

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

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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
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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

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

<210> 5

<211> 352

<212> PRT

<213> Artificial Sequence

<220>

<223> SEQ ID NO5: dengue virus 4 NS1 antigen

<400> 5

Asp	Thr	Gly	Cys	Ala	Val	Ser	Trp	Ser	Gly	Lys	Glu	Leu	Lys	Cys	Gly	1	5	10	15
Ser	Gly	Ile	Phe	Val	Val	Asp	Asn	Val	His	Thr	Trp	Thr	Glu	Gln	Tyr	20	25	30	

<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

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


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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

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<210> 16

<211> 497

<212> PRT

<213> Artificial Sequence

<220>

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

<400> 16

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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

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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
1			5					10					15		
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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