Sequence Listing

<110> GENENTECH, INC., et al.

<120> Immunoglobulin Variants and Uses Thereof

<130> P4182R1 WO

<150> US 61/105,086
<151> 2008-10-14

<150> US 61/152,131
<151> 2009-02-12

<150> US 61/171,768
<151> 2009-04-22

<150> US 61/220,514
<151> 2009-06-25

<160> 17

<210> 1
<211> 123
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 1

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Glu | Val | Gln | Leu | Val | Glu | Ser | Gly | Gly | Gly | Leu | Val | Gln | Pro | Gly | |
| 1 | | | | 5 | | | | 10 | | | | | | 15 | |
| Gly | Ser | Leu | Arg | Leu | Ser | Cys | Ala | Ala | Ser | Gly | Tyr | Thr | Phe | Thr | |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Asn | Tyr | Gly | Met | Asn | Trp | Val | Arg | Gln | Ala | Pro | Gly | Lys | Gly | Leu | |
| | | | 35 | | | | | 40 | | | | | 45 | | |
| Glu | Trp | Val | Gly | Trp | Ile | Asn | Thr | Tyr | Thr | Gly | Glu | Pro | Thr | Tyr | |
| | | | 50 | | | | | 55 | | | | | 60 | | |
| Ala | Ala | Asp | Phe | Lys | Arg | Arg | Phe | Thr | Phe | Ser | Leu | Asp | Thr | Ser | |
| | | | 65 | | | | | 70 | | | | | 75 | | |
| Lys | Ser | Thr | Ala | Tyr | Leu | Gln | Met | Asn | Ser | Leu | Arg | Ala | Glu | Asp | |
| | | | 80 | | | | | 85 | | | | | 90 | | |
| Thr | Ala | Val | Tyr | Tyr | Cys | Ala | Lys | Tyr | Pro | His | Tyr | Tyr | Gly | Ser | |
| | | | 95 | | | | | 100 | | | | | 105 | | |

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

 Val Ser Ser


<210> 2
<211> 108
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 2
 Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

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

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

 Val Leu Ile Tyr Phe Thr Ser Ser Leu His Ser Gly Val Pro Ser
                  50                  55                  60

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

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

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

 Ile Lys Arg


<210> 3
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> sequence is synthesized

<400> 3
 Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
   1               5                  10                  15
```

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

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

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

 Ala Ala Asp Phe Lys Arg Arg Phe Thr Phe Ser Leu Asp Thr Ser
                  65                  70                  75

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

 Thr Ala Val Tyr Tyr Cys Ala Lys Tyr Pro Tyr Tyr Tyr Gly Thr
                  95                 100                 105

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

<210> 4
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> sequence is synthesized

<400> 4
 Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

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

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

 Val Leu Ile Tyr Phe Thr Ser Ser Leu His Ser Gly Val Pro Ser
                  50                  55                  60

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

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

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

 Ile Lys Arg Thr Val
```

110

<210> 5
<211> 118
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

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

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

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

Glu Trp Met Gly Glu Ile Tyr Pro Gly Ser Gly Ser Ser Tyr Tyr
50 55 60

Asn Glu Lys Phe Lys Gly Arg Val Thr Met Thr Arg Asp Thr Ser
65 70 75

Thr Ser Thr Val Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp
80 85 90

Thr Ala Val Tyr Tyr Cys Ala Arg Ser Gly Asp Gly Ser Arg Phe
95 100 105

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

<210> 6
<211> 111
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 6
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu
1 5 10 15

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

Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly
35 40 45

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

 Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe
                  65                  70                  75

 Thr Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr
                  80                  85                  90

 Tyr Cys Gln Gln Ser Leu Gln Asp Pro Pro Thr Phe Gly Gly Gly
                  95                 100                 105

 Thr Lys Val Glu Ile Lys
                 110

<210> 7
<211> 449
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

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

 Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Asn Ile Lys
                  20                  25                  30

 Asp Thr Tyr Ile His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
                  35                  40                  45

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

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

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

 Thr Ala Val Tyr Tyr Cys Ser Arg Trp Gly Gly Asp Gly Phe Tyr
                  95                 100                 105

 Ala Met Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
                 110                 115                 120

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

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

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

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

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

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

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

Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly
                230                 235                 240

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

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

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

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

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

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

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

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

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

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

Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly
```

```
                395                 400                 405

 Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
                410                 415                 420

 Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
                425                 430                 435

 His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
                440                 445

<210> 8
<211> 214
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 8
 Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
   1               5                  10                  15

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

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

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

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

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

 His Tyr Thr Thr Pro Pro Thr Phe Gly Gln Gly Thr Lys Val Glu
                 95                 100                 105

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

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

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

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

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

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

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

Arg Gly Glu Cys

<210> 9
<211> 360
<212> DNA
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 9
tcctgtgcag cctctggatt caccttcagt aacgcctgga tgagctgggt 50

ccgccaggct ccagggaagg ggctggagtg ggtctccgct attagtggta 100

gtggtaacac atactatgca gactccgtga agggccggtt caccatctcc 150

agagacaatt ccaagaacac gctgtatctg caaatgaaca gcctgagagc 200

cgaggacact gccgtgtatt actgtgcgag agcctcccac cgtatattag 250

gttatgcttt tgatatctgg ggccagggta cactggtcac cgtgagctca 300

gaggtgcagc tgttggagtc tgggggaggc ttggtacagc ctgggggtc 350

cctgagactc 360

<210> 10
<211> 327
<212> DNA
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 10
tcttgttctg gaagccgctc caacatcggg agaaatgctg ttagttggta 50

tcagcagctc ccaggaacgg cccccaaact cctcatctat gctaacagca 100

atcggccctc aggggtccct gaccgattct ctggctccaa gtctggcacc 150

tcagcctccc tggccatcag tgggctccgg tccgaggatg aggctgatta 200

ttactgtgca gcatgggatg gcagcctgaa tggttgggtg ttcggcggag 250

gaaccaagct gacggtccca gtctgtgctg actcagccac cctcagcgtc 300

tgggaccccc gggcagaggg  tcaccat 327

<210> 11
<211> 227
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 11
Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
1  5  10  15

Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
20  25  30

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

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
50  55  60

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
65  70  75

Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
80  85  90

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
95  100  105

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys
110  115  120

Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
125  130  135

Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
140  145  150

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
155  160  165

Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser

```
                170                 175                 180

 Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                185                 190                 195

 Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
                200                 205                 210

 Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                215                 220                 225

 Gly Lys


<210> 12
<211> 227
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 12
 Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
   1               5                  10                  15

 Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
                20                  25                  30

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

 Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
                50                  55                  60

 Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
                65                  70                  75

 Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
                80                  85                  90

 Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
                95                 100                 105

 Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys
                110                 115                 120

 Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
                125                 130                 135

 Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
                140                 145                 150
```

```
 Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                 155                 160                 165

 Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                 170                 175                 180

 Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                 185                 190                 195

 Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
                 200                 205                 210

 Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                 215                 220                 225

 Gly Lys


<210> 13
<211> 226
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 13
 Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
   1               5                  10                  15

 Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
                  20                  25                  30

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

 Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
                  50                  55                  60

 Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
                  65                  70                  75

 Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
                  80                  85                  90

 Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
                  95                 100                 105

 Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys
                 110                 115                 120
```

```
 Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
                 125                 130                 135

 Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
                 140                 145                 150

 Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                 155                 160                 165

 Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                 170                 175                 180

 Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                 185                 190                 195

 Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
                 200                 205                 210

 Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                 215                 220                 225

 Gly


<210> 14
<211> 226
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 14
 Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
   1               5                  10                  15

 Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
                  20                  25                  30

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

 Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
                  50                  55                  60

 Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
                  65                  70                  75

 Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
                  80                  85                  90

 Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
```

```
                 95                  100                 105

 Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys
                110                 115                 120

 Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
                125                 130                 135

 Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
                140                 145                 150

 Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                155                 160                 165

 Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                170                 175                 180

 Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                185                 190                 195

 Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
                200                 205                 210

 Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
                215                 220                 225

 Gly


<210> 15
<211> 225
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 15
 Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly
   1               5                  10                  15

 Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
                 20                  25                  30

 Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser
                 35                  40                  45

 His Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val
                 50                  55                  60

 Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn
                 65                  70                  75
```

```
 Ser Thr Phe Arg Val Val Ser Val Leu Thr Val Val His Gln Asp
                  80                  85                  90

 Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly
                  95                 100                 105

 Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln
                 110                 115                 120

 Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
                 125                 130                 135

 Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe
                 140                 145                 150

 Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro
                 155                 160                 165

 Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp Ser Asp Gly
                 170                 175                 180

 Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
                 185                 190                 195

 Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
                 200                 205                 210

 His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
                 215                 220                 225

<210> 16
<211> 274
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 16
 Leu Gly Asp Thr Thr His Thr Cys Pro Arg Cys Pro Glu Pro Lys
   1               5                  10                  15

 Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg Cys Pro Glu Pro Lys
                  20                  25                  30

 Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg Cys Pro Glu Pro Lys
                  35                  40                  45

 Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg Cys Pro Ala Pro Glu
                  50                  55                  60
```

```
Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys
 65                  70                  75

Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val
 80                  85                  90

Val Asp Val Ser His Glu Asp Pro Glu Val Gln Phe Lys Trp Tyr
 95                 100                 105

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
110                 115                 120

Glu Gln Tyr Asn Ser Thr Phe Arg Val Val Ser Val Leu Thr Val
125                 130                 135

Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val
140                 145                 150

Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
155                 160                 165

Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
170                 175                 180

Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu
185                 190                 195

Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser
200                 205                 210

Ser Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu
215                 220                 225

Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp
230                 235                 240

Lys Ser Arg Trp Gln Gln Gly Asn Ile Phe Ser Cys Ser Val Met
245                 250                 255

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

Ser Pro Gly Lys
```

<210> 17
<211> 224
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 17

```
 Pro Pro Cys Pro Ser Cys Pro Ala Pro Glu Phe Leu Gly Gly Pro
   1               5                  10                  15

 Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile
                  20                  25                  30

 Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln
                  35                  40                  45

 Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu
                  50                  55                  60

 Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser
                  65                  70                  75

 Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp
                  80                  85                  90

 Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu
                  95                 100                 105

 Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro
                 110                 115                 120

 Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met
                 125                 130                 135

 Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
                 140                 145                 150

 Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu
                 155                 160                 165

 Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser
                 170                 175                 180

 Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys Ser Arg Trp Gln
                 185                 190                 195

 Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
                 200                 205                 210

 Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly Lys
                 215                 220
```