<110> Adams ET AL.

<120> Immunoglobulin Variants and Uses Thereof

<130> P1990R3C1

<140> US 11/147,780
<141> 2005-06-07

<150> US 60/434,115
<151> 2002-12-16

<150> US 60/526,163
<151> 2003-12-01

<150> PCT/US03/40426
<151> 2003-12-16

<160> 53

<210> 1
<211> 107
<212> PRT
<213> Mus musculus

<400> 1

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

Lys Arg

<210> 2
<211> 107
<212> PRT
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 2

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 Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

 Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Ser Ser Val Ser
                20                  25                  30

 Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Pro
                35                  40                  45

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

 Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
                65                  70                  75

 Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp
                80                  85                  90

 Ser Phe Asn Pro Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
                95                 100                 105

 Lys Arg
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<210> 3
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Sequence is synthesized

<400> 3

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 Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

 Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser
                20                  25                  30

 Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys
                35                  40                  45

 Leu Leu Ile Tyr Ala Ala Ser Ser Leu Glu Ser Gly Val Pro Ser
                50                  55                  60

 Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile
                65                  70                  75

 Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln
                80                  85                  90

 Tyr Asn Ser Leu Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu
                95                 100                 105

 Ile Lys Arg
```

<210> 4
<211> 10
<212> PRT
<213> Mus musculus

<400> 4
Arg Ala Ser Ser Ser Val Ser Tyr Met His
5 10

<210> 5
<211> 7
<212> PRT
<213> Mus musculus

<400> 5
Ala Pro Ser Asn Leu Ala Ser
5

<210> 6
<211> 9
<212> PRT
<213> Mus musculus

<400> 6
Gln Gln Trp Ser Phe Asn Pro Pro Thr
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<210> 7
<211> 122
<212> PRT
<213> Mus musculus

<400> 7
Gln Ala Tyr Leu Gln Gln Ser Gly Ala Glu Leu Val Arg Pro Gly
1 5 10 15

Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr
20 25 30

Ser Tyr Asn Met His Trp Val Lys Gln Thr Pro Arg Gln Gly Leu
35 40 45

Glu Trp Ile Gly Ala Ile Tyr Pro Gly Asn Gly Asp Thr Ser Tyr
50 55 60

Asn Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser
65 70 75

Ser Ser Thr Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp
80 85 90

Ser Ala Val Tyr Phe Cys Ala Arg Val Val Tyr Tyr Ser Asn Ser
95 100 105

Tyr Trp Tyr Phe Asp Val Trp Gly Thr Gly Thr Thr Val Thr Val
110 115 120

Ser Ser

<210> 8
<211> 122
<212> PRT
<213> Artificial sequence

<220>

<223> Sequence is synthesized

<400> 8

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 Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
   1               5                  10                  15

 Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Thr
                20                  25                  30

 Ser Tyr Asn Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
                35                  40                  45

 Glu Trp Val Gly Ala Ile Tyr Pro Gly Asn Gly Asp Thr Ser Tyr
                50                  55                  60

 Asn Gln Lys Phe Lys Gly Arg Phe Thr Ile Ser Val Asp Lys Ser
                65                  70                  75

 Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
                80                  85                  90

 Thr Ala Val Tyr Tyr Cys Ala Arg Val Val Tyr Tyr Ser Asn Ser
                95                 100                 105

 Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val
               110                 115                 120

 Ser Ser
```

<210> 9
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Sequence is synthesized

<400> 9

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 Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
   1               5                  10                  15

 Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser
                20                  25                  30

 Ser Tyr Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
                35                  40                  45

 Glu Trp Val Ala Val Ile Ser Gly Asp Gly Gly Ser Thr Tyr Tyr
                50                  55                  60

 Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser
                65                  70                  75

 Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
                80                  85                  90

 Thr Ala Val Tyr Tyr Cys Ala Arg Gly Arg Val Gly Tyr Ser Leu
                95                 100                 105
```

Tyr Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
110 115

<210> 10
<211> 10
<212> PRT
<213> Mus musculus

<400> 10
Gly Tyr Thr Phe Thr Ser Tyr Asn Met His
5 10

<210> 11
<211> 17
<212> PRT
<213> Mus musculus

<400> 11
Ala Ile Tyr Pro Gly Asn Gly Asp Thr Ser Tyr Asn Gln Lys Phe
1 5 10 15

Lys Gly

<210> 12
<211> 13
<212> PRT
<213> Mus musculus

<400> 12
Val Val Tyr Tyr Ser Asn Ser Tyr Trp Tyr Phe Asp Val
5 10

<210> 13
<211> 5679
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence is synthesized

<400> 13
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gaactgtgtg cgcaggtaga agctttggag attatcgtca ctgcaatgct 150

tcgcaatatg gcgcaaaatg accaacagcg gttgattgat caggtagagg 200

gggcgctgta cgaggtaaag cccgatgcca gcattcctga cgacgatacg 250

gagctgctgc gcgattacgt aaagaagtta ttgaagcatc ctcgtcagta 300

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atagtcgctt tgtttttatt ttttaatgta tttgtaacta gaattcgagc 400

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atcgcatttc ttcttgcatc tatgttcgtt ttttctattg ctacaaacgc 500

gtacgctgat atccagatga cccagtcccc gagctccctg tccgcctctg 550

tgggcgatag ggtcaccatc acctgcagag ccagtcagag cgtgtcgact 600

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gcttctctgg atccggttct gggacggatt tcactctgac catcagcagt 750

ctgcagccag aagacttcgc aacttattac tgtcaacact cttggggtat 800

tccgcgcaca tttggacagg gtaccaaggt ggagatcaaa cgaactgtgg 850

ctgcaccatc tgtcttcatc ttcccgccat ctgatgagca gttgaaatct 900

ggaactgctt ctgttgtgtg cctgctgaat aacttctatc ccagagaggc 950

caaagtacag tggaaggtgg ataacgccct ccaatcgggt aactcccagg 1000

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accctgacgc tgagcaaagc agactacgag aaacacaaag tctacgcctg 1100

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cagccagggg gctcactccg tttgtcctgt gcagcttctg gctacacctt 1400

caccgaatat atcatccact gggtccgtca ggccccgggt aagggcctgg 1450

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gtgctcgatg gatcagcgat ttcttcgact actggggtca aggaaccctg 1650

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accctcctcc aagagcacct ctgggggcac agcggccctg ggctgcctgg 1750

tcaaggacta cttccccgaa ccggtgacgg tgtcgtggaa ctcaggcgcc 1800

ctgaccagcg gcgtgcacac cttcccggct gtcctacagt cctcaggact 1850

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ggcgtatcac gaggcccttt cgtcttcaa 5679

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<211> 241
<212> PRT
<213> Artificial Sequence

<220>
<223> Sequence is synthesized

<400> 14

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Met Lys Lys Asn Ile Ala Phe Leu Leu Ala Ser Met Phe Val Phe
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Ser Ile Ala Thr Asn Ala Tyr Ala Asp Ile Gln Met Thr Gln Ser
             20                  25                  30

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

Cys Arg Ala Ser Gln Ser Val Ser Thr Ser Ser Tyr Ser Tyr Met
             50                  55                  60

His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
             65                  70                  75

Tyr Tyr Ala Ser Asn Leu Glu Ser Gly Val Pro Ser Arg Phe Ser
             80                  85                  90

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu
             95                 100                 105

Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln His Ser Trp Gly
            110                 115                 120

Ile Pro Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg
            125                 130                 135
```

```
Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
                140                 145                 150

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
                155                 160                 165

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala
                170                 175                 180

Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser
                185                 190                 195

Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys
                200                 205                 210

Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His
                215                 220                 225

Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu
                230                 235                 240

Cys
```

<210> 15
<211> 248
<212> PRT
<213> Artificial Sequence

<220>
<223> Sequence is synthesized

<400> 15

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Met Lys Lys Asn Ile Ala Phe Leu Leu Ala Ser Met Phe Val Phe
  1               5                  10                  15

Ser Ile Ala Thr Asn Ala Tyr Ala Glu Val Gln Leu Val Glu Ser
                20                  25                  30

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

Ala Ala Ser Gly Tyr Thr Phe Thr Glu Tyr Ile Ile His Trp Val
                50                  55                  60

Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Ser Ile Asn
                65                  70                  75

Pro Asp Tyr Asp Ile Thr Asn Tyr Asn Gln Arg Phe Lys Gly Arg
                80                  85                  90

Phe Thr Ile Ser Arg Asp Asp Ser Lys Asn Thr Leu Tyr Leu Gln
                95                 100                 105

Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala
                110                 115                 120

Arg Trp Ile Ser Asp Phe Phe Asp Tyr Trp Gly Gln Gly Thr Leu
                125                 130                 135

Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
```

```
                140                 145                 150

Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
                155                 160                 165

Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
                170                 175                 180

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                185                 190                 195

Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
                200                 205                 210

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val
                215                 220                 225

Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro
                230                 235                 240

Lys Ser Cys Asp Lys Thr His Thr
                245
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<210> 16
<211> 5678
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence is chimeric

<400> 16

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gaactgtgtg cgcaggtaga agctttggag attatcgtca ctgcaatgct 150

tcgcaatatg gcgcaaaatg accaacagcg gttgattgat caggtagagg 200

gggcgctgta cgaggtaaag cccgatgcca gcattcctga cgacgatacg 250

gagctgctgc gcgattacgt aaagaagtta ttgaagcatc ctcgtcagta 300

aaaagttaat cttttcaaca gctgtcataa agttgtcacg gccgagactt 350

atagtcgctt tgtttttatt ttttaatgta tttgtaacta gaattcgagc 400

tcggtacccg gggatcctct agaggttgag gtgatttatg aaaaagaata 450

tcgcatttct tcttgcatct atgttcgttt tttctattgc tacaaacgcg 500

tacgctcaga tagtactgtc ccagtccccg gctatcctgt ccgcctctcc 550

tggcgagaag gtcactatga cctgcagagc cagctcttct gtgagctata 600

tgcattggta tcaacagaaa ccaggaagct ctccgaaacc atggatttac 650

gctccatcga acctcgcgtc tggagtccct gcgcgcttct ctggatccgg 700

ttctgggact agttactctc tgaccatcag cagagtggag gcagaagacg 750
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aaagggtatc tagaggttga ggtgatttta tgaaaaagaa tatcgcattt 1250

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ccactctgac tgtggacaag tccagcagta ctgcctacat gcaactgagc 1550

agcctgactt ctgaggacag cgctgtctac ttttgtgctc gcgtggtcta 1600

ctatagcaac agctactggt acttcgacgt ctggggtacc ggaaccacag 1650

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tactccctca gcagcgtggt gaccgtgccc tccagcagct tgggcaccca 1900

gacctacatc tgcaacgtga atcacaagcc cagcaacacc aaggtggaca 1950

agaaagttga gcccaaatct tgtgacaaaa ctcacacatg accaccgcat 2000

gcaccagtat cgtccattcc gacagcatcg ccagtcacta tggcgtgctg 2050

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<212> PRT
<213> Artificial sequence

<220>
<223> Sequence is chimeric

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 Gly Ala Glu Leu Val Arg Pro Gly Ala Ser Val Lys Met Ser Cys
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 Lys Gln Thr Pro Arg Gln Gly Leu Glu Trp Ile Gly Ala Ile Tyr
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 Pro Gly Asn Gly Asp Thr Ser Tyr Asn Gln Lys Phe Lys Gly Lys
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 Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Thr Ala Tyr Met Gln
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 Arg Val Val Tyr Tyr Ser Asn Ser Tyr Trp Tyr Phe Asp Val Trp
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 Gly Thr Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly
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 Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
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 Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
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 Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
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 His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu
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 Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
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aaccactaca cgcagaagag cctctccctg tctccgggta aatgagtgcg 2350

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gccttcctgt ttttgctcac ccagaaacgc tggtgaaagt aaaagatgct 4200

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gtttgccgga tcaagagcta ccaactcttt ttccgaaggt aactggcttc 5250

agcagagcgc agataccaaa tactgtcctt ctagtgtagc cgtagttagg 5300

ccaccacttc aagaactctg tagcaccgcc tacatacctc gctctgctaa 5350

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cgcagccgaa cgaccgagcg cagcgagtca gtgagcgagg aagcggaaga 5900

gcgcccaata cgcaaaccgc ctctccccgc gcgttggccg attcattaat 5950

ccaactggca cgacaggttt cccgactgga aagcgggcag tgagcgcaac 6000

gcaattaatg tgagttacct cactcattag gcaccccagg ctttacactt 6050

tatgcttccg gctcgtatgt tgtgtggaat tgtgagcgga taacaatttc 6100

acacaggaaa cagctatgac catgattacg aatta 6135

<210> 21
<211> 232
<212> PRT
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 21

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 Met Gly Trp Ser Cys Ile Ile Leu Phe Leu Val Ala Thr Ala Thr
   1               5                  10                  15

 Gly Val His Ser Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu
                20                  25                  30

 Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser
                35                  40                  45

 Ser Ser Val Ser Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Lys
                50                  55                  60

 Ala Pro Lys Pro Leu Ile Tyr Ala Pro Ser Asn Leu Ala Ser Gly
                65                  70                  75

 Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
                80                  85                  90

 Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr
                95                 100                 105

 Cys Gln Gln Trp Ser Phe Asn Pro Pro Thr Phe Gly Gln Gly Thr
               110                 115                 120

 Lys Val Glu Ile Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile
               125                 130                 135

 Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val
               140                 145                 150

 Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln
               155                 160                 165

 Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser
               170                 175                 180

 Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser
               185                 190                 195

 Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
               200                 205                 210

 Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
               215                 220                 225

 Ser Phe Asn Arg Gly Glu Cys
               230
```

<210> 22
<211> 471
<212> PRT
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 22

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Met Gly Trp Ser Cys Ile Ile Leu Phe Leu Val Ala Thr Ala Thr
 1               5                  10                  15

Gly Val His Ser Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu
            20                  25                  30

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

Tyr Thr Phe Thr Ser Tyr Asn Met His Trp Val Arg Gln Ala Pro
            50                  55                  60

Gly Lys Gly Leu Glu Trp Val Gly Ala Ile Tyr Pro Gly Asn Gly
            65                  70                  75

Asp Thr Ser Tyr Asn Gln Lys Phe Lys Gly Arg Phe Thr Ile Ser
            80                  85                  90

Val Asp Lys Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu
            95                  100                 105

Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Val Val Tyr
            110                 115                 120

Tyr Ser Asn Ser Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr
            125                 130                 135

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
            140                 145                 150

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
            155                 160                 165

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
            170                 175                 180

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
            185                 190                 195

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
            200                 205                 210

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
            215                 220                 225

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu
            230                 235                 240

Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala
            245                 250                 255

Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys
            260                 265                 270

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
            275                 280                 285

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn
            290                 295                 300

Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro
```

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                305                 310                 315

 Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu
                320                 325                 330

 Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
                335                 340                 345

 Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile
                350                 355                 360

 Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu
                365                 370                 375

 Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr
                380                 385                 390

 Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp
                395                 400                 405

 Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
                410                 415                 420

 Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr
                425                 430                 435

 Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser
                440                 445                 450

 Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu
                455                 460                 465

 Ser Leu Ser Pro Gly Lys
                470

<210> 23
<211> 471
<212> PRT
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 23
 Met Gly Trp Ser Cys Ile Ile Leu Phe Leu Val Ala Thr Ala Thr
   1               5                  10                  15

 Gly Val His Ser Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu
                20                  25                  30

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

 Tyr Thr Phe Thr Ser Tyr Asn Met His Trp Val Arg Gln Ala Pro
                50                  55                  60

 Gly Lys Gly Leu Glu Trp Val Gly Ala Ile Tyr Pro Gly Asn Gly
                65                  70                  75

 Asp Thr Ser Tyr Asn Gln Lys Phe Lys Gly Arg Phe Thr Ile Ser
                80                  85                  90
```

Val Asp Lys Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu
95 100 105

Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Val Val Tyr
110 115 120

Tyr Ser Asn Ser Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr
125 130 135

Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
140 145 150

Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
155 160 165

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
170 175 180

Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
185 190 195

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val
200 205 210

Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
215 220 225

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu
230 235 240

Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala
245 250 255

Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys
260 265 270

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
275 280 285

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn
290 295 300

Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro
305 310 315

Arg Glu Glu Gln Tyr Asn Ala Thr Tyr Arg Val Val Ser Val Leu
320 325 330

Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
335 340 345

Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Ala Ala Thr Ile
350 355 360

Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu
365 370 375

Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr
380 385 390

Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp

395 400 405

Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
410 415 420

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr
425 430 435

Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser
440 445 450

Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu
455 460 465

Ser Leu Ser Pro Gly Lys
470

<210> 24
<211> 891
<212> DNA
<213> Macaca fascicularis

<400> 24
atgacaacac ccagaaattc agtaaatggg actttcccag cagagccaat 50

gaaaggccct attgctatgc aacctggtcc aaaaccactc ctcaggagga 100

tgtcttcact ggtgggtccc acgcaaagct tcttcatgag ggaatctaag 150

gctttggggg ctgtccagat tatgaatggg ctcttccaca ttgccctggg 200

gggtcttctg atgatcccag cagggatcta tgcacccatc tgtgtgactg 250

tgtggtaccc tctgtgggga ggcattatgt atattatttc cggatcactc 300

ctggcagcaa cggagaaaaa ctccaggaag tgtttggtca aaggaaaaat 350

gataatgaat tcattgagcc tctttgctgc catttctgga atgattcttt 400

caatcatgga catacttaat attaaaattt cccatttttt aaaaatggag 450

agtctgaatt ttatcagagt tcacacacca tatattaaca tatacaactg 500

tgaaccagct aatccctctg agaaaaactc tccatctact caatactgtt 550

acagcataca atctctgttc ctgggcattt tgtcagtgat gctgatcttt 600

gccttcttcc aggaacttgt aatagctggc atcgttgaga atgaatggag 650

aagaacatgc tccagaccca aatctagcgt agttctcctg tcagctgaag 700

aaaaaaaaga acaagtcatt gaaataaaag aagaagtggt tgggctaact 750

gaaacatctt cccaaccaaa gaatgaagaa gccattgaaa ttattccaat 800

ccaagaagag gaagaagaag aaacagagac aaactttcca gaacctcccc 850

aagatcagga atcttcacca atagaaaatg acagctctcc t 891

<210> 25
<211> 297

<212> PRT
<213> Macaca fascicularis

<400> 25

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Met Thr Thr Pro Arg Asn Ser Val Asn Gly Thr Phe Pro Ala Glu
  1               5                  10                  15

Pro Met Lys Gly Pro Ile Ala Met Gln Pro Gly Pro Lys Pro Leu
             20                  25                  30

Leu Arg Arg Met Ser Ser Leu Val Gly Pro Thr Gln Ser Phe Phe
             35                  40                  45

Met Arg Glu Ser Lys Ala Leu Gly Ala Val Gln Ile Met Asn Gly
             50                  55                  60

Leu Phe His Ile Ala Leu Gly Gly Leu Leu Met Ile Pro Ala Gly
             65                  70                  75

Ile Tyr Ala Pro Ile Cys Val Thr Val Trp Tyr Pro Leu Trp Gly
             80                  85                  90

Gly Ile Met Tyr Ile Ile Ser Gly Ser Leu Leu Ala Ala Thr Glu
             95                 100                 105

Lys Asn Ser Arg Lys Cys Leu Val Lys Gly Lys Met Ile Met Asn
            110                 115                 120

Ser Leu Ser Leu Phe Ala Ala Ile Ser Gly Met Ile Leu Ser Ile
            125                 130                 135

Met Asp Ile Leu Asn Ile Lys Ile Ser His Phe Leu Lys Met Glu
            140                 145                 150

Ser Leu Asn Phe Ile Arg Val His Thr Pro Tyr Ile Asn Ile Tyr
            155                 160                 165

Asn Cys Glu Pro Ala Asn Pro Ser Glu Lys Asn Ser Pro Ser Thr
            170                 175                 180

Gln Tyr Cys Tyr Ser Ile Gln Ser Leu Phe Leu Gly Ile Leu Ser
            185                 190                 195

Val Met Leu Ile Phe Ala Phe Phe Gln Glu Leu Val Ile Ala Gly
            200                 205                 210

Ile Val Glu Asn Glu Trp Arg Arg Thr Cys Ser Arg Pro Lys Ser
            215                 220                 225

Ser Val Val Leu Leu Ser Ala Glu Glu Lys Lys Glu Gln Val Ile
            230                 235                 240

Glu Ile Lys Glu Glu Val Val Gly Leu Thr Glu Thr Ser Ser Gln
            245                 250                 255

Pro Lys Asn Glu Glu Ala Ile Glu Ile Ile Pro Ile Gln Glu Glu
            260                 265                 270

Glu Glu Glu Glu Thr Glu Thr Asn Phe Pro Glu Pro Pro Gln Asp
            275                 280                 285
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```
Gln Glu Ser Ser Pro Ile Glu Asn Asp Ser Ser Pro
                290                 295

<210> 26
<211> 297
<212> PRT
<213> Homo sapiens

<400> 26
Met Thr Thr Pro Arg Asn Ser Val Asn Gly Thr Phe Pro Ala Glu
  1               5                  10                  15

Pro Met Lys Gly Pro Ile Ala Met Gln Ser Gly Pro Lys Pro Leu
                20                  25                  30

Phe Arg Arg Met Ser Ser Leu Val Gly Pro Thr Gln Ser Phe Phe
                35                  40                  45

Met Arg Glu Ser Lys Ala Leu Gly Ala Val Gln Ile Met Asn Gly
                50                  55                  60

Leu Phe His Ile Ala Leu Gly Gly Leu Leu Met Ile Pro Ala Gly
                65                  70                  75

Ile Tyr Ala Pro Ile Cys Val Thr Val Trp Tyr Pro Leu Trp Gly
                80                  85                  90

Gly Ile Met Tyr Ile Ile Ser Gly Ser Leu Leu Ala Ala Thr Glu
                95                 100                 105

Lys Asn Ser Arg Lys Cys Leu Val Lys Gly Lys Met Ile Met Asn
               110                 115                 120

Ser Leu Ser Leu Phe Ala Ala Ile Ser Gly Met Ile Leu Ser Ile
               125                 130                 135

Met Asp Ile Leu Asn Ile Lys Ile Ser His Phe Leu Lys Met Glu
               140                 145                 150

Ser Leu Asn Phe Ile Arg Ala His Thr Pro Tyr Ile Asn Ile Tyr
               155                 160                 165

Asn Cys Glu Pro Ala Asn Pro Ser Glu Lys Asn Ser Pro Ser Thr
               170                 175                 180

Gln Tyr Cys Tyr Ser Ile Gln Ser Leu Phe Leu Gly Ile Leu Ser
               185                 190                 195

Val Met Leu Ile Phe Ala Phe Phe Gln Glu Leu Val Ile Ala Gly
               200                 205                 210

Ile Val Glu Asn Glu Trp Lys Arg Thr Cys Ser Arg Pro Lys Ser
               215                 220                 225

Asn Ile Val Leu Leu Ser Ala Glu Glu Lys Lys Glu Gln Thr Ile
               230                 235                 240

Glu Ile Lys Glu Glu Val Val Gly Leu Thr Glu Thr Ser Ser Gln
               245                 250                 255

Pro Lys Asn Glu Glu Asp Ile Glu Ile Ile Pro Ile Gln Glu Glu
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260 265 270

Glu Glu Glu Glu Thr Glu Thr Asn Phe Pro Glu Pro Pro Gln Asp
275 280 285

Gln Glu Ser Ser Pro Ile Glu Asn Asp Ser Ser Pro
290 295

<210> 27
<211> 36
<212> DNA
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 27
ctacaccttc acgagctata acatgcactg ggtccg 36

<210> 28
<211> 51
<212> DNA
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 28
gattaatcct gacaacggcg acacgagcta taaccagaag ttcaagggcc 50

g 51

<210> 29
<211> 38
<212> DNA
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 29
gaatgggttg cagcgatcta tcctggcaac ggcgacac 38

<210> 30
<211> 65
<212> DNA
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 30
attattgtgc tcgagtggtc tactatagca acagctactg gtacttcgac 50

gtctggggtc aagga 65

<210> 31
<211> 36
<212> DNA
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 31
ctgcacagcc agctcttctg tcagctatat gcattg 36

<210> 32
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 32
aactactgat ttacgctcca tcgaacctcg cgtctggagt cc 42

<210> 33
<211> 45
<212> DNA
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 33
tattactgtc aacagtggag cttcaatccg cccacatttg gacag 45

<210> 34
<211> 37
<212> DNA
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 34
gtttcactat aagtgtcgac aagtccaaaa acacatt 37

<210> 35
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 35
gccaggatag atggcgccaa cccattccag gcc 33

<210> 36
<211> 26
<212> DNA
<213> Artificial sequence

<220>
<223> Sequence is synthesized

<400> 36
aagctccgaa accactgatt tacgct 26

<210> 37
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence is synthesized

<400> 37
agttttgaga gcaaaatg 18

<210> 38
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence is synthesized

<400> 38
aagctatgaa cactaatg 18

<210> 39
<211> 452
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 39

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

```
Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
                155                 160                 165

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                170                 175                 180

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
                185                 190                 195

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
                200                 205                 210

Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
                215                 220                 225

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
                230                 235                 240

Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
                245                 250                 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
                260                 265                 270

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
                275                 280                 285

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
                290                 295                 300

Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
                305                 310                 315

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
                320                 325                 330

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys
                335                 340                 345

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
                350                 355                 360

Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
                365                 370                 375

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                380                 385                 390

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                395                 400                 405

Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                410                 415                 420

Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
                425                 430                 435

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                440                 445                 450

Gly Lys
```

<210> 40
<211> 213
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 40
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
1 5 10 15

Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Ser Ser Val Ser
20 25 30

Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Pro
35 40 45

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

Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75

Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp
80 85 90

Ser Phe Asn Pro Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
95 100 105

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
110 115 120

Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu
125 130 135

Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
140 145 150

Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln
155 160 165

Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu
170 175 180

Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val
185 190 195

Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg
200 205 210

Gly Glu Cys

<210> 41
<211> 452
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 41

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
  1               5                  10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Thr
             20                  25                  30

Ser Tyr Asn Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
             35                  40                  45

Glu Trp Val Gly Ala Ile Tyr Pro Gly Asn Gly Asp Thr Ser Tyr
             50                  55                  60

Asn Gln Lys Phe Lys Gly Arg Phe Thr Ile Ser Val Asp Lys Ser
             65                  70                  75

Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
             80                  85                  90

Thr Ala Val Tyr Tyr Cys Ala Arg Val Val Tyr Tyr Ser Asn Ser
             95                 100                 105

Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val
            110                 115                 120

Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
            125                 130                 135

Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
            140                 145                 150

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
            155                 160                 165

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
            170                 175                 180

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            185                 190                 195

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
            200                 205                 210

Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
            215                 220                 225

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
            230                 235                 240

Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
            245                 250                 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
            260                 265                 270

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
            275                 280                 285

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
            290                 295                 300
```

```
Tyr Asn Ala Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
                305                 310                 315

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
                320                 325                 330

Lys Ala Leu Pro Ala Pro Ile Ala Ala Thr Ile Ser Lys Ala Lys
                335                 340                 345

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
                350                 355                 360

Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
                365                 370                 375

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                380                 385                 390

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                395                 400                 405

Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                410                 415                 420

Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
                425                 430                 435

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                440                 445                 450

Gly Lys
```

<210> 42
<211> 452
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 42

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
  1                 5                  10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Thr
                20                  25                  30

Ser Tyr Asn Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
                35                  40                  45

Glu Trp Val Gly Ala Ile Tyr Pro Gly Asn Gly Asp Thr Ser Tyr
                50                  55                  60

Asn Gln Lys Phe Lys Gly Arg Phe Thr Ile Ser Val Asp Lys Ser
                65                  70                  75

Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
                80                  85                  90

Thr Ala Val Tyr Tyr Cys Ala Arg Val Val Tyr Tyr Ser Ala Ser
```

```
                 95                  100                 105

Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val
                110                 115                 120

Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
                125                 130                 135

Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
                140                 145                 150

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
                155                 160                 165

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                170                 175                 180

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
                185                 190                 195

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
                200                 205                 210

Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
                215                 220                 225

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
                230                 235                 240

Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
                245                 250                 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
                260                 265                 270

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
                275                 280                 285

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
                290                 295                 300

Tyr Asn Ala Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
                305                 310                 315

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
                320                 325                 330

Lys Ala Leu Pro Ala Pro Ile Ala Ala Thr Ile Ser Lys Ala Lys
                335                 340                 345

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
                350                 355                 360

Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
                365                 370                 375

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                380                 385                 390

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                395                 400                 405
```

```
Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                410                 415                 420

Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
                425                 430                 435

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                440                 445                 450

Gly Lys
```

<210> 43
<211> 213
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 43

```
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
  1               5                  10                  15

Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Ser Ser Val Ser
                20                  25                  30

Tyr Leu His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Pro
                35                  40                  45

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

Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
                65                  70                  75

Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp
                80                  85                  90

Ser Phe Asn Pro Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
                95                 100                 105

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
                110                 115                 120

Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu
                125                 130                 135

Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
                140                 145                 150

Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln
                155                 160                 165

Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu
                170                 175                 180

Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val
                185                 190                 195
```

```
Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg
                200                 205                 210

Gly Glu Cys
```

<210> 44
<211> 452
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 44

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
  1               5                  10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Thr
            20                  25                  30

Ser Tyr Asn Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
            35                  40                  45

Glu Trp Val Gly Ala Ile Tyr Pro Gly Asn Gly Ala Thr Ser Tyr
            50                  55                  60

Asn Gln Lys Phe Lys Gly Arg Phe Thr Ile Ser Val Asp Lys Ser
            65                  70                  75

Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
            80                  85                  90

Thr Ala Val Tyr Tyr Cys Ala Arg Val Val Tyr Tyr Ser Ala Ser
            95                  100                 105

Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val
            110                 115                 120

Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
            125                 130                 135

Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
            140                 145                 150

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
            155                 160                 165

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
            170                 175                 180

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            185                 190                 195

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
            200                 205                 210

Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
            215                 220                 225

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
```

```
                230                 235                 240

Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
                245                 250                 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
                260                 265                 270

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
                275                 280                 285

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
                290                 295                 300

Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
                305                 310                 315

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
                320                 325                 330

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys
                335                 340                 345

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
                350                 355                 360

Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
                365                 370                 375

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                380                 385                 390

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                395                 400                 405

Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                410                 415                 420

Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
                425                 430                 435

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                440                 445                 450

Gly Lys
```

<210> 45
<211> 213
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 45

```
 Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

 Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Ser Ser Val Ser
                20                  25                  30
```

```
Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Pro
                    35                  40                  45

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

Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
                    65                  70                  75

Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp
                    80                  85                  90

Ala Phe Asn Pro Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
                    95                  100                 105

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
                    110                 115                 120

Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu
                    125                 130                 135

Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
                    140                 145                 150

Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln
                    155                 160                 165

Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu
                    170                 175                 180

Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val
                    185                 190                 195

Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg
                    200                 205                 210

Gly Glu Cys


<210> 46
<211> 452
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 46
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
  1                 5                  10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Thr
                    20                  25                  30

Ser Tyr Asn Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
                    35                  40                  45

Glu Trp Val Gly Ala Ile Tyr Pro Gly Asn Gly Ala Thr Ser Tyr
                    50                  55                  60

Asn Gln Lys Phe Lys Gly Arg Phe Thr Ile Ser Val Asp Lys Ser
```

65 70 75

Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
80 85 90

Thr Ala Val Tyr Tyr Cys Ala Arg Val Val Tyr Tyr Ser Ala Ser
95 100 105

Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val
110 115 120

Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
125 130 135

Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
140 145 150

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
155 160 165

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
170 175 180

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
185 190 195

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
200 205 210

Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
215 220 225

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
230 235 240

Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
245 250 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
260 265 270

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
275 280 285

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
290 295 300

Tyr Asn Ala Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
305 310 315

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
320 325 330

Lys Ala Leu Pro Ala Pro Ile Ala Ala Thr Ile Ser Lys Ala Lys
335 340 345

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
350 355 360

Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
365 370 375

```
Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                380                 385                 390

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                395                 400                 405

Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                410                 415                 420

Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
                425                 430                 435

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                440                 445                 450

Gly Lys
```

<210> 47
<211> 213
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 47

```
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
  1               5                  10                  15

Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Ser Ser Val Ser
                20                  25                  30

Tyr Leu His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Pro
                35                  40                  45

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

Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
                65                  70                  75

Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp
                80                  85                  90

Ala Phe Asn Pro Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
                95                 100                 105

Lys Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
                110                 115                 120

Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu
                125                 130                 135

Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp
                140                 145                 150

Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln
                155                 160                 165

Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu
```

```
                170                 175                 180

 Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val
                185                 190                 195

 Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg
                200                 205                 210

 Gly Glu Cys


<210> 48
<211> 452
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 48
 Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
   1               5                  10                  15

 Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Thr
                20                  25                  30

 Ser Tyr Asn Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
                35                  40                  45

 Glu Trp Val Gly Ala Ile Tyr Pro Gly Asn Gly Ala Thr Ser Tyr
                50                  55                  60

 Asn Gln Lys Phe Lys Gly Arg Phe Thr Ile Ser Val Asp Lys Ser
                65                  70                  75

 Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
                80                  85                  90

 Thr Ala Val Tyr Tyr Cys Ala Arg Val Val Tyr Tyr Ser Ala Ser
                95                  100                 105

 Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val
                110                 115                 120

 Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
                125                 130                 135

 Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
                140                 145                 150

 Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
                155                 160                 165

 Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                170                 175                 180

 Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
                185                 190                 195

 Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
                200                 205                 210
```

```
Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
                215                 220                 225

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
                230                 235                 240

Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
                245                 250                 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
                260                 265                 270

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
                275                 280                 285

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
                290                 295                 300

Tyr Asn Ala Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
                305                 310                 315

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
                320                 325                 330

Lys Ala Leu Pro Ala Pro Ile Ala Ala Thr Ile Ser Lys Ala Lys
                335                 340                 345

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
                350                 355                 360

Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
                365                 370                 375

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                380                 385                 390

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                395                 400                 405

Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                410                 415                 420

Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
                425                 430                 435

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                440                 445                 450

Gly Lys
```

<210> 49
<211> 452
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 49
```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
```

```
  1               5                  10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Thr
                20                  25                  30

Ser Tyr Asn Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
                35                  40                  45

Glu Trp Val Gly Ala Ile Tyr Pro Gly Asn Gly Ala Thr Ser Tyr
                50                  55                  60

Asn Gln Lys Phe Lys Gly Arg Phe Thr Ile Ser Val Asp Lys Ser
                65                  70                  75

Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
                80                  85                  90

Thr Ala Val Tyr Tyr Cys Ala Arg Val Val Tyr Tyr Ser Ala Ser
                95                  100                 105

Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val
                110                 115                 120

Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
                125                 130                 135

Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
                140                 145                 150

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
                155                 160                 165

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                170                 175                 180

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
                185                 190                 195

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
                200                 205                 210

Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
                215                 220                 225

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
                230                 235                 240

Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
                245                 250                 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
                260                 265                 270

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
                275                 280                 285

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
                290                 295                 300

Tyr Asn Ala Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
                305                 310                 315
```

```
Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Ala Val Ser Asn
                320                 325                 330

Lys Ala Leu Pro Ala Pro Ile Glu Ala Thr Ile Ser Lys Ala Lys
                335                 340                 345

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
                350                 355                 360

Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
                365                 370                 375

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                380                 385                 390

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                395                 400                 405

Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                410                 415                 420

Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
                425                 430                 435

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                440                 445                 450

Gly Lys
```

<210> 50
<211> 452
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 50

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
  1               5                  10                  15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Thr
                20                  25                  30

Ser Tyr Asn Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
                35                  40                  45

Glu Trp Val Gly Ala Ile Tyr Pro Gly Asn Gly Ala Thr Ser Tyr
                50                  55                  60

Asn Gln Lys Phe Lys Gly Arg Phe Thr Ile Ser Val Asp Lys Ser
                65                  70                  75

Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
                80                  85                  90

Thr Ala Val Tyr Tyr Cys Ala Arg Val Val Tyr Tyr Ser Ala Ser
                95                 100                 105

Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val
```

```
                110                 115                 120

Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro
                125                 130                 135

Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
                140                 145                 150

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
                155                 160                 165

Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                170                 175                 180

Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
                185                 190                 195

Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
                200                 205                 210

Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
                215                 220                 225

Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
                230                 235                 240

Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
                245                 250                 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
                260                 265                 270

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
                275                 280                 285

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
                290                 295                 300

Tyr Asn Ala Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
                305                 310                 315

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
                320                 325                 330

Ala Ala Leu Pro Ala Pro Ile Ala Ala Thr Ile Ser Lys Ala Lys
                335                 340                 345

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
                350                 355                 360

Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
                365                 370                 375

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                380                 385                 390

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                395                 400                 405

Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                410                 415                 420
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Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
425 430 435

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
440 445 450

Gly Lys

<210> 51
<211> 122
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 51
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Thr
20 25 30

Ser Tyr Asn Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
35 40 45

Glu Trp Val Gly Ala Ile Tyr Pro Gly Asn Gly Ala Thr Ser Tyr
50 55 60

Asn Gln Lys Phe Lys Gly Arg Phe Thr Ile Ser Val Asp Lys Ser
65 70 75

Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
80 85 90

Thr Ala Val Tyr Tyr Cys Ala Arg Val Val Tyr Tyr Ser Ala Ser
95 100 105

Tyr Trp Tyr Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val
110 115 120

Ser Ser

<210> 52
<211> 107
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 52
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
1 5 10 15

Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Ser Ser Val Ser
20 25 30

Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Pro

```
                35                  40                  45

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

Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
                65                  70                  75

Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp
                80                  85                  90

Ala Phe Asn Pro Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
                95                  100                 105

Lys Arg
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<210> 53
<211> 107
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 53

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Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
  1               5                  10                  15

Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Ser Ser Val Ser
                20                  25                  30

Tyr Leu His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Pro
                35                  40                  45

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

Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
                65                  70                  75

Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp
                80                  85                  90

Ala Phe Asn Pro Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile
                95                  100                 105

Lys Arg
```