

170222\_16PP026WO\_Sequence protocol\_JX-2.txt

SEQUENCE LISTING

<110> EUROIMMUN Medizinische Labordiagnostika AG

<120> An immunoassay for the diagnosis of viral infections

<130> 16PP026WO

<160> 27

<170> BiSSAP 1.3

<210> 1

<211> 352

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO1: Zika virus NS1 antigen

<400> 1

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

Trp	Pro	Lys	Ser	His	Thr	Leu	Trp	Thr	Asp	Gly	Val	Glu	Glu	Ser	Asp
225					230					235					240
Leu	Ile	Ile	Pro	Lys	Ser	Leu	Ala	Gly	Pro	Leu	Ser	His	His	Asn	Thr
				245					250					255	
Arg	Glu	Gly	Tyr	Arg	Thr	Gln	Val	Lys	Gly	Pro	Trp	His	Ser	Glu	Glu
			260					265					270		
Leu	Glu	Ile	Arg	Phe	Glu	Glu	Cys	Pro	Gly	Thr	Lys	Val	His	Val	Glu
		275					280					285			
Glu	Thr	Cys	Gly	Thr	Arg	Gly	Pro	Ser	Leu	Arg	Ser	Thr	Thr	Ala	Ser
	290					295					300				
Gly	Arg	Val	Ile	Glu	Glu	Trp	Cys	Cys	Arg	Glu	Cys	Thr	Met	Pro	Pro
305					310					315					320
Leu	Ser	Phe	Arg	Ala	Lys	Asp	Gly	Cys	Trp	Tyr	Gly	Met	Glu	Ile	Arg
				325					330					335	
Pro	Arg	Lys	Glu	Pro	Glu	Ser	Asn	Leu	Val	Arg	Ser	Met	Val	Thr	Ala
			340					345					350		

<210> 2

<211> 352

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO2: dengue virus 1 NS1 antigen

<400> 2

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

Gln Met Cys Asp His Arg Leu Met Ser Ala Ala Ile Lys Asp Ser Lys	180	185	190
Ala Val His Ala Asp Met Gly Tyr Trp Ile Glu Ser Glu Lys Asn Glu	195	200	205
Thr Trp Lys Leu Ala Arg Ala Ser Phe Ile Glu Val Lys Thr Cys Ile	210	215	220
Trp Pro Lys Ser His Thr Leu Trp Ser Asn Gly Val Leu Glu Ser Glu	225	230	235
Met Ile Ile Pro Lys Ile Tyr Gly Gly Pro Ile Ser Gln His Asn Tyr	245	250	255
Arg Pro Gly Tyr Phe Thr Gln Thr Ala Gly Pro Trp His Leu Gly Lys	260	265	270
Leu Glu Leu Asp Phe Asp Leu Cys Glu Gly Thr Thr Val Ile Val Asp	275	280	285
Glu His Cys Gly Asn Arg Gly Pro Ser Leu Arg Thr Thr Thr Val Thr	290	295	300
Gly Lys Ile Ile His Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro	305	310	315
Leu Arg Phe Arg Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg	325	330	335
Pro Val Lys Glu Lys Glu Glu Asn Leu Val Lys Ser Met Val Ser Ala	340	345	350

<210> 3

<211> 352

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO3: dengue virus 2 NS1 antigen

<400> 3

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

His	Asn	Gln	Thr	Phe	Leu	Ile	Asp	Gly	Pro	Glu	Thr	Ala	Glu	Cys	Pro
130						135					140				
Asn	Thr	Asn	Arg	Ala	Trp	Asn	Ser	Leu	Glu	Val	Glu	Asp	Tyr	Gly	Phe
145					150					155					160
Gly	Val	Phe	Thr	Thr	Asn	Ile	Trp	Leu	Lys	Leu	Lys	Glu	Lys	Gln	Asp
				165					170					175	
Ala	Phe	Cys	Asp	Ser	Lys	Leu	Met	Ser	Ala	Ala	Ile	Lys	Asp	Asn	Arg
			180					185					190		
Ala	Val	His	Ala	Asp	Met	Gly	Tyr	Trp	Ile	Glu	Ser	Ala	Leu	Asn	Asp
		195					200					205			
Thr	Trp	Lys	Ile	Glu	Lys	Ala	Ser	Phe	Ile	Glu	Val	Lys	Asn	Cys	His
	210					215					220				
Trp	Pro	Lys	Ser	His	Thr	Leu	Trp	Ser	Asn	Gly	Val	Leu	Glu	Ser	Glu
225					230					235					240
Met	Ile	Ile	Pro	Lys	Asn	Leu	Ala	Gly	Pro	Val	Ser	Gln	His	Asn	Tyr
				245					250					255	
Arg	Pro	Gly	Tyr	His	Thr	Gln	Ile	Ala	Gly	Pro	Trp	His	Leu	Gly	Lys
		260						265					270		
Leu	Glu	Met	Asp	Phe	Asp	Phe	Cys	Asp	Gly	Thr	Thr	Val	Val	Val	Thr
		275					280					285			
Glu	Asp	Cys	Gly	Asn	Arg	Gly	Pro	Ser	Leu	Arg	Thr	Thr	Thr	Ala	Ser
	290					295					300				
Gly	Lys	Leu	Ile	Thr	Glu	Trp	Cys	Cys	Arg	Ser	Cys	Thr	Leu	Pro	Pro
305					310					315					320
Leu	Arg	Tyr	Arg	Gly	Glu	Asp	Gly	Cys	Trp	Tyr	Gly	Met	Glu	Ile	Arg
				325					330					335	
Pro	Leu	Lys	Glu	Lys	Glu	Glu	Asn	Leu	Val	Asn	Ser	Leu	Val	Thr	Ala
		340						345					350		

<210> 4

<211> 352

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO4: dengue virus 3 NS1 antigen

<400> 4

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





<400> 6

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

<210> 7

<211> 352

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO7: Tick-borne encephalitis virus NS1 antigen

<400> 7

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



Arg Pro Val His Asp Gln Gly Gly Leu Val Arg Ser Met Val Val Ala  
 340 345 350

<210> 8

<211> 352

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO8: Japanese encephalitis virus NS1 antigen

<400> 8

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

Glu	Asp	Cys	Gly	Lys	Arg	Gly	Pro	Ser	Ile	Arg	Thr	Thr	Thr	Asp	Ser
290						295					300				
Gly	Lys	Leu	Ile	Thr	Asp	Trp	Cys	Cys	Arg	Ser	Cys	Ser	Leu	Pro	Pro
305					310					315				320	
Leu	Arg	Phe	Arg	Thr	Glu	Asn	Gly	Cys	Trp	Tyr	Gly	Met	Glu	Ile	Arg
				325					330					335	
Pro	Val	Arg	His	Asp	Glu	Thr	Thr	Leu	Val	Arg	Ser	Gln	Val	Asp	Ala
			340					345					350		

<210> 9

<211> 352

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO9: Yellow fever virus NS1 antigen

<400> 9

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

Met	Phe	Met	Pro	Arg	Ser	Ile	Gly	Gly	Pro	Val	Ser	Ser	His	Asn	His
			245						250					255	
Ile	Pro	Gly	Tyr	Lys	Val	Gln	Thr	Asn	Gly	Pro	Trp	Met	Gln	Val	Pro
		260						265					270		
Leu	Glu	Val	Lys	Arg	Glu	Ala	Cys	Pro	Gly	Thr	Ser	Val	Ile	Ile	Asp
		275					280					285			
Gly	Asn	Cys	Asp	Gly	Arg	Gly	Lys	Ser	Thr	Arg	Ser	Thr	Thr	Asp	Ser
	290					295					300				
Gly	Lys	Ile	Ile	Pro	Glu	Trp	Cys	Cys	Arg	Ser	Cys	Thr	Met	Pro	Pro
305					310					315				320	
Val	Ser	Phe	His	Gly	Ser	Asp	Gly	Cys	Trp	Tyr	Pro	Met	Glu	Ile	Arg
			325						330					335	
Pro	Arg	Lys	Thr	His	Glu	Ser	His	Leu	Val	Arg	Ser	Trp	Val	Thr	Ala
		340						345						350	

<210> 10

<211> 362

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO10: Zika virus NS1 antigen with C-terminal His tag

<400> 10

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

Ala Ala His Ser Asp Leu Gly Tyr Trp Ile Glu Ser Glu Lys Asn Asp  
 195 200 205  
 Thr Trp Arg Leu Lys Arg Ala His Leu Ile Glu Met Lys Thr Cys Glu  
 210 215 220  
 Trp Pro Lys Ser His Thr Leu Trp Thr Asp Gly Val Glu Glu Ser Asp  
 225 230 235 240  
 Leu Ile Ile Pro Lys Ser Leu Ala Gly Pro Leu Ser His His Asn Thr  
 245 250 255  
 Arg Glu Gly Tyr Arg Thr Gln Val Lys Gly Pro Trp His Ser Glu Glu  
 260 265 270  
 Leu Glu Ile Arg Phe Glu Glu Cys Pro Gly Thr Lys Val His Val Glu  
 275 280 285  
 Glu Thr Cys Gly Thr Arg Gly Pro Ser Leu Arg Ser Thr Thr Ala Ser  
 290 295 300  
 Gly Arg Val Ile Glu Glu Trp Cys Cys Arg Glu Cys Thr Met Pro Pro  
 305 310 315 320  
 Leu Ser Phe Arg Ala Lys Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg  
 325 330 335  
 Pro Arg Lys Glu Pro Glu Ser Asn Leu Val Arg Ser Met Val Thr Ala  
 340 345 350  
 Leu Glu His His His His His His His  
 355 360

<210> 11

<211> 500

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO 11: Zika virus envelope glycoprotein

<400> 11

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

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

<210> 12  
 <211> 494  
 <212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO12: dengue virus 1 envelope glycoprotein

<400> 12

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

<210> 13

<211> 495

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO13: dengue virus 2 envelope glycoprotein

<400> 13

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

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

<210> 14

<211> 493

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO14: dengue virus 3 envelope glycoprotein

<400> 14





Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly Asp Thr  
                           405                          410                          415  
 Ala Trp Asp Phe Gly Ser Val Gly Gly Val Leu Asn Ser Leu Gly Lys  
                           420                          425                          430  
 Met Val His Gln Ile Phe Gly Ser Ala Tyr Thr Ala Leu Phe Ser Gly  
                           435                          440                          445  
 Val Ser Trp Ile Met Lys Ile Gly Ile Gly Val Leu Leu Thr Trp Ile  
                           450                          455                          460  
 Gly Leu Asn Ser Lys Asn Thr Ser Met Ser Phe Ser Cys Ile Ala Ile  
 465                          470                          475                          480  
 Gly Ile Ile Thr Leu Tyr Leu Gly Val Val Val Gln Ala  
                           485                          490

<210> 15

<211> 495

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO15: dengue virus 4 envelope glycoprotein

<400> 15

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

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

<210> 16

<211> 497

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO16: West Nile virus envelope glycoprotein

<400> 16

Phe	Asn	Cys	Leu	Gly	Met	Ser	Asn	Arg	Asp	Phe	Leu	Glu	Gly	Val	Ser	1		5		10		15
Gly	Ala	Thr	Trp	Val	Asp	Leu	Val	Leu	Glu	Gly	Asp	Ser	Cys	Val	Thr		20		25		30	
Ile	Met	Ser	Lys	Asp	Lys	Pro	Thr	Ile	Asp	Val	Lys	Met	Met	Asn	Met	35		40		45		

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

Leu Phe Gly Gly Met Ser Trp Ile Thr Gln Gly Leu Leu Gly Ala Leu  
 450 455 460  
 Leu Leu Trp Met Gly Ile Asn Ala Arg Asp Arg Ser Ile Ala Met Thr  
 465 470 475 480  
 Phe Leu Ala Val Gly Gly Val Leu Leu Phe Leu Ser Val Asn Val His  
 485 490 495  
 Ala

<210> 17

<211> 496

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO17: Tick-borne encephalitis virus envelope glycoprotein

<400> 17

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



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

450		455		460											
Gly	Ala	Leu	Leu	Leu	Trp	Met	Gly	Val	Asn	Ala	Arg	Asp	Arg	Ser	Ile
465				470					475					480	
Ala	Leu	Ala	Phe	Leu	Ala	Thr	Gly	Gly	Val	Leu	Val	Phe	Leu	Ala	Thr
			485						490					495	
Asn	Val	His	Ala												
			500												

<210> 19  
 <211> 353  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> SEQ ID NO19: Powassan virus NS1 antigen

<400> 19

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



	260		265		270										
Thr	Pro	Leu	Arg	Val	Val	Arg	Asp	His	Cys	Pro	Gly	Thr	Ser	Val	Arg
	275					280						285			
Ile	Asp	Ser	His	Cys	Asp	Lys	Arg	Gly	Ala	Ser	Val	Arg	Ser	Thr	Thr
	290					295						300			
Glu	Ser	Gly	Lys	Ile	Ile	Pro	Glu	Trp	Cys	Cys	Arg	Ala	Cys	Glu	Leu
305					310					315					320
Pro	Pro	Val	Thr	Phe	Arg	Ser	Gly	Thr	Asp	Cys	Trp	Tyr	Ala	Met	Glu
				325					330				335		
Ile	Arg	Pro	Val	His	Ser	Gln	Gly	Gly	Leu	Val	Arg	Ser	Met	Val	Val
			340					345					350		

Ala

<210> 20

<211> 384

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO20: Zika virus NS1 antigen with C-terminal His tag and additional fused peptide

<400> 20

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

195	200	205
Ala Val Lys Gly Lys Glu Ala	Ala His Ser Asp Leu Gly Tyr Trp Ile	
210	215	220
Glu Ser Glu Lys Asn Asp Thr Trp Arg Leu Lys Arg Ala His Leu Ile		
225	230	235
Glu Met Lys Thr Cys Glu Trp Pro Lys Ser His Thr Leu Trp Thr Asp		
245	250	255
Gly Val Glu Glu Ser Asp Leu Ile Ile Pro Lys Ser Leu Ala Gly Pro		
260	265	270
Leu Ser His His Asn Thr Arg Glu Gly Tyr Arg Thr Gln Val Lys Gly		
275	280	285
Pro Trp His Ser Glu Glu Leu Glu Ile Arg Phe Glu Glu Cys Pro Gly		
290	295	300
Thr Lys Val His Val Glu Glu Thr Cys Gly Thr Arg Gly Pro Ser Leu		
305	310	315
Arg Ser Thr Thr Ala Ser Gly Arg Val Ile Glu Glu Trp Cys Cys Arg		
325	330	335
Glu Cys Thr Met Pro Pro Leu Ser Phe Arg Ala Lys Asp Gly Cys Trp		
340	345	350
Tyr Gly Met Glu Ile Arg Pro Arg Lys Glu Pro Glu Ser Asn Leu Val		
355	360	365
Arg Ser Met Val Thr Ala Leu Glu His His His His His His His His		
370	375	380

<210> 21

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO21: Zika virus NS1 epitope

<400> 21

Arg Met Glu Asn Ile Met Trp Lys Ser Val Glu Gly

1 5 10

<210> 22

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO22: Zika virus NS1 epitope

<400> 22

Gln Arg Leu Pro Val Pro Val Asn Glu

1 5

<210> 23  
 <211> 9  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <223> SEQ ID NO23: Zika virus NS1 epitope  
  
 <400> 23  
 Ser Tyr Phe Val Arg Ala Ala Lys Thr  
 1 5  
  
 <210> 24  
 <211> 4  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <223> SEQ ID NO24: Zika virus NS1 epitope  
  
 <400> 24  
 Asp Thr Leu Lys  
 1  
  
 <210> 25  
 <211> 5  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <223> SEQ ID NO25: Zika virus NS1 epitope  
  
 <400> 25  
 Asp Tyr Ser Leu Glu  
 1 5  
  
 <210> 26  
 <211> 5  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <223> SEQ ID NO26: Zika virus NS1 epitope  
  
 <400> 26  
 Ser Phe Arg Ala Lys  
 1 5  
  
 <210> 27  
 <211> 493

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO27: Yellow fever virus envelope glycoprotein

<400> 27

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