SEQUENCE LISTING

<110> The University of Tokyo
St. Marianna University School of Medicine

<120> Therapeutic agent or prophylactic agent for HAM

<130> T0529AKP0016

<160> 109

<170> PatentIn version 3.5

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35 40 45

Pro Ala Ser Asp Asp Thr Pro Glu Phe Cys Ala Ala Leu Arg Ser Tyr
50 55 60

Ala Leu Cys Thr Arg Arg Thr Ala Arg Thr Cys Arg Gly Asp Leu Ala
65 70 75 80

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

Cys Ser Lys Asp Gly Pro Thr Ser Gln Pro Arg Leu Arg Thr Leu Pro
100 105 110

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Tyr Glu Lys Ser Phe His Lys His Ser Ala Thr Pro Asn Tyr Thr His
    130                 135                 140

Cys Gly Leu Phe Gly Asp Pro His Leu Arg Thr Phe Thr Asp Arg Phe
145                 150                 155                 160

Gln Thr Cys Lys Val Gln Gly Ala Trp Pro Leu Ile Asp Asn Asn Tyr
                165                 170                 175

Leu Asn Val Gln Val Thr Asn Thr Pro Val Leu Pro Gly Ser Ala Ala
            180                 185                 190

Thr Ala Thr Ser Lys Leu Thr Ile Ile Phe Lys Asn Phe Gln Glu Cys
        195                 200                 205

Val Asp Gln Lys Val Tyr Gln Ala Glu Met Asp Glu Leu Pro Ala Ala
    210                 215                 220

Phe Val Asp Gly Ser Lys Asn Gly Gly Asp Lys His Gly Ala Asn Ser
225                 230                 235                 240

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

Lys Tyr Ile Gly Thr Thr Ile Val Val Arg Gln Val Gly Arg Tyr Leu
            260                 265                 270

Thr Phe Ala Val Arg Met Pro Glu Glu Val Val Asn Ala Val Glu Asp
        275                 280                 285

Trp Asp Ser Gln Gly Leu Tyr Leu Cys Leu Arg Gly Cys Pro Leu Asn
    290                 295                 300

Gln Gln Ile Asp Phe Gln Ala Phe His Thr Asn Ala Glu Gly Thr Gly
305                 310                 315                 320
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Phe Pro Tyr Glu Thr Ala Val Ala Lys Cys Lys Glu Lys Leu Pro Val
            340                 345                 350

Glu Asp Leu Tyr Tyr Gln Ala Cys Val Phe Asp Leu Leu Thr Thr Gly
        355                 360                 365

Asp Val Asn Phe Thr Leu Ala Ala Tyr Tyr Ala Leu Glu Asp Val Lys
    370                 375                 380

Met Leu His Ser Asn Lys Asp Lys Leu His Leu Tyr Glu Arg Thr Arg
385                 390                 395                 400

Asp Leu Pro Gly Arg Ala Ala Ala Gly Leu Pro Leu Ala Pro Arg Pro
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Leu Lys Cys Asn Ser Glu Phe Trp Ser Ala Thr Ser Ser Gly Ser His
        35                  40                  45

Ala Pro Ala Ser Asp Asp Val Pro Glu Phe Cys Ala Ala Leu Arg Thr
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    50                  55                  60

Tyr Ala Leu Cys Thr Arg Arg Thr Ala Arg Thr Cys Arg Gly Asp Leu
65                  70                  75                  80

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

Asn Cys Ser Lys Asp Gly Pro Thr Ser Gln Pro Arg Val Arg Thr Leu
            100                 105                 110

Pro Pro Ala Gly Asp Ser Gln Glu Arg Ser Asp Ser Pro Glu Ile Cys
        115                 120                 125

His Tyr Glu Lys Ser Phe His Lys His Ser Ala Ala Pro Asn Tyr Thr
    130                 135                 140

His Cys Gly Leu Phe Gly Asp Pro His Leu Arg Thr Phe Thr Asp His
145                 150                 155                 160

Phe Gln Thr Cys Lys Val Gln Gly Ala Trp Pro Leu Ile Asp Asn Asn
                165                 170                 175

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

Ala Thr Ala Thr Ser Lys Leu Thr Ile Ile Phe Lys Asn Phe Gln Glu
        195                 200                 205

Cys Val Asp Gln Lys Val Tyr Gln Ala Glu Met Asp Glu Leu Pro Ser
    210                 215                 220

Ala Phe Ala Asp Gly Ser Lys Asn Gly Gly Asp Lys His Gly Ala Asn
225                 230                 235                 240

Ser Leu Lys Ile Thr Glu Lys Val Ser Gly Gln His Val Glu Ile Gln
                245                 250                 255
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Ala Lys Tyr Ile Gly Thr Thr Ile Val Val Arg Gln Val Gly Arg Tyr
            260                 265                 270

Leu Thr Phe Ala Val Arg Met Pro Glu Glu Val Val Asn Ala Val Glu
        275                 280                 285

Asp Arg Asp Ser Gln Gly Leu Tyr Leu Cys Leu Arg Gly Cys Pro Leu
    290                 295                 300

Asn Gln Gln Ile Asp Phe Gln Ala Phe Arg Ala Asn Ala Glu Ser Pro
305                 310                 315                 320

Arg Arg Pro Ala Ala Ala Ser Pro Ser Pro Val Val Pro Glu Thr Phe
                325                 330                 335

Pro Tyr Glu Thr Ala Val Ala Lys Cys Lys Glu Lys Leu Pro Val Glu
            340                 345                 350

Asp Leu Tyr Tyr Gln Ala Cys Val Phe Asp Leu Leu Thr Thr Gly Asp
        355                 360                 365

Val Asn Phe Thr Leu Ala Ala Tyr Tyr Ala Leu Glu Asp Gly Lys Met
    370                 375                 380

Leu His Ser Asn Lys Asp Lys Leu His Leu Phe Glu Arg Thr Arg Glu
385                 390                 395                 400

Leu Pro Gly Ala Val Ala Ala Ala Ala Phe Pro Leu Ala Pro Glu Met
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Leu Pro Gly Thr Val Thr Leu Leu Val Leu Leu Pro Leu Phe Trp
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Gly

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<400> 7

Gly Thr Thr Pro Asp Tyr
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Arg Ser Ser Gln Ser Leu Glu Tyr Ser Asp Gly Tyr Thr Phe Leu Glu
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Glu Val Ser Asn Arg Phe Ser
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Phe Gln Ala Thr His Asp Pro Leu Thr
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<400> 11

Ser Tyr Val Met His
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Tyr Ile Ile Pro Tyr Asn Asp Asn Thr Lys Tyr Asn Glu Lys Phe Lys
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Gly

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<212> PRT
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Ala Arg Arg Asn Glu Tyr Tyr Gly Ser Ser Phe Phe Asp Tyr
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Gln Ala Ser Gln Asp Ile Asp Asn Tyr Leu Ala
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Gly Ala Thr Asn Leu Ala Asp
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Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Ser
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Ser Leu Lys Leu Ser Cys Val Ala Ser Gly Phe Thr Phe Ser Asn Tyr
            20   25   30

Gly Met Asn Trp Ile Arg Gln Ala Pro Lys Lys Gly Leu Glu Trp Ile
        35   40   45

Gly Met Ile Tyr Tyr Asp Ser Ser Glu Lys His Tyr Ala Asp Ser Val
    50   55   60

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

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


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


Val Ser Ser
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Asp Val Val Leu Thr Gln Thr Pro Val Ser Leu Ser Val Thr Leu Gly
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Asp Gln Ala Ser Met Ser Cys Arg Ser Ser Gln Ser Leu Glu Tyr Ser
            20                  25                  30


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


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


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


Ser Arg Val Glu Pro Glu Asp Leu Gly Val Tyr Tyr Cys Phe Gln Ala
                85                  90                  95


Thr His Asp Pro Leu Thr Phe Gly Ser Gly Thr Lys Leu Glu Ile Lys
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Ser Val Lys Met Ser Cys Lys Thr Ser Gly Tyr Thr Phe Thr Ser Tyr
            20                  25                  30


Val Met His Trp Val Lys Gln Lys Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45


Gly Tyr Ile Ile Pro Tyr Asn Asp Asn Thr Lys Tyr Asn Glu Lys Phe
    50                  55                  60


Lys Gly Lys Ala Thr Leu Thr Ser Asp Lys Ser Ser Ser Thr Ala Tyr
65                  70                  75                  80


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


Ala Arg Arg Asn Glu Tyr Tyr Gly Ser Ser Phe Phe Asp Tyr Trp Gly
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Gln Gly Thr Thr Leu Thr Val Ser Ser
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Glu Ile Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Asp Asn Tyr
20 25 30

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

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

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

Glu Asp Leu Gly Ile Tyr Tyr Cys Leu Gln Gly Tyr Ile Pro Pro Arg
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Leu Lys Arg
100 105

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Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser
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<212> PRT
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<220>
<223> VH3-48/JH3 FR2

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Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ser
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<212> PRT
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Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr Leu Gln
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Met Asn Ser Leu Arg Asp Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg
20 25 30

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<212> PRT
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Trp Gly Gln Gly Thr Met Val Thr Val Ser Ser
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<220>
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Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
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Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
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Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
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Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser
            20   25   30

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Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala
1   5   10

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Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg
            20   25   30

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<400> 31

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

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1   5   10

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<212> PRT
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<223> VH3-23/JH3 FR3

<400> 33

Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln
1   5   10   15

Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys
            20   25   30

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<220>
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Asp Ile Val Met Thr Gln Thr Pro Leu Ser Leu Ser Val Thr Pro Gly
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Gln Pro Ala Ser Ile Ser Cys
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<223> A18/JK2 FR2

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Trp Tyr Leu Gln Lys Pro Gly Gln Ser Pro Gln Leu Leu Ile Tyr
1   5   10   15

<210> 36
<211> 32
<212> PRT
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<220>
<223> A18/JK2 FR3

<400> 36

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1   5   10   15

Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys
            20   25   30

<210> 37
<211> 11
<212> PRT
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<220>
<223> A18/JK2 FR4

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Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
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<210> 38
<211> 23
<212> PRT
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<220>
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Gln Pro Ala Ser Ile Ser Cys
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1 5 10 15

Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys
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<212> PRT
<213> Artificial

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<223> VH 5F9.1-GL

<400> 41

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

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

Ser Met Ile Tyr Tyr Asp Ser Ser Glu Lys His Tyr Ala Asp Ser Val
    50   55   60

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

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

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

Val Ser Ser
        115

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<212> PRT

<213> Artificial

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<223> VH 5F9.2-GL

<400> 42

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

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

Ser Met Ile Tyr Tyr Asp Ser Ser Glu Lys His Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Arg Gly Thr Thr Pro Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr
100 105 110

Val Ser Ser
115

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

<220>
<223> VH 5F9.3-GL

<400> 43

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly

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

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

Ser Met Ile Tyr Tyr Asp Ser Ser Glu Lys His Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Arg Gly Thr Thr Pro Asp Tyr Trp Gly Gln Gly Thr Thr Val Thr
100 105 110

Val Ser Ser
115

<210> 44
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<212> PRT
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<223> VH 5F9.4-GL

<400> 44

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
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Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
20 25 30

Gly Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val

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        35                  40                  45

Ala Met Ile Tyr Tyr Asp Ser Ser Glu Lys His Tyr Ala Asp Ser Val
    50                  55                  60

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

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

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

Val Ser Ser
        115


<210>  45
<211>  115
<212>  PRT
<213>  Artificial

<220>
<223>  VH 5F9.5-GL

<400>  45

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

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

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

Ala Met Ile Tyr Tyr Asp Ser Ser Glu Lys His Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
```

65 70 75 80

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

Ala Arg Gly Thr Thr Pro Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr
100 105 110

Val Ser Ser
115

<210> 46
<211> 115
<212> PRT
<213> Artificial

<220>
<223> VH 5F9.6-GL

<400> 46

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

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

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

Ala Met Ile Tyr Tyr Asp Ser Ser Glu Lys His Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Arg Gly Thr Thr Pro Asp Tyr Trp Gly Gln Gly Thr Thr Val Thr

```
            100                 105                 110


Val Ser Ser
        115


<210>  47
<211>  115
<212>  PRT
<213>  Artificial

<220>
<223>  VH 5F9.7-GL

<400>  47

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


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


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


Ser Met Ile Tyr Tyr Asp Ser Ser Glu Lys His Tyr Ala Asp Ser Val
    50                  55                  60


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


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


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


Val Ser Ser
        115


<210>  48
```

<211> 115
<212> PRT
<213> Artificial

<220>
<223> VH 5F9.8-GL

<400> 48

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

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

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

Ser Met Ile Tyr Tyr Asp Ser Ser Glu Lys His Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Lys Gly Thr Thr Pro Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr
100 105 110

Val Ser Ser
115

<210> 49
<211> 115
<212> PRT
<213> Artificial

<220>
<223> VH 5F9.9-GL

<400> 49

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


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


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


Ser Met Ile Tyr Tyr Asp Ser Ser Glu Lys His Tyr Ala Asp Ser Val
    50                  55                  60


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


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


Ala Lys Gly Thr Thr Pro Asp Tyr Trp Gly Gln Gly Thr Thr Val Thr
            100                 105                 110


Val Ser Ser
        115


<210>  50
<211>  113
<212>  PRT
<213>  Artificial

<220>
<223>  VL 5F9.1-GL

<400>  50

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


Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Glu Tyr Ser
            20                  25                  30
```

```
Asp Gly Tyr Thr Phe Leu Glu Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

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

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

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Phe Gln Ala
                85                  90                  95

Thr His Asp Pro Leu Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110

Arg
```

<210> 51
<211> 113
<212> PRT
<213> Artificial

<220>
<223> VL 5F9.2-GL

<400> 51

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

Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Glu Tyr Ser
            20                  25                  30

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

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

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


Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Phe Gln Ala
                85                  90                  95


Thr His Asp Pro Leu Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110


Arg
```

<210> 52
<211> 113
<212> PRT
<213> Artificial

<220>
<223> VL 5F9.3-GL

<400> 52

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


Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Glu Tyr Ser
            20                  25                  30


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


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


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


Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Phe Gln Ala
                85                  90                  95
```

Thr His Asp Pro Leu Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

Arg

<210> 53
<211> 14
<212> PRT
<213> Mus musculus

<400> 53

Glu Glu Val Val Asn Ala Val Glu Asp Trp Asp Ser Gln Gly
1 5 10

<210> 54
<211> 14
<212> PRT
<213> Mus musculus

<400> 54

Asn Gln Gln Ile Asp Phe Gln Ala Phe His Thr Asn Ala Glu
1 5 10

<210> 55
<211> 11
<212> PRT
<213> Mus musculus

<400> 55

Pro Thr Ala Pro Glu Thr Phe Pro Tyr Glu Thr
1 5 10

<210> 56
<211> 11
<212> PRT
<213> Mus musculus

<400> 56

Lys Leu Pro Val Glu Asp Leu Tyr Tyr Gln Ala

1 5 10

<210> 57
<211> 16
<212> PRT
<213> Homo sapiens

<400> 57

Leu Tyr Glu Arg Thr Arg Asp Leu Pro Gly Arg Ala Ala Ala Gly Leu
1 5 10 15

<210> 58
<211> 11
<212> PRT
<213> Mus musculus

<400> 58

Arg Ala Ser Gln Asp Ile Ser Ser Tyr Leu Asn
1 5 10

<210> 59
<211> 7
<212> PRT
<213> Mus musculus

<400> 59

Tyr Thr Ser Arg Leu His Ser
1 5

<210> 60
<211> 7
<212> PRT
<213> Mus musculus

<400> 60

Gln Gln Leu Asn Thr Leu Pro
1 5

<210> 61
<211> 5
<212> PRT

<213> Mus musculus

<400> 61

Asp Ala Trp Met Asp
1 5

<210> 62
<211> 19
<212> PRT
<213> Mus musculus

<400> 62

Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr Tyr Ala Glu Ser
1 5 10 15

Val Lys Gly

<210> 63
<211> 5
<212> PRT
<213> Mus musculus

<400> 63

Arg Asp Gly Ala Tyr
1 5

<210> 64
<211> 16
<212> PRT
<213> Mus musculus

<400> 64

Arg Ser Ser Gln Ser Leu Val His Ser Asn Gly Asn Thr Tyr Leu His
1 5 10 15

<210> 65
<211> 7
<212> PRT
<213> Mus musculus

<400> 65

Lys Val Ser Asn Arg Phe Ser
1 5

<210> 66
<211> 7
<212> PRT
<213> Mus musculus

<400> 66

Ser Gln Ser Thr His Val Pro
1 5

<210> 67
<211> 6
<212> PRT
<213> Mus musculus

<400> 67

Thr Ser Tyr Tyr Trp Asn
1 5

<210> 68
<211> 16
<212> PRT
<213> Mus musculus

<400> 68

Tyr Ile Ser Tyr Asp Gly Thr Asn Asn Tyr Asn Pro Ser Leu Lys Asn
1 5 10 15

<210> 69

<400> 69
000

<210> 70
<211> 450
<212> PRT
<213> Homo sapiens

<400> 70

```
Met Gln Pro Pro Arg Glu Arg Leu Val Val Thr Gly Arg Ala Gly Trp
1               5                  10                  15

Met Gly Met Gly Arg Gly Ala Gly Arg Ser Ala Leu Gly Phe Trp Pro
            20                  25                  30

Thr Leu Ala Phe Leu Leu Cys Ser Phe Pro Ala Ala Thr Ser Pro Cys
        35                  40                  45

Lys Ile Leu Lys Cys Asn Ser Glu Phe Trp Ser Ala Thr Ser Gly Ser
    50                  55                  60

His Ala Pro Ala Ser Asp Asp Thr Pro Glu Phe Cys Ala Ala Leu Arg
65                  70                  75                  80

Ser Tyr Ala Leu Cys Thr Arg Arg Thr Ala Arg Thr Cys Arg Gly Asp
                85                  90                  95

Leu Ala Tyr His Ser Ala Val His Gly Ile Glu Asp Leu Met Ser Gln
            100                 105                 110

His Asn Cys Ser Lys Asp Gly Pro Thr Ser Gln Pro Arg Leu Arg Thr
        115                 120                 125

Leu Pro Pro Ala Gly Asp Ser Gln Glu Arg Ser Asp Ser Pro Glu Ile
    130                 135                 140

Cys His Tyr Glu Lys Ser Phe His Lys His Ser Ala Thr Pro Asn Tyr
145                 150                 155                 160

Thr His Cys Gly Leu Phe Gly Asp Pro His Leu Arg Thr Phe Thr Asp
                165                 170                 175

Arg Phe Gln Thr Cys Lys Val Gln Gly Ala Trp Pro Leu Ile Asp Asn
            180                 185                 190

Asn Tyr Leu Asn Val Gln Val Thr Asn Thr Pro Val Leu Pro Gly Ser
```

```
        195                 200                 205

Ala Ala Thr Ala Thr Ser Lys Leu Thr Ile Ile Phe Lys Asn Phe Gln
    210                 215                 220

Glu Cys Val Asp Gln Lys Val Tyr Gln Ala Glu Met Asp Glu Leu Pro
225                 230                 235                 240

Ala Ala Phe Val Asp Gly Ser Lys Asn Gly Gly Asp Lys His Gly Ala
                245                 250                 255

Asn Ser Leu Lys Ile Thr Glu Lys Val Ser Gly Gln His Val Glu Ile
            260                 265                 270

Gln Ala Lys Tyr Ile Gly Thr Thr Ile Val Val Arg Gln Val Gly Arg
        275                 280                 285

Tyr Leu Thr Phe Ala Val Arg Met Pro Glu Glu Val Val Asn Ala Val
    290                 295                 300

Glu Asp Trp Asp Ser Gln Gly Leu Tyr Leu Cys Leu Arg Gly Cys Pro
305                 310                 315                 320

Leu Asn Gln Gln Ile Asp Phe Gln Ala Phe His Thr Asn Ala Glu Gly
                325                 330                 335

Thr Gly Ala Arg Arg Leu Ala Ala Ala Ser Pro Ala Pro Thr Ala Pro
            340                 345                 350

Glu Thr Phe Pro Tyr Glu Thr Ala Val Ala Lys Cys Lys Glu Lys Leu
        355                 360                 365

Pro Val Glu Asp Leu Tyr Tyr Gln Ala Cys Val Phe Asp Leu Leu Thr
    370                 375                 380

Thr Gly Asp Val Asn Phe Thr Leu Ala Ala Tyr Tyr Ala Leu Glu Asp
385                 390                 395                 400
```

```
Val Lys Met Leu His Ser Asn Lys Asp Lys Leu His Leu Tyr Asp Arg
                405                 410                 415


Thr Arg Asp Leu Pro Gly Arg Ala Ala Ala Gly Leu Pro Leu Ala Pro
            420                 425                 430


Arg Pro Leu Leu Gly Ala Leu Val Pro Leu Leu Ala Leu Leu Pro Val
        435                 440                 445


Phe Cys
    450


<210>  71
<211>  454
<212>  PRT
<213>  Mus musculus

<400>  71

Met Gln Pro Pro Arg Glu Arg Leu Val Val Thr Gly Arg Ala Gly Trp
1               5                   10                  15


Met Gly Met Gly Arg Gly Ala Gly Arg Ser Ala Leu Gly Leu Trp Pro
            20                  25                  30


Thr Leu Ala Phe Leu Leu Cys Ser Phe Pro Ala Ala Ile Ser Pro Cys
        35                  40                  45


Lys Ile Leu Lys Cys Asn Ser Glu Phe Trp Ser Ala Thr Ser Ser Gly
    50                  55                  60


Ser His Ala Pro Ala Ser Asp Asp Val Pro Glu Phe Cys Ala Ala Leu
65                  70                  75                  80


Arg Thr Tyr Ala Leu Cys Thr Arg Arg Thr Ala Arg Thr Cys Arg Gly
                85                  90                  95


Asp Leu Ala Tyr His Ser Ala Val His Gly Ile Glu Asp Leu Met Ser
            100                 105                 110
```

```
Gln His Asn Cys Ser Lys Asp Gly Pro Thr Ser Gln Pro Arg Val Arg
        115                 120                 125

Thr Leu Pro Pro Ala Gly Asp Ser Gln Glu Arg Ser Asp Ser Pro Glu
    130                 135                 140

Ile Cys His Tyr Glu Lys Ser Phe His Lys His Ser Ala Ala Pro Asn
145                 150                 155                 160

Tyr Thr His Cys Gly Leu Phe Gly Asp Pro His Leu Arg Thr Phe Thr
                165                 170                 175

Asp His Phe Gln Thr Cys Lys Val Gln Gly Ala Trp Pro Leu Ile Asp
            180                 185                 190

Asn Asn Tyr Leu Asn Val Gln Val Thr Asn Thr Pro Val Leu Pro Gly
        195                 200                 205

Ser Ala Ala Thr Ala Thr Ser Lys Leu Thr Ile Ile Phe Lys Asn Phe
    210                 215                 220

Gln Glu Cys Val Asp Gln Lys Val Tyr Gln Ala Glu Met Asp Glu Leu
225                 230                 235                 240

Pro Ser Ala Phe Ala Asp Gly Ser Lys Asn Gly Gly Asp Lys His Gly
                245                 250                 255

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

Ile Gln Ala Lys Tyr Ile Gly Thr Thr Ile Val Val Arg Gln Val Gly
        275                 280                 285

Arg Tyr Leu Thr Phe Ala Val Arg Met Pro Glu Glu Val Val Asn Ala
    290                 295                 300
```

```
Val Glu Asp Arg Asp Ser Gln Gly Leu Tyr Leu Cys Leu Arg Gly Cys
305                 310                 315                 320

Pro Leu Asn Gln Gln Ile Asp Phe Gln Ala Phe Arg Ala Asn Ala Glu
                325                 330                 335

Ser Pro Arg Arg Pro Ala Ala Ala Ser Pro Ser Pro Val Val Pro Glu
            340                 345                 350

Thr Phe Pro Tyr Glu Thr Ala Val Ala Lys Cys Lys Glu Lys Leu Pro
        355                 360                 365

Val Glu Asp Leu Tyr Tyr Gln Ala Cys Val Phe Asp Leu Leu Thr Thr
    370                 375                 380

Gly Asp Val Asn Phe Thr Leu Ala Ala Tyr Tyr Ala Leu Glu Asp Gly
385                 390                 395                 400

Lys Met Leu His Ser Asn Lys Asp Lys Leu His Leu Phe Glu Arg Thr
                405                 410                 415

Arg Glu Leu Pro Gly Ala Val Ala Ala Ala Ala Ala Ala Ala Thr Thr
            420                 425                 430

Phe Pro Leu Ala Pro Gln Ile Leu Leu Gly Thr Ile Pro Leu Leu Val
        435                 440                 445

Leu Leu Pro Val Leu Trp
    450


<210>  72
<211>  449
<212>  PRT
<213>  Rattus norvegicus

<400>  72

Met Gln Pro Pro Arg Glu Arg Leu Val Val Thr Gly Arg Ala Gly Trp
1               5                   10                  15
```

```
Met Gly Met Gly Arg Gly Ala Gly Arg Ser Ala Leu Gly Leu Trp Pro
            20                  25                  30

Thr Leu Ala Phe Leu Leu Cys Ser Phe Pro Ala Ala Ile Ser Pro Cys
        35                  40                  45

Lys Ile Leu Lys Cys Asn Ser Glu Phe Trp Ser Ala Thr Ser Ser Gly
    50                  55                  60

Ser His Ala Pro Ala Ser Asp Asp Val Pro Glu Phe Cys Ala Ala Leu
65                  70                  75                  80

Arg Thr Tyr Ala Leu Cys Thr Arg Arg Thr Ala Arg Thr Cys Arg Gly
                85                  90                  95

Asp Leu Ala Tyr His Ser Ala Val His Gly Ile Glu Asp Leu Met Ser
            100                 105                 110

Gln His Asn Cys Ser Lys Asp Gly Pro Thr Ser Gln Pro Arg Val Arg
        115                 120                 125

Thr Leu Pro Pro Ala Gly Asp Ser Gln Glu Arg Ser Asp Ser Pro Glu
    130                 135                 140

Ile Cys His Tyr Glu Lys Ser Phe His Lys His Ser Ala Ala Pro Asn
145                 150                 155                 160

Tyr Thr His Cys Gly Leu Phe Gly Asp Pro His Leu Arg Thr Phe Thr
                165                 170                 175

Asp His Phe Gln Thr Cys Lys Val Gln Gly Ala Trp Pro Leu Ile Asp
            180                 185                 190

Asn Asn Tyr Leu Asn Val Gln Val Thr Asn Thr Pro Val Leu Pro Gly
        195                 200                 205

Ser Ala Ala Thr Ala Thr Ser Lys Leu Thr Ile Ile Phe Lys Asn Phe
```

```
    210                 215                 220

Gln Glu Cys Val Asp Gln Lys Val Tyr Gln Ala Glu Met Asp Glu Leu
225                 230                 235                 240

Pro Ser Ala Phe Ala Asp Gly Ser Lys Asn Gly Gly Asp Lys His Gly
                245                 250                 255

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

Ile Gln Ala Lys Tyr Ile Gly Thr Thr Ile Val Val Arg Gln Val Gly
        275                 280                 285

Arg Tyr Leu Thr Phe Ala Val Arg Met Pro Glu Glu Val Val Asn Ala
    290                 295                 300

Val Glu Asp Arg Asp Ser Gln Gly Leu Tyr Leu Cys Leu Arg Gly Cys
305                 310                 315                 320

Pro Leu Asn Gln Gln Ile Asp Phe Gln Ala Phe Arg Ala Asn Ala Glu
                325                 330                 335

Ser Pro Arg Arg Pro Ala Ala Ala Ser Pro Ser Pro Val Val Pro Glu
            340                 345                 350

Thr Phe Pro Tyr Glu Thr Ala Val Ala Lys Cys Lys Glu Lys Leu Pro
        355                 360                 365

Val Glu Asp Leu Tyr Tyr Gln Ala Cys Val Phe Asp Leu Leu Thr Thr
    370                 375                 380

Gly Asp Val Asn Phe Thr Leu Ala Ala Tyr Tyr Ala Leu Glu Asp Gly
385                 390                 395                 400

Lys Met Leu His Ser Asn Lys Asp Lys Leu His Leu Phe Glu Arg Thr
                405                 410                 415
```

Arg Glu Leu Pro Gly Ala Val Ala Ala Ala Ala Phe Pro Leu Ala Pro
            420   425   430

Glu Met Leu Pro Gly Thr Val Thr Leu Leu Val Leu Leu Pro Leu Phe
        435   440   445

Trp

<210> 73
<211> 234
<212> PRT
<213> Mus musculus

<400> 73

Met Met Ser Ser Ala Gln Phe Leu Gly Leu Leu Leu Leu Cys Phe Gln
1   5   10   15

Gly Thr Arg Cys Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser
            20   25   30

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

Ile Ser Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Val
    50   55   60

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

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

Asn Leu Glu Gln Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln Leu Asn
            100   105   110

Thr Leu Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
        115   120   125

```
Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln
    130                 135                 140

Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr
145                 150                 155                 160

Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln
                165                 170                 175

Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr
            180                 185                 190

Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg
        195                 200                 205

His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro
    210                 215                 220

Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225                 230
```

<210> 74
<211> 471
<212> PRT
<213> Mus musculus

<400> 74

```
Met Tyr Leu Gly Leu Asn Tyr Val Phe Ile Val Phe Leu Leu Asn Gly
1               5                   10                  15

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

Pro Gly Gly Ser Met Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
        35                  40                  45

Ser Asp Ala Trp Met Asp Trp Val Arg Gln Ser Pro Glu Lys Gly Leu
```

```
    50                  55                  60

Glu Trp Val Ala Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr
65                  70                  75                  80

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

Lys Arg Ser Val Tyr Leu Gln Met Asn Asn Leu Arg Ala Glu Asp Thr
            100                 105                 110

Gly Ile Tyr Tyr Cys Thr Arg Arg Asp Gly Ala Tyr Trp Gly Gln Gly
        115                 120                 125

Thr Leu Val Thr Val Ser Ala Ala Lys Thr Thr Pro Pro Ser Val Tyr
    130                 135                 140

Pro Leu Ala Pro Gly Cys Gly Asp Thr Thr Gly Ser Ser Val Thr Leu
145                 150                 155                 160

Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Ser Val Thr Val Thr Trp
                165                 170                 175

Asn Ser Gly Ser Leu Ser Ser Ser Val His Thr Phe Pro Ala Leu Leu
            180                 185                 190

Gln Ser Gly Leu Tyr Thr Met Ser Ser Ser Val Thr Val Pro Ser Ser
        195                 200                 205

Thr Trp Pro Ser Gln Thr Val Thr Cys Ser Val Ala His Pro Ala Ser
    210                 215                 220

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

Ile Asn Pro Cys Pro Pro Cys Lys Glu Cys His Lys Cys Pro Ala Pro
                245                 250                 255
```

```
Asn Leu Glu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro Asn Ile Lys
            260                 265                 270

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

Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp Phe Val Asn
    290                 295                 300

Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg Glu Asp Tyr
305                 310                 315                 320

Asn Ser Thr Ile Arg Val Val Ser Thr Leu Pro Ile Gln His Gln Asp
                325                 330                 335

Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn Lys Asp Leu
            340                 345                 350

Pro Ser Pro Ile Glu Arg Thr Ile Ser Lys Ile Lys Gly Leu Val Arg
        355                 360                 365

Ala Pro Gln Val Tyr Ile Leu Pro Pro Pro Ala Glu Gln Leu Ser Arg
    370                 375                 380

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

Ile Ser Val Glu Trp Thr Ser Asn Gly His Thr Glu Glu Asn Tyr Lys
                405                 410                 415

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

Lys Leu Asn Met Lys Thr Ser Lys Trp Glu Lys Thr Asp Ser Phe Ser
        435                 440                 445

Cys Asn Val Arg His Glu Gly Leu Lys Asn Tyr Tyr Leu Lys Lys Thr
```

```
    450                 455                 460


Ile Ser Arg Ser Pro Gly Lys
465                 470


<210>  75
<211>  238
<212>  PRT
<213>  Mus musculus

<400>  75

Met Lys Leu Pro Val Arg Leu Leu Val Leu Met Phe Trp Ile Pro Ala
1               5                   10                  15


Ser Ser Ser Asp Val Val Met Thr Gln Thr Pro Leu Ser Leu Pro Val
            20                  25                  30


Ser Leu Gly Asp Gln Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu
        35                  40                  45


Val His Ser Asn Gly Asn Thr Tyr Leu His Trp Tyr Leu Gln Arg Pro
    50                  55                  60


Gly Gln Ser Pro Lys Leu Leu Ile Tyr Lys Val Ser Asn Arg Phe Ser
65                  70                  75                  80


Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
                85                  90                  95


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


Ser Gln Ser Thr His Val Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu
        115                 120                 125


Glu Ile Lys Arg Ala Asp Ala Ala Pro Thr Val Ser Ile Phe Pro Pro
    130                 135                 140
```

```
Ser Ser Glu Gln Leu Thr Ser Gly Gly Ala Ser Val Val Cys Phe Leu
145                 150                 155                 160


Asn Asn Phe Tyr Pro Lys Asp Ile Asn Val Lys Trp Lys Ile Asp Gly
                165                 170                 175


Ser Glu Arg Gln Asn Gly Val Leu Asn Ser Trp Thr Asp Gln Asp Ser
            180                 185                 190


Lys Asp Ser Thr Tyr Ser Met Ser Ser Thr Leu Thr Leu Thr Lys Asp
        195                 200                 205


Glu Tyr Glu Arg His Asn Ser Tyr Thr Cys Glu Ala Thr His Lys Thr
    210                 215                 220


Ser Thr Ser Pro Ile Val Lys Ser Phe Asn Arg Asn Glu Cys
225                 230                 235


<210>  76
<211>  466
<212>  PRT
<213>  Mus musculus

<400>  76

Met Lys Val Leu Ser Leu Leu Tyr Leu Leu Thr Ala Ile Pro Gly Ile
1               5                   10                  15


Met Ser Asp Val Lys Leu Gln Glu Ser Gly Pro Gly Leu Val Lys Pro
            20                  25                  30


Ser Gln Ser Leu Ser Leu Thr Cys Ser Val Thr Gly Tyr Ser Ile Thr
        35                  40                  45


Thr Ser Tyr Tyr Trp Asn Trp Ile Arg Gln Phe Pro Gly Asn Lys Leu
    50                  55                  60


Glu Trp Met Gly Tyr Ile Ser Tyr Asp Gly Thr Asn Asn Tyr Asn Pro
65                  70                  75                  80
```

```
Ser Leu Lys Asn Arg Ile Ser Ile Thr Arg Asp Thr Ser Lys Asn Gln
                85                  90                  95

Phe Phe Leu Arg Leu Asn Ser Val Thr Thr Glu Asp Thr Ala Thr Tyr
            100                 105                 110

Tyr Cys Ala Gly Ser Phe Gly Tyr Ser Gln Gly Thr Leu Val Thr Val
        115                 120                 125

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

Cys Gly Asp Thr Thr Gly Ser Ser Val Thr Leu Gly Cys Leu Val Lys
145                 150                 155                 160

Gly Tyr Phe Pro Glu Ser Val Thr Val Thr Trp Asn Ser Gly Ser Leu
                165                 170                 175

Ser Ser Ser Val His Thr Phe Pro Ala Leu Leu Gln Ser Gly Leu Tyr
            180                 185                 190

Thr Met Ser Ser Ser Val Thr Val Pro Ser Ser Thr Trp Pro Ser Gln
        195                 200                 205

Thr Val Thr Cys Ser Val Ala His Pro Ala Ser Ser Thr Thr Val Asp
    210                 215                 220

Lys Lys Leu Glu Pro Ser Gly Pro Ile Ser Thr Ile Asn Pro Cys Pro
225                 230                 235                 240

Pro Cys Lys Glu Cys His Lys Cys Pro Ala Pro Asn Leu Glu Gly Gly
                245                 250                 255

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

Ser Leu Thr Pro Lys Val Thr Cys Val Val Val Asp Val Ser Glu Asp
```

```
        275                 280                 285

Asp Pro Asp Val Gln Ile Ser Trp Phe Val Asn Asn Val Glu Val His
    290                 295                 300

Thr Ala Gln Thr Gln Thr His Arg Glu Asp Tyr Asn Ser Thr Ile Arg
305                 310                 315                 320

Val Val Ser Thr Leu Pro Ile Gln His Gln Asp Trp Met Ser Gly Lys
                325                 330                 335

Glu Phe Lys Cys Lys Val Asn Asn Lys Asp Leu Pro Ser Pro Ile Glu
            340                 345                 350

Arg Thr Ile Ser Lys Ile Lys Gly Leu Val Arg Ala Pro Gln Val Tyr
        355                 360                 365

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

Thr Cys Leu Val Val Gly Phe Asn Pro Gly Asp Ile Ser Val Glu Trp
385                 390                 395                 400

Thr Ser Asn Gly His Thr Glu Glu Asn Tyr Lys Asp Thr Ala Pro Val
                405                 410                 415

Leu Asp Ser Asp Gly Ser Tyr Phe Ile Tyr Ser Lys Leu Asn Met Lys
            420                 425                 430

Thr Ser Lys Trp Glu Lys Thr Asp Ser Phe Ser Cys Asn Val Arg His
        435                 440                 445

Glu Gly Leu Lys Asn Tyr Tyr Leu Lys Lys Thr Ile Ser Arg Ser Pro
    450                 455                 460

Gly Lys
465
```

<210> 77
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> chimeric antibody light chain

<400> 77

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


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


Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Val Lys Leu Leu Ile
        35                  40                  45


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


Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser Asn Leu Glu Gln
65                  70                  75                  80


Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln Leu Asn Thr Leu Pro Trp
                85                  90                  95


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


Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125


Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140


Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160
```

```
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175


Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190


Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205


Phe Asn Arg Gly Glu Cys
    210


<210>  78
<211>  446
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  chimeric antibody heavy chain

<400>  78

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


Ser Met Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asp Ala
            20                  25                  30


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


Ala Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr Tyr Ala Glu
    50                  55                  60


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


Val Tyr Leu Gln Met Asn Asn Leu Arg Ala Glu Asp Thr Gly Ile Tyr
                85                  90                  95
```

```
Tyr Cys Thr Arg Arg Asp Gly Ala Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

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

Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
    130                 135                 140

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145                 150                 155                 160

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

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
            180                 185                 190

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

Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr
    210                 215                 220

Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                 230                 235                 240

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                 250                 255

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
            260                 265                 270

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

Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val
```

```
    290                 295                 300

Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                 310                 315                 320

Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                 330                 335

Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
            340                 345                 350

Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
        355                 360                 365

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                 375                 380

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

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

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
            420                 425                 430

Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445


<210>  79
<211>  1461
<212>  PRT
<213>  Homo sapiens

<400>  79

Met Ala Ala Glu Arg Gly Ala Arg Arg Leu Leu Ser Thr Pro Ser Phe
1               5                   10                  15
```

```
Trp Leu Tyr Cys Leu Leu Leu Leu Gly Arg Arg Ala Pro Gly Ala Ala
            20                  25                  30

Ala Ala Arg Ser Gly Ser Ala Pro Gln Ser Pro Gly Ala Ser Ile Arg
        35                  40                  45

Thr Phe Thr Pro Phe Tyr Phe Leu Val Glu Pro Val Asp Thr Leu Ser
    50                  55                  60

Val Arg Gly Ser Ser Val Ile Leu Asn Cys Ser Ala Tyr Ser Glu Pro
65                  70                  75                  80

Ser Pro Lys Ile Glu Trp Lys Lys Asp Gly Thr Phe Leu Asn Leu Val
                85                  90                  95

Ser Asp Asp Arg Arg Gln Leu Leu Pro Asp Gly Ser Leu Phe Ile Ser
            100                 105                 110

Asn Val Val His Ser Lys His Asn Lys Pro Asp Glu Gly Tyr Tyr Gln
        115                 120                 125

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

Lys Leu Ile Val Ala Gly Leu Pro Arg Phe Thr Ser Gln Pro Glu Pro
145                 150                 155                 160

Ser Ser Val Tyr Ala Gly Asn Asn Ala Ile Leu Asn Cys Glu Val Asn
                165                 170                 175

Ala Asp Leu Val Pro Phe Val Arg Trp Glu Gln Asn Arg Gln Pro Leu
            180                 185                 190

Leu Leu Asp Asp Arg Val Ile Lys Leu Pro Ser Gly Met Leu Val Ile
        195                 200                 205

Ser Asn Ala Thr Glu Gly Asp Gly Gly Leu Tyr Arg Cys Val Val Glu
    210                 215                 220
```

```
Ser Gly Gly Pro Pro Lys Tyr Ser Asp Glu Val Glu Leu Lys Val Leu
225                 230                 235                 240

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

Pro Leu Val Arg Val Ile Gly Gln Asp Val Val Leu Pro Cys Val Ala
            260                 265                 270

Ser Gly Leu Pro Thr Pro Thr Ile Lys Trp Met Lys Asn Glu Glu Ala
        275                 280                 285

Leu Asp Thr Glu Ser Ser Glu Arg Leu Val Leu Leu Ala Gly Gly Ser
    290                 295                 300

Leu Glu Ile Ser Asp Val Thr Glu Asp Asp Ala Gly Thr Tyr Phe Cys
305                 310                 315                 320

Ile Ala Asp Asn Gly Asn Glu Thr Ile Glu Ala Gln Ala Glu Leu Thr
                325                 330                 335

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

His Glu Ser Met Asp Ile Val Phe Glu Cys Glu Val Thr Gly Lys Pro
        355                 360                 365

Thr Pro Thr Val Lys Trp Val Lys Asn Gly Asp Met Val Ile Pro Ser
    370                 375                 380

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

Val Lys Ser Asp Glu Gly Phe Tyr Gln Cys Ile Ala Glu Asn Asp Val
                405                 410                 415
```

```
Gly Asn Ala Gln Ala Gly Ala Gln Leu Ile Ile Leu Glu His Ala Pro
            420                 425                 430

Ala Thr Thr Gly Pro Leu Pro Ser Ala Pro Arg Asp Val Val Ala Ser
        435                 440                 445

Leu Val Ser Thr Arg Phe Ile Lys Leu Thr Trp Arg Thr Pro Ala Ser
    450                 455                 460

Asp Pro His Gly Asp Asn Leu Thr Tyr Ser Val Phe Tyr Thr Lys Glu
465                 470                 475                 480

Gly Ile Ala Arg Glu Arg Val Glu Asn Thr Ser His Pro Gly Glu Met
                485                 490                 495

Gln Val Thr Ile Gln Asn Leu Met Pro Ala Thr Val Tyr Ile Phe Arg
            500                 505                 510

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

Arg Val Glu Thr Gln Pro Glu Val Gln Leu Pro Gly Pro Ala Pro Asn
    530                 535                 540

Leu Arg Ala Tyr Ala Ala Ser Pro Thr Ser Ile Thr Val Thr Trp Glu
545                 550                 555                 560

Thr Pro Val Ser Gly Asn Gly Glu Ile Gln Asn Tyr Lys Leu Tyr Tyr
                565                 570                 575

Met Glu Lys Gly Thr Asp Lys Glu Gln Asp Val Asp Val Ser Ser His
            580                 585                 590

Ser Tyr Thr Ile Asn Gly Leu Lys Lys Tyr Thr Glu Tyr Ser Phe Arg
        595                 600                 605

Val Val Ala Tyr Asn Lys His Gly Pro Gly Val Ser Thr Pro Asp Val
    610                 615                 620
```

```
Ala Val Arg Thr Leu Ser Asp Val Pro Ser Ala Ala Pro Gln Asn Leu
625                 630                 635                 640

Ser Leu Glu Val Arg Asn Ser Lys Ser Ile Met Ile His Trp Gln Pro
                645                 650                 655

Pro Ala Pro Ala Thr Gln Asn Gly Gln Ile Thr Gly Tyr Lys Ile Arg
            660                 665                 670

Tyr Arg Lys Ala Ser Arg Lys Ser Asp Val Thr Glu Thr Leu Val Ser
        675                 680                 685

Gly Thr Gln Leu Ser Gln Leu Ile Glu Gly Leu Asp Arg Gly Thr Glu
    690                 695                 700

Tyr Asn Phe Arg Val Ala Ala Leu Thr Ile Asn Gly Thr Gly Pro Ala
705                 710                 715                 720

Thr Asp Trp Leu Ser Ala Glu Thr Phe Glu Ser Asp Leu Asp Glu Thr
                725                 730                 735

Arg Val Pro Glu Val Pro Ser Ser Leu His Val Arg Pro Leu Val Thr
            740                 745                 750

Ser Ile Val Val Ser Trp Thr Pro Pro Glu Asn Gln Asn Ile Val Val
        755                 760                 765

Arg Gly Tyr Ala Ile Gly Tyr Gly Ile Gly Ser Pro His Ala Gln Thr
    770                 775                 780

Ile Lys Val Asp Tyr Lys Gln Arg Tyr Tyr Thr Ile Glu Asn Leu Asp
785                 790                 795                 800

Pro Ser Ser His Tyr Val Ile Thr Leu Lys Ala Phe Asn Asn Val Gly
                805                 810                 815
```

```
Glu Gly Ile Pro Leu Tyr Glu Ser Ala Val Thr Arg Pro His Thr Asp
            820                 825                 830

Thr Ser Glu Val Asp Leu Phe Val Ile Asn Ala Pro Tyr Thr Pro Val
        835                 840                 845

Pro Asp Pro Thr Pro Met Met Pro Pro Val Gly Val Gln Ala Ser Ile
    850                 855                 860

Leu Ser His Asp Thr Ile Arg Ile Thr Trp Ala Asp Asn Ser Leu Pro
865                 870                 875                 880

Lys His Gln Lys Ile Thr Asp Ser Arg Tyr Tyr Thr Val Arg Trp Lys
                885                 890                 895

Thr Asn Ile Pro Ala Asn Thr Lys Tyr Lys Asn Ala Asn Ala Thr Thr
            900                 905                 910

Leu Ser Tyr Leu Val Thr Gly Leu Lys Pro Asn Thr Leu Tyr Glu Phe
        915                 920                 925

Ser Val Met Val Thr Lys Gly Arg Arg Ser Ser Thr Trp Ser Met Thr
    930                 935                 940

Ala His Gly Thr Thr Phe Glu Leu Val Pro Thr Ser Pro Pro Lys Asp
945                 950                 955                 960

Val Thr Val Val Ser Lys Glu Gly Lys Pro Lys Thr Ile Ile Val Asn
                965                 970                 975

Trp Gln Pro Pro Ser Glu Ala Asn Gly Lys Ile Thr Gly Tyr Ile Ile
            980                 985                 990

Tyr Tyr Ser Thr Asp Val Asn Ala  Glu Ile His Asp Trp  Val Ile Glu
        995                 1000                1005

Pro Val  Val Gly Asn Arg Leu  Thr His Gln Ile Gln  Glu Leu Thr
    1010                1015                1020
```

```
Leu Asp  Thr Pro Tyr Tyr Phe  Lys Ile Gln Ala Arg  Asn Ser Lys
    1025                1030                1035

Gly Met  Gly Pro Met Ser Glu  Ala Val Gln Phe Arg  Thr Pro Lys
    1040                1045                1050

Ala Asp  Ser Ser Asp Lys Met  Pro Asn Asp Gln Ala  Ser Gly Ser
    1055                1060                1065

Gly Gly  Lys Gly Ser Arg Leu  Pro Asp Leu Gly Ser  Asp Tyr Lys
    1070                1075                1080

Pro Pro  Met Ser Gly Ser Asn  Ser Pro His Gly Ser  Pro Thr Ser
    1085                1090                1095

Pro Leu  Asp Ser Asn Met Leu  Leu Val Ile Ile Val  Ser Val Gly
    1100                1105                1110

Val Ile  Thr Ile Val Val Val  Val Ile Ile Ala Val  Phe Cys Thr
    1115                1120                1125

Arg Arg  Thr Thr Ser His Gln  Lys Lys Lys Arg Ala  Ala Cys Lys
    1130                1135                1140

Ser Val  Asn Gly Ser His Lys  Tyr Lys Gly Asn Ser  Lys Asp Val
    1145                1150                1155

Lys Pro  Pro Asp Leu Trp Ile  His His Glu Arg Leu  Glu Leu Lys
    1160                1165                1170

Pro Ile  Asp Lys Ser Pro Asp  Pro Asn Pro Ile Met  Thr Asp Thr
    1175                1180                1185

Pro Ile  Pro Arg Asn Ser Gln  Asp Ile Thr Pro Val  Asp Asn Ser
    1190                1195                1200
```

```
Met Asp  Ser Asn Ile His Gln  Arg Arg Asn Ser Tyr  Arg Gly His
    1205                 1210                 1215

Glu Ser  Glu Asp Ser Met Ser  Thr Leu Ala Gly Arg  Arg Gly Met
    1220                 1225                 1230

Arg Pro  Lys Met Met Met Pro  Phe Asp Ser Gln Pro  Pro Gln Pro
    1235                 1240                 1245

Val Ile  Ser Ala His Pro Ile  His Ser Leu Asp Asn  Pro His His
    1250                 1255                 1260

His Phe  His Ser Ser Ser Leu  Ala Ser Pro Ala Arg  Ser His Leu
    1265                 1270                 1275

Tyr His  Pro Gly Ser Pro Trp  Pro Ile Gly Thr Ser  Met Ser Leu
    1280                 1285                 1290

Ser Asp  Arg Ala Asn Ser Thr  Glu Ser Val Arg Asn  Thr Pro Ser
    1295                 1300                 1305

Thr Asp  Thr Met Pro Ala Ser  Ser Ser Gln Thr Cys  Cys Thr Asp
    1310                 1315                 1320

His Gln  Asp Pro Glu Gly Ala  Thr Ser Ser Ser Tyr  Leu Ala Ser
    1325                 1330                 1335

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

Arg Pro  Ser His Pro Leu Lys  Ser Phe Ala Val Pro  Ala Ile Pro
    1355                 1360                 1365

Pro Pro  Gly Pro Pro Thr Tyr  Asp Pro Ala Leu Pro  Ser Thr Pro
    1370                 1375                 1380

Leu Leu  Ser Gln Gln Ala Leu  Asn His His Ile His  Ser Val Lys
    1385                 1390                 1395
```

```
Thr Ala  Ser Ile Gly Thr Leu  Gly Arg Ser Arg Pro  Pro Met Pro
    1400                1405                1410


Val Val  Val Pro Ser Ala Pro  Glu Val Gln Glu Thr  Thr Arg Met
    1415                1420                1425


Leu Glu  Asp Ser Glu Ser Ser  Tyr Glu Pro Asp Glu  Leu Thr Lys
    1430                1435                1440


Glu Met  Ala His Leu Glu Gly  Leu Met Lys Asp Leu  Asn Ala Ile
    1445                1450                1455


Thr Thr  Ala
    1460
```

<210> 80
<211> 446
<212> PRT
<213> Artificial Sequence

<220>
<223> humanized antibody heavy chain HA

<400> 80

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


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


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


Ala Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr Tyr Ala Glu
    50                  55                  60


Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Ser Ile
65                  70                  75                  80
```

```
Ala Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Leu Tyr
                85                  90                  95

Tyr Cys Thr Arg Arg Asp Gly Ala Tyr Trp Gly Lys Gly Thr Thr Val
            100                 105                 110

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

Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
    130                 135                 140

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145                 150                 155                 160

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

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
            180                 185                 190

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

Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr
    210                 215                 220

Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                 230                 235                 240

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                 250                 255

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
            260                 265                 270
```

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

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

Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                 310                 315                 320

Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                 330                 335

Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
            340                 345                 350

Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
        355                 360                 365

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                 375                 380

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

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

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
            420                 425                 430

Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445
```

<210> 81
<211> 446
<212> PRT
<213> Artificial Sequence

<220>

<223> humanized antibody heavy chain HB

<400> 81

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


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


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


Ala Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr Tyr Ala Glu
    50                  55                  60


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


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


Tyr Cys Thr Arg Arg Asp Gly Ala Tyr Trp Gly Lys Gly Thr Thr Val
            100                 105                 110


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


Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
    130                 135                 140


Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145                 150                 155                 160


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


Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
            180                 185                 190
```

```
Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr
        195                 200                 205

Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr
    210                 215                 220

Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                 230                 235                 240

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                 250                 255

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
            260                 265                 270

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

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

Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                 310                 315                 320

Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                 330                 335

Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
            340                 345                 350

Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
        355                 360                 365

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                 375                 380
```

```
Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp
385                 390                 395                 400


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


Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
            420                 425                 430


Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445


<210>  82
<211>  446
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  humanized antibody heavy chain HC

<400>  82

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


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


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


Ala Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr Tyr Ala Glu
    50                  55                  60


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


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

```
Tyr Cys Thr Arg Arg Asp Gly Ala Tyr Trp Gly Lys Gly Thr Thr Val
            100                 105                 110

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

Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
    130                 135                 140

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145                 150                 155                 160

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

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
            180                 185                 190

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

Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr
    210                 215                 220

Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                 230                 235                 240

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                 250                 255

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
            260                 265                 270

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

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

```
Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                 310                 315                 320


Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                 330                 335


Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
            340                 345                 350


Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
        355                 360                 365


Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                 375                 380


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


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


Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
            420                 425                 430


Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445


<210>  83
<211>  446
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  humanized antibody heavy chain HD

<400>  83

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

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

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

Ala Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr Tyr Ala Glu
    50                  55                  60

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

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

Tyr Cys Thr Arg Arg Asp Gly Ala Tyr Trp Gly Lys Gly Thr Thr Val
            100                 105                 110

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

Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
    130                 135                 140

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145                 150                 155                 160

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

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
            180                 185                 190

Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr
        195                 200                 205
```

```
Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr
    210                 215                 220

Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                 230                 235                 240

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                 250                 255

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
            260                 265                 270

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

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

Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                 310                 315                 320

Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                 330                 335

Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
            340                 345                 350

Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
        355                 360                 365

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                 375                 380

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

Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
                405                 410                 415
```

```
Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
            420                 425                 430


Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445


<210>  84
<211>  446
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  humanized antibody heavy chain HE

<400>  84

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


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


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


Ala Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr Tyr Ala Glu
    50                  55                  60


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


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


Tyr Cys Thr Arg Arg Asp Gly Ala Tyr Trp Gly Lys Gly Thr Thr Val
            100                 105                 110


Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala
        115                 120                 125
```

```
Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
    130                 135                 140

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145                 150                 155                 160

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

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
            180                 185                 190

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

Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr
    210                 215                 220

Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                 230                 235                 240

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                 250                 255

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
            260                 265                 270

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

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

Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                 310                 315                 320
```

```
Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                 330                 335

Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
            340                 345                 350

Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
        355                 360                 365

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                 375                 380

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

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

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
            420                 425                 430

Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445


<210>  85
<211>  446
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  humanized antibody heavy chain HF

<400>  85

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

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

```
Trp Met Asp Trp Phe Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45

Ala Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr Tyr Ala Glu
    50                  55                  60

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

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

Tyr Cys Thr Arg Arg Asp Gly Ala Tyr Trp Gly Lys Gly Thr Thr Val
            100                 105                 110

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

Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
    130                 135                 140

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145                 150                 155                 160

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

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
            180                 185                 190

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

Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr
    210                 215                 220

Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                 230                 235                 240
```

```
Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                 250                 255

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
            260                 265                 270

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

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

Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                 310                 315                 320

Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                 330                 335

Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
            340                 345                 350

Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
        355                 360                 365

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                 375                 380

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

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

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
            420                 425                 430
```

```
Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445


<210>  86
<211>  446
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  humanized antibody heavy chain HG

<400>  86

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


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


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


Ala Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr Tyr Ala Glu
    50                  55                  60


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


Ala Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr Ala Leu Tyr
                85                  90                  95


Tyr Cys Thr Arg Arg Asp Gly Ala Tyr Trp Gly Lys Gly Thr Thr Val
            100                 105                 110


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


Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
    130                 135                 140
```

```
Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145                 150                 155                 160

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

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
            180                 185                 190

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

Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr
    210                 215                 220

Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                 230                 235                 240

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                 250                 255

Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
            260                 265                 270

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

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

Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                 310                 315                 320

Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                 330                 335

Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
            340                 345                 350
```

```
Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
        355                 360                 365


Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                 375                 380


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


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


Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
            420                 425                 430


Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445


<210>  87
<211>  446
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  humanized antibody heavy chain HH

<400>  87

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


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


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


Ala Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr Tyr Ala Glu
    50                  55                  60
```

```
Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Ser Ile
65                  70                  75                  80

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

Tyr Cys Thr Arg Arg Asp Gly Ala Tyr Trp Gly Lys Gly Thr Thr Val
            100                 105                 110

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

Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu
    130                 135                 140

Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly
145                 150                 155                 160

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

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu
            180                 185                 190

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

Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr
    210                 215                 220

Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                 230                 235                 240

Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                 250                 255
```

```
Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
            260                 265                 270

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

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

Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                 310                 315                 320

Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                 330                 335

Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
            340                 345                 350

Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
        355                 360                 365

Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                 375                 380

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

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

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
            420                 425                 430

Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445
```

<210> 88
<211> 214

<212> PRT
<213> Artificial Sequence

<220>
<223> humanized antibody light chain KA

<400> 88

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


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


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


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


Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80


Glu Asp Phe Ala Ser Tyr Phe Cys Gln Gln Leu Asn Thr Leu Pro Trp
                85                  90                  95


Thr Phe Gly Gly Gly Thr Lys Val Glu Met Glu Arg Thr Val Ala Ala
            100                 105                 110


Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125


Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140


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


Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175
```

```
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190


Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205


Phe Asn Arg Gly Glu Cys
    210


<210>  89
<211>  214
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  humanized antibody light chain KB

<400>  89

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


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


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


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


Ser Gly Ser Gly Thr Asp Tyr Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80


Glu Asp Phe Ala Ser Tyr Phe Cys Gln Gln Leu Asn Thr Leu Pro Trp
                85                  90                  95


Thr Phe Gly Gly Gly Thr Lys Val Glu Met Glu Arg Thr Val Ala Ala
            100                 105                 110
```

```
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125


Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140


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


Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175


Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190


Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205


Phe Asn Arg Gly Glu Cys
    210


<210>  90
<211>  214
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  humanized antibody light chain KC

<400>  90

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


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


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

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

Ser Gly Ser Gly Thr Asp Tyr Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Ser Tyr Phe Cys Gln Gln Leu Asn Thr Leu Pro Trp
                85                  90                  95

Thr Phe Gly Gly Gly Thr Lys Val Glu Met Glu Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

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

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210
```

<210> 91
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> humanized antibody light chain KD

<400> 91

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


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


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


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


Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80


Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Leu Asn Thr Leu Pro Trp
                85                  90                  95


Thr Phe Gly Gly Gly Thr Lys Val Glu Met Glu Arg Thr Val Ala Ala
            100                 105                 110


Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125


Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140


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


Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175
```

```
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190


Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205


Phe Asn Arg Gly Glu Cys
    210


<210>  92
<211>  214
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  humanized antibody light chain KE

<400>  92

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


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


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


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


Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80


Glu Asp Phe Ala Ser Tyr Phe Cys Gln Gln Leu Asn Thr Leu Pro Trp
                85                  90                  95


Thr Phe Gly Gly Gly Thr Lys Val Glu Met Glu Arg Thr Val Ala Ala
            100                 105                 110
```

```
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125


Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140


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


Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175


Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190


Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205


Phe Asn Arg Gly Glu Cys
    210


<210>  93
<211>  214
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  humanized antibody light chain KF

<400>  93

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


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


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

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

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Leu Asn Thr Leu Pro Trp
                85                  90                  95

Thr Phe Gly Gly Gly Thr Lys Val Glu Met Glu Arg Thr Val Ala Ala
            100                 105                 110

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140

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

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205

Phe Asn Arg Gly Glu Cys
    210
```

<210> 94
<211> 214
<212> PRT
<213> Artificial Sequence

<220>

<223> humanized antibody light chain KG

<400> 94

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


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


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


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


Ser Gly Ser Gly Thr Asp Tyr Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80


Glu Asp Phe Ala Thr Tyr Phe Cys Gln Gln Leu Asn Thr Leu Pro Trp
                85                  90                  95


Thr Phe Gly Gly Gly Thr Lys Val Glu Met Glu Arg Thr Val Ala Ala
            100                 105                 110


Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125


Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140


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


Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175


Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
            180                 185                 190
```

```
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205


Phe Asn Arg Gly Glu Cys
    210


<210>  95
<211>  116
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  humanized antibody heavy chain

<400>  95

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


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


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


Ala Glu Ile Arg Ser Lys Ala Asn Asn His Ala Thr Tyr Tyr Ala Glu
    50                  55                  60


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


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


Tyr Cys Thr Arg Arg Asp Gly Ala Tyr Trp Gly Lys Gly Thr Thr Val
            100                 105                 110


Thr Val Ser Ser
        115
```

<210> 96
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> humanized antibody light chain

<400> 96

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

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

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

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

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Phe Ala Ser Tyr Phe Cys Gln Gln Leu Asn Thr Leu Pro Trp
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Met Glu
100 105

<210> 97
<211> 14
<212> PRT
<213> Artificial Sequence

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

<400> 97

Thr Gly Thr Ser Ser Ser Val Gly Asp Ser Ile Tyr Val Ser
1   5   10

<210> 98
<211> 7
<212> PRT
<213> Artificial Sequence

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

<400> 98

Asp Val Thr Lys Arg Pro Ser
1   5

<210> 99
<211> 9
<212> PRT
<213> Artificial Sequence

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

<400> 99

Cys Ser Tyr Ala Gly Thr Asp Thr Leu
1   5

<210> 100
<211> 5
<212> PRT
<213> Artificial Sequence

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

<400> 100

Ser His Gly Ile Ser
1   5

<210> 101
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<220>
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Trp Ile Ser Pro Tyr Ser Gly Asn Thr Asn Tyr Ala Gln Lys Leu Gln
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Gly

<210> 102
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Val Gly Ser Gly Pro Tyr Tyr Tyr Met Asp Val
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<210> 103
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Tyr Ser Tyr Ala Gly Thr Asp Thr Leu
1   5

<210> 104
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Phe Ser Tyr Ala Gly Thr Asp Thr Leu
1 5

<210> 105
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His Ser Tyr Ala Gly Thr Asp Thr Leu
1 5

<210> 106
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Leu Ser Tyr Ala Gly Thr Asp Thr Leu
1 5

<210> 107
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Val Ser Tyr Ala Gly Thr Asp Thr Leu
1 5

<210> 108
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Ile Ser Tyr Ala Gly Thr Asp Thr Leu
1   5

<210> 109
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<400> 109

Lys Ser Tyr Ala Gly Thr Asp Thr Leu
1   5