SEQUENCE LISTING

<110> MacroGenics, Inc.
Huang, Ling
Johnson, Leslie

<120> CD3-Binding Molecules Capable of Binding to Human and Non-Human CD3

<130> 1301.0075I

<150> US 61/488,716
<151> 2011-05-21

<150> US 61/530,353
<151> 2011-09-01

<160> 88

<170> PatentIn version 3.5

<210> 1
<211> 107
<212> PRT
<213> Mus musculus

<400> 1

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

Glu Lys Val Thr Met Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met
20 25 30

Asn Trp Tyr Gln Gln Lys Ser Gly Thr Ser Pro Lys Arg Trp Ile Tyr
35 40 45

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

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Met Glu Thr Glu
65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Arg Asn Pro Pro Thr
85 90 95

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

<210> 2
<211> 321
<212> DNA
<213> Mus musculus

<400> 2
caggtggtgc tgacccagtc ccccgccatc atgtccgcct tccccggcga gaaagtgaca 60

atgacctgct ccgcctcctc ctccgtgtcc tacatgaact ggtatcagca gaagtccggc 120

acctccccca agcggtggat ctacgactcc tccaagctgg cctccggcgt gcccgccaga 180

ttctctggct ccggctccgg caccagctac tccctgacca tctcctccat ggaaaccgag 240

gacgccgcca cctactactg ccagcagtgg tcccggaacc cccctacctt cggcggaggc 300

accaagctgc agatcaccag a 321

<210> 3
<211> 121
<212> PRT
<213> Mus musculus

<400> 3

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

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

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

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

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

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

Ala Ser Pro Gln Val His Tyr Asp Tyr Asn Gly Phe Pro Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 4
<211> 363
<212> DNA
<213> Mus musculus

<400> 4
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tcctgcaagg cctccggcta caccttcacc cggtccacca tgcactgggt gaaacagcgg 120

cctggacagg gcctggaatg gatcggctac atcaaccccc ccagcgccta caccaactac 180

aaccagaagt tcaaggacaa ggccaccctg accgccgaca agtcctccag caccgcctac 240

atgcagctgt cctccctgac ctccgaggac tccgccgtgt actactgcgc ctcccccccag 300

gtgcactacg actacaacgg cttcccctac tggggccagg gcaccctggt gacagtgtcc 360

tcc 363

<210> 5
<211> 110
<212> PRT
<213> Mus musculus

<400> 5

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

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

Asn Tyr Ala Asn Trp Val Gln Glu Lys Pro Asp His Leu Phe Thr Gly
35 40 45

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Gly Val Pro Ala Arg Phe
50 55 60

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

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

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

<210> 6
<211> 330
<212> DNA
<213> Mus musculus

<400> 6
caggccgtgg tgacacagga gtcagctctg accacatccc caggcgaaac agtgactctg 60

acctgcagat ccagcactgg agcagtgact acctctaact acgctaattg ggtgcaggag 120

aagcccgacc acctgttcac tgggctgatc ggcggaacca acaaaagggc acccggtgtg 180

cctgcccggt tttctggcag tctgatcgga gacaaggccg ctctgacaat tactggcgcc 240

cagacagagg atgaagctat ttacttctgt gcactgtggt atagcaatct gtgggtgttt 300

gggggtggca ccaaactgac agtgctggga 330

<210> 7
<211> 125
<212> PRT
<213> Mus musculus

<400> 7

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

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

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

Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
    50                  55                  60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
        115                 120                 125
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<210> 8
<211> 375
<212> DNA
<213> Mus musculus

<400> 8

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tcctgcgccg cctccggctt cacctttaac acatacgcta tgaattgggt gcgacaggca      120

cctggcaagg gcctggagtg ggtggcaagg atcaggtcca agtacaacaa ttatgcaacc      180

tactatgccg actctgtgaa ggatagattc acaatcagtc gcgacgattc ccagagcatt      240

ctgtatctgc agatgaacaa tctgaaaact gaagacaccg ccatgtacta ttgtgtgcgg      300

cacggtaact tcggcaattc ttacgtgtct tggtttgctt attggggaca ggggacactg      360

gtgactgtgt cttcc                                                       375
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<210> 9
<211> 218
<212> PRT
<213> Homo sapiens

<400> 9

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Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
1               5                   10                  15

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
            20                  25                  30

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
        35                  40                  45

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
    50                  55                  60

Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
65                  70                  75                  80
```

```
His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
                85                  90                  95

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
            100                 105                 110

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
        115                 120                 125

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
    130                 135                 140

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
145                 150                 155                 160

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
                165                 170                 175

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

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
        195                 200                 205

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
    210                 215
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<210> 10
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb1 Variable Light Chain Variant 1

<400> 10

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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 Ser Ala Ser Ser Ser Val Ser Tyr Met
            20                  25                  30

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

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

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

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

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
            100                 105
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<210> 11
<211> 318
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 1

<400> 11
gacatccaga tgacccagtc cccctccagc ctgtccgcct ctgtgggcga cagagtgaca 60

atcacctgtt ccgccagctc ctccgtgtcc tacatgaact ggtatcagca gaagccccggc 120

aaggccccca agcggctgat ctacgactcc tccaagctgg cctccggcgt gccctccaga 180

ttctccggct ctggctccgg caccgagttc accctgacca tctccagcct gcagccccgag 240

gacttcgcca cctactactg ccagcagtgg tcccggaacc cccctacctt cggcggaggc 300

accaaggtgg aaatcaag 318

<210> 12
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb1 Variable Light Chain Variant 2 (mAb1 LC-2)

<400> 12

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

Glu Lys Val Thr Ile Thr Cys Ser Ala Ser Ser Ser Val Ser Tyr Met
20 25 30

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

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

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

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

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

<210> 13
<211> 318
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 1

<400> 13
gacgtggtga tgacccagtc tcctgccatc atgagtgctt tcccaggcga gaaagtgacc 60

attacatgct ctgcttccag ctctgtgtcc tacatgaact ggtatcagca gaagccaggg 120

aaagcaccca agaggtggat ctacgactcc tccaagctgg cctccggcgt gccaagccgg 180

ttctctggta gtggctcagg aaccgagttt actctgacca tttccagcct gcagcctgaa 240

gatttcgcaa catactattg tcagcagtgg tccagaaatc cccctacatt tggcggaggg 300

actaaagtgg aaatcaag 318

<210> 14
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb1 Variable Heavy Chain

<400> 14

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 Arg Ser
20 25 30

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

Gly Tyr Ile Asn Pro Ser Ser Ala Tyr Thr Asn Tyr Asn Gln Lys 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 Ser Pro Gln Val His Tyr Asp Tyr Asn Gly Phe Pro Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 15
<211> 363
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light

Chain Chain

<400> 15
caggtgcagc tggtgcagtc tggcgccgaa gtgaagaaac ctggcgcctc cgtgaaggtg 60

tcctgcaagg cctccggcta caccttcacc cggtccacca tgcactgggt gcgacaggcc 120

ccaggccagg gactggaatg gatcggctac atcaacccct ccagcgccta caccaactac 180

aaccagaaat tcaaggaccg cgtgaccatc accgccgaca agtccaccag caccgcctac 240

atggaactgt ctagcctgcg gagcgaggac accgccgtgt actactgcgc ctcccccccag 300

gtgcactacg actacaacgg cttcccctac tggggccagg gcaccctggt gacagtgtcc 360

tcc 363

<210> 16
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Variable Chain Variant 1 (h-mAb2 VL-1)

<400> 16

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

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

Asn Tyr Ala Asn Trp Phe Gln Gln Lys Pro Gly Gln Ala Pro Arg Thr
35 40 45

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
50 55 60

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

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

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

<210> 17
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 1 (h-mAb2 VL-1)

<400> 17

caggctgtgg tgactcagga gccttcactg accgtgtccc caggcggaac tgtgaccctg 60

acatgcagat ccagcacagg cgcagtgacc acatctaact acgccaattg gttccagcag 120

aagccaggac aggcaccaag gaccctgatc gggggtacaa acaaaagggc tccctggacc 180

cctgcacggt tttctggaag tctgctgggc ggaaaggccg ctctgactat taccggggca 240

caggccgagg acgaagccga ttactattgt gctctgtggt atagcaatct gtgggtgttc 300

gggggtggca caaaactgac tgtgctggga 330

<210> 18
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Variable Chain Variant 2 (h-mAb2 VL-2)

<400> 18

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

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

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

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
50 55 60

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

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

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

<210> 19
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 2 (h-mAb2 VL-2)

<400> 19
caggctgtgg tgactcagga gccttcactg accgtgtccc caggcggaac tgtgaccctg 60

acatgcagat ccagcacagg cgcagtgacc acatctaact acgccaattg ggtgcagcag 120

aagccaggac aggcaccaag gaccctgatc gggggtacaa acaaaagggc tccctggacc 180

cctgcacggt tttctggaag tctgctgggc ggaaaggccg ctctgactat taccggggca 240

caggccgagg acgaagccga ttactattgt gctctgtggt atagcaatct gtgggtgttc 300

gggggtggca caaaactgac tgtgctggga 330

<210> 20
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Variable Chain Variant 3 (h-mAb2 VL-3)

<400> 20

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

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

Asn Tyr Ala Asn Trp Phe Gln Glu Lys Pro Gly Gln Ala Pro Arg Thr
35 40 45

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
50 55 60

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

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

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

<210> 21
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 3 (h-mAb2 VL-3)

<400> 21
caggctgtgg tgactcagga gccttcactg accgtgtccc caggcggaac tgtgaccctg 60

acatgcagat ccagcacagg cgcagtgacc acatctaact acgccaattg gttccaggag 120

aagccaggac aggcaccaag gaccctgatc gggggtacaa acaaaagggc tccctggacc 180

cctgcacggt tttctggaag tctgctgggc ggaaaggccg ctctgactat taccggggca 240

caggccgagg acgaagccga ttactattgt gctctgtggt atagcaatct gtgggtgttc 300

ggggggtggca caaaactgac tgtgctggga 330

<210> 22
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Variable Chain Variant 4 (h-mAb2 VL-4)

<400> 22

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

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

Asn Tyr Ala Asn Trp Phe Gln Gln Lys Pro Gly Gln Ala Pro Arg Gly
35 40 45

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
50 55 60

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

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

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

<210> 23
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 4 (h-mAb2 VL-4)

<400> 23
caggctgtgg tgactcagga gccttcactg accgtgtccc caggcggaac tgtgaccctg 60

acatgcagat ccagcacagg cgcagtgacc acatctaact acgccaattg gttccagcag 120

aagccaggac aggcaccaag gggcctgatc gggggtacaa acaaaagggc tccctggacc 180

cctgcacggt tttctggaag tctgctgggc ggaaaggccg ctctgactat taccggggca 240

caggccgagg acgaagccga ttactattgt gctctgtggt atagcaatct gtgggtgttc 300

ggggggtggca caaaactgac tgtgctggga 330

<210> 24
<211> 110
<212> PRT

<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Variable Chain Variant 5 (h-mAb2 VL-5)

<400> 24

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

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

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

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60

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

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

Leu Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110
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<210> 25
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 5 (h-mAb2 VL-2)

<400> 25

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caggctgtgg tgactcagga gccttcactg accgtgtccc caggcggaac tgtgaccctg       60

acatgcagat ccagcacagg cgcagtgacc acatctaact acgccaattg ggtgcaggag      120

aagccaggac aggcaccaag gaccctgatc gggggtacaa acaaaagggc tccctggacc      180

cctgcacggt tttctggaag tctgctgggc ggaaaggccg ctctgactat taccggggca      240

caggccgagg acgaagccga ttactattgt gctctgtggt atagcaatct gtgggtgttc      300

gggggtggca caaaactgac tgtgctggga                                       330
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<210> 26
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Variable Chain Variant 6 (h-mAb2 VL-6)

<400> 26

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

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

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

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
50 55 60

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

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

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

<210> 27
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 6 (h-mAb2 VL-6)

<400> 27
caggctgtgg tgactcagga gccttcactg accgtgtccc caggcggaac tgtgaccctg 60

acatgcagat ccagcacagg cgcagtgacc acatctaact acgccaattg ggtgcagcag 120

aagccaggac aggcaccaag gggcctgatc gggggtacaa acaaaagggc tccctggacc 180

cctgcacggt tttctggaag tctgctgggc ggaaaggccg ctctgactat taccggggca 240

caggccgagg acgaagccga ttactattgt gctctgtggt atagcaatct gtgggtgttc 300

gggggtggca caaaactgac tgtgctggga 330

<210> 28
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Variable Chain Variant 7 (h-mAb2 VL-7)

<400> 28

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

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

Asn Tyr Ala Asn Trp Phe Gln Glu Lys Pro Gly Gln Ala Pro Arg Gly
        35                  40                  45

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60

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

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

Leu Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110
```

<210> 29
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 7 (h-mAb2 VL-7)

<400> 29

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caggctgtgg tgactcagga gccttcactg accgtgtccc caggcggaac tgtgaccctg       60

acatgcagat ccagcacagg cgcagtgacc acatctaact acgccaattg gttccaggag      120

aagccaggac aggcaccaag gggcctgatc gggggtacaa acaaaagggc tccctggacc      180

cctgcacggt tttctggaag tctgctgggc ggaaaggccg ctctgactat taccggggca      240

caggccgagg acgaagccga ttactattgt gctctgtggt atagcaatct gtgggtgttc      300

gggggtggca caaaactgac tgtgctggga                                       330
```

<210> 30
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Variable Chain Variant 8 (h-mAb2 VL-8)

<400> 30

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

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

Asn Tyr Ala Asn Trp Val Gln Glu Lys Pro Gly Gln Ala Pro Arg Gly
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```
        35                  40                  45

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60

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

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

Leu Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110
```

<210> 31
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 8 (h-mAb2 VL-8)

<400> 31

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caggctgtgg tgactcagga gccttcactg accgtgtccc caggcggaac tgtgaccctg       60

acatgcagat ccagcacagg cgcagtgacc acatctaact acgccaattg ggtgcaggag      120

aagccaggac aggcaccaag gggcctgatc gggggtacaa acaaaagggc tccctggacc      180

cctgcacggt tttctggaag tctgctgggc ggaaaggccg ctctgactat taccggggca      240

caggccgagg acgaagccga ttactattgt gctctgtggt atagcaatct gtgggtgttc      300

gggggtggca caaaactgac tgtgctggga                                       330
```

<210> 32
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Variable Chain Variant 9 (h-mAb2 VL-9)

<400> 32

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

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

Asn Tyr Ala Asn Trp Val Gln Glu Lys Pro Gly Gln Ala Phe Arg Gly
        35                  40                  45

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60
```

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

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

Leu Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110
```

<210> 33
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 9 (h-mAb2 VL-9)

<400> 33

caggctgtgg tgactcagga gccttcactg accgtgtccc caggcggaac tgtgaccctg 60

acatgcagat ccagcacagg cgcagtgacc acatctaact acgccaattg ggtgcaggag 120

aagccaggac aggcattcag gggcctgatc gggggtacaa acaaaagggc tccctggacc 180

cctgcacggt tttctggaag tctgctgggc ggaaaggccg ctctgactat taccggggca 240

caggccgagg acgaagccga ttactattgt gctctgtggt atagcaatct gtgggtgttc 300

gggggtggca caaaactgac tgtgctggga 330

<210> 34
<211> 110
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Variable Chain Variant 10 (h-mAb2 VL-10)

<400> 34

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

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

Asn Tyr Ala Asn Trp Phe Gln Gln Lys Pro Asp His Leu Phe Thr Gly
        35                  40                  45

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60

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

Gln Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Ala Leu Trp Tyr Ser Asn
                85                  90                  95
```

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

<210> 35
<211> 330
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Light Chain Variant 10 (h-mAb2 VL-10)

<400> 35
caggctgtgg tgactcagga gccttcactg accgtgtccc caggcggaac tgtgaccctg 60

acatgcagat ccagcactgg agcagtgact acctctaact acgctaattg gttccagcag 120

aagcccgacc acctgttcac tgggctgatc ggcggaacca acaaaagggc tccctggacc 180

cctgcacggt tttctggaag tctgctgggc ggaaaggccg ctctgactat taccggggca 240

caggccgagg acgaagccga ttactattgt gctctgtggt atagcaatct gtgggtgttc 300

gggggtggca caaaactgac tgtgctggga 330

<210> 36
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Heavy Chain Variant 1 (h-mAb2 VH-1)

<400> 36

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

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

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

Gly Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Ala Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

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

115 120 125

<210> 37
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Heavy Chain Variant 1 (h-mAb2 VH-1)

<400> 37
gaggtgcagc tggtggaaag cggcggagga ctggtgcagc caggtggcag cctgcgactg 60

tcttgcgccg ctagtggctt caccttttct acatacgcca tgaactgggt gaggcaggct 120

cctggaaagg ggctggagtg ggtgggcagg atcaggtcca agtacaacaa ttatgcaacc 180

tactatgccg actcagtgaa ggatagattc acaatttccc gcgacgattc taaaaacagt 240

ctgtatctgc agatgaactc cctgaagact gaagacaccg ccgtgtacta ttgtgcaaga 300

cacggaaact tcggcaactc ctacgtgtcc tggtttgcat attggggtca gggcacactg 360

gtgaccgtgt ccagc 375

<210> 38
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Heavy Chain Variant 2 (h-mAb2 VH-2)

<400> 38

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

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

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

Gly Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Ala Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

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

115 120 125

<210> 39
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Heavy Chain Variant 2 (h-mAb2 VH-2)

<400> 39
gaggtgcagc tggtggaaag cggcggagga ctggtgcagc caggtggcag cctgcgactg 60

tcttgcgccg ctagtggctt cacctttaac acatacgcca tgaactgggt gaggcaggct 120

cctggaaagg ggctggagtg ggtgggcagg atcaggtcca agtacaacaa ttatgcaacc 180

tactatgccg actcagtgaa ggatagattc acaatttccc gcgacgattc taaaaacagt 240

ctgtatctgc agatgaactc cctgaagact gaagacaccg ccgtgtacta ttgtgcaaga 300

cacggaaact tcggcaactc ctacgtgtcc tggtttgcat attggggtca gggcacactg 360

gtgaccgtgt ccagc 375

<210> 40
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Heavy Chain Variant 3 (h-mAb2 VH-3)

<400> 40

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

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

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

Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Ala Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

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

115 120 125

<210> 41
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Heavy Chain Variant 3 (h-mAb2 VH-3)

<400> 41
gaggtgcagc tggtggaaag cggcggagga ctggtgcagc caggtggcag cctgcgactg 60

tcttgcgccg ctagtggctt caccttttct acatacgcca tgaactgggt gaggcaggct 120

cctggaaagg ggctggagtg ggtggccagg atcaggtcca agtacaacaa ttatgcaacc 180

tactatgccg actcagtgaa ggatagattc acaatttccc gcgacgattc taaaaacagt 240

ctgtatctgc agatgaactc cctgaagact gaagacaccg ccgtgtacta ttgtgcaaga 300

cacggaaact tcggcaactc ctacgtgtcc tggtttgcat attggggtca gggcacactg 360

gtgaccgtgt ccagc 375

<210> 42
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Heavy Chain Variant 4 (h-mAb2 VH-4)

<400> 42

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

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

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

Gly Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

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

115 120 125

<210> 43
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Heavy Chain Variant 4 (h-mAb2 VH-4)

<400> 43
gaggtgcagc tggtggaaag cggcggagga ctggtgcagc caggtggcag cctgcgactg 60

tcttgcgccg ctagtggctt caccttttct acatacgcca tgaactgggt gaggcaggct 120

cctggaaagg ggctggagtg ggtgggcagg atcaggtcca agtacaacaa ttatgcaacc 180

tactatgccg actcagtgaa ggatagattc acaatttccc gcgacgattc taaaaacagt 240

ctgtatctgc agatgaactc cctgaagact gaagacaccg ccgtgtacta ttgtgtgaga 300

cacggaaact tcggcaactc ctacgtgtcc tggtttgcat attggggtca gggcacactg 360

gtgaccgtgt ccagc 375

<210> 44
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Heavy Chain Variant 5 (h-mAb2 VH-5)

<400> 44

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

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

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

Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Ala Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

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

115 120 125

<210> 45
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Heavy Chain Variant 5 (h-mAb2 VH-5)

<400> 45
gaggtgcagc tggtggaaag cggcggagga ctggtgcagc caggtggcag cctgcgactg 60

tcttgcgccg ctagtggctt cacctttaac acatacgcca tgaactgggt gaggcaggct 120

cctggaaagg ggctggagtg ggtggccagg atcaggtcca agtacaacaa ttatgcaacc 180

tactatgccg actcagtgaa ggatagattc acaatttccc gcgacgattc taaaaacagt 240

ctgtatctgc agatgaactc cctgaagact gaagacaccg ccgtgtacta ttgtgcaaga 300

cacggaaact tcggcaactc ctacgtgtcc tggtttgcat attggggtca gggcacactg 360

gtgaccgtgt ccagc 375

<210> 46
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Heavy Chain Variant 6 (h-mAb2 VH-6)

<400> 46

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

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

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

Gly Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

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

115 120 125

<210> 47
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Heavy Chain Variant 6 (h-mAb2 VH-6)

<400> 47
gaggtgcagc tggtggaaag cggcggagga ctggtgcagc caggtggcag cctgcgactg 60

tcttgcgccg ctagtggctt cacctttaac acatacgcca tgaactgggt gaggcaggct 120

cctggaaagg ggctggagtg ggtgggcagg atcaggtcca agtacaacaa ttatgcaacc 180

tactatgccg actcagtgaa ggatagattc acaatttccc gcgacgattc taaaaacagt 240

ctgtatctgc agatgaactc cctgaagact gaagacaccg ccgtgtacta ttgtgtgaga 300

cacggaaact tcggcaactc ctacgtgtcc tggtttgcat attggggtca gggcacactg 360

gtgaccgtgt ccagc 375

<210> 48
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Heavy Chain Variant 7 (h-mAb2 VH-7)

<400> 48

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

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

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

Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

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

115 120 125

<210> 49
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Heavy Chain Variant 7 (h-mAb2 VH-7)

<400> 49
gaggtgcagc tggtggaaag cggcggagga ctggtgcagc caggtggcag cctgcgactg 60

tcttgcgccg ctagtggctt caccttttct acatacgcca tgaactgggt gaggcaggct 120

cctggaaagg ggctggagtg ggtggccagg atcaggtcca agtacaacaa ttatgcaacc 180

tactatgccg actcagtgaa ggatagattc acaatttccc gcgacgattc taaaaacagt 240

ctgtatctgc agatgaactc cctgaagact gaagacaccg ccgtgtacta ttgtgtgaga 300

cacggaaact tcggcaactc ctacgtgtcc tggtttgcat attggggtca gggcacactg 360

gtgaccgtgt ccagc 375

<210> 50
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Heavy Chain Variant 8 (h-mAb2 VH-8)

<400> 50

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

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

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

Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

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

115 120 125

<210> 51
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Heavy Chain Variant 8 (h-mAb2 VH-8)

<400> 51
gaggtgcagc tggtggagtc tgggggaggc ttggtccagc ctggagggtc cctgagactc 60

tcctgtgcag cctctggatt caccttcaac acatacgcta tgaattgggt ccgccaggct 120

ccagggaagg ggctggagtg ggttgcaagg atcaggtcca agtacaacaa ttatgcaacc 180

tactatgccg actctgtgaa ggatagattc accatctcaa gagatgattc aaagaactca 240

ctgtatctgc aaatgaacag cctgaaaacc gaggacacgg ccgtgtatta ctgtgtgaga 300

cacggtaact tcggcaattc ttacgtgtct tggtttgctt attggggaca ggggacactg 360

gtgactgtgt cttcc 375

<210> 52
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of Humanized mAb2 Variable Heavy Chain Variant QV (h-mAb2 VL-QV)

<400> 52

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

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

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

Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

```
Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
        115                 120                 125
```

<210> 53
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding Humanized mAb2 Variable Heavy Chain Variant QV (h-mAb2 VL-QV)

<400> 53

gaggtgcagc tggtggaaag cggcggagga ctggtgcagc caaagggatc actgaaactg 60

tcctgcgccg cctccggctt cacctttaac acatacgcta tgaattgggt gcgacaggca 120

cctggcaagg gcctggagtg ggtggcaagg atcaggtcca agtacaacaa ttatgcaacc 180

tactatgccg actctgtgaa ggatagattc acaatcagtc gcgacgattc ccagagcatt 240

ctgtatctgc agatgaacaa tctgaaaact gaagacaccg ccatgtacta ttgtgtgcgg 300

cacggtaact tcggcaattc ttacgtgtct tggtttgctt attggggaca ggggacactg 360

gtgactgtgt cttcc 375

<210> 54
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of hVH-6L

<400> 54

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

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

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

Gly Arg Ile Arg Asn Lys Tyr Asn Asn Tyr Ala Thr Glu Tyr Ala Asp
    50                  55                  60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

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

```
        115                 120                 125

<210>  55
<211>  125
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Amino acid sequence of hVH-8L

<400>  55

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

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

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

Ala Arg Ile Arg Asn Lys Tyr Asn Asn Tyr Ala Thr Glu Tyr Ala Asp
    50                  55                  60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125

<210>  56
<211>  125
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Amino acid sequence of hXR32VH-8 di-1

<400>  56

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

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

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

Ala Arg Thr Arg Ser Lys Ala Asn Ser Tyr Thr Thr Tyr Tyr Ala Ala
    50                  55                  60
```

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

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

Tyr Cys Ala Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 57
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of hXR32VH-8 di-2

<400> 57

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

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

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

Gly Arg Thr Arg Ser Lys Ala Asn Ser Tyr Thr Thr Tyr Tyr Ala Ala
    50                  55                  60

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

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

Tyr Cys Ala Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 58
<211> 272
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the hXR32VL-Her-2VH E coil

<400> 58

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

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

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

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60

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

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

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

Gly Ser Gly Gly Gly Gly Gln Val Gln Leu Gln Gln Ser Gly Pro Glu
        115                 120                 125

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

Phe Asn Ile Lys Asp Thr Tyr Ile His Trp Val Lys Gln Arg Pro Glu
145                 150                 155                 160

Gln Gly Leu Glu Trp Ile Gly Arg Ile Tyr Pro Thr Asn Gly Tyr Thr
                165                 170                 175

Arg Tyr Asp Pro Lys Phe Gln Asp Lys Ala Thr Ile Thr Ala Asp Thr
            180                 185                 190

Ser Ser Asn Thr Ala Tyr Leu Gln Val Ser Arg Leu Thr Ser Glu Asp
        195                 200                 205

Thr Ala Val Tyr Tyr Cys Ser Arg Trp Gly Gly Asp Gly Phe Tyr Ala
    210                 215                 220

Met Asp Tyr Trp Gly Gln Gly Ala Ser Val Thr Val Ser Ser Gly Gly
225                 230                 235                 240

Cys Gly Gly Gly Lys Val Ala Ala Leu Lys Glu Lys Val Ala Ala Leu
                245                 250                 255

Lys Glu Lys Val Ala Ala Leu Lys Glu Lys Val Ala Ala Leu Lys Glu
            260                 265                 270
```

<210> 59
<211> 276
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the Her2VL-hXR32VH-K coil

<400> 59

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

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

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

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

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

Ala Asp Leu Ala Val Tyr Tyr Cys Gln Gln His Tyr Thr Thr Pro Pro
                85                  90                  95

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

Ser Gly Gly Gly Gly Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu
        115                 120                 125

Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe
    130                 135                 140

Thr Phe Asn Thr Tyr Ala Met Asn Trp Val Arg Gln Ala Pro Gly Lys
145                 150                 155                 160

Gly Leu Glu Trp Val Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala
                165                 170                 175

Thr Tyr Tyr Ala Asp Ser Val Lys Asp Arg Phe Thr Ile Ser Arg Asp
            180                 185                 190

Asp Ser Lys Asn Ser Leu Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu
        195                 200                 205

Asp Thr Ala Val Tyr Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser
    210                 215                 220

Tyr Val Ser Trp Phe Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val
225                 230                 235                 240

Ser Ser Gly Gly Cys Gly Gly Gly Glu Val Ala Ala Leu Glu Lys Glu
                245                 250                 255

Val Ala Ala Leu Glu Lys Glu Val Ala Ala Leu Glu Lys Glu Val Ala
            260                 265                 270

Ala Leu Glu Lys
        275
```

<210> 60
<211> 278
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the CD19VL-hXR32VH-E coil

<400> 60

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

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

Gly Asp Ser Tyr Leu Asn Trp Tyr Gln Gln Ile Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Tyr Asp Ala Ser Asn Leu Val Ser Gly Ile Pro Pro
50 55 60

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

Pro Val Glu Lys Val Asp Ala Ala Thr Tyr His Cys Gln Gln Ser Thr
85 90 95

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

Gly Gly Ser Gly Gly Gly Gly Glu Val Gln Leu Val Glu Ser Gly Gly
115 120 125

Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser
130 135 140

Gly Phe Thr Phe Asn Thr Tyr Ala Met Asn Trp Val Arg Gln Ala Pro
145 150 155 160

Gly Lys Gly Leu Glu Trp Val Ala Arg Ile Arg Ser Lys Tyr Asn Asn
165 170 175

Tyr Ala Thr Tyr Tyr Ala Asp Ser Val Lys Asp Arg Phe Thr Ile Ser
180 185 190

Arg Asp Asp Ser Lys Asn Ser Leu Tyr Leu Gln Met Asn Ser Leu Lys
195 200 205

Thr Glu Asp Thr Ala Val Tyr Tyr Cys Val Arg His Gly Asn Phe Gly
210 215 220

Asn Ser Tyr Val Ser Trp Phe Ala Tyr Trp Gly Gln Gly Thr Leu Val
225 230 235 240

Thr Val Ser Ser Gly Gly Cys Gly Gly Gly Glu Val Ala Ala Leu Glu
245 250 255

Lys Glu Val Ala Ala Leu Glu Lys Glu Val Ala Ala Leu Glu Lys Glu
260 265 270

Val Ala Ala Leu Glu Lys
275

<210> 61
<211> 276
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the hXR32VL-CD19VH-K coil

<400> 61

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

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

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

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60

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

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

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

Gly Ser Gly Gly Gly Gly Gln Val Gln Leu Gln Gln Ser Gly Ala Glu
        115                 120                 125

Leu Val Arg Pro Gly Ser Ser Val Lys Ile Ser Cys Lys Ala Ser Gly
    130                 135                 140

Tyr Ala Phe Ser Ser Tyr Trp Met Asn Trp Val Lys Gln Arg Pro Gly
145                 150                 155                 160

Gln Gly Leu Glu Trp Ile Gly Gln Ile Trp Pro Gly Asp Gly Asp Thr
                165                 170                 175

Asn Tyr Asn Gly Lys Phe Lys Gly Lys Ala Thr Leu Thr Ala Asp Glu
            180                 185                 190

Ser Ser Ser Thr Ala Tyr Met Gln Leu Ser Ser Leu Ala Ser Glu Asp
        195                 200                 205

Ser Ala Val Tyr Phe Cys Ala Arg Arg Glu Thr Thr Thr Val Gly Arg
    210                 215                 220

Tyr Tyr Tyr Ala Met Asp Tyr Trp Gly Gln Gly Thr Thr Val Thr Val
225                 230                 235                 240

Ser Ser Gly Gly Cys Gly Gly Gly Lys Val Ala Ala Leu Lys Glu Lys
                245                 250                 255
```

```
Val Ala Ala Leu Lys Glu Lys Val Ala Ala Leu Lys Glu Lys Val Ala
            260                 265                 270

Ala Leu Lys Glu
        275
```

<210> 62
<211> 271
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the hXR32VL-EGFRVH-E coil

<400> 62

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

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

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

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60

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

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

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

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

Leu Val Gln Pro Ser Gln Ser Leu Ser Ile Thr Cys Thr Val Ser Gly
    130                 135                 140

Phe Ser Leu Thr Asn Tyr Gly Val His Trp Val Arg Gln Ser Pro Gly
145                 150                 155                 160

Lys Gly Leu Glu Trp Leu Gly Val Ile Trp Ser Gly Gly Asn Thr Asp
                165                 170                 175

Tyr Asn Thr Pro Phe Thr Ser Arg Leu Ser Ile Asn Lys Asp Asn Ser
            180                 185                 190

Lys Ser Gln Val Phe Phe Lys Met Asn Ser Leu Gln Ser Asn Asp Thr
        195                 200                 205

Ala Ile Tyr Tyr Cys Ala Arg Ala Leu Thr Tyr Tyr Asp Tyr Glu Phe
    210                 215                 220
```

```
Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Gly Gly Cys
225                 230                 235                 240

Gly Gly Gly Glu Val Ala Ala Leu Glu Lys Glu Val Ala Ala Leu Glu
                245                 250                 255

Lys Glu Val Ala Ala Leu Glu Lys Glu Val Ala Ala Leu Glu Lys
            260                 265                 270
```

<210> 63
<211> 274
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the EGFRVL-hXR32VH-K coil

<400> 63

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

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

Ile His Trp Tyr Gln Gln Arg Thr Asn Gly Ser Pro Arg Leu Leu Ile
        35                  40                  45

Lys Tyr Ala Ser Glu Ser Ile Ser Gly Ile Pro Ser Arg Phe Ser Gly
    50                  55                  60

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

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

Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Gly Gly Gly Ser Gly
            100                 105                 110

Gly Gly Gly Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
        115                 120                 125

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
    130                 135                 140

Asn Thr Tyr Ala Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
145                 150                 155                 160

Glu Trp Val Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr
                165                 170                 175

Tyr Ala Asp Ser Val Lys Asp Arg Phe Thr Ile Ser Arg Asp Asp Ser
            180                 185                 190

Lys Asn Ser Leu Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr
        195                 200                 205
```

```
Ala Val Tyr Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val
    210                 215                 220

Ser Trp Phe Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
225                 230                 235                 240

Gly Gly Cys Gly Gly Gly Lys Val Ala Ala Leu Lys Glu Lys Val Ala
                245                 250                 255

Ala Leu Lys Glu Lys Val Ala Ala Leu Lys Glu Lys Val Ala Ala Leu
            260                 265                 270

Lys Glu
```

<210> 64
<211> 275
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the hBRCA69DVL-hXR32VH-E coil

<400> 64

```
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 Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80

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

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Gly Gly Gly Gly Ser
            100                 105                 110

Gly Gly Gly Gly Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val
        115                 120                 125

Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr
    130                 135                 140

Phe Asn Thr Tyr Ala Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly
145                 150                 155                 160

Leu Glu Trp Val Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr
                165                 170                 175
```

```
Tyr Tyr Ala Asp Ser Val Lys Asp Arg Phe Thr Ile Ser Arg Asp Asp
            180                 185                 190

Ser Lys Asn Ser Leu Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp
        195                 200                 205

Thr Ala Val Tyr Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr
    210                 215                 220

Val Ser Trp Phe Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser
225                 230                 235                 240

Ser Gly Gly Cys Gly Gly Gly Glu Val Ala Ala Leu Glu Lys Glu Val
                245                 250                 255

Ala Ala Leu Glu Lys Glu Val Ala Ala Leu Glu Lys Glu Val Ala Ala
            260                 265                 270

Leu Glu Lys
        275
```

<210> 65
<211> 272
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the hXR32VL-hBRCA69DVH-K coil

<400> 65

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

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

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

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60

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

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

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

Gly Ser Gly Gly Gly Gly Gln Val Gln Leu Val Gln Ser Gly Ala Glu
        115                 120                 125

Val Lys Lys Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly
    130                 135                 140
```

```
Tyr Thr Phe Thr Ser Tyr Trp Met Gln Trp Val Arg Gln Ala Pro Gly
145                 150                 155                 160

Gln Gly Leu Glu Trp Met Gly Thr Ile Tyr Pro Gly Asp Gly Asp Thr
                165                 170                 175

Arg Tyr Thr Gln Lys Phe Lys Gly Arg Val Thr Ile Thr Ala Asp Lys
            180                 185                 190

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

Thr Ala Val Tyr Tyr Cys Ala Arg Arg Gly Ile Pro Arg Leu Trp Tyr
    210                 215                 220

Phe Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Gly Gly
225                 230                 235                 240

Cys Gly Gly Gly Lys Val Ala Ala Leu Lys Glu Lys Val Ala Ala Leu
                245                 250                 255

Lys Glu Lys Val Ala Ala Leu Lys Glu Lys Val Ala Ala Leu Lys Glu
            260                 265                 270
```

<210> 66
<211> 275
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the hBRCA84DVL-hXR32VH-E coil

<400> 66

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

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

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

Tyr Ser Ala Ser Tyr Arg Tyr Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60

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

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

Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Gly Gly Gly Gly Ser
            100                 105                 110

Gly Gly Gly Gly Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val
        115                 120                 125
```

```
Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr
    130                 135                 140

Phe Asn Thr Tyr Ala Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly
145                 150                 155                 160

Leu Glu Trp Val Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr
                165                 170                 175

Tyr Tyr Ala Asp Ser Val Lys Asp Arg Phe Thr Ile Ser Arg Asp Asp
            180                 185                 190

Ser Lys Asn Ser Leu Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp
        195                 200                 205

Thr Ala Val Tyr Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr
    210                 215                 220

Val Ser Trp Phe Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser
225                 230                 235                 240

Ser Gly Gly Cys Gly Gly Gly Glu Val Ala Ala Leu Glu Lys Glu Val
                245                 250                 255

Ala Ala Leu Glu Lys Glu Val Ala Ala Leu Glu Lys Glu Val Ala Ala
            260                 265                 270

Leu Glu Lys
        275
```

<210> 67
<211> 274
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the hXR32VL-hBRCA84DVH-K coil

<400> 67

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

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

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

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60

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

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

Leu Trp Val Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gly Gly
```

```
            100                 105                 110

Gly Ser Gly Gly Gly Gly Glu Val Gln Leu Val Glu Ser Gly Gly Gly
        115                 120                 125

Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly
    130                 135                 140

Phe Thr Phe Ser Ser Phe Gly Met His Trp Val Arg Gln Ala Pro Gly
145                 150                 155                 160

Lys Gly Leu Glu Trp Val Ala Tyr Ile Ser Ser Asp Ser Ser Ala Ile
                165                 170                 175

Tyr Tyr Ala Asp Thr Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn
            180                 185                 190

Ala Lys Asn Ser Leu Tyr Leu Gln Met Asn Ser Leu Arg Asp Glu Asp
        195                 200                 205

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

Ser Arg Leu Asp Tyr Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
225                 230                 235                 240

Gly Gly Cys Gly Gly Gly Lys Val Ala Ala Leu Lys Glu Lys Val Ala
                245                 250                 255

Ala Leu Lys Glu Lys Val Ala Ala Leu Lys Glu Lys Val Ala Ala Leu
            260                 265                 270

Lys Glu
```

<210> 68
<211> 279
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the 4420VL-hXR32VH-E coil

<400> 68

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

Asp Gln Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val His Ser
            20                  25                  30

Asn Gly Asn Thr Tyr Leu Arg Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45

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

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

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

Thr His Val Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110

Gly Gly Gly Ser Gly Gly Gly Gly Glu Val Gln Leu Val Glu Ser Gly
        115                 120                 125

Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala
    130                 135                 140

Ser Gly Phe Thr Phe Asn Thr Tyr Ala Met Asn Trp Val Arg Gln Ala
145                 150                 155                 160

Pro Gly Lys Gly Leu Glu Trp Val Ala Arg Ile Arg Ser Lys Tyr Asn
                165                 170                 175

Asn Tyr Ala Thr Tyr Tyr Ala Asp Ser Val Lys Asp Arg Phe Thr Ile
            180                 185                 190

Ser Arg Asp Asp Ser Lys Asn Ser Leu Tyr Leu Gln Met Asn Ser Leu
        195                 200                 205

Lys Thr Glu Asp Thr Ala Val Tyr Tyr Cys Val Arg His Gly Asn Phe
    210                 215                 220

Gly Asn Ser Tyr Val Ser Trp Phe Ala Tyr Trp Gly Gln Gly Thr Leu
225                 230                 235                 240

Val Thr Val Ser Ser Gly Gly Cys Gly Gly Gly Glu Val Ala Ala Leu
                245                 250                 255

Glu Lys Glu Val Ala Ala Leu Glu Lys Glu Val Ala Ala Leu Glu Lys
            260                 265                 270

Glu Val Ala Ala Leu Glu Lys
        275

<210>  69
<211>  270
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Amino acid sequence of the hXR32VL-4420VH-K coil

<400>  69

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

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

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

```
Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60

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

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

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

Gly Ser Gly Gly Gly Gly Glu Val Lys Leu Asp Glu Thr Gly Gly Gly
        115                 120                 125

Leu Val Gln Pro Gly Arg Pro Met Lys Leu Ser Cys Val Ala Ser Gly
    130                 135                 140

Phe Thr Phe Ser Asp Tyr Trp Met Asn Trp Val Arg Gln Ser Pro Glu
145                 150                 155                 160

Lys Gly Leu Glu Trp Val Ala Gln Ile Arg Asn Lys Pro Tyr Asn Tyr
                165                 170                 175

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

Asp Asp Ser Lys Ser Ser Val Tyr Leu Gln Met Asn Asn Leu Arg Val
        195                 200                 205

Glu Asp Met Gly Ile Tyr Tyr Cys Thr Gly Ser Tyr Tyr Gly Met Asp
    210                 215                 220

Tyr Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser Gly Gly Cys Gly
225                 230                 235                 240

Gly Gly Lys Val Ala Ala Leu Lys Glu Lys Val Ala Ala Leu Lys Glu
                245                 250                 255

Lys Val Ala Ala Leu Lys Glu Lys Val Ala Ala Leu Lys Glu
            260                 265                 270
```

<210> 70
<211> 274
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the RECA47VL-hXR32VH-K coil

<400> 70

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

Glu Arg Val Thr Met Thr Cys Ser Ala Arg Ser Ser Ile Ser Phe Met
            20                  25                  30
```

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

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

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Met Glu Ala Glu
65                  70                  75                  80

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

Phe Gly Ser Gly Thr Lys Leu Glu Leu Lys Arg Gly Gly Gly Ser Gly
            100                 105                 110

Gly Gly Gly Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln
        115                 120                 125

Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe
    130                 135                 140

Asn Thr Tyr Ala Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
145                 150                 155                 160

Glu Trp Val Ala Arg Ile Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr
                165                 170                 175

Tyr Ala Asp Ser Val Lys Asp Arg Phe Thr Ile Ser Arg Asp Asp Ser
            180                 185                 190

Lys Asn Ser Leu Tyr Leu Gln Met Asn Ser Leu Lys Thr Glu Asp Thr
        195                 200                 205

Ala Val Tyr Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val
    210                 215                 220

Ser Trp Phe Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
225                 230                 235                 240

Gly Gly Cys Gly Gly Gly Lys Val Ala Ala Leu Lys Glu Lys Val Ala
                245                 250                 255

Ala Leu Lys Glu Lys Val Ala Ala Leu Lys Glu Lys Val Ala Ala Leu
            260                 265                 270

Lys Glu
```

<210> 71
<211> 271
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of the hXR32VL-RECA47VH-E coil

<400> 71

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

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

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

Leu Ile Gly Gly Thr Asn Lys Arg Ala Pro Trp Thr Pro Ala Arg Phe
    50                  55                  60

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

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

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

Gly Ser Gly Gly Gly Gly Gln Val Gln Leu Gln Gln Ser Gly Pro Glu
        115                 120                 125

Leu Val Lys Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly
    130                 135                 140

Tyr Thr Phe Ser Gly Ser Trp Met Asn Trp Val Lys Gln Arg Pro Gly
145                 150                 155                 160

Gln Gly Leu Glu Trp Ile Gly Arg Ile Tyr Pro Gly Asp Gly Glu Thr
                165                 170                 175

Asn Tyr Asn Gly Lys Phe Lys Asp Lys Ala Thr Leu Thr Ala Asp Lys
            180                 185                 190

Ser Ser Thr Thr Ala Tyr Met Glu Leu Ser Ser Leu Thr Ser Val Asp
        195                 200                 205

Ser Ala Val Tyr Phe Cys Ala Arg Ile Tyr Gly Asn Asn Val Tyr Phe
    210                 215                 220

Asp Val Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser Gly Gly Cys
225                 230                 235                 240

Gly Gly Gly Glu Val Ala Ala Leu Glu Lys Glu Val Ala Ala Leu Glu
                245                 250                 255

Lys Glu Val Ala Ala Leu Glu Lys Glu Val Ala Ala Leu Glu Lys
            260                 265                 270
```

<210> 72
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of hVH-6M

<400> 72

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

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

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

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

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 73
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding hVH-6M Variable Heavy Chain

<400> 73
gaggtgcagc tggtggagtc tgggggaggc ttggtccagc ctggagggtc cctgagactc 60

tcctgtgcag cctctggatt caccttcaac acatacgcta tgaattgggt ccgccaggct 120

ccagggaagg ggctggagtg ggttggaagg atcaggtcca agtacaacaa ttatgcaacc 180

gagtatgccg actctgtgaa ggatagattc accatctcaa gagatgattc aaagaactca 240

ctgtatctgc aaatgaacag cctgaaaacc gaggacacgg ccgtgtatta ctgtgtgaga 300

cacggtaact tcggcaattc ttacgtgtct tggtttgctt attggggaca ggggacactg 360

gtgactgtgt cttcc 375

<210> 74
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of hVH-8M

<400> 74

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

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

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

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

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 75
<211> 375
<212> DNA
<213> Artificial Sequence

<220>
<223> Polynucleotide Sequence Encoding hVH-8M Variable Heavy Chain

<400> 75
gaggtgcagc tggtggagtc tgggggaggc ttggtccagc ctggagggtc cctgagactc 60

tcctgtgcag cctctggatt caccttcaac acatacgcta tgaattgggt ccgccaggct 120

ccagggaagg ggctggagtg ggttgcaagg atcaggaaca agtacaacaa ttatgcaacc 180

gagtatgccg actctgtgaa ggatagattc accatctcaa gagatgattc aaagaactca 240

ctgtatctgc aaatgaacag cctgaaaacc gaggacacgg ccgtgtatta ctgtgtgaga 300

cacggtaact tcggcaattc ttacgtgtct tggtttgctt attggggaca ggggacactg 360

gtgactgtgt cttcc 375

<210> 76
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "a" (I51T Y52cA) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 76

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

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

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

Ala Arg Thr Ala Ser Lys Ala Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
    50                  55                  60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
        115                 120                 125
```

<210> 77
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "b" (I51T N54S) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 77

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

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

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

Ala Arg Thr Arg Ser Lys Tyr Asn Ser Tyr Ala Thr Tyr Tyr Ala Asp
    50                  55                  60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
        115                 120                 125
```

<210> 78
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "c" (I51T A56T) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 78

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

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

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

Ala Arg Thr Arg Ser Lys Tyr Asn Asn Tyr Thr Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
115 120 125

<210> 79
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "d" (I51T Y52cA N54S) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 79

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

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

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

Ala Arg Thr Arg Ser Lys Ala Asn Ser Tyr Ala Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
        115                 120                 125
```

<210> 80
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "e" (I51T N54S A56T) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 80

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

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

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

Ala Arg Thr Arg Ser Lys Tyr Asn Ser Tyr Thr Thr Tyr Tyr Ala Asp
    50                  55                  60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
        115                 120                 125
```

<210> 81
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "f" (I51T Y52cA N54S A56T) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 81

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

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

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

Ala Arg Thr Arg Ser Lys Ala Asn Ser Tyr Thr Thr Tyr Tyr Ala Asp
    50                  55                  60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
        115                 120                 125
```

<210> 82
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "g" (I51T D61A) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 82

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

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

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

Ala Arg Thr Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Ala
    50                  55                  60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
        115                 120                 125
```

<210> 83
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "h" (I51T D65G) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 83

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

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

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

Ala Arg Thr Arg Ser Lys Tyr Asn Asn Tyr Ala Thr Tyr Tyr Ala Asp
50 55 60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
115 120 125

<210> 84
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "i" (I51T Y52cA N54S D61A) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 84

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

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

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

Ala Arg Thr Arg Ser Lys Ala Asn Ser Tyr Ala Thr Tyr Tyr Ala Ala
50 55 60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
        115                 120                 125
```

<210> 85
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "j" (I51T Y52cA N54S D65G) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 85

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

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

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

Ala Arg Thr Arg Ser Lys Ala Asn Ser Tyr Ala Thr Tyr Tyr Ala Asp
    50                  55                  60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
        115                 120                 125
```

<210> 86
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "k" (I51T Y52cA N54S D61A D65G) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 86

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

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

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

Ala Arg Thr Arg Ser Lys Ala Asn Ser Tyr Ala Thr Tyr Tyr Ala Ala
    50                  55                  60

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

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

Tyr Cys Val Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
        115                 120                 125
```

<210> 87
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "2k" (I51T Y52cA N54S D61A D65G (VH8-A49G V93A)) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 87

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

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

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

Gly Arg Thr Arg Ser Lys Ala Asn Ser Tyr Thr Thr Tyr Tyr Ala Ala
    50                  55                  60

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

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

Tyr Cys Ala Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
            100                 105                 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 88
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino Acid Sequence of variant "5k" (I51T Y52cA N54S D61A D65G (VH8-V93A)) of humanized mAb2 murine monoclonal antibody variable heavy chain

<400> 88

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

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

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

Ala Arg Thr Arg Ser Lys Ala Asn Ser Tyr Thr Thr Tyr Tyr Ala Ala
50 55 60

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

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

Tyr Cys Ala Arg His Gly Asn Phe Gly Asn Ser Tyr Val Ser Trp Phe
100 105 110

Ala Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125