SEQUENCE LISTING

<110> BEAM THERAPEUTICS INC.

<120> COMPOSITIONS AND METHODS FOR TREATING HEMOGLOBINOPATHIES

<130> 52885-790.602

<140> PCT/US2020/018193
<141> 2020-02-13

<150> 62/966,526
<151> 2020-01-27

<150> 62/941,569
<151> 2019-11-27

<150> 62/931,722
<151> 2019-11-06

<150> 62/931,747
<151> 2019-11-06

<150> 62/852,228
<151> 2019-05-23

<150> 62/852,224
<151> 2019-05-23

<150> 62/805,271
<151> 2019-02-13

<150> 62/805,277
<151> 2019-02-13

<160> 310

<170> PatentIn version 3.5

<210> 1
<211> 1368
<212> PRT
<213> Streptococcus pyogenes

<400> 1
Met Asp Lys Lys Tyr Ser Ile Gly Leu Asp Ile Gly Thr Asn Ser Val
1 5 10 15

```
Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe
            20                  25                  30

Lys Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile
        35                  40                  45

Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu
    50                  55                  60

Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys
65                  70                  75                  80

Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser
                85                  90                  95

Phe Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys
            100                 105                 110

His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr
        115                 120                 125

His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp
    130                 135                 140

Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His
145                 150                 155                 160

Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro
                165                 170                 175

Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr
            180                 185                 190

Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala
        195                 200                 205
```

```
Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn
    210                 215                 220

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

Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe
                245                 250                 255

Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp
            260                 265                 270

Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp
        275                 280                 285

Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp
    290                 295                 300

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

Met Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys
                325                 330                 335

Ala Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe
            340                 345                 350

Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser
        355                 360                 365

Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp
    370                 375                 380

Gly Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg
385                 390                 395                 400
```

```
Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu
                405                 410                 415

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

Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile
        435                 440                 445

Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp
    450                 455                 460

Met Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu
465                 470                 475                 480

Val Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr
                485                 490                 495

Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser
            500                 505                 510

Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys
        515                 520                 525

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

Lys Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr
545                 550                 555                 560

Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp
                565                 570                 575

Ser Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly
            580                 585                 590
```

```
Thr Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp
        595                 600                 605

Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr
    610                 615                 620

Leu Phe Glu Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala
625                 630                 635                 640

His Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr
                645                 650                 655

Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp
            660                 665                 670

Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe
        675                 680                 685

Ala Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu Thr Phe
    690                 695                 700

Lys Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly Asp Ser Leu
705                 710                 715                 720

His Glu His Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly
                725                 730                 735

Ile Leu Gln Thr Val Lys Val Val Asp Glu Leu Val Lys Val Met Gly
            740                 745                 750

Arg His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln
        755                 760                 765

Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile
    770                 775                 780
```

```
Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro
785                 790                 795                 800


Val Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu
                805                 810                 815


Gln Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg
            820                 825                 830


Leu Ser Asp Tyr Asp Val Asp His Ile Val Pro Gln Ser Phe Leu Lys
        835                 840                 845


Asp Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg
    850                 855                 860


Gly Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys
865                 870                 875                 880


Asn Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys
                885                 890                 895


Phe Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp
            900                 905                 910


Lys Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr
        915                 920                 925


Lys His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp
    930                 935                 940


Glu Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser
945                 950                 955                 960


Lys Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg
                965                 970                 975
```

```
Glu Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val
            980                 985                 990


Val Gly Thr Ala Leu Ile Lys Lys  Tyr Pro Lys Leu Glu  Ser Glu Phe
        995                 1000                1005


Val Tyr  Gly Asp Tyr Lys Val  Tyr Asp Val Arg Lys  Met Ile Ala
    1010                1015                1020


Lys Ser  Glu Gln Glu Ile Gly  Lys Ala Thr Ala Lys  Tyr Phe Phe
    1025                1030                1035


Tyr Ser  Asn Ile Met Asn Phe  Phe Lys Thr Glu Ile  Thr Leu Ala
    1040                1045                1050


Asn Gly  Glu Ile Arg Lys Arg  Pro Leu Ile Glu Thr  Asn Gly Glu
    1055                1060                1065


Thr Gly  Glu Ile Val Trp Asp  Lys Gly Arg Asp Phe  Ala Thr Val
    1070                1075                1080


Arg Lys  Val Leu Ser Met Pro  Gln Val Asn Ile Val  Lys Lys Thr
    1085                1090                1095


Glu Val  Gln Thr Gly Gly Phe  Ser Lys Glu Ser Ile  Leu Pro Lys
    1100                1105                1110


Arg Asn  Ser Asp Lys Leu Ile  Ala Arg Lys Lys Asp  Trp Asp Pro
    1115                1120                1125


Lys Lys  Tyr Gly Gly Phe Asp  Ser Pro Thr Val Ala  Tyr Ser Val
    1130                1135                1140


Leu Val  Val Ala Lys Val Glu  Lys Gly Lys Ser Lys  Lys Leu Lys
    1145                1150                1155
```

```
Ser Val  Lys Glu Leu Leu Gly  Ile Thr Ile Met Glu  Arg Ser Ser
    1160                1165                1170

Phe Glu  Lys Asn Pro Ile Asp  Phe Leu Glu Ala Lys  Gly Tyr Lys
    1175                1180                1185

Glu Val  Lys Lys Asp Leu Ile  Ile Lys Leu Pro Lys  Tyr Ser Leu
    1190                1195                1200

Phe Glu  Leu Glu Asn Gly Arg  Lys Arg Met Leu Ala  Ser Ala Gly
    1205                1210                1215

Glu Leu  Gln Lys Gly Asn Glu  Leu Ala Leu Pro Ser  Lys Tyr Val
    1220                1225                1230

Asn Phe  Leu Tyr Leu Ala Ser  His Tyr Glu Lys Leu  Lys Gly Ser
    1235                1240                1245

Pro Glu  Asp Asn Glu Gln Lys  Gln Leu Phe Val Glu  Gln His Lys
    1250                1255                1260

His Tyr  Leu Asp Glu Ile Ile  Glu Gln Ile Ser Glu  Phe Ser Lys
    1265                1270                1275

Arg Val  Ile Leu Ala Asp Ala  Asn Leu Asp Lys Val  Leu Ser Ala
    1280                1285                1290

Tyr Asn  Lys His Arg Asp Lys  Pro Ile Arg Glu Gln  Ala Glu Asn
    1295                1300                1305

Ile Ile  His Leu Phe Thr Leu  Thr Asn Leu Gly Ala  Pro Ala Ala
    1310                1315                1320

Phe Lys  Tyr Phe Asp Thr Thr  Ile Asp Arg Lys Arg  Tyr Thr Ser
    1325                1330                1335
```

Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln Ser Ile Thr
1340 1345 1350

Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu Gly Gly Asp
1355 1360 1365

<210> 2
<211> 167
<212> PRT
<213> Artificial Sequence

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

<400> 2
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1 5 10 15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
20 25 30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
35 40 45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65 70 75 80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
85 90 95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
100 105 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His

115 120 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
130 135 140

Leu Cys Tyr Phe Phe Arg Met Pro Arg Gln Val Phe Asn Ala Gln Lys
145 150 155 160

Lys Ala Gln Ser Ser Thr Asp
165

<210> 3
<211> 1410
<212> PRT
<213> Artificial Sequence

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

<400> 3
Glu Ile Gly Lys Ala Thr Ala Lys Tyr Phe Phe Tyr Ser Asn Ile Met
1 5 10 15

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

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

Lys Gly Arg Asp Phe Ala Thr Val Arg Lys Val Leu Ser Met Pro Gln
50 55 60

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

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

```
Lys Asp Trp Asp Pro Lys Lys Tyr Gly Gly Phe Met Gln Pro Thr Val
            100                 105                 110

Ala Tyr Ser Val Leu Val Val Ala Lys Val Glu Lys Gly Lys Ser Lys
        115                 120                 125

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

Ser Ser Phe Glu Lys Asn Pro Ile Asp Phe Leu Glu Ala Lys Gly Tyr
145                 150                 155                 160

Lys Glu Val Lys Lys Asp Leu Ile Ile Lys Leu Pro Lys Tyr Ser Leu
                165                 170                 175

Phe Glu Leu Glu Asn Gly Arg Lys Arg Met Leu Ala Ser Ala Lys Phe
            180                 185                 190

Leu Gln Lys Gly Asn Glu Leu Ala Leu Pro Ser Lys Tyr Val Asn Phe
        195                 200                 205

Leu Tyr Leu Ala Ser His Tyr Glu Lys Leu Lys Gly Ser Pro Glu Asp
    210                 215                 220

Asn Glu Gln Lys Gln Leu Phe Val Glu Gln His Lys His Tyr Leu Asp
225                 230                 235                 240

Glu Ile Ile Glu Gln Ile Ser Glu Phe Ser Lys Arg Val Ile Leu Ala
                245                 250                 255

Asp Ala Asn Leu Asp Lys Val Leu Ser Ala Tyr Asn Lys His Arg Asp
            260                 265                 270

Lys Pro Ile Arg Glu Gln Ala Glu Asn Ile Ile His Leu Phe Thr Leu
        275                 280                 285
```

```
Thr Asn Leu Gly Ala Pro Arg Ala Phe Lys Tyr Phe Asp Thr Thr Ile
    290                 295                 300

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

Ile His Gln Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser
                325                 330                 335

Gln Leu Gly Gly Asp Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly
            340                 345                 350

Ser Gly Gly Ser Gly Gly Ser Gly Gly Met Asp Lys Lys Tyr Ser Ile
        355                 360                 365

Gly Leu Ala Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp
    370                 375                 380

Glu Tyr Lys Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp
385                 390                 395                 400

Arg His Ser Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser
                405                 410                 415

Gly Glu Thr Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg
            420                 425                 430

Tyr Thr Arg Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser
        435                 440                 445

Asn Glu Met Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu
    450                 455                 460

Ser Phe Leu Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe
465                 470                 475                 480
```

```
Gly Asn Ile Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile
                485                 490                 495

Tyr His Leu Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu
            500                 505                 510

Arg Leu Ile Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His
        515                 520                 525

Phe Leu Ile Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys
    530                 535                 540

Leu Phe Ile Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn
545                 550                 555                 560

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

Leu Ser Lys Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly
            580                 585                 590

Glu Lys Lys Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly
        595                 600                 605

Leu Thr Pro Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys
    610                 615                 620

Leu Gln Leu Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu
625                 630                 635                 640

Ala Gln Ile Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn
                645                 650                 655

Leu Ser Asp Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu
            660                 665                 670
```

```
Ile Thr Lys Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu
        675                 680                 685

His His Gln Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu
    690                 695                 700

Pro Glu Lys Tyr Lys Glu Ile Phe Phe Asp Gln Ser Lys Asn Gly Tyr
705                 710                 715                 720

Ala Gly Tyr Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe
                725                 730                 735

Ile Lys Pro Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val
            740                 745                 750

Lys Leu Asn Arg Glu Asp Leu Leu Arg Lys Gln Arg Thr Phe Asp Asn
        755                 760                 765

Gly Ser Ile Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu
    770                 775                 780

Arg Arg Gln Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys
785                 790                 795                 800

Ile Glu Lys Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu
                805                 810                 815

Ala Arg Gly Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu
            820                 825                 830

Thr Ile Thr Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser
        835                 840                 845

Ala Gln Ser Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro
    850                 855                 860
```

```
Asn Glu Lys Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr
865                 870                 875                 880


Val Tyr Asn Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg
                885                 890                 895


Lys Pro Ala Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu
            900                 905                 910


Leu Phe Lys Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp
        915                 920                 925


Tyr Phe Lys Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val
    930                 935                 940


Glu Asp Arg Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys
945                 950                 955                 960


Ile Ile Lys Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile
                965                 970                 975


Leu Glu Asp Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met
            980                 985                 990


Ile Glu Glu Arg Leu Lys Thr Tyr  Ala His Leu Phe Asp  Asp Lys Val
        995                 1000                1005


Met Lys  Gln Leu Lys Arg Arg  Arg Tyr Thr Gly Trp  Gly Arg Leu
    1010                1015                1020


Ser Arg  Lys Leu Ile Asn Gly  Ile Arg Asp Lys Gln  Ser Gly Lys
    1025                1030                1035


Thr Ile  Leu Asp Phe Leu Lys  Ser Asp Gly Phe Ala  Asn Arg Asn
    1040                1045                1050
```

```
Phe Met  Gln Leu Ile His Asp  Asp Ser Leu Thr Phe  Lys Glu Asp
    1055                1060                1065

Ile Gln  Lys Ala Gln Val Ser  Gly Gln Gly Asp Ser  Leu His Glu
    1070                1075                1080

His Ile  Ala Asn Leu Ala Gly  Ser Pro Ala Ile Lys  Lys Gly Ile
    1085                1090                1095

Leu Gln  Thr Val Lys Val Val  Asp Glu Leu Val Lys  Val Met Gly
    1100                1105                1110

Arg His  Lys Pro Glu Asn Ile  Val Ile Glu Met Ala  Arg Glu Asn
    1115                1120                1125

Gln Thr  Thr Gln Lys Gly Gln  Lys Asn Ser Arg Glu  Arg Met Lys
    1130                1135                1140

Arg Ile  Glu Glu Gly Ile Lys  Glu Leu Gly Ser Gln  Ile Leu Lys
    1145                1150                1155

Glu His  Pro Val Glu Asn Thr  Gln Leu Gln Asn Glu  Lys Leu Tyr
    1160                1165                1170

Leu Tyr  Tyr Leu Gln Asn Gly  Arg Asp Met Tyr Val  Asp Gln Glu
    1175                1180                1185

Leu Asp  Ile Asn Arg Leu Ser  Asp Tyr Asp Val Asp  His Ile Val
    1190                1195                1200

Pro Gln  Ser Phe Leu Lys Asp  Asp Ser Ile Asp Asn  Lys Val Leu
    1205                1210                1215

Thr Arg  Ser Asp Lys Asn Arg  Gly Lys Ser Asp Asn  Val Pro Ser
    1220                1225                1230
```

```
Glu Glu  Val Val Lys Lys Met  Lys Asn Tyr Trp Arg  Gln Leu Leu
    1235                1240                1245


Asn Ala  Lys Leu Ile Thr Gln  Arg Lys Phe Asp Asn  Leu Thr Lys
    1250                1255                1260


Ala Glu  Arg Gly Gly Leu Ser  Glu Leu Asp Lys Ala  Gly Phe Ile
    1265                1270                1275


Lys Arg  Gln Leu Val Glu Thr  Arg Gln Ile Thr Lys  His Val Ala
    1280                1285                1290


Gln Ile  Leu Asp Ser Arg Met  Asn Thr Lys Tyr Asp  Glu Asn Asp
    1295                1300                1305


Lys Leu  Ile Arg Glu Val Lys  Val Ile Thr Leu Lys  Ser Lys Leu
    1310                1315                1320


Val Ser  Asp Phe Arg Lys Asp  Phe Gln Phe Tyr Lys  Val Arg Glu
    1325                1330                1335


Ile Asn  Asn Tyr His His Ala  His Asp Ala Tyr Leu  Asn Ala Val
    1340                1345                1350


Val Gly  Thr Ala Leu Ile Lys  Lys Tyr Pro Lys Leu  Glu Ser Glu
    1355                1360                1365


Phe Val  Tyr Gly Asp Tyr Lys  Val Tyr Asp Val Arg  Lys Met Ile
    1370                1375                1380


Ala Lys  Ser Glu Gln Glu Gly  Ala Asp Lys Arg Thr  Ala Asp Gly
    1385                1390                1395


Ser Glu  Phe Glu Ser Pro Lys  Lys Lys Arg Lys Val
    1400                1405                1410
```

<210> 4
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 4
cuucuccaca ggagucagau 20

<210> 5
<211> 21
<212> RNA
<213> Artificial Sequence

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

<400> 5
acuucuccac aggagucaga u 21

<210> 6
<211> 22
<212> RNA
<213> Artificial Sequence

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

<400> 6
gacuucucca caggagucag au 22

<210> 7
<211> 125
<212> RNA
<213> Artificial Sequence

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

<400> 7
guuuuuguac ucucaagauu uaaguaacug uacaacgaaa cuuacacagu uacuuaaauc 60

uugcagaagc uacaaagaua aggcuucaug ccgaaaucaa cacccuguca uuuuauggca 120

gggug 125

<210> 8
<211> 145
<212> RNA
<213> Artificial Sequence

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

<400> 8
cuucuccaca ggagucagau guuuuuguac ucucaagauu uaaguaacug uacaacgaaa 60

cuuacacagu uacuuaaauc uugcagaagc uacaaagaua aggcuucaug ccgaaaucaa 120

cacccuguca uuuuauggca gggug 145

<210> 9
<211> 146
<212> RNA
<213> Artificial Sequence

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

<400> 9
acuucuccac aggagucaga uguuuuugua cucucaagau uuaaguaacu guacaacgaa 60

acuuacacag uuacuuaaau cuugcagaag cuacaaagau aaggcuucau gccgaaauca 120

acacccuguc auuuuauggc agggug 146

<210> 10
<211> 147
<212> RNA
<213> Artificial Sequence

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

<400> 10
gacuucucca caggagucag auguuuuugu acucucaaga uuuaaguaac uguacaacga 60

aacuuacaca guuacuuaaa ucuugcagaa gcuacaaaga uaaggcuuca ugccgaaauc 120

aacacccugu cauuuuaugg cagggug 147

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

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

<400> 11
Arg Asn Glu His Leu Glu Val
1 5

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

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

<400> 12
Gln Ser Thr Thr Leu Lys Arg
1 5

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

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

<400> 13
Arg Thr Glu His Leu Ala Arg
1 5

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

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

<400> 14
Arg Gly Glu His Leu Arg Gln
1 5

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

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

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

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

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

<400> 16
Arg Asn Asp Lys Leu Val Pro
1 5

<210> 17
<211> 167
<212> PRT
<213> Artificial Sequence

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

<400> 17

```
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
            20                  25                  30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Thr Phe Phe Arg Met Pro Arg Gln Val Phe Asn Ala Gln Lys
145                 150                 155                 160
```

Lys Ala Gln Ser Ser Thr Asp
165

<210> 18
<211> 160
<212> PRT
<213> Staphylococcus aureus

<400> 18
Met Gly Ser His Met Thr Asn Asp Ile Tyr Phe Met Thr Leu Ala Ile
1 5 10 15

Glu Glu Ala Lys Lys Ala Ala Gln Leu Gly Glu Val Pro Ile Gly Ala
20 25 30

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

Glu Thr Leu Gln Gln Pro Thr Ala His Ala Glu His Ile Ala Ile Glu
50 55 60

Arg Ala Ala Lys Val Leu Gly Ser Trp Arg Leu Glu Gly Cys Thr Leu
65 70 75 80

Tyr Val Thr Leu Glu Pro Cys Val Met Cys Ala Gly Thr Ile Val Met
85 90 95

Ser Arg Ile Pro Arg Val Val Tyr Gly Ala Asp Asp Pro Lys Gly Gly
100 105 110

Cys Ser Gly Ser Leu Met Asn Leu Leu Gln Gln Ser Asn Phe Asn His
115 120 125

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

Leu Thr Thr Phe Phe Lys Asn Leu Arg Ala Asn Lys Lys Ser Thr Asn
145 150 155 160

<210> 19
<211> 161
<212> PRT
<213> Bacillus subtilis

<400> 19
Met Thr Gln Asp Glu Leu Tyr Met Lys Glu Ala Ile Lys Glu Ala Lys
1 5 10 15

Lys Ala Glu Glu Lys Gly Glu Val Pro Ile Gly Ala Val Leu Val Ile
20 25 30

Asn Gly Glu Ile Ile Ala Arg Ala His Asn Leu Arg Glu Thr Glu Gln
35 40 45

Arg Ser Ile Ala His Ala Glu Met Leu Val Ile Asp Glu Ala Cys Lys
50 55 60

Ala Leu Gly Thr Trp Arg Leu Glu Gly Ala Thr Leu Tyr Val Thr Leu
65 70 75 80

Glu Pro Cys Pro Met Cys Ala Gly Ala Val Val Leu Ser Arg Val Glu
85 90 95

Lys Val Val Phe Gly Ala Phe Asp Pro Lys Gly Gly Cys Ser Gly Thr
100 105 110

Leu Met Asn Leu Leu Gln Glu Glu Arg Phe Asn His Gln Ala Glu Val
115 120 125

Val Ser Gly Val Leu Glu Glu Glu Cys Gly Gly Met Leu Ser Ala Phe
130 135 140

Phe Arg Glu Leu Arg Lys Lys Lys Lys Ala Ala Arg Lys Asn Leu Ser
145 150 155 160

Glu

<210> 20
<211> 183
<212> PRT
<213> Salmonella typhimurium

<400> 20
Met Pro Pro Ala Phe Ile Thr Gly Val Thr Ser Leu Ser Asp Val Glu
1   5   10   15

Leu Asp His Glu Tyr Trp Met Arg His Ala Leu Thr Leu Ala Lys Arg
            20   25   30

Ala Trp Asp Glu Arg Glu Val Pro Val Gly Ala Val Leu Val His Asn
        35   40   45

His Arg Val Ile Gly Glu Gly Trp Asn Arg Pro Ile Gly Arg His Asp
    50   55   60

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

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

Pro Cys Val Met Cys Ala Gly Ala Met Val His Ser Arg Ile Gly Arg
            100   105   110

Val Val Phe Gly Ala Arg Asp Ala Lys Thr Gly Ala Ala Gly Ser Leu
        115   120   125

Ile Asp Val Leu His His Pro Gly Met Asn His Arg Val Glu Ile Ile
    130   135   140

Glu Gly Val Leu Arg Asp Glu Cys Ala Thr Leu Leu Ser Asp Phe Phe
145 150 155 160

Arg Met Arg Arg Gln Glu Ile Lys Ala Leu Lys Lys Ala Asp Arg Ala
165 170 175

Glu Gly Ala Gly Pro Ala Val
180

<210> 21
<211> 164
<212> PRT
<213> Shewanella putrefaciens

<400> 21
Met Asp Glu Tyr Trp Met Gln Val Ala Met Gln Met Ala Glu Lys Ala
1 5 10 15

Glu Ala Ala Gly Glu Val Pro Val Gly Ala Val Leu Val Lys Asp Gly
20 25 30

Gln Gln Ile Ala Thr Gly Tyr Asn Leu Ser Ile Ser Gln His Asp Pro
35 40 45

Thr Ala His Ala Glu Ile Leu Cys Leu Arg Ser Ala Gly Lys Lys Leu
50 55 60

Glu Asn Tyr Arg Leu Leu Asp Ala Thr Leu Tyr Ile Thr Leu Glu Pro
65 70 75 80

Cys Ala Met Cys Ala Gly Ala Met Val His Ser Arg Ile Ala Arg Val
85 90 95

Val Tyr Gly Ala Arg Asp Glu Lys Thr Gly Ala Ala Gly Thr Val Val
100 105 110

Asn Leu Leu Gln His Pro Ala Phe Asn His Gln Val Glu Val Thr Ser
115 120 125

```
Gly Val Leu Ala Glu Ala Cys Ser Ala Gln Leu Ser Arg Phe Phe Lys
    130                 135                 140

Arg Arg Arg Asp Glu Lys Lys Ala Leu Lys Leu Ala Gln Arg Ala Gln
145                 150                 155                 160

Gln Gly Ile Glu
```

<210> 22
<211> 173
<212> PRT
<213> Haemophilus influenzae

<400> 22

```
Met Asp Ala Ala Lys Val Arg Ser Glu Phe Asp Glu Lys Met Met Arg
1               5                   10                  15

Tyr Ala Leu Glu Leu Ala Asp Lys Ala Glu Ala Leu Gly Glu Ile Pro
            20                  25                  30

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

Trp Asn Leu Ser Ile Val Gln Ser Asp Pro Thr Ala His Ala Glu Ile
    50                  55                  60

Ile Ala Leu Arg Asn Gly Ala Lys Asn Ile Gln Asn Tyr Arg Leu Leu
65                  70                  75                  80

Asn Ser Thr Leu Tyr Val Thr Leu Glu Pro Cys Thr Met Cys Ala Gly
                85                  90                  95

Ala Ile Leu His Ser Arg Ile Lys Arg Leu Val Phe Gly Ala Ser Asp
            100                 105                 110
```

```
Tyr Lys Thr Gly Ala Ile Gly Ser Arg Phe His Phe Phe Asp Asp Tyr
        115                 120                 125


Lys Met Asn His Thr Leu Glu Ile Thr Ser Gly Val Leu Ala Glu Glu
    130                 135                 140


Cys Ser Gln Lys Leu Ser Thr Phe Phe Gln Lys Arg Arg Glu Glu Lys
145                 150                 155                 160


Lys Ile Glu Lys Ala Leu Leu Lys Ser Leu Ser Asp Lys
                165                 170


<210> 23
<211> 161
<212> PRT
<213> Caulobacter crescentus

<400> 23
Met Arg Thr Asp Glu Ser Glu Asp Gln Asp His Arg Met Met Arg Leu
1               5                   10                  15


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


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


Gly Asn Gly Pro Ile Ala Ala His Asp Pro Thr Ala His Ala Glu Ile
    50                  55                  60


Ala Ala Met Arg Ala Ala Ala Ala Lys Leu Gly Asn Tyr Arg Leu Thr
65                  70                  75                  80


Asp Leu Thr Leu Val Val Thr Leu Glu Pro Cys Ala Met Cys Ala Gly
                85                  90                  95


Ala Ile Ser His Ala Arg Ile Gly Arg Val Val Phe Gly Ala Asp Asp
            100                 105                 110
```

```
Pro Lys Gly Gly Ala Val Val His Gly Pro Lys Phe Phe Ala Gln Pro
        115                 120                 125


Thr Cys His Trp Arg Pro Glu Val Thr Gly Gly Val Leu Ala Asp Glu
    130                 135                 140


Ser Ala Asp Leu Leu Arg Gly Phe Phe Arg Ala Arg Arg Lys Ala Lys
145                 150                 155                 160


Ile
```

<210> 24
<211> 179
<212> PRT
<213> Geobacter sulfurreducens

<400> 24

```
Met Ser Ser Leu Lys Lys Thr Pro Ile Arg Asp Asp Ala Tyr Trp Met
1               5                   10                  15


Gly Lys Ala Ile Arg Glu Ala Ala Lys Ala Ala Ala Arg Asp Glu Val
            20                  25                  30


Pro Ile Gly Ala Val Ile Val Arg Asp Gly Ala Val Ile Gly Arg Gly
        35                  40                  45


His Asn Leu Arg Glu Gly Ser Asn Asp Pro Ser Ala His Ala Glu Met
    50                  55                  60


Ile Ala Ile Arg Gln Ala Ala Arg Arg Ser Ala Asn Trp Arg Leu Thr
65                  70                  75                  80


Gly Ala Thr Leu Tyr Val Thr Leu Glu Pro Cys Leu Met Cys Met Gly
                85                  90                  95
```

Ala Ile Ile Leu Ala Arg Leu Glu Arg Val Val Phe Gly Cys Tyr Asp
100 105 110

Pro Lys Gly Gly Ala Ala Gly Ser Leu Tyr Asp Leu Ser Ala Asp Pro
115 120 125

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

Cys Gly Thr Met Leu Ser Asp Phe Phe Arg Asp Leu Arg Arg Arg Lys
145 150 155 160

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

Pro Glu Pro

<210> 25
<211> 8811
<212> DNA
<213> Artificial Sequence

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

<400> 25
atatgccaag tacgcccccct attgacgtca atgacggtaa atggcccgcc tggcattatg 60

cccagtacat gaccttatgg gactttccta cttggcagta catctacgta ttagtcatcg 120

ctattaccat ggtgatgcgg ttttggcagt acatcaatgg gcgtggatag cggtttgact 180

cacggggatt tccaagtctc caccccattg acgtcaatgg gagtttgttt tggcaccaaa 240

atcaacggga ctttccaaaa tgtcgtaaca actccgcccc attgacgcaa atgggcggta 300

ggcgtgtacg gtgggaggtc tatataagca gagctggttt agtgaaccgt cagatccgct 360

agagatccgc ggccgctaat acgactcact atagggagag ccgccaccat gaaacggaca 420

gccgacggaa gcgagttcga gtcaccaaag aagaagcgga aagtctctga agtcgagttt 480

agccacgagt attggatgag gcacgcactg accctggcaa agcgagcatg ggatgaaaga 540

gaagtccccg tgggcgccgt gctggtgcac aacaatagag tgatcggaga gggatggaac 600

aggccaatcg gccgccacga ccctaccgca cacgcagaga tcatggcact gaggcaggga 660

ggcctggtca tgcagaatta ccgcctgatc gatgccaccc tgtatgtgac actggagcca 720

tgcgtgatgt gcgcaggagc aatgatccac agcaggatcg gaagagtggt gttcggagca 780

cgggacgcca agaccggcgc agcaggctcc ctgatggatg tgctgcacca ccccggcatg 840

aaccaccggg tggagatcac agagggaatc ctggcagacg agtgcgccgc cctgctgagc 900

gatttcttta gaatgcggag acaggagatc aaggcccaga agaaggcaca gagctccacc 960

gactctggag gatctagcgg aggatcctct ggaagcgaga caccaggcac aagcgagtcc 1020

gccacaccag agagctccgg cggctcctcc ggaggatcct ctgaggtgga gttttcccac 1080

gagtactgga tgagacatgc cctgaccctg gccaagaggg cacgcgatga gagggaggtg 1140

cctgtgggag ccgtgctggt gctgaacaat agagtgatcg gcgagggctg gaacagagcc 1200

atcggcctgc acgacccaac agcccatgcc gaaattatgg ccctgagaca gggcggcctg 1260

gtcatgcaga actacagact gattgacgcc accctgtacg tgacattcga gccttgcgtg 1320

atgtgcgccg gcgccatgat ccactctagg atcggccgcg tggtgtttgg cgtgaggaac 1380

gcaaaaaccg gcgccgcagg ctccctgatg gacgtgctgc actaccccgg catgaatcac 1440

cgcgtcgaaa ttaccgaggg aatcctggca gatgaatgtg ccgccctgct gtgctatttc 1500

tttcggatgc ctagacaggt gttcaatgct cagaagaagg cccagagctc caccgactcc 1560

ggaggatcta gcggaggctc ctctggctct gagacacctg gcacaagcga gagcgcaaca 1620

cctgaaagca gcgggggcag cagcgggggg tcagacaaga agtacagcat cggcctggcc 1680

atcggcacca actctgtggg ctgggccgtg atcaccgacg agtacaaggt gcccagcaag 1740

aaattcaagg tgctgggcaa caccgaccgg cacagcatca agaagaacct gatcggagcc 1800

ctgctgttcg acagcggcga aacagccgag gccacccggc tgaagagaac cgccagaaga 1860

agatacacca gacggaagaa ccggatctgc tatctgcaag agatcttcag caacgagatg 1920

gccaaggtgg acgacagctt cttccacaga ctggaagagt ccttcctggt ggaagaggat 1980

aagaagcacg agcggcaccc catcttcggc aacatcgtgg acgaggtggc ctaccacgag 2040

aagtacccca ccatctacca cctgagaaag aaactggtgg acagcaccga caaggccgac 2100

ctgcggctga tctatctggc cctggcccac atgatcaagt tccggggcca cttcctgatc 2160

gagggcgacc tgaaccccga caacagcgac gtggacaagc tgttcatcca gctggtgcag 2220

acctacaacc agctgttcga ggaaaacccc atcaacgcca gcggcgtgga cgccaaggcc 2280

atcctgtctg ccagactgag caagagcaga cggctggaaa atctgatcgc ccagctgccc 2340

ggcgagaaga agaatggcct gttcggaaac ctgattgccc tgagcctggg cctgaccccc 2400

aacttcaaga gcaacttcga cctggccgag gatgccaaac tgcagctgag caaggacacc 2460

tacgacgacg acctggacaa cctgctggcc cagatcggcg accagtacgc cgacctgttt 2520

ctggccgcca agaacctgtc cgacgccatc ctgctgagcg acatcctgag agtgaacacc 2580

gagatcacca aggcccccct gagcgcctct atgatcaaga gatacgacga gcaccaccag 2640

gacctgaccc tgctgaaagc tctcgtgcgg cagcagctgc ctgagaagta caaagagatt 2700

ttcttcgacc agagcaagaa cggctacgcc ggctacattg acggcggagc cagccaggaa 2760

gagttctaca agttcatcaa gcccatcctg gaaaagatgg acggcaccga ggaactgctc 2820

gtgaagctga acagagagga cctgctgcgg aagcagcgga ccttcgacaa cggcagcatc 2880

ccccaccaga tccacctggg agagctgcac gccattctgc ggcggcagga agatttttac 2940

ccattcctga aggacaaccg ggaaaagatc gagaagatcc tgaccttccg catcccctac 3000

tacgtgggcc ctctggccag gggaaacagc agattcgcct ggatgaccag aaagagcgag 3060

gaaaccatca ccccctggaa cttcgaggaa gtggtggaca agggcgcttc cgcccagagc 3120

ttcatcgagc ggatgaccaa cttcgataag aacctgccca acgagaaggt gctgcccaag 3180

cacagcctgc tgtacgagta cttcaccgtg tataacgagc tgaccaaagt gaaatacgtg 3240

accgagggaa tgagaaagcc cgccttcctg agcggcgagc agaaaaaggc catcgtggac 3300

ctgctgttca agaccaaccg gaaagtgacc gtgaagcagc tgaaagagga ctacttcaag 3360

aaaatcgagt gcttcgactc cgtggaaatc tccggcgtgg aagatcggtt caacgcctcc 3420

ctgggcacat accacgatct gctgaaaatt atcaaggaca aggacttcct ggacaatgag 3480

gaaaacgagg acattctgga agatatcgtg ctgaccctga cactgtttga ggacagagag 3540

atgatcgagg aacggctgaa aacctatgcc cacctgttcg acgacaaagt gatgaagcag 3600

ctgaagcggc ggagatacac cggctggggc aggctgagcc ggaagctgat caacggcatc 3660

cgggacaagc agtccggcaa gacaatcctg gatttcctga agtccgacgg cttcgccaac 3720

agaaacttca tgcagctgat ccacgacgac agcctgacct ttaaagagga catccagaaa 3780

gcccaggtgt ccggccaggg cgatagcctg cacgagcaca ttgccaatct ggccggcagc 3840

cccgccatta agaagggcat cctgcagaca gtgaaggtgg tggacgagct cgtgaaagtg 3900

atgggccggc acaagcccga gaacatcgtg atcgaaatgg ccagagagaa ccagaccacc 3960

cagaagggac agaagaacag ccgcgagaga atgaagcgga tcgaagaggg catcaaagag 4020

ctgggcagcc agatcctgaa agaacacccc gtggaaaaca cccagctgca gaacgagaag 4080

ctgtacctgt actacctgca gaatgggcgg gatatgtacg tggaccagga actggacatc 4140

aaccggctgt ccgactacga tgtggaccat atcgtgcctc agagctttct gaaggacgac 4200

tccatcgaca acaaggtgct gaccagaagc gacaagaacc ggggcaagag cgacaacgtg 4260

ccctccgaag aggtcgtgaa gaagatgaag aactactggc ggcagctgct gaacgccaag 4320

ctgattaccc agagaaagtt cgacaatctg accaaggccg agagaggcgg cctgagcgaa 4380

ctggataagg ccggcttcat caagagacag ctggtggaaa cccggcagat cacaaagcac 4440

gtggcacaga tcctggactc ccggatgaac actaagtacg acgagaatga caagctgatc 4500

cgggaagtga aagtgatcac cctgaagtcc aagctggtgt ccgatttccg gaaggatttc 4560

cagttttaca aagtgcgcga gatcaacaac taccaccacg cccacgacgc ctacctgaac 4620

gccgtcgtgg gaaccgccct gatcaaaaag taccctaagc tggaaagcga gttcgtgtac 4680

ggcgactaca aggtgtacga cgtgcggaag atgatcgcca agagcgagca ggaaatcggc 4740

aaggctaccg ccaagtactt cttctacagc aacatcatga acttttttcaa gaccgagatt 4800

accctggcca acggcgagat ccggaagcgg cctctgatcg agacaaacgg cgaaaccggg 4860

gagatcgtgt gggataaggg ccgggatttt gccaccgtgc ggaaagtgct gagcatgccc 4920

caagtgaata tcgtgaaaaa gaccgaggtg cagacaggcg gcttcagcaa agagtctatc 4980

ctgcccaaga ggaacagcga taagctgatc gccagaaaga aggactggga ccctaagaag 5040

tacggcggct tcgacagccc caccgtggcc tattctgtgc tggtggtggc caaagtggaa 5100

aagggcaagt ccaagaaact gaagagtgtg aaagagctgc tggggatcac catcatggaa 5160

agaagcagct tcgagaagaa tcccatcgac tttctggaag ccaagggcta caaagaagtg 5220

aaaaaggacc tgatcatcaa gctgcctaag tactccctgt tcgagctgga aaacggccgg 5280

aagagaatgc tggcctctgc cggcgaactg cagaagggaa acgaactggc cctgccctcc 5340

aaatatgtga acttcctgta cctggccagc cactatgaga agctgaaggg ctcccccgag 5400

gataatgagc agaaacagct gtttgtggaa cagcacaagc actacctgga cgagatcatc 5460

gagcagatca gcgagttctc caagagagtg atcctggccg acgctaatct ggacaaagtg 5520

ctgtccgcct acaacaagca ccgggataag cccatcagag agcaggccga gaatatcatc 5580

cacctgttta ccctgaccaa tctgggagcc cctgccgcct tcaagtactt tgacaccacc 5640

atcgaccgga agaggtacac cagcaccaaa gaggtgctgg acgccaccct gatccaccag 5700

agcatcaccg gcctgtacga gacacggatc gacctgtctc agctgggagg tgactctggc 5760

ggctcaaaaa gaaccgccga cggcagcgaa ttcgagccca agaagaagag gaaagtctaa 5820

ccggtcatca tcaccatcac cattgagttt aaacccgctg atcagcctcg actgtgcctt 5880

ctagttgcca gccatctgtt gtttgcccct cccccgtgcc ttccttgacc ctggaaggtg 5940

ccactcccac tgtcctttcc taataaaatg aggaaattgc atcgcattgt ctgagtaggt 6000

gtcattctat tctgggggggt ggggtggggc aggacagcaa gggggaggat tgggaagaca 6060

atagcaggca tgctggggat gcggtgggct ctatggcttc tgaggcggaa agaaccagct 6120

ggggctcgat accgtcgacc tctagctaga gcttggcgta atcatggtca tagctgtttc 6180

ctgtgtgaaa ttgttatccg ctcacaattc cacacaacat acgagccgga agcataaagt 6240

gtaaagccta gggtgcctaa tgagtgagct aactcacatt aattgcgttg cgctcactgc 6300

ccgctttcca gtcgggaaac ctgtcgtgcc agctgcatta atgaatcggc caacgcgcgg 6360

ggagaggcgg tttgcgtatt gggcgctctt ccgcttcctc gctcactgac tcgctgcgct 6420

cggtcgttcg gctgcggcga gcggtatcag ctcactcaaa ggcggtaata cggttatcca 6480

cagaatcagg ggataacgca ggaaagaaca tgtgagcaaa aggccagcaa aaggccagga 6540

accgtaaaaa ggccgcgttg ctggcgtttt tccataggct ccgcccccct gacgagcatc 6600

acaaaaatcg acgctcaagt cagaggtggc gaaacccgac aggactataa agataccagg 6660

cgtttccccc tggaagctcc ctcgtgcgct ctcctgttcc gaccctgccg cttaccggat 6720

acctgtccgc ctttctccct tcgggaagcg tggcgctttc tcatagctca cgctgtaggt 6780

atctcagttc ggtgtaggtc gttcgctcca agctgggctg tgtgcacgaa ccccccgttc 6840

agcccgaccg ctgcgcctta tccggtaact atcgtcttga gtccaacccg gtaagacacg 6900

acttatcgcc actggcagca gccactggta acaggattag cagagcgagg tatgtaggcg 6960

gtgctacaga gttcttgaag tggtggccta actacggcta cactagaaga acagtatttg 7020

gtatctgcgc tctgctgaag ccagttacct tcggaaaaag agttggtagc tcttgatccg 7080

gcaaacaaac caccgctggt agcggtggtt tttttgtttg caagcagcag attacgcgca 7140

gaaaaaaagg atctcaagaa gatcctttga tcttttctac ggggtctgac actcagtgga 7200

acgaaaactc acgttaaggg attttggtca tgagattatc aaaaaggatc ttcacctaga 7260

tccttttaaa ttaaaaatga agttttaaat caatctaaag tatatatgag taaacttggt 7320

ctgacagtta ccaatgctta atcagtgagg cacctatctc agcgatctgt ctatttcgtt 7380

catccatagt tgcctgactc cccgtcgtgt agataactac gatacgggag ggcttaccat 7440

ctggccccag tgctgcaatg ataccgcgag acccacgctc accggctcca gatttatcag 7500

caataaacca gccagccgga agggccgagc gcagaagtgg tcctgcaact ttatccgcct 7560

ccatccagtc tattaattgt tgccgggaag ctagagtaag tagttcgcca gttaatagtt 7620

tgcgcaacgt tgttgccatt gctacaggca tcgtggtgtc acgctcgtcg tttggtatgg 7680

cttcattcag ctccggttcc caacgatcaa ggcgagttac atgatccccc atgttgtgca 7740

aaaaagcggt tagctccttc ggtcctccga tcgttgtcag aagtaagttg gccgcagtgt 7800

tatcactcat ggttatggca gcactgcata attctcttac tgtcatgcca tccgtaagat 7860

gcttttctgt gactggtgag tactcaacca agtcattctg agaatagtgt atgcggcgac 7920

cgagttgctc ttgcccggcg tcaatacggg ataataccgc gccacatagc agaactttaa 7980

aagtgctcat cattggaaaa cgttcttcgg ggcgaaaact ctcaaggatc ttaccgctgt 8040

tgagatccag ttcgatgtaa cccactcgtg cacccaactg atcttcagca tcttttactt 8100

tcaccagcgt ttctgggtga gcaaaaacag gaaggcaaaa tgccgcaaaa aagggaataa 8160

gggcgacacg gaaatgttga atactcatac tcttcctttt tcaatattat tgaagcattt 8220

atcagggtta ttgtctcatg agcggataca tatttgaatg tatttagaaa aataaacaaa 8280

taggggttcc gcgcacattt ccccgaaaag tgccacctga cgtcgacgga tcgggagatc 8340

gatctcccga tcccctaggg tcgactctca gtacaatctg ctctgatgcc gcatagttaa 8400

gccagtatct gctccctgct tgtgtgttgg aggtcgctga gtagtgcgcg agcaaaattt 8460

aagctacaac aaggcaaggc ttgaccgaca attgcatgaa gaatctgctt agggttaggc 8520

gttttgcgct gcttcgcgat gtacgggcca gatatacgcg ttgacattga ttattgacta 8580

gttattaata gtaatcaatt acggggtcat tagttcatag cccatatatg gagttccgcg 8640

ttacataact tacggtaaat ggcccgcctg gctgaccgcc caacgacccc cgcccattga 8700

cgtcaataat gacgtatgtt cccatagtaa cgccaatagg gactttccat tgacgtcaat 8760

gggtggagta tttacggtaa actgcccact tggcagtaca tcaagtgtat c 8811

<210> 26
<211> 147
<212> PRT
<213> Homo sapiens

<400> 26
Met Val His Leu Thr Pro Glu Glu Lys Ser Ala Val Thr Ala Leu Trp

1 5 10 15

Gly Lys Val Asn Val Asp Glu Val Gly Gly Glu Ala Leu Gly Arg Leu
20 25 30

Leu Val Val Tyr Pro Trp Thr Gln Arg Phe Phe Glu Ser Phe Gly Asp
35 40 45

Leu Ser Thr Pro Asp Ala Val Met Gly Asn Pro Lys Val Lys Ala His
50 55 60

Gly Lys Lys Val Leu Gly Ala Phe Ser Asp Gly Leu Ala His Leu Asp
65 70 75 80

Asn Leu Lys Gly Thr Phe Ala Thr Leu Ser Glu Leu His Cys Asp Lys
85 90 95

Leu His Val Asp Pro Glu Asn Phe Arg Leu Leu Gly Asn Val Leu Val
100 105 110

Cys Val Leu Ala His His Phe Gly Lys Glu Phe Thr Pro Pro Val Gln
115 120 125

Ala Ala Tyr Gln Lys Val Val Ala Gly Val Ala Asn Ala Leu Ala His
130 135 140

Lys Tyr His
145

<210> 27
<211> 628
<212> DNA
<213> Homo sapiens

<400> 27
acatttgctt ctgacacaac tgtgttcact agcaacctca aacagacacc atggtgcatc 60

tgactcctga ggagaagtct gccgttactg ccctgtgggg caaggtgaac gtggatgaag 120

ttggtggtga ggccctgggc aggctgctgg tggtctaccc ttggacccag aggttctttg 180

agtcctttgg ggatctgtcc actcctgatg ctgttatggg caaccctaag gtgaaggctc 240

atggcaagaa agtgctcggt gcctttagtg atggcctggc tcacctggac aacctcaagg 300

gcacctttgc cacactgagt gagctgcact gtgacaagct gcacgtggat cctgagaact 360

tcaggctcct gggcaacgtg ctggtctgtg tgctggccca tcactttggc aaagaattca 420

ccccaccagt gcaggctgcc tatcagaaag tggtggctgg tgtggctaat gccctggccc 480

acaagtatca ctaagctcgc tttcttgctg tccaatttct attaaaggtt cctttgttcc 540

ctaagtccaa ctactaaact gggggatatt atgaagggcc ttgagcatct ggattctgcc 600

taataaaaaa catttatttt cattgcaa 628

<210> 28
<211> 1367
<212> PRT
<213> Streptococcus pyogenes

<400> 28
Met Asp Lys Lys Tyr Ser Ile Gly Leu Asp Ile Gly Thr Asn Ser Val
1 5 10 15

Gly Trp Ala Val Ile Thr Asp Asp Tyr Lys Val Pro Ser Lys Lys Phe
20 25 30

Lys Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile
35 40 45

Gly Ala Leu Leu Phe Gly Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu
50 55 60

Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys
65 70 75 80

Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser
85 90 95

```
Phe Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys
            100                 105                 110

His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr
        115                 120                 125

His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Ala Asp
    130                 135                 140

Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His
145                 150                 155                 160

Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro
                165                 170                 175

Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Ile Tyr
            180                 185                 190

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

Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn
    210                 215                 220

Leu Ile Ala Gln Leu Pro Gly Glu Lys Arg Asn Gly Leu Phe Gly Asn
225                 230                 235                 240

Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe
                245                 250                 255

Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp
            260                 265                 270

Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp
        275                 280                 285
```

```
Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp
    290                 295                 300

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

Met Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys
                325                 330                 335

Ala Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe
            340                 345                 350

Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser
        355                 360                 365

Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp
    370                 375                 380

Gly Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg
385                 390                 395                 400

Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu
                405                 410                 415

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

Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile
        435                 440                 445

Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp
    450                 455                 460

Met Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu
465                 470                 475                 480
```

```
Val Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr
                485                 490                 495

Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser
            500                 505                 510

Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys
        515                 520                 525

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

Lys Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr
545                 550                 555                 560

Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp
                565                 570                 575

Ser Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly
            580                 585                 590

Ala Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp
        595                 600                 605

Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr
    610                 615                 620

Leu Phe Glu Asp Arg Gly Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala
625                 630                 635                 640

His Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr
                645                 650                 655

Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp
            660                 665                 670
```

```
Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe
        675                 680                 685

Ala Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu Thr Phe
    690                 695                 700

Lys Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly His Ser Leu
705                 710                 715                 720

His Glu Gln Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly
                725                 730                 735

Ile Leu Gln Thr Val Lys Ile Val Asp Glu Leu Val Lys Val Met Gly
            740                 745                 750

His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln Thr
        755                 760                 765

Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile Glu
    770                 775                 780

Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro Val
785                 790                 795                 800

Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu Gln
                805                 810                 815

Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg Leu
            820                 825                 830

Ser Asp Tyr Asp Val Asp His Ile Val Pro Gln Ser Phe Ile Lys Asp
        835                 840                 845

Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg Gly
    850                 855                 860
```

```
Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys Asn
865                 870                 875                 880

Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys Phe
                885                 890                 895

Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp Lys
            900                 905                 910

Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr Lys
        915                 920                 925

His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp Glu
    930                 935                 940

Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser Lys
945                 950                 955                 960

Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg Glu
                965                 970                 975

Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val Val
            980                 985                 990

Gly Thr Ala Leu Ile Lys Lys Tyr  Pro Lys Leu Glu Ser  Glu Phe Val
        995                 1000                1005

Tyr Gly  Asp Tyr Lys Val Tyr  Asp Val Arg Lys Met  Ile Ala Lys
    1010                1015                1020

Ser Glu  Gln Glu Ile Gly Lys  Ala Thr Ala Lys Tyr  Phe Phe Tyr
    1025                1030                1035

Ser Asn  Ile Met Asn Phe Phe  Lys Thr Glu Ile Thr  Leu Ala Asn
    1040                1045                1050
```

```
Gly Glu  Ile Arg Lys Arg Pro  Leu Ile Glu Thr Asn  Gly Glu Thr
    1055                1060                1065

Gly Glu  Ile Val Trp Asp Lys  Gly Arg Asp Phe Ala  Thr Val Arg
    1070                1075                1080

Lys Val  Leu Ser Met Pro Gln  Val Asn Ile Val Lys  Lys Thr Glu
    1085                1090                1095

Val Gln  Thr Gly Gly Phe Ser  Lys Glu Ser Ile Leu  Pro Lys Arg
    1100                1105                1110

Asn Ser  Asp Lys Leu Ile Ala  Arg Lys Lys Asp Trp  Asp Pro Lys
    1115                1120                1125

Lys Tyr  Gly Gly Phe Asp Ser  Pro Thr Val Ala Tyr  Ser Val Leu
    1130                1135                1140

Val Val  Ala Lys Val Glu Lys  Gly Lys Ser Lys Lys  Leu Lys Ser
    1145                1150                1155

Val Lys  Glu Leu Leu Gly Ile  Thr Ile Met Glu Arg  Ser Ser Phe
    1160                1165                1170

Glu Lys  Asn Pro Ile Asp Phe  Leu Glu Ala Lys Gly  Tyr Lys Glu
    1175                1180                1185

Val Lys  Lys Asp Leu Ile Ile  Lys Leu Pro Lys Tyr  Ser Leu Phe
    1190                1195                1200

Glu Leu  Glu Asn Gly Arg Lys  Arg Met Leu Ala Ser  Ala Gly Glu
    1205                1210                1215

Leu Gln  Lys Gly Asn Glu Leu  Ala Leu Pro Ser Lys  Tyr Val Asn
    1220                1225                1230
```

```
Phe Leu  Tyr Leu Ala Ser His  Tyr Glu Lys Leu Lys  Gly Ser Pro
    1235                 1240                 1245


Glu Asp  Asn Glu Gln Lys Gln  Leu Phe Val Glu Gln  His Lys His
    1250                 1255                 1260


Tyr Leu  Asp Glu Ile Ile Glu  Gln Ile Ser Glu Phe  Ser Lys Arg
    1265                 1270                 1275


Val Ile  Leu Ala Asp Ala Asn  Leu Asp Lys Val Leu  Ser Ala Tyr
    1280                 1285                 1290


Asn Lys  His Arg Asp Lys Pro  Ile Arg Glu Gln Ala  Glu Asn Ile
    1295                 1300                 1305


Ile His  Leu Phe Thr Leu Thr  Asn Leu Gly Ala Pro  Ala Ala Phe
    1310                 1315                 1320


Lys Tyr  Phe Asp Thr Thr Ile  Asp Arg Lys Arg Tyr  Thr Ser Thr
    1325                 1330                 1335


Lys Glu  Val Leu Asp Ala Thr  Leu Ile His Gln Ser  Ile Thr Gly
    1340                 1345                 1350


Leu Tyr  Glu Thr Arg Ile Asp  Leu Ser Gln Leu Gly  Gly Asp
    1355                 1360                 1365


<210> 29
<211> 4104
<212> DNA
<213> Streptococcus pyogenes

<400> 29
atggataaga aatactcaat aggcttagat atcggcacaa atagcgtcgg atgggcggtg       60

atcactgatg attataaggt tccgtctaaa aagttcaagg ttctgggaaa tacagaccgc      120
```

cacagtatca aaaaaaatct tataggggct cttttatttg gcagtggaga gacagcggaa 180

gcgactcgtc tcaaacggac agctcgtaga aggtatacac gtcggaagaa tcgtatttgt 240

tatctacagg agatttttc aaatgagatg gcgaaagtag atgatagttt ctttcatcga 300

cttgaagagt ctttttggt ggaagaagac aagaagcatg aacgtcatcc tatttttgga 360

aatatagtag atgaagttgc ttatcatgag aaatatccaa ctatctatca tctgcgaaaa 420

aaattggcag attctactga taaagcggat ttgcgcttaa tctatttggc cttagcgcat 480

atgattaagt ttcgtggtca ttttttgatt gagggagatt taaatcctga taatagtgat 540

gtggacaaac tatttatcca gttggtacaa atctacaatc aattatttga agaaaaccct 600

attaacgcaa gtagagtaga tgctaaagcg attctttctg cacgattgag taaatcaaga 660

cgattagaaa atctcattgc tcagctcccc ggtgagaaga gaaatggctt gtttgggaat 720

ctcattgctt tgtcattggg attgacccct aattttaaat caaattttga tttggcagaa 780

gatgctaaat tacagctttc aaaagatact tacgatgatg atttagataa tttattggcg 840

caaattggag atcaatatgc tgatttgttt ttggcagcta agaatttatc agatgctatt 900

ttactttcag atatcctaag agtaaatagt gaaataacta aggctcccct atcagcttca 960

atgattaagc gctacgatga acatcatcaa gacttgactc ttttaaaagc tttagttcga 1020

caacaacttc cagaaaagta taaagaaatc ttttttgatc aatcaaaaaa cggatatgca 1080

ggttatattg atgggggagc tagccaagaa gaattttata aatttatcaa accaatttta 1140

gaaaaaatgg atggtactga ggaattattg gtgaaactaa atcgtgaaga tttgctgcgc 1200

aagcaacgga cctttgacaa cggctctatt ccccatcaaa ttcacttggg tgagctgcat 1260

gctattttga gaagacaaga agacttttat ccatttttaa aagacaatcg tgagaagatt 1320

gaaaaaatct tgacttttcg aattccttat tatgttggtc cattggcgcg tggcaatagt 1380

cgttttgcat ggatgactcg gaagtctgaa gaaacaatta ccccatggaa ttttgaagaa 1440

gttgtcgata aaggtgcttc agctcaatca tttattgaac gcatgacaaa ctttgataaa 1500

aatcttccaa atgaaaaagt actaccaaaa catagtttgc tttatgagta ttttacggtt 1560

tataacgaat tgacaaaggt caaatatgtt actgagggaa tgcgaaaacc agcatttctt 1620

tcaggtgaac agaagaaagc cattgttgat ttactcttca aaacaaatcg aaaagtaacc 1680

gttaagcaat taaaagaaga ttatttcaaa aaaatagaat gttttgatag tgttgaaatt 1740

tcaggagttg aagatagatt taatgcttca ttaggcgcct accatgattt gctaaaaatt 1800

attaaagata aagatttttt ggataatgaa gaaaatgaag atatcttaga ggatattgtt 1860

ttaacattga ccttatttga agataggggg atgattgagg aaagacttaa aacatatgct 1920

cacctctttg atgataaggt gatgaaacag cttaaacgtc gccgttatac tggttgggga 1980

cgtttgtctc gaaaattgat taatggtatt agggataagc aatctggcaa aacaatatta 2040

gatttttga aatcagatgg ttttgccaat cgcaatttta tgcagctgat ccatgatgat 2100

agtttgacat ttaaagaaga tattcaaaaa gcacaggtgt ctggacaagg ccatagttta 2160

catgaacaga ttgctaactt agctggcagt cctgctatta aaaaaggtat tttacagact 2220

gtaaaaattg ttgatgaact ggtcaaagta atggggcata agccagaaaa tatcgttatt 2280

gaaatggcac gtgaaaatca gacaactcaa aagggccaga aaaattcgcg agagcgtatg 2340

aaacgaatcg aagaaggtat caaagaatta ggaagtcaga ttcttaaaga gcatcctgtt 2400

gaaaatactc aattgcaaaa tgaaaagctc tatctctatt atctacaaaa tggaagagac 2460

atgtatgtgg accaagaatt agatattaat cgtttaagtg attatgatgt cgatcacatt 2520

gttccacaaa gtttcattaa agacgattca atagacaata aggtactaac gcgttctgat 2580

aaaaatcgtg gtaaatcgga taacgttcca agtgaagaag tagtcaaaaa gatgaaaaac 2640

tattggagac aacttctaaa cgccaagtta atcactcaac gtaagtttga taatttaacg 2700

aaagctgaac gtggaggttt gagtgaactt gataaagctg gttttatcaa acgccaattg 2760

gttgaaactc gccaaatcac taagcatgtg gcacaaattt tggatagtcg catgaatact 2820

aaatacgatg aaaatgataa acttattcga gaggttaaag tgattacctt aaaatctaaa 2880

ttagtttctg acttccgaaa agatttccaa ttctataaag tacgtgagat taacaattac 2940

catcatgccc atgatgcgta tctaaatgcc gtcgttggaa ctgctttgat taagaaatat 3000

ccaaaacttg aatcggagtt tgtctatggt gattataaag tttatgatgt tcgtaaaatg 3060

attgctaagt ctgagcaaga aataggcaaa gcaaccgcaa aatatttctt ttactctaat 3120

atcatgaact tcttcaaaac agaaattaca cttgcaaatg gagagattcg caaacgccct 3180

ctaatcgaaa ctaatgggga aactggagaa attgtctggg ataaagggcg agattttgcc 3240

acagtgcgca aagtattgtc catgccccaa gtcaatattg tcaagaaaac agaagtacag 3300

acaggcggat tctccaagga gtcaatttta ccaaaaagaa attcggacaa gcttattgct 3360

cgtaaaaaag actgggatcc aaaaaaatat ggtggttttg atagtccaac ggtagcttat 3420

tcagtcctag tggttgctaa ggtggaaaaa gggaaatcga agaagttaaa atccgttaaa 3480

gagttactag ggatcacaat tatggaaaga agttcctttg aaaaaaatcc gattgacttt 3540

ttagaagcta aaggatataa ggaagttaaa aaagacttaa tcattaaact acctaaatat 3600

agtctttttg agttagaaaa cggtcgtaaa cggatgctgg ctagtgccgg agaattacaa 3660

aaaggaaatg agctggctct gccaagcaaa tatgtgaatt ttttatattt agctagtcat 3720

tatgaaaagt tgaagggtag tccagaagat aacgaacaaa aacaattgtt tgtggagcag 3780

cataagcatt atttagatga gattattgag caaatcagtg aattttctaa gcgtgttatt 3840

ttagcagatg ccaatttaga taaagttctt agtgcatata acaaacatag agacaaacca 3900

atacgtgaac aagcagaaaa tattattcat ttatttacgt tgacgaatct tggagctccc 3960

gctgctttta aatattttga tacaacaatt gatcgtaaac gatatacgtc tacaaaagaa 4020

gttttagatg ccactcttat ccatcaatcc atcactggtc tttatgaaac acgcattgat 4080

ttgagtcagc taggaggtga ctga 4104

<210> 30
<211> 4212
<212> DNA
<213> Streptococcus pyogenes

<400> 30
atggataaaa agtattctat tggtttagac atcggcacta attccgttgg atgggctgtc 60

ataaccgatg aatacaaagt accttcaaag aaatttaagg tgttggggaa cacagaccgt 120

cattcgatta aaaagaatct tatcggtgcc ctcctattcg atagtggcga aacggcagag 180

gcgactcgcc tgaaacgaac cgctcggaga aggtatacac gtcgcaagaa ccgaatatgt 240

tacttacaag aaatttttag caatgagatg gccaaagttg acgattcttt ctttcaccgt 300

ttggaagagt ccttccttgt cgaagaggac aagaaacatg aacggcaccc catctttgga 360

aacatagtag atgaggtggc atatcatgaa aagtacccaa cgatttatca cctcagaaaa 420

aagctagttg actcaactga taaagcggac ctgaggttaa tctacttggc tcttgcccat 480

atgataaagt tccgtgggca ctttctcatt gagggtgatc taaatccgga caactcggat 540

gtcgacaaac tgttcatcca gttagtacaa acctataatc agttgtttga agagaaccct 600

ataaatgcaa gtggcgtgga tgcgaaggct attcttagcg cccgcctctc taaatcccga 660

cggctagaaa acctgatcgc acaattaccc ggagagaaga aaaatgggtt gttcggtaac 720

cttatagcgc tctcactagg cctgacacca aattttaagt cgaacttcga cttagctgaa 780

gatgccaaat tgcagcttag taaggacacg tacgatgacg atctcgacaa tctactggca 840

caaattggag atcagtatgc ggacttattt ttggctgcca aaaaccttag cgatgcaatc 900

ctcctatctg acatactgag agttaatact gagattacca aggcgccgtt atccgcttca 960

atgatcaaaa ggtacgatga acatcaccaa gacttgacac ttctcaaggc cctagtccgt 1020

cagcaactgc ctgagaaata taaggaaata ttctttgatc agtcgaaaaa cgggtacgca 1080

ggttatattg acggcggagc gagtcaagag gaattctaca agtttatcaa acccatatta 1140

gagaagatgg atgggacgga agagttgctt gtaaaactca atcgcgaaga tctactgcga 1200

aagcagcgga ctttcgacaa cggtagcatt ccacatcaaa tccacttagg cgaattgcat 1260

gctatactta gaaggcagga ggatttttat ccgttcctca aagacaatcg tgaaaagatt 1320

gagaaaatcc taacctttcg cataccttac tatgtgggac ccctggcccg agggaactct 1380

cggttcgcat ggatgacaag aaagtccgaa gaaacgatta ctccatggaa ttttgaggaa 1440

gttgtcgata aaggtgcgtc agctcaatcg ttcatcgaga ggatgaccaa ctttgacaag 1500

aatttaccga acgaaaaagt attgcctaag cacagtttac tttacgagta tttcacagtg 1560

tacaatgaac tcacgaaagt taagtatgtc actgagggca tgcgtaaacc cgcctttcta 1620

agcggagaac agaagaaagc aatagtagat ctgttattca agaccaaccg caaagtgaca 1680

gttaagcaat tgaaagagga ctactttaag aaaattgaat gcttcgattc tgtcgagatc 1740

tccggggtag aagatcgatt taatgcgtca cttggtacgt atcatgacct cctaaagata 1800

attaaagata aggacttcct ggataacgaa gagaatgaag atatcttaga agatatagtg 1860

ttgactctta ccctctttga agatcgggaa atgattgagg aaagactaaa aacatacgct 1920

cacctgttcg acgataaggt tatgaaacag ttaaagaggc gtcgctatac gggctgggga 1980

cgattgtcgc ggaaacttat caacgggata agagacaagc aaagtggtaa aactattctc 2040

gattttctaa agagcgacgg cttcgccaat aggaacttta tgcagctgat ccatgatgac 2100

tctttaacct tcaaagagga tatacaaaag gcacaggttt ccggacaagg ggactcattg 2160

cacgaacata ttgcgaatct tgctggttcg ccagccatca aaaagggcat actccagaca 2220

gtcaaagtag tggatgagct agttaaggtc atgggacgtc acaaaccgga aaacattgta 2280

atcgagatgg cacgcgaaaa tcaaacgact cagaaggggc aaaaaaacag tcgagagcgg 2340

atgaagagaa tagaagaggg tattaaagaa ctgggcagcc agatcttaaa ggagcatcct 2400

gtggaaaata cccaattgca gaacgagaaa ctttacctct attacctaca aaatggaagg 2460

gacatgtatg ttgatcagga actggacata aaccgtttat ctgattacga cgtcgatcac 2520

attgtacccc aatccttttt gaaggacgat tcaatcgaca ataaagtgct tacacgctcg 2580

gataagaacc gagggaaaag tgacaatgtt ccaagcgagg aagtcgtaaa gaaaatgaag 2640

aactattggc ggcagctcct aaatgcgaaa ctgataacgc aaagaaagtt cgataactta 2700

actaaagctg agaggggtgg cttgtctgaa cttgacaagg ccggatttat taaacgtcag 2760

ctcgtggaaa cccgccaaat cacaaagcat gttgcacaga tactagattc ccgaatgaat 2820

acgaaatacg acgagaacga taagctgatt cgggaagtca aagtaatcac tttaaagtca 2880

aaattggtgt cggacttcag aaaggatttt caattctata aagttaggga gataaataac 2940

taccaccatg cgcacgacgc ttatcttaat gccgtcgtag ggaccgcact cattaagaaa 3000

tacccgaagc tagaaagtga gtttgtgtat ggtgattaca aagtttatga cgtccgtaag 3060

atgatcgcga aaagcgaaca ggagataggc aaggctacag ccaaatactt cttttattct 3120

aacattatga atttctttaa gacggaaatc actctggcaa acggagagat acgcaaacga 3180

cctttaattg aaaccaatgg ggagacaggt gaaatcgtat gggataaggg ccgggacttc 3240

gcgacggtga gaaaagtttt gtccatgccc caagtcaaca tagtaaagaa aactgaggtg 3300

cagaccggag ggttttcaaa ggaatcgatt cttccaaaaa ggaatagtga taagctcatc 3360

gctcgtaaaa aggactggga cccgaaaaag tacggtggct tcgatagccc tacagttgcc 3420

tattctgtcc tagtagtggc aaaagttgag aagggaaaat ccaagaaact gaagtcagtc 3480

aaagaattat tggggataac gattatggag cgctcgtctt ttgaaaagaa ccccatcgac 3540

ttccttgagg cgaaaggtta caaggaagta aaaaaggatc tcataattaa actaccaaag 3600

tatagtctgt ttgagttaga aaatggccga aaacggatgt tggctagcgc cggagagctt 3660

caaaagggga acgaactcgc actaccgtct aaatacgtga atttcctgta tttagcgtcc 3720

cattacgaga agttgaaagg ttcacctgaa gataacgaac agaagcaact ttttgttgag 3780

cagcacaaac attatctcga cgaaatcata gagcaaattt cggaattcag taagagagtc 3840

atcctagctg atgccaatct ggacaaagta ttaagcgcat acaacaagca cagggataaa 3900

cccatacgtg agcaggcgga aaatattatc catttgttta ctcttaccaa cctcggcgct 3960

ccagccgcat tcaagtattt tgacacaacg atagatcgca aacgatacac ttctaccaag 4020

gaggtgctag acgcgacact gattcaccaa tccatcacgg gattatatga aactcggata 4080

gatttgtcac agcttggggg tgacggatcc cccaagaaga agaggaaagt ctcgagcgac 4140

tacaaagacc atgacggtga ttataaagat catgacatcg attacaagga tgacgatgac 4200

aaggctgcag ga 4212

<210> 31
<211> 1368
<212> PRT
<213> Streptococcus pyogenes

<400> 31
Met Asp Lys Lys Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val
1   5   10   15

Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe
            20   25   30

Lys Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile
        35   40   45

Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu
    50   55   60

Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys
65   70   75   80

Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser
                85   90   95

Phe Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys
            100   105   110

His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr
        115   120   125

His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp
    130   135   140

Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His
145   150   155   160

Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro
                165   170   175

Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr
            180   185   190

```
Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala
        195                 200                 205

Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn
    210                 215                 220

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

Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe
                245                 250                 255

Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp
            260                 265                 270

Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp
        275                 280                 285

Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp
    290                 295                 300

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

Met Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys
                325                 330                 335

Ala Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe
            340                 345                 350

Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser
        355                 360                 365

Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp
    370                 375                 380
```

```
Gly Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg
385                 390                 395                 400

Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu
                405                 410                 415

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

Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile
        435                 440                 445

Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp
    450                 455                 460

Met Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu
465                 470                 475                 480

Val Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr
                485                 490                 495

Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser
            500                 505                 510

Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys
        515                 520                 525

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

Lys Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr
545                 550                 555                 560

Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp
                565                 570                 575
```

```
Ser Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly
            580                 585                 590

Thr Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp
        595                 600                 605

Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr
    610                 615                 620

Leu Phe Glu Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala
625                 630                 635                 640

His Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr
                645                 650                 655

Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp
            660                 665                 670

Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe
        675                 680                 685

Ala Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu Thr Phe
    690                 695                 700

Lys Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly Asp Ser Leu
705                 710                 715                 720

His Glu His Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly
                725                 730                 735

Ile Leu Gln Thr Val Lys Val Val Asp Glu Leu Val Lys Val Met Gly
            740                 745                 750

Arg His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln
        755                 760                 765
```

```
Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile
    770                 775                 780

Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro
785                 790                 795                 800

Val Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu
                805                 810                 815

Gln Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg
            820                 825                 830

Leu Ser Asp Tyr Asp Val Asp His Ile Val Pro Gln Ser Phe Leu Lys
        835                 840                 845

Asp Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg
    850                 855                 860

Gly Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys
865                 870                 875                 880

Asn Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys
                885                 890                 895

Phe Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp
            900                 905                 910

Lys Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr
        915                 920                 925

Lys His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp
    930                 935                 940

Glu Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser
945                 950                 955                 960
```

```
Lys Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg
               965                 970                 975

Glu Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val
           980                 985                 990

Val Gly Thr Ala Leu Ile Lys Lys  Tyr Pro Lys Leu Glu  Ser Glu Phe
        995                1000                1005

Val Tyr  Gly Asp Tyr Lys Val  Tyr Asp Val Arg Lys  Met Ile Ala
    1010                1015                1020

Lys Ser  Glu Gln Glu Ile Gly  Lys Ala Thr Ala Lys  Tyr Phe Phe
    1025                1030                1035

Tyr Ser  Asn Ile Met Asn Phe  Phe Lys Thr Glu Ile  Thr Leu Ala
    1040                1045                1050

Asn Gly  Glu Ile Arg Lys Arg  Pro Leu Ile Glu Thr  Asn Gly Glu
    1055                1060                1065

Thr Gly  Glu Ile Val Trp Asp  Lys Gly Arg Asp Phe  Ala Thr Val
    1070                1075                1080

Arg Lys  Val Leu Ser Met Pro  Gln Val Asn Ile Val  Lys Lys Thr
    1085                1090                1095

Glu Val  Gln Thr Gly Gly Phe  Ser Lys Glu Ser Ile  Leu Pro Lys
    1100                1105                1110

Arg Asn  Ser Asp Lys Leu Ile  Ala Arg Lys Lys Asp  Trp Asp Pro
    1115                1120                1125

Lys Lys  Tyr Gly Gly Phe Asp  Ser Pro Thr Val Ala  Tyr Ser Val
    1130                1135                1140
```

```
Leu Val  Val Ala Lys Val Glu  Lys Gly Lys Ser Lys  Lys Leu Lys
    1145                1150                1155

Ser Val  Lys Glu Leu Leu Gly  Ile Thr Ile Met Glu  Arg Ser Ser
    1160                1165                1170

Phe Glu  Lys Asn Pro Ile Asp  Phe Leu Glu Ala Lys  Gly Tyr Lys
    1175                1180                1185

Glu Val  Lys Lys Asp Leu Ile  Ile Lys Leu Pro Lys  Tyr Ser Leu
    1190                1195                1200

Phe Glu  Leu Glu Asn Gly Arg  Lys Arg Met Leu Ala  Ser Ala Gly
    1205                1210                1215

Glu Leu  Gln Lys Gly Asn Glu  Leu Ala Leu Pro Ser  Lys Tyr Val
    1220                1225                1230

Asn Phe  Leu Tyr Leu Ala Ser  His Tyr Glu Lys Leu  Lys Gly Ser
    1235                1240                1245

Pro Glu  Asp Asn Glu Gln Lys  Gln Leu Phe Val Glu  Gln His Lys
    1250                1255                1260

His Tyr  Leu Asp Glu Ile Ile  Glu Gln Ile Ser Glu  Phe Ser Lys
    1265                1270                1275

Arg Val  Ile Leu Ala Asp Ala  Asn Leu Asp Lys Val  Leu Ser Ala
    1280                1285                1290

Tyr Asn  Lys His Arg Asp Lys  Pro Ile Arg Glu Gln  Ala Glu Asn
    1295                1300                1305

Ile Ile  His Leu Phe Thr Leu  Thr Asn Leu Gly Ala  Pro Ala Ala
    1310                1315                1320
```

```
Phe Lys  Tyr Phe Asp Thr Thr  Ile Asp Arg Lys Arg  Tyr Thr Ser
    1325                 1330                 1335


Thr Lys  Glu Val Leu Asp Ala  Thr Leu Ile His Gln  Ser Ile Thr
    1340                 1345                 1350


Gly Leu  Tyr Glu Thr Arg Ile  Asp Leu Ser Gln Leu  Gly Gly Asp
    1355                 1360                 1365


<210> 32
<211> 4107
<212> DNA
<213> Streptococcus pyogenes

<400> 32
atggataaga aatactcaat aggcttagat atcggcacaa atagcgtcgg atgggcggtg       60

atcactgatg aatataaggt tccgtctaaa aagttcaagg ttctgggaaa tacagaccgc      120

cacagtatca aaaaaaatct tataggggct cttttatttg acagtggaga gacagcggaa      180

gcgactcgtc tcaaacggac agctcgtaga aggtatacac gtcggaagaa tcgtatttgt      240

tatctacagg agatttttc aaatgagatg gcgaaagtag atgatagttt ctttcatcga      300

cttgaagagt ctttttggt ggaagaagac aagaagcatg aacgtcatcc tatttttgga      360

aatatagtag atgaagttgc ttatcatgag aaatatccaa ctatctatca tctgcgaaaa      420

aaattggtag attctactga taaagcggat ttgcgcttaa tctatttggc cttagcgcat      480

atgattaagt ttcgtggtca ttttttgatt gagggagatt taaatcctga taatagtgat      540

gtggacaaac tatttatcca gttggtacaa acctacaatc aattatttga agaaaaccct      600

attaacgcaa gtggagtaga tgctaaagcg attctttctg cacgattgag taaatcaaga      660

cgattagaaa atctcattgc tcagctcccc ggtgagaaga aaaatggctt atttgggaat      720

ctcattgctt tgtcattggg tttgacccct aattttaaat caaattttga tttggcagaa      780

gatgctaaat tacagctttc aaaagatact tacgatgatg atttagataa tttattggcg      840
```

caaattggag atcaatatgc tgatttgttt ttggcagcta agaatttatc agatgctatt 900

ttactttcag atatcctaag agtaaatact gaaataacta aggctcccct atcagcttca 960

atgattaaac gctacgatga acatcatcaa gacttgactc ttttaaaagc tttagttcga 1020

caacaacttc cagaaaagta taaagaaatc ttttttgatc aatcaaaaaa cggatatgca 1080

ggttatattg atgggggagc tagccaagaa gaattttata aatttatcaa accaatttta 1140

gaaaaaatgg atggtactga ggaattattg gtgaaactaa atcgtgaaga tttgctgcgc 1200

aagcaacgga cctttgacaa cggctctatt ccccatcaaa ttcacttggg tgagctgcat 1260

gctattttga gaagacaaga agacttttat ccatttttaa aagacaatcg tgagaagatt 1320

gaaaaaatct tgacttttcg aattccttat tatgttggtc cattggcgcg tggcaatagt 1380

cgttttgcat ggatgactcg gaagtctgaa gaaacaatta ccccatggaa ttttgaagaa 1440

gttgtcgata aaggtgcttc agctcaatca tttattgaac gcatgacaaa ctttgataaa 1500

aatcttccaa atgaaaaagt actaccaaaa catagtttgc tttatgagta ttttacggtt 1560

tataacgaat tgacaaaggt caaatatgtt actgaaggaa tgcgaaaacc agcatttctt 1620

tcaggtgaac agaagaaagc cattgttgat ttactcttca aaacaaatcg aaaagtaacc 1680

gttaagcaat taaaagaaga ttatttcaaa aaaatagaat gttttgatag tgttgaaatt 1740

tcaggagttg aagatagatt taatgcttca ttaggtacct accatgattt gctaaaaatt 1800

attaaagata aagatttttt ggataatgaa gaaaatgaag atatcttaga ggatattgtt 1860

ttaacattga ccttatttga agatagggag atgattgagg aaagacttaa aacatatgct 1920

cacctctttg atgataaggt gatgaaacag cttaaacgtc gccgttatac tggttgggga 1980

cgtttgtctc gaaaattgat taatggtatt agggataagc aatctggcaa aacaatatta 2040

gatttttga aatcagatgg ttttgccaat cgcaatttta tgcagctgat ccatgatgat 2100

agtttgacat ttaaagaaga cattcaaaaa gcacaagtgt ctggacaagg cgatagttta 2160

catgaacata ttgcaaattt agctggtagc cctgctatta aaaaaggtat tttacagact 2220

gtaaaagttg ttgatgaatt ggtcaaagta atggggcggc ataagccaga aaatatcgtt 2280

attgaaatgg cacgtgaaaa tcagacaact caaaagggcc agaaaaattc gcgagagcgt 2340

atgaaacgaa tcgaagaagg tatcaaagaa ttaggaagtc agattcttaa agagcatcct 2400

gttgaaaata ctcaattgca aaatgaaaag ctctatctct attatctcca aaatggaaga 2460

gacatgtatg tggaccaaga attagatatt aatcgtttaa gtgattatga tgtcgatcac 2520

attgttccac aaagtttcct taaagacgat tcaatagaca ataaggtctt aacgcgttct 2580

gataaaaatc gtggtaaatc ggataacgtt ccaagtgaag aagtagtcaa aaagatgaaa 2640

aactattgga gacaacttct aaacgccaag ttaatcactc aacgtaagtt tgataattta 2700

acgaaagctg aacgtggagg tttgagtgaa cttgataaag ctggttttat caaacgccaa 2760

ttggttgaaa ctcgccaaat cactaagcat gtggcacaaa ttttggatag tcgcatgaat 2820

actaaatacg atgaaaatga taaacttatt cgagaggtta aagtgattac cttaaaatct 2880

aaattagttt ctgacttccg aaaagatttc caattctata aagtacgtga gattaacaat 2940

taccatcatg cccatgatgc gtatctaaat gccgtcgttg gaactgcttt gattaagaaa 3000

tatccaaaac ttgaatcgga gtttgtctat ggtgattata aagtttatga tgttcgtaaa 3060

atgattgcta agtctgagca agaaataggc aaagcaaccg caaaatattt cttttactct 3120

aatatcatga acttcttcaa aacagaaatt acacttgcaa atggagagat tcgcaaacgc 3180

cctctaatcg aaactaatgg ggaaactgga gaaattgtct gggataaagg gcgagatttt 3240

gccacagtgc gcaaagtatt gtccatgccc caagtcaata ttgtcaagaa aacagaagta 3300

cagacaggcg gattctccaa ggagtcaatt ttaccaaaaa gaaattcgga caagcttatt 3360

gctcgtaaaa aagactggga tccaaaaaaa tatggtggtt ttgatagtcc aacggtagct 3420

tattcagtcc tagtggttgc taaggtggaa aaagggaaat cgaagaagtt aaaatccgtt 3480

aaagagttac tagggatcac aattatggaa agaagttcct ttgaaaaaaa tccgattgac 3540

tttttagaag ctaaaggata taaggaagtt aaaaaagact taatcattaa actacctaaa 3600

tatagtcttt ttgagttaga aaacggtcgt aaacggatgc tggctagtgc cggagaatta 3660

caaaaaggaa atgagctggc tctgccaagc aaatatgtga atttttttata tttagctagt 3720

cattatgaaa agttgaaggg tagtccagaa gataacgaac aaaaacaatt gtttgtggag 3780

cagcataagc attatttaga tgagattatt gagcaaatca gtgaattttc taagcgtgtt 3840

attttagcag atgccaattt agataaagtt cttagtgcat ataacaaaca tagagacaaa 3900

ccaatacgtg aacaagcaga aaatattatt catttattta cgttgacgaa tcttggagct 3960

cccgctgctt ttaaatattt tgatacaaca attgatcgta aacgatatac gtctacaaaa 4020

gaagttttag atgccactct tatccatcaa tccatcactg gtctttatga aacacgcatt 4080

gatttgagtc agctaggagg tgactga 4107

<210> 33
<211> 1082
<212> PRT
<213> Neisseria meningitidis

<400> 33

```
Met Ala Ala Phe Lys Pro Asn Pro Ile Asn Tyr Ile Leu Gly Leu Asp
1               5                  10                  15

Ile Gly Ile Ala Ser Val Gly Trp Ala Met Val Glu Ile Asp Glu Asp
            20                  25                  30

Glu Asn Pro Ile Cys Leu Ile Asp Leu Gly Val Arg Val Phe Glu Arg
        35                  40                  45

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

Ala Arg Ser Val Arg Arg Leu Thr Arg Arg Arg Ala His Arg Leu Leu
65                  70                  75                  80

Arg Ala Arg Arg Leu Leu Lys Arg Glu Gly Val Leu Gln Ala Ala Asp
                85                  90                  95

Phe Asp Glu Asn Gly Leu Ile Lys Ser Leu Pro Asn Thr Pro Trp Gln
            100                 105                 110
```

```
Leu Arg Ala Ala Ala Leu Asp Arg Lys Leu Thr Pro Leu Glu Trp Ser
        115                 120                 125

Ala Val Leu Leu His Leu Ile Lys His Arg Gly Tyr Leu Ser Gln Arg
    130                 135                 140

Lys Asn Glu Gly Glu Thr Ala Asp Lys Glu Leu Gly Ala Leu Leu Lys
145                 150                 155                 160

Gly Val Ala Asp Asn Ala His Ala Leu Gln Thr Gly Asp Phe Arg Thr
                165                 170                 175

Pro Ala Glu Leu Ala Leu Asn Lys Phe Glu Lys Glu Ser Gly His Ile
            180                 185                 190

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

Gln Ala Glu Leu Ile Leu Leu Phe Glu Lys Gln Lys Glu Phe Gly Asn
    210                 215                 220

Pro His Val Ser Gly Gly Leu Lys Glu Gly Ile Glu Thr Leu Leu Met
225                 230                 235                 240

Thr Gln Arg Pro Ala Leu Ser Gly Asp Ala Val Gln Lys Met Leu Gly
                245                 250                 255

His Cys Thr Phe Glu Pro Ala Glu Pro Lys Ala Ala Lys Asn Thr Tyr
            260                 265                 270

Thr Ala Glu Arg Phe Ile Trp Leu Thr Lys Leu Asn Asn Leu Arg Ile
        275                 280                 285

Leu Glu Gln Gly Ser Glu Arg Pro Leu Thr Asp Thr Glu Arg Ala Thr
    290                 295                 300
```

```
Leu Met Asp Glu Pro Tyr Arg Lys Ser Lys Leu Thr Tyr Ala Gln Ala
305                 310                 315                 320


Arg Lys Leu Leu Gly Leu Glu Asp Thr Ala Phe Phe Lys Gly Leu Arg
                325                 330                 335


Tyr Gly Lys Asp Asn Ala Glu Ala Ser Thr Leu Met Glu Met Lys Ala
            340                 345                 350


Tyr His Ala Ile Ser Arg Ala Leu Glu Lys Glu Gly Leu Lys Asp Lys
        355                 360                 365


Lys Ser Pro Leu Asn Leu Ser Pro Glu Leu Gln Asp Glu Ile Gly Thr
    370                 375                 380


Ala Phe Ser Leu Phe Lys Thr Asp Glu Asp Ile Thr Gly Arg Leu Lys
385                 390                 395                 400


Asp Arg Ile Gln Pro Glu Ile Leu Glu Ala Leu Leu Lys His Ile Ser
                405                 410                 415


Phe Asp Lys Phe Val Gln Ile Ser Leu Lys Ala Leu Arg Arg Ile Val
            420                 425                 430


Pro Leu Met Glu Gln Gly Lys Arg Tyr Asp Glu Ala Cys Ala Glu Ile
        435                 440                 445


Tyr Gly Asp His Tyr Gly Lys Lys Asn Thr Glu Glu Lys Ile Tyr Leu
    450                 455                 460


Pro Pro Ile Pro Ala Asp Glu Ile Arg Asn Pro Val Val Leu Arg Ala
465                 470                 475                 480


Leu Ser Gln Ala Arg Lys Val Ile Asn Gly Val Val Arg Arg Tyr Gly
                485                 490                 495
```

```
Ser Pro Ala Arg Ile His Ile Glu Thr Ala Arg Glu Val Gly Lys Ser
            500                 505                 510

Phe Lys Asp Arg Lys Glu Ile Glu Lys Arg Gln Glu Glu Asn Arg Lys
        515                 520                 525

Asp Arg Glu Lys Ala Ala Ala Lys Phe Arg Glu Tyr Phe Pro Asn Phe
    530                 535                 540

Val Gly Glu Pro Lys Ser Lys Asp Ile Leu Lys Leu Arg Leu Tyr Glu
545                 550                 555                 560

Gln Gln His Gly Lys Cys Leu Tyr Ser Gly Lys Glu Ile Asn Leu Gly
                565                 570                 575

Arg Leu Asn Glu Lys Gly Tyr Val Glu Ile Asp His Ala Leu Pro Phe
            580                 585                 590

Ser Arg Thr Trp Asp Asp Ser Phe Asn Asn Lys Val Leu Val Leu Gly
        595                 600                 605

Ser Glu Asn Gln Asn Lys Gly Asn Gln Thr Pro Tyr Glu Tyr Phe Asn
    610                 615                 620

Gly Lys Asp Asn Ser Arg Glu Trp Gln Glu Phe Lys Ala Arg Val Glu
625                 630                 635                 640

Thr Ser Arg Phe Pro Arg Ser Lys Lys Gln Arg Ile Leu Leu Gln Lys
                645                 650                 655

Phe Asp Glu Asp Gly Phe Lys Glu Arg Asn Leu Asn Asp Thr Arg Tyr
            660                 665                 670

Val Asn Arg Phe Leu Cys Gln Phe Val Ala Asp Arg Met Arg Leu Thr
        675                 680                 685
```

```
Gly Lys Gly Lys Lys Arg Val Phe Ala Ser Asn Gly Gln Ile Thr Asn
    690                 695                 700

Leu Leu Arg Gly Phe Trp Gly Leu Arg Lys Val Arg Ala Glu Asn Asp
705                 710                 715                 720

Arg His His Ala Leu Asp Ala Val Val Val Ala Cys Ser Thr Val Ala
                725                 730                 735

Met Gln Gln Lys Ile Thr Arg Phe Val Arg Tyr Lys Glu Met Asn Ala
            740                 745                 750

Phe Asp Gly Lys Thr Ile Asp Lys Glu Thr Gly Glu Val Leu His Gln
        755                 760                 765

Lys Thr His Phe Pro Gln Pro Trp Glu Phe Phe Ala Gln Glu Val Met
    770                 775                 780

Ile Arg Val Phe Gly Lys Pro Asp Gly Lys Pro Glu Phe Glu Glu Ala
785                 790                 795                 800

Asp Thr Pro Glu Lys Leu Arg Thr Leu Leu Ala Glu Lys Leu Ser Ser
                805                 810                 815

Arg Pro Glu Ala Val His Glu Tyr Val Thr Pro Leu Phe Val Ser Arg
            820                 825                 830

Ala Pro Asn Arg Lys Met Ser Gly Gln Gly His Met Glu Thr Val Lys
        835                 840                 845

Ser Ala Lys Arg Leu Asp Glu Gly Val Ser Val Leu Arg Val Pro Leu
    850                 855                 860

Thr Gln Leu Lys Leu Lys Asp Leu Glu Lys Met Val Asn Arg Glu Arg
865                 870                 875                 880
```

```
Glu Pro Lys Leu Tyr Glu Ala Leu Lys Ala Arg Leu Glu Ala His Lys
               885                 890                 895


Asp Asp Pro Ala Lys Ala Phe Ala Glu Pro Phe Tyr Lys Tyr Asp Lys
            900                 905                 910


Ala Gly Asn Arg Thr Gln Gln Val Lys Ala Val Arg Val Glu Gln Val
        915                 920                 925


Gln Lys Thr Gly Val Trp Val Arg Asn His Asn Gly Ile Ala Asp Asn
    930                 935                 940


Ala Thr Met Val Arg Val Asp Val Phe Glu Lys Gly Asp Lys Tyr Tyr
945                 950                 955                 960


Leu Val Pro Ile Tyr Ser Trp Gln Val Ala Lys Gly Ile Leu Pro Asp
               965                 970                 975


Arg Ala Val Val Gln Gly Lys Asp Glu Glu Asp Trp Gln Leu Ile Asp
            980                 985                 990


Asp Ser Phe Asn Phe Lys Phe Ser  Leu His Pro Asn Asp  Leu Val Glu
        995                 1000                1005


Val Ile  Thr Lys Lys Ala Arg  Met Phe Gly Tyr Phe  Ala Ser Cys
    1010                1015                1020


His Arg  Gly Thr Gly Asn Ile  Asn Ile Arg Ile His  Asp Leu Asp
    1025                1030                1035


His Lys  Ile Gly Lys Asn Gly  Ile Leu Glu Gly Ile  Gly Val Lys
    1040                1045                1050


Thr Ala  Leu Ser Phe Gln Lys  Tyr Gln Ile Asp Glu  Leu Gly Lys
    1055                1060                1065
```

Glu Ile Arg Pro Cys Arg Leu Lys Lys Arg Pro Pro Val Arg
    1070   1075   1080

<210> 34
<211> 1082
<212> PRT
<213> Neisseria meningitidis

<400> 34
Met Ala Ala Phe Lys Pro Asn Pro Ile Asn Tyr Ile Leu Gly Leu Asp
1   5   10   15

Ile Gly Ile Ala Ser Val Gly Trp Ala Met Val Glu Ile Asp Glu Glu
            20   25   30

Glu Asn Pro Ile Arg Leu Ile Asp Leu Gly Val Arg Val Phe Glu Arg
        35   40   45

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

Ala Arg Ser Val Arg Arg Leu Thr Arg Arg Arg Ala His Arg Leu Leu
65   70   75   80

Arg Ala Arg Arg Leu Leu Lys Arg Glu Gly Val Leu Gln Ala Ala Asp
                85   90   95

Phe Asp Glu Asn Gly Leu Ile Lys Ser Leu Pro Asn Thr Pro Trp Gln
            100   105   110

Leu Arg Ala Ala Ala Leu Asp Arg Lys Leu Thr Pro Leu Glu Trp Ser
        115   120   125

Ala Val Leu Leu His Leu Ile Lys His Arg Gly Tyr Leu Ser Gln Arg
    130   135   140

Lys Asn Glu Gly Glu Thr Ala Asp Lys Glu Leu Gly Ala Leu Leu Lys

```
145                 150                 155                 160

Gly Val Ala Asn Asn Ala His Ala Leu Gln Thr Gly Asp Phe Arg Thr
                165                 170                 175

Pro Ala Glu Leu Ala Leu Asn Lys Phe Glu Lys Glu Ser Gly His Ile
            180                 185                 190

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

Gln Ala Glu Leu Ile Leu Leu Phe Glu Lys Gln Lys Glu Phe Gly Asn
    210                 215                 220

Pro His Val Ser Gly Gly Leu Lys Glu Gly Ile Glu Thr Leu Leu Met
225                 230                 235                 240

Thr Gln Arg Pro Ala Leu Ser Gly Asp Ala Val Gln Lys Met Leu Gly
                245                 250                 255

His Cys Thr Phe Glu Pro Ala Glu Pro Lys Ala Ala Lys Asn Thr Tyr
            260                 265                 270

Thr Ala Glu Arg Phe Ile Trp Leu Thr Lys Leu Asn Asn Leu Arg Ile
        275                 280                 285

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

Leu Met Asp Glu Pro Tyr Arg Lys Ser Lys Leu Thr Tyr Ala Gln Ala
305                 310                 315                 320

Arg Lys Leu Leu Gly Leu Glu Asp Thr Ala Phe Phe Lys Gly Leu Arg
                325                 330                 335

Tyr Gly Lys Asp Asn Ala Glu Ala Ser Thr Leu Met Glu Met Lys Ala
```

```
            340                 345                 350

Tyr His Ala Ile Ser Arg Ala Leu Glu Lys Glu Gly Leu Lys Asp Lys
        355                 360                 365

Lys Ser Pro Leu Asn Leu Ser Ser Glu Leu Gln Asp Glu Ile Gly Thr
    370                 375                 380

Ala Phe Ser Leu Phe Lys Thr Asp Glu Asp Ile Thr Gly Arg Leu Lys
385                 390                 395                 400

Asp Arg Val Gln Pro Glu Ile Leu Glu Ala Leu Leu Lys His Ile Ser
                405                 410                 415

Phe Asp Lys Phe Val Gln Ile Ser Leu Lys Ala Leu Arg Arg Ile Val
            420                 425                 430

Pro Leu Met Glu Gln Gly Lys Arg Tyr Asp Glu Ala Cys Ala Glu Ile
        435                 440                 445

Tyr Gly Asp His Tyr Gly Lys Lys Asn Thr Glu Glu Lys Ile Tyr Leu
    450                 455                 460

Pro Pro Ile Pro Ala Asp Glu Ile Arg Asn Pro Val Val Leu Arg Ala
465                 470                 475                 480

Leu Ser Gln Ala Arg Lys Val Ile Asn Gly Val Val Arg Arg Tyr Gly
                485                 490                 495

Ser Pro Ala Arg Ile His Ile Glu Thr Ala Arg Glu Val Gly Lys Ser
            500                 505                 510

Phe Lys Asp Arg Lys Glu Ile Glu Lys Arg Gln Glu Glu Asn Arg Lys
        515                 520                 525

Asp Arg Glu Lys Ala Ala Ala Lys Phe Arg Glu Tyr Phe Pro Asn Phe
```

```
    530                 535                 540

Val Gly Glu Pro Lys Ser Lys Asp Ile Leu Lys Leu Arg Leu Tyr Glu
545                 550                 555                 560

Gln Gln His Gly Lys Cys Leu Tyr Ser Gly Lys Glu Ile Asn Leu Val
                565                 570                 575

Arg Leu Asn Glu Lys Gly Tyr Val Glu Ile Asp His Ala Leu Pro Phe
            580                 585                 590

Ser Arg Thr Trp Asp Asp Ser Phe Asn Asn Lys Val Leu Val Leu Gly
        595                 600                 605

Ser Glu Asn Gln Asn Lys Gly Asn Gln Thr Pro Tyr Glu Tyr Phe Asn
    610                 615                 620

Gly Lys Asp Asn Ser Arg Glu Trp Gln Glu Phe Lys Ala Arg Val Glu
625                 630                 635                 640

Thr Ser Arg Phe Pro Arg Ser Lys Lys Gln Arg Ile Leu Leu Gln Lys
                645                 650                 655

Phe Asp Glu Asp Gly Phe Lys Glu Cys Asn Leu Asn Asp Thr Arg Tyr
            660                 665                 670

Val Asn Arg Phe Leu Cys Gln Phe Val Ala Asp His Ile Leu Leu Thr
        675                 680                 685

Gly Lys Gly Lys Arg Arg Val Phe Ala Ser Asn Gly Gln Ile Thr Asn
    690                 695                 700

Leu Leu Arg Gly Phe Trp Gly Leu Arg Lys Val Arg Ala Glu Asn Asp
705                 710                 715                 720

Arg His His Ala Leu Asp Ala Val Val Val Ala Cys Ser Thr Val Ala
```

```
                725                 730                 735

Met Gln Gln Lys Ile Thr Arg Phe Val Arg Tyr Lys Glu Met Asn Ala
            740                 745                 750

Phe Asp Gly Lys Thr Ile Asp Lys Glu Thr Gly Lys Val Leu His Gln
        755                 760                 765

Lys Thr His Phe Pro Gln Pro Trp Glu Phe Phe Ala Gln Glu Val Met
    770                 775                 780

Ile Arg Val Phe Gly Lys Pro Asp Gly Lys Pro Glu Phe Glu Glu Ala
785                 790                 795                 800

Asp Thr Pro Glu Lys Leu Arg Thr Leu Leu Ala Glu Lys Leu Ser Ser
                805                 810                 815

Arg Pro Glu Ala Val His Glu Tyr Val Thr Pro Leu Phe Val Ser Arg
            820                 825                 830

Ala Pro Asn Arg Lys Met Ser Gly Ala His Lys Asp Thr Leu Arg Ser
        835                 840                 845

Ala Lys Arg Phe Val Lys His Asn Glu Lys Ile Ser Val Lys Arg Val
    850                 855                 860

Trp Leu Thr Glu Ile Lys Leu Ala Asp Leu Glu Asn Met Val Asn Tyr
865                 870                 875                 880

Lys Asn Gly Arg Glu Ile Glu Leu Tyr Glu Ala Leu Lys Ala Arg Leu
                885                 890                 895

Glu Ala Tyr Gly Gly Asn Ala Lys Gln Ala Phe Asp Pro Lys Asp Asn
            900                 905                 910

Pro Phe Tyr Lys Lys Gly Gly Gln Leu Val Lys Ala Val Arg Val Glu
```

915 920 925

Lys Thr Gln Glu Ser Gly Val Leu Leu Asn Lys Lys Asn Ala Tyr Thr
930 935 940

Ile Ala Asp Asn Gly Asp Met Val Arg Val Asp Val Phe Cys Lys Val
945 950 955 960

Asp Lys Lys Gly Lys Asn Gln Tyr Phe Ile Val Pro Ile Tyr Ala Trp
965 970 975

Gln Val Ala Glu Asn Ile Leu Pro Asp Ile Asp Cys Lys Gly Tyr Arg
980 985 990

Ile Asp Asp Ser Tyr Thr Phe Cys Phe Ser Leu His Lys Tyr Asp Leu
995 1000 1005

Ile Ala Phe Gln Lys Asp Glu Lys Ser Lys Val Glu Phe Ala Tyr
1010 1015 1020

Tyr Ile Asn Cys Asp Ser Ser Asn Gly Arg Phe Tyr Leu Ala Trp
1025 1030 1035

His Asp Lys Gly Ser Lys Glu Gln Gln Phe Arg Ile Ser Thr Gln
1040 1045 1050

Asn Leu Val Leu Ile Gln Lys Tyr Gln Val Asn Glu Leu Gly Lys
1055 1060 1065

Glu Ile Arg Pro Cys Arg Leu Lys Lys Arg Pro Pro Val Arg
1070 1075 1080

<210> 35
<211> 1368
<212> PRT
<213> Artificial Sequence

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

<400> 35

```
Met Asp Lys Lys Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val
1               5                  10                  15

Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe
            20                  25                  30

Lys Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile
        35                  40                  45

Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu
    50                  55                  60

Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys
65                  70                  75                  80

Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser
                85                  90                  95

Phe Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys
            100                 105                 110

His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr
        115                 120                 125

His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp
    130                 135                 140

Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His
145                 150                 155                 160

Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro
                165                 170                 175
```

```
Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr
            180                 185                 190

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

Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn
    210                 215                 220

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

Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe
                245                 250                 255

Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp
            260                 265                 270

Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp
        275                 280                 285

Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp
    290                 295                 300

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

Met Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys
                325                 330                 335

Ala Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe
            340                 345                 350

Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser
        355                 360                 365
```

```
Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp
    370                 375                 380

Gly Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg
385                 390                 395                 400

Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu
                405                 410                 415

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

Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile
        435                 440                 445

Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp
    450                 455                 460

Met Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu
465                 470                 475                 480

Val Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr
                485                 490                 495

Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser
            500                 505                 510

Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys
        515                 520                 525

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

Lys Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr
545                 550                 555                 560
```

```
Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp
                565                 570                 575

Ser Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly
            580                 585                 590

Thr Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp
        595                 600                 605

Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr
    610                 615                 620

Leu Phe Glu Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala
625                 630                 635                 640

His Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr
                645                 650                 655

Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp
            660                 665                 670

Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe
        675                 680                 685

Ala Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu Thr Phe
    690                 695                 700

Lys Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly Asp Ser Leu
705                 710                 715                 720

His Glu His Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly
                725                 730                 735

Ile Leu Gln Thr Val Lys Val Val Asp Glu Leu Val Lys Val Met Gly
            740                 745                 750
```

```
Arg His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln
        755                 760                 765

Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile
    770                 775                 780

Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro
785                 790                 795                 800

Val Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu
                805                 810                 815

Gln Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg
            820                 825                 830

Leu Ser Asp Tyr Asp Val Asp Ala Ile Val Pro Gln Ser Phe Leu Lys
        835                 840                 845

Asp Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg
    850                 855                 860

Gly Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys
865                 870                 875                 880

Asn Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys
                885                 890                 895

Phe Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp
            900                 905                 910

Lys Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr
        915                 920                 925

Lys His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp
    930                 935                 940
```

```
Glu Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser
945                 950                 955                 960


Lys Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg
                965                 970                 975


Glu Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val
            980                 985                 990


Val Gly Thr Ala Leu Ile Lys Lys  Tyr Pro Lys Leu Glu  Ser Glu Phe
        995                 1000                1005


Val Tyr  Gly Asp Tyr Lys Val  Tyr Asp Val Arg Lys  Met Ile Ala
    1010                1015                1020


Lys Ser  Glu Gln Glu Ile Gly  Lys Ala Thr Ala Lys  Tyr Phe Phe
    1025                1030                1035


Tyr Ser  Asn Ile Met Asn Phe  Phe Lys Thr Glu Ile  Thr Leu Ala
    1040                1045                1050


Asn Gly  Glu Ile Arg Lys Arg  Pro Leu Ile Glu Thr  Asn Gly Glu
    1055                1060                1065


Thr Gly  Glu Ile Val Trp Asp  Lys Gly Arg Asp Phe  Ala Thr Val
    1070                1075                1080


Arg Lys  Val Leu Ser Met Pro  Gln Val Asn Ile Val  Lys Lys Thr
    1085                1090                1095


Glu Val  Gln Thr Gly Gly Phe  Ser Lys Glu Ser Ile  Leu Pro Lys
    1100                1105                1110


Arg Asn  Ser Asp Lys Leu Ile  Ala Arg Lys Lys Asp  Trp Asp Pro
    1115                1120                1125
```

```
Lys Lys  Tyr Gly Gly Phe Asp  Ser Pro Thr Val Ala  Tyr Ser Val
    1130                1135                1140


Leu Val  Val Ala Lys Val Glu  Lys Gly Lys Ser Lys  Lys Leu Lys
    1145                1150                1155


Ser Val  Lys Glu Leu Leu Gly  Ile Thr Ile Met Glu  Arg Ser Ser
    1160                1165                1170


Phe Glu  Lys Asn Pro Ile Asp  Phe Leu Glu Ala Lys  Gly Tyr Lys
    1175                1180                1185


Glu Val  Lys Lys Asp Leu Ile  Ile Lys Leu Pro Lys  Tyr Ser Leu
    1190                1195                1200


Phe Glu  Leu Glu Asn Gly Arg  Lys Arg Met Leu Ala  Ser Ala Gly
    1205                1210                1215


Glu Leu  Gln Lys Gly Asn Glu  Leu Ala Leu Pro Ser  Lys Tyr Val
    1220                1225                1230


Asn Phe  Leu Tyr Leu Ala Ser  His Tyr Glu Lys Leu  Lys Gly Ser
    1235                1240                1245


Pro Glu  Asp Asn Glu Gln Lys  Gln Leu Phe Val Glu  Gln His Lys
    1250                1255                1260


His Tyr  Leu Asp Glu Ile Ile  Glu Gln Ile Ser Glu  Phe Ser Lys
    1265                1270                1275


Arg Val  Ile Leu Ala Asp Ala  Asn Leu Asp Lys Val  Leu Ser Ala
    1280                1285                1290


Tyr Asn  Lys His Arg Asp Lys  Pro Ile Arg Glu Gln  Ala Glu Asn
    1295                1300                1305
```

Ile Ile His Leu Phe Thr Leu Thr Asn Leu Gly Ala Pro Ala Ala
    1310   1315   1320

Phe Lys Tyr Phe Asp Thr Thr Ile Asp Arg Lys Arg Tyr Thr Ser
    1325   1330   1335

Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln Ser Ile Thr
    1340   1345   1350

Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu Gly Gly Asp
    1355   1360   1365

<210> 36
<211> 1367
<212> PRT
<213> Artificial Sequence

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

<400> 36
Asp Lys Lys Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val Gly
1   5   10   15

Trp Ala Val Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe Lys
            20   25   30

Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile Gly
        35   40   45

Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu Lys
    50   55   60

Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys Tyr
65   70   75   80

Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser Phe

85 90 95

Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys His
100 105 110

Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr His
115 120 125

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

Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His Met
145 150 155 160

Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro Asp
165 170 175

Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr Asn
180 185 190

Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala Lys
195 200 205

Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn Leu
210 215 220

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

Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe Asp
245 250 255

Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp Asp
260 265 270

Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp Leu

```
        275                 280                 285

Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp Ile
    290                 295                 300

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

Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys Ala
                325                 330                 335

Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe Asp
            340                 345                 350

Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser Gln
        355                 360                 365

Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp Gly
    370                 375                 380

Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg Lys
385                 390                 395                 400

Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu Gly
                405                 410                 415

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

Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile Pro
        435                 440                 445

Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp Met
    450                 455                 460

Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu Val
```

```
465                 470                 475                 480

Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr Asn
                485                 490                 495

Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser Leu
            500                 505                 510

Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys Tyr
        515                 520                 525

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

Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr Val
545                 550                 555                 560

Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp Ser
                565                 570                 575

Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly Thr
            580                 585                 590

Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp Asn
        595                 600                 605

Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr Leu
    610                 615                 620

Phe Glu Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala His
625                 630                 635                 640

Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr Thr
                645                 650                 655

Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp Lys
```

660 665 670

Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe Ala
675 680 685

Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu Thr Phe Lys
690 695 700

Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly Asp Ser Leu His
705 710 715 720

Glu His Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly Ile
725 730 735

Leu Gln Thr Val Lys Val Val Asp Glu Leu Val Lys Val Met Gly Arg
740 745 750

His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln Thr
755 760 765

Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile Glu
770 775 780

Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro Val
785 790 795 800

Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu Gln
805 810 815

Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg Leu
820 825 830

Ser Asp Tyr Asp Val Asp Ala Ile Val Pro Gln Ser Phe Leu Lys Asp
835 840 845

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

```
    850                 855                 860

Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys Asn
865                 870                 875                 880

Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys Phe
                885                 890                 895

Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp Lys
            900                 905                 910

Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr Lys
        915                 920                 925

His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp Glu
    930                 935                 940

Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser Lys
945                 950                 955                 960

Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg Glu
                965                 970                 975

Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val Val
            980                 985                 990

Gly Thr Ala Leu Ile Lys Lys Tyr  Pro Lys Leu Glu Ser  Glu Phe Val
        995                 1000                1005

Tyr Gly  Asp Tyr Lys Val Tyr  Asp Val Arg Lys Met  Ile Ala Lys
    1010                1015                1020

Ser Glu  Gln Glu Ile Gly Lys  Ala Thr Ala Lys Tyr  Phe Phe Tyr
    1025                1030                1035

Ser Asn  Ile Met Asn Phe Phe  Lys Thr Glu Ile Thr  Leu Ala Asn
```

```
    1040                1045                1050

Gly Glu  Ile Arg Lys Arg Pro  Leu Ile Glu Thr Asn  Gly Glu Thr
    1055                1060                1065

Gly Glu  Ile Val Trp Asp Lys  Gly Arg Asp Phe Ala  Thr Val Arg
    1070                1075                1080

Lys Val  Leu Ser Met Pro Gln  Val Asn Ile Val Lys  Lys Thr Glu
    1085                1090                1095

Val Gln  Thr Gly Gly Phe Ser  Lys Glu Ser Ile Leu  Pro Lys Arg
    1100                1105                1110

Asn Ser  Asp Lys Leu Ile Ala  Arg Lys Lys Asp Trp  Asp Pro Lys
    1115                1120                1125

Lys Tyr  Gly Gly Phe Asp Ser  Pro Thr Val Ala Tyr  Ser Val Leu
    1130                1135                1140

Val Val  Ala Lys Val Glu Lys  Gly Lys Ser Lys Lys  Leu Lys Ser
    1145                1150                1155

Val Lys  Glu Leu Leu Gly Ile  Thr Ile Met Glu Arg  Ser Ser Phe
    1160                1165                1170

Glu Lys  Asn Pro Ile Asp Phe  Leu Glu Ala Lys Gly  Tyr Lys Glu
    1175                1180                1185

Val Lys  Lys Asp Leu Ile Ile  Lys Leu Pro Lys Tyr  Ser Leu Phe
    1190                1195                1200

Glu Leu  Glu Asn Gly Arg Lys  Arg Met Leu Ala Ser  Ala Gly Glu
    1205                1210                1215

Leu Gln  Lys Gly Asn Glu Leu  Ala Leu Pro Ser Lys  Tyr Val Asn
```

```
    1220                1225                1230

Phe Leu  Tyr Leu Ala Ser His  Tyr Glu Lys Leu Lys  Gly Ser Pro
    1235                1240                1245

Glu Asp  Asn Glu Gln Lys Gln  Leu Phe Val Glu Gln  His Lys His
    1250                1255                1260

Tyr Leu  Asp Glu Ile Ile Glu  Gln Ile Ser Glu Phe  Ser Lys Arg
    1265                1270                1275

Val Ile  Leu Ala Asp Ala Asn  Leu Asp Lys Val Leu  Ser Ala Tyr
    1280                1285                1290

Asn Lys  His Arg Asp Lys Pro  Ile Arg Glu Gln Ala  Glu Asn Ile
    1295                1300                1305

Ile His  Leu Phe Thr Leu Thr  Asn Leu Gly Ala Pro  Ala Ala Phe
    1310                1315                1320

Lys Tyr  Phe Asp Thr Thr Ile  Asp Arg Lys Arg Tyr  Thr Ser Thr
    1325                1330                1335

Lys Glu  Val Leu Asp Ala Thr  Leu Ile His Gln Ser  Ile Thr Gly
    1340                1345                1350

Leu Tyr  Glu Thr Arg Ile Asp  Leu Ser Gln Leu Gly  Gly Asp
    1355                1360                1365


<210> 37
<211> 1367
<212> PRT
<213> Artificial Sequence

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

<400> 37

```
Asp Lys Lys Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val Gly
1               5                   10                  15

Trp Ala Val Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe Lys
            20                  25                  30

Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile Gly
        35                  40                  45

Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu Lys
    50                  55                  60

Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys Tyr
65                  70                  75                  80

Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser Phe
                85                  90                  95

Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys His
            100                 105                 110

Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr His
        115                 120                 125

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

Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His Met
145                 150                 155                 160

Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro Asp
                165                 170                 175

Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr Asn
            180                 185                 190
```

```
Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala Lys
        195                 200                 205

Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn Leu
    210                 215                 220

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

Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe Asp
                245                 250                 255

Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp Asp
            260                 265                 270

Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp Leu
        275                 280                 285

Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp Ile
    290                 295                 300

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

Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys Ala
                325                 330                 335

Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe Asp
            340                 345                 350

Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser Gln
        355                 360                 365

Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp Gly
    370                 375                 380
```

```
Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg Lys
385                 390                 395                 400


Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu Gly
                405                 410                 415


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


Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile Pro
        435                 440                 445


Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp Met
    450                 455                 460


Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu Val
465                 470                 475                 480


Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr Asn
                485                 490                 495


Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser Leu
            500                 505                 510


Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys Tyr
        515                 520                 525


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


Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr Val
545                 550                 555                 560


Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp Ser
                565                 570                 575
```

```
Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly Thr
            580                 585                 590

Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp Asn
        595                 600                 605

Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr Leu
    610                 615                 620

Phe Glu Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala His
625                 630                 635                 640

Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr Thr
                645                 650                 655

Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp Lys
            660                 665                 670

Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe Ala
        675                 680                 685

Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu Thr Phe Lys
    690                 695                 700

Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly Asp Ser Leu His
705                 710                 715                 720

Glu His Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly Ile
                725                 730                 735

Leu Gln Thr Val Lys Val Val Asp Glu Leu Val Lys Val Met Gly Arg
            740                 745                 750

His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln Thr
        755                 760                 765
```

```
Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile Glu
    770                 775                 780

Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro Val
785                 790                 795                 800

Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu Gln
                805                 810                 815

Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg Leu
            820                 825                 830

Ser Asp Tyr Asp Val Asp His Ile Val Pro Gln Ser Phe Leu Lys Asp
        835                 840                 845

Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg Gly
    850                 855                 860

Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys Asn
865                 870                 875                 880

Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys Phe
                885                 890                 895

Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp Lys
            900                 905                 910

Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr Lys
        915                 920                 925

His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp Glu
    930                 935                 940

Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser Lys
945                 950                 955                 960
```

```
Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg Glu
               965                 970                 975


Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val Val
           980                 985                 990


Gly Thr Ala Leu Ile Lys Lys Tyr  Pro Lys Leu Glu Ser  Glu Phe Val
        995                1000                1005


Tyr Gly  Asp Tyr Lys Val Tyr  Asp Val Arg Lys Met  Ile Ala Lys
    1010                1015                1020


Ser Glu  Gln Glu Ile Gly Lys  Ala Thr Ala Lys Tyr  Phe Phe Tyr
    1025                1030                1035


Ser Asn  Ile Met Asn Phe Phe  Lys Thr Glu Ile Thr  Leu Ala Asn
    1040                1045                1050


Gly Glu  Ile Arg Lys Arg Pro  Leu Ile Glu Thr Asn  Gly Glu Thr
    1055                1060                1065


Gly Glu  Ile Val Trp Asp Lys  Gly Arg Asp Phe Ala  Thr Val Arg
    1070                1075                1080


Lys Val  Leu Ser Met Pro Gln  Val Asn Ile Val Lys  Lys Thr Glu
    1085                1090                1095


Val Gln  Thr Gly Gly Phe Ser  Lys Glu Ser Ile Leu  Pro Lys Arg
    1100                1105                1110


Asn Ser  Asp Lys Leu Ile Ala  Arg Lys Lys Asp Trp  Asp Pro Lys
    1115                1120                1125


Lys Tyr  Gly Gly Phe Asp Ser  Pro Thr Val Ala Tyr  Ser Val Leu
    1130                1135                1140
```

```
Val Val  Ala Lys Val Glu Lys  Gly Lys Ser Lys Lys  Leu Lys Ser
    1145                1150                1155

Val Lys  Glu Leu Leu Gly Ile  Thr Ile Met Glu Arg  Ser Ser Phe
    1160                1165                1170

Glu Lys  Asn Pro Ile Asp Phe  Leu Glu Ala Lys Gly  Tyr Lys Glu
    1175                1180                1185

Val Lys  Lys Asp Leu Ile Ile  Lys Leu Pro Lys Tyr  Ser Leu Phe
    1190                1195                1200

Glu Leu  Glu Asn Gly Arg Lys  Arg Met Leu Ala Ser  Ala Gly Glu
    1205                1210                1215

Leu Gln  Lys Gly Asn Glu Leu  Ala Leu Pro Ser Lys  Tyr Val Asn
    1220                1225                1230

Phe Leu  Tyr Leu Ala Ser His  Tyr Glu Lys Leu Lys  Gly Ser Pro
    1235                1240                1245

Glu Asp  Asn Glu Gln Lys Gln  Leu Phe Val Glu Gln  His Lys His
    1250                1255                1260

Tyr Leu  Asp Glu Ile Ile Glu  Gln Ile Ser Glu Phe  Ser Lys Arg
    1265                1270                1275

Val Ile  Leu Ala Asp Ala Asn  Leu Asp Lys Val Leu  Ser Ala Tyr
    1280                1285                1290

Asn Lys  His Arg Asp Lys Pro  Ile Arg Glu Gln Ala  Glu Asn Ile
    1295                1300                1305

Ile His  Leu Phe Thr Leu Thr  Asn Leu Gly Ala Pro  Ala Ala Phe
    1310                1315                1320
```

```
Lys Tyr  Phe Asp Thr Thr Ile  Asp Arg Lys Arg Tyr  Thr Ser Thr
    1325                1330                1335


Lys Glu  Val Leu Asp Ala Thr  Leu Ile His Gln Ser  Ile Thr Gly
    1340                1345                1350


Leu Tyr  Glu Thr Arg Ile Asp  Leu Ser Gln Leu Gly  Gly Asp
    1355                1360                1365


<210> 38
<211> 1367
<212> PRT
<213> Streptococcus pyogenes

<400> 38
Asp Lys Lys Tyr Ser Ile Gly Leu Asp Ile Gly Thr Asn Ser Val Gly
1               5                   10                  15


Trp Ala Val Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe Lys
            20                  25                  30


Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile Gly
        35                  40                  45


Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu Lys
    50                  55                  60


Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys Tyr
65                  70                  75                  80


Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser Phe
                85                  90                  95


Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys His
            100                 105                 110


Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr His
```

```
        115                 120                 125

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

Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His Met
145                 150                 155                 160

Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro Asp
                165                 170                 175

Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr Asn
            180                 185                 190

Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala Lys
        195                 200                 205

Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn Leu
    210                 215                 220

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

Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe Asp
                245                 250                 255

Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp Asp
            260                 265                 270

Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp Leu
        275                 280                 285

Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp Ile
    290                 295                 300

Leu Arg Val Asn Thr Glu Ile Thr Lys Ala Pro Leu Ser Ala Ser Met
```

```
305                 310                 315                 320

Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys Ala
                325                 330                 335

Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe Asp
            340                 345                 350

Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser Gln
        355                 360                 365

Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp Gly
    370                 375                 380

Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg Lys
385                 390                 395                 400

Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu Gly
                405                 410                 415

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

Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile Pro
        435                 440                 445

Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp Met
    450                 455                 460

Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu Val
465                 470                 475                 480

Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr Asn
                485                 490                 495

Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser Leu
```

```
            500                 505                 510

Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys Tyr
        515                 520                 525

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

Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr Val
545                 550                 555                 560

Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp Ser
                565                 570                 575

Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly Thr
            580                 585                 590

Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp Asn
        595                 600                 605

Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr Leu
    610                 615                 620

Phe Glu Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala His
625                 630                 635                 640

Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr Thr
                645                 650                 655

Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp Lys
            660                 665                 670

Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe Ala
        675                 680                 685

Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu Thr Phe Lys
```

```
    690                 695                 700

Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly Asp Ser Leu His
705                 710                 715                 720

Glu His Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly Ile
                725                 730                 735

Leu Gln Thr Val Lys Val Val Asp Glu Leu Val Lys Val Met Gly Arg
            740                 745                 750

His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln Thr
        755                 760                 765

Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile Glu
    770                 775                 780

Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro Val
785                 790                 795                 800

Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu Gln
                805                 810                 815

Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg Leu
            820                 825                 830

Ser Asp Tyr Asp Val Asp His Ile Val Pro Gln Ser Phe Leu Lys Asp
        835                 840                 845

Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg Gly
    850                 855                 860

Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys Asn
865                 870                 875                 880

Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys Phe
```

885 890 895

Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp Lys
900 905 910

Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr Lys
915 920 925

His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp Glu
930 935 940

Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser Lys
945 950 955 960

Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg Glu
965 970 975

Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val Val
980 985 990

Gly Thr Ala Leu Ile Lys Lys Tyr Pro Lys Leu Glu Ser Glu Phe Val
995 1000 1005

Tyr Gly Asp Tyr Lys Val Tyr Asp Val Arg Lys Met Ile Ala Lys
1010 1015 1020

Ser Glu Gln Glu Ile Gly Lys Ala Thr Ala Lys Tyr Phe Phe Tyr
1025 1030 1035

Ser Asn Ile Met Asn Phe Phe Lys Thr Glu Ile Thr Leu Ala Asn
1040 1045 1050

Gly Glu Ile Arg Lys Arg Pro Leu Ile Glu Thr Asn Gly Glu Thr
1055 1060 1065

Gly Glu Ile Val Trp Asp Lys Gly Arg Asp Phe Ala Thr Val Arg

```
    1070                1075                1080

Lys Val  Leu Ser Met Pro Gln  Val Asn Ile Val Lys  Lys Thr Glu
    1085                1090                1095

Val Gln  Thr Gly Gly Phe Ser  Lys Glu Ser Ile Leu  Pro Lys Arg
    1100                1105                1110

Asn Ser  Asp Lys Leu Ile Ala  Arg Lys Lys Asp Trp  Asp Pro Lys
    1115                1120                1125

Lys Tyr  Gly Gly Phe Asp Ser  Pro Thr Val Ala Tyr  Ser Val Leu
    1130                1135                1140

Val Val  Ala Lys Val Glu Lys  Gly Lys Ser Lys Lys  Leu Lys Ser
    1145                1150                1155

Val Lys  Glu Leu Leu Gly Ile  Thr Ile Met Glu Arg  Ser Ser Phe
    1160                1165                1170

Glu Lys  Asn Pro Ile Asp Phe  Leu Glu Ala Lys Gly  Tyr Lys Glu
    1175                1180                1185

Val Lys  Lys Asp Leu Ile Ile  Lys Leu Pro Lys Tyr  Ser Leu Phe
    1190                1195                1200

Glu Leu  Glu Asn Gly Arg Lys  Arg Met Leu Ala Ser  Ala Gly Glu
    1205                1210                1215

Leu Gln  Lys Gly Asn Glu Leu  Ala Leu Pro Ser Lys  Tyr Val Asn
    1220                1225                1230

Phe Leu  Tyr Leu Ala Ser His  Tyr Glu Lys Leu Lys  Gly Ser Pro
    1235                1240                1245

Glu Asp  Asn Glu Gln Lys Gln  Leu Phe Val Glu Gln  His Lys His
```

```
    1250                1255                1260

Tyr Leu  Asp Glu Ile Ile Glu  Gln Ile Ser Glu Phe  Ser Lys Arg
    1265                1270                1275

Val Ile  Leu Ala Asp Ala Asn  Leu Asp Lys Val Leu  Ser Ala Tyr
    1280                1285                1290

Asn Lys  His Arg Asp Lys Pro  Ile Arg Glu Gln Ala  Glu Asn Ile
    1295                1300                1305

Ile His  Leu Phe Thr Leu Thr  Asn Leu Gly Ala Pro  Ala Ala Phe
    1310                1315                1320

Lys Tyr  Phe Asp Thr Thr Ile  Asp Arg Lys Arg Tyr  Thr Ser Thr
    1325                1330                1335

Lys Glu  Val Leu Asp Ala Thr  Leu Ile His Gln Ser  Ile Thr Gly
    1340                1345                1350

Leu Tyr  Glu Thr Arg Ile Asp  Leu Ser Gln Leu Gly  Gly Asp
    1355                1360                1365


<210> 39
<211> 1129
<212> PRT
<213> Alicyclobacillus acidoterrestris

<400> 39
Met Ala Val Lys Ser Ile Lys Val Lys Leu Arg Leu Asp Asp Met Pro
1               5                   10                  15

Glu Ile Arg Ala Gly Leu Trp Lys Leu His Lys Glu Val Asn Ala Gly
            20                  25                  30

Val Arg Tyr Tyr Thr Glu Trp Leu Ser Leu Leu Arg Gln Glu Asn Leu
        35                  40                  45
```

```
Tyr Arg Arg Ser Pro Asn Gly Asp Gly Glu Gln Glu Cys Asp Lys Thr
    50                  55                  60

Ala Glu Glu Cys Lys Ala Glu Leu Leu Glu Arg Leu Arg Ala Arg Gln
65                  70                  75                  80

Val Glu Asn Gly His Arg Gly Pro Ala Gly Ser Asp Asp Glu Leu Leu
                85                  90                  95

Gln Leu Ala Arg Gln Leu Tyr Glu Leu Leu Val Pro Gln Ala Ile Gly
            100                 105                 110

Ala Lys Gly Asp Ala Gln Gln Ile Ala Arg Lys Phe Leu Ser Pro Leu
        115                 120                 125

Ala Asp Lys Asp Ala Val Gly Gly Leu Gly Ile Ala Lys Ala Gly Asn
    130                 135                 140

Lys Pro Arg Trp Val Arg Met Arg Glu Ala Gly Glu Pro Gly Trp Glu
145                 150                 155                 160

Glu Glu Lys Glu Lys Ala Glu Thr Arg Lys Ser Ala Asp Arg Thr Ala
                165                 170                 175

Asp Val Leu Arg Ala Leu Ala Asp Phe Gly Leu Lys Pro Leu Met Arg
            180                 185                 190

Val Tyr Thr Asp Ser Glu Met Ser Ser Val Glu Trp Lys Pro Leu Arg
        195                 200                 205

Lys Gly Gln Ala Val Arg Thr Trp Asp Arg Asp Met Phe Gln Gln Ala
    210                 215                 220

Ile Glu Arg Met Met Ser Trp Glu Ser Trp Asn Gln Arg Val Gly Gln
225                 230                 235                 240
```

```
Glu Tyr Ala Lys Leu Val Glu Gln Lys Asn Arg Phe Glu Gln Lys Asn
                245                 250                 255

Phe Val Gly Gln Glu His Leu Val His Leu Val Asn Gln Leu Gln Gln
            260                 265                 270

Asp Met Lys Glu Ala Ser Pro Gly Leu Glu Ser Lys Glu Gln Thr Ala
        275                 280                 285

His Tyr Val Thr Gly Arg Ala Leu Arg Gly Ser Asp Lys Val Phe Glu
    290                 295                 300

Lys Trp Gly Lys Leu Ala Pro Asp Ala Pro Phe Asp Leu Tyr Asp Ala
305                 310                 315                 320

Glu Ile Lys Asn Val Gln Arg Arg Asn Thr Arg Arg Phe Gly Ser His
                325                 330                 335

Asp Leu Phe Ala Lys Leu Ala Glu Pro Glu Tyr Gln Ala Leu Trp Arg
            340                 345                 350

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

Arg Lys Leu Asn His Ala Lys Met Phe Ala Thr Phe Thr Leu Pro Asp
    370                 375                 380

Ala Thr Ala His Pro Ile Trp Thr Arg Phe Asp Lys Leu Gly Gly Asn
385                 390                 395                 400

Leu His Gln Tyr Thr Phe Leu Phe Asn Glu Phe Gly Glu Arg Arg His
                405                 410                 415

Ala Ile Arg Phe His Lys Leu Leu Lys Val Glu Asn Gly Val Ala Arg
            420                 425                 430
```

```
Glu Val Asp Asp Val Thr Val Pro Ile Ser Met Ser Glu Gln Leu Asp
        435                 440                 445

Asn Leu Leu Pro Arg Asp Pro Asn Glu Pro Ile Ala Leu Tyr Phe Arg
    450                 455                 460

Asp Tyr Gly Ala Glu Gln His Phe Thr Gly Glu Phe Gly Gly Ala Lys
465                 470                 475                 480

Ile Gln Cys Arg Arg Asp Gln Leu Ala His Met His Arg Arg Arg Gly
                485                 490                 495

Ala Arg Asp Val Tyr Leu Asn Val Ser Val Arg Val Gln Ser Gln Ser
            500                 505                 510

Glu Ala Arg Gly Glu Arg Arg Pro Pro Tyr Ala Ala Val Phe Arg Leu
        515                 520                 525

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

Tyr Leu Ala Glu His Pro Asp Asp Gly Lys Leu Gly Ser Glu Gly Leu
545                 550                 555                 560

Leu Ser Gly Leu Arg Val Met Ser Val Asp Leu Gly Leu Arg Thr Ser
                565                 570                 575

Ala Ser Ile Ser Val Phe Arg Val Ala Arg Lys Asp Glu Leu Lys Pro
            580                 585                 590

Asn Ser Lys Gly Arg Val Pro Phe Phe Phe Pro Ile Lys Gly Asn Asp
        595                 600                 605

Asn Leu Val Ala Val His Glu Arg Ser Gln Leu Leu Lys Leu Pro Gly
    610                 615                 620
```

```
Glu Thr Glu Ser Lys Asp Leu Arg Ala Ile Arg Glu Glu Arg Gln Arg
625                 630                 635                 640


Thr Leu Arg Gln Leu Arg Thr Gln Leu Ala Tyr Leu Arg Leu Leu Val
                645                 650                 655


Arg Cys Gly Ser Glu Asp Val Gly Arg Arg Glu Arg Ser Trp Ala Lys
            660                 665                 670


Leu Ile Glu Gln Pro Val Asp Ala Ala Asn His Met Thr Pro Asp Trp
        675                 680                 685


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


Ile Cys Ser Asp Lys Glu Trp Met Asp Ala Val Tyr Glu Ser Val Arg
705                 710                 715                 720


Arg Val Trp Arg His Met Gly Lys Gln Val Arg Asp Trp Arg Lys Asp
                725                 730                 735


Val Arg Ser Gly Glu Arg Pro Lys Ile Arg Gly Tyr Ala Lys Asp Val
            740                 745                 750


Val Gly Gly Asn Ser Ile Glu Gln Ile Glu Tyr Leu Glu Arg Gln Tyr
        755                 760                 765


Lys Phe Leu Lys Ser Trp Ser Phe Phe Gly Lys Val Ser Gly Gln Val
    770                 775                 780


Ile Arg Ala Glu Lys Gly Ser Arg Phe Ala Ile Thr Leu Arg Glu His
785                 790                 795                 800


Ile Asp His Ala Lys Glu Asp Arg Leu Lys Lys Leu Ala Asp Arg Ile
                805                 810                 815
```

```
Ile Met Glu Ala Leu Gly Tyr Val Tyr Ala Leu Asp Glu Arg Gly Lys
            820                 825                 830

Gly Lys Trp Val Ala Lys Tyr Pro Pro Cys Gln Leu Ile Leu Leu Glu
        835                 840                 845

Glu Leu Ser Glu Tyr Gln Phe Asn Asn Asp Arg Pro Pro Ser Glu Asn
    850                 855                 860

Asn Gln Leu Met Gln Trp Ser His Arg Gly Val Phe Gln Glu Leu Ile
865                 870                 875                 880

Asn Gln Ala Gln Val His Asp Leu Leu Val Gly Thr Met Tyr Ala Ala
                885                 890                 895

Phe Ser Ser Arg Phe Asp Ala Arg Thr Gly Ala Pro Gly Ile Arg Cys
            900                 905                 910

Arg Arg Val Pro Ala Arg Cys Thr Gln Glu His Asn Pro Glu Pro Phe
        915                 920                 925

Pro Trp Trp Leu Asn Lys Phe Val Val Glu His Thr Leu Asp Ala Cys
    930                 935                 940

Pro Leu Arg Ala Asp Asp Leu Ile Pro Thr Gly Glu Gly Glu Ile Phe
945                 950                 955                 960

Val Ser Pro Phe Ser Ala Glu Glu Gly Asp Phe His Gln Ile His Ala
                965                 970                 975

Asp Leu Asn Ala Ala Gln Asn Leu Gln Gln Arg Leu Trp Ser Asp Phe
            980                 985                 990

Asp Ile Ser Gln Ile Arg Leu Arg  Cys Asp Trp Gly Glu  Val Asp Gly
        995                 1000                1005
```

Glu Leu Val Leu Ile Pro Arg Leu Thr Gly Lys Arg Thr Ala Asp
1010 1015 1020

Ser Tyr Ser Asn Lys Val Phe Tyr Thr Asn Thr Gly Val Thr Tyr
1025 1030 1035

Tyr Glu Arg Glu Arg Gly Lys Lys Arg Arg Lys Val Phe Ala Gln
1040 1045 1050

Glu Lys Leu Ser Glu Glu Glu Ala Glu Leu Leu Val Glu Ala Asp
1055 1060 1065

Glu Ala Arg Glu Lys Ser Val Val Leu Met Arg Asp Pro Ser Gly
1070 1075 1080

Ile Ile Asn Arg Gly Asn Trp Thr Arg Gln Lys Glu Phe Trp Ser
1085 1090 1095

Met Val Asn Gln Arg Ile Glu Gly Tyr Leu Val Lys Gln Ile Arg
1100 1105 1110

Ser Arg Val Pro Leu Gln Asp Ser Ala Cys Glu Asn Thr Gly Asp
1115 1120 1125

Ile

<210> 40
<211> 345
<212> PRT
<213> Sulfolobus islandicus

<400> 40
Met Glu Val Pro Leu Tyr Asn Ile Phe Gly Asp Asn Tyr Ile Ile Gln
1 5 10 15

Val Ala Thr Glu Ala Glu Asn Ser Thr Ile Tyr Asn Asn Lys Val Glu

```
            20                  25                  30

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

Ala Lys Asn Asn Glu Asp Ala Ala Ala Glu Arg Arg Gly Lys Ala Lys
    50                  55                  60

Lys Lys Lys Gly Glu Glu Gly Glu Thr Thr Thr Ser Asn Ile Ile Leu
65                  70                  75                  80

Pro Leu Ser Gly Asn Asp Lys Asn Pro Trp Thr Glu Thr Leu Lys Cys
                85                  90                  95

Tyr Asn Phe Pro Thr Thr Val Ala Leu Ser Glu Val Phe Lys Asn Phe
            100                 105                 110

Ser Gln Val Lys Glu Cys Glu Glu Val Ser Ala Pro Ser Phe Val Lys
        115                 120                 125

Pro Glu Phe Tyr Glu Phe Gly Arg Ser Pro Gly Met Val Glu Arg Thr
    130                 135                 140

Arg Arg Val Lys Leu Glu Val Glu Pro His Tyr Leu Ile Ile Ala Ala
145                 150                 155                 160

Ala Gly Trp Val Leu Thr Arg Leu Gly Lys Ala Lys Val Ser Glu Gly
                165                 170                 175

Asp Tyr Val Gly Val Asn Val Phe Thr Pro Thr Arg Gly Ile Leu Tyr
            180                 185                 190

Ser Leu Ile Gln Asn Val Asn Gly Ile Val Pro Gly Ile Lys Pro Glu
        195                 200                 205

Thr Ala Phe Gly Leu Trp Ile Ala Arg Lys Val Val Ser Ser Val Thr
```

210 215 220

Asn Pro Asn Val Ser Val Val Arg Ile Tyr Thr Ile Ser Asp Ala Val
225 230 235 240

Gly Gln Asn Pro Thr Thr Ile Asn Gly Gly Phe Ser Ile Asp Leu Thr
245 250 255

Lys Leu Leu Glu Lys Arg Tyr Leu Leu Ser Glu Arg Leu Glu Ala Ile
260 265 270

Ala Arg Asn Ala Leu Ser Ile Ser Ser Asn Met Arg Glu Arg Tyr Ile
275 280 285

Val Leu Ala Asn Tyr Ile Tyr Glu Tyr Leu Thr Gly Ser Lys Arg Leu
290 295 300

Glu Asp Leu Leu Tyr Phe Ala Asn Arg Asp Leu Ile Met Asn Leu Asn
305 310 315 320

Ser Asp Asp Gly Lys Val Arg Asp Leu Lys Leu Ile Ser Ala Tyr Val
325 330 335

Asn Gly Glu Leu Ile Arg Gly Glu Gly
340 345

<210> 41
<211> 345
<212> PRT
<213> Sulfolobus islandicus

<400> 41
Met Glu Val Pro Leu Tyr Asn Ile Phe Gly Asp Asn Tyr Ile Ile Gln
1 5 10 15

Val Ala Thr Glu Ala Glu Asn Ser Thr Ile Tyr Asn Asn Lys Val Glu
20 25 30

```
Ile Asp Asp Glu Glu Leu Arg Asn Val Leu Asn Leu Ala Tyr Lys Ile
        35                  40                  45

Ala Lys Asn Asn Glu Asp Ala Ala Ala Glu Arg Arg Gly Lys Ala Lys
    50                  55                  60

Lys Lys Lys Gly Glu Glu Gly Glu Thr Thr Thr Ser Asn Ile Ile Leu
65                  70                  75                  80

Pro Leu Ser Gly Asn Asp Lys Asn Pro Trp Thr Glu Thr Leu Lys Cys
                85                  90                  95

Tyr Asn Phe Pro Thr Thr Val Ala Leu Ser Glu Val Phe Lys Asn Phe
            100                 105                 110

Ser Gln Val Lys Glu Cys Glu Glu Val Ser Ala Pro Ser Phe Val Lys
        115                 120                 125

Pro Glu Phe Tyr Lys Phe Gly Arg Ser Pro Gly Met Val Glu Arg Thr
    130                 135                 140

Arg Arg Val Lys Leu Glu Val Glu Pro His Tyr Leu Ile Met Ala Ala
145                 150                 155                 160

Ala Gly Trp Val Leu Thr Arg Leu Gly Lys Ala Lys Val Ser Glu Gly
                165                 170                 175

Asp Tyr Val Gly Val Asn Val Phe Thr Pro Thr Arg Gly Ile Leu Tyr
            180                 185                 190

Ser Leu Ile Gln Asn Val Asn Gly Ile Val Pro Gly Ile Lys Pro Glu
        195                 200                 205

Thr Ala Phe Gly Leu Trp Ile Ala Arg Lys Val Val Ser Ser Val Thr
    210                 215                 220
```

```
Asn Pro Asn Val Ser Val Val Ser Ile Tyr Thr Ile Ser Asp Ala Val
225                 230                 235                 240


Gly Gln Asn Pro Thr Thr Ile Asn Gly Gly Phe Ser Ile Asp Leu Thr
                245                 250                 255


Lys Leu Leu Glu Lys Arg Asp Leu Leu Ser Glu Arg Leu Glu Ala Ile
            260                 265                 270


Ala Arg Asn Ala Leu Ser Ile Ser Ser Asn Met Arg Glu Arg Tyr Ile
        275                 280                 285


Val Leu Ala Asn Tyr Ile Tyr Glu Tyr Leu Thr Gly Ser Lys Arg Leu
    290                 295                 300


Glu Asp Leu Leu Tyr Phe Ala Asn Arg Asp Leu Ile Met Asn Leu Asn
305                 310                 315                 320


Ser Asp Asp Gly Lys Val Arg Asp Leu Lys Leu Ile Ser Ala Tyr Val
                325                 330                 335


Asn Gly Glu Leu Ile Arg Gly Glu Gly
            340                 345


<210> 42
<211> 986
<212> PRT
<213> Unknown

<220>
<223> Description of Unknown:
      Deltaproteobacteria CasX sequence

<400> 42
Met Glu Lys Arg Ile Asn Lys Ile Arg Lys Lys Leu Ser Ala Asp Asn
1               5                   10                  15


Ala Thr Lys Pro Val Ser Arg Ser Gly Pro Met Lys Thr Leu Leu Val
```

```
            20                  25                  30

Arg Val Met Thr Asp Asp Leu Lys Lys Arg Leu Glu Lys Arg Arg Lys
        35                  40                  45

Lys Pro Glu Val Met Pro Gln Val Ile Ser Asn Asn Ala Ala Asn Asn
    50                  55                  60

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

Gln Val Tyr Trp Gln Glu Phe Lys Asp Asp His Val Gly Leu Met Cys
                85                  90                  95

Lys Phe Ala Gln Pro Ala Ser Lys Lys Ile Asp Gln Asn Lys Leu Lys
            100                 105                 110

Pro Glu Met Asp Glu Lys Gly Asn Leu Thr Thr Ala Gly Phe Ala Cys
        115                 120                 125

Ser Gln Cys Gly Gln Pro Leu Phe Val Tyr Lys Leu Glu Gln Val Ser
    130                 135                 140

Glu Lys Gly Lys Ala Tyr Thr Asn Tyr Phe Gly Arg Cys Asn Val Ala
145                 150                 155                 160

Glu His Glu Lys Leu Ile Leu Leu Ala Gln Leu Lys Pro Val Lys Asp
                165                 170                 175

Ser Asp Glu Ala Val Thr Tyr Ser Leu Gly Lys Phe Gly Gln Arg Ala
            180                 185                 190

Leu Asp Phe Tyr Ser Ile His Val Thr Lys Glu Ser Thr His Pro Val
        195                 200                 205

Lys Pro Leu Ala Gln Ile Ala Gly Asn Arg Tyr Ala Ser Gly Pro Val
```

```
    210                 215                 220

Gly Lys Ala Leu Ser Asp Ala Cys Met Gly Thr Ile Ala Ser Phe Leu
225                 230                 235                 240

Ser Lys Tyr Gln Asp Ile Ile Ile Glu His Gln Lys Val Val Lys Gly
                245                 250                 255

Asn Gln Lys Arg Leu Glu Ser Leu Arg Glu Leu Ala Gly Lys Glu Asn
            260                 265                 270

Leu Glu Tyr Pro Ser Val Thr Leu Pro Pro Gln Pro His Thr Lys Glu
        275                 280                 285

Gly Val Asp Ala Tyr Asn Glu Val Ile Ala Arg Val Arg Met Trp Val
    290                 295                 300

Asn Leu Asn Leu Trp Gln Lys Leu Lys Leu Ser Arg Asp Asp Ala Lys
305                 310                 315                 320

Pro Leu Leu Arg Leu Lys Gly Phe Pro Ser Phe Pro Val Val Glu Arg
                325                 330                 335

Arg Glu Asn Glu Val Asp Trp Trp Asn Thr Ile Asn Glu Val Lys Lys
            340                 345                 350

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

Thr Ala Glu Lys Arg Asn Thr Ile Leu Glu Gly Tyr Asn Tyr Leu Pro
    370                 375                 380

Asn Glu Asn Asp His Lys Lys Arg Glu Gly Ser Leu Glu Asn Pro Lys
385                 390                 395                 400

Lys Pro Ala Lys Arg Gln Phe Gly Asp Leu Leu Leu Tyr Leu Glu Lys
```

405 410 415

Lys Tyr Ala Gly Asp Trp Gly Lys Val Phe Asp Glu Ala Trp Glu Arg
420 425 430

Ile Asp Lys Lys Ile Ala Gly Leu Thr Ser His Ile Glu Arg Glu Glu
435 440 445

Ala Arg Asn Ala Glu Asp Ala Gln Ser Lys Ala Val Leu Thr Asp Trp
450 455 460

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

Glu Lys Glu Phe Tyr Ala Cys Glu Ile Gln Leu Gln Lys Trp Tyr Gly
485 490 495

Asp Leu Arg Gly Asn Pro Phe Ala Val Glu Ala Glu Asn Arg Val Val
500 505 510

Asp Ile Ser Gly Phe Ser Ile Gly Ser Asp Gly His Ser Ile Gln Tyr
515 520 525

Arg Asn Leu Leu Ala Trp Lys Tyr Leu Glu Asn Gly Lys Arg Glu Phe
530 535 540

Tyr Leu Leu Met Asn Tyr Gly Lys Lys Gly Arg Ile Arg Phe Thr Asp
545 550 555 560

Gly Thr Asp Ile Lys Lys Ser Gly Lys Trp Gln Gly Leu Leu Tyr Gly
565 570 575

Gly Gly Lys Ala Lys Val Ile Asp Leu Thr Phe Asp Pro Asp Asp Glu
580 585 590

Gln Leu Ile Ile Leu Pro Leu Ala Phe Gly Thr Arg Gln Gly Arg Glu

595 600 605

Phe Ile Trp Asn Asp Leu Leu Ser Leu Glu Thr Gly Leu Ile Lys Leu
610 615 620

Ala Asn Gly Arg Val Ile Glu Lys Thr Ile Tyr Asn Lys Lys Ile Gly
625 630 635 640

Arg Asp Glu Pro Ala Leu Phe Val Ala Leu Thr Phe Glu Arg Arg Glu
645 650 655

Val Val Asp Pro Ser Asn Ile Lys Pro Val Asn Leu Ile Gly Val Ala
660 665 670

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

Cys Pro Leu Pro Glu Phe Lys Asp Ser Ser Gly Gly Pro Thr Asp Ile
690 695 700

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

Ala Lys Glu Val Glu Gln Arg Arg Ala Gly Gly Tyr Ser Arg Lys Phe
725 730 735

Ala Ser Lys Ser Arg Asn Leu Ala Asp Asp Met Val Arg Asn Ser Ala
740 745 750

Arg Asp Leu Phe Tyr His Ala Val Thr His Asp Ala Val Leu Val Phe
755 760 765

Ala Asn Leu Ser Arg Gly Phe Gly Arg Gln Gly Lys Arg Thr Phe Met
770 775 780

Thr Glu Arg Gln Tyr Thr Lys Met Glu Asp Trp Leu Thr Ala Lys Leu

785 790 795 800

Ala Tyr Glu Gly Leu Thr Ser Lys Thr Tyr Leu Ser Lys Thr Leu Ala
805 810 815

Gln Tyr Thr Ser Lys Thr Cys Ser Asn Cys Gly Phe Thr Ile Thr Tyr
820 825 830

Ala Asp Met Asp Val Met Leu Val Arg Leu Lys Lys Thr Ser Asp Gly
835 840 845

Trp Ala Thr Thr Leu Asn Asn Lys Glu Leu Lys Ala Glu Tyr Gln Ile
850 855 860

Thr Tyr Tyr Asn Arg Tyr Lys Arg Gln Thr Val Glu Lys Glu Leu Ser
865 870 875 880

Ala Glu Leu Asp Arg Leu Ser Glu Glu Ser Gly Asn Asn Asp Ile Ser
885 890 895

Lys Trp Thr Lys Gly Arg Arg Asp Glu Ala Leu Phe Leu Leu Lys Lys
900 905 910

Arg Phe Ser His Arg Pro Val Gln Glu Gln Phe Val Cys Leu Asp Cys
915 920 925

Gly His Glu Val His Ala Ala Glu Gln Ala Ala Leu Asn Ile Ala Arg
930 935 940

Ser Trp Leu Phe Leu Asn Ser Asn Ser Thr Glu Phe Lys Ser Tyr Lys
945 950 955 960

Ser Gly Lys Gln Pro Phe Val Gly Ala Trp Gln Ala Phe Tyr Lys Arg
965 970 975

Arg Leu Lys Glu Val Trp Lys Pro Asn Ala

980 985

<210> 43
<211> 1210
<212> PRT
<213> Unknown

<220>
<223> Description of Unknown:
uncultured Parcubacteria group bacterium sequence

<400> 43
Met Ser Lys Arg His Pro Arg Ile Ser Gly Val Lys Gly Tyr Arg Leu
1 5 10 15

His Ala Gln Arg Leu Glu Tyr Thr Gly Lys Ser Gly Ala Met Arg Thr
20 25 30

Ile Lys Tyr Pro Leu Tyr Ser Ser Pro Ser Gly Gly Arg Thr Val Pro
35 40 45

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

Leu Ser Asn Phe Asp Asp Leu Tyr Asn Ala Glu Lys Arg Asn Glu Glu
65 70 75 80

Lys Val Tyr Ser Val Leu Asp Phe Trp Tyr Asp Cys Val Gln Tyr Gly
85 90 95

Ala Val Phe Ser Tyr Thr Ala Pro Gly Leu Leu Lys Asn Val Ala Glu
100 105 110

Val Arg Gly Gly Ser Tyr Glu Leu Thr Lys Thr Leu Lys Gly Ser His
115 120 125

Leu Tyr Asp Glu Leu Gln Ile Asp Lys Val Ile Lys Phe Leu Asn Lys
130 135 140

```
Lys Glu Ile Ser Arg Ala Asn Gly Ser Leu Asp Lys Leu Lys Lys Asp
145                 150                 155                 160

Ile Ile Asp Cys Phe Lys Ala Glu Tyr Arg Glu Arg His Lys Asp Gln
                165                 170                 175

Cys Asn Lys Leu Ala Asp Asp Ile Lys Asn Ala Lys Lys Asp Ala Gly
            180                 185                 190

Ala Ser Leu Gly Glu Arg Gln Lys Lys Leu Phe Arg Asp Phe Phe Gly
        195                 200                 205

Ile Ser Glu Gln Ser Glu Asn Asp Lys Pro Ser Phe Thr Asn Pro Leu
    210                 215                 220

Asn Leu Thr Cys Cys Leu Leu Pro Phe Asp Thr Val Asn Asn Asn Arg
225                 230                 235                 240

Asn Arg Gly Glu Val Leu Phe Asn Lys Leu Lys Glu Tyr Ala Gln Lys
                245                 250                 255

Leu Asp Lys Asn Glu Gly Ser Leu Glu Met Trp Glu Tyr Ile Gly Ile
            260                 265                 270

Gly Asn Ser Gly Thr Ala Phe Ser Asn Phe Leu Gly Glu Gly Phe Leu
        275                 280                 285

Gly Arg Leu Arg Glu Asn Lys Ile Thr Glu Leu Lys Lys Ala Met Met
    290                 295                 300

Asp Ile Thr Asp Ala Trp Arg Gly Gln Glu Gln Glu Glu Glu Leu Glu
305                 310                 315                 320

Lys Arg Leu Arg Ile Leu Ala Ala Leu Thr Ile Lys Leu Arg Glu Pro
                325                 330                 335
```

```
Lys Phe Asp Asn His Trp Gly Gly Tyr Arg Ser Asp Ile Asn Gly Lys
            340                 345                 350

Leu Ser Ser Trp Leu Gln Asn Tyr Ile Asn Gln Thr Val Lys Ile Lys
        355                 360                 365

Glu Asp Leu Lys Gly His Lys Lys Asp Leu Lys Lys Ala Lys Glu Met
    370                 375                 380

Ile Asn Arg Phe Gly Glu Ser Asp Thr Lys Glu Glu Ala Val Val Ser
385                 390                 395                 400

Ser Leu Leu Glu Ser Ile Glu Lys Ile Val Pro Asp Asp Ser Ala Asp
                405                 410                 415

Asp Glu Lys Pro Asp Ile Pro Ala Ile Ala Ile Tyr Arg Arg Phe Leu
            420                 425                 430

Ser Asp Gly Arg Leu Thr Leu Asn Arg Phe Val Gln Arg Glu Asp Val
        435                 440                 445

Gln Glu Ala Leu Ile Lys Glu Arg Leu Glu Ala Glu Lys Lys Lys Lys
    450                 455                 460

Pro Lys Lys Arg Lys Lys Lys Ser Asp Ala Glu Asp Glu Lys Glu Thr
465                 470                 475                 480

Ile Asp Phe Lys Glu Leu Phe Pro His Leu Ala Lys Pro Leu Lys Leu
                485                 490                 495

Val Pro Asn Phe Tyr Gly Asp Ser Lys Arg Glu Leu Tyr Lys Lys Tyr
            500                 505                 510

Lys Asn Ala Ala Ile Tyr Thr Asp Ala Leu Trp Lys Ala Val Glu Lys
        515                 520                 525
```

```
Ile Tyr Lys Ser Ala Phe Ser Ser Ser Leu Lys Asn Ser Phe Phe Asp
    530                 535                 540

Thr Asp Phe Asp Lys Asp Phe Phe Ile Lys Arg Leu Gln Lys Ile Phe
545                 550                 555                 560

Ser Val Tyr Arg Arg Phe Asn Thr Asp Lys Trp Lys Pro Ile Val Lys
                565                 570                 575

Asn Ser Phe Ala Pro Tyr Cys Asp Ile Val Ser Leu Ala Glu Asn Glu
            580                 585                 590

Val Leu Tyr Lys Pro Lys Gln Ser Arg Ser Arg Lys Ser Ala Ala Ile
        595                 600                 605

Asp Lys Asn Arg Val Arg Leu Pro Ser Thr Glu Asn Ile Ala Lys Ala
    610                 615                 620

Gly Ile Ala Leu Ala Arg Glu Leu Ser Val Ala Gly Phe Asp Trp Lys
625                 630                 635                 640

Asp Leu Leu Lys Lys Glu Glu His Glu Glu Tyr Ile Asp Leu Ile Glu
                645                 650                 655

Leu His Lys Thr Ala Leu Ala Leu Leu Leu Ala Val Thr Glu Thr Gln
            660                 665                 670

Leu Asp Ile Ser Ala Leu Asp Phe Val Glu Asn Gly Thr Val Lys Asp
        675                 680                 685

Phe Met Lys Thr Arg Asp Gly Asn Leu Val Leu Glu Gly Arg Phe Leu
    690                 695                 700

Glu Met Phe Ser Gln Ser Ile Val Phe Ser Glu Leu Arg Gly Leu Ala
705                 710                 715                 720
```

```
Gly Leu Met Ser Arg Lys Glu Phe Ile Thr Arg Ser Ala Ile Gln Thr
                725                 730                 735

Met Asn Gly Lys Gln Ala Glu Leu Leu Tyr Ile Pro His Glu Phe Gln
            740                 745                 750

Ser Ala Lys Ile Thr Thr Pro Lys Glu Met Ser Arg Ala Phe Leu Asp
        755                 760                 765

Leu Ala Pro Ala Glu Phe Ala Thr Ser Leu Glu Pro Glu Ser Leu Ser
    770                 775                 780

Glu Lys Ser Leu Leu Lys Leu Lys Gln Met Arg Tyr Tyr Pro His Tyr
785                 790                 795                 800

Phe Gly Tyr Glu Leu Thr Arg Thr Gly Gln Gly Ile Asp Gly Gly Val
                805                 810                 815

Ala Glu Asn Ala Leu Arg Leu Glu Lys Ser Pro Val Lys Lys Arg Glu
            820                 825                 830

Ile Lys Cys Lys Gln Tyr Lys Thr Leu Gly Arg Gly Gln Asn Lys Ile
        835                 840                 845

Val Leu Tyr Val Arg Ser Ser Tyr Tyr Gln Thr Gln Phe Leu Glu Trp
    850                 855                 860

Phe Leu His Arg Pro Lys Asn Val Gln Thr Asp Val Ala Val Ser Gly
865                 870                 875                 880

Ser Phe Leu Ile Asp Glu Lys Lys Val Lys Thr Arg Trp Asn Tyr Asp
                885                 890                 895

Ala Leu Thr Val Ala Leu Glu Pro Val Ser Gly Ser Glu Arg Val Phe
            900                 905                 910
```

```
Val Ser Gln Pro Phe Thr Ile Phe Pro Glu Lys Ser Ala Glu Glu Glu
        915                 920                 925


Gly Gln Arg Tyr Leu Gly Ile Asp Ile Gly Glu Tyr Gly Ile Ala Tyr
    930                 935                 940


Thr Ala Leu Glu Ile Thr Gly Asp Ser Ala Lys Ile Leu Asp Gln Asn
945                 950                 955                 960


Phe Ile Ser Asp Pro Gln Leu Lys Thr Leu Arg Glu Glu Val Lys Gly
                965                 970                 975


Leu Lys Leu Asp Gln Arg Arg Gly Thr Phe Ala Met Pro Ser Thr Lys
            980                 985                 990


Ile Ala Arg Ile Arg Glu Ser Leu  Val His Ser Leu Arg  Asn Arg Ile
        995                 1000                1005


His His  Leu Ala Leu Lys His  Lys Ala Lys Ile Val  Tyr Glu Leu
    1010                1015                1020


Glu Val  Ser Arg Phe Glu Glu  Gly Lys Gln Lys Ile  Lys Lys Val
    1025                1030                1035


Tyr Ala  Thr Leu Lys Lys Ala  Asp Val Tyr Ser Glu  Ile Asp Ala
    1040                1045                1050


Asp Lys  Asn Leu Gln Thr Thr  Val Trp Gly Lys Leu  Ala Val Ala
    1055                1060                1065


Ser Glu  Ile Ser Ala Ser Tyr  Thr Ser Gln Phe Cys  Gly Ala Cys
    1070                1075                1080


Lys Lys  Leu Trp Arg Ala Glu  Met Gln Val Asp Glu  Thr Ile Thr
    1085                1090                1095
```

```
Thr Gln  Glu Leu Ile Gly Thr  Val Arg Val Ile Lys  Gly Gly Thr
    1100                1105                1110


Leu Ile  Asp Ala Ile Lys Asp  Phe Met Arg Pro Pro  Ile Phe Asp
    1115                1120                1125


Glu Asn  Asp Thr Pro Phe Pro  Lys Tyr Arg Asp Phe  Cys Asp Lys
    1130                1135                1140


His His  Ile Ser Lys Lys Met  Arg Gly Asn Ser Cys  Leu Phe Ile
    1145                1150                1155


Cys Pro  Phe Cys Arg Ala Asn  Ala Asp Ala Asp Ile  Gln Ala Ser
    1160                1165                1170


Gln Thr  Ile Ala Leu Leu Arg  Tyr Val Lys Glu Glu  Lys Lys Val
    1175                1180                1185


Glu Asp  Tyr Phe Glu Arg Phe  Arg Lys Leu Lys Asn  Ile Lys Val
    1190                1195                1200


Leu Gly  Gln Met Lys Lys Ile
    1205                1210
```

<210> 44
<211> 306
<212> DNA
<213> Artificial Sequence

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

<400> 44
tgcctgtcat acgaaaccga gatactgaca gtagaatatg gccttctgcc aatcgggaag 60

attgtggaga aacggataga atgcacagtt tactctgtcg ataacaatgg taacatttat 120

actcagccag ttgcccagtg gcacgaccgg ggagagcagg aagtattcga atactgtctg 180

gaggatggaa gtctcattag ggccactaag gaccacaaat ttatgacagt cgatggccag 240

atgctgccta tagacgaaat ctttgagcga gagttggacc tcatgcgagt tgacaacctt 300

cctaat 306

<210> 45
<211> 102
<212> PRT
<213> Artificial Sequence

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

<400> 45
Cys Leu Ser Tyr Glu Thr Glu Ile Leu Thr Val Glu Tyr Gly Leu Leu
1 5 10 15

Pro Ile Gly Lys Ile Val Glu Lys Arg Ile Glu Cys Thr Val Tyr Ser
20 25 30

Val Asp Asn Asn Gly Asn Ile Tyr Thr Gln Pro Val Ala Gln Trp His
35 40 45

Asp Arg Gly Glu Gln Glu Val Phe Glu Tyr Cys Leu Glu Asp Gly Ser
50 55 60

Leu Ile Arg Ala Thr Lys Asp His Lys Phe Met Thr Val Asp Gly Gln
65 70 75 80

Met Leu Pro Ile Asp Glu Ile Phe Glu Arg Glu Leu Asp Leu Met Arg
85 90 95

Val Asp Asn Leu Pro Asn
100

<210> 46
<211> 108

<212> DNA
<213> Artificial Sequence

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

<400> 46
atgatcaaga tagctacaag gaagtatctt ggcaaacaaa acgtttatga tattggagtc 60

gaaagagatc acaactttgc tctgaagaac ggattcatag cttctaat 108

<210> 47
<211> 36
<212> PRT
<213> Artificial Sequence

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

<400> 47
Met Ile Lys Ile Ala Thr Arg Lys Tyr Leu Gly Lys Gln Asn Val Tyr
1 5 10 15

Asp Ile Gly Val Glu Arg Asp His Asn Phe Ala Leu Lys Asn Gly Phe
20 25 30

Ile Ala Ser Asn
35

<210> 48
<211> 303
<212> DNA
<213> Artificial Sequence

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

<400> 48
tgcctgtctt atgataccga gatacttacc gttgaatatg gcttcttgcc tattggaaag 60

attgtcgaag agagaattga atgcacagta tatactgtag acaagaatgg tttcgtttac 120

acacagccca ttgctcaatg gcacaatcgc ggcgaacaag aagtatttga gtactgtctc 180

gaggatggaa gcatcatacg agcaactaaa gatcataaat tcatgaccac tgacgggcag 240

atgttgccaa tagatgagat attcgagcgg ggcttggatc tcaaacaagt ggatggattg 300

cca 303

<210> 49
<211> 101
<212> PRT
<213> Artificial Sequence

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

<400> 49

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

<210> 50
<211> 159
<212> DNA
<213> Artificial Sequence

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

<400> 50
atgaagagga ctgccgatgg atcagagttt gaatctccca agaagaagag gaaagtaaag 60

ataatatctc gaaaaagtct tggtacccaa aatgtctatg atattggagt ggagaaagat 120

cacaacttcc ttctcaagaa cggtctcgta gccagcaac 159

<210> 51
<211> 53
<212> PRT
<213> Artificial Sequence

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

<400> 51
Met Lys Arg Thr Ala Asp Gly Ser Glu Phe Glu Ser Pro Lys Lys Lys
1 5 10 15

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

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

Leu Val Ala Ser Asn
50

<210> 52
<211> 24
<212> PRT
<213> Artificial Sequence

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

<400> 52
Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala
1   5   10   15

Thr Pro Glu Ser Ser Gly Gly Ser
            20

<210> 53
<211> 32
<212> PRT
<213> Artificial Sequence

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

<400> 53
Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr
1   5   10   15

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

<210> 54
<211> 104
<212> PRT
<213> Artificial Sequence

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

<400> 54
Gly Gly Ser Gly Gly Ser Pro Gly Ser Pro Ala Gly Ser Pro Thr Ser
1   5   10   15

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

Thr Ser Thr Glu Pro Ser Glu Gly Ser Ala Pro Gly Ser Pro Ala Gly
35 40 45

Ser Pro Thr Ser Thr Glu Glu Gly Thr Ser Thr Glu Pro Ser Glu Gly
50 55 60

Ser Ala Pro Gly Thr Ser Thr Glu Pro Ser Glu Gly Ser Ala Pro Gly
65 70 75 80

Thr Ser Glu Ser Ala Thr Pro Glu Ser Gly Pro Gly Ser Glu Pro Ala
85 90 95

Thr Ser Gly Gly Ser Gly Gly Ser
100

<210> 55
<211> 16
<212> PRT
<213> Artificial Sequence

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

<400> 55
Ser Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser
1 5 10 15

<210> 56
<211> 4
<212> PRT
<213> Artificial Sequence

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

<400> 56
Ser Gly Gly Ser
1

<210> 57
<211> 120
<212> PRT
<213> Artificial Sequence

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

<220>
<221> MISC_FEATURE
<222> (1)..(120)
<223> This sequence may encompass 1-30 "Ser Gly Gly Ser"
repeating units

<400> 57
Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser
1 5 10 15

Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser
20 25 30

Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser
35 40 45

Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser
50 55 60

Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser
65 70 75 80

Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser
85 90 95

Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Gly Ser
100 105 110

Ser Gly Gly Ser Ser Gly Gly Ser
115 120

<210> 58
<211> 120
<212> PRT
<213> Artificial Sequence

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

<220>
<221> MISC_FEATURE
<222> (1)..(120)
<223> This sequence may encompass 1-30 "Gly Gly Gly Ser"
repeating units

<400> 58
Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
1 5 10 15

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
20 25 30

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
35 40 45

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
50 55 60

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
65 70 75 80

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
85 90 95

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
100 105 110

Gly Gly Gly Ser Gly Gly Gly Ser

115 120

<210> 59
<211> 150
<212> PRT
<213> Artificial Sequence

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

<220>
<221> MISC_FEATURE
<222> (1)..(150)
<223> This sequence may encompass 1-30 "Gly Gly Gly Gly Ser" repeating units

<400> 59
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
1 5 10 15

Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
20 25 30

Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
35 40 45

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
50 55 60

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
65 70 75 80

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
85 90 95

Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
100 105 110

Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
        115   120   125

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
    130   135   140

Ser Gly Gly Gly Gly Ser
145   150

<210> 60
<211> 30
<212> PRT
<213> Artificial Sequence

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

<220>
<221> MISC_FEATURE
<222> (1)..(30)
<223> This sequence may encompass 1-30 residues

<400> 60
Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly
1   5   10   15

Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly
            20   25   30

<210> 61
<211> 150
<212> PRT
<213> Artificial Sequence

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

<220>
<221> MISC_FEATURE

<222> (1)..(150)
<223> This sequence may encompass 1-30 "Glu Ala Ala Ala Lys" repeating units

<400> 61
Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu
1 5 10 15

Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala
20 25 30

Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala
35 40 45

Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala
50 55 60

Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys
65 70 75 80

Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu
85 90 95

Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala
100 105 110

Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala
115 120 125

Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala Lys Glu Ala Ala Ala
130 135 140

Lys Glu Ala Ala Ala Lys
145 150

<210> 62
<211> 90
<212> PRT

<213> Artificial Sequence

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

<220>
<221> MISC_FEATURE
<222> (1)..(90)
<223> This sequence may encompass 1-30 "Gly Gly Ser"
repeating units

<400> 62
Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly
1 5 10 15

Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly
20 25 30

Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser
35 40 45

Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly
50 55 60

Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly
65 70 75 80

Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser
85 90

<210> 63
<211> 60
<212> PRT
<213> Artificial Sequence

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

<220>
<221> MOD_RES
<222> (1)..(1)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (3)..(3)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (7)..(7)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (9)..(9)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (11)..(11)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (13)..(13)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (15)..(15)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (17)..(17)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (19)..(19)

<223> Any amino acid

<220>
<221> MOD_RES
<222> (21)..(21)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (23)..(23)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (25)..(25)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (27)..(27)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (29)..(29)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (31)..(31)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (33)..(33)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (35)..(35)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (37)..(37)
<223> Any amino acid

<220>

<221> MOD_RES
<222> (39)..(39)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (41)..(41)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (43)..(43)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (45)..(45)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (47)..(47)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (49)..(49)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (51)..(51)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (53)..(53)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (55)..(55)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (57)..(57)
<223> Any amino acid

<220>
<221> MOD_RES
<222> (59)..(59)
<223> Any amino acid

<220>
<221> MISC_FEATURE
<222> (1)..(60)
<223> This sequence may encompass 1-30 "Xaa Pro"
repeating units

<400> 63
Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro
1 5 10 15

Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro
20 25 30

Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro
35 40 45

Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro Xaa Pro
50 55 60

<210> 64
<211> 24
<212> PRT
<213> Artificial Sequence

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

<400> 64
Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr
1 5 10 15

Ser Glu Ser Ala Thr Pro Glu Ser
20

<210> 65

<211> 40
<212> PRT
<213> Artificial Sequence

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

<400> 65
Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr
1 5 10 15

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

Ser Gly Gly Ser Ser Gly Gly Ser
35 40

<210> 66
<211> 64
<212> PRT
<213> Artificial Sequence

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

<400> 66
Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr
1 5 10 15

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

Ser Gly Gly Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr
35 40 45

Ser Glu Ser Ala Thr Pro Glu Ser Ser Gly Gly Ser Ser Gly Gly Ser
50 55 60

<210> 67

<211> 92
<212> PRT
<213> Artificial Sequence

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

<400> 67
Pro Gly Ser Pro Ala Gly Ser Pro Thr Ser Thr Glu Glu Gly Thr Ser
1 5 10 15

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

Glu Gly Ser Ala Pro Gly Ser Pro Ala Gly Ser Pro Thr Ser Thr Glu
35 40 45

Glu Gly Thr Ser Thr Glu Pro Ser Glu Gly Ser Ala Pro Gly Thr Ser
50 55 60

Thr Glu Pro Ser Glu Gly Ser Ala Pro Gly Thr Ser Glu Ser Ala Thr
65 70 75 80

Pro Glu Ser Gly Pro Gly Ser Glu Pro Ala Thr Ser
85 90

<210> 68
<211> 18
<212> PRT
<213> Artificial Sequence

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

<400> 68
Lys Arg Thr Ala Asp Gly Ser Glu Phe Glu Ser Pro Lys Lys Lys Arg
1 5 10 15

Lys Val

<210> 69
<211> 16
<212> PRT
<213> Artificial Sequence

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

<400> 69
Lys Arg Pro Ala Ala Thr Lys Lys Ala Gly Gln Ala Lys Lys Lys Lys
1 5 10 15

<210> 70
<211> 17
<212> PRT
<213> Artificial Sequence

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

<400> 70
Lys Lys Thr Glu Leu Gln Thr Thr Asn Ala Glu Asn Lys Thr Lys Lys
1 5 10 15

Leu

<210> 71
<211> 19
<212> PRT
<213> Artificial Sequence

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

<400> 71
Lys Arg Gly Ile Asn Asp Arg Asn Phe Trp Arg Gly Glu Asn Gly Arg
1 5 10 15

Lys Thr Arg

<210> 72
<211> 16
<212> PRT
<213> Artificial Sequence

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

<400> 72
Arg Lys Ser Gly Lys Ile Ala Ala Ile Val Val Lys Arg Pro Arg Lys
1 5 10 15

<210> 73
<211> 7
<212> PRT
<213> Artificial Sequence

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

<400> 73
Pro Lys Lys Lys Arg Lys Val
1 5

<210> 74
<211> 30
<212> PRT
<213> Artificial Sequence

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

<400> 74
Met Asp Ser Leu Leu Met Asn Arg Arg Lys Phe Leu Tyr Gln Phe Lys
1 5 10 15

Asn Val Arg Trp Ala Lys Gly Arg Arg Glu Thr Tyr Leu Cys

20 25 30

<210> 75
<211> 84
<212> PRT
<213> Bacillus phage PBS2

<400> 75
Met Thr Asn Leu Ser Asp Ile Ile Glu Lys Glu Thr Gly Lys Gln Leu
1 5 10 15

Val Ile Gln Glu Ser Ile Leu Met Leu Pro Glu Glu Val Glu Glu Val
20 25 30

Ile Gly Asn Lys Pro Glu Ser Asp Ile Leu Val His Thr Ala Tyr Asp
35 40 45

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

Tyr Lys Pro Trp Ala Leu Val Ile Gln Asp Ser Asn Gly Glu Asn Lys
65 70 75 80

Ile Lys Met Leu

<210> 76
<211> 23
<212> DNA
<213> Homo sapiens

<400> 76
gtggggaagg ggcccccaag agg 23

<210> 77
<211> 1807
<212> PRT
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 77

```
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15

Thr Leu Ala Lys Arg Ala Trp Asp Glu Arg Glu Val Pro Val Gly Ala
            20                  25                  30

Val Leu Val His Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Pro
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Leu Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Ala Arg Asp Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

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

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175
```

```
Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Ser Glu Val Glu Phe Ser His Glu Tyr
        195                 200                 205

Trp Met Arg His Ala Leu Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg
    210                 215                 220

Glu Val Pro Val Gly Ala Val Leu Val Leu Asn Asn Arg Val Ile Gly
225                 230                 235                 240

Glu Gly Trp Asn Arg Ala Ile Gly Leu His Asp Pro Thr Ala His Ala
                245                 250                 255

Glu Ile Met Ala Leu Arg Gln Gly Gly Leu Val Met Gln Asn Tyr Arg
            260                 265                 270

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

Ala Gly Ala Met Ile His Ser Arg Ile Gly Arg Val Val Phe Gly Val
    290                 295                 300

Arg Asn Ala Lys Thr Gly Ala Ala Gly Ser Leu Met Asp Val Leu His
305                 310                 315                 320

Tyr Pro Gly Met Asn His Arg Val Glu Ile Thr Glu Gly Ile Leu Ala
                325                 330                 335

Asp Glu Cys Ala Ala Leu Leu Cys Tyr Phe Phe Arg Met Pro Arg Gln
            340                 345                 350

Val Phe Asn Ala Gln Lys Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly
        355                 360                 365
```

```
Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser
    370                 375                 380

Ala Thr Pro Glu Ser Ser Gly Gly Ser Ser Gly Gly Ser Glu Ile Gly
385                 390                 395                 400

Lys Ala Thr Ala Lys Tyr Phe Phe Tyr Ser Asn Ile Met Asn Phe Phe
                405                 410                 415

Lys Thr Glu Ile Thr Leu Ala Asn Gly Glu Ile Arg Lys Arg Pro Leu
            420                 425                 430

Ile Glu Thr Asn Gly Glu Thr Gly Glu Ile Val Trp Asp Lys Gly Arg
        435                 440                 445

Asp Phe Ala Thr Val Arg Lys Val Leu Ser Met Pro Gln Val Asn Ile
    450                 455                 460

Val Lys Lys Thr Glu Val Gln Thr Gly Gly Phe Ser Lys Glu Ser Ile
465                 470                 475                 480

Leu Pro Lys Arg Asn Ser Asp Lys Leu Ile Ala Arg Lys Lys Asp Trp
                485                 490                 495

Asp Pro Lys Lys Tyr Gly Gly Phe Met Gln Pro Thr Val Ala Tyr Ser
            500                 505                 510

Val Leu Val Val Ala Lys Val Glu Lys Gly Lys Ser Lys Lys Leu Lys
        515                 520                 525

Ser Val Lys Glu Leu Leu Gly Ile Thr Ile Met Glu Arg Ser Ser Phe
    530                 535                 540

Glu Lys Asn Pro Ile Asp Phe Leu Glu Ala Lys Gly Tyr Lys Glu Val
545                 550                 555                 560
```

```
Lys Lys Asp Leu Ile Ile Lys Leu Pro Lys Tyr Ser Leu Phe Glu Leu
                565                 570                 575

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

Gly Asn Glu Leu Ala Leu Pro Ser Lys Tyr Val Asn Phe Leu Tyr Leu
        595                 600                 605

Ala Ser His Tyr Glu Lys Leu Lys Gly Ser Pro Glu Asp Asn Glu Gln
    610                 615                 620

Lys Gln Leu Phe Val Glu Gln His Lys His Tyr Leu Asp Glu Ile Ile
625                 630                 635                 640

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

Leu Asp Lys Val Leu Ser Ala Tyr Asn Lys His Arg Asp Lys Pro Ile
            660                 665                 670

Arg Glu Gln Ala Glu Asn Ile Ile His Leu Phe Thr Leu Thr Asn Leu
        675                 680                 685

Gly Ala Pro Arg Ala Phe Lys Tyr Phe Asp Thr Thr Ile Ala Arg Lys
    690                 695                 700

Glu Tyr Arg Ser Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln
705                 710                 715                 720

Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu Gly
                725                 730                 735

Gly Asp Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly
            740                 745                 750
```

```
Ser Gly Gly Ser Gly Gly Met Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        755                 760                 765

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    770                 775                 780

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
785                 790                 795                 800

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                805                 810                 815

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            820                 825                 830

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        835                 840                 845

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    850                 855                 860

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
865                 870                 875                 880

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                885                 890                 895

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            900                 905                 910

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        915                 920                 925

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    930                 935                 940
```

```
Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
945                 950                 955                 960


Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                965                 970                 975


Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            980                 985                 990


Asn Gly Leu Phe Gly Asn Leu Ile  Ala Leu Ser Leu Gly  Leu Thr Pro
        995                 1000                1005


Asn Phe  Lys Ser Asn Phe Asp  Leu Ala Glu Asp Ala  Lys Leu Gln
    1010                1015                1020


Leu Ser  Lys Asp Thr Tyr Asp  Asp Asp Leu Asp Asn  Leu Leu Ala
    1025                1030                1035


Gln Ile  Gly Asp Gln Tyr Ala  Asp Leu Phe Leu Ala  Ala Lys Asn
    1040                1045                1050


Leu Ser  Asp Ala Ile Leu Leu  Ser Asp Ile Leu Arg  Val Asn Thr
    1055                1060                1065


Glu Ile  Thr Lys Ala Pro Leu  Ser Ala Ser Met Ile  Lys Arg Tyr
    1070                1075                1080


Asp Glu  His His Gln Asp Leu  Thr Leu Leu Lys Ala  Leu Val Arg
    1085                1090                1095


Gln Gln  Leu Pro Glu Lys Tyr  Lys Glu Ile Phe Phe  Asp Gln Ser
    1100                1105                1110


Lys Asn  Gly Tyr Ala Gly Tyr  Ile Asp Gly Gly Ala  Ser Gln Glu
    1115                1120                1125
```

```
Glu Phe  Tyr Lys Phe Ile Lys  Pro Ile Leu Glu Lys  Met Asp Gly
    1130                1135                1140

Thr Glu  Glu Leu Leu Val Lys  Leu Asn Arg Glu Asp  Leu Leu Arg
    1145                1150                1155

Lys Gln  Arg Thr Phe Asp Asn  Gly Ser Ile Pro His  Gln Ile His
    1160                1165                1170

Leu Gly  Glu Leu His Ala Ile  Leu Arg Arg Gln Glu  Asp Phe Tyr
    1175                1180                1185

Pro Phe  Leu Lys Asp Asn Arg  Glu Lys Ile Glu Lys  Ile Leu Thr
    1190                1195                1200

Phe Arg  Ile Pro Tyr Tyr Val  Gly Pro Leu Ala Arg  Gly Asn Ser
    1205                1210                1215

Arg Phe  Ala Trp Met Thr Arg  Lys Ser Glu Glu Thr  Ile Thr Pro
    1220                1225                1230

Trp Asn  Phe Glu Glu Val Val  Asp Lys Gly Ala Ser  Ala Gln Ser
    1235                1240                1245

Phe Ile  Glu Arg Met Thr Asn  Phe Asp Lys Asn Leu  Pro Asn Glu
    1250                1255                1260

Lys Val  Leu Pro Lys His Ser  Leu Leu Tyr Glu Tyr  Phe Thr Val
    1265                1270                1275

Tyr Asn  Glu Leu Thr Lys Val  Lys Tyr Val Thr Glu  Gly Met Arg
    1280                1285                1290

Lys Pro  Ala Phe Leu Ser Gly  Glu Gln Lys Lys Ala  Ile Val Asp
    1295                1300                1305
```

```
Leu Leu  Phe Lys Thr Asn Arg  Lys Val Thr Val Lys  Gln Leu Lys
    1310                1315                1320

Glu Asp  Tyr Phe Lys Lys Ile  Glu Cys Phe Asp Ser  Val Glu Ile
    1325                1330                1335

Ser Gly  Val Glu Asp Arg Phe  Asn Ala Ser Leu Gly  Thr Tyr His
    1340                1345                1350

Asp Leu  Leu Lys Ile Ile Lys  Asp Lys Asp Phe Leu  Asp Asn Glu
    1355                1360                1365

Glu Asn  Glu Asp Ile Leu Glu  Asp Ile Val Leu Thr  Leu Thr Leu
    1370                1375                1380

Phe Glu  Asp Arg Glu Met Ile  Glu Glu Arg Leu Lys  Thr Tyr Ala
    1385                1390                1395

His Leu  Phe Asp Asp Lys Val  Met Lys Gln Leu Lys  Arg Arg Arg
    1400                1405                1410

Tyr Thr  Gly Trp Gly Arg Leu  Ser Arg Lys Leu Ile  Asn Gly Ile
    1415                1420                1425

Arg Asp  Lys Gln Ser Gly Lys  Thr Ile Leu Asp Phe  Leu Lys Ser
    1430                1435                1440

Asp Gly  Phe Ala Asn Arg Asn  Phe Met Gln Leu Ile  His Asp Asp
    1445                1450                1455

Ser Leu  Thr Phe Lys Glu Asp  Ile Gln Lys Ala Gln  Val Ser Gly
    1460                1465                1470

Gln Gly  Asp Ser Leu His Glu  His Ile Ala Asn Leu  Ala Gly Ser
    1475                1480                1485
```

```
Pro Ala  Ile Lys Lys Gly Ile  Leu Gln Thr Val Lys  Val Val Asp
    1490                1495                1500

Glu Leu  Val Lys Val Met Gly  Arg His Lys Pro Glu  Asn Ile Val
    1505                1510                1515

Ile Glu  Met Ala Arg Glu Asn  Gln Thr Thr Gln Lys  Gly Gln Lys
    1520                1525                1530

Asn Ser  Arg Glu Arg Met Lys  Arg Ile Glu Glu Gly  Ile Lys Glu
    1535                1540                1545

Leu Gly  Ser Gln Ile Leu Lys  Glu His Pro Val Glu  Asn Thr Gln
    1550                1555                1560

Leu Gln  Asn Glu Lys Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg
    1565                1570                1575

Asp Met  Tyr Val Asp Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp
    1580                1585                1590

Tyr Asp  Val Asp His Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp
    1595                1600                1605

Ser Ile  Asp Asn Lys Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly
    1610                1615                1620

Lys Ser  Asp Asn Val Pro Ser  Glu Glu Val Val Lys  Lys Met Lys
    1625                1630                1635

Asn Tyr  Trp Arg Gln Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg
    1640                1645                1650

Lys Phe  Asp Asn Leu Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu
    1655                1660                1665
```

```
Leu Asp  Lys Ala Gly Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg
    1670                 1675                 1680


Gln Ile  Thr Lys His Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn
    1685                 1690                 1695


Thr Lys  Tyr Asp Glu Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val
    1700                 1705                 1710


Ile Thr  Leu Lys Ser Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe
    1715                 1720                 1725


Gln Phe  Tyr Lys Val Arg Glu  Ile Asn Asn Tyr His  His Ala His
    1730                 1735                 1740


Asp Ala  Tyr Leu Asn Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys
    1745                 1750                 1755


Tyr Pro  Lys Leu Glu Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val
    1760                 1765                 1770


Tyr Asp  Val Arg Lys Met Ile  Ala Lys Ser Glu Gln  Glu Gly Ala
    1775                 1780                 1785


Asp Lys  Arg Thr Ala Asp Gly  Ser Glu Phe Glu Ser  Pro Lys Lys
    1790                 1795                 1800


Lys Arg  Lys Val
    1805
```

<210> 78
<211> 80
<212> RNA
<213> Artificial Sequence

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

<400> 78
guuuuagagc uagaaauagc aaguuaaaau aaggcuaguc cguuaucaac uugaaaaagu 60

ggcaccgagu cggugcuuuu 80

<210> 79
<211> 987
<212> PRT
<213> Unknown

<220>
<223> Description of Unknown:
Deltaproteobacteria CasX sequence

<400> 79
Met Glu Lys Arg Ile Asn Lys Ile Arg Lys Lys Leu Ser Ala Asp Asn
1 5 10 15

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

Arg Val Met Thr Asp Asp Leu Lys Lys Arg Leu Glu Lys Arg Arg Lys
35 40 45

Lys Pro Glu Val Met Pro Gln Val Ile Ser Asn Asn Ala Ala Asn Asn
50 55 60

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

Gln Val Tyr Trp Gln Glu Phe Lys Asp Asp His Val Gly Leu Met Cys
85 90 95

Lys Phe Ala Gln Pro Ala Ser Lys Lys Ile Asp Gln Asn Lys Leu Lys
100 105 110

Pro Glu Met Asp Glu Lys Gly Asn Leu Thr Thr Ala Gly Phe Ala Cys
115 120 125

```
Ser Gln Cys Gly Gln Pro Leu Phe Val Tyr Lys Leu Glu Gln Val Ser
    130                 135                 140

Glu Lys Gly Lys Ala Tyr Thr Asn Tyr Phe Gly Arg Cys Asn Val Ala
145                 150                 155                 160

Glu His Glu Lys Leu Ile Leu Leu Ala Gln Leu Lys Pro Val Lys Asp
                165                 170                 175

Ser Asp Glu Ala Val Thr Tyr Ser Leu Gly Lys Phe Gly Gln Arg Ala
            180                 185                 190

Leu Asp Phe Tyr Ser Ile His Val Thr Lys Glu Ser Thr His Pro Val
        195                 200                 205

Lys Pro Leu Ala Gln Ile Ala Gly Asn Arg Tyr Ala Ser Gly Pro Val
    210                 215                 220

Gly Lys Ala Leu Ser Asp Ala Cys Met Gly Thr Ile Ala Ser Phe Leu
225                 230                 235                 240

Ser Lys Tyr Gln Asp Ile Ile Ile Glu His Gln Lys Val Val Lys Gly
                245                 250                 255

Asn Gln Lys Arg Leu Glu Ser Leu Arg Glu Leu Ala Gly Lys Glu Asn
            260                 265                 270

Leu Glu Tyr Pro Ser Val Thr Leu Pro Pro Gln Pro His Thr Lys Glu
        275                 280                 285

Gly Val Asp Phe Ala Tyr Asn Glu Val Ile Ala Arg Val Arg Met Trp
    290                 295                 300

Val Asn Leu Asn Leu Trp Gln Lys Leu Lys Leu Ser Arg Asp Asp Ala
305                 310                 315                 320
```

```
Lys Pro Leu Leu Arg Leu Lys Gly Phe Pro Ser Phe Pro Val Val Glu
                325                 330                 335

Arg Arg Glu Asn Glu Val Asp Trp Trp Asn Thr Ile Asn Glu Val Lys
            340                 345                 350

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

Val Thr Ala Glu Lys Arg Asn Thr Ile Leu Glu Gly Tyr Asn Tyr Leu
    370                 375                 380

Pro Asn Glu Asn Asp His Lys Lys Arg Glu Gly Ser Leu Glu Asn Pro
385                 390                 395                 400

Lys Lys Pro Ala Lys Arg Gln Phe Gly Asp Leu Leu Leu Tyr Leu Glu
                405                 410                 415

Lys Lys Tyr Ala Gly Asp Trp Gly Lys Val Phe Asp Glu Ala Trp Glu
            420                 425                 430

Arg Ile Asp Lys Lys Ile Ala Gly Leu Thr Ser His Ile Glu Arg Glu
        435                 440                 445

Glu Ala Arg Asn Ala Glu Asp Ala Gln Ser Lys Ala Val Leu Thr Asp
    450                 455                 460

Trp Leu Arg Ala Lys Ala Ser Phe Val Leu Glu Arg Leu Lys Glu Met
465                 470                 475                 480

Asp Glu Lys Glu Phe Tyr Ala Cys Glu Ile Gln Leu Gln Lys Trp Tyr
                485                 490                 495

Gly Asp Leu Arg Gly Asn Pro Phe Ala Val Glu Ala Glu Asn Arg Val
            500                 505                 510
```

```
Val Asp Ile Ser Gly Phe Ser Ile Gly Ser Asp Gly His Ser Ile Gln
        515                 520                 525

Tyr Arg Asn Leu Leu Ala Trp Lys Tyr Leu Glu Asn Gly Lys Arg Glu
    530                 535                 540

Phe Tyr Leu Leu Met Asn Tyr Gly Lys Lys Gly Arg Ile Arg Phe Thr
545                 550                 555                 560

Asp Gly Thr Asp Ile Lys Lys Ser Gly Lys Trp Gln Gly Leu Leu Tyr
                565                 570                 575

Gly Gly Gly Lys Ala Lys Val Ile Asp Leu Thr Phe Asp Pro Asp Asp
            580                 585                 590

Glu Gln Leu Ile Ile Leu Pro Leu Ala Phe Gly Thr Arg Gln Gly Arg
        595                 600                 605

Glu Phe Ile Trp Asn Asp Leu Leu Ser Leu Glu Thr Gly Leu Ile Lys
    610                 615                 620

Leu Ala Asn Gly Arg Val Ile Glu Lys Thr Ile Tyr Asn Lys Lys Ile
625                 630                 635                 640

Gly Arg Asp Glu Pro Ala Leu Phe Val Ala Leu Thr Phe Glu Arg Arg
                645                 650                 655

Glu Val Val Asp Pro Ser Asn Ile Lys Pro Val Asn Leu Ile Gly Val
            660                 665                 670

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

Gly Cys Pro Leu Pro Glu Phe Lys Asp Ser Ser Gly Gly Pro Thr Asp
    690                 695                 700
```

```
Ile Leu Arg Ile Gly Glu Gly Tyr Lys Glu Lys Gln Arg Ala Ile Gln
705                 710                 715                 720


Ala Ala Lys Glu Val Glu Gln Arg Arg Ala Gly Gly Tyr Ser Arg Lys
                725                 730                 735


Phe Ala Ser Lys Ser Arg Asn Leu Ala Asp Asp Met Val Arg Asn Ser
            740                 745                 750


Ala Arg Asp Leu Phe Tyr His Ala Val Thr His Asp Ala Val Leu Val
        755                 760                 765


Phe Ala Asn Leu Ser Arg Gly Phe Gly Arg Gln Gly Lys Arg Thr Phe
    770                 775                 780


Met Thr Glu Arg Gln Tyr Thr Lys Met Glu Asp Trp Leu Thr Ala Lys
785                 790                 795                 800


Leu Ala Tyr Glu Gly Leu Thr Ser Lys Thr Tyr Leu Ser Lys Thr Leu
                805                 810                 815


Ala Gln Tyr Thr Ser Lys Thr Cys Ser Asn Cys Gly Phe Thr Ile Thr
            820                 825                 830


Tyr Ala Asp Met Asp Val Met Leu Val Arg Leu Lys Lys Thr Ser Asp
        835                 840                 845


Gly Trp Ala Thr Thr Leu Asn Asn Lys Glu Leu Lys Ala Glu Tyr Gln
    850                 855                 860


Ile Thr Tyr Tyr Asn Arg Tyr Lys Arg Gln Thr Val Glu Lys Glu Leu
865                 870                 875                 880


Ser Ala Glu Leu Asp Arg Leu Ser Glu Glu Ser Gly Asn Asn Asp Ile
                885                 890                 895
```

```
Ser Lys Trp Thr Lys Gly Arg Arg Asp Glu Ala Leu Phe Leu Leu Lys
            900                 905                 910

Lys Arg Phe Ser His Arg Pro Val Gln Glu Gln Phe Val Cys Leu Asp
        915                 920                 925

Cys Gly His Glu Val His Ala Ala Glu Gln Ala Ala Leu Asn Ile Ala
    930                 935                 940

Arg Ser Trp Leu Phe Leu Asn Ser Asn Ser Thr Glu Phe Lys Ser Tyr
945                 950                 955                 960

Lys Ser Gly Lys Gln Pro Phe Val Gly Ala Trp Gln Ala Phe Tyr Lys
                965                 970                 975

Arg Arg Leu Lys Glu Val Trp Lys Pro Asn Ala
            980                 985


<210> 80
<211> 1300
<212> PRT
<213> Francisella novicida

<400> 80
Met Ser Ile Tyr Gln Glu Phe Val Asn Lys Tyr Ser Leu Ser Lys Thr
1               5                   10                  15

Leu Arg Phe Glu Leu Ile Pro Gln Gly Lys Thr Leu Glu Asn Ile Lys
            20                  25                  30

Ala Arg Gly Leu Ile Leu Asp Asp Glu Lys Arg Ala Lys Asp Tyr Lys
        35                  40                  45

Lys Ala Lys Gln Ile Ile Asp Lys Tyr His Gln Phe Phe Ile Glu Glu
    50                  55                  60

Ile Leu Ser Ser Val Cys Ile Ser Glu Asp Leu Leu Gln Asn Tyr Ser
```

```
65                  70                  75                  80

Asp Val Tyr Phe Lys Leu Lys Lys Ser Asp Asp Asp Asn Leu Gln Lys
                85                  90                  95

Asp Phe Lys Ser Ala Lys Asp Thr Ile Lys Lys Gln Ile Ser Glu Tyr
            100                 105                 110

Ile Lys Asp Ser Glu Lys Phe Lys Asn Leu Phe Asn Gln Asn Leu Ile
        115                 120                 125

Asp Ala Lys Lys Gly Gln Glu Ser Asp Leu Ile Leu Trp Leu Lys Gln
    130                 135                 140

Ser Lys Asp Asn Gly Ile Glu Leu Phe Lys Ala Asn Ser Asp Ile Thr
145                 150                 155                 160

Asp Ile Asp Glu Ala Leu Glu Ile Ile Lys Ser Phe Lys Gly Trp Thr
                165                 170                 175

Thr Tyr Phe Lys Gly Phe His Glu Asn Arg Lys Asn Val Tyr Ser Ser
            180                 185                 190

Asn Asp Ile Pro Thr Ser Ile Ile Tyr Arg Ile Val Asp Asp Asn Leu
        195                 200                 205

Pro Lys Phe Leu Glu Asn Lys Ala Lys Tyr Glu Ser Leu Lys Asp Lys
    210                 215                 220

Ala Pro Glu Ala Ile Asn Tyr Glu Gln Ile Lys Lys Asp Leu Ala Glu
225                 230                 235                 240

Glu Leu Thr Phe Asp Ile Asp Tyr Lys Thr Ser Glu Val Asn Gln Arg
                245                 250                 255

Val Phe Ser Leu Asp Glu Val Phe Glu Ile Ala Asn Phe Asn Asn Tyr
```

```
            260                 265                 270

Leu Asn Gln Ser Gly Ile Thr Lys Phe Asn Thr Ile Ile Gly Gly Lys
        275                 280                 285

Phe Val Asn Gly Glu Asn Thr Lys Arg Lys Gly Ile Asn Glu Tyr Ile
    290                 295                 300

Asn Leu Tyr Ser Gln Gln Ile Asn Asp Lys Thr Leu Lys Lys Tyr Lys
305                 310                 315                 320

Met Ser Val Leu Phe Lys Gln Ile Leu Ser Asp Thr Glu Ser Lys Ser
                325                 330                 335

Phe Val Ile Asp Lys Leu Glu Asp Asp Ser Asp Val Val Thr Thr Met
            340                 345                 350

Gln Ser Phe Tyr Glu Gln Ile Ala Ala Phe Lys Thr Val Glu Glu Lys
        355                 360                 365

Ser Ile Lys Glu Thr Leu Ser Leu Leu Phe Asp Asp Leu Lys Ala Gln
    370                 375                 380

Lys Leu Asp Leu Ser Lys Ile Tyr Phe Lys Asn Asp Lys Ser Leu Thr
385                 390                 395                 400

Asp Leu Ser Gln Gln Val Phe Asp Asp Tyr Ser Val Ile Gly Thr Ala
                405                 410                 415

Val Leu Glu Tyr Ile Thr Gln Gln Ile Ala Pro Lys Asn Leu Asp Asn
            420                 425                 430

Pro Ser Lys Lys Glu Gln Glu Leu Ile Ala Lys Lys Thr Glu Lys Ala
        435                 440                 445

Lys Tyr Leu Ser Leu Glu Thr Ile Lys Leu Ala Leu Glu Glu Phe Asn
```

```
    450                 455                 460

Lys His Arg Asp Ile Asp Lys Gln Cys Arg Phe Glu Glu Ile Leu Ala
465                 470                 475                 480

Asn Phe Ala Ala Ile Pro Met Ile Phe Asp Glu Ile Ala Gln Asn Lys
                485                 490                 495

Asp Asn Leu Ala Gln Ile Ser Ile Lys Tyr Gln Asn Gln Gly Lys Lys
            500                 505                 510

Asp Leu Leu Gln Ala Ser Ala Glu Asp Asp Val Lys Ala Ile Lys Asp
        515                 520                 525

Leu Leu Asp Gln Thr Asn Asn Leu Leu His Lys Leu Lys Ile Phe His
    530                 535                 540

Ile Ser Gln Ser Glu Asp Lys Ala Asn Ile Leu Asp Lys Asp Glu His
545                 550                 555                 560

Phe Tyr Leu Val Phe Glu Glu Cys Tyr Phe Glu Leu Ala Asn Ile Val
                565                 570                 575

Pro Leu Tyr Asn Lys Ile Arg Asn Tyr Ile Thr Gln Lys Pro Tyr Ser
            580                 585                 590

Asp Glu Lys Phe Lys Leu Asn Phe Glu Asn Ser Thr Leu Ala Asn Gly
        595                 600                 605

Trp Asp Lys Asn Lys Glu Pro Asp Asn Thr Ala Ile Leu Phe Ile Lys
    610                 615                 620

Asp Asp Lys Tyr Tyr Leu Gly Val Met Asn Lys Lys Asn Asn Lys Ile
625                 630                 635                 640

Phe Asp Asp Lys Ala Ile Lys Glu Asn Lys Gly Glu Gly Tyr Lys Lys
```

645 650 655

Ile Val Tyr Lys Leu Leu Pro Gly Ala Asn Lys Met Leu Pro Lys Val
660 665 670

Phe Phe Ser Ala Lys Ser Ile Lys Phe Tyr Asn Pro Ser Glu Asp Ile
675 680 685

Leu Arg Ile Arg Asn His Ser Thr His Thr Lys Asn Gly Ser Pro Gln
690 695 700

Lys Gly Tyr Glu Lys Phe Glu Phe Asn Ile Glu Asp Cys Arg Lys Phe
705 710 715 720

Ile Asp Phe Tyr Lys Gln Ser Ile Ser Lys His Pro Glu Trp Lys Asp
725 730 735

Phe Gly Phe Arg Phe Ser Asp Thr Gln Arg Tyr Asn Ser Ile Asp Glu
740 745 750

Phe Tyr Arg Glu Val Glu Asn Gln Gly Tyr Lys Leu Thr Phe Glu Asn
755 760 765

Ile Ser Glu Ser Tyr Ile Asp Ser Val Val Asn Gln Gly Lys Leu Tyr
770 775 780

Leu Phe Gln Ile Tyr Asn Lys Asp Phe Ser Ala Tyr Ser Lys Gly Arg
785 790 795 800

Pro Asn Leu His Thr Leu Tyr Trp Lys Ala Leu Phe Asp Glu Arg Asn
805 810 815

Leu Gln Asp Val Val Tyr Lys Leu Asn Gly Glu Ala Glu Leu Phe Tyr
820 825 830

Arg Lys Gln Ser Ile Pro Lys Lys Ile Thr His Pro Ala Lys Glu Ala

```
        835                 840                 845

Ile Ala Asn Lys Asn Lys Asp Asn Pro Lys Lys Glu Ser Val Phe Glu
    850                 855                 860

Tyr Asp Leu Ile Lys Asp Lys Arg Phe Thr Glu Asp Lys Phe Phe Phe
865                 870                 875                 880

His Cys Pro Ile Thr Ile Asn Phe Lys Ser Ser Gly Ala Asn Lys Phe
                885                 890                 895

Asn Asp Glu Ile Asn Leu Leu Leu Lys Glu Lys Ala Asn Asp Val His
            900                 905                 910

Ile Leu Ser Ile Asp Arg Gly Glu Arg His Leu Ala Tyr Tyr Thr Leu
        915                 920                 925

Val Asp Gly Lys Gly Asn Ile Ile Lys Gln Asp Thr Phe Asn Ile Ile
    930                 935                 940

Gly Asn Asp Arg Met Lys Thr Asn Tyr His Asp Lys Leu Ala Ala Ile
945                 950                 955                 960

Glu Lys Asp Arg Asp Ser Ala Arg Lys Asp Trp Lys Lys Ile Asn Asn
                965                 970                 975

Ile Lys Glu Met Lys Glu Gly Tyr Leu Ser Gln Val Val His Glu Ile
            980                 985                 990

Ala Lys Leu Val Ile Glu Tyr Asn  Ala Ile Val Val Phe  Glu Asp Leu
        995                 1000                1005

Asn Phe  Gly Phe Lys Arg Gly  Arg Phe Lys Val Glu  Lys Gln Val
    1010                1015                1020

Tyr Gln  Lys Leu Glu Lys Met  Leu Ile Glu Lys Leu  Asn Tyr Leu
```

```
    1025                1030                1035

Val Phe  Lys Asp Asn Glu Phe  Asp Lys Thr Gly Gly  Val Leu Arg
    1040                1045                1050

Ala Tyr  Gln Leu Thr Ala Pro  Phe Glu Thr Phe Lys  Lys Met Gly
    1055                1060                1065

Lys Gln  Thr Gly Ile Ile Tyr  Tyr Val Pro Ala Gly  Phe Thr Ser
    1070                1075                1080

Lys Ile  Cys Pro Val Thr Gly  Phe Val Asn Gln Leu  Tyr Pro Lys
    1085                1090                1095

Tyr Glu  Ser Val Ser Lys Ser  Gln Glu Phe Phe Ser  Lys Phe Asp
    1100                1105                1110

Lys Ile  Cys Tyr Asn Leu Asp  Lys Gly Tyr Phe Glu  Phe Ser Phe
    1115                1120                1125

Asp Tyr  Lys Asn Phe Gly Asp  Lys Ala Ala Lys Gly  Lys Trp Thr
    1130                1135                1140

Ile Ala  Ser Phe Gly Ser Arg  Leu Ile Asn Phe Arg  Asn Ser Asp
    1145                1150                1155

Lys Asn  His Asn Trp Asp Thr  Arg Glu Val Tyr Pro  Thr Lys Glu
    1160                1165                1170

Leu Glu  Lys Leu Leu Lys Asp  Tyr Ser Ile Glu Tyr  Gly His Gly
    1175                1180                1185

Glu Cys  Ile Lys Ala Ala Ile  Cys Gly Glu Ser Asp  Lys Lys Phe
    1190                1195                1200

Phe Ala  Lys Leu Thr Ser Val  Leu Asn Thr Ile Leu  Gln Met Arg
```

```
    1205                1210                1215


Asn Ser  Lys Thr Gly Thr Glu  Leu Asp Tyr Leu Ile  Ser Pro Val
    1220                1225                1230


Ala Asp  Val Asn Gly Asn Phe  Phe Asp Ser Arg Gln  Ala Pro Lys
    1235                1240                1245


Asn Met  Pro Gln Asp Ala Asp  Ala Asn Gly Ala Tyr  His Ile Gly
    1250                1255                1260


Leu Lys  Gly Leu Met Leu Leu  Gly Arg Ile Lys Asn  Asn Gln Glu
    1265                1270                1275


Gly Lys  Lys Leu Asn Leu Val  Ile Lys Asn Glu Glu  Tyr Phe Glu
    1280                1285                1290


Phe Val  Gln Asn Arg Asn Asn
    1295                1300


<210> 81
<211> 1300
<212> PRT
<213> Francisella novicida

<400> 81
Met Ser Ile Tyr Gln Glu Phe Val Asn Lys Tyr Ser Leu Ser Lys Thr
1               5                   10                  15


Leu Arg Phe Glu Leu Ile Pro Gln Gly Lys Thr Leu Glu Asn Ile Lys
            20                  25                  30


Ala Arg Gly Leu Ile Leu Asp Asp Glu Lys Arg Ala Lys Asp Tyr Lys
        35                  40                  45


Lys Ala Lys Gln Ile Ile Asp Lys Tyr His Gln Phe Phe Ile Glu Glu
    50                  55                  60
```

```
Ile Leu Ser Ser Val Cys Ile Ser Glu Asp Leu Leu Gln Asn Tyr Ser
65                  70                  75                  80


Asp Val Tyr Phe Lys Leu Lys Lys Ser Asp Asp Asp Asn Leu Gln Lys
                85                  90                  95


Asp Phe Lys Ser Ala Lys Asp Thr Ile Lys Lys Gln Ile Ser Glu Tyr
            100                 105                 110


Ile Lys Asp Ser Glu Lys Phe Lys Asn Leu Phe Asn Gln Asn Leu Ile
        115                 120                 125


Asp Ala Lys Lys Gly Gln Glu Ser Asp Leu Ile Leu Trp Leu Lys Gln
    130                 135                 140


Ser Lys Asp Asn Gly Ile Glu Leu Phe Lys Ala Asn Ser Asp Ile Thr
145                 150                 155                 160


Asp Ile Asp Glu Ala Leu Glu Ile Ile Lys Ser Phe Lys Gly Trp Thr
                165                 170                 175


Thr Tyr Phe Lys Gly Phe His Glu Asn Arg Lys Asn Val Tyr Ser Ser
            180                 185                 190


Asn Asp Ile Pro Thr Ser Ile Ile Tyr Arg Ile Val Asp Asp Asn Leu
        195                 200                 205


Pro Lys Phe Leu Glu Asn Lys Ala Lys Tyr Glu Ser Leu Lys Asp Lys
    210                 215                 220


Ala Pro Glu Ala Ile Asn Tyr Glu Gln Ile Lys Lys Asp Leu Ala Glu
225                 230                 235                 240


Glu Leu Thr Phe Asp Ile Asp Tyr Lys Thr Ser Glu Val Asn Gln Arg
                245                 250                 255
```

```
Val Phe Ser Leu Asp Glu Val Phe Glu Ile Ala Asn Phe Asn Asn Tyr
            260                 265                 270

Leu Asn Gln Ser Gly Ile Thr Lys Phe Asn Thr Ile Ile Gly Gly Lys
        275                 280                 285

Phe Val Asn Gly Glu Asn Thr Lys Arg Lys Gly Ile Asn Glu Tyr Ile
    290                 295                 300

Asn Leu Tyr Ser Gln Gln Ile Asn Asp Lys Thr Leu Lys Lys Tyr Lys
305                 310                 315                 320

Met Ser Val Leu Phe Lys Gln Ile Leu Ser Asp Thr Glu Ser Lys Ser
                325                 330                 335

Phe Val Ile Asp Lys Leu Glu Asp Asp Ser Asp Val Val Thr Thr Met
            340                 345                 350

Gln Ser Phe Tyr Glu Gln Ile Ala Ala Phe Lys Thr Val Glu Glu Lys
        355                 360                 365

Ser Ile Lys Glu Thr Leu Ser Leu Leu Phe Asp Asp Leu Lys Ala Gln
    370                 375                 380

Lys Leu Asp Leu Ser Lys Ile Tyr Phe Lys Asn Asp Lys Ser Leu Thr
385                 390                 395                 400

Asp Leu Ser Gln Gln Val Phe Asp Asp Tyr Ser Val Ile Gly Thr Ala
                405                 410                 415

Val Leu Glu Tyr Ile Thr Gln Gln Ile Ala Pro Lys Asn Leu Asp Asn
            420                 425                 430

Pro Ser Lys Lys Glu Gln Glu Leu Ile Ala Lys Lys Thr Glu Lys Ala
        435                 440                 445
```

```
Lys Tyr Leu Ser Leu Glu Thr Ile Lys Leu Ala Leu Glu Glu Phe Asn
    450                 455                 460

Lys His Arg Asp Ile Asp Lys Gln Cys Arg Phe Glu Glu Ile Leu Ala
465                 470                 475                 480

Asn Phe Ala Ala Ile Pro Met Ile Phe Asp Glu Ile Ala Gln Asn Lys
                485                 490                 495

Asp Asn Leu Ala Gln Ile Ser Ile Lys Tyr Gln Asn Gln Gly Lys Lys
            500                 505                 510

Asp Leu Leu Gln Ala Ser Ala Glu Asp Asp Val Lys Ala Ile Lys Asp
        515                 520                 525

Leu Leu Asp Gln Thr Asn Asn Leu Leu His Lys Leu Lys Ile Phe His
    530                 535                 540

Ile Ser Gln Ser Glu Asp Lys Ala Asn Ile Leu Asp Lys Asp Glu His
545                 550                 555                 560

Phe Tyr Leu Val Phe Glu Glu Cys Tyr Phe Glu Leu Ala Asn Ile Val
                565                 570                 575

Pro Leu Tyr Asn Lys Ile Arg Asn Tyr Ile Thr Gln Lys Pro Tyr Ser
            580                 585                 590

Asp Glu Lys Phe Lys Leu Asn Phe Glu Asn Ser Thr Leu Ala Asn Gly
        595                 600                 605

Trp Asp Lys Asn Lys Glu Pro Asp Asn Thr Ala Ile Leu Phe Ile Lys
    610                 615                 620

Asp Asp Lys Tyr Tyr Leu Gly Val Met Asn Lys Lys Asn Asn Lys Ile
625                 630                 635                 640
```

```
Phe Asp Asp Lys Ala Ile Lys Glu Asn Lys Gly Glu Gly Tyr Lys Lys
               645                 650                 655

Ile Val Tyr Lys Leu Leu Pro Gly Ala Asn Lys Met Leu Pro Lys Val
            660                 665                 670

Phe Phe Ser Ala Lys Ser Ile Lys Phe Tyr Asn Pro Ser Glu Asp Ile
        675                 680                 685

Leu Arg Ile Arg Asn His Ser Thr His Thr Lys Asn Gly Ser Pro Gln
    690                 695                 700

Lys Gly Tyr Glu Lys Phe Glu Phe Asn Ile Glu Asp Cys Arg Lys Phe
705                 710                 715                 720

Ile Asp Phe Tyr Lys Gln Ser Ile Ser Lys His Pro Glu Trp Lys Asp
               725                 730                 735

Phe Gly Phe Arg Phe Ser Asp Thr Gln Arg Tyr Asn Ser Ile Asp Glu
            740                 745                 750

Phe Tyr Arg Glu Val Glu Asn Gln Gly Tyr Lys Leu Thr Phe Glu Asn
        755                 760                 765

Ile Ser Glu Ser Tyr Ile Asp Ser Val Val Asn Gln Gly Lys Leu Tyr
    770                 775                 780

Leu Phe Gln Ile Tyr Asn Lys Asp Phe Ser Ala Tyr Ser Lys Gly Arg
785                 790                 795                 800

Pro Asn Leu His Thr Leu Tyr Trp Lys Ala Leu Phe Asp Glu Arg Asn
               805                 810                 815

Leu Gln Asp Val Val Tyr Lys Leu Asn Gly Glu Ala Glu Leu Phe Tyr
            820                 825                 830
```

```
Arg Lys Gln Ser Ile Pro Lys Lys Ile Thr His Pro Ala Lys Glu Ala
        835                 840                 845

Ile Ala Asn Lys Asn Lys Asp Asn Pro Lys Lys Glu Ser Val Phe Glu
    850                 855                 860

Tyr Asp Leu Ile Lys Asp Lys Arg Phe Thr Glu Asp Lys Phe Phe Phe
865                 870                 875                 880

His Cys Pro Ile Thr Ile Asn Phe Lys Ser Ser Gly Ala Asn Lys Phe
                885                 890                 895

Asn Asp Glu Ile Asn Leu Leu Leu Lys Glu Lys Ala Asn Asp Val His
            900                 905                 910

Ile Leu Ser Ile Ala Arg Gly Glu Arg His Leu Ala Tyr Tyr Thr Leu
        915                 920                 925

Val Asp Gly Lys Gly Asn Ile Ile Lys Gln Asp Thr Phe Asn Ile Ile
    930                 935                 940

Gly Asn Asp Arg Met Lys Thr Asn Tyr His Asp Lys Leu Ala Ala Ile
945                 950                 955                 960

Glu Lys Asp Arg Asp Ser Ala Arg Lys Asp Trp Lys Lys Ile Asn Asn
                965                 970                 975

Ile Lys Glu Met Lys Glu Gly Tyr Leu Ser Gln Val Val His Glu Ile
            980                 985                 990

Ala Lys Leu Val Ile Glu Tyr Asn  Ala Ile Val Val Phe  Glu Asp Leu
        995                 1000                1005

Asn Phe  Gly Phe Lys Arg Gly  Arg Phe Lys Val Glu  Lys Gln Val
    1010                1015                1020
```

```
Tyr Gln  Lys Leu Glu Lys Met  Leu Ile Glu Lys Leu  Asn Tyr Leu
    1025                1030                1035


Val Phe  Lys Asp Asn Glu Phe  Asp Lys Thr Gly Gly  Val Leu Arg
    1040                1045                1050


Ala Tyr  Gln Leu Thr Ala Pro  Phe Glu Thr Phe Lys  Lys Met Gly
    1055                1060                1065


Lys Gln  Thr Gly Ile Ile Tyr  Tyr Val Pro Ala Gly  Phe Thr Ser
    1070                1075                1080


Lys Ile  Cys Pro Val Thr Gly  Phe Val Asn Gln Leu  Tyr Pro Lys
    1085                1090                1095


Tyr Glu  Ser Val Ser Lys Ser  Gln Glu Phe Phe Ser  Lys Phe Asp
    1100                1105                1110


Lys Ile  Cys Tyr Asn Leu Asp  Lys Gly Tyr Phe Glu  Phe Ser Phe
    1115                1120                1125


Asp Tyr  Lys Asn Phe Gly Asp  Lys Ala Ala Lys Gly  Lys Trp Thr
    1130                1135                1140


Ile Ala  Ser Phe Gly Ser Arg  Leu Ile Asn Phe Arg  Asn Ser Asp
    1145                1150                1155


Lys Asn  His Asn Trp Asp Thr  Arg Glu Val Tyr Pro  Thr Lys Glu
    1160                1165                1170


Leu Glu  Lys Leu Leu Lys Asp  Tyr Ser Ile Glu Tyr  Gly His Gly
    1175                1180                1185


Glu Cys  Ile Lys Ala Ala Ile  Cys Gly Glu Ser Asp  Lys Lys Phe
    1190                1195                1200
```

```
Phe Ala  Lys Leu Thr Ser Val  Leu Asn Thr Ile Leu  Gln Met Arg
    1205                 1210                 1215


Asn Ser  Lys Thr Gly Thr Glu  Leu Asp Tyr Leu Ile  Ser Pro Val
    1220                 1225                 1230


Ala Asp  Val Asn Gly Asn Phe  Phe Asp Ser Arg Gln  Ala Pro Lys
    1235                 1240                 1245


Asn Met  Pro Gln Asp Ala Asp  Ala Asn Gly Ala Tyr  His Ile Gly
    1250                 1255                 1260


Leu Lys  Gly Leu Met Leu Leu  Gly Arg Ile Lys Asn  Asn Gln Glu
    1265                 1270                 1275


Gly Lys  Lys Leu Asn Leu Val  Ile Lys Asn Glu Glu  Tyr Phe Glu
    1280                 1285                 1290


Phe Val  Gln Asn Arg Asn Asn
    1295                 1300
```

<210> 82
<211> 1300
<212> PRT
<213> Francisella novicida

<400> 82

```
Met Ser Ile Tyr Gln Glu Phe Val Asn Lys Tyr Ser Leu Ser Lys Thr
1               5                  10                  15


Leu Arg Phe Glu Leu Ile Pro Gln Gly Lys Thr Leu Glu Asn Ile Lys
            20                  25                  30


Ala Arg Gly Leu Ile Leu Asp Asp Glu Lys Arg Ala Lys Asp Tyr Lys
        35                  40                  45


Lys Ala Lys Gln Ile Ile Asp Lys Tyr His Gln Phe Phe Ile Glu Glu
```

```
    50                  55                  60

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

Asp Val Tyr Phe Lys Leu Lys Lys Ser Asp Asp Asp Asn Leu Gln Lys
                85                  90                  95

Asp Phe Lys Ser Ala Lys Asp Thr Ile Lys Lys Gln Ile Ser Glu Tyr
            100                 105                 110

Ile Lys Asp Ser Glu Lys Phe Lys Asn Leu Phe Asn Gln Asn Leu Ile
        115                 120                 125

Asp Ala Lys Lys Gly Gln Glu Ser Asp Leu Ile Leu Trp Leu Lys Gln
    130                 135                 140

Ser Lys Asp Asn Gly Ile Glu Leu Phe Lys Ala Asn Ser Asp Ile Thr
145                 150                 155                 160

Asp Ile Asp Glu Ala Leu Glu Ile Ile Lys Ser Phe Lys Gly Trp Thr
                165                 170                 175

Thr Tyr Phe Lys Gly Phe His Glu Asn Arg Lys Asn Val Tyr Ser Ser
            180                 185                 190

Asn Asp Ile Pro Thr Ser Ile Ile Tyr Arg Ile Val Asp Asp Asn Leu
        195                 200                 205

Pro Lys Phe Leu Glu Asn Lys Ala Lys Tyr Glu Ser Leu Lys Asp Lys
    210                 215                 220

Ala Pro Glu Ala Ile Asn Tyr Glu Gln Ile Lys Lys Asp Leu Ala Glu
225                 230                 235                 240

Glu Leu Thr Phe Asp Ile Asp Tyr Lys Thr Ser Glu Val Asn Gln Arg
```

```
                245                 250                 255

Val Phe Ser Leu Asp Glu Val Phe Glu Ile Ala Asn Phe Asn Asn Tyr
            260                 265                 270

Leu Asn Gln Ser Gly Ile Thr Lys Phe Asn Thr Ile Ile Gly Gly Lys
        275                 280                 285

Phe Val Asn Gly Glu Asn Thr Lys Arg Lys Gly Ile Asn Glu Tyr Ile
    290                 295                 300

Asn Leu Tyr Ser Gln Gln Ile Asn Asp Lys Thr Leu Lys Lys Tyr Lys
305                 310                 315                 320

Met Ser Val Leu Phe Lys Gln Ile Leu Ser Asp Thr Glu Ser Lys Ser
                325                 330                 335

Phe Val Ile Asp Lys Leu Glu Asp Asp Ser Asp Val Val Thr Thr Met
            340                 345                 350

Gln Ser Phe Tyr Glu Gln Ile Ala Ala Phe Lys Thr Val Glu Glu Lys
        355                 360                 365

Ser Ile Lys Glu Thr Leu Ser Leu Leu Phe Asp Asp Leu Lys Ala Gln
    370                 375                 380

Lys Leu Asp Leu Ser Lys Ile Tyr Phe Lys Asn Asp Lys Ser Leu Thr
385                 390                 395                 400

Asp Leu Ser Gln Gln Val Phe Asp Asp Tyr Ser Val Ile Gly Thr Ala
                405                 410                 415

Val Leu Glu Tyr Ile Thr Gln Gln Ile Ala Pro Lys Asn Leu Asp Asn
            420                 425                 430

Pro Ser Lys Lys Glu Gln Glu Leu Ile Ala Lys Lys Thr Glu Lys Ala
```

```
        435                 440                 445

Lys Tyr Leu Ser Leu Glu Thr Ile Lys Leu Ala Leu Glu Glu Phe Asn
    450                 455                 460

Lys His Arg Asp Ile Asp Lys Gln Cys Arg Phe Glu Glu Ile Leu Ala
465                 470                 475                 480

Asn Phe Ala Ala Ile Pro Met Ile Phe Asp Glu Ile Ala Gln Asn Lys
                485                 490                 495

Asp Asn Leu Ala Gln Ile Ser Ile Lys Tyr Gln Asn Gln Gly Lys Lys
            500                 505                 510

Asp Leu Leu Gln Ala Ser Ala Glu Asp Asp Val Lys Ala Ile Lys Asp
        515                 520                 525

Leu Leu Asp Gln Thr Asn Asn Leu Leu His Lys Leu Lys Ile Phe His
    530                 535                 540

Ile Ser Gln Ser Glu Asp Lys Ala Asn Ile Leu Asp Lys Asp Glu His
545                 550                 555                 560

Phe Tyr Leu Val Phe Glu Glu Cys Tyr Phe Glu Leu Ala Asn Ile Val
                565                 570                 575

Pro Leu Tyr Asn Lys Ile Arg Asn Tyr Ile Thr Gln Lys Pro Tyr Ser
            580                 585                 590

Asp Glu Lys Phe Lys Leu Asn Phe Glu Asn Ser Thr Leu Ala Asn Gly
        595                 600                 605

Trp Asp Lys Asn Lys Glu Pro Asp Asn Thr Ala Ile Leu Phe Ile Lys
    610                 615                 620

Asp Asp Lys Tyr Tyr Leu Gly Val Met Asn Lys Lys Asn Asn Lys Ile
```

625 630 635 640

Phe Asp Asp Lys Ala Ile Lys Glu Asn Lys Gly Glu Gly Tyr Lys Lys
645 650 655

Ile Val Tyr Lys Leu Leu Pro Gly Ala Asn Lys Met Leu Pro Lys Val
660 665 670

Phe Phe Ser Ala Lys Ser Ile Lys Phe Tyr Asn Pro Ser Glu Asp Ile
675 680 685

Leu Arg Ile Arg Asn His Ser Thr His Thr Lys Asn Gly Ser Pro Gln
690 695 700

Lys Gly Tyr Glu Lys Phe Glu Phe Asn Ile Glu Asp Cys Arg Lys Phe
705 710 715 720

Ile Asp Phe Tyr Lys Gln Ser Ile Ser Lys His Pro Glu Trp Lys Asp
725 730 735

Phe Gly Phe Arg Phe Ser Asp Thr Gln Arg Tyr Asn Ser Ile Asp Glu
740 745 750

Phe Tyr Arg Glu Val Glu Asn Gln Gly Tyr Lys Leu Thr Phe Glu Asn
755 760 765

Ile Ser Glu Ser Tyr Ile Asp Ser Val Val Asn Gln Gly Lys Leu Tyr
770 775 780

Leu Phe Gln Ile Tyr Asn Lys Asp Phe Ser Ala Tyr Ser Lys Gly Arg
785 790 795 800

Pro Asn Leu His Thr Leu Tyr Trp Lys Ala Leu Phe Asp Glu Arg Asn
805 810 815

Leu Gln Asp Val Val Tyr Lys Leu Asn Gly Glu Ala Glu Leu Phe Tyr

```
            820                 825                 830

Arg Lys Gln Ser Ile Pro Lys Lys Ile Thr His Pro Ala Lys Glu Ala
        835                 840                 845

Ile Ala Asn Lys Asn Lys Asp Asn Pro Lys Lys Glu Ser Val Phe Glu
    850                 855                 860

Tyr Asp Leu Ile Lys Asp Lys Arg Phe Thr Glu Asp Lys Phe Phe Phe
865                 870                 875                 880

His Cys Pro Ile Thr Ile Asn Phe Lys Ser Ser Gly Ala Asn Lys Phe
                885                 890                 895

Asn Asp Glu Ile Asn Leu Leu Leu Lys Glu Lys Ala Asn Asp Val His
            900                 905                 910

Ile Leu Ser Ile Asp Arg Gly Glu Arg His Leu Ala Tyr Tyr Thr Leu
        915                 920                 925

Val Asp Gly Lys Gly Asn Ile Ile Lys Gln Asp Thr Phe Asn Ile Ile
    930                 935                 940

Gly Asn Asp Arg Met Lys Thr Asn Tyr His Asp Lys Leu Ala Ala Ile
945                 950                 955                 960

Glu Lys Asp Arg Asp Ser Ala Arg Lys Asp Trp Lys Lys Ile Asn Asn
                965                 970                 975

Ile Lys Glu Met Lys Glu Gly Tyr Leu Ser Gln Val Val His Glu Ile
            980                 985                 990

Ala Lys Leu Val Ile Glu Tyr Asn  Ala Ile Val Val Phe  Ala Asp Leu
        995                 1000                1005

Asn Phe  Gly Phe Lys Arg Gly  Arg Phe Lys Val Glu  Lys Gln Val
```

```
    1010                1015                1020

Tyr Gln  Lys Leu Glu Lys Met  Leu Ile Glu Lys Leu  Asn Tyr Leu
    1025                1030                1035

Val Phe  Lys Asp Asn Glu Phe  Asp Lys Thr Gly Gly  Val Leu Arg
    1040                1045                1050

Ala Tyr  Gln Leu Thr Ala Pro  Phe Glu Thr Phe Lys  Lys Met Gly
    1055                1060                1065

Lys Gln  Thr Gly Ile Ile Tyr  Tyr Val Pro Ala Gly  Phe Thr Ser
    1070                1075                1080

Lys Ile  Cys Pro Val Thr Gly  Phe Val Asn Gln Leu  Tyr Pro Lys
    1085                1090                1095

Tyr Glu  Ser Val Ser Lys Ser  Gln Glu Phe Phe Ser  Lys Phe Asp
    1100                1105                1110

Lys Ile  Cys Tyr Asn Leu Asp  Lys Gly Tyr Phe Glu  Phe Ser Phe
    1115                1120                1125

Asp Tyr  Lys Asn Phe Gly Asp  Lys Ala Ala Lys Gly  Lys Trp Thr
    1130                1135                1140

Ile Ala  Ser Phe Gly Ser Arg  Leu Ile Asn Phe Arg  Asn Ser Asp
    1145                1150                1155

Lys Asn  His Asn Trp Asp Thr  Arg Glu Val Tyr Pro  Thr Lys Glu
    1160                1165                1170

Leu Glu  Lys Leu Leu Lys Asp  Tyr Ser Ile Glu Tyr  Gly His Gly
    1175                1180                1185

Glu Cys  Ile Lys Ala Ala Ile  Cys Gly Glu Ser Asp  Lys Lys Phe
```

```
    1190                1195                1200

Phe Ala  Lys Leu Thr Ser Val  Leu Asn Thr Ile Leu  Gln Met Arg
    1205                1210                1215

Asn Ser  Lys Thr Gly Thr Glu  Leu Asp Tyr Leu Ile  Ser Pro Val
    1220                1225                1230

Ala Asp  Val Asn Gly Asn Phe  Phe Asp Ser Arg Gln  Ala Pro Lys
    1235                1240                1245

Asn Met  Pro Gln Asp Ala Asp  Ala Asn Gly Ala Tyr  His Ile Gly
    1250                1255                1260

Leu Lys  Gly Leu Met Leu Leu  Gly Arg Ile Lys Asn  Asn Gln Glu
    1265                1270                1275

Gly Lys  Lys Leu Asn Leu Val  Ile Lys Asn Glu Glu  Tyr Phe Glu
    1280                1285                1290

Phe Val  Gln Asn Arg Asn Asn
    1295                1300


<210> 83
<211> 1300
<212> PRT
<213> Francisella novicida

<400> 83
Met Ser Ile Tyr Gln Glu Phe Val Asn Lys Tyr Ser Leu Ser Lys Thr
1               5                  10                  15

Leu Arg Phe Glu Leu Ile Pro Gln Gly Lys Thr Leu Glu Asn Ile Lys
            20                  25                  30

Ala Arg Gly Leu Ile Leu Asp Asp Glu Lys Arg Ala Lys Asp Tyr Lys
        35                  40                  45
```

```
Lys Ala Lys Gln Ile Ile Asp Lys Tyr His Gln Phe Phe Ile Glu Glu
    50                  55                  60

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

Asp Val Tyr Phe Lys Leu Lys Lys Ser Asp Asp Asp Asn Leu Gln Lys
                85                  90                  95

Asp Phe Lys Ser Ala Lys Asp Thr Ile Lys Lys Gln Ile Ser Glu Tyr
            100                 105                 110

Ile Lys Asp Ser Glu Lys Phe Lys Asn Leu Phe Asn Gln Asn Leu Ile
        115                 120                 125

Asp Ala Lys Lys Gly Gln Glu Ser Asp Leu Ile Leu Trp Leu Lys Gln
    130                 135                 140

Ser Lys Asp Asn Gly Ile Glu Leu Phe Lys Ala Asn Ser Asp Ile Thr
145                 150                 155                 160

Asp Ile Asp Glu Ala Leu Glu Ile Ile Lys Ser Phe Lys Gly Trp Thr
                165                 170                 175

Thr Tyr Phe Lys Gly Phe His Glu Asn Arg Lys Asn Val Tyr Ser Ser
            180                 185                 190

Asn Asp Ile Pro Thr Ser Ile Ile Tyr Arg Ile Val Asp Asp Asn Leu
        195                 200                 205

Pro Lys Phe Leu Glu Asn Lys Ala Lys Tyr Glu Ser Leu Lys Asp Lys
    210                 215                 220

Ala Pro Glu Ala Ile Asn Tyr Glu Gln Ile Lys Lys Asp Leu Ala Glu
225                 230                 235                 240
```

```
Glu Leu Thr Phe Asp Ile Asp Tyr Lys Thr Ser Glu Val Asn Gln Arg
                245                 250                 255

Val Phe Ser Leu Asp Glu Val Phe Glu Ile Ala Asn Phe Asn Asn Tyr
            260                 265                 270

Leu Asn Gln Ser Gly Ile Thr Lys Phe Asn Thr Ile Ile Gly Gly Lys
        275                 280                 285

Phe Val Asn Gly Glu Asn Thr Lys Arg Lys Gly Ile Asn Glu Tyr Ile
    290                 295                 300

Asn Leu Tyr Ser Gln Gln Ile Asn Asp Lys Thr Leu Lys Lys Tyr Lys
305                 310                 315                 320

Met Ser Val Leu Phe Lys Gln Ile Leu Ser Asp Thr Glu Ser Lys Ser
                325                 330                 335

Phe Val Ile Asp Lys Leu Glu Asp Asp Ser Asp Val Val Thr Thr Met
            340                 345                 350

Gln Ser Phe Tyr Glu Gln Ile Ala Ala Phe Lys Thr Val Glu Glu Lys
        355                 360                 365

Ser Ile Lys Glu Thr Leu Ser Leu Leu Phe Asp Asp Leu Lys Ala Gln
    370                 375                 380

Lys Leu Asp Leu Ser Lys Ile Tyr Phe Lys Asn Asp Lys Ser Leu Thr
385                 390                 395                 400

Asp Leu Ser Gln Gln Val Phe Asp Asp Tyr Ser Val Ile Gly Thr Ala
                405                 410                 415

Val Leu Glu Tyr Ile Thr Gln Gln Ile Ala Pro Lys Asn Leu Asp Asn
            420                 425                 430
```

```
Pro Ser Lys Lys Glu Gln Glu Leu Ile Ala Lys Lys Thr Glu Lys Ala
        435                 440                 445


Lys Tyr Leu Ser Leu Glu Thr Ile Lys Leu Ala Leu Glu Glu Phe Asn
    450                 455                 460


Lys His Arg Asp Ile Asp Lys Gln Cys Arg Phe Glu Glu Ile Leu Ala
465                 470                 475                 480


Asn Phe Ala Ala Ile Pro Met Ile Phe Asp Glu Ile Ala Gln Asn Lys
                485                 490                 495


Asp Asn Leu Ala Gln Ile Ser Ile Lys Tyr Gln Asn Gln Gly Lys Lys
            500                 505                 510


Asp Leu Leu Gln Ala Ser Ala Glu Asp Asp Val Lys Ala Ile Lys Asp
        515                 520                 525


Leu Leu Asp Gln Thr Asn Asn Leu Leu His Lys Leu Lys Ile Phe His
    530                 535                 540


Ile Ser Gln Ser Glu Asp Lys Ala Asn Ile Leu Asp Lys Asp Glu His
545                 550                 555                 560


Phe Tyr Leu Val Phe Glu Glu Cys Tyr Phe Glu Leu Ala Asn Ile Val
                565                 570                 575


Pro Leu Tyr Asn Lys Ile Arg Asn Tyr Ile Thr Gln Lys Pro Tyr Ser
            580                 585                 590


Asp Glu Lys Phe Lys Leu Asn Phe Glu Asn Ser Thr Leu Ala Asn Gly
        595                 600                 605


Trp Asp Lys Asn Lys Glu Pro Asp Asn Thr Ala Ile Leu Phe Ile Lys
    610                 615                 620
```

```
Asp Asp Lys Tyr Tyr Leu Gly Val Met Asn Lys Lys Asn Asn Lys Ile
625                 630                 635                 640


Phe Asp Asp Lys Ala Ile Lys Glu Asn Lys Gly Glu Gly Tyr Lys Lys
                645                 650                 655


Ile Val Tyr Lys Leu Leu Pro Gly Ala Asn Lys Met Leu Pro Lys Val
            660                 665                 670


Phe Phe Ser Ala Lys Ser Ile Lys Phe Tyr Asn Pro Ser Glu Asp Ile
        675                 680                 685


Leu Arg Ile Arg Asn His Ser Thr His Thr Lys Asn Gly Ser Pro Gln
    690                 695                 700


Lys Gly Tyr Glu Lys Phe Glu Phe Asn Ile Glu Asp Cys Arg Lys Phe
705                 710                 715                 720


Ile Asp Phe Tyr Lys Gln Ser Ile Ser Lys His Pro Glu Trp Lys Asp
                725                 730                 735


Phe Gly Phe Arg Phe Ser Asp Thr Gln Arg Tyr Asn Ser Ile Asp Glu
            740                 745                 750


Phe Tyr Arg Glu Val Glu Asn Gln Gly Tyr Lys Leu Thr Phe Glu Asn
        755                 760                 765


Ile Ser Glu Ser Tyr Ile Asp Ser Val Val Asn Gln Gly Lys Leu Tyr
    770                 775                 780


Leu Phe Gln Ile Tyr Asn Lys Asp Phe Ser Ala Tyr Ser Lys Gly Arg
785                 790                 795                 800


Pro Asn Leu His Thr Leu Tyr Trp Lys Ala Leu Phe Asp Glu Arg Asn
                805                 810                 815
```

```
Leu Gln Asp Val Val Tyr Lys Leu Asn Gly Glu Ala Glu Leu Phe Tyr
            820                 825                 830

Arg Lys Gln Ser Ile Pro Lys Lys Ile Thr His Pro Ala Lys Glu Ala
        835                 840                 845

Ile Ala Asn Lys Asn Lys Asp Asn Pro Lys Lys Glu Ser Val Phe Glu
    850                 855                 860

Tyr Asp Leu Ile Lys Asp Lys Arg Phe Thr Glu Asp Lys Phe Phe Phe
865                 870                 875                 880

His Cys Pro Ile Thr Ile Asn Phe Lys Ser Ser Gly Ala Asn Lys Phe
                885                 890                 895

Asn Asp Glu Ile Asn Leu Leu Leu Lys Glu Lys Ala Asn Asp Val His
            900                 905                 910

Ile Leu Ser Ile Asp Arg Gly Glu Arg His Leu Ala Tyr Tyr Thr Leu
        915                 920                 925

Val Asp Gly Lys Gly Asn Ile Ile Lys Gln Asp Thr Phe Asn Ile Ile
    930                 935                 940

Gly Asn Asp Arg Met Lys Thr Asn Tyr His Asp Lys Leu Ala Ala Ile
945                 950                 955                 960

Glu Lys Asp Arg Asp Ser Ala Arg Lys Asp Trp Lys Lys Ile Asn Asn
                965                 970                 975

Ile Lys Glu Met Lys Glu Gly Tyr Leu Ser Gln Val Val His Glu Ile
            980                 985                 990

Ala Lys Leu Val Ile Glu Tyr Asn  Ala Ile Val Val Phe  Glu Asp Leu
        995                 1000                1005
```

```
Asn Phe  Gly Phe Lys Arg Gly  Arg Phe Lys Val Glu  Lys Gln Val
    1010                1015                1020

Tyr Gln  Lys Leu Glu Lys Met  Leu Ile Glu Lys Leu  Asn Tyr Leu
    1025                1030                1035

Val Phe  Lys Asp Asn Glu Phe  Asp Lys Thr Gly Gly  Val Leu Arg
    1040                1045                1050

Ala Tyr  Gln Leu Thr Ala Pro  Phe Glu Thr Phe Lys  Lys Met Gly
    1055                1060                1065

Lys Gln  Thr Gly Ile Ile Tyr  Tyr Val Pro Ala Gly  Phe Thr Ser
    1070                1075                1080

Lys Ile  Cys Pro Val Thr Gly  Phe Val Asn Gln Leu  Tyr Pro Lys
    1085                1090                1095

Tyr Glu  Ser Val Ser Lys Ser  Gln Glu Phe Phe Ser  Lys Phe Asp
    1100                1105                1110

Lys Ile  Cys Tyr Asn Leu Asp  Lys Gly Tyr Phe Glu  Phe Ser Phe
    1115                1120                1125

Asp Tyr  Lys Asn Phe Gly Asp  Lys Ala Ala Lys Gly  Lys Trp Thr
    1130                1135                1140

Ile Ala  Ser Phe Gly Ser Arg  Leu Ile Asn Phe Arg  Asn Ser Asp
    1145                1150                1155

Lys Asn  His Asn Trp Asp Thr  Arg Glu Val Tyr Pro  Thr Lys Glu
    1160                1165                1170

Leu Glu  Lys Leu Leu Lys Asp  Tyr Ser Ile Glu Tyr  Gly His Gly
    1175                1180                1185
```

```
Glu Cys  Ile Lys Ala Ala Ile  Cys Gly Glu Ser Asp  Lys Lys Phe
    1190                1195                1200


Phe Ala  Lys Leu Thr Ser Val  Leu Asn Thr Ile Leu  Gln Met Arg
    1205                1210                1215


Asn Ser  Lys Thr Gly Thr Glu  Leu Asp Tyr Leu Ile  Ser Pro Val
    1220                1225                1230


Ala Asp  Val Asn Gly Asn Phe  Phe Asp Ser Arg Gln  Ala Pro Lys
    1235                1240                1245


Asn Met  Pro Gln Asp Ala Ala  Ala Asn Gly Ala Tyr  His Ile Gly
    1250                1255                1260


Leu Lys  Gly Leu Met Leu Leu  Gly Arg Ile Lys Asn  Asn Gln Glu
    1265                1270                1275


Gly Lys  Lys Leu Asn Leu Val  Ile Lys Asn Glu Glu  Tyr Phe Glu
    1280                1285                1290


Phe Val  Gln Asn Arg Asn Asn
    1295                1300


<210> 84
<211> 1300
<212> PRT
<213> Francisella novicida

<400> 84
Met Ser Ile Tyr Gln Glu Phe Val Asn Lys Tyr Ser Leu Ser Lys Thr
1               5                  10                  15


Leu Arg Phe Glu Leu Ile Pro Gln Gly Lys Thr Leu Glu Asn Ile Lys
            20                  25                  30


Ala Arg Gly Leu Ile Leu Asp Asp Glu Lys Arg Ala Lys Asp Tyr Lys
```

```
        35                  40                  45

Lys Ala Lys Gln Ile Ile Asp Lys Tyr His Gln Phe Phe Ile Glu Glu
    50                  55                  60

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

Asp Val Tyr Phe Lys Leu Lys Lys Ser Asp Asp Asp Asn Leu Gln Lys
                85                  90                  95

Asp Phe Lys Ser Ala Lys Asp Thr Ile Lys Lys Gln Ile Ser Glu Tyr
            100                 105                 110

Ile Lys Asp Ser Glu Lys Phe Lys Asn Leu Phe Asn Gln Asn Leu Ile
        115                 120                 125

Asp Ala Lys Lys Gly Gln Glu Ser Asp Leu Ile Leu Trp Leu Lys Gln
    130                 135                 140

Ser Lys Asp Asn Gly Ile Glu Leu Phe Lys Ala Asn Ser Asp Ile Thr
145                 150                 155                 160

Asp Ile Asp Glu Ala Leu Glu Ile Ile Lys Ser Phe Lys Gly Trp Thr
                165                 170                 175

Thr Tyr Phe Lys Gly Phe His Glu Asn Arg Lys Asn Val Tyr Ser Ser
            180                 185                 190

Asn Asp Ile Pro Thr Ser Ile Ile Tyr Arg Ile Val Asp Asp Asn Leu
        195                 200                 205

Pro Lys Phe Leu Glu Asn Lys Ala Lys Tyr Glu Ser Leu Lys Asp Lys
    210                 215                 220

Ala Pro Glu Ala Ile Asn Tyr Glu Gln Ile Lys Lys Asp Leu Ala Glu
```

225 230 235 240

Glu Leu Thr Phe Asp Ile Asp Tyr Lys Thr Ser Glu Val Asn Gln Arg
245 250 255

Val Phe Ser Leu Asp Glu Val Phe Glu Ile Ala Asn Phe Asn Asn Tyr
260 265 270

Leu Asn Gln Ser Gly Ile Thr Lys Phe Asn Thr Ile Ile Gly Gly Lys
275 280 285

Phe Val Asn Gly Glu Asn Thr Lys Arg Lys Gly Ile Asn Glu Tyr Ile
290 295 300

Asn Leu Tyr Ser Gln Gln Ile Asn Asp Lys Thr Leu Lys Lys Tyr Lys
305 310 315 320

Met Ser Val Leu Phe Lys Gln Ile Leu Ser Asp Thr Glu Ser Lys Ser
325 330 335

Phe Val Ile Asp Lys Leu Glu Asp Asp Ser Asp Val Val Thr Thr Met
340 345 350

Gln Ser Phe Tyr Glu Gln Ile Ala Ala Phe Lys Thr Val Glu Glu Lys
355 360 365

Ser Ile Lys Glu Thr Leu Ser Leu Leu Phe Asp Asp Leu Lys Ala Gln
370 375 380

Lys Leu Asp Leu Ser Lys Ile Tyr Phe Lys Asn Asp Lys Ser Leu Thr
385 390 395 400

Asp Leu Ser Gln Gln Val Phe Asp Asp Tyr Ser Val Ile Gly Thr Ala
405 410 415

Val Leu Glu Tyr Ile Thr Gln Gln Ile Ala Pro Lys Asn Leu Asp Asn

```
            420                 425                 430

Pro Ser Lys Lys Glu Gln Glu Leu Ile Ala Lys Lys Thr Glu Lys Ala
        435                 440                 445

Lys Tyr Leu Ser Leu Glu Thr Ile Lys Leu Ala Leu Glu Glu Phe Asn
    450                 455                 460

Lys His Arg Asp Ile Asp Lys Gln Cys Arg Phe Glu Glu Ile Leu Ala
465                 470                 475                 480

Asn Phe Ala Ala Ile Pro Met Ile Phe Asp Glu Ile Ala Gln Asn Lys
                485                 490                 495

Asp Asn Leu Ala Gln Ile Ser Ile Lys Tyr Gln Asn Gln Gly Lys Lys
            500                 505                 510

Asp Leu Leu Gln Ala Ser Ala Glu Asp Asp Val Lys Ala Ile Lys Asp
        515                 520                 525

Leu Leu Asp Gln Thr Asn Asn Leu Leu His Lys Leu Lys Ile Phe His
    530                 535                 540

Ile Ser Gln Ser Glu Asp Lys Ala Asn Ile Leu Asp Lys Asp Glu His
545                 550                 555                 560

Phe Tyr Leu Val Phe Glu Glu Cys Tyr Phe Glu Leu Ala Asn Ile Val
                565                 570                 575

Pro Leu Tyr Asn Lys Ile Arg Asn Tyr Ile Thr Gln Lys Pro Tyr Ser
            580                 585                 590

Asp Glu Lys Phe Lys Leu Asn Phe Glu Asn Ser Thr Leu Ala Asn Gly
        595                 600                 605

Trp Asp Lys Asn Lys Glu Pro Asp Asn Thr Ala Ile Leu Phe Ile Lys
```

```
    610                 615                 620

Asp Asp Lys Tyr Tyr Leu Gly Val Met Asn Lys Lys Asn Asn Lys Ile
625                 630                 635                 640

Phe Asp Asp Lys Ala Ile Lys Glu Asn Lys Gly Glu Gly Tyr Lys Lys
                645                 650                 655

Ile Val Tyr Lys Leu Leu Pro Gly Ala Asn Lys Met Leu Pro Lys Val
            660                 665                 670

Phe Phe Ser Ala Lys Ser Ile Lys Phe Tyr Asn Pro Ser Glu Asp Ile
        675                 680                 685

Leu Arg Ile Arg Asn His Ser Thr His Thr Lys Asn Gly Ser Pro Gln
    690                 695                 700

Lys Gly Tyr Glu Lys Phe Glu Phe Asn Ile Glu Asp Cys Arg Lys Phe
705                 710                 715                 720

Ile Asp Phe Tyr Lys Gln Ser Ile Ser Lys His Pro Glu Trp Lys Asp
                725                 730                 735

Phe Gly Phe Arg Phe Ser Asp Thr Gln Arg Tyr Asn Ser Ile Asp Glu
            740                 745                 750

Phe Tyr Arg Glu Val Glu Asn Gln Gly Tyr Lys Leu Thr Phe Glu Asn
        755                 760                 765

Ile Ser Glu Ser Tyr Ile Asp Ser Val Val Asn Gln Gly Lys Leu Tyr
    770                 775                 780

Leu Phe Gln Ile Tyr Asn Lys Asp Phe Ser Ala Tyr Ser Lys Gly Arg
785                 790                 795                 800

Pro Asn Leu His Thr Leu Tyr Trp Lys Ala Leu Phe Asp Glu Arg Asn
```

805 810 815

Leu Gln Asp Val Val Tyr Lys Leu Asn Gly Glu Ala Glu Leu Phe Tyr
820 825 830

Arg Lys Gln Ser Ile Pro Lys Lys Ile Thr His Pro Ala Lys Glu Ala
835 840 845

Ile Ala Asn Lys Asn Lys Asp Asn Pro Lys Lys Glu Ser Val Phe Glu
850 855 860

Tyr Asp Leu Ile Lys Asp Lys Arg Phe Thr Glu Asp Lys Phe Phe Phe
865 870 875 880

His Cys Pro Ile Thr Ile Asn Phe Lys Ser Ser Gly Ala Asn Lys Phe
885 890 895

Asn Asp Glu Ile Asn Leu Leu Leu Lys Glu Lys Ala Asn Asp Val His
900 905 910

Ile Leu Ser Ile Ala Arg Gly Glu Arg His Leu Ala Tyr Tyr Thr Leu
915 920 925

Val Asp Gly Lys Gly Asn Ile Ile Lys Gln Asp Thr Phe Asn Ile Ile
930 935 940

Gly Asn Asp Arg Met Lys Thr Asn Tyr His Asp Lys Leu Ala Ala Ile
945 950 955 960

Glu Lys Asp Arg Asp Ser Ala Arg Lys Asp Trp Lys Lys Ile Asn Asn
965 970 975

Ile Lys Glu Met Lys Glu Gly Tyr Leu Ser Gln Val Val His Glu Ile
980 985 990

Ala Lys Leu Val Ile Glu Tyr Asn Ala Ile Val Val Phe Ala Asp Leu

```
        995                 1000                 1005

Asn Phe  Gly Phe Lys Arg Gly  Arg Phe Lys Val Glu  Lys Gln Val
    1010                 1015                 1020

Tyr Gln  Lys Leu Glu Lys Met  Leu Ile Glu Lys Leu  Asn Tyr Leu
    1025                 1030                 1035

Val Phe  Lys Asp Asn Glu Phe  Asp Lys Thr Gly Gly  Val Leu Arg
    1040                 1045                 1050

Ala Tyr  Gln Leu Thr Ala Pro  Phe Glu Thr Phe Lys  Lys Met Gly
    1055                 1060                 1065

Lys Gln  Thr Gly Ile Ile Tyr  Tyr Val Pro Ala Gly  Phe Thr Ser
    1070                 1075                 1080

Lys Ile  Cys Pro Val Thr Gly  Phe Val Asn Gln Leu  Tyr Pro Lys
    1085                 1090                 1095

Tyr Glu  Ser Val Ser Lys Ser  Gln Glu Phe Phe Ser  Lys Phe Asp
    1100                 1105                 1110

Lys Ile  Cys Tyr Asn Leu Asp  Lys Gly Tyr Phe Glu  Phe Ser Phe
    1115                 1120                 1125

Asp Tyr  Lys Asn Phe Gly Asp  Lys Ala Ala Lys Gly  Lys Trp Thr
    1130                 1135                 1140

Ile Ala  Ser Phe Gly Ser Arg  Leu Ile Asn Phe Arg  Asn Ser Asp
    1145                 1150                 1155

Lys Asn  His Asn Trp Asp Thr  Arg Glu Val Tyr Pro  Thr Lys Glu
    1160                 1165                 1170

Leu Glu  Lys Leu Leu Lys Asp  Tyr Ser Ile Glu Tyr  Gly His Gly
```

1175 1180 1185

Glu Cys Ile Lys Ala Ala Ile Cys Gly Glu Ser Asp Lys Lys Phe
1190 1195 1200

Phe Ala Lys Leu Thr Ser Val Leu Asn Thr Ile Leu Gln Met Arg
1205 1210 1215

Asn Ser Lys Thr Gly Thr Glu Leu Asp Tyr Leu Ile Ser Pro Val
1220 1225 1230

Ala Asp Val Asn Gly Asn Phe Phe Asp Ser Arg Gln Ala Pro Lys
1235 1240 1245

Asn Met Pro Gln Asp Ala Asp Ala Asn Gly Ala Tyr His Ile Gly
1250 1255 1260

Leu Lys Gly Leu Met Leu Leu Gly Arg Ile Lys Asn Asn Gln Glu
1265 1270 1275

Gly Lys Lys Leu Asn Leu Val Ile Lys Asn Glu Glu Tyr Phe Glu
1280 1285 1290

Phe Val Gln Asn Arg Asn Asn
1295 1300

<210> 85
<211> 1300
<212> PRT
<213> Francisella novicida

<400> 85
Met Ser Ile Tyr Gln Glu Phe Val Asn Lys Tyr Ser Leu Ser Lys Thr
1 5 10 15

Leu Arg Phe Glu Leu Ile Pro Gln Gly Lys Thr Leu Glu Asn Ile Lys
20 25 30

```
Ala Arg Gly Leu Ile Leu Asp Asp Glu Lys Arg Ala Lys Asp Tyr Lys
        35                  40                  45

Lys Ala Lys Gln Ile Ile Asp Lys Tyr His Gln Phe Phe Ile Glu Glu
    50                  55                  60

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

Asp Val Tyr Phe Lys Leu Lys Lys Ser Asp Asp Asp Asn Leu Gln Lys
                85                  90                  95

Asp Phe Lys Ser Ala Lys Asp Thr Ile Lys Lys Gln Ile Ser Glu Tyr
            100                 105                 110

Ile Lys Asp Ser Glu Lys Phe Lys Asn Leu Phe Asn Gln Asn Leu Ile
        115                 120                 125

Asp Ala Lys Lys Gly Gln Glu Ser Asp Leu Ile Leu Trp Leu Lys Gln
    130                 135                 140

Ser Lys Asp Asn Gly Ile Glu Leu Phe Lys Ala Asn Ser Asp Ile Thr
145                 150                 155                 160

Asp Ile Asp Glu Ala Leu Glu Ile Ile Lys Ser Phe Lys Gly Trp Thr
                165                 170                 175

Thr Tyr Phe Lys Gly Phe His Glu Asn Arg Lys Asn Val Tyr Ser Ser
            180                 185                 190

Asn Asp Ile Pro Thr Ser Ile Ile Tyr Arg Ile Val Asp Asp Asn Leu
        195                 200                 205

Pro Lys Phe Leu Glu Asn Lys Ala Lys Tyr Glu Ser Leu Lys Asp Lys
    210                 215                 220
```

```
Ala Pro Glu Ala Ile Asn Tyr Glu Gln Ile Lys Lys Asp Leu Ala Glu
225                 230                 235                 240


Glu Leu Thr Phe Asp Ile Asp Tyr Lys Thr Ser Glu Val Asn Gln Arg
                245                 250                 255


Val Phe Ser Leu Asp Glu Val Phe Glu Ile Ala Asn Phe Asn Asn Tyr
            260                 265                 270


Leu Asn Gln Ser Gly Ile Thr Lys Phe Asn Thr Ile Ile Gly Gly Lys
        275                 280                 285


Phe Val Asn Gly Glu Asn Thr Lys Arg Lys Gly Ile Asn Glu Tyr Ile
    290                 295                 300


Asn Leu Tyr Ser Gln Gln Ile Asn Asp Lys Thr Leu Lys Lys Tyr Lys
305                 310                 315                 320


Met Ser Val Leu Phe Lys Gln Ile Leu Ser Asp Thr Glu Ser Lys Ser
                325                 330                 335


Phe Val Ile Asp Lys Leu Glu Asp Asp Ser Asp Val Val Thr Thr Met
            340                 345                 350


Gln Ser Phe Tyr Glu Gln Ile Ala Ala Phe Lys Thr Val Glu Glu Lys
        355                 360                 365


Ser Ile Lys Glu Thr Leu Ser Leu Leu Phe Asp Asp Leu Lys Ala Gln
    370                 375                 380


Lys Leu Asp Leu Ser Lys Ile Tyr Phe Lys Asn Asp Lys Ser Leu Thr
385                 390                 395                 400


Asp Leu Ser Gln Gln Val Phe Asp Asp Tyr Ser Val Ile Gly Thr Ala
                405                 410                 415
```

```
Val Leu Glu Tyr Ile Thr Gln Gln Ile Ala Pro Lys Asn Leu Asp Asn
            420                 425                 430

Pro Ser Lys Lys Glu Gln Glu Leu Ile Ala Lys Lys Thr Glu Lys Ala
        435                 440                 445

Lys Tyr Leu Ser Leu Glu Thr Ile Lys Leu Ala Leu Glu Glu Phe Asn
    450                 455                 460

Lys His Arg Asp Ile Asp Lys Gln Cys Arg Phe Glu Glu Ile Leu Ala
465                 470                 475                 480

Asn Phe Ala Ala Ile Pro Met Ile Phe Asp Glu Ile Ala Gln Asn Lys
                485                 490                 495

Asp Asn Leu Ala Gln Ile Ser Ile Lys Tyr Gln Asn Gln Gly Lys Lys
            500                 505                 510

Asp Leu Leu Gln Ala Ser Ala Glu Asp Asp Val Lys Ala Ile Lys Asp
        515                 520                 525

Leu Leu Asp Gln Thr Asn Asn Leu Leu His Lys Leu Lys Ile Phe His
    530                 535                 540

Ile Ser Gln Ser Glu Asp Lys Ala Asn Ile Leu Asp Lys Asp Glu His
545                 550                 555                 560

Phe Tyr Leu Val Phe Glu Glu Cys Tyr Phe Glu Leu Ala Asn Ile Val
                565                 570                 575

Pro Leu Tyr Asn Lys Ile Arg Asn Tyr Ile Thr Gln Lys Pro Tyr Ser
            580                 585                 590

Asp Glu Lys Phe Lys Leu Asn Phe Glu Asn Ser Thr Leu Ala Asn Gly
        595                 600                 605
```

```
Trp Asp Lys Asn Lys Glu Pro Asp Asn Thr Ala Ile Leu Phe Ile Lys
    610                 615                 620

Asp Asp Lys Tyr Tyr Leu Gly Val Met Asn Lys Lys Asn Asn Lys Ile
625                 630                 635                 640

Phe Asp Asp Lys Ala Ile Lys Glu Asn Lys Gly Glu Gly Tyr Lys Lys
                645                 650                 655

Ile Val Tyr Lys Leu Leu Pro Gly Ala Asn Lys Met Leu Pro Lys Val
            660                 665                 670

Phe Phe Ser Ala Lys Ser Ile Lys Phe Tyr Asn Pro Ser Glu Asp Ile
        675                 680                 685

Leu Arg Ile Arg Asn His Ser Thr His Thr Lys Asn Gly Ser Pro Gln
    690                 695                 700

Lys Gly Tyr Glu Lys Phe Glu Phe Asn Ile Glu Asp Cys Arg Lys Phe
705                 710                 715                 720

Ile Asp Phe Tyr Lys Gln Ser Ile Ser Lys His Pro Glu Trp Lys Asp
                725                 730                 735

Phe Gly Phe Arg Phe Ser Asp Thr Gln Arg Tyr Asn Ser Ile Asp Glu
            740                 745                 750

Phe Tyr Arg Glu Val Glu Asn Gln Gly Tyr Lys Leu Thr Phe Glu Asn
        755                 760                 765

Ile Ser Glu Ser Tyr Ile Asp Ser Val Val Asn Gln Gly Lys Leu Tyr
    770                 775                 780

Leu Phe Gln Ile Tyr Asn Lys Asp Phe Ser Ala Tyr Ser Lys Gly Arg
785                 790                 795                 800
```

```
Pro Asn Leu His Thr Leu Tyr Trp Lys Ala Leu Phe Asp Glu Arg Asn
               805                 810                 815

Leu Gln Asp Val Val Tyr Lys Leu Asn Gly Glu Ala Glu Leu Phe Tyr
            820                 825                 830

Arg Lys Gln Ser Ile Pro Lys Lys Ile Thr His Pro Ala Lys Glu Ala
        835                 840                 845

Ile Ala Asn Lys Asn Lys Asp Asn Pro Lys Lys Glu Ser Val Phe Glu
    850                 855                 860

Tyr Asp Leu Ile Lys Asp Lys Arg Phe Thr Glu Asp Lys Phe Phe Phe
865                 870                 875                 880

His Cys Pro Ile Thr Ile Asn Phe Lys Ser Ser Gly Ala Asn Lys Phe
               885                 890                 895

Asn Asp Glu Ile Asn Leu Leu Leu Lys Glu Lys Ala Asn Asp Val His
            900                 905                 910

Ile Leu Ser Ile Ala Arg Gly Glu Arg His Leu Ala Tyr Tyr Thr Leu
        915                 920                 925

Val Asp Gly Lys Gly Asn Ile Ile Lys Gln Asp Thr Phe Asn Ile Ile
    930                 935                 940

Gly Asn Asp Arg Met Lys Thr Asn Tyr His Asp Lys Leu Ala Ala Ile
945                 950                 955                 960

Glu Lys Asp Arg Asp Ser Ala Arg Lys Asp Trp Lys Lys Ile Asn Asn
               965                 970                 975

Ile Lys Glu Met Lys Glu Gly Tyr Leu Ser Gln Val Val His Glu Ile
            980                 985                 990
```

```
Ala Lys Leu Val Ile Glu Tyr Asn  Ala Ile Val Val Phe  Glu Asp Leu
        995                 1000                1005


Asn Phe  Gly Phe Lys Arg Gly  Arg Phe Lys Val Glu  Lys Gln Val
    1010                1015                1020


Tyr Gln  Lys Leu Glu Lys Met  Leu Ile Glu Lys Leu  Asn Tyr Leu
    1025                1030                1035


Val Phe  Lys Asp Asn Glu Phe  Asp Lys Thr Gly Gly  Val Leu Arg
    1040                1045                1050


Ala Tyr  Gln Leu Thr Ala Pro  Phe Glu Thr Phe Lys  Lys Met Gly
    1055                1060                1065


Lys Gln  Thr Gly Ile Ile Tyr  Tyr Val Pro Ala Gly  Phe Thr Ser
    1070                1075                1080


Lys Ile  Cys Pro Val Thr Gly  Phe Val Asn Gln Leu  Tyr Pro Lys
    1085                1090                1095


Tyr Glu  Ser Val Ser Lys Ser  Gln Glu Phe Phe Ser  Lys Phe Asp
    1100                1105                1110


Lys Ile  Cys Tyr Asn Leu Asp  Lys Gly Tyr Phe Glu  Phe Ser Phe
    1115                1120                1125


Asp Tyr  Lys Asn Phe Gly Asp  Lys Ala Ala Lys Gly  Lys Trp Thr
    1130                1135                1140


Ile Ala  Ser Phe Gly Ser Arg  Leu Ile Asn Phe Arg  Asn Ser Asp
    1145                1150                1155


Lys Asn  His Asn Trp Asp Thr  Arg Glu Val Tyr Pro  Thr Lys Glu
    1160                1165                1170
```

```
Leu Glu  Lys Leu Leu Lys Asp  Tyr Ser Ile Glu Tyr  Gly His Gly
    1175                 1180                 1185


Glu Cys  Ile Lys Ala Ala Ile  Cys Gly Glu Ser Asp  Lys Lys Phe
    1190                 1195                 1200


Phe Ala  Lys Leu Thr Ser Val  Leu Asn Thr Ile Leu  Gln Met Arg
    1205                 1210                 1215


Asn Ser  Lys Thr Gly Thr Glu  Leu Asp Tyr Leu Ile  Ser Pro Val
    1220                 1225                 1230


Ala Asp  Val Asn Gly Asn Phe  Phe Asp Ser Arg Gln  Ala Pro Lys
    1235                 1240                 1245


Asn Met  Pro Gln Asp Ala Ala  Ala Asn Gly Ala Tyr  His Ile Gly
    1250                 1255                 1260


Leu Lys  Gly Leu Met Leu Leu  Gly Arg Ile Lys Asn  Asn Gln Glu
    1265                 1270                 1275


Gly Lys  Lys Leu Asn Leu Val  Ile Lys Asn Glu Glu  Tyr Phe Glu
    1280                 1285                 1290


Phe Val  Gln Asn Arg Asn Asn
    1295                 1300


<210> 86
<211> 1300
<212> PRT
<213> Francisella novicida

<400> 86
Met Ser Ile Tyr Gln Glu Phe Val Asn Lys Tyr Ser Leu Ser Lys Thr
1               5                  10                  15


Leu Arg Phe Glu Leu Ile Pro Gln Gly Lys Thr Leu Glu Asn Ile Lys
```

```
            20                  25                  30

Ala Arg Gly Leu Ile Leu Asp Asp Glu Lys Arg Ala Lys Asp Tyr Lys
        35                  40                  45

Lys Ala Lys Gln Ile Ile Asp Lys Tyr His Gln Phe Phe Ile Glu Glu
    50                  55                  60

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

Asp Val Tyr Phe Lys Leu Lys Lys Ser Asp Asp Asp Asn Leu Gln Lys
                85                  90                  95

Asp Phe Lys Ser Ala Lys Asp Thr Ile Lys Lys Gln Ile Ser Glu Tyr
            100                 105                 110

Ile Lys Asp Ser Glu Lys Phe Lys Asn Leu Phe Asn Gln Asn Leu Ile
        115                 120                 125

Asp Ala Lys Lys Gly Gln Glu Ser Asp Leu Ile Leu Trp Leu Lys Gln
    130                 135                 140

Ser Lys Asp Asn Gly Ile Glu Leu Phe Lys Ala Asn Ser Asp Ile Thr
145                 150                 155                 160

Asp Ile Asp Glu Ala Leu Glu Ile Ile Lys Ser Phe Lys Gly Trp Thr
                165                 170                 175

Thr Tyr Phe Lys Gly Phe His Glu Asn Arg Lys Asn Val Tyr Ser Ser
            180                 185                 190

Asn Asp Ile Pro Thr Ser Ile Ile Tyr Arg Ile Val Asp Asp Asn Leu
        195                 200                 205

Pro Lys Phe Leu Glu Asn Lys Ala Lys Tyr Glu Ser Leu Lys Asp Lys
```

```
    210                 215                 220

Ala Pro Glu Ala Ile Asn Tyr Glu Gln Ile Lys Lys Asp Leu Ala Glu
225                 230                 235                 240

Glu Leu Thr Phe Asp Ile Asp Tyr Lys Thr Ser Glu Val Asn Gln Arg
                245                 250                 255

Val Phe Ser Leu Asp Glu Val Phe Glu Ile Ala Asn Phe Asn Asn Tyr
            260                 265                 270

Leu Asn Gln Ser Gly Ile Thr Lys Phe Asn Thr Ile Ile Gly Gly Lys
        275                 280                 285

Phe Val Asn Gly Glu Asn Thr Lys Arg Lys Gly Ile Asn Glu Tyr Ile
    290                 295                 300

Asn Leu Tyr Ser Gln Gln Ile Asn Asp Lys Thr Leu Lys Lys Tyr Lys
305                 310                 315                 320

Met Ser Val Leu Phe Lys Gln Ile Leu Ser Asp Thr Glu Ser Lys Ser
                325                 330                 335

Phe Val Ile Asp Lys Leu Glu Asp Asp Ser Asp Val Val Thr Thr Met
            340                 345                 350

Gln Ser Phe Tyr Glu Gln Ile Ala Ala Phe Lys Thr Val Glu Glu Lys
        355                 360                 365

Ser Ile Lys Glu Thr Leu Ser Leu Leu Phe Asp Asp Leu Lys Ala Gln
    370                 375                 380

Lys Leu Asp Leu Ser Lys Ile Tyr Phe Lys Asn Asp Lys Ser Leu Thr
385                 390                 395                 400

Asp Leu Ser Gln Gln Val Phe Asp Asp Tyr Ser Val Ile Gly Thr Ala
```

405 410 415

Val Leu Glu Tyr Ile Thr Gln Gln Ile Ala Pro Lys Asn Leu Asp Asn
420 425 430

Pro Ser Lys Lys Glu Gln Glu Leu Ile Ala Lys Lys Thr Glu Lys Ala
435 440 445

Lys Tyr Leu Ser Leu Glu Thr Ile Lys Leu Ala Leu Glu Glu Phe Asn
450 455 460

Lys His Arg Asp Ile Asp Lys Gln Cys Arg Phe Glu Glu Ile Leu Ala
465 470 475 480

Asn Phe Ala Ala Ile Pro Met Ile Phe Asp Glu Ile Ala Gln Asn Lys
485 490 495

Asp Asn Leu Ala Gln Ile Ser Ile Lys Tyr Gln Asn Gln Gly Lys Lys
500 505 510

Asp Leu Leu Gln Ala Ser Ala Glu Asp Asp Val Lys Ala Ile Lys Asp
515 520 525

Leu Leu Asp Gln Thr Asn Asn Leu Leu His Lys Leu Lys Ile Phe His
530 535 540

Ile Ser Gln Ser Glu Asp Lys Ala Asn Ile Leu Asp Lys Asp Glu His
545 550 555 560

Phe Tyr Leu Val Phe Glu Glu Cys Tyr Phe Glu Leu Ala Asn Ile Val
565 570 575

Pro Leu Tyr Asn Lys Ile Arg Asn Tyr Ile Thr Gln Lys Pro Tyr Ser
580 585 590

Asp Glu Lys Phe Lys Leu Asn Phe Glu Asn Ser Thr Leu Ala Asn Gly

595 600 605

Trp Asp Lys Asn Lys Glu Pro Asp Asn Thr Ala Ile Leu Phe Ile Lys
610 615 620

Asp Asp Lys Tyr Tyr Leu Gly Val Met Asn Lys Lys Asn Asn Lys Ile
625 630 635 640

Phe Asp Asp Lys Ala Ile Lys Glu Asn Lys Gly Glu Gly Tyr Lys Lys
645 650 655

Ile Val Tyr Lys Leu Leu Pro Gly Ala Asn Lys Met Leu Pro Lys Val
660 665 670

Phe Phe Ser Ala Lys Ser Ile Lys Phe Tyr Asn Pro Ser Glu Asp Ile
675 680 685

Leu Arg Ile Arg Asn His Ser Thr His Thr Lys Asn Gly Ser Pro Gln
690 695 700

Lys Gly Tyr Glu Lys Phe Glu Phe Asn Ile Glu Asp Cys Arg Lys Phe
705 710 715 720

Ile Asp Phe Tyr Lys Gln Ser Ile Ser Lys His Pro Glu Trp Lys Asp
725 730 735

Phe Gly Phe Arg Phe Ser Asp Thr Gln Arg Tyr Asn Ser Ile Asp Glu
740 745 750

Phe Tyr Arg Glu Val Glu Asn Gln Gly Tyr Lys Leu Thr Phe Glu Asn
755 760 765

Ile Ser Glu Ser Tyr Ile Asp Ser Val Val Asn Gln Gly Lys Leu Tyr
770 775 780

Leu Phe Gln Ile Tyr Asn Lys Asp Phe Ser Ala Tyr Ser Lys Gly Arg

785 790 795 800

Pro Asn Leu His Thr Leu Tyr Trp Lys Ala Leu Phe Asp Glu Arg Asn
805 810 815

Leu Gln Asp Val Val Tyr Lys Leu Asn Gly Glu Ala Glu Leu Phe Tyr
820 825 830

Arg Lys Gln Ser Ile Pro Lys Lys Ile Thr His Pro Ala Lys Glu Ala
835 840 845

Ile Ala Asn Lys Asn Lys Asp Asn Pro Lys Lys Glu Ser Val Phe Glu
850 855 860

Tyr Asp Leu Ile Lys Asp Lys Arg Phe Thr Glu Asp Lys Phe Phe Phe
865 870 875 880

His Cys Pro Ile Thr Ile Asn Phe Lys Ser Ser Gly Ala Asn Lys Phe
885 890 895

Asn Asp Glu Ile Asn Leu Leu Leu Lys Glu Lys Ala Asn Asp Val His
900 905 910

Ile Leu Ser Ile Asp Arg Gly Glu Arg His Leu Ala Tyr Tyr Thr Leu
915 920 925

Val Asp Gly Lys Gly Asn Ile Ile Lys Gln Asp Thr Phe Asn Ile Ile
930 935 940

Gly Asn Asp Arg Met Lys Thr Asn Tyr His Asp Lys Leu Ala Ala Ile
945 950 955 960

Glu Lys Asp Arg Asp Ser Ala Arg Lys Asp Trp Lys Lys Ile Asn Asn
965 970 975

Ile Lys Glu Met Lys Glu Gly Tyr Leu Ser Gln Val Val His Glu Ile

980 985 990

Ala Lys Leu Val Ile Glu Tyr Asn Ala Ile Val Val Phe Ala Asp Leu
995 1000 1005

Asn Phe Gly Phe Lys Arg Gly Arg Phe Lys Val Glu Lys Gln Val
1010 1015 1020

Tyr Gln Lys Leu Glu Lys Met Leu Ile Glu Lys Leu Asn Tyr Leu
1025 1030 1035

Val Phe Lys Asp Asn Glu Phe Asp Lys Thr Gly Gly Val Leu Arg
1040 1045 1050

Ala Tyr Gln Leu Thr Ala Pro Phe Glu Thr Phe Lys Lys Met Gly
1055 1060 1065

Lys Gln Thr Gly Ile Ile Tyr Tyr Val Pro Ala Gly Phe Thr Ser
1070 1075 1080

Lys Ile Cys Pro Val Thr Gly Phe Val Asn Gln Leu Tyr Pro Lys
1085 1090 1095

Tyr Glu Ser Val Ser Lys Ser Gln Glu Phe Phe Ser Lys Phe Asp
1100 1105 1110

Lys Ile Cys Tyr Asn Leu Asp Lys Gly Tyr Phe Glu Phe Ser Phe
1115 1120 1125

Asp Tyr Lys Asn Phe Gly Asp Lys Ala Ala Lys Gly Lys Trp Thr
1130 1135 1140

Ile Ala Ser Phe Gly Ser Arg Leu Ile Asn Phe Arg Asn Ser Asp
1145 1150 1155

Lys Asn His Asn Trp Asp Thr Arg Glu Val Tyr Pro Thr Lys Glu

```
    1160                1165                1170

Leu Glu  Lys Leu Leu Lys Asp  Tyr Ser Ile Glu Tyr  Gly His Gly
    1175                1180                1185

Glu Cys  Ile Lys Ala Ala Ile  Cys Gly Glu Ser Asp  Lys Lys Phe
    1190                1195                1200

Phe Ala  Lys Leu Thr Ser Val  Leu Asn Thr Ile Leu  Gln Met Arg
    1205                1210                1215

Asn Ser  Lys Thr Gly Thr Glu  Leu Asp Tyr Leu Ile  Ser Pro Val
    1220                1225                1230

Ala Asp  Val Asn Gly Asn Phe  Phe Asp Ser Arg Gln  Ala Pro Lys
    1235                1240                1245

Asn Met  Pro Gln Asp Ala Ala  Ala Asn Gly Ala Tyr  His Ile Gly
    1250                1255                1260

Leu Lys  Gly Leu Met Leu Leu  Gly Arg Ile Lys Asn  Asn Gln Glu
    1265                1270                1275

Gly Lys  Lys Leu Asn Leu Val  Ile Lys Asn Glu Glu  Tyr Phe Glu
    1280                1285                1290

Phe Val  Gln Asn Arg Asn Asn
    1295                1300
```

<210> 87
<211> 1300
<212> PRT
<213> Francisella novicida

<400> 87

```
Met Ser Ile Tyr Gln Glu Phe Val Asn Lys Tyr Ser Leu Ser Lys Thr
1               5                  10                  15
```

```
Leu Arg Phe Glu Leu Ile Pro Gln Gly Lys Thr Leu Glu Asn Ile Lys
            20                  25                  30

Ala Arg Gly Leu Ile Leu Asp Asp Glu Lys Arg Ala Lys Asp Tyr Lys
        35                  40                  45

Lys Ala Lys Gln Ile Ile Asp Lys Tyr His Gln Phe Phe Ile Glu Glu
    50                  55                  60

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

Asp Val Tyr Phe Lys Leu Lys Lys Ser Asp Asp Asp Asn Leu Gln Lys
                85                  90                  95

Asp Phe Lys Ser Ala Lys Asp Thr Ile Lys Lys Gln Ile Ser Glu Tyr
            100                 105                 110

Ile Lys Asp Ser Glu Lys Phe Lys Asn Leu Phe Asn Gln Asn Leu Ile
        115                 120                 125

Asp Ala Lys Lys Gly Gln Glu Ser Asp Leu Ile Leu Trp Leu Lys Gln
    130                 135                 140

Ser Lys Asp Asn Gly Ile Glu Leu Phe Lys Ala Asn Ser Asp Ile Thr
145                 150                 155                 160

Asp Ile Asp Glu Ala Leu Glu Ile Ile Lys Ser Phe Lys Gly Trp Thr
                165                 170                 175

Thr Tyr Phe Lys Gly Phe His Glu Asn Arg Lys Asn Val Tyr Ser Ser
            180                 185                 190

Asn Asp Ile Pro Thr Ser Ile Ile Tyr Arg Ile Val Asp Asp Asn Leu
        195                 200                 205
```

```
Pro Lys Phe Leu Glu Asn Lys Ala Lys Tyr Glu Ser Leu Lys Asp Lys
    210                 215                 220

Ala Pro Glu Ala Ile Asn Tyr Glu Gln Ile Lys Lys Asp Leu Ala Glu
225                 230                 235                 240

Glu Leu Thr Phe Asp Ile Asp Tyr Lys Thr Ser Glu Val Asn Gln Arg
                245                 250                 255

Val Phe Ser Leu Asp Glu Val Phe Glu Ile Ala Asn Phe Asn Asn Tyr
            260                 265                 270

Leu Asn Gln Ser Gly Ile Thr Lys Phe Asn Thr Ile Ile Gly Gly Lys
        275                 280                 285

Phe Val Asn Gly Glu Asn Thr Lys Arg Lys Gly Ile Asn Glu Tyr Ile
    290                 295                 300

Asn Leu Tyr Ser Gln Gln Ile Asn Asp Lys Thr Leu Lys Lys Tyr Lys
305                 310                 315                 320

Met Ser Val Leu Phe Lys Gln Ile Leu Ser Asp Thr Glu Ser Lys Ser
                325                 330                 335

Phe Val Ile Asp Lys Leu Glu Asp Asp Ser Asp Val Val Thr Thr Met
            340                 345                 350

Gln Ser Phe Tyr Glu Gln Ile Ala Ala Phe Lys Thr Val Glu Glu Lys
        355                 360                 365

Ser Ile Lys Glu Thr Leu Ser Leu Leu Phe Asp Asp Leu Lys Ala Gln
    370                 375                 380

Lys Leu Asp Leu Ser Lys Ile Tyr Phe Lys Asn Asp Lys Ser Leu Thr
385                 390                 395                 400
```

```
Asp Leu Ser Gln Gln Val Phe Asp Asp Tyr Ser Val Ile Gly Thr Ala
                405                 410                 415

Val Leu Glu Tyr Ile Thr Gln Gln Ile Ala Pro Lys Asn Leu Asp Asn
            420                 425                 430

Pro Ser Lys Lys Glu Gln Glu Leu Ile Ala Lys Lys Thr Glu Lys Ala
        435                 440                 445

Lys Tyr Leu Ser Leu Glu Thr Ile Lys Leu Ala Leu Glu Glu Phe Asn
    450                 455                 460

Lys His Arg Asp Ile Asp Lys Gln Cys Arg Phe Glu Glu Ile Leu Ala
465                 470                 475                 480

Asn Phe Ala Ala Ile Pro Met Ile Phe Asp Glu Ile Ala Gln Asn Lys
                485                 490                 495

Asp Asn Leu Ala Gln Ile Ser Ile Lys Tyr Gln Asn Gln Gly Lys Lys
            500                 505                 510

Asp Leu Leu Gln Ala Ser Ala Glu Asp Asp Val Lys Ala Ile Lys Asp
        515                 520                 525

Leu Leu Asp Gln Thr Asn Asn Leu Leu His Lys Leu Lys Ile Phe His
    530                 535                 540

Ile Ser Gln Ser Glu Asp Lys Ala Asn Ile Leu Asp Lys Asp Glu His
545                 550                 555                 560

Phe Tyr Leu Val Phe Glu Glu Cys Tyr Phe Glu Leu Ala Asn Ile Val
                565                 570                 575

Pro Leu Tyr Asn Lys Ile Arg Asn Tyr Ile Thr Gln Lys Pro Tyr Ser
            580                 585                 590
```

```
Asp Glu Lys Phe Lys Leu Asn Phe Glu Asn Ser Thr Leu Ala Asn Gly
        595                 600                 605

Trp Asp Lys Asn Lys Glu Pro Asp Asn Thr Ala Ile Leu Phe Ile Lys
    610                 615                 620

Asp Asp Lys Tyr Tyr Leu Gly Val Met Asn Lys Lys Asn Asn Lys Ile
625                 630                 635                 640

Phe Asp Asp Lys Ala Ile Lys Glu Asn Lys Gly Glu Gly Tyr Lys Lys
                645                 650                 655

Ile Val Tyr Lys Leu Leu Pro Gly Ala Asn Lys Met Leu Pro Lys Val
            660                 665                 670

Phe Phe Ser Ala Lys Ser Ile Lys Phe Tyr Asn Pro Ser Glu Asp Ile
        675                 680                 685

Leu Arg Ile Arg Asn His Ser Thr His Thr Lys Asn Gly Ser Pro Gln
    690                 695                 700

Lys Gly Tyr Glu Lys Phe Glu Phe Asn Ile Glu Asp Cys Arg Lys Phe
705                 710                 715                 720

Ile Asp Phe Tyr Lys Gln Ser Ile Ser Lys His Pro Glu Trp Lys Asp
                725                 730                 735

Phe Gly Phe Arg Phe Ser Asp Thr Gln Arg Tyr Asn Ser Ile Asp Glu
            740                 745                 750

Phe Tyr Arg Glu Val Glu Asn Gln Gly Tyr Lys Leu Thr Phe Glu Asn
        755                 760                 765

Ile Ser Glu Ser Tyr Ile Asp Ser Val Val Asn Gln Gly Lys Leu Tyr
    770                 775                 780
```

```
Leu Phe Gln Ile Tyr Asn Lys Asp Phe Ser Ala Tyr Ser Lys Gly Arg
785                 790                 795                 800


Pro Asn Leu His Thr Leu Tyr Trp Lys Ala Leu Phe Asp Glu Arg Asn
                805                 810                 815


Leu Gln Asp Val Val Tyr Lys Leu Asn Gly Glu Ala Glu Leu Phe Tyr
            820                 825                 830


Arg Lys Gln Ser Ile Pro Lys Lys Ile Thr His Pro Ala Lys Glu Ala
        835                 840                 845


Ile Ala Asn Lys Asn Lys Asp Asn Pro Lys Lys Glu Ser Val Phe Glu
    850                 855                 860


Tyr Asp Leu Ile Lys Asp Lys Arg Phe Thr Glu Asp Lys Phe Phe Phe
865                 870                 875                 880


His Cys Pro Ile Thr Ile Asn Phe Lys Ser Ser Gly Ala Asn Lys Phe
                885                 890                 895


Asn Asp Glu Ile Asn Leu Leu Leu Lys Glu Lys Ala Asn Asp Val His
            900                 905                 910


Ile Leu Ser Ile Ala Arg Gly Glu Arg His Leu Ala Tyr Tyr Thr Leu
        915                 920                 925


Val Asp Gly Lys Gly Asn Ile Ile Lys Gln Asp Thr Phe Asn Ile Ile
    930                 935                 940


Gly Asn Asp Arg Met Lys Thr Asn Tyr His Asp Lys Leu Ala Ala Ile
945                 950                 955                 960


Glu Lys Asp Arg Asp Ser Ala Arg Lys Asp Trp Lys Lys Ile Asn Asn
                965                 970                 975
```

```
Ile Lys Glu Met Lys Glu Gly Tyr Leu Ser Gln Val Val His Glu Ile
            980                 985                 990


Ala Lys Leu Val Ile Glu Tyr Asn  Ala Ile Val Val Phe  Ala Asp Leu
        995                 1000                1005


Asn Phe  Gly Phe Lys Arg Gly  Arg Phe Lys Val Glu  Lys Gln Val
    1010                1015                1020


Tyr Gln  Lys Leu Glu Lys Met  Leu Ile Glu Lys Leu  Asn Tyr Leu
    1025                1030                1035


Val Phe  Lys Asp Asn Glu Phe  Asp Lys Thr Gly Gly  Val Leu Arg
    1040                1045                1050


Ala Tyr  Gln Leu Thr Ala Pro  Phe Glu Thr Phe Lys  Lys Met Gly
    1055                1060                1065


Lys Gln  Thr Gly Ile Ile Tyr  Tyr Val Pro Ala Gly  Phe Thr Ser
    1070                1075                1080


Lys Ile  Cys Pro Val Thr Gly  Phe Val Asn Gln Leu  Tyr Pro Lys
    1085                1090                1095


Tyr Glu  Ser Val Ser Lys Ser  Gln Glu Phe Phe Ser  Lys Phe Asp
    1100                1105                1110


Lys Ile  Cys Tyr Asn Leu Asp  Lys Gly Tyr Phe Glu  Phe Ser Phe
    1115                1120                1125


Asp Tyr  Lys Asn Phe Gly Asp  Lys Ala Ala Lys Gly  Lys Trp Thr
    1130                1135                1140


Ile Ala  Ser Phe Gly Ser Arg  Leu Ile Asn Phe Arg  Asn Ser Asp
    1145                1150                1155
```

```
Lys Asn  His Asn Trp Asp Thr  Arg Glu Val Tyr Pro  Thr Lys Glu
    1160                1165                1170


Leu Glu  Lys Leu Leu Lys Asp  Tyr Ser Ile Glu Tyr  Gly His Gly
    1175                1180                1185


Glu Cys  Ile Lys Ala Ala Ile  Cys Gly Glu Ser Asp  Lys Lys Phe
    1190                1195                1200


Phe Ala  Lys Leu Thr Ser Val  Leu Asn Thr Ile Leu  Gln Met Arg
    1205                1210                1215


Asn Ser  Lys Thr Gly Thr Glu  Leu Asp Tyr Leu Ile  Ser Pro Val
    1220                1225                1230


Ala Asp  Val Asn Gly Asn Phe  Phe Asp Ser Arg Gln  Ala Pro Lys
    1235                1240                1245


Asn Met  Pro Gln Asp Ala Ala  Ala Asn Gly Ala Tyr  His Ile Gly
    1250                1255                1260


Leu Lys  Gly Leu Met Leu Leu  Gly Arg Ile Lys Asn  Asn Gln Glu
    1265                1270                1275


Gly Lys  Lys Leu Asn Leu Val  Ile Lys Asn Glu Glu  Tyr Phe Glu
    1280                1285                1290


Phe Val  Gln Asn Arg Asn Asn
    1295                1300


<210> 88
<211> 1052
<212> PRT
<213> Staphylococcus aureus

<400> 88
Lys Arg Asn Tyr Ile Leu Gly Leu Asp Ile Gly Ile Thr Ser Val Gly
```

```
1               5                   10                  15

Tyr Gly Ile Ile Asp Tyr Glu Thr Arg Asp Val Ile Asp Ala Gly Val
            20                  25                  30

Arg Leu Phe Lys Glu Ala Asn Val Glu Asn Asn Glu Gly Arg Arg Ser
        35                  40                  45

Lys Arg Gly Ala Arg Arg Leu Lys Arg Arg Arg Arg His Arg Ile Gln
    50                  55                  60

Arg Val Lys Lys Leu Leu Phe Asp Tyr Asn Leu Leu Thr Asp His Ser
65                  70                  75                  80

Glu Leu Ser Gly Ile Asn Pro Tyr Glu Ala Arg Val Lys Gly Leu Ser
                85                  90                  95

Gln Lys Leu Ser Glu Glu Glu Phe Ser Ala Ala Leu Leu His Leu Ala
            100                 105                 110

Lys Arg Arg Gly Val His Asn Val Asn Glu Val Glu Glu Asp Thr Gly
        115                 120                 125

Asn Glu Leu Ser Thr Lys Glu Gln Ile Ser Arg Asn Ser Lys Ala Leu
    130                 135                 140

Glu Glu Lys Tyr Val Ala Glu Leu Gln Leu Glu Arg Leu Lys Lys Asp
145                 150                 155                 160

Gly Glu Val Arg Gly Ser Ile Asn Arg Phe Lys Thr Ser Asp Tyr Val
                165                 170                 175

Lys Glu Ala Lys Gln Leu Leu Lys Val Gln Lys Ala Tyr His Gln Leu
            180                 185                 190

Asp Gln Ser Phe Ile Asp Thr Tyr Ile Asp Leu Leu Glu Thr Arg Arg
```

```
        195                 200                 205

Thr Tyr Tyr Glu Gly Pro Gly Glu Gly Ser Pro Phe Gly Trp Lys Asp
    210                 215                 220

Ile Lys Glu Trp Tyr Glu Met Leu Met Gly His Cys Thr Tyr Phe Pro
225                 230                 235                 240

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

Ala Leu Asn Asp Leu Asn Asn Leu Val Ile Thr Arg Asp Glu Asn Glu
            260                 265                 270

Lys Leu Glu Tyr Tyr Glu Lys Phe Gln Ile Ile Glu Asn Val Phe Lys
        275                 280                 285

Gln Lys Lys Lys Pro Thr Leu Lys Gln Ile Ala Lys Glu Ile Leu Val
    290                 295                 300

Asn Glu Glu Asp Ile Lys Gly Tyr Arg Val Thr Ser Thr Gly Lys Pro
305                 310                 315                 320

Glu Phe Thr Asn Leu Lys Val Tyr His Asp Ile Lys Asp Ile Thr Ala
                325                 330                 335

Arg Lys Glu Ile Ile Glu Asn Ala Glu Leu Leu Asp Gln Ile Ala Lys
            340                 345                 350

Ile Leu Thr Ile Tyr Gln Ser Ser Glu Asp Ile Gln Glu Glu Leu Thr
        355                 360                 365

Asn Leu Asn Ser Glu Leu Thr Gln Glu Glu Ile Glu Gln Ile Ser Asn
    370                 375                 380

Leu Lys Gly Tyr Thr Gly Thr His Asn Leu Ser Leu Lys Ala Ile Asn
```

```
385                 390                 395                 400

Leu Ile Leu Asp Glu Leu Trp His Thr Asn Asp Asn Gln Ile Ala Ile
                405                 410                 415

Phe Asn Arg Leu Lys Leu Val Pro Lys Lys Val Asp Leu Ser Gln Gln
            420                 425                 430

Lys Glu Ile Pro Thr Thr Leu Val Asp Asp Phe Ile Leu Ser Pro Val
        435                 440                 445

Val Lys Arg Ser Phe Ile Gln Ser Ile Lys Val Ile Asn Ala Ile Ile
    450                 455                 460

Lys Lys Tyr Gly Leu Pro Asn Asp Ile Ile Ile Glu Leu Ala Arg Glu
465                 470                 475                 480

Lys Asn Ser Lys Asp Ala Gln Lys Met Ile Asn Glu Met Gln Lys Arg
                485                 490                 495

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

Lys Glu Asn Ala Lys Tyr Leu Ile Glu Lys Ile Lys Leu His Asp Met
        515                 520                 525

Gln Glu Gly Lys Cys Leu Tyr Ser Leu Glu Ala Ile Pro Leu Glu Asp
    530                 535                 540

Leu Leu Asn Asn Pro Phe Asn Tyr Glu Val Asp His Ile Ile Pro Arg
545                 550                 555                 560

Ser Val Ser Phe Asp Asn Ser Phe Asn Asn Lys Val Leu Val Lys Gln
                565                 570                 575

Glu Glu Asn Ser Lys Lys Gly Asn Arg Thr Pro Phe Gln Tyr Leu Ser
```

580 585 590

Ser Ser Asp Ser Lys Ile Ser Tyr Glu Thr Phe Lys Lys His Ile Leu
595 600 605

Asn Leu Ala Lys Gly Lys Gly Arg Ile Ser Lys Thr Lys Lys Glu Tyr
610 615 620

Leu Leu Glu Glu Arg Asp Ile Asn Arg Phe Ser Val Gln Lys Asp Phe
625 630 635 640

Ile Asn Arg Asn Leu Val Asp Thr Arg Tyr Ala Thr Arg Gly Leu Met
645 650 655

Asn Leu Leu Arg Ser Tyr Phe Arg Val Asn Asn Leu Asp Val Lys Val
660 665 670

Lys Ser Ile Asn Gly Gly Phe Thr Ser Phe Leu Arg Arg Lys Trp Lys
675 680 685

Phe Lys Lys Glu Arg Asn Lys Gly Tyr Lys His His Ala Glu Asp Ala
690 695 700

Leu Ile Ile Ala Asn Ala Asp Phe Ile Phe Lys Glu Trp Lys Lys Leu
705 710 715 720

Asp Lys Ala Lys Lys Val Met Glu Asn Gln Met Phe Glu Glu Lys Gln
725 730 735

Ala Glu Ser Met Pro Glu Ile Glu Thr Glu Gln Glu Tyr Lys Glu Ile
740 745 750

Phe Ile Thr Pro His Gln Ile Lys His Ile Lys Asp Phe Lys Asp Tyr
755 760 765

Lys Tyr Ser His Arg Val Asp Lys Lys Pro Asn Arg Glu Leu Ile Asn

```
    770                 775                 780

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

Val Asn Asn Leu Asn Gly Leu Tyr Asp Lys Asp Asn Asp Lys Leu Lys
                805                 810                 815

Lys Leu Ile Asn Lys Ser Pro Glu Lys Leu Leu Met Tyr His His Asp
            820                 825                 830

Pro Gln Thr Tyr Gln Lys Leu Lys Leu Ile Met Glu Gln Tyr Gly Asp
        835                 840                 845

Glu Lys Asn Pro Leu Tyr Lys Tyr Tyr Glu Glu Thr Gly Asn Tyr Leu
    850                 855                 860

Thr Lys Tyr Ser Lys Lys Asp Asn Gly Pro Val Ile Lys Lys Ile Lys
865                 870                 875                 880

Tyr Tyr Gly Asn Lys Leu Asn Ala His Leu Asp Ile Thr Asp Asp Tyr
                885                 890                 895

Pro Asn Ser Arg Asn Lys Val Val Lys Leu Ser Leu Lys Pro Tyr Arg
            900                 905                 910

Phe Asp Val Tyr Leu Asp Asn Gly Val Tyr Lys Phe Val Thr Val Lys
        915                 920                 925

Asn Leu Asp Val Ile Lys Lys Glu Asn Tyr Tyr Glu Val Asn Ser Lys
    930                 935                 940

Cys Tyr Glu Glu Ala Lys Lys Leu Lys Lys Ile Ser Asn Gln Ala Glu
945                 950                 955                 960

Phe Ile Ala Ser Phe Tyr Asn Asn Asp Leu Ile Lys Ile Asn Gly Glu
```

965 970 975

Leu Tyr Arg Val Ile Gly Val Asn Asn Asp Leu Leu Asn Arg Ile Glu
980 985 990

Val Asn Met Ile Asp Ile Thr Tyr Arg Glu Tyr Leu Glu Asn Met Asn
995 1000 1005

Asp Lys Arg Pro Pro Arg Ile Ile Lys Thr Ile Ala Ser Lys Thr
1010 1015 1020

Gln Ser Ile Lys Lys Tyr Ser Thr Asp Ile Leu Gly Asn Leu Tyr
1025 1030 1035

Glu Val Lys Ser Lys Lys His Pro Gln Ile Ile Lys Lys Gly
1040 1045 1050

<210> 89
<211> 1052
<212> PRT
<213> Staphylococcus aureus

<400> 89
Lys Arg Asn Tyr Ile Leu Gly Leu Asp Ile Gly Ile Thr Ser Val Gly
1 5 10 15

Tyr Gly Ile Ile Asp Tyr Glu Thr Arg Asp Val Ile Asp Ala Gly Val
20 25 30

Arg Leu Phe Lys Glu Ala Asn Val Glu Asn Asn Glu Gly Arg Arg Ser
35 40 45

Lys Arg Gly Ala Arg Arg Leu Lys Arg Arg Arg Arg His Arg Ile Gln
50 55 60

Arg Val Lys Lys Leu Leu Phe Asp Tyr Asn Leu Leu Thr Asp His Ser
65 70 75 80

```
Glu Leu Ser Gly Ile Asn Pro Tyr Glu Ala Arg Val Lys Gly Leu Ser
                85                  90                  95

Gln Lys Leu Ser Glu Glu Glu Phe Ser Ala Ala Leu Leu His Leu Ala
            100                 105                 110

Lys Arg Arg Gly Val His Asn Val Asn Glu Val Glu Glu Asp Thr Gly
        115                 120                 125

Asn Glu Leu Ser Thr Lys Glu Gln Ile Ser Arg Asn Ser Lys Ala Leu
    130                 135                 140

Glu Glu Lys Tyr Val Ala Glu Leu Gln Leu Glu Arg Leu Lys Lys Asp
145                 150                 155                 160

Gly Glu Val Arg Gly Ser Ile Asn Arg Phe Lys Thr Ser Asp Tyr Val
                165                 170                 175

Lys Glu Ala Lys Gln Leu Leu Lys Val Gln Lys Ala Tyr His Gln Leu
            180                 185                 190

Asp Gln Ser Phe Ile Asp Thr Tyr Ile Asp Leu Leu Glu Thr Arg Arg
        195                 200                 205

Thr Tyr Tyr Glu Gly Pro Gly Glu Gly Ser Pro Phe Gly Trp Lys Asp
    210                 215                 220

Ile Lys Glu Trp Tyr Glu Met Leu Met Gly His Cys Thr Tyr Phe Pro
225                 230                 235                 240

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

Ala Leu Asn Asp Leu Asn Asn Leu Val Ile Thr Arg Asp Glu Asn Glu
            260                 265                 270
```

```
Lys Leu Glu Tyr Tyr Glu Lys Phe Gln Ile Ile Glu Asn Val Phe Lys
        275                 280                 285

Gln Lys Lys Lys Pro Thr Leu Lys Gln Ile Ala Lys Glu Ile Leu Val
    290                 295                 300

Asn Glu Glu Asp Ile Lys Gly Tyr Arg Val Thr Ser Thr Gly Lys Pro
305                 310                 315                 320

Glu Phe Thr Asn Leu Lys Val Tyr His Asp Ile Lys Asp Ile Thr Ala
                325                 330                 335

Arg Lys Glu Ile Ile Glu Asn Ala Glu Leu Leu Asp Gln Ile Ala Lys
            340                 345                 350

Ile Leu Thr Ile Tyr Gln Ser Ser Glu Asp Ile Gln Glu Glu Leu Thr
        355                 360                 365

Asn Leu Asn Ser Glu Leu Thr Gln Glu Glu Ile Glu Gln Ile Ser Asn
    370                 375                 380

Leu Lys Gly Tyr Thr Gly Thr His Asn Leu Ser Leu Lys Ala Ile Asn
385                 390                 395                 400

Leu Ile Leu Asp Glu Leu Trp His Thr Asn Asp Asn Gln Ile Ala Ile
                405                 410                 415

Phe Asn Arg Leu Lys Leu Val Pro Lys Lys Val Asp Leu Ser Gln Gln
            420                 425                 430

Lys Glu Ile Pro Thr Thr Leu Val Asp Asp Phe Ile Leu Ser Pro Val
        435                 440                 445

Val Lys Arg Ser Phe Ile Gln Ser Ile Lys Val Ile Asn Ala Ile Ile
    450                 455                 460
```

```
Lys Lys Tyr Gly Leu Pro Asn Asp Ile Ile Ile Glu Leu Ala Arg Glu
465                 470                 475                 480

Lys Asn Ser Lys Asp Ala Gln Lys Met Ile Asn Glu Met Gln Lys Arg
                485                 490                 495

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

Lys Glu Asn Ala Lys Tyr Leu Ile Glu Lys Ile Lys Leu His Asp Met
        515                 520                 525

Gln Glu Gly Lys Cys Leu Tyr Ser Leu Glu Ala Ile Pro Leu Glu Asp
    530                 535                 540

Leu Leu Asn Asn Pro Phe Asn Tyr Glu Val Asp His Ile Ile Pro Arg
545                 550                 555                 560

Ser Val Ser Phe Asp Asn Ser Phe Asn Asn Lys Val Leu Val Lys Gln
                565                 570                 575

Glu Glu Ala Ser Lys Lys Gly Asn Arg Thr Pro Phe Gln Tyr Leu Ser
            580                 585                 590

Ser Ser Asp Ser Lys Ile Ser Tyr Glu Thr Phe Lys Lys His Ile Leu
        595                 600                 605

Asn Leu Ala Lys Gly Lys Gly Arg Ile Ser Lys Thr Lys Lys Glu Tyr
    610                 615                 620

Leu Leu Glu Glu Arg Asp Ile Asn Arg Phe Ser Val Gln Lys Asp Phe
625                 630                 635                 640

Ile Asn Arg Asn Leu Val Asp Thr Arg Tyr Ala Thr Arg Gly Leu Met
                645                 650                 655
```

```
Asn Leu Leu Arg Ser Tyr Phe Arg Val Asn Asn Leu Asp Val Lys Val
            660                 665                 670

Lys Ser Ile Asn Gly Gly Phe Thr Ser Phe Leu Arg Arg Lys Trp Lys
        675                 680                 685

Phe Lys Lys Glu Arg Asn Lys Gly Tyr Lys His His Ala Glu Asp Ala
    690                 695                 700

Leu Ile Ile Ala Asn Ala Asp Phe Ile Phe Lys Glu Trp Lys Lys Leu
705                 710                 715                 720

Asp Lys Ala Lys Lys Val Met Glu Asn Gln Met Phe Glu Glu Lys Gln
                725                 730                 735

Ala Glu Ser Met Pro Glu Ile Glu Thr Glu Gln Glu Tyr Lys Glu Ile
            740                 745                 750

Phe Ile Thr Pro His Gln Ile Lys His Ile Lys Asp Phe Lys Asp Tyr
        755                 760                 765

Lys Tyr Ser His Arg Val Asp Lys Lys Pro Asn Arg Glu Leu Ile Asn
    770                 775                 780

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

Val Asn Asn Leu Asn Gly Leu Tyr Asp Lys Asp Asn Asp Lys Leu Lys
                805                 810                 815

Lys Leu Ile Asn Lys Ser Pro Glu Lys Leu Leu Met Tyr His His Asp
            820                 825                 830

Pro Gln Thr Tyr Gln Lys Leu Lys Leu Ile Met Glu Gln Tyr Gly Asp
        835                 840                 845
```

```
Glu Lys Asn Pro Leu Tyr Lys Tyr Tyr Glu Glu Thr Gly Asn Tyr Leu
    850                 855                 860

Thr Lys Tyr Ser Lys Lys Asp Asn Gly Pro Val Ile Lys Lys Ile Lys
865                 870                 875                 880

Tyr Tyr Gly Asn Lys Leu Asn Ala His Leu Asp Ile Thr Asp Asp Tyr
                885                 890                 895

Pro Asn Ser Arg Asn Lys Val Val Lys Leu Ser Leu Lys Pro Tyr Arg
            900                 905                 910

Phe Asp Val Tyr Leu Asp Asn Gly Val Tyr Lys Phe Val Thr Val Lys
        915                 920                 925

Asn Leu Asp Val Ile Lys Lys Glu Asn Tyr Tyr Glu Val Asn Ser Lys
    930                 935                 940

Cys Tyr Glu Glu Ala Lys Lys Leu Lys Lys Ile Ser Asn Gln Ala Glu
945                 950                 955                 960

Phe Ile Ala Ser Phe Tyr Asn Asn Asp Leu Ile Lys Ile Asn Gly Glu
                965                 970                 975

Leu Tyr Arg Val Ile Gly Val Asn Asn Asp Leu Leu Asn Arg Ile Glu
            980                 985                 990

Val Asn Met Ile Asp Ile Thr Tyr  Arg Glu Tyr Leu Glu  Asn Met Asn
        995                 1000                1005

Asp Lys  Arg Pro Pro Arg Ile  Ile Lys Thr Ile Ala  Ser Lys Thr
    1010                1015                1020

Gln Ser  Ile Lys Lys Tyr Ser  Thr Asp Ile Leu Gly  Asn Leu Tyr
    1025                1030                1035
```

Glu Val Lys Ser Lys Lys His Pro Gln Ile Ile Lys Lys Gly
    1040   1045   1050

<210> 90
<211> 1052
<212> PRT
<213> Staphylococcus aureus

<400> 90
Lys Arg Asn Tyr Ile Leu Gly Leu Asp Ile Gly Ile Thr Ser Val Gly
1   5   10   15

Tyr Gly Ile Ile Asp Tyr Glu Thr Arg Asp Val Ile Asp Ala Gly Val
            20   25   30

Arg Leu Phe Lys Glu Ala Asn Val Glu Asn Asn Glu Gly Arg Arg Ser
        35   40   45

Lys Arg Gly Ala Arg Arg Leu Lys Arg Arg Arg Arg His Arg Ile Gln
    50   55   60

Arg Val Lys Lys Leu Leu Phe Asp Tyr Asn Leu Leu Thr Asp His Ser
65   70   75   80

Glu Leu Ser Gly Ile Asn Pro Tyr Glu Ala Arg Val Lys Gly Leu Ser
                85   90   95

Gln Lys Leu Ser Glu Glu Glu Phe Ser Ala Ala Leu Leu His Leu Ala
            100   105   110

Lys Arg Arg Gly Val His Asn Val Asn Glu Val Glu Glu Asp Thr Gly
        115   120   125

Asn Glu Leu Ser Thr Lys Glu Gln Ile Ser Arg Asn Ser Lys Ala Leu
    130   135   140

Glu Glu Lys Tyr Val Ala Glu Leu Gln Leu Glu Arg Leu Lys Lys Asp

```
145                 150                 155                 160

Gly Glu Val Arg Gly Ser Ile Asn Arg Phe Lys Thr Ser Asp Tyr Val
                165                 170                 175

Lys Glu Ala Lys Gln Leu Leu Lys Val Gln Lys Ala Tyr His Gln Leu
            180                 185                 190

Asp Gln Ser Phe Ile Asp Thr Tyr Ile Asp Leu Leu Glu Thr Arg Arg
        195                 200                 205

Thr Tyr Tyr Glu Gly Pro Gly Glu Gly Ser Pro Phe Gly Trp Lys Asp
    210                 215                 220

Ile Lys Glu Trp Tyr Glu Met Leu Met Gly His Cys Thr Tyr Phe Pro
225                 230                 235                 240

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

Ala Leu Asn Asp Leu Asn Asn Leu Val Ile Thr Arg Asp Glu Asn Glu
            260                 265                 270

Lys Leu Glu Tyr Tyr Glu Lys Phe Gln Ile Ile Glu Asn Val Phe Lys
        275                 280                 285

Gln Lys Lys Lys Pro Thr Leu Lys Gln Ile Ala Lys Glu Ile Leu Val
    290                 295                 300

Asn Glu Glu Asp Ile Lys Gly Tyr Arg Val Thr Ser Thr Gly Lys Pro
305                 310                 315                 320

Glu Phe Thr Asn Leu Lys Val Tyr His Asp Ile Lys Asp Ile Thr Ala
                325                 330                 335

Arg Lys Glu Ile Ile Glu Asn Ala Glu Leu Leu Asp Gln Ile Ala Lys
```

340 345 350

Ile Leu Thr Ile Tyr Gln Ser Ser Glu Asp Ile Gln Glu Glu Leu Thr
355 360 365

Asn Leu Asn Ser Glu Leu Thr Gln Glu Glu Ile Glu Gln Ile Ser Asn
370 375 380

Leu Lys Gly Tyr Thr Gly Thr His Asn Leu Ser Leu Lys Ala Ile Asn
385 390 395 400

Leu Ile Leu Asp Glu Leu Trp His Thr Asn Asp Asn Gln Ile Ala Ile
405 410 415

Phe Asn Arg Leu Lys Leu Val Pro Lys Lys Val Asp Leu Ser Gln Gln
420 425 430

Lys Glu Ile Pro Thr Thr Leu Val Asp Asp Phe Ile Leu Ser Pro Val
435 440 445

Val Lys Arg Ser Phe Ile Gln Ser Ile Lys Val Ile Asn Ala Ile Ile
450 455 460

Lys Lys Tyr Gly Leu Pro Asn Asp Ile Ile Ile Glu Leu Ala Arg Glu
465 470 475 480

Lys Asn Ser Lys Asp Ala Gln Lys Met Ile Asn Glu Met Gln Lys Arg
485 490 495

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

Lys Glu Asn Ala Lys Tyr Leu Ile Glu Lys Ile Lys Leu His Asp Met
515 520 525

Gln Glu Gly Lys Cys Leu Tyr Ser Leu Glu Ala Ile Pro Leu Glu Asp

```
    530                 535                 540

Leu Leu Asn Asn Pro Phe Asn Tyr Glu Val Asp His Ile Ile Pro Arg
545                 550                 555                 560

Ser Val Ser Phe Asp Asn Ser Phe Asn Asn Lys Val Leu Val Lys Gln
                565                 570                 575

Glu Glu Ala Ser Lys Lys Gly Asn Arg Thr Pro Phe Gln Tyr Leu Ser
            580                 585                 590

Ser Ser Asp Ser Lys Ile Ser Tyr Glu Thr Phe Lys Lys His Ile Leu
        595                 600                 605

Asn Leu Ala Lys Gly Lys Gly Arg Ile Ser Lys Thr Lys Lys Glu Tyr
    610                 615                 620

Leu Leu Glu Glu Arg Asp Ile Asn Arg Phe Ser Val Gln Lys Asp Phe
625                 630                 635                 640

Ile Asn Arg Asn Leu Val Asp Thr Arg Tyr Ala Thr Arg Gly Leu Met
                645                 650                 655

Asn Leu Leu Arg Ser Tyr Phe Arg Val Asn Asn Leu Asp Val Lys Val
            660                 665                 670

Lys Ser Ile Asn Gly Gly Phe Thr Ser Phe Leu Arg Arg Lys Trp Lys
        675                 680                 685

Phe Lys Lys Glu Arg Asn Lys Gly Tyr Lys His His Ala Glu Asp Ala
    690                 695                 700

Leu Ile Ile Ala Asn Ala Asp Phe Ile Phe Lys Glu Trp Lys Lys Leu
705                 710                 715                 720

Asp Lys Ala Lys Lys Val Met Glu Asn Gln Met Phe Glu Glu Lys Gln
```

```
                725                 730                 735

Ala Glu Ser Met Pro Glu Ile Glu Thr Glu Gln Glu Tyr Lys Glu Ile
            740                 745                 750

Phe Ile Thr Pro His Gln Ile Lys His Ile Lys Asp Phe Lys Asp Tyr
        755                 760                 765

Lys Tyr Ser His Arg Val Asp Lys Lys Pro Asn Arg Lys Leu Ile Asn
    770                 775                 780

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

Val Asn Asn Leu Asn Gly Leu Tyr Asp Lys Asp Asn Asp Lys Leu Lys
                805                 810                 815

Lys Leu Ile Asn Lys Ser Pro Glu Lys Leu Leu Met Tyr His His Asp
            820                 825                 830

Pro Gln Thr Tyr Gln Lys Leu Lys Leu Ile Met Glu Gln Tyr Gly Asp
        835                 840                 845

Glu Lys Asn Pro Leu Tyr Lys Tyr Tyr Glu Glu Thr Gly Asn Tyr Leu
    850                 855                 860

Thr Lys Tyr Ser Lys Lys Asp Asn Gly Pro Val Ile Lys Lys Ile Lys
865                 870                 875                 880

Tyr Tyr Gly Asn Lys Leu Asn Ala His Leu Asp Ile Thr Asp Asp Tyr
                885                 890                 895

Pro Asn Ser Arg Asn Lys Val Val Lys Leu Ser Leu Lys Pro Tyr Arg
            900                 905                 910

Phe Asp Val Tyr Leu Asp Asn Gly Val Tyr Lys Phe Val Thr Val Lys
```

915 920 925

Asn Leu Asp Val Ile Lys Lys Glu Asn Tyr Tyr Glu Val Asn Ser Lys
930 935 940

Cys Tyr Glu Glu Ala Lys Lys Leu Lys Lys Ile Ser Asn Gln Ala Glu
945 950 955 960

Phe Ile Ala Ser Phe Tyr Lys Asn Asp Leu Ile Lys Ile Asn Gly Glu
965 970 975

Leu Tyr Arg Val Ile Gly Val Asn Asn Asp Leu Leu Asn Arg Ile Glu
980 985 990

Val Asn Met Ile Asp Ile Thr Tyr Arg Glu Tyr Leu Glu Asn Met Asn
995 1000 1005

Asp Lys Arg Pro Pro His Ile Ile Lys Thr Ile Ala Ser Lys Thr
1010 1015 1020

Gln Ser Ile Lys Lys Tyr Ser Thr Asp Ile Leu Gly Asn Leu Tyr
1025 1030 1035

Glu Val Lys Ser Lys Lys His Pro Gln Ile Ile Lys Lys Gly
1040 1045 1050

<210> 91
<211> 1140
<212> PRT
<213> Bacillus hisashii

<400> 91
Met Ala Pro Lys Lys Lys Arg Lys Val Gly Ile His Gly Val Pro Ala
1 5 10 15

Ala Ala Thr Arg Ser Phe Ile Leu Lys Ile Glu Pro Asn Glu Glu Val
20 25 30

```
Lys Lys Gly Leu Trp Lys Thr His Glu Val Leu Asn His Gly Ile Ala
        35                  40                  45

Tyr Tyr Met Asn Ile Leu Lys Leu Ile Arg Gln Glu Ala Ile Tyr Glu
    50                  55                  60

His His Glu Gln Asp Pro Lys Asn Pro Lys Lys Val Ser Lys Ala Glu
65                  70                  75                  80

Ile Gln Ala Glu Leu Trp Asp Phe Val Leu Lys Met Gln Lys Cys Asn
                85                  90                  95

Ser Phe Thr His Glu Val Asp Lys Asp Glu Val Phe Asn Ile Leu Arg
            100                 105                 110

Glu Leu Tyr Glu Glu Leu Val Pro Ser Ser Val Glu Lys Lys Gly Glu
        115                 120                 125

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

Ser Gln Ser Gly Lys Gly Thr Ala Ser Ser Gly Arg Lys Pro Arg Trp
145                 150                 155                 160

Tyr Asn Leu Lys Ile Ala Gly Asp Pro Ser Trp Glu Glu Glu Lys Lys
                165                 170                 175

Lys Trp Glu Glu Asp Lys Lys Lys Asp Pro Leu Ala Lys Ile Leu Gly
            180                 185                 190

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

Ser Asn Glu Pro Ile Val Lys Glu Ile Lys Trp Met Glu Lys Ser Arg
    210                 215                 220
```

```
Asn Gln Ser Val Arg Arg Leu Asp Lys Asp Met Phe Ile Gln Ala Leu
225                 230                 235                 240


Glu Arg Phe Leu Ser Trp Glu Ser Trp Asn Leu Lys Val Lys Glu Glu
                245                 250                 255


Tyr Glu Lys Val Glu Lys Glu Tyr Lys Thr Leu Glu Glu Arg Ile Lys
            260                 265                 270


Glu Asp Ile Gln Ala Leu Lys Ala Leu Glu Gln Tyr Glu Lys Glu Arg
        275                 280                 285


Gln Glu Gln Leu Leu Arg Asp Thr Leu Asn Thr Asn Glu Tyr Arg Leu
    290                 295                 300


Ser Lys Arg Gly Leu Arg Gly Trp Arg Glu Ile Ile Gln Lys Trp Leu
305                 310                 315                 320


Lys Met Asp Glu Asn Glu Pro Ser Glu Lys Tyr Leu Glu Val Phe Lys
                325                 330                 335


Asp Tyr Gln Arg Lys His Pro Arg Glu Ala Gly Asp Tyr Ser Val Tyr
            340                 345                 350


Glu Phe Leu Ser Lys Lys Glu Asn His Phe Ile Trp Arg Asn His Pro
        355                 360                 365


Glu Tyr Pro Tyr Leu Tyr Ala Thr Phe Cys Glu Ile Asp Lys Lys Lys
    370                 375                 380


Lys Asp Ala Lys Gln Gln Ala Thr Phe Thr Leu Ala Asp Pro Ile Asn
385                 390                 395                 400


His Pro Leu Trp Val Arg Phe Glu Glu Arg Ser Gly Ser Asn Leu Asn
                405                 410                 415
```

```
Lys Tyr Arg Ile Leu Thr Glu Gln Leu His Thr Glu Lys Leu Lys Lys
            420                 425                 430

Lys Leu Thr Val Gln Leu Asp Arg Leu Ile Tyr Pro Thr Glu Ser Gly
        435                 440                 445

Gly Trp Glu Glu Lys Gly Lys Val Asp Ile Val Leu Leu Pro Ser Arg
    450                 455                 460

Gln Phe Tyr Asn Gln Ile Phe Leu Asp Ile Glu Glu Lys Gly Lys His
465                 470                 475                 480

Ala Phe Thr Tyr Lys Asp Glu Ser Ile Lys Phe Pro Leu Lys Gly Thr
                485                 490                 495

Leu Gly Gly Ala Arg Val Gln Phe Asp Arg Asp His Leu Arg Arg Tyr
            500                 505                 510

Pro His Lys Val Glu Ser Gly Asn Val Gly Arg Ile Tyr Phe Asn Met
        515                 520                 525

Thr Val Asn Ile Glu Pro Thr Glu Ser Pro Val Ser Lys Ser Leu Lys
    530                 535                 540

Ile His Arg Asp Asp Phe Pro Lys Val Val Asn Phe Lys Pro Lys Glu
545                 550                 555                 560

Leu Thr Glu Trp Ile Lys Asp Ser Lys Gly Lys Lys Leu Lys Ser Gly
                565                 570                 575

Ile Glu Ser Leu Glu Ile Gly Leu Arg Val Met Ser Ile Asp Leu Gly
            580                 585                 590

Gln Arg Gln Ala Ala Ala Ala Ser Ile Phe Glu Val Val Asp Gln Lys
        595                 600                 605
```

```
Pro Asp Ile Glu Gly Lys Leu Phe Phe Pro Ile Lys Gly Thr Glu Leu
    610                 615                 620

Tyr Ala Val His Arg Ala Ser Phe Asn Ile Lys Leu Pro Gly Glu Thr
625                 630                 635                 640

Leu Val Lys Ser Arg Glu Val Leu Arg Lys Ala Arg Glu Asp Asn Leu
                645                 650                 655

Lys Leu Met Asn Gln Lys Leu Asn Phe Leu Arg Asn Val Leu His Phe
            660                 665                 670

Gln Gln Phe Glu Asp Ile Thr Glu Arg Glu Lys Arg Val Thr Lys Trp
        675                 680                 685

Ile Ser Arg Gln Glu Asn Ser Asp Val Pro Leu Val Tyr Gln Asp Glu
    690                 695                 700

Leu Ile Gln Ile Arg Glu Leu Met Tyr Lys Pro Tyr Lys Asp Trp Val
705                 710                 715                 720

Ala Phe Leu Lys Gln Leu His Lys Arg Leu Glu Val Glu Ile Gly Lys
                725                 730                 735

Glu Val Lys His Trp Arg Lys Ser Leu Ser Asp Gly Arg Lys Gly Leu
            740                 745                 750

Tyr Gly Ile Ser Leu Lys Asn Ile Asp Glu Ile Asp Arg Thr Arg Lys
        755                 760                 765

Phe Leu Leu Arg Trp Ser Leu Arg Pro Thr Glu Pro Gly Glu Val Arg
    770                 775                 780

Arg Leu Glu Pro Gly Gln Arg Phe Ala Ile Asp Gln Leu Asn His Leu
785                 790                 795                 800
```

```
Asn Ala Leu Lys Glu Asp Arg Leu Lys Lys Met Ala Asn Thr Ile Ile
                805                 810                 815

Met His Ala Leu Gly Tyr Cys Tyr Asp Val Arg Lys Lys Lys Trp Gln
            820                 825                 830

Ala Lys Asn Pro Ala Cys Gln Ile Ile Leu Phe Glu Asp Leu Ser Asn
        835                 840                 845

Tyr Asn Pro Tyr Glu Glu Arg Ser Arg Phe Glu Asn Ser Lys Leu Met
    850                 855                 860

Lys Trp Ser Arg Arg Glu Ile Pro Arg Gln Val Ala Leu Gln Gly Glu
865                 870                 875                 880

Ile Tyr Gly Leu Gln Val Gly Glu Val Gly Ala Gln Phe Ser Ser Arg
                885                 890                 895

Phe His Ala Lys Thr Gly Ser Pro Gly Ile Arg Cys Ser Val Val Thr
            900                 905                 910

Lys Glu Lys Leu Gln Asp Asn Arg Phe Phe Lys Asn Leu Gln Arg Glu
        915                 920                 925

Gly Arg Leu Thr Leu Asp Lys Ile Ala Val Leu Lys Glu Gly Asp Leu
    930                 935                 940

Tyr Pro Asp Lys Gly Gly Glu Lys Phe Ile Ser Leu Ser Lys Asp Arg
945                 950                 955                 960

Lys Cys Val Thr Thr His Ala Asp Ile Asn Ala Ala Gln Asn Leu Gln
                965                 970                 975

Lys Arg Phe Trp Thr Arg Thr His Gly Phe Tyr Lys Val Tyr Cys Lys
            980                 985                 990
```

```
Ala Tyr Gln Val Asp Gly Gln Thr  Val Tyr Ile Pro Glu  Ser Lys Asp
        995                 1000                1005


Gln Lys  Gln Lys Ile Ile Glu  Glu Phe Gly Glu Gly  Tyr Phe Ile
    1010                1015                1020


Leu Lys  Asp Gly Val Tyr Glu  Trp Val Asn Ala Gly  Lys Leu Lys
    1025                1030                1035


Ile Lys  Lys Gly Ser Ser Lys  Gln Ser Ser Ser Glu  Leu Val Asp
    1040                1045                1050


Ser Asp  Ile Leu Lys Asp Ser  Phe Asp Leu Ala Ser  Glu Leu Lys
    1055                1060                1065


Gly Glu  Lys Leu Met Leu Tyr  Arg Asp Pro Ser Gly  Asn Val Phe
    1070                1075                1080


Pro Ser  Asp Lys Trp Met Ala  Ala Gly Val Phe Phe  Gly Lys Leu
    1085                1090                1095


Glu Arg  Ile Leu Ile Ser Lys  Leu Thr Asn Gln Tyr  Ser Ile Ser
    1100                1105                1110


Thr Ile  Glu Asp Asp Ser Ser  Lys Gln Ser Met Lys  Arg Pro Ala
    1115                1120                1125


Ala Thr  Lys Lys Ala Gly Gln  Ala Lys Lys Lys Lys
    1130                1135                1140


<210> 92
<211> 1112
<212> PRT
<213> Bacillus sp.

<400> 92
Met Ala Ile Arg Ser Ile Lys Leu Lys Met Lys Thr Asn Ser Gly Thr
```

```
1               5                   10                  15

Asp Ser Ile Tyr Leu Arg Lys Ala Leu Trp Arg Thr His Gln Leu Ile
            20                  25                  30

Asn Glu Gly Ile Ala Tyr Tyr Met Asn Leu Leu Thr Leu Tyr Arg Gln
        35                  40                  45

Glu Ala Ile Gly Asp Lys Thr Lys Glu Ala Tyr Gln Ala Glu Leu Ile
    50                  55                  60

Asn Ile Ile Arg Asn Gln Gln Arg Asn Asn Gly Ser Ser Glu Glu His
65                  70                  75                  80

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

Ile Ile Pro Ser Ser Ile Gly Glu Ser Gly Asp Ala Asn Gln Leu Gly
            100                 105                 110

Asn Lys Phe Leu Tyr Pro Leu Val Asp Pro Asn Ser Gln Ser Gly Lys
        115                 120                 125

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

Glu Gly Asn Pro Asp Trp Glu Leu Glu Lys Lys Lys Asp Glu Glu Arg
145                 150                 155                 160

Lys Ala Lys Asp Pro Thr Val Lys Ile Phe Asp Asn Leu Asn Lys Tyr
                165                 170                 175

Gly Leu Leu Pro Leu Phe Pro Leu Phe Thr Asn Ile Gln Lys Asp Ile
            180                 185                 190

Glu Trp Leu Pro Leu Gly Lys Arg Gln Ser Val Arg Lys Trp Asp Lys
```

```
        195                 200                 205

Asp Met Phe Ile Gln Ala Ile Glu Arg Leu Leu Ser Trp Glu Ser Trp
    210                 215                 220

Asn Arg Arg Val Ala Asp Glu Tyr Lys Gln Leu Lys Glu Lys Thr Glu
225                 230                 235                 240

Ser Tyr Tyr Lys Glu His Leu Thr Gly Gly Glu Glu Trp Ile Glu Lys
                245                 250                 255

Ile Arg Lys Phe Glu Lys Glu Arg Asn Met Glu Leu Glu Lys Asn Ala
            260                 265                 270

Phe Ala Pro Asn Asp Gly Tyr Phe Ile Thr Ser Arg Gln Ile Arg Gly
        275                 280                 285

Trp Asp Arg Val Tyr Glu Lys Trp Ser Lys Leu Pro Glu Ser Ala Ser
    290                 295                 300

Pro Glu Glu Leu Trp Lys Val Val Ala Glu Gln Gln Asn Lys Met Ser
305                 310                 315                 320

Glu Gly Phe Gly Asp Pro Lys Val Phe Ser Phe Leu Ala Asn Arg Glu
                325                 330                 335

Asn Arg Asp Ile Trp Arg Gly His Ser Glu Arg Ile Tyr His Ile Ala
            340                 345                 350

Ala Tyr Asn Gly Leu Gln Lys Lys Leu Ser Arg Thr Lys Glu Gln Ala
        355                 360                 365

Thr Phe Thr Leu Pro Asp Ala Ile Glu His Pro Leu Trp Ile Arg Tyr
    370                 375                 380

Glu Ser Pro Gly Gly Thr Asn Leu Asn Leu Phe Lys Leu Glu Glu Lys
```

385 390 395 400

Gln Lys Lys Asn Tyr Tyr Val Thr Leu Ser Lys Ile Ile Trp Pro Ser
405 410 415

Glu Glu Lys Trp Ile Glu Lys Glu Asn Ile Glu Ile Pro Leu Ala Pro
420 425 430

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

Lys Gln Glu Ile Ser Phe Ser Asp Tyr Ser Ser Arg Ile Ser Leu Asp
450 455 460

Gly Val Leu Gly Gly Ser Arg Ile Gln Phe Asn Arg Lys Tyr Ile Lys
465 470 475 480

Asn His Lys Glu Leu Leu Gly Glu Gly Asp Ile Gly Pro Val Phe Phe
485 490 495

Asn Leu Val Val Asp Val Ala Pro Leu Gln Glu Thr Arg Asn Gly Arg
500 505 510

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

Ser Lys Val Ile Asp Tyr Lys Pro Lys Glu Leu Met Asp Trp Met Asn
530 535 540

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

Met Arg Val Met Ser Ile Asp Met Gly Gln Arg Thr Ser Ala Ser Val
565 570 575

Ser Ile Phe Glu Val Val Lys Glu Leu Pro Lys Asp Gln Glu Gln Lys

580 585 590

Leu Phe Tyr Ser Ile Asn Asp Thr Glu Leu Phe Ala Ile His Lys Arg
595 600 605

Ser Phe Leu Leu Asn Leu Pro Gly Glu Val Val Thr Lys Asn Asn Lys
610 615 620

Gln Gln Arg Gln Glu Arg Arg Lys Lys Arg Gln Phe Val Arg Ser Gln
625 630 635 640

Ile Arg Met Leu Ala Asn Val Leu Arg Leu Glu Thr Lys Lys Thr Pro
645 650 655

Asp Glu Arg Lys Lys Ala Ile His Lys Leu Met Glu Ile Val Gln Ser
660 665 670

Tyr Asp Ser Trp Thr Ala Ser Gln Lys Glu Val Trp Glu Lys Glu Leu
675 680 685

Asn Leu Leu Thr Asn Met Ala Ala Phe Asn Asp Glu Ile Trp Lys Glu
690 695 700

Ser Leu Val Glu Leu His His Arg Ile Glu Pro Tyr Val Gly Gln Ile
705 710 715 720

Val Ser Lys Trp Arg Lys Gly Leu Ser Glu Gly Arg Lys Asn Leu Ala
725 730 735

Gly Ile Ser Met Trp Asn Ile Asp Glu Leu Glu Asp Thr Arg Arg Leu
740 745 750

Leu Ile Ser Trp Ser Lys Arg Ser Arg Thr Pro Gly Glu Ala Asn Arg
755 760 765

Ile Glu Thr Asp Glu Pro Phe Gly Ser Ser Leu Leu Gln His Ile Gln

```
    770                 775                 780

Asn Val Lys Asp Asp Arg Leu Lys Gln Met Ala Asn Leu Ile Ile Met
785                 790                 795                 800

Thr Ala Leu Gly Phe Lys Tyr Asp Lys Glu Glu Lys Asp Arg Tyr Lys
                805                 810                 815

Arg Trp Lys Glu Thr Tyr Pro Ala Cys Gln Ile Ile Leu Phe Glu Asn
            820                 825                 830

Leu Asn Arg Tyr Leu Phe Asn Leu Asp Arg Ser Arg Arg Glu Asn Ser
        835                 840                 845

Arg Leu Met Lys Trp Ala His Arg Ser Ile Pro Arg Thr Val Ser Met
    850                 855                 860

Gln Gly Glu Met Phe Gly Leu Gln Val Gly Asp Val Arg Ser Glu Tyr
865                 870                 875                 880

Ser Ser Arg Phe His Ala Lys Thr Gly Ala Pro Gly Ile Arg Cys His
                885                 890                 895

Ala Leu Thr Glu Glu Asp Leu Lys Ala Gly Ser Asn Thr Leu Lys Arg
            900                 905                 910

Leu Ile Glu Asp Gly Phe Ile Asn Glu Ser Glu Leu Ala Tyr Leu Lys
        915                 920                 925

Lys Gly Asp Ile Ile Pro Ser Gln Gly Gly Glu Leu Phe Val Thr Leu
    930                 935                 940

Ser Lys Arg Tyr Lys Lys Asp Ser Asp Asn Asn Glu Leu Thr Val Ile
945                 950                 955                 960

His Ala Asp Ile Asn Ala Ala Gln Asn Leu Gln Lys Arg Phe Trp Gln
```

965 970 975

Gln Asn Ser Glu Val Tyr Arg Val Pro Cys Gln Leu Ala Arg Met Gly
980 985 990

Glu Asp Lys Leu Tyr Ile Pro Lys Ser Gln Thr Glu Thr Ile Lys Lys
995 1000 1005

Tyr Phe Gly Lys Gly Ser Phe Val Lys Asn Asn Thr Glu Gln Glu
1010 1015 1020

Val Tyr Lys Trp Glu Lys Ser Glu Lys Met Lys Ile Lys Thr Asp
1025 1030 1035

Thr Thr Phe Asp Leu Gln Asp Leu Asp Gly Phe Glu Asp Ile Ser
1040 1045 1050

Lys Thr Ile Glu Leu Ala Gln Glu Gln Gln Lys Lys Tyr Leu Thr
1055 1060 1065

Met Phe Arg Asp Pro Ser Gly Tyr Phe Phe Asn Asn Glu Thr Trp
1070 1075 1080

Arg Pro Gln Lys Glu Tyr Trp Ser Ile Val Asn Asn Ile Ile Lys
1085 1090 1095

Ser Cys Leu Lys Lys Lys Ile Leu Ser Asn Lys Val Glu Leu
1100 1105 1110

<210> 93
<211> 1368
<212> PRT
<213> Artificial Sequence

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

<400> 93

```
Met Asp Lys Lys Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val
1               5                  10                  15

Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe
            20                  25                  30

Lys Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile
        35                  40                  45

Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu
    50                  55                  60

Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys
65                  70                  75                  80

Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser
                85                  90                  95

Phe Phe His Arg Leu Glu Glu Ser Val Leu Val Glu Glu Asp Lys Lys
            100                 105                 110

His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr
        115                 120                 125

His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp
    130                 135                 140

Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His
145                 150                 155                 160

Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro
                165                 170                 175

Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr
            180                 185                 190
```

```
Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala
        195                 200                 205

Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn
    210                 215                 220

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

Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe
                245                 250                 255

Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp
            260                 265                 270

Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp
        275                 280                 285

Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp
    290                 295                 300

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

Met Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys
                325                 330                 335

Ala Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe
            340                 345                 350

Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser
        355                 360                 365

Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp
    370                 375                 380
```

```
Gly Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg
385                 390                 395                 400


Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu
                405                 410                 415


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


Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile
        435                 440                 445


Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp
    450                 455                 460


Met Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu
465                 470                 475                 480


Val Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr
                485                 490                 495


Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser
            500                 505                 510


Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys
        515                 520                 525


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


Lys Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr
545                 550                 555                 560


Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp
                565                 570                 575
```

```
Ser Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly
            580                 585                 590

Thr Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp
        595                 600                 605

Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr
    610                 615                 620

Leu Phe Glu Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala
625                 630                 635                 640

His Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr
                645                 650                 655

Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp
            660                 665                 670

Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe
        675                 680                 685

Ala Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu Thr Phe
    690                 695                 700

Lys Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly Asp Ser Leu
705                 710                 715                 720

His Glu His Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly
                725                 730                 735

Ile Leu Gln Thr Val Lys Val Val Asp Glu Leu Val Lys Val Met Gly
            740                 745                 750

Arg His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln
        755                 760                 765
```

```
Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile
    770                 775                 780

Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro
785                 790                 795                 800

Val Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu
                805                 810                 815

Gln Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg
            820                 825                 830

Leu Ser Asp Tyr Asp Val Asp His Ile Val Pro Gln Ser Phe Leu Lys
        835                 840                 845

Asp Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg
    850                 855                 860

Gly Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys
865                 870                 875                 880

Asn Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys
                885                 890                 895

Phe Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp
            900                 905                 910

Lys Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr
        915                 920                 925

Lys His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp
    930                 935                 940

Glu Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser
945                 950                 955                 960
```

```
Lys Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg
               965                 970                 975


Glu Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val
           980                 985                 990


Val Gly Thr Ala Leu Ile Lys Lys  Tyr Pro Lys Leu Glu  Ser Glu Phe
        995                1000                1005


Val Tyr  Gly Asp Tyr Lys Val  Tyr Asp Val Arg Lys  Met Ile Ala
    1010                1015                1020


Lys Ser  Glu Gln Glu Ile Gly  Lys Ala Thr Ala Lys  Tyr Phe Phe
    1025                1030                1035


Tyr Ser  Asn Ile Met Asn Phe  Phe Lys Thr Glu Ile  Thr Leu Ala
    1040                1045                1050


Asn Gly  Glu Ile Arg Lys Arg  Pro Leu Ile Glu Thr  Asn Gly Glu
    1055                1060                1065


Thr Gly  Glu Ile Val Trp Asp  Lys Gly Arg Asp Phe  Ala Thr Val
    1070                1075                1080


Arg Lys  Val Leu Ser Met Pro  Gln Val Asn Ile Val  Lys Lys Thr
    1085                1090                1095


Glu Val  Gln Thr Gly Gly Phe  Ser Lys Glu Ser Ile  Leu Pro Lys
    1100                1105                1110


Arg Asn  Ser Asp Lys Leu Ile  Ala Arg Lys Lys Asp  Trp Asp Pro
    1115                1120                1125


Lys Lys  Tyr Gly Gly Phe Glu  Ser Pro Thr Val Ala  Tyr Ser Val
    1130                1135                1140
```

```
Leu Val  Val Ala Lys Val Glu  Lys Gly Lys Ser Lys  Lys Leu Lys
    1145                1150                1155


Ser Val  Lys Glu Leu Leu Gly  Ile Thr Ile Met Glu  Arg Ser Ser
    1160                1165                1170


Phe Glu  Lys Asn Pro Ile Asp  Phe Leu Glu Ala Lys  Gly Tyr Lys
    1175                1180                1185


Glu Val  Lys Lys Asp Leu Ile  Ile Lys Leu Pro Lys  Tyr Ser Leu
    1190                1195                1200


Phe Glu  Leu Glu Asn Gly Arg  Lys Arg Met Leu Ala  Ser Ala Gly
    1205                1210                1215


Glu Leu  Gln Lys Gly Asn Glu  Leu Ala Leu Pro Ser  Lys Tyr Val
    1220                1225                1230


Asn Phe  Leu Tyr Leu Ala Ser  His Tyr Glu Lys Leu  Lys Gly Ser
    1235                1240                1245


Pro Glu  Asp Asn Glu Gln Lys  Gln Leu Phe Val Glu  Gln His Lys
    1250                1255                1260


His Tyr  Leu Asp Glu Ile Ile  Glu Gln Ile Ser Glu  Phe Ser Lys
    1265                1270                1275


Arg Val  Ile Leu Ala Asp Ala  Asn Leu Asp Lys Val  Leu Ser Ala
    1280                1285                1290


Tyr Asn  Lys His Arg Asp Lys  Pro Ile Arg Glu Gln  Ala Glu Asn
    1295                1300                1305


Ile Ile  His Leu Phe Thr Leu  Thr Asn Leu Gly Ala  Pro Ala Ala
    1310                1315                1320
```

Phe Lys Tyr Phe Asp Thr Thr Ile Asp Arg Lys Gln Tyr Arg Ser
1325 1330 1335

Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln Ser Ile Thr
1340 1345 1350

Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu Gly Gly Asp
1355 1360 1365

<210> 94
<211> 1368
<212> PRT
<213> Artificial Sequence

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

<400> 94
Met Asp Lys Lys Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val
1 5 10 15

Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe
20 25 30

Lys Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile
35 40 45

Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu
50 55 60

Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys
65 70 75 80

Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser
85 90 95

Phe Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys

100 105 110

His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr
115 120 125

His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp
130 135 140

Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His
145 150 155 160

Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro
165 170 175

Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr
180 185 190

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

Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn
210 215 220

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

Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe
245 250 255

Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp
260 265 270

Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp
275 280 285

Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp

```
    290                 295                 300

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

Met Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys
                325                 330                 335

Ala Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe
            340                 345                 350

Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser
        355                 360                 365

Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp
    370                 375                 380

Gly Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg
385                 390                 395                 400

Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu
                405                 410                 415

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

Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile
        435                 440                 445

Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp
    450                 455                 460

Met Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu
465                 470                 475                 480

Val Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr
```

485 490 495

Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser
500 505 510

Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys
515 520 525

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

Lys Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr
545 550 555 560

Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp
565 570 575

Ser Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly
580 585 590

Thr Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp
595 600 605

Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr
610 615 620

Leu Phe Glu Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala
625 630 635 640

His Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr
645 650 655

Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp
660 665 670

Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe

```
        675                 680                 685

Ala Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu Thr Phe
    690                 695                 700

Lys Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly Asp Ser Leu
705                 710                 715                 720

His Glu His Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly
                725                 730                 735

Ile Leu Gln Thr Val Lys Val Val Asp Glu Leu Val Lys Val Met Gly
            740                 745                 750

Arg His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln
        755                 760                 765

Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile
    770                 775                 780

Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro
785                 790                 795                 800

Val Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu
                805                 810                 815

Gln Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg
            820                 825                 830

Leu Ser Asp Tyr Asp Val Asp His Ile Val Pro Gln Ser Phe Leu Lys
        835                 840                 845

Asp Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg
    850                 855                 860

Gly Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys
```

865 870 875 880

Asn Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys
885 890 895

Phe Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp
900 905 910

Lys Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr
915 920 925

Lys His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp
930 935 940

Glu Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser
945 950 955 960

Lys Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg
965 970 975

Glu Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val
980 985 990

Val Gly Thr Ala Leu Ile Lys Lys Tyr Pro Lys Leu Glu Ser Glu Phe
995 1000 1005

Val Tyr Gly Asp Tyr Lys Val Tyr Asp Val Arg Lys Met Ile Ala
1010 1015 1020

Lys Ser Glu Gln Glu Ile Gly Lys Ala Thr Ala Lys Tyr Phe Phe
1025 1030 1035

Tyr Ser Asn Ile Met Asn Phe Phe Lys Thr Glu Ile Thr Leu Ala
1040 1045 1050

Asn Gly Glu Ile Arg Lys Arg Pro Leu Ile Glu Thr Asn Gly Glu

```
    1055                1060                1065

Thr Gly  Glu Ile Val Trp Asp  Lys Gly Arg Asp Phe  Ala Thr Val
    1070                1075                1080

Arg Lys  Val Leu Ser Met Pro  Gln Val Asn Ile Val  Lys Lys Thr
    1085                1090                1095

Glu Val  Gln Thr Gly Gly Phe  Ser Lys Glu Ser Ile  Leu Pro Lys
    1100                1105                1110

Arg Asn  Ser Asp Lys Leu Ile  Ala Arg Lys Lys Asp  Trp Asp Pro
    1115                1120                1125

Lys Lys  Tyr Gly Gly Phe Val  Ser Pro Thr Val Ala  Tyr Ser Val
    1130                1135                1140

Leu Val  Val Ala Lys Val Glu  Lys Gly Lys Ser Lys  Lys Leu Lys
    1145                1150                1155

Ser Val  Lys Glu Leu Leu Gly  Ile Thr Ile Met Glu  Arg Ser Ser
    1160                1165                1170

Phe Glu  Lys Asn Pro Ile Asp  Phe Leu Glu Ala Lys  Gly Tyr Lys
    1175                1180                1185

Glu Val  Lys Lys Asp Leu Ile  Ile Lys Leu Pro Lys  Tyr Ser Leu
    1190                1195                1200

Phe Glu  Leu Glu Asn Gly Arg  Lys Arg Met Leu Ala  Ser Ala Gly
    1205                1210                1215

Glu Leu  Gln Lys Gly Asn Glu  Leu Ala Leu Pro Ser  Lys Tyr Val
    1220                1225                1230

Asn Phe  Leu Tyr Leu Ala Ser  His Tyr Glu Lys Leu  Lys Gly Ser
```

1235 1240 1245

Pro Glu Asp Asn Glu Gln Lys Gln Leu Phe Val Glu Gln His Lys
1250 1255 1260

His Tyr Leu Asp Glu Ile Ile Glu Gln Ile Ser Glu Phe Ser Lys
1265 1270 1275

Arg Val Ile Leu Ala Asp Ala Asn Leu Asp Lys Val Leu Ser Ala
1280 1285 1290

Tyr Asn Lys His Arg Asp Lys Pro Ile Arg Glu Gln Ala Glu Asn
1295 1300 1305

Ile Ile His Leu Phe Thr Leu Thr Asn Leu Gly Ala Pro Ala Ala
1310 1315 1320

Phe Lys Tyr Phe Asp Thr Thr Ile Asp Arg Lys Gln Tyr Arg Ser
1325 1330 1335

Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln Ser Ile Thr
1340 1345 1350

Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu Gly Gly Asp
1355 1360 1365

<210> 95
<211> 1368
<212> PRT
<213> Artificial Sequence

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

<400> 95
Met Asp Lys Lys Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val
1 5 10 15

```
Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe
            20                  25                  30

Lys Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile
        35                  40                  45

Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu
    50                  55                  60

Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys
65                  70                  75                  80

Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser
                85                  90                  95

Phe Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys
            100                 105                 110

His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr
        115                 120                 125

His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp
    130                 135                 140

Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His
145                 150                 155                 160

Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro
                165                 170                 175

Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr
            180                 185                 190

Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala
        195                 200                 205
```

```
Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn
    210                 215                 220

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

Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe
                245                 250                 255

Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp
            260                 265                 270

Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp
        275                 280                 285

Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp
    290                 295                 300

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

Met Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys
                325                 330                 335

Ala Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe
            340                 345                 350

Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser
        355                 360                 365

Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp
    370                 375                 380

Gly Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg
385                 390                 395                 400
```

```
Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu
                405                 410                 415

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

Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile
        435                 440                 445

Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp
    450                 455                 460

Met Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu
465                 470                 475                 480

Val Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr
                485                 490                 495

Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser
            500                 505                 510

Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys
        515                 520                 525

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

Lys Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr
545                 550                 555                 560

Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp
                565                 570                 575

Ser Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly
            580                 585                 590
```

```
Thr Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp
        595                 600                 605

Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr
    610                 615                 620

Leu Phe Glu Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala
625                 630                 635                 640

His Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr
                645                 650                 655

Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp
            660                 665                 670

Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe
        675                 680                 685

Ala Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu Thr Phe
    690                 695                 700

Lys Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly Asp Ser Leu
705                 710                 715                 720

His Glu His Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly
                725                 730                 735

Ile Leu Gln Thr Val Lys Val Val Asp Glu Leu Val Lys Val Met Gly
            740                 745                 750

Arg His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln
        755                 760                 765

Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile
    770                 775                 780
```

```
Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro
785                 790                 795                 800


Val Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu
                805                 810                 815


Gln Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg
            820                 825                 830


Leu Ser Asp Tyr Asp Val Asp His Ile Val Pro Gln Ser Phe Leu Lys
        835                 840                 845


Asp Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg
    850                 855                 860


Gly Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys
865                 870                 875                 880


Asn Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys
                885                 890                 895


Phe Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp
            900                 905                 910


Lys Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr
        915                 920                 925


Lys His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp
    930                 935                 940


Glu Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser
945                 950                 955                 960


Lys Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg
                965                 970                 975
```

```
Glu Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val
            980                 985                 990


Val Gly Thr Ala Leu Ile Lys Lys  Tyr Pro Lys Leu Glu  Ser Glu Phe
        995                 1000                1005


Val Tyr  Gly Asp Tyr Lys Val  Tyr Asp Val Arg Lys  Met Ile Ala
    1010                1015                1020


Lys Ser  Glu Gln Glu Ile Gly  Lys Ala Thr Ala Lys  Tyr Phe Phe
    1025                1030                1035


Tyr Ser  Asn Ile Met Asn Phe  Phe Lys Thr Glu Ile  Thr Leu Ala
    1040                1045                1050


Asn Gly  Glu Ile Arg Lys Arg  Pro Leu Ile Glu Thr  Asn Gly Glu
    1055                1060                1065


Thr Gly  Glu Ile Val Trp Asp  Lys Gly Arg Asp Phe  Ala Thr Val
    1070                1075                1080


Arg Lys  Val Leu Ser Met Pro  Gln Val Asn Ile Val  Lys Lys Thr
    1085                1090                1095


Glu Val  Gln Thr Gly Gly Phe  Ser Lys Glu Ser Ile  Leu Pro Lys
    1100                1105                1110


Arg Asn  Ser Asp Lys Leu Ile  Ala Arg Lys Lys Asp  Trp Asp Pro
    1115                1120                1125


Lys Lys  Tyr Gly Gly Phe Val  Ser Pro Thr Val Ala  Tyr Ser Val
    1130                1135                1140


Leu Val  Val Ala Lys Val Glu  Lys Gly Lys Ser Lys  Lys Leu Lys
    1145                1150                1155
```

```
Ser Val  Lys Glu Leu Leu Gly  Ile Thr Ile Met Glu  Arg Ser Ser
    1160                1165                1170

Phe Glu  Lys Asn Pro Ile Asp  Phe Leu Glu Ala Lys  Gly Tyr Lys
    1175                1180                1185

Glu Val  Lys Lys Asp Leu Ile  Ile Lys Leu Pro Lys  Tyr Ser Leu
    1190                1195                1200

Phe Glu  Leu Glu Asn Gly Arg  Lys Arg Met Leu Ala  Ser Ala Arg
    1205                1210                1215

Glu Leu  Gln Lys Gly Asn Glu  Leu Ala Leu Pro Ser  Lys Tyr Val
    1220                1225                1230

Asn Phe  Leu Tyr Leu Ala Ser  His Tyr Glu Lys Leu  Lys Gly Ser
    1235                1240                1245

Pro Glu  Asp Asn Glu Gln Lys  Gln Leu Phe Val Glu  Gln His Lys
    1250                1255                1260

His Tyr  Leu Asp Glu Ile Ile  Glu Gln Ile Ser Glu  Phe Ser Lys
    1265                1270                1275

Arg Val  Ile Leu Ala Asp Ala  Asn Leu Asp Lys Val  Leu Ser Ala
    1280                1285                1290

Tyr Asn  Lys His Arg Asp Lys  Pro Ile Arg Glu Gln  Ala Glu Asn
    1295                1300                1305

Ile Ile  His Leu Phe Thr Leu  Thr Asn Leu Gly Ala  Pro Ala Ala
    1310                1315                1320

Phe Lys  Tyr Phe Asp Thr Thr  Ile Asp Arg Lys Glu  Tyr Arg Ser
    1325                1330                1335
```

Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln Ser Ile Thr
1340 1345 1350

Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu Gly Gly Asp
1355 1360 1365

<210> 96
<211> 1359
<212> PRT
<213> Artificial Sequence

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

<400> 96
Met Asp Lys Lys Tyr Ser Ile Gly Leu Asp Ile Gly Thr Asn Ser Val
1 5 10 15

Gly Trp Ala Val Ile Thr Asp Asp Tyr Lys Val Pro Ser Lys Lys Phe
20 25 30

Lys Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile
35 40 45

Gly Ala Leu Leu Phe Gly Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu
50 55 60

Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys
65 70 75 80

Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser
85 90 95

Phe Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys
100 105 110

His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr

```
        115                 120                 125

His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Ala Asp
    130                 135                 140

Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His
145                 150                 155                 160

Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro
                165                 170                 175

Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Ile Tyr
            180                 185                 190

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

Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn
    210                 215                 220

Leu Ile Ala Gln Leu Pro Gly Glu Lys Arg Asn Gly Leu Phe Gly Asn
225                 230                 235                 240

Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe
                245                 250                 255

Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp
            260                 265                 270

Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp
        275                 280                 285

Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp
    290                 295                 300

Ile Leu Arg Val Asn Ser Glu Ile Thr Lys Ala Pro Leu Ser Ala Ser
```

```
305                 310                 315                 320

Met Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys
                325                 330                 335

Ala Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe
            340                 345                 350

Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser
        355                 360                 365

Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp
    370                 375                 380

Gly Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg
385                 390                 395                 400

Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu
                405                 410                 415

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

Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile
        435                 440                 445

Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp
    450                 455                 460

Met Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu
465                 470                 475                 480

Val Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr
                485                 490                 495

Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser
```

```
            500                 505                 510

Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys
        515                 520                 525

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

Lys Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr
545                 550                 555                 560

Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp
                565                 570                 575

Ser Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly
            580                 585                 590

Ala Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp
        595                 600                 605

Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr
    610                 615                 620

Leu Phe Glu Asp Arg Gly Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala
625                 630                 635                 640

His Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr
                645                 650                 655

Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp
            660                 665                 670

Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe
        675                 680                 685

Ala Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu Thr Phe
```

```
    690                 695                 700

Lys Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly His Ser Leu
705                 710                 715                 720

His Glu Gln Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly
                725                 730                 735

Ile Leu Gln Thr Val Lys Ile Val Asp Glu Leu Val Lys Val Met Gly
            740                 745                 750

His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln Thr
        755                 760                 765

Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile Glu
    770                 775                 780

Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro Val
785                 790                 795                 800

Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu Gln
                805                 810                 815

Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg Leu
            820                 825                 830

Ser Asp Tyr Asp Val Asp His Ile Val Pro Gln Ser Phe Ile Lys Asp
        835                 840                 845

Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg Gly
    850                 855                 860

Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys Asn
865                 870                 875                 880

Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys Phe
```

```
               885                 890                 895

Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp Lys
            900                 905                 910

Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr Lys
        915                 920                 925

His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp Glu
    930                 935                 940

Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser Lys
945                 950                 955                 960

Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg Glu
                965                 970                 975

Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val Val
            980                 985                 990

Gly Thr Ala Leu Ile Lys Lys Tyr  Pro Lys Leu Glu Ser  Glu Phe Val
        995                 1000                1005

Tyr Gly  Asp Tyr Lys Val Tyr  Asp Val Arg Lys Met  Ile Ala Lys
    1010                1015                1020

Ser Glu  Gln Glu Ile Gly Lys  Ala Thr Ala Lys Tyr  Phe Phe Tyr
    1025                1030                1035

Ser Asn  Ile Met Asn Phe Phe  Lys Thr Glu Ile Thr  Leu Ala Asn
    1040                1045                1050

Gly Glu  Ile Arg Lys Arg Pro  Leu Ile Glu Thr Asn  Gly Glu Thr
    1055                1060                1065

Gly Glu  Ile Val Trp Asp Lys  Gly Arg Asp Phe Ala  Thr Val Arg
```

```
    1070                1075                1080

Lys Val  Leu Ser Met Pro Gln  Val Asn Ile Val Lys  Lys Thr Glu
    1085                1090                1095

Ile Gln  Thr Val Gly Gln Asn  Gly Gly Leu Phe Asp  Asp Asn Pro
    1100                1105                1110

Lys Ser  Pro Leu Glu Val Thr  Pro Ser Lys Leu Val  Pro Leu Lys
    1115                1120                1125

Lys Glu  Leu Asn Pro Lys Lys  Tyr Gly Gly Tyr Gln  Lys Pro Thr
    1130                1135                1140

Thr Ala  Tyr Pro Val Leu Leu  Ile Thr Asp Thr Lys  Gln Leu Ile
    1145                1150                1155

Pro Ile  Ser Val Met Asn Lys  Lys Gln Phe Glu Gln  Asn Pro Val
    1160                1165                1170

Lys Phe  Leu Arg Asp Arg Gly  Tyr Gln Gln Val Gly  Lys Asn Asp
    1175                1180                1185

Phe Ile  Lys Leu Pro Lys Tyr  Thr Leu Val Asp Ile  Gly Asp Gly
    1190                1195                1200

Ile Lys  Arg Leu Trp Ala Ser  Ser Lys Glu Ile His  Lys Gly Asn
    1205                1210                1215

Gln Leu  Val Val Ser Lys Lys  Ser Gln Ile Leu Leu  Tyr His Ala
    1220                1225                1230

His His  Leu Asp Ser Asp Leu  Ser Asn Asp Tyr Leu  Gln Asn His
    1235                1240                1245

Asn Gln  Gln Phe Asp Val Leu  Phe Asn Glu Ile Ile  Ser Phe Ser
```

1250 1255 1260

Lys Lys Cys Lys Leu Gly Lys Glu His Ile Gln Lys Ile Glu Asn
1265 1270 1275

Val Tyr Ser Asn Lys Lys Asn Ser Ala Ser Ile Glu Glu Leu Ala
1280 1285 1290

Glu Ser Phe Ile Lys Leu Leu Gly Phe Thr Gln Leu Gly Ala Thr
1295 1300 1305

Ser Pro Phe Asn Phe Leu Gly Val Lys Leu Asn Gln Lys Gln Tyr
1310 1315 1320

Lys Gly Lys Lys Asp Tyr Ile Leu Pro Cys Thr Glu Gly Thr Leu
1325 1330 1335

Ile Arg Gln Ser Ile Thr Gly Leu Tyr Glu Thr Arg Val Asp Leu
1340 1345 1350

Ser Lys Ile Gly Glu Asp
1355

<210> 97
<211> 1367
<212> PRT
<213> Artificial Sequence

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

<400> 97
Asp Lys Lys Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val Gly
1 5 10 15

Trp Ala Val Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe Lys
20 25 30

```
Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile Gly
        35                  40                  45

Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu Lys
    50                  55                  60

Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys Tyr
65                  70                  75                  80

Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser Phe
                85                  90                  95

Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys His
            100                 105                 110

Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr His
        115                 120                 125

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

Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His Met
145                 150                 155                 160

Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro Asp
                165                 170                 175

Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr Asn
            180                 185                 190

Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala Lys
        195                 200                 205

Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn Leu
    210                 215                 220
```

```
Ile Ala Gln Leu Pro Gly Glu Lys Lys Asn Gly Leu Phe Gly Asn Leu
225                 230                 235                 240


Ile Ala Leu Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe Asp
                245                 250                 255


Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp Asp
            260                 265                 270


Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp Leu
        275                 280                 285


Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp Ile
    290                 295                 300


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


Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys Ala
                325                 330                 335


Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe Asp
            340                 345                 350


Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser Gln
        355                 360                 365


Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp Gly
    370                 375                 380


Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg Lys
385                 390                 395                 400


Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu Gly
                405                 410                 415
```

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

Lys Asp Asn Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile Pro
        435                 440                 445

Tyr Tyr Val Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp Met
    450                 455                 460

Thr Arg Lys Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu Val
465                 470                 475                 480

Val Asp Lys Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr Ala
                485                 490                 495

Phe Asp Lys Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser Leu
            500                 505                 510

Leu Tyr Glu Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys Tyr
        515                 520                 525

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

Lys Ala Ile Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr Val
545                 550                 555                 560

Lys Gln Leu Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp Ser
                565                 570                 575

Val Glu Ile Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly Thr
            580                 585                 590

Tyr His Asp Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp Asn
        595                 600                 605
```

```
Glu Glu Asn Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr Leu
    610                 615                 620

Phe Glu Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala His
625                 630                 635                 640

Leu Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr Thr
                645                 650                 655

Gly Trp Gly Ala Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp Lys
            660                 665                 670

Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly Phe Ala
        675                 680                 685

Asn Arg Asn Phe Met Ala Leu Ile His Asp Asp Ser Leu Thr Phe Lys
    690                 695                 700

Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly Asp Ser Leu His
705                 710                 715                 720

Glu His Ile Ala Asn Leu Ala Gly Ser Pro Ala Ile Lys Lys Gly Ile
                725                 730                 735

Leu Gln Thr Val Lys Val Val Asp Glu Leu Val Lys Val Met Gly Arg
            740                 745                 750

His Lys Pro Glu Asn Ile Val Ile Glu Met Ala Arg Glu Asn Gln Thr
        755                 760                 765

Thr Gln Lys Gly Gln Lys Asn Ser Arg Glu Arg Met Lys Arg Ile Glu
    770                 775                 780

Glu Gly Ile Lys Glu Leu Gly Ser Gln Ile Leu Lys Glu His Pro Val
785                 790                 795                 800
```

```
Glu Asn Thr Gln Leu Gln Asn Glu Lys Leu Tyr Leu Tyr Tyr Leu Gln
                805                 810                 815

Asn Gly Arg Asp Met Tyr Val Asp Gln Glu Leu Asp Ile Asn Arg Leu
            820                 825                 830

Ser Asp Tyr Asp Val Asp His Ile Val Pro Gln Ser Phe Leu Lys Asp
        835                 840                 845

Asp Ser Ile Asp Asn Lys Val Leu Thr Arg Ser Asp Lys Asn Arg Gly
    850                 855                 860

Lys Ser Asp Asn Val Pro Ser Glu Glu Val Val Lys Lys Met Lys Asn
865                 870                 875                 880

Tyr Trp Arg Gln Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys Phe
                885                 890                 895

Asp Asn Leu Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp Lys
            900                 905                 910

Ala Gly Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Ala Ile Thr Lys
        915                 920                 925

His Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp Glu
    930                 935                 940

Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser Lys
945                 950                 955                 960

Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val Arg Glu
                965                 970                 975

Ile Asn Asn Tyr His His Ala His Asp Ala Tyr Leu Asn Ala Val Val
            980                 985                 990
```

```
Gly Thr Ala Leu Ile Lys Lys Tyr  Pro Lys Leu Glu Ser  Glu Phe Val
        995                 1000                1005


Tyr Gly  Asp Tyr Lys Val Tyr  Asp Val Arg Lys Met  Ile Ala Lys
    1010                1015                1020


Ser Glu  Gln Glu Ile Gly Lys  Ala Thr Ala Lys Tyr  Phe Phe Tyr
    1025                1030                1035


Ser Asn  Ile Met Asn Phe Phe  Lys Thr Glu Ile Thr  Leu Ala Asn
    1040                1045                1050


Gly Glu  Ile Arg Lys Arg Pro  Leu Ile Glu Thr Asn  Gly Glu Thr
    1055                1060                1065


Gly Glu  Ile Val Trp Asp Lys  Gly Arg Asp Phe Ala  Thr Val Arg
    1070                1075                1080


Lys Val  Leu Ser Met Pro Gln  Val Asn Ile Val Lys  Lys Thr Glu
    1085                1090                1095


Val Gln  Thr Gly Gly Phe Ser  Lys Glu Ser Ile Leu  Pro Lys Arg
    1100                1105                1110


Asn Ser  Asp Lys Leu Ile Ala  Arg Lys Lys Asp Trp  Asp Pro Lys
    1115                1120                1125


Lys Tyr  Gly Gly Phe Asp Ser  Pro Thr Val Ala Tyr  Ser Val Leu
    1130                1135                1140


Val Val  Ala Lys Val Glu Lys  Gly Lys Ser Lys Lys  Leu Lys Ser
    1145                1150                1155


Val Lys  Glu Leu Leu Gly Ile  Thr Ile Met Glu Arg  Ser Ser Phe
    1160                1165                1170
```

```
Glu Lys  Asn Pro Ile Asp Phe  Leu Glu Ala Lys Gly  Tyr Lys Glu
    1175                1180                1185

Val Lys  Lys Asp Leu Ile Ile  Lys Leu Pro Lys Tyr  Ser Leu Phe
    1190                1195                1200

Glu Leu  Glu Asn Gly Arg Lys  Arg Met Leu Ala Ser  Ala Gly Glu
    1205                1210                1215

Leu Gln  Lys Gly Asn Glu Leu  Ala Leu Pro Ser Lys  Tyr Val Asn
    1220                1225                1230

Phe Leu  Tyr Leu Ala Ser His  Tyr Glu Lys Leu Lys  Gly Ser Pro
    1235                1240                1245

Glu Asp  Asn Glu Gln Lys Gln  Leu Phe Val Glu Gln  His Lys His
    1250                1255                1260

Tyr Leu  Asp Glu Ile Ile Glu  Gln Ile Ser Glu Phe  Ser Lys Arg
    1265                1270                1275

Val Ile  Leu Ala Asp Ala Asn  Leu Asp Lys Val Leu  Ser Ala Tyr
    1280                1285                1290

Asn Lys  His Arg Asp Lys Pro  Ile Arg Glu Gln Ala  Glu Asn Ile
    1295                1300                1305

Ile His  Leu Phe Thr Leu Thr  Asn Leu Gly Ala Pro  Ala Ala Phe
    1310                1315                1320

Lys Tyr  Phe Asp Thr Thr Ile  Asp Arg Lys Arg Tyr  Thr Ser Thr
    1325                1330                1335

Lys Glu  Val Leu Asp Ala Thr  Leu Ile His Gln Ser  Ile Thr Gly
    1340                1345                1350
```

Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu Gly Gly Asp
    1355   1360   1365

<210> 98
<211> 29
<212> PRT
<213> Artificial Sequence

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

<400> 98
Pro Lys Lys Lys Arg Lys Val Glu Gly Ala Asp Lys Arg Thr Ala Asp
1   5   10   15

Gly Ser Glu Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
            20   25

<210> 99
<211> 23
<212> PRT
<213> Artificial Sequence

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

<400> 99
Arg Lys Ser Gly Lys Ile Ala Ala Ile Val Val Lys Arg Pro Arg Lys
1   5   10   15

Pro Lys Lys Lys Arg Lys Val
            20

<210> 100
<211> 16
<212> PRT
<213> Artificial Sequence

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

peptide

<400> 100
Lys Arg Pro Ala Ala Thr Lys Lys Ala Gly Gln Ala Lys Lys Lys Lys
1 5 10 15

<210> 101
<211> 167
<212> PRT
<213> Escherichia coli

<400> 101
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1 5 10 15

Thr Leu Ala Lys Arg Ala Trp Asp Glu Arg Glu Val Pro Val Gly Ala
20 25 30

Val Leu Val His Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Pro
35 40 45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65 70 75 80

Tyr Val Thr Leu Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
85 90 95

Ser Arg Ile Gly Arg Val Val Phe Gly Ala Arg Asp Ala Lys Thr Gly
100 105 110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His
115 120 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
130 135 140

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

Lys Ala Gln Ser Ser Thr Asp
165

<210> 102
<211> 178
<212> PRT
<213> Escherichia coli

<400> 102
Met Arg Arg Ala Phe Ile Thr Gly Val Phe Phe Leu Ser Glu Val Glu
1 5 10 15

Phe Ser His Glu Tyr Trp Met Arg His Ala Leu Thr Leu Ala Lys Arg
20 25 30

Ala Trp Asp Glu Arg Glu Val Pro Val Gly Ala Val Leu Val His Asn
35 40 45

Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Pro Ile Gly Arg His Asp
50 55 60

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

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

Pro Cys Val Met Cys Ala Gly Ala Met Ile His Ser Arg Ile Gly Arg
100 105 110

Val Val Phe Gly Ala Arg Asp Ala Lys Thr Gly Ala Ala Gly Ser Leu
115 120 125

Met Asp Val Leu His His Pro Gly Met Asn His Arg Val Glu Ile Thr

130 135 140

Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu Leu Ser Asp Phe Phe
145 150 155 160

Arg Met Arg Arg Gln Glu Ile Lys Ala Gln Lys Lys Ala Gln Ser Ser
165 170 175

Thr Asp

<210> 103
<211> 167
<212> PRT
<213> Escherichia coli

<400> 103
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1 5 10 15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
20 25 30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
35 40 45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65 70 75 80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
85 90 95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
100 105 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115   120   125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130   135   140

Leu Cys Tyr Phe Phe Arg Met Pro Arg Gln Val Phe Asn Ala Gln Lys
145   150   155   160

Lys Ala Gln Ser Ser Thr Asp
                165

<210> 104
<211> 8
<212> PRT
<213> Artificial Sequence

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

<400> 104
Ser Gly Gly Ser Ser Gly Gly Ser
1   5

<210> 105
<211> 1609
<212> PRT
<213> Artificial Sequence

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

<400> 105
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1   5   10   15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
            20   25   30

```
Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Thr Phe Phe Arg Met Pro Arg Gln Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Glu Ile Gly Lys Ala Thr Ala Lys Tyr
        195                 200                 205

Phe Phe Tyr Ser Asn Ile Met Asn Phe Phe Lys Thr Glu Ile Thr Leu
    210                 215                 220
```

```
Ala Asn Gly Glu Ile Arg Lys Arg Pro Leu Ile Glu Thr Asn Gly Glu
225                 230                 235                 240

Thr Gly Glu Ile Val Trp Asp Lys Gly Arg Asp Phe Ala Thr Val Arg
                245                 250                 255

Lys Val Leu Ser Met Pro Gln Val Asn Ile Val Lys Lys Thr Glu Val
            260                 265                 270

Gln Thr Gly Gly Phe Ser Lys Glu Ser Ile Leu Pro Lys Arg Asn Ser
        275                 280                 285

Asp Lys Leu Ile Ala Arg Lys Lys Asp Trp Asp Pro Lys Lys Tyr Gly
    290                 295                 300

Gly Phe Met Gln Pro Thr Val Ala Tyr Ser Val Leu Val Val Ala Lys
305                 310                 315                 320

Val Glu Lys Gly Lys Ser Lys Lys Leu Lys Ser Val Lys Glu Leu Leu
                325                 330                 335

Gly Ile Thr Ile Met Glu Arg Ser Ser Phe Glu Lys Asn Pro Ile Asp
            340                 345                 350

Phe Leu Glu Ala Lys Gly Tyr Lys Glu Val Lys Lys Asp Leu Ile Ile
        355                 360                 365

Lys Leu Pro Lys Tyr Ser Leu Phe Glu Leu Glu Asn Gly Arg Lys Arg
    370                 375                 380

Met Leu Ala Ser Ala Lys Phe Leu Gln Lys Gly Asn Glu Leu Ala Leu
385                 390                 395                 400

Pro Ser Lys Tyr Val Asn Phe Leu Tyr Leu Ala Ser His Tyr Glu Lys
                405                 410                 415
```

```
Leu Lys Gly Ser Pro Glu Asp Asn Glu Gln Lys Gln Leu Phe Val Glu
            420                 425                 430

Gln His Lys His Tyr Leu Asp Glu Ile Ile Glu Gln Ile Ser Glu Phe
        435                 440                 445

Ser Lys Arg Val Ile Leu Ala Asp Ala Asn Leu Asp Lys Val Leu Ser
    450                 455                 460

Ala Tyr Asn Lys His Arg Asp Lys Pro Ile Arg Glu Gln Ala Glu Asn
465                 470                 475                 480

Ile Ile His Leu Phe Thr Leu Thr Asn Leu Gly Ala Pro Arg Ala Phe
                485                 490                 495

Lys Tyr Phe Asp Thr Thr Ile Ala Arg Lys Glu Tyr Arg Ser Thr Lys
            500                 505                 510

Glu Val Leu Asp Ala Thr Leu Ile His Gln Ser Ile Thr Gly Leu Tyr
        515                 520                 525

Glu Thr Arg Ile Asp Leu Ser Gln Leu Gly Gly Asp Gly Gly Ser Gly
    530                 535                 540

Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly
545                 550                 555                 560

Met Asp Lys Lys Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val
                565                 570                 575

Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe
            580                 585                 590

Lys Val Leu Gly Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile
        595                 600                 605
```

```
Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu
    610                 615                 620

Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys
625                 630                 635                 640

Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser
                645                 650                 655

Phe Phe His Arg Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys
            660                 665                 670

His Glu Arg His Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr
        675                 680                 685

His Glu Lys Tyr Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp
    690                 695                 700

Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His
705                 710                 715                 720

Met Ile Lys Phe Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro
                725                 730                 735

Asp Asn Ser Asp Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr
            740                 745                 750

Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala
        755                 760                 765

Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn
    770                 775                 780

Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys Asn Gly Leu Phe Gly Asn
785                 790                 795                 800
```

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

Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp
            820                 825                 830

Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp
        835                 840                 845

Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp
    850                 855                 860

Ile Leu Arg Val Asn Thr Glu Ile Thr Lys Ala Pro Leu Ser Ala Ser
865                 870                 875                 880

Met Ile Lys Arg Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys
                885                 890                 895

Ala Leu Val Arg Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe
            900                 905                 910

Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser
        915                 920                 925

Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp
    930                 935                 940

Gly Thr Glu Glu Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg
945                 950                 955                 960

Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu
                965                 970                 975

Gly Glu Leu His Ala Ile Leu Arg Arg Gln Glu Asp Phe Tyr Pro Phe
            980                 985                 990
```

```
Leu Lys Asp Asn Arg Glu Lys Ile  Glu Lys Ile Leu Thr  Phe Arg Ile
        995                 1000                1005


Pro Tyr  Tyr Val Gly Pro Leu  Ala Arg Gly Asn Ser  Arg Phe Ala
    1010                1015                1020


Trp Met  Thr Arg Lys Ser Glu  Glu Thr Ile Thr Pro  Trp Asn Phe
    1025                1030                1035


Glu Glu  Val Val Asp Lys Gly  Ala Ser Ala Gln Ser  Phe Ile Glu
    1040                1045                1050


Arg Met  Thr Asn Phe Asp Lys  Asn Leu Pro Asn Glu  Lys Val Leu
    1055                1060                1065


Pro Lys  His Ser Leu Leu Tyr  Glu Tyr Phe Thr Val  Tyr Asn Glu
    1070                1075                1080


Leu Thr  Lys Val Lys Tyr Val  Thr Glu Gly Met Arg  Lys Pro Ala
    1085                1090                1095


Phe Leu  Ser Gly Glu Gln Lys  Lys Ala Ile Val Asp  Leu Leu Phe
    1100                1105                1110


Lys Thr  Asn Arg Lys Val Thr  Val Lys Gln Leu Lys  Glu Asp Tyr
    1115                1120                1125


Phe Lys  Lys Ile Glu Cys Phe  Asp Ser Val Glu Ile  Ser Gly Val
    1130                1135                1140


Glu Asp  Arg Phe Asn Ala Ser  Leu Gly Thr Tyr His  Asp Leu Leu
    1145                1150                1155


Lys Ile  Ile Lys Asp Lys Asp  Phe Leu Asp Asn Glu  Glu Asn Glu
    1160                1165                1170
```

```
Asp Ile  Leu Glu Asp Ile Val  Leu Thr Leu Thr Leu  Phe Glu Asp
    1175                1180                1185

Arg Glu  Met Ile Glu Glu Arg  Leu Lys Thr Tyr Ala  His Leu Phe
    1190                1195                1200

Asp Asp  Lys Val Met Lys Gln  Leu Lys Arg Arg Arg  Tyr Thr Gly
    1205                1210                1215

Trp Gly  Arg Leu Ser Arg Lys  Leu Ile Asn Gly Ile  Arg Asp Lys
    1220                1225                1230

Gln Ser  Gly Lys Thr Ile Leu  Asp Phe Leu Lys Ser  Asp Gly Phe
    1235                1240                1245

Ala Asn  Arg Asn Phe Met Gln  Leu Ile His Asp Asp  Ser Leu Thr
    1250                1255                1260

Phe Lys  Glu Asp Ile Gln Lys  Ala Gln Val Ser Gly  Gln Gly Asp
    1265                1270                1275

Ser Leu  His Glu His Ile Ala  Asn Leu Ala Gly Ser  Pro Ala Ile
    1280                1285                1290

Lys Lys  Gly Ile Leu Gln Thr  Val Lys Val Val Asp  Glu Leu Val
    1295                1300                1305

Lys Val  Met Gly Arg His Lys  Pro Glu Asn Ile Val  Ile Glu Met
    1310                1315                1320

Ala Arg  Glu Asn Gln Thr Thr  Gln Lys Gly Gln Lys  Asn Ser Arg
    1325                1330                1335

Glu Arg  Met Lys Arg Ile Glu  Glu Gly Ile Lys Glu  Leu Gly Ser
    1340                1345                1350
```

```
Gln Ile  Leu Lys Glu His Pro  Val Glu Asn Thr Gln  Leu Gln Asn
    1355                1360                1365

Glu Lys  Leu Tyr Leu Tyr Tyr  Leu Gln Asn Gly Arg  Asp Met Tyr
    1370                1375                1380

Val Asp  Gln Glu Leu Asp Ile  Asn Arg Leu Ser Asp  Tyr Asp Val
    1385                1390                1395

Asp His  Ile Val Pro Gln Ser  Phe Leu Lys Asp Asp  Ser Ile Asp
    1400                1405                1410

Asn Lys  Val Leu Thr Arg Ser  Asp Lys Asn Arg Gly  Lys Ser Asp
    1415                1420                1425

Asn Val  Pro Ser Glu Glu Val  Val Lys Lys Met Lys  Asn Tyr Trp
    1430                1435                1440

Arg Gln  Leu Leu Asn Ala Lys  Leu Ile Thr Gln Arg  Lys Phe Asp
    1445                1450                1455

Asn Leu  Thr Lys Ala Glu Arg  Gly Gly Leu Ser Glu  Leu Asp Lys
    1460                1465                1470

Ala Gly  Phe Ile Lys Arg Gln  Leu Val Glu Thr Arg  Gln Ile Thr
    1475                1480                1485

Lys His  Val Ala Gln Ile Leu  Asp Ser Arg Met Asn  Thr Lys Tyr
    1490                1495                1500

Asp Glu  Asn Asp Lys Leu Ile  Arg Glu Val Lys Val  Ile Thr Leu
    1505                1510                1515

Lys Ser  Lys Leu Val Ser Asp  Phe Arg Lys Asp Phe  Gln Phe Tyr
    1520                1525                1530
```

Lys Val Arg Glu Ile Asn Asn Tyr His His Ala His Asp Ala Tyr
    1535   1540   1545

Leu Asn Ala Val Val Gly Thr Ala Leu Ile Lys Lys Tyr Pro Lys
    1550   1555   1560

Leu Glu Ser Glu Phe Val Tyr Gly Asp Tyr Lys Val Tyr Asp Val
    1565   1570   1575

Arg Lys Met Ile Ala Lys Ser Glu Gln Glu Gly Ala Asp Lys Arg
    1580   1585   1590

Thr Ala Asp Gly Ser Glu Phe Glu Ser Pro Lys Lys Lys Arg Lys
    1595   1600   1605

Val

<210> 106
<211> 1807
<212> PRT
<213> Artificial Sequence

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

<400> 106
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1   5   10   15

Thr Leu Ala Lys Arg Ala Trp Asp Glu Arg Glu Val Pro Val Gly Ala
            20   25   30

Val Leu Val His Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Pro
        35   40   45

Ile Gly Arg His Asp Pro Thr Ala His Ala Glu Ile Met Ala Leu Arg

```
    50                  55                  60

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Leu Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Ala Arg Asp Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

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

Lys Ala Gln Ser Ser Thr Asp Gly Gly Ser Ser Gly Gly Ser Ser Gly
                165                 170                 175

Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser Gly
            180                 185                 190

Gly Ser Ser Gly Gly Ser Met Ser Glu Val Glu Phe Ser His Glu Tyr
        195                 200                 205

Trp Met Arg His Ala Leu Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg
    210                 215                 220

Glu Val Pro Val Gly Ala Val Leu Val Leu Asn Asn Arg Val Ile Gly
225                 230                 235                 240

Glu Gly Trp Asn Arg Ala Ile Gly Leu His Asp Pro Thr Ala His Ala
```

245 250 255

Glu Ile Met Ala Leu Arg Gln Gly Gly Leu Val Met Gln Asn Tyr Arg
260 265 270

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

Ala Gly Ala Met Ile His Ser Arg Ile Gly Arg Val Val Phe Gly Val
290 295 300

Arg Asn Ala Lys Thr Gly Ala Ala Gly Ser Leu Met Asp Val Leu His
305 310 315 320

Tyr Pro Gly Met Asn His Arg Val Glu Ile Thr Glu Gly Ile Leu Ala
325 330 335

Asp Glu Cys Ala Ala Leu Leu Cys Thr Phe Phe Arg Met Pro Arg Gln
340 345 350

Val Phe Asn Ala Gln Lys Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly
355 360 365

Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser
370 375 380

Ala Thr Pro Glu Ser Ser Gly Gly Ser Ser Gly Gly Ser Glu Ile Gly
385 390 395 400

Lys Ala Thr Ala Lys Tyr Phe Phe Tyr Ser Asn Ile Met Asn Phe Phe
405 410 415

Lys Thr Glu Ile Thr Leu Ala Asn Gly Glu Ile Arg Lys Arg Pro Leu
420 425 430

Ile Glu Thr Asn Gly Glu Thr Gly Glu Ile Val Trp Asp Lys Gly Arg

```
        435                 440                 445

Asp Phe Ala Thr Val Arg Lys Val Leu Ser Met Pro Gln Val Asn Ile
    450                 455                 460

Val Lys Lys Thr Glu Val Gln Thr Gly Gly Phe Ser Lys Glu Ser Ile
465                 470                 475                 480

Leu Pro Lys Arg Asn Ser Asp Lys Leu Ile Ala Arg Lys Lys Asp Trp
                485                 490                 495

Asp Pro Lys Lys Tyr Gly Gly Phe Met Gln Pro Thr Val Ala Tyr Ser
            500                 505                 510

Val Leu Val Val Ala Lys Val Glu Lys Gly Lys Ser Lys Lys Leu Lys
        515                 520                 525

Ser Val Lys Glu Leu Leu Gly Ile Thr Ile Met Glu Arg Ser Ser Phe
    530                 535                 540

Glu Lys Asn Pro Ile Asp Phe Leu Glu Ala Lys Gly Tyr Lys Glu Val
545                 550                 555                 560

Lys Lys Asp Leu Ile Ile Lys Leu Pro Lys Tyr Ser Leu Phe Glu Leu
                565                 570                 575

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

Gly Asn Glu Leu Ala Leu Pro Ser Lys Tyr Val Asn Phe Leu Tyr Leu
        595                 600                 605

Ala Ser His Tyr Glu Lys Leu Lys Gly Ser Pro Glu Asp Asn Glu Gln
    610                 615                 620

Lys Gln Leu Phe Val Glu Gln His Lys His Tyr Leu Asp Glu Ile Ile
```

625 630 635 640

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

Leu Asp Lys Val Leu Ser Ala Tyr Asn Lys His Arg Asp Lys Pro Ile
660 665 670

Arg Glu Gln Ala Glu Asn Ile Ile His Leu Phe Thr Leu Thr Asn Leu
675 680 685

Gly Ala Pro Arg Ala Phe Lys Tyr Phe Asp Thr Thr Ile Ala Arg Lys
690 695 700

Glu Tyr Arg Ser Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln
705 710 715 720

Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu Gly
725 730 735

Gly Asp Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly
740 745 750

Ser Gly Gly Ser Gly Gly Met Asp Lys Lys Tyr Ser Ile Gly Leu Ala
755 760 765

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
770 775 780

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
785 790 795 800

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
805 810 815

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg

820 825 830

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
835 840 845

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
850 855 860

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
865 870 875 880

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
885 890 895

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
900 905 910

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
915 920 925

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
930 935 940

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
945 950 955 960

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
965 970 975

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
980 985 990

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
995 1000 1005

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln

```
    1010                1015                1020

Leu Ser  Lys Asp Thr Tyr Asp  Asp Asp Leu Asp Asn  Leu Leu Ala
    1025                1030                1035

Gln Ile  Gly Asp Gln Tyr Ala  Asp Leu Phe Leu Ala  Ala Lys Asn
    1040                1045                1050

Leu Ser  Asp Ala Ile Leu Leu  Ser Asp Ile Leu Arg  Val Asn Thr
    1055                1060                1065

Glu Ile  Thr Lys Ala Pro Leu  Ser Ala Ser Met Ile  Lys Arg Tyr
    1070                1075                1080

Asp Glu  His His Gln Asp Leu  Thr Leu Leu Lys Ala  Leu Val Arg
    1085                1090                1095

Gln Gln  Leu Pro Glu Lys Tyr  Lys Glu Ile Phe Phe  Asp Gln Ser
    1100                1105                1110

Lys Asn  Gly Tyr Ala Gly Tyr  Ile Asp Gly Gly Ala  Ser Gln Glu
    1115                1120                1125

Glu Phe  Tyr Lys Phe Ile Lys  Pro Ile Leu Glu Lys  Met Asp Gly
    1130                1135                1140

Thr Glu  Glu Leu Leu Val Lys  Leu Asn Arg Glu Asp  Leu Leu Arg
    1145                1150                1155

Lys Gln  Arg Thr Phe Asp Asn  Gly Ser Ile Pro His  Gln Ile His
    1160                1165                1170

Leu Gly  Glu Leu His Ala Ile  Leu Arg Arg Gln Glu  Asp Phe Tyr
    1175                1180                1185

Pro Phe  Leu Lys Asp Asn Arg  Glu Lys Ile Glu Lys  Ile Leu Thr
```

```
    1190                1195                1200

Phe Arg  Ile Pro Tyr Tyr Val  Gly Pro Leu Ala Arg  Gly Asn Ser
    1205                1210                1215

Arg Phe  Ala Trp Met Thr Arg  Lys Ser Glu Glu Thr  Ile Thr Pro
    1220                1225                1230

Trp Asn  Phe Glu Glu Val Val  Asp Lys Gly Ala Ser  Ala Gln Ser
    1235                1240                1245

Phe Ile  Glu Arg Met Thr Asn  Phe Asp Lys Asn Leu  Pro Asn Glu
    1250                1255                1260

Lys Val  Leu Pro Lys His Ser  Leu Leu Tyr Glu Tyr  Phe Thr Val
    1265                1270                1275

Tyr Asn  Glu Leu Thr Lys Val  Lys Tyr Val Thr Glu  Gly Met Arg
    1280                1285                1290

Lys Pro  Ala Phe Leu Ser Gly  Glu Gln Lys Lys Ala  Ile Val Asp
    1295                1300                1305

Leu Leu  Phe Lys Thr Asn Arg  Lys Val Thr Val Lys  Gln Leu Lys
    1310                1315                1320

Glu Asp  Tyr Phe Lys Lys Ile  Glu Cys Phe Asp Ser  Val Glu Ile
    1325                1330                1335

Ser Gly  Val Glu Asp Arg Phe  Asn Ala Ser Leu Gly  Thr Tyr His
    1340                1345                1350

Asp Leu  Leu Lys Ile Ile Lys  Asp Lys Asp Phe Leu  Asp Asn Glu
    1355                1360                1365

Glu Asn  Glu Asp Ile Leu Glu  Asp Ile Val Leu Thr  Leu Thr Leu
```

```
    1370                1375                1380

Phe Glu  Asp Arg Glu Met Ile  Glu Glu Arg Leu Lys  Thr Tyr Ala
    1385                1390                1395

His Leu  Phe Asp Asp Lys Val  Met Lys Gln Leu Lys  Arg Arg Arg
    1400                1405                1410

Tyr Thr  Gly Trp Gly Arg Leu  Ser Arg Lys Leu Ile  Asn Gly Ile
    1415                1420                1425

Arg Asp  Lys Gln Ser Gly Lys  Thr Ile Leu Asp Phe  Leu Lys Ser
    1430                1435                1440

Asp Gly  Phe Ala Asn Arg Asn  Phe Met Gln Leu Ile  His Asp Asp
    1445                1450                1455

Ser Leu  Thr Phe Lys Glu Asp  Ile Gln Lys Ala Gln  Val Ser Gly
    1460                1465                1470

Gln Gly  Asp Ser Leu His Glu  His Ile Ala Asn Leu  Ala Gly Ser
    1475                1480                1485

Pro Ala  Ile Lys Lys Gly Ile  Leu Gln Thr Val Lys  Val Val Asp
    1490                1495                1500

Glu Leu  Val Lys Val Met Gly  Arg His Lys Pro Glu  Asn Ile Val
    1505                1510                1515

Ile Glu  Met Ala Arg Glu Asn  Gln Thr Thr Gln Lys  Gly Gln Lys
    1520                1525                1530

Asn Ser  Arg Glu Arg Met Lys  Arg Ile Glu Glu Gly  Ile Lys Glu
    1535                1540                1545

Leu Gly  Ser Gln Ile Leu Lys  Glu His Pro Val Glu  Asn Thr Gln
```

```
    1550                1555                1560

Leu Gln  Asn Glu Lys Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg
    1565                1570                1575

Asp Met  Tyr Val Asp Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp
    1580                1585                1590

Tyr Asp  Val Asp His Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp
    1595                1600                1605

Ser Ile  Asp Asn Lys Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly
    1610                1615                1620

Lys Ser  Asp Asn Val Pro Ser  Glu Glu Val Val Lys  Lys Met Lys
    1625                1630                1635

Asn Tyr  Trp Arg Gln Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg
    1640                1645                1650

Lys Phe  Asp Asn Leu Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu
    1655                1660                1665

Leu Asp  Lys Ala Gly Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg
    1670                1675                1680

Gln Ile  Thr Lys His Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn
    1685                1690                1695

Thr Lys  Tyr Asp Glu Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val
    1700                1705                1710

Ile Thr  Leu Lys Ser Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe
    1715                1720                1725

Gln Phe  Tyr Lys Val Arg Glu  Ile Asn Asn Tyr His  His Ala His
```

```
    1730                1735                1740


Asp Ala  Tyr Leu Asn Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys
    1745                1750                1755


Tyr Pro  Lys Leu Glu Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val
    1760                1765                1770


Tyr Asp  Val Arg Lys Met Ile  Ala Lys Ser Glu Gln  Glu Gly Ala
    1775                1780                1785


Asp Lys  Arg Thr Ala Asp Gly  Ser Glu Phe Glu Ser  Pro Lys Lys
    1790                1795                1800


Lys Arg  Lys Val
    1805


<210> 107
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 107
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                   10                  15


Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
            20                  25                  30


Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35                  40                  45


Ile Gly Leu His Asp Pro Thr Ala His Ala Glu Ile Met Ala Leu Arg
    50                  55                  60
```

```
Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Arg Phe Phe Arg Met Pro Arg Arg Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255
```

```
Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445
```

```
Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640
```

```
Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830
```

```
Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990

Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005

Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020
```

```
Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110

Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200
```

```
Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                 1210                 1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                 1225                 1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                 1240                 1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                 1255                 1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                 1270                 1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                 1285                 1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                 1300                 1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                 1315                 1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Asp Ser Pro  Thr Val Ala
    1325                 1330                 1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                 1345                 1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                 1360                 1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                 1375                 1380
```

```
Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Gly Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470

Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485

Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                1495                1500

Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                1510                1515

Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Arg
    1520                1525                1530

Tyr Thr  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                1540                1545

Ser Ile  Thr Gly Leu Tyr Glu  Thr Arg Ile Asp Leu  Ser Gln Leu
    1550                1555                1560
```

Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp Gly Ser Glu
    1565   1570   1575

Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
    1580   1585

<210> 108
<211> 1786
<212> PRT
<213> Artificial Sequence

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

<400> 108
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1   5   10   15

Thr Leu Ala Lys Arg Ala Trp Asp Glu Arg Glu Val Pro Val Gly Ala
            20   25   30

Val Leu Val His Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Pro
        35   40   45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65   70   75   80

Tyr Val Thr Leu Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85   90   95

Ser Arg Ile Gly Arg Val Val Phe Gly Ala Arg Asp Ala Lys Thr Gly
            100   105   110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His

```
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

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

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Ser Glu Val Glu Phe Ser His Glu Tyr
        195                 200                 205

Trp Met Arg His Ala Leu Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg
    210                 215                 220

Glu Val Pro Val Gly Ala Val Leu Val Leu Asn Asn Arg Val Ile Gly
225                 230                 235                 240

Glu Gly Trp Asn Arg Ala Ile Gly Leu His Asp Pro Thr Ala His Ala
                245                 250                 255

Glu Ile Met Ala Leu Arg Gln Gly Gly Leu Val Met Gln Asn Tyr Arg
            260                 265                 270

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

Ala Gly Ala Met Ile His Ser Arg Ile Gly Arg Val Val Phe Gly Val
    290                 295                 300

Arg Asn Ala Lys Thr Gly Ala Ala Gly Ser Leu Met Asp Val Leu His
```

```
305                 310                 315                 320

His Pro Gly Met Asn His Arg Val Glu Ile Thr Glu Gly Ile Leu Ala
                325                 330                 335

Asp Glu Cys Ala Ala Leu Leu Cys Arg Phe Phe Arg Met Pro Arg Arg
            340                 345                 350

Val Phe Asn Ala Gln Lys Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly
        355                 360                 365

Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser
    370                 375                 380

Ala Thr Pro Glu Ser Ser Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys
385                 390                 395                 400

Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val Gly Trp Ala Val
                405                 410                 415

Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe Lys Val Leu Gly
            420                 425                 430

Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu
        435                 440                 445

Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala
    450                 455                 460

Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu
465                 470                 475                 480

Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser Phe Phe His Arg
                485                 490                 495

Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys His Glu Arg His
```

500 505 510

Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr His Glu Lys Tyr
515 520 525

Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp Ser Thr Asp Lys
530 535 540

Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His Met Ile Lys Phe
545 550 555 560

Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp
565 570 575

Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe
580 585 590

Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala Lys Ala Ile Leu
595 600 605

Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln
610 615 620

Leu Pro Gly Glu Lys Lys Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu
625 630 635 640

Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu
645 650 655

Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp
660 665 670

Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala
675 680 685

Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp Ile Leu Arg Val

```
    690                 695                 700

Asn Thr Glu Ile Thr Lys Ala Pro Leu Ser Ala Ser Met Ile Lys Arg
705                 710                 715                 720

Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys Ala Leu Val Arg
                725                 730                 735

Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe Asp Gln Ser Lys
            740                 745                 750

Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe
        755                 760                 765

Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp Gly Thr Glu Glu
    770                 775                 780

Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg Lys Gln Arg Thr
785                 790                 795                 800

Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu Gly Glu Leu His
                805                 810                 815

Ala Ile Leu Arg Arg Gln Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn
            820                 825                 830

Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val
        835                 840                 845

Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp Met Thr Arg Lys
    850                 855                 860

Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu Val Val Asp Lys
865                 870                 875                 880

Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr Asn Phe Asp Lys
```

885 890 895

Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser Leu Leu Tyr Glu
900 905 910

Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys Tyr Val Thr Glu
915 920 925

Gly Met Arg Lys Pro Ala Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile
930 935 940

Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr Val Lys Gln Leu
945 950 955 960

Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp Ser Val Glu Ile
965 970 975

Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly Thr Tyr His Asp
980 985 990

Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn
995 1000 1005

Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr Leu Phe Glu
1010 1015 1020

Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala His Leu
1025 1030 1035

Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr Thr
1040 1045 1050

Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp
1055 1060 1065

Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly

```
    1070                1075                1080

Phe Ala  Asn Arg Asn Phe Met  Gln Leu Ile His Asp  Asp Ser Leu
    1085                1090                1095

Thr Phe  Lys Glu Asp Ile Gln  Lys Ala Gln Val Ser  Gly Gln Gly
    1100                1105                1110

Asp Ser  Leu His Glu His Ile  Ala Asn Leu Ala Gly  Ser Pro Ala
    1115                1120                1125

Ile Lys  Lys Gly Ile Leu Gln  Thr Val Lys Val Val  Asp Glu Leu
    1130                1135                1140

Val Lys  Val Met Gly Arg His  Lys Pro Glu Asn Ile  Val Ile Glu
    1145                1150                1155

Met Ala  Arg Glu Asn Gln Thr  Thr Gln Lys Gly Gln  Lys Asn Ser
    1160                1165                1170

Arg Glu  Arg Met Lys Arg Ile  Glu Glu Gly Ile Lys  Glu Leu Gly
    1175                1180                1185

Ser Gln  Ile Leu Lys Glu His  Pro Val Glu Asn Thr  Gln Leu Gln
    1190                1195                1200

Asn Glu  Lys Leu Tyr Leu Tyr  Tyr Leu Gln Asn Gly  Arg Asp Met
    1205                1210                1215

Tyr Val  Asp Gln Glu Leu Asp  Ile Asn Arg Leu Ser  Asp Tyr Asp
    1220                1225                1230

Val Asp  His Ile Val Pro Gln  Ser Phe Leu Lys Asp  Asp Ser Ile
    1235                1240                1245

Asp Asn  Lys Val Leu Thr Arg  Ser Asp Lys Asn Arg  Gly Lys Ser
```

```
    1250                1255                1260

Asp Asn  Val Pro Ser Glu Glu  Val Val Lys Lys Met  Lys Asn Tyr
    1265                1270                1275

Trp Arg  Gln Leu Leu Asn Ala  Lys Leu Ile Thr Gln  Arg Lys Phe
    1280                1285                1290

Asp Asn  Leu Thr Lys Ala Glu  Arg Gly Gly Leu Ser  Glu Leu Asp
    1295                1300                1305

Lys Ala  Gly Phe Ile Lys Arg  Gln Leu Val Glu Thr  Arg Gln Ile
    1310                1315                1320

Thr Lys  His Val Ala Gln Ile  Leu Asp Ser Arg Met  Asn Thr Lys
    1325                1330                1335

Tyr Asp  Glu Asn Asp Lys Leu  Ile Arg Glu Val Lys  Val Ile Thr
    1340                1345                1350

Leu Lys  Ser Lys Leu Val Ser  Asp Phe Arg Lys Asp  Phe Gln Phe
    1355                1360                1365

Tyr Lys  Val Arg Glu Ile Asn  Asn Tyr His His Ala  His Asp Ala
    1370                1375                1380

Tyr Leu  Asn Ala Val Val Gly  Thr Ala Leu Ile Lys  Lys Tyr Pro
    1385                1390                1395

Lys Leu  Glu Ser Glu Phe Val  Tyr Gly Asp Tyr Lys  Val Tyr Asp
    1400                1405                1410

Val Arg  Lys Met Ile Ala Lys  Ser Glu Gln Glu Ile  Gly Lys Ala
    1415                1420                1425

Thr Ala  Lys Tyr Phe Phe Tyr  Ser Asn Ile Met Asn  Phe Phe Lys
```

1430 1435 1440

Thr Glu Ile Thr Leu Ala Asn Gly Glu Ile Arg Lys Arg Pro Leu
1445 1450 1455

Ile Glu Thr Asn Gly Glu Thr Gly Glu Ile Val Trp Asp Lys Gly
1460 1465 1470

Arg Asp Phe Ala Thr Val Arg Lys Val Leu Ser Met Pro Gln Val
1475 1480 1485

Asn Ile Val Lys Lys Thr Glu Val Gln Thr Gly Gly Phe Ser Lys
1490 1495 1500

Glu Ser Ile Leu Pro Lys Arg Asn Ser Asp Lys Leu Ile Ala Arg
1505 1510 1515

Lys Lys Asp Trp Asp Pro Lys Lys Tyr Gly Gly Phe Asp Ser Pro
1520 1525 1530

Thr Val Ala Tyr Ser Val Leu Val Val Ala Lys Val Glu Lys Gly
1535 1540 1545

Lys Ser Lys Lys Leu Lys Ser Val Lys Glu Leu Leu Gly Ile Thr
1550 1555 1560

Ile Met Glu Arg Ser Ser Phe Glu Lys Asn Pro Ile Asp Phe Leu
1565 1570 1575

Glu Ala Lys Gly Tyr Lys Glu Val Lys Lys Asp Leu Ile Ile Lys
1580 1585 1590

Leu Pro Lys Tyr Ser Leu Phe Glu Leu Glu Asn Gly Arg Lys Arg
1595 1600 1605

Met Leu Ala Ser Ala Gly Glu Leu Gln Lys Gly Asn Glu Leu Ala

```
    1610                1615                1620

Leu Pro  Ser Lys Tyr Val Asn  Phe Leu Tyr Leu Ala  Ser His Tyr
    1625                1630                1635

Glu Lys  Leu Lys Gly Ser Pro  Glu Asp Asn Glu Gln  Lys Gln Leu
    1640                1645                1650

Phe Val  Glu Gln His Lys His  Tyr Leu Asp Glu Ile  Ile Glu Gln
    1655                1660                1665

Ile Ser  Glu Phe Ser Lys Arg  Val Ile Leu Ala Asp  Ala Asn Leu
    1670                1675                1680

Asp Lys  Val Leu Ser Ala Tyr  Asn Lys His Arg Asp  Lys Pro Ile
    1685                1690                1695

Arg Glu  Gln Ala Glu Asn Ile  Ile His Leu Phe Thr  Leu Thr Asn
    1700                1705                1710

Leu Gly  Ala Pro Ala Ala Phe  Lys Tyr Phe Asp Thr  Thr Ile Asp
    1715                1720                1725

Arg Lys  Arg Tyr Thr Ser Thr  Lys Glu Val Leu Asp  Ala Thr Leu
    1730                1735                1740

Ile His  Gln Ser Ile Thr Gly  Leu Tyr Glu Thr Arg  Ile Asp Leu
    1745                1750                1755

Ser Gln  Leu Gly Gly Asp Glu  Gly Ala Asp Lys Arg  Thr Ala Asp
    1760                1765                1770

Gly Ser  Glu Phe Glu Ser Pro  Lys Lys Lys Arg Lys  Val
    1775                1780                1785
```

<210> 109

<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 109

```
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
            20                  25                  30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Tyr Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Arg Phe Phe Arg Met Pro Arg Arg Val Phe Asn Ala Gln Lys
145                 150                 155                 160
```

```
Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350
```

```
Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540
```

```
Tyr Lys Glu Ile Phe Phe Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr
545                 550                 555                 560


Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575


Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590


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


Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620


Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640


Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655


Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670


Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685


Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700


Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720


Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735
```

```
Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925
```

```
Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990

Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005

Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020

Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110
```

```
Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290
```

```
Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Asp Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Gly Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470
```

```
Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                 1480                 1485


Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                 1495                 1500


Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                 1510                 1515


Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Arg
    1520                 1525                 1530


Tyr Thr  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                 1540                 1545


Ser Ile  Thr Gly Leu Tyr Glu  Thr Arg Ile Asp Leu  Ser Gln Leu
    1550                 1555                 1560


Gly Gly  Asp Glu Gly Ala Asp  Lys Arg Thr Ala Asp  Gly Ser Glu
    1565                 1570                 1575


Phe Glu  Ser Pro Lys Lys Lys  Arg Lys Val
    1580                 1585


<210> 110
<211> 1786
<212> PRT
<213> Artificial Sequence

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

<400> 110
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15


Thr Leu Ala Lys Arg Ala Trp Asp Glu Arg Glu Val Pro Val Gly Ala
```

```
            20                  25                  30

Val Leu Val His Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Pro
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Leu Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Ala Arg Asp Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

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

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Ser Glu Val Glu Phe Ser His Glu Tyr
        195                 200                 205

Trp Met Arg His Ala Leu Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg
```

```
    210                 215                 220

Glu Val Pro Val Gly Ala Val Leu Val Leu Asn Asn Arg Val Ile Gly
225                 230                 235                 240

Glu Gly Trp Asn Arg Ala Ile Gly Leu His Asp Pro Thr Ala His Ala
                245                 250                 255

Glu Ile Met Ala Leu Arg Gln Gly Gly Leu Val Met Gln Asn Tyr Arg
            260                 265                 270

Leu Tyr Asp Ala Thr Leu Tyr Val Thr Phe Glu Pro Cys Val Met Cys
        275                 280                 285

Ala Gly Ala Met Ile His Ser Arg Ile Gly Arg Val Val Phe Gly Val
    290                 295                 300

Arg Asn Ala Lys Thr Gly Ala Ala Gly Ser Leu Met Asp Val Leu His
305                 310                 315                 320

His Pro Gly Met Asn His Arg Val Glu Ile Thr Glu Gly Ile Leu Ala
                325                 330                 335

Asp Glu Cys Ala Ala Leu Leu Cys Arg Phe Phe Arg Met Pro Arg Arg
            340                 345                 350

Val Phe Asn Ala Gln Lys Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly
        355                 360                 365

Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser
    370                 375                 380

Ala Thr Pro Glu Ser Ser Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys
385                 390                 395                 400

Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val Gly Trp Ala Val
```

405 410 415

Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe Lys Val Leu Gly
420 425 430

Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu
435 440 445

Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala
450 455 460

Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu
465 470 475 480

Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser Phe Phe His Arg
485 490 495

Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys His Glu Arg His
500 505 510

Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr His Glu Lys Tyr
515 520 525

Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp Ser Thr Asp Lys
530 535 540

Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His Met Ile Lys Phe
545 550 555 560

Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp
565 570 575

Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe
580 585 590

Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala Lys Ala Ile Leu

595 600 605

Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln
610 615 620

Leu Pro Gly Glu Lys Lys Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu
625 630 635 640

Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu
645 650 655

Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp
660 665 670

Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala
675 680 685

Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp Ile Leu Arg Val
690 695 700

Asn Thr Glu Ile Thr Lys Ala Pro Leu Ser Ala Ser Met Ile Lys Arg
705 710 715 720

Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys Ala Leu Val Arg
725 730 735

Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe Asp Gln Ser Lys
740 745 750

Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe
755 760 765

Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp Gly Thr Glu Glu
770 775 780

Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg Lys Gln Arg Thr

785 790 795 800

Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu Gly Glu Leu His
805 810 815

Ala Ile Leu Arg Arg Gln Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn
820 825 830

Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val
835 840 845

Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp Met Thr Arg Lys
850 855 860

Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu Val Val Asp Lys
865 870 875 880

Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr Asn Phe Asp Lys
885 890 895

Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser Leu Leu Tyr Glu
900 905 910

Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys Tyr Val Thr Glu
915 920 925

Gly Met Arg Lys Pro Ala Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile
930 935 940

Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr Val Lys Gln Leu
945 950 955 960

Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp Ser Val Glu Ile
965 970 975

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

```
            980                 985                 990

Leu Leu Lys Ile Ile Lys Asp Lys  Asp Phe Leu Asp Asn  Glu Glu Asn
        995                 1000                1005

Glu Asp  Ile Leu Glu Asp Ile  Val Leu Thr Leu Thr  Leu Phe Glu
    1010                1015                1020

Asp Arg  Glu Met Ile Glu Glu  Arg Leu Lys Thr Tyr  Ala His Leu
    1025                1030                1035

Phe Asp  Asp Lys Val Met Lys  Gln Leu Lys Arg Arg  Arg Tyr Thr
    1040                1045                1050

Gly Trp  Gly Arg Leu Ser Arg  Lys Leu Ile Asn Gly  Ile Arg Asp
    1055                1060                1065

Lys Gln  Ser Gly Lys Thr Ile  Leu Asp Phe Leu Lys  Ser Asp Gly
    1070                1075                1080

Phe Ala  Asn Arg Asn Phe Met  Gln Leu Ile His Asp  Asp Ser Leu
    1085                1090                1095

Thr Phe  Lys Glu Asp Ile Gln  Lys Ala Gln Val Ser  Gly Gln Gly
    1100                1105                1110

Asp Ser  Leu His Glu His Ile  Ala Asn Leu Ala Gly  Ser Pro Ala
    1115                1120                1125

Ile Lys  Lys Gly Ile Leu Gln  Thr Val Lys Val Val  Asp Glu Leu
    1130                1135                1140

Val Lys  Val Met Gly Arg His  Lys Pro Glu Asn Ile  Val Ile Glu
    1145                1150                1155

Met Ala  Arg Glu Asn Gln Thr  Thr Gln Lys Gly Gln  Lys Asn Ser
```

```
    1160                1165                1170

Arg Glu  Arg Met Lys Arg Ile  Glu Glu Gly Ile Lys  Glu Leu Gly
    1175                1180                1185

Ser Gln  Ile Leu Lys Glu His  Pro Val Glu Asn Thr  Gln Leu Gln
    1190                1195                1200

Asn Glu  Lys Leu Tyr Leu Tyr  Tyr Leu Gln Asn Gly  Arg Asp Met
    1205                1210                1215

Tyr Val  Asp Gln Glu Leu Asp  Ile Asn Arg Leu Ser  Asp Tyr Asp
    1220                1225                1230

Val Asp  His Ile Val Pro Gln  Ser Phe Leu Lys Asp  Asp Ser Ile
    1235                1240                1245

Asp Asn  Lys Val Leu Thr Arg  Ser Asp Lys Asn Arg  Gly Lys Ser
    1250                1255                1260

Asp Asn  Val Pro Ser Glu Glu  Val Val Lys Lys Met  Lys Asn Tyr
    1265                1270                1275

Trp Arg  Gln Leu Leu Asn Ala  Lys Leu Ile Thr Gln  Arg Lys Phe
    1280                1285                1290

Asp Asn  Leu Thr Lys Ala Glu  Arg Gly Gly Leu Ser  Glu Leu Asp
    1295                1300                1305

Lys Ala  Gly Phe Ile Lys Arg  Gln Leu Val Glu Thr  Arg Gln Ile
    1310                1315                1320

Thr Lys  His Val Ala Gln Ile  Leu Asp Ser Arg Met  Asn Thr Lys
    1325                1330                1335

Tyr Asp  Glu Asn Asp Lys Leu  Ile Arg Glu Val Lys  Val Ile Thr
```

```
    1340                1345                1350

Leu Lys  Ser Lys Leu Val Ser  Asp Phe Arg Lys Asp  Phe Gln Phe
    1355                1360                1365

Tyr Lys  Val Arg Glu Ile Asn  Asn Tyr His His Ala  His Asp Ala
    1370                1375                1380

Tyr Leu  Asn Ala Val Val Gly  Thr Ala Leu Ile Lys  Lys Tyr Pro
    1385                1390                1395

Lys Leu  Glu Ser Glu Phe Val  Tyr Gly Asp Tyr Lys  Val Tyr Asp
    1400                1405                1410

Val Arg  Lys Met Ile Ala Lys  Ser Glu Gln Glu Ile  Gly Lys Ala
    1415                1420                1425

Thr Ala  Lys Tyr Phe Phe Tyr  Ser Asn Ile Met Asn  Phe Phe Lys
    1430                1435                1440

Thr Glu  Ile Thr Leu Ala Asn  Gly Glu Ile Arg Lys  Arg Pro Leu
    1445                1450                1455

Ile Glu  Thr Asn Gly Glu Thr  Gly Glu Ile Val Trp  Asp Lys Gly
    1460                1465                1470

Arg Asp  Phe Ala Thr Val Arg  Lys Val Leu Ser Met  Pro Gln Val
    1475                1480                1485

Asn Ile  Val Lys Lys Thr Glu  Val Gln Thr Gly Gly  Phe Ser Lys
    1490                1495                1500

Glu Ser  Ile Leu Pro Lys Arg  Asn Ser Asp Lys Leu  Ile Ala Arg
    1505                1510                1515

Lys Lys  Asp Trp Asp Pro Lys  Lys Tyr Gly Gly Phe  Asp Ser Pro
```

```
    1520                1525                1530

Thr Val  Ala Tyr Ser Val Leu  Val Val Ala Lys Val  Glu Lys Gly
    1535                1540                1545

Lys Ser  Lys Lys Leu Lys Ser  Val Lys Glu Leu Leu  Gly Ile Thr
    1550                1555                1560

Ile Met  Glu Arg Ser Ser Phe  Glu Lys Asn Pro Ile  Asp Phe Leu
    1565                1570                1575

Glu Ala  Lys Gly Tyr Lys Glu  Val Lys Lys Asp Leu  Ile Ile Lys
    1580                1585                1590

Leu Pro  Lys Tyr Ser Leu Phe  Glu Leu Glu Asn Gly  Arg Lys Arg
    1595                1600                1605

Met Leu  Ala Ser Ala Gly Glu  Leu Gln Lys Gly Asn  Glu Leu Ala
    1610                1615                1620

Leu Pro  Ser Lys Tyr Val Asn  Phe Leu Tyr Leu Ala  Ser His Tyr
    1625                1630                1635

Glu Lys  Leu Lys Gly Ser Pro  Glu Asp Asn Glu Gln  Lys Gln Leu
    1640                1645                1650

Phe Val  Glu Gln His Lys His  Tyr Leu Asp Glu Ile  Ile Glu Gln
    1655                1660                1665

Ile Ser  Glu Phe Ser Lys Arg  Val Ile Leu Ala Asp  Ala Asn Leu
    1670                1675                1680

Asp Lys  Val Leu Ser Ala Tyr  Asn Lys His Arg Asp  Lys Pro Ile
    1685                1690                1695

Arg Glu  Gln Ala Glu Asn Ile  Ile His Leu Phe Thr  Leu Thr Asn
```

1700 1705 1710

Leu Gly Ala Pro Ala Ala Phe Lys Tyr Phe Asp Thr Thr Ile Asp
1715 1720 1725

Arg Lys Arg Tyr Thr Ser Thr Lys Glu Val Leu Asp Ala Thr Leu
1730 1735 1740

Ile His Gln Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu
1745 1750 1755

Ser Gln Leu Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp
1760 1765 1770

Gly Ser Glu Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
1775 1780 1785

<210> 111
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 111
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1 5 10 15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
20 25 30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
35 40 45

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

```
Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Ser Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Tyr Phe Phe Arg Met Pro Arg Arg Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255
```

```
Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445
```

```
Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640
```

```
Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830
```

```
Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990

Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005

Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020
```

```
Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110

Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200
```

```
Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                 1210                 1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                 1225                 1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                 1240                 1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                 1255                 1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                 1270                 1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                 1285                 1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                 1300                 1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                 1315                 1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Asp Ser Pro  Thr Val Ala
    1325                 1330                 1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                 1345                 1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                 1360                 1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                 1375                 1380
```

```
Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Gly Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470

Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485

Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                1495                1500

Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                1510                1515

Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Arg
    1520                1525                1530

Tyr Thr  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                1540                1545

Ser Ile  Thr Gly Leu Tyr Glu  Thr Arg Ile Asp Leu  Ser Gln Leu
    1550                1555                1560
```

Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp Gly Ser Glu
    1565   1570   1575

Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
    1580   1585

<210> 112
<211> 1786
<212> PRT
<213> Artificial Sequence

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

<400> 112
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1   5   10   15

Thr Leu Ala Lys Arg Ala Trp Asp Glu Arg Glu Val Pro Val Gly Ala
            20   25   30

Val Leu Val His Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Pro
        35   40   45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65   70   75   80

Tyr Val Thr Leu Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85   90   95

Ser Arg Ile Gly Arg Val Val Phe Gly Ala Arg Asp Ala Lys Thr Gly
            100   105   110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His

```
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

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

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Ser Glu Val Glu Phe Ser His Glu Tyr
        195                 200                 205

Trp Met Arg His Ala Leu Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg
    210                 215                 220

Glu Val Pro Val Gly Ala Val Leu Val Leu Asn Asn Arg Val Ile Gly
225                 230                 235                 240

Glu Gly Trp Asn Arg Ala Ile Gly Leu His Asp Pro Thr Ala His Ala
                245                 250                 255

Glu Ile Met Ala Leu Arg Gln Gly Gly Leu Val Met Gln Asn Tyr Arg
            260                 265                 270

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

Ala Gly Ala Met Ile His Ser Arg Ile Gly Arg Val Val Phe Gly Val
    290                 295                 300

Arg Asn Ala Lys Thr Gly Ala Ala Gly Ser Leu Met Asp Val Leu His
```

```
305                 310                 315                 320

Tyr Pro Gly Met Asn His Arg Val Glu Ile Thr Glu Gly Ile Leu Ala
                325                 330                 335

Asp Glu Cys Ala Ala Leu Leu Cys Tyr Phe Phe Arg Met Pro Arg Arg
            340                 345                 350

Val Phe Asn Ala Gln Lys Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly
        355                 360                 365

Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser
    370                 375                 380

Ala Thr Pro Glu Ser Ser Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys
385                 390                 395                 400

Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val Gly Trp Ala Val
                405                 410                 415

Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe Lys Val Leu Gly
            420                 425                 430

Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu
        435                 440                 445

Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala
    450                 455                 460

Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu
465                 470                 475                 480

Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser Phe Phe His Arg
                485                 490                 495

Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys His Glu Arg His
```

```
            500                 505                 510

Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr His Glu Lys Tyr
        515                 520                 525

Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp Ser Thr Asp Lys
    530                 535                 540

Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His Met Ile Lys Phe
545                 550                 555                 560

Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp
                565                 570                 575

Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe
            580                 585                 590

Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala Lys Ala Ile Leu
        595                 600                 605

Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln
    610                 615                 620

Leu Pro Gly Glu Lys Lys Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu
625                 630                 635                 640

Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu
                645                 650                 655

Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp
            660                 665                 670

Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala
        675                 680                 685

Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp Ile Leu Arg Val
```

```
    690                 695                 700

Asn Thr Glu Ile Thr Lys Ala Pro Leu Ser Ala Ser Met Ile Lys Arg
705                 710                 715                 720

Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys Ala Leu Val Arg
                725                 730                 735

Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe Asp Gln Ser Lys
            740                 745                 750

Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe
        755                 760                 765

Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp Gly Thr Glu Glu
    770                 775                 780

Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg Lys Gln Arg Thr
785                 790                 795                 800

Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu Gly Glu Leu His
                805                 810                 815

Ala Ile Leu Arg Arg Gln Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn
            820                 825                 830

Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val
        835                 840                 845

Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp Met Thr Arg Lys
    850                 855                 860

Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu Val Val Asp Lys
865                 870                 875                 880

Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr Asn Phe Asp Lys
```

885 890 895

Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser Leu Leu Tyr Glu
900 905 910

Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys Tyr Val Thr Glu
915 920 925

Gly Met Arg Lys Pro Ala Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile
930 935 940

Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr Val Lys Gln Leu
945 950 955 960

Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp Ser Val Glu Ile
965 970 975

Ser Gly Val Glu Asp Arg Phe Asn Ala Ser Leu Gly Thr Tyr His Asp
980 985 990

Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn
995 1000 1005

Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr Leu Phe Glu
1010 1015 1020

Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala His Leu
1025 1030 1035

Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr Thr
1040 1045 1050

Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp
1055 1060 1065

Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly

```
    1070                1075                1080

Phe Ala  Asn Arg Asn Phe Met  Gln Leu Ile His Asp  Asp Ser Leu
    1085                1090                1095

Thr Phe  Lys Glu Asp Ile Gln  Lys Ala Gln Val Ser  Gly Gln Gly
    1100                1105                1110

Asp Ser  Leu His Glu His Ile  Ala Asn Leu Ala Gly  Ser Pro Ala
    1115                1120                1125

Ile Lys  Lys Gly Ile Leu Gln  Thr Val Lys Val Val  Asp Glu Leu
    1130                1135                1140

Val Lys  Val Met Gly Arg His  Lys Pro Glu Asn Ile  Val Ile Glu
    1145                1150                1155

Met Ala  Arg Glu Asn Gln Thr  Thr Gln Lys Gly Gln  Lys Asn Ser
    1160                1165                1170

Arg Glu  Arg Met Lys Arg Ile  Glu Glu Gly Ile Lys  Glu Leu Gly
    1175                1180                1185

Ser Gln  Ile Leu Lys Glu His  Pro Val Glu Asn Thr  Gln Leu Gln
    1190                1195                1200

Asn Glu  Lys Leu Tyr Leu Tyr  Tyr Leu Gln Asn Gly  Arg Asp Met
    1205                1210                1215

Tyr Val  Asp Gln Glu Leu Asp  Ile Asn Arg Leu Ser  Asp Tyr Asp
    1220                1225                1230

Val Asp  His Ile Val Pro Gln  Ser Phe Leu Lys Asp  Asp Ser Ile
    1235                1240                1245

Asp Asn  Lys Val Leu Thr Arg  Ser Asp Lys Asn Arg  Gly Lys Ser
```

```
    1250                1255                1260

Asp Asn  Val Pro Ser Glu Glu  Val Val Lys Lys Met  Lys Asn Tyr
    1265                1270                1275

Trp Arg  Gln Leu Leu Asn Ala  Lys Leu Ile Thr Gln  Arg Lys Phe
    1280                1285                1290

Asp Asn  Leu Thr Lys Ala Glu  Arg Gly Gly Leu Ser  Glu Leu Asp
    1295                1300                1305

Lys Ala  Gly Phe Ile Lys Arg  Gln Leu Val Glu Thr  Arg Gln Ile
    1310                1315                1320

Thr Lys  His Val Ala Gln Ile  Leu Asp Ser Arg Met  Asn Thr Lys
    1325                1330                1335

Tyr Asp  Glu Asn Asp Lys Leu  Ile Arg Glu Val Lys  Val Ile Thr
    1340                1345                1350

Leu Lys  Ser Lys Leu Val Ser  Asp Phe Arg Lys Asp  Phe Gln Phe
    1355                1360                1365

Tyr Lys  Val Arg Glu Ile Asn  Asn Tyr His His Ala  His Asp Ala
    1370                1375                1380

Tyr Leu  Asn Ala Val Val Gly  Thr Ala Leu Ile Lys  Lys Tyr Pro
    1385                1390                1395

Lys Leu  Glu Ser Glu Phe Val  Tyr Gly Asp Tyr Lys  Val Tyr Asp
    1400                1405                1410

Val Arg  Lys Met Ile Ala Lys  Ser Glu Gln Glu Ile  Gly Lys Ala
    1415                1420                1425

Thr Ala  Lys Tyr Phe Phe Tyr  Ser Asn Ile Met Asn  Phe Phe Lys
```

```
    1430                1435                1440

Thr Glu  Ile Thr Leu Ala Asn  Gly Glu Ile Arg Lys  Arg Pro Leu
    1445                1450                1455

Ile Glu  Thr Asn Gly Glu Thr  Gly Glu Ile Val Trp  Asp Lys Gly
    1460                1465                1470

Arg Asp  Phe Ala Thr Val Arg  Lys Val Leu Ser Met  Pro Gln Val
    1475                1480                1485

Asn Ile  Val Lys Lys Thr Glu  Val Gln Thr Gly Gly  Phe Ser Lys
    1490                1495                1500

Glu Ser  Ile Leu Pro Lys Arg  Asn Ser Asp Lys Leu  Ile Ala Arg
    1505                1510                1515

Lys Lys  Asp Trp Asp Pro Lys  Lys Tyr Gly Gly Phe  Asp Ser Pro
    1520                1525                1530

Thr Val  Ala Tyr Ser Val Leu  Val Val Ala Lys Val  Glu Lys Gly
    1535                1540                1545

Lys Ser  Lys Lys Leu Lys Ser  Val Lys Glu Leu Leu  Gly Ile Thr
    1550                1555                1560

Ile Met  Glu Arg Ser Ser Phe  Glu Lys Asn Pro Ile  Asp Phe Leu
    1565                1570                1575

Glu Ala  Lys Gly Tyr Lys Glu  Val Lys Lys Asp Leu  Ile Ile Lys
    1580                1585                1590

Leu Pro  Lys Tyr Ser Leu Phe  Glu Leu Glu Asn Gly  Arg Lys Arg
    1595                1600                1605

Met Leu  Ala Ser Ala Gly Glu  Leu Gln Lys Gly Asn  Glu Leu Ala
```

```
    1610                1615                1620

Leu Pro  Ser Lys Tyr Val Asn  Phe Leu Tyr Leu Ala  Ser His Tyr
    1625                1630                1635

Glu Lys  Leu Lys Gly Ser Pro  Glu Asp Asn Glu Gln  Lys Gln Leu
    1640                1645                1650

Phe Val  Glu Gln His Lys His  Tyr Leu Asp Glu Ile  Ile Glu Gln
    1655                1660                1665

Ile Ser  Glu Phe Ser Lys Arg  Val Ile Leu Ala Asp  Ala Asn Leu
    1670                1675                1680

Asp Lys  Val Leu Ser Ala Tyr  Asn Lys His Arg Asp  Lys Pro Ile
    1685                1690                1695

Arg Glu  Gln Ala Glu Asn Ile  Ile His Leu Phe Thr  Leu Thr Asn
    1700                1705                1710

Leu Gly  Ala Pro Ala Ala Phe  Lys Tyr Phe Asp Thr  Thr Ile Asp
    1715                1720                1725

Arg Lys  Arg Tyr Thr Ser Thr  Lys Glu Val Leu Asp  Ala Thr Leu
    1730                1735                1740

Ile His  Gln Ser Ile Thr Gly  Leu Tyr Glu Thr Arg  Ile Asp Leu
    1745                1750                1755

Ser Gln  Leu Gly Gly Asp Glu  Gly Ala Asp Lys Arg  Thr Ala Asp
    1760                1765                1770

Gly Ser  Glu Phe Glu Ser Pro  Lys Lys Lys Arg Lys  Val
    1775                1780                1785
```

<210> 113

<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 113

```
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
            20                  25                  30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Tyr Asp Ala Thr Leu
65                  70                  75                  80

Tyr Ser Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Arg Phe Phe Arg Met Pro Arg Arg Val Phe Asn Ala Gln Lys
145                 150                 155                 160
```

```
Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350
```

```
Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540
```

```
Tyr Lys Glu Ile Phe Phe Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr
545                 550                 555                 560


Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575


Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590


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


Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620


Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640


Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655


Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670


Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685


Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700


Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720


Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735
```

```
Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925
```

```
Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990

Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005

Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020

Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110
```

```
Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290
```

```
Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Asp Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Gly Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470
```

```
Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485


Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                1495                1500


Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                1510                1515


Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Arg
    1520                1525                1530


Tyr Thr  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                1540                1545


Ser Ile  Thr Gly Leu Tyr Glu  Thr Arg Ile Asp Leu  Ser Gln Leu
    1550                1555                1560


Gly Gly  Asp Glu Gly Ala Asp  Lys Arg Thr Ala Asp  Gly Ser Glu
    1565                1570                1575


Phe Glu  Ser Pro Lys Lys Lys  Arg Lys Val
    1580                1585


<210> 114
<211> 1786
<212> PRT
<213> Artificial Sequence

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

<400> 114
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15


Thr Leu Ala Lys Arg Ala Trp Asp Glu Arg Glu Val Pro Val Gly Ala
```

```
            20                  25                  30

Val Leu Val His Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Pro
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Leu Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Ala Arg Asp Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

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

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Ser Glu Val Glu Phe Ser His Glu Tyr
        195                 200                 205

Trp Met Arg His Ala Leu Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg
```

```
    210                 215                 220

Glu Val Pro Val Gly Ala Val Leu Val Leu Asn Asn Arg Val Ile Gly
225                 230                 235                 240

Glu Gly Trp Asn Arg Ala Ile Gly Leu His Asp Pro Thr Ala His Ala
                245                 250                 255

Glu Ile Met Ala Leu Arg Gln Gly Gly Leu Val Met Gln Asn Tyr Arg
            260                 265                 270

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

Ala Gly Ala Met Ile His Ser Arg Ile Gly Arg Val Val Phe Gly Val
    290                 295                 300

Arg Asn Ala Lys Thr Gly Ala Ala Gly Ser Leu Met Asp Val Leu His
305                 310                 315                 320

His Pro Gly Met Asn His Arg Val Glu Ile Thr Glu Gly Ile Leu Ala
                325                 330                 335

Asp Glu Cys Ala Ala Leu Leu Cys Arg Phe Phe Arg Met Pro Arg Arg
            340                 345                 350

Val Phe Asn Ala Gln Lys Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly
        355                 360                 365

Ser Ser Gly Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser
    370                 375                 380

Ala Thr Pro Glu Ser Ser Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys
385                 390                 395                 400

Tyr Ser Ile Gly Leu Ala Ile Gly Thr Asn Ser Val Gly Trp Ala Val
```

405 410 415

Ile Thr Asp Glu Tyr Lys Val Pro Ser Lys Lys Phe Lys Val Leu Gly
420 425 430

Asn Thr Asp Arg His Ser Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu
435 440 445

Phe Asp Ser Gly Glu Thr Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala
450 455 460

Arg Arg Arg Tyr Thr Arg Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu
465 470 475 480

Ile Phe Ser Asn Glu Met Ala Lys Val Asp Asp Ser Phe Phe His Arg
485 490 495

Leu Glu Glu Ser Phe Leu Val Glu Glu Asp Lys Lys His Glu Arg His
500 505 510

Pro Ile Phe Gly Asn Ile Val Asp Glu Val Ala Tyr His Glu Lys Tyr
515 520 525

Pro Thr Ile Tyr His Leu Arg Lys Lys Leu Val Asp Ser Thr Asp Lys
530 535 540

Ala Asp Leu Arg Leu Ile Tyr Leu Ala Leu Ala His Met Ile Lys Phe
545 550 555 560

Arg Gly His Phe Leu Ile Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp
565 570 575

Val Asp Lys Leu Phe Ile Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe
580 585 590

Glu Glu Asn Pro Ile Asn Ala Ser Gly Val Asp Ala Lys Ala Ile Leu

595 600 605

Ser Ala Arg Leu Ser Lys Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln
610 615 620

Leu Pro Gly Glu Lys Lys Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu
625 630 635 640

Ser Leu Gly Leu Thr Pro Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu
645 650 655

Asp Ala Lys Leu Gln Leu Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp
660 665 670

Asn Leu Leu Ala Gln Ile Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala
675 680 685

Ala Lys Asn Leu Ser Asp Ala Ile Leu Leu Ser Asp Ile Leu Arg Val
690 695 700

Asn Thr Glu Ile Thr Lys Ala Pro Leu Ser Ala Ser Met Ile Lys Arg
705 710 715 720

Tyr Asp Glu His His Gln Asp Leu Thr Leu Leu Lys Ala Leu Val Arg
725 730 735

Gln Gln Leu Pro Glu Lys Tyr Lys Glu Ile Phe Phe Asp Gln Ser Lys
740 745 750

Asn Gly Tyr Ala Gly Tyr Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe
755 760 765

Tyr Lys Phe Ile Lys Pro Ile Leu Glu Lys Met Asp Gly Thr Glu Glu
770 775 780

Leu Leu Val Lys Leu Asn Arg Glu Asp Leu Leu Arg Lys Gln Arg Thr

785 790 795 800

Phe Asp Asn Gly Ser Ile Pro His Gln Ile His Leu Gly Glu Leu His
805 810 815

Ala Ile Leu Arg Arg Gln Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn
820 825 830

Arg Glu Lys Ile Glu Lys Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val
835 840 845

Gly Pro Leu Ala Arg Gly Asn Ser Arg Phe Ala Trp Met Thr Arg Lys
850 855 860

Ser Glu Glu Thr Ile Thr Pro Trp Asn Phe Glu Glu Val Val Asp Lys
865 870 875 880

Gly Ala Ser Ala Gln Ser Phe Ile Glu Arg Met Thr Asn Phe Asp Lys
885 890 895

Asn Leu Pro Asn Glu Lys Val Leu Pro Lys His Ser Leu Leu Tyr Glu
900 905 910

Tyr Phe Thr Val Tyr Asn Glu Leu Thr Lys Val Lys Tyr Val Thr Glu
915 920 925

Gly Met Arg Lys Pro Ala Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile
930 935 940

Val Asp Leu Leu Phe Lys Thr Asn Arg Lys Val Thr Val Lys Gln Leu
945 950 955 960

Lys Glu Asp Tyr Phe Lys Lys Ile Glu Cys Phe Asp Ser Val Glu Ile
965 970 975

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

980 985 990

Leu Leu Lys Ile Ile Lys Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn
995 1000 1005

Glu Asp Ile Leu Glu Asp Ile Val Leu Thr Leu Thr Leu Phe Glu
1010 1015 1020

Asp Arg Glu Met Ile Glu Glu Arg Leu Lys Thr Tyr Ala His Leu
1025 1030 1035

Phe Asp Asp Lys Val Met Lys Gln Leu Lys Arg Arg Arg Tyr Thr
1040 1045 1050

Gly Trp Gly Arg Leu Ser Arg Lys Leu Ile Asn Gly Ile Arg Asp
1055 1060 1065

Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe Leu Lys Ser Asp Gly
1070 1075 1080

Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His Asp Asp Ser Leu
1085 1090 1095

Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser Gly Gln Gly
1100 1105 1110

Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser Pro Ala
1115 1120 1125

Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu Leu
1130 1135 1140

Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
1145 1150 1155

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser

```
    1160                1165                1170

Arg Glu  Arg Met Lys Arg Ile  Glu Glu Gly Ile Lys  Glu Leu Gly
    1175                1180                1185

Ser Gln  Ile Leu Lys Glu His  Pro Val Glu Asn Thr  Gln Leu Gln
    1190                1195                1200

Asn Glu  Lys Leu Tyr Leu Tyr  Tyr Leu Gln Asn Gly  Arg Asp Met
    1205                1210                1215

Tyr Val  Asp Gln Glu Leu Asp  Ile Asn Arg Leu Ser  Asp Tyr Asp
    1220                1225                1230

Val Asp  His Ile Val Pro Gln  Ser Phe Leu Lys Asp  Asp Ser Ile
    1235                1240                1245

Asp Asn  Lys Val Leu Thr Arg  Ser Asp Lys Asn Arg  Gly Lys Ser
    1250                1255                1260

Asp Asn  Val Pro Ser Glu Glu  Val Val Lys Lys Met  Lys Asn Tyr
    1265                1270                1275

Trp Arg  Gln Leu Leu Asn Ala  Lys Leu Ile Thr Gln  Arg Lys Phe
    1280                1285                1290

Asp Asn  Leu Thr Lys Ala Glu  Arg Gly Gly Leu Ser  Glu Leu Asp
    1295                1300                1305

Lys Ala  Gly Phe Ile Lys Arg  Gln Leu Val Glu Thr  Arg Gln Ile
    1310                1315                1320

Thr Lys  His Val Ala Gln Ile  Leu Asp Ser Arg Met  Asn Thr Lys
    1325                1330                1335

Tyr Asp  Glu Asn Asp Lys Leu  Ile Arg Glu Val Lys  Val Ile Thr
```

```
    1340                1345                1350

Leu Lys  Ser Lys Leu Val Ser  Asp Phe Arg Lys Asp  Phe Gln Phe
    1355                1360                1365

Tyr Lys  Val Arg Glu Ile Asn  Asn Tyr His His Ala  His Asp Ala
    1370                1375                1380

Tyr Leu  Asn Ala Val Val Gly  Thr Ala Leu Ile Lys  Lys Tyr Pro
    1385                1390                1395

Lys Leu  Glu Ser Glu Phe Val  Tyr Gly Asp Tyr Lys  Val Tyr Asp
    1400                1405                1410

Val Arg  Lys Met Ile Ala Lys  Ser Glu Gln Glu Ile  Gly Lys Ala
    1415                1420                1425

Thr Ala  Lys Tyr Phe Phe Tyr  Ser Asn Ile Met Asn  Phe Phe Lys
    1430                1435                1440

Thr Glu  Ile Thr Leu Ala Asn  Gly Glu Ile Arg Lys  Arg Pro Leu
    1445                1450                1455

Ile Glu  Thr Asn Gly Glu Thr  Gly Glu Ile Val Trp  Asp Lys Gly
    1460                1465                1470

Arg Asp  Phe Ala Thr Val Arg  Lys Val Leu Ser Met  Pro Gln Val
    1475                1480                1485

Asn Ile  Val Lys Lys Thr Glu  Val Gln Thr Gly Gly  Phe Ser Lys
    1490                1495                1500

Glu Ser  Ile Leu Pro Lys Arg  Asn Ser Asp Lys Leu  Ile Ala Arg
    1505                1510                1515

Lys Lys  Asp Trp Asp Pro Lys  Lys Tyr Gly Gly Phe  Asp Ser Pro
```

```
    1520                1525                1530

Thr Val  Ala Tyr Ser Val Leu  Val Val Ala Lys Val  Glu Lys Gly
    1535                1540                1545

Lys Ser  Lys Lys Leu Lys Ser  Val Lys Glu Leu Leu  Gly Ile Thr
    1550                1555                1560

Ile Met  Glu Arg Ser Ser Phe  Glu Lys Asn Pro Ile  Asp Phe Leu
    1565                1570                1575

Glu Ala  Lys Gly Tyr Lys Glu  Val Lys Lys Asp Leu  Ile Ile Lys
    1580                1585                1590

Leu Pro  Lys Tyr Ser Leu Phe  Glu Leu Glu Asn Gly  Arg Lys Arg
    1595                1600                1605

Met Leu  Ala Ser Ala Gly Glu  Leu Gln Lys Gly Asn  Glu Leu Ala
    1610                1615                1620

Leu Pro  Ser Lys Tyr Val Asn  Phe Leu Tyr Leu Ala  Ser His Tyr
    1625                1630                1635

Glu Lys  Leu Lys Gly Ser Pro  Glu Asp Asn Glu Gln  Lys Gln Leu
    1640                1645                1650

Phe Val  Glu Gln His Lys His  Tyr Leu Asp Glu Ile  Ile Glu Gln
    1655                1660                1665

Ile Ser  Glu Phe Ser Lys Arg  Val Ile Leu Ala Asp  Ala Asn Leu
    1670                1675                1680

Asp Lys  Val Leu Ser Ala Tyr  Asn Lys His Arg Asp  Lys Pro Ile
    1685                1690                1695

Arg Glu  Gln Ala Glu Asn Ile  Ile His Leu Phe Thr  Leu Thr Asn
```

1700 1705 1710

Leu Gly Ala Pro Ala Ala Phe Lys Tyr Phe Asp Thr Thr Ile Asp
1715 1720 1725

Arg Lys Arg Tyr Thr Ser Thr Lys Glu Val Leu Asp Ala Thr Leu
1730 1735 1740

Ile His Gln Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu
1745 1750 1755

Ser Gln Leu Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp
1760 1765 1770

Gly Ser Glu Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
1775 1780 1785

<210> 115
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 115
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1 5 10 15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
20 25 30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
35 40 45

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

```
Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Thr Phe Phe Arg Met Pro Arg Gln Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255
```

```
Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445
```

```
Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640
```

```
Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830
```

```
Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990

Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005

Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020
```

```
Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110

Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200
```

```
Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                 1210                 1215


Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                 1225                 1230


Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                 1240                 1245


Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                 1255                 1260


Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                 1270                 1275


Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                 1285                 1290


Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                 1300                 1305


Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                 1315                 1320


Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                 1330                 1335


Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                 1345                 1350


Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                 1360                 1365


Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                 1375                 1380
```

```
Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470

Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485

Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                1495                1500

Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                1510                1515

Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Gln
    1520                1525                1530

Tyr Arg  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                1540                1545

Ser Ile  Thr Gly Leu Tyr Glu  Thr Arg Ile Asp Leu  Ser Gln Leu
    1550                1555                1560
```

Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp Gly Ser Glu
    1565   1570   1575

Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
    1580   1585

<210> 116
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 116
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1   5   10   15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
            20   25   30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35   40   45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65   70   75   80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85   90   95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100   105   110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His

```
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Arg Phe Phe Arg Met Pro Arg Gln Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
```

```
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
```

```
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640

Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
```

```
    690                 695                 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
```

885 890 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
900 905 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
915 920 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
930 935 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945 950 955 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
965 970 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
980 985 990

Ile Leu Lys Glu His Pro Val Glu Asn Thr Gln Leu Gln Asn Glu Lys
995 1000 1005

Leu Tyr Leu Tyr Tyr Leu Gln Asn Gly Arg Asp Met Tyr Val Asp
1010 1015 1020

Gln Glu Leu Asp Ile Asn Arg Leu Ser Asp Tyr Asp Val Asp His
1025 1030 1035

Ile Val Pro Gln Ser Phe Leu Lys Asp Asp Ser Ile Asp Asn Lys
1040 1045 1050

Val Leu Thr Arg Ser Asp Lys Asn Arg Gly Lys Ser Asp Asn Val
1055 1060 1065

Pro Ser Glu Glu Val Val Lys Lys Met Lys Asn Tyr Trp Arg Gln

```
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110

Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
```

```
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
```

1430 1435 1440

Lys Gly Ser Pro Glu Asp Asn Glu Gln Lys Gln Leu Phe Val Glu
1445 1450 1455

Gln His Lys His Tyr Leu Asp Glu Ile Ile Glu Gln Ile Ser Glu
1460 1465 1470

Phe Ser Lys Arg Val Ile Leu Ala Asp Ala Asn Leu Asp Lys Val
1475 1480 1485

Leu Ser Ala Tyr Asn Lys His Arg Asp Lys Pro Ile Arg Glu Gln
1490 1495 1500

Ala Glu Asn Ile Ile His Leu Phe Thr Leu Thr Asn Leu Gly Ala
1505 1510 1515

Pro Ala Ala Phe Lys Tyr Phe Asp Thr Thr Ile Asp Arg Lys Gln
1520 1525 1530

Tyr Arg Ser Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln
1535 1540 1545

Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu
1550 1555 1560

Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp Gly Ser Glu
1565 1570 1575

Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
1580 1585

<210> 117
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 117

```
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
            20                  25                  30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Tyr Phe Phe Arg Met Pro Arg Ser Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175
```

```
Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365
```

```
Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

Tyr Lys Glu Ile Phe Phe Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr
545                 550                 555                 560
```

```
Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640

Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750
```

```
Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940
```

```
Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960


Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975


Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990


Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005


Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020


Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035


Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050


Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065


Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080


Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095


Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110


Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125
```

```
Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305
```

```
Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470

Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485
```

Leu Ser Ala Tyr Asn Lys His Arg Asp Lys Pro Ile Arg Glu Gln
1490 1495 1500

Ala Glu Asn Ile Ile His Leu Phe Thr Leu Thr Asn Leu Gly Ala
1505 1510 1515

Pro Ala Ala Phe Lys Tyr Phe Asp Thr Thr Ile Asp Arg Lys Gln
1520 1525 1530

Tyr Arg Ser Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln
1535 1540 1545

Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu
1550 1555 1560

Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp Gly Ser Glu
1565 1570 1575

Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
1580 1585

<210> 118
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 118
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1 5 10 15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
20 25 30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala

```
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Tyr Phe Phe Arg Met Pro Arg Gln Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
```

```
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
```

```
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
```

```
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640

Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
```

805 810 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
820 825 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
835 840 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
850 855 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865 870 875 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
885 890 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
900 905 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
915 920 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
930 935 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945 950 955 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
965 970 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
980 985 990

Ile Leu Lys Glu His Pro Val Glu Asn Thr Gln Leu Gln Asn Glu Lys

```
        995                 1000                 1005

Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                 1015                 1020

Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                 1030                 1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                 1045                 1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                 1060                 1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                 1075                 1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                 1090                 1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                 1105                 1110

Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                 1120                 1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                 1135                 1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                 1150                 1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                 1165                 1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
```

```
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
```

```
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470

Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485

Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                1495                1500

Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                1510                1515

Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Gln
    1520                1525                1530

Tyr Arg  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
```

1535 1540 1545

Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu
1550 1555 1560

Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp Gly Ser Glu
1565 1570 1575

Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
1580 1585

<210> 119
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 119
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1 5 10 15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
20 25 30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
35 40 45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65 70 75 80

Tyr Ser Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
85 90 95

```
Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Tyr Phe Phe Arg Met Pro Arg Gln Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285
```

```
Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480
```

```
Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640

Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670
```

```
Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860
```

```
Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880


Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895


Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910


Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925


Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940


Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960


Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975


Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990


Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005


Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020


Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035


Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050
```

```
Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065


Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080


Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095


Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110


Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125


Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140


Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155


Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170


Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185


Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200


Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215


Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230
```

```
Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410
```

```
Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                 1420                 1425


Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                 1435                 1440


Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                 1450                 1455


Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                 1465                 1470


Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                 1480                 1485


Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                 1495                 1500


Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                 1510                 1515


Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Gln
    1520                 1525                 1530


Tyr Arg  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                 1540                 1545


Ser Ile  Thr Gly Leu Tyr Glu  Thr Arg Ile Asp Leu  Ser Gln Leu
    1550                 1555                 1560


Gly Gly  Asp Glu Gly Ala Asp  Lys Arg Thr Ala Asp  Gly Ser Glu
    1565                 1570                 1575


Phe Glu  Ser Pro Lys Lys Lys  Arg Lys Val
    1580                 1585
```

<210> 120
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 120
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1 5 10 15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
20 25 30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
35 40 45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65 70 75 80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
85 90 95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
100 105 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
115 120 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
130 135 140

Leu Cys Tyr Phe Phe Arg Met Pro Arg Gln Val Phe Asn Ala Gln Lys

```
145                 150                 155                 160

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

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
```

340 345 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
355 360 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
370 375 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385 390 395 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
405 410 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
420 425 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
435 440 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
450 455 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465 470 475 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
485 490 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
500 505 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
515 520 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys

```
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640

Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
```

```
               725                 730                 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
```

```
        915                 920                 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990

Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005

Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020

Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
```

```
    1100                1105                1110

Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
```

1280 1285 1290

Lys Lys Thr Glu Val Gln Thr Gly Gly Phe Ser Lys Glu Ser Ile
1295 1300 1305

Leu Pro Lys Arg Asn Ser Asp Lys Leu Ile Ala Arg Lys Lys Asp
1310 1315 1320

Trp Asp Pro Lys Lys Tyr Gly Gly Phe Val Ser Pro Thr Val Ala
1325 1330 1335

Tyr Ser Val Leu Val Val Ala Lys Val Glu Lys Gly Lys Ser Lys
1340 1345 1350

Lys Leu Lys Ser Val Lys Glu Leu Leu Gly Ile Thr Ile Met Glu
1355 1360 1365

Arg Ser Ser Phe Glu Lys Asn Pro Ile Asp Phe Leu Glu Ala Lys
1370 1375 1380

Gly Tyr Lys Glu Val Lys Lys Asp Leu Ile Ile Lys Leu Pro Lys
1385 1390 1395

Tyr Ser Leu Phe Glu Leu Glu Asn Gly Arg Lys Arg Met Leu Ala
1400 1405 1410

Ser Ala Arg Glu Leu Gln Lys Gly Asn Glu Leu Ala Leu Pro Ser
1415 1420 1425

Lys Tyr Val Asn Phe Leu Tyr Leu Ala Ser His Tyr Glu Lys Leu
1430 1435 1440

Lys Gly Ser Pro Glu Asp Asn Glu Gln Lys Gln Leu Phe Val Glu
1445 1450 1455

Gln His Lys His Tyr Leu Asp Glu Ile Ile Glu Gln Ile Ser Glu

```
    1460                1465                1470


Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485


Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                1495                1500


Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                1510                1515


Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Gln
    1520                1525                1530


Tyr Arg  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                1540                1545


Ser Ile  Thr Gly Leu Tyr Glu  Thr Arg Ile Asp Leu  Ser Gln Leu
    1550                1555                1560


Gly Gly  Asp Glu Gly Ala Asp  Lys Arg Thr Ala Asp  Gly Ser Glu
    1565                1570                1575


Phe Glu  Ser Pro Lys Lys Lys  Arg Lys Val
    1580                1585


<210> 121
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 121
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15
```

```
Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
            20                  25                  30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Tyr Phe Phe Arg Met Pro Arg Arg Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205
```

```
Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400
```

```
Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590
```

```
Arg Glu Asp Leu Leu Arg Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile
        595                 600                 605

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640

Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780
```

```
Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800


Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815


Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830


Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845


Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860


Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880


Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895


Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910


Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925


Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940


Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960


Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975
```

```
Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990


Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005


Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020


Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035


Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050


Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065


Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080


Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095


Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110


Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125


Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140


Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155
```

```
Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170


Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185


Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200


Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215


Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230


Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245


Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260


Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275


Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290


Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305


Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320


Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335
```

```
Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470

Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485

Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                1495                1500

Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                1510                1515
```

```
Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Gln
    1520                1525                1530


Tyr Arg  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                1540                1545


Ser Ile  Thr Gly Leu Tyr Glu  Thr Arg Ile Asp Leu  Ser Gln Leu
    1550                1555                1560


Gly Gly  Asp Glu Gly Ala Asp  Lys Arg Thr Ala Asp  Gly Ser Glu
    1565                1570                1575


Phe Glu  Ser Pro Lys Lys Lys  Arg Lys Val
    1580                1585
```

<210> 122
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 122

```
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15


Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
            20                  25                  30


Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35                  40                  45


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


Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
```

```
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Arg Phe Phe Arg Met Pro Arg Arg Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
```

```
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
```

```
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640

Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
```

645 650 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
660 665 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
675 680 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
690 695 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705 710 715 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
725 730 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
740 745 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
755 760 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
770 775 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785 790 795 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
805 810 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
820 825 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln

```
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990

Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005

Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020

Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
```

```
    1025                1030                1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110

Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
```

```
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
```

```
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470

Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485

Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                1495                1500

Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                1510                1515

Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Gln
    1520                1525                1530

Tyr Arg  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                1540                1545

Ser Ile  Thr Gly Leu Tyr Glu  Thr Arg Ile Asp Leu  Ser Gln Leu
    1550                1555                1560

Gly Gly  Asp Glu Gly Ala Asp  Lys Arg Thr Ala Asp  Gly Ser Glu
```

1565 1570 1575

Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
1580 1585

<210> 123
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 123
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1 5 10 15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
20 25 30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
35 40 45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Tyr Asp Ala Thr Leu
65 70 75 80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
85 90 95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
100 105 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
115 120 125

```
Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Arg Phe Phe Arg Met Pro Arg Arg Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320
```

```
Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510
```

```
Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640

Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700
```

```
Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720


Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735


Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750


Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765


Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780


Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800


Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815


Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830


Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845


Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860


Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880


Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895
```

```
Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990

Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005

Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020

Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080
```

```
Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110

Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260
```

```
Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440
```

```
Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455


Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470


Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485


Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                1495                1500


Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                1510                1515


Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Gln
    1520                1525                1530


Tyr Arg  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                1540                1545


Ser Ile  Thr Gly Leu Tyr Glu  Thr Arg Ile Asp Leu  Ser Gln Leu
    1550                1555                1560


Gly Gly  Asp Glu Gly Ala Asp  Lys Arg Thr Ala Asp  Gly Ser Glu
    1565                1570                1575


Phe Glu  Ser Pro Lys Lys Lys  Arg Lys Val
    1580                1585


<210> 124
<211> 1588
<212> PRT
<213> Artificial Sequence

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

polypeptide

<400> 124

```
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
            20                  25                  30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Arg Phe Phe Arg Met Pro Arg Arg Val Phe Asn Ala Gln Lys
145                 150                 155                 160

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

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
```

```
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
```

```
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
```

```
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640

Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
```

```
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
```

```
945                 950                 955                 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990

Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005

Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020

Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110

Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
```

```
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
```

```
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470

Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485

Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
```

1490 1495 1500

Ala Glu Asn Ile Ile His Leu Phe Thr Leu Thr Asn Leu Gly Ala
1505 1510 1515

Pro Ala Ala Phe Lys Tyr Phe Asp Thr Thr Ile Asp Arg Lys Gln
1520 1525 1530

Tyr Arg Ser Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln
1535 1540 1545

Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu
1550 1555 1560

Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp Gly Ser Glu
1565 1570 1575

Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
1580 1585

<210> 125
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 125
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1 5 10 15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
20 25 30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
35 40 45

```
Ile Gly Leu His Asp Pro Thr Ala His Ala Glu Ile Met Ala Leu Arg
    50                  55                  60

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Thr Phe Phe Arg Met Pro Arg Arg Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240
```

```
Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430
```

```
Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620
```

```
Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640


Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655


Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670


Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685


Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700


Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720


Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735


Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750


Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765


Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780


Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800


Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815
```

```
Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990

Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005
```

```
Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020

Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110

Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185
```

```
Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365
```

```
Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470

Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485

Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                1495                1500

Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                1510                1515

Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Gln
    1520                1525                1530

Tyr Arg  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                1540                1545
```

Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu
1550 1555 1560

Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp Gly Ser Glu
1565 1570 1575

Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
1580 1585

<210> 126
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 126
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1 5 10 15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
20 25 30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
35 40 45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65 70 75 80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
85 90 95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly

```
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Thr Phe Phe Arg Met Pro Arg Ser Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
```

```
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
```

```
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590

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

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640

Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
```

```
        675                 680                 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

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

865 870 875 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
885 890 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
900 905 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
915 920 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
930 935 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945 950 955 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
965 970 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
980 985 990

Ile Leu Lys Glu His Pro Val Glu Asn Thr Gln Leu Gln Asn Glu Lys
995 1000 1005

Leu Tyr Leu Tyr Tyr Leu Gln Asn Gly Arg Asp Met Tyr Val Asp
1010 1015 1020

Gln Glu Leu Asp Ile Asn Arg Leu Ser Asp Tyr Asp Val Asp His
1025 1030 1035

Ile Val Pro Gln Ser Phe Leu Lys Asp Asp Ser Ile Asp Asn Lys
1040 1045 1050

Val Leu Thr Arg Ser Asp Lys Asn Arg Gly Lys Ser Asp Asn Val

```
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110

Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
```

```
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
```

1415 1420 1425

Lys Tyr Val Asn Phe Leu Tyr Leu Ala Ser His Tyr Glu Lys Leu
1430 1435 1440

Lys Gly Ser Pro Glu Asp Asn Glu Gln Lys Gln Leu Phe Val Glu
1445 1450 1455

Gln His Lys His Tyr Leu Asp Glu Ile Ile Glu Gln Ile Ser Glu
1460 1465 1470

Phe Ser Lys Arg Val Ile Leu Ala Asp Ala Asn Leu Asp Lys Val
1475 1480 1485

Leu Ser Ala Tyr Asn Lys His Arg Asp Lys Pro Ile Arg Glu Gln
1490 1495 1500

Ala Glu Asn Ile Ile His Leu Phe Thr Leu Thr Asn Leu Gly Ala
1505 1510 1515

Pro Ala Ala Phe Lys Tyr Phe Asp Thr Thr Ile Asp Arg Lys Gln
1520 1525 1530

Tyr Arg Ser Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln
1535 1540 1545

Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu
1550 1555 1560

Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp Gly Ser Glu
1565 1570 1575

Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
1580 1585

<210> 127

<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 127

```
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15

Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
            20                  25                  30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Tyr Asp Ala Thr Leu
65                  70                  75                  80

Tyr Val Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His His Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Arg Phe Phe Arg Met Pro Arg Arg Val Phe Asn Ala Gln Lys
145                 150                 155                 160
```

```
Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350
```

```
Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
                405                 410                 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
            420                 425                 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
        435                 440                 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
    450                 455                 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465                 470                 475                 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
                485                 490                 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
            500                 505                 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
        515                 520                 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
    530                 535                 540
```

```
Tyr Lys Glu Ile Phe Phe Asp Gln Ser Lys Asn Gly Tyr Ala Gly Tyr
545                 550                 555                 560


Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
                565                 570                 575


Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
            580                 585                 590


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


Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
    610                 615                 620


Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625                 630                 635                 640


Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
                645                 650                 655


Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
            660                 665                 670


Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
        675                 680                 685


Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
    690                 695                 700


Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705                 710                 715                 720


Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
                725                 730                 735
```

```
Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
            740                 745                 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
        755                 760                 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
    770                 775                 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys
785                 790                 795                 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
                805                 810                 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
            820                 825                 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
        835                 840                 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
    850                 855                 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865                 870                 875                 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
                885                 890                 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
            900                 905                 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
        915                 920                 925
```

```
Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
    930                 935                 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945                 950                 955                 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
                965                 970                 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln
            980                 985                 990

Ile Leu Lys Glu His Pro Val Glu  Asn Thr Gln Leu Gln  Asn Glu Lys
        995                 1000                1005

Leu Tyr  Leu Tyr Tyr Leu Gln  Asn Gly Arg Asp Met  Tyr Val Asp
    1010                1015                1020

Gln Glu  Leu Asp Ile Asn Arg  Leu Ser Asp Tyr Asp  Val Asp His
    1025                1030                1035

Ile Val  Pro Gln Ser Phe Leu  Lys Asp Asp Ser Ile  Asp Asn Lys
    1040                1045                1050

Val Leu  Thr Arg Ser Asp Lys  Asn Arg Gly Lys Ser  Asp Asn Val
    1055                1060                1065

Pro Ser  Glu Glu Val Val Lys  Lys Met Lys Asn Tyr  Trp Arg Gln
    1070                1075                1080

Leu Leu  Asn Ala Lys Leu Ile  Thr Gln Arg Lys Phe  Asp Asn Leu
    1085                1090                1095

Thr Lys  Ala Glu Arg Gly Gly  Leu Ser Glu Leu Asp  Lys Ala Gly
    1100                1105                1110
```

```
Phe Ile  Lys Arg Gln Leu Val  Glu Thr Arg Gln Ile  Thr Lys His
    1115                1120                1125

Val Ala  Gln Ile Leu Asp Ser  Arg Met Asn Thr Lys  Tyr Asp Glu
    1130                1135                1140

Asn Asp  Lys Leu Ile Arg Glu  Val Lys Val Ile Thr  Leu Lys Ser
    1145                1150                1155

Lys Leu  Val Ser Asp Phe Arg  Lys Asp Phe Gln Phe  Tyr Lys Val
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290
```

```
Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470
```

```
Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                 1480                 1485


Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                 1495                 1500


Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                 1510                 1515


Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Gln
    1520                 1525                 1530


Tyr Arg  Ser Thr Lys Glu Val  Leu Asp Ala Thr Leu  Ile His Gln
    1535                 1540                 1545


Ser Ile  Thr Gly Leu Tyr Glu  Thr Arg Ile Asp Leu  Ser Gln Leu
    1550                 1555                 1560


Gly Gly  Asp Glu Gly Ala Asp  Lys Arg Thr Ala Asp  Gly Ser Glu
    1565                 1570                 1575


Phe Glu  Ser Pro Lys Lys Lys  Arg Lys Val
    1580                 1585


<210> 128
<211> 1588
<212> PRT
<213> Artificial Sequence

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

<400> 128
Met Ser Glu Val Glu Phe Ser His Glu Tyr Trp Met Arg His Ala Leu
1               5                  10                  15


Thr Leu Ala Lys Arg Ala Arg Asp Glu Arg Glu Val Pro Val Gly Ala
```

```
            20                  25                  30

Val Leu Val Leu Asn Asn Arg Val Ile Gly Glu Gly Trp Asn Arg Ala
        35                  40                  45

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

Gln Gly Gly Leu Val Met Gln Asn Tyr Arg Leu Ile Asp Ala Thr Leu
65                  70                  75                  80

Tyr Ser Thr Phe Glu Pro Cys Val Met Cys Ala Gly Ala Met Ile His
                85                  90                  95

Ser Arg Ile Gly Arg Val Val Phe Gly Val Arg Asn Ala Lys Thr Gly
            100                 105                 110

Ala Ala Gly Ser Leu Met Asp Val Leu His Tyr Pro Gly Met Asn His
        115                 120                 125

Arg Val Glu Ile Thr Glu Gly Ile Leu Ala Asp Glu Cys Ala Ala Leu
    130                 135                 140

Leu Cys Tyr Phe Phe Arg Met Pro Arg Arg Val Phe Asn Ala Gln Lys
145                 150                 155                 160

Lys Ala Gln Ser Ser Thr Asp Ser Gly Gly Ser Ser Gly Gly Ser Ser
                165                 170                 175

Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro Glu Ser Ser
            180                 185                 190

Gly Gly Ser Ser Gly Gly Ser Asp Lys Lys Tyr Ser Ile Gly Leu Ala
        195                 200                 205

Ile Gly Thr Asn Ser Val Gly Trp Ala Val Ile Thr Asp Glu Tyr Lys
```

```
    210                 215                 220

Val Pro Ser Lys Lys Phe Lys Val Leu Gly Asn Thr Asp Arg His Ser
225                 230                 235                 240

Ile Lys Lys Asn Leu Ile Gly Ala Leu Leu Phe Asp Ser Gly Glu Thr
                245                 250                 255

Ala Glu Ala Thr Arg Leu Lys Arg Thr Ala Arg Arg Arg Tyr Thr Arg
            260                 265                 270

Arg Lys Asn Arg Ile Cys Tyr Leu Gln Glu Ile Phe Ser Asn Glu Met
        275                 280                 285

Ala Lys Val Asp Asp Ser Phe Phe His Arg Leu Glu Glu Ser Phe Leu
    290                 295                 300

Val Glu Glu Asp Lys Lys His Glu Arg His Pro Ile Phe Gly Asn Ile
305                 310                 315                 320

Val Asp Glu Val Ala Tyr His Glu Lys Tyr Pro Thr Ile Tyr His Leu
                325                 330                 335

Arg Lys Lys Leu Val Asp Ser Thr Asp Lys Ala Asp Leu Arg Leu Ile
            340                 345                 350

Tyr Leu Ala Leu Ala His Met Ile Lys Phe Arg Gly His Phe Leu Ile
        355                 360                 365

Glu Gly Asp Leu Asn Pro Asp Asn Ser Asp Val Asp Lys Leu Phe Ile
    370                 375                 380

Gln Leu Val Gln Thr Tyr Asn Gln Leu Phe Glu Glu Asn Pro Ile Asn
385                 390                 395                 400

Ala Ser Gly Val Asp Ala Lys Ala Ile Leu Ser Ala Arg Leu Ser Lys
```

405 410 415

Ser Arg Arg Leu Glu Asn Leu Ile Ala Gln Leu Pro Gly Glu Lys Lys
420 425 430

Asn Gly Leu Phe Gly Asn Leu Ile Ala Leu Ser Leu Gly Leu Thr Pro
435 440 445

Asn Phe Lys Ser Asn Phe Asp Leu Ala Glu Asp Ala Lys Leu Gln Leu
450 455 460

Ser Lys Asp Thr Tyr Asp Asp Asp Leu Asp Asn Leu Leu Ala Gln Ile
465 470 475 480

Gly Asp Gln Tyr Ala Asp Leu Phe Leu Ala Ala Lys Asn Leu Ser Asp
485 490 495

Ala Ile Leu Leu Ser Asp Ile Leu Arg Val Asn Thr Glu Ile Thr Lys
500 505 510

Ala Pro Leu Ser Ala Ser Met Ile Lys Arg Tyr Asp Glu His His Gln
515 520 525

Asp Leu Thr Leu Leu Lys Ala Leu Val Arg Gln Gln Leu Pro Glu Lys
530 535 540

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

Ile Asp Gly Gly Ala Ser Gln Glu Glu Phe Tyr Lys Phe Ile Lys Pro
565 570 575

Ile Leu Glu Lys Met Asp Gly Thr Glu Glu Leu Leu Val Lys Leu Asn
580 585 590

Arg Glu Asp Leu Leu Arg Lys Gln Arg Thr Phe Asp Asn Gly Ser Ile

595 600 605

Pro His Gln Ile His Leu Gly Glu Leu His Ala Ile Leu Arg Arg Gln
610 615 620

Glu Asp Phe Tyr Pro Phe Leu Lys Asp Asn Arg Glu Lys Ile Glu Lys
625 630 635 640

Ile Leu Thr Phe Arg Ile Pro Tyr Tyr Val Gly Pro Leu Ala Arg Gly
645 650 655

Asn Ser Arg Phe Ala Trp Met Thr Arg Lys Ser Glu Glu Thr Ile Thr
660 665 670

Pro Trp Asn Phe Glu Glu Val Val Asp Lys Gly Ala Ser Ala Gln Ser
675 680 685

Phe Ile Glu Arg Met Thr Asn Phe Asp Lys Asn Leu Pro Asn Glu Lys
690 695 700

Val Leu Pro Lys His Ser Leu Leu Tyr Glu Tyr Phe Thr Val Tyr Asn
705 710 715 720

Glu Leu Thr Lys Val Lys Tyr Val Thr Glu Gly Met Arg Lys Pro Ala
725 730 735

Phe Leu Ser Gly Glu Gln Lys Lys Ala Ile Val Asp Leu Leu Phe Lys
740 745 750

Thr Asn Arg Lys Val Thr Val Lys Gln Leu Lys Glu Asp Tyr Phe Lys
755 760 765

Lys Ile Glu Cys Phe Asp Ser Val Glu Ile Ser Gly Val Glu Asp Arg
770 775 780

Phe Asn Ala Ser Leu Gly Thr Tyr His Asp Leu Leu Lys Ile Ile Lys

785 790 795 800

Asp Lys Asp Phe Leu Asp Asn Glu Glu Asn Glu Asp Ile Leu Glu Asp
805 810 815

Ile Val Leu Thr Leu Thr Leu Phe Glu Asp Arg Glu Met Ile Glu Glu
820 825 830

Arg Leu Lys Thr Tyr Ala His Leu Phe Asp Asp Lys Val Met Lys Gln
835 840 845

Leu Lys Arg Arg Arg Tyr Thr Gly Trp Gly Arg Leu Ser Arg Lys Leu
850 855 860

Ile Asn Gly Ile Arg Asp Lys Gln Ser Gly Lys Thr Ile Leu Asp Phe
865 870 875 880

Leu Lys Ser Asp Gly Phe Ala Asn Arg Asn Phe Met Gln Leu Ile His
885 890 895

Asp Asp Ser Leu Thr Phe Lys Glu Asp Ile Gln Lys Ala Gln Val Ser
900 905 910

Gly Gln Gly Asp Ser Leu His Glu His Ile Ala Asn Leu Ala Gly Ser
915 920 925

Pro Ala Ile Lys Lys Gly Ile Leu Gln Thr Val Lys Val Val Asp Glu
930 935 940

Leu Val Lys Val Met Gly Arg His Lys Pro Glu Asn Ile Val Ile Glu
945 950 955 960

Met Ala Arg Glu Asn Gln Thr Thr Gln Lys Gly Gln Lys Asn Ser Arg
965 970 975

Glu Arg Met Lys Arg Ile Glu Glu Gly Ile Lys Glu Leu Gly Ser Gln

980 985 990

Ile Leu Lys Glu His Pro Val Glu Asn Thr Gln Leu Gln Asn Glu Lys
995 1000 1005

Leu Tyr Leu Tyr Tyr Leu Gln Asn Gly Arg Asp Met Tyr Val Asp
1010 1015 1020

Gln Glu Leu Asp Ile Asn Arg Leu Ser Asp Tyr Asp Val Asp His
1025 1030 1035

Ile Val Pro Gln Ser Phe Leu Lys Asp Asp Ser Ile Asp Asn Lys
1040 1045 1050

Val Leu Thr Arg Ser Asp Lys Asn Arg Gly Lys Ser Asp Asn Val
1055 1060 1065

Pro Ser Glu Glu Val Val Lys Lys Met Lys Asn Tyr Trp Arg Gln
1070 1075 1080

Leu Leu Asn Ala Lys Leu Ile Thr Gln Arg Lys Phe Asp Asn Leu
1085 1090 1095

Thr Lys Ala Glu Arg Gly Gly Leu Ser Glu Leu Asp Lys Ala Gly
1100 1105 1110

Phe Ile Lys Arg Gln Leu Val Glu Thr Arg Gln Ile Thr Lys His
1115 1120 1125

Val Ala Gln Ile Leu Asp Ser Arg Met Asn Thr Lys Tyr Asp Glu
1130 1135 1140

Asn Asp Lys Leu Ile Arg Glu Val Lys Val Ile Thr Leu Lys Ser
1145 1150 1155

Lys Leu Val Ser Asp Phe Arg Lys Asp Phe Gln Phe Tyr Lys Val

```
    1160                1165                1170

Arg Glu  Ile Asn Asn Tyr His  His Ala His Asp Ala  Tyr Leu Asn
    1175                1180                1185

Ala Val  Val Gly Thr Ala Leu  Ile Lys Lys Tyr Pro  Lys Leu Glu
    1190                1195                1200

Ser Glu  Phe Val Tyr Gly Asp  Tyr Lys Val Tyr Asp  Val Arg Lys
    1205                1210                1215

Met Ile  Ala Lys Ser Glu Gln  Glu Ile Gly Lys Ala  Thr Ala Lys
    1220                1225                1230

Tyr Phe  Phe Tyr Ser Asn Ile  Met Asn Phe Phe Lys  Thr Glu Ile
    1235                1240                1245

Thr Leu  Ala Asn Gly Glu Ile  Arg Lys Arg Pro Leu  Ile Glu Thr
    1250                1255                1260

Asn Gly  Glu Thr Gly Glu Ile  Val Trp Asp Lys Gly  Arg Asp Phe
    1265                1270                1275

Ala Thr  Val Arg Lys Val Leu  Ser Met Pro Gln Val  Asn Ile Val
    1280                1285                1290

Lys Lys  Thr Glu Val Gln Thr  Gly Gly Phe Ser Lys  Glu Ser Ile
    1295                1300                1305

Leu Pro  Lys Arg Asn Ser Asp  Lys Leu Ile Ala Arg  Lys Lys Asp
    1310                1315                1320

Trp Asp  Pro Lys Lys Tyr Gly  Gly Phe Val Ser Pro  Thr Val Ala
    1325                1330                1335

Tyr Ser  Val Leu Val Val Ala  Lys Val Glu Lys Gly  Lys Ser Lys
```

```
    1340                1345                1350

Lys Leu  Lys Ser Val Lys Glu  Leu Leu Gly Ile Thr  Ile Met Glu
    1355                1360                1365

Arg Ser  Ser Phe Glu Lys Asn  Pro Ile Asp Phe Leu  Glu Ala Lys
    1370                1375                1380

Gly Tyr  Lys Glu Val Lys Lys  Asp Leu Ile Ile Lys  Leu Pro Lys
    1385                1390                1395

Tyr Ser  Leu Phe Glu Leu Glu  Asn Gly Arg Lys Arg  Met Leu Ala
    1400                1405                1410

Ser Ala  Arg Glu Leu Gln Lys  Gly Asn Glu Leu Ala  Leu Pro Ser
    1415                1420                1425

Lys Tyr  Val Asn Phe Leu Tyr  Leu Ala Ser His Tyr  Glu Lys Leu
    1430                1435                1440

Lys Gly  Ser Pro Glu Asp Asn  Glu Gln Lys Gln Leu  Phe Val Glu
    1445                1450                1455

Gln His  Lys His Tyr Leu Asp  Glu Ile Ile Glu Gln  Ile Ser Glu
    1460                1465                1470

Phe Ser  Lys Arg Val Ile Leu  Ala Asp Ala Asn Leu  Asp Lys Val
    1475                1480                1485

Leu Ser  Ala Tyr Asn Lys His  Arg Asp Lys Pro Ile  Arg Glu Gln
    1490                1495                1500

Ala Glu  Asn Ile Ile His Leu  Phe Thr Leu Thr Asn  Leu Gly Ala
    1505                1510                1515

Pro Ala  Ala Phe Lys Tyr Phe  Asp Thr Thr Ile Asp  Arg Lys Gln
```

1520 1525 1530

Tyr Arg Ser Thr Lys Glu Val Leu Asp Ala Thr Leu Ile His Gln
1535 1540 1545

Ser Ile Thr Gly Leu Tyr Glu Thr Arg Ile Asp Leu Ser Gln Leu
1550 1555 1560

Gly Gly Asp Glu Gly Ala Asp Lys Arg Thr Ala Asp Gly Ser Glu
1565 1570 1575

Phe Glu Ser Pro Lys Lys Lys Arg Lys Val
1580 1585

<210> 129
<211> 4
<212> PRT
<213> Artificial Sequence

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

<400> 129
Ser Gly Gly Ser
1

<210> 130
<211> 4
<212> PRT
<213> Artificial Sequence

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

<400> 130
Gly Gly Gly Ser
1

<210> 131

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

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

<400> 131
Gly Gly Gly Gly Ser
1 5

<210> 132
<211> 5
<212> PRT
<213> Artificial Sequence

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

<400> 132
Glu Ala Ala Ala Lys
1 5

<210> 133
<211> 21
<212> PRT
<213> Artificial Sequence

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

<220>
<221> MISC_FEATURE
<222> (1)..(21)
<223> This sequence may encompass 1, 3 or 7 "Gly Gly Ser" repeating units

<400> 133
Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly
1 5 10 15

Gly Ser Gly Gly Ser
20

<210> 134
<211> 5
<212> PRT
<213> Artificial Sequence

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

<400> 134
Pro Ala Pro Ala Pro
1 5

<210> 135
<211> 6
<212> PRT
<213> Artificial Sequence

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

<400> 135
Pro Ala Pro Ala Pro Ala
1 5

<210> 136
<211> 7
<212> PRT
<213> Artificial Sequence

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

<400> 136
Pro Ala Pro Ala Pro Ala Pro
1 5

<210> 137
<211> 8

<212> PRT
<213> Artificial Sequence

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

<400> 137
Pro Ala Pro Ala Pro Ala Pro Ala
1 5

<210> 138
<211> 9
<212> PRT
<213> Artificial Sequence

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

<400> 138
Pro Ala Pro Ala Pro Ala Pro Ala Pro
1 5

<210> 139
<211> 15
<212> PRT
<213> Artificial Sequence

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

<400> 139
Pro Ala Pro Ala Pro Ala Pro Ala Pro Ala Pro Ala Pro Ala Pro
1 5 10 15

<210> 140
<211> 21
<212> PRT
<213> Artificial Sequence

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

<400> 140
Pro Ala Pro Ala Pro Ala Pro Ala Pro Ala Pro Ala Pro Ala Pro Ala
1   5   10   15

Pro Ala Pro Ala Pro
            20

<210> 141
<211> 117
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (98)..(117)
<223> a, c, t, g, unknown or other

<400> 141
gttctgtctt ttggtcagga caaccgtcta gctataagtg ctgcagggtg tgagaaactc   60

ctattgctgg acgatgtctc ttacgaggca ttagcacnnn nnnnnnnnnn nnnnnnn   117

<210> 142
<211> 108
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (89)..(108)
<223> a, c, t, g, unknown or other

<400> 142
gacctatagg gtcaatgaat ctgtgcgtgt gccataagta attaaaaatt acccaccaca   60

ggagcacctg aaaacaggtg cttggcacnn nnnnnnnnnn nnnnnnnn 108

<210> 143
<211> 119
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (100)..(119)
<223> a, c, t, g, unknown or other

<400> 143
gtctaaagga cagaattttt caacgggtgt gccaatggcc actttccagg tggcaaagcc 60

cgttgaactt ctcaaaaaga acgatctgag aagtggcacn nnnnnnnnnn nnnnnnnn 119

<210> 144
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 144
gugggaagg ggcccccaag 20

<210> 145
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 145

auugagauag ugugggggaag 20

<210> 146
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 146
cauugagaua gugugggggaa 20

<210> 147
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 147
gcauugagau agugugggga 20

<210> 148
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 148
gcuauugguc aaggcaaggc 20

<210> 149
<211> 20
<212> RNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<400> 149
caaggcuauu ggucaaggca 20

<210> 150
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 150
cuugucaagg cuauugguca 20

<210> 151
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 151
cuugaccaau agccuugaca 20

<210> 152
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 152
guuugccuug ucaaggcuau 20

<210> 153
<211> 20

<212> RNA
<213> Artificial Sequence

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

<400> 153
uggucaaguu ugccuuguca 20

<210> 154
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 154
uggggaaggg gcccccaaga 20

<210> 155
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 155
guguggggaa ggggccccca 20

<210> 156
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 156
ucagacagau auuugcauug 20

<210> 157
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 157
uuucagacag auauuugcau 20

<210> 158
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 158
cuugccuuga ccaauagccu 20

<210> 159
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 159
uagccuugac aaggcaaacu 20

<210> 160
<211> 20
<212> RNA
<213> Artificial Sequence

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

oligonucleotide

<400> 160
caaacuugac caauagucuu 20

<210> 161
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 161
uguggggaag gggcccccaa 20

<210> 162
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 162
gggccccuuc cccacacuau 20

<210> 163
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 163
cagacagaua uuugcauuga 20

<210> 164
<211> 20
<212> RNA

<213> Artificial Sequence

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

<400> 164
gccuugacaa ggcaaacuug 20

<210> 165
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 165
uugacaaggc aaacuugacc 20

<210> 166
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 166
ugaccaauag ucuuagagua 20

<210> 167
<211> 23
<212> RNA
<213> Artificial Sequence

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

<400> 167
agacagauau uugcauugag aua 23

<210> 168
<211> 6
<212> PRT
<213> Artificial Sequence

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

<400> 168
Gly Gly Ser Gly Gly Ser
1 5

<210> 169
<211> 20
<212> PRT
<213> Artificial Sequence

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

<400> 169
Gly Ser Ser Gly Ser Glu Thr Pro Gly Thr Ser Glu Ser Ala Thr Pro
1 5 10 15

Glu Ser Ser Gly
20

<210> 170
<211> 18
<212> DNA
<213> Artificial Sequence

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

<400> 170
ggaggctctg gaggaagc 18

<210> 171
<211> 60

<212> DNA
<213> Artificial Sequence

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

<400> 171
ggctcttctg gatctgaaac acctggcaca agcgagagcg ccacccctga gagctctggc 60

<210> 172
<211> 17
<212> PRT
<213> Artificial Sequence

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

<400> 172
Met Ala Pro Lys Lys Lys Arg Lys Val Gly Ile His Gly Val Pro Ala
1 5 10 15

Ala

<210> 173
<211> 51
<212> DNA
<213> Artificial Sequence

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

<400> 173
atggccccaa agaagaagcg gaaggtcggt atccacggag tcccagcagc c 51

<210> 174
<211> 933
<212> DNA
<213> Unknown

<220>

<223> Description of Unknown:
inactivated kanamycin resistance gene sequence

<400> 174
ccggaattgc cagctggggc gccctctggt aaggttggga agccctgcaa agtaaactgg 60

atggctttct tgccgccaag gatctgatgg cgcaggggat caagatctga tcaagagaca 120

ggatgaggat cctttcgcat gatcgaataa gatggattgc acgcaggttc tccggccgct 180

taggtggagc gcctattcgg ctatgactgg gcacaacaga caatcggctg ctctgatgcc 240

gccgtgttcc ggctgtcagc gcaggggcgc ccggttcttt ttgtcaagac cgacctgtcc 300

ggtgccctga atgaactgca ggacgaggca gcgcggctat cgtggctggc cacgacgggc 360

gttccttgcg cagctgtgct cgacgttgtc actgaagcgg gaagggactg gctgctattg 420

ggcgaagtgc cggggcagga tctcctgtca tctcaccttg ctcctgccga gaaagtatcc 480

atcatggctg atgcaatgcg gcggctgcat acgcttgatc cggctacctg cccattcgac 540

caccaagcga aacatcgcat cgagcgagca cgtactcgga tggaagccgg tcttgtcgat 600

caggatgatc tggacgaaga gcatcagggg ctcgcgccag ccgaactgtt cgccaggctc 660

aaggcgcgca tgcccgacgg cgaggatctc gtcgtgaccc atggcgatgc ctgcttgccg 720

aatatcatgg tggaaaatgg ccgcttttct ggattcatta actgtggccg gctgggtgtg 780

gcggaccgct atcaggacat agcgttggct acccgtgata ttgctgaaga gcttggcggc 840

gaatgggctg accgcttcct cgtgctttac ggtatcgccg ctcccgattc gcagcgcatc 900

gccttctatc gccttcttga cgagttcttc taa 933

<210> 175
<211> 100
<212> RNA
<213> Artificial Sequence

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

<400> 175
cuugaccaau agccuugaca guuuuagagc uagaaauagc aaguuaaaau aaggcuaguc 60

cguuaucaac uugaaaaagu ggcaccgagu cggugcuuuu 100

<210> 176
<211> 100
<212> RNA
<213> Artificial Sequence

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

<400> 176
cuugaccaau agccuugaca guuuuagagc uagaaauagc aaguuaaaau aaggcuaguc 60

cguuaucaac uugaaaaagu ggcaccgagu cggugcuuuu 100

<210> 177
<211> 23
<212> DNA
<213> Homo sapiens

<400> 177
cttgaccaat agccttgaca agg 23

<210> 178
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 178
gaacacaaag cauagacugc 20

<210> 179
<211> 20
<212> RNA
<213> Artificial Sequence

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

oligonucleotide

<400> 179
gggaaagacc cagcauccgu 20

<210> 180
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 180
gcucccauca caucaaccgg 20

<210> 181
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 181
ggugagugag ugugugcgug 20

<210> 182
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 182
ggcuucaggu ucuaaaugag 20

<210> 183
<211> 20
<212> RNA

<213> Artificial Sequence

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

<400> 183
gcagagaguc gccgucucca 20

<210> 184
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 184
guguaagacc ucaaaagcac 20

<210> 185
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 185
gaugagaagg agaaguucuu 20

<210> 186
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 186
gaggacaaag uacaaacggc 20

<210> 187
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 187
gccaccacag ggaagcuggg 20

<210> 188
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 188
gcucucaggc ccuguccgca 20

<210> 189
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 189
gagcaaauac cagagauaag 20

<210> 190
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 190
gaucaggaaa uagagccaca 20

<210> 191
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 191
gcccaucccu gaguccagcg 20

<210> 192
<211> 23
<212> RNA
<213> Artificial Sequence

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

<400> 192
gaacacgaag acaucugaag gua 23

<210> 193
<211> 23
<212> RNA
<213> Artificial Sequence

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

<400> 193
gauuuacagc cuggccuuug ggg 23

<210> 194
<211> 22
<212> RNA
<213> Artificial Sequence

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

<400> 194
ggagagaaag agaaguugau ug 22

<210> 195
<211> 22
<212> RNA
<213> Artificial Sequence

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

<400> 195
gagggugagg gaugagauaa ug 22

<210> 196
<211> 22
<212> RNA
<213> Artificial Sequence

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

<400> 196
gguggaggag ggugcauggg gu 22

<210> 197
<211> 22
<212> RNA
<213> Artificial Sequence

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

<400> 197
gcuguugcau gaggaaaggg ac 22

<210> 198
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 198
ggcccagacu gagcacguga 20

<210> 199
<211> 20
<212> RNA
<213> Artificial Sequence

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

<400> 199
ggcacugcgg cuggaggugg 20

<210> 200
<211> 21
<212> RNA
<213> Artificial Sequence

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

<400> 200
gcagagcacu ggaauucguc a 21

<210> 201
<211> 76
<212> RNA
<213> Artificial Sequence

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

<400> 201
guuuuagagc uagaaauagc aaguuaaaau aaggcuaguc cguuaucaac uugaaaaagu 60

ggcaccgagu cggugc 76

<210> 202
<211> 84
<212> RNA
<213> Artificial Sequence

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

<400> 202
guuuuaguac ucuguaauga aaauuacaga aucuacuaaa acaaggcaaa augccguguu 60

uaucucguca acuuguuggc gaga 84

<210> 203
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 203
acactctttc cctacacgac gctcttccga tctnnnncca gccccatctg tcaaact 57

<210> 204
<211> 54
<212> DNA
<213> Artificial Sequence

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

<400> 204
tggagttcag acgtgtgctc ttccgatctt gaatggattc cttggaaaca atga 54

<210> 205
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 205
acactctttc cctacacgac gctcttccga tctnnnntga gggagagccg tgtagtt 57

<210> 206
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 206
tggagttcag acgtgtgctc ttccgatctg cctctcaaag tgctgggat 49

<210> 207
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 207
acactctttc cctacacgac gctcttccga tctnnnncca tcaggctctc agctcag 57

<210> 208
<211> 48
<212> DNA
<213> Artificial Sequence

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

<400> 208
tggagttcag acgtgtgctc ttccgatctc tcgtgggttt gtggttgc 48

<210> 209
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 209
acactctttc cctacacgac gctcttccga tctnnnngcc attcccctct ttagcca 57

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

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

<400> 210
tggagttcag acgtgtgctc ttccgatctg agccgttccc tctttgcta 49

<210> 211
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 211
acactctttc cctacacgac gctcttccga tctnnnnaac ctgtgtgaca cttggca 57

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

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

<400> 212
tggagttcag acgtgtgctc ttccgatctg tctggcccaa gatcacaca 49

<210> 213
<211> 56
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(36)
<223> a, c, t, g, unknown or other

<400> 213
acactctttc cctacacgac gctcttccga tctnnncacg gataaagacg ctggga 56

<210> 214
<211> 47
<212> DNA
<213> Artificial Sequence

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

<400> 214
tggagttcag acgtgtgctc ttccgatctg gggtcccagg tgctgac 47

<210> 215
<211> 56
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(36)
<223> a, c, t, g, unknown or other

<400> 215
acactctttc cctacacgac gctcttccga tctnnnttga ttgtctcctt tgccgc 56

<210> 216
<211> 53
<212> DNA
<213> Artificial Sequence

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

<400> 216
tggagttcag acgtgtgctc ttccgatctt gacccagtgt ttgatagatc agt 53

<210> 217
<211> 56
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(36)
<223> a, c, t, g, unknown or other

<400> 217
acactctttc cctacacgac gctcttccga tctnnncacc ccttcagtcc atgctt 56

<210> 218
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 218
tggagttcag acgtgtgctc ttccgatctt ctgatgggga ggaacgagt 49

<210> 219
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 219
acactctttc cctacacgac gctcttccga tctnnnncag ctcagcctga gtgttga 57

<210> 220
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 220
tggagttcag acgtgtgctc ttccgatctg cccaccctag tcattggag 49

<210> 221
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 221
acactctttc cctacacgac gctcttccga tctnnnngtc agagggacac actgtgg 57

<210> 222
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 222
tggagttcag acgtgtgctc ttccgatctc acactcactc acccacaca 49

<210> 223
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 223
acactctttc cctacacgac gctcttccga tctnnnntgt gtgggtgagt gagtgtg 57

<210> 224
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 224
tggagttcag acgtgtgctc ttccgatctc accaaggttc acagcctga 49

<210> 225
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 225
acactctttc cctacacgac gctcttccga tctnnnnttg tctctgcctg tagctgc 57

<210> 226
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 226
tggagttcag acgtgtgctc ttccgatctc gctctgggct tcatcttca 49

<210> 227
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 227
acactctttc cctacacgac gctcttccga tctnnnntgg gattatgggt gtgagcc 57

<210> 228
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 228
tggagttcag acgtgtgctc ttccgatctt gccttcctcc tctctctcc 49

<210> 229
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 229
acactctttc cctacacgac gctcttccga tctnnnntgc agaccagatt cggagaa 57

<210> 230
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 230
tggagttcag acgtgtgctc ttccgatctg ttcagtttcc agggggtcc 49

<210> 231
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 231
acactctttc cctacacgac gctcttccga tctnnnntcc gcacagcctt agttcaa 57

<210> 232
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 232
tggagttcag acgtgtgctc ttccgatcta acttgaagag acggcagca 49

<210> 233
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 233
acactctttc cctacacgac gctcttccga tctnnnnccc ccagctacag aaaggtc 57

<210> 234
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 234
tggagttcag acgtgtgctc ttccgatcta tttccaccgc aaaatggcc 49

<210> 235
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 235
acactctttc cctacacgac gctcttccga tctnnnntca cttcagccca ggagtat 57

<210> 236
<211> 51
<212> DNA
<213> Artificial Sequence

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

<400> 236
tggagttcag acgtgtgctc ttccgatctt gtgtatggtg agaggtaggg a 51

<210> 237
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 237
acactctttc cctacacgac gctcttccga tctnnnngtc tgaggtcaca cagtggg 57

<210> 238
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 238
tggagttcag acgtgtgctc ttccgatctc tgagagcagg gaccacatc 49

<210> 239
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 239
acactctttc cctacacgac gctcttccga tctnnnnggg aggtggagag aggatgt 57

<210> 240
<211> 54
<212> DNA
<213> Artificial Sequence

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

<400> 240
tggagttcag acgtgtgctc ttccgatcta ctcttcctga ggtctaggaa cccg 54

<210> 241
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 241
acactctttc cctacacgac gctcttccga tctnnnnccc tgttcctaaa gcccacc 57

<210> 242
<211> 53
<212> DNA
<213> Artificial Sequence

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

<400> 242
tggagttcag acgtgtgctc ttccgatcta ctctctggtt ctgtttgtgg cca 53

<210> 243
<211> 60
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 243
acactctttc cctacacgac gctcttccga tctnnnnatt tgatggagtt ggacatggcc 60

<210> 244
<211> 46
<212> DNA
<213> Artificial Sequence

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

<400> 244
tggagttcag acgtgtgctc tccagctact tgttcttgag tgaagg 46

<210> 245
<211> 59
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 245
acactctttc cctacacgac gctcttccga tctnnnntgg ctttccaaat cagtgggtc 59

<210> 246
<211> 52
<212> DNA
<213> Artificial Sequence

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

<400> 246
tggagttcag acgtgtgctc ttccgatctc tcataagctt agaccaacaa gc 52

<210> 247
<211> 58
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 247
acactctttc cctacacgac gctcttccga tctnnnnctg gttgaccaat ctgtggtg 58

<210> 248
<211> 41
<212> DNA
<213> Artificial Sequence

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

<400> 248
tggagttcag acgtgtgctc tctgcgtctg gatcaggtac g 41

<210> 249
<211> 58
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 249
acactctttc cctacacgac gctcttccga tctnnnngtg tggagagtga gtaagcca 58

<210> 250
<211> 50
<212> DNA
<213> Artificial Sequence

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

<400> 250
tggagttcag acgtgtgctc ttccgatcta cggtaggatg atttcaggca 50

<210> 251
<211> 58
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 251
acactctttc cctacacgac gctcttccga tctnnnncac aaagcagtgt agctcagg 58

<210> 252
<211> 54
<212> DNA
<213> Artificial Sequence

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

<400> 252
tggagttcag acgtgtgctc ttccgatctt ttttggtact cgagtgttat tcag 54

<210> 253
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 253
acactctttc cctacacgac gctcttccga tctnnnntcc cctgttgacc tggagaa 57

<210> 254
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 254
tggagttcag acgtgtgctc ttccgatctc actgtacttg ccctgacca 49

<210> 255
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 255
acactctttc cctacacgac gctcttccga tctnnnnttg gtgttgacag ggagcaa 57

<210> 256
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 256
tggagttcag acgtgtgctc ttccgatctc tgagatgtgg gcagaaggg 49

<210> 257
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 257
acactctttc cctacacgac gctcttccga tctnnnntga gagggaacag aagggct 57

<210> 258
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 258
tggagttcag acgtgtgctc ttccgatctg tccaaaggcc caagaacct 49

<210> 259
<211> 58
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 259
acactctttc cctacacgac gctcttccga tctnnnntcc tagcactttg gaaggtcg 58

<210> 260
<211> 51
<212> DNA
<213> Artificial Sequence

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

<400> 260
tggagttcag acgtgtgctc ttccgatctg ctcatcttaa tctgctcagc c 51

<210> 261
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 261
acactctttc cctacacgac gctcttccga tctnnnnaaa ggagcagctc ttcctgg 57

<210> 262
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 262
tggagttcag acgtgtgctc ttccgatctg tctgcaccat ctcccacaa 49

<210> 263
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 263
acactctttc cctacacgac gctcttccga tctnnnnggc atggcttctg agactca 57

<210> 264
<211> 53
<212> DNA
<213> Artificial Sequence

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

<400> 264
tggagttcag acgtgtgctc ttccgatctg tctcccttgc actccctgtc ttt 53

<210> 265
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 265
acactctttc cctacacgac gctcttccga tctnnnnttt ggcaatggag gcattgg 57

<210> 266
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 266
tggagttcag acgtgtgctc ttccgatctg aagaggctgc ccatgagag 49

<210> 267
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 267
acactctttc cctacacgac gctcttccga tctnnnnggt ctgaggctcg aatcctg 57

<210> 268
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 268
tggagttcag acgtgtgctc ttccgatctc tgtggcctcc atatccctg 49

<210> 269
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 269
acactctttc cctacacgac gctcttccga tctnnnnttt ccaccagaac tcagccc 57

<210> 270
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 270
tggagttcag acgtgtgctc ttccgatctc ctcggttcct ccacaacac 49

<210> 271
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 271
acactctttc cctacacgac gctcttccga tctnnnncac gggaaggaca ggagaag 57

<210> 272
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 272
tggagttcag acgtgtgctc ttccgatctg caggggaggg ataaagcag 49

<210> 273
<211> 59
<212> DNA
<213> Artificial Sequence

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

<220>

<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 273
acactctttc cctacacgac gctcttccga tctnnnngga aacgcccatg caattagtc 59

<210> 274
<211> 51
<212> DNA
<213> Artificial Sequence

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

<400> 274
tggagttcag acgtgtgctc ttccgatctc ttgtcaacca gtatcccggt g 51

<210> 275
<211> 61
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 275
acactctttc cctacacgac gctcttccga tctnnnntga atggattcct tggaaacaat 60

g 61

<210> 276
<211> 49
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
primer

<400> 276
tggagttcag acgtgtgctc ttccgatctc agccccatc tgtcaaact 49

<210> 277
<211> 49
<212> DNA
<213> Artificial Sequence

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

<400> 277
tggagttcag acgtgtgctc ttccgatctt cctttcaacc cgaacggag 49

<210> 278
<211> 57
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 278
acactctttc cctacacgac gctcttccga tctnnnngct ggtcttcttt cccctcc 57

<210> 279
<211> 59
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (34)..(37)
<223> a, c, t, g, unknown or other

<400> 279
acactctttc cctacacgac gctcttccga tctnnnngcc ctgcttcttt ttctctggt 59

<210> 280
<211> 51
<212> DNA
<213> Artificial Sequence

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

<400> 280
tggagttcag acgtgtgctc ttccgatcta ccattaacgc agccaacttc a 51

<210> 281
<211> 60
<212> DNA
<213> Artificial Sequence

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

<400> 281
acactctttc cctacacgac gctcttccga tctcatgagg tctatggact tcaagagcaa 60

<210> 282
<211> 56
<212> DNA
<213> Artificial Sequence

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

<400> 282
tggagttcag acgtgtgctc ttccgatctc atcattgacc agagctctgg gcagaa 56

<210> 283
<211> 60
<212> DNA
<213> Artificial Sequence

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

<400> 283
acactctttc cctacacgac gctcttccga tctgcactta ccagcattac ttcctaaacc 60

<210> 284
<211> 55
<212> DNA
<213> Artificial Sequence

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

<400> 284
tggagttcag acgtgtgctc ttccgatcta tgggctccac ttttcagctc tgtaa 55

<210> 285
<211> 57
<212> DNA
<213> Artificial Sequence

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

<400> 285
acactctttc cctacacgac gctcttccga tctcagttca ggcacatgta ggaggga 57

<210> 286
<211> 56
<212> DNA
<213> Artificial Sequence

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

<400> 286
tggagttcag acgtgtgctc ttccgatcta ccgcctgcag ctgtcggaca ctggca 56

<210> 287
<211> 56
<212> DNA
<213> Artificial Sequence

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

<400> 287
acactctttc cctacacgac gctcttccga tctaaaagat gagtatgcct gccgtg 56

<210> 288
<211> 56
<212> DNA
<213> Artificial Sequence

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

<400> 288
tggagttcag acgtgtgctc ttccgatctc agattgttta tatcagatgg gatggg 56

<210> 289
<211> 59
<212> DNA
<213> Artificial Sequence

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

<400> 289
acactctttc cctacacgac gctcttccga tctatgcaag tttggtcctg agccctccc 59

<210> 290
<211> 53
<212> DNA
<213> Artificial Sequence

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

<400> 290
tggagttcag acgtgtgctc ttccgatctg atgtgggttc cctgcgctct gca 53

<210> 291
<211> 57
<212> DNA
<213> Artificial Sequence

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

<400> 291
acactctttc cctacacgac gctcttccga tctccaggga ctgagggtgg aaggtcc 57

<210> 292
<211> 52
<212> DNA
<213> Artificial Sequence

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

<400> 292
tggagttcag acgtgtgctc ttccgatcta cctccgcctg agcagtggag aa 52

<210> 293
<211> 27
<212> DNA
<213> Artificial Sequence

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

<400> 293
tcgagctcgg tacctaatac gactcac 27

<210> 294
<211> 149
<212> DNA
<213> Artificial Sequence

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

<400> 294
ttttttttt ttttttttt ttttttttt ttttttttt ttttttttt ttttttttt 60

ttttttttt ttttttttt ttttttttt ttttttttt ttttttttt ttttttttt 120

cttcctactc aggctttatt caaagacca 149

<210> 295
<211> 13
<212> DNA
<213> Homo sapiens

<400> 295
ttgaccaata gcc 13

<210> 296
<211> 67
<212> DNA
<213> Homo sapiens

<400> 296
tggctaaact ccacccatgg gttggccagc cttgccttga ccaatagcct tgacaaggca 60

aacttga 67

<210> 297
<211> 8
<212> PRT
<213> Artificial Sequence

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

<220>

<221> MOD_RES
<222> (5)..(5)
<223> Val or Ala

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Ser or Pro

<400> 297
His Leu Thr Pro Xaa Glu Lys Xaa
1 5

<210> 298
<211> 25
<212> DNA
<213> Artificial Sequence

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

<400> 298
gcatctgact cctgtggaga agtct 25

<210> 299
<211> 25
<212> DNA
<213> Artificial Sequence

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

<400> 299
agacttctcc acaggagtca gatgc 25

<210> 300
<211> 8
<212> PRT
<213> Artificial Sequence

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

<400> 300
His Leu Thr Pro Val Glu Lys Ser
1 5

<210> 301
<211> 21
<212> DNA
<213> Artificial Sequence

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

<400> 301
acttctcaag gagtcaggtg c 21

<210> 302
<211> 9
<212> PRT
<213> Artificial Sequence

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

<400> 302
Val His Leu Thr Pro Val Glu Lys Ser
1 5

<210> 303
<211> 20
<212> DNA
<213> Artificial Sequence

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

<400> 303
gaacacaaag catagactgc 20

<210> 304
<211> 20

<212> DNA
<213> Artificial Sequence

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

<400> 304
ggacagcttt tcctagacag 20

<210> 305
<211> 8
<212> PRT
<213> Artificial Sequence

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

<220>
<221> MOD_RES
<222> (5)..(5)
<223> Val or Ala

<220>
<221> MOD_RES
<222> (8)..(8)
<223> Ser or Pro

<400> 305
His Leu Thr Pro Xaa Glu Lys Xaa
1 5

<210> 306
<211> 25
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base

<222> (10)..(10)
<223> t or c

<220>
<221> modified_base
<222> (13)..(13)
<223> t or c

<220>
<221> modified_base
<222> (15)..(15)
<223> t or c

<220>
<221> modified_base
<222> (23)..(23)
<223> t or c

<400> 306
gcacctgacn ccngnggaga agnct 25

<210> 307
<211> 25
<212> DNA
<213> Artificial Sequence

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

<220>
<221> modified_base
<222> (3)..(3)
<223> a or g

<220>
<221> modified_base
<222> (11)..(11)
<223> a or g

<220>
<221> modified_base
<222> (13)..(13)
<223> a or g

<220>

<221> modified_base
<222> (16)..(16)
<223> a or g

<400> 307
agncttctcc ncnggngtca ggtgc 25

<210> 308
<211> 101
<212> RNA
<213> Artificial Sequence

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

<400> 308
gacuucucca caggagucag gguuuuagag cuagaaauag caaguuaaaa uaaggcuagu 60

ccguuaucaa cuugaaaaag uggcaccgag ucggugcuuu u 101

<210> 309
<211> 100
<212> RNA
<213> Artificial Sequence

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

<400> 309
acuucuccac aggagucagg guuuuagagc uagaaauagc aaguuaaaau aaggcuaguc 60

cguuaucaac uugaaaaagu ggcaccgagu cggugcuuuu 100

<210> 310
<211> 99
<212> RNA
<213> Artificial Sequence

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

<400> 310

cuucuccaca ggagucaggg uuuuagagcu agaaauagca aguuaaaaua aggcuagucc 60

guuaucaacu ugaaaaagug gcaccgaguc ggugcuuuu 99