SEQUENCE LISTING

<110> BiocerOX Products B.V.

<120> ANTI-CD134 (OX40) ANTIBODIES AND USES THEREOF

<130> P101024PC00

<150> ep 13159794.0
<151> 2013-03-18

<150> EP 13159794.0
<151> 2013-03-18

<160> 152

<170> PatentIn version 3.5

<210> 1
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<212> PRT
<213> homo sapiens

<220>
<221> SIGNAL
<222> (1)..(28)

<220>
<221> TRANSMEM
<222> (215)..(235)

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Leu Leu Leu Gly Leu Gly Leu Ser Thr Val Thr Gly Leu His Cys Val
            20                  25                  30

Gly Asp Thr Tyr Pro Ser Asn Asp Arg Cys Cys His Glu Cys Arg Pro
        35                  40                  45

Gly Asn Gly Met Val Ser Arg Cys Ser Arg Ser Gln Asn Thr Val Cys
    50                  55                  60

Arg Pro Cys Gly Pro Gly Phe Tyr Asn Asp Val Val Ser Ser Lys Pro
65                  70                  75                  80

Cys Lys Pro Cys Thr Trp Cys Asn Leu Arg Ser Gly Ser Glu Arg Lys
                85                  90                  95

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

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

Pro Pro Gly His Phe Ser Pro Gly Asp Asn Gln Ala Cys Lys Pro Trp
    130                 135                 140
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Thr Asn Cys Thr Leu Ala Gly Lys His Thr Leu Gln Pro Ala Ser Asn
145                 150                 155                 160

Ser Ser Asp Ala Ile Cys Glu Asp Arg Asp Pro Pro Ala Thr Gln Pro
                165                 170                 175

Gln Glu Thr Gln Gly Pro Pro Ala Arg Pro Ile Thr Val Gln Pro Thr
            180                 185                 190

Glu Ala Trp Pro Arg Thr Ser Gln Gly Pro Ser Thr Arg Pro Val Glu
        195                 200                 205

Val Pro Gly Gly Arg Ala Val Ala Ala Ile Leu Gly Leu Gly Leu Val
    210                 215                 220

Leu Gly Leu Leu Gly Pro Leu Ala Ile Leu Leu Ala Leu Tyr Leu Leu
225                 230                 235                 240

Arg Arg Asp Gln Arg Leu Pro Pro Asp Ala His Lys Pro Pro Gly Gly
                245                 250                 255

Gly Ser Phe Arg Thr Pro Ile Gln Glu Glu Gln Ala Asp Ala His Ser
            260                 265                 270

Thr Leu Ala Lys Ile
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<210> 2
<211> 834
<212> DNA
<213> Artificial

<220>
<223> Sf9 insect cell-optimized cDNA sequence for human CD134

<400> 2

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cgttgctgcc acgaatgcag gcctggcaac ggcatggtgt cccgttgctc ccgttcccag      180

aacaccgtgt gccgtccctg cggtcccggt ttctacaacg acgtggtgtc ctccaagccc      240

tgcaagcctt gcacttggtg taacctccgc tccggttccg agcgcaagca gctgtgcacc      300

gctacccagg acactgtctg taggtgcagg gctggcaccc agcccctgga ctcctacaag      360

cccggtgtcg actgcgctcc ctgcccccct ggtcacttct ctcccggcga caaccaggct      420

tgcaaaccat ggaccaactg caccctggct ggcaagcaca ccctgcagcc cgcttccaac      480

tcctccgacg ctatctgcga ggaccgtgac ccccctgcta ctcaacctca ggagactcag      540

ggtccccccg ctcgtcccat caccgtgcag cccaccgagg cttggccccg tacctcccaa      600

ggacctagca ctaggcctgt ggaggtgccc ggtggtcgtg ctgtggctgc tatcctgggc      660
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cgtcgtgacc agcgtctgcc ccccgacgct cacaagcccc ctggtggtgg ttccttccgt 780

acccccatcc aggaggagca ggctgacgct cactccaccc tggccaagat ctaa 834

<210> 3
<211> 11
<212> PRT
<213> Artificial

<220>
<223> N-terminus amino acid sequence of clone 20E5 heavy chain

<400> 3

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

<210> 4
<211> 119
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 20E5 heavy chain variable region

<400> 4

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

Ser Val Lys Met Ser Cys Lys Ala 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 Asn Pro Tyr Asn Asp Gly 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 Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Ser Val Thr Val Ser Ser
115

<210> 5
<211> 108
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 20E5 light chain variable region

<400> 5

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 Asn 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 Gly Asn Thr Leu Pro Trp
85 90 95

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

<210> 6
<211> 10
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 20E5 heavy chain CDR1

<400> 6

Gly Tyr Thr Phe Thr Ser Tyr Val Met His
1 5 10

<210> 7
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 20E5 heavy chain CDR2

<400> 7

Tyr Ile Asn Pro Tyr Asn Asp Gly Thr Lys Tyr Asn Glu Lys Phe Lys
1 5 10 15

Gly

<210> 8
<211> 10

<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 20E5 heavy chain CDR3

<400> 8

Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr
1 5 10

<210> 9
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 20E5 light chain CDR1

<400> 9

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

<210> 10
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 20E5 light chain CDR2

<400> 10

Tyr Thr Ser Arg Leu His Ser
1 5

<210> 11
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 20E5 light chain CDR3

<400> 11

Gln Gln Gly Asn Thr Leu Pro Trp Thr
1 5

<210> 12
<211> 121
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 12H3 heavy chain variable region

<400> 12

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

Ser Val Lys Ile Ser Cys Lys Thr Ser Gly Tyr Thr Phe Lys Asp Tyr
20 25 30

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

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

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

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Ala Gly Thr Thr Val Thr Val Ser Pro
115 120

<210> 13
<211> 108
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 12H3 light chain variable region

<400> 13

Asp Ile Val Met Thr Gln Ser His Lys Phe Met Ser Thr Ser Leu Gly
1 5 10 15

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

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

Tyr Trp Ala Ser Thr Arg His Thr Gly Val Pro Asp Arg Phe Thr Gly
50 55 60

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

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

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

<210> 14
<211> 10

<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 12H3 heavy chain CDR1

<400> 14

Gly Tyr Thr Phe Lys Asp Tyr Thr Met His
1 5 10

<210> 15
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 12H3 heavy chain CDR2

<400> 15

Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe Lys
1 5 10 15

Asp

<210> 16
<211> 12
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 12H3 heavy chain CDR3

<400> 16

Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val
1 5 10

<210> 17
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 12H3 light chain CDR1

<400> 17

Lys Ala Ser Gln Asp Val Gly Ala Ala Val Ala
1 5 10

<210> 18
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 12H3 light chain CDR2

<400> 18

Trp Ala Ser Thr Arg His Thr
1 5

<210> 19
<211> 9
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of clone 12H3 light chain CDR3

<400> 19

Gln Gln Tyr Ile Asn Tyr Pro Leu Thr
1 5

<210> 20
<211> 1398
<212> DNA
<213> Artificial

<220>
<223> CHO-optimized cDNA sequence coding for chimeric clone 20E5 human IgG4 chain

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gtgcagctgc agcagtcagg ccccgagctg gtcaagcctg gcgctagcgt gaagatgagc 120

tgtaaagcta gcggctacac cttcactagc tacgtgatgc actgggtcaa gcagaagccc 180

ggccagggcc tggagtggat cggctatatt aacccctata acgacggcac taagtataac 240

gagaagttta agggcaaggc taccctgact agcgataagt ctagctctac cgcctatatg 300

gaactgtcta gtctgactag tgaagatagc gccgtctact actgcgctaa ctactacggc 360

tctagcctgt ctatggacta ctggggccag ggcactagcg tgaccgtgtc tagcgctagc 420

actaagggcc ctagcgtgtt ccccctggcc ccctgctcta gatctactag cgagtctacc 480

gccgctctgg gctgcctggt caaggactac ttccccgagc ccgtgaccgt cagctggaat 540

agcggcgctc tgactagcgg cgtgcacacc ttccctgccg tgctgcagtc tagcggcctg 600

tatagtctgt ctagcgtggt caccgtgcct agttctagcc tgggcactaa gacctacacc 660

tgtaacgtgg accacaagcc ctctaacact aaggtggaca agcgggtgga atctaagtac 720

ggccctccct gccccccctg ccctgcccct gaatttctgg gcggacctag tgtgttcctg 780

ttcccaccta agcctaagga caccctgatg atctctagaa cccccgaagt gacctgcgtg 840

gtggtggacg tgtcacagga agatcccgag gtccagttta attggtacgt ggacggcgtg 900

gaagtgcaca acgctaagac taagcctaga gaggaacagt ttaactctac ctatagggtc 960

gtcagcgtgc tgaccgtgct gcaccaggac tggctgaacg gcaaagagta taagtgtaaa 1020

gtgtctaaca agggcctgcc tagctctatc gaaaagacta tctctaaggc taagggccag 1080

cctagagaac ctcaggtcta caccctgccc cctagtcagg aagagatgac taagaatcag 1140

gtgtcactga cctgtctggt caagggcttc taccctagcg atatcgccgt cgagtgggag 1200

tctaacggcc agcccgagaa caactataag actacccccc ctgtgctgga tagcgacggt 1260

agcttcttcc tgtactcacg gctgaccgtg gataagtcta ggtggcagga aggcaacgtc 1320

tttagctgta gcgtgatgca cgaggccctg cacaatcact acactcagaa gtcactgagc 1380

ctgagcctgg gcaagtga 1398

<210> 21
<211> 702
<212> DNA
<213> Artificial

<220>
<223> CHO-optimized cDNA sequence coding for chimeric clone 20E5 human kappa chain

<400> 21
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attcagatga ctcagactac ctctagcctg agcgctagcc tgggcgatag agtgactatt 120

agctgtagag ctagtcagga tatctctaac tacctgaact ggtatcagca gaaacccgac 180

ggcaccgtga agctgctgat ctactacacc tctagactgc actcaggcgt gccctctagg 240

tttagcggta gcggtagtgg caccgactat agcctgacta tctctaacct ggaacaggaa 300

gatatcgcta cctacttctg tcagcagggc aacaccctgc cctggacctt cggcggaggc 360

actaagctgg aaatcaagcg gaccgtggcc gctccctcag tgtttatctt cccacctagc 420

gacgagcagc tgaagtccgg caccgctagc gtcgtgtgcc tgctgaacaa cttctaccct 480

agagaagcta aggtgcagtg gaaagtggat aacgccctgc agtcaggcaa ctctcaggaa 540

tcagtcaccg agcaggactc taaggatagc acctatagcc tgtctagcac cctgaccctg 600

tctaaggccg actacgagaa gcacaaggtc tacgcctgcg aagtgactca ccagggactg 660

tctagccccg tgactaagtc ctttaataga ggcgagtgct ga 702

<210> 22
<211> 1407
<212> DNA
<213> Artificial

<220>
<223> CHO-optimized cDNA sequence coding for chimeric clone 20E5 human IgG1 chain

<400> 22
atggagtggt caggcgtgtt catgttcctg ctgagcgtga ccgctggcgt gcactcagag 60

gtgcagctgc agcagtcagg ccccgagctg gtcaagcctg gcgctagcgt gaagatgagc 120

tgtaaagcta gcggctacac cttcactagc tacgtgatgc actgggtcaa gcagaagccc 180

ggtcagggcc tggagtggat cggctatatt aacccctata acgacggcac taagtataac 240

gagaagttta agggtaaagc taccctgact agcgataagt ctagctctac cgcctatatg 300

gaactgtcta gtctgactag tgaagatagc gccgtctact actgcgctaa ctactacggc 360

tctagcctgt ctatggacta ctggggtcag ggcactagcg tgaccgtgtc tagcgctagc 420

actaagggcc ctagcgtgtt ccccctggcc cctagctcta agtctactag cggcggcacc 480

gccgctctgg gctgcctggt caaggactac ttccccgagc ccgtgaccgt cagctggaat 540

agcggcgctc tgactagcgg agtgcacacc ttccccgccg tgctgcagtc tagcggcctg 600

tatagtctgt ctagcgtggt caccgtgcct agttctagcc tgggcactca gacctatatc 660

tgtaacgtga accacaagcc ctctaacact aaggtggaca agaaggtgga acctaagtcc 720

tgcgataaga ctcacacctg tccccccctgc cctgcccctg agctgctggg aggacctagt 780

gtgttcctgt tcccacctaa gcctaaggac accctgatga tctctagaac ccccgaagtg 840

acctgcgtgg tggtggacgt cagtcacgag gaccctgaag tgaagtttaa ttggtacgtg 900

gacggcgtgg aagtgcacaa cgctaagact aagcctagag aggaacagta taactctacc 960

tatagggtcg tcagcgtgct gaccgtgctg caccaggact ggctgaacgg taaagagtat 1020

aagtgtaaag tgtctaacaa ggccctgcca gcccctatcg aaaagactat ctctaaggct 1080

aagggtcagc ctagggaacc tcaggtctac accctgcccc ctagtaggga cgagctgact 1140

aagaatcagg tcagcctgac ttgtctggtc aagggcttct accctagcga tatcgccgtc 1200

gagtgggagt ctaacggtca gcccgagaac aactataaga ctacccccc tgtgctggat 1260

agcgacggta gcttcttcct gtactctaaa ctgaccgtgg ataagtctag gtggcagcag 1320

ggtaacgtgt tcagctgtag cgtgatgcac gaggccctgc acaatcacta cactcagaag 1380

tcactgagcc tgagccccgg taagtga 1407

<210> 23
<211> 1404
<212> DNA
<213> Artificial

<220>
<223> CHO-optimized cDNA sequence coding for chimeric clone 12H3 human IgG4 chain

<400> 23
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gtgcagctgc agcagtccgg ccctgagctg gtgaaacctg gcgcctccgt gaagatctcc 120

tgcaagacct ccggctacac cttcaaggac tacacaatgc actgggtgaa acagtcccac 180

ggcaagtcct tggagtggat cggcggaatc taccccaaca acggcggctc cacctacaac 240

cagaacttca aggacaaggc caccctgacc gtggacaagt cctcctccac cgcctatatg 300

gaatttcggt ccctgacctc cgaggactcc gccgtgtact actgcgcccg gatgggctac 360

cacggccccc acctggattt cgacgtgtgg ggcgctggca ccaccgtgac cgtgtctcca 420

gctagcacca agggcccctc cgtgttccct ctggcccctt gctcccggtc cacctccgag 480

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tggaactctg gcgccctgac cagcggcgtg cacaccttcc ctgccgtgct gcagtcctcc 600

ggcctgtact ccctgtcctc cgtggtgaca gtgccctcct ccagcctggg caccaagacc 660

tacacctgta acgtggacca caagccctcc aacaccaagg tggacaagcg ggtggaatct 720

aagtacggcc ctccctgccc accttgccct gcccctgaat ttctgggcgg accttccgtg 780

ttcctgttcc ccccaaagcc caaggacacc ctgatgatct cccggacccc cgaagtgacc 840

tgcgtggtgg tggacgtgtc ccaagaagat cccgaggtcc agttcaattg gtacgtggac 900

ggcgtggaag tgcacaacgc caagaccaag cccagagagg aacagttcaa ctccacctac 960

cgggtggtgt ccgtgctgac cgtgctgcac caggactggc tgaacggcaa agagtacaag 1020

tgcaaggtct ccaacaaggg cctgcccagc tctatcgaaa agacaatctc caaggccaag 1080

ggccagcccc gcgagcccca ggtgtacacc ctgcctccca gccaagaaga gatgaccaag 1140

aaccaggtgt ccctgacttg tctggtgaaa ggcttctacc cctccgatat cgccgtcgag 1200

tgggagtcca acggccagcc cgagaacaac tacaagacca ccccccctgt gctggactcc 1260

gacggctcct tcttcctgta ctctcggctg acagtggata agtcccggtg gcaagaaggc 1320

aacgtcttct cctgctccgt gatgcacgag gccctgcaca accactacac ccagaagtcc 1380

ctgtccctga gcctgggcaa gtag 1404

<210> 24
<211> 702
<212> DNA
<213> Artificial

<220>
<223> CHO-optimized cDNA sequence coding for chimeric clone 12H3 human kappa chain

<400> 24
atggagtggt ccggtgtctt tatgttcctg ctgtccgtga ccgctggcgt gcactccgat 60

atcgtgatga cccagtccca caagtttatg tccacctccc tgggcgacag agtctctatt 120

acctgcaagg cctcccagga cgtgggcgct gccgtggcct ggtatcagca gaagcccggc 180

cagtccccca agctgctgat ctactgggcc tccaccagac acaccggcgt gcccgacaga 240

ttcaccggcg gaggctctgg caccgacttc accctgacaa tctccaacgt gcagtccgag 300

gacctgaccg actacttctg ccagcagtat atcaactacc ccctgacctt cggcggaggc 360

accaagctgg aaatcaagcg gaccgtggcc gctccctccg tgtttatctt cccaccctcc 420

gacgagcagc tgaagtccgg caccgcctcc gtggtctgcc tgctgaacaa cttctacccc 480

cgcgaggcca aggtgcagtg gaaggtggac aacgccctgc agtccggcaa ctcccaagaa 540

tccgtgaccg agcaggactc caaggacagc acctactccc tgtcctccac cctgaccctg 600

tccaaggccg actacgagaa gcacaaggtg tacgcctgcg aagtgaccca ccagggcctg 660

tccagccccg tgaccaagtc cttcaaccgg ggcgagtgct aa 702

<210> 25
<211> 465
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of chimeric clone 20E5 human IgG4 chain

<400> 25

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

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

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

Glu Trp Ile Gly Tyr Ile Asn Pro Tyr Asn Asp Gly Thr Lys Tyr Asn
65                  70                  75                  80

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

Thr Ala Tyr Met Glu Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val
            100                 105                 110

Tyr Tyr Cys Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp
        115                 120                 125

Gly Gln Gly Thr Ser Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
    130                 135                 140

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

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
                165                 170                 175

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

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
        195                 200                 205

Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp
    210                 215                 220

His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser Lys Tyr
225                 230                 235                 240

Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly Gly Pro
                245                 250                 255

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

Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln Glu Asp
275 280 285

Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
290 295 300

Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr Arg Val
305 310 315 320

Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
325 330 335

Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile Glu Lys
340 345 350

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

Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr
370 375 380

Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
385 390 395 400

Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
405 410 415

Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys
420 425 430

Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu
435 440 445

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly
450 455 460

Lys
465

<210> 26
<211> 233
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of chimeric clone 20E5 human kappa chain

<400> 26

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

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

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

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

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

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

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

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

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

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

Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
165 170 175

Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
180 185 190

Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
195 200 205

Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
210 215 220

Thr Lys Ser Phe Asn Arg Gly Glu Cys
225 230

<210> 27
<211> 468
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of chimeric clone 20E5 human IgG1 chain

<400> 27

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

```
1               5                  10                  15

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

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

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

Glu Trp Ile Gly Tyr Ile Asn Pro Tyr Asn Asp Gly Thr Lys Tyr Asn
65                  70                  75                  80

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

Thr Ala Tyr Met Glu Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val
            100                 105                 110

Tyr Tyr Cys Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp
        115                 120                 125

Gly Gln Gly Thr Ser Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
    130                 135                 140

Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr
145                 150                 155                 160

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
                165                 170                 175

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

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
        195                 200                 205

Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn
    210                 215                 220

His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser
225                 230                 235                 240

Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
                245                 250                 255

Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu
            260                 265                 270

Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser
```

275 280 285

His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu
290 295 300

Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr
305 310 315 320

Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn
325 330 335

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

Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln
355 360 365

Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val
370 375 380

Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val
385 390 395 400

Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro
405 410 415

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

Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val
435 440 445

Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu
450 455 460

Ser Pro Gly Lys
465

<210> 28
<211> 467
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of chimeric clone 12H3 human IgG4 chain

<400> 28

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

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

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

Lys Asp Tyr Thr Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu
    50                  55                  60

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

Gln Asn Phe Lys Asp Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Ser
                85                  90                  95

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

Tyr Tyr Cys Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp
        115                 120                 125

Val Trp Gly Ala Gly Thr Thr Val Thr Val Ser Pro Ala Ser Thr Lys
    130                 135                 140

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

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

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
            180                 185                 190

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

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn
    210                 215                 220

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser
225                 230                 235                 240

Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly
                245                 250                 255

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
            260                 265                 270

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln
        275                 280                 285

Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val
    290                 295                 300
```

```
His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr
305                 310                 315                 320

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
                325                 330                 335

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile
            340                 345                 350

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

Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser
    370                 375                 380

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
385                 390                 395                 400

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
                405                 410                 415

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val
            420                 425                 430

Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met
        435                 440                 445

His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
    450                 455                 460

Leu Gly Lys
465
```

<210>  29
<211>  233
<212>  PRT
<213>  Artificial

<220>
<223>  Amino acid sequence of chimeric clone 12H3 human kappa chain

<400>  29

```
Met Glu Trp Ser Gly Val Phe Met Phe Leu Leu Ser Val Thr Ala Gly
1               5                   10                  15

Val His Ser Asp Ile Val Met Thr Gln Ser His Lys Phe Met Ser Thr
            20                  25                  30

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

Gly Ala Ala Val Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Lys
```

50 55 60

Leu Leu Ile Tyr Trp Ala Ser Thr Arg His Thr Gly Val Pro Asp Arg
65 70 75 80

Phe Thr Gly Gly Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Asn
85 90 95

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

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

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

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

Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
165 170 175

Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
180 185 190

Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
195 200 205

Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
210 215 220

Thr Lys Ser Phe Asn Arg Gly Glu Cys
225 230

<210> 30
<211> 240
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of human CD134_CRD2 (aa 1-28 >< 66-277)

<220>
<221> SIGNAL
<222> (1)..(28)

<220>
<221> TRANSMEM
<222> (178)..(198)

<400> 30

Met Cys Val Gly Ala Arg Arg Leu Gly Arg Gly Pro Cys Ala Ala Leu
1 5 10 15

```
Leu Leu Leu Gly Leu Gly Leu Ser Thr Val Thr Gly Pro Cys Gly Pro
            20                  25                  30

Gly Phe Tyr Asn Asp Val Val Ser Ser Lys Pro Cys Lys Pro Cys Thr
        35                  40                  45

Trp Cys Asn Leu Arg Ser Gly Ser Glu Arg Lys Gln Leu Cys Thr Ala
    50                  55                  60

Thr Gln Asp Thr Val Cys Arg Cys Arg Ala Gly Thr Gln Pro Leu Asp
65                  70                  75                  80

Ser Tyr Lys Pro Gly Val Asp Cys Ala Pro Cys Pro Pro Gly His Phe
                85                  90                  95

Ser Pro Gly Asp Asn Gln Ala Cys Lys Pro Trp Thr Asn Cys Thr Leu
            100                 105                 110

Ala Gly Lys His Thr Leu Gln Pro Ala Ser Asn Ser Ser Asp Ala Ile
        115                 120                 125

Cys Glu Asp Arg Asp Pro Pro Ala Thr Gln Pro Gln Glu Thr Gln Gly
    130                 135                 140

Pro Pro Ala Arg Pro Ile Thr Val Gln Pro Thr Glu Ala Trp Pro Arg
145                 150                 155                 160

Thr Ser Gln Gly Pro Ser Thr Arg Pro Val Glu Val Pro Gly Gly Arg
                165                 170                 175

Ala Val Ala Ala Ile Leu Gly Leu Gly Leu Val Leu Gly Leu Leu Gly
            180                 185                 190

Pro Leu Ala Ile Leu Leu Ala Leu Tyr Leu Leu Arg Arg Asp Gln Arg
        195                 200                 205

Leu Pro Pro Asp Ala His Lys Pro Pro Gly Gly Gly Ser Phe Arg Thr
    210                 215                 220

Pro Ile Gln Glu Glu Gln Ala Asp Ala His Ser Thr Leu Ala Lys Ile
225                 230                 235                 240
```

<210>  31
<211>  198
<212>  PRT
<213>  Artificial

<220>
<223>  Amino acid sequence of human CD134_CRD3 (aa 1-28 >< 108-277)

<220>

<221> SIGNAL
<222> (1)..(28)

<220>
<221> TRANSMEM
<222> (136)..(156)

<400> 31

```
Met Cys Val Gly Ala Arg Arg Leu Gly Arg Gly Pro Cys Ala Ala Leu
1               5                  10                  15

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

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

Cys Pro Pro Gly His Phe Ser Pro Gly Asp Asn Gln Ala Cys Lys Pro
    50                  55                  60

Trp Thr Asn Cys Thr Leu Ala Gly Lys His Thr Leu Gln Pro Ala Ser
65                  70                  75                  80

Asn Ser Ser Asp Ala Ile Cys Glu Asp Arg Asp Pro Pro Ala Thr Gln
                85                  90                  95

Pro Gln Glu Thr Gln Gly Pro Pro Ala Arg Pro Ile Thr Val Gln Pro
            100                 105                 110

Thr Glu Ala Trp Pro Arg Thr Ser Gln Gly Pro Ser Thr Arg Pro Val
        115                 120                 125

Glu Val Pro Gly Gly Arg Ala Val Ala Ala Ile Leu Gly Leu Gly Leu
    130                 135                 140

Val Leu Gly Leu Leu Gly Pro Leu Ala Ile Leu Leu Ala Leu Tyr Leu
145                 150                 155                 160

Leu Arg Arg Asp Gln Arg Leu Pro Pro Asp Ala His Lys Pro Pro Gly
                165                 170                 175

Gly Gly Ser Phe Arg Thr Pro Ile Gln Glu Glu Gln Ala Asp Ala His
            180                 185                 190

Ser Thr Leu Ala Lys Ile
        195
```

<210> 32
<211> 179
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of human CD134_CRD4 (aa 1-28 >< 127-277)

<220>
<221> SIGNAL
<222> (1)..(28)

<220>
<221> TRANSMEM
<222> (117)..(137)

<400> 32

Met Cys Val Gly Ala Arg Arg Leu Gly Arg Gly Pro Cys Ala Ala Leu
1 5 10 15

Leu Leu Leu Gly Leu Gly Leu Ser Thr Val Thr Gly Pro Cys Pro Pro
20 25 30

Gly His Phe Ser Pro Gly Asp Asn Gln Ala Cys Lys Pro Trp Thr Asn
35 40 45

Cys Thr Leu Ala Gly Lys His Thr Leu Gln Pro Ala Ser Asn Ser Ser
50 55 60

Asp Ala Ile Cys Glu Asp Arg Asp Pro Pro Ala Thr Gln Pro Gln Glu
65 70 75 80

Thr Gln Gly Pro Pro Ala Arg Pro Ile Thr Val Gln Pro Thr Glu Ala
85 90 95

Trp Pro Arg Thr Ser Gln Gly Pro Ser Thr Arg Pro Val Glu Val Pro
100 105 110

Gly Gly Arg Ala Val Ala Ala Ile Leu Gly Leu Gly Leu Val Leu Gly
115 120 125

Leu Leu Gly Pro Leu Ala Ile Leu Leu Ala Leu Tyr Leu Leu Arg Arg
130 135 140

Asp Gln Arg Leu Pro Pro Asp Ala His Lys Pro Pro Gly Gly Gly Ser
145 150 155 160

Phe Arg Thr Pro Ile Gln Glu Glu Gln Ala Asp Ala His Ser Thr Leu
165 170 175

Ala Lys Ile

<210> 33
<211> 159
<212> PRT
<213> Artificial

<220>
<223> Amino acid sequence of human CD134_CRD4 truncated (aa 1-28 ><

147-277)

<220>
<221> SIGNAL
<222> (1)..(28)

<220>
<221> TRANSMEM
<222> (97)..(117)

<400> 33

```
Met Cys Val Gly Ala Arg Arg Leu Gly Arg Gly Pro Cys Ala Ala Leu
1               5                   10                  15

Leu Leu Leu Gly Leu Gly Leu Ser Thr Val Thr Gly Cys Thr Leu Ala
            20                  25                  30

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

Glu Asp Arg Asp Pro Pro Ala Thr Gln Pro Gln Glu Thr Gln Gly Pro
    50                  55                  60

Pro Ala Arg Pro Ile Thr Val Gln Pro Thr Glu Ala Trp Pro Arg Thr
65                  70                  75                  80

Ser Gln Gly Pro Ser Thr Arg Pro Val Glu Val Pro Gly Gly Arg Ala
                85                  90                  95

Val Ala Ala Ile Leu Gly Leu Gly Leu Val Leu Gly Leu Leu Gly Pro
            100                 105                 110

Leu Ala Ile Leu Leu Ala Leu Tyr Leu Leu Arg Arg Asp Gln Arg Leu
        115                 120                 125

Pro Pro Asp Ala His Lys Pro Pro Gly Gly Gly Ser Phe Arg Thr Pro
    130                 135                 140

Ile Gln Glu Glu Gln Ala Asp Ala His Ser Thr Leu Ala Lys Ile
145                 150                 155
```

<210> 34
<211> 19
<212> PRT
<213> Homo sapiens

<400> 34

```
Arg Cys Arg Ala Gly Thr Gln Pro Leu Asp Ser Tyr Lys Pro Gly Val
1               5                   10                  15

Asp Cys Ala
```

<210> 35
<211> 107
<212> PRT
<213> Homo sapiens

<400> 35

Arg Cys Arg Ala Gly Thr Gln Pro Leu Asp Ser Tyr Lys Pro Gly Val
1 5 10 15

Asp Cys Ala Pro Cys Pro Pro Gly His Phe Ser Pro Gly Asp Asn Gln
20 25 30

Ala Cys Lys Pro Trp Thr Asn Cys Thr Leu Ala Gly Lys His Thr Leu
35 40 45

Gln Pro Ala Ser Asn Ser Ser Asp Ala Ile Cys Glu Asp Arg Asp Pro
50 55 60

Pro Ala Thr Gln Pro Gln Glu Thr Gln Gly Pro Pro Ala Arg Pro Ile
65 70 75 80

Thr Val Gln Pro Thr Glu Ala Trp Pro Arg Thr Ser Gln Gly Pro Ser
85 90 95

Thr Arg Pro Val Glu Val Pro Gly Gly Arg Ala
100 105

<210> 36
<211> 68
<212> PRT
<213> Homo sapiens

<400> 36

Cys Thr Leu Ala Gly Lys His Thr Leu Gln Pro Ala Ser Asn Ser Ser
1 5 10 15

Asp Ala Ile Cys Glu Asp Arg Asp Pro Pro Ala Thr Gln Pro Gln Glu
20 25 30

Thr Gln Gly Pro Pro Ala Arg Pro Ile Thr Val Gln Pro Thr Glu Ala
35 40 45

Trp Pro Arg Thr Ser Gln Gly Pro Ser Thr Arg Pro Val Glu Val Pro
50 55 60

Gly Gly Arg Ala
65

<210> 37
<211> 29
<212> PRT
<213> Homo sapiens

<400> 37

Thr Tyr Ser Ser Pro Glu Asp Gly Ile His Glu Leu Phe Pro Ala Pro
1 5 10 15

Asp Gly Glu Glu Asp Thr Ala Glu Leu Gln Gly Gly Cys
20 25

<210> 38
<211> 39
<212> PRT
<213> Homo sapiens

<400> 38

Arg Cys Arg Ala Gly Thr Gln Pro Leu Asp Ser Tyr Lys Pro Gly Val
1 5 10 15

Asp Cys Ala Pro Cys Pro Pro Gly His Phe Ser Pro Gly Asp Asn Gln
20 25 30

Ala Cys Lys Pro Trp Thr Asn
35

<210> 39
<211> 20
<212> DNA
<213> Artificial

<220>
<223> mkappa antisense primer (primer no: 201)

<400> 39
gacagttggt gcagcatcag 20

<210> 40
<211> 20
<212> DNA
<213> Artificial

<220>
<223> mkappa antisense primer (primer no: 266)

<400> 40
cactggatgg tgggaagatg 20

<210> 41
<211> 20
<212> DNA
<213> Artificial

<220>
<223> mIgG1 antisense primer (primer no: 203)

<400> 41
ggccagtgga tagacagatg 20

<210> 42
<211> 20
<212> DNA
<213> Artificial

<220>
<223> mlgG1 antisense primer (primer no: 204)

<400> 42
tggacaggga tccagagttc 20

<210> 43
<211> 25
<212> DNA
<213> Artificial

<220>
<223> 20E5HC sense primer (primer no: 259)

<220>
<221> misc_feature
<222> (14)..(14)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (23)..(23)
<223> n is a, c, g, or t

<400> 43
gcgaagtaca aytncarcar wsngg 25

<210> 44
<211> 25
<212> DNA
<213> Artificial

<220>
<223> 20E5HC sense primer (primer no: 260)

<220>
<221> misc_feature
<222> (20)..(20)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (23)..(23)
<223> n is a, c, g, or t

<400> 44
gcgtacaatt acarcarwsn ggncc 25

<210> 45
<211> 22
<212> DNA
<213> Artificial

<220>
<223> 20E5LC sense primer (primer no: 265)

<220>
<221> misc_feature
<222> (17)..(17)
<223> n is a, c, g, or t

<400> 45
gcgatataca ratgacncar ac 22

<210> 46
<211> 21
<212> DNA
<213> Artificial

<220>
<223> mlgG1 antisense primer (primer no: 416)

<400> 46
cagtggatag acagatgggg g 21

<210> 47
<211> 20
<212> DNA
<213> Artificial

<220>
<223> mkappa antisense primer (primer no: 394)

<400> 47
actggatggt gggaagatgg 20

<210> 48
<211> 26
<212> DNA
<213> Artificial

<220>
<223> signal peptide sense primer (primer no: 405)

<400> 48
atgggatgga gctrtatcat sytctt 26

<210> 49
<211> 26
<212> DNA
<213> Artificial

<220>
<223> signal peptide sense primer (primer no: 410)

<400> 49
atggratgga gckgggtctt tmtctt 26

<210> 50
<211> 24
<212> DNA
<213> Artificial

<220>
<223> signal peptide sense primer (primer no: 389)

<400> 50
atgggcwtca aagatggagt caca 24

<210> 51
<211> 24
<212> DNA
<213> Artificial

<220>
<223> CD134 leader sense primer (primer no: 362)

<400> 51
ctcggatccg ccaccatgtg cgtg 24

<210> 52
<211> 24
<212> DNA
<213> Artificial

<220>
<223> RD2 sense primer (primer no: 364)

<400> 52
actgtcactg gaccctgcgg tccc 24

<210> 53
<211> 24
<212> DNA
<213> Artificial

<220>
<223> CRD2 antisense primer (primer no: 365)

<400> 53
gggaccgcag ggtccagtga cagt 24

<210> 54
<211> 24
<212> DNA
<213> Artificial

<220>
<223> CRD3 sense primer (primer no: 366)

<400> 54
actgtcactg gaaggtgcag ggct 24

<210> 55
<211> 24
<212> DNA
<213> Artificial

<220>
<223> CD134 end primer (primer no: 363)

<400> 55
agaattctta ttagatcttg gcca 24

<210> 56
<211> 24
<212> DNA
<213> Artificial

<220>
<223> CRD3 antisense primer (primer no: 367)

<400> 56
agccctgcac cttccagtga cagt 24

<210> 57
<211> 24
<212> DNA
<213> Artificial

<220>
<223> CRD4 sense primer (primer no: 368)

<400> 57
actgtcactg gaccctgccc ccct 24

<210> 58
<211> 24
<212> DNA
<213> Artificial

<220>
<223> CRD4 antisense primer (primer no: 369)

<400> 58
agggggggcag ggtccagtga cagt 24

<210> 59
<211> 24
<212> DNA
<213> Artificial

<220>
<223> CRD4 truncated sense primer (primer no: 370)

<400> 59
actgtcactg gatgcaccct ggct 24

<210> 60
<211> 24
<212> DNA
<213> Artificial

<220>
<223> CRD4 truncated antisense primer (primer no: 371)

<400> 60
agccagggtg catccagtga cagt 24

<210> 61
<211> 11
<212> PRT
<213> Artificial

<220>
<223> N-terminal amino acid sequence of clone 20E5 light chain

<400> 61

Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu
1 5 10

<210> 62
<211> 108
<212> PRT
<213> Artificial Sequence

<220>

<223> Amino acid sequence of PDL-humanized light chain variable region VL1 clone 20E5

<400> 62

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

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Asn 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 Thr Tyr Tyr Cys Gln Gln Gly Asn Thr Leu Pro Trp
                85                  90                  95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg
            100                 105
```

<210> 63
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized light chain variable region VL2 clone 20E5

<400> 63

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

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Asn 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 Gly Asn Thr Leu Pro Trp
                85                  90                  95
```

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 64
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized heavy chain variable region VH1 clone 20E5

<400> 64

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 65
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized heavy chain variable region VH2 clone 20E5

<400> 65

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 66
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized heavy chain variable region VH3 clone 20E5

<400> 66

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 67
<211> 108
<212> PRT

<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized light chain variable region VL1 clone 12H3

<400> 67

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

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

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

Tyr Trp Ala Ser Thr Arg His Thr 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 Tyr Cys Gln Gln Tyr Ile Asn Tyr Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 68
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized light chain variable region VL2 clone 12H3

<400> 68

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

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

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

Tyr Trp Ala Ser Thr Arg His Thr Gly Val Pro Asp Arg Phe Ser Gly
50 55 60

Gly 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 Tyr Cys Gln Gln Tyr Ile Asn Tyr Pro Leu

85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 69
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized heavy chain variable region VH1 clone 12H3

<400> 69

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 70
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized heavy chain variable region VH2 clone 12H3

<400> 70

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

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

```
Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
    50                  55                  60

Lys Asp Arg Val Thr Leu Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120
```

<210> 71
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized heavy chain variable region VH3 clone 12H3

<400> 71

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
    50                  55                  60

Lys Asp Arg Ala Thr Leu Thr Val Asp Lys Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120
```

<210> 72
<211> 1398
<212> DNA
<213> Artificial Sequence

<220>
<223> Cricetulus griseus-optimized cDNA sequence coding for humanized heavy IgG4 chain clone 20E5 containing PDL-humanized VH1

<400> 72
atggaatgga gcggcgtgtt catgttcctg ctgtccgtga ccgcgggagt gcacagtcag 60

gtgcagctgg tgcagtctgg cgccgaagtg aagaaacctg gcgcctccgt gaaggtgtcc 120

tgcaaggcct ccggctacac ctttaccagc tacgtgatgc actgggtgcg acaggcccct 180

ggccagagac tggaatggat gggctacatc aacccctaca acgacggcac caagtacaac 240

gagaagttca agggcagagt gaccatcacc tccgacacct ccgcctccac cgcctacatg 300

gaactgtcct ccctgcggag cgaggacacc gccgtgtact actgcgccaa ctactacggc 360

tcctccctgt ctatggacta ctggggccag ggcaccctcg tgaccgtgtc ctctgctagc 420

accaagggcc cctccgtgtt tcctctggcc ccttgctcca gatccacctc cgagtctacc 480

gccgctctgg gctgcctcgt gaaggactac ttccccgagc ccgtgacagt gtcttggaac 540

tctggcgccc tgacctccgg cgtgcacaca tttccagctg tgctgcagtc ctccggcctg 600

tactccctgt cctccgtcgt gactgtgcct tcctctagcc tgggcaccaa gacctacacc 660

tgtaacgtgg accacaagcc ctccaacacc aaggtggaca agcgggtgga atctaagtac 720

ggccctcctt gcccaccctg ccctgcccct gaatttctgg gcggaccttc cgtgttcctg 780

tttccccaa agcccaagga caccctgatg atctcccgga cccccgaagt gacctgcgtg 840

gtggtggatg tgtcccagga agatcccgag gtgcagttca attggtacgt ggacggcgtg 900

gaagtgcaca acgccaagac caagcccaga gaggaacagt tcaactccac ctaccgggtg 960

gtgtccgtgc tgaccgtgct gcaccaggat tggctgaacg gcaaagagta caagtgcaag 1020

gtgtccaaca agggcctgcc ctccagcatc gaaaagacca tctccaaggc caagggccag 1080

ccccgggaac cccaggtgta cacactgcct ccaagccagg aagagatgac caagaaccag 1140

gtgtccctga cctgtctcgt gaaaggcttc taccctccg atatcgccgt ggaatgggag 1200

tccaacggcc agcctgagaa caactacaag accacccccc ctgtgctgga ctccgacggc 1260

tccttcttcc tgtactctcg cctgaccgtg gacaagtccc ggtggcagga aggcaacgtg 1320

ttctcctgct ctgtgatgca cgaggccctg cacaaccact acacccagaa gtccctgtcc 1380

ctgtctctgg gcaagtag 1398

<210> 73
<211> 1398
<212> DNA
<213> Artificial Sequence

<220>
<223> Cricetulus griseus-optimized cDNA sequence coding for humanized heavy IgG4 chain clone 20E5 containing PDL-humanized VH2

<400> 73
atggaatgga gcggcgtgtt catgttcctg ctgtccgtga ccgcgggagt gcattctcag 60

gtgcagctgg tgcagtctgg cgccgaagtg aagaaacctg gcgcctccgt gaaggtgtcc 120

tgcaaggcct ccggctacac ctttaccagc tacgtgatgc actgggtgcg acaggcccct 180

ggccagagac tggaatggat cggctacatc aacccctaca acgacggcac caagtacaac 240

gagaagttca agggcagagc caccatcacc tccgacacct ctgcctccac cgcctacatg 300

gaactgtcct ccctgcggag cgaggacacc gccgtgtact actgcgccaa ctactacggc 360

tcctccctgt ctatggacta ctggggccag ggcaccctcg tgaccgtgtc ctctgctagc 420

accaagggcc cctccgtgtt tcctctggcc ccttgctcca gatccacctc cgagtctacc 480

gccgctctgg gctgcctcgt gaaggactac ttccccgagc ccgtgacagt gtcttggaac 540

tctggcgccc tgacctccgg cgtgcacaca tttccagctg tgctgcagtc ctccggcctg 600

tactccctgt cctccgtcgt gactgtgcct tcctctagcc tgggcaccaa gacctacacc 660

tgtaacgtgg accacaagcc ctccaacacc aaggtggaca agcgggtgga atctaagtac 720

ggccctcctt gcccaccctg ccctgccct gaatttctgg gcggaccttc cgtgttcctg 780

tttccccaa agcccaagga caccctgatg atctcccgga cccccgaagt gacctgcgtg 840

gtggtggatg tgtcccagga agatcccgag gtgcagttca attggtacgt ggacggcgtg 900

gaagtgcaca acgccaagac caagcccaga gaggaacagt tcaactccac ctaccgggtg 960

gtgtccgtgc tgaccgtgct gcaccaggat tggctgaacg gcaaagagta caagtgcaag 1020

gtgtccaaca agggcctgcc ctccagcatc gaaaagacca tctccaaggc caagggccag 1080

ccccgggaac cccaggtgta cacactgcct ccaagccagg aagagatgac caagaaccag 1140

gtgtccctga cctgtctcgt gaaaggcttc taccctccg atatcgccgt ggaatgggag 1200

tccaacggcc agcctgagaa caactacaag accacccccc ctgtgctgga ctccgacggc 1260

tccttcttcc tgtactctcg cctgaccgtg gacaagtccc ggtggcagga aggcaacgtg 1320

ttctcctgct ctgtgatgca cgaggccctg cacaaccact acacccagaa gtccctgtcc 1380

ctgtctctgg gcaagtag 1398

<210> 74
<211> 1398
<212> DNA
<213> Artificial Sequence

<220>
<223> Cricetulus griseus-optimized cDNA sequence coding for humanized heavy IgG4 chain clone 20E5 containing PDL-humanized VH3

<400> 74
atggaatgga gcggcgtgtt catgttcctg ctgtccgtga ccgcgggagt gcattctcag 60

gtgcagctgg tgcagtctgg cgccgaagtg aagaaacctg gcgcctccgt gaaggtgtcc 120

tgcaaggcct ccggctacac ctttaccagc tacgtgatgc actgggtgcg acaggcccct 180

ggccagagac tggaatggat cggctacatc aacccctaca acgacggcac caagtacaac 240

gagaagttca agggcagagc caccctgacc tccgacaagt ctgcctccac cgcctacatg 300

gaactgtcct ccctgcggag cgaggacacc gccgtgtact actgcgccaa ctactacggc 360

tcctccctgt ctatggacta ctggggccag ggcaccctcg tgaccgtgtc ctctgctagc 420

accaagggcc cctccgtgtt tcctctggcc ccttgctcca gatccacctc cgagtctacc 480

gccgctctgg gctgcctcgt gaaggactac ttccccgagc ccgtgacagt gtcttggaac 540

tctggcgccc tgacctccgg cgtgcacaca tttccagctg tgctgcagtc ctccggcctg 600

tactccctgt cctccgtcgt gactgtgcct tcctctagcc tgggcaccaa gacctacacc 660

tgtaacgtgg accacaagcc ctccaacacc aaggtggaca agcgggtgga atctaagtac 720

ggccctcctt gcccaccctg ccctgccct gaatttctgg gcggaccttc cgtgttcctg 780

tttccccaa agcccaagga caccctgatg atctcccgga cccccgaagt gacctgcgtg 840

gtggtggatg tgtcccagga agatcccgag gtgcagttca attggtacgt ggacggcgtg 900

gaagtgcaca acgccaagac caagcccaga gaggaacagt tcaactccac ctaccgggtg 960

gtgtccgtgc tgaccgtgct gcaccaggat tggctgaacg gcaaagagta caagtgcaag 1020

gtgtccaaca agggcctgcc ctccagcatc gaaaagacca tctccaaggc caagggccag 1080

ccccgggaac cccaggtgta cacactgcct ccaagccagg aagagatgac caagaaccag 1140

gtgtccctga cctgtctcgt gaaaggcttc taccctccg atatcgccgt ggaatgggag 1200

tccaacggcc agcctgagaa caactacaag accacccccc ctgtgctgga ctccgacggc 1260

tccttcttcc tgtactctcg cctgaccgtg gacaagtccc ggtggcagga aggcaacgtg 1320

ttctcctgct ctgtgatgca cgaggccctg cacaaccact acacccagaa gtccctgtcc 1380

ctgtctctgg gcaagtag 1398

<210> 75
<211> 702
<212> DNA
<213> Artificial Sequence

<220>
<223> Cricetulus griseus-optimized cDNA sequence coding for humanized light chain clone 20E5 containing PDL-humanized VL1

<400> 75
atggaatgga gcggcgtgtt catgttcctg ctgtccgtga ccgcgggagt gcacagcgac 60

atccagatga cccagtcccc ctccagcctg tctgcctctg tgggcgacag agtgaccatc 120

acctgtcggg cctcccagga catctccaac tacctgaact ggtatcagca gaagcccggc 180

aaggccccca agctgctgat ctactacacc tcccggctgc actccggcgt gccctctaga 240

ttttccggct ctggctccgg caccgactat accctgacca tcagctccct gcagcccgag 300

gacttcgcca cctactactg ccagcagggc aacaccctgc cctggacctt tggccagggc 360

accaaggtgg aaatcaagcg gaccgtagcc gcccttccg tgttcatctt tccaccctcc 420

gacgagcagc tgaagtctgg caccgcttcc gtcgtgtgcc tgctgaacaa cttctacccc 480

cgcgaggcca aggtgcagtg gaaggtggac aacgccctgc agtccggcaa ctcccaggaa 540

agcgtgaccg agcaggactc caaggacagc acctactccc tgtcctccac cctgaccctg 600

tccaaggccg actacgagaa gcacaaggtg tacgcctgcg aagtgaccca ccagggcctg 660

tctagccccg tgaccaagtc tttcaaccgg ggcgagtgct ag 702

<210> 76
<211> 702
<212> DNA
<213> Artificial Sequence

<220>
<223> Cricetulus griseus-optimized cDNA sequence coding for humanized light chain clone 20E5 containing PDL-humanized VL2

<400> 76
atggaatgga gcggcgtgtt catgttcctg ctgtccgtga ccgcgggagt gcacagcgac 60

atccagatga cccagtcccc ctccagcctg tctgcctctg tgggcgacag agtgaccatc 120

acctgtcggg cctcccagga catctccaac tacctgaact ggtatcagca gaaacccggc 180

aaggccgtga agctgctgat ctactacacc tcccggctgc actccggcgt gccctctaga 240

ttttccggct ctggctccgg caccgactat accctgacca tcagctccct gcagcccgag 300

gacttcgcta cctacttctg tcagcaaggc aacaccctgc cctggacctt tggccagggc 360

accaaggtgg aaatcaagcg gaccgtagcc gccccttccg tgttcatctt tccaccctcc 420

gacgagcagc tgaagtctgg caccgcttcc gtcgtgtgcc tgctgaacaa cttctacccc 480

cgcgaggcca aggtgcagtg gaaggtggac aacgccctgc agtccggcaa ctcccaggaa 540

agcgtgaccg agcaggactc caaggacagc acctactccc tgtcctccac cctgaccctg 600

tccaaggccg actacgagaa gcacaaggtg tacgcctgcg aagtgaccca ccagggcctg 660

tctagccccg tgaccaagtc tttcaaccgg ggcgagtgct ag 702

<210> 77
<211> 1404
<212> DNA
<213> Artificial Sequence

<220>
<223> Cricetulus griseus-optimized cDNA sequence coding for humanized heavy IgG4 chain clone 12H3 containing PDL-humanized VH1

<400> 77
atggagctgg gcctgtcctg gatcttcctg ctggccatcc tgaagggcgt gcagtgccag 60

gtgcagctgg tgcagtctgg cgccgaagtg aagaaacccg gctcctccgt gaaggtgtcc 120

tgcaaggctt ccggctacac cttcaaggac tacaccatgc actgggtgcg acaggcccct 180

ggacagggcc tggaatggat gggcggcatc taccctaaca acggcggctc cacctacaac 240

cagaacttca aggatagagt gaccatcacc gccgacaagt ccacctccac cgcctacatg 300

gaactgtcct ccctgcggag cgaggacacc gccgtgtact actgtgcccg gatgggctac 360

cacggccccc acctggattt tgacgtgtgg ggccagggca ccaccgtgac cgtgtcctct 420

gcttctacca agggcccctc cgtgttccct ctggcccctt gctccagatc cacctccgag 480

tctaccgccg ctctgggctg cctcgtgaag gactacttcc ccgagcctgt gacagtgtcc 540

tggaactctg gcgccctgac ctctggcgtg cacacctttc agctgtgct gcagtcctcc 600

ggcctgtact ccctgtcctc cgtcgtgaca gtgccctcca gctctctggg caccaagacc 660

tacacctgta acgtggacca caagccctcc aacaccaagg tggacaagcg ggtggaatct 720

aagtacggcc ctccctgccc tccttgccca gcccctgaat ttctgggcgg acccagcgtg 780

ttcctgttcc ccccaaagcc caaggacacc ctgatgatct cccggacccc cgaagtgacc 840

tgcgtggtgg tggatgtgtc ccaggaagat cccgaggtgc agttcaattg gtacgtggac 900

ggcgtggaag tgcacaacgc caagaccaag cctagagagg aacagttcaa cagcacctac 960

cgggtggtgt ccgtgctgac cgtgctgcac caggattggc tgaacggcaa agagtacaag 1020

tgcaaggtgt ccaacaaggg cctgccttcc agcatcgaaa agaccatctc caaggccaag 1080

ggccagcccc gggaacccca ggtgtacaca ctgcctccaa gccaggaaga gatgaccaag 1140

aaccaggtgt ccctgacctg tctcgtgaaa ggcttctacc cctccgatat cgccgtggaa 1200

tgggagtcca acggccagcc tgagaacaac tacaagacca ccccccctgt gctggactcc 1260

gacggctcct tcttcctgta ctctcgcctg accgtggaca agtcccggtg gcaggaaggc 1320

aacgtgttct cctgctccgt gatgcacgag gccctgcaca accactacac ccagaagtcc 1380

ctgtccctgt ctctgggaaa gtaa 1404

<210> 78
<211> 1404
<212> DNA
<213> Artificial Sequence

<220>
<223> Cricetulus griseus-optimized cDNA sequence coding for humanized heavy IgG4 chain clone 12H3 containing PDL-humanized VH2

<400> 78
atggagctgg gcctgtcctg gatcttcctg ctggccatcc tgaagggcgt gcagtgccag 60

gtgcagctgg tgcagtctgg cgccgaagtg aagaaacccg gctcctccgt gaaggtgtcc 120

tgcaaggctt ccggctacac cttcaaggac tacaccatgc actgggtgcg acaggcccct 180

ggacagggcc tggaatggat cggcggcatc taccctaaca acggcggctc cacctacaac 240

cagaacttca aggatagagt gaccctgacc gccgacaagt ccacctccac cgcctacatg 300

gaactgtcct ccctgcggag cgaggacacc gccgtgtact actgtgcccg gatgggctac 360

cacggccccc acctggattt tgacgtgtgg ggccagggca ccaccgtgac cgtgtcctct 420

gcttctacca agggcccctc cgtgttccct ctggcccctt gctccagatc cacctccgag 480

tctaccgccg ctctgggctg cctcgtgaag gactacttcc ccgagcctgt gacagtgtcc 540

tggaactctg gcgccctgac ctctggcgtg cacacctttc agctgtgct gcagtcctcc 600

ggcctgtact ccctgtcctc cgtcgtgaca gtgccctcca gctctctggg caccaagacc 660

tacacctgta acgtggacca caagccctcc aacaccaagg tggacaagcg ggtggaatct 720

aagtacggcc ctccctgccc tccttgccca gcccctgaat ttctgggcgg acccagcgtg 780

ttcctgttcc ccccaaagcc caaggacacc ctgatgatct cccggacccc cgaagtgacc 840

tgcgtggtgg tggatgtgtc ccaggaagat cccgaggtgc agttcaattg gtacgtggac 900

ggcgtggaag tgcacaacgc caagaccaag cctagagagg aacagttcaa cagcacctac 960

cgggtggtgt ccgtgctgac cgtgctgcac caggattggc tgaacggcaa agagtacaag 1020

tgcaaggtgt ccaacaaggg cctgccttcc agcatcgaaa agaccatctc caaggccaag 1080

ggccagcccc gggaacccca ggtgtacaca ctgcctccaa gccaggaaga gatgaccaag 1140

aaccaggtgt ccctgacctg tctcgtgaaa ggcttctacc cctccgatat cgccgtggaa 1200

tgggagtcca acggccagcc tgagaacaac tacaagacca ccccccctgt gctggactcc 1260

gacggctcct tcttcctgta ctctcgcctg accgtggaca agagccggtg gcaggaaggc 1320

aacgtgttct cctgctccgt gatgcacgag gccctgcaca accactacac ccagaagtcc 1380

ctgtccctgt ctctgggaaa gtaa 1404

<210> 79
<211> 1404
<212> DNA
<213> Artificial Sequence

<220>
<223> Cricetulus griseus-optimized cDNA sequence coding for humanized heavy IgG4 chain clone 12H3 containing PDL-humanized VH3

<400> 79
atggagctgg gcctgtcctg gatcttcctg ctggccatcc tgaagggcgt gcagtgccag 60

gtgcagctgg tgcagtctgg cgccgaagtg aagaaacccg gctcctccgt gaaggtgtcc 120

tgcaaggctt ccggctacac cttcaaggac tacaccatgc actgggtgcg acaggcccct 180

ggacagggcc tggaatggat cggcggcatc taccctaaca acggcggctc cacctacaac 240

cagaacttca aggatcgggc caccctgacc gtggacaagt ccacctctac cgcctacatg 300

gaactgtcct ccctgcggag cgaggacacc gccgtgtact actgtgcccg gatgggctac 360

cacggccccc acctggattt tgacgtgtgg ggccagggca ccaccgtgac agtgtcctct 420

gcttccacca agggcccctc cgtgtttcct ctggcccctt gctccagatc cacctccgag 480

tctaccgccg ctctgggctg cctcgtgaag gactacttcc ccgagcctgt gaccgtgtcc 540

tggaactctg gcgctctgac ctctggcgtg cacaccttcc ctgctgtgct gcagtctagc 600

ggcctgtact ccctgtcctc cgtcgtgacc gtgccttcca gctctctggg caccaagacc 660

tacacctgta acgtggacca caagccctcc aacaccaagg tggacaagcg ggtggaatct 720

aagtacggcc ctccctgccc tccttgccca gccctgaat ttctgggcgg accttccgtg 780

ttcctgttcc ccccaaagcc caaggacacc ctgatgatct cccggacccc cgaagtgacc 840

tgcgtggtgg tggatgtgtc ccaggaagat cccgaggtgc agttcaattg gtacgtggac 900

ggcgtggaag tgcacaacgc caagaccaag cctagagagg aacagttcaa cagcacctac 960

cgggtggtgt ccgtgctgac cgtgctgcac caggattggc tgaacggcaa agagtacaag 1020

tgcaaggtgt ccaacaaggg cctgcctagc tccatcgaaa agaccatctc caaggccaag 1080

ggccagcccc gggaacccca ggtgtacaca ctgcctccaa gccaggaaga gatgaccaag 1140

aaccaggtgt ccctgacctg tctcgtgaaa ggcttctacc cctccgatat cgccgtggaa 1200

tgggagtcca acggccagcc tgagaacaac tacaagacca ccccccctgt gctggactcc 1260

gacggctcct tcttcctgta ctctcggctg acagtggata agagccggtg gcaggaaggc 1320

aacgtgttct cctgctccgt gatgcacgag gccctgcaca accactacac ccagaagtcc 1380

ctgtccctgt ctctgggaaa gtaa 1404

<210> 80
<211> 711
<212> DNA
<213> Artificial Sequence

<220>
<223> Cricetulus griseus-optimized cDNA sequence coding for humanized light chain clone 12H3 containing PDL-humanized VL1

<400> 80
atggacatgc gggtgcccgc tcagctgctg ggattgctgc tgctgtggtt cccaggcgcc 60

agatgcgaca tccagatgac ccagtccccc tccagcctgt ctgcctctgt gggcgacaga 120

gtgaccatca catgcaaggc ctcccaggac gtgggagccg ccgtggcttg gtatcagcag 180

aagcctggca aggcccccaa gctgctgatc tactgggcct ctaccagaca caccggcgtg 240

ccctccagat tctccggctc tggctctggc accgacttta ccctgaccat cagctccctg 300

cagcccgagg acttcgccac ctactactgc cagcagtaca tcaactaccc cctgaccttc 360

ggcggaggca ccaaggtgga aatcaagcgg accgtggccg ctccctccgt gttcatcttc 420

ccaccttccg acgagcagct gaagtccggc accgcttctg tcgtgtgcct gctgaacaac 480

ttctaccccc gcgaggccaa ggtgcagtgg aaggtggaca acgccctgca gtccggcaac 540

tcccaggaat ccgtgaccga gcaggactcc aaggacagca cctactccct gtcctccacc 600

ctgaccctgt ccaaggccga ctacgagaag cacaaggtgt acgcctgcga agtgacccac 660

cagggcctgt ctagccccgt gaccaagtct ttcaaccggg gcgagtgcta a 711

<210> 81
<211> 711
<212> DNA
<213> Artificial Sequence

<220>
<223> Cricetulus griseus-optimized cDNA sequence coding for humanized light chain clone 12H3 containing PDL-humanized VL2

<400> 81
atggacatgc gggtgcccgc tcagctgctg ggattgctgc tgctgtggtt cccaggcgcc 60

agatgcgaca tccagatgac ccagtccccc tccagcctgt ctgcctctgt gggcgacaga 120

gtgaccatca catgcaaggc ctcccaggac gtgggagccg ccgtggcttg gtatcagcag 180

aagcctggca aggcccccaa gctgctgatc tactgggcct ctaccagaca caccggcgtg 240

cccgacagat tctctggcgg cggatctggc accgacttta ccctgaccat cagctccctg 300

cagcccgagg acttcgccac ctactactgc cagcagtaca tcaactaccc cctgaccttc 360

ggcggaggca ccaaggtgga aatcaagcgg accgtggccg ctccctccgt gttcatcttc 420

ccaccttccg acgagcagct gaagtccggc accgcttctg tcgtgtgcct gctgaacaac 480

ttctaccccc gcgaggccaa ggtgcagtgg aaggtggaca acgccctgca gtccggcaac 540

tcccaggaat ccgtgaccga gcaggactcc aaggacagca cctactccct gtcctccacc 600

ctgaccctgt ccaaggccga ctacgagaag cacaaggtgt acgcctgcga agtgacccac 660

cagggcctgt ctagccccgt gaccaagtct ttcaaccggg gcgagtgcta a 711

<210> 82
<211> 465
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of humanized heavy IgG4 chain clone 20E5 containing PDL-humanized VH1

<400> 82

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

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

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

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

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

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

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

Tyr Tyr Cys Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp
115 120 125

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

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

```
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
                165                 170                 175

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

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
        195                 200                 205

Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp
    210                 215                 220

His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser Lys Tyr
225                 230                 235                 240

Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly Gly Pro
                245                 250                 255

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

Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln Glu Asp
        275                 280                 285

Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
    290                 295                 300

Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr Arg Val
305                 310                 315                 320

Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
                325                 330                 335

Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile Glu Lys
            340                 345                 350

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

Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr
    370                 375                 380

Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
385                 390                 395                 400

Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
                405                 410                 415

Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys
            420                 425                 430
```

Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu
435 440 445

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly
450 455 460

Lys
465

<210> 83
<211> 465
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of humanized heavy IgG4 chain clone 20E5 containing PDL-humanized VH2

<400> 83

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

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

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

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

Glu Trp Ile Gly Tyr Ile Asn Pro Tyr Asn Asp Gly Thr Lys Tyr Asn
65 70 75 80

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

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

Tyr Tyr Cys Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp
115 120 125

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

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

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
165 170 175

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

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
        195                 200                 205

Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp
    210                 215                 220

His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser Lys Tyr
225                 230                 235                 240

Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly Gly Pro
                245                 250                 255

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

Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln Glu Asp
        275                 280                 285

Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
    290                 295                 300

Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr Arg Val
305                 310                 315                 320

Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
                325                 330                 335

Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile Glu Lys
            340                 345                 350

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

Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr
    370                 375                 380

Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
385                 390                 395                 400

Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
                405                 410                 415

Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys
            420                 425                 430

Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu
        435                 440                 445
```

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly
450 455 460

Lys
465

<210> 84
<211> 465
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of humanized heavy IgG4 chain clone 20E5 containing PDL-humanized VH3

<400> 84

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

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

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

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

Glu Trp Ile Gly Tyr Ile Asn Pro Tyr Asn Asp Gly Thr Lys Tyr Asn
65 70 75 80

Glu Lys Phe Lys Gly Arg Ala Thr Leu Thr Ser Asp Lys Ser Ala Ser
85 90 95

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

Tyr Tyr Cys Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp
115 120 125

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

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

Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
165 170 175

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

Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr

195 200 205

Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp
210 215 220

His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser Lys Tyr
225 230 235 240

Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly Gly Pro
245 250 255

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

Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln Glu Asp
275 280 285

Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
290 295 300

Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr Arg Val
305 310 315 320

Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
325 330 335

Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile Glu Lys
340 345 350

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

Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr
370 375 380

Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
385 390 395 400

Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
405 410 415

Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys
420 425 430

Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu
435 440 445

Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly
450 455 460

Lys

465

<210> 85
<211> 233
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of humanized light chain clone 20E5 containing PDL-humanized VL1

<400> 85

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

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

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

Ser Asn Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys
50 55 60

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

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

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

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

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

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

Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
165 170 175

Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
180 185 190

Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
195 200 205

Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
210 215 220

Thr Lys Ser Phe Asn Arg Gly Glu Cys
225 230

<210> 86
<211> 233
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of humanized light chain clone 20E5 containing PDL-humanized VL2

<400> 86

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

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

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

Ser Asn Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Val Lys
50 55 60

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

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

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

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

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

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

Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
165 170 175

Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
180 185 190

Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
195 200 205

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Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
    210                 215                 220

Thr Lys Ser Phe Asn Arg Gly Glu Cys
225                 230

<210>  87
<211>  467
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Amino acid sequence of humanized heavy IgG4 chain clone 12H3
       containing PDL-humanized VH1

<400>  87

Met Glu Leu Gly Leu Ser Trp Ile Phe Leu Leu Ala Ile Leu Lys Gly
1               5                   10                  15

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

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

Lys Asp Tyr Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
    50                  55                  60

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

Gln Asn Phe Lys Asp Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser
                85                  90                  95

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

Tyr Tyr Cys Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp
        115                 120                 125

Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
    130                 135                 140

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

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

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
            180                 185                 190
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Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
        195                 200                 205

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn
    210                 215                 220

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser
225                 230                 235                 240

Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly
                245                 250                 255

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
            260                 265                 270

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln
        275                 280                 285

Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val
    290                 295                 300

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr
305                 310                 315                 320

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
                325                 330                 335

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile
            340                 345                 350

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

Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser
    370                 375                 380

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
385                 390                 395                 400

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
                405                 410                 415

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val
            420                 425                 430

Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met
        435                 440                 445

His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
    450                 455                 460
```

Leu Gly Lys
465

<210> 88
<211> 467
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of humanized heavy IgG4 chain clone 12H3 containing PDL-humanized VH2

<400> 88

Met Glu Leu Gly Leu Ser Trp Ile Phe Leu Leu Ala Ile Leu Lys Gly
1 5 10 15

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

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

Lys Asp Tyr Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
50 55 60

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

Gln Asn Phe Lys Asp Arg Val Thr Leu Thr Ala Asp Lys Ser Thr Ser
85 90 95

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

Tyr Tyr Cys Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp
115 120 125

Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
130 135 140

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

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

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
180 185 190

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

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn

210 215 220

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser
225 230 235 240

Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly
245 250 255

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
260 265 270

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln
275 280 285

Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val
290 295 300

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr
305 310 315 320

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
325 330 335

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile
340 345 350

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

Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser
370 375 380

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
385 390 395 400

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
405 410 415

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val
420 425 430

Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met
435 440 445

His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
450 455 460

Leu Gly Lys
465

<210> 89

<211> 467
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of humanized heavy IgG4 chain clone 12H3 containing PDL-humanized VH3

<400> 89

Met Glu Leu Gly Leu Ser Trp Ile Phe Leu Leu Ala Ile Leu Lys Gly
1 5 10 15

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

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

Lys Asp Tyr Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
50 55 60

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

Gln Asn Phe Lys Asp Arg Ala Thr Leu Thr Val Asp Lys Ser Thr Ser
85 90 95

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

Tyr Tyr Cys Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp
115 120 125

Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys
130 135 140

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

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

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
180 185 190

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

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn
210 215 220

Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser
225 230 235 240

Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly
245 250 255

Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
260 265 270

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln
275 280 285

Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val
290 295 300

His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr
305 310 315 320

Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
325 330 335

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile
340 345 350

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

Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser
370 375 380

Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
385 390 395 400

Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
405 410 415

Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val
420 425 430

Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met
435 440 445

His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
450 455 460

Leu Gly Lys
465

<210> 90
<211> 236
<212> PRT
<213> Artificial Sequence

<220>

<223> Amino acid sequence of humanized light chain clone 12H3 containing PDL-humanized VL1

<400> 90

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

Phe Pro Gly Ala Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser
            20                  25                  30

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

Gln Asp Val Gly Ala Ala Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys
    50                  55                  60

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

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

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

Tyr Ile Asn Tyr Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile
        115                 120                 125

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

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
145                 150                 155                 160

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
                165                 170                 175

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
            180                 185                 190

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

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
    210                 215                 220

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

<210> 91
<211> 236
<212> PRT

<213> Artificial Sequence

<220>
<223> Amino acid sequence of humanized light chain clone 12H3 containing PDL-humanized VL2

<400> 91

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

Phe Pro Gly Ala Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser
            20                  25                  30

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

Gln Asp Val Gly Ala Ala Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys
    50                  55                  60

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

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

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

Tyr Ile Asn Tyr Pro Leu Thr Phe Gly Gly Gly Thr Lys Val Glu Ile
        115                 120                 125

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

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn
145                 150                 155                 160

Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu
                165                 170                 175

Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp
            180                 185                 190

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

Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser
    210                 215                 220

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

<210> 92
<211> 88
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of CRD4 A1-B1-module

<400> 92

Pro Cys Pro Pro Gly His Phe Ser Pro Gly Asp Asn Gln Ala Cys Lys
1 5 10 15

Pro Trp Thr Asn Cys Thr Leu Ala Gly Lys His Thr Leu Gln Pro Ala
20 25 30

Ser Asn Ser Ser Asp Ala Ile Cys Glu Asp Arg Asp Pro Pro Ala Thr
35 40 45

Gln Pro Gln Glu Thr Gln Gly Pro Pro Ala Arg Pro Ile Thr Val Gln
50 55 60

Pro Thr Glu Ala Trp Pro Arg Thr Ser Gln Gly Pro Ser Thr Arg Pro
65 70 75 80

Val Glu Val Pro Gly Gly Arg Ala
85

<210> 93
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized light chain variable region VL1 clone 20E5

<400> 93

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

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Asn 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 Thr Tyr Tyr Cys Gln Gln Gly Asn Thr Leu Pro Trp
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 94
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized light chain variable region VL2 clone 20E5

<400> 94

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

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Asn 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 Gly Asn Thr Leu Pro Trp
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 95
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized light chain variable region VL1 clone 12H3

<400> 95

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

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

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

Tyr Trp Ala Ser Thr Arg His Thr 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 Tyr Cys Gln Gln Tyr Ile Asn Tyr Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 96
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of PDL-humanized light chain variable region VL2 clone 12H3

<400> 96

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

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

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

Tyr Trp Ala Ser Thr Arg His Thr Gly Val Pro Asp Arg Phe Ser Gly
50 55 60

Gly 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 Tyr Cys Gln Gln Tyr Ile Asn Tyr Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 97
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Humanized 20E5 antibody variable heavy chain

<220>
<221> VARIANT
<222> (48)..(48)
<223> may also be Met

<220>
<221> VARIANT
<222> (68)..(68)
<223> may also be Val

<220>
<221> VARIANT
<222> (70)..(70)
<223> may also be Ile

<220>
<221> VARIANT
<222> (74)..(74)
<223> may also be Thr

<400> 97

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
            100                 105                 110

Thr Leu Val Thr Val Ser Ser
        115
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<210> 98
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Humanized 20E5 antibody variable light chain

<220>
<221> VARIANT
<222> (44)..(44)
<223> May also be Pro

<220>
<221> VARIANT
<222> (87)..(87)
<223> May also be Tyr

<400> 98

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

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile Ser Asn 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 Gly Asn Thr Leu Pro Trp
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 99
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Humanized 12H3 antibody variable heavy chain

<220>
<221> VARIANT
<222> (48)..(48)
<223> May also be Met

<220>
<221> VARIANT
<222> (68)..(68)
<223> May also be Val

<220>
<221> VARIANT
<222> (70)..(70)
<223> May also be Ile

<220>
<221> VARIANT
<222> (72)..(72)
<223> May also be Ala

<400> 99

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Ala Thr Leu Thr Val Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 100
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Humanized 12H3 antibody variable light chain

<220>
<221> VARIANT
<222> (60)..(60)
<223> May also be Ser

<220>
<221> VARIANT
<222> (65)..(65)
<223> May also be Ser

<400> 100

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

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

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

Tyr Trp Ala Ser Thr Arg His Thr Gly Val Pro Asp Arg Phe Ser Gly
50 55 60

Gly 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 Tyr Cys Gln Gln Tyr Ile Asn Tyr Pro Leu
85 90 95

Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 101
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 101

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 102
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 102

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 103
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 103

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 104
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 104

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 105
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 105

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 106
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 106

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 107
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 107

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 108
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 108

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 109
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 109

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 110
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 110

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 111
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 111

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 112
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 112

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 113
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 113

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 114
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 114

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 115
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 115

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Leu Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 116
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 116

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Ile Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 117
<211> 119

<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 117

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Ile Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 118
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 118

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Ile Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 119
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 119

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Tyr Pro Asn Gln Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 120
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 120

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45

Gly Gly Ile Tyr Pro Asn Gln Gly Gly Ser Thr Tyr Asn Gln Asn Phe
    50                  55                  60

Lys Asp Arg Val Thr Leu Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120


<210>  121
<211>  121
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  antibody heavy chain sequence

<400>  121

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45

Gly Gly Ile Tyr Pro Asn Gln Gly Gly Ser Thr Tyr Asn Gln Asn Phe
    50                  55                  60

Lys Asp Arg Ala Thr Leu Thr Val Asp Lys Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
            100                 105                 110
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Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 122
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 122

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Tyr Pro Asn Ala Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 123
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 123

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Gly Ile Tyr Pro Asn Ala Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Val Thr Leu Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 124
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 124

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Gly Ile Tyr Pro Asn Ala Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Ala Thr Leu Thr Val Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 125
<211> 121
<212> PRT
<213> Artificial Sequence

<220>

<223> antibody heavy chain sequence

<400> 125

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Tyr Pro Asn Glu Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 126
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 126

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Gly Ile Tyr Pro Asn Glu Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Val Thr Leu Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 127
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 127

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Gly Ile Tyr Pro Asn Glu Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Ala Thr Leu Thr Val Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 128
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 128

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

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

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Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
    50                  55                  60

Lys Asp Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

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

Ala Arg Leu Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120
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<210> 129
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 129

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
    50                  55                  60

Lys Asp Arg Val Thr Leu Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

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

Ala Arg Leu Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120
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<210> 130
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 130

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Ala Thr Leu Thr Val Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Leu Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 131
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 131

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Ile Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 132
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 132

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Val Thr Leu Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Ile Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 133
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 133

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Ala Thr Leu Thr Val Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Ile Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 134
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
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<220>
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<222> (11)..(11)
<223> May also be Leu

<220>
<221> VARIANT
<222> (48)..(48)
<223> May also be Ile

<220>
<221> VARIANT
<222> (56)..(56)
<223> May also be Gly, Ala, Ser or Glu

<220>
<221> VARIANT
<222> (68)..(68)
<223> May also be Ala

<220>
<221> VARIANT
<222> (70)..(70)
<223> May also be Ile

<220>
<221> VARIANT

<222> (74)..(74)
<223> May also be Lys

<220>
<221> VARIANT
<222> (106)..(106)
<223> May also be Leu or Ile

<400> 134

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 135
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody CDR2 sequence

<400> 135

Tyr Ile Asn Pro Tyr Asn Gly Gly Thr Lys Tyr Asn Glu Lys Phe
1 5 10 15

Lys Gly

<210> 136
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody CDR2 sequence

<400> 136

Tyr Ile Asn Pro Tyr Asn Ala Gly Thr Lys Tyr Asn Glu Lys Phe Lys
1 5 10 15

Gly

<210> 137
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody CDR2 sequence

<400> 137

Tyr Ile Asn Pro Tyr Asn Ser Gly Thr Lys Tyr Asn Glu Lys Phe Lys
1 5 10 15

Gly

<210> 138
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody CDR2 sequence

<400> 138

Tyr Ile Asn Pro Tyr Asn Glu Gly Thr Lys Tyr Asn Glu Lys Phe Lys
1 5 10 15

Gly

<210> 139
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody CDR3 sequence

<400> 139

Tyr Tyr Gly Ser Ser Leu Ser Leu Asp Tyr
1 5 10

<210> 140
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody CDR3 sequence

<400> 140

Tyr Tyr Gly Ser Ser Leu Ser Ile Asp Tyr
1 5 10

<210> 141
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody CDR2 sequence

<400> 141

Gly Ile Tyr Pro Asn Gln Gly Gly Ser Thr Tyr Asn Gln Asn Phe Lys
1 5 10 15

Asp

<210> 142
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody CDR2 sequence

<400> 142

Gly Ile Tyr Pro Asn Ala Gly Gly Ser Thr Tyr Asn Gln Asn Phe Lys
1 5 10 15

Asp

<210> 143
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody CDR2 sequence

<400> 143

Gly Ile Tyr Pro Asn Glu Gly Gly Ser Thr Tyr Asn Gln Asn Phe Lys
1 5 10 15

Asp

<210> 144
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody CDR3 sequence

<400> 144

Leu Gly Tyr His Gly Pro His Leu Asp Phe Asp Val
1 5 10

<210> 145
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody CDR3 sequence

<400> 145

Ile Gly Tyr His Gly Pro His Leu Asp Phe Asp Val
1 5 10

<210> 146
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 146

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 147
<211> 121
<212> PRT
<213> Artificial Sequence

<220>

<223> antibody heavy chain sequence

<400> 147

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Val Thr Leu Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 148
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 148

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
50 55 60

Lys Asp Arg Ala Thr Leu Thr Val Asp Lys Ser Thr Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Thr Val Thr Val Ser Ser
115 120

<210> 149
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 149

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 150
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 150

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 151
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> antibody heavy chain sequence

<400> 151

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

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

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

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

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

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

Ala Asn Tyr Tyr Gly Ser Ser Leu Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 152
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
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<220>
<221> VARIANT
<222> (11)..(11)
<223> May also be Leu

<220>
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<222> (48)..(48)
<223> May also be Ile

<220>
<221> VARIANT
<222> (55)..(55)
<223> May also be Gln, Ala or Glu

<220>
<221> VARIANT
<222> (68)..(68)
<223> May also be Ala

<220>
<221> VARIANT
<222> (70)..(70)
<223> May also be Leu

<220>
<221> VARIANT
<222> (72)..(72)
<223> May also be Val

<220>
<221> VARIANT
<222> (99)..(99)
<223> May also be Leu or Ile

<400> 152

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

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

Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45

Gly Gly Ile Tyr Pro Asn Asn Gly Gly Ser Thr Tyr Asn Gln Asn Phe
    50                  55                  60

Lys Asp Arg Val Thr Ile Thr Ala Asp Lys Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80

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

```
Ala Arg Met Gly Tyr His Gly Pro His Leu Asp Phe Asp Val Trp Gly
            100                 105                 110

Gln Gly Thr Thr Val Thr Val Ser Ser
        115                 120
```