	695
Glu Ser Ser Ala Thr Pro Glu Thr Val Glu Thr Ala Ala Ala Asp Arg		700
705	710	715
Thr Asp Met Pro Gly Ile Arg Pro Tyr Gly Ala Thr Phe Arg Ala Ala		720
	725	730
Ala Ala Val Gln His Ala Asn Ala Ala Asp Gly Val Arg Ile Phe Asn		735
	740	745
Ser Leu Ala Thr Val Tyr Ala Asp Ser Thr Ala Ala His Ala Asp		750
	755	760
Met Gln Gly Arg Arg Leu Lys Ala Val Ser Asp Gly Leu Asp His Asn		765
	770	775
Gly Thr Gly Leu Arg Val Ile Ala Gln Thr Gln Gln Asp Gly Gly Thr		780
785	790	795
Trp Glu Gln Gly Gly Val Glu Gly Lys Met Arg Gly Ser Thr Gln Thr		800
	805	810
Val Gly Ile Ala Lys Thr Gly Glu Asn Thr Thr Ala Ala Thr		815
	820	825
Leu Gly Met Gly Arg Ser Thr Trp Ser Glu Asn Ser Ala Asn Ala Lys		830
	835	840
Thr Asp Ser Ile Ser Leu Phe Ala Gly Ile Arg His Asp Ala Gly Asp		845
	850	855
Ile Gly Tyr Leu Lys Gly Leu Phe Ser Tyr Gly Arg Tyr Lys Asn Ser		860
865	870	875
Ile Ser Arg Ser Thr Gly Ala Asp Glu His Ala Glu Gly Ser Val Asn		880
	885	890
Gly Thr Leu Met Gln Leu Gly Ala Leu Gly Gly Val Asn Val Pro Phe		895
	900	905
Ala Ala Thr Gly Asp Leu Thr Val Glu Gly Gly Leu Arg Tyr Asp Leu		910
	915	920
Leu Lys Gln Asp Ala Phe Ala Glu Lys Gly Ser Ala Leu Gly Trp Ser		925
	930	935
Gly Asn Ser Leu Thr Glu Gly Thr Leu Val Gly Leu Ala Gly Leu Lys		940
945	950	955
		960

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Leu	Ser	Gln	Pro	Leu	Ser	Asp	Lys	Ala	Val	Leu	Phe	Ala	Thr	Ala	Gly
				965					970					975	
Val	Glu	Arg	Asp	Leu	Asn	Gly	Arg	Asp	Tyr	Thr	Val	Thr	Gly	Gly	Phe
			980					985					990		
Thr	Gly	Ala	Thr	Ala	Ala	Thr	Gly	Lys	Thr	Gly	Ala	Arg	Asn	Met	Pro
		995					1000					1005			
His	Thr	Arg	Leu	Val	Ala	Gly	Leu	Gly	Ala	Asp	Val	Glu	Phe	Gly	Asn
	1010					1015				1020					
Gly	Trp	Asn	Gly	Leu	Ala	Arg	Tyr	Ser	Tyr	Ala	Gly	Ser	Lys	Gln	Tyr
1025					1030					1035					1040
Gly	Asn	His	Ser	Gly	Arg	Val	Gly	Val	Gly	Tyr	Arg	Phe			
				1045					1050						

&lt;210&gt; 6

&lt;211&gt; 1053

&lt;212&gt; PRT

&lt;213&gt; Neisseria meningitidis

&lt;400&gt; 6

Gly	Gly	Gly	Gly	Gly	Gly	Thr	Ser	Ala	Pro	Asp	Phe	Asn	Ala	Gly	Gly
1				5					10					15	
Thr	Gly	Ile	Gly	Ser	Asn	Ser	Arg	Ala	Thr	Thr	Ala	Lys	Ser	Ala	Ala
		20					25						30		
Val	Ser	Tyr	Ala	Gly	Ile	Lys	Asn	Glu	Met	Cys	Lys	Asp	Arg	Ser	Met
		35				40						45			
Leu	Cys	Ala	Gly	Arg	Asp	Asp	Val	Ala	Val	Thr	Asp	Arg	Asp	Ala	Lys
	50					55					60				
Ile	Asn	Ala	Pro	Pro	Pro	Asn	Leu	His	Thr	Gly	Asp	Phe	Pro	Asn	Pro
65					70					75					80
Asn	Asp	Ala	Tyr	Lys	Asn	Leu	Ile	Asn	Leu	Lys	Pro	Ala	Ile	Glu	Ala
			85					90						95	
Gly	Tyr	Thr	Gly	Arg	Gly	Val	Glu	Val	Gly	Ile	Val	Asp	Thr	Gly	Glu
		100					105						110		
Ser	Val	Gly	Ser	Ile	Ser	Phe	Pro	Glu	Leu	Tyr	Gly	Arg	Lys	Glu	His
		115				120						125			
Gly	Tyr	Asn	Glu	Asn	Tyr	Lys	Asn	Tyr	Thr	Ala	Tyr	Met	Arg	Lys	Glu
	130					135					140				
Ala	Pro	Glu	Asp	Gly	Gly	Gly	Lys	Asp	Ile	Glu	Ala	Ser	Phe	Asp	Asp
145					150					155					160
Glu	Ala	Val	Ile	Glu	Thr	Glu	Ala	Lys	Pro	Thr	Asp	Ile	Arg	His	Val
			165						170					175	
Lys	Glu	Ile	Gly	His	Ile	Asp	Leu	Val	Ser	His	Ile	Ile	Gly	Gly	Arg
		180					185						190		
Ser	Val	Asp	Gly	Arg	Pro	Ala	Gly	Gly	Ile	Ala	Pro	Asp	Ala	Thr	Leu
		195				200						205			
His	Ile	Met	Asn	Thr	Asn	Asp	Glu	Thr	Lys	Asn	Glu	Met	Met	Val	Ala
	210					215					220				
Ala	Ile	Arg	Asn	Ala	Trp	Val	Lys	Leu	Gly	Glu	Arg	Gly	Val	Arg	Ile
225					230					235					240
Val	Asn	Asn	Ser	Phe	Gly	Thr	Thr	Ser	Arg	Ala	Gly	Thr	Ala	Asp	Leu
			245						250					255	
Phe	Gln	Ile	Ala	Asn	Ser	Glu	Glu	Gln	Tyr	Arg	Gln	Ala	Leu	Leu	Asp
		260						265					270		
Tyr	Ser	Gly	Gly	Asp	Lys	Thr	Asp	Glu	Gly	Ile	Arg	Leu	Met	Gln	Gln
		275					280					285			
Ser	Asp	Tyr	Gly	Asn	Leu	Ser	Tyr	His	Ile	Arg	Asn	Lys	Asn	Met	Leu
	290					295					300				
Phe	Ile	Phe	Ser	Thr	Gly	Asn	Asp	Ala	Gln	Ala	Gln	Pro	Asn	Thr	Tyr
305					310					315					320
Ala	Leu	Leu	Pro	Phe	Tyr	Glu	Lys	Asp	Ala	Gln	Lys	Gly	Ile	Ile	Thr
			325						330					335	
Val	Ala	Gly	Val	Asp	Arg	Ser	Gly	Glu	Lys	Phe	Lys	Arg	Glu	Met	Tyr

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			340					345					350		
Gly	Glu	Pro	Gly	Thr	Glu	Pro	Leu	Glu	Tyr	Gly	Ser	Asn	His	Cys	Gly
		355					360					365			
Ile	Thr	Ala	Met	Trp	Cys	Leu	Ser	Ala	Pro	Tyr	Glu	Ala	Ser	Val	Arg
		370				375					380				
Phe	Thr	Arg	Thr	Asn	Pro	Ile	Gln	Ile	Ala	Gly	Thr	Ser	Phe	Ser	Ala
385					390					395					400
Pro	Ile	Val	Thr	Gly	Thr	Ala	Ala	Leu	Leu	Leu	Gln	Lys	Tyr	Pro	Trp
				405				410						415	
Met	Ser	Asn	Asp	Asn	Leu	Arg	Thr	Thr	Leu	Leu	Thr	Thr	Ala	Gln	Asp
			420					425					430		
Ile	Gly	Ala	Val	Gly	Val	Asp	Ser	Lys	Phe	Gly	Trp	Gly	Leu	Leu	Asp
		435					440					445			
Ala	Gly	Lys	Ala	Met	Asn	Gly	Pro	Ala	Ser	Phe	Pro	Phe	Gly	Asp	Phe
		450				455					460				
Thr	Ala	Asp	Thr	Lys	Gly	Thr	Ser	Asp	Ile	Ala	Tyr	Ser	Phe	Arg	Asn
465					470					475					480
Asp	Ile	Ser	Gly	Thr	Gly	Gly	Leu	Ile	Lys	Lys	Gly	Gly	Ser	Gln	Leu
				485				490						495	
Gln	Leu	His	Gly	Asn	Asn	Thr	Tyr	Thr	Gly	Lys	Thr	Ile	Ile	Glu	Gly
			500					505					510		
Gly	Ser	Leu	Val	Leu	Tyr	Gly	Asn	Asn	Lys	Ser	Asp	Met	Arg	Val	Glu
		515					520					525			
Thr	Lys	Gly	Ala	Leu	Ile	Tyr	Asn	Gly	Ala	Ala	Ser	Gly	Gly	Ser	Leu
		530				535					540				
Asn	Ser	Asp	Gly	Ile	Val	Tyr	Leu	Ala	Asp	Thr	Asp	Gln	Ser	Gly	Ala
545					550					555					560
Asn	Glu	Thr	Val	His	Ile	Lys	Gly	Ser	Leu	Gln	Leu	Asp	Gly	Lys	Gly
				565				570						575	
Thr	Leu	Tyr	Thr	Arg	Leu	Gly	Lys	Leu	Leu	Lys	Val	Asp	Gly	Thr	Ala
			580					585					590		
Ile	Ile	Gly	Gly	Lys	Leu	Tyr	Met	Ser	Ala	Arg	Gly	Lys	Gly	Ala	Gly
		595					600					605			
Tyr	Leu	Asn	Ser	Thr	Gly	Arg	Arg	Val	Pro	Phe	Leu	Ser	Ala	Ala	Lys
		610				615					620				
Ile	Gly	Gln	Asp	Tyr	Ser	Phe	Phe	Thr	Asn	Ile	Glu	Thr	Asp	Gly	Gly
625					630					635					640
Leu	Leu	Ala	Ser	Leu	Asp	Ser	Val	Glu	Lys	Thr	Ala	Gly	Ser	Glu	Gly
				645				650						655	
Asp	Thr	Leu	Ser	Tyr	Tyr	Val	Arg	Arg	Gly	Asn	Ala	Ala	Arg	Thr	Ala
			660					665					670		
Ser	Ala	Ala	Ala	His	Ser	Ala	Pro	Ala	Gly	Leu	Lys	His	Ala	Val	Glu
		675					680					685			
Gln	Gly	Gly	Ser	Asn	Leu	Glu	Asn	Leu	Met	Val	Glu	Leu	Asp	Ala	Ser

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Thr	Asp	Ser	Ile	Ser	Leu	Phe	Ala	Gly	Ile	Arg	His	Asp	Ala	Gly	Asp		
850						855					860						
Ile	Gly	Tyr	Leu	Lys	Gly	Leu	Phe	Ser	Tyr	Gly	Arg	Tyr	Lys	Asn	Ser		
865					870					875					880		
Ile	Ser	Arg	Ser	Thr	Gly	Ala	Asp	Glu	His	Ala	Glu	Gly	Ser	Val	Asn		
				885					890					895			
Gly	Thr	Leu	Met	Gln	Leu	Gly	Ala	Leu	Gly	Gly	Val	Asn	Val	Pro	Phe		
			900					905					910				
Ala	Ala	Thr	Gly	Asp	Leu	Thr	Val	Glu	Gly	Gly	Leu	Arg	Tyr	Asp	Leu		
		915					920					925					
Leu	Lys	Gln	Asp	Ala	Phe	Ala	Glu	Lys	Gly	Ser	Ala	Leu	Gly	Trp	Ser		
	930					935					940						
Gly	Asn	Ser	Leu	Thr	Glu	Gly	Thr	Leu	Val	Gly	Leu	Ala	Gly	Leu	Lys		
945					950					955					960		
Leu	Ser	Gln	Pro	Leu	Ser	Asp	Lys	Ala	Val	Leu	Phe	Ala	Thr	Ala	Gly		
				965					970					975			
Val	Glu	Arg	Asp	Leu	Asn	Gly	Arg	Asp	Tyr	Thr	Val	Thr	Gly	Gly	Phe		
			980					985					990				
Thr	Gly	Ala	Thr	Ala	Ala	Thr	Gly	Lys	Thr	Gly	Ala	Arg	Asn	Met	Pro		
		995					1000					1005					
His	Thr	Arg	Leu	Val	Ala	Gly	Leu	Gly	Ala	Asp	Val	Glu	Phe	Gly	Asn		
	1010					1015					1020						
Gly	Trp	Asn	Gly	Leu	Ala	Arg	Tyr	Ser	Tyr	Ala	Gly	Ser	Lys	Gln	Tyr		
1025					1030					1035					1040		
Gly	Asn	His	Ser	Gly	Arg	Val	Gly	Val	Gly	Tyr	Arg	Phe					
				1045					1050								