SEQUENCE LISTING

<110> NOVARTIS AG

<120> FACTOR XI ANTIBODIES AND METHODS OF USE

<130> PAT056955-WO-PCT

<140>
<141>

<150> 62/341,568
<151> 2016-05-25

<150> 62/184,955
<151> 2015-06-26

<160> 51

<170> PatentIn version 3.5

<210> 1
<211> 625
<212> PRT
<213> Homo sapiens

<400> 1

```
Met Ile Phe Leu Tyr Gln Val Val His Phe Ile Leu Phe Thr Ser Val
1               5                  10                  15


Ser Gly Glu Cys Val Thr Gln Leu Leu Lys Asp Thr Cys Phe Glu Gly
            20                  25                  30


Gly Asp Ile Thr Thr Val Phe Thr Pro Ser Ala Lys Tyr Cys Gln Val
        35                  40                  45


Val Cys Thr Tyr His Pro Arg Cys Leu Leu Phe Thr Phe Thr Ala Glu
    50                  55                  60


Ser Pro Ser Glu Asp Pro Thr Arg Trp Phe Thr Cys Val Leu Lys Asp
65                  70                  75                  80


Ser Val Thr Glu Thr Leu Pro Arg Val Asn Arg Thr Ala Ala Ile Ser
                85                  90                  95
```

```
Gly Tyr Ser Phe Lys Gln Cys Ser His Gln Ile Ser Ala Cys Asn Lys
            100                 105                 110

Asp Ile Tyr Val Asp Leu Asp Met Lys Gly Ile Asn Tyr Asn Ser Ser
        115                 120                 125

Val Ala Lys Ser Ala Gln Glu Cys Gln Glu Arg Cys Thr Asp Asp Val
    130                 135                 140

His Cys His Phe Phe Thr Tyr Ala Thr Arg Gln Phe Pro Ser Leu Glu
145                 150                 155                 160

His Arg Asn Ile Cys Leu Leu Lys His Thr Gln Thr Gly Thr Pro Thr
                165                 170                 175

Arg Ile Thr Lys Leu Asp Lys Val Val Ser Gly Phe Ser Leu Lys Ser
            180                 185                 190

Cys Ala Leu Ser Asn Leu Ala Cys Ile Arg Asp Ile Phe Pro Asn Thr
        195                 200                 205

Val Phe Ala Asp Ser Asn Ile Asp Ser Val Met Ala Pro Asp Ala Phe
    210                 215                 220

Val Ser Gly Arg Ile Cys Thr His His Pro Gly Cys Leu Phe Phe Thr
225                 230                 235                 240

Phe Phe Ser Gln Glu Trp Pro Lys Glu Ser Gln Arg Asn Leu Cys Leu
                245                 250                 255

Leu Lys Thr Ser Glu Ser Gly Leu Pro Ser Thr Arg Ile Lys Lys Ser
            260                 265                 270

Lys Ala Leu Ser Gly Phe Ser Leu Gln Ser Cys Arg His Ser Ile Pro
        275                 280                 285

Val Phe Cys His Ser Ser Phe Tyr His Asp Thr Asp Phe Leu Gly Glu
```

```
    290                 295                 300

Glu Leu Asp Ile Val Ala Ala Lys Ser His Glu Ala Cys Gln Lys Leu
305                 310                 315                 320

Cys Thr Asn Ala Val Arg Cys Gln Phe Phe Thr Tyr Thr Pro Ala Gln
                325                 330                 335

Ala Ser Cys Asn Glu Gly Lys Gly Lys Cys Tyr Leu Lys Leu Ser Ser
            340                 345                 350

Asn Gly Ser Pro Thr Lys Ile Leu His Gly Arg Gly Gly Ile Ser Gly
        355                 360                 365

Tyr Thr Leu Arg Leu Cys Lys Met Asp Asn Glu Cys Thr Thr Lys Ile
    370                 375                 380

Lys Pro Arg Ile Val Gly Gly Thr Ala Ser Val Arg Gly Glu Trp Pro
385                 390                 395                 400

Trp Gln Val Thr Leu His Thr Thr Ser Pro Thr Gln Arg His Leu Cys
                405                 410                 415

Gly Gly Ser Ile Ile Gly Asn Gln Trp Ile Leu Thr Ala Ala His Cys
            420                 425                 430

Phe Tyr Gly Val Glu Ser Pro Lys Ile Leu Arg Val Tyr Ser Gly Ile
        435                 440                 445

Leu Asn Gln Ser Glu Ile Lys Glu Asp Thr Ser Phe Phe Gly Val Gln
    450                 455                 460

Glu Ile Ile Ile His Asp Gln Tyr Lys Met Ala Glu Ser Gly Tyr Asp
465                 470                 475                 480

Ile Ala Leu Leu Lys Leu Glu Thr Thr Val Asn Tyr Thr Asp Ser Gln
                485                 490                 495
```

```
Arg Pro Ile Cys Leu Pro Ser Lys Gly Asp Arg Asn Val Ile Tyr Thr
            500                 505                 510

Asp Cys Trp Val Thr Gly Trp Gly Tyr Arg Lys Leu Arg Asp Lys Ile
        515                 520                 525

Gln Asn Thr Leu Gln Lys Ala Lys Ile Pro Leu Val Thr Asn Glu Glu
    530                 535                 540

Cys Gln Lys Arg Tyr Arg Gly His Lys Ile Thr His Lys Met Ile Cys
545                 550                 555                 560

Ala Gly Tyr Arg Glu Gly Gly Lys Asp Ala Cys Lys Gly Asp Ser Gly
                565                 570                 575

Gly Pro Leu Ser Cys Lys His Asn Glu Val Trp His Leu Val Gly Ile
            580                 585                 590

Thr Ser Trp Gly Glu Gly Cys Ala Gln Arg Glu Arg Pro Gly Val Tyr
        595                 600                 605

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

Val
625
```

<210> 2
<211> 3278
<212> DNA
<213> Homo sapiens

<400> 2
aggcacacag gcaaaatcaa gttctacatc tgtccctgtg tatgtcactt gtttgaatac 60

gaaataaaat taaaaaaata aattcagtgt attgagaaag caagcaattc tctcaaggta 120

tatttctgac atactaagat tttaacgact ttcacaaata tgctgtactg agagagaatg 180

ttacataaca ttgagaacta gtacaagtaa atattaaagt gaagtgacca tttcctacac 240

aagctcattc agaggaggat gaagaccatt ttggaggaag aaaagcaccc ttattaagaa 300

ttgcagcaag taagccaaca aggtcttttc aggatgattt tcttatatca agtggtacat 360

ttcattttat ttacttcagt ttctggtgaa tgtgtgactc agttgttgaa ggacacctgc 420

tttgaaggag gggacattac tacggtcttc acaccaagcg ccaagtactg ccaggtagtc 480

tgcacttacc acccaagatg tttactcttc actttcacgg cggaatcacc atctgaggat 540

cccacccgat ggtttacttg tgtcctgaaa gacagtgtta cagaaacact gccaagagtg 600

aataggacag cagcgatttc tgggtattct ttcaagcaat gctcacacca aataagcgct 660

tgcaacaaag acatttatgt ggacctagac atgaagggca taaactataa cagctcagtt 720

gccaagagtg ctcaagaatg ccaagaaaga tgcacggatg acgtccactg ccacttttc 780

acgtacgcca caaggcagtt tcccagcctg gagcatcgta acatttgtct actgaagcac 840

acccaaacag ggacaccaac cagaataacg aagctcgata aagtggtgtc tggattttca 900

ctgaaatcct gtgcactttc taatctggct tgtattaggg acattttccc taatacggtg 960

tttgcagaca gcaacatcga cagtgtcatg gctcccgatg cttttgtctg tggccgaatc 1020

tgcactcatc atcccggttg cttgtttttt accttctttt cccaggaatg gcccaaagaa 1080

tctcaaagaa atctttgtct ccttaaaaca tctgagagtg gattgcccag tacacgcatt 1140

aaaaagagca aagctctttc tggtttcagt ctacaaagct gcaggcacag catcccagtg 1200

ttctgccatt cttcatttta ccatgacact gatttcttgg gagaagaact ggatattgtt 1260

gctgcaaaaa gtcacgaggc ctgccagaaa ctgtgcacca atgccgtccg ctgccagttt 1320

tttacctata ccccagccca agcatcctgc aacgaaggga agggcaagtg ttacttaaag 1380

ctttcttcaa acggatctcc aactaaaata cttcacggga gaggaggcat ctctggatac 1440

acattaaggt tgtgtaaaat ggataatgag tgtaccacca aaatcaagcc caggatcgtt 1500

ggaggaactg cgtctgttcg tggtgagtgg ccgtggcagg tgaccctgca cacaacctca 1560

cccactcaga gacacctgtg tggaggctcc atcattggaa accagtggat attaacagcc 1620

gctcactgtt tctatggggt agagtcacct aagattttgc gtgtctacag tggcatttta 1680

aatcaatctg aaataaaaga ggacacatct ttctttgggg ttcaagaaat aataatccat 1740

gatcagtata aaatggcaga aagcgggtat gatattgcct tgttgaaact ggaaaccaca 1800

gtgaattaca cagattctca acgacccata tgcctgcctt ccaaaggaga tagaaatgta 1860

atatacactg attgctgggt gactggatgg gggtacagaa aactaagaga caaaatacaa 1920

aatactctcc agaaagccaa gataccctta gtgaccaacg aagagtgcca gaagagatac 1980

agaggacata aaataaccca taagatgatc tgtgccggct acagggaagg agggaaggac 2040

gcttgcaagg gagattcggg aggccctctg tcctgcaaac acaatgaggt ctggcatctg 2100

gtaggcatca cgagctgggg cgaaggctgt gctcaaaggg agcggccagg tgtttacacc 2160

aacgtggtcg agtacgtgga ctggattctg gagaaaactc aagcagtgtg aatgggttcc 2220

caggggccat tggagtccct gaaggaccca ggatttgctg ggagagggtg ttgagttcac 2280

tgtgccagca tgcttcctcc acagtaacac gctgaagggg cttggtgttt gtaagaaaat 2340

gctagaagaa aacaaactgt cacaagttgt tatgtccaaa actcccgttc tatgatcgtt 2400

gtagtttgtt tgagcattca gtctctttgt ttttgatcac gcttctatgg agtccaagaa 2460

ttaccataag gcaatatttc tgaagattac tatataggca gatatagcag aaaataacca 2520

agtagtggca gtggggatca ggcagaagaa ctggtaaaag aagccaccat aaatagattt 2580

gttcgatgaa agatgaaaac tggaagaaag gagaacaaag acagtcttca ccattttgca 2640

ggaatctaca ctctgcctat gtgaacacat ttcttttgta aagaaagaaa ttgattgcat 2700

ttaatggcag attttcagaa tagtcaggaa ttcttgtcat ttccatttta aaatatatat 2760

taaaaaaaat cagttcgagt agacacgagc taagagtgaa tgtgaagata acagaatttc 2820

tgtgtggaag aggattacaa gcagcaattt acctggaagt gataccttag gggcaatctt 2880

gaagatacac tttcctgaaa aatgatttgt gatggattgt atatttattt aaaatatctt 2940

gggaggggag gctgatggag atagggagca tgctcaaacc tccctaagac aagctgctgc 3000

tgtgactatg ggctcccaaa gagctagatc gtatatttat ttgacaaaaa tcaccataga 3060

ctgcatccat actacagaga aaaaacaatt agggcgcaaa tggatagtta cagtaaagtc 3120

ttcagcaagc agctgcctgt attctaagca ctgggatttt ctgtttcgtg caaatattta 3180

tctcattatt gttgtgatct agttcaataa cctagaattt gaattgtcac cacatagctt 3240

tcaatctgtg ccaacaacta tacaattcat caagtgtg 3278

<210> 3
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 3
Thr Ala Ala Met Ser
1 5

<210> 4
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 4
Gly Ile Ser Gly Ser Gly Ser Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 5
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 5
Glu Leu Ser Tyr Leu Tyr Ser Gly Tyr Tyr Phe Asp Tyr

1 5 10

<210> 6
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 6
Gly Phe Thr Phe Ser Thr Ala
1 5

<210> 7
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 7
Ser Gly Ser Gly Ser Ser
1 5

<210> 8
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 8
Glu Leu Ser Tyr Leu Tyr Ser Gly Tyr Tyr Phe Asp Tyr
1 5 10

<210> 9
<211> 122

<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polypeptide"

<400> 9
Gln Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

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

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

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

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Leu Ser Tyr Leu Tyr Ser Gly Tyr Tyr Phe Asp Tyr Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 10
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polynucleotide"

<400> 10
caggtgcaat tgctggaaag cggcggtggc ctggtgcagc cgggtggcag cctgcgtctg 60

agctgcgcgg cgtccggatt caccttttct actgctgcta tgtcttgggt gcgccaggcc 120

ccgggcaaag gtctcgagtg ggtttccggt atctctggtt ctggttcttc tacctactat 180

gcggatagcg tgaaaggccg ctttaccatc agccgcgata attcgaaaaa caccctgtat 240

ctgcaaatga acagcctgcg tgcggaagat acggccgtgt attattgcgc gcgtgaactg 300

tcttacctgt actctggtta ctacttcgat tactggggcc aaggcaccct ggtgactgtt 360

agctca 366

<210> 11
<211> 452
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polypeptide"

<400> 11
Gln Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

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

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

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

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

```
Ala Arg Glu Leu Ser Tyr Leu Tyr Ser Gly Tyr Tyr Phe Asp Tyr Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Pro Lys Ser
    210                 215                 220

Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Ala Ala
225                 230                 235                 240

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

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

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

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

Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn
305                 310                 315                 320

Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro
                325                 330                 335

Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln
            340                 345                 350

Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val
        355                 360                 365

Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val
    370                 375                 380

Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro
385                 390                 395                 400

Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr
                405                 410                 415

Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val
            420                 425                 430

Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu
        435                 440                 445

Ser Pro Gly Lys
    450
```

<210> 12
<211> 1356
<212> DNA
<213> Artificial Sequence

<220>

<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polynucleotide"

<400> 12
caggtgcaat tgctggaaag cggcggtggc ctggtgcagc cgggtggcag cctgcgtctg 60

agctgcgcgg cgtccggatt caccttttct actgctgcta tgtcttgggt gcgccaggcc 120

ccgggcaaag gtctcgagtg ggtttccggt atctctggtt ctggttcttc tacctactat 180

gcggatagcg tgaaaggccg ctttaccatc agccgcgata attcgaaaaa caccctgtat 240

ctgcaaatga acagcctgcg tgcggaagat acggccgtgt attattgcgc gcgtgaactg 300

tcttacctgt actctggtta ctacttcgat tactggggcc aaggcaccct ggtgactgtt 360

agctcagcct ccaccaaggg tccatcggtc ttcccctgg caccctcctc caagagcacc 420

tctgggggca cagcggccct gggctgcctg gtcaaggact acttccccga accggtgacg 480

gtgtcgtgga actcaggcgc cctgaccagc ggcgtgcaca ccttcccggc tgtcctacag 540

tcctcaggac tctactccct cagcagcgtg gtgaccgtgc cctccagcag cttgggcacc 600

cagacctaca tctgcaacgt gaatcacaag cccagcaaca ccaaggtgga caagagagtt 660

gagcccaaat cttgtgacaa aactcacaca tgcccaccgt gcccagcacc tgaagcagcg 720

gggggaccgt cagtcttcct cttcccccca aaacccaagg acaccctcat gatctcccgg 780

acccctgagg tcacatgcgt ggtggtggac gtgagccacg aagaccctga ggtcaagttc 840

aactggtacg tggacggcgt ggaggtgcat aatgccaaga caaagccgcg ggaggagcag 900

tacaacagca cgtaccgggt ggtcagcgtc ctcaccgtcc tgcaccagga ctggctgaat 960

ggcaaggagt acaagtgcaa ggtctccaac aaagccctcc cagccccat cgagaaaacc 1020

atctccaaag ccaaagggca gccccgagaa ccacaggtgt acaccctgcc cccatcccgg 1080

gaggagatga ccaagaacca ggtcagcctg acctgcctgg tcaaaggctt ctatcccagc 1140

gacatcgccg tggagtggga gagcaatggg cagccggaga acaactacaa gaccacgcct 1200

cccgtgctgg actccgacgg ctccttcttc ctctacagca agctcaccgt ggacaagagc 1260

aggtggcagc aggggaacgt cttctcatgc tccgtgatgc atgaggctct gcacaaccac 1320

tacacgcaga agagcctctc cctgtctccg ggtaaa 1356

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

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
peptide"

<400> 13
Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn Asp Val Ser
1 5 10

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

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
peptide"

<400> 14
Lys Asn Tyr Asn Arg Pro Ser
1 5

<210> 15
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
peptide"

<400> 15
Ser Ala Trp Asp Gln Arg Gln Phe Asp Val Val
1 5 10

<210> 16
<211> 9
<212> PRT

<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
peptide"

<400> 16
Ser Ser Ser Asn Ile Gly Ser Asn Asp
1 5

<210> 17
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
peptide"

<400> 17
Lys Asn Tyr
1

<210> 18
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
peptide"

<400> 18
Trp Asp Gln Arg Gln Phe Asp Val
1 5

<210> 19
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic

polypeptide"

<400> 19
Asp Ile Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1   5   10   15

Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
            20   25   30

Asp Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
        35   40   45

Ile Tyr Lys Asn Tyr Asn Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50   55   60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu Gln
65   70   75   80

Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Gln Arg Gln
                85   90   95

Phe Asp Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100   105   110

<210> 20
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polynucleotide"

<400> 20
gatatcgtgc tgacccagcc gccgagcgtg agcggtgcac cgggccagcg cgtgaccatt 60

agctgtagcg gcagcagcag caacattggt tctaacgacg tgtcttggta ccagcagctg 120

ccgggcacgg cgccgaaact gctgatctac aaaaactaca accgcccgag cggcgtgccg 180

gatcgcttta gcggatccaa aagcggcacc agcgccagcc tggcgattac cggcctgcaa 240

gcagaagacg aagcggatta ttactgctct gcttgggacc agcgtcagtt cgacgttgtg 300

tttggcggcg gcacgaagtt aaccgtccta 330

<210> 21
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polypeptide"

<400> 21
Asp Ile Val Leu Thr Gln Pro Pro Ser Val Ser Gly Ala Pro Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
20 25 30

Asp Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Lys Asn Tyr Asn Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Thr Gly Leu Gln
65 70 75 80

Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Gln Arg Gln
85 90 95

Phe Asp Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
130 135 140

```
Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160


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


Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190


Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205


Thr Val Ala Pro Thr Glu Cys Ser
    210                 215


<210> 22
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
      polynucleotide"

<400> 22
gatatcgtgc tgacccagcc gccgagcgtg agcggtgcac cgggccagcg cgtgaccatt       60

agctgtagcg gcagcagcag caacattggt tctaacgacg tgtcttggta ccagcagctg      120

ccgggcacgg cgccgaaact gctgatctac aaaaactaca accgcccgag cggcgtgccg      180

gatcgcttta gcggatccaa aagcggcacc agcgccagcc tggcgattac cggcctgcaa      240

gcagaagacg aagcggatta ttactgctct gcttgggacc agcgtcagtt cgacgttgtg      300

tttggcggcg gcacgaagtt aaccgtccta ggtcagccca aggctgcccc ctcggtcact      360

ctgttcccgc cctcctctga ggagcttcaa gccaacaagg ccacactggt gtgtctcata      420

agtgacttct acccgggagc cgtgacagtg gcctggaagg cagatagcag ccccgtcaag      480

gcgggagtgg agaccaccac accctccaaa caaagcaaca acaagtacgc ggccagcagc      540
```

tatctgagcc tgacgcctga gcagtggaag tcccacagaa gctacagctg ccaggtcacg 600

catgaaggga gcaccgtgga gaagacagtg gcccctacag aatgttca 648

<210> 23
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 23
Thr Ala Ala Met Ser
1 5

<210> 24
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 24
Gly Ile Ser Gly Ser Gly Ser Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 25
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 25
Glu Leu Ser Tyr Leu Tyr Ser Gly Tyr Tyr Phe Asp Tyr
1   5   10

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

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
      peptide"

<400> 26
Gly Phe Thr Phe Ser Thr Ala
1   5

<210> 27
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
      peptide"

<400> 27
Ser Gly Ser Gly Ser Ser
1   5

<210> 28
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
      peptide"

<400> 28
Glu Leu Ser Tyr Leu Tyr Ser Gly Tyr Tyr Phe Asp Tyr
1   5   10

<210> 29
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polypeptide"

<400> 29
Gln Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

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

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

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

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Leu Ser Tyr Leu Tyr Ser Gly Tyr Tyr Phe Asp Tyr Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 30
<211> 366
<212> DNA
<213> Artificial Sequence

<220>
<221> source

<223> /note="Description of Artificial Sequence: Synthetic
polynucleotide"

<400> 30
caggtgcagc tgctggaatc aggcggcgga ctggtgcagc ctggcggtag cctgagactg 60

agctgcgctg ctagtggctt cacctttagc accgccgcta tgagctgggt tcgacaggcc 120

ccagggaaag gcctcgagtg ggtctcaggg attagcggta gcggctctag cacctactac 180

gccgatagcg tgaagggccg gttcactatc tctagggata actctaagaa caccctgtac 240

ctgcagatga atagcctgag agccgaggac accgccgtct actactgcgc tagagagctg 300

agctacctgt atagcggcta ctacttcgac tactggggtc aaggcaccct ggtcaccgtg 360

tctagc 366

<210> 31
<211> 452
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polypeptide"

<400> 31
Gln Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

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

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

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

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

```
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Arg Glu Leu Ser Tyr Leu Tyr Ser Gly Tyr Tyr Phe Asp Tyr Trp
            100                 105                 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
    130                 135                 140

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160

Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
        195                 200                 205

His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Pro Lys Ser
    210                 215                 220

Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
225                 230                 235                 240

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

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

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

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

Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn
305                 310                 315                 320

Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Ala Ala Pro
                325                 330                 335

Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln
            340                 345                 350

Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val
        355                 360                 365

Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val
    370                 375                 380

Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro
385                 390                 395                 400

Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr
                405                 410                 415

Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val
            420                 425                 430

Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu
        435                 440                 445

Ser Pro Gly Lys
    450
```

<210> 32
<211> 1356
<212> DNA
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polynucleotide"

<400> 32
caggtgcagc tgctggaatc aggcggcgga ctggtgcagc ctggcggtag cctgagactg 60

agctgcgctg ctagtggctt cacctttagc accgccgcta tgagctgggt tcgacaggcc 120

ccagggaaag gcctcgagtg ggtctcaggg attagcggta gcggctctag cacctactac 180

gccgatagcg tgaagggccg gttcactatc tctagggata actctaagaa caccctgtac 240

ctgcagatga atagcctgag agccgaggac accgccgtct actactgcgc tagagagctg 300

agctacctgt atagcggcta ctacttcgac tactggggtc aaggcaccct ggtcaccgtg 360

tctagcgcta gcactaaggg cccctccgtg ttccctctgg ccccttccag caagtctacc 420

tccggcggca cagctgctct gggctgcctg gtcaaggact acttccctga gcctgtgaca 480

gtgtcctgga actctggcgc cctgacctct ggcgtgcaca ccttccctgc cgtgctgcag 540

tcctccggcc tgtactccct gtcctccgtg gtcacagtgc cttcaagcag cctgggcacc 600

cagacctata tctgcaacgt gaaccacaag ccttccaaca ccaaggtgga caagcgggtg 660

gagcctaagt cctgcgacaa gacccacacc tgtcctccct gccctgctcc tgaactgctg 720

ggcggccctt ctgtgttcct gttccctcca aagcccaagg acaccctgat gatctcccgg 780

acccctgaag tgacctgcgt ggtggtggcc gtgtcccacg aggatcctga agtgaagttc 840

aattggtacg tggacggcgt ggaggtgcac aacgccaaga ccaagcctcg ggaggaacag 900

tacaactcca cctaccgggt ggtgtccgtg ctgaccgtgc tgcaccagga ctggctgaac 960

ggcaaagagt acaagtgcaa agtctccaac aaggccctgg ccgcccctat cgaaaagaca 1020

atctccaagg ccaagggcca gcctagggaa ccccaggtgt acaccctgcc acccagccgg 1080

gaggaaatga ccaagaacca ggtgtccctg acctgtctgg tcaagggctt ctacccttcc 1140

gatatcgccg tggagtggga gtctaacggc cagcctgaga acaactacaa gaccacccct 1200

cctgtgctgg actccgacgg ctccttcttc ctgtactcca aactgaccgt ggacaagtcc 1260

cggtggcagc agggcaacgt gttctcctgc tccgtgatgc acgaggccct gcacaaccac 1320

tacacccaga agtccctgtc cctgtctccc ggcaag 1356

<210> 33
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 33
Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn Asp Val Ser
1 5 10

<210> 34
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 34
Lys Asn Tyr Asn Arg Pro Ser
1 5

<210> 35
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 35
Ser Ala Trp Asp Gln Arg Gln Phe Asp Val Val
1 5 10

<210> 36

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

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
peptide"

<400> 36
Ser Ser Ser Asn Ile Gly Ser Asn Asp
1 5

<210> 37
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
peptide"

<400> 37
Lys Asn Tyr
1

<210> 38
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
peptide"

<400> 38
Trp Asp Gln Arg Gln Phe Asp Val
1 5

<210> 39
<211> 110
<212> PRT
<213> Artificial Sequence

<220>

<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polypeptide"

<400> 39
Gln Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
20 25 30

Asp Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Lys Asn Tyr Asn Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Gln
65 70 75 80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Gln Arg Gln
85 90 95

Phe Asp Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105 110

<210> 40
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polynucleotide"

<400> 40
cagtcagtcc tgactcagcc ccctagcgct agtggcaccc ctggtcaaag agtgactatt 60

agctgtagcg gctctagctc taatatcggc tctaacgacg tcagctggta tcagcagctg 120

cccggcaccg cccctaagct gctgatctat aagaactata ataggcctag cggcgtgccc 180

gataggttta gcggatctaa atcagggact tctgctagtc tggctattag cggcctgcag 240

tcagaggacg aggccgacta ctactgtagc gcctgggatc agcgtcagtt cgacgtggtg 300

ttcggcggag gcactaagct gaccgtgctg 330

<210> 41
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic polypeptide"

<400> 41
Gln Ser Val Leu Thr Gln Pro Pro Ser Ala Ser Gly Thr Pro Gly Gln
1 5 10 15

Arg Val Thr Ile Ser Cys Ser Gly Ser Ser Ser Asn Ile Gly Ser Asn
20 25 30

Asp Val Ser Trp Tyr Gln Gln Leu Pro Gly Thr Ala Pro Lys Leu Leu
35 40 45

Ile Tyr Lys Asn Tyr Asn Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Gln
65 70 75 80

Ser Glu Asp Glu Ala Asp Tyr Tyr Cys Ser Ala Trp Asp Gln Arg Gln
85 90 95

Phe Asp Val Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln
100 105 110

Pro Lys Ala Ala Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu
115 120 125

```
Leu Gln Ala Asn Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr
    130                 135                 140

Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys
145                 150                 155                 160

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

Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His
            180                 185                 190

Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys
        195                 200                 205

Thr Val Ala Pro Thr Glu Cys Ser
    210                 215
```

<210> 42
<211> 648
<212> DNA
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic polynucleotide"

<400> 42
cagtcagtcc tgactcagcc ccctagcgct agtggcaccc ctggtcaaag agtgactatt 60

agctgtagcg gctctagctc taatatcggc tctaacgacg tcagctggta tcagcagctg 120

cccggcaccg cccctaagct gctgatctat aagaactata ataggcctag cggcgtgccc 180

gataggttta gcggatctaa atcagggact tctgctagtc tggctattag cggcctgcag 240

tcagaggacg aggccgacta ctactgtagc gcctgggatc agcgtcagtt cgacgtggtg 300

ttcggcggag gcactaagct gaccgtgctg ggtcaaccta aggctgcccc cagcgtgacc 360

ctgttccccc ccagcagcga ggagctgcag gccaacaagg ccaccctggt gtgcctgatc 420

agcgacttct acccaggcgc cgtgaccgtg gcctggaagg ccgacagcag ccccgtgaag 480

gccggcgtgg agaccaccac ccccagcaag cagagcaaca acaagtacgc cgccagcagc 540

tacctgagcc tgaccccga gcagtggaag agccacaggt cctacagctg ccaggtgacc 600

cacgagggca gcaccgtgga aaagaccgtg gccccaaccg agtgcagc 648

<210> 43
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 43
Gly Phe Thr Phe Ser Thr Ala Ala
1 5

<210> 44
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 44
Ile Ser Gly Ser Gly Ser Ser Thr
1 5

<210> 45
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 45
Ala Arg Glu Leu Ser Tyr Leu Tyr Ser Gly Tyr Tyr Phe Asp Tyr

1 5 10 15

<210> 46
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 46
Gly Phe Thr Phe Ser Thr Ala Ala Met Ser
1 5 10

<210> 47
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic peptide"

<400> 47
Ser Ser Asn Ile Gly Ser Asn Asp
1 5

<210> 48
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic 6xHis tag"

<400> 48
His His His His His His
1 5

<210> 49
<211> 4

<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
peptide"

<400> 49
Met Gly Ser Ser
1

<210> 50
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
8xHis tag"

<400> 50
His His His His His His His His
1 5

<210> 51
<211> 238
<212> PRT
<213> Artificial Sequence

<220>
<221> source
<223> /note="Description of Artificial Sequence: Synthetic
polypeptide"

<400> 51
Ile Val Gly Gly Thr Ala Ser Val Arg Gly Glu Trp Pro Trp Gln Val
1 5 10 15

Thr Leu His Thr Thr Ser Pro Thr Gln Arg His Leu Cys Gly Gly Ser
20 25 30

Ile Ile Gly Asn Gln Trp Ile Leu Thr Ala Ala His Cys Phe Tyr Gly
35 40 45

```
Val Glu Ser Pro Lys Ile Leu Arg Val Tyr Ser Gly Ile Leu Asn Gln
    50                  55                  60

Ser Glu Ile Lys Glu Asp Thr Ser Phe Phe Gly Val Gln Glu Ile Ile
65                  70                  75                  80

Ile His Asp Gln Tyr Lys Met Ala Glu Ser Gly Tyr Asp Ile Ala Leu
                85                  90                  95

Leu Lys Leu Glu Thr Thr Val Asn Tyr Thr Asp Ser Gln Arg Pro Ile
            100                 105                 110

Cys Leu Pro Ser Lys Gly Asp Arg Asn Val Ile Tyr Thr Asp Cys Trp
        115                 120                 125

Val Thr Gly Trp Gly Tyr Arg Lys Leu Arg Asp Lys Ile Gln Asn Thr
    130                 135                 140

Leu Gln Lys Ala Lys Ile Pro Leu Val Thr Asn Glu Glu Cys Gln Lys
145                 150                 155                 160

Arg Tyr Arg Gly His Lys Ile Thr His Lys Met Ile Cys Ala Gly Tyr
                165                 170                 175

Arg Glu Gly Gly Lys Asp Ala Cys Lys Gly Asp Ser Gly Gly Pro Leu
            180                 185                 190

Ser Cys Lys His Asn Glu Val Trp His Leu Val Gly Ile Thr Ser Trp
        195                 200                 205

Gly Glu Gly Cys Ala Gln Arg Glu Arg Pro Gly Val Tyr Thr Asn Val
    210                 215                 220

Val Glu Tyr Val Asp Trp Ile Leu Glu Lys Thr Gln Ala Val
225                 230                 235
```