SEQUENCE LISTING

<110> DCB-USA LLC
Kaohsiung Medical University

<120> ANTIBODY LOCKER FOR THE INACTIVATION OF PROTEIN DRUG

<130> P2757-1-PCT

<150> PCT/US61/827,763
<151> 2013-05-28

<160> 78

<170> BiSSAP 1.3

<210> 1
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> infliximab light chain

<400> 1
Asp Ile Leu Leu Thr Gln Ser Pro Ala Ile Leu Ser Val Ser Pro Gly
1 5 10 15
Glu Arg Val Ser Phe Ser Cys Arg Ala Ser Gln Phe Val Gly Ser Ser
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 Met Ser Gly Ile Pro Ser Arg Phe Ser Gly
50 55 60
Ser Gly Ser Gly Thr Asp Phe Thr Leu Ser Ile Asn Thr Val Glu Ser
65 70 75 80
Glu Asp Ile Ala Asp Tyr Tyr Cys Gln Gln Ser His Ser Trp Pro Phe
85 90 95
Thr Phe Gly Ser Gly Thr Asn Leu Glu Val Lys Arg Thr Val Ala Ala
100 105 110
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
180 185 190
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205
Phe Asn Arg Gly Glu Cys
210

<210> 2
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> Panitumumab light chain

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

```
Glu Pro Ala Ser Ile Ser Cys Arg Ser Ser Gln Asn Ile Val His Asn
            20                  25                  30
Asn Gly Ile Thr Tyr Leu Glu Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45
Pro Gln Leu Leu Ile Tyr Lys Val Ser Asp Arg Phe Ser Gly Val Pro
    50                  55                  60
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80
Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Phe Gln Gly
                85                  90                  95
Ser His Ile Pro Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105                 110
Arg Ala Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
        115                 120                 125
Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn
    130                 135                 140
Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala
145                 150                 155                 160
Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys
                165                 170                 175
Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp
            180                 185                 190
Tyr Glu Lys His Lys Leu Tyr Ala Cys Glu Val Thr His Gln Gly Leu
        195                 200                 205
Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215                 220
```

<210> 3
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Trastuzumab light chain

<400> 3

```
Ala Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
1               5                   10                  15
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Val Asn Thr
            20                  25                  30
Ala Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
        35                  40                  45
Ile Tyr Ser Ala Ser Phe Leu Tyr Ser Gly Val Pro Ser Arg Phe Ser
    50                  55                  60
Gly Ser Arg Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
65                  70                  75                  80
Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln His Tyr Thr Thr Pro
                85                  90                  95
Pro Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val
            180                 185                 190
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205
Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 4
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> adalimumab light chain

<400> 4
Ala Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
1   5   10   15
Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Arg Asn
            20   25   30
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
        35   40   45
Ile Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
    50   55   60
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
65   70   75   80
Pro Glu Asp Val Ala Thr Tyr Tyr Cys Gln Arg Tyr Asn Arg Ala Pro
                85   90   95
Tyr Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100   105   110
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115   120   125
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130   135   140
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145   150   155   160
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165   170   175
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu
            180   185   190
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195   200   205
Ser Phe Asn Arg Gly Glu Cys
    210   215

<210> 5
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> DENOSUMAB LIGHT CHAIN

<400> 5
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1   5   10   15
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Arg Gly Arg
            20   25   30
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35   40   45
Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50   55   60
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65   70   75   80
Pro Glu Asp Phe Ala Val Phe Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
                85   90   95
Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100   105   110
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115   120   125
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130   135   140

```
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu
            180                 185                 190
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205
Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 6
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Ipilimumab light chain

<400> 6
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Gly Ser Ser
            20                  25                  30
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45
Ile Tyr Gly Ala Phe Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
                85                  90                  95
Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
            100                 105                 110
Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser
        115                 120                 125
Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu
    130                 135                 140
Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser
145                 150                 155                 160
Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu
                165                 170                 175
Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu
            180                 185                 190
Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys
        195                 200                 205
Ser Phe Asn Arg Gly Glu Cys
    210                 215

<210> 7
<211> 214
<212> PRT
<213> Artificial Sequence

<220>
<223> tremelimumab light chain

<400> 7
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 Ser Ile Asn Ser Tyr
            20                  25                  30
Leu Asp Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45
Tyr Ala Ala Ser Ser Leu Gln 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 Tyr Ser Thr Pro Phe
                85                  90                  95
Thr Phe Gly Pro Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
            100                 105                 110
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115                 120                 125
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130                 135                 140
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145                 150                 155                 160
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165                 170                 175
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
            180                 185                 190
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195                 200                 205
Phe Asn Arg Gly Glu Cys
    210
```

<210> 8
<211> 219
<212> PRT
<213> Artificial Sequence

<220>
<223> efalizumab light chain

<400> 8

```
Ala Ala Gln Pro Ala Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu
1               5                   10                  15
Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Lys
            20                  25                  30
Thr Ile Ser Lys Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala
        35                  40                  45
Pro Lys Leu Leu Ile Tyr Ser Gly Ser Thr Leu Gln Ser Gly Val Pro
    50                  55                  60
Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile
65                  70                  75                  80
Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln His
                85                  90                  95
Asn Glu Tyr Pro Leu Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105                 110
Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
        115                 120                 125
Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
    130                 135                 140
Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
145                 150                 155                 160
Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
                165                 170                 175
Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
            180                 185                 190
Lys His Lys Leu Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
        195                 200                 205
Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215
```

<210> 9
<211> 216
<212> PRT
<213> Artificial Sequence

<220>
<223> ustekinumab light chain

<400> 9
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 Gly Ile Ser Ser Trp
            20   25   30
Leu Ala Trp Tyr Gln Gln Lys Pro Glu Lys Ala Pro Lys Ser Leu Ile
        35   40   45
Tyr Ala Ala Ser Ser Leu Gln 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 Ile Tyr Pro Tyr
                85   90   95
Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala Ala
            100   105   110
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
        115   120   125
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
    130   135   140
Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145   150   155   160
Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
                165   170   175
Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Leu Tyr
            180   185   190
Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
        195   200   205
Phe Asn Arg Gly Glu Cys Leu Glu
    210   215

<210> 10
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> IgG1 hinge

<400> 10
Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro
1   5   10   15

<210> 11
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> IgG2 hinge

<400> 11
Glu Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro
1   5   10

<210> 12
<211> 62
<212> PRT
<213> Artificial Sequence

<220>
<223> IgG3 hinge

<400> 12
Glu Leu Lys Thr Pro Leu Gly Asp Thr Thr His Thr Cys Pro Arg Cys
1   5   10   15
Pro Glu Pro Lys Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg Cys Pro
            20   25   30
Glu Pro Lys Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg Cys Pro Glu
        35   40   45
Pro Lys Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg Cys Pro
    50   55   60

<210> 13
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> IgG4 hinge

<400> 13
Glu Ser Lys Tyr Gly Pro Pro Cys Pro Ser Cys Pro
1   5   10

<210> 14
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> IgA1 hinge

<400> 14
Pro Val Pro Ser Thr Pro Pro Thr Pro Ser Pro Ser Thr Pro Pro Thr
1   5   10   15
Pro Ser Pro Ser Cys Cys His
            20

<210> 15
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> IgA2 hinge

<400> 15
Pro Val Pro Pro Pro Pro Pro Cys Cys His
1   5   10

<210> 16
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> MMP2 substrate

<400> 16
Gly Pro Leu Gly Val Arg
1   5

<210> 17
<211> 2445
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG1 Hinge Ipilimumab

<400> 17
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcc caaatcttgt gacaaaactc acacatgccc 120

accgtgccca gttaacggcg gcggcggcag cggtcccctg ggtgtgagag cggcccagcc 180

ggccgaaatt gtgttgacgc agtctccagg caccctgtct ttgtctccag gggaaagagc 240

caccctctcc tgcagggcca gtcagagtgt tggcagcagc tacttagcct ggtaccagca 300

gaaacctggc caggctccca ggctcctcat ctatggtgca ttcagcaggg ccactggcat 360

cccagacagg ttcagtggca gtgggtctgg gacagacttc actctcacca tcagcagact 420

ggagcctgaa gattttgcag tgtattactg tcagcagtat ggtagctcac cgtggacgtt 480

cggccaaggg accaaggtgg aaatcaaacg gactgtggct gcaccatctg tcttcatctt 540

cccgccatct gatgagcagt tgaaatctgg aactgcctct gttgtgtgcc tgctgaataa 600

cttctatccc agagaggcca aagtacagtg gaaggtggat aacgccctcc aatcgggtaa 660

ctcccaggag agtgtcacag agcaggacag caaggacagc acctacagcc tcagcagcac 720

cctgacgctg agcaaagcag actacgagaa acacaaactc tacgcctgcg aagtcaccca 780

tcagggcctg agctcgcccg tcacaaagag cttcaacagg ggagagtgcc tcgagcgagc 840

aaaacgagca ccagtaaaac aaacactaaa cttcgaccta ctaaaactag caggagacgt 900

agaatcaaac ccaggaccag ccacaaccat ggagacagac acactcctgc tatgggtact 960

gctgctctgg gttccaggtt ccactggtga cgagcccaaa tcttgtgaca aaactcacac 1020

atgcccaccg tgcccaggcg gccgcggcgg cggcggcagc ggtcccctgg gtgtgagaag 1080

atctcaggtg cagctggtgg agtctggggg aggcgtggtc cagcctggga ggtccctgag 1140

actctcctgt gcagcctctg gattcacctt cagtagctat actatgcact gggtccgcca 1200

ggctccaggc aaggggctgg agtgggtgac atttatatca tatgatggaa acaataaata 1260

ctacgcagac tccgtgaagg gccgattcac catctccaga gacaattcca agaacacgct 1320

gtatctgcaa atgaacagcc tgagagctga ggacacggct atatattact gtgcgaggac 1380

cggctggctg gggccctttg actactgggg ccagggaacc ctggtcaccg tctcctcagc 1440

ctccaccaag ggaccatcgg tcttcccccct ggcaccctcc tccaagagca cctctggggg 1500

cacagcggcc ctgggctgcc tggtcaagga ctacttcccc gaaccggtga cggtgtcgtg 1560

gaactcaggc gccctgacca gcggcgtgca caccttcccg gctgtcctac agtcctcagg 1620

actctactcc ctcagcagcg tggtgaccgt gccctccagc agcttgggca cccagaccta 1680

catctgcaac gtgaatcaca agcccagcaa caccaaggtc gacaagaaag ttgagcccaa 1740

atcttgtgac aaaactcaca catgcccacc gtgcccagca cccgaactcc tgggggggacc 1800

gtcagtcttc ctcttccccc caaaacccaa ggacaccctc atgatctccc ggacccctga 1860

ggtcacatgc gtggtggtgg acgtgagcca cgaagaccct gaggtcaagt tcaactggta 1920

cgtggacggc gtggaggtgc ataatgccaa gacaaagccg cgggaggagc agtacaacag 1980

cacgtaccgt gtggtcagcg tcctcaccgt cctgcaccag gactggctga atggcaagga 2040

gtacaagtgc aaggtctcca acaaagccct cccagccccc atcgagaaaa ccatctccaa 2100

agccaagggg cagccccgag aaccacaggt gtacaccctg cccccatccc gggatgagct 2160

gaccaagaac caggtcagcc tgacctgcct ggtcaaaggc ttctatccca gcgacatcgc 2220

cgtggagtgg gagagcaatg ggcagccgga gaacaactac aagaccacgc ctcccgtgct 2280

ggactccgac ggctccttct tcctctacag caagctcacc gtggacaaga gcaggtggca 2340

gcaggggaac gtcttctcat gctccgtgat gcatgaggct ctgcacaacc actacacgca 2400

gaagagcctc tccctgtctc cgggtaaata aatcgatggc gcgcc 2445

<210> 18
<211> 2427
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG2 Hinge Ipilimumab

<400> 18
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcg caaatgttgt gtcgagtgcc caccgtgccc 120

agttaacggc ggcggcggca gcggtcccct gggtgtgaga gcggcccagc cggccgaaat 180

tgtgttgacg cagtctccag gcaccctgtc tttgtctcca ggggaaagag ccaccctctc 240

ctgcagggcc agtcagagtg ttggcagcag ctacttagcc tggtaccagc agaaacctgg 300

ccaggctccc aggctcctca tctatggtgc attcagcagg gccactggca tcccagacag 360

gttcagtggc agtgggtctg ggacagactt cactctcacc atcagcagac tggagcctga 420

agattttgca gtgtattact gtcagcagta tggtagctca ccgtggacgt tcggccaagg 480

gaccaaggtg gaaatcaaac ggactgtggc tgcaccatct gtcttcatct tcccgccatc 540

tgatgagcag ttgaaatctg gaactgcctc tgttgtgtgc ctgctgaata acttctatcc 600

cagagaggcc aaagtacagt ggaaggtgga taacgccctc caatcgggta actcccagga 660

gagtgtcaca gagcaggaca gcaaggacag cacctacagc ctcagcagca ccctgacgct 720

gagcaaagca gactacgaga aacacaaact ctacgcctgc gaagtcaccc atcagggcct 780

gagctcgccc gtcacaaaga gcttcaacag gggagagtgc ctcgagcgag caaaacgagc 840

accagtaaaa caaacactaa acttcgacct actaaaacta gcaggagacg tagaatcaaa 900

cccaggacca gccacaacca tggagacaga cacactcctg ctatgggtac tgctgctctg 960

ggttccaggt tccactggtg acgagcgcaa atgttgtgtc gagtgcccac cgtgcccagg 1020

cggccgcggc ggcggcggca gcggtcccct gggtgtgaga agatctcagg tgcagctggt 1080

ggagtctggg ggaggcgtgg tccagcctgg gaggtccctg agactctcct gtgcagcctc 1140

tggattcacc ttcagtagct atactatgca ctgggtccgc caggctccag gcaaggggct 1200

ggagtgggtg acatttatat catatgatgg aaacaataaa tactacgcag actccgtgaa 1260

gggccgattc accatctcca gagacaattc caagaacacg ctgtatctgc aaatgaacag 1320

cctgagagct gaggacacgg ctatatatta ctgtgcgagg accggctggc tggggccctt 1380

tgactactgg ggccagggaa ccctggtcac cgtctcctca gcctccacca agggaccatc 1440

ggtcttcccc ctggcaccct cctccaagag cacctctggg ggcacagcgg ccctgggctg 1500

cctggtcaag gactacttcc ccgaaccggt gacggtgtcg tggaactcag gcgccctgac 1560

cagcggcgtg cacaccttcc cggctgtcct acagtcctca ggactctact ccctcagcag 1620

cgtggtgacc gtgccctcca gcagcttggg cacccagacc tacatctgca acgtgaatca 1680

caagcccagc aacaccaagg tcgacaagaa agttgagccc aaatcttgtg acaaaactca 1740

cacatgccca ccgtgcccag cacccgaact cctgggggga ccgtcagtct tcctcttccc 1800

cccaaaaccc aaggacaccc tcatgatctc ccggacccct gaggtcacat gcgtggtggt 1860

ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg tacgtggacg gcgtggaggt 1920

gcataatgcc aagacaaagc cgcgggagga gcagtacaac agcacgtacc gtgtggtcag 1980

cgtcctcacc gtcctgcacc aggactggct gaatggcaag gagtacaagt gcaaggtctc 2040

caacaaagcc ctcccagccc ccatcgagaa aaccatctcc aaagccaagg ggcagccccg 2100

agaaccacag gtgtacaccc tgcccccatc ccgggatgag ctgaccaaga accaggtcag 2160

cctgacctgc ctggtcaaag gcttctatcc cagcgacatc gccgtggagt gggagagcaa 2220

tgggcagccg gagaacaact acaagaccac gcctcccgtg ctggactccg acggctcctt 2280

cttcctctac agcaagctca ccgtggacaa gagcaggtgg cagcagggga acgtcttctc 2340

atgctccgtg atgcatgagg ctctgcacaa ccactacacg cagaagagcc tctccctgtc 2400

tccgggtaaa taaatcgatg gcgcgcc 2427

<210> 19
<211> 2727
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG3 Hinge Ipilimumab

<400> 19
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagct caaaacccca cttggtgaca caactcacac 120

atgcccacgg tgcccagagc ccaaatcttg tgacacacct cccccgtgcc cacggtgccc 180

agagcccaaa tcttgtgaca cacctccccc atgcccacgg tgcccagagc ccaaatcttg 240

```
tgacacacct cccccgtgcc caaggtgccc agttaacggc ggcggcggca gcggtcccct     300
gggtgtgaga gcggcccagc cggccgaaat tgtgttgacg cagtctccag gcaccctgtc     360
tttgtctcca ggggaaagag ccaccctctc ctgcagggcc agtcagagtg ttggcagcag     420
ctacttagcc tggtaccagc agaaacctgg ccaggctccc aggctcctca tctatggtgc     480
attcagcagg gccactggca tcccagacag gttcagtggc agtgggtctg ggacagactt     540
cactctcacc atcagcagac tggagcctga agattttgca gtgtattact gtcagcagta     600
tggtagctca ccgtggacgt tcggccaagg gaccaaggtg gaaatcaaac ggactgtggc     660
tgcaccatct gtcttcatct tcccgccatc tgatgagcag ttgaaatctg gaactgcctc     720
tgttgtgtgc ctgctgaata acttctatcc cagagaggcc aaagtacagt ggaaggtgga     780
taacgccctc caatcgggta actcccagga gagtgtcaca gagcaggaca gcaaggacag     840
cacctacagc ctcagcagca ccctgacgct gagcaaagca gactacgaga aacacaaact     900
ctacgcctgc gaagtcaccc atcagggcct gagctcgccc gtcacaaaga gcttcaacag     960
gggagagtgc ctcgagcgag caaaacgagc accagtaaaa caaacactaa acttcgacct    1020
actaaaacta gcaggagacg tagaatcaaa cccaggacca gccacaacca tggagacaga    1080
cacactcctg ctatgggtac tgctgctctg ggttccaggt tccactggtg acgagctcaa    1140
aaccccactt ggtgacacaa ctcacacatg cccacggtgc ccagagccca aatcttgtga    1200
cacacctccc ccgtgcccac ggtgcccaga gcccaaatct tgtgacacac ctcccccatg    1260
cccacggtgc ccagagccca aatcttgtga cacacctccc ccgtgcccaa ggtgcccagg    1320
cggccgcggc ggcggcggca gcggtcccct gggtgtgaga agatctcagg tgcagctggt    1380
ggagtctggg ggaggcgtgg tccagcctgg gaggtccctg agactctcct gtgcagcctc    1440
tggattcacc ttcagtagct atactatgca ctgggtccgc caggctccag gcaaggggct    1500
ggagtgggtg acatttatat catatgatgg aaacaataaa tactacgcag actccgtgaa    1560
gggccgattc accatctcca gagacaattc caagaacacg ctgtatctgc aaatgaacag    1620
cctgagagct gaggacacgg ctatatatta ctgtgcgagg accggctggc tggggccctt    1680
tgactactgg ggccagggaa ccctggtcac cgtctcctca gcctccacca agggaccatc    1740
ggtcttcccc ctggcaccct cctccaagag cacctctggg ggcacagcgg ccctgggctg    1800
cctggtcaag gactacttcc ccgaaccggt gacggtgtcg tggaactcag gcgccctgac    1860
cagcggcgtg cacaccttcc cggctgtcct acagtcctca ggactctact ccctcagcag    1920
cgtggtgacc gtgccctcca gcagcttggg cacccagacc tacatctgca acgtgaatca    1980
caagcccagc aacaccaagg tcgacaagaa agttgagccc aaatcttgtg acaaaactca    2040
cacatgccca ccgtgcccag cacccgaact cctgggggga ccgtcagtct tcctcttccc    2100
cccaaaaccc aaggacaccc tcatgatctc ccggacccct gaggtcacat gcgtggtggt    2160
```

ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg tacgtggacg gcgtggaggt 2220

gcataatgcc aagacaaagc cgcgggagga gcagtacaac agcacgtacc gtgtggtcag 2280

cgtcctcacc gtcctgcacc aggactggct gaatggcaag gagtacaagt gcaaggtctc 2340

caacaaagcc ctcccagccc ccatcgagaa aaccatctcc aaagccaagg ggcagccccg 2400

agaaccacag gtgtacaccc tgcccccatc ccgggatgag ctgaccaaga accaggtcag 2460

cctgacctgc ctggtcaaag gcttctatcc cagcgacatc gccgtggagt gggagagcaa 2520

tgggcagccg gagaacaact acaagaccac gcctcccgtg ctggactccg acggctcctt 2580

cttcctctac agcaagctca ccgtggacaa gagcaggtgg cagcagggga acgtcttctc 2640

atgctccgtg atgcatgagg ctctgcacaa ccactacacg cagaagagcc tctccctgtc 2700

tccgggtaaa taaatcgatg gcgcgcc 2727

<210> 20
<211> 2427
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG4 Hinge Ipilimumab

<400> 20
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagtc caaatatggt cccccatgcc catcatgccc 120

agttaacggc ggcggcggca gcggtcccct gggtgtgaga gcggcccagc cggccgaaat 180

tgtgttgacg cagtctccag gcaccctgtc tttgtctcca ggggaaagag ccaccctctc 240

ctgcagggcc agtcagagtg ttggcagcag ctacttagcc tggtaccagc agaaacctgg 300

ccaggctccc aggctcctca tctatggtgc attcagcagg gccactggca tcccagacag 360

gttcagtggc agtgggtctg ggacagactt cactctcacc atcagcagac tggagcctga 420

agattttgca gtgtattact gtcagcagta tggtagctca ccgtggacgt tcggccaagg 480

gaccaaggtg gaaatcaaac ggactgtggc tgcaccatct gtcttcatct tcccgccatc 540

tgatgagcag ttgaaatctg gaactgcctc tgttgtgtgc ctgctgaata acttctatcc 600

cagagaggcc aaagtacagt ggaaggtgga taacgccctc caatcgggta actcccagga 660

gagtgtcaca gagcaggaca gcaaggacag cacctacagc ctcagcagca ccctgacgct 720

gagcaaagca gactacgaga aacacaaact ctacgcctgc gaagtcaccc atcagggcct 780

gagctcgccc gtcacaaaga gcttcaacag gggagagtgc ctcgagcgag caaaacgagc 840

accagtaaaa caaacactaa acttcgacct actaaaacta gcaggagacg tagaatcaaa 900

cccaggacca gccacaacca tggagacaga cacactcctg ctatgggtac tgctgctctg 960

ggttccaggt tccactggtg acgagtccaa atatggtccc ccatgcccat catgcccagg 1020

cggccgcggc ggcggcggca gcggtcccct gggtgtgaga agatctcagg tgcagctggt 1080

ggagtctggg ggaggcgtgg tccagcctgg gaggtccctg agactctcct gtgcagcctc 1140

tggattcacc ttcagtagct atactatgca ctgggtccgc caggctccag gcaaggggct 1200

ggagtgggtg acatttatat catatgatgg aaacaataaa tactacgcag actccgtgaa 1260

gggccgattc accatctcca gagacaattc caagaacacg ctgtatctgc aaatgaacag 1320

cctgagagct gaggacacgg ctatatatta ctgtgcgagg accggctggc tggggccctt 1380

tgactactgg ggccagggaa ccctggtcac cgtctcctca gcctccacca agggaccatc 1440

ggtcttcccc ctggcaccct cctccaagag cacctctggg ggcacagcgg ccctgggctg 1500

cctggtcaag gactacttcc ccgaaccggt gacggtgtcg tggaactcag gcgccctgac 1560

cagcggcgtg cacaccttcc cggctgtcct acagtcctca ggactctact ccctcagcag 1620

cgtggtgacc gtgccctcca gcagcttggg cacccagacc tacatctgca acgtgaatca 1680

caagcccagc aacaccaagg tcgacaagaa agttgagccc aaatcttgtg acaaaactca 1740

cacatgccca ccgtgcccag cacccgaact cctgggggga ccgtcagtct tcctcttccc 1800

cccaaaaccc aaggacaccc tcatgatctc ccggacccct gaggtcacat gcgtggtggt 1860

ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg tacgtggacg gcgtggaggt 1920

gcataatgcc aagacaaagc cgcgggagga gcagtacaac agcacgtacc gtgtggtcag 1980

cgtcctcacc gtcctgcacc aggactggct gaatggcaag gagtacaagt gcaaggtctc 2040

caacaaagcc ctcccagccc ccatcgagaa aaccatctcc aaagccaagg ggcagccccg 2100

agaaccacag gtgtacaccc tgcccccatc ccgggatgag ctgaccaaga accaggtcag 2160

cctgacctgc ctggtcaaag gcttctatcc cagcgacatc gccgtggagt gggagagcaa 2220

tgggcagccg gagaacaact acaagaccac gcctcccgtg ctggactccg acggctcctt 2280

cttcctctac agcaagctca ccgtggacaa gagcaggtgg cagcagggga acgtcttctc 2340

atgctccgtg atgcatgagg ctctgcacaa ccactacacg cagaagagcc tctccctgtc 2400

tccgggtaaa taaatcgatg gcgcgcc 2427

<210> 21
<211> 2469
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA1 Hinge Ipilimumab

<400> 21
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacccagt tccctcaact ccacctaccc catctccctc 120

aactccacct accccatctc cctcatgctg ccacgttaac ggcggcggcg gcagcggtcc 180

cctgggtgtg agagcggccc agccggccga aattgtgttg acgcagtctc caggcaccct 240

gtctttgtct ccaggggaaa gagccaccct ctcctgcagg gccagtcaga gtgttggcag 300
cagctactta gcctggtacc agcagaaacc tggccaggct cccaggctcc tcatctatgg 360
tgcattcagc agggccactg gcatcccaga caggttcagt ggcagtgggt ctgggacaga 420
cttcactctc accatcagca gactggagcc tgaagatttt gcagtgtatt actgtcagca 480
gtatggtagc tcaccgtgga cgttcggcca agggaccaag gtggaaatca aacggactgt 540
ggctgcacca tctgtcttca tcttcccgcc atctgatgag cagttgaaat ctggaactgc 600
ctctgttgtg tgcctgctga ataacttcta tcccagagag gccaaagtac agtggaaggt 660
ggataacgcc ctccaatcgg gtaactccca ggagagtgtc acagagcagg acagcaagga 720
cagcacctac agcctcagca gcaccctgac gctgagcaaa gcagactacg agaaacacaa 780
actctacgcc tgcgaagtca cccatcaggg cctgagctcg cccgtcacaa agagcttcaa 840
caggggagag tgcctcgagc gagcaaaacg agcaccagta aaacaaacac taaacttcga 900
cctactaaaa ctagcaggag acgtagaatc aaacccagga ccagccacaa ccatggagac 960
agacacactc ctgctatggg tactgctgct ctgggttcca ggttccactg gtgacgagcc 1020
caaatcttgt gacaaaactc acacatgccc accgtgccca ggcggccgcg gcggcggcgg 1080
cagcggtccc ctgggtgtga gaagatctca ggtgcagctg gtggagtctg ggggaggcgt 1140
ggtccagcct gggaggtccc tgagactctc ctgtgcagcc tctggattca ccttcagtag 1200
ctatactatg cactgggtcc gccaggctcc aggcaagggg ctggagtggg tgacatttat 1260
atcatatgat ggaaacaata aatactacgc agactccgtg aagggccgat tcaccatctc 1320
cagagacaat tccaagaaca cgctgtatct gcaaatgaac agcctgagag ctgaggacac 1380
ggctatatat tactgtgcga ggaccggctg gctggggccc tttgactact ggggccaggg 1440
aaccctggtc accgtctcct cagcctccac caagggacca tcggtcttcc ccctggcacc 1500
ctcctccaag agcacctctg ggggcacagc ggccctgggc tgcctggtca aggactactt 1560
ccccgaaccg gtgacggtgt cgtggaactc aggcgccctg accagcggcg tgcacacctt 1620
cccggctgtc ctacagtcct caggactcta ctccctcagc agcgtggtga ccgtgccctc 1680
cagcagcttg ggcacccaga cctacatctg caacgtgaat cacaagccca gcaacaccaa 1740
ggtcgacaag aaagttgagc ccaaatcttg tgacaaaact cacacatgcc caccgtgccc 1800
agcacccgaa ctcctggggg gaccgtcagt cttcctcttc cccccaaaac ccaaggacac 1860
cctcatgatc tcccggaccc ctgaggtcac atgcgtggtg gtggacgtga gccacgaaga 1920
ccctgaggtc aagttcaact ggtacgtgga cggcgtggag gtgcataatg ccaagacaaa 1980
gccgcgggag gagcagtaca acagcacgta ccgtgtggtc agcgtcctca ccgtcctgca 2040
ccaggactgg ctgaatggca aggagtacaa gtgcaaggtc tccaacaaag ccctcccagc 2100
ccccatcgag aaaaccatct ccaaagccaa ggggcagccc cgagaaccac aggtgtacac 2160
cctgccccca tcccgggatg agctgaccaa gaaccaggtc agcctgacct gcctggtcaa 2220

aggcttctat cccagcgaca tcgccgtgga gtgggagagc aatgggcagc cggagaacaa 2280

ctacaagacc acgcctcccg tgctggactc cgacggctcc ttcttcctct acagcaagct 2340

caccgtggac aagagcaggt ggcagcaggg gaacgtcttc tcatgctccg tgatgcatga 2400

ggctctgcac aaccactaca cgcagaagag cctctccctg tctccgggta aataaatcga 2460

tggcgcgcc 2469

<210> 22
<211> 2415
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA2 Hinge Ipilimumab

<400> 22
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacccagt tcccccacct cccccatgct gccacgttaa 120

cggcggcggc ggcagcggtc ccctgggtgt gagagcggcc cagccggccg aaattgtgtt 180

gacgcagtct ccaggcaccc tgtctttgtc tccaggggaa agagccaccc tctcctgcag 240

ggccagtcag agtgttggca gcagctactt agcctggtac cagcagaaac ctggccaggc 300

tcccaggctc ctcatctatg gtgcattcag cagggccact ggcatcccag acaggttcag 360

tggcagtggg tctgggacag acttcactct caccatcagc agactggagc ctgaagattt 420

tgcagtgtat tactgtcagc agtatggtag ctcaccgtgg acgttcggcc aagggaccaa 480

ggtggaaatc aaacggactg tggctgcacc atctgtcttc atcttcccgc catctgatga 540

gcagttgaaa tctggaactg cctctgttgt gtgcctgctg aataacttct atcccagaga 600

ggccaaagta cagtggaagg tggataacgc cctccaatcg ggtaactccc aggagagtgt 660

cacagagcag gacagcaagg acagcaccta cagcctcagc agcaccctga cgctgagcaa 720

agcagactac gagaaacaca aactctacgc ctgcgaagtc acccatcagg gcctgagctc 780

gcccgtcaca aagagcttca acaggggaga gtgcctcgag cgagcaaaac gagcaccagt 840

aaaacaaaca ctaaacttcg acctactaaa actagcagga gacgtagaat caaacccagg 900

accagccaca accatggaga cagacacact cctgctatgg gtactgctgc tctgggttcc 960

aggttccact ggtgacccag ttcccccacc tcccccatgc tgccacggcg gccgcggcgg 1020

cggcggcagc ggtcccctgg gtgtgagaag atctcaggtg cagctggtgg agtctggggg 1080

aggcgtggtc cagcctggga ggtccctgag actctcctgt gcagcctctg gattcacctt 1140

cagtagctat actatgcact gggtccgcca ggctccaggc aaggggctgg agtgggtgac 1200

atttatatca tatgatggaa acaataaata ctacgcagac tccgtgaagg gccgattcac 1260

catctccaga gacaattcca agaacacgct gtatctgcaa atgaacagcc tgagagctga 1320

ggacacggct atatattact gtgcgaggac cggctggctg gggccctttg actactgggg 1380

ccagggaacc ctggtcaccg tctcctcagc ctccaccaag ggaccatcgg tcttccccct 1440

ggcaccctcc tccaagagca cctctggggg cacagcggcc ctgggctgcc tggtcaagga 1500

ctacttcccc gaaccggtga cggtgtcgtg gaactcaggc gccctgacca gcggcgtgca 1560

caccttcccg gctgtcctac agtcctcagg actctactcc ctcagcagcg tggtgaccgt 1620

gccctccagc agcttgggca cccagaccta catctgcaac gtgaatcaca agcccagcaa 1680

caccaaggtc gacaagaaag ttgagcccaa atcttgtgac aaaactcaca catgcccacc 1740

gtgcccagca cccgaactcc tgggggggacc gtcagtcttc ctcttccccc caaaacccaa 1800

ggacaccctc atgatctccc ggacccctga ggtcacatgc gtggtggtgg acgtgagcca 1860

cgaagaccct gaggtcaagt tcaactggta cgtggacggc gtggaggtgc ataatgccaa 1920

gacaaagccg cgggaggagc agtacaacag cacgtaccgt gtggtcagcg tcctcaccgt 1980

cctgcaccag gactggctga atggcaagga gtacaagtgc aaggtctcca acaaagccct 2040

cccagccccc atcgagaaaa ccatctccaa agccaagggg cagccccgag aaccacaggt 2100

gtacaccctg cccccatccc gggatgagct gaccaagaac caggtcagcc tgacctgcct 2160

ggtcaaaggc ttctatccca gcgacatcgc cgtggagtgg gagagcaatg ggcagccgga 2220

gaacaactac aagaccacgc ctcccgtgct ggactccgac ggctccttct tcctctacag 2280

caagctcacc gtggacaaga gcaggtggca gcaggggaac gtcttctcat gctccgtgat 2340

gcatgaggct ctgcacaacc actacacgca gaagagcctc tccctgtctc cgggtaaata 2400

aatcgatggc gcgcc 2415

<210> 23
<211> 2451
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG1 Hinge Ticilimumab

<400> 23
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcc caaatcttgt gacaaaactc acacatgccc 120

accgtgccca gttaacggcg gcggcggcag cggtcccctg ggtgtgagag cggcccagcc 180

ggccgacatc cagatgaccc agtctccatc ctccctgtct gcatctgtag gagacagagt 240

caccatcact tgccgggcaa gtcagagcat taacagctat ttagattggt atcagcagaa 300

accagggaaa gcccctaagc tcctgatcta tgctgcatcc agtttgcaaa gtggggtccc 360

atcaaggttc agtggcagtg gatctgggac agatttcact ctcaccatca gcagtctgca 420

acctgaagat tttgcaactt actactgtca acagtattac agtaccccat tcactttcgg 480

ccctgggacc aaagtggaaa tcaaacgaac tgtggctgca ccatctgtct tcatcttccc 540

gccatctgat gagcagttga aatctggaac tgcctctgtt gtgtgcctgc tgaataactt 600
ctatcccaga gaggccaaag tacagtggaa ggtggataac gccctccaat cgggtaactc 660
ccaggagagt gtcacagagc aggacagcaa ggacagcacc tacagcctca gcagcaccct 720
gacgctgagc aaagcagact acgagaaaca caaactctac gcctgcgaag tcacccatca 780
gggcctgagc tcgcccgtca caaagagctt caacagggga gagtgcctcg agcgagcaaa 840
acgagcacca gtaaaacaaa cactaaactt cgacctacta aaactagcag gagacgtaga 900
atcaaaccca ggaccagcca caaccatgga gacagacaca ctcctgctat gggtactgct 960
gctctgggtt ccaggttcca ctggtgacga gcccaaatct tgtgacaaaa ctcacacatg 1020
cccaccgtgc ccaggcggcc gcggcggcgg cggcagcggt cccctgggtg tgagaagatc 1080
tcaggtgcag ctggtggagt ctgggggagg cgtggtccaa ccggggcggt ccctgagact 1140
ctcctgtgca gcctctggat tcaccttcag tagctatggc atgcactggg tccgccaggc 1200
tccagggaag gggctggagt gggtcgcagt tatttggtat gacggaagta acaaatatta 1260
tgcagactca gtgaagggcc gattcaccat ctccagagac aactccaaga acacactgta 1320
tctgcaaatg aacagcctga gagccgagga cacggctgtg tattactgtg cgagagatcc 1380
tcgcggggca acactctact actactacta cgggatggac gtctggggcc agggaaccac 1440
ggtcaccgtc tcttcagcct ccaccaaggg cccatcggtc ttcccctgg cgccctgctc 1500
caggagcacc tccgagagca cagcggccct gggctgcctg gtcaaggact acttccccga 1560
accggtgacg gtgtcgtgga actcaggcgc tctgaccagc ggcgtgcaca ccttcccagc 1620
tgtcctacag tcctcaggac tctactccct cagcagcgtg gtgaccgtgc cctccagcaa 1680
cttcggcacc cagacctaca cctgcaacgt agatcacaag cccagcaaca ccaaggtcga 1740
caagacagtt gagcgcaaat gttgtgtcga gtgcccaccg tgcccagcac cacctgtggc 1800
aggaccgtca gtcttcctct tccccccaaa acccaaggac accctcatga tctcccggac 1860
ccctgaggtc acgtgcgtgg tggtggacgt gagccacgaa gaccccgagg tccagttcaa 1920
ctggtacgtg gacggcgtgg aggtgcataa tgccaagaca aagccacggg aggagcagtt 1980
caacagcacg ttccgtgtgg tcagcgtcct caccgtcgtg caccaggact ggctgaacgg 2040
caaggagtac aagtgcaagg tctccaacaa aggcctccca gcccccatcg agaaaaccat 2100
ctccaaaacc aaagggcagc cccgagaacc acaggtgtac accctgcccc catcccggga 2160
ggagatgacc aagaaccagg tcagcctgac ctgcctggtc aaaggcttct accccagcga 2220
catcgccgtg gagtgggaga gcaatgggca gccggagaac aactacaaga ccacacctcc 2280
catgctggac tccgacggct ccttcttcct ctacagcaag ctcaccgtgg acaagagcag 2340
gtggcagcag gggaacgtct tctcatgctc cgtgatgcat gaggctctgc acaaccacta 2400
cacacagaag agcctctccc tgtctccggg taaataaatc gatggcgcgc c 2451

<210> 24
<211> 2433
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG2 Hinge Ticilimumab

<400> 24
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcg caaatgttgt gtcgagtgcc caccgtgccc 120

agttaacggc ggcggcggca gcggtcccct gggtgtgaga gcggcccagc cggccgacat 180

ccagatgacc cagtctccat cctccctgtc tgcatctgta ggagacagag tcaccatcac 240

ttgccgggca agtcagagca ttaacagcta tttagattgg tatcagcaga aaccagggaa 300

agcccctaag ctcctgatct atgctgcatc cagtttgcaa agtggggtcc catcaaggtt 360

cagtggcagt ggatctggga cagatttcac tctcaccatc agcagtctgc aacctgaaga 420

ttttgcaact tactactgtc aacagtatta cagtacccca ttcactttcg gccctgggac 480

caaagtggaa atcaaacgaa ctgtggctgc accatctgtc ttcatcttcc cgccatctga 540

tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg ctgaataact tctatcccag 600

agaggccaaa gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag 660

tgtcacagag caggacagca aggacagcac ctacagcctc agcagcaccc tgacgctgag 720

caaagcagac tacgagaaac acaaactcta cgcctgcgaa gtcacccatc agggcctgag 780

ctcgcccgtc acaaagagct tcaacagggg agagtgcctc gagcgagcaa aacgagcacc 840

agtaaaacaa acactaaact tcgacctact aaaactagca ggagacgtag aatcaaaccc 900

aggaccagcc acaaccatgg agacagacac actcctgcta tgggtactgc tgctctgggt 960

tccaggttcc actggtgacg agcgcaaatg ttgtgtcgag tgcccaccgt gcccaggcgg 1020

ccgcggcggc ggcggcagcg gtcccctggg tgtgagaaga tctcaggtgc agctggtgga 1080

gtctggggga ggcgtggtcc aaccggggcg gtccctgaga ctctcctgtg cagcctctgg 1140

attcaccttc agtagctatg gcatgcactg ggtccgccag gctccaggga aggggctgga 1200

gtgggtcgca gttatttggt atgacggaag taacaaatat tatgcagact cagtgaaggg 1260

ccgattcacc atctccagag acaactccaa gaacacactg tatctgcaaa tgaacagcct 1320

gagagccgag gacacggctg tgtattactg tgcgagagat cctcgcgggg caacactcta 1380

ctactactac tacgggatgg acgtctgggg ccagggaacc acggtcaccg tctcttcagc 1440

ctccaccaag ggcccatcgg tcttcccccct ggcgccctgc tccaggagca cctccgagag 1500

cacagcggcc ctgggctgcc tggtcaagga ctacttcccc gaaccggtga cggtgtcgtg 1560

gaactcaggc gctctgacca gcggcgtgca caccttccca gctgtcctac agtcctcagg 1620

actctactcc ctcagcagcg tggtgaccgt gccctccagc aacttcggca cccagaccta 1680

cacctgcaac gtagatcaca agcccagcaa caccaaggtc gacaagacag ttgagcgcaa 1740

atgttgtgtc gagtgcccac cgtgcccagc accacctgtg gcaggaccgt cagtcttcct 1800

cttcccccca aaacccaagg acaccctcat gatctcccgg acccctgagg tcacgtgcgt 1860

ggtggtggac gtgagccacg aagaccccga ggtccagttc aactggtacg tggacggcgt 1920

ggaggtgcat aatgccaaga caaagccacg ggaggagcag ttcaacagca cgttccgtgt 1980

ggtcagcgtc ctcaccgtcg tgcaccagga ctggctgaac ggcaaggagt acaagtgcaa 2040

ggtctccaac aaaggcctcc cagccccat cgagaaaacc atctccaaaa ccaaagggca 2100

gccccgagaa ccacaggtgt acaccctgcc cccatcccgg gaggagatga ccaagaacca 2160

ggtcagcctg acctgcctgg tcaaaggctt ctaccccagc gacatcgccg tggagtggga 2220

gagcaatggg cagccggaga acaactacaa gaccacacct cccatgctgg actccgacgg 2280

ctccttcttc ctctacagca agctcaccgt ggacaagagc aggtggcagc aggggaacgt 2340

cttctcatgc tccgtgatgc atgaggctct gcacaaccac tacacacaga agagcctctc 2400

cctgtctccg ggtaaataaa tcgatggcgc gcc 2433

<210> 25
<211> 2733
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG3 Hinge Ticilimumab

<400> 25
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagct caaaacccca cttggtgaca caactcacac 120

atgcccacgg tgcccagagc ccaaatcttg tgacacacct cccccgtgcc cacggtgccc 180

agagcccaaa tcttgtgaca cacctccccc atgcccacgg tgcccagagc ccaaatcttg 240

tgacacacct cccccgtgcc caaggtgccc agttaacggc ggcggcggca gcggtccgct 300

gggtgtgaga gcggcccagc cggccgacat ccagatgacc cagtctccat cctccctgtc 360

tgcatctgta ggagacagag tcaccatcac ttgccgggca agtcagagca ttaacagcta 420

tttagattgg tatcagcaga aaccagggaa agcccctaag ctcctgatct atgctgcatc 480

cagtttgcaa agtggggtcc catcaaggtt cagtggcagt ggatctggga cagatttcac 540

tctcaccatc agcagtctgc aacctgaaga ttttgcaact tactactgtc aacagtatta 600

cagtacccca ttcactttcg gccctgggac caaagtggaa atcaaacgaa ctgtggctgc 660

accatctgtc ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt 720

tgtgtgcctg ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa 780

cgccctccaa tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac 840

ctacagcctc agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaactcta 900
cgcctgcgaa gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg 960
agagtgcctc gagcgagcaa aacgagcacc agtaaaacaa acactaaact tcgacctact 1020
aaaactagca ggagacgtag aatcaaaccc aggaccagcc acaaccatgg agacagacac 1080
actcctgcta tgggtactgc tgctctgggt tccaggttcc actggtgacg agctcaaaac 1140
cccacttggt gacacaactc acacatgccc acggtgccca gagcccaaat cttgtgacac 1200
acctcccccg tgcccacggt gcccagagcc caaatcttgt gacacacctc ccccatgccc 1260
acggtgccca gagcccaaat cttgtgacac acctcccccg tgcccaaggt gcccaggcgg 1320
ccgcggcggc ggcggcagcg gtcccctggg tgtgagaaga tctcaggtgc agctggtgga 1380
gtctggggga ggcgtggtcc aaccggggcg gtccctgaga ctctcctgtg cagcctctgg 1440
attcaccttc agtagctatg gcatgcactg ggtccgccag gctccaggga aggggctgga 1500
gtgggtcgca gttatttggt atgacggaag taacaaatat tatgcagact cagtgaaggg 1560
ccgattcacc atctccagag acaactccaa gaacacactg tatctgcaaa tgaacagcct 1620
gagagccgag gacacggctg tgtattactg tgcgagagat cctcgcgggg caacactcta 1680
ctactactac tacgggatgg acgtctgggg ccagggaacc acggtcaccg tctcttcagc 1740
ctccaccaag ggcccatcgg tcttcccccc ggcgccctgc tccaggagca cctccgagag 1800
cacagcggcc ctgggctgcc tggtcaagga ctacttcccc gaaccggtga cggtgtcgtg 1860
gaactcaggc gctctgacca gcggcgtgca caccttccca gctgtcctac agtcctcagg 1920
actctactcc ctcagcagcg tggtgaccgt gccctccagc aacttcggca cccagaccta 1980
cacctgcaac gtagatcaca agcccagcaa caccaaggtc gacaagacag ttgagcgcaa 2040
atgttgtgtc gagtgcccac cgtgcccagc accacctgtg gcaggaccgt cagtcttcct 2100
cttcccccca aaacccaagg acaccctcat gatctcccgg acccctgagg tcacgtgcgt 2160
ggtggtggac gtgagccacg aagaccccga ggtccagttc aactggtacg tggacggcgt 2220
ggaggtgcat aatgccaaga caaagccacg ggaggagcag ttcaacagca cgttccgtgt 2280
ggtcagcgtc ctcaccgtcg tgcaccagga ctggctgaac ggcaaggagt acaagtgcaa 2340
ggtctccaac aaaggcctcc cagccccat cgagaaaacc atctccaaaa ccaaagggca 2400
gccccgagaa ccacaggtgt acaccctgcc cccatcccgg gaggagatga ccaagaacca 2460
ggtcagcctg acctgcctgg tcaaaggctt ctaccccagc gacatcgccg tggagtggga 2520
gagcaatggg cagccggaga acaactacaa gaccacacct cccatgctgg actccgacgg 2580
ctccttcttc ctctacagca agctcaccgt ggacaagagc aggtggcagc aggggaacgt 2640
cttctcatgc tccgtgatgc atgaggctct gcacaaccac tacacacaga agagcctctc 2700
cctgtctccg ggtaaataaa tcgatggcgc gcc 2733

<210> 26
<211> 2433
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG4 Hinge Ticilimumab

<400> 26
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagtc caaatatggt cccccatgcc catcatgccc 120

agttaacggc ggcggcggca gcggtcccct gggtgtgaga gcggcccagc cggccgacat 180

ccagatgacc cagtctccat cctccctgtc tgcatctgta ggagacagag tcaccatcac 240

ttgccgggca agtcagagca ttaacagcta tttagattgg tatcagcaga aaccagggaa 300

agcccctaag ctcctgatct atgctgcatc cagtttgcaa agtggggtcc catcaaggtt 360

cagtggcagt ggatctggga cagatttcac tctcaccatc agcagtctgc aacctgaaga 420

ttttgcaact tactactgtc aacagtatta cagtacccca ttcactttcg gccctgggac 480

caaagtggaa atcaaacgaa ctgtggctgc accatctgtc ttcatcttcc cgccatctga 540

tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg ctgaataact tctatcccag 600

agaggccaaa gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag 660

tgtcacagag caggacagca aggacagcac ctacagcctc agcagcaccc tgacgctgag 720

caaagcagac tacgagaaac acaaactcta cgcctgcgaa gtcacccatc agggcctgag 780

ctcgcccgtc acaaagagct tcaacagggg agagtgcctc gagcgagcaa aacgagcacc 840

agtaaaacaa acactaaact tcgacctact aaaactagca ggagacgtag aatcaaaccc 900

aggaccagcc acaaccatgg agacagacac actcctgcta tgggtactgc tgctctgggt 960

tccaggttcc actggtgacg agtccaaata tggtccccca tgcccatcat gcccaggcgg 1020

ccgcggcggc ggcggcagcg gtcccctggg tgtgagaaga tctcaggtgc agctggtgga 1080

gtctggggga ggcgtggtcc aaccggggcg gtccctgaga ctctcctgtg cagcctctgg 1140

attcaccttc agtagctatg gcatgcactg ggtccgccag gctccaggga aggggctgga 1200

gtgggtcgca gttatttggt atgacggaag taacaaatat tatgcagact cagtgaaggg 1260

ccgattcacc atctccagag acaactccaa gaacacactg tatctgcaaa tgaacagcct 1320

gagagccgag gacacggctg tgtattactg tgcgagagat cctcgcgggg caacactcta 1380

ctactactac tacgggatgg acgtctgggg ccagggaacc acggtcaccg tctcttcagc 1440

ctccaccaag ggcccatcgg tcttcccccct ggcgccctgc tccaggagca cctccgagag 1500

cacagcggcc ctgggctgcc tggtcaagga ctacttcccc gaaccggtga cggtgtcgtg 1560

gaactcaggc gctctgacca gcggcgtgca caccttccca gctgtcctac agtcctcagg 1620

actctactcc ctcagcagcg tggtgaccgt gccctccagc aacttcggca cccagaccta 1680

cacctgcaac gtagatcaca agcccagcaa caccaaggtc gacaagacag ttgagcgcaa 1740

atgttgtgtc gagtgcccac cgtgcccagc accacctgtg gcaggaccgt cagtcttcct 1800

cttcccccca aaacccaagg acaccctcat gatctcccgg acccctgagg tcacgtgcgt 1860

ggtggtggac gtgagccacg aagaccccga ggtccagttc aactggtacg tggacggcgt 1920

ggaggtgcat aatgccaaga caaagccacg ggaggagcag ttcaacagca cgttccgtgt 1980

ggtcagcgtc ctcaccgtcg tgcaccagga ctggctgaac ggcaaggagt acaagtgcaa 2040

ggtctccaac aaaggcctcc cagccccat cgagaaaacc atctccaaaa ccaaagggca 2100

gccccgagaa ccacaggtgt acaccctgcc cccatcccgg gaggagatga ccaagaacca 2160

ggtcagcctg acctgcctgg tcaaaggctt ctaccccagc gacatcgccg tggagtggga 2220

gagcaatggg cagccggaga acaactacaa gaccacacct cccatgctgg actccgacgg 2280

ctccttcttc ctctacagca agctcaccgt ggacaagagc aggtggcagc aggggaacgt 2340

cttctcatgc tccgtgatgc atgaggctct gcacaaccac tacacacaga agagcctctc 2400

cctgtctccg ggtaaataaa tcgatggcgc gcc 2433

<210> 27
<211> 2475
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA1 Hinge Ticilimumab

<400> 27
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacccagt tccctcaact ccacctaccc catctccctc 120

aactccacct accccatctc cctcatgctg ccacgttaac ggcggcggcg gcagcggtcc 180

cctgggtgtg agagcggccc agccggccga catccagatg acccagtctc catcctccct 240

gtctgcatct gtaggagaca gagtcaccat cacttgccgg gcaagtcaga gcattaacag 300

ctatttagat tggtatcagc agaaaccagg gaaagcccct aagctcctga tctatgctgc 360

atccagtttg caaagtgggg tcccatcaag gttcagtggc agtggatctg ggacagattt 420

cactctcacc atcagcagtc tgcaacctga agattttgca acttactact gtcaacagta 480

ttacagtacc ccattcactt tcggccctgg gaccaaagtg gaaatcaaac gaactgtggc 540

tgcaccatct gtcttcatct tcccgccatc tgatgagcag ttgaaatctg gaactgcctc 600

tgttgtgtgc ctgctgaata acttctatcc cagagaggcc aaagtacagt ggaaggtgga 660

taacgccctc caatcgggta actcccagga gagtgtcaca gagcaggaca gcaaggacag 720

cacctacagc ctcagcagca ccctgacgct gagcaaagca gactacgaga aacacaaact 780

ctacgcctgc gaagtcaccc atcagggcct gagctcgccc gtcacaaaga gcttcaacag 840

gggagagtgc ctcgagcgag caaaacgagc accagtaaaa caaacactaa acttcgacct 900

actaaaacta gcaggagacg tagaatcaaa cccaggacca gccacaacca tggagacaga 960

cacactcctg ctatgggtac tgctgctctg ggttccaggt tccactggtg acgagcccaa 1020

atcttgtgac aaaactcaca catgcccacc gtgcccaggc ggccgcggcg gcggcggcag 1080

cggtcccctg ggtgtgagaa gatctcaggt gcagctggtg gagtctgggg gaggcgtggt 1140

ccaaccgggg cggtccctga gactctcctg tgcagcctct ggattcacct tcagtagcta 1200

tggcatgcac tgggtccgcc aggctccagg gaaggggctg gagtgggtcg cagttatttg 1260

gtatgacgga agtaacaaat attatgcaga ctcagtgaag ggccgattca ccatctccag 1320

agacaactcc aagaacacac tgtatctgca aatgaacagc ctgagagccg aggacacggc 1380

tgtgtattac tgtgcgagag atcctcgcgg ggcaacactc tactactact actacgggat 1440

ggacgtctgg ggccagggaa ccacggtcac cgtctcttca gcctccacca agggcccatc 1500

ggtcttcccc ctggcgccct gctccaggag cacctccgag agcacagcgg ccctgggctg 1560

cctggtcaag gactacttcc ccgaaccggt gacggtgtcg tggaactcag gcgctctgac 1620

cagcggcgtg cacaccttcc cagctgtcct acagtcctca ggactctact ccctcagcag 1680

cgtggtgacc gtgccctcca gcaacttcgg cacccagacc tacacctgca acgtagatca 1740

caagcccagc aacaccaagg tcgacaagac agttgagcgc aaatgttgtg tcgagtgccc 1800

accgtgccca gcaccacctg tggcaggacc gtcagtcttc ctcttccccc caaaacccaa 1860

ggacaccctc atgatctccc ggacccctga ggtcacgtgc gtggtggtgg acgtgagcca 1920

cgaagacccc gaggtccagt tcaactggta cgtggacggc gtggaggtgc ataatgccaa 1980

gacaaagcca cgggaggagc agttcaacag cacgttccgt gtggtcagcg tcctcaccgt 2040

cgtgcaccag gactggctga acggcaagga gtacaagtgc aaggtctcca acaaaggcct 2100

cccagccccc atcgagaaaa ccatctccaa aaccaaaggg cagccccgag aaccacaggt 2160

gtacaccctg cccccatccc gggaggagat gaccaagaac caggtcagcc tgacctgcct 2220

ggtcaaaggc ttctacccca gcgacatcgc cgtggagtgg gagagcaatg ggcagccgga 2280

gaacaactac aagaccacac ctcccatgct ggactccgac ggctccttct tcctctacag 2340

caagctcacc gtggacaaga gcaggtggca gcaggggaac gtcttctcat gctccgtgat 2400

gcatgaggct ctgcacaacc actacacaca gaagagcctc tccctgtctc cgggtaaata 2460

aatcgatggc gcgcc 2475

<210> 28
<211> 2421
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA2 Hinge Ticilimumab

<400> 28

```
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct      60
ctgggttcca ggttccactg gtgacccagt tcccccacct cccccatgct gccacgttaa     120
cggcggcggc ggcagcggtc ccctgggtgt gagagcggcc cagccggccg acatccagat     180
gacccagtct ccatcctccc tgtctgcatc tgtaggagac agagtcacca tcacttgccg     240
ggcaagtcag agcattaaca gctatttaga ttggtatcag cagaaaccag ggaaagcccc     300
taagctcctg atctatgctg catccagttt gcaaagtggg gtcccatcaa ggttcagtgg     360
cagtggatct gggacagatt tcactctcac catcagcagt ctgcaacctg aagattttgc     420
aacttactac tgtcaacagt attacagtac cccattcact ttcggccctg ggaccaaagt     480
ggaaatcaaa cgaactgtgg ctgcaccatc tgtcttcatc ttcccgccat ctgatgagca     540
gttgaaatct ggaactgcct ctgttgtgtg cctgctgaat aacttctatc ccagagaggc     600
caaagtacag tggaaggtgg ataacgccct ccaatcgggt aactcccagg agagtgtcac     660
agagcaggac agcaaggaca gcacctacag cctcagcagc accctgacgc tgagcaaagc     720
agactacgag aaacacaaac tctacgcctg cgaagtcacc catcagggcc tgagctcgcc     780
cgtcacaaag agcttcaaca ggggagagtg cctcgagcga gcaaaacgag caccagtaaa     840
acaaacacta aacttcgacc tactaaaact agcaggagac gtagaatcaa acccaggacc     900
agccacaacc atggagacag acacactcct gctatgggta ctgctgctct gggttccagg     960
ttccactggt gacccagttc ccccacctcc cccatgctgc cacggcggcc gcggcggcgg    1020
cggcagcggt cccctgggtg tgagaagatc tcaggtgcag ctggtggagt ctgggggagg    1080
cgtggtccaa ccggggcggt ccctgagact ctcctgtgca gcctctggat tcaccttcag    1140
tagctatggc atgcactggg tccgccaggc tccagggaag gggctggagt gggtcgcagt    1200
tatttggtat gacggaagta acaaatatta tgcagactca gtgaagggcc gattcaccat    1260
ctccagagac aactccaaga acacactgta tctgcaaatg aacagcctga gagccgagga    1320
cacggctgtg tattactgtg cgagagatcc tcgcggggca acactctact actactacta    1380
cgggatggac gtctggggcc agggaaccac ggtcaccgtc tcttcagcct ccaccaaggg    1440
cccatcggtc ttcccctgg cgccctgctc caggagcacc tccgagagca cagcggccct    1500
gggctgcctg gtcaaggact acttccccga accggtgacg gtgtcgtgga actcaggcgc    1560
tctgaccagc ggcgtgcaca ccttcccagc tgtcctacag tcctcaggac tctactccct    1620
cagcagcgtg gtgaccgtgc cctccagcaa cttcggcacc cagacctaca cctgcaacgt    1680
agatcacaag cccagcaaca ccaaggtcga caagacagtt gagcgcaaat gttgtgtcga    1740
gtgcccaccg tgcccagcac cacctgtggc aggaccgtca gtcttcctct tccccccaaa    1800
acccaaggac accctcatga tctcccggac ccctgaggtc acgtgcgtgg tggtggacgt    1860
gagccacgaa gaccccgagg tccagttcaa ctggtacgtg gacggcgtgg aggtgcataa    1920
tgccaagaca aagccacggg aggagcagtt caacagcacg ttccgtgtgg tcagcgtcct    1980
```

caccgtcgtg caccaggact ggctgaacgg caaggagtac aagtgcaagg tctccaacaa 2040

aggcctccca gcccccatcg agaaaaccat ctccaaaacc aaagggcagc cccgagaacc 2100

acaggtgtac accctgcccc catcccggga ggagatgacc aagaaccagg tcagcctgac 2160

ctgcctggtc aaaggcttct accccagcga catcgccgtg gagtgggaga gcaatgggca 2220

gccggagaac aactacaaga ccacacctcc catgctggac tccgacggct ccttcttcct 2280

ctacagcaag ctcaccgtgg acaagagcag gtggcagcag gggaacgtct tctcatgctc 2340

cgtgatgcat gaggctctgc acaaccacta cacacagaag agcctctccc tgtctccggg 2400

taaataaatc gatggcgcgc c 2421

<210> 29
<211> 2451
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG1 Hinge Humira

<400> 29
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcc caaatcttgt gacaaaactc acacatgccc 120

accgtgccca gttaacggcg gcggcggcag cggtcccctg ggtgtgagag cggcccagcc 180

ggccgacatc cagatgaccc agagccccag cagcctgagc gccagcgtgg gcgacagagt 240

gaccatcacc tgcagagcca gccagggcat cagaaactac ctggcctggt accagcagaa 300

gcccggcaag gcccccaagc tgctgatcta cgccgccagc accctgcaga gcggcgtgcc 360

cagcagattc agcggcagcg gcagcggcac cgacttcacc ctgaccatca gcagcctgca 420

gcccgaggac gtggccacct actactgcca gagatacaac agagcccccc acaccttcgg 480

ccagggcacc aaggtggaga tcaagagaac tgtggctgca ccatctgtct tcatcttccc 540

gccatctgat gagcagttga aatctggaac tgcctctgtt gtgtgcctgc tgaataactt 600

ctatcccaga gaggccaaag tacagtggaa ggtggataac gccctccaat cgggtaactc 660

ccaggagagt gtcacagagc aggacagcaa ggacagcacc tacagcctca gcagcaccct 720

gacgctgagc aaagcagact acgagaaaca caaactctac gcctgcgaag tcacccatca 780

gggcctgagc tcgcccgtca caaagagctt caacagggga gagtgcctcg agcgagcaaa 840

acgagcacca gtaaaacaaa cactaaactt cgacctacta aaactagcag gagacgtaga 900

atcaaaccca ggaccagcca caaccatgga gacagacaca ctcctgctat gggtactgct 960

gctctgggtt ccaggttcca ctggtgacga gcccaaatct tgtgacaaaa ctcacacatg 1020

cccaccgtgc ccaggcggcc gcggcggcgg cggcagcggt cccctgggtg tgagaagatc 1080

tgaggtgcag ctggtggaga gcggcggcgg cctggtgcag cccggcagaa gcctgagact 1140

gagctgcgcc gccagcggct tcaccttcga cgactacgcc atgcactggg tgagacaggc 1200

ccccggcaag ggcctggagt gggtgagcgc catcacctgg aacagcggcc acatcgacta 1260

cgccgacagc gtggagggca gattcaccat cagcagagac aacgccaaga acagcctgta 1320

cctgcagatg aacagcctga gagccgagga caccgccgtg tactactgcg ccaaggtgag 1380

ctacctgagc accgccagca gcctggacta ctggggccag ggcaccctgg tgaccgtgag 1440

cagcgcctcc accaagggac catcggtctt ccccctggca ccctcctcca agagcacctc 1500

tgggggcaca gcggccctgg gctgcctggt caaggactac ttccccgaac cggtgacggt 1560

gtcgtggaac tcaggcgccc tgaccagcgg cgtgcacacc ttcccggctg tcctacagtc 1620

ctcaggactc tactccctca gcagcgtggt gaccgtgccc tccagcagct tgggcaccca 1680

gacctacatc tgcaacgtga atcacaagcc cagcaacacc aaggtcgaca agaaagttga 1740

gcccaaatct tgtgacaaaa ctcacacatg cccaccgtgc ccagcacctg aactcctggg 1800

gggaccgtca gtcttcctct tccccccaaa acccaaggac accctcatga tctcccggac 1860

ccctgaggtc acatgcgtgg tggtggacgt gagccacgaa gaccctgagg tcaagttcaa 1920

ctggtacgtg gacggcgtgg aggtgcataa tgccaagaca aagccgcggg aggagcagta 1980

caacagcacg taccgggtgg tcagcgtcct caccgtcctg caccaggact ggctgaatgg 2040

caaggagtac aagtgcaagg tctccaacaa agccctccca gccccatcg agaaaaccat 2100

ctccaaagcc aaagggcagc cccgagaacc acaggtgtac accctgcccc catcccggga 2160

tgagctgacc aagaaccagg tcagcctgac ctgcctggtc aaaggcttct atcccagcga 2220

catcgccgtg gagtgggaga gcaatgggca gccggagaac aactacaaga ccacgcctcc 2280

cgtgctggac tccgacggct ccttcttcct ctacagcaag ctcaccgtgg acaagagcag 2340

gtggcagcag gggaacgtct tctcatgctc cgtgatgcat gaggctctgc acaaccacta 2400

cacgcagaag agcctctccc tgtctccggg taaataaatc gatggcgcgc c 2451

<210> 30
<211> 2433
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG2 Hinge Humira

<400> 30
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcg caaatgttgt gtcgagtgcc caccgtgccc 120

agttaacggc ggcggcggca gcggtcccct gggtgtgaga gcggcccagc cggccgacat 180

ccagatgacc cagagcccca gcagcctgag cgccagcgtg ggcgacagag tgaccatcac 240

ctgcagagcc agccagggca tcagaaacta cctggcctgg taccagcaga agcccggcaa 300

ggcccccaag ctgctgatct acgccgccag caccctgcag agcggcgtgc ccagcagatt 360

cagcggcagc ggcagcggca ccgacttcac cctgaccatc agcagcctgc agcccgagga 420
cgtggccacc tactactgcc agagatacaa cagagccccc tacaccttcg gccagggcac 480
caaggtggag atcaagagaa ctgtggctgc accatctgtc ttcatcttcc cgccatctga 540
tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg ctgaataact tctatcccag 600
agaggccaaa gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag 660
tgtcacagag caggacagca aggacagcac ctacagcctc agcagcaccc tgacgctgag 720
caaagcagac tacgagaaac acaaactcta cgcctgcgaa gtcacccatc agggcctgag 780
ctcgcccgtc acaaagagct tcaacagggg agagtgcctc gagcgagcaa aacgagcacc 840
agtaaaacaa acactaaact tcgacctact aaaactagca ggagacgtag aatcaaaccc 900
aggaccagcc acaaccatgg agacagacac actcctgcta tgggtactgc tgctctgggt 960
tccaggttcc actggtgacg agcgcaaatg ttgtgtcgag tgcccaccgt gcccaggcgg 1020
ccgcggcggc ggcggcagcg gtcccctggg tgtgagaaga tctgaggtgc agctggtgga 1080
gagcggcggc ggcctggtgc agcccggcag aagcctgaga ctgagctgcg ccgccagcgg 1140
cttcaccttc gacgactacg ccatgcactg ggtgagacag gcccccggca agggcctgga 1200
gtgggtgagc gccatcacct ggaacagcgg ccacatcgac tacgccgaca gcgtggaggg 1260
cagattcacc atcagcagag acaacgccaa gaacagcctg tacctgcaga tgaacagcct 1320
gagagccgag gacaccgccg tgtactactg cgccaaggtg agctacctga gcaccgccag 1380
cagcctggac tactggggcc agggcaccct ggtgaccgtg agcagcgcct ccaccaaggg 1440
accatcggtc ttcccctgg caccctcctc caagagcacc tctgggggca cagcggccct 1500
gggctgcctg gtcaaggact acttccccga accggtgacg gtgtcgtgga actcaggcgc 1560
cctgaccagc ggcgtgcaca ccttcccggc tgtcctacag tcctcaggac tctactccct 1620
cagcagcgtg gtgaccgtgc cctccagcag cttgggcacc cagacctaca tctgcaacgt 1680
gaatcacaag cccagcaaca ccaaggtcga caagaaagtt gagcccaaat cttgtgacaa 1740
aactcacaca tgcccaccgt gcccagcacc tgaactcctg gggggaccgt cagtcttcct 1800
cttccccca aaacccaagg acaccctcat gatctcccgg acccctgagg tcacatgcgt 1860
ggtggtggac gtgagccacg aagaccctga ggtcaagttc aactggtacg tggacggcgt 1920
ggaggtgcat aatgccaaga caaagccgcg ggaggagcag tacaacagca cgtaccgggt 1980
ggtcagcgtc ctcaccgtcc tgcaccagga ctggctgaat ggcaaggagt acaagtgcaa 2040
ggtctccaac aaagccctcc cagccccat cgagaaaacc atctccaaag ccaaagggca 2100
gccccgagaa ccacaggtgt acaccctgcc cccatcccgg gatgagctga ccaagaacca 2160
ggtcagcctg acctgcctgg tcaaaggctt ctatcccagc gacatcgccg tggagtggga 2220
gagcaatggg cagccggaga acaactacaa gaccacgcct cccgtgctgg actccgacgg 2280

ctccttcttc ctctacagca agctcaccgt ggacaagagc aggtggcagc aggggaacgt 2340

cttctcatgc tccgtgatgc atgaggctct gcacaaccac tacacgcaga agagcctctc 2400

cctgtctccg ggtaaataaa tcgatggcgc gcc 2433

<210> 31
<211> 2732
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG3 Hinge Humira

<400> 31
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagct caaaacccca cttggtgaca caactcacac 120

atgcccacgg tgcccagagc ccaaatcttg tgacacacct cccccgtgcc cacggtgccc 180

agagcccaaa tcttgtgaca cacctccccc atgcccacgg tgcccagagc ccaaatcttg 240

tgacacacct cccccgtgcc caaggtgccc agttaacggc ggcggcggca gcggtccgct 300

gggtgtgaga gcggcccagc cggccgacat ccagatgacc cagagcccca gcagcctgag 360

cgccagcgtg ggcgacagag tgaccatcac ctgcagagcc agccagggca tcagaaacta 420

cctggcctgg taccagcaga agcccggcaa ggcccccaag ctgctgatct acgccgccag 480

caccctgcag agcggcgtgc ccagcagatt cagcggcagc ggcagcggca ccgacttcac 540

cctgacctca gcagcctgca gcccgaggac gtggccacct actactgcca gagatacaac 600

agagcccccc acaccttcgg ccagggcacc aaggtggaga tcaagagaac tgtggctgca 660

ccatctgtct tcatcttccc gccatctgat gagcagttga aatctggaac tgcctctgtt 720

gtgtgcctgc tgaataactt ctatcccaga gaggccaaag tacagtggaa ggtggataac 780

gccctccaat cgggtaactc ccaggagagt gtcacagagc aggacagcaa ggacagcacc 840

tacagcctca gcagcaccct gacgctgagc aaagcagact acgagaaaca caaactctac 900

gcctgcgaag tcacccatca gggcctgagc tcgcccgtca caaagagctt caacagggga 960

gagtgcctcg agcgagcaaa acgagcacca gtaaaacaaa cactaaactt cgacctacta 1020

aaactagcag gagacgtaga atcaaaccca ggaccagcca caaccatgga gacagacaca 1080

ctcctgctat gggtactgct gctctgggtt ccaggttcca ctggtgacga gctcaaaacc 1140

ccacttggtg acacaactca cacatgccca cggtgcccag agcccaaatc ttgtgacaca 1200

cctcccccgt gcccacggtg cccagagccc aaatcttgtg acacacctcc cccatgccca 1260

cggtgcccag agcccaaatc ttgtgacaca cctcccccgt gcccaaggtg cccaggcggc 1320

cgcggcggcg gcggcagcgg tcccctgggt gtgagaagat ctgaggtgca gctggtggag 1380

agcggcggcg gcctggtgca gcccggcaga agcctgagac tgagctgcgc cgccagcggc 1440

ttcaccttcg acgactacgc catgcactgg gtgagacagg cccccggcaa gggcctggag 1500

tgggtgagcg ccatcacctg gaacagcggc cacatcgact acgccgacag cgtggagggc 1560

agattcacca tcagcagaga caacgccaag aacagcctgt acctgcagat gaacagcctg 1620

agagccgagg acaccgccgt gtactactgc gccaaggtga gctacctgag caccgccagc 1680

agcctggact actggggcca gggcaccctg gtgaccgtga gcagcgcctc caccaaggga 1740

ccatcggtct tcccccctggc accctcctcc aagagcacct ctgggggcac agcggccctg 1800

ggctgcctgg tcaaggacta cttccccgaa ccggtgacgg tgtcgtggaa ctcaggcgcc 1860

ctgaccagcg gcgtgcacac cttcccggct gtcctacagt cctcaggact ctactccctc 1920

agcagcgtgg tgaccgtgcc ctccagcagc ttgggcaccc agacctacat ctgcaacgtg 1980

aatcacaagc ccagcaacac caaggtcgac aagaaagttg agcccaaatc ttgtgacaaa 2040

actcacacat gcccaccgtg cccagcacct gaactcctgg ggggaccgtc agtcttcctc 2100

ttcccccaa aacccaagga caccctcatg atctcccgga cccctgaggt cacatgcgtg 2160

gtggtggacg tgagccacga agaccctgag gtcaagttca actggtacgt ggacggcgtg 2220

gaggtgcata atgccaagac aaagccgcgg gaggagcagt acaacagcac gtaccgggtg 2280

gtcagcgtcc tcaccgtcct gcaccaggac tggctgaatg gcaaggagta caagtgcaag 2340

gtctccaaca aagccctccc agcccccatc gagaaaacca tctccaaagc caaagggcag 2400

ccccgagaac cacaggtgta caccctgccc ccatcccggg atgagctgac caagaaccag 2460

gtcagcctga cctgcctggt caaaggcttc tatcccagcg acatcgccgt ggagtgggag 2520

agcaatgggc agccggagaa caactacaag accacgcctc ccgtgctgga ctccgacggc 2580

tccttcttcc tctacagcaa gctcaccgtg gacaagagca ggtggcagca ggggaacgtc 2640

ttctcatgct ccgtgatgca tgaggctctg cacaaccact acacgcagaa gagcctctcc 2700

ctgtctccgg gtaaataaat cgatggcgcg cc 2732

<210> 32
<211> 2433
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG4 Hinge Humira

<400> 32
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagtc caaatatggt cccccatgcc catcatgccc 120

agttaacggc ggcggcggca gcggtcccct gggtgtgaga gcggcccagc cggccgacat 180

ccagatgacc cagagcccca gcagcctgag cgccagcgtg ggcgacagag tgaccatcac 240

ctgcagagcc agccagggca tcagaaacta cctggcctgg taccagcaga agcccggcaa 300

ggcccccaag ctgctgatct acgccgccag caccctgcag agcggcgtgc ccagcagatt 360

cagcggcagc ggcagcggca ccgacttcac cctgaccatc agcagcctgc agcccgagga 420
cgtggccacc tactactgcc agagatacaa cagagccccc tacaccttcg gccagggcac 480
caaggtggag atcaagagaa ctgtggctgc accatctgtc ttcatcttcc cgccatctga 540
tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg ctgaataact tctatcccag 600
agaggccaaa gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag 660
tgtcacagag caggacagca aggacagcac ctacagcctc agcagcaccc tgacgctgag 720
caaagcagac tacgagaaac acaaactcta cgcctgcgaa gtcacccatc agggcctgag 780
ctcgcccgtc acaaagagct tcaacagggg agagtgcctc gagcgagcaa aacgagcacc 840
agtaaaacaa acactaaact tcgacctact aaaactagca ggagacgtag aatcaaaccc 900
aggaccagcc acaaccatgg agacagacac actcctgcta tgggtactgc tgctctgggt 960
tccaggttcc actggtgacg agtccaaata tggtccccca tgcccatcat gcccaggcgg 1020
ccgcggcggc ggcggcagcg gtcccctggg tgtgagaaga tctgaggtgc agctggtgga 1080
gagcggcggc ggcctggtgc agcccggcag aagcctgaga ctgagctgcg ccgccagcgg 1140
cttcaccttc gacgactacg ccatgcactg ggtgagacag gcccccggca agggcctgga 1200
gtgggtgagc gccatcacct ggaacagcgg ccacatcgac tacgccgaca gcgtggaggg 1260
cagattcacc atcagcagag acaacgccaa gaacagcctg tacctgcaga tgaacagcct 1320
gagagccgag gacaccgccg tgtactactg cgccaaggtg agctacctga gcaccgccag 1380
cagcctggac tactggggcc agggcaccct ggtgaccgtg agcagcgcct ccaccaaggg 1440
accatcggtc ttcccctgg caccctcctc caagagcacc tctgggggca cagcggccct 1500
gggctgcctg gtcaaggact acttccccga accggtgacg gtgtcgtgga actcaggcgc 1560
cctgaccagc ggcgtgcaca ccttcccggc tgtcctacag tcctcaggac tctactccct 1620
cagcagcgtg gtgaccgtgc cctccagcag cttgggcacc cagacctaca tctgcaacgt 1680
gaatcacaag cccagcaaca ccaaggtcga caagaaagtt gagcccaaat cttgtgacaa 1740
aactcacaca tgcccaccgt gcccagcacc tgaactcctg gggggaccgt cagtcttcct 1800
cttcccccca aaacccaagg acaccctcat gatctcccgg acccctgagg tcacatgcgt 1860
ggtggtggac gtgagccacg aagaccctga ggtcaagttc aactggtacg tggacggcgt 1920
ggaggtgcat aatgccaaga caaagccgcg ggaggagcag tacaacagca cgtaccgggt 1980
ggtcagcgtc ctcaccgtcc tgcaccagga ctggctgaat ggcaaggagt acaagtgcaa 2040
ggtctccaac aaagccctcc cagccccat cgagaaaacc atctccaaag ccaaagggca 2100
gccccgagaa ccacaggtgt acaccctgcc cccatcccgg gatgagctga ccaagaacca 2160
ggtcagcctg acctgcctgg tcaaaggctt ctatcccagc gacatcgccg tggagtggga 2220
gagcaatggg cagccggaga acaactacaa gaccacgcct cccgtgctgg actccgacgg 2280
ctccttcttc ctctacagca agctcaccgt ggacaagagc aggtggcagc aggggaacgt 2340

cttctcatgc tccgtgatgc atgaggctct gcacaaccac tacacgcaga agagcctctc 2400

cctgtctccg ggtaaataaa tcgatggcgc gcc 2433

<210> 33
<211> 2475
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA1 Hinge Humira

<400> 33
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacccagt tccctcaact ccacctaccc catctccctc 120

aactccacct accccatctc cctcatgctg ccacgttaac ggcggcggcg gcagcggtcc 180

cctgggtgtg agagcggccc agccggccga catccagatg acccagagcc ccagcagcct 240

gagcgccagc gtgggcgaca gagtgaccat cacctgcaga gccagccagg gcatcagaaa 300

ctacctggcc tggtaccagc agaagcccgg caaggccccc aagctgctga tctacgccgc 360

cagcaccctg cagagcggcg tgcccagcag attcagcggc agcggcagcg gcaccgactt 420

caccctgacc atcagcagcc tgcagcccga ggacgtggcc acctactact gccagagata 480

caacagagcc ccctacacct tcggccaggg caccaaggtg gagatcaaga gaactgtggc 540

tgcaccatct gtcttcatct tcccgccatc tgatgagcag ttgaaatctg gaactgcctc 600

tgttgtgtgc ctgctgaata acttctatcc cagagaggcc aaagtacagt ggaaggtgga 660

taacgccctc caatcgggta actcccagga gagtgtcaca gagcaggaca gcaaggacag 720

cacctacagc ctcagcagca ccctgacgct gagcaaagca gactacgaga aacacaaact 780

ctacgcctgc gaagtcaccc atcagggcct gagctcgccc gtcacaaaga gcttcaacag 840

gggagagtgc ctcgagcgag caaaacgagc accagtaaaa caaacactaa acttcgacct 900

actaaaacta gcaggagacg tagaatcaaa cccaggacca gccacaacca tggagacaga 960

cacactcctg ctatgggtac tgctgctctg ggttccaggt tccactggtg acgagcccaa 1020

atcttgtgac aaaactcaca catgcccacc gtgcccaggc ggccgcggcg gcggcggcag 1080

cggtcccctg ggtgtgagaa gatctgaggt gcagctggtg gagagcggcg gcggcctggt 1140

gcagcccggc agaagcctga gactgagctg cgccgccagc ggcttcacct tcgacgacta 1200

cgccatgcac tgggtgagac aggcccccgg caagggcctg gagtgggtga gcgccatcac 1260

ctggaacagc ggccacatcg actacgccga cagcgtggag ggcagattca ccatcagcag 1320

agacaacgcc aagaacagcc tgtacctgca gatgaacagc ctgagagccg aggacaccgc 1380

cgtgtactac tgcgccaagg tgagctacct gagcaccgcc agcagcctgg actactgggg 1440

ccagggcacc ctggtgaccg tgagcagcgc ctccaccaag ggaccatcgg tcttccccct 1500

ggcaccctcc tccaagagca cctctggggg cacagcggcc ctgggctgcc tggtcaagga 1560

ctacttcccc gaaccggtga cggtgtcgtg gaactcaggc gccctgacca gcggcgtgca 1620

caccttcccg gctgtcctac agtcctcagg actctactcc ctcagcagcg tggtgaccgt 1680

gccctccagc agcttgggca cccagaccta catctgcaac gtgaatcaca agcccagcaa 1740

caccaaggtc gacaagaaag ttgagcccaa atcttgtgac aaaactcaca catgcccacc 1800

gtgcccagca cctgaactcc tgggggggacc gtcagtcttc ctcttccccc caaaacccaa 1860

ggacaccctc atgatctccc ggacccctga ggtcacatgc gtggtggtgg acgtgagcca 1920

cgaagaccct gaggtcaagt tcaactggta cgtggacggc gtggaggtgc ataatgccaa 1980

gacaaagccg cgggaggagc agtacaacag cacgtaccgg gtggtcagcg tcctcaccgt 2040

cctgcaccag gactggctga atggcaagga gtacaagtgc aaggtctcca acaaagccct 2100

cccagccccc atcgagaaaa ccatctccaa agccaaaggg cagccccgag aaccacaggt 2160

gtacaccctg cccccatccc gggatgagct gaccaagaac caggtcagcc tgacctgcct 2220

ggtcaaaggc ttctatccca gcgacatcgc cgtggagtgg gagagcaatg ggcagccgga 2280

gaacaactac aagaccacgc ctcccgtgct ggactccgac ggctccttct tcctctacag 2340

caagctcacc gtggacaaga gcaggtggca gcaggggaac gtcttctcat gctccgtgat 2400

gcatgaggct ctgcacaacc actacacgca gaagagcctc tccctgtctc cgggtaaata 2460

aatcgatggc gcgcc 2475

<210> 34
<211> 2420
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA2 Hinge Humira

<400> 34
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacccagt tcccccacct cccccatgct gccacgttaa 120

cggcggcggc ggcagcggtc ccctgggtgt gagagcggcc cagccggccg acatccagat 180

gacccagagc cccagcagcc tgagcgccag cgtgggcgac agagtgacca tcacctgcag 240

agccagccag ggcatcagaa actacctggc ctggtaccag cagaagcccg gcaaggcccc 300

caagctgctg atctacgccg ccagcaccct gcagagcggc gtgcccagca gattcagcgg 360

cagcggcagc ggcaccgact tcaccctgac catcagcagc ctgcagcccg aggacgtggc 420

cacctactac tgccagagat acaacagagc cccctacacc ttcggccagg gcaccaaggt 480

ggagatcaag agaactgtgg ctgcaccatc tgtcttcatc ttcccgccat ctgatgagca 540

gttgaaatct ggaactgcct ctgttgtgtg cctgctgaat aacttctatc ccagagaggc 600

caaagtacag tggaaggtgg ataacgccct ccaatcgggt aactcccagg agagtgtcac 660

agagcaggac agcaaggaca gcacctacag cctcagcagc accctgacgc tgagcaaagc 720
agactacgag aaacacaaac tctacgcctg cgaagtcacc catcagggcc tgagctcgcc 780
cgtcacaaag agcttcaaca ggggagagtg cctcgagcga gcaaaacgag caccagtaaa 840
acaaacacta aacttcgacc tactaaaact agcaggagac gtagaatcaa acccaggacc 900
agccacaacc atggagacag acacactcct gctatggtac tgctgctctg ggttccaggt 960
tccactggtg acccagttcc cccacctccc ccatgctgcc acggcggccg cggcggcggc 1020
ggcagcggtc ccctgggtgt gagaagatct gaggtgcagc tggtggagag cggcggcggc 1080
ctggtgcagc ccggcagaag cctgagactg agctgcgccg ccagcggctt caccttcgac 1140
gactacgcca tgcactgggt gagacaggcc cccggcaagg gcctggagtg ggtgagcgcc 1200
atcacctgga acagcggcca catcgactac gccgacagcg tggagggcag attcaccatc 1260
agcagagaca acgccaagaa cagcctgtac ctgcagatga acagcctgag agccgaggac 1320
accgccgtgt actactgcgc caaggtgagc tacctgagca ccgccagcag cctggactac 1380
tggggccagg gcaccctggt gaccgtgagc agcgcctcca ccaagggacc atcggtcttc 1440
cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg ctgcctggtc 1500
aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct gaccagcggc 1560
gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag cagcgtggtg 1620
accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa tcacaagccc 1680
agcaacacca aggtcgacaa gaaagttgag cccaaatctt gtgacaaaac tcacacatgc 1740
ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt cccccaaaa 1800
cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt ggtggacgtg 1860
agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga ggtgcataat 1920
gccaagacaa agccgcggga ggagcagtac aacagcacgt accgggtggt cagcgtcctc 1980
accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt ctccaacaaa 2040
gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc ccgagaacca 2100
caggtgtaca ccctgccccc atcccgggat gagctgacca agaaccaggt cagcctgacc 2160
tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag caatgggcag 2220
ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc cttcttcctc 2280
tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt ctcatgctcc 2340
gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct gtctccgggt 2400
aaataaatcg atggcgcgcc 2420

<210> 35
<211> 2465
<212> DNA

<213> Artificial Sequence

<220>
<223> IgG1 Hinge Panitumumab

<400> 35
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcc caaatcttgt gacaaaactc acacatgccc 120

accgtgccca gttaacggcg gcggcggcag cggtcccctg ggtgtgagag cggcccagcc 180

ggcgatattg tgatgaccca gagcccgctg agcctgccgg tgaccccagg cgaaccggcg 240

tcgattagct gccgcagctc gcagaacatc gtgcataata acggcattac ctatctggaa 300

tggtatctgc agaaaccggg ccaaagcccg cagctgttaa tttataaagt gagcgatcgc 360

tttagcggcg tgccggatcg cttttcgggc agcggtagtg gcaccgattt tacgctgaaa 420

attagccgcg tggaagcgga ggatgttggc gtgtattact gctttcaggg cagccatatc 480

ccgccaacct ttggccaagg caccaaagtg gaaattaaac gcgcgcggac tgtggctgca 540

ccatctgtct tcatcttccc gccatctgat gagcagttga aatctggaac tgcctctgtt 600

gtgtgcctgc tgaataactt ctatcccaga gaggccaaag tacagtggaa ggtggataac 660

gccctccaat cgggtaactc ccaggagagt gtcacagagc aggacagcaa ggacagcacc 720

tacagcctca gcagcaccct gacgctgagc aaagcagact acgagaaaca caaactctac 780

gcctgcgaag tcacccatca gggcctgagc tcgcccgtca caaagagctt caacagggga 840

gagtgcctcg agcgagcaaa acgagcacca gtaaaacaaa cactaaactt cgacctacta 900

aaactagcag gagacgtaga atcaaaccca ggaccagcca caaccatgga gacagacaca 960

ctcctgctat gggtactgct gctctgggtt ccaggttcca ctggtgacga gcccaaatct 1020

tgtgacaaaa ctcacacatg cccaccgtgc ccaggcggcc gcggcggcgg cggcagcggt 1080

cccctgggtg tgagaagatc tcaggtgcaa ctggttcaga gcggcgcgga agtgaaaaag 1140

ccgggcgcgt cggttaaagt gagctgcaaa gcctcaggct atacctttac gagctactgg 1200

atgcattggg tgcgccaggc cccgggtcag ggcctggaat ggatgggtaa catttatccg 1260

ggcagcggtg gcaccaacta tgcggaaaaa tttaagaacc gcgtgaccat gacgcgtgat 1320

accagcattt cgacggccta tatggaactg agccgcctgc gtagcgatga caccgccgtg 1380

tattactgcg cgcgcagtgg cggtccgtat tttttcgatt actggggcca gggtacgctg 1440

gttaccgtga gctcggcctc caccaaggga ccatcggtct tcccccctggc accctcctcc 1500

aagagcacct ctgggggcac agcggccctg ggctgcctgg tcaaggacta cttccccgaa 1560

ccggtgacgg tgtcgtggaa ctcaggcgcc ctgaccagcg gcgtgcacac cttcccggct 1620

gtcctacagt cctcaggact ctactccctc agcagcgtgg tgaccgtgcc ctccagcagc 1680

ttgggcaccc agacctacat ctgcaacgtg aatcacaagc ccagcaacac caaggtggac 1740

aagagagttg tcgacgagcc caaatcttgt gacaaaactc acacatgccc accgtgccca 1800

gcacctgaac tcctgggggg accgtcagtc ttcctcttcc ccccaaaacc caaggacacc 1860

ctcatgatct cccggacccc tgaggtcaca tgcgtggtgg tggacgtgag ccacgaagac 1920

cctgaggtca agttcaactg gtacgtggac ggcgtggagg tgcataatgc caagacaaag 1980

ccgcgggagg agcagtacaa cagcacgtac cgtgtggtca gcgtcctcac cgtcctgcac 2040

caggactggc tgaatggcaa ggagtacaag tgcaaggtct ccaacaaagc cctcccagcc 2100

cccatcgaga aaaccatctc caaagccaaa gggcagcccc gagaaccaca ggtgtacacc 2160

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa 2220

ggcttctatc ccagcgacat cgccgtggag tgggagagca atgggcagcc ggagaacaac 2280

tacaagacca cgcctcccgt gctggactcc gacggctcct tcttcctcta tagcaagctc 2340

accgtggaca agagcaggtg gcagcagggg aacgtcttct catgctccgt gatgcatgag 2400

gctctgcaca accactacac gcagaagagc ctctccctgt ccccgggtaa aatcgatggc 2460

gcgcc 2465

<210> 36
<211> 2439
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG1 Hinge Prolia

<400> 36
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcc caaatcttgt gacaaaactc acacatgccc 120

accgtgccca gttaacggcg gcggcggcag cggtcccctg ggtgtgagag cggcccagcc 180

ggccgaaatt gtgttgacgc agtctccagg caccctgtct ttgtctccag gggaaagagc 240

caccctctcc tgtagggcca gtcagagtgt tcgcggcagg tacttagcct ggtaccagca 300

gaaacctggc caggctccca ggctcctcat ctatggtgca tccagcaggg ccactggcat 360

cccagacagg ttcagtggca gtgggtctgg gacagacttc actctcacca tcagcagact 420

ggagcctgaa gattttgcag tgttttactg tcagcagtat ggtagttcac ctcggacgtt 480

cggccaaggg accaaggtgg aaatcaaacg aactgtggct gcaccatctg tcttcatctt 540

cccgccatct gatgagcagt tgaaatctgg aactgcctct gttgtgtgcc tgctgaataa 600

cttctatccc agagaggcca aagtacagtg gaaggtggat aacgccctcc aatcgggtaa 660

ctcccaggag agtgtcacag agcaggacag caaggacagc acctacagcc tcagcagcac 720

cctgacgctg agcaaagcag actacgagaa acacaaactc tacgcctgcg aagtcaccca 780

tcagggcctg agctcgcccg tcacaaagag cttcaacagg ggagagtgcc tcgagcgagc 840

aaaacgagca ccagtaaaac aaacactaaa cttcgaccta ctaaaactag caggagacgt 900

agaatcaaac ccaggaccag ccacaaccat ggagacagac acactcctgc tatgggtact 960

gctgctctgg gttccaggtt ccactggtga cgagcccaaa tcttgtgaca aaactcacac 1020

atgcccaccg tgcccaggcg gccgcggcgg cggcggcagc ggtcccctgg gtgtgagaag 1080

atctgaagtg aagctggagg agtctggagg aggcttggtg caacctggag gatccatgaa 1140

actctcctgt gttgcctctg gattcatttt cagtaaccac tggatgaact gggtccgcca 1200

gtctccagag aaggggcttg agtgggttgc tgaaattaga tcaaaatcta ttaattctgc 1260

aacacattat gcggagtctg tgaaagggag gttcaccatc tcaagagatg attccaaaag 1320

tgctgtctac ctgcaaatga ccgacttaag aactgaagac actggcgttt attactgttc 1380

caggaattac tacggtagta cctacgacta ctggggccaa ggcaccactc tcacagtctc 1440

ctcagcctcc accaagggcc catcggtctt ccccctggca ccctcctcca agagcacctc 1500

tgggggcaca gcggccctgg gctgcctggt caaggactac ttccccgaac cggtgacggt 1560

gtcgtggaac tcaggcgccc tgaccagcgg cgtgcacacc ttcccggctg tcctacagtc 1620

ctcaggactc tactccctca gcagcgtggt gaccgtgccc tccagcagct tgggcaccca 1680

gacctacatc tgcaacgtga atcacaagcc cagcaacacc aaggtcgaca agacagttga 1740

gcgcaaatgt tgtgtcgagt gcccaccgtg cccagcacca cctgtggcag gaccgtcagt 1800

cttcctcttc cccccaaaac ccaaggacac cctcatgatc tcccggaccc ctgaggtcac 1860

gtgcgtggtg gtggacgtga gccacgaaga ccccgaggtc cagttcaact ggtacgtgga 1920

cggcgtggag gtgcataatg ccaagacaaa gccacgggag gagcagttca acagcacgtt 1980

ccgtgtggtc agcgtcctca ccgtcgtgca ccaggactgg ctgaacggca aggagtacaa 2040

gtgcaaggtc tccaacaaag gcctcccagc ccccatcgag aaaaccatct ccaaaaccaa 2100

agggcagccc cgagaaccac aggtgtacac cctgccccca tcccgggagg agatgaccaa 2160

gaaccaggtc agcctgacct gcctggtcaa aggcttctac cccagcgaca tcgccgtgga 2220

gtgggagagc aatgggcagc cggagaacaa ctacaagacc acacctccca tgctggactc 2280

cgacggctcc ttcttcctct acagcaagct caccgtggac aagagcaggt ggcagcaggg 2340

gaacgtcttc tcatgctccg tgatgcatga ggctctgcac aaccactaca cacagaagag 2400

cctctccctg tctccgggta aataaatcga tggcgcgcc 2439

<210> 37
<211> 2421
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG2 Hinge Prolia

<400> 37
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcg caaatgttgt gtcgagtgcc caccgtgccc 120

agttaacggc ggcggcggca gcggtcccct gggtgtgaga gcggcccagc cggccgaaat 180
tgtgttgacg cagtctccag gcaccctgtc tttgtctcca ggggaaagag ccaccctctc 240
ctgtagggcc agtcagagtg ttcgcggcag gtacttagcc tggtaccagc agaaacctgg 300
ccaggctccc aggctcctca tctatggtgc atccagcagg gccactggca tcccagacag 360
gttcagtggc agtgggtctg ggacagactt cactctcacc atcagcagac tggagcctga 420
agattttgca gtgttttact gtcagcagta tggtagttca cctcggacgt tcggccaagg 480
gaccaaggtg gaaatcaaac gaactgtggc tgcaccatct gtcttcatct tcccgccatc 540
tgatgagcag ttgaaatctg gaactgcctc tgttgtgtgc ctgctgaata acttctatcc 600
cagagaggcc aaagtacagt ggaaggtgga taacgccctc caatcgggta actcccagga 660
gagtgtcaca gagcaggaca gcaaggacag cacctacagc ctcagcagca ccctgacgct 720
gagcaaagca gactacgaga aacacaaact ctacgcctgc gaagtcaccc atcagggcct 780
gagctcgccc gtcacaaaga gcttcaacag gggagagtgc ctcgagcgag caaaacgagc 840
accagtaaaa caaacactaa acttcgacct actaaaacta gcaggagacg tagaatcaaa 900
cccaggacca gccacaacca tggagacaga cacactcctg ctatgggtac tgctgctctg 960
ggttccaggt tccactggtg acgagcgcaa atgttgtgtc gagtgcccac cgtgcccagg 1020
cggccgcggc ggcggcggca gcggtcccct gggtgtgaga agatctgaag tgaagctgga 1080
ggagtctgga ggaggcttgg tgcaacctgg aggatccatg aaactctcct gtgttgcctc 1140
tggattcatt ttcagtaacc actggatgaa ctgggtccgc cagtctccag agaaggggct 1200
tgagtgggtt gctgaaatta gatcaaaatc tattaattct gcaacacatt atgcggagtc 1260
tgtgaaaggg aggttcacca tctcaagaga tgattccaaa agtgctgtct acctgcaaat 1320
gaccgactta agaactgaag acactggcgt ttattactgt tccaggaatt actacggtag 1380
tacctacgac tactggggcc aaggcaccac tctcacagtc tcctcagcct ccaccaaggg 1440
cccatcggtc ttcccctgg caccctcctc caagagcacc tctgggggca cagcggccct 1500
gggctgcctg gtcaaggact acttccccga accggtgacg gtgtcgtgga actcaggcgc 1560
cctgaccagc ggcgtgcaca ccttcccggc tgtcctacag tcctcaggac tctactccct 1620
cagcagcgtg gtgaccgtgc cctccagcag cttgggcacc cagacctaca tctgcaacgt 1680
gaatcacaag cccagcaaca ccaaggtcga caagacagtt gagcgcaaat gttgtgtcga 1740
gtgcccaccg tgcccagcac cacctgtggc aggaccgtca gtcttcctct tccccccaaa 1800
acccaaggac accctcatga tctcccggac ccctgaggtc acgtgcgtgg tggtggacgt 1860
gagccacgaa gaccccgagg tccagttcaa ctggtacgtg gacggcgtgg aggtgcataa 1920
tgccaagaca aagccacggg aggagcagtt caacagcacg ttccgtgtgg tcagcgtcct 1980
caccgtcgtg caccaggact ggctgaacgg caaggagtac aagtgcaagg tctccaacaa 2040

aggcctccca gcccccatcg agaaaaccat ctccaaaacc aaagggcagc cccgagaacc 2100

acaggtgtac accctgcccc catcccggga ggagatgacc aagaaccagg tcagcctgac 2160

ctgcctggtc aaaggcttct accccagcga catcgccgtg gagtgggaga gcaatgggca 2220

gccggagaac aactacaaga ccacacctcc catgctggac tccgacggct ccttcttcct 2280

ctacagcaag ctcaccgtgg acaagagcag gtggcagcag gggaacgtct tctcatgctc 2340

cgtgatgcat gaggctctgc acaaccacta cacacagaag agcctctccc tgtctccggg 2400

taaataaatc gatggcgcgc c 2421

<210> 38
<211> 2759
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG3 Hinge Prolia

<400> 38
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagct caaaacccca cttggtgaca caactcacac 120

atgcccacgg tgcccagagc ccaaatcttg tgacacacct cccccgtgcc cacggtgccc 180

agagcccaaa tcttgtgaca cacctccccc atgcccacgg tgcccagagc ccaaatcttg 240

tgacacacct cccccgtgcc caaggtgccc agttaacggc ggcggcggca gcggtccgct 300

gggtgtgaga gcggcccagc cggccgaaat tgtgttgacg cagtctccag gcaccctgtc 360

tttgtctcca ggggaaagag ccaccctctc ctgtagggcc agtcagagtg ttcgcggcag 420

gtacttagcc tggtaccagc agaaacctgg ccaggctccc aggctcctca tctatggtgc 480

atccagcagg gccactggca tcccagacag gttcagtggc agtgggtctg ggacagactt 540

cactctcacc atcagcagac tggagcctga agattttgca gtgttttact gtcagcagta 600

tggtagttca cctcggacgt tcggccaagg gaccaaggtg gaaatcaaac gaactgtggc 660

tgcaccatct gtcttcatct tcccgccatc tgatgagcag ttgaaatctg gaactgcctc 720

tgttgtgtgc ctgctgaata acttctatcc cagagaggcc aaagtacagt ggaaggtgga 780

taacgccctc caatcgggta actcccagga gagtgtcaca gagcaggaca gcaaggacag 840

cacctacagc ctcagcagca ccctgacgct gagcaaagca gactacgaga aacacaaact 900

ctacgcctgc gaagtcaccc atcagggcct gagctcgccc gtcacaaaga gcttcaacag 960

gggagagtgc ctcgagcgag caaaacgagc accagtaaaa caaacactaa acttcgacct 1020

actaaaacta gcaggagacg tagaatcaaa cccaggacca gccacaacca tggagacaga 1080

cacactcctg ctatgggtac tgctgctctg ggttccaggt tccactggtg acgagctcaa 1140

aaccccactt ggtgacacaa ctcacacatg cccacggtgc ccagagccca aatcttgtga 1200

cacacctccc ccgtgcccac ggtgcccaga gcccaaatct tgtgacacac ctcccccatg 1260

```
cccacggtgc ccagagccca aatcttgtga cacacctccc ccgtgcccaa ggtgcccagg    1320

cggccgcggc ggcggcggca gcggtcccct gggtgtgaga agatctgaag tgaagctgga    1380

ggagtctgga ggaggcttgg tgcaacctgg aggatccatg aaactctcct gtgttgcctc    1440

tggattcatt ttcagtaacc actggatgaa ctgggtccgc cagtctccag agaaggggct    1500

tgagtgggtt gctgaaatta gatcaaaatc tattaattct gcaacacatt atgcggagtc    1560

tgtgaaaggg aggttcacca tctcaagaga tgattccaaa agtgctgtct acctgcaaat    1620

gaccgactta agaactgaag acactggcgt ttattactgt tccaggaatt actacggtag    1680

tacctacgac tactggggcc aaggcaccac tctcacagtc tcctcagcct ccaccaaggg    1740

cccatcggtc ttcccctgg caccctcctc caagagcacc tctgggggca cagcggccct    1800

gggctgcctg gtcaaggact acttccccga accggtgacg gtgtcgtgga actcaggcgc    1860

cctgaccagc ggcgtgcaca ccttcccggc tgtcctacag tcctcaggac tctactccct    1920

cagcagcgtg gtgaccgtgc cctccagcag cttgggcacc cagacctaca tctgcaacgt    1980

gaatcacaag cccagcaaca ccaaggtcga caagacagtt gagcgcaaat gttgtgtcga    2040

gtgcccaccg tgcccagcac cacctgtggc aggaccgtca gtcttcctct tccccccaaa    2100

acccaaggac accctcatga tctcccggac ccctgaggtc acgtgcgtgg tggtggacgt    2160

gagccacgaa gaccccgagg tccagttcaa ctggtacgtg gacggcgtgg aggtgcataa    2220

tgccaagaca aagccacggg aggagcagtt caacagcacg ttccgtgtgg tcagcgtcct    2280

caccgtcgtg caccaggact ggctgaacgg caaggagtac aagtgcaagg tctccaacaa    2340

aggcctccca gcccccatcg agaaaaccat ctccaaaacc aaagggcagc cccgagaacc    2400

acaggtgtac accctgcccc catcccggga ggagatgacc aagaaccagg tcagcctgac    2460

ctgcctggtc aaaggcttct accccagcga catcgccgtg gagtgggaga gcaatgggca    2520

gccggagaac aactacaaga ccacacctcc catgctggac tccgacggct ccttcttcct    2580

ctacagcaag ctcaccgtgg acaagagcag gtggcagcag gggaacgtct tctcatgctc    2640

cgtgatgcat gaggctctgc acaaccacta cacacagaag agcctctccc tgtctccggg    2700

taaataaaca cgcagaagag cctctccctg tctccgggta aataaatcga tggcgcgcc     2759
```

<210> 39
<211> 2421
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG4 Hinge Prolia

<400> 39

```
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct      60

ctgggttcca ggttccactg gtgacgagtc caaatatggt cccccatgcc catcatgccc     120
```

agttaacggc ggcggcggca gcggtcccct gggtgtgaga gcggcccagc cggccgaaat 180
tgtgttgacg cagtctccag gcaccctgtc tttgtctcca ggggaaagag ccaccctctc 240
ctgtagggcc agtcagagtg ttcgcggcag gtacttagcc tggtaccagc agaaacctgg 300
ccaggctccc aggctcctca tctatggtgc atccagcagg gccactggca tcccagacag 360
gttcagtggc agtgggtctg ggacagactt cactctcacc atcagcagac tggagcctga 420
agattttgca gtgttttact gtcagcagta tggtagttca cctcggacgt tcggccaagg 480
gaccaaggtg gaaatcaaac gaactgtggc tgcaccatct gtcttcatct tcccgccatc 540
tgatgagcag ttgaaatctg gaactgcctc tgttgtgtgc ctgctgaata acttctatcc 600
cagagaggcc aaagtacagt ggaaggtgga taacgccctc caatcgggta actcccagga 660
gagtgtcaca gagcaggaca gcaaggacag cacctacagc ctcagcagca ccctgacgct 720
gagcaaagca gactacgaga aacacaaact ctacgcctgc gaagtcaccc atcagggcct 780
gagctcgccc gtcacaaaga gcttcaacag gggagagtgc ctcgagcgag caaaacgagc 840
accagtaaaa caaacactaa acttcgacct actaaaacta gcaggagacg tagaatcaaa 900
cccaggacca gccacaacca tggagacaga cacactcctg ctatgggtac tgctgctctg 960
ggttccaggt tccactggtg acgagtccaa atatggtccc ccatgcccat catgcccagg 1020
cggccgcggc ggcggcggca gcggtcccct gggtgtgaga agatctgaag tgaagctgga 1080
ggagtctgga ggaggcttgg tgcaacctgg aggatccatg aaactctcct gtgttgcctc 1140
tggattcatt ttcagtaacc actggatgaa ctgggtccgc cagtctccag agaaggggct 1200
tgagtgggtt gctgaaatta gatcaaaatc tattaattct gcaacacatt atgcggagtc 1260
tgtgaaaggg aggttcacca tctcaagaga tgattccaaa agtgctgtct acctgcaaat 1320
gaccgactta agaactgaag acactggcgt ttattactgt tccaggaatt actacggtag 1380
tacctacgac tactggggcc aaggcaccac tctcacagtc tcctcagcct ccaccaaggg 1440
cccatcggtc ttcccctgg caccctcctc caagagcacc tctgggggca cagcggccct 1500
gggctgcctg gtcaaggact acttccccga accggtgacg gtgtcgtgga actcaggcgc 1560
cctgaccagc ggcgtgcaca ccttcccggc tgtcctacag tcctcaggac tctactccct 1620
cagcagcgtg gtgaccgtgc cctccagcag cttgggcacc cagacctaca tctgcaacgt 1680
gaatcacaag cccagcaaca ccaaggtcga caagacagtt gagcgcaaat gttgtgtcga 1740
gtgcccaccg tgcccagcac cacctgtggc aggaccgtca gtcttcctct tccccccaaa 1800
acccaaggac accctcatga tctcccggac ccctgaggtc acgtgcgtgg tggtggacgt 1860
gagccacgaa gaccccgagg tccagttcaa ctggtacgtg gacggcgtgg aggtgcataa 1920
tgccaagaca aagccacggg aggagcagtt caacagcacg ttccgtgtgg tcagcgtcct 1980
caccgtcgtg caccaggact ggctgaacgg caaggagtac aagtgcaagg tctccaacaa 2040
aggcctccca gcccccatcg agaaaaccat ctccaaaacc aaagggcagc cccgagaacc 2100

acaggtgtac accctgcccc catcccggga ggagatgacc aagaaccagg tcagcctgac 2160

ctgcctggtc aaaggcttct accccagcga catcgccgtg gagtgggaga gcaatgggca 2220

gccggagaac aactacaaga ccacacctcc catgctggac tccgacggct ccttcttcct 2280

ctacagcaag ctcaccgtgg acaagagcag gtggcagcag gggaacgtct tctcatgctc 2340

cgtgatgcat gaggctctgc acaaccacta cacacagaag agcctctccc tgtctccggg 2400

taaataaatc gatggcgcgc c 2421

<210> 40
<211> 2463
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA1 Hinge Prolia

<400> 40
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacccagt tccctcaact ccacctaccc catctccctc 120

aactccacct accccatctc cctcatgctg ccacgttaac ggcggcggcg gcagcggtcc 180

cctgggtgtg agagcggccc agccggccga aattgtgttg acgcagtctc caggcaccct 240

gtctttgtct ccaggggaaa gagccaccct ctcctgtagg gccagtcaga gtgttcgcgg 300

caggtactta gcctggtacc agcagaaacc tggccaggct cccaggctcc tcatctatgg 360

tgcatccagc agggccactg gcatcccaga caggttcagt ggcagtgggt ctgggacaga 420

cttcactctc accatcagca gactggagcc tgaagatttt gcagtgtttt actgtcagca 480

gtatggtagt tcacctcgga cgttcggcca agggaccaag gtggaaatca aacgaactgt 540

ggctgcacca tctgtcttca tcttcccgcc atctgatgag cagttgaaat ctggaactgc 600

ctctgttgtg tgcctgctga ataacttcta tcccagagag gccaaagtac agtggaaggt 660

ggataacgcc ctccaatcgg gtaactccca ggagagtgtc acagagcagg acagcaagga 720

cagcacctac agcctcagca gcaccctgac gctgagcaaa gcagactacg agaaacacaa 780

actctacgcc tgcgaagtca cccatcaggg cctgagctcg cccgtcacaa agagcttcaa 840

caggggagag tgcctcgagc gagcaaaacg agcaccagta aaacaaacac taaacttcga 900

cctactaaaa ctagcaggag acgtagaatc aaacccagga ccagccacaa ccatggagac 960

agacacactc ctgctatggg tactgctgct ctgggttcca ggttccactg gtgacgagcc 1020

caaatcttgt gacaaaactc acacatgccc accgtgccca ggcggccgcg gcggcggcgg 1080

cagcggtccc ctgggtgtga gaagatctga agtgaagctg gaggagtctg gaggaggctt 1140

ggtgcaacct ggaggatcca tgaaactctc ctgtgttgcc tctggattca ttttcagtaa 1200

ccactggatg aactgggtcc gccagtctcc agagaagggg cttgagtggg ttgctgaaat 1260

tagatcaaaa tctattaatt ctgcaacaca ttatgcggag tctgtgaaag ggaggttcac 1320

catctcaaga gatgattcca aaagtgctgt ctacctgcaa atgaccgact taagaactga 1380

agacactggc gtttattact gttccaggaa ttactacggt agtacctacg actactgggg 1440

ccaaggcacc actctcacag tctcctcagc ctccaccaag ggcccatcgg tcttccccct 1500

ggcaccctcc tccaagagca cctctggggg cacagcggcc ctgggctgcc tggtcaagga 1560

ctacttcccc gaaccggtga cggtgtcgtg gaactcaggc gccctgacca gcggcgtgca 1620

caccttcccg gctgtcctac agtcctcagg actctactcc ctcagcagcg tggtgaccgt 1680

gccctccagc agcttgggca cccagaccta catctgcaac gtgaatcaca agcccagcaa 1740

caccaaggtc gacaagacag ttgagcgcaa atgttgtgtc gagtgcccac cgtgcccagc 1800

accacctgtg gcaggaccgt cagtcttcct cttcccccca aaacccaagg acaccctcat 1860

gatctcccgg acccctgagg tcacgtgcgt ggtggtggac gtgagccacg aagaccccga 1920

ggtccagttc aactggtacg tggacggcgt ggaggtgcat aatgccaaga caaagccacg 1980

ggaggagcag ttcaacagca cgttccgtgt ggtcagcgtc ctcaccgtcg tgcaccagga 2040

ctggctgaac ggcaaggagt acaagtgcaa ggtctccaac aaaggcctcc cagccccat 2100

cgagaaaacc atctccaaaa ccaaagggca gccccgagaa ccacaggtgt acaccctgcc 2160

cccatcccgg gaggagatga ccaagaacca ggtcagcctg acctgcctgg tcaaaggctt 2220

ctaccccagc gacatcgccg tggagtggga gagcaatggg cagccggaga acaactacaa 2280

gaccacacct cccatgctgg actccgacgg ctccttcttc ctctacagca agctcaccgt 2340

ggacaagagc aggtggcagc aggggaacgt cttctcatgc tccgtgatgc atgaggctct 2400

gcacaaccac tacacacaga agagcctctc cctgtctccg ggtaaataaa tcgatggcgc 2460

gcc 2463

<210> 41
<211> 2409
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA2 Hinge Prolia

<400> 41
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacccagt tcccccacct cccccatgct gccacgttaa 120

cggcggcggc ggcagcggtc ccctgggtgt gagagcggcc cagccggccg aaattgtgtt 180

gacgcagtct ccaggcaccc tgtctttgtc tccaggggaa agagccaccc tctcctgtag 240

ggccagtcag agtgttcgcg gcaggtactt agcctggtac cagcagaaac ctggccaggc 300

tcccaggctc ctcatctatg gtgcatccag cagggccact ggcatcccag acaggttcag 360

tggcagtggg tctgggacag acttcactct caccatcagc agactggagc ctgaagattt 420

```
tgcagtgttt tactgtcagc agtatggtag ttcacctcgg acgttcggcc aagggaccaa     480
ggtggaaatc aaacgaactg tggctgcacc atctgtcttc atcttcccgc catctgatga     540
gcagttgaaa tctggaactg cctctgttgt gtgcctgctg aataacttct atcccagaga     600
ggccaaagta cagtggaagg tggataacgc cctccaatcg ggtaactccc aggagagtgt     660
cacagagcag gacagcaagg acagcaccta cagcctcagc agcaccctga cgctgagcaa     720
agcagactac gagaaacaca aactctacgc ctgcgaagtc acccatcagg gcctgagctc     780
gcccgtcaca aagagcttca acaggggaga gtgcctcgag cgagcaaaac gagcaccagt     840
aaaacaaaca ctaaacttcg acctactaaa actagcagga gacgtagaat caaacccagg     900
accagccaca accatggaga cagacacact cctgctatgg gtactgctgc tctgggttcc     960
aggttccact ggtgacccag ttcccccacc tcccccatgc tgccacggcg gccgcggcgg    1020
cggcggcagc ggtcccctgg gtgtgagaag atctgaagtg aagctggagg agtctggagg    1080
aggcttggtg caacctggag gatccatgaa actctcctgt gttgcctctg gattcatttt    1140
cagtaaccac tggatgaact gggtccgcca gtctccagag aaggggcttg agtgggttgc    1200
tgaaattaga tcaaaatcta ttaattctgc aacacattat gcggagtctg tgaaagggag    1260
gttcaccatc tcaagagatg attccaaaag tgctgtctac ctgcaaatga ccgacttaag    1320
aactgaagac actggcgttt attactgttc caggaattac tacggtagta cctacgacta    1380
ctggggccaa ggcaccactc tcacagtctc ctcagcctcc accaagggcc catcggtctt    1440
ccccctggca ccctcctcca agagcacctc tgggggcaca gcggccctgg gctgcctggt    1500
caaggactac ttccccgaac cggtgacggt gtcgtggaac tcaggcgccc tgaccagcgg    1560
cgtgcacacc ttcccggctg tcctacagtc ctcaggactc tactccctca gcagcgtggt    1620
gaccgtgccc tccagcagct tgggcaccca gacctacatc tgcaacgtga atcacaagcc    1680
cagcaacacc aaggtcgaca agacagttga gcgcaaatgt tgtgtcgagt gcccaccgtg    1740
cccagcacca cctgtggcag gaccgtcagt cttcctcttc cccccaaaac ccaaggacac    1800
cctcatgatc tcccggaccc ctgaggtcac gtgcgtggtg gtggacgtga gccacgaaga    1860
ccccgaggtc cagttcaact ggtacgtgga cggcgtggag gtgcataatg ccaagacaaa    1920
gccacgggag gagcagttca acagcacgtt ccgtgtggtc agcgtcctca ccgtcgtgca    1980
ccaggactgg ctgaacggca aggagtacaa gtgcaaggtc tccaacaaag gcctcccagc    2040
ccccatcgag aaaaccatct ccaaaaccaa agggcagccc cgagaaccac aggtgtacac    2100
cctgccccca tcccgggagg agatgaccaa gaaccaggtc agcctgacct gcctggtcaa    2160
aggcttctac cccagcgaca tcgccgtgga gtgggagagc aatgggcagc cggagaacaa    2220
ctacaagacc acacctccca tgctggactc cgacggctcc ttcttcctct acagcaagct    2280
caccgtggac aagagcaggt ggcagcaggg gaacgtcttc tcatgctccg tgatgcatga    2340
```

ggctctgcac aaccactaca cacagaagag cctctccctg tctccgggta aataaatcga 2400

tggcgcgcc 2409

<210> 42
<211> 2419
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG1 Hinge Raptiva

<400> 42
aagcttgtta tccaccatgg agacagacac actcctgcta tgggtactgc tgctctgggt 60

tccaggttcc actggtgacg agcccaaatc ttgtgacaaa actcacacat gcccaccgtg 120

cccagttaac ggcggcggcg gcagcccctt cagagcggcc cagccggccg acatccagat 180

gacccagagc cccagcagcc tgagcgccag cgtgggcgac agagtgacca tcacctgcag 240

agccagcaag accatcagca agtacctggc ctggtaccag cagaagcccg gcaaggcccc 300

caagctgctg atctacagcg gcagcaccct gcagagcggc gtgcccagca gattcagcgg 360

cagcggcagc ggcaccgact tcaccctgac catcagcagc ctgcagcccg aggacttcgc 420

cacctactac tgccagcagc acaacgagta ccccctgacc ttcggccagg gcaccaaggt 480

ggagatcaag agaactgtgg ctgcaccatc tgtcttcatc ttcccgccat ctgatgagca 540

gttgaaatct ggaactgcct ctgttgtgtg cctgctgaat aacttctatc ccagagaggc 600

caaagtacag tggaaggtgg ataacgccct ccaatcgggt aactcccagg agagtgtcac 660

agagcaggac agcaaggaca gcacctacag cctcagcagc accctgacgc tgagcaaagc 720

agactacgag aaacacaaac tctacgcctg cgaagtcacc catcagggcc tgagctcgcc 780

cgtcacaaag agcttcaaca ggggagagtg cctcgagcga gcaaaacgag caccagtaaa 840

acaaacacta aacttcgacc tactaaaact agcaggagac gtagaatcaa acccaggacc 900

agccacaacc atggagacag acacactcct gctatgggta ctgctgctct gggttccagg 960

ttccactggt gacgagccca aatcttgtga caaaactcac acatgcccac cgtgcccagg 1020

cggccgcggc ggcggcggca gcccccttcag aagatctgag gtgcagctgg tggagagcgg 1080

cggcggcctg gtgcagcccg gcggcagcct gagactgagc tgcgccgcca gcggctacag 1140

cttcaccggc cactggatga actgggtgag acaggccccc ggcaagggcc tggagtgggt 1200

gggcatgatc caccccagcg acagcgagac cagatacaac cagaagttca aggacagatt 1260

caccatcagc gtggacaaga gcaagaacac cctgtacctg cagatgaaca gcctgagagc 1320

cgaggacacc gccgtgtact actgcgccag aggcatctac ttctacggca ccacctactt 1380

cgactactgg ggccagggca ccctggtgac cgtctcctca gcctccacca agggaccatc 1440

ggtcttcccc ctggcaccct cctccaagag cacctctggg ggcacagcgg ccctgggctg 1500

cctggtcaag gactacttcc ccgaaccggt gacggtgtcg tggaactcag gcgccctgac 1560

cagcggcgtg cacaccttcc cggctgtcct acagtcctca ggactctact ccctcagcag 1620

cgtggtgacc gtgccctcca gcagcttggg cacccagacc tacatctgca acgtgaatca 1680

caagcccagc aacaccaagg tcgacaagaa agttgagccc aaatcttgtg acaaaactca 1740

cacatgccca ccgtgcccag cacctgaact cctgggggga ccgtcagtct tcctcttccc 1800

cccaaaaccc aaggacaccc tcatgatctc ccggacccct gaggtcacat gcgtggtggt 1860

ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg tacgtggacg gcgtggaggt 1920

gcataatgcc aagacaaagc cgcgggagga gcagtacaac agcacgtacc gggtggtcag 1980

cgtcctcacc gtcctgcacc aggactggct gaatggcaag gagtacaagt gcaaggtctc 2040

caacaaagcc ctcccagccc ccatcgagaa aaccatctcc aaagccaaag ggcagccccg 2100

agaaccacag gtgtacaccc tgcccccatc ccgggatgag ctgaccaaga accaggtcag 2160

cctgacctgc ctggtcaaag gcttctatcc cagcgacatc gccgtggagt gggagagcaa 2220

tgggcagccg gagaacaact acaagaccac gcctcccgtg ctggactccg acggctcctt 2280

cttcctctac agcaagctca ccgtggacaa gagcaggtgg cagcagggga acgtcttctc 2340

atgctccgtg atgcatgagg ctctgcacaa ccactacacg cagaagagcc tctccctgtc 2400

tccgggtaaa taaatcgat 2419

<210> 43
<211> 2448
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG1 Hinge Remicade

<400> 43
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcc caaatcttgt gacaaaactc acacatgccc 120

accgtgccca gttaacggcg gcggcggcag cggtcccctg ggtgtgagag cggcccagcc 180

ggccgacatc ttgctgactc agtctccagc catcctgtct gtgagtccag gagaaagagt 240

cagtttctcc tgcagggcca gtcagttcgt tggctcaagc atccactggt atcagcaaag 300

aacaaatggt tctccaaggc ttctcataaa gtatgcttct gagtctatgt ctgggatccc 360

ttccaggttt agtggcagtg gatcagggac agattttact cttagcatca acactgtgga 420

gtctgaagat attgcagatt attactgtca acaaagtcat agctggccat tcacgttcgg 480

ctcggggaca aatttggaag taaaacggac tgtggctgca ccatctgtct tcatcttccc 540

gccatctgat gagcagttga aatctggaac tgcctctgtt gtgtgcctgc tgaataactt 600

ctatcccaga gaggccaaag tacagtggaa ggtggataac gccctccaat cgggtaactc 660

ccaggagagt gtcacagagc aggacagcaa ggacagcacc tacagcctca gcagcaccct 720

gacgctgagc aaagcagact acgagaaaca caaactctac gcctgcgaag tcacccatca 780

gggcctgagc tcgcccgtca caaagagctt caacagggga gagtgcctcg agcgagcaaa 840

acgagcacca gtaaaacaaa cactaaactt cgacctacta aaactagcag gagacgtaga 900

atcaaaccca ggaccagcca caaccatgga gacagacaca ctcctgctat gggtactgct 960

gctctgggtt ccaggttcca ctggtgacga gcccaaatct tgtgacaaaa ctcacacatg 1020

cccaccgtgc ccaggcggcc gcggcggcgg cggcagcggt cccctgggtg tgagaagatc 1080

tgaagtgaag ctggaggagt ctggaggagg cttggtgcaa cctggaggat ccatgaaact 1140

ctcctgtgtt gcctctggat tcattttcag taaccactgg atgaactggg tccgccagtc 1200

tccagagaag gggcttgagt gggttgctga aattagatca aaatctatta attctgcaac 1260

acattatgcg gagtctgtga aagggaggtt caccatctca agagatgatt ccaaaagtgc 1320

tgtctacctg caaatgaccg acttaagaac tgaagacact ggcgtttatt actgttccag 1380

gaattactac ggtagtacct acgactactg gggccaaggc accactctca cagtctcctc 1440

agcctccacc aagggcccat cggtcttccc cctggcaccc tcctccaaga gcacctctgg 1500

gggcacagcg gccctgggct gcctggtcaa ggactacttc cccgaaccgg tgacggtgtc 1560

gtggaactca ggcgccctga ccagcggcgt gcacaccttc ccggctgtcc tacagtcctc 1620

aggactctac tccctcagca gcgtggtgac cgtgccctcc agcagcttgg gcacccagac 1680

ctacatctgc aacgtgaatc acaagcccag caacaccaag gtcgacaaga aagttgagcc 1740

caaatcttgt gacaaaactc acacatgccc accgtgccca gcacctgaac tcctgggggg 1800

accgtcagtc ttcctcttcc ccccaaaacc caaggacacc ctcatgatct cccggacccc 1860

tgaggtcaca tgcgtggtgg tggacgtgag ccacgaagac cctgaggtca agttcaactg 1920

gtacgtggac ggcgtggagg tgcataatgc caagacaaag ccgcgggagg agcagtacaa 1980

cagcacgtac cgggtggtca gcgtcctcac cgtcctgcac caggactggc tgaatggcaa 2040

ggagtacaag tgcaaggtct ccaacaaagc cctcccagcc cccatcgaga aaaccatctc 2100

caaagccaaa gggcagcccc gagaaccaca ggtgtacacc ctgcccccat cccgggatga 2160

gctgaccaag aaccaggtca gcctgacctg cctggtcaaa ggcttctatc ccagcgacat 2220

cgccgtggag tgggagagca atgggcagcc ggagaacaac tacaagacca cgcctcccgt 2280

gctggactcc gacggctcct tcttcctcta cagcaagctc accgtggaca agagcaggtg 2340

gcagcagggg aacgtcttct catgctccgt gatgcatgag gctctgcaca accactacac 2400

gcagaagagc ctctccctgt ctccgggtaa ataaatcgat ggcgcgcc 2448

<210> 44
<211> 2430
<212> DNA
<213> Artificial Sequence

<220>

<223> IgG2 Hinge Remicade

<400> 44

gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcg caaatgttgt gtcgagtgcc caccgtgccc 120

agttaacggc ggcggcggca gcggtcccct gggtgtgaga gcggcccagc cggccgacat 180

cttgctgact cagtctccag ccatcctgtc tgtgagtcca ggagaaagag tcagtttctc 240

ctgcagggcc agtcagttcg ttggctcaag catccactgg tatcagcaaa gaacaaatgg 300

ttctccaagg cttctcataa agtatgcttc tgagtctatg tctgggatcc cttccaggtt 360

tagtggcagt ggatcaggga cagattttac tcttagcatc aacactgtgg agtctgaaga 420

tattgcagat tattactgtc aacaaagtca tagctggcca ttcacgttcg gctcggggac 480

aaatttggaa gtaaaacgga ctgtggctgc accatctgtc ttcatcttcc cgccatctga 540

tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg ctgaataact tctatcccag 600

agaggccaaa gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag 660

tgtcacagag caggacagca aggacagcac ctacagcctc agcagcaccc tgacgctgag 720

caaagcagac tacgagaaac acaaactcta cgcctgcgaa gtcacccatc agggcctgag 780

ctcgcccgtc acaaagagct tcaacagggg agagtgcctc gagcgagcaa aacgagcacc 840

agtaaaacaa acactaaact tcgacctact aaaactagca ggagacgtag aatcaaaccc 900

aggaccagcc acaaccatgg agacagacac actcctgcta tgggtactgc tgctctgggt 960

tccaggttcc actggtgacg agcgcaaatg ttgtgtcgag tgcccaccgt gcccaggcgg 1020

ccgcggcggc ggcggcagcg gtcccctggg tgtgagaaga tctgaagtga agctggagga 1080

gtctggagga ggcttggtgc aacctggagg atccatgaaa ctctcctgtg ttgcctctgg 1140

attcattttc agtaaccact ggatgaactg ggtccgccag tctccagaga aggggcttga 1200

gtgggttgct gaaattagat caaaatctat taattctgca acacattatg cggagtctgt 1260

gaaagggagg ttcaccatct caagagatga ttccaaaagt gctgtctacc tgcaaatgac 1320

cgacttaaga actgaagaca ctggcgttta ttactgttcc aggaattact acggtagtac 1380

ctacgactac tggggccaag gcaccactct cacagtctcc tcagcctcca ccaagggccc 1440

atcggtcttc cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg 1500

ctgcctggtc aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct 1560

gaccagcggc gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag 1620

cagcgtggtg accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa 1680

tcacaagccc agcaacacca aggtcgacaa gaaagttgag cccaaatctt gtgacaaaac 1740

tcacacatgc ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt 1800

ccccccaaaa cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt 1860

ggtggacgtg agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga 1920

ggtgcataat gccaagacaa agccgcggga ggagcagtac aacagcacgt accgggtggt 1980

cagcgtcctc accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt 2040

ctccaacaaa gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc 2100

ccgagaacca caggtgtaca ccctgccccc atcccgggat gagctgacca agaaccaggt 2160

cagcctgacc tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag 2220

caatgggcag ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc 2280

cttcttcctc tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt 2340

ctcatgctcc gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct 2400

gtctccgggt aaataaatcg atggcgcgcc 2430

<210> 45
<211> 3048
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG3 Hinge Remicade

<400> 45
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagct caaaacccca cttggtgaca caactcacac 120

atgcccacgg tgcccagagc ccaaatcttg tgacacacct cccccgtgcc cacggtgccc 180

agagcccaaa tcttgtgaca cacctccccc atgcccacgg tgcccagagc ccaaatcttg 240

tgacacacct cccccgtgcc caaggtgccc agttaacggc ggcggcggca gcggtccgct 300

gggtgtgaga gcggcccagc cggccgacat cttgctgact cagtctccag ccatcctgtc 360

tgtgagtcca ggagaaagag tcagtttctc ctgcagggcc agtcagttcg ttggctcaag 420

catccactgg tatcagcaaa gaacaaatgg ttctccaagg cttctcataa agtatgcttc 480

tgagtctatg tctgggatcc cttccaggtt tagtggcagt ggatcaggga cagattttac 540

tcttagcatc aacactgtgg agtctgaaga tattgcagat tattactgtc aacaaagtca 600

tagctggcca ttcacgttcg gctcggggac aaatttggaa gtaaaacgga ctgtggctgc 660

accatctgtc ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt 720

tgtgtgcctg ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa 780

cgccctccaa tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac 840

ctacagcctc agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaactcta 900

cgcctgcgaa gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg 960

agagtgcctc gagcgagcaa aacgagcacc agtaaaacaa acactaaact tcgacctact 1020

aaaactagca ggagacgtag aatcaaaccc aggaccagcc acaaccatgg agacagacac 1080

actcctgcta tgggtactgc tgctctgggt tccaggttcc actggtgacg agctcaaaac 1140
cccacttggt gacacaactc acacatgccc acggtgccca gagcccaaat cttgtgacac 1200
acctcccccg tgcccacggt gcccagagcc caaatcttgt gacacacctc ccccatgccc 1260
acggtgccca gagcccaaat cttgtgacac acctcccccg tgcccaaggt gcccaggcgg 1320
ccgcggcggc ggcggcagcg gtcccctggg tgtgagaaga tctgaagtga agctggagga 1380
gtctggagga ggcttggtgc aacctggagg atccatgaaa ctctcctgtg ttgcctctgg 1440
attcattttc agtaaccact ggatgaactg ggtccgccag tctccagaga aggggcttga 1500
gtgggttgct gaaattagat caaaatctat taattctgca acacattatg cggagtctgt 1560
gaaagggagg ttcaccatct caagagatga ttccaaaagt gctgtctacc tgcaaatgac 1620
cgacttaaga actgaagaca ctggcgttta ttactgttcc aggaattact acggtagtac 1680
ctacgactac tggggccaag gcaccactct cacagtctcc tcagcctcca ccaagggccc 1740
atcggtcttc cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg 1800
ctgcctggtc aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct 1860
gaccagcggc gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag 1920
cagcgtggtg accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa 1980
tcacaagccc agcaacacca aggtcgacaa gaaagttgag cccaaatctt gtgacaaaac 2040
tcacacatgc ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt 2100
ccccccaaaa cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt 2160
ggtggacgtg agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga 2220
ggtgcataat gccaagacaa agccgcggga ggagcagtac aacagcacgt accgggtggt 2280
cagcgtcctc accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt 2340
ctccaacaaa gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc 2400
ccgagaacca caggtgtaca ccctgccccc atcccgggat gagctgacca agaaccaggt 2460
cagcctgacc tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag 2520
caatgggcag ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc 2580
cttcttcctc tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt 2640
ctcatgctcc gtgatgcatg aggctctgca caaccactcc cccatcgaga aaaccatctc 2700
caaagccaaa gggcagcccc gagaaccaca ggtgtacacc ctgcccccat cccgggatga 2760
gctgaccaag aaccaggtca gcctgacctg cctggtcaaa ggcttctatc ccagcgacat 2820
cgccgtggag tgggagagca atgggcagcc ggagaacaac tacaagacca cgcctcccgt 2880
gctggactcc gacggctcct tcttcctcta cagcaagctc accgtggaca agagcaggtg 2940
gcagcagggg aacgtcttct catgctccgt gatgcatgag gctctgcaca accactacac 3000

gcagaagagc ctctccctgt ctccgggtaa ataaatcgat ggcgcgcc 3048

<210> 46
<211> 2430
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG4 Hinge Remicade

<400> 46
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagtc caaatatggt cccccatgcc catcatgccc 120

agttaacggc ggcggcggca gcggtcccct gggtgtgaga gcggcccagc cggccgacat 180

cttgctgact cagtctccag ccatcctgtc tgtgagtcca ggagaaagag tcagtttctc 240

ctgcagggcc agtcagttcg ttggctcaag catccactgg tatcagcaaa gaacaaatgg 300

ttctccaagg cttctcataa agtatgcttc tgagtctatg tctgggatcc cttccaggtt 360

tagtggcagt ggatcaggga cagattttac tcttagcatc aacactgtgg agtctgaaga 420

tattgcagat tattactgtc aacaaagtca tagctggcca ttcacgttcg gctcggggac 480

aaatttggaa gtaaaacgga ctgtggctgc accatctgtc ttcatcttcc cgccatctga 540

tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg ctgaataact tctatcccag 600

agaggccaaa gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag 660

tgtcacagag caggacagca aggacagcac ctacagcctc agcagcaccc tgacgctgag 720

caaagcagac tacgagaaac acaaactcta cgcctgcgaa gtcacccatc agggcctgag 780

ctcgcccgtc acaaagagct tcaacagggg agagtgcctc gagcgagcaa aacgagcacc 840

agtaaaacaa acactaaact tcgacctact aaaactagca ggagacgtag aatcaaaccc 900

aggaccagcc acaaccatgg agacagacac actcctgcta tgggtactgc tgctctgggt 960

tccaggttcc actggtgacg agtccaaata tggtccccca tgcccatcat gcccaggcgg 1020

ccgcggcggc ggcggcagcg gtcccctggg tgtgagaaga tctgaagtga agctggagga 1080

gtctggagga ggcttggtgc aacctggagg atccatgaaa ctctcctgtg ttgcctctgg 1140

attcattttc agtaaccact ggatgaactg ggtccgccag tctccagaga aggggcttga 1200

gtgggttgct gaaattagat caaaatctat taattctgca acacattatg cggagtctgt 1260

gaaagggagg ttcaccatct caagagatga ttccaaaagt gctgtctacc tgcaaatgac 1320

cgacttaaga actgaagaca ctggcgttta ttactgttcc aggaattact acggtagtac 1380

ctacgactac tggggccaag gcaccactct cacagtctcc tcagcctcca ccaagggccc 1440

atcggtcttc cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg 1500

ctgcctggtc aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct 1560

gaccagcggc gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag 1620

cagcgtggtg accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa 1680

tcacaagccc agcaacacca aggtcgacaa gaaagttgag cccaaatctt gtgacaaaac 1740

tcacacatgc ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt 1800

ccccccaaaa cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt 1860

ggtggacgtg agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga 1920

ggtgcataat gccaagacaa agccgcggga ggagcagtac aacagcacgt accgggtggt 1980

cagcgtcctc accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt 2040

ctccaacaaa gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc 2100

ccgagaacca caggtgtaca ccctgccccc atcccgggat gagctgacca agaaccaggt 2160

cagcctgacc tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag 2220

caatgggcag ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc 2280

cttcttcctc tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt 2340

ctcatgctcc gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct 2400

gtctccgggt aaataaatcg atggcgcgcc 2430

<210> 47
<211> 2421
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA1 Hinge Remicade

<400> 47
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacccagt tccctcaact ccacctaccc catctccctc 120

aactccacct accccatctc cctcatgctg ccacgttaac ggcggcggcg gcagcggtcc 180

cctgggtgtg agagcggccc agccggccag agtcagtttc tcctgcaggg ccagtcagtt 240

cgttggctca agcatccact ggtatcagca aagaacaaat ggttctccaa ggcttctcat 300

aaagtatgct tctgagtcta tgtctgggat cccttccagg tttagtggca gtggatcagg 360

gacagatttt actcttagca tcaacactgt ggagtctgaa gatattgcag attattactg 420

tcaacaaagt catagctggc cattcacgtt cggctcgggg acaaatttgg aagtaaaacg 480

gactgtggct gcaccatctg tcttcatctt cccgccatct gatgagcagt tgaaatctgg 540

aactgcctct gttgtgtgcc tgctgaataa cttctatccc agagaggcca aagtacagtg 600

gaaggtggat aacgccctcc aatcgggtaa ctcccaggag agtgtcacag agcaggacag 660

caaggacagc acctacagcc tcagcagcac cctgacgctg agcaaagcag actacgagaa 720

acacaaactc tacgcctgcg aagtcaccca tcagggcctg agctcgcccg tcacaaagag 780

cttcaacagg ggagagtgcc tcgagcgagc aaaacgagca ccagtaaaac aaacactaaa 840

cttcgaccta ctaaaactag caggagacgt agaatcaaac ccaggaccag ccacaaccat 900

ggagacagac acactcctgc tatgggtact gctgctctgg gttccaggtt ccactggtga 960

cgagcccaaa tcttgtgaca aaactcacac atgcccaccg tgcccaggcg gccgcggcgg 1020

cggcggcagc ggtcccctgg gtgtgagaag atctgaagtg aagctggagg agtctggagg 1080

aggcttggtg caacctggag gatccatgaa actctcctgt gttgcctctg gattcatttt 1140

cagtaaccac tggatgaact gggtccgcca gtctccagag aaggggcttg agtgggttgc 1200

tgaaattaga tcaaaatcta ttaattctgc aacacattat gcggagtctg tgaaagggag 1260

gttcaccatc tcaagagatg attccaaaag tgctgtctac ctgcaaatga ccgacttaag 1320

aactgaagac actggcgttt attactgttc caggaattac tacggtagta cctacgacta 1380

ctggggccaa ggcaccactc tcacagtctc ctcagcctcc accaagggcc catcggtctt 1440

ccccctggca ccctcctcca agagcacctc tgggggcaca gcggccctgg gctgcctggt 1500

caaggactac ttccccgaac cggtgacggt gtcgtggaac tcaggcgccc tgaccagcgg 1560

cgtgcacacc ttcccggctg tcctacagtc ctcaggactc tactccctca gcagcgtggt 1620

gaccgtgccc tccagcagct tgggcaccca gacctacatc tgcaacgtga atcacaagcc 1680

cagcaacacc aaggtcgaca agaaagttga gcccaaatct tgtgacaaaa ctcacacatg 1740

cccaccgtgc ccagcacctg aactcctggg gggaccgtca gtcttcctct tccccccaaa 1800

acccaaggac accctcatga tctcccggac ccctgaggtc acatgcgtgg tggtggacgt 1860

gagccacgaa gaccctgagg tcaagttcaa ctggtacgtg gacggcgtgg aggtgcataa 1920

tgccaagaca aagccgcggg aggagcagta caacagcacg taccgggtgg tcagcgtcct 1980

caccgtcctg caccaggact ggctgaatgg caaggagtac aagtgcaagg tctccaacaa 2040

agccctccca gcccccatcg agaaaaccat ctccaaagcc aaagggcagc cccgagaacc 2100

acaggtgtac accctgcccc catcccggga tgagctgacc aagaaccagg tcagcctgac 2160

ctgcctggtc aaaggcttct atcccagcga catcgccgtg gagtgggaga gcaatgggca 2220

gccggagaac aactacaaga ccacgcctcc cgtgctggac tccgacggct ccttcttcct 2280

ctacagcaag ctcaccgtgg acaagagcag gtggcagcag gggaacgtct tctcatgctc 2340

cgtgatgcat gaggctctgc acaaccacta cacgcagaag agcctctccc tgtctccggg 2400

taaataaatc gatggcgcgc c 2421

<210> 48
<211> 2418
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA2 Hinge Remicade

<400> 48
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacccagt tcccccacct cccccatgct gccacgttaa 120

cggcggcggc ggcagcggtc ccctgggtgt gagagcggcc cagccggccg acatcttgct 180

gactcagtct ccagccatcc tgtctgtgag tccaggagaa agagtcagtt tctcctgcag 240

ggccagtcag ttcgttggct caagcatcca ctggtatcag caaagaacaa atggttctcc 300

aaggcttctc ataaagtatg cttctgagtc tatgtctggg atcccttcca ggtttagtgg 360

cagtggatca gggacagatt ttactcttag catcaacact gtggagtctg aagatattgc 420

agattattac tgtcaacaaa gtcatagctg gccattcacg ttcggctcgg ggacaaattt 480

ggaagtaaaa cggactgtgg ctgcaccatc tgtcttcatc ttcccgccat ctgatgagca 540

gttgaaatct ggaactgcct ctgttgtgtg cctgctgaat aacttctatc ccagagaggc 600

caaagtacag tggaaggtgg ataacgccct ccaatcgggt aactcccagg agagtgtcac 660

agagcaggac agcaaggaca gcacctacag cctcagcagc accctgacgc tgagcaaagc 720

agactacgag aaacacaaac tctacgcctg cgaagtcacc catcagggcc tgagctcgcc 780

cgtcacaaag agcttcaaca ggggagagtg cctcgagcga gcaaaacgag caccagtaaa 840

acaaacacta aacttcgacc tactaaaact agcaggagac gtagaatcaa acccaggacc 900

agccacaacc atggagacag acacactcct gctatgggta ctgctgctct gggttccagg 960

ttccactggt gacccagttc ccccacctcc cccatgctgc cacggcggcc gcggcggcgg 1020

cggcagcggt cccctgggtg tgagaagatc tgaagtgaag ctggaggagt ctggaggagg 1080

cttggtgcaa cctggaggat ccatgaaact ctcctgtgtt gcctctggat tcattttcag 1140

taaccactgg atgaactggg tccgccagtc tccagagaag gggcttgagt gggttgctga 1200

aattagatca aaatctatta attctgcaac acattatgcg gagtctgtga aagggaggtt 1260

caccatctca agagatgatt ccaaaagtgc tgtctacctg caaatgaccg acttaagaac 1320

tgaagacact ggcgtttatt actgttccag gaattactac ggtagtacct acgactactg 1380

gggccaaggc accactctca cagtctcctc agcctccacc aagggcccat cggtcttccc 1440

cctggcaccc tcctccaaga gcacctctgg gggcacagcg gccctgggct gcctggtcaa 1500

ggactacttc cccgaaccgg tgacggtgtc gtggaactca ggcgccctga ccagcggcgt 1560

gcacaccttc ccggctgtcc tacagtcctc aggactctac tccctcagca gcgtggtgac 1620

cgtgccctcc agcagcttgg gcacccagac ctacatctgc aacgtgaatc acaagcccag 1680

caacaccaag gtcgacaaga aagttgagcc caaatcttgt gacaaaactc acacatgccc 1740

accgtgccca gcacctgaac tcctgggggg accgtcagtc ttcctcttcc ccccaaaacc 1800

caaggacacc ctcatgatct cccggacccc tgaggtcaca tgcgtggtgg tggacgtgag 1860

ccacgaagac cctgaggtca agttcaactg gtacgtggac ggcgtggagg tgcataatgc 1920

caagacaaag ccgcgggagg agcagtacaa cagcacgtac cgggtggtca gcgtcctcac 1980

cgtcctgcac caggactggc tgaatggcaa ggagtacaag tgcaaggtct ccaacaaagc 2040

cctcccagcc cccatcgaga aaaccatctc caaagccaaa gggcagcccc gagaaccaca 2100

ggtgtacacc ctgcccccat cccgggatga gctgaccaag aaccaggtca gcctgacctg 2160

cctggtcaaa ggcttctatc ccagcgacat cgccgtggag tgggagagca atgggcagcc 2220

ggagaacaac tacaagacca cgcctcccgt gctggactcc gacggctcct tcttcctcta 2280

cagcaagctc accgtggaca agagcaggtg gcagcagggg aacgtcttct catgctccgt 2340

gatgcatgag gctctgcaca accactacac gcagaagagc ctctccctgt ctccgggtaa 2400

ataaatcgat ggcgcgcc 2418

<210> 49
<211> 2413
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG1 Hinge Stelara

<400> 49
aagcttgtta tccaccatgg agacagacac actcctgcta tgggtactgc tgctctgggt 60

tccaggttcc actggtgacg agcccaaatc ttgtgacaaa actcacacat gcccaccgtg 120

cccagttaac ggcggcggcg gcagcccctt cagagcggcc cagccggccg acatccagat 180

gacccagagc cccagcagcc tgagcgccag cgtgggcgac agagtgacca tcacctgcag 240

agccagccag ggcatcagca gctggctggc ctggtaccag cagaagcccg agaaggcccc 300

caagagcctg atctacgccg ccagcagcct gcagagcggc gtgcccagca gattcagcgg 360

cagcggcagc ggcaccgact tcaccctgac catcagcagc ctgcagcccg aggacttcgc 420

cacctactac tgccagcagt acaacatcta cccctacacc ttcggccagg gcaccaagct 480

ggagatcaag agaactgtgg ctgcaccatc tgtcttcatc ttcccgccat ctgatgagca 540

gttgaaatct ggaactgcct ctgttgtgtg cctgctgaat aacttctatc ccagagaggc 600

caaagtacag tggaaggtgg ataacgccct ccaatcgggt aactcccagg agagtgtcac 660

agagcaggac agcaaggaca gcacctacag cctcagcagc accctgacgc tgagcaaagc 720

agactacgag aaacacaaac tctacgcctg cgaagtcacc catcagggcc tgagctcgcc 780

cgtcacaaag agcttcaaca ggggagagtg cctcgagcga gcaaaacgag caccagtaaa 840

acaaacacta aacttcgacc tactaaaact agcaggagac gtagaatcaa acccaggacc 900

agccacaacc atggagacag acacactcct gctatgggta ctgctgctct gggttccagg 960

ttccactggt gacgagccca aatcttgtga caaaactcac acatgcccac cgtgcccagg 1020

cggccgcggc ggcggcggca gccccttcag aagatctgag gtgcagctgg tgcagagcgg 1080

cgccgaggtg aagaagcccg gcgagagcct gaagatcagc tgcaagggca gcggctacag 1140

cttcaccacc tactggctgg gctgggtgag acagatgccc ggcaagggcc tggactggat 1200

cggcatcatg agccccgtgg acagcgacat cagatacagc cccagcttcc agggccaggt 1260

gaccatgagc gtggacaaga gcatcaccac cgcctacctg cagtggaaca gcctgaaggc 1320

cagcgacacc gccatgtact actgcgccag aagaagaccc ggccagggct acttcgactt 1380

ctggggccag ggcaccctgg tgaccgtgag cagcgcctcc accaagggac catcggtctt 1440

ccccctggca ccctcctcca agagcacctc tgggggcaca gcggccctgg gctgcctggt 1500

caaggactac ttccccgaac cggtgacggt gtcgtggaac tcaggcgccc tgaccagcgg 1560

cgtgcacacc ttcccggctg tcctacagtc ctcaggactc tactccctca gcagcgtggt 1620

gaccgtgccc tccagcagct tgggcaccca gacctacatc tgcaacgtga atcacaagcc 1680

cagcaacacc aaggtcgaca agaaagttga gcccaaatct tgtgacaaaa ctcacacatg 1740

cccaccgtgc ccagcacctg aactcctggg gggaccgtca gtcttcctct tccccccaaa 1800

acccaaggac accctcatga tctcccggac ccctgaggtc acatgcgtgg tggtggacgt 1860

gagccacgaa gaccctgagg tcaagttcaa ctggtacgtg gacggcgtgg aggtgcataa 1920

tgccaagaca aagccgcggg aggagcagta caacagcacg taccgggtgg tcagcgtcct 1980

caccgtcctg caccaggact ggctgaatgg caaggagtac aagtgcaagg tctccaacaa 2040

agccctccca gcccccatcg agaaaaccat ctccaaagcc aaagggcagc cccgagaacc 2100

acaggtgtac accctgcccc catcccggga tgagctgacc aagaaccagg tcagcctgac 2160

ctgcctggtc aaaggcttct atcccagcga catcgccgtg gagtgggaga gcaatgggca 2220

gccggagaac aactacaaga ccacgcctcc cgtgctggac tccgacggct ccttcttcct 2280

ctacagcaag ctcaccgtgg acaagagcag gtggcagcag gggaacgtct tctcatgctc 2340

cgtgatgcat gaggctctgc acaaccacta cacgcagaag agcctctccc tgtctccggg 2400

taaataaatc gat 2413

<210> 50
<211> 2459
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG1 Hinge Trastuzumab

<400> 50
gctagcaagc ttgttatcca ccatggagac agacacactc ctgctatggg tactgctgct 60

ctgggttcca ggttccactg gtgacgagcc caaatcttgt gacaaaactc acacatgccc 120

accgtgccca gttaacggcg gcggcggcag cggtcccctg ggtgtgagag cggcccagcc 180

ggcgacatcc agatgaccca gagccccagc agcctgagcg ccagcgtggg cgacagagtg 240

accatcacct gcagagccag ccaggacgtg aacaccgccg tggcctggta ccagcagaag 300

cccggcaagg cccccaagct gctgatctac agcgccagct tcctgtacag cggcgtgccc 360
agcagattca gcggcagcag aagcggcacc gacttcaccc tgaccatcag cagcctgcag 420
cccgaggact tcgccaccta ctactgccag cagcactaca ccacccccc caccttcggc 480
cagggcacca aggtggagat caagagaacc gtggccgccc ccagcgtgtt catcttcccc 540
cccagcgacg agcagctgaa gagcggcacc gccagcgtgg tgtgcctgct gaacaacttc 600
taccccagag aggccaaggt gcagtggaag gtggacaacg ccctgcagag cggcaacagc 660
caggagagcg tgaccgagca ggacagcaag gacagcacct acagcctgag cagcaccctg 720
accctgagca aggccgacta cgagaagcac aaggtgtacg cctgcgaggt gacccaccag 780
ggcctgagca gccccgtgac caagagcttc aacagaggcg agtgcctcga gcgagcaaaa 840
cgagcaccag taaaacaaac actaaacttc gacctactaa aactagcagg agacgtagaa 900
tcaaacccag gaccagccac aaccatggag acagacacac tcctgctatg ggtactgctg 960
ctctgggttc caggttccac tggtgacgag cccaaatctt gtgacaaaac tcacacatgc 1020
ccaccgtgcc caggcggccg cggcggcggc ggcagcggtc ccctgggtgt gagaagatct 1080
gaggtgcagc tggtggagag cggcggcggc ctggtgcagc ccggcggcag cctgagactg 1140
agctgcgccg ccagcggctt caacatcaag gacacctaca tccactgggt gagacaggcc 1200
cccggcaagg gcctggagtg ggtggccaga atctacccca ccaacggcta caccagatac 1260
gccgacagcg tgaagggcag attcaccatc agcgccgaca ccagcaagaa caccgcctac 1320
ctgcagatga acagcctgag agccgaggac accgccgtgt actactgcag cagatggggc 1380
ggcgacggct tctacgccat ggactactgg ggccagggca ccctggtgac cgtgagcagc 1440
gccagcacca agggccccag cgtgttcccc ctggccccca gcagcaagag caccagcggc 1500
ggcaccgccg ccctgggctg cctggtgaag gactacttcc ccgagcccgt gaccgtgagc 1560
tggaacagcg gcgccctgac cagcggcgtg cacaccttcc ccgccgtgct gcagagcagc 1620
ggcctgtaca gcctgagcag cgtggtgacc gtgcccagca gcagcctggg cacccagacc 1680
tacatctgca acgtgaacca caagcccagc aacaccaagg tggacaagaa ggtggtcgac 1740
aagaaagttg agcccaaatc ttgtgacaaa actcacacat gcccaccgtg cccagcacct 1800
gaactcctgg ggggaccgtc agtcttcctc ttcccccaa aacccaagga caccctcatg 1860
atctcccgga cccctgaggt cacatgcgtg gtggtggacg tgagccacga agaccctgag 1920
gtcaagttca actggtacgt ggacggcgtg gaggtgcata atgccaagac aaagccgcgg 1980
gaggagcagt acaacagcac gtaccgggtg gtcagcgtcc tcaccgtcct gcaccaggac 2040
tggctgaatg gcaaggagta caagtgcaag gtctccaaca aagccctccc agcccccatc 2100
gagaaaacca tctccaaagc caaagggcag ccccgagaac cacaggtgta caccctgccc 2160
ccatcccggg atgagctgac caagaaccag gtcagcctga cctgcctggt caaaggcttc 2220
tatcccagcg acatcgccgt ggagtgggag agcaatgggc agccggagaa caactacaag 2280

accacgcctc ccgtgctgga ctccgacggc tccttcttcc tctacagcaa gctcaccgtg 2340

gacaagagca ggtggcagca ggggaacgtc ttctcatgct ccgtgatgca tgaggctctg 2400

cacaaccact acacgcagaa gagcctctcc ctgtctccgg gtaaaatcga tggcgcgcc 2459

<210> 51
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> MMP2 substrate

<400> 51
Pro Leu Gly Met Trp Ser Arg
1 5

<210> 52
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> MMP2 substrate

<400> 52
Pro Leu Gly Leu Trp Ala Arg
1 5

<210> 53
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> MMP2 substrate

<400> 53
Pro Gln Gly Ile Ala Gly Gln Arg
1 5

<210> 54
<211> 35
<212> PRT
<213> Artificial Sequence

<220>
<223> IgD1 Hinge

<400> 54
Ser Pro Lys Ala Gln Ala Ser Ser Val Pro Thr Ala Gln Pro Gln Ala
1 5 10 15
Glu Gly Ser Leu Ala Lys Ala Thr Thr Ala Pro Ala Thr Thr Arg Asn
20 25 30
Thr Glu Cys
35

<210> 55
<211> 25
<212> PRT
<213> Artificial Sequence

<220>
<223> IgD2 Hinge

<400> 55
Arg Gly Gly Glu Glu Lys Lys Lys Glu Lys Glu Lys Glu Glu Gln Glu
1   5   10   15
Glu Arg Glu Thr Lys Thr Pro Glu Cys
            20   25

<210> 56
<211> 105
<212> DNA
<213> Artificial Sequence

<220>
<223> IgD1 Hinge

<400> 56
tctccaaagg cacaggcctc ctccgtgccc actgcacaac cccaagcaga gggcagcctc 60

gccaaggcaa ccacagcccc agccaccacc cgtaacacag agtgt 105

<210> 57
<211> 75
<212> DNA
<213> Artificial Sequence

<220>
<223> IgD2 Hinge

<400> 57
agaggaggag aagagaagaa gaaggagaag gagaaagagg aacaagaaga gagagagaca 60

aagacaccag agtgt 75

<210> 58
<211> 450
<212> PRT
<213> Artificial Sequence

<220>
<223> infliximab heavy chain

<400> 58
Glu Val Lys Leu Glu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1   5   10   15
Ser Met Lys Leu Ser Cys Val Ala Ser Gly Phe Ile Phe Ser Asn His
            20   25   30
Trp Met Asn Trp Val Arg Gln Ser Pro Glu Lys Gly Leu Glu Trp Val
        35   40   45
Ala Glu Ile Arg Ser Lys Ser Ile Asn Ser Ala Thr His Tyr Ala Glu
    50   55   60
Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Ser Ala
65   70   75   80
Val Tyr Leu Gln Met Thr Asp Leu Arg Thr Glu Asp Thr Gly Val Tyr
                85   90   95
Tyr Cys Ser Arg Asn Tyr Tyr Gly Ser Thr Tyr Asp Tyr Trp Gly Gln
            100   105   110
Gly Thr Thr Leu Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
        115   120   125
Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala
    130   135   140
Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser

```
145                 150                 155                 160
Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val
                165                 170                 175
Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
            180                 185                 190
Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys
        195                 200                 205
Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp
    210                 215                 220
Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly
225                 230                 235                 240
Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile
                245                 250                 255
Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu
            260                 265                 270
Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His
        275                 280                 285
Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg
    290                 295                 300
Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys
305                 310                 315                 320
Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu
                325                 330                 335
Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr
            340                 345                 350
Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu
        355                 360                 365
Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp
    370                 375                 380
Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val
385                 390                 395                 400
Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp
                405                 410                 415
Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His
            420                 425                 430
Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
        435                 440                 445
Gly Lys
    450
```

<210> 59
<211> 385
<212> PRT
<213> Artificial Sequence

<220>
<223> Panitumumab heavy chain

<400> 59

```
Gln Val Gln Leu Leu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15
Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Ser Tyr
            20                  25                  30
Trp Ile Ala Trp Val Arg Gln Met Pro Gly Lys Gly Leu Glu Tyr Met
        35                  40                  45
Gly Leu Ile Tyr Pro Gly Asp Ser Asp Thr Lys Tyr Ser Pro Ser Phe
    50                  55                  60
Gln Gly Gln Val Thr Ile Ser Val Asp Lys Ser Val Ser Thr Ala Tyr
65                  70                  75                  80
Leu Gln Trp Ser Ser Leu Lys Pro Ser Asp Ser Ala Val Tyr Phe Cys
                85                  90                  95
Ala Arg His Asp Val Gly Tyr Cys Ser Ser Ser Asn Cys Ala Lys Trp
            100                 105                 110
Pro Glu Tyr Phe Gln His Trp Gly Gln Gly Thr Leu Val Thr Val Ser
        115                 120                 125
```

```
Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser
    130                 135                 140
Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp
145                 150                 155                 160
Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr
                165                 170                 175
Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr
            180                 185                 190
Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln
        195                 200                 205
Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp
    210                 215                 220
Lys Arg Val Val Asp Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys
225                 230                 235                 240
Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu
                245                 250                 255
Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu
            260                 265                 270
Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys
        275                 280                 285
Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys
    290                 295                 300
Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu
305                 310                 315                 320
Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys
                325                 330                 335
Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
            340                 345                 350
Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
        355                 360                 365
Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
    370                 375                 380
Gly
385

<210> 60
<211> 439
<212> PRT
<213> Artificial Sequence

<220>
<223> Trastuzumab heavy chain

<400> 60
Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly Ser
1               5                   10                  15
Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Asn Ile Lys Asp Thr Tyr
            20                  25                  30
Ile His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala
        35                  40                  45
Arg Ile Tyr Pro Thr Asn Gly Tyr Thr Arg Tyr Ala Asp Ser Val Lys
    50                  55                  60
Gly Arg Phe Thr Ile Ser Ala Asp Thr Ser Lys Asn Thr Ala Tyr Leu
65                  70                  75                  80
Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ser
                85                  90                  95
Arg Trp Gly Gly Asp Gly Phe Tyr Ala Met Asp Tyr Trp Gly Gln Gly
            100                 105                 110
Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
```

```
                165                 170                 175
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205
Ser Asn Thr Lys Val Asp Lys Lys Val Val Asp Lys Lys Val Glu Pro
    210                 215                 220
Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu
225                 230                 235                 240
Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp
                245                 250                 255
Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
            260                 265                 270
Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly
        275                 280                 285
Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn
    290                 295                 300
Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp
305                 310                 315                 320
Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro
                325                 330                 335
Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu
            340                 345                 350
Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn
        355                 360                 365
Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile
    370                 375                 380
Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr
385                 390                 395                 400
Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys
                405                 410                 415
Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys
            420                 425                 430
Ser Val Met His Glu Ala Leu
        435

<210> 61
<211> 451
<212> PRT
<213> Artificial Sequence

<220>
<223> adalimumab heavy chain

<400> 61
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1                   5                   10                  15
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asp Asp Tyr
            20                  25                  30
Ala Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Ser Ala Ile Thr Trp Asn Ser Gly His Ile Asp Tyr Ala Asp Ser Val
    50                  55                  60
Glu Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Lys Val Ser Tyr Leu Ser Thr Ala Ser Ser Leu Asp Tyr Trp Gly
            100                 105                 110
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160
```

```
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205
Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
    210                 215                 220
Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly
225                 230                 235                 240
Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
                245                 250                 255
Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
            260                 265                 270
Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val
        275                 280                 285
His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr
    290                 295                 300
Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
305                 310                 315                 320
Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile
                325                 330                 335
Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val
            340                 345                 350
Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser
        355                 360                 365
Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
    370                 375                 380
Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
385                 390                 395                 400
Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
                405                 410                 415
Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
            420                 425                 430
His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
        435                 440                 445
Pro Gly Lys
    450

<210> 62
<211> 448
<212> PRT
<213> Artificial Sequence

<220>
<223> denosumab heavy chain

<400> 62
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30
Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Ser Gly Ile Thr Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Lys Asp Pro Gly Thr Thr Val Ile Met Ser Trp Phe Asp Pro Trp
            100                 105                 110
Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro
        115                 120                 125
Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr
```

```
    130                 135                 140
Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr
145                 150                 155                 160
Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro
                165                 170                 175
Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr
            180                 185                 190
Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys Asn Val Asp
        195                 200                 205
His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu Arg Lys Cys
    210                 215                 220
Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala Gly Pro Ser
225                 230                 235                 240
Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg
                245                 250                 255
Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro
            260                 265                 270
Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala
        275                 280                 285
Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe Arg Val Val
    290                 295                 300
Ser Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly Lys Glu Tyr
305                 310                 315                 320
Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile Glu Lys Thr
                325                 330                 335
Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu
            340                 345                 350
Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys
        355                 360                 365
Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser
    370                 375                 380
Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Met Leu Asp
385                 390                 395                 400
Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                405                 410                 415
Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala
            420                 425                 430
Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445



<210> 63
<211> 448
<212> PRT
<213> Artificial Sequence

<220>
<223> Ipilimumab heavy chain

<400> 63
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1               5                   10                  15
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30
Thr Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Thr Phe Ile Ser Tyr Asp Gly Asn Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Ile Tyr Tyr Cys
                85                  90                  95
Ala Arg Thr Gly Trp Leu Gly Pro Phe Asp Tyr Trp Gly Gln Gly Thr
            100                 105                 110
```

```
Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro
        115                 120                 125
Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly
    130                 135                 140
Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn
145                 150                 155                 160
Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln
                165                 170                 175
Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser
            180                 185                 190
Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
        195                 200                 205
Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr
    210                 215                 220
His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser
225                 230                 235                 240
Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg
                245                 250                 255
Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro
            260                 265                 270
Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala
        275                 280                 285
Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val
    290                 295                 300
Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr
305                 310                 315                 320
Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr
                325                 330                 335
Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu
            340                 345                 350
Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys
        355                 360                 365
Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser
    370                 375                 380
Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp
385                 390                 395                 400
Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
                405                 410                 415
Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala
            420                 425                 430
Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445


<210> 64
<211> 451
<212> PRT
<213> Artificial Sequence

<220>
<223> tremelimumab heavy chain

<400> 64
Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
1                 5                  10                  15
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20                  25                  30
Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Ala Val Ile Trp Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val
    50                  55                  60
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
```

```
                85                  90                  95
Ala Arg Asp Pro Arg Gly Ala Thr Leu Tyr Tyr Tyr Tyr Tyr Gly Met
            100                 105                 110
Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr
        115                 120                 125
Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser
    130                 135                 140
Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
145                 150                 155                 160
Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
                165                 170                 175
Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser
            180                 185                 190
Val Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr Tyr Thr Cys
        195                 200                 205
Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Thr Val Glu
    210                 215                 220
Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro Pro Val Ala
225                 230                 235                 240
Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
                245                 250                 255
Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
            260                 265                 270
Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val
        275                 280                 285
His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Phe
    290                 295                 300
Arg Val Val Ser Val Leu Thr Val Val His Gln Asp Trp Leu Asn Gly
305                 310                 315                 320
Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ala Pro Ile
                325                 330                 335
Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu Pro Gln Val
            340                 345                 350
Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser
        355                 360                 365
Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
    370                 375                 380
Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
385                 390                 395                 400
Met Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
                405                 410                 415
Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
            420                 425                 430
His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
        435                 440                 445
Pro Gly Lys
    450

<210> 65
<211> 451
<212> PRT
<213> Artificial Sequence

<220>
<223> efalizumab heavy chain

<400> 65
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 Tyr Ser Phe Thr Gly His
            20                  25                  30
Trp Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Gly Met Ile His Pro Ser Asp Ser Glu Thr Arg Tyr Asn Gln Lys Phe
    50                  55                  60
```

```
Lys Asp Arg Phe Thr Ile Ser Val Asp Lys Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Arg Gly Ile Tyr Phe Tyr Gly Thr Thr Tyr Phe Asp Tyr Trp Gly
            100                 105                 110
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser
        115                 120                 125
Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala
    130                 135                 140
Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val
145                 150                 155                 160
Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala
                165                 170                 175
Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val
            180                 185                 190
Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His
        195                 200                 205
Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys
    210                 215                 220
Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly
225                 230                 235                 240
Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
                245                 250                 255
Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
            260                 265                 270
Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val
        275                 280                 285
His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr
    290                 295                 300
Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
305                 310                 315                 320
Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile
                325                 330                 335
Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val
            340                 345                 350
Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser
        355                 360                 365
Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
    370                 375                 380
Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
385                 390                 395                 400
Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
                405                 410                 415
Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
            420                 425                 430
His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
        435                 440                 445
Pro Gly Lys
    450

<210> 66
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<223> ustekinumab heavy chain

<400> 66
Glu Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Glu
1               5                   10                  15
Ser Leu Lys Ile Ser Cys Lys Gly Ser Gly Tyr Ser Phe Thr Thr Tyr
            20                  25                  30
Trp Leu Gly Trp Val Arg Gln Met Pro Gly Lys Gly Leu Asp Trp Ile
```

```
        35                  40                  45
Gly Ile Met Ser Pro Val Asp Ser Asp Ile Arg Tyr Ser Pro Ser Phe
    50                  55                  60
Gln Gly Gln Val Thr Met Ser Val Asp Lys Ser Ile Thr Thr Ala Tyr
65                  70                  75                  80
Leu Gln Trp Asn Ser Leu Lys Ala Ser Asp Thr Ala Met Tyr Tyr Cys
                85                  90                  95
Ala Arg Arg Arg Pro Gly Gln Gly Tyr Phe Asp Phe Trp Gly Gln Gly
            100                 105                 110
Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205
Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys
    210                 215                 220
Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro
225                 230                 235                 240
Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser
                245                 250                 255
Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp
            260                 265                 270
Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
        275                 280                 285
Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val
    290                 295                 300
Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
305                 310                 315                 320
Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys
                325                 330                 335
Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr
            340                 345                 350
Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr
        355                 360                 365
Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
    370                 375                 380
Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
385                 390                 395                 400
Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys
                405                 410                 415
Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
            420                 425                 430
Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
        435                 440                 445
Lys
```

<210> 67
<211> 744
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG1 Hinge+ Ipilimumab light chain

<400> 67
gagcccaaat cttgtgacaa aactcacaca tgcccaccgt gcccagttaa cggcggcggc 60

ggcagcggtc ccctgggtgt gagagcggcc cagccggccg aaattgtgtt gacgcagtct 120

ccaggcaccc tgtctttgtc tccaggggaa agagccaccc tctcctgcag ggccagtcag 180

agtgttggca gcagctactt agcctggtac cagcagaaac ctggccaggc tcccaggctc 240

ctcatctatg gtgcattcag cagggccact ggcatcccag acaggttcag tggcagtggg 300

tctgggacag acttcactct caccatcagc agactggagc ctgaagattt tgcagtgtat 360

tactgtcagc agtatggtag ctcaccgtgg acgttcggcc aagggaccaa ggtggaaatc 420

aaacggactg tggctgcacc atctgtcttc atcttcccgc catctgatga gcagttgaaa 480

tctggaactg cctctgttgt gtgcctgctg aataacttct atcccagaga ggccaaagta 540

cagtggaagg tggataacgc cctccaatcg ggtaactccc aggagagtgt cacagagcag 600

gacagcaagg acagcaccta cagcctcagc agcaccctga cgctgagcaa agcagactac 660

gagaaacaca aactctacgc ctgcgaagtc acccatcagg gcctgagctc gcccgtcaca 720

aagagcttca acaggggaga gtgc 744

<210> 68
<211> 1440
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG1 Hinge+ Ipilimumab heavy chain

<400> 68
gagcccaaat cttgtgacaa aactcacaca tgcccaccgt gcccaggcgg ccgcggcggc 60

ggcggcagcg gtcccctggg tgtgagaaga tctcaggtgc agctggtgga gtctgggga 120

ggcgtggtcc agcctgggag gtccctgaga ctctcctgtg cagcctctgg attcaccttc 180

agtagctata ctatgcactg ggtccgccag gctccaggca aggggctgga gtgggtgaca 240

tttatatcat atgatggaaa caataaatac tacgcagact ccgtgaaggg ccgattcacc 300

atctccagag acaattccaa gaacacgctg tatctgcaaa tgaacagcct gagagctgag 360

gacacggcta tatattactg tgcgaggacc ggctggctgg ggcctttga ctactggggc 420

cagggaaccc tggtcaccgt ctcctcagcc tccaccaagg gaccatcggt cttccccctg 480

gcaccctcct ccaagagcac ctctgggggc acagcggccc tgggctgcct ggtcaaggac 540

tacttccccg aaccggtgac ggtgtcgtgg aactcaggcg ccctgaccag cggcgtgcac 600

accttcccgg ctgtcctaca gtcctcagga ctctactccc tcagcagcgt ggtgaccgtg 660

ccctccagca gcttgggcac ccagacctac atctgcaacg tgaatcacaa gcccagcaac 720

accaaggtcg acaagaaagt tgagcccaaa tcttgtgaca aaactcacac atgcccaccg 780

tgcccagcac ccgaactcct gggggggaccg tcagtcttcc tcttcccccc aaaacccaag 840

gacaccctca tgatctcccg gacccctgag gtcacatgcg tggtggtgga cgtgagccac 900

gaagaccctg aggtcaagtt caactggtac gtggacggcg tggaggtgca taatgccaag 960

acaaagccgc gggaggagca gtacaacagc acgtaccgtg tggtcagcgt cctcaccgtc 1020

ctgcaccagg actggctgaa tggcaaggag tacaagtgca aggtctccaa caaagccctc 1080

ccagccccca tcgagaaaac catctccaaa gccaaggggc agccccgaga accacaggtg 1140

tacaccctgc ccccatcccg ggatgagctg accaagaacc aggtcagcct gacctgcctg 1200

gtcaaaggct tctatcccag cgacatcgcc gtggagtggg agagcaatgg gcagccggag 1260

aacaactaca agaccacgcc tcccgtgctg gactccgacg gctccttctt cctctacagc 1320

aagctcaccg tggacaagag caggtggcag caggggaacg tcttctcatg ctccgtgatg 1380

catgaggctc tgcacaacca ctacacgcag aagagcctct ccctgtctcc gggtaaataa 1440

<210> 69
<211> 735
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG2 Hinge+ Ipilimumab light chain

<400> 69
gagcgcaaat gttgtgtcga gtgcccaccg tgcccagtta acggcggcgg cggcagcggt 60

cccctgggtg tgagagcggc ccagccggcc gaaattgtgt tgacgcagtc tccaggcacc 120

ctgtctttgt ctccagggga aagagccacc ctctcctgca gggccagtca gagtgttggc 180

agcagctact tagcctggta ccagcagaaa cctggccagg ctcccaggct cctcatctat 240

ggtgcattca gcagggccac tggcatccca gacaggttca gtggcagtgg gtctgggaca 300

gacttcactc tcaccatcag cagactggag cctgaagatt ttgcagtgta ttactgtcag 360

cagtatggta gctcaccgtg gacgttcggc caagggacca aggtggaaat caaacggact 420

gtggctgcac catctgtctt catcttcccg ccatctgatg agcagttgaa atctggaact 480

gcctctgttg tgtgcctgct gaataacttc tatcccagag aggccaaagt acagtggaag 540

gtggataacg ccctccaatc gggtaactcc caggagagtg tcacagagca ggacagcaag 600

gacagcacct acagcctcag cagcaccctg acgctgagca aagcagacta cgagaaacac 660

aaactctacg cctgcgaagt cacccatcag ggcctgagct cgcccgtcac aaagagcttc 720

aacaggggag agtgc 735

<210> 70
<211> 1431
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG2 Hinge+ Ipilimumab heavy chain

<400> 70
gagcgcaaat gttgtgtcga gtgcccaccg tgcccaggcg gccgcggcgg cggcggcagc 60

ggtcccctgg gtgtgagaag atctcaggtg cagctggtgg agtctggggg aggcgtggtc 120

cagcctggga ggtccctgag actctcctgt gcagcctctg gattcacctt cagtagctat 180

actatgcact gggtccgcca ggctccaggc aaggggctgg agtgggtgac atttatatca 240

tatgatggaa acaataaata ctacgcagac tccgtgaagg gccgattcac catctccaga 300

gacaattcca agaacacgct gtatctgcaa atgaacagcc tgagagctga ggacacggct 360

atatattact gtgcgaggac cggctggctg gggccctttg actactgggg ccagggaacc 420

ctggtcaccg tctcctcagc ctccaccaag ggaccatcgg tcttcccccc ggcaccctcc 480

tccaagagca cctctggggg cacagcggcc ctgggctgcc tggtcaagga ctacttcccc 540

gaaccggtga cggtgtcgtg gaactcaggc gccctgacca gcggcgtgca caccttcccg 600

gctgtcctac agtcctcagg actctactcc ctcagcagcg tggtgaccgt gccctccagc 660

agcttgggca cccagaccta catctgcaac gtgaatcaca agcccagcaa caccaaggtc 720

gacaagaaag ttgagcccaa atcttgtgac aaaactcaca catgcccacc gtgcccagca 780

cccgaactcc tgggggacc gtcagtcttc ctcttccccc caaaacccaa ggacaccctc 840

atgatctccc ggacccctga ggtcacatgc gtggtggtgg acgtgagcca cgaagaccct 900

gaggtcaagt tcaactggta cgtggacggc gtggaggtgc ataatgccaa gacaaagccg 960

cgggaggagc agtacaacag cacgtaccgt gtggtcagcg tcctcaccgt cctgcaccag 1020

gactggctga atggcaagga gtacaagtgc aaggtctcca acaaagccct cccagccccc 1080

atcgagaaaa ccatctccaa agccaagggg cagccccgag aaccacaggt gtacaccctg 1140

cccccatccc gggatgagct gaccaagaac caggtcagcc tgacctgcct ggtcaaaggc 1200

ttctatccca gcgacatcgc cgtggagtgg gagagcaatg ggcagccgga gaacaactac 1260

aagaccacgc ctcccgtgct ggactccgac ggctccttct tcctctacag caagctcacc 1320

gtggacaaga gcaggtggca gcaggggaac gtcttctcat gctccgtgat gcatgaggct 1380

ctgcacaacc actacacgca gaagagcctc tccctgtctc cgggtaaata a 1431

<210> 71
<211> 885
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG3 Hinge+ Ipilimumab light chain

<400> 71
gagctcaaaa ccccacttgg tgacacaact cacacatgcc cacggtgccc agagcccaaa 60

tcttgtgaca cacctccccc gtgcccacgg tgcccagagc ccaaatcttg tgacacacct 120

cccccatgcc cacggtgccc agagcccaaa tcttgtgaca cacctccccc gtgcccaagg 180

tgcccagtta acggcggcgg cggcagcggt cccctgggtg tgagagcggc ccagccggcc 240

gaaattgtgt tgacgcagtc tccaggcacc ctgtctttgt ctccagggga aagagccacc 300

ctctcctgca gggccagtca gagtgttggc agcagctact tagcctggta ccagcagaaa 360

cctggccagg ctcccaggct cctcatctat ggtgcattca gcagggccac tggcatccca 420

gacaggttca gtggcagtgg gtctgggaca gacttcactc tcaccatcag cagactggag 480

cctgaagatt ttgcagtgta ttactgtcag cagtatggta gctcaccgtg gacgttcggc 540

caagggacca aggtggaaat caaacggact gtggctgcac catctgtctt catcttcccg 600

ccatctgatg agcagttgaa atctggaact gcctctgttg tgtgcctgct gaataacttc 660

tatcccagag aggccaaagt acagtggaag gtggataacg ccctccaatc gggtaactcc 720

caggagagtg tcacagagca ggacagcaag gacagcacct acagcctcag cagcaccctg 780

acgctgagca aagcagacta cgagaaacac aaactctacg cctgcgaagt cacccatcag 840

ggcctgagct cgcccgtcac aaagagcttc aacaggggag agtgc 885

<210> 72
<211> 1581
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG3 Hinge+ Ipilimumab heavy chain

<400> 72
gagctcaaaa ccccacttgg tgacacaact cacacatgcc cacggtgccc agagcccaaa 60

tcttgtgaca cacctccccc gtgcccacgg tgcccagagc ccaaatcttg tgacacacct 120

cccccatgcc cacggtgccc agagcccaaa tcttgtgaca cacctccccc gtgcccaagg 180

tgcccaggcg gccgcggcgg cggcggcagc ggtcccctgg gtgtgagaag atctcaggtg 240

cagctggtgg agtctggggg aggcgtggtc cagcctggga ggtccctgag actctcctgt 300

gcagcctctg gattcacctt cagtagctat actatgcact gggtccgcca ggctccaggc 360

aaggggctgg agtgggtgac atttatatca tatgatggaa acaataaata ctacgcagac 420

tccgtgaagg gccgattcac catctccaga gacaattcca agaacacgct gtatctgcaa 480

atgaacagcc tgagagctga ggacacggct atatattact gtgcgaggac cggctggctg 540

gggccctttg actactgggg ccagggaacc ctggtcaccg tctcctcagc ctccaccaag 600

ggaccatcgg tcttcccccc ggcaccctcc tccaagagca cctctggggg cacagcggcc 660

ctgggctgcc tggtcaagga ctacttcccc gaaccggtga cggtgtcgtg gaactcaggc 720

gccctgacca gcggcgtgca caccttcccg gctgtcctac agtcctcagg actctactcc 780

ctcagcagcg tggtgaccgt gccctccagc agcttgggca cccagaccta catctgcaac 840

gtgaatcaca agcccagcaa caccaaggtc gacaagaaag ttgagcccaa atcttgtgac 900

aaaactcaca catgcccacc gtgcccagca cccgaactcc tgggggggacc gtcagtcttc 960

ctcttccccc caaaacccaa ggacaccctc atgatctccc ggacccctga ggtcacatgc 1020

gtggtggtgg acgtgagcca cgaagaccct gaggtcaagt tcaactggta cgtggacggc 1080

gtggaggtgc ataatgccaa gacaaagccg cgggaggagc agtacaacag cacgtaccgt 1140

gtggtcagcg tcctcaccgt cctgcaccag gactggctga atggcaagga gtacaagtgc 1200

aaggtctcca acaaagccct cccagccccc atcgagaaaa ccatctccaa agccaagggg 1260

cagccccgag aaccacaggt gtacaccctg cccccatccc gggatgagct gaccaagaac 1320

caggtcagcc tgacctgcct ggtcaaaggc ttctatccca gcgacatcgc cgtggagtgg 1380

gagagcaatg ggcagccgga gaacaactac aagaccacgc ctcccgtgct ggactccgac 1440

ggctccttct tcctctacag caagctcacc gtggacaaga gcaggtggca gcaggggaac 1500

gtcttctcat gctccgtgat gcatgaggct ctgcacaacc actacacgca gaagagcctc 1560

tccctgtctc cgggtaaata a 1581

<210> 73
<211> 735
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG4 Hinge+ Ipilimumab light chain

<400> 73
gagtccaaat atggtccccc atgcccatca tgcccagtta acggcggcgg cggcagcggt 60

cccctgggtg tgagagcggc ccagccggcc gaaattgtgt tgacgcagtc tccaggcacc 120

ctgtctttgt ctccagggga aagagccacc ctctcctgca gggccagtca gagtgttggc 180

agcagctact tagcctggta ccagcagaaa cctggccagg ctcccaggct cctcatctat 240

ggtgcattca gcagggccac tggcatccca gacaggttca gtggcagtgg gtctgggaca 300

gacttcactc tcaccatcag cagactggag cctgaagatt ttgcagtgta ttactgtcag 360

cagtatggta gctcaccgtg gacgttcggc caagggacca aggtggaaat caaacggact 420

gtggctgcac catctgtctt catcttcccg ccatctgatg agcagttgaa atctggaact 480

gcctctgttg tgtgcctgct gaataacttc tatcccagag aggccaaagt acagtggaag 540

gtggataacg ccctccaatc gggtaactcc caggagagtg tcacagagca ggacagcaag 600

gacagcacct acagcctcag cagcaccctg acgctgagca aagcagacta cgagaaacac 660

aaactctacg cctgcgaagt cacccatcag ggcctgagct cgcccgtcac aaagagcttc 720

aacaggggag agtgc 735

<210> 74
<211> 1431
<212> DNA
<213> Artificial Sequence

<220>
<223> IgG4 Hinge+ Ipilimumab heavy chain

<400> 74
gagtccaaat atggtccccc atgcccatca tgcccaggcg gccgcggcgg cggcggcagc 60

ggtcccctgg gtgtgagaag atctcaggtg cagctggtgg agtctggggg aggcgtggtc 120

cagcctggga ggtccctgag actctcctgt gcagcctctg gattcacctt cagtagctat 180

actatgcact gggtccgcca ggctccaggc aaggggctgg agtgggtgac atttatatca 240

tatgatggaa acaataaata ctacgcagac tccgtgaagg gccgattcac catctccaga 300

gacaattcca agaacacgct gtatctgcaa atgaacagcc tgagagctga ggacacggct 360

atatattact gtgcgaggac cggctggctg gggccctttg actactgggg ccagggaacc 420

ctggtcaccg tctcctcagc ctccaccaag ggaccatcgg tcttcccccc ggcaccctcc 480

tccaagagca cctctggggg cacagcggcc ctgggctgcc tggtcaagga ctacttcccc 540

gaaccggtga cggtgtcgtg gaactcaggc gccctgacca gcggcgtgca caccttcccg 600

gctgtcctac agtcctcagg actctactcc ctcagcagcg tggtgaccgt gccctccagc 660

agcttgggca cccagaccta catctgcaac gtgaatcaca agcccagcaa caccaaggtc 720

gacaagaaag ttgagcccaa atcttgtgac aaaactcaca catgcccacc gtgcccagca 780

cccgaactcc tgggggggacc gtcagtcttc ctcttccccc caaaacccaa ggacaccctc 840

atgatctccc ggaccctga ggtcacatgc gtggtggtgg acgtgagcca cgaagaccct 900

gaggtcaagt tcaactggta cgtggacggc gtggaggtgc ataatgccaa gacaaagccg 960

cgggaggagc agtacaacag cacgtaccgt gtggtcagcg tcctcaccgt cctgcaccag 1020

gactggctga atggcaagga gtacaagtgc aaggtctcca acaaagccct cccagccccc 1080

atcgagaaaa ccatctccaa agccaagggg cagccccgag aaccacaggt gtacaccctg 1140

cccccatccc gggatgagct gaccaagaac caggtcagcc tgacctgcct ggtcaaaggc 1200

ttctatccca gcgacatcgc cgtggagtgg gagagcaatg ggcagccgga gaacaactac 1260

aagaccacgc ctcccgtgct ggactccgac ggctccttct tcctctacag caagctcacc 1320

gtggacaaga gcaggtggca gcaggggaac gtcttctcat gctccgtgat gcatgaggct 1380

ctgcacaacc actacacgca gaagagcctc tccctgtctc cgggtaaata a 1431

<210> 75
<211> 768
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA1 Hinge+ Ipilimumab light chain

<400> 75
ccagttccct caactccacc taccccatct ccctcaactc cacctacccc atctccctca 60

tgctgccacg ttaacggcgg cggcggcagc ggtcccctgg gtgtgagagc ggcccagccg 120

gccgaaattg tgttgacgca gtctccaggc accctgtctt tgtctccagg ggaaagagcc 180

accctctcct gcagggccag tcagagtgtt ggcagcagct acttagcctg gtaccagcag 240

aaacctggcc aggctcccag gctcctcatc tatggtgcat tcagcagggc cactggcatc 300

ccagacaggt tcagtggcag tgggtctggg acagacttca ctctcaccat cagcagactg 360

gagcctgaag attttgcagt gtattactgt cagcagtatg gtagctcacc gtggacgttc 420

ggccaaggga ccaaggtgga aatcaaacgg actgtggctg caccatctgt cttcatcttc 480

ccgccatctg atgagcagtt gaaatctgga actgcctctg ttgtgtgcct gctgaataac 540

ttctatccca gagaggccaa agtacagtgg aaggtggata acgccctcca atcgggtaac 600

tcccaggaga gtgtcacaga gcaggacagc aaggacagca cctacagcct cagcagcacc 660

ctgacgctga gcaaagcaga ctacgagaaa cacaaactct acgcctgcga agtcacccat 720

cagggcctga gctcgcccgt cacaaagagc ttcaacaggg gagagtgc 768

<210> 76
<211> 768
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA1 Hinge+ Ipilimumab heavy chain

<400> 76
ccagttccct caactccacc taccccatct ccctcaactc cacctacccc atctccctca 60

tgctgccacg ttaacggcgg cggcggcagc ggtcccctgg gtgtgagagc ggcccagccg 120

gccgaaattg tgttgacgca gtctccaggc accctgtctt tgtctccagg ggaaagagcc 180

accctctcct gcagggccag tcagagtgtt ggcagcagct acttagcctg gtaccagcag 240

aaacctggcc aggctcccag gctcctcatc tatggtgcat tcagcagggc cactggcatc 300

ccagacaggt tcagtggcag tgggtctggg acagacttca ctctcaccat cagcagactg 360

gagcctgaag attttgcagt gtattactgt cagcagtatg gtagctcacc gtggacgttc 420

ggccaaggga ccaaggtgga aatcaaacgg actgtggctg caccatctgt cttcatcttc 480

ccgccatctg atgagcagtt gaaatctgga actgcctctg ttgtgtgcct gctgaataac 540

ttctatccca gagaggccaa agtacagtgg aaggtggata acgccctcca atcgggtaac 600

tcccaggaga gtgtcacaga gcaggacagc aaggacagca cctacagcct cagcagcacc 660

ctgacgctga gcaaagcaga ctacgagaaa cacaaactct acgcctgcga agtcacccat 720

cagggcctga gctcgcccgt cacaaagagc ttcaacaggg gagagtgc 768

<210> 77
<211> 729
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA2 Hinge+ Ipilimumab light chain

<400> 77
ccagttcccc cacctccccc atgctgccac gttaacggcg gcggcggcag cggtcccctg 60

ggtgtgagag cggcccagcc ggccgaaatt gtgttgacgc agtctccagg caccctgtct 120

ttgtctccag gggaaagagc caccctctcc tgcagggcca gtcagagtgt tggcagcagc 180

tacttagcct ggtaccagca gaaacctggc caggctccca ggctcctcat ctatggtgca 240

ttcagcaggg ccactggcat cccagacagg ttcagtggca gtgggtctgg gacagacttc 300

actctcacca tcagcagact ggagcctgaa gattttgcag tgtattactg tcagcagtat 360

ggtagctcac cgtggacgtt cggccaaggg accaaggtgg aaatcaaacg gactgtggct 420

gcaccatctg tcttcatctt cccgccatct gatgagcagt tgaaatctgg aactgcctct 480

gttgtgtgcc tgctgaataa cttctatccc agagaggcca aagtacagtg gaaggtggat 540

aacgccctcc aatcgggtaa ctcccaggag agtgtcacag agcaggacag caaggacagc 600

acctacagcc tcagcagcac cctgacgctg agcaaagcag actacgagaa acacaaactc 660

tacgcctgcg aagtcaccca tcagggcctg agctcgcccg tcacaaagag cttcaacagg 720

ggagagtgc 729

<210> 78
<211> 729
<212> DNA
<213> Artificial Sequence

<220>
<223> IgA2 Hinge+ Ipilimumab heavy chain

<400> 78
ccagttcccc cacctccccc atgctgccac gttaacggcg gcggcggcag cggtcccctg 60

ggtgtgagag cggcccagcc ggccgaaatt gtgttgacgc agtctccagg caccctgtct 120

ttgtctccag gggaaagagc caccctctcc tgcagggcca gtcagagtgt tggcagcagc 180

tacttagcct ggtaccagca gaaacctggc caggctccca ggctcctcat ctatggtgca 240

ttcagcaggg ccactggcat cccagacagg ttcagtggca gtgggtctgg gacagacttc 300

actctcacca tcagcagact ggagcctgaa gattttgcag tgtattactg tcagcagtat 360

ggtagctcac cgtggacgtt cggccaaggg accaaggtgg aaatcaaacg gactgtggct 420

gcaccatctg tcttcatctt cccgccatct gatgagcagt tgaaatctgg aactgcctct 480

gttgtgtgcc tgctgaataa cttctatccc agagaggcca aagtacagtg gaaggtggat 540

aacgccctcc aatcgggtaa ctcccaggag agtgtcacag agcaggacag caaggacagc 600

acctacagcc tcagcagcac cctgacgctg agcaaagcag actacgagaa acacaaactc 660

tacgcctgcg aagtcaccca tcagggcctg agctcgcccg tcacaaagag cttcaacagg 720

ggagagtgc 729