

PN791902WO\_ST25  
SEQUENCE LISTING

<110> Istituto Superiore di Sanità

<120> ANTIBODY DERIVATIVES

<130> PN791902WO

<150> 1010389.3

<151> 2010-06-21

<160> 24

<170> PatentIn version 3.5

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<212> DNA

<213> Artificial

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<221> CDS

<222> (1)..(864)

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Ala Gln Pro Ala Met Ala Met Ala Glu Val Gln Leu Ala Glu Ser Gly	
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Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala	
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tct gga ttc acc ttt agc agc gat gcc atg agc tgg gtc cgc cag gct	192
Ser Gly Phe Thr Phe Ser Ser Asp Ala Met Ser Trp Val Arg Gln Ala	
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cca ggg aag ggg ctg gag tgg gtc tca gct att agt ggt agt ggt ggt	240
Pro Gly Lys Gly Leu Glu Trp Val Ser Ala Ile Ser Gly Ser Gly Gly	
65 70 75 80	
agc aca tac tac gca gac tcc gtg aag ggc cgg ttc acc atc tcc aga	288
Ser Thr Tyr Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg	
85 90 95	
gac aat tcc aag aac acg ctg tat ctg caa atg aac agc ctg aga gcc	336
Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala	
100 105 110	
gag gac acg gcc gta tat tac tgt gcg aaa agt aat gag ttt ctt ttt	384
Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys Ser Asn Glu Phe Leu Phe	
115 120 125	
gac tac tgg ggc cag gga act ctg gtc acc gtg tcg aga ggt gga ggc	432
Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Arg Gly Gly Gly	
130 135 140	
ggt tca ggc gga ggt ggc tct ggc ggt ggc gga tcg tct gag ctg act	480
Gly Ser Gly Gly Gly Ser Gly Gly Gly Gly Ser Ser Glu Leu Thr	
145 150 155 160	

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cag gac cct gct gtg tct gtg gcc ttg gga cag aca gtc agg atc aca	528
Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln Thr Val Arg Ile Thr	
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Cys Gln Gly Asp Ser Leu Arg Ser Ser Tyr Ala Ser Trp Tyr Arg Gln	
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agg cca gga cag gcc cct gta cct gtc atc tat ggt aag aac aac tgg	624
Arg Pro Gly Gln Ala Pro Val Pro Val Ile Tyr Gly Lys Asn Asn Trp	
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ccc tca ggg atc cca gac cgg ttc tct ggc tcc agc tca gga aac aca	672
Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser Ser Ser Gly Asn Thr	
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gct tcc ttg acc atc act ggg gct cag gcg gaa gat gag gct gac tat	720
Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu Asp Glu Ala Asp Tyr	
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tac tgt aac tcc tct tat gcg tgg ctg ccc tat gtg gta ttc ggc gga	768
Tyr Cys Asn Ser Ser Tyr Ala Trp Leu Pro Tyr Val Val Phe Gly Gly	
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Gly Thr Lys Leu Thr Val Leu Gly Ala Ala Ala Asp Asp Asp Ser Asp	
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Ser Gly Phe Thr Phe Ser Ser Asp Ala Met Ser Trp Val Arg Gln Ala  
50 55 60

Pro Gly Lys Gly Leu Glu Trp Val Ser Ala Ile Ser Gly Ser Gly Gly  
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Ser Thr Tyr Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg  
85 90 95

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Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala  
100 105 110

Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys Ser Asn Glu Phe Leu Phe  
115 120 125

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Arg Gly Gly Gly  
130 135 140

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ser Glu Leu Thr  
145 150 155 160

Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln Thr Val Arg Ile Thr  
165 170 175

Cys Gln Gly Asp Ser Leu Arg Ser Ser Tyr Ala Ser Trp Tyr Arg Gln  
180 185 190

Arg Pro Gly Gln Ala Pro Val Pro Val Ile Tyr Gly Lys Asn Asn Trp  
195 200 205

Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser Ser Ser Gly Asn Thr  
210 215 220

Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu Asp Glu Ala Asp Tyr  
225 230 235 240

Tyr Cys Asn Ser Ser Tyr Ala Trp Leu Pro Tyr Val Val Phe Gly Gly  
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Gly Thr Lys Leu Thr Val Leu Gly Ala Ala Ala Asp Asp Asp Ser Asp  
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Asp Asp Asp Tyr Lys Asp Asp Asp Asp Lys His His His His His His  
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<223> aCEANcoI5' forward primer

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22

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<212> DNA  
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<223> CEA EcoRI3' reverse primer

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<210> 5  
<211> 27  
<212> DNA  
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<220>  
<223> Ub WT NotI5' forward primer

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gaaggagcgg ccgctatgca gatcttc 27

<210> 6  
<211> 29  
<212> DNA  
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<220>  
<223> UbWTNotI3' reverse primer

<400> 6  
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<210> 7  
<211> 70  
<212> DNA  
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<220>  
<223> VPRNotI+link5' forward primer

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cagaagacca 70

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<211> 36  
<212> DNA  
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<220>  
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<210> 9  
<211> 26  
<212> DNA  
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<220>  
<223> LinYCD NotI 5' forward primer

<400> 9  
ctaggcgcgg ccgcttccca tcgggt 26

<210> 10  
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<212> DNA  
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<220>  
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<400> 10  
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<210> 11  
 <211> 72  
 <212> DNA  
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<220>  
 <223> LLONotI+link5' forward primer

<400> 11  
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 ccatggaaat cg 72

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<400> 12  
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<210> 13  
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 <223> Lin-IL2 NotI 5' forward primer

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

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250

245

255

ggg acc aag ctg acc gtc cta ggc gcg gcc gca atg cag atc ttc gtc	816
Gly Thr Lys Leu Thr Val Leu Gly Ala Ala Ala Met Gln Ile Phe Val	
	260
aag acg tta acc ggt aaa acc ata act cta gaa gtt gaa cca tcc gat	864
Lys Thr Leu Thr Gly Lys Thr Ile Thr Leu Glu Val Glu Pro Ser Asp	
	275
acc atc gaa aac gtt aag gct aaa att caa gac aag gaa ggc att cca	912
Thr Ile Glu Asn Val Lys Ala Lys Ile Gln Asp Lys Glu Gly Ile Pro	
	290
cct gat caa caa aga ttg atc ttt gcc ggt aag cag ctc gag gac ggt	960
Pro Asp Gln Gln Arg Leu Ile Phe Ala Gly Lys Gln Leu Glu Asp Gly	
	305
aga acg ctg tct gat tac aac att cag aag gag tcg acc tta cat ctt	1008
Arg Thr Leu Ser Asp Tyr Asn Ile Gln Lys Glu Ser Thr Leu His Leu	
	325
gtc tta aga cta aga ggt gcg gcc gca ctc gag cac cac cac cac cac	1056
Val Leu Arg Leu Arg Gly Ala Ala Ala Leu Glu His His His His His	
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cac	1059
His	

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

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Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys Ser Asn Glu Phe Leu Phe  
115 120 125

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Arg Gly Gly Gly  
130 135 140

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ser Glu Leu Thr  
145 150 155 160

Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln Thr Val Arg Ile Thr  
165 170 175

Cys Gln Gly Asp Ser Leu Arg Ser Ser Tyr Ala Ser Trp Tyr Arg Gln  
180 185 190

Arg Pro Gly Gln Ala Pro Val Pro Val Ile Tyr Gly Lys Asn Asn Trp  
195 200 205

Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser Ser Ser Gly Asn Thr  
210 215 220

Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu Asp Glu Ala Asp Tyr  
225 230 235 240

Tyr Cys Asn Ser Ser Tyr Ala Trp Leu Pro Tyr Val Val Phe Gly Gly  
245 250 255

Gly Thr Lys Leu Thr Val Leu Gly Ala Ala Ala Met Gln Ile Phe Val  
260 265 270

Lys Thr Leu Thr Gly Lys Thr Ile Thr Leu Glu Val Glu Pro Ser Asp  
275 280 285

Thr Ile Glu Asn Val Lys Ala Lys Ile Gln Asp Lys Glu Gly Ile Pro  
290 295 300

Pro Asp Gln Gln Arg Leu Ile Phe Ala Gly Lys Gln Leu Glu Asp Gly  
305 310 315 320

Arg Thr Leu Ser Asp Tyr Asn Ile Gln Lys Glu Ser Thr Leu His Leu  
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340 345 350

His

<210> 17  
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&lt;223&gt; scFVDIATHIS-1:HIV-vpr

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(1152)

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gcc	cag	ccg	gcg	atg	gcc	atg	gcc	gag	gtg	cag	ctg	gcg	gag	tct	ggg	96
Ala	Gln	Pro	Ala	Met	Ala	Met	Ala	Glu	Val	Gln	Leu	Ala	Glu	Ser	Gly	
			20					25					30			
gga	ggc	ttg	gta	cag	cct	ggg	ggg	tcc	ctg	aga	ctc	tcc	tgt	gcc	gcc	144
Gly	Gly	Leu	Val	Gln	Pro	Gly	Gly	Ser	Leu	Arg	Leu	Ser	Cys	Ala	Ala	
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tct	gga	ttc	acc	ttt	agc	agc	gat	gcc	atg	agc	tgg	gtc	cgc	cag	gct	192
Ser	Gly	Phe	Thr	Phe	Ser	Ser	Asp	Ala	Met	Ser	Trp	Val	Arg	Gln	Ala	
	50					55					60					
cca	ggg	aag	ggg	ctg	gag	tgg	gtc	tca	gct	att	agt	ggt	agt	ggt	ggt	240
Pro	Gly	Lys	Gly	Leu	Glu	Trp	Val	Ser	Ala	Ile	Ser	Gly	Ser	Gly	Gly	
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agc	aca	tac	tac	gca	gac	tcc	gtg	aag	ggc	cgg	ttc	acc	atc	tcc	aga	288
Ser	Thr	Tyr	Tyr	Ala	Asp	Ser	Val	Lys	Gly	Arg	Phe	Thr	Ile	Ser	Arg	
				85					90					95		
gac	aat	tcc	aag	aac	acg	ctg	tat	ctg	caa	atg	aac	agc	ctg	aga	gcc	336
Asp	Asn	Ser	Lys	Asn	Thr	Leu	Tyr	Leu	Gln	Met	Asn	Ser	Leu	Arg	Ala	
			100					105					110			
gag	gac	acg	gcc	gta	tat	tac	tgt	gcg	aaa	agt	aat	gag	ttt	ctt	ttt	384
Glu	Asp	Thr	Ala	Val	Tyr	Tyr	Cys	Ala	Lys	Ser	Asn	Glu	Phe	Leu	Phe	
		115					120					125				
gac	tac	tgg	ggc	cag	gga	act	ctg	gtc	acc	gtg	tcg	aga	ggt	gga	ggc	432
Asp	Tyr	Trp	Gly	Gln	Gly	Thr	Leu	Val	Thr	Val	Ser	Arg	Gly	Gly	Gly	
	130					135					140					
ggt	tca	ggc	gga	ggt	ggc	tct	ggc	ggt	ggc	gga	tcg	tct	gag	ctg	act	480
Gly	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Gly	Ser	Ser	Glu	Leu	Thr	
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cag	gac	cct	gct	gtg	tct	gtg	gcc	ttg	gga	cag	aca	gtc	agg	atc	aca	528
Gln	Asp	Pro	Ala	Val	Ser	Val	Ala	Leu	Gly	Gln	Thr	Val	Arg	Ile	Thr	
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tgc	caa	gga	gac	agc	ctc	aga	agc	tct	tat	gca	agc	tgg	tac	cgg	cag	576
Cys	Gln	Gly	Asp	Ser	Leu	Arg	Ser	Ser	Tyr	Ala	Ser	Trp	Tyr	Arg	Gln	
			180				185						190			
agg	cca	gga	cag	gcc	cct	gta	cct	gtc	atc	tat	ggt	aag	aac	aac	tgg	624
Arg	Pro	Gly	Gln	Ala	Pro	Val	Pro	Val	Ile	Tyr	Gly	Lys	Asn	Asn	Trp	
		195				200						205				
ccc	tca	ggg	atc	cca	gac	cgg	ttc	tct	ggc	tcc	agc	tca	gga	aac	aca	672
Pro	Ser	Gly	Ile	Pro	Asp	Arg	Phe	Ser	Gly	Ser	Ser	Ser	Gly	Asn	Thr	
	210					215					220					
gct	tcc	ttg	acc	atc	act	ggg	gct	cag	gcg	gaa	gat	gag	gct	gac	tat	720

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Ala 225	Ser	Leu	Thr	Ile	Thr 230	Gly	Ala	Gln	Ala	Glu 235	Asp	Glu	Ala	Asp	Tyr 240	
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ggg Gly	acc Thr	aag Lys	ctg Leu 260	acc Thr	gtc Val	cta Leu	ggc Gly	gcg Ala 265	gcc Ala	gca Ala	tct Ser	tcc Ser	tca Ser 270	tcg Ser	ggt Gly	816
agt Ser	agc Ser	tct Ser 275	tcc Ser	ggc Gly	atg Met	gaa Glu	caa Gln 280	gcc Ala	cca Pro	gaa Glu	gac Asp	caa Gln 285	ggg Gly	cca Pro	cag Gln	864
agg Arg	gag Glu 290	cca Pro	cac His	aat Asn	gaa Glu	tgg Trp 295	aca Thr	cta Leu	gag Glu	ctt Leu	tta Leu 300	gag Glu	gag Glu	ctt Leu	aag Lys	912
aat Asn 305	gaa Glu	gct Ala	gtt Val	aga Arg	cat His 310	ttt Phe	cct Pro	agg Arg	att Ile	tgg Trp 315	ctc Leu	cat His	ggc Gly	tta Leu	ggg Gly 320	960
caa Gln	cat His	atc Ile	tat Tyr	gaa Glu 325	act Thr	tat Tyr	ggg Gly	gat Asp	act Thr 330	tgg Trp	gca Ala	gga Gly	gtg Val	gaa Glu 335	gcc Ala	1008
ata Ile	ata Ile	aga Arg	att Ile 340	ctg Leu	caa Gln	caa Gln	ctg Leu	ctg Leu 345	ttt Phe	atc Ile	cat His	ttc Phe	aga Arg 350	att Ile	ggg Gly	1056
tgt Cys	cga Arg	cat His 355	agc Ser	aga Arg	ata Ile	ggc Gly	gtt Val 360	act Thr	caa Gln	cag Gln	agg Arg	aga Arg 365	gca Ala	aga Arg	aat Asn	1104
gga Gly 370	gcc Ala	agt Ser	aga Arg	tcc Ser	gcg Ala	gcc Ala 375	gca Ala	ctc Leu	gag Glu	cac His	cac His 380	cac His	cac His	cac His	cac His	1152

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Gly	Gly	Leu 35	Val	Gln	Pro	Gly	Gly 40	Ser	Leu	Arg	Leu	Ser 45	Cys	Ala	Ala
Ser	Gly 50	Phe	Thr	Phe	Ser	Ser 55	Asp	Ala	Met	Ser	Trp 60	Val	Arg	Gln	Ala
Pro 65	Gly	Lys	Gly	Leu	Glu 70	Trp	Val	Ser	Ala	Ile 75	Ser	Gly	Ser	Gly	Gly 80

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Ser Thr Tyr Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg  
85 90 95

Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala  
100 105 110

Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys Ser Asn Glu Phe Leu Phe  
115 120 125

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Arg Gly Gly Gly  
130 135 140

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ser Glu Leu Thr  
145 150 155 160

Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln Thr Val Arg Ile Thr  
165 170 175

Cys Gln Gly Asp Ser Leu Arg Ser Ser Tyr Ala Ser Trp Tyr Arg Gln  
180 185 190

Arg Pro Gly Gln Ala Pro Val Pro Val Ile Tyr Gly Lys Asn Asn Trp  
195 200 205

Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser Ser Ser Gly Asn Thr  
210 215 220

Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu Asp Glu Ala Asp Tyr  
225 230 235 240

Tyr Cys Asn Ser Ser Tyr Ala Trp Leu Pro Tyr Val Val Phe Gly Gly  
245 250 255

Gly Thr Lys Leu Thr Val Leu Gly Ala Ala Ala Ser Ser Ser Ser Gly  
260 265 270

Ser Ser Ser Ser Gly Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln  
275 280 285

Arg Glu Pro His Asn Glu Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys  
290 295 300

Asn Glu Ala Val Arg His Phe Pro Arg Ile Trp Leu His Gly Leu Gly  
305 310 315 320

Gln His Ile Tyr Glu Thr Tyr Gly Asp Thr Trp Ala Gly Val Glu Ala  
325 330 335

Ile Ile Arg Ile Leu Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly  
340 345 350

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Cys Arg His Ser Arg Ile Gly Val Thr Gln Gln Arg Arg Ala Arg Asn  
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<222> (1)..(1353)

<400> 19 48  
atg aaa tac ctg ctg ccg acg gct gct gct ggt ctg ctg ctc ctc gct  
Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala  
1 5 10 15

gcc cag ccg gcg atg gcc atg gcc gag gtg cag ctg gcg gag tct ggg 96  
Ala Gln Pro Ala Met Ala Met Ala Glu Val Gln Leu Ala Glu Ser Gly  
20 25 30

gga ggc ttg gta cag cct ggg ggg tcc ctg aga ctc tcc tgt gcc gcc 144  
Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala  
35 40 45

tct gga ttc acc ttt agc agc gat gcc atg agc tgg gtc cgc cag gct 192  
Ser Gly Phe Thr Phe Ser Ser Asp Ala Met Ser Trp Val Arg Gln Ala  
50 55 60

c c a g g g a a g g g g c t g g a g t g g g t c a g c t a t t a g t g g t a g t g g t g g t 240  
Pro Gly Lys Gly Leu Glu Trp Val Ser Ala Ile Ser Gly Ser Gly Gly  
65 70 75 80

agc aca tac tac gca gac tcc gtg aag ggc cgg ttc acc atc tcc aga 288  
Ser Thr Tyr Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg  
85 90 95

gac aat tcc aag aac acg ctg tat ctg caa atg aac agc ctg aga gcc 336  
Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala  
100 105 110

gag gac acg gcc gta tat tac tgt gcg aaa agt aat gag ttt ctt ttt 384  
Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys Ser Asn Glu Phe Leu Phe  
115 120 125

gac tac tgg ggc cag gga act ctg gtc acc gtg tcg aga ggt gga ggc 432  
Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Arg Gly Gly Gly  
130 135 140

ggt tca ggc gga ggt ggc tct ggc ggt ggc gga tcg tct gag ctg act 480  
Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ser Glu Leu Thr  
145 150 155 160

cag gac cct gct gtg tct gtg gcc ttg gga cag aca gtc agg atc aca 528  
Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln Thr Val Arg Ile Thr  
165 170 175

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

cac cac cac  
His His His  
450

<210> 20  
<211> 451  
<212> PRT  
<213> Artificial

<220>  
<223> Synthetic Construct

<400> 20

Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala  
1 5 10 15

Ala Gln Pro Ala Met Ala Met Ala Glu Val Gln Leu Ala Glu Ser Gly  
20 25 30

Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala  
35 40 45

Ser Gly Phe Thr Phe Ser Ser Asp Ala Met Ser Trp Val Arg Gln Ala  
50 55 60

Pro Gly Lys Gly Leu Glu Trp Val Ser Ala Ile Ser Gly Ser Gly Gly  
65 70 75 80

Ser Thr Tyr Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg  
85 90 95

Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala  
100 105 110

Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys Ser Asn Glu Phe Leu Phe  
115 120 125

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Arg Gly Gly Gly  
130 135 140

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ser Glu Leu Thr  
145 150 155 160

Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln Thr Val Arg Ile Thr  
165 170 175

Cys Gln Gly Asp Ser Leu Arg Ser Ser Tyr Ala Ser Trp Tyr Arg Gln  
180 185 190

Arg Pro Gly Gln Ala Pro Val Pro Val Ile Tyr Gly Lys Asn Asn Trp  
195 200 205

Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser Ser Ser Gly Asn Thr

210

215

Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu Asp Glu Ala Asp Tyr  
225 230 235 240

Tyr Cys Asn Ser Ser Tyr Ala Trp Leu Pro Tyr Val Val Phe Gly Gly  
245 250 255

Gly Thr Lys Leu Thr Val Leu Gly Ala Ala Ala Ser Ser Ser Ser Gly  
260 265 270

Ser Ser Ser Ser Gly Ser Ser Ser Gly Met Val Thr Gly Gly Met  
275 280 285

Ala Ser Lys Trp Asp Gln Lys Gly Met Asp Ile Ala Tyr Glu Glu Ala  
290 295 300

Ala Leu Gly Tyr Lys Glu Gly Gly Val Pro Ile Gly Gly Cys Leu Ile  
305 310 315 320

Asn Asn Lys Asp Gly Ser Val Leu Gly Arg Gly His Asn Met Arg Phe  
325 330 335

Gln Lys Gly Ser Ala Thr Leu His Gly Glu Ile Ser Thr Leu Glu Asn  
340 345 350

Cys Gly Arg Leu Glu Gly Lys Val Tyr Lys Asp Thr Thr Leu Tyr Thr  
355 360 365

Thr Leu Ser Pro Cys Asp Met Cys Thr Gly Ala Ile Ile Met Tyr Gly  
370 375 380

Ile Pro Arg Cys Val Val Gly Glu Asn Val Asn Phe Lys Ser Lys Gly  
385 390 395 400

Glu Lys Tyr Leu Gln Thr Arg Gly His Glu Val Val Val Val Asp Asp  
405 410 415

Glu Arg Cys Lys Lys Ile Met Lys Gln Phe Ile Asp Glu Arg Pro Gln  
420 425 430

Asp Trp Phe Glu Asp Ile Pro Glu Ala Ala Ala Leu Glu His His His  
435 440 445

His His His  
450

<210> 21  
<211> 2292  
<212> DNA  
<213> Artificial

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<220>

<223> scFvDIATHIS-1:LLO PEST

<220>

<221> CDS

<222> (1)..(2292)

<400> 21

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



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

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cct Pro	cct Pro	gca Ala 515	tat Tyr	atc Ile	tca Ser	agt Ser	gtg Val 520	gca Ala	tac Tyr	ggc Gly	cgt Arg	caa Gln 525	ggt Val	tat Tyr	ttg Leu	1584
aaa Lys	tta Leu 530	tcg Ser	act Thr	aat Asn	tcc Ser	cat His 535	agt Ser	act Thr	aaa Lys	gta Val 540	aaa Lys	gct Ala	gct Ala	ttt Phe	gat Asp	1632
gct Ala 545	gcc Ala	gta Val	agt Ser	ggg Gly	aaa Lys 550	tct Ser	gtc Val	tca Ser	ggg Gly	gat Asp 555	gta Val	gaa Glu	tta Leu	aca Thr	aat Asn 560	1680
atc Ile	atc Ile	aaa Lys	aat Asn	tct Ser 565	tcc Ser	ttc Phe	aaa Lys	gcc Ala	gta Val 570	att Ile	tac Tyr	ggg Gly	ggg Gly	tcc Ser 575	gca Ala	1728
aaa Lys	gat Asp	gaa Glu	gtt Val 580	caa Gln	atc Ile	atc Ile	gat Asp	ggc Gly 585	aac Asn	ctc Leu	gga Gly	gac Asp	tta Leu 590	cga Arg	gat Asp	1776
att Ile	ttg Leu	aaa Lys 595	aaa Lys	ggg Gly	gct Ala	act Thr	ttt Phe 600	aat Asn	cga Arg	gaa Glu	aca Thr	cca Pro 605	gga Gly	gtt Val	ccc Pro	1824
att Ile	gct Ala 610	tat Tyr	aca Thr	aca Thr	aat Asn	ttc Phe 615	tta Leu	aaa Lys	gac Asp	aat Asn	gaa Glu 620	tta Leu	gct Ala	gtt Val	att Ile	1872
aaa Lys 625	aac Asn	aac Asn	tca Ser	gaa Glu	tat Tyr 630	att Ile	gaa Glu	aca Thr	act Thr	tca Ser 635	aaa Lys	gct Ala	tat Tyr	aca Thr	gat Asp 640	1920
gga Gly	aaa Lys	att Ile	aat Asn	att Ile 645	gat Asp	cac His	tct Ser	gga Gly	ggc Gly 650	tac Tyr	gtt Val	gct Ala	caa Gln	ttc Phe 655	aac Asn	1968
atc Ile	tct Ser	tgg Trp	gat Asp 660	gaa Glu	ata Ile	aat Asn	tat Tyr	gat Asp 665	cct Pro	gaa Glu	ggg Gly	aac Asn	gaa Glu 670	att Ile	gtt Val	2016
caa Gln	cat His	aaa Lys 675	aac Asn	tgg Trp	agc Ser	gaa Glu	aac Asn 680	aat Asn	aaa Lys	agc Ser	aag Lys	cta Leu 685	gct Ala	cat His	ttc Phe	2064
aca Thr	tcg Ser 690	tcc Ser	atc Ile	tat Tyr	ttg Leu	cca Pro 695	ggg Gly	aac Asn	gca Ala	aga Arg	aat Asn 700	att Ile	aat Asn	gtt Val	tac Tyr	2112
gcc Ala 705	aaa Lys	gaa Glu	tgc Cys	act Thr	ggg Gly 710	tta Leu	gct Ala	tgg Trp	gaa Glu	tgg Trp 715	tgg Trp	aga Arg	acg Thr	gta Val	att Ile 720	2160
gat Asp	gac Asp	cgg Arg	aac Asn	tta Leu 725	cca Pro	ctt Leu	gtg Val	aaa Lys	aat Asn 730	aga Arg	aat Asn	atc Ile	tcc Ser 735	atc Ile	tgg Trp	2208
ggc Gly	act Thr	acg Thr	ctt Leu 740	tat Tyr	ccg Pro	aaa Lys	tat Tyr	agt Ser 745	aat Asn	agt Ser	gta Val	gat Asp	aat Asn 750	cca Pro	atc Ile	2256
gaa Glu	gcg Ala	gcc Ala 755	gca Ala	ctc Leu	gag Glu	cac His	cac His 760	cac His	cac His	cac His	cac His	cac His	cac His	cac His	cac His	2292

<210> 22  
<211> 764

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<212> PRT

<213> Artificial

<220>

<223> Synthetic Construct

<400> 22

Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala  
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Ala Gln Pro Ala Met Ala Met Ala Glu Val Gln Leu Ala Glu Ser Gly  
20 25 30

Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala  
35 40 45

Ser Gly Phe Thr Phe Ser Ser Asp Ala Met Ser Trp Val Arg Gln Ala  
50 55 60

Pro Gly Lys Gly Leu Glu Trp Val Ser Ala Ile Ser Gly Ser Gly Gly  
65 70 75 80

Ser Thr Tyr Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg  
85 90 95

Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala  
100 105 110

Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys Ser Asn Glu Phe Leu Phe  
115 120 125

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Arg Gly Gly Gly  
130 135 140

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ser Glu Leu Thr  
145 150 155 160

Gln Asp Pro Ala Val Ser Val Ala Leu Gly Gln Thr Val Arg Ile Thr  
165 170 175

Cys Gln Gly Asp Ser Leu Arg Ser Ser Tyr Ala Ser Trp Tyr Arg Gln  
180 185 190

Arg Pro Gly Gln Ala Pro Val Pro Val Ile Tyr Gly Lys Asn Asn Trp  
195 200 205

Pro Ser Gly Ile Pro Asp Arg Phe Ser Gly Ser Ser Ser Gly Asn Thr  
210 215 220

Ala Ser Leu Thr Ile Thr Gly Ala Gln Ala Glu Asp Glu Ala Asp Tyr  
225 230 235 240

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

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Pro Pro Ala Tyr Ile Ser Ser Val Ala Tyr Gly Arg Gln Val Tyr Leu  
515 520 525

Lys Leu Ser Thr Asn Ser His Ser Thr Lys Val Lys Ala Ala Phe Asp  
530 535 540

Ala Ala Val Ser Gly Lys Ser Val Ser Gly Asp Val Glu Leu Thr Asn  
545 550 555 560

Ile Ile Lys Asn Ser Ser Phe Lys Ala Val Ile Tyr Gly Gly Ser Ala  
565 570 575

Lys Asp Glu Val Gln Ile Ile Asp Gly Asn Leu Gly Asp Leu Arg Asp  
580 585 590

Ile Leu Lys Lys Gly Ala Thr Phe Asn Arg Glu Thr Pro Gly Val Pro  
595 600 605

Ile Ala Tyr Thr Thr Asn Phe Leu Lys Asp Asn Glu Leu Ala Val Ile  
610 615 620

Lys Asn Asn Ser Glu Tyr Ile Glu Thr Thr Ser Lys Ala Tyr Thr Asp  
625 630 635 640

Gly Lys Ile Asn Ile Asp His Ser Gly Gly Tyr Val Ala Gln Phe Asn  
645 650 655

Ile Ser Trp Asp Glu Ile Asn Tyr Asp Pro Glu Gly Asn Glu Ile Val  
660 665 670

Gln His Lys Asn Trp Ser Glu Asn Asn Lys Ser Lys Leu Ala His Phe  
675 680 685

Thr Ser Ser Ile Tyr Leu Pro Gly Asn Ala Arg Asn Ile Asn Val Tyr  
690 695 700

Ala Lys Glu Cys Thr Gly Leu Ala Trp Glu Trp Trp Arg Thr Val Ile  
705 710 715 720

Asp Asp Arg Asn Leu Pro Leu Val Lys Asn Arg Asn Ile Ser Ile Trp  
725 730 735

Gly Thr Thr Leu Tyr Pro Lys Tyr Ser Asn Ser Val Asp Asn Pro Ile  
740 745 750

Glu Ala Ala Ala Leu Glu His His His His His  
755 760

<210> 23  
<211> 1278  
<212> DNA  
<213> Artificial

PN791902WO\_ST25

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

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225		230		235		240										
tac	tgt	aac	tcc	tct	tat	gcg	tgg	ctg	ccc	tat	gtg	gta	ttc	ggc	gga	768
Tyr	Cys	Asn	Ser	Ser	Tyr	Ala	Trp	Leu	Pro	Tyr	Val	Val	Phe	Gly	Gly	
				245					250					255		
ggg	acc	aag	ctg	acc	gtc	cta	ggc	gcg	gcc	gca	tct	tcc	tca	tcg	ggg	816
Gly	Thr	Lys	Leu	Thr	Val	Leu	Gly	Ala	Ala	Ala	Ser	Ser	Ser	Ser	Gly	
			260					265					270			
agt	agc	tct	tcc	ggc	tca	tcg	tcc	agc	ggc	gca	cct	act	tca	agt	tct	864
Ser	Ser	Ser	Ser	Gly	Ser	Ser	Ser	Ser	Gly	Ala	Pro	Thr	Ser	Ser	Ser	
		275					280					285				
aca	aag	aaa	aca	cag	cta	caa	ctg	gag	cat	tta	ctg	ctg	gat	tta	cag	912
Thr	Lys	Lys	Thr	Gln	Leu	Gln	Leu	Glu	His	Leu	Leu	Leu	Asp	Leu	Gln	
	290					295					300					
atg	att	ttg	aat	gga	att	aat	aat	tac	aag	aat	ccc	aaa	ctc	acc	agg	960
Met	Ile	Leu	Asn	Gly	Ile	Asn	Asn	Tyr	Lys	Asn	Pro	Lys	Leu	Thr	Arg	
305				310						315					320	
atg	ctc	aca	ttt	aag	ttt	tac	atg	ccc	aag	aag	gcc	aca	gaa	ctg	aaa	1008
Met	Leu	Thr	Phe	Lys	Phe	Tyr	Met	Pro	Lys	Lys	Ala	Thr	Glu	Leu	Lys	
				325					330				335			
cat	ctt	cag	tgt	cta	gaa	gaa	gaa	ctc	aaa	cct	ctg	gag	gaa	gtg	cta	1056
His	Leu	Gln	Cys	Leu	Glu	Glu	Glu	Leu	Lys	Pro	Leu	Glu	Glu	Val	Leu	
			340					345					350			
aat	tta	gct	caa	agc	aaa	aac	ttt	cac	tta	aga	ccc	agg	gac	tta	atc	1104
Asn	Leu	Ala	Gln	Ser	Lys	Asn	Phe	His	Leu	Arg	Pro	Arg	Asp	Leu	Ile	
		355					360					365				
agc	aat	atc	aac	gta	ata	gtt	ctg	gaa	cta	aag	gga	tct	gaa	aca	aca	1152
Ser	Asn	Ile	Asn	Val	Ile	Val	Leu	Glu	Leu	Lys	Gly	Ser	Glu	Thr	Thr	
	370					375					380					
ttc	atg	tgt	gaa	tat	gct	gat	gag	aca	gca	acc	att	gta	gaa	ttt	ctg	1200
Phe	Met	Cys	Glu	Tyr	Ala	Asp	Glu	Thr	Ala	Thr	Ile	Val	Glu	Phe	Leu	
385					390					395					400	
aac	aga	tgg	att	acc	ttt	tgt	caa	agc	atc	atc	tca	aca	ctg	act	gcg	1248
Asn	Arg	Trp	Ile	Thr	Phe	Cys	Gln	Ser	Ile	Ile	Ser	Thr	Leu	Thr	Ala	
				405					410					415		
gcc	gca	ctc	gag	cac	cac	cac	cac	cac	cac							1278
Ala	Ala	Leu	Glu	His	His	His	His	His	His							
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Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala  
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Ala Gln Pro Ala Met Ala Met Ala Glu Val Gln Leu Ala Glu Ser Gly  
 20 25 30

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



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Met Ile Leu Asn Gly Ile Asn Asn Tyr Lys Asn Pro Lys Leu Thr Arg  
305 310 315 320

Met Leu Thr Phe Lys Phe Tyr Met Pro Lys Lys Ala Thr Glu Leu Lys  
325 330 335

His Leu Gln Cys Leu Glu Glu Glu Leu Lys Pro Leu Glu Glu Val Leu  
340 345 350

Asn Leu Ala Gln Ser Lys Asn Phe His Leu Arg Pro Arg Asp Leu Ile  
355 360 365

Ser Asn Ile Asn Val Ile Val Leu Glu Leu Lys Gly Ser Glu Thr Thr  
370 375 380

Phe Met Cys Glu Tyr Ala Asp Glu Thr Ala Thr Ile Val Glu Phe Leu  
385 390 395 400

Asn Arg Trp Ile Thr Phe Cys Gln Ser Ile Ile Ser Thr Leu Thr Ala  
405 410 415

Ala Ala Leu Glu His His His His His His  
420 425