SEQUENCE LISTING

<110> SANGAMO THERAPEUTICS, INC.

<120> ENGINEERED TARGET SPECIFIC BASE EDITORS

<130> 8325-0180/S180-PCT

<140>
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<150> 62/867,565
<151> 2019-06-27

<150> 62/817,153
<151> 2019-03-12

<150> 62/753,696
<151> 2018-10-31

<150> 62/721,903
<151> 2018-08-23

<160> 92

<170> PatentIn version 3.5

<210> 1
<211> 49
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<220>
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<222> (1)..(15)
<223> a, c, t, g, unknown or other

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<222> (21)..(49)
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<400> 1
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<210> 2
<211> 32
<212> PRT
<213> Artificial Sequence

<220>
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polypeptide

<400> 2
Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr
1 5 10 15

Ser Glu Ser Ala Thr Pro Glu Ser Ser Gly Gly Ser Ser Gly Gly Ser
20 25 30

<210> 3
<211> 58
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 3
Gly Thr Gly Gly Pro Lys Lys Lys Arg Lys Val Tyr Pro Tyr Asp Val
1 5 10 15

Pro Asp Tyr Ala Gly Tyr Pro Tyr Asp Val Pro Asp Tyr Ala Gly Ser
20 25 30

Tyr Pro Tyr Asp Val Pro Asp Tyr Ala Gly Ser Ala Ala Pro Ala Ala
35 40 45

Lys Lys Lys Lys Leu Asp Phe Glu Ser Glu
50 55

<210> 4
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
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oligonucleotide

<400> 4
gtgctgacca tcgacgagaa agggactgaa gct 33

<210> 5
<211> 579

<212> PRT
<213> Unknown

<220>
<223> Description of Unknown: FokI
polypeptide

<400> 5
Met Val Ser Lys Ile Arg Thr Phe Gly Trp Val Gln Asn Pro Gly Lys
1 5 10 15

Phe Glu Asn Leu Lys Arg Val Val Gln Val Phe Asp Arg Asn Ser Lys
20 25 30

Val His Asn Glu Val Lys Asn Ile Lys Ile Pro Thr Leu Val Lys Glu
35 40 45

Ser Lys Ile Gln Lys Glu Leu Val Ala Ile Met Asn Gln His Asp Leu
50 55 60

Ile Tyr Thr Tyr Lys Glu Leu Val Gly Thr Gly Thr Ser Ile Arg Ser
65 70 75 80

Glu Ala Pro Cys Asp Ala Ile Ile Gln Ala Thr Ile Ala Asp Gln Gly
85 90 95

Asn Lys Lys Gly Tyr Ile Asp Asn Trp Ser Ser Asp Gly Phe Leu Arg
100 105 110

Trp Ala His Ala Leu Gly Phe Ile Glu Tyr Ile Asn Lys Ser Asp Ser
115 120 125

Phe Val Ile Thr Asp Val Gly Leu Ala Tyr Ser Lys Ser Ala Asp Gly
130 135 140

Ser Ala Ile Glu Lys Glu Ile Leu Ile Glu Ala Ile Ser Ser Tyr Pro
145 150 155 160

Pro Ala Ile Arg Ile Leu Thr Leu Leu Glu Asp Gly Gln His Leu Thr
165 170 175

Lys Phe Asp Leu Gly Lys Asn Leu Gly Phe Ser Gly Glu Ser Gly Phe
180 185 190

Thr Ser Leu Pro Glu Gly Ile Leu Leu Asp Thr Leu Ala Asn Ala Met
195 200 205

Pro Lys Asp Lys Gly Glu Ile Arg Asn Asn Trp Glu Gly Ser Ser Asp
210 215 220

Lys Tyr Ala Arg Met Ile Gly Gly Trp Leu Asp Lys Leu Gly Leu Val
225 230 235 240

Lys Gln Gly Lys Lys Glu Phe Ile Ile Pro Thr Leu Gly Lys Pro Asp
245 250 255

Asn Lys Glu Phe Ile Ser His Ala Phe Lys Ile Thr Gly Glu Gly Leu
260 265 270

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

Lys Arg Val Tyr Trp Glu Met Leu Ala Thr Asn Leu Thr Asp Lys Glu
290 295 300

Tyr Val Arg Thr Arg Arg Ala Leu Ile Leu Glu Ile Leu Ile Lys Ala
305 310 315 320

Gly Ser Leu Lys Ile Glu Gln Ile Gln Asp Asn Leu Lys Lys Leu Gly
325 330 335

Phe Asp Glu Val Ile Glu Thr Ile Glu Asn Asp Ile Lys Gly Leu Ile
340 345 350

Asn Thr Gly Ile Phe Ile Glu Ile Lys Gly Arg Phe Tyr Gln Leu Lys
355 360 365

Asp His Ile Leu Gln Phe Val Ile Pro Asn Arg Gly Val Thr Lys Gln
370 375 380

Leu Val Lys Ser Glu Leu Glu Glu Lys Lys Ser Glu Leu Arg His Lys
385 390 395 400

Leu Lys Tyr Val Pro His Glu Tyr Ile Glu Leu Ile Glu Ile Ala Arg
405 410 415

Asn Ser Thr Gln Asp Arg Ile Leu Glu Met Lys Val Met Glu Phe Phe
420 425 430

Met Lys Val Tyr Gly Tyr Arg Gly Lys His Leu Gly Gly Ser Arg Lys
435 440 445

Pro Asp Gly Ala Ile Tyr Thr Val Gly Ser Pro Ile Asp Tyr Gly Val
450 455 460

Ile Val Asp Thr Lys Ala Tyr Ser Gly Gly Tyr Asn Leu Pro Ile Gly
465 470 475 480

Gln Ala Asp Glu Met Gln Arg Tyr Val Glu Glu Asn Gln Thr Arg Asn
485 490 495

Lys His Ile Asn Pro Asn Glu Trp Trp Lys Val Tyr Pro Ser Ser Val
500 505 510

Thr Glu Phe Lys Phe Leu Phe Val Ser Gly His Phe Lys Gly Asn Tyr
515 520 525

Lys Ala Gln Leu Thr Arg Leu Asn His Ile Thr Asn Cys Asn Gly Ala
530 535 540

Val Leu Ser Val Glu Glu Leu Leu Ile Gly Gly Glu Met Ile Lys Ala
545 550 555 560

Gly Thr Leu Thr Leu Glu Glu Val Arg Arg Lys Phe Asn Asn Gly Glu
565 570 575

Ile Asn Phe

<210> 6
<211> 28
<212> DNA
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<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 6
atgtttttag aggccatacc catgtcta 28

<210> 7
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 7
gccatgtttt tagaggccat acccatgt 28

<210> 8
<211> 28
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<213> Artificial Sequence

<220>
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<400> 8
gggccatgtt tttagaggcc atacccat 28

<210> 9
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 9
ggggccatgt ttttagaggc cataccca 28

<210> 10
<211> 28
<212> DNA
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<220>
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<400> 10
ctggggccat gtttttagag gccatacc 28

<210> 11
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 11
Thr Gln Ala Thr Leu Gly Val
1 5

<210> 12
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 12
Asp Arg Ser His Leu Ala Arg
1 5

<210> 13
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 13
Gln Ser Ala His Arg Lys Asn
1 5

<210> 14
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 14
Ser Thr Ala Ala Leu Ser Tyr
1 5

<210> 15
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 15
Thr Ser Gly Ser Leu Thr Arg
1 5

<210> 16
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 16
Ser Asn Gln Asn Leu Thr Thr
1 5

<210> 17
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 17
Thr Ser Gly Ser Leu Ser Arg
1 5

<210> 18
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 18
His Ser Ala Thr Leu Lys Tyr

1 5

<210> 19
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 19
Gln Asn Ala His Arg Lys Thr
1 5

<210> 20
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 20
Thr Ser Ser Asn Arg Ala Val
1 5

<210> 21
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 21
Arg Ser Asp Ala Leu Ser Thr
1 5

<210> 22
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 22

Asp Arg Ser Thr Arg Thr Lys
1 5

<210> 23
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 23
Asp Ser Ser His Arg Thr Arg
1 5

<210> 24
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 24
Asp Arg Ser Asp Leu Ser Arg
1 5

<210> 25
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 25
Arg Ser Thr His Leu Val Arg
1 5

<210> 26
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 26
Glu Arg Gly Thr Leu Ala Arg
1 5

<210> 27
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 27
Arg Ser Asp His Leu Ser Arg
1 5

<210> 28
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 28
Ser Gly Thr Pro His Glu Val Gly Val Tyr Thr Leu
1 5 10

<210> 29
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 29
Ser Gly Gly Gly Leu Gly Ser Thr
1 5

<210> 30
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 30
tgtgtctgt 9

<210> 31
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 31
tgtttctgt 9

<210> 32
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 32
tgttcctgt 9

<210> 33
<211> 9
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 33
tgtccctgt 9

<210> 34
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 34
tttaaattat ggagtatgtt tctgtgga 28

<210> 35
<211> 320
<212> PRT
<213> Bos sp.

<400> 35
Met Ser Lys Ser Glu Ser Pro Lys Glu Pro Glu Gln Leu Arg Lys Leu
1 5 10 15

Phe Ile Gly Gly Leu Ser Phe Glu Thr Thr Asp Glu Ser Leu Arg Ser
20 25 30

His Phe Glu Gln Trp Gly Thr Leu Thr Asp Cys Val Val Met Arg Asp
35 40 45

Pro Asn Thr Lys Arg Ser Arg Gly Phe Gly Phe Val Thr Tyr Ala Thr
50 55 60

Val Glu Glu Val Asp Ala Ala Met Asn Ala Arg Pro His Lys Val Asp
65 70 75 80

Gly Arg Val Val Glu Pro Lys Arg Ala Val Ser Arg Glu Asp Ser Gln
85 90 95

Arg Pro Gly Ala His Leu Thr Val Lys Lys Ile Phe Val Gly Gly Ile
100 105 110

Lys Glu Asp Thr Glu Glu His His Leu Arg Asp Tyr Phe Glu Gln Tyr
115 120 125

Gly Lys Ile Glu Val Ile Glu Ile Met Thr Asp Arg Gly Ser Gly Lys
130 135 140

Lys Arg Gly Phe Ala Phe Val Thr Phe Asp Asp His Asp Ser Val Asp
145 150 155 160

Lys Ile Val Ile Gln Lys Tyr His Thr Val Asn Gly His Asn Cys Glu
165 170 175

Val Arg Lys Ala Leu Ser Lys Gln Glu Met Ala Ser Ala Ser Ser Ser
180 185 190

Gln Arg Gly Arg Ser Gly Ser Gly Asn Phe Gly Gly Gly Arg Gly Gly
195 200 205

Gly Phe Gly Gly Asn Asp Asn Phe Gly Arg Gly Gly Asn Phe Ser Gly
210 215 220

Arg Gly Gly Phe Gly Gly Ser Arg Gly Gly Gly Gly Tyr Gly Gly Ser
225 230 235 240

Gly Asp Gly Tyr Asn Gly Phe Gly Asn Asp Gly Ser Asn Phe Gly Gly
245 250 255

Gly Gly Ser Tyr Asn Asp Phe Gly Asn Tyr Asn Asn Gln Ser Ser Asn
260 265 270

Phe Gly Pro Met Lys Gly Gly Asn Phe Gly Gly Arg Ser Ser Gly Pro
275 280 285

Tyr Gly Gly Gly Gly Gln Tyr Phe Ala Lys Pro Arg Asn Gln Gly Gly
290 295 300

Tyr Gly Gly Ser Ser Ser Ser Ser Ser Tyr Gly Ser Gly Arg Arg Phe
305 310 315 320

<210> 36
<211> 587
<212> PRT
<213> Unknown

<220>
<223> Description of Unknown:
BPT4 sequence

<400> 36
Met Asp Ile Lys Val His Phe His Asp Phe Ser His Val Arg Ile Asp
1 5 10 15

Cys Glu Glu Ser Thr Phe His Glu Leu Arg Asp Phe Phe Ser Phe Glu
20 25 30

Ala Asp Gly Tyr Arg Phe Asn Pro Arg Phe Arg Tyr Gly Asn Trp Asp
35 40 45

Gly Arg Ile Arg Leu Leu Asp Tyr Asn Arg Leu Leu Pro Phe Gly Leu
50 55 60

Val Gly Gln Ile Lys Lys Phe Cys Asp Asn Phe Gly Tyr Lys Ala Trp
65 70 75 80

Ile Asp Pro Gln Ile Asn Glu Lys Glu Glu Leu Ser Arg Lys Asp Phe
85 90 95

Asp Glu Trp Leu Ser Lys Leu Glu Ile Tyr Ser Gly Asn Lys Arg Ile
100 105 110

Glu Pro His Trp Tyr Gln Lys Asp Ala Val Phe Glu Gly Leu Val Asn
115 120 125

Arg Arg Arg Ile Leu Asn Leu Pro Thr Ser Ala Gly Lys Ser Leu Ile
130 135 140

Gln Ala Leu Leu Ala Arg Tyr Tyr Leu Glu Asn Tyr Glu Gly Lys Ile
145 150 155 160

Leu Ile Ile Val Pro Thr Thr Ala Leu Thr Thr Gln Met Ala Asp Asp
165 170 175

Phe Val Asp Tyr Arg Leu Phe Ser His Ala Met Ile Lys Lys Ile Gly
180 185 190

Gly Gly Ala Ser Lys Asp Asp Lys Tyr Lys Asn Asp Ala Pro Val Val
195 200 205

Val Gly Thr Trp Gln Thr Val Val Lys Gln Pro Lys Glu Trp Phe Ser
210 215 220

Gln Phe Gly Met Met Met Asn Asp Glu Cys His Leu Ala Thr Gly Lys
225 230 235 240

Ser Ile Ser Ser Ile Ile Ser Gly Leu Asn Asn Cys Met Phe Lys Phe
245 250 255

Gly Leu Ser Gly Ser Leu Arg Asp Gly Lys Ala Asn Ile Met Gln Tyr
260 265 270

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

Met Glu Asp Gly Gln Val Thr Glu Leu Lys Ile Asn Ser Ile Phe Leu
290 295 300

Arg Tyr Pro Asp Glu Phe Thr Thr Lys Leu Lys Gly Lys Thr Tyr Gln
305 310 315 320

Glu Glu Ile Lys Ile Ile Thr Gly Leu Ser Lys Arg Asn Lys Trp Ile
325 330 335

Ala Lys Leu Ala Ile Lys Leu Ala Gln Lys Asp Glu Asn Ala Phe Val
340 345 350

Met Phe Lys His Val Ser His Gly Lys Ala Ile Phe Asp Leu Ile Lys
355 360 365

Asn Glu Tyr Asp Lys Val Tyr Tyr Val Ser Gly Glu Val Asp Thr Glu
370 375 380

Thr Arg Asn Ile Met Lys Thr Leu Ala Glu Asn Gly Lys Gly Ile Ile
385 390 395 400

Ile Val Ala Ser Tyr Gly Val Phe Ser Thr Gly Ile Ser Val Lys Asn
405 410 415

Leu His His Val Val Leu Ala His Gly Val Lys Ser Lys Ile Ile Val
420 425 430

Leu Gln Thr Ile Gly Arg Val Leu Arg Lys His Gly Ser Lys Thr Ile
435 440 445

Ala Thr Val Trp Asp Leu Ile Asp Ser Ala Gly Val Lys Pro Lys Ser
450 455 460

Ala Asn Thr Lys Lys Lys Tyr Val His Leu Asn Tyr Leu Leu Lys His
465 470 475 480

Gly Ile Asp Arg Ile Gln Arg Tyr Ala Asp Glu Lys Phe Asn Tyr Val
485 490 495

Met Lys Thr Val Asn Leu Ile Ser Phe Gly Pro Leu Glu Lys Lys Met
500 505 510

Leu Leu Glu Phe Lys Gln Phe Leu Tyr Glu Ala Ser Ile Asp Glu Phe
515 520 525

Met Gly Lys Ile Ala Ser Cys Gln Thr Leu Glu Gly Leu Glu Glu Leu
530 535 540

Glu Ala Tyr Tyr Lys Lys Arg Val Lys Glu Thr Glu Leu Lys Asp Thr
545 550 555 560

Asp Asp Ile Ser Val Arg Asp Ala Leu Ala Gly Lys Arg Ala Glu Leu
565 570 575

Glu Asp Ser Asp Asp Glu Val Glu Glu Ser Phe
580 585

<210> 37
<211> 715
<212> PRT
<213> Deinococcus radiodurans

<400> 37
Met Ser Ala Ala Leu Pro Ala Glu Pro Phe Arg Val Ser Gly Gly Val
1 5 10 15

Asn Lys Val Arg Phe Arg Ser Asp Thr Gly Phe Thr Val Met Ser Ala
20 25 30

Thr Leu Arg Asn Glu Gln Gly Glu Asp Pro Asp Ala Thr Val Ile Gly
35 40 45

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

Met Glu Glu His Arg Glu Tyr Gly Tyr Gln Tyr Arg Val Val Asn Met
65 70 75 80

Val Leu Glu Ala Met Pro Ala Asp Leu Ser Glu Glu Gly Val Ala Ala
85 90 95

Tyr Phe Glu Ala Arg Val Gly Gly Val Gly Lys Val Leu Ala Gly Arg
100 105 110

Ile Ala Lys Thr Phe Gly Ala Ala Ala Phe Asp Leu Leu Glu Asp Asp
115 120 125

Pro Gln Lys Phe Leu Gln Val Pro Gly Ile Thr Glu Ser Thr Leu His
130 135 140

Lys Met Val Ser Ser Trp Ser Gln Gln Gly Leu Glu Arg Arg Leu Leu
145 150 155 160

Ala Gly Leu Gln Gly Leu Gly Leu Thr Ile Asn Gln Ala Gln Arg Ala
165 170 175

Val Lys His Phe Gly Ala Asp Ala Leu Asp Arg Leu Glu Lys Asp Leu
180 185 190

Phe Thr Leu Thr Glu Val Glu Gly Ile Gly Phe Leu Thr Ala Asp Lys
195 200 205

Leu Trp Gln Ala Arg Gly Gly Ala Leu Asp Asp Pro Arg Arg Leu Thr
210 215 220

Ala Ala Ala Val Tyr Ala Leu Gln Leu Ala Gly Thr Gln Ala Gly His
225 230 235 240

Ser Phe Leu Pro Arg Ser Arg Ala Glu Lys Gly Val Val His Tyr Thr
245 250 255

Arg Val Thr Pro Gly Gln Ala Arg Leu Ala Val Glu Thr Ala Val Glu
260 265 270

Leu Gly Arg Leu Ser Glu Asp Asp Ser Pro Leu Phe Ala Ala Glu Ala
275 280 285

Ala Ala Thr Gly Glu Gly Arg Ile Tyr Leu Pro His Val Leu Arg Ala
290 295 300

Glu Lys Lys Leu Ala Ser Leu Ile Arg Thr Leu Leu Ala Thr Pro Pro
305 310 315 320

Ala Asp Gly Ala Gly Asn Asp Asp Trp Ala Val Pro Lys Lys Ala Arg
325 330 335

Lys Gly Leu Ser Glu Glu Gln Ala Ser Val Leu Asp Gln Leu Ala Gly
340 345 350

His Arg Leu Val Val Leu Thr Gly Gly Pro Gly Thr Gly Lys Ser Thr
355 360 365

Thr Thr Lys Ala Val Ala Asp Leu Ala Glu Ser Leu Gly Leu Glu Val
370 375 380

Gly Leu Cys Ala Pro Thr Gly Lys Ala Ala Arg Arg Leu Gly Glu Val
385 390 395 400

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

Gln Gly Phe Arg His Asn His Leu Glu Pro Ala Pro Tyr Asp Leu Leu
420 425 430

Ile Val Asp Glu Val Ser Met Met Gly Asp Ala Leu Met Leu Ser Leu
435 440 445

Leu Ala Ala Val Pro Pro Gly Ala Arg Val Leu Leu Val Gly Asp Thr
450 455 460

Asp Gln Leu Pro Pro Val Asp Ala Gly Leu Pro Leu Leu Ala Leu Ala
465 470 475 480

Gln Ala Ala Pro Thr Ile Lys Leu Thr Gln Val Tyr Arg Gln Ala Ala
485 490 495

Lys Asn Pro Ile Ile Gln Ala Ala His Gly Leu Leu His Gly Glu Ala
500 505 510

Pro Ala Trp Gly Asp Lys Arg Leu Asn Leu Thr Glu Ile Glu Pro Asp
515 520 525

Gly Gly Ala Arg Arg Val Ala Leu Met Val Arg Glu Leu Gly Gly Pro

530 535 540

Gly Ala Val Gln Val Leu Thr Pro Met Arg Lys Gly Pro Leu Gly Met
545 550 555 560

Asp His Leu Asn Tyr His Leu Gln Ala Leu Phe Asn Pro Gly Glu Gly
565 570 575

Gly Val Arg Ile Ala Glu Gly Glu Ala Arg Pro Gly Asp Thr Val Val
580 585 590

Gln Thr Lys Asn Asp Tyr Asn Asn Glu Ile Phe Asn Gly Thr Leu Gly
595 600 605

Met Val Leu Lys Ala Glu Gly Ala Arg Leu Thr Val Asp Phe Asp Gly
610 615 620

Asn Val Val Glu Leu Thr Gly Ala Glu Leu Phe Asn Leu Gln Leu Gly
625 630 635 640

Tyr Ala Leu Thr Val His Arg Ala Gln Gly Ser Glu Trp Gly Thr Val
645 650 655

Leu Gly Val Leu His Glu Ala His Met Pro Met Leu Ser Arg Asn Leu
660 665 670

Val Tyr Thr Ala Leu Thr Arg Ala Arg Asp Arg Phe Phe Ser Ala Gly
675 680 685

Ser Ala Ser Ala Trp Gln Ile Ala Ala Ala Arg Gln Arg Glu Ala Arg
690 695 700

Asn Thr Ala Leu Leu Glu Arg Ile Arg Ala His
705 710 715

<210> 38
<211> 353
<212> PRT
<213> Escherichia coli

<400> 38
Met Ala Ile Asp Glu Asn Lys Gln Lys Ala Leu Ala Ala Ala Leu Gly
1 5 10 15

Gln Ile Glu Lys Gln Phe Gly Lys Gly Ser Ile Met Arg Leu Gly Glu
20 25 30

Asp Arg Ser Met Asp Val Glu Thr Ile Ser Thr Gly Ser Leu Ser Leu
35 40 45

Asp Ile Ala Leu Gly Ala Gly Gly Leu Pro Met Gly Arg Ile Val Glu
50 55 60

Ile Tyr Gly Pro Glu Ser Ser Gly Lys Thr Thr Leu Thr Leu Gln Val
65 70 75 80

Ile Ala Ala Ala Gln Arg Glu Gly Lys Thr Cys Ala Phe Ile Asp Ala
85 90 95

Glu His Ala Leu Asp Pro Ile Tyr Ala Arg Lys Leu Gly Val Asp Ile
100 105 110

Asp Asn Leu Leu Cys Ser Gln Pro Asp Thr Gly Glu Gln Ala Leu Glu
115 120 125

Ile Cys Asp Ala Leu Ala Arg Ser Gly Ala Val Asp Val Ile Val Val
130 135 140

Asp Ser Val Ala Ala Leu Thr Pro Lys Ala Glu Ile Glu Gly Glu Ile
145 150 155 160

Gly Asp Ser His Met Gly Leu Ala Ala Arg Met Met Ser Gln Ala Met
165 170 175

Arg Lys Leu Ala Gly Asn Leu Lys Gln Ser Asn Thr Leu Leu Ile Phe
180 185 190

Ile Asn Gln Ile Arg Met Lys Ile Gly Val Met Phe Gly Asn Pro Glu
195 200 205

Thr Thr Thr Gly Gly Asn Ala Leu Lys Phe Tyr Ala Ser Val Arg Leu
210 215 220

Asp Ile Arg Arg Ile Gly Ala Val Lys Glu Gly Glu Asn Val Val Gly

225 230 235 240

Ser Glu Thr Arg Val Lys Val Val Lys Asn Lys Ile Ala Ala Pro Phe
245 250 255

Lys Gln Ala Glu Phe Gln Ile Leu Tyr Gly Glu Gly Ile Asn Phe Tyr
260 265 270

Gly Glu Leu Val Asp Leu Gly Val Lys Glu Lys Leu Ile Glu Lys Ala
275 280 285

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

Asn Ala Thr Ala Trp Leu Lys Asp Asn Pro Glu Thr Ala Lys Glu Ile
305 310 315 320

Glu Lys Lys Val Arg Glu Leu Leu Leu Ser Asn Pro Asn Ser Thr Pro
325 330 335

Asp Phe Ser Val Asp Asp Ser Glu Gly Val Ala Glu Thr Asn Glu Asp
340 345 350

Phe

<210> 39
<211> 1180
<212> PRT
<213> Escherichia coli

<400> 39
Met Ser Asp Val Ala Glu Thr Leu Asp Pro Leu Arg Leu Pro Leu Gln
1 5 10 15

Gly Glu Arg Leu Ile Glu Ala Ser Ala Gly Thr Gly Lys Thr Phe Thr
20 25 30

Ile Ala Ala Leu Tyr Leu Arg Leu Leu Leu Gly Leu Gly Gly Ser Ala
35 40 45

Ala Phe Pro Arg Pro Leu Thr Val Glu Glu Leu Leu Val Val Thr Phe
50 55 60

Thr Glu Ala Ala Thr Ala Glu Leu Arg Gly Arg Ile Arg Ser Asn Ile
65 70 75 80

His Glu Leu Arg Ile Ala Cys Leu Arg Glu Thr Thr Asp Asn Pro Leu
85 90 95

Tyr Glu Arg Leu Leu Glu Glu Ile Asp Asp Lys Ala Gln Ala Ala Gln
100 105 110

Trp Leu Leu Leu Ala Glu Arg Gln Met Asp Glu Ala Ala Val Phe Thr
115 120 125

Ile His Gly Phe Cys Gln Arg Met Leu Asn Leu Asn Ala Phe Glu Ser
130 135 140

Gly Met Leu Phe Glu Gln Gln Leu Ile Glu Asp Glu Ser Leu Leu Arg
145 150 155 160

Tyr Gln Ala Cys Ala Asp Phe Trp Arg Arg His Cys Tyr Pro Leu Pro
165 170 175

Arg Glu Ile Ala Gln Val Val Phe Glu Thr Trp Lys Gly Pro Gln Ala
180 185 190

Leu Leu Arg Asp Ile Asn Arg Tyr Leu Gln Gly Glu Ala Pro Val Ile
195 200 205

Lys Ala Pro Pro Pro Asp Asp Glu Thr Leu Ala Ser Arg His Ala Gln
210 215 220

Ile Val Ala Arg Ile Asp Thr Val Lys Gln Gln Trp Arg Asp Ala Val
225 230 235 240

Gly Glu Leu Asp Ala Leu Ile Glu Ser Ser Gly Ile Asp Arg Arg Lys
245 250 255

Phe Asn Arg Ser Asn Gln Ala Lys Trp Ile Asp Lys Ile Ser Ala Trp
260 265 270

Ala Glu Glu Glu Thr Asn Ser Tyr Gln Leu Pro Glu Ser Leu Glu Lys

275 280 285

Phe Ser Gln Arg Phe Leu Glu Asp Arg Thr Lys Ala Gly Gly Glu Thr
290 295 300

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

Leu Ser Ile Arg Asp Leu Val Ile Thr Arg Ala Leu Ala Glu Ile Arg
325 330 335

Glu Thr Val Ala Arg Glu Lys Arg Arg Arg Gly Glu Leu Gly Phe Asp
340 345 350

Asp Met Leu Ser Arg Leu Asp Ser Ala Leu Arg Ser Glu Ser Gly Glu
355 360 365

Val Leu Ala Ala Ala Ile Arg Thr Arg Phe Pro Val Ala Met Ile Asp
370 375 380

Glu Phe Gln Asp Thr Asp Pro Gln Gln Tyr Arg Ile Phe Arg Arg Ile
385 390 395 400

Trp His His Gln Pro Glu Thr Ala Leu Leu Leu Ile Gly Asp Pro Lys
405 410 415

Gln Ala Ile Tyr Ala Phe Arg Gly Ala Asp Ile Phe Thr Tyr Met Lys
420 425 430

Ala Arg Ser Glu Val His Ala His Tyr Thr Leu Asp Thr Asn Trp Arg
435 440 445

Ser Ala Pro Gly Met Val Asn Ser Val Asn Lys Leu Phe Ser Gln Thr
450 455 460

Asp Asp Ala Phe Met Phe Arg Glu Ile Pro Phe Ile Pro Val Lys Ser
465 470 475 480

Ala Gly Lys Asn Gln Ala Leu Arg Phe Val Phe Lys Gly Glu Thr Gln
485 490 495

Pro Ala Met Lys Met Trp Leu Met Glu Gly Glu Ser Cys Gly Val Gly
500 505 510

Asp Tyr Gln Ser Thr Met Ala Gln Val Cys Ala Ala Gln Ile Arg Asp
515 520 525

Trp Leu Gln Ala Gly Gln Arg Gly Glu Ala Leu Leu Met Asn Gly Asp
530 535 540

Asp Ala Arg Pro Val Arg Ala Ser Asp Ile Ser Val Leu Val Arg Ser
545 550 555 560

Arg Gln Glu Ala Ala Gln Val Arg Asp Ala Leu Thr Leu Leu Glu Ile
565 570 575

Pro Ser Val Tyr Leu Ser Asn Arg Asp Ser Val Phe Glu Thr Leu Glu
580 585 590

Ala Gln Glu Met Leu Trp Leu Leu Gln Ala Val Met Thr Pro Glu Arg
595 600 605

Glu Asn Thr Leu Arg Ser Ala Leu Ala Thr Ser Met Met Gly Leu Asn
610 615 620

Ala Leu Asp Ile Glu Thr Leu Asn Asn Asp Glu His Ala Trp Asp Val
625 630 635 640

Val Val Glu Glu Phe Asp Gly Tyr Arg Gln Ile Trp Arg Lys Arg Gly
645 650 655

Val Met Pro Met Leu Arg Ala Leu Met Ser Ala Arg Asn Ile Ala Glu
660 665 670

Asn Leu Leu Ala Thr Ala Gly Gly Glu Arg Arg Leu Thr Asp Ile Leu
675 680 685

His Ile Ser Glu Leu Leu Gln Glu Ala Gly Thr Gln Leu Glu Ser Glu
690 695 700

His Ala Leu Val Arg Trp Leu Ser Gln His Ile Leu Glu Pro Asp Ser
705 710 715 720

Asn Ala Ser Ser Gln Gln Met Arg Leu Glu Ser Asp Lys His Leu Val
725 730 735

Gln Ile Val Thr Ile His Lys Ser Lys Gly Leu Glu Tyr Pro Leu Val
740 745 750

Trp Leu Pro Phe Ile Thr Asn Phe Arg Val Gln Glu Gln Ala Phe Tyr
755 760 765

His Asp Arg His Ser Phe Glu Ala Val Leu Asp Leu Asn Ala Ala Pro
770 775 780

Glu Ser Val Asp Leu Ala Glu Ala Glu Arg Leu Ala Glu Asp Leu Arg
785 790 795 800

Leu Leu Tyr Val Ala Leu Thr Arg Ser Val Trp His Cys Ser Leu Gly
805 810 815

Val Ala Pro Leu Val Arg Arg Arg Gly Asp Lys Lys Gly Asp Thr Asp
820 825 830

Val His Gln Ser Ala Leu Gly Arg Leu Leu Gln Lys Gly Glu Pro Gln
835 840 845

Asp Ala Ala Gly Leu Arg Thr Cys Ile Glu Ala Leu Cys Asp Asp Asp
850 855 860

Ile Ala Trp Gln Thr Ala Gln Thr Gly Asp Asn Gln Pro Trp Gln Val
865 870 875 880

Asn Asp Val Ser Thr Ala Glu Leu Asn Ala Lys Thr Leu Gln Arg Leu
885 890 895

Pro Gly Asp Asn Trp Arg Val Thr Ser Tyr Ser Gly Leu Gln Gln Arg
900 905 910

Gly His Gly Ile Ala Gln Asp Leu Met Pro Arg Leu Asp Val Asp Ala
915 920 925

Ala Gly Val Ala Ser Val Val Glu Glu Pro Thr Leu Thr Pro His Gln
930 935 940

Phe Pro Arg Gly Ala Ser Pro Gly Thr Phe Leu His Ser Leu Phe Glu
945 950 955 960

Asp Leu Asp Phe Thr Gln Pro Val Asp Pro Asn Trp Val Arg Glu Lys
965 970 975

Leu Glu Leu Gly Gly Phe Glu Ser Gln Trp Glu Pro Val Leu Thr Glu
980 985 990

Trp Ile Thr Ala Val Leu Gln Ala Pro Leu Asn Glu Thr Gly Val Ser
995 1000 1005

Leu Ser Gln Leu Ser Ala Arg Asn Lys Gln Val Glu Met Glu Phe
1010 1015 1020

Tyr Leu Pro Ile Ser Glu Pro Leu Ile Ala Ser Gln Leu Asp Thr
1025 1030 1035

Leu Ile Arg Gln Phe Asp Pro Leu Ser Ala Gly Cys Pro Pro Leu
1040 1045 1050

Glu Phe Met Gln Val Arg Gly Met Leu Lys Gly Phe Ile Asp Leu
1055 1060 1065

Val Phe Arg His Glu Gly Arg Tyr Tyr Leu Leu Asp Tyr Lys Ser
1070 1075 1080

Asn Trp Leu Gly Glu Asp Ser Ser Ala Tyr Thr Gln Gln Ala Met
1085 1090 1095

Ala Ala Ala Met Gln Ala His Arg Tyr Asp Leu Gln Tyr Gln Leu
1100 1105 1110

Tyr Thr Leu Ala Leu His Arg Tyr Leu Arg His Arg Ile Ala Asp
1115 1120 1125

Tyr Asp Tyr Glu His His Phe Gly Gly Val Ile Tyr Leu Phe Leu
1130 1135 1140

Arg Gly Val Asp Lys Glu His Pro Gln Gln Gly Ile Tyr Thr Thr

1145 1150 1155

Arg Pro Asn Ala Gly Leu Ile Ala Leu Met Asp Glu Met Phe Ala
1160 1165 1170

Gly Met Thr Leu Glu Glu Ala
1175 1180

<210> 40
<211> 1122
<212> PRT
<213> Escherichia coli

<400> 40
Met Leu Arg Val Tyr His Ser Asn Arg Leu Asp Val Leu Glu Ala Leu
1 5 10 15

Met Glu Phe Ile Val Glu Arg Glu Arg Leu Asp Asp Pro Phe Glu Pro
20 25 30

Glu Met Ile Leu Val Gln Ser Thr Gly Met Ala Gln Trp Leu Gln Met
35 40 45

Thr Leu Ser Gln Lys Phe Gly Ile Ala Ala Asn Ile Asp Phe Pro Leu
50 55 60

Pro Ala Ser Phe Ile Trp Asp Met Phe Val Arg Val Leu Pro Glu Ile
65 70 75 80

Pro Lys Glu Ser Ala Phe Asn Lys Gln Ser Met Ser Trp Lys Leu Met
85 90 95

Thr Leu Leu Pro Gln Leu Leu Glu Arg Glu Asp Phe Thr Leu Leu Arg
100 105 110

His Tyr Leu Thr Asp Asp Ser Asp Lys Arg Lys Leu Phe Gln Leu Ser
115 120 125

Ser Lys Ala Ala Asp Leu Phe Asp Gln Tyr Leu Val Tyr Arg Pro Asp
130 135 140

Trp Leu Ala Gln Trp Glu Thr Gly His Leu Val Glu Gly Leu Gly Glu
145 150 155 160

Ala Gln Ala Trp Gln Ala Pro Leu Trp Lys Ala Leu Val Glu Tyr Thr
165 170 175

His Gln Leu Gly Gln Pro Arg Trp His Arg Ala Asn Leu Tyr Gln Arg
180 185 190

Phe Ile Glu Thr Leu Glu Ser Ala Thr Thr Cys Pro Pro Gly Leu Pro
195 200 205

Ser Arg Val Phe Ile Cys Gly Ile Ser Ala Leu Pro Pro Val Tyr Leu
210 215 220

Gln Ala Leu Gln Ala Leu Gly Lys His Ile Glu Ile His Leu Leu Phe
225 230 235 240

Thr Asn Pro Cys Arg Tyr Tyr Trp Gly Asp Ile Lys Asp Pro Ala Tyr
245 250 255

Leu Ala Lys Leu Leu Thr Arg Gln Arg Arg His Ser Phe Glu Asp Arg
260 265 270

Glu Leu Pro Leu Phe Arg Asp Ser Glu Asn Ala Gly Gln Leu Phe Asn
275 280 285

Ser Asp Gly Glu Gln Asp Val Gly Asn Pro Leu Leu Ala Ser Trp Gly
290 295 300

Lys Leu Gly Arg Asp Tyr Ile Tyr Leu Leu Ser Asp Leu Glu Ser Ser
305 310 315 320

Gln Glu Leu Asp Ala Phe Val Asp Val Thr Pro Asp Asn Leu Leu His
325 330 335

Asn Ile Gln Ser Asp Ile Leu Glu Leu Glu Asn Arg Ala Val Ala Gly
340 345 350

Val Asn Ile Glu Glu Phe Ser Arg Ser Asp Asn Lys Arg Pro Leu Asp
355 360 365

Pro Leu Asp Ser Ser Ile Thr Phe His Val Cys His Ser Pro Gln Arg

370 375 380

Glu Val Glu Val Leu His Asp Arg Leu Leu Ala Met Leu Glu Glu Asp
385 390 395 400

Pro Thr Leu Thr Pro Arg Asp Ile Ile Val Met Val Ala Asp Ile Asp
405 410 415

Ser Tyr Ser Pro Phe Ile Gln Ala Val Phe Gly Ser Ala Pro Ala Asp
420 425 430

Arg Tyr Leu Pro Tyr Ala Ile Ser Asp Arg Arg Ala Arg Gln Ser His
435 440 445

Pro Val Leu Glu Ala Phe Ile Ser Leu Leu Ser Leu Pro Asp Ser Arg
450 455 460

Phe Val Ser Glu Asp Val Leu Ala Leu Leu Asp Val Pro Val Leu Ala
465 470 475 480

Ala Arg Phe Asp Ile Thr Glu Glu Gly Leu Arg Tyr Leu Arg Gln Trp
485 490 495

Val Asn Glu Ser Gly Ile Arg Trp Gly Ile Asp Asp Asp Asn Val Arg
500 505 510

Glu Leu Glu Leu Pro Ala Thr Gly Gln His Thr Trp Arg Phe Gly Leu
515 520 525

Thr Arg Met Leu Leu Gly Tyr Ala Met Glu Ser Ala Gln Gly Glu Trp
530 535 540

Gln Ser Val Leu Pro Tyr Asp Glu Ser Ser Gly Leu Ile Ala Glu Leu
545 550 555 560

Val Gly His Leu Ala Ser Leu Leu Met Gln Leu Asn Ile Trp Arg Arg
565 570 575

Gly Leu Ala Gln Glu Arg Pro Leu Glu Glu Trp Leu Pro Val Cys Arg
580 585 590

Asp Met Leu Asn Ala Phe Phe Leu Pro Asp Ala Glu Thr Glu Ala Ala
595 600 605

Met Thr Leu Ile Glu Gln Gln Trp Gln Ala Ile Ile Ala Glu Gly Leu
610 615 620

Gly Ala Gln Tyr Gly Asp Ala Val Pro Leu Ser Leu Leu Arg Asp Glu
625 630 635 640

Leu Ala Gln Arg Leu Asp Gln Glu Arg Ile Ser Gln Arg Phe Leu Ala
645 650 655

Gly Pro Val Asn Ile Cys Thr Leu Met Pro Met Arg Ser Ile Pro Phe
660 665 670

Lys Val Val Cys Leu Leu Gly Met Asn Asp Gly Val Tyr Pro Arg Gln
675 680 685

Leu Ala Pro Leu Gly Phe Asp Leu Met Ser Gln Lys Pro Lys Arg Gly
690 695 700

Asp Arg Ser Arg Arg Asp Asp Asp Arg Tyr Leu Phe Leu Glu Ala Leu
705 710 715 720

Ile Ser Ala Gln Gln Lys Leu Tyr Ile Ser Tyr Ile Gly Arg Ser Ile
725 730 735

Gln Asp Asn Ser Glu Arg Phe Pro Ser Val Leu Val Gln Glu Leu Ile
740 745 750

Asp Tyr Ile Gly Gln Ser His Tyr Leu Pro Gly Asp Glu Ala Leu Asn
755 760 765

Cys Asp Glu Ser Glu Ala Arg Val Lys Ala His Leu Thr Cys Leu His
770 775 780

Thr Arg Met Pro Phe Asp Pro Gln Asn Tyr Gln Pro Gly Glu Arg Gln
785 790 795 800

Ser Tyr Ala Arg Glu Trp Leu Pro Ala Ala Ser Gln Ala Gly Lys Ala
805 810 815

His Ser Glu Phe Val Gln Pro Leu Pro Phe Thr Leu Pro Glu Thr Val
820 825 830

Pro Leu Glu Thr Leu Gln Arg Phe Trp Ala His Pro Val Arg Ala Phe
835 840 845

Phe Gln Met Arg Leu Gln Val Asn Phe Arg Thr Glu Asp Ser Glu Ile
850 855 860

Pro Asp Thr Glu Pro Phe Ile Leu Glu Gly Leu Ser Arg Tyr Gln Ile
865 870 875 880

Asn Gln Gln Leu Leu Asn Ala Leu Val Glu Gln Asp Asp Ala Glu Arg
885 890 895

Leu Phe Arg Arg Phe Arg Ala Ala Gly Asp Leu Pro Tyr Gly Ala Phe
900 905 910

Gly Glu Ile Phe Trp Glu Thr Gln Cys Gln Glu Met Gln Gln Leu Ala
915 920 925

Asp Arg Val Ile Ala Cys Arg Gln Pro Gly Gln Ser Met Glu Ile Asp
930 935 940

Leu Ala Cys Asn Gly Val Gln Ile Thr Gly Trp Leu Pro Gln Val Gln
945 950 955 960

Pro Asp Gly Leu Leu Arg Trp Arg Pro Ser Leu Leu Ser Val Ala Gln
965 970 975

Gly Met Gln Leu Trp Leu Glu His Leu Val Tyr Cys Ala Ser Gly Gly
980 985 990

Asn Gly Glu Ser Arg Leu Phe Leu Arg Lys Asp Gly Glu Trp Arg Phe
995 1000 1005

Pro Pro Leu Ala Ala Glu Gln Ala Leu His Tyr Leu Ser Gln Leu
1010 1015 1020

Ile Glu Gly Tyr Arg Glu Gly Met Ser Ala Pro Leu Leu Val Leu
1025 1030 1035

Pro Glu Ser Gly Gly Ala Trp Leu Lys Thr Cys Tyr Asp Ala Gln
1040 1045 1050

Asn Asp Ala Met Leu Asp Asp Asp Ser Thr Leu Gln Lys Ala Arg
1055 1060 1065

Thr Lys Phe Leu Gln Ala Tyr Glu Gly Asn Met Met Val Arg Gly
1070 1075 1080

Glu Gly Asp Asp Ile Trp Tyr Gln Arg Leu Trp Arg Gln Leu Thr
1085 1090 1095

Pro Glu Thr Met Glu Ala Ile Val Glu Gln Ser Gln Arg Phe Leu
1100 1105 1110

Leu Pro Leu Phe Arg Phe Asn Gln Ser
1115 1120

<210> 41
<211> 608
<212> PRT
<213> Escherichia coli

<400> 41
Met Lys Leu Gln Lys Gln Leu Leu Glu Ala Val Glu His Lys Gln Leu
1 5 10 15

Arg Pro Leu Asp Val Gln Phe Ala Leu Thr Val Ala Gly Asp Glu His
20 25 30

Pro Ala Val Thr Leu Ala Ala Ala Leu Leu Ser His Asp Ala Gly Glu
35 40 45

Gly His Val Cys Leu Pro Leu Ser Arg Leu Glu Asn Asn Glu Ala Ser
50 55 60

His Pro Leu Leu Ala Thr Cys Val Ser Glu Ile Gly Glu Leu Gln Asn
65 70 75 80

Trp Glu Glu Cys Leu Leu Ala Ser Gln Ala Val Ser Arg Gly Asp Glu
85 90 95

Pro Thr Pro Met Ile Leu Cys Gly Asp Arg Leu Tyr Leu Asn Arg Met
100 105 110

Trp Cys Asn Glu Arg Thr Val Ala Arg Phe Phe Asn Glu Val Asn His
115 120 125

Ala Ile Glu Val Asp Glu Ala Leu Leu Ala Gln Thr Leu Asp Lys Leu
130 135 140

Phe Pro Val Ser Asp Glu Ile Asn Trp Gln Lys Val Ala Ala Ala Val
145 150 155 160

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

Lys Thr Thr Thr Val Ala Lys Leu Leu Ala Ala Leu Ile Gln Met Ala
180 185 190

Asp Gly Glu Arg Cys Arg Ile Arg Leu Ala Ala Pro Thr Gly Lys Ala
195 200 205

Ala Ala Arg Leu Thr Glu Ser Leu Gly Lys Ala Leu Arg Gln Leu Pro
210 215 220

Leu Thr Asp Glu Gln Lys Lys Arg Ile Pro Glu Asp Ala Ser Thr Leu
225 230 235 240

His Arg Leu Leu Gly Ala Gln Pro Gly Ser Gln Arg Leu Arg His His
245 250 255

Ala Gly Asn Pro Leu His Leu Asp Val Leu Val Val Asp Glu Ala Ser
260 265 270

Met Ile Asp Leu Pro Met Met Ser Arg Leu Ile Asp Ala Leu Pro Asp
275 280 285

His Ala Arg Val Ile Phe Leu Gly Asp Arg Asp Gln Leu Ala Ser Val
290 295 300

Glu Ala Gly Ala Val Leu Gly Asp Ile Cys Ala Tyr Ala Asn Ala Gly
305 310 315 320

Phe Thr Ala Glu Arg Ala Arg Gln Leu Ser Arg Leu Thr Gly Thr His
325 330 335

Val Pro Ala Gly Thr Gly Thr Glu Ala Ala Ser Leu Arg Asp Ser Leu
340 345 350

Cys Leu Leu Gln Lys Ser Tyr Arg Phe Gly Ser Asp Ser Gly Ile Gly
355 360 365

Gln Leu Ala Ala Ala Ile Asn Arg Gly Asp Lys Thr Ala Val Lys Thr
370 375 380

Val Phe Gln Gln Asp Phe Thr Asp Ile Glu Lys Arg Leu Leu Gln Ser
385 390 395 400

Gly Glu Asp Tyr Ile Ala Met Leu Glu Glu Ala Leu Ala Gly Tyr Gly
405 410 415

Arg Tyr Leu Asp Leu Leu Gln Ala Arg Ala Glu Pro Asp Leu Ile Ile
420 425 430

Gln Ala Phe Asn Glu Tyr Gln Leu Leu Cys Ala Leu Arg Glu Gly Pro
435 440 445

Phe Gly Val Ala Gly Leu Asn Glu Arg Ile Glu Gln Phe Met Gln Gln
450 455 460

Lys Arg Lys Ile His Arg His Pro His Ser Arg Trp Tyr Glu Gly Arg
465 470 475 480

Pro Val Met Ile Ala Arg Asn Asp Ser Ala Leu Gly Leu Phe Asn Gly
485 490 495

Asp Ile Gly Ile Ala Leu Asp Arg Gly Gln Gly Thr Arg Val Trp Phe
500 505 510

Ala Met Pro Asp Gly Asn Ile Lys Ser Val Gln Pro Ser Arg Leu Pro
515 520 525

Glu His Glu Thr Thr Trp Ala Met Thr Val His Lys Ser Gln Gly Ser

530 535 540

Glu Phe Asp His Ala Ala Leu Ile Leu Pro Ser Gln Arg Thr Pro Val
545 550 555 560

Val Thr Arg Glu Leu Val Tyr Thr Ala Val Thr Arg Ala Arg Arg Arg
565 570 575

Leu Ser Leu Tyr Ala Asp Glu Arg Ile Leu Ser Ala Ala Ile Ala Thr
580 585 590

Arg Thr Glu Arg Arg Ser Gly Leu Ala Ala Leu Phe Ser Ser Arg Glu
595 600 605

<210> 42
<211> 609
<212> PRT
<213> Escherichia coli

<400> 42
Met Ala Gln Ala Glu Val Leu Asn Leu Glu Ser Gly Ala Lys Gln Val
1 5 10 15

Leu Gln Glu Thr Phe Gly Tyr Gln Gln Phe Arg Pro Gly Gln Glu Glu
20 25 30

Ile Ile Asp Thr Val Leu Ser Gly Arg Asp Cys Leu Val Val Met Pro
35 40 45

Thr Gly Gly Gly Lys Ser Leu Cys Tyr Gln Ile Pro Ala Leu Leu Leu
50 55 60

Asn Gly Leu Thr Val Val Val Ser Pro Leu Ile Ser Leu Met Lys Asp
65 70 75 80

Gln Val Asp Gln Leu Gln Ala Asn Gly Val Ala Ala Ala Cys Leu Asn
85 90 95

Ser Thr Gln Thr Arg Glu Gln Gln Leu Glu Val Met Thr Gly Cys Arg
100 105 110

Thr Gly Gln Ile Arg Leu Leu Tyr Ile Ala Pro Glu Arg Leu Met Leu
115 120 125

Asp Asn Phe Leu Glu His Leu Ala His Trp Asn Pro Val Leu Leu Ala
130 135 140

Val Asp Glu Ala His Cys Ile Ser Gln Trp Gly His Asp Phe Arg Pro
145 150 155 160

Glu Tyr Ala Ala Leu Gly Gln Leu Arg Gln Arg Phe Pro Thr Leu Pro
165 170 175

Phe Met Ala Leu Thr Ala Thr Ala Asp Asp Thr Thr Arg Gln Asp Ile
180 185 190

Val Arg Leu Leu Gly Leu Asn Asp Pro Leu Ile Gln Ile Ser Ser Phe
195 200 205

Asp Arg Pro Asn Ile Arg Tyr Met Leu Met Glu Lys Phe Lys Pro Leu
210 215 220

Asp Gln Leu Met Arg Tyr Val Gln Glu Gln Arg Gly Lys Ser Gly Ile
225 230 235 240

Ile Tyr Cys Asn Ser Arg Ala Lys Val Glu Asp Thr Ala Ala Arg Leu
245 250 255

Gln Ser Lys Gly Ile Ser Ala Ala Ala Tyr His Ala Gly Leu Glu Asn
260 265 270

Asn Val Arg Ala Asp Val Gln Glu Lys Phe Gln Arg Asp Asp Leu Gln
275 280 285

Ile Val Val Ala Thr Val Ala Phe Gly Met Gly Ile Asn Lys Pro Asn
290 295 300

Val Arg Phe Val Val His Phe Asp Ile Pro Arg Asn Ile Glu Ser Tyr
305 310 315 320

Tyr Gln Glu Thr Gly Arg Ala Gly Arg Asp Gly Leu Pro Ala Glu Ala
325 330 335

Met Leu Phe Tyr Asp Pro Ala Asp Met Ala Trp Leu Arg Arg Cys Leu

340 345 350

Glu Glu Lys Pro Gln Gly Gln Leu Gln Asp Ile Glu Arg His Lys Leu
355 360 365

Asn Ala Met Gly Ala Phe Ala Glu Ala Gln Thr Cys Arg Arg Leu Val
370 375 380

Leu Leu Asn Tyr Phe Gly Glu Gly Arg Gln Glu Pro Cys Gly Asn Cys
385 390 395 400

Asp Ile Cys Leu Asp Pro Pro Lys Gln Tyr Asp Gly Ser Thr Asp Ala
405 410 415

Gln Ile Ala Leu Ser Thr Ile Gly Arg Val Asn Gln Arg Phe Gly Met
420 425 430

Gly Tyr Val Val Glu Val Ile Arg Gly Ala Asn Asn Gln Arg Ile Arg
435 440 445

Asp Tyr Gly His Asp Lys Leu Lys Val Tyr Gly Met Gly Arg Asp Lys
450 455 460

Ser His Glu His Trp Val Ser Val Ile Arg Gln Leu Ile His Leu Gly
465 470 475 480

Leu Val Thr Gln Asn Ile Ala Gln His Ser Ala Leu Gln Leu Thr Glu
485 490 495

Ala Ala Arg Pro Val Leu Arg Gly Glu Ser Ser Leu Gln Leu Ala Val
500 505 510

Pro Arg Ile Val Ala Leu Lys Pro Lys Ala Met Gln Lys Ser Phe Gly
515 520 525

Gly Asn Tyr Asp Arg Lys Leu Phe Ala Lys Leu Arg Lys Leu Arg Lys
530 535 540

Ser Ile Ala Asp Glu Ser Asn Val Pro Pro Tyr Val Val Phe Asn Asp
545 550 555 560

Ala Thr Leu Ile Glu Met Ala Glu Gln Met Pro Ile Thr Ala Ser Glu
565 570 575

Met Leu Ser Val Asn Gly Val Gly Met Arg Lys Leu Glu Arg Phe Gly
580 585 590

Lys Pro Phe Met Ala Leu Ile Arg Ala His Val Asp Gly Asp Asp Glu
595 600 605

Glu

<210> 43
<211> 508
<212> PRT
<213> Escherichia coli

<400> 43
Met Arg Leu Asn Pro Gly Gln Gln Gln Ala Val Glu Phe Val Thr Gly
1 5 10 15

Pro Cys Leu Val Leu Ala Gly Ala Gly Ser Gly Lys Thr Arg Val Ile
20 25 30

Thr Asn Lys Ile Ala His Leu Ile Arg Gly Cys Gly Tyr Gln Ala Arg
35 40 45

His Ile Ala Ala Val Thr Phe Thr Asn Lys Ala Ala Arg Glu Met Lys
50 55 60

Glu Arg Val Gly Gln Thr Leu Gly Arg Lys Glu Ala Arg Gly Leu Met
65 70 75 80

Ile Ser Thr Phe His Thr Leu Gly Leu Asp Ile Ile Lys Arg Glu Tyr
85 90 95

Ala Ala Leu Gly Met Lys Ala Asn Phe Ser Leu Phe Asp Asp Thr Asp
100 105 110

Gln Leu Ala Leu Leu Lys Glu Leu Thr Glu Gly Leu Ile Glu Asp Asp
115 120 125

Lys Val Leu Leu Gln Gln Leu Ile Ser Thr Ile Ser Asn Trp Lys Asn

130 135 140

Asp Leu Lys Thr Pro Ala Gln Ala Ala Ala Glu Ala Lys Gly Glu Arg
145 150 155 160

Asp Arg Ile Phe Ala His Cys Tyr Gly Leu Tyr Asp Ala His Leu Lys
165 170 175

Ala Cys Asn Val Leu Asp Phe Asp Asp Leu Ile Leu Leu Pro Thr Leu
180 185 190

Leu Leu Gln Arg Asn Glu Glu Val Arg Glu Arg Trp Gln Asn Lys Ile
195 200 205

Arg Tyr Leu Leu Val Asp Glu Tyr Gln Asp Thr Asn Thr Ser Gln Tyr
210 215 220

Glu Leu Val Lys Leu Leu Val Gly Ser Arg Ala Arg Phe Thr Val Val
225 230 235 240

Gly Asp Asp Asp Gln Ser Ile Tyr Ser Trp Arg Gly Ala Arg Pro Gln
245 250 255

Asn Leu Val Leu Leu Ser Gln Asp Phe Pro Ala Leu Lys Val Ile Lys
260 265 270

Leu Glu Gln Asn Tyr Arg Ser Ser Gly Arg Ile Leu Lys Ala Ala Asn
275 280 285

Ile Leu Ile Ala Asn Asn Pro His Val Phe Glu Lys Arg Leu Phe Ser
290 295 300

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

Glu His Glu Ala Glu Arg Val Thr Gly Glu Leu Ile Ala His His Phe
325 330 335

Val Asn Lys Thr Gln Tyr Lys Asp Tyr Ala Ile Leu Tyr Arg Gly Asn
340 345 350

His Gln Ser Arg Val Phe Glu Lys Phe Leu Met Gln Asn Arg Ile Pro
355 360 365

Tyr Lys Ile Ser Gly Gly Gly Gly Gly Gly Glu Ser Glu Glu Glu Leu
370 375 380

Asp Gln Val Gln Leu Met Thr Leu His Ala Ser Lys Gly Leu Glu Phe
385 390 395 400

Pro Tyr Val Tyr Met Val Gly Met Glu Glu Gly Phe Leu Pro His Gln
405 410 415

Ser Ser Ile Asp Glu Asp Asn Ile Asp Glu Glu Arg Arg Leu Ala Tyr
420 425 430

Val Gly Ile Thr Arg Ala Gln Lys Glu Leu Thr Phe Thr Leu Cys Lys
435 440 445

Glu Arg Arg Gln Tyr Gly Glu Leu Val Arg Pro Glu Pro Ser Arg Phe
450 455 460

Leu Leu Glu Leu Pro Gln Asp Asp Leu Ile Trp Glu Gln Glu Arg Lys
465 470 475 480

Val Val Ser Ala Glu Glu Arg Met Gln Lys Gly Gln Ser His Leu Ala
485 490 495

Asn Leu Lys Ala Met Met Ala Ala Lys Arg Gly Lys
500 505

<210> 44
<211> 720
<212> PRT
<213> Escherichia coli

<400> 44
Met Asp Val Ser Tyr Leu Leu Asp Ser Leu Asn Asp Lys Gln Arg Glu
1 5 10 15

Ala Val Ala Ala Pro Arg Ser Asn Leu Leu Val Leu Ala Gly Ala Gly
20 25 30

Ser Gly Lys Thr Arg Val Leu Val His Arg Ile Ala Trp Leu Met Ser

35 40 45

Val Glu Asn Cys Ser Pro Tyr Ser Ile Met Ala Val Thr Phe Thr Asn
50 55 60

Lys Ala Ala Ala Glu Met Arg His Arg Ile Gly Gln Leu Met Gly Thr
65 70 75 80

Ser Gln Gly Gly Met Trp Val Gly Thr Phe His Gly Leu Ala His Arg
85 90 95

Leu Leu Arg Ala His His Met Asp Ala Asn Leu Pro Gln Asp Phe Gln
100 105 110

Ile Leu Asp Ser Glu Asp Gln Leu Arg Leu Leu Lys Arg Leu Ile Lys
115 120 125

Ala Met Asn Leu Asp Glu Lys Gln Trp Pro Pro Arg Gln Ala Met Trp
130 135 140

Tyr Ile Asn Ser Gln Lys Asp Glu Gly Leu Arg Pro His His Ile Gln
145 150 155 160

Ser Tyr Gly Asn Pro Val Glu Gln Thr Trp Gln Lys Val Tyr Gln Ala
165 170 175

Tyr Gln Glu Ala Cys Asp Arg Ala Gly Leu Val Asp Phe Ala Glu Leu
180 185 190

Leu Leu Arg Ala His Glu Leu Trp Leu Asn Lys Pro His Ile Leu Gln
195 200 205

His Tyr Arg Glu Arg Phe Thr Asn Ile Leu Val Asp Glu Phe Gln Asp
210 215 220

Thr Asn Asn Ile Gln Tyr Ala Trp Ile Arg Leu Leu Ala Gly Asp Thr
225 230 235 240

Gly Lys Val Met Ile Val Gly Asp Asp Asp Gln Ser Ile Tyr Gly Trp
245 250 255

Arg Gly Ala Gln Val Glu Asn Ile Gln Arg Phe Leu Asn Asp Phe Pro
260 265 270

Gly Ala Glu Thr Ile Arg Leu Glu Gln Asn Tyr Arg Ser Thr Ser Asn
275 280 285

Ile Leu Ser Ala Ala Asn Ala Leu Ile Glu Asn Asn Asn Gly Arg Leu
290 295 300

Gly Lys Lys Leu Trp Thr Asp Gly Ala Asp Gly Glu Pro Ile Ser Leu
305 310 315 320

Tyr Cys Ala Phe Asn Glu Leu Asp Glu Ala Arg Phe Val Val Asn Arg
325 330 335

Ile Lys Thr Trp Gln Asp Asn Gly Gly Ala Leu Ala Glu Cys Ala Ile
340 345 350

Leu Tyr Arg Ser Asn Ala Gln Ser Arg Val Leu Glu Glu Ala Leu Leu
355 360 365

Gln Ala Ser Met Pro Tyr Arg Ile Tyr Gly Gly Met Arg Phe Phe Glu
370 375 380

Arg Gln Glu Ile Lys Asp Ala Leu Ser Tyr Leu Arg Leu Ile Ala Asn
385 390 395 400

Arg Asn Asp Asp Ala Ala Phe Glu Arg Val Val Asn Thr Pro Thr Arg
405 410 415

Gly Ile Gly Asp Arg Thr Leu Asp Val Val Arg Gln Thr Ser Arg Asp
420 425 430

Arg Gln Leu Thr Leu Trp Gln Ala Cys Arg Glu Leu Leu Gln Glu Lys
435 440 445

Ala Leu Ala Gly Arg Ala Ala Ser Ala Leu Gln Arg Phe Met Glu Leu
450 455 460

Ile Asp Ala Leu Ala Gln Glu Thr Ala Asp Met Pro Leu His Val Gln
465 470 475 480

Thr Asp Arg Val Ile Lys Asp Ser Gly Leu Arg Thr Met Tyr Glu Gln
485 490 495

Glu Lys Gly Glu Lys Gly Gln Thr Arg Ile Glu Asn Leu Glu Glu Leu
500 505 510

Val Thr Ala Thr Arg Gln Phe Ser Tyr Asn Glu Glu Asp Glu Asp Leu
515 520 525

Met Pro Leu Gln Ala Phe Leu Ser His Ala Ala Leu Glu Ala Gly Glu
530 535 540

Gly Gln Ala Asp Thr Trp Gln Asp Ala Val Gln Leu Met Thr Leu His
545 550 555 560

Ser Ala Lys Gly Leu Glu Phe Pro Gln Val Phe Ile Val Gly Met Glu
565 570 575

Glu Gly Met Phe Pro Ser Gln Met Ser Leu Asp Glu Gly Gly Arg Leu
580 585 590

Glu Glu Glu Arg Arg Leu Ala Tyr Val Gly Val Thr Arg Ala Met Gln
595 600 605

Lys Leu Thr Leu Thr Tyr Ala Glu Thr Arg Arg Leu Tyr Gly Lys Glu
610 615 620

Val Tyr His Arg Pro Ser Arg Phe Ile Gly Glu Leu Pro Glu Glu Cys
625 630 635 640

Val Glu Glu Val Arg Leu Arg Ala Thr Val Ser Arg Pro Val Ser His
645 650 655

Gln Arg Met Gly Thr Pro Met Val Glu Asn Asp Ser Gly Tyr Lys Leu
660 665 670

Gly Gln Arg Val Arg His Ala Lys Phe Gly Glu Gly Thr Ile Val Asn
675 680 685

Met Glu Gly Ser Gly Glu His Ser Arg Leu Gln Val Ala Phe Gln Gly
690 695 700

Gln Gly Ile Lys Trp Leu Val Ala Ala Tyr Ala Arg Leu Glu Ser Val
705 710 715 720

<210> 45
<211> 968
<212> PRT
<213> Escherichia coli

<400> 45
Met Pro Phe Thr Leu Gly Gln Arg Trp Ile Ser Asp Thr Glu Ser Glu
1 5 10 15

Leu Gly Leu Gly Thr Val Val Ala Val Asp Ala Arg Thr Val Thr Leu
20 25 30

Leu Phe Pro Ser Thr Gly Glu Asn Arg Leu Tyr Ala Arg Ser Asp Ser
35 40 45

Pro Val Thr Arg Val Met Phe Asn Pro Gly Asp Thr Ile Thr Ser His
50 55 60

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

Leu Thr Tyr Ile Gly Thr Arg Leu Asp Thr Glu Glu Ser Gly Val Ala
85 90 95

Leu Arg Glu Val Phe Leu Asp Ser Lys Leu Val Phe Ser Lys Pro Gln
100 105 110

Asp Arg Leu Phe Ala Gly Gln Ile Asp Arg Met Asp Arg Phe Ala Leu
115 120 125

Arg Tyr Arg Ala Arg Lys Tyr Ser Ser Glu Gln Phe Arg Met Pro Tyr
130 135 140

Ser Gly Leu Arg Gly Gln Arg Thr Ser Leu Ile Pro His Gln Leu Asn
145 150 155 160

Ile Ala His Asp Val Gly Arg Arg His Ala Pro Arg Val Leu Leu Ala
165 170 175

Asp Glu Val Gly Leu Gly Lys Thr Ile Glu Ala Gly Met Ile Leu His
180 185 190

Gln Gln Leu Leu Ser Gly Ala Ala Glu Arg Val Leu Ile Ile Val Pro
195 200 205

Glu Thr Leu Gln His Gln Trp Leu Val Glu Met Leu Arg Arg Phe Asn
210 215 220

Leu Arg Phe Ala Leu Phe Asp Asp Glu Arg Tyr Ala Glu Ala Gln His
225 230 235 240

Asp Ala Tyr Asn Pro Phe Asp Thr Glu Gln Leu Val Ile Cys Ser Leu
245 250 255

Asp Phe Ala Arg Arg Ser Lys Gln Arg Leu Glu His Leu Cys Glu Ala
260 265 270

Glu Trp Asp Leu Leu Val Val Asp Glu Ala His His Leu Val Trp Ser
275 280 285

Glu Asp Ala Pro Ser Arg Glu Tyr Gln Ala Ile Glu Gln Leu Ala Glu
290 295 300

His Val Pro Gly Val Leu Leu Leu Thr Ala Thr Pro Glu Gln Leu Gly
305 310 315 320

Met Glu Ser His Phe Ala Arg Leu Arg Leu Leu Asp Pro Asn Arg Phe
325 330 335

His Asp Phe Ala Gln Phe Val Glu Glu Gln Lys Asn Tyr Arg Pro Val
340 345 350

Ala Asp Ala Val Ala Met Leu Leu Ala Gly Asn Lys Leu Ser Asn Asp
355 360 365

Glu Leu Asn Met Leu Gly Glu Met Ile Gly Glu Gln Asp Ile Glu Pro
370 375 380

Leu Leu Gln Ala Ala Asn Ser Asp Ser Glu Asp Ala Gln Ser Ala Arg
385 390 395 400

Gln Glu Leu Val Ser Met Leu Met Asp Arg His Gly Thr Ser Arg Val
405 410 415

Leu Phe Arg Asn Thr Arg Asn Gly Val Lys Gly Phe Pro Lys Arg Glu
420 425 430

Leu His Thr Ile Lys Leu Pro Leu Pro Thr Gln Tyr Gln Thr Ala Ile
435 440 445

Lys Val Ser Gly Ile Met Gly Ala Arg Lys Ser Ala Glu Asp Arg Ala
450 455 460

Arg Asp Met Leu Tyr Pro Glu Arg Ile Tyr Gln Glu Phe Glu Gly Asp
465 470 475 480

Asn Ala Thr Trp Trp Asn Phe Asp Pro Arg Val Glu Trp Leu Met Gly
485 490 495

Tyr Leu Thr Ser His Arg Ser Gln Lys Val Leu Val Ile Cys Ala Lys
500 505 510

Ala Ala Thr Ala Leu Gln Leu Glu Gln Val Leu Arg Glu Arg Glu Gly
515 520 525

Ile Arg Ala Ala Val Phe His Glu Gly Met Ser Ile Ile Glu Arg Asp
530 535 540

Arg Ala Ala Ala Trp Phe Ala Glu Glu Asp Thr Gly Ala Gln Val Leu
545 550 555 560

Leu Cys Ser Glu Ile Gly Ser Glu Gly Arg Asn Phe Gln Phe Ala Ser
565 570 575

His Met Val Met Phe Asp Leu Pro Phe Asn Pro Asp Leu Leu Glu Gln
580 585 590

Arg Ile Gly Arg Leu Asp Arg Ile Gly Gln Ala His Asp Ile Gln Ile
595 600 605

His Val Pro Tyr Leu Glu Lys Thr Ala Gln Ser Val Leu Val Arg Trp

610 615 620

Tyr His Glu Gly Leu Asp Ala Phe Glu His Thr Cys Pro Thr Gly Arg
625 630 635 640

Thr Ile Tyr Asp Ser Val Tyr Asn Asp Leu Ile Asn Tyr Leu Ala Ser
645 650 655

Pro Asp Gln Thr Glu Gly Phe Asp Asp Leu Ile Lys Asn Cys Arg Glu
660 665 670

Gln His Glu Ala Leu Lys Ala Gln Leu Glu Gln Gly Arg Asp Arg Leu
675 680 685

Leu Glu Ile His Ser Asn Gly Gly Glu Lys Ala Gln Ala Leu Ala Glu
690 695 700

Ser Ile Glu Glu Gln Asp Asp Asp Thr Asn Leu Ile Ala Phe Ala Met
705 710 715 720

Asn Leu Phe Asp Ile Ile Gly Ile Asn Gln Asp Asp Arg Gly Asp Asn
725 730 735

Met Ile Val Leu Thr Pro Ser Asp His Met Leu Val Pro Asp Phe Pro
740 745 750

Gly Leu Ser Glu Asp Gly Ile Thr Ile Thr Phe Asp Arg Glu Val Ala
755 760 765

Leu Ala Arg Glu Asp Ala Gln Phe Ile Thr Trp Glu His Pro Leu Ile
770 775 780

Arg Asn Gly Leu Asp Leu Ile Leu Ser Gly Asp Thr Gly Ser Ser Thr
785 790 795 800

Ile Ser Leu Leu Lys Asn Lys Ala Leu Pro Val Gly Thr Leu Leu Val
805 810 815

Glu Leu Ile Tyr Val Val Glu Ala Gln Ala Pro Lys Gln Leu Gln Leu
820 825 830

Asn Arg Phe Leu Pro Pro Thr Pro Val Arg Met Leu Leu Asp Lys Asn
835 840 845

Gly Asn Asn Leu Ala Ala Gln Val Glu Phe Glu Thr Phe Asn Arg Gln
850 855 860

Leu Asn Ala Val Asn Arg His Thr Gly Ser Lys Leu Val Asn Ala Val
865 870 875 880

Gln Gln Asp Val His Ala Ile Leu Gln Leu Gly Glu Ala Gln Ile Glu
885 890 895

Lys Ser Ala Arg Ala Leu Ile Asp Ala Ala Arg Asn Glu Ala Asp Glu
900 905 910

Lys Leu Ser Ala Glu Leu Ser Arg Leu Glu Ala Leu Arg Ala Val Asn
915 920 925

Pro Asn Ile Arg Asp Asp Glu Leu Thr Ala Ile Glu Ser Asn Arg Gln
930 935 940

Gln Val Met Glu Ser Leu Asp Gln Ala Gly Trp Arg Leu Asp Ala Leu
945 950 955 960

Arg Leu Ile Val Val Thr His Gln
965

<210> 46
<211> 693
<212> PRT
<213> Escherichia coli

<400> 46
Met Lys Gly Arg Leu Leu Asp Ala Val Pro Leu Ser Ser Leu Thr Gly
1 5 10 15

Val Gly Ala Ala Leu Ser Asn Lys Leu Ala Lys Ile Asn Leu His Thr
20 25 30

Val Gln Asp Leu Leu Leu His Leu Pro Leu Arg Tyr Glu Asp Arg Thr
35 40 45

His Leu Tyr Pro Ile Gly Glu Leu Leu Pro Gly Val Tyr Ala Thr Val

50 55 60

Glu Gly Glu Val Leu Asn Cys Asn Ile Ser Phe Gly Gly Arg Arg Met
65 70 75 80

Met Thr Cys Gln Ile Ser Asp Gly Ser Gly Ile Leu Thr Met Arg Phe
85 90 95

Phe Asn Phe Ser Ala Ala Met Lys Asn Ser Leu Ala Ala Gly Arg Arg
100 105 110

Val Leu Ala Tyr Gly Glu Ala Lys Arg Gly Lys Tyr Gly Ala Glu Met
115 120 125

Ile His Pro Glu Tyr Arg Val Gln Gly Asp Leu Ser Thr Pro Glu Leu
130 135 140

Gln Glu Thr Leu Thr Pro Val Tyr Pro Thr Thr Glu Gly Val Lys Gln
145 150 155 160

Ala Thr Leu Arg Lys Leu Thr Asp Gln Ala Leu Asp Leu Leu Asp Thr
165 170 175

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

Thr Leu Pro Glu Ala Leu Arg Thr Leu His Arg Pro Pro Pro Thr Leu
195 200 205

Gln Leu Ser Asp Leu Glu Thr Gly Gln His Pro Ala Gln Arg Arg Leu
210 215 220

Ile Leu Glu Glu Leu Leu Ala His Asn Leu Ser Met Leu Ala Leu Arg
225 230 235 240

Ala Gly Ala Gln Arg Phe His Ala Gln Pro Leu Ser Ala Asn Asp Thr
245 250 255

Leu Lys Asn Lys Leu Leu Ala Ala Leu Pro Phe Lys Pro Thr Gly Ala
260 265 270

Gln Ala Arg Val Val Ala Glu Ile Glu Arg Asp Met Ala Leu Asp Val
275 280 285

Pro Met Met Arg Leu Val Gln Gly Asp Val Gly Ser Gly Lys Thr Leu
290 295 300

Val Ala Ala Leu Ala Ala Leu Arg Ala Ile Ala His Gly Lys Gln Val
305 310 315 320

Ala Leu Met Ala Pro Thr Glu Leu Leu Ala Glu Gln His Ala Asn Asn
325 330 335

Phe Arg Asn Trp Phe Ala Pro Leu Gly Ile Glu Val Gly Trp Leu Ala
340 345 350

Gly Lys Gln Lys Gly Lys Ala Arg Leu Ala Gln Gln Glu Ala Ile Ala
355 360 365

Ser Gly Gln Val Gln Met Ile Val Gly Thr His Ala Ile Phe Gln Glu
370 375 380

Gln Val Gln Phe Asn Gly Leu Ala Leu Val Ile Ile Asp Glu Gln His
385 390 395 400

Arg Phe Gly Val His Gln Arg Leu Ala Leu Trp Glu Lys Gly Gln Gln
405 410 415

Gln Gly Phe His Pro His Gln Leu Ile Met Thr Ala Thr Pro Ile Pro
420 425 430

Arg Thr Leu Ala Met Thr Ala Tyr Ala Asp Leu Asp Thr Ser Val Ile
435 440 445

Asp Glu Leu Pro Pro Gly Arg Thr Pro Val Thr Thr Val Ala Ile Pro
450 455 460

Asp Thr Arg Arg Thr Asp Ile Ile Asp Arg Val His His Ala Cys Ile
465 470 475 480

Thr Glu Gly Arg Gln Ala Tyr Trp Val Cys Thr Leu Ile Glu Glu Ser
485 490 495

Glu Leu Leu Glu Ala Gln Ala Ala Glu Ala Thr Trp Glu Glu Leu Lys
500 505 510

Leu Ala Leu Pro Glu Leu Asn Val Gly Leu Val His Gly Arg Met Lys
515 520 525

Pro Ala Glu Lys Gln Ala Val Met Ala Ser Phe Lys Gln Gly Glu Leu
530 535 540

His Leu Leu Val Ala Thr Thr Val Ile Glu Val Gly Val Asp Val Pro
545 550 555 560

Asn Ala Ser Leu Met Ile Ile Glu Asn Pro Glu Arg Leu Gly Leu Ala
565 570 575

Gln Leu His Gln Leu Arg Gly Arg Val Gly Arg Gly Ala Val Ala Ser
580 585 590

His Cys Val Leu Leu Tyr Lys Thr Pro Leu Ser Lys Thr Ala Gln Ile
595 600 605

Arg Leu Gln Val Leu Arg Asp Ser Asn Asp Gly Phe Val Ile Ala Gln
610 615 620

Lys Asp Leu Glu Ile Arg Gly Pro Gly Glu Leu Leu Gly Thr Arg Gln
625 630 635 640

Thr Gly Asn Ala Glu Phe Lys Val Ala Asp Leu Leu Arg Asp Gln Ala
645 650 655

Met Ile Pro Glu Val Gln Arg Leu Ala Arg His Ile His Glu Arg Tyr
660 665 670

Pro Gln Gln Ala Lys Ala Leu Ile Glu Arg Trp Met Pro Glu Thr Glu
675 680 685

Arg Tyr Ser Asn Ala
690

<210> 47
<211> 467

<212> PRT
<213> Homo sapiens

<400> 47
Met Ser Leu Ser Leu Trp Gln Gln Cys Leu Ala Arg Leu Gln Asp Glu
1 5 10 15

Leu Pro Ala Thr Glu Phe Ser Met Trp Ile Arg Pro Leu Gln Ala Glu
20 25 30

Leu Ser Asp Asn Thr Leu Ala Leu Tyr Ala Pro Asn Arg Phe Val Leu
35 40 45

Asp Trp Val Arg Asp Lys Tyr Leu Asn Asn Ile Asn Gly Leu Leu Thr
50 55 60

Ser Phe Cys Gly Ala Asp Ala Pro Gln Leu Arg Phe Glu Val Gly Thr
65 70 75 80

Lys Pro Val Thr Gln Thr Pro Gln Ala Ala Val Thr Ser Asn Val Ala
85 90 95

Ala Pro Ala Gln Val Ala Gln Thr Gln Pro Gln Arg Ala Ala Pro Ser
100 105 110

Thr Arg Ser Gly Trp Asp Asn Val Pro Ala Pro Ala Glu Pro Thr Tyr
115 120 125

Arg Ser Asn Val Asn Val Lys His Thr Phe Asp Asn Phe Val Glu Gly
130 135 140

Lys Ser Asn Gln Leu Ala Arg Ala Ala Ala Arg Gln Val Ala Asp Asn
145 150 155 160

Pro Gly Gly Ala Tyr Asn Pro Leu Phe Leu Tyr Gly Gly Thr Gly Leu
165 170 175

Gly Lys Thr His Leu Leu His Ala Val Gly Asn Gly Ile Met Ala Arg
180 185 190

Lys Pro Asn Ala Lys Val Val Tyr Met His Ser Glu Arg Phe Val Gln
195 200 205

Asp Met Val Lys Ala Leu Gln Asn Asn Ala Ile Glu Glu Phe Lys Arg
210 215 220

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

Ala Asn Lys Glu Arg Ser Gln Glu Glu Phe Phe His Thr Phe Asn Ala
245 250 255

Leu Leu Glu Gly Asn Gln Gln Ile Ile Leu Thr Ser Asp Arg Tyr Pro
260 265 270

Lys Glu Ile Asn Gly Val Glu Asp Arg Leu Lys Ser Arg Phe Gly Trp
275 280 285

Gly Leu Thr Val Ala Ile Glu Pro Pro Glu Leu Glu Thr Arg Val Ala
290 295 300

Ile Leu Met Lys Lys Ala Asp Glu Asn Asp Ile Arg Leu Pro Gly Glu
305 310 315 320

Val Ala Phe Phe Ile Ala Lys Arg Leu Arg Ser Asn Val Arg Glu Leu
325 330 335

Glu Gly Ala Leu Asn Arg Val Ile Ala Asn Ala Asn Phe Thr Gly Arg
340 345 350

Ala Ile Thr Ile Asp Phe Val Arg Glu Ala Leu Arg Asp Leu Leu Ala
355 360 365

Leu Gln Glu Lys Leu Val Thr Ile Asp Asn Ile Gln Lys Thr Val Ala
370 375 380

Glu Tyr Tyr Lys Ile Lys Val Ala Asp Leu Leu Ser Lys Arg Arg Ser
385 390 395 400

Arg Ser Val Ala Arg Pro Arg Gln Met Ala Met Ala Leu Ala Lys Glu
405 410 415

Leu Thr Asn His Ser Leu Pro Glu Ile Gly Asp Ala Phe Gly Gly Arg
420 425 430

Asp His Thr Thr Val Leu His Ala Cys Arg Lys Ile Glu Gln Leu Arg
435 440 445

Glu Glu Ser His Asp Ile Lys Glu Asp Phe Ser Asn Leu Ile Arg Thr
450 455 460

Leu Ser Ser
465

<210> 48
<211> 215
<212> PRT
<213> Homo sapiens

<400> 48
Met Gly Lys Gly Asp Pro Lys Lys Pro Arg Gly Lys Met Ser Ser Tyr
1 5 10 15

Ala Phe Phe Val Gln Thr Cys Arg Glu Glu His Lys Lys Lys His Pro
20 25 30

Asp Ala Ser Val Asn Phe Ser Glu Phe Ser Lys Lys Cys Ser Glu Arg
35 40 45

Trp Lys Thr Met Ser Ala Lys Glu Lys Gly Lys Phe Glu Asp Met Ala
50 55 60

Lys Ala Asp Lys Ala Arg Tyr Glu Arg Glu Met Lys Thr Tyr Ile Pro
65 70 75 80

Pro Lys Gly Glu Thr Lys Lys Lys Phe Lys Asp Pro Asn Ala Pro Lys
85 90 95

Arg Pro Pro Ser Ala Phe Phe Leu Phe Cys Ser Glu Tyr Arg Pro Lys
100 105 110

Ile Lys Gly Glu His Pro Gly Leu Ser Ile Gly Asp Val Ala Lys Lys
115 120 125

Leu Gly Glu Met Trp Asn Asn Thr Ala Ala Asp Asp Lys Gln Pro Tyr
130 135 140

Glu Lys Lys Ala Ala Lys Leu Lys Glu Lys Tyr Glu Lys Asp Ile Ala
145 150 155 160

Ala Tyr Arg Ala Lys Gly Lys Pro Asp Ala Ala Lys Lys Gly Val Val
165 170 175

Lys Ala Glu Lys Ser Lys Lys Lys Lys Glu Glu Glu Glu Asp Glu Glu
180 185 190

Asp Glu Glu Asp Glu Glu Glu Glu Glu Asp Glu Glu Asp Glu Asp Glu
195 200 205

Glu Glu Asp Asp Asp Asp Glu
210 215

<210> 49
<211> 209
<212> PRT
<213> Homo sapiens

<400> 49
Met Gly Lys Gly Asp Pro Asn Lys Pro Arg Gly Lys Met Ser Ser Tyr
1 5 10 15

Ala Phe Phe Val Gln Thr Cys Arg Glu Glu His Lys Lys Lys His Pro
20 25 30

Asp Ser Ser Val Asn Phe Ala Glu Phe Ser Lys Lys Cys Ser Glu Arg
35 40 45

Trp Lys Thr Met Ser Ala Lys Glu Lys Ser Lys Phe Glu Asp Met Ala
50 55 60

Lys Ser Asp Lys Ala Arg Tyr Asp Arg Glu Met Lys Asn Tyr Val Pro
65 70 75 80

Pro Lys Gly Asp Lys Lys Gly Lys Lys Lys Asp Pro Asn Ala Pro Lys
85 90 95

Arg Pro Pro Ser Ala Phe Phe Leu Phe Cys Ser Glu His Arg Pro Lys
100 105 110

Ile Lys Ser Glu His Pro Gly Leu Ser Ile Gly Asp Thr Ala Lys Lys
115 120 125

Leu Gly Glu Met Trp Ser Glu Gln Ser Ala Lys Asp Lys Gln Pro Tyr
130 135 140

Glu Gln Lys Ala Ala Lys Leu Lys Glu Lys Tyr Glu Lys Asp Ile Ala
145 150 155 160

Ala Tyr Arg Ala Lys Gly Lys Ser Glu Ala Gly Lys Lys Gly Pro Gly
165 170 175

Arg Pro Thr Gly Ser Lys Lys Lys Asn Glu Pro Glu Asp Glu Glu Glu
180 185 190

Glu Glu Glu Glu Glu Asp Glu Asp Glu Glu Glu Glu Asp Glu Asp Glu
195 200 205

Glu

<210> 50
<211> 616
<212> PRT
<213> Homo sapiens

<400> 50
Met Val Gly Gln Leu Ser Glu Gly Ala Ile Ala Ala Ile Met Gln Lys
1 5 10 15

Gly Asp Thr Asn Ile Lys Pro Ile Leu Gln Val Ile Asn Ile Arg Pro
20 25 30

Ile Thr Thr Gly Asn Ser Pro Pro Arg Tyr Arg Leu Leu Met Ser Asp
35 40 45

Gly Leu Asn Thr Leu Ser Ser Phe Met Leu Ala Thr Gln Leu Asn Pro
50 55 60

Leu Val Glu Glu Glu Gln Leu Ser Ser Asn Cys Val Cys Gln Ile His
65 70 75 80

Arg Phe Ile Val Asn Thr Leu Lys Asp Gly Arg Arg Val Val Ile Leu

85 90 95

Met Glu Leu Glu Val Leu Lys Ser Ala Glu Ala Val Gly Val Lys Ile
100 105 110

Gly Asn Pro Val Pro Tyr Asn Glu Gly Leu Gly Gln Pro Gln Val Ala
115 120 125

Pro Pro Ala Pro Ala Ala Ser Pro Ala Ala Ser Ser Arg Pro Gln Pro
130 135 140

Gln Asn Gly Ser Ser Gly Met Gly Ser Thr Val Ser Lys Ala Tyr Gly
145 150 155 160

Ala Ser Lys Thr Phe Gly Lys Ala Ala Gly Pro Ser Leu Ser His Thr
165 170 175

Ser Gly Gly Thr Gln Ser Lys Val Val Pro Ile Ala Ser Leu Thr Pro
180 185 190

Tyr Gln Ser Lys Trp Thr Ile Cys Ala Arg Val Thr Asn Lys Ser Gln
195 200 205

Ile Arg Thr Trp Ser Asn Ser Arg Gly Glu Gly Lys Leu Phe Ser Leu
210 215 220

Glu Leu Val Asp Glu Ser Gly Glu Ile Arg Ala Thr Ala Phe Asn Glu
225 230 235 240

Gln Val Asp Lys Phe Phe Pro Leu Ile Glu Val Asn Lys Val Tyr Tyr
245 250 255

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

Lys Asn Asp Tyr Glu Met Thr Phe Asn Asn Glu Thr Ser Val Met Pro
275 280 285

Cys Glu Asp Asp His His Leu Pro Thr Val Gln Phe Asp Phe Thr Gly
290 295 300

Ile Asp Asp Leu Glu Asn Lys Ser Lys Asp Ser Leu Val Asp Ile Ile
305 310 315 320

Gly Ile Cys Lys Ser Tyr Glu Asp Ala Thr Lys Ile Thr Val Arg Ser
325 330 335

Asn Asn Arg Glu Val Ala Lys Arg Asn Ile Tyr Leu Met Asp Thr Ser
340 345 350

Gly Lys Val Val Thr Ala Thr Leu Trp Gly Glu Asp Ala Asp Lys Phe
355 360 365

Asp Gly Ser Arg Gln Pro Val Leu Ala Ile Lys Gly Ala Arg Val Ser
370 375 380

Asp Phe Gly Gly Arg Ser Leu Ser Val Leu Ser Ser Ser Thr Ile Ile
385 390 395 400

Ala Asn Pro Asp Ile Pro Glu Ala Tyr Lys Leu Arg Gly Trp Phe Asp
405 410 415

Ala Glu Gly Gln Ala Leu Asp Gly Val Ser Ile Ser Asp Leu Lys Ser
420 425 430

Gly Gly Val Gly Gly Ser Asn Thr Asn Trp Lys Thr Leu Tyr Glu Val
435 440 445

Lys Ser Glu Asn Leu Gly Gln Gly Asp Lys Pro Asp Tyr Phe Ser Ser
450 455 460

Val Ala Thr Val Val Tyr Leu Arg Lys Glu Asn Cys Met Tyr Gln Ala
465 470 475 480

Cys Pro Thr Gln Asp Cys Asn Lys Lys Val Ile Asp Gln Gln Asn Gly
485 490 495

Leu Tyr Arg Cys Glu Lys Cys Asp Thr Glu Phe Pro Asn Phe Lys Tyr
500 505 510

Arg Met Ile Leu Ser Val Asn Ile Ala Asp Phe Gln Glu Asn Gln Trp
515 520 525

Val Thr Cys Phe Gln Glu Ser Ala Glu Ala Ile Leu Gly Gln Asn Ala
530 535 540

Ala Tyr Leu Gly Glu Leu Lys Asp Lys Asn Glu Gln Ala Phe Glu Glu
545 550 555 560

Val Phe Gln Asn Ala Asn Phe Arg Ser Phe Ile Phe Arg Val Arg Val
565 570 575

Lys Val Glu Thr Tyr Asn Asp Glu Ser Arg Ile Lys Ala Thr Val Met
580 585 590

Asp Val Lys Pro Val Asp Tyr Arg Glu Tyr Gly Arg Arg Leu Val Met
595 600 605

Ser Ile Arg Arg Ser Ala Leu Met
610 615

<210> 51
<211> 270
<212> PRT
<213> Homo sapiens

<400> 51
Met Trp Asn Ser Gly Phe Glu Ser Tyr Gly Ser Ser Ser Tyr Gly Gly
1 5 10 15

Ala Gly Gly Tyr Thr Gln Ser Pro Gly Gly Phe Gly Ser Pro Ala Pro
20 25 30

Ser Gln Ala Glu Lys Lys Ser Arg Ala Arg Ala Gln His Ile Val Pro
35 40 45

Cys Thr Ile Ser Gln Leu Leu Ser Ala Thr Leu Val Asp Glu Val Phe
50 55 60

Arg Ile Gly Asn Val Glu Ile Ser Gln Val Thr Ile Val Gly Ile Ile
65 70 75 80

Arg His Ala Glu Lys Ala Pro Thr Asn Ile Val Tyr Lys Ile Asp Asp
85 90 95

Met Thr Ala Ala Pro Met Asp Val Arg Gln Trp Val Asp Thr Asp Asp
100 105 110

Thr Ser Ser Glu Asn Thr Val Val Pro Pro Glu Thr Tyr Val Lys Val
115 120 125

Ala Gly His Leu Arg Ser Phe Gln Asn Lys Lys Ser Leu Val Ala Phe
130 135 140

Lys Ile Met Pro Leu Glu Asp Met Asn Glu Phe Thr Thr His Ile Leu
145 150 155 160

Glu Val Ile Asn Ala His Met Val Leu Ser Lys Ala Asn Ser Gln Pro
165 170 175

Ser Ala Gly Arg Ala Pro Ile Ser Asn Pro Gly Met Ser Glu Ala Gly
180 185 190

Asn Phe Gly Gly Asn Ser Phe Met Pro Ala Asn Gly Leu Thr Val Ala
195 200 205

Gln Asn Gln Val Leu Asn Leu Ile Lys Ala Cys Pro Arg Pro Glu Gly
210 215 220

Leu Asn Phe Gln Asp Leu Lys Asn Gln Leu Lys His Met Ser Val Ser
225 230 235 240

Ser Ile Lys Gln Ala Val Asp Phe Leu Ser Asn Glu Gly His Ile Tyr
245 250 255

Ser Thr Val Asp Asp Asp His Phe Lys Ser Thr Asp Ala Glu
260 265 270

<210> 52
<211> 121
<212> PRT
<213> Homo sapiens

<400> 52
Met Val Asp Met Met Asp Leu Pro Arg Ser Arg Ile Asn Ala Gly Met
1 5 10 15

Leu Ala Gln Phe Ile Asp Lys Pro Val Cys Phe Val Gly Arg Leu Glu

20 25 30

Lys Ile His Pro Thr Gly Lys Met Phe Ile Leu Ser Asp Gly Glu Gly
35 40 45

Lys Asn Gly Thr Ile Glu Leu Met Glu Pro Leu Asp Glu Glu Ile Ser
50 55 60

Gly Ile Val Glu Val Val Gly Arg Val Thr Ala Lys Ala Thr Ile Leu
65 70 75 80

Cys Thr Ser Tyr Val Gln Phe Lys Glu Asp Ser His Pro Phe Asp Leu
85 90 95

Gly Leu Tyr Asn Glu Ala Val Lys Ile Ile His Asp Phe Pro Gln Phe
100 105 110

Tyr Pro Leu Gly Ile Val Gln His Asp
115 120

<210> 53
<211> 339
<212> PRT
<213> Homo sapiens

<400> 53
Met Ala Met Gln Met Gln Leu Glu Ala Asn Ala Asp Thr Ser Val Glu
1 5 10 15

Glu Glu Ser Phe Gly Pro Gln Pro Ile Ser Arg Leu Glu Gln Cys Gly
20 25 30

Ile Asn Ala Asn Asp Val Lys Lys Leu Glu Glu Ala Gly Phe His Thr
35 40 45

Val Glu Ala Val Ala Tyr Ala Pro Lys Lys Glu Leu Ile Asn Ile Lys
50 55 60

Gly Ile Ser Glu Ala Lys Ala Asp Lys Ile Leu Ala Glu Ala Ala Lys
65 70 75 80

Leu Val Pro Met Gly Phe Thr Thr Ala Thr Glu Phe His Gln Arg Arg
85 90 95

Ser Glu Ile Ile Gln Ile Thr Thr Gly Ser Lys Glu Leu Asp Lys Leu
100 105 110

Leu Gln Gly Gly Ile Glu Thr Gly Ser Ile Thr Glu Met Phe Gly Glu
115 120 125

Phe Arg Thr Gly Lys Thr Gln Ile Cys His Thr Leu Ala Val Thr Cys
130 135 140

Gln Leu Pro Ile Asp Arg Gly Gly Gly Glu Gly Lys Ala Met Tyr Ile
145 150 155 160

Asp Thr Glu Gly Thr Phe Arg Pro Glu Arg Leu Leu Ala Val Ala Glu
165 170 175

Arg Tyr Gly Leu Ser Gly Ser Asp Val Leu Asp Asn Val Ala Tyr Ala
180 185 190

Arg Ala Phe Asn Thr Asp His Gln Thr Gln Leu Leu Tyr Gln Ala Ser
195 200 205

Ala Met Met Val Glu Ser Arg Tyr Ala Leu Leu Ile Val Asp Ser Ala
210 215 220

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

Arg Gln Met His Leu Ala Arg Phe Leu Arg Met Leu Leu Arg Leu Ala
245 250 255

Asp Glu Phe Gly Val Ala Val Val Ile Thr Asn Gln Val Val Ala Gln
260 265 270

Val Asp Gly Ala Ala Met Phe Ala Ala Asp Pro Lys Lys Pro Ile Gly
275 280 285

Gly Asn Ile Ile Ala His Ala Ser Thr Thr Arg Leu Tyr Leu Arg Lys
290 295 300

Gly Arg Gly Glu Thr Arg Ile Cys Lys Ile Tyr Asp Ser Pro Cys Leu

305 310 315 320

Pro Glu Ala Glu Ala Met Phe Ala Ile Asn Ala Asp Gly Val Gly Asp
325 330 335

Ala Lys Asp

<210> 54
<211> 418
<212> PRT
<213> Homo sapiens

<400> 54
Met Ser Gly Thr Glu Glu Ala Ile Leu Gly Gly Arg Asp Ser His Pro
1 5 10 15

Ala Ala Gly Gly Gly Ser Val Leu Cys Phe Gly Gln Cys Gln Tyr Thr
20 25 30

Ala Glu Glu Tyr Gln Ala Ile Gln Lys Ala Leu Arg Gln Arg Leu Gly
35 40 45

Pro Glu Tyr Ile Ser Ser Arg Met Ala Gly Gly Gly Gln Lys Val Cys
50 55 60

Tyr Ile Glu Gly His Arg Val Ile Asn Leu Ala Asn Glu Met Phe Gly
65 70 75 80

Tyr Asn Gly Trp Ala His Ser Ile Thr Gln Gln Asn Val Asp Phe Val
85 90 95

Asp Leu Asn Asn Gly Lys Phe Tyr Val Gly Val Cys Ala Phe Val Arg
100 105 110

Val Gln Leu Lys Asp Gly Ser Tyr His Glu Asp Val Gly Tyr Gly Val
115 120 125

Ser Glu Gly Leu Lys Ser Lys Ala Leu Ser Leu Glu Lys Ala Arg Lys
130 135 140

Glu Ala Val Thr Asp Gly Leu Lys Arg Ala Leu Arg Ser Phe Gly Asn
145 150 155 160

Ala Leu Gly Asn Cys Ile Leu Asp Lys Asp Tyr Leu Arg Ser Leu Asn
165 170 175

Lys Leu Pro Arg Gln Leu Pro Leu Glu Val Asp Leu Thr Lys Ala Lys
180 185 190

Arg Gln Asp Leu Glu Pro Ser Val Glu Glu Ala Arg Tyr Asn Ser Cys
195 200 205

Arg Pro Asn Met Ala Leu Gly His Pro Gln Leu Gln Gln Val Thr Ser
210 215 220

Pro Ser Arg Pro Ser His Ala Val Ile Pro Ala Asp Gln Asp Cys Ser
225 230 235 240

Ser Arg Ser Leu Ser Ser Ser Ala Val Glu Ser Glu Ala Thr His Gln
245 250 255

Arg Lys Leu Arg Gln Lys Gln Leu Gln Gln Gln Phe Arg Glu Arg Met
260 265 270

Glu Lys Gln Gln Val Arg Val Ser Thr Pro Ser Ala Glu Lys Ser Glu
275 280 285

Ala Ala Pro Pro Ala Pro Pro Val Thr His Ser Thr Pro Val Thr Val
290 295 300

Ser Glu Pro Leu Leu Glu Lys Asp Phe Leu Ala Gly Val Thr Gln Glu
305 310 315 320

Leu Ile Lys Thr Leu Glu Asp Asn Ser Glu Lys Trp Ala Val Thr Pro
325 330 335

Asp Ala Gly Asp Gly Val Val Lys Pro Ser Ser Arg Ala Asp Pro Ala
340 345 350

Gln Thr Ser Asp Thr Leu Ala Leu Asn Asn Gln Met Val Thr Gln Asn
355 360 365

Arg Thr Pro His Ser Val Cys His Gln Lys Pro Gln Ala Lys Ser Gly

370 375 380

Ser Trp Asp Leu Gln Thr Tyr Ser Ala Asp Gln Arg Thr Thr Gly Asn
385 390 395 400

Trp Glu Ser His Arg Lys Ser Gln Asp Met Lys Lys Arg Lys Tyr Asp
405 410 415

Pro Ser

<210> 55
<211> 1417
<212> PRT
<213> Homo sapiens

<400> 55
Met Ala Ala Val Pro Gln Asn Asn Leu Gln Glu Gln Leu Glu Arg His
1 5 10 15

Ser Ala Arg Thr Leu Asn Asn Lys Leu Ser Leu Ser Lys Pro Lys Phe
20 25 30

Ser Gly Phe Thr Phe Lys Lys Lys Thr Ser Ser Asp Asn Asn Val Ser
35 40 45

Val Thr Asn Val Ser Val Ala Lys Thr Pro Val Leu Arg Asn Lys Asp
50 55 60

Val Asn Val Thr Glu Asp Phe Ser Phe Ser Glu Pro Leu Pro Asn Thr
65 70 75 80

Thr Asn Gln Gln Arg Val Lys Asp Phe Phe Lys Asn Ala Pro Ala Gly
85 90 95

Gln Glu Thr Gln Arg Gly Gly Ser Lys Ser Leu Leu Pro Asp Phe Leu
100 105 110

Gln Thr Pro Lys Glu Val Val Cys Thr Thr Gln Asn Thr Pro Thr Val
115 120 125

Lys Lys Ser Arg Asp Thr Ala Leu Lys Lys Leu Glu Phe Ser Ser Ser
130 135 140

Pro Asp Ser Leu Ser Thr Ile Asn Asp Trp Asp Asp Met Asp Asp Phe
145 150 155 160

Asp Thr Ser Glu Thr Ser Lys Ser Phe Val Thr Pro Pro Gln Ser His
165 170 175

Phe Val Arg Val Ser Thr Ala Gln Lys Ser Lys Lys Gly Lys Arg Asn
180 185 190

Phe Phe Lys Ala Gln Leu Tyr Thr Thr Asn Thr Val Lys Thr Asp Leu
195 200 205

Pro Pro Pro Ser Ser Glu Ser Glu Gln Ile Asp Leu Thr Glu Glu Gln
210 215 220

Lys Asp Asp Ser Glu Trp Leu Ser Ser Asp Val Ile Cys Ile Asp Asp
225 230 235 240

Gly Pro Ile Ala Glu Val His Ile Asn Glu Asp Ala Gln Glu Ser Asp
245 250 255

Ser Leu Lys Thr His Leu Glu Asp Glu Arg Asp Asn Ser Glu Lys Lys
260 265 270

Lys Asn Leu Glu Glu Ala Glu Leu His Ser Thr Glu Lys Val Pro Cys
275 280 285

Ile Glu Phe Asp Asp Asp Asp Tyr Asp Thr Asp Phe Val Pro Pro Ser
290 295 300

Pro Glu Glu Ile Ile Ser Ala Ser Ser Ser Ser Ser Lys Cys Leu Ser
305 310 315 320

Thr Leu Lys Asp Leu Asp Thr Ser Asp Arg Lys Glu Asp Val Leu Ser
325 330 335

Thr Ser Lys Asp Leu Leu Ser Lys Pro Glu Lys Met Ser Met Gln Glu
340 345 350

Leu Asn Pro Glu Thr Ser Thr Asp Cys Asp Ala Arg Gln Ile Ser Leu

355 360 365

Gln Gln Gln Leu Ile His Val Met Glu His Ile Cys Lys Leu Ile Asp
370 375 380

Thr Ile Pro Asp Asp Lys Leu Lys Leu Leu Asp Cys Gly Asn Glu Leu
385 390 395 400

Leu Gln Gln Arg Asn Ile Arg Arg Lys Leu Leu Thr Glu Val Asp Phe
405 410 415

Asn Lys Ser Asp Ala Ser Leu Leu Gly Ser Leu Trp Arg Tyr Arg Pro
420 425 430

Asp Ser Leu Asp Gly Pro Met Glu Gly Asp Ser Cys Pro Thr Gly Asn
435 440 445

Ser Met Lys Glu Leu Asn Phe Ser His Leu Pro Ser Asn Ser Val Ser
450 455 460

Pro Gly Asp Cys Leu Leu Thr Thr Thr Leu Gly Lys Thr Gly Phe Ser
465 470 475 480

Ala Thr Arg Lys Asn Leu Phe Glu Arg Pro Leu Phe Asn Thr His Leu
485 490 495

Gln Lys Ser Phe Val Ser Ser Asn Trp Ala Glu Thr Pro Arg Leu Gly
500 505 510

Lys Lys Asn Glu Ser Ser Tyr Phe Pro Gly Asn Val Leu Thr Ser Thr
515 520 525

Ala Val Lys Asp Gln Asn Lys His Thr Ala Ser Ile Asn Asp Leu Glu
530 535 540

Arg Glu Thr Gln Pro Ser Tyr Asp Ile Asp Asn Phe Asp Ile Asp Asp
545 550 555 560

Phe Asp Asp Asp Asp Asp Trp Glu Asp Ile Met His Asn Leu Ala Ala
565 570 575

Ser Lys Ser Ser Thr Ala Ala Tyr Gln Pro Ile Lys Glu Gly Arg Pro
580 585 590

Ile Lys Ser Val Ser Glu Arg Leu Ser Ser Ala Lys Thr Asp Cys Leu
595 600 605

Pro Val Ser Ser Thr Ala Gln Asn Ile Asn Phe Ser Glu Ser Ile Gln
610 615 620

Asn Tyr Thr Asp Lys Ser Ala Gln Asn Leu Ala Ser Arg Asn Leu Lys
625 630 635 640

His Glu Arg Phe Gln Ser Leu Ser Phe Pro His Thr Lys Glu Met Met
645 650 655

Lys Ile Phe His Lys Lys Phe Gly Leu His Asn Phe Arg Thr Asn Gln
660 665 670

Leu Glu Ala Ile Asn Ala Ala Leu Leu Gly Glu Asp Cys Phe Ile Leu
675 680 685

Met Pro Thr Gly Gly Gly Lys Ser Leu Cys Tyr Gln Leu Pro Ala Cys
690 695 700

Val Ser Pro Gly Val Thr Val Val Ile Ser Pro Leu Arg Ser Leu Ile
705 710 715 720

Val Asp Gln Val Gln Lys Leu Thr Ser Leu Asp Ile Pro Ala Thr Tyr
725 730 735

Leu Thr Gly Asp Lys Thr Asp Ser Glu Ala Thr Asn Ile Tyr Leu Gln
740 745 750

Leu Ser Lys Lys Asp Pro Ile Ile Lys Leu Leu Tyr Val Thr Pro Glu
755 760 765

Lys Ile Cys Ala Ser Asn Arg Leu Ile Ser Thr Leu Glu Asn Leu Tyr
770 775 780

Glu Arg Lys Leu Leu Ala Arg Phe Val Ile Asp Glu Ala His Cys Val
785 790 795 800

Ser Gln Trp Gly His Asp Phe Arg Gln Asp Tyr Lys Arg Met Asn Met
805 810 815

Leu Arg Gln Lys Phe Pro Ser Val Pro Val Met Ala Leu Thr Ala Thr
820 825 830

Ala Asn Pro Arg Val Gln Lys Asp Ile Leu Thr Gln Leu Lys Ile Leu
835 840 845

Arg Pro Gln Val Phe Ser Met Ser Phe Asn Arg His Asn Leu Lys Tyr
850 855 860

Tyr Val Leu Pro Lys Lys Pro Lys Lys Val Ala Phe Asp Cys Leu Glu
865 870 875 880

Trp Ile Arg Lys His His Pro Tyr Asp Ser Gly Ile Ile Tyr Cys Leu
885 890 895

Ser Arg Arg Glu Cys Asp Thr Met Ala Asp Thr Leu Gln Arg Asp Gly
900 905 910

Leu Ala Ala Leu Ala Tyr His Ala Gly Leu Ser Asp Ser Ala Arg Asp
915 920 925

Glu Val Gln Gln Lys Trp Ile Asn Gln Asp Gly Cys Gln Val Ile Cys
930 935 940

Ala Thr Ile Ala Phe Gly Met Gly Ile Asp Lys Pro Asp Val Arg Phe
945 950 955 960

Val Ile His Ala Ser Leu Pro Lys Ser Val Glu Gly Tyr Tyr Gln Glu
965 970 975

Ser Gly Arg Ala Gly Arg Asp Gly Glu Ile Ser His Cys Leu Leu Phe
980 985 990

Tyr Thr Tyr His Asp Val Thr Arg Leu Lys Arg Leu Ile Met Met Glu
995 1000 1005

Lys Asp Gly Asn His His Thr Arg Glu Thr His Phe Asn Asn Leu
1010 1015 1020

Tyr Ser Met Val His Tyr Cys Glu Asn Ile Thr Glu Cys Arg Arg
1025 1030 1035

Ile Gln Leu Leu Ala Tyr Phe Gly Glu Asn Gly Phe Asn Pro Asp
1040 1045 1050

Phe Cys Lys Lys His Pro Asp Val Ser Cys Asp Asn Cys Cys Lys
1055 1060 1065

Thr Lys Asp Tyr Lys Thr Arg Asp Val Thr Asp Asp Val Lys Ser
1070 1075 1080

Ile Val Arg Phe Val Gln Glu His Ser Ser Ser Gln Gly Met Arg
1085 1090 1095

Asn Ile Lys His Val Gly Pro Ser Gly Arg Phe Thr Met Asn Met
1100 1105 1110

Leu Val Asp Ile Phe Leu Gly Ser Lys Ser Ala Lys Ile Gln Ser
1115 1120 1125

Gly Ile Phe Gly Lys Gly Ser Ala Tyr Ser Arg His Asn Ala Glu
1130 1135 1140

Arg Leu Phe Lys Lys Leu Ile Leu Asp Lys Ile Leu Asp Glu Asp
1145 1150 1155

Leu Tyr Ile Asn Ala Asn Asp Gln Ala Ile Ala Tyr Val Met Leu
1160 1165 1170

Gly Asn Lys Ala Gln Thr Val Leu Asn Gly Asn Leu Lys Val Asp
1175 1180 1185

Phe Met Glu Thr Glu Asn Ser Ser Ser Val Lys Lys Gln Lys Ala
1190 1195 1200

Leu Val Ala Lys Val Ser Gln Arg Glu Glu Met Val Lys Lys Cys
1205 1210 1215

Leu Gly Glu Leu Thr Glu Val Cys Lys Ser Leu Gly Lys Val Phe

1220 1225 1230

Gly Val His Tyr Phe Asn Ile Phe Asn Thr Val Thr Leu Lys Lys
1235 1240 1245

Leu Ala Glu Ser Leu Ser Ser Asp Pro Glu Val Leu Leu Gln Ile
1250 1255 1260

Asp Gly Val Thr Glu Asp Lys Leu Glu Lys Tyr Gly Ala Glu Val
1265 1270 1275

Ile Ser Val Leu Gln Lys Tyr Ser Glu Trp Thr Ser Pro Ala Glu
1280 1285 1290

Asp Ser Ser Pro Gly Ile Ser Leu Ser Ser Ser Arg Gly Pro Gly
1295 1300 1305

Arg Ser Ala Ala Glu Glu Leu Asp Glu Glu Ile Pro Val Ser Ser
1310 1315 1320

His Tyr Phe Ala Ser Lys Thr Arg Asn Glu Arg Lys Arg Lys Lys
1325 1330 1335

Met Pro Ala Ser Gln Arg Ser Lys Arg Arg Lys Thr Ala Ser Ser
1340 1345 1350

Gly Ser Lys Ala Lys Gly Gly Ser Ala Thr Cys Arg Lys Ile Ser
1355 1360 1365

Ser Lys Thr Lys Ser Ser Ser Ile Ile Gly Ser Ser Ser Ala Ser
1370 1375 1380

His Thr Ser Gln Ala Thr Ser Gly Ala Asn Ser Lys Leu Gly Ile
1385 1390 1395

Met Ala Pro Pro Lys Pro Ile Asn Arg Pro Phe Leu Lys Pro Ser
1400 1405 1410

Tyr Ala Phe Ser
1415

<210> 56
<211> 846
<212> PRT
<213> Homo sapiens

<400> 56
Met Gly Ile Gln Gly Leu Leu Gln Phe Ile Lys Glu Ala Ser Glu Pro
1 5 10 15

Ile His Val Arg Lys Tyr Lys Gly Gln Val Val Ala Val Asp Thr Tyr
20 25 30

Cys Trp Leu His Lys Gly Ala Ile Ala Cys Ala Glu Lys Leu Ala Lys
35 40 45

Gly Glu Pro Thr Asp Arg Tyr Val Gly Phe Cys Met Lys Phe Val Asn
50 55 60

Met Leu Leu Ser His Gly Ile Lys Pro Ile Leu Val Phe Asp Gly Cys
65 70 75 80

Thr Leu Pro Ser Lys Lys Glu Val Glu Arg Ser Arg Arg Glu Arg Arg
85 90 95

Gln Ala Asn Leu Leu Lys Gly Lys Gln Leu Leu Arg Glu Gly Lys Val
100 105 110

Ser Glu Ala Arg Glu Cys Phe Thr Arg Ser Ile Asn Ile Thr His Ala
115 120 125

Met Ala His Lys Val Ile Lys Ala Ala Arg Ser Gln Gly Val Asp Cys
130 135 140

Leu Val Ala Pro Tyr Glu Ala Asp Ala Gln Leu Ala Tyr Leu Asn Lys
145 150 155 160

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

Phe Gly Cys Lys Lys Val Ile Leu Lys Met Asp Gln Phe Gly Asn Gly
180 185 190

Leu Glu Ile Asp Gln Ala Arg Leu Gly Met Cys Arg Gln Leu Gly Asp

195 200 205

Val Phe Thr Glu Glu Lys Phe Arg Tyr Met Cys Ile Leu Ser Gly Cys
210 215 220

Asp Tyr Leu Ser Ser Leu Arg Gly Ile Gly Leu Ala Lys Ala Cys Lys
225 230 235 240

Val Leu Arg Leu Ala Asn Asn Pro Asp Ile Val Lys Val Ile Lys Lys
245 250 255

Ile Gly His Tyr Leu Lys Met Asn Ile Thr Val Pro Glu Asp Tyr Ile
260 265 270

Asn Gly Phe Ile Arg Ala Asn Asn Thr Phe Leu Tyr Gln Leu Val Phe
275 280 285

Asp Pro Ile Lys Arg Lys Leu Ile Pro Leu Asn Ala Tyr Glu Asp Asp
290 295 300

Val Asp Pro Glu Thr Leu Ser Tyr Ala Gly Gln Tyr Val Asp Asp Ser
305 310 315 320

Ile Ala Leu Gln Ile Ala Leu Gly Asn Lys Asp Ile Asn Thr Phe Glu
325 330 335

Gln Ile Asp Asp Tyr Asn Pro Asp Thr Ala Met Pro Ala His Ser Arg
340 345 350

Ser His Ser Trp Asp Asp Lys Thr Cys Gln Lys Ser Ala Asn Val Ser
355 360 365

Ser Ile Trp His Arg Asn Tyr Ser Pro Arg Pro Glu Ser Gly Thr Val
370 375 380

Ser Asp Ala Pro Gln Leu Lys Glu Asn Pro Ser Thr Val Gly Val Glu
385 390 395 400

Arg Val Ile Ser Thr Lys Gly Leu Asn Leu Pro Arg Lys Ser Ser Ile
405 410 415

Val Lys Arg Pro Arg Ser Ala Glu Leu Ser Glu Asp Asp Leu Leu Ser
420 425 430

Gln Tyr Ser Leu Ser Phe Thr Lys Lys Thr Lys Lys Asn Ser Ser Glu
435 440 445

Gly Asn Lys Ser Leu Ser Phe Ser Glu Val Phe Val Pro Asp Leu Val
450 455 460

Asn Gly Pro Thr Asn Lys Lys Ser Val Ser Thr Pro Pro Arg Thr Arg
465 470 475 480

Asn Lys Phe Ala Thr Phe Leu Gln Arg Lys Asn Glu Glu Ser Gly Ala
485 490 495

Val Val Val Pro Gly Thr Arg Ser Arg Phe Phe Cys Ser Ser Asp Ser
500 505 510

Thr Asp Cys Val Ser Asn Lys Val Ser Ile Gln Pro Leu Asp Glu Thr
515 520 525

Ala Val Thr Asp Lys Glu Asn Asn Leu His Glu Ser Glu Tyr Gly Asp
530 535 540

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

Asp Asp Ile Pro Asn Asn His Ile Pro Gly Asp His Ile Pro Asp Lys
565 570 575

Ala Thr Val Phe Thr Asp Glu Glu Ser Tyr Ser Phe Glu Ser Ser Lys
580 585 590

Phe Thr Arg Thr Ile Ser Pro Pro Thr Leu Gly Thr Leu Arg Ser Cys
595 600 605

Phe Ser Trp Ser Gly Gly Leu Gly Asp Phe Ser Arg Thr Pro Ser Pro
610 615 620

Ser Pro Ser Thr Ala Leu Gln Gln Phe Arg Arg Lys Ser Asp Ser Pro
625 630 635 640

Thr Ser Leu Pro Glu Asn Asn Met Ser Asp Val Ser Gln Leu Lys Ser
645 650 655

Glu Glu Ser Ser Asp Asp Glu Ser His Pro Leu Arg Glu Glu Ala Cys
660 665 670

Ser Ser Gln Ser Gln Glu Ser Gly Glu Phe Ser Leu Gln Ser Ser Asn
675 680 685

Ala Ser Lys Leu Ser Gln Cys Ser Ser Lys Asp Ser Asp Ser Glu Glu
690 695 700

Ser Asp Cys Asn Ile Lys Leu Leu Asp Ser Gln Ser Asp Gln Thr Ser
705 710 715 720

Lys Leu Arg Leu Ser His Phe Ser Lys Lys Asp Thr Pro Leu Arg Asn
725 730 735

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

Thr Lys Ile Lys Pro Leu Gly Pro Ala Arg Ala Ser Gly Leu Ser Lys
755 760 765

Lys Pro Ala Ser Ile Gln Lys Arg Lys His His Asn Ala Glu Asn Lys
770 775 780

Pro Gly Leu Gln Ile Lys Leu Asn Glu Leu Trp Lys Asn Phe Gly Phe
785 790 795 800

Lys Lys Asp Ser Glu Lys Leu Pro Pro Cys Lys Lys Pro Leu Ser Pro
805 810 815

Val Arg Asp Asn Ile Gln Leu Thr Pro Glu Ala Glu Glu Asp Ile Phe
820 825 830

Asn Lys Pro Glu Cys Gly Arg Val Gln Arg Ala Ile Phe Gln
835 840 845

<210> 57
<211> 649

<212> PRT
<213> Homo sapiens

<400> 57
Met Ala Ser Val Ser Ala Leu Thr Glu Glu Leu Asp Ser Ile Thr Ser
1 5 10 15

Glu Leu His Ala Val Glu Ile Gln Ile Gln Glu Leu Thr Glu Arg Gln
20 25 30

Gln Glu Leu Ile Gln Lys Lys Lys Val Leu Thr Lys Lys Ile Lys Gln
35 40 45

Cys Leu Glu Asp Ser Asp Ala Gly Ala Ser Asn Glu Tyr Asp Ser Ser
50 55 60

Pro Ala Ala Trp Asn Lys Glu Asp Phe Pro Trp Ser Gly Lys Val Lys
65 70 75 80

Asp Ile Leu Gln Asn Val Phe Lys Leu Glu Lys Phe Arg Pro Leu Gln
85 90 95

Leu Glu Thr Ile Asn Val Thr Met Ala Gly Lys Glu Val Phe Leu Val
100 105 110

Met Pro Thr Gly Gly Gly Lys Ser Leu Cys Tyr Gln Leu Pro Ala Leu
115 120 125

Cys Ser Asp Gly Phe Thr Leu Val Ile Cys Pro Leu Ile Ser Leu Met
130 135 140

Glu Asp Gln Leu Met Val Leu Lys Gln Leu Gly Ile Ser Ala Thr Met
145 150 155 160

Leu Asn Ala Ser Ser Ser Lys Glu His Val Lys Trp Val His Ala Glu
165 170 175

Met Val Asn Lys Asn Ser Glu Leu Lys Leu Ile Tyr Val Thr Pro Glu
180 185 190

Lys Ile Ala Lys Ser Lys Met Phe Met Ser Arg Leu Glu Lys Ala Tyr
195 200 205

Glu Ala Arg Arg Phe Thr Arg Ile Ala Val Asp Glu Val His Cys Cys
210 215 220

Ser Gln Trp Gly His Asp Phe Arg Pro Asp Tyr Lys Ala Leu Gly Ile
225 230 235 240

Leu Lys Arg Gln Phe Pro Asn Ala Ser Leu Ile Gly Leu Thr Ala Thr
245 250 255

Ala Thr Asn His Val Leu Thr Asp Ala Gln Lys Ile Leu Cys Ile Glu
260 265 270

Lys Cys Phe Thr Phe Thr Ala Ser Phe Asn Arg Pro Asn Leu Tyr Tyr
275 280 285

Glu Val Arg Gln Lys Pro Ser Asn Thr Glu Asp Phe Ile Glu Asp Ile
290 295 300

Val Lys Leu Ile Asn Gly Arg Tyr Lys Gly Gln Ser Gly Ile Ile Tyr
305 310 315 320

Cys Phe Ser Gln Lys Asp Ser Glu Gln Val Thr Val Ser Leu Gln Asn
325 330 335

Leu Gly Ile His Ala Gly Ala Tyr His Ala Asn Leu Glu Pro Glu Asp
340 345 350

Lys Thr Thr Val His Arg Lys Trp Ser Ala Asn Glu Ile Gln Val Val
355 360 365

Val Ala Thr Val Ala Phe Gly Met Gly Ile Asp Lys Pro Asp Val Arg
370 375 380

Phe Val Ile His His Ser Met Ser Lys Ser Met Glu Asn Tyr Tyr Gln
385 390 395 400

Glu Ser Gly Arg Ala Gly Arg Asp Asp Met Lys Ala Asp Cys Ile Leu
405 410 415

Tyr Tyr Gly Phe Gly Asp Ile Phe Arg Ile Ser Ser Met Val Val Met
420 425 430

Glu Asn Val Gly Gln Gln Lys Leu Tyr Glu Met Val Ser Tyr Cys Gln
435 440 445

Asn Ile Ser Lys Cys Arg Arg Val Leu Met Ala Gln His Phe Asp Glu
450 455 460

Val Trp Asn Ser Glu Ala Cys Asn Lys Met Cys Asp Asn Cys Cys Lys
465 470 475 480

Asp Ser Ala Phe Glu Arg Lys Asn Ile Thr Glu Tyr Cys Arg Asp Leu
485 490 495

Ile Lys Ile Leu Lys Gln Ala Glu Glu Leu Asn Glu Lys Leu Thr Pro
500 505 510

Leu Lys Leu Ile Asp Ser Trp Met Gly Lys Gly Ala Ala Lys Leu Arg
515 520 525

Val Ala Gly Val Val Ala Pro Thr Leu Pro Arg Glu Asp Leu Glu Lys
530 535 540

Ile Ile Ala His Phe Leu Ile Gln Gln Tyr Leu Lys Glu Asp Tyr Ser
545 550 555 560

Phe Thr Ala Tyr Ala Thr Ile Ser Tyr Leu Lys Ile Gly Pro Lys Ala
565 570 575

Asn Leu Leu Asn Asn Glu Ala His Ala Ile Thr Met Gln Val Thr Lys
580 585 590

Ser Thr Gln Asn Ser Phe Arg Ala Glu Ser Ser Gln Thr Cys His Ser
595 600 605

Glu Gln Gly Asp Lys Lys Met Glu Glu Lys Asn Ser Gly Asn Phe Gln
610 615 620

Lys Lys Ala Ala Asn Met Leu Gln Gln Ser Gly Ser Lys Asn Thr Gly
625 630 635 640

Ala Lys Lys Arg Lys Ile Asp Asp Ala

645

<210> 58
<211> 760
<212> PRT
<213> Homo sapiens

<400> 58
Met Lys Leu Asn Val Asp Gly Leu Leu Val Tyr Phe Pro Tyr Asp Tyr
1 5 10 15

Ile Tyr Pro Glu Gln Phe Ser Tyr Met Arg Glu Leu Lys Arg Thr Leu
20 25 30

Asp Ala Lys Gly His Gly Val Leu Glu Met Pro Ser Gly Thr Gly Lys
35 40 45

Thr Val Ser Leu Leu Ala Leu Ile Met Ala Tyr Gln Arg Ala Tyr Pro
50 55 60

Leu Glu Val Thr Lys Leu Ile Tyr Cys Ser Arg Thr Val Pro Glu Ile
65 70 75 80

Glu Lys Val Ile Glu Glu Leu Arg Lys Leu Leu Asn Phe Tyr Glu Lys
85 90 95

Gln Glu Gly Glu Lys Leu Pro Phe Leu Gly Leu Ala Leu Ser Ser Arg
100 105 110

Lys Asn Leu Cys Ile His Pro Glu Val Thr Pro Leu Arg Phe Gly Lys
115 120 125

Asp Val Asp Gly Lys Cys His Ser Leu Thr Ala Ser Tyr Val Arg Ala
130 135 140

Gln Tyr Gln His Asp Thr Ser Leu Pro His Cys Arg Phe Tyr Glu Glu
145 150 155 160

Phe Asp Ala His Gly Arg Glu Val Pro Leu Pro Ala Gly Ile Tyr Asn
165 170 175

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

Phe Leu Ala Arg Tyr Ser Ile Leu His Ala Asn Val Val Val Tyr Ser
195 200 205

Tyr His Tyr Leu Leu Asp Pro Lys Ile Ala Asp Leu Val Ser Lys Glu
210 215 220

Leu Ala Arg Lys Ala Val Val Val Phe Asp Glu Ala His Asn Ile Asp
225 230 235 240

Asn Val Cys Ile Asp Ser Met Ser Val Asn Leu Thr Arg Arg Thr Leu
245 250 255

Asp Arg Cys Gln Gly Asn Leu Glu Thr Leu Gln Lys Thr Val Leu Arg
260 265 270

Ile Lys Glu Thr Asp Glu Gln Arg Leu Arg Asp Glu Tyr Arg Arg Leu
275 280 285

Val Glu Gly Leu Arg Glu Ala Ser Ala Ala Arg Glu Thr Asp Ala His
290 295 300

Leu Ala Asn Pro Val Leu Pro Asp Glu Val Leu Gln Glu Ala Val Pro
305 310 315 320

Gly Ser Ile Arg Thr Ala Glu His Phe Leu Gly Phe Leu Arg Arg Leu
325 330 335

Leu Glu Tyr Val Lys Trp Arg Leu Arg Val Gln His Val Val Gln Glu
340 345 350

Ser Pro Pro Ala Phe Leu Ser Gly Leu Ala Gln Arg Val Cys Ile Gln
355 360 365

Arg Lys Pro Leu Arg Phe Cys Ala Glu Arg Leu Arg Ser Leu Leu His
370 375 380

Thr Leu Glu Ile Thr Asp Leu Ala Asp Phe Ser Pro Leu Thr Leu Leu
385 390 395 400

Ala Asn Phe Ala Thr Leu Val Ser Thr Tyr Ala Lys Gly Phe Thr Ile

405 410 415

Ile Ile Glu Pro Phe Asp Asp Arg Thr Pro Thr Ile Ala Asn Pro Ile
420 425 430

Leu His Phe Ser Cys Met Asp Ala Ser Leu Ala Ile Lys Pro Val Phe
435 440 445

Glu Arg Phe Gln Ser Val Ile Ile Thr Ser Gly Thr Leu Ser Pro Leu
450 455 460

Asp Ile Tyr Pro Lys Ile Leu Asp Phe His Pro Val Thr Met Ala Thr
465 470 475 480

Phe Thr Met Thr Leu Ala Arg Val Cys Leu Cys Pro Met Ile Ile Gly
485 490 495

Arg Gly Asn Asp Gln Val Ala Ile Ser Ser Lys Phe Glu Thr Arg Glu
500 505 510

Asp Ile Ala Val Ile Arg Asn Tyr Gly Asn Leu Leu Leu Glu Met Ser
515 520 525

Ala Val Val Pro Asp Gly Ile Val Ala Phe Phe Thr Ser Tyr Gln Tyr
530 535 540

Met Glu Ser Thr Val Ala Ser Trp Tyr Glu Gln Gly Ile Leu Glu Asn
545 550 555 560

Ile Gln Arg Asn Lys Leu Leu Phe Ile Glu Thr Gln Asp Gly Ala Glu
565 570 575

Thr Ser Val Ala Leu Glu Lys Tyr Gln Glu Ala Cys Glu Asn Gly Arg
580 585 590

Gly Ala Ile Leu Leu Ser Val Ala Arg Gly Lys Val Ser Glu Gly Ile
595 600 605

Asp Phe Val His His Tyr Gly Arg Ala Val Ile Met Phe Gly Val Pro
610 615 620

Tyr Val Tyr Thr Gln Ser Arg Ile Leu Lys Ala Arg Leu Glu Tyr Leu
625 630 635 640

Arg Asp Gln Phe Gln Ile Arg Glu Asn Asp Phe Leu Thr Phe Asp Ala
645 650 655

Met Arg His Ala Ala Gln Cys Val Gly Arg Ala Ile Arg Gly Lys Thr
660 665 670

Asp Tyr Gly Leu Met Val Phe Ala Asp Lys Arg Phe Ala Arg Gly Asp
675 680 685

Lys Arg Gly Lys Leu Pro Arg Trp Ile Gln Glu His Leu Thr Asp Ala
690 695 700

Asn Leu Asn Leu Thr Val Asp Glu Gly Val Gln Val Ala Lys Tyr Phe
705 710 715 720

Leu Arg Gln Met Ala Gln Pro Phe His Arg Glu Asp Gln Leu Gly Leu
725 730 735

Ser Leu Leu Ser Leu Glu Gln Leu Glu Ser Glu Glu Thr Leu Lys Arg
740 745 750

Ile Glu Gln Ile Ala Gln Gln Leu
755 760

<210> 59
<211> 782
<212> PRT
<213> Homo sapiens

<400> 59
Met Gly Lys Arg Asp Arg Ala Asp Arg Asp Lys Lys Lys Ser Arg Lys
1 5 10 15

Arg His Tyr Glu Asp Glu Glu Asp Asp Glu Glu Asp Ala Pro Gly Asn
20 25 30

Asp Pro Gln Glu Ala Val Pro Ser Ala Ala Gly Lys Gln Val Asp Glu
35 40 45

Ser Gly Thr Lys Val Asp Glu Tyr Gly Ala Lys Asp Tyr Arg Leu Gln

50 55 60

Met Pro Leu Lys Asp Asp His Thr Ser Arg Pro Leu Trp Val Ala Pro
65 70 75 80

Asp Gly His Ile Phe Leu Glu Ala Phe Ser Pro Val Tyr Lys Tyr Ala
85 90 95

Gln Asp Phe Leu Val Ala Ile Ala Glu Pro Val Cys Arg Pro Thr His
100 105 110

Val His Glu Tyr Lys Leu Thr Ala Tyr Ser Leu Tyr Ala Ala Val Ser
115 120 125

Val Gly Leu Gln Thr Ser Asp Ile Thr Glu Tyr Leu Arg Lys Leu Ser
130 135 140

Lys Thr Gly Val Pro Asp Gly Ile Met Gln Phe Ile Lys Leu Cys Thr
145 150 155 160

Val Ser Tyr Gly Lys Val Lys Leu Val Leu Lys His Asn Arg Tyr Phe
165 170 175

Val Glu Ser Cys His Pro Asp Val Ile Gln His Leu Leu Gln Asp Pro
180 185 190

Val Ile Arg Glu Cys Arg Leu Arg Asn Ser Glu Gly Glu Ala Thr Glu
195 200 205

Leu Ile Thr Glu Thr Phe Thr Ser Lys Ser Ala Ile Ser Lys Thr Ala
210 215 220

Glu Ser Ser Gly Gly Pro Ser Thr Ser Arg Val Thr Asp Pro Gln Gly
225 230 235 240

Lys Ser Asp Ile Pro Met Asp Leu Phe Asp Phe Tyr Glu Gln Met Asp
245 250 255

Lys Asp Glu Glu Glu Glu Glu Glu Thr Gln Thr Val Ser Phe Glu Val
260 265 270

Lys Gln Glu Met Ile Glu Glu Leu Gln Lys Arg Cys Ile His Leu Glu
275 280 285

Tyr Pro Leu Leu Ala Glu Tyr Asp Phe Arg Asn Asp Ser Val Asn Pro
290 295 300

Asp Ile Asn Ile Asp Leu Lys Pro Thr Ala Val Leu Arg Pro Tyr Gln
305 310 315 320

Glu Lys Ser Leu Arg Lys Met Phe Gly Asn Gly Arg Ala Arg Ser Gly
325 330 335

Val Ile Val Leu Pro Cys Gly Ala Gly Lys Ser Leu Val Gly Val Thr
340 345 350

Ala Ala Cys Thr Val Arg Lys Arg Cys Leu Val Leu Gly Asn Ser Ala
355 360 365

Val Ser Val Glu Gln Trp Lys Ala Gln Phe Lys Met Trp Ser Thr Ile
370 375 380

Asp Asp Ser Gln Ile Cys Arg Phe Thr Ser Asp Ala Lys Asp Lys Pro
385 390 395 400

Ile Gly Cys Ser Val Ala Ile Ser Thr Tyr Ser Met Leu Gly His Thr
405 410 415

Thr Lys Arg Ser Trp Glu Ala Glu Arg Val Met Glu Trp Leu Lys Thr
420 425 430

Gln Glu Trp Gly Leu Met Ile Leu Asp Glu Val His Thr Ile Pro Ala
435 440 445

Lys Met Phe Arg Arg Val Leu Thr Ile Val Gln Ala His Cys Lys Leu
450 455 460

Gly Leu Thr Ala Thr Leu Val Arg Glu Asp Asp Lys Ile Val Asp Leu
465 470 475 480

Asn Phe Leu Ile Gly Pro Lys Leu Tyr Glu Ala Asn Trp Met Glu Leu
485 490 495

Gln Asn Asn Gly Tyr Ile Ala Lys Val Gln Cys Ala Glu Val Trp Cys
500 505 510

Pro Met Ser Pro Glu Phe Tyr Arg Glu Tyr Val Ala Ile Lys Thr Lys
515 520 525

Lys Arg Ile Leu Leu Tyr Thr Met Asn Pro Asn Lys Phe Arg Ala Cys
530 535 540

Gln Phe Leu Ile Lys Phe His Glu Arg Arg Asn Asp Lys Ile Ile Val
545 550 555 560

Phe Ala Asp Asn Val Phe Ala Leu Lys Glu Tyr Ala Ile Arg Leu Asn
565 570 575

Lys Pro Tyr Ile Tyr Gly Pro Thr Ser Gln Gly Glu Arg Met Gln Ile
580 585 590

Leu Gln Asn Phe Lys His Asn Pro Lys Ile Asn Thr Ile Phe Ile Ser
595 600 605

Lys Val Gly Asp Thr Ser Phe Asp Leu Pro Glu Ala Asn Val Leu Ile
610 615 620

Gln Ile Ser Ser His Gly Gly Ser Arg Arg Gln Glu Ala Gln Arg Leu
625 630 635 640

Gly Arg Val Leu Arg Ala Lys Lys Gly Met Val Ala Glu Glu Tyr Asn
645 650 655

Ala Phe Phe Tyr Ser Leu Val Ser Gln Asp Thr Gln Glu Met Ala Tyr
660 665 670

Ser Thr Lys Arg Gln Arg Phe Leu Val Asp Gln Gly Tyr Ser Phe Lys
675 680 685

Val Ile Thr Lys Leu Ala Gly Met Glu Glu Glu Asp Leu Ala Phe Ser
690 695 700

Thr Lys Glu Glu Gln Gln Gln Leu Leu Gln Lys Val Leu Ala Ala Thr
705 710 715 720

Asp Leu Asp Ala Glu Glu Glu Val Val Ala Gly Glu Phe Gly Ser Arg
725 730 735

Ser Ser Gln Ala Ser Arg Arg Phe Gly Thr Met Ser Ser Met Ser Gly
740 745 750

Ala Asp Asp Thr Val Tyr Met Glu Tyr His Ser Ser Arg Ser Lys Ala
755 760 765

Pro Ser Lys His Val His Pro Leu Phe Lys Arg Phe Arg Lys
770 775 780

<210> 60
<211> 1432
<212> PRT
<213> Homo sapiens

<400> 60
Met Ser Glu Lys Lys Leu Glu Thr Thr Ala Gln Gln Arg Lys Cys Pro
1 5 10 15

Glu Trp Met Asn Val Gln Asn Lys Arg Cys Ala Val Glu Glu Arg Lys
20 25 30

Ala Cys Val Arg Lys Ser Val Phe Glu Asp Asp Leu Pro Phe Leu Glu
35 40 45

Phe Thr Gly Ser Ile Val Tyr Ser Tyr Asp Ala Ser Asp Cys Ser Phe
50 55 60

Leu Ser Glu Asp Ile Ser Met Ser Leu Ser Asp Gly Asp Val Val Gly
65 70 75 80

Phe Asp Met Glu Trp Pro Pro Leu Tyr Asn Arg Gly Lys Leu Gly Lys
85 90 95

Val Ala Leu Ile Gln Leu Cys Val Ser Glu Ser Lys Cys Tyr Leu Phe
100 105 110

His Val Ser Ser Met Ser Val Phe Pro Gln Gly Leu Lys Met Leu Leu
115 120 125

Glu Asn Lys Ala Val Lys Lys Ala Gly Val Gly Ile Glu Gly Asp Gln
130 135 140

Trp Lys Leu Leu Arg Asp Phe Asp Ile Lys Leu Lys Asn Phe Val Glu
145 150 155 160

Leu Thr Asp Val Ala Asn Lys Lys Leu Lys Cys Thr Glu Thr Trp Ser
165 170 175

Leu Asn Ser Leu Val Lys His Leu Leu Gly Lys Gln Leu Leu Lys Asp
180 185 190

Lys Ser Ile Arg Cys Ser Asn Trp Ser Lys Phe Pro Leu Thr Glu Asp
195 200 205

Gln Lys Leu Tyr Ala Ala Thr Asp Ala Tyr Ala Gly Phe Ile Ile Tyr
210 215 220

Arg Asn Leu Glu Ile Leu Asp Asp Thr Val Gln Arg Phe Ala Ile Asn
225 230 235 240

Lys Glu Glu Glu Ile Leu Leu Ser Asp Met Asn Lys Gln Leu Thr Ser
245 250 255

Ile Ser Glu Glu Val Met Asp Leu Ala Lys His Leu Pro His Ala Phe
260 265 270

Ser Lys Leu Glu Asn Pro Arg Arg Val Ser Ile Leu Leu Lys Asp Ile
275 280 285

Ser Glu Asn Leu Tyr Ser Leu Arg Arg Met Ile Ile Gly Ser Thr Asn
290 295 300

Ile Glu Thr Glu Leu Arg Pro Ser Asn Asn Leu Asn Leu Leu Ser Phe
305 310 315 320

Glu Asp Ser Thr Thr Gly Gly Val Gln Gln Lys Gln Ile Arg Glu His
325 330 335

Glu Val Leu Ile His Val Glu Asp Glu Thr Trp Asp Pro Thr Leu Asp
340 345 350

His Leu Ala Lys His Asp Gly Glu Asp Val Leu Gly Asn Lys Val Glu
355 360 365

Arg Lys Glu Asp Gly Phe Glu Asp Gly Val Glu Asp Asn Lys Leu Lys
370 375 380

Glu Asn Met Glu Arg Ala Cys Leu Met Ser Leu Asp Ile Thr Glu His
385 390 395 400

Glu Leu Gln Ile Leu Glu Gln Gln Ser Gln Glu Glu Tyr Leu Ser Asp
405 410 415

Ile Ala Tyr Lys Ser Thr Glu His Leu Ser Pro Asn Asp Asn Glu Asn
420 425 430

Asp Thr Ser Tyr Val Ile Glu Ser Asp Glu Asp Leu Glu Met Glu Met
435 440 445

Leu Lys His Leu Ser Pro Asn Asp Asn Glu Asn Asp Thr Ser Tyr Val
450 455 460

Ile Glu Ser Asp Glu Asp Leu Glu Met Glu Met Leu Lys Ser Leu Glu
465 470 475 480

Asn Leu Asn Ser Gly Thr Val Glu Pro Thr His Ser Lys Cys Leu Lys
485 490 495

Met Glu Arg Asn Leu Gly Leu Pro Thr Lys Glu Glu Glu Glu Asp Asp
500 505 510

Glu Asn Glu Ala Asn Glu Gly Glu Glu Asp Asp Asp Lys Asp Phe Leu
515 520 525

Trp Pro Ala Pro Asn Glu Glu Gln Val Thr Cys Leu Lys Met Tyr Phe
530 535 540

Gly His Ser Ser Phe Lys Pro Val Gln Trp Lys Val Ile His Ser Val
545 550 555 560

Leu Glu Glu Arg Arg Asp Asn Val Ala Val Met Ala Thr Gly Tyr Gly

565 570 575

Lys Ser Leu Cys Phe Gln Tyr Pro Pro Val Tyr Val Gly Lys Ile Gly
580 585 590

Leu Val Ile Ser Pro Leu Ile Ser Leu Met Glu Asp Gln Val Leu Gln
595 600 605

Leu Lys Met Ser Asn Ile Pro Ala Cys Phe Leu Gly Ser Ala Gln Ser
610 615 620

Glu Asn Val Leu Thr Asp Ile Lys Leu Gly Lys Tyr Arg Ile Val Tyr
625 630 635 640

Val Thr Pro Glu Tyr Cys Ser Gly Asn Met Gly Leu Leu Gln Gln Leu
645 650 655

Glu Ala Asp Ile Gly Ile Thr Leu Ile Ala Val Asp Glu Ala His Cys
660 665 670

Ile Ser Glu Trp Gly His Asp Phe Arg Asp Ser Phe Arg Lys Leu Gly
675 680 685

Ser Leu Lys Thr Ala Leu Pro Met Val Pro Ile Val Ala Leu Thr Ala
690 695 700

Thr Ala Ser Ser Ser Ile Arg Glu Asp Ile Val Arg Cys Leu Asn Leu
705 710 715 720

Arg Asn Pro Gln Ile Thr Cys Thr Gly Phe Asp Arg Pro Asn Leu Tyr
725 730 735

Leu Glu Val Arg Arg Lys Thr Gly Asn Ile Leu Gln Asp Leu Gln Pro
740 745 750

Phe Leu Val Lys Thr Ser Ser His Trp Glu Phe Glu Gly Pro Thr Ile
755 760 765

Ile Tyr Cys Pro Ser Arg Lys Met Thr Gln Gln Val Thr Gly Glu Leu
770 775 780

Arg Lys Leu Asn Leu Ser Cys Gly Thr Tyr His Ala Gly Met Ser Phe
785 790 795 800

Ser Thr Arg Lys Asp Ile His His Arg Phe Val Arg Asp Glu Ile Gln
805 810 815

Cys Val Ile Ala Thr Ile Ala Phe Gly Met Gly Ile Asn Lys Ala Asp
820 825 830

Ile Arg Gln Val Ile His Tyr Gly Ala Pro Lys Asp Met Glu Ser Tyr
835 840 845

Tyr Gln Glu Ile Gly Arg Ala Gly Arg Asp Gly Leu Gln Ser Ser Cys
850 855 860

His Val Leu Trp Ala Pro Ala Asp Ile Asn Leu Asn Arg His Leu Leu
865 870 875 880

Thr Glu Ile Arg Asn Glu Lys Phe Arg Leu Tyr Lys Leu Lys Met Met
885 890 895

Ala Lys Met Glu Lys Tyr Leu His Ser Ser Arg Cys Arg Arg Gln Ile
900 905 910

Ile Leu Ser His Phe Glu Asp Lys Gln Val Gln Lys Ala Ser Leu Gly
915 920 925

Ile Met Gly Thr Glu Lys Cys Cys Asp Asn Cys Arg Ser Arg Leu Asp
930 935 940

His Cys Tyr Ser Met Asp Asp Ser Glu Asp Thr Ser Trp Asp Phe Gly
945 950 955 960

Pro Gln Ala Phe Lys Leu Leu Ser Ala Val Asp Ile Leu Gly Glu Lys
965 970 975

Phe Gly Ile Gly Leu Pro Ile Leu Phe Leu Arg Gly Ser Asn Ser Gln
980 985 990

Arg Leu Ala Asp Gln Tyr Arg Arg His Ser Leu Phe Gly Thr Gly Lys
995 1000 1005

Asp Gln Thr Glu Ser Trp Trp Lys Ala Phe Ser Arg Gln Leu Ile
1010 1015 1020

Thr Glu Gly Phe Leu Val Glu Val Ser Arg Tyr Asn Lys Phe Met
1025 1030 1035

Lys Ile Cys Ala Leu Thr Lys Lys Gly Arg Asn Trp Leu His Lys
1040 1045 1050

Ala Asn Thr Glu Ser Gln Ser Leu Ile Leu Gln Ala Asn Glu Glu
1055 1060 1065

Leu Cys Pro Lys Lys Leu Leu Leu Pro Ser Ser Lys Thr Val Ser
1070 1075 1080

Ser Gly Thr Lys Glu His Cys Tyr Asn Gln Val Pro Val Glu Leu
1085 1090 1095

Ser Thr Glu Lys Lys Ser Asn Leu Glu Lys Leu Tyr Ser Tyr Lys
1100 1105 1110

Pro Cys Asp Lys Ile Ser Ser Gly Ser Asn Ile Ser Lys Lys Ser
1115 1120 1125

Ile Met Val Gln Ser Pro Glu Lys Ala Tyr Ser Ser Ser Gln Pro
1130 1135 1140

Val Ile Ser Ala Gln Glu Gln Glu Thr Gln Ile Val Leu Tyr Gly
1145 1150 1155

Lys Leu Val Glu Ala Arg Gln Lys His Ala Asn Lys Met Asp Val
1160 1165 1170

Pro Pro Ala Ile Leu Ala Thr Asn Lys Ile Leu Val Asp Met Ala
1175 1180 1185

Lys Met Arg Pro Thr Thr Val Glu Asn Val Lys Arg Ile Asp Gly
1190 1195 1200

Val Ser Glu Gly Lys Ala Ala Met Leu Ala Pro Leu Leu Glu Val
1205 1210 1215

Ile Lys His Phe Cys Gln Thr Asn Ser Val Gln Thr Asp Leu Phe
1220 1225 1230

Ser Ser Thr Lys Pro Gln Glu Glu Gln Lys Thr Ser Leu Val Ala
1235 1240 1245

Lys Asn Lys Ile Cys Thr Leu Ser Gln Ser Met Ala Ile Thr Tyr
1250 1255 1260

Ser Leu Phe Gln Glu Lys Lys Met Pro Leu Lys Ser Ile Ala Glu
1265 1270 1275

Ser Arg Ile Leu Pro Leu Met Thr Ile Gly Met His Leu Ser Gln
1280 1285 1290

Ala Val Lys Ala Gly Cys Pro Leu Asp Leu Glu Arg Ala Gly Leu
1295 1300 1305

Thr Pro Glu Val Gln Lys Ile Ile Ala Asp Val Ile Arg Asn Pro
1310 1315 1320

Pro Val Asn Ser Asp Met Ser Lys Ile Ser Leu Ile Arg Met Leu
1325 1330 1335

Val Pro Glu Asn Ile Asp Thr Tyr Leu Ile His Met Ala Ile Glu
1340 1345 1350

Ile Leu Lys His Gly Pro Asp Ser Gly Leu Gln Pro Ser Cys Asp
1355 1360 1365

Val Asn Lys Arg Arg Cys Phe Pro Gly Ser Glu Glu Ile Cys Ser
1370 1375 1380

Ser Ser Lys Arg Ser Lys Glu Glu Val Gly Ile Asn Thr Glu Thr
1385 1390 1395

Ser Ser Ala Glu Arg Lys Arg Arg Leu Pro Val Trp Phe Ala Lys
1400 1405 1410

Gly Ser Asp Thr Ser Lys Lys Leu Met Asp Lys Thr Lys Arg Gly

1415 1420 1425

Gly Leu Phe Ser
1430

<210> 61
<211> 991
<212> PRT
<213> Homo sapiens

<400> 61
Met Ser Ser His His Thr Thr Phe Pro Phe Asp Pro Glu Arg Arg Val
1 5 10 15

Arg Ser Thr Leu Lys Lys Val Phe Gly Phe Asp Ser Phe Lys Thr Pro
20 25 30

Leu Gln Glu Ser Ala Thr Met Ala Val Val Lys Gly Asn Lys Asp Val
35 40 45

Phe Val Cys Met Pro Thr Gly Ala Gly Lys Ser Leu Cys Tyr Gln Leu
50 55 60

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

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

Val Ser Ser Leu Asn Ser Lys Leu Ser Ala Gln Glu Arg Lys Glu Leu
100 105 110

Leu Ala Asp Leu Glu Arg Glu Lys Pro Gln Thr Lys Ile Leu Tyr Ile
115 120 125

Thr Pro Glu Met Ala Ala Ser Ser Ser Phe Gln Pro Thr Leu Asn Ser
130 135 140

Leu Val Ser Arg His Leu Leu Ser Tyr Leu Val Val Asp Glu Ala His
145 150 155 160

Cys Val Ser Gln Trp Gly His Asp Phe Arg Pro Asp Tyr Leu Arg Leu
165 170 175

Gly Ala Leu Arg Ser Arg Leu Gly His Ala Pro Cys Val Ala Leu Thr
180 185 190

Ala Thr Ala Thr Pro Gln Val Gln Glu Asp Val Phe Ala Ala Leu His
195 200 205

Leu Lys Lys Pro Val Ala Ile Phe Lys Thr Pro Cys Phe Arg Ala Asn
210 215 220

Leu Phe Tyr Asp Val Gln Phe Lys Glu Leu Ile Ser Asp Pro Tyr Gly
225 230 235 240

Asn Leu Lys Asp Phe Cys Leu Lys Ala Leu Gly Gln Glu Ala Asp Lys
245 250 255

Gly Leu Ser Gly Cys Gly Ile Val Tyr Cys Arg Thr Arg Glu Ala Cys
260 265 270

Glu Gln Leu Ala Ile Glu Leu Ser Cys Arg Gly Val Asn Ala Lys Ala
275 280 285

Tyr His Ala Gly Leu Lys Ala Ser Glu Arg Thr Leu Val Gln Asn Asp
290 295 300

Trp Met Glu Glu Lys Val Pro Val Ile Val Ala Thr Ile Ser Phe Gly
305 310 315 320

Met Gly Val Asp Lys Ala Asn Val Arg Phe Val Ala His Trp Asn Ile
325 330 335

Ala Lys Ser Met Ala Gly Tyr Tyr Gln Glu Ser Gly Arg Ala Gly Arg
340 345 350

Asp Gly Lys Pro Ser Trp Cys Arg Leu Tyr Tyr Ser Arg Asn Asp Arg
355 360 365

Asp Gln Val Ser Phe Leu Ile Arg Lys Glu Val Ala Lys Leu Gln Glu
370 375 380

Lys Arg Gly Asn Lys Ala Ser Asp Lys Ala Thr Ile Met Ala Phe Asp

385 390 395 400

Ala Leu Val Thr Phe Cys Glu Glu Leu Gly Cys Arg His Ala Ala Ile
405 410 415

Ala Lys Tyr Phe Gly Asp Ala Leu Pro Ala Cys Ala Lys Gly Cys Asp
420 425 430

His Cys Gln Asn Pro Thr Ala Val Arg Arg Arg Leu Glu Ala Leu Glu
435 440 445

Arg Ser Ser Ser Trp Ser Lys Thr Cys Ile Gly Pro Ser Gln Gly Asn
450 455 460

Gly Phe Asp Pro Glu Leu Tyr Glu Gly Gly Arg Lys Gly Tyr Gly Asp
465 470 475 480

Phe Ser Arg Tyr Asp Glu Gly Ser Gly Gly Ser Gly Asp Glu Gly Arg
485 490 495

Asp Glu Ala His Lys Arg Glu Trp Asn Leu Phe Tyr Gln Lys Gln Met
500 505 510

Gln Leu Arg Lys Gly Lys Asp Pro Lys Ile Glu Glu Phe Val Pro Pro
515 520 525

Asp Glu Asn Cys Pro Leu Lys Glu Ala Ser Ser Arg Arg Ile Pro Arg
530 535 540

Leu Thr Val Lys Ala Arg Glu His Cys Leu Arg Leu Leu Glu Glu Ala
545 550 555 560

Leu Ser Ser Asn Arg Gln Ser Thr Arg Thr Ala Asp Glu Ala Asp Leu
565 570 575

Arg Ala Lys Ala Val Glu Leu Glu His Glu Thr Phe Arg Asn Ala Lys
580 585 590

Val Ala Asn Leu Tyr Lys Ala Ser Val Leu Lys Lys Val Ala Asp Ile
595 600 605

His Arg Ala Ser Lys Asp Gly Gln Pro Tyr Asp Met Gly Gly Ser Ala
610 615 620

Lys Ser Cys Ser Ala Gln Ala Glu Pro Pro Glu Pro Asn Glu Tyr Asp
625 630 635 640

Ile Pro Pro Ala Ser His Val Tyr Ser Leu Lys Pro Lys Arg Val Gly
645 650 655

Ala Gly Phe Pro Lys Gly Ser Cys Pro Phe Gln Thr Ala Thr Glu Leu
660 665 670

Met Glu Thr Thr Arg Ile Arg Glu Gln Ala Pro Gln Pro Glu Arg Gly
675 680 685

Gly Glu His Glu Pro Pro Ser Arg Pro Cys Gly Leu Leu Asp Glu Asp
690 695 700

Gly Ser Glu Pro Leu Pro Gly Pro Arg Gly Glu Val Pro Gly Gly Ser
705 710 715 720

Ala His Tyr Gly Gly Pro Ser Pro Glu Lys Lys Ala Lys Ser Ser Ser
725 730 735

Gly Gly Ser Ser Leu Ala Lys Gly Arg Ala Ser Lys Lys Gln Gln Leu
740 745 750

Leu Ala Thr Ala Ala His Lys Asp Ser Gln Ser Ile Ala Arg Phe Phe
755 760 765

Cys Arg Arg Val Glu Ser Pro Ala Leu Leu Ala Ser Ala Pro Glu Ala
770 775 780

Glu Gly Ala Cys Pro Ser Cys Glu Gly Val Gln Gly Pro Pro Met Ala
785 790 795 800

Pro Glu Lys Tyr Thr Gly Glu Glu Asp Gly Ala Gly Gly His Ser Pro
805 810 815

Ala Pro Pro Gln Thr Glu Glu Cys Leu Arg Glu Arg Pro Ser Thr Cys
820 825 830

Pro Pro Arg Asp Gln Gly Thr Pro Glu Val Gln Pro Thr Pro Ala Lys
835 840 845

Asp Thr Trp Lys Gly Lys Arg Pro Arg Ser Gln Gln Glu Asn Pro Glu
850 855 860

Ser Gln Pro Gln Lys Arg Pro Arg Pro Ser Ala Lys Pro Ser Val Val
865 870 875 880

Ala Glu Val Lys Gly Ser Val Ser Ala Ser Glu Gln Gly Thr Leu Asn
885 890 895

Pro Thr Ala Gln Asp Pro Phe Gln Leu Ser Ala Pro Gly Val Ser Leu
900 905 910

Lys Glu Ala Ala Asn Val Val Val Lys Cys Leu Thr Pro Phe Tyr Lys
915 920 925

Glu Gly Lys Phe Ala Ser Lys Glu Leu Phe Lys Gly Phe Ala Arg His
930 935 940

Leu Ser His Leu Leu Thr Gln Lys Thr Ser Pro Gly Arg Ser Val Lys
945 950 955 960

Glu Glu Ala Gln Asn Leu Ile Arg His Phe Phe His Gly Arg Ala Arg
965 970 975

Cys Glu Ser Glu Ala Asp Trp His Gly Leu Cys Gly Pro Gln Arg
980 985 990

<210> 62
<211> 1208
<212> PRT
<213> Homo sapiens

<400> 62
Met Glu Arg Leu Arg Asp Val Arg Glu Arg Leu Gln Ala Trp Glu Arg
1 5 10 15

Ala Phe Arg Arg Gln Arg Gly Arg Arg Pro Ser Gln Asp Asp Val Glu
20 25 30

Ala Ala Pro Glu Glu Thr Arg Ala Leu Tyr Arg Glu Tyr Arg Thr Leu
35 40 45

Lys Arg Thr Thr Gly Gln Ala Gly Gly Gly Leu Arg Ser Ser Glu Ser
50 55 60

Leu Pro Ala Ala Ala Glu Glu Ala Pro Glu Pro Arg Cys Trp Gly Pro
65 70 75 80

His Leu Asn Arg Ala Ala Thr Lys Ser Pro Gln Ser Thr Pro Gly Arg
85 90 95

Ser Arg Gln Gly Ser Val Pro Asp Tyr Gly Gln Arg Leu Lys Ala Asn
100 105 110

Leu Lys Gly Thr Leu Gln Ala Gly Pro Ala Leu Gly Arg Arg Pro Trp
115 120 125

Pro Leu Gly Arg Ala Ser Ser Lys Ala Ser Thr Pro Lys Pro Pro Gly
130 135 140

Thr Gly Pro Val Pro Ser Phe Ala Glu Lys Val Ser Asp Glu Pro Pro
145 150 155 160

Gln Leu Pro Glu Pro Gln Pro Arg Pro Gly Arg Leu Gln His Leu Gln
165 170 175

Ala Ser Leu Ser Gln Arg Leu Gly Ser Leu Asp Pro Gly Trp Leu Gln
180 185 190

Arg Cys His Ser Glu Val Pro Asp Phe Leu Gly Ala Pro Lys Ala Cys
195 200 205

Arg Pro Asp Leu Gly Ser Glu Glu Ser Gln Leu Leu Ile Pro Gly Glu
210 215 220

Ser Ala Val Leu Gly Pro Gly Ala Gly Ser Gln Gly Pro Glu Ala Ser
225 230 235 240

Ala Phe Gln Glu Val Ser Ile Arg Val Gly Ser Pro Gln Pro Ser Ser
245 250 255

Ser Gly Gly Glu Lys Arg Arg Trp Asn Glu Glu Pro Trp Glu Ser Pro
260 265 270

Ala Gln Val Gln Gln Glu Ser Ser Gln Ala Gly Pro Pro Ser Glu Gly
275 280 285

Ala Gly Ala Val Ala Val Glu Glu Asp Pro Pro Gly Glu Pro Val Gln
290 295 300

Ala Gln Pro Pro Gln Pro Cys Ser Ser Pro Ser Asn Pro Arg Tyr His
305 310 315 320

Gly Leu Ser Pro Ser Ser Gln Ala Arg Ala Gly Lys Ala Glu Gly Thr
325 330 335

Ala Pro Leu His Ile Phe Pro Arg Leu Ala Arg His Asp Arg Gly Asn
340 345 350

Tyr Val Arg Leu Asn Met Lys Gln Lys His Tyr Val Arg Gly Arg Ala
355 360 365

Leu Arg Ser Arg Leu Leu Arg Lys Gln Ala Trp Lys Gln Lys Trp Arg
370 375 380

Lys Lys Gly Glu Cys Phe Gly Gly Gly Gly Ala Thr Val Thr Thr Lys
385 390 395 400

Glu Ser Cys Phe Leu Asn Glu Gln Phe Asp His Trp Ala Ala Gln Cys
405 410 415

Pro Arg Pro Ala Ser Glu Glu Asp Thr Asp Ala Val Gly Pro Glu Pro
420 425 430

Leu Val Pro Ser Pro Gln Pro Val Pro Glu Val Pro Ser Leu Asp Pro
435 440 445

Thr Val Leu Pro Leu Tyr Ser Leu Gly Pro Ser Gly Gln Leu Ala Glu
450 455 460

Thr Pro Ala Glu Val Phe Gln Ala Leu Glu Gln Leu Gly His Gln Ala
465 470 475 480

Phe Arg Pro Gly Gln Glu Arg Ala Val Met Arg Ile Leu Ser Gly Ile
485 490 495

Ser Thr Leu Leu Val Leu Pro Thr Gly Ala Gly Lys Ser Leu Cys Tyr
500 505 510

Gln Leu Pro Ala Leu Leu Tyr Ser Arg Arg Ser Pro Cys Leu Thr Leu
515 520 525

Val Val Ser Pro Leu Leu Ser Leu Met Asp Asp Gln Val Ser Gly Leu
530 535 540

Pro Pro Cys Leu Lys Ala Ala Cys Ile His Ser Gly Met Thr Arg Lys
545 550 555 560

Gln Arg Glu Ser Val Leu Gln Lys Ile Arg Ala Ala Gln Val His Val
565 570 575

Leu Met Leu Thr Pro Glu Ala Leu Val Gly Ala Gly Gly Leu Pro Pro
580 585 590

Ala Ala Gln Leu Pro Pro Val Ala Phe Ala Cys Ile Asp Glu Ala His
595 600 605

Cys Leu Ser Gln Trp Ser His Asn Phe Arg Pro Cys Tyr Leu Arg Val
610 615 620

Cys Lys Val Leu Arg Glu Arg Met Gly Val His Cys Phe Leu Gly Leu
625 630 635 640

Thr Ala Thr Ala Thr Arg Arg Thr Ala Ser Asp Val Ala Gln His Leu
645 650 655

Ala Val Ala Glu Glu Pro Asp Leu His Gly Pro Ala Pro Val Pro Thr
660 665 670

Asn Leu His Leu Ser Val Ser Met Asp Arg Asp Thr Asp Gln Ala Leu
675 680 685

Leu Thr Leu Leu Gln Gly Lys Arg Phe Gln Asn Leu Asp Ser Ile Ile

690 695 700

Ile Tyr Cys Asn Arg Arg Glu Asp Thr Glu Arg Ile Ala Ala Leu Leu
705 710 715 720

Arg Thr Cys Leu His Ala Ala Trp Val Pro Gly Ser Gly Gly Arg Ala
725 730 735

Pro Lys Thr Thr Ala Glu Ala Tyr His Ala Gly Met Cys Ser Arg Glu
740 745 750

Arg Arg Arg Val Gln Arg Ala Phe Met Gln Gly Gln Leu Arg Val Val
755 760 765

Val Ala Thr Val Ala Phe Gly Met Gly Leu Asp Arg Pro Asp Val Arg
770 775 780

Ala Val Leu His Leu Gly Leu Pro Pro Ser Phe Glu Ser Tyr Val Gln
785 790 795 800

Ala Val Gly Arg Ala Gly Arg Asp Gly Gln Pro Ala His Cys His Leu
805 810 815

Phe Leu Gln Pro Gln Gly Glu Asp Leu Arg Glu Leu Arg Arg His Val
820 825 830

His Ala Asp Ser Thr Asp Phe Leu Ala Val Lys Arg Leu Val Gln Arg
835 840 845

Val Phe Pro Ala Cys Thr Cys Thr Cys Thr Arg Pro Pro Ser Glu Gln
850 855 860

Glu Gly Ala Val Gly Gly Glu Arg Pro Val Pro Lys Tyr Pro Pro Gln
865 870 875 880

Glu Ala Glu Gln Leu Ser His Gln Ala Ala Pro Gly Pro Arg Arg Val
885 890 895

Cys Met Gly His Glu Arg Ala Leu Pro Ile Gln Leu Thr Val Gln Ala
900 905 910

Leu Asp Met Pro Glu Glu Ala Ile Glu Thr Leu Leu Cys Tyr Leu Glu
915 920 925

Leu His Pro His His Trp Leu Glu Leu Leu Ala Thr Thr Tyr Thr His
930 935 940

Cys Arg Leu Asn Cys Pro Gly Gly Pro Ala Gln Leu Gln Ala Leu Ala
945 950 955 960

His Arg Cys Pro Pro Leu Ala Val Cys Leu Ala Gln Gln Leu Pro Glu
965 970 975

Asp Pro Gly Gln Gly Ser Ser Ser Val Glu Phe Asp Met Val Lys Leu
980 985 990

Val Asp Ser Met Gly Trp Glu Leu Ala Ser Val Arg Arg Ala Leu Cys
995 1000 1005

Gln Leu Gln Trp Asp His Glu Pro Arg Thr Gly Val Arg Arg Gly
1010 1015 1020

Thr Gly Val Leu Val Glu Phe Ser Glu Leu Ala Phe His Leu Arg
1025 1030 1035

Ser Pro Gly Asp Leu Thr Ala Glu Glu Lys Asp Gln Ile Cys Asp
1040 1045 1050

Phe Leu Tyr Gly Arg Val Gln Ala Arg Glu Arg Gln Ala Leu Ala
1055 1060 1065

Arg Leu Arg Arg Thr Phe Gln Ala Phe His Ser Val Ala Phe Pro
1070 1075 1080

Ser Cys Gly Pro Cys Leu Glu Gln Gln Asp Glu Glu Arg Ser Thr
1085 1090 1095

Arg Leu Lys Asp Leu Leu Gly Arg Tyr Phe Glu Glu Glu Glu Gly
1100 1105 1110

Gln Glu Pro Gly Gly Met Glu Asp Ala Gln Gly Pro Glu Pro Gly
1115 1120 1125

Gln Ala Arg Leu Gln Asp Trp Glu Asp Gln Val Arg Cys Asp Ile
1130 1135 1140

Arg Gln Phe Leu Ser Leu Arg Pro Glu Glu Lys Phe Ser Ser Arg
1145 1150 1155

Ala Val Ala Arg Ile Phe His Gly Ile Gly Ser Pro Cys Tyr Pro
1160 1165 1170

Ala Gln Val Tyr Gly Gln Asp Arg Arg Phe Trp Arg Lys Tyr Leu
1175 1180 1185

His Leu Ser Phe His Ala Leu Val Gly Leu Ala Thr Glu Glu Leu
1190 1195 1200

Leu Gln Val Ala Arg
1205

<210> 63
<211> 1101
<212> PRT
<213> Homo sapiens

<400> 63
Met Asp Glu Cys Gly Ser Arg Ile Arg Arg Arg Val Ser Leu Pro Lys
1 5 10 15

Arg Asn Arg Pro Ser Leu Gly Cys Ile Phe Gly Ala Pro Thr Ala Ala
20 25 30

Glu Leu Val Pro Gly Asp Glu Gly Lys Glu Glu Glu Glu Met Val Ala
35 40 45

Glu Asn Arg Arg Arg Lys Thr Ala Gly Val Leu Pro Val Glu Val Gln
50 55 60

Pro Leu Leu Leu Ser Asp Ser Pro Glu Cys Leu Val Leu Gly Gly Gly
65 70 75 80

Asp Thr Asn Pro Asp Leu Leu Arg His Met Pro Thr Asp Arg Gly Val
85 90 95

Gly Asp Gln Pro Asn Asp Ser Glu Val Asp Met Phe Gly Asp Tyr Asp
100 105 110

Ser Phe Thr Glu Asn Ser Phe Ile Ala Gln Val Asp Asp Leu Glu Gln
115 120 125

Lys Tyr Met Gln Leu Pro Glu His Lys Lys His Ala Thr Asp Phe Ala
130 135 140

Thr Glu Asn Leu Cys Ser Glu Ser Ile Lys Asn Lys Leu Ser Ile Thr
145 150 155 160

Thr Ile Gly Asn Leu Thr Glu Leu Gln Thr Asp Lys His Thr Glu Asn
165 170 175

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

Tyr Asp Val Pro Ser Ser Gln Ala Ile Tyr Phe Glu Asn Leu Gln Asn
195 200 205

Ser Ser Asn Asp Leu Gly Asp His Ser Met Lys Glu Arg Asp Trp Lys
210 215 220

Ser Ser Ser His Asn Thr Val Asn Glu Glu Leu Pro His Asn Cys Ile
225 230 235 240

Glu Gln Pro Gln Gln Asn Asp Glu Ser Ser Ser Lys Val Arg Thr Ser
245 250 255

Ser Asp Met Asn Arg Arg Lys Ser Ile Lys Asp His Leu Lys Asn Ala
260 265 270

Met Thr Gly Asn Ala Lys Ala Gln Thr Pro Ile Phe Ser Arg Ser Lys
275 280 285

Gln Leu Lys Asp Thr Leu Leu Ser Glu Glu Ile Asn Val Ala Lys Lys
290 295 300

Thr Val Glu Ser Ser Ser Asn Asp Leu Gly Pro Phe Tyr Ser Leu Pro
305 310 315 320

Ser Lys Val Arg Asp Leu Tyr Ala Gln Phe Lys Gly Ile Glu Lys Leu
325 330 335

Tyr Glu Trp Gln His Thr Cys Leu Thr Leu Asn Ser Val Gln Glu Arg
340 345 350

Lys Asn Leu Ile Tyr Ser Leu Pro Thr Ser Gly Gly Lys Thr Leu Val
355 360 365

Ala Glu Ile Leu Met Leu Gln Glu Leu Leu Cys Cys Arg Lys Asp Val
370 375 380

Leu Met Ile Leu Pro Tyr Val Ala Ile Val Gln Glu Lys Ile Ser Gly
385 390 395 400

Leu Ser Ser Phe Gly Ile Glu Leu Gly Phe Phe Val Glu Glu Tyr Ala
405 410 415

Gly Ser Lys Gly Arg Phe Pro Pro Thr Lys Arg Arg Glu Lys Lys Ser
420 425 430

Leu Tyr Ile Ala Thr Ile Glu Lys Gly His Ser Leu Val Asn Ser Leu
435 440 445

Ile Glu Thr Gly Arg Ile Asp Ser Leu Gly Leu Val Val Val Asp Glu
450 455 460

Leu His Met Ile Gly Glu Gly Ser Arg Gly Ala Thr Leu Glu Met Thr
465 470 475 480

Leu Ala Lys Ile Leu Tyr Thr Ser Lys Thr Thr Gln Ile Ile Gly Met
485 490 495

Ser Ala Thr Leu Asn Asn Val Glu Asp Leu Gln Lys Phe Leu Gln Ala
500 505 510

Glu Tyr Tyr Thr Ser Gln Phe Arg Pro Val Glu Leu Lys Glu Tyr Leu
515 520 525

Lys Ile Asn Asp Thr Ile Tyr Glu Val Asp Ser Lys Ala Glu Asn Gly
530 535 540

Met Thr Phe Ser Arg Leu Leu Asn Tyr Lys Tyr Ser Asp Thr Leu Lys
545 550 555 560

Lys Met Asp Pro Asp His Leu Val Ala Leu Val Thr Glu Val Ile Pro
565 570 575

Asn Tyr Ser Cys Leu Val Phe Cys Pro Ser Lys Lys Asn Cys Glu Asn
580 585 590

Val Ala Glu Met Ile Cys Lys Phe Leu Ser Lys Glu Tyr Leu Lys His
595 600 605

Lys Glu Lys Glu Lys Cys Glu Val Ile Lys Asn Leu Lys Asn Ile Gly
610 615 620

Asn Gly Asn Leu Cys Pro Val Leu Lys Arg Thr Ile Pro Phe Gly Val
625 630 635 640

Ala Tyr His His Ser Gly Leu Thr Ser Asp Glu Arg Lys Leu Leu Glu
645 650 655

Glu Ala Tyr Ser Thr Gly Val Leu Cys Leu Phe Thr Cys Thr Ser Thr
660 665 670

Leu Ala Ala Gly Val Asn Leu Pro Ala Arg Arg Val Ile Leu Arg Ala
675 680 685

Pro Tyr Val Ala Lys Glu Phe Leu Lys Arg Asn Gln Tyr Lys Gln Met
690 695 700

Ile Gly Arg Ala Gly Arg Ala Gly Ile Asp Thr Ile Gly Glu Ser Ile
705 710 715 720

Leu Ile Leu Gln Glu Lys Asp Lys Gln Gln Val Leu Glu Leu Ile Thr
725 730 735

Lys Pro Leu Glu Asn Cys Tyr Ser His Leu Val Gln Glu Phe Thr Lys
740 745 750

Gly Ile Gln Thr Leu Phe Leu Ser Leu Ile Gly Leu Lys Ile Ala Thr

755 760 765

Asn Leu Asp Asp Ile Tyr His Phe Met Asn Gly Thr Phe Phe Gly Val
770 775 780

Gln Gln Lys Val Leu Leu Lys Glu Lys Ser Leu Trp Glu Ile Thr Val
785 790 795 800

Glu Ser Leu Arg Tyr Leu Thr Glu Lys Gly Leu Leu Gln Lys Asp Thr
805 810 815

Ile Tyr Lys Ser Glu Glu Glu Val Gln Tyr Asn Phe His Ile Thr Lys
820 825 830

Leu Gly Arg Ala Ser Phe Lys Gly Thr Ile Asp Leu Ala Tyr Cys Asp
835 840 845

Ile Leu Tyr Arg Asp Leu Lys Lys Gly Leu Glu Gly Leu Val Leu Glu
850 855 860

Ser Leu Leu His Leu Ile Tyr Leu Thr Thr Pro Tyr Asp Leu Val Ser
865 870 875 880

Gln Cys Asn Pro Asp Trp Met Ile Tyr Phe Arg Gln Phe Ser Gln Leu
885 890 895

Ser Pro Ala Glu Gln Asn Val Ala Ala Ile Leu Gly Val Ser Glu Ser
900 905 910

Phe Ile Gly Lys Lys Ala Ser Gly Gln Ala Ile Gly Lys Lys Val Asp
915 920 925

Lys Asn Val Val Asn Arg Leu Tyr Leu Ser Phe Val Leu Tyr Thr Leu
930 935 940

Leu Lys Glu Thr Asn Ile Trp Thr Val Ser Glu Lys Phe Asn Met Pro
945 950 955 960

Arg Gly Tyr Ile Gln Asn Leu Leu Thr Gly Thr Ala Ser Phe Ser Ser
965 970 975

Cys Val Leu His Phe Cys Glu Glu Leu Glu Glu Phe Trp Val Tyr Arg
980 985 990

Ala Leu Leu Val Glu Leu Thr Lys Lys Leu Thr Tyr Cys Val Lys Ala
995 1000 1005

Glu Leu Ile Pro Leu Met Glu Val Thr Gly Val Leu Glu Gly Arg
1010 1015 1020

Ala Lys Gln Leu Tyr Ser Ala Gly Tyr Lys Ser Leu Met His Leu
1025 1030 1035

Ala Asn Ala Asn Pro Glu Val Leu Val Arg Thr Ile Asp His Leu
1040 1045 1050

Ser Arg Arg Gln Ala Lys Gln Ile Val Ser Ser Ala Lys Met Leu
1055 1060 1065

Leu His Glu Lys Ala Glu Ala Leu Gln Glu Glu Val Glu Glu Leu
1070 1075 1080

Leu Arg Leu Pro Ser Asp Phe Pro Gly Ala Val Ala Ser Ser Thr
1085 1090 1095

Asp Lys Ala
1100

<210> 64
<211> 1196
<212> PRT
<213> Herpes simplex virus

<400> 64
Met Glu Thr Lys Pro Lys Thr Ala Thr Thr Ile Lys Val Pro Pro Gly
1 5 10 15

Pro Leu Gly Tyr Val Tyr Ala Arg Ala Cys Pro Ser Glu Gly Ile Glu
20 25 30

Leu Leu Ala Leu Leu Ser Ala Arg Ser Gly Asp Ser Asp Val Ala Val
35 40 45

Ala Pro Leu Val Val Gly Leu Thr Val Glu Ser Gly Phe Glu Ala Asn

50 55 60

Val Ala Val Val Val Gly Ser Arg Thr Thr Gly Leu Gly Gly Thr Ala
65 70 75 80

Val Ser Leu Lys Leu Thr Pro Ser His Tyr Ser Ser Ser Val Tyr Val
85 90 95

Phe His Gly Gly Arg His Leu Asp Pro Ser Thr Gln Ala Pro Asn Leu
100 105 110

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

Thr Pro Arg Pro Gly Asp Leu Lys His Glu Thr Thr Gly Glu Ala Leu
130 135 140

Cys Glu Arg Leu Gly Leu Asp Pro Asp Arg Ala Leu Leu Tyr Leu Val
145 150 155 160

Val Thr Glu Gly Phe Lys Glu Ala Val Cys Ile Asn Asn Thr Phe Leu
165 170 175

His Leu Gly Gly Ser Asp Lys Val Thr Ile Gly Gly Ala Glu Val His
180 185 190

Arg Ile Pro Val Tyr Pro Leu Gln Leu Phe Met Pro Asp Phe Ser Arg
195 200 205

Val Ile Ala Glu Pro Phe Asn Ala Asn His Arg Ser Ile Gly Glu Lys
210 215 220

Phe Thr Tyr Pro Leu Pro Phe Phe Asn Arg Pro Leu Asn Arg Leu Leu
225 230 235 240

Phe Glu Ala Val Val Gly Pro Ala Ala Val Ala Leu Arg Cys Arg Asn
245 250 255

Val Asp Ala Val Ala Arg Ala Ala Ala His Leu Ala Phe Asp Glu Asn
260 265 270

His Glu Gly Ala Ala Leu Pro Ala Asp Ile Thr Phe Thr Ala Phe Glu
275 280 285

Ala Ser Gln Gly Lys Thr Pro Arg Gly Gly Arg Asp Gly Gly Gly Lys
290 295 300

Gly Ala Ala Gly Gly Phe Glu Gln Arg Leu Ala Ser Val Met Ala Gly
305 310 315 320

Asp Ala Ala Leu Ala Leu Glu Ser Ile Val Ser Met Ala Val Phe Asp
325 330 335

Glu Pro Pro Thr Asp Ile Ser Ala Trp Pro Leu Phe Glu Gly Gln Asp
340 345 350

Thr Ala Ala Ala Arg Ala Asn Ala Val Gly Ala Tyr Leu Ala Arg Ala
355 360 365

Ala Gly Leu Val Gly Ala Met Val Phe Ser Thr Asn Ser Ala Leu His
370 375 380

Leu Thr Glu Val Asp Asp Ala Gly Pro Ala Asp Pro Lys Asp His Ser
385 390 395 400

Lys Pro Ser Phe Tyr Arg Phe Phe Leu Val Pro Gly Thr His Val Ala
405 410 415

Ala Asn Pro Gln Val Asp Arg Glu Gly His Val Val Pro Gly Phe Glu
420 425 430

Gly Arg Pro Thr Ala Pro Leu Val Gly Gly Thr Gln Glu Phe Ala Gly
435 440 445

Glu His Leu Ala Met Leu Cys Gly Phe Ser Pro Ala Leu Leu Ala Lys
450 455 460

Met Leu Phe Tyr Leu Glu Arg Cys Asp Gly Ala Val Ile Val Gly Arg
465 470 475 480

Gln Glu Met Asp Val Phe Arg Tyr Val Ala Asp Ser Asn Gln Thr Asp
485 490 495

Val Pro Cys Asn Leu Cys Thr Phe Asp Thr Arg His Ala Cys Val His
500 505 510

Thr Thr Leu Met Arg Leu Arg Ala Arg His Pro Lys Phe Ala Ser Ala
515 520 525

Ala Arg Gly Ala Ile Gly Val Phe Gly Thr Met Asn Ser Met Tyr Ser
530 535 540

Asp Cys Asp Val Leu Gly Asn Tyr Ala Ala Phe Ser Ala Leu Lys Arg
545 550 555 560

Ala Asp Gly Ser Glu Thr Ala Arg Thr Ile Met Gln Glu Thr Tyr Arg
565 570 575

Ala Ala Thr Glu Arg Val Met Ala Glu Leu Glu Thr Leu Gln Tyr Val
580 585 590

Asp Gln Ala Val Pro Thr Ala Met Gly Arg Leu Glu Thr Ile Ile Thr
595 600 605

Asn Arg Glu Ala Leu His Thr Val Val Asn Asn Val Arg Gln Val Val
610 615 620

Asp Arg Glu Val Glu Gln Leu Met Arg Asn Leu Val Glu Gly Arg Asn
625 630 635 640

Phe Lys Phe Arg Asp Gly Leu Gly Glu Ala Asn His Ala Met Ser Leu
645 650 655

Thr Leu Asp Pro Tyr Ala Cys Gly Pro Cys Pro Leu Leu Gln Leu Leu
660 665 670

Gly Arg Arg Ser Asn Leu Ala Val Tyr Gln Asp Leu Ala Leu Ser Gln
675 680 685

Cys His Gly Val Phe Ala Gly Gln Ser Val Glu Gly Arg Asn Phe Arg
690 695 700

Asn Gln Phe Gln Pro Val Leu Arg Arg Arg Val Met Asp Met Phe Asn
705 710 715 720

Asn Gly Phe Leu Ser Ala Lys Thr Leu Thr Val Ala Leu Ser Glu Gly
725 730 735

Ala Ala Ile Cys Ala Pro Ser Leu Thr Ala Gly Gln Thr Ala Pro Ala
740 745 750

Glu Ser Ser Phe Glu Gly Asp Val Ala Arg Val Thr Leu Gly Phe Pro
755 760 765

Lys Glu Leu Arg Val Lys Ser Arg Val Leu Phe Ala Gly Ala Ser Ala
770 775 780

Asn Ala Ser Glu Ala Ala Lys Ala Arg Val Ala Ser Leu Gln Ser Ala
785 790 795 800

Tyr Gln Lys Pro Asp Lys Arg Val Asp Ile Leu Leu Gly Pro Leu Gly
805 810 815

Phe Leu Leu Lys Gln Phe His Ala Ala Ile Phe Pro Asn Gly Lys Pro
820 825 830

Pro Gly Ser Asn Gln Pro Asn Pro Gln Trp Phe Trp Thr Ala Leu Gln
835 840 845

Arg Asn Gln Leu Pro Ala Arg Leu Leu Ser Arg Glu Asp Ile Glu Thr
850 855 860

Ile Ala Phe Ile Lys Lys Phe Ser Leu Asp Tyr Gly Ala Ile Asn Phe
865 870 875 880

Ile Asn Leu Ala Pro Asn Asn Val Ser Glu Leu Ala Met Tyr Tyr Met
885 890 895

Ala Asn Gln Ile Leu Arg Tyr Cys Asp His Ser Thr Tyr Phe Ile Asn
900 905 910

Thr Leu Thr Ala Ile Ile Ala Gly Ser Arg Arg Pro Pro Ser Val Gln
915 920 925

Ala Ala Ala Ala Trp Ser Ala Gln Gly Gly Ala Gly Leu Glu Ala Gly

930 935 940

Ala Arg Ala Leu Met Asp Ala Val Asp Ala His Pro Gly Ala Trp Thr
945 950 955 960

Ser Met Phe Ala Ser Cys Asn Leu Leu Arg Pro Val Met Ala Ala Arg
965 970 975

Pro Met Val Val Leu Gly Leu Ser Ile Ser Lys Tyr Tyr Gly Met Ala
980 985 990

Gly Asn Asp Arg Val Phe Gln Ala Gly Asn Trp Ala Ser Leu Met Gly
995 1000 1005

Gly Lys Asn Ala Cys Pro Leu Leu Ile Phe Asp Arg Thr Arg Lys
1010 1015 1020

Phe Val Leu Ala Cys Pro Arg Ala Gly Phe Val Cys Ala Ala Ser
1025 1030 1035

Ser Leu Gly Gly Gly Ala His Glu Ser Ser Leu Cys Glu Gln Leu
1040 1045 1050

Arg Gly Ile Ile Ser Glu Gly Gly Ala Ala Val Ala Ser Ser Val
1055 1060 1065

Phe Val Ala Thr Val Lys Ser Leu Gly Pro Arg Thr Gln Gln Leu
1070 1075 1080

Gln Ile Glu Asp Trp Leu Ala Leu Leu Glu Asp Glu Tyr Leu Ser
1085 1090 1095

Glu Glu Met Met Glu Leu Thr Ala Arg Ala Leu Glu Arg Gly Asn
1100 1105 1110

Gly Glu Trp Ser Thr Asp Ala Ala Leu Glu Val Ala His Glu Ala
1115 1120 1125

Glu Ala Leu Val Ser Gln Leu Gly Asn Ala Gly Glu Val Phe Asn
1130 1135 1140

Phe Gly Asp Phe Gly Cys Glu Asp Asp Asn Ala Thr Pro Phe Gly
1145 1150 1155

Gly Pro Gly Ala Pro Gly Pro Ala Phe Ala Gly Arg Lys Arg Ala
1160 1165 1170

Phe His Gly Asp Asp Pro Phe Gly Glu Gly Pro Pro Asp Lys Lys
1175 1180 1185

Gly Asp Leu Thr Leu Asp Met Leu
1190 1195

<210> 65
<211> 843
<212> PRT
<213> Saccharomyces cerevisiae

<400> 65
Met Thr Asp Val Glu Gly Tyr Gln Pro Lys Ser Lys Gly Lys Ile Phe
1 5 10 15

Pro Asp Met Gly Glu Ser Phe Phe Ser Ser Asp Glu Asp Ser Pro Ala
20 25 30

Thr Asp Ala Glu Ile Asp Glu Asn Tyr Asp Asp Asn Arg Glu Thr Ser
35 40 45

Glu Gly Arg Gly Glu Arg Asp Thr Gly Ala Met Val Thr Gly Leu Lys
50 55 60

Lys Pro Arg Lys Lys Thr Lys Ser Ser Arg His Thr Ala Ala Asp Ser
65 70 75 80

Ser Met Asn Gln Met Asp Ala Lys Asp Lys Ala Leu Leu Gln Asp Thr
85 90 95

Asn Ser Asp Ile Pro Ala Asp Phe Val Pro Asp Ser Val Ser Gly Met
100 105 110

Phe Arg Ser His Asp Phe Ser Tyr Leu Arg Leu Arg Pro Asp His Ala
115 120 125

Ser Arg Pro Leu Trp Ile Ser Pro Ser Asp Gly Arg Ile Ile Leu Glu

130 135 140

Ser Phe Ser Pro Leu Ala Glu Gln Ala Gln Asp Phe Leu Val Thr Ile
145 150 155 160

Ala Glu Pro Ile Ser Arg Pro Ser His Ile His Glu Tyr Lys Ile Thr
165 170 175

Ala Tyr Ser Leu Tyr Ala Ala Val Ser Val Gly Leu Glu Thr Asp Asp
180 185 190

Ile Ile Ser Val Leu Asp Arg Leu Ser Lys Val Pro Val Ala Glu Ser
195 200 205

Ile Ile Asn Phe Ile Lys Gly Ala Thr Ile Ser Tyr Gly Lys Val Lys
210 215 220

Leu Val Ile Lys His Asn Arg Tyr Phe Val Glu Thr Thr Gln Ala Asp
225 230 235 240

Ile Leu Gln Met Leu Leu Asn Asp Ser Val Ile Gly Pro Leu Arg Ile
245 250 255

Asp Ser Asp His Gln Val Gln Pro Pro Glu Asp Val Leu Gln Gln Gln
260 265 270

Leu Gln Gln Thr Ala Gly Lys Pro Ala Thr Asn Val Asn Pro Asn Asp
275 280 285

Val Glu Ala Val Phe Ser Ala Val Ile Gly Gly Asp Asn Glu Arg Glu
290 295 300

Glu Glu Asp Asp Asp Ile Asp Ala Val His Ser Phe Glu Ile Ala Asn
305 310 315 320

Glu Ser Val Glu Val Val Lys Lys Arg Cys Gln Glu Ile Asp Tyr Pro
325 330 335

Val Leu Glu Glu Tyr Asp Phe Arg Asn Asp His Arg Asn Pro Asp Leu
340 345 350

Asp Ile Asp Leu Lys Pro Ser Thr Gln Ile Arg Pro Tyr Gln Glu Lys
355 360 365

Ser Leu Ser Lys Met Phe Gly Asn Gly Arg Ala Arg Ser Gly Ile Ile
370 375 380

Val Leu Pro Cys Gly Ala Gly Lys Thr Leu Val Gly Ile Thr Ala Ala
385 390 395 400

Cys Thr Ile Lys Lys Ser Val Ile Val Leu Cys Thr Ser Ser Val Ser
405 410 415

Val Met Gln Trp Arg Gln Gln Phe Leu Gln Trp Cys Thr Leu Gln Pro
420 425 430

Glu Asn Cys Ala Val Phe Thr Ser Asp Asn Lys Glu Met Phe Gln Thr
435 440 445

Glu Ser Gly Leu Val Val Ser Thr Tyr Ser Met Val Ala Asn Thr Arg
450 455 460

Asn Arg Ser His Asp Ser Gln Lys Val Met Asp Phe Leu Thr Gly Arg
465 470 475 480

Glu Trp Gly Phe Ile Ile Leu Asp Glu Val His Val Val Pro Ala Ala
485 490 495

Met Phe Arg Arg Val Val Ser Thr Ile Ala Ala His Ala Lys Leu Gly
500 505 510

Leu Thr Ala Thr Leu Val Arg Glu Asp Asp Lys Ile Gly Asp Leu Asn
515 520 525

Phe Leu Ile Gly Pro Lys Leu Tyr Glu Ala Asn Trp Met Glu Leu Ser
530 535 540

Gln Lys Gly His Ile Ala Asn Val Gln Cys Ala Glu Val Trp Cys Pro
545 550 555 560

Met Thr Ala Glu Phe Tyr Gln Glu Tyr Leu Arg Glu Thr Ala Arg Lys
565 570 575

Arg Met Leu Leu Tyr Ile Met Asn Pro Thr Lys Phe Gln Ala Cys Gln
580 585 590

Phe Leu Ile Gln Tyr His Glu Arg Arg Gly Asp Lys Ile Ile Val Phe
595 600 605

Ser Asp Asn Val Tyr Ala Leu Gln Glu Tyr Ala Leu Lys Met Gly Lys
610 615 620

Pro Phe Ile Tyr Gly Ser Thr Pro Gln Gln Glu Arg Met Asn Ile Leu
625 630 635 640

Gln Asn Phe Gln Tyr Asn Asp Gln Ile Asn Thr Ile Phe Leu Ser Lys
645 650 655

Val Gly Asp Thr Ser Ile Asp Leu Pro Glu Ala Thr Cys Leu Ile Gln
660 665 670

Ile Ser Ser His Tyr Gly Ser Arg Arg Gln Glu Ala Gln Arg Leu Gly
675 680 685

Arg Ile Leu Arg Ala Lys Arg Arg Asn Asp Glu Gly Phe Asn Ala Phe
690 695 700

Phe Tyr Ser Leu Val Ser Lys Asp Thr Gln Glu Met Tyr Tyr Ser Thr
705 710 715 720

Lys Arg Gln Ala Phe Leu Val Asp Gln Gly Tyr Ala Phe Lys Val Ile
725 730 735

Thr His Leu His Gly Met Glu Asn Ile Pro Asn Leu Ala Tyr Ala Ser
740 745 750

Pro Arg Glu Arg Arg Glu Leu Leu Gln Glu Val Leu Leu Lys Asn Glu
755 760 765

Glu Ala Ala Gly Ile Glu Val Gly Asp Asp Ala Asp Asn Ser Val Gly
770 775 780

Arg Gly Ser Asn Gly His Lys Arg Phe Lys Ser Lys Ala Val Arg Gly
785 790 795 800

Glu Gly Ser Leu Ser Gly Leu Ala Gly Gly Glu Asp Met Ala Tyr Met
805 810 815

Glu Tyr Ser Thr Asn Lys Asn Lys Glu Leu Lys Glu His His Pro Leu
820 825 830

Ile Arg Lys Met Tyr Tyr Lys Asn Leu Lys Lys
835 840

<210> 66
<211> 778
<212> PRT
<213> Saccharomyces cerevisiae

<400> 66
Met Lys Phe Tyr Ile Asp Asp Leu Pro Val Leu Phe Pro Tyr Pro Lys
1 5 10 15

Ile Tyr Pro Glu Gln Tyr Asn Tyr Met Cys Asp Ile Lys Lys Thr Leu
20 25 30

Asp Val Gly Gly Asn Ser Ile Leu Glu Met Pro Ser Gly Thr Gly Lys
35 40 45

Thr Val Ser Leu Leu Ser Leu Thr Ile Ala Tyr Gln Met His Tyr Pro
50 55 60

Glu His Arg Lys Ile Ile Tyr Cys Ser Arg Thr Met Ser Glu Ile Glu
65 70 75 80

Lys Ala Leu Val Glu Leu Glu Asn Leu Met Asp Tyr Arg Thr Lys Glu
85 90 95

Leu Gly Tyr Gln Glu Asp Phe Arg Gly Leu Gly Leu Thr Ser Arg Lys
100 105 110

Asn Leu Cys Leu His Pro Glu Val Ser Lys Glu Arg Lys Gly Thr Val
115 120 125

Val Asp Glu Lys Cys Arg Arg Met Thr Asn Gly Gln Ala Lys Arg Lys
130 135 140

Leu Glu Glu Asp Pro Glu Ala Asn Val Glu Leu Cys Glu Tyr His Glu
145 150 155 160

Asn Leu Tyr Asn Ile Glu Val Glu Asp Tyr Leu Pro Lys Gly Val Phe
165 170 175

Ser Phe Glu Lys Leu Leu Lys Tyr Cys Glu Glu Lys Thr Leu Cys Pro
180 185 190

Tyr Phe Ile Val Arg Arg Met Ile Ser Leu Cys Asn Ile Ile Ile Tyr
195 200 205

Ser Tyr His Tyr Leu Leu Asp Pro Lys Ile Ala Glu Arg Val Ser Asn
210 215 220

Glu Val Ser Lys Asp Ser Ile Val Ile Phe Asp Glu Ala His Asn Ile
225 230 235 240

Asp Asn Val Cys Ile Glu Ser Leu Ser Leu Asp Leu Thr Thr Asp Ala
245 250 255

Leu Arg Arg Ala Thr Arg Gly Ala Asn Ala Leu Asp Glu Arg Ile Ser
260 265 270

Glu Val Arg Lys Val Asp Ser Gln Lys Leu Gln Asp Glu Tyr Glu Lys
275 280 285

Leu Val Gln Gly Leu His Ser Ala Asp Ile Leu Thr Asp Gln Glu Glu
290 295 300

Pro Phe Val Glu Thr Pro Val Leu Pro Gln Asp Leu Leu Thr Glu Ala
305 310 315 320

Ile Pro Gly Asn Ile Arg Arg Ala Glu His Phe Val Ser Phe Leu Lys
325 330 335

Arg Leu Ile Glu Tyr Leu Lys Thr Arg Met Lys Val Leu His Val Ile
340 345 350

Ser Glu Thr Pro Lys Ser Phe Leu Gln His Leu Lys Gln Leu Thr Phe
355 360 365

Ile Glu Arg Lys Pro Leu Arg Phe Cys Ser Glu Arg Leu Ser Leu Leu
370 375 380

Val Arg Thr Leu Glu Val Thr Glu Val Glu Asp Phe Thr Ala Leu Lys
385 390 395 400

Asp Ile Ala Thr Phe Ala Thr Leu Ile Ser Thr Tyr Glu Glu Gly Phe
405 410 415

Leu Leu Ile Ile Glu Pro Tyr Glu Ile Glu Asn Ala Ala Val Pro Asn
420 425 430

Pro Ile Met Arg Phe Thr Cys Leu Asp Ala Ser Ile Ala Ile Lys Pro
435 440 445

Val Phe Glu Arg Phe Ser Ser Val Ile Ile Thr Ser Gly Thr Ile Ser
450 455 460

Pro Leu Asp Met Tyr Pro Arg Met Leu Asn Phe Lys Thr Val Leu Gln
465 470 475 480

Lys Ser Tyr Ala Met Thr Leu Ala Lys Lys Ser Phe Leu Pro Met Ile
485 490 495

Ile Thr Lys Gly Ser Asp Gln Val Ala Ile Ser Ser Arg Phe Glu Ile
500 505 510

Arg Asn Asp Pro Ser Ile Val Arg Asn Tyr Gly Ser Met Leu Val Glu
515 520 525

Phe Ala Lys Ile Thr Pro Asp Gly Met Val Val Phe Phe Pro Ser Tyr
530 535 540

Leu Tyr Met Glu Ser Ile Val Ser Met Trp Gln Thr Met Gly Ile Leu
545 550 555 560

Asp Glu Val Trp Lys His Lys Leu Ile Leu Val Glu Thr Pro Asp Ala
565 570 575

Gln Glu Thr Ser Leu Ala Leu Glu Thr Tyr Arg Lys Ala Cys Ser Asn

580 585 590

Gly Arg Gly Ala Ile Leu Leu Ser Val Ala Arg Gly Lys Val Ser Glu
595 600 605

Gly Ile Asp Phe Asp His Gln Tyr Gly Arg Thr Val Leu Met Ile Gly
610 615 620

Ile Pro Phe Gln Tyr Thr Glu Ser Arg Ile Leu Lys Ala Arg Leu Glu
625 630 635 640

Phe Met Arg Glu Asn Tyr Arg Ile Arg Glu Asn Asp Phe Leu Ser Phe
645 650 655

Asp Ala Met Arg His Ala Ala Gln Cys Leu Gly Arg Val Leu Arg Gly
660 665 670

Lys Asp Asp Tyr Gly Val Met Val Leu Ala Asp Arg Arg Phe Ser Arg
675 680 685

Lys Arg Ser Gln Leu Pro Lys Trp Ile Ala Gln Gly Leu Ser Asp Ala
690 695 700

Asp Leu Asn Leu Ser Thr Asp Met Ala Ile Ser Asn Thr Lys Gln Phe
705 710 715 720

Leu Arg Thr Met Ala Gln Pro Thr Asp Pro Lys Asp Gln Glu Gly Val
725 730 735

Ser Val Trp Ser Tyr Glu Asp Leu Ile Lys His Gln Asn Ser Arg Lys
740 745 750

Asp Gln Gly Gly Phe Ile Glu Asn Glu Asn Lys Glu Gly Glu Gln Asp
755 760 765

Glu Asp Glu Asp Glu Asp Ile Glu Met Gln
770 775

<210> 67
<211> 129
<212> PRT
<213> Streptococcus pyogenes

<400> 67
Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr Asn Gln Leu
1 5 10 15

Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala Lys Ala Ile
20 25 30

Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn Leu Ile Ala
35 40 45

Gln Leu Pro Gly Glu Lys Lys Asn Gly Leu Phe Gly Asn Leu Ile Ala
50 55 60

Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe Asp Leu Ala
65 70 75 80

Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp Asp Asp Leu
85 90 95

Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp Leu Phe Leu
100 105 110

Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp Ile Leu Arg
115 120 125

Val

<210> 68
<211> 625
<212> PRT
<213> Streptococcus pyogenes

<400> 68
Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu
1 5 10 15

Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu
20 25 30

Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys
35 40 45

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

Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp
65 70 75 80

Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val
85 90 95

Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly
100 105 110

Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg
115 120 125

Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys Asn Gly Leu
130 135 140

Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys
145 150 155 160

Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp
165 170 175

Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln
180 185 190

Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu
195 200 205

Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys Ala Pro Leu
210 215 220

Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr
225 230 235 240

Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu
245 250 255

Ile Phe Phe Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly
260 265 270

Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu
275 280 285

Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp
290 295 300

Leu Leu Arg Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln
305 310 315 320

Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln Glu Asp Phe
325 330 335

Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr
340 345 350

Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg
355 360 365

Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn
370 375 380

Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu
385 390 395 400

Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro
405 410 415

Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr
420 425 430

Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala Phe Leu Ser
435 440 445

Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg
450 455 460

Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu
465 470 475 480

Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala

485 490 495

Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp
500 505 510

Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu
515 520 525

Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu Arg Leu Lys
530 535 540

Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg
545 550 555 560

Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly
565 570 575

Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser
580 585 590

Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser
595 600 605

Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly
610 615 620

Asp
625

<210> 69
<211> 49
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<220>
<221> modified_base
<222> (1)..(15)
<223> a, c, t, g, unknown or other

<220>

<221> modified_base
<222> (21)..(49)
<223> a, c, t, g, unknown or other

<400> 69
nnnnnnnnnn nnnnntctct nnnnnnnnnn nnnnnnnnnn nnnnnnnnn 49

<210> 70
<211> 49
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<220>
<221> modified_base
<222> (1)..(15)
<223> a, c, t, g, unknown or other

<220>
<221> modified_base
<222> (21)..(49)
<223> a, c, t, g, unknown or other

<400> 70
nnnnnnnnnn nnnnntctct nnnnnnnnnn nnnnnnnnnn nnnnnnnnn 49

<210> 71
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<220>
<221> modified_base
<222> (1)..(10)
<223> a, c, t, g, unknown or other

<220>
<221> modified_base
<222> (16)..(25)
<223> a, c, t, g, unknown or other

<400> 71
nnnnnnnnnn tctctnnnnn nnnnn 25

<210> 72
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<220>
<221> modified_base
<222> (1)..(10)
<223> a, c, t, g, unknown or other

<220>
<221> modified_base
<222> (16)..(25)
<223> a, c, t, g, unknown or other

<400> 72
nnnnnnnnnn tctctnnnnn nnnnn 25

<210> 73
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<220>
<221> modified_base
<222> (6)..(10)
<223> a, c, t, g, unknown or other

<400> 73
gtrhgnnnnn 10

<210> 74
<211> 14
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<220>

<221> modified_base
<222> (11)..(11)
<223> a, c, t, g, unknown or other

<400> 74
yyyyyyyyyy nyag 14

<210> 75
<211> 9
<212> PRT
<213> Unknown

<220>
<223> Description of Unknown:
'LAGLIDADG' family motif peptide

<400> 75
Leu Ala Gly Leu Ile Asp Ala Asp Gly
1 5

<210> 76
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 76
Leu Arg Gly Ser
1

<210> 77
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<220>
<221> modified_base
<222> (1)..(3)
<223> a, c, t, g, unknown or other

<220>
<221> modified_base
<222> (8)..(21)
<223> a, c, t, g, unknown or other

<400> 77
nnnaaaannn nnnnnnnnnn ngg 23

<210> 78
<211> 59
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<400> 78
gtgctgacca tcgacgagaa agggactgaa gctgctgggg ccatgttttt agaggccat 59

<210> 79
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 79
Leu Asn Tyr Gly Val Cys Phe Cys Gly
1 5

<210> 80
<211> 49
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<220>
<221> modified_base
<222> (1)..(15)
<223> a, c, t, g, unknown or other

<220>
<221> modified_base
<222> (21)..(49)
<223> a, c, t, g, unknown or other

<400> 80
nnnnnnnnnn nnnnntctct nnnnnnnnnn nnnnnnnnnn nnnnnnnnn 49

<210> 81
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 81
caaatgcttg tgagaaagct tgctca 26

<210> 82
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 82
Gln Ser Ser Asp Leu Ser Arg
1 5

<210> 83
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 83
Leu Lys Trp Asn Leu Arg Thr
1 5

<210> 84
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 84
Arg Ser Asp Asn Leu Ala Arg
1 5

<210> 85
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 85
Trp Gln Ser Ser Leu Ile Val
1 5

<210> 86
<211> 7
<212> PRT
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<220>
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<400> 86
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1 5

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<212> DNA
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<220>
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<210> 88
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<210> 89
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Thr Asn Gln Asn Arg Ile Thr
1 5

<210> 90
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<400> 90
Arg Ser Ala Asn Leu Thr Arg
1 5

<210> 91
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<210> 92
<211> 7
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<213> Artificial Sequence

<220>
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1 5