

SEQUENCE LISTING

<110> Howard Hughes Medical Institute

<120> MODIFIED LIGAND-GATED ION CHANNELS AND METHODS OF USE

<130> 30872-0014W01

<150> US 62/359,534

<151> 2016-07-07

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<160> 12

<170> PatentIn version 3.5

<210> 1

<211> 224

<212> PRT

<213> human

<400> 1

Met Arg Cys Ser Pro Gly Gly Val Trp Leu Ala Leu Ala Ala Ser Leu
1 5 10 15

Leu His Val Ser Leu Gln Gly Glu Phe Gln Arg Lys Leu Tyr Lys Glu
20 25 30

Leu Val Lys Asn Tyr Asn Pro Leu Glu Arg Pro Val Ala Asn Asp Ser
35 40 45

Gln Pro Leu Thr Val Tyr Phe Ser Leu Ser Leu Leu Gln Ile Met Asp
50 55 60

Val Asp Glu Lys Asn Gln Val Leu Thr Thr Asn Ile Trp Leu Gln Met
65 70 75 80

Ser Trp Thr Asp His Tyr Leu Gln Trp Asn Val Ser Glu Tyr Pro Gly
85 90 95

Val Lys Thr Val Arg Phe Pro Asp Gly Gln Ile Trp Lys Pro Asp Ile
100 105 110

Leu Leu Tyr Asn Ser Ala Asp Glu Arg Phe Asp Ala Thr Phe His Thr

115

120

125

Asn Val Leu Val Asn Ser Ser Gly His Cys Gln Tyr Leu Pro Pro Gly
 130 135 140

Ile Phe Lys Ser Ser Cys Tyr Ile Asp Val Arg Trp Phe Pro Phe Asp
 145 150 155 160

Val Gln His Cys Lys Leu Lys Phe Gly Ser Trp Ser Tyr Gly Gly Trp
 165 170 175

Ser Leu Asp Leu Gln Met Gln Glu Ala Asp Ile Ser Gly Tyr Ile Pro
 180 185 190

Asn Gly Glu Trp Asp Leu Val Gly Ile Pro Gly Lys Arg Ser Glu Arg
 195 200 205

Phe Tyr Glu Cys Cys Lys Glu Pro Tyr Pro Asp Val Thr Phe Thr Val
 210 215 220

<210> 2

<211> 229

<212> PRT

<213> human

<400> 2

Met Arg Cys Ser Pro Gly Gly Val Trp Leu Ala Leu Ala Ala Ser Leu
 1 5 10 15

Leu His Val Ser Leu Gln Gly Glu Phe Gln Arg Lys Leu Tyr Lys Glu
 20 25 30

Leu Val Lys Asn Tyr Asn Pro Leu Glu Arg Pro Val Ala Asn Asp Ser
 35 40 45

Gln Pro Leu Thr Val Tyr Phe Ser Leu Ser Leu Leu Gln Ile Met Asp
 50 55 60

Val Asp Glu Lys Asn Gln Val Leu Thr Thr Asn Ile Trp Leu Gln Met
 65 70 75 80

Ser Trp Thr Asp His Tyr Leu Gln Trp Asn Val Ser Glu Tyr Pro Gly
85 90 95

Val Lys Thr Val Arg Phe Pro Asp Gly Gln Ile Trp Lys Pro Asp Ile
100 105 110

Leu Leu Tyr Asn Ser Ala Asp Glu Arg Phe Asp Ala Thr Phe His Thr
115 120 125

Asn Val Leu Val Asn Ser Ser Gly His Cys Gln Tyr Leu Pro Pro Gly
130 135 140

Ile Phe Lys Ser Ser Cys Tyr Ile Asp Val Arg Trp Phe Pro Phe Asp
145 150 155 160

Val Gln His Cys Lys Leu Lys Phe Gly Ser Trp Ser Tyr Gly Gly Trp
165 170 175

Ser Leu Asp Leu Gln Met Gln Glu Ala Asp Ile Ser Gly Tyr Ile Pro
180 185 190

Asn Gly Glu Trp Asp Leu Val Gly Ile Pro Gly Lys Arg Ser Glu Arg
195 200 205

Phe Tyr Glu Cys Cys Lys Glu Pro Tyr Pro Asp Val Thr Phe Thr Val
210 215 220

Thr Met Arg Arg Arg
225

<210> 3
<211> 247
<212> PRT
<213> mouse

<400> 3

Ile Ile Arg Arg Arg Pro Leu Phe Tyr Ala Val Ser Leu Leu Leu Pro
1 5 10 15

Ser Ile Phe Leu Met Val Val Asp Ile Val Gly Phe Cys Leu Pro Pro
20 25 30

Asp Ser Gly Glu Arg Val Ser Phe Lys Ile Thr Leu Leu Leu Gly Tyr
35 40 45

Ser Val Phe Leu Ile Ile Val Ser Asp Thr Leu Pro Ala Thr Ile Gly
50 55 60

Thr Pro Leu Ile Gly Val Tyr Phe Val Val Cys Met Ala Leu Leu Val
65 70 75 80

Ile Ser Leu Ala Glu Thr Ile Phe Ile Val Arg Leu Val His Lys Gln
85 90 95

Asp Leu Gln Arg Pro Val Pro Asp Trp Leu Arg His Leu Val Leu Asp
100 105 110

Arg Ile Ala Trp Ile Leu Cys Leu Gly Glu Gln Pro Met Ala His Arg
115 120 125

Pro Pro Ala Thr Phe Gln Ala Asn Lys Thr Asp Asp Cys Ser Gly Ser
130 135 140

Asp Leu Leu Pro Ala Met Gly Asn His Cys Ser His Val Gly Gly Pro
145 150 155 160

Gln Asp Leu Glu Lys Thr Pro Arg Gly Arg Gly Ser Pro Leu Pro Pro
165 170 175

Pro Arg Glu Ala Ser Leu Ala Val Arg Gly Leu Leu Gln Glu Leu Ser
180 185 190

Ser Ile Arg His Phe Leu Glu Lys Arg Asp Glu Met Arg Glu Val Ala
195 200 205

Arg Asp Trp Leu Arg Val Gly Tyr Val Leu Asp Arg Leu Leu Phe Arg
210 215 220

Ile Tyr Leu Leu Ala Val Leu Ala Tyr Ser Ile Thr Leu Val Thr Leu
225 230 235 240

Trp Ser Ile Trp His Tyr Ser

<210> 4
 <211> 236
 <212> PRT
 <213> human

<400> 4

Leu Phe Tyr Val Val Ser Leu Leu Leu Pro Ser Ile Phe Leu Met Val
 1 5 10 15

Met Asp Ile Val Gly Phe Tyr Leu Pro Pro Asn Ser Gly Glu Arg Val
 20 25 30

Ser Phe Lys Ile Thr Leu Leu Leu Gly Tyr Ser Val Phe Leu Ile Ile
 35 40 45

Val Ser Asp Thr Leu Pro Ala Thr Ala Ile Gly Thr Pro Leu Ile Gly
 50 55 60

Val Tyr Phe Val Val Cys Met Ala Leu Leu Val Ile Ser Leu Ala Glu
 65 70 75 80

Thr Ile Phe Ile Val Arg Leu Val His Lys Gln Asp Leu Gln Gln Pro
 85 90 95

Val Pro Ala Trp Leu Arg His Leu Val Leu Glu Arg Ile Ala Trp Leu
 100 105 110

Leu Cys Leu Arg Glu Gln Ser Thr Ser Gln Arg Pro Pro Ala Thr Ser
 115 120 125

Gln Ala Thr Lys Thr Asp Asp Cys Ser Ala Met Gly Asn His Cys Ser
 130 135 140

His Met Gly Gly Pro Gln Asp Phe Glu Lys Ser Pro Arg Asp Arg Cys
 145 150 155 160

Ser Pro Pro Pro Pro Pro Arg Glu Ala Ser Leu Ala Val Cys Gly Leu
 165 170 175

Leu Gln Glu Leu Ser Ser Ile Arg Gln Phe Leu Glu Lys Arg Asp Glu
180 185 190

Ile Arg Glu Val Ala Arg Asp Trp Leu Arg Val Gly Ser Val Leu Asp
195 200 205

Lys Leu Leu Phe His Ile Tyr Leu Leu Ala Val Leu Ala Tyr Ser Ile
210 215 220

Thr Leu Val Met Leu Trp Ser Ile Trp Gln Tyr Ala
225 230 235

<210> 5
<211> 202
<212> PRT
<213> mouse

<400> 5

Met Gly Tyr Tyr Leu Ile Gln Met Tyr Ile Pro Ser Leu Leu Ile Val
1 5 10 15

Ile Leu Ser Trp Ile Ser Phe Trp Ile Asn Met Asp Ala Ala Pro Ala
20 25 30

Arg Val Gly Leu Gly Ile Thr Thr Val Leu Thr Met Thr Thr Gln Ser
35 40 45

Ser Gly Ser Arg Ala Ser Leu Pro Lys Val Ser Tyr Val Lys Ala Ile
50 55 60

Asp Ile Trp Met Ala Val Cys Leu Leu Phe Val Phe Ser Ala Leu Leu
65 70 75 80

Glu Tyr Ala Ala Val Asn Phe Val Ser Arg Gln His Lys Glu Leu Leu
85 90 95

Arg Phe Arg Arg Lys Arg Arg His His Lys Glu Asp Glu Ala Gly Glu
100 105 110

Gly Arg Phe Asn Phe Ser Ala Tyr Gly Met Gly Pro Ala Cys Leu Gln
115 120 125

Ala Lys Asp Gly Ile Ser Val Lys Gly Ala Asn Asn Ser Asn Thr Thr
130 135 140

Asn Pro Pro Pro Ala Pro Ser Lys Ser Pro Glu Glu Met Arg Lys Leu
145 150 155 160

Phe Ile Gln Arg Ala Lys Lys Ile Asp Lys Ile Ser Arg Ile Gly Phe
165 170 175

Pro Met Ala Phe Leu Ile Phe Asn Met Phe Tyr Trp Ile Ile Tyr Lys
180 185 190

Ile Val Arg Arg Glu Asp Val His Asn Gln
195 200

<210> 6
<211> 471
<212> PRT
<213> artificial

<220>
<223> (alpha)7-5HT3 chimeric receptor

<400> 6

Met Arg Cys Ser Pro Gly Gly Val Trp Leu Ala Leu Ala Ala Ser Leu
1 5 10 15

Leu His Val Ser Leu Gln Gly Glu Phe Gln Arg Lys Leu Tyr Lys Glu
20 25 30

Leu Val Lys Asn Tyr Asn Pro Leu Glu Arg Pro Val Ala Asn Asp Ser
35 40 45

Gln Pro Leu Thr Val Tyr Phe Ser Leu Ser Leu Leu Gln Ile Met Asp
50 55 60

Val Asp Glu Lys Asn Gln Val Leu Thr Thr Asn Ile Trp Leu Gln Met
65 70 75 80

Ser Trp Thr Asp His Tyr Leu Gln Trp Asn Val Ser Glu Tyr Pro Gly
85 90 95

Val Lys Thr Val Arg Phe Pro Asp Gly Gln Ile Trp Lys Pro Asp Ile
100 105 110

Leu Leu Tyr Asn Ser Ala Asp Glu Arg Phe Asp Ala Thr Phe His Thr
115 120 125

Asn Val Leu Val Asn Ser Ser Gly His Cys Gln Tyr Leu Pro Pro Gly
130 135 140

Ile Phe Lys Ser Ser Cys Tyr Ile Asp Val Arg Trp Phe Pro Phe Asp
145 150 155 160

Val Gln His Cys Lys Leu Lys Phe Gly Ser Trp Ser Tyr Gly Gly Trp
165 170 175

Ser Leu Asp Leu Gln Met Gln Glu Ala Asp Ile Ser Gly Tyr Ile Pro
180 185 190

Asn Gly Glu Trp Asp Leu Val Gly Ile Pro Gly Lys Arg Ser Glu Arg
195 200 205

Phe Tyr Glu Cys Cys Lys Glu Pro Tyr Pro Asp Val Thr Phe Thr Val
210 215 220

Ile Ile Arg Arg Arg Pro Leu Phe Tyr Ala Val Ser Leu Leu Leu Pro
225 230 235 240

Ser Ile Phe Leu Met Val Val Asp Ile Val Gly Phe Cys Leu Pro Pro
245 250 255

Asp Ser Gly Glu Arg Val Ser Phe Lys Ile Thr Leu Leu Leu Gly Tyr
260 265 270

Ser Val Phe Leu Ile Ile Val Ser Asp Thr Leu Pro Ala Thr Ile Gly
275 280 285

Thr Pro Leu Ile Gly Val Tyr Phe Val Val Cys Met Ala Leu Leu Val
290 295 300

Ile Ser Leu Ala Glu Thr Ile Phe Ile Val Arg Leu Val His Lys Gln

305		310		315		320									
Asp	Leu	Gln	Arg	Pro	Val	Pro	Asp	Trp	Leu	Arg	His	Leu	Val	Leu	Asp
				325					330					335	
Arg	Ile	Ala	Trp	Ile	Leu	Cys	Leu	Gly	Glu	Gln	Pro	Met	Ala	His	Arg
			340					345					350		
Pro	Pro	Ala	Thr	Phe	Gln	Ala	Asn	Lys	Thr	Asp	Asp	Cys	Ser	Gly	Ser
		355						360				365			
Asp	Leu	Leu	Pro	Ala	Met	Gly	Asn	His	Cys	Ser	His	Val	Gly	Gly	Pro
	370					375					380				
Gln	Asp	Leu	Glu	Lys	Thr	Pro	Arg	Gly	Arg	Gly	Ser	Pro	Leu	Pro	Pro
385					390					395					400
Pro	Arg	Glu	Ala	Ser	Leu	Ala	Val	Arg	Gly	Leu	Leu	Gln	Glu	Leu	Ser
				405					410					415	
Ser	Ile	Arg	His	Phe	Leu	Glu	Lys	Arg	Asp	Glu	Met	Arg	Glu	Val	Ala
			420					425					430		
Arg	Asp	Trp	Leu	Arg	Val	Gly	Tyr	Val	Leu	Asp	Arg	Leu	Leu	Phe	Arg
		435						440				445			
Ile	Tyr	Leu	Leu	Ala	Val	Leu	Ala	Tyr	Ser	Ile	Thr	Leu	Val	Thr	Leu
	450					455					460				
Trp	Ser	Ile	Trp	His	Tyr	Ser									
465					470										

<210> 7
 <211> 430
 <212> PRT
 <213> artificial

<220>
 <223> (alpha)7-GlyR chimeric receptor

<400> 7

Met	Arg	Cys	Ser	Pro	Gly	Gly	Val	Trp	Leu	Ala	Leu	Ala	Ala	Ser	Leu
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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

Met Arg Arg Arg Met Gly Tyr Tyr Leu Ile Gln Met Tyr Ile Pro Ser
225 230 235 240

Leu Leu Ile Val Ile Leu Ser Trp Ile Ser Phe Trp Ile Asn Met Asp
245 250 255

Ala Ala Pro Ala Arg Val Gly Leu Gly Ile Thr Thr Val Leu Thr Met
260 265 270

Thr Thr Gln Ser Ser Gly Ser Arg Ala Ser Leu Pro Lys Val Ser Tyr
275 280 285

Val Lys Ala Ile Asp Ile Trp Met Ala Val Cys Leu Leu Phe Val Phe
290 295 300

Ser Ala Leu Leu Glu Tyr Ala Ala Val Asn Phe Val Ser Arg Gln His
305 310 315 320

Lys Glu Leu Leu Arg Phe Arg Arg Lys Arg Arg His His Lys Glu Asp
325 330 335

Glu Ala Gly Glu Gly Arg Phe Asn Phe Ser Ala Tyr Gly Met Gly Pro
340 345 350

Ala Cys Leu Gln Ala Lys Asp Gly Ile Ser Val Lys Gly Ala Asn Asn
355 360 365

Ser Asn Thr Thr Asn Pro Pro Pro Ala Pro Ser Lys Ser Pro Glu Glu
370 375 380

Met Arg Lys Leu Phe Ile Gln Arg Ala Lys Lys Ile Asp Lys Ile Ser
385 390 395 400

Arg Ile Gly Phe Pro Met Ala Phe Leu Ile Phe Asn Met Phe Tyr Trp
405 410 415

Ile Ile Tyr Lys Ile Val Arg Arg Glu Asp Val His Asn Gln
420 425 430

<211> 466
<212> PRT
<213> artificial

<220>
<223> (alpha)7-5HT3 chimeric receptor

<400> 8

Met Arg Cys Ser Pro Gly Gly Val Trp Leu Ala Leu Ala Ala Ser Leu
1 5 10 15

Leu His Val Ser Leu Gln Gly Glu Phe Gln Arg Lys Leu Tyr Lys Glu
20 25 30

Leu Val Lys Asn Tyr Asn Pro Leu Glu Arg Pro Val Ala Asn Asp Ser
35 40 45

Gln Pro Leu Thr Val Tyr Phe Ser Leu Ser Leu Leu Gln Ile Met Asp
50 55 60

Val Asp Glu Lys Asn Gln Val Leu Thr Thr Asn Ile Trp Leu Gln Met
65 70 75 80

Ser Trp Thr Asp His Tyr Leu Gln Trp Asn Val Ser Glu Tyr Pro Gly
85 90 95

Val Lys Thr Val Arg Phe Pro Asp Gly Gln Ile Trp Lys Pro Asp Ile
100 105 110

Leu Leu Tyr Asn Ser Ala Asp Glu Arg Phe Asp Ala Thr Phe His Thr
115 120 125

Asn Val Leu Val Asn Ser Ser Gly His Cys Gln Tyr Leu Pro Pro Gly
130 135 140

Ile Phe Lys Ser Ser Cys Tyr Ile Asp Val Arg Trp Phe Pro Phe Asp
145 150 155 160

Val Gln His Cys Lys Leu Lys Phe Gly Ser Trp Ser Tyr Gly Gly Trp
165 170 175

Ser Leu Asp Leu Gln Met Gln Glu Ala Asp Ile Ser Gly Tyr Ile Pro

180

185

190

Asn Gly Glu Trp Asp Leu Val Gly Ile Pro Gly Lys Arg Ser Glu Arg
 195 200 205

Phe Tyr Glu Cys Cys Lys Glu Pro Tyr Pro Asp Val Thr Phe Thr Val
 210 215 220

Ile Ile Arg Arg Arg Pro Leu Phe Tyr Val Val Ser Leu Leu Leu Pro
 225 230 235 240

Ser Ile Phe Leu Met Val Met Asp Ile Val Gly Phe Tyr Leu Pro Pro
 245 250 255

Asn Ser Gly Glu Arg Val Ser Phe Lys Ile Thr Leu Leu Leu Gly Tyr
 260 265 270

Ser Val Phe Leu Ile Ile Val Ser Asp Thr Leu Pro Ala Thr Ala Ile
 275 280 285

Gly Thr Pro Leu Ile Gly Val Tyr Phe Val Val Cys Met Ala Leu Leu
 290 295 300

Val Ile Ser Leu Ala Glu Thr Ile Phe Ile Val Arg Leu Val His Lys
 305 310 315 320

Gln Asp Leu Gln Gln Pro Val Pro Ala Trp Leu Arg His Leu Val Leu
 325 330 335

Glu Arg Ile Ala Trp Leu Leu Cys Leu Arg Glu Gln Ser Thr Ser Gln
 340 345 350

Arg Pro Pro Ala Thr Ser Gln Ala Thr Lys Thr Asp Asp Cys Ser Ala
 355 360 365

Met Gly Asn His Cys Ser His Met Gly Gly Pro Gln Asp Phe Glu Lys
 370 375 380

Ser Pro Arg Asp Arg Cys Ser Pro Pro Pro Pro Pro Arg Glu Ala Ser
 385 390 395 400

Leu Ala Val Cys Gly Leu Leu Gln Glu Leu Ser Ser Ile Arg Gln Phe
405 410 415

Leu Glu Lys Arg Asp Glu Ile Arg Glu Val Ala Arg Asp Trp Leu Arg
420 425 430

Val Gly Ser Val Leu Asp Lys Leu Leu Phe His Ile Tyr Leu Leu Ala
435 440 445

Val Leu Ala Tyr Ser Ile Thr Leu Val Met Leu Trp Ser Ile Trp Gln
450 455 460

Tyr Ala
465

<210> 9
<211> 195
<212> PRT
<213> human

<400> 9

Leu Leu Gln Thr Tyr Phe Pro Ala Thr Leu Met Val Met Leu Ser Trp
1 5 10 15

Val Ser Phe Trp Ile Asp Arg Arg Ala Val Pro Ala Arg Val Pro Leu
20 25 30

Gly Ile Thr Thr Val Leu Thr Met Ser Thr Ile Ile Thr Gly Val Asn
35 40 45

Ala Ser Met Pro Arg Val Ser Tyr Ile Lys Ala Val Asp Ile Tyr Leu
50 55 60

Trp Val Ser Phe Val Phe Val Phe Leu Ser Val Leu Glu Tyr Ala Ala
65 70 75 80

Val Asn Tyr Leu Thr Thr Val Gln Glu Arg Lys Glu Gln Lys Leu Arg
85 90 95

Glu Lys Leu Pro Cys Thr Ser Gly Leu Pro Pro Pro Arg Thr Ala Met
100 105 110

Leu Asp Gly Asn Tyr Ser Asp Gly Glu Val Asn Asp Leu Asp Asn Tyr
115 120 125

Met Pro Glu Asn Gly Glu Lys Pro Asp Arg Met Met Val Gln Leu Thr
130 135 140

Leu Ala Ser Glu Arg Ser Ser Pro Gln Arg Lys Ser Gln Arg Ser Ser
145 150 155 160

Tyr Val Ser Met Arg Ile Asp Thr His Ala Ile Asp Lys Tyr Ser Arg
165 170 175

Ile Ile Phe Pro Ala Ala Tyr Ile Leu Phe Asn Leu Ile Tyr Trp Ser
180 185 190

Ile Phe Ser
195

<210> 10
<211> 428
<212> PRT
<213> artificial

<220>
<223> (alpha)7- GABAC chimeric receptor

<400> 10

Met Arg Cys Ser Pro Gly Gly Val Trp Leu Ala Leu Ala Ala Ser Leu
1 5 10 15

Leu His Val Ser Leu Gln Gly Glu Phe Gln Arg Lys Leu Tyr Lys Glu
20 25 30

Leu Val Lys Asn Tyr Asn Pro Leu Glu Arg Pro Val Ala Asn Asp Ser
35 40 45

Gln Pro Leu Thr Val Tyr Phe Ser Leu Ser Leu Leu Gln Ile Met Asp
50 55 60

Val Asp Glu Lys Asn Gln Val Leu Thr Thr Asn Ile Trp Leu Gln Met
65 70 75 80

Ser Trp Thr Asp His Tyr Leu Gln Trp Asn Val Ser Glu Tyr Pro Gly
85 90 95

Val Lys Thr Val Arg Phe Pro Asp Gly Gln Ile Trp Lys Pro Asp Ile
100 105 110

Leu Leu Tyr Asn Ser Ala Asp Glu Arg Phe Asp Ala Thr Phe His Thr
115 120 125

Asn Val Leu Val Asn Ser Ser Gly His Cys Gln Tyr Leu Pro Pro Gly
130 135 140

Ile Phe Lys Ser Ser Cys Tyr Ile Asp Val Arg Trp Phe Pro Phe Asp
145 150 155 160

Val Gln His Cys Lys Leu Lys Phe Gly Ser Trp Ser Tyr Gly Gly Trp
165 170 175

Ser Leu Asp Leu Gln Met Gln Glu Ala Asp Ile Ser Gly Tyr Ile Pro
180 185 190

Asn Gly Glu Trp Asp Leu Val Gly Ile Pro Gly Lys Arg Ser Glu Arg
195 200 205

Phe Tyr Glu Cys Cys Lys Glu Pro Tyr Pro Asp Val Thr Phe Thr Val
210 215 220

Thr Met Arg Arg Arg Thr Leu Tyr Tyr Leu Leu Gln Thr Tyr Phe Pro
225 230 235 240

Ala Thr Leu Met Val Met Leu Ser Trp Val Ser Phe Trp Ile Asp Arg
245 250 255

Arg Ala Val Pro Ala Arg Val Pro Leu Gly Ile Thr Thr Val Leu Thr
260 265 270

Met Ser Thr Ile Ile Thr Gly Val Asn Ala Ser Met Pro Arg Val Ser
275 280 285

Tyr Ile Lys Ala Val Asp Ile Tyr Leu Trp Val Ser Phe Val Phe Val
290 295 300

Phe Leu Ser Val Leu Glu Tyr Ala Ala Val Asn Tyr Leu Thr Thr Val
305 310 315 320

Gln Glu Arg Lys Glu Gln Lys Leu Arg Glu Lys Leu Pro Cys Thr Ser
325 330 335

Gly Leu Pro Pro Pro Arg Thr Ala Met Leu Asp Gly Asn Tyr Ser Asp
340 345 350

Gly Glu Val Asn Asp Leu Asp Asn Tyr Met Pro Glu Asn Gly Glu Lys
355 360 365

Pro Asp Arg Met Met Val Gln Leu Thr Leu Ala Ser Glu Arg Ser Ser
370 375 380

Pro Gln Arg Lys Ser Gln Arg Ser Ser Tyr Val Ser Met Arg Ile Asp
385 390 395 400

Thr His Ala Ile Asp Lys Tyr Ser Arg Ile Ile Phe Pro Ala Ala Tyr
405 410 415

Ile Leu Phe Asn Leu Ile Tyr Trp Ser Ile Phe Ser
420 425

<210> 11
<211> 233
<212> PRT
<213> human

<400> 11

Met Arg Cys Ser Pro Gly Gly Val Trp Leu Ala Leu Ala Ala Ser Leu
1 5 10 15

Leu His Val Ser Leu Gln Gly Glu Phe Gln Arg Lys Leu Tyr Lys Glu
20 25 30

Leu Val Lys Asn Tyr Asn Pro Leu Glu Arg Pro Val Ala Asn Asp Ser
35 40 45

Gln Pro Leu Thr Val Tyr Phe Ser Leu Ser Leu Leu Gln Ile Met Asp
50 55 60

Val Asp Glu Lys Asn Gln Val Leu Thr Thr Asn Ile Trp Leu Gln Met
65 70 75 80

Ser Trp Thr Asp His Tyr Leu Gln Trp Asn Val Ser Glu Tyr Pro Gly
85 90 95

Val Lys Thr Val Arg Phe Pro Asp Gly Gln Ile Trp Lys Pro Asp Ile
100 105 110

Leu Leu Tyr Asn Ser Ala Asp Glu Arg Phe Asp Ala Thr Phe His Thr
115 120 125

Asn Val Leu Val Asn Ser Ser Gly His Cys Gln Tyr Leu Pro Pro Gly
130 135 140

Ile Phe Lys Ser Ser Cys Tyr Ile Asp Val Arg Trp Phe Pro Phe Asp
145 150 155 160

Val Gln His Cys Lys Leu Lys Phe Gly Ser Trp Ser Tyr Gly Gly Trp
165 170 175

Ser Leu Asp Leu Gln Met Gln Glu Ala Asp Ile Ser Gly Tyr Ile Pro
180 185 190

Asn Gly Glu Trp Asp Leu Val Gly Ile Pro Gly Lys Arg Ser Glu Arg
195 200 205

Phe Tyr Glu Cys Cys Lys Glu Pro Tyr Pro Asp Val Thr Phe Thr Val
210 215 220

Thr Met Arg Arg Arg Thr Leu Tyr Tyr
225 230

<210> 12
<211> 502
<212> PRT
<213> rat

<400> 12

Met Gly Gly Gly Arg Gly Gly Ile Trp Leu Ala Leu Ala Ala Ala Leu
1 5 10 15

Leu His Val Ser Leu Gln Gly Glu Phe Gln Arg Arg Leu Tyr Lys Glu
20 25 30

Leu Val Lys Asn Tyr Asn Pro Leu Glu Arg Pro Val Ala Asn Asp Ser
35 40 45

Gln Pro Leu Thr Val Tyr Phe Ser Leu Ser Leu Leu Gln Ile Met Asp
50 55 60

Val Asp Glu Lys Asn Gln Val Leu Thr Thr Asn Ile Trp Leu Gln Met
65 70 75 80

Ser Trp Thr Asp His Tyr Leu Gln Trp Asn Met Ser Glu Tyr Pro Gly
85 90 95

Val Lys Asn Val Arg Phe Pro Asp Gly Gln Ile Trp Lys Pro Asp Ile
100 105 110

Leu Leu Tyr Asn Ser Ala Asp Glu Arg Phe Asp Ala Thr Phe His Thr
115 120 125

Asn Val Leu Val Asn Ala Ser Gly His Cys Gln Tyr Leu Pro Pro Gly
130 135 140

Ile Phe Lys Ser Ser Cys Tyr Ile Asp Val Arg Trp Phe Pro Phe Asp
145 150 155 160

Val Gln Gln Cys Lys Leu Lys Phe Gly Ser Trp Ser Tyr Gly Gly Trp
165 170 175

Ser Leu Asp Leu Gln Met Gln Glu Ala Asp Ile Ser Ser Tyr Ile Pro
180 185 190

Asn Gly Glu Trp Asp Leu Met Gly Ile Pro Gly Lys Arg Asn Glu Lys
195 200 205

Phe Tyr Glu Cys Cys Lys Glu Pro Tyr Pro Asp Val Thr Tyr Thr Val
210 215 220

Thr Met Arg Arg Arg Thr Leu Tyr Tyr Gly Leu Asn Leu Leu Ile Pro
225 230 235 240

Cys Val Leu Ile Ser Ala Leu Ala Leu Leu Val Phe Leu Leu Pro Ala
245 250 255

Asp Ser Gly Glu Lys Ile Ser Leu Gly Ile Thr Val Leu Leu Ser Leu
260 265 270

Thr Val Phe Met Leu Leu Val Ala Glu Ile Met Pro Ala Thr Ser Asp
275 280 285

Ser Val Pro Leu Ile Ala Gln Tyr Phe Ala Ser Thr Met Ile Ile Val
290 295 300

Gly Leu Ser Val Val Val Thr Val Ile Val Leu Arg Tyr His His His
305 310 315 320

Asp Pro Asp Gly Gly Lys Met Pro Lys Trp Thr Arg Ile Ile Leu Leu
325 330 335

Asn Trp Cys Ala Trp Phe Leu Arg Met Lys Arg Pro Gly Glu Asp Lys
340 345 350

Val Arg Pro Ala Cys Gln His Lys Pro Arg Arg Cys Ser Leu Ala Ser
355 360 365

Val Glu Leu Ser Ala Gly Ala Gly Pro Pro Thr Ser Asn Gly Asn Leu
370 375 380

Leu Tyr Ile Gly Phe Arg Gly Leu Glu Gly Met His Cys Ala Pro Thr
385 390 395 400

Pro Asp Ser Gly Val Val Cys Gly Arg Leu Ala Cys Ser Pro Thr His
405 410 415

Asp Glu His Leu Met His Gly Ala His Pro Ser Asp Gly Asp Pro Asp
420 425 430

Leu Ala Lys Ile Leu Glu Glu Val Arg Tyr Ile Ala Asn Arg Asn Arg
435 440 445

Cys Gln Asp Glu Ser Glu Val Ile Cys Ser Glu Trp Lys Phe Ala Ala
450 455 460

Cys Val Val Asp Pro Leu Cys Leu Met Ala Phe Ser Val Phe Thr Ile
465 470 475 480

Ile Cys Thr Ile Gly Ile Leu Met Ser Ala Pro Asn Phe Val Glu Ala
485 490 495

Val Ser Lys Asp Phe Ala
500