SEQUENCE LISTING

<110> H. Lundbeck A/S

<120> TREATMENT OF MOST BOTHERSOME SYMPTOM (MBS) ASSOCIATED WITH MIGRAINE USING ANTI-CGRP ANTIBODIES

<130> 1250-US-PSP

<160> 567

<170> PatentIn version 3.5

<210> 1
<211> 439
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 1

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

Leu Thr Leu Thr Cys Thr Val Ser Gly Leu Asp Leu Ser Ser Tyr Tyr
            20                  25                  30

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

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

Arg Phe Thr Ile Ser Arg Ala Ser Ser Thr Thr Val Asp Leu Lys Met
65                  70                  75                  80

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

Asp Ile Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
            100                 105                 110

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

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
    130                 135                 140

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
145                 150                 155                 160

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

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
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180 185 190

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu
195 200 205

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

Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys
225 230 235 240

Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val
245 250 255

Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
260 265 270

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr
275 280 285

Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
290 295 300

Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu
305 310 315 320

Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg
325 330 335

Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys
340 345 350

Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp
355 360 365

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

Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser
385 390 395 400

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

Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser
420 425 430

Leu Ser Leu Ser Pro Gly Lys
435

<210> 2

<211> 109
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 2

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

Leu Thr Leu Thr Cys Thr Val Ser Gly Leu Asp Leu Ser Ser Tyr Tyr
            20                  25                  30

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

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

Arg Phe Thr Ile Ser Arg Ala Ser Ser Thr Thr Val Asp Leu Lys Met
65                  70                  75                  80

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

Asp Ile Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser
            100                 105
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<210> 3
<211> 29
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 3

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

Leu Thr Leu Thr Cys Thr Val Ser Gly Leu Asp Leu Ser
            20                  25
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<210> 4
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 4

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Ser Tyr Tyr Met Gln
1               5
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<210> 5
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 5

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

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

<220>
<223> Engineered antibody sequence

<400> 6

Val Ile Gly Ile Asn Asp Asn Thr Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 7
<211> 31
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 7

Arg Phe Thr Ile Ser Arg Ala Ser Ser Thr Thr Val Asp Leu Lys Met
1 5 10 15

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

<210> 8
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 8

Gly Asp Ile
1

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

<220>
<223> Engineered antibody sequence

<400> 9

Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 10
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 10

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
100 105 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
115 120 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
165 170 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
180 185 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
195 200 205

```
Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
    210                 215                 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225                 230                 235                 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
                245                 250                 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
            260                 265                 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
        275                 280                 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
    290                 295                 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305                 310                 315                 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
                325                 330
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<210> 11
<211> 1320
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 11

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cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg ggacacccct gacactcacc       60

tgcacagtct ctggactcga cctcagtagc tactacatgc aatgggtccg ccaggctcca      120

gggaaggggc tggaatggat cggagtcatt ggtattaatg ataacacata ctacgcgagc      180

tgggcgaaag gccgattcac catctccaga gcctcgtcga ccacggtgga tctgaaaatg      240

accagtctga caaccgagga cacggccacc tatttctgtg ccagagggga catctggggc      300

ccaggcaccc tcgtcaccgt ctcgagcgcc tccaccaagg gcccatcggt cttccccctg      360

gcaccctcct ccaagagcac ctctgggggc acagcggccc tgggctgcct ggtcaaggac      420

tacttccccg aaccggtgac ggtgtcgtgg aactcaggcg ccctgaccag cggcgtgcac      480

accttcccgg ctgtcctaca gtcctcagga ctctactccc tcagcagcgt ggtgaccgtg      540

ccctccagca gcttgggcac ccagacctac atctgcaacg tgaatcacaa gcccagcaac      600

accaaggtgg acaagagagt tgagcccaaa tcttgtgaca aaactcacac atgcccaccg      660

tgcccagcac ctgaactcct gggggggaccg tcagtcttcc tcttcccccc aaaacccaag      720

gacaccctca tgatctcccg gacccctgag gtcacatgcg tggtggtgga cgtgagccac      780
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gaagaccctg aggtcaagtt caactggtac gtggacggcg tggaggtgca taatgccaag 840

acaaagccgc gggaggagca gtacgccagc acgtaccgtg tggtcagcgt cctcaccgtc 900

ctgcaccagg actggctgaa tggcaaggag tacaagtgca aggtctccaa caaagccctc 960

ccagccccca tcgagaaaac catctccaaa gccaaagggc agccccgaga accacaggtg 1020

tacaccctgc ccccatcccg ggaggagatg accaagaacc aggtcagcct gacctgcctg 1080

gtcaaaggct tctatcccag cgacatcgcc gtggagtggg agagcaatgg gcagccggag 1140

aacaactaca agaccacgcc tcccgtgctg gactccgacg gctccttctt cctctacagc 1200

aagctcaccg tggacaagag caggtggcag caggggaacg tcttctcatg ctccgtgatg 1260

catgaggctc tgcacaacca ctacacgcag aagagcctct ccctgtctcc gggtaaatga 1320

<210> 12
<211> 327
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 12
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tgcacagtct ctggactcga cctcagtagc tactacatgc aatgggtccg ccaggctcca 120

gggaaggggc tggaatggat cggagtcatt ggtattaatg ataacacata ctacgcgagc 180

tgggcgaaag gccgattcac catctccaga gcctcgtcga ccacggtgga tctgaaaatg 240

accagtctga caaccgagga cacggccacc tatttctgtg ccagagggga catctggggc 300

ccaggcaccc tcgtcaccgt ctcgagc 327

<210> 13
<211> 87
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 13
cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg ggacacccct gacactcacc 60

tgcacagtct ctggactcga cctcagt 87

<210> 14
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 14
agctactaca tgcaa 15

<210> 15

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

<220>
<223> Engineered antibody sequence

<400> 15
tgggtccgcc aggctccagg gaaggggctg gaatggatcg ga 42

<210> 16
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 16
gtcattggta ttaatgataa cacatactac gcgagctggg cgaaaggc 48

<210> 17
<211> 93
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 17
cgattcacca tctccagagc ctcgtcgacc acggtggatc tgaaaatgac cagtctgaca 60

accgaggaca cggccaccta tttctgtgcc aga 93

<210> 18
<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 18
ggggacatc 9

<210> 19
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 19
tggggcccag gcaccctcgt caccgtctcg agc 33

<210> 20
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 20
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ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggaccccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 21
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 21

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

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

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

Ile Tyr Ser Thr Ser Thr Leu Ala Ser Gly Val Ser Ser Arg Phe Lys
50 55 60

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

Cys Ala Asp Ala Ala Thr Tyr Tyr Cys Leu Gly Ser Tyr Asp Cys Ser

85 90 95

Ser Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Glu Val Val Val 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 Val 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> 22
<211> 113
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 22

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

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

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

Ile Tyr Ser Thr Ser Thr Leu Ala Ser Gly Val Ser Ser Arg Phe Lys
50 55 60

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

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

Ser Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Glu Val Val Val Lys
100 105 110

Arg

<210> 23
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 23

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

Thr Val Thr Ile Asn Cys
20

<210> 24
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 24

Gln Ala Ser Gln Ser Val Tyr Asp Asn Asn Tyr Leu Ala
1 5 10

<210> 25
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 25

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

<210> 26
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 26

Ser Thr Ser Thr Leu Ala Ser
1 5

<210> 27
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 27

Gly Val Ser Ser Arg Phe Lys Gly Ser Gly Ser Gly Thr Gln Phe Thr
1 5 10 15

Leu Thr Ile Ser Asp Leu Glu Cys Ala Asp Ala Ala Thr Tyr Tyr Cys
20 25 30

<210> 28
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 28

Leu Gly Ser Tyr Asp Cys Ser Ser Gly Asp Cys Phe Val
1 5 10

<210> 29
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 29

Phe Gly Gly Gly Thr Glu Val Val Val Lys Arg
1 5 10

<210> 30
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 30

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 31
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 31
caagtgctga cccagactgc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgccagg ccagtcagag tgtttatgat aacaactacc tagcctggta tcagcagaaa 120

ccagggcagc ctcccaagca actgatctat tctacatcca ctctggcatc tggggtctca 180

tcgcggttca aaggcagtgg atctgggaca cagttcactc tcaccatcag cgacctggag 240

tgtgccgatg ctgccactta ctactgtcta ggcagttatg attgtagtag tggtgattgt 300

tttgttttcg gcggagggac cgaggtggtg gtcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 32
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 32
caagtgctga cccagactgc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgccagg ccagtcagag tgtttatgat aacaactacc tagcctggta tcagcagaaa 120

ccagggcagc ctcccaagca actgatctat tctacatcca ctctggcatc tggggtctca 180

tcgcggttca aaggcagtgg atctgggaca cagttcactc tcaccatcag cgacctggag 240

tgtgccgatg ctgccactta ctactgtcta ggcagttatg attgtagtag tggtgattgt 300

tttgttttcg gcggagggac cgaggtggtg gtcaaacgt 339

<210> 33
<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 33
caagtgctga cccagactgc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgc 66

<210> 34
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 34
caggccagtc agagtgttta tgataacaac tacctagcc 39

<210> 35
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 35
tggtatcagc agaaaccagg gcagcctccc aagcaactga tctat 45

<210> 36
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 36
tctacatcca ctctggcatc t 21

<210> 37
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 37
ggggtctcat cgcggttcaa aggcagtgga tctgggacac agttcactct caccatcagc 60

gacctggagt gtgccgatgc tgccacttac tactgt 96

<210> 38

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

<220>
<223> Engineered antibody sequence

<400> 38
ctaggcagtt atgattgtag tagtggtgat tgttttgtt 39

<210> 39
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 39
ttcggcggag ggaccgaggt ggtggtcaaa cgt 33

<210> 40
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 40
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aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 41
<211> 441
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 41

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 Val Ser Gly Leu Asp Leu Ser Ser Tyr
20 25 30

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

Gly Val Ile Gly Ile Asn Asp Asn Thr Tyr Tyr Ala Ser Trp Ala Lys

50 55 60

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
100 105 110

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

Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
130 135 140

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
145 150 155 160

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

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

Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg
195 200 205

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

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

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
245 250 255

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
260 265 270

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
275 280 285

Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
290 295 300

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

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln

325 330 335

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
340 345 350

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
355 360 365

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
370 375 380

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

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

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

Lys Ser Leu Ser Leu Ser Pro Gly Lys
435 440

<210> 42
<211> 111
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 42

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

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

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

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

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
100 105 110

<210> 43
<211> 30
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 43

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 Val Ser Gly Leu Asp Leu Ser
20 25 30

<210> 44
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 44

Ser Tyr Tyr Met Gln
1 5

<210> 45
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 45

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

<210> 46
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 46

Val Ile Gly Ile Asn Asp Asn Thr Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 47
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 47

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

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

<210> 48
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 48

Gly Asp Ile
1

<210> 49
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 49

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 50
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 50

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

```
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
                85                  90                  95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
            100                 105                 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
        115                 120                 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
    130                 135                 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145                 150                 155                 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
                165                 170                 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
            180                 185                 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
        195                 200                 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
    210                 215                 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225                 230                 235                 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
                245                 250                 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
            260                 265                 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
        275                 280                 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
    290                 295                 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305                 310                 315                 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
                325                 330
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<210> 51
<211> 1326
<212> DNA

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 51
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggact cgacctcagt agctactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtatca atgataacac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgctag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agcgcctcca ccaagggccc atcggtcttc 360

cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg ctgcctggtc 420

aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct gaccagcggc 480

gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag cagcgtggtg 540

accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa tcacaagccc 600

agcaacacca aggtggacaa gagagttgag cccaaatctt gtgacaaaac tcacacatgc 660

ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt cccccaaaa 720

cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt ggtggacgtg 780

agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga ggtgcataat 840

gccaagacaa agccgcggga ggagcagtac gccagcacgt accgtgtggt cagcgtcctc 900

accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt ctccaacaaa 960

gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc ccgagaacca 1020

caggtgtaca ccctgccccc atcccgggag gagatgacca agaaccaggt cagcctgacc 1080

tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag caatgggcag 1140

ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc cttcttcctc 1200

tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt ctcatgctcc 1260

gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct gtctccgggt 1320

aaatga 1326

<210> 52
<211> 333
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 52
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggact cgacctcagt agctactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtatca atgataacac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgctag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agc 333

<210> 53
<211> 90
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 53
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggact cgacctcagt 90

<210> 54
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 54
agctactaca tgcaa 15

<210> 55
<211> 42
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 55
tgggtccgtc aggctccagg gaaggggctg gagtgggtcg ga 42

<210> 56
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 56
gtcattggta tcaatgataa cacatactac gcgagctggg cgaaaggc 48

<210> 57
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 57
cgattcacca tctccagaga caattccaag accacggtgt atcttcaaat gaacagcctg 60

agagctgagg acactgctgt gtatttctgt gctaga 96

<210> 58
<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 58
ggggacatc 9

<210> 59
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 59
tggggccaag ggaccctcgt caccgtctcg agc 33

<210> 60
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 60
gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggacccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 61
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 61

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

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

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

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

Ser Gly Asp Cys Phe Val Phe Gly Gly 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 Val 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> 62
<211> 113
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 62

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

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

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

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

Ser Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

Arg

<210> 63
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 63

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

Arg Val Thr Ile Asn Cys
20

<210> 64
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 64

Gln Ala Ser Gln Ser Val Tyr Asp Asn Asn Tyr Leu Ala
1 5 10

<210> 65
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 65

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

<210> 66
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 66

Ser Thr Ser Thr Leu Ala Ser
1 5

<210> 67
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 67

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

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Val Ala Thr Tyr Tyr Cys
20 25 30

<210> 68
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 68

Leu Gly Ser Tyr Asp Cys Ser Ser Gly Asp Cys Phe Val
1 5 10

<210> 69

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

<220>
<223> Engineered antibody sequence

<400> 69

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
1 5 10

<210> 70
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 70

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 71
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 71
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagag tgtttatgat aacaactacc tagcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtcta ggcagttatg attgtagtag tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 72
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 72
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagag tgtttatgat aacaactacc tagcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtcta ggcagttatg attgtagtag tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgt 339

<210> 73
<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 73
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgc 66

<210> 74
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 74
caggccagtc agagtgttta tgataacaac tacctagcc 39

<210> 75
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 75
tggtatcagc agaaaccagg gaaagttcct aagcaactga tctat 45

<210> 76
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 76
tctacatcca ctctggcatc t 21

<210> 77
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 77
ggggtcccat ctcgtttcag tggcagtgga tctgggacag atttcactct caccatcagc 60

agcctgcagc ctgaagatgt tgcaacttat tactgt 96

<210> 78
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 78
ctaggcagtt atgattgtag tagtggtgat tgttttgtt 39

<210> 79
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 79
ttcggcggag gaaccaaggt ggaaatcaaa cgt 33

<210> 80
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 80
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 81
<211> 441
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 81

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 Val Ser Gly Leu Asp Leu Ser Ser Tyr
20 25 30

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

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

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
100 105 110

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

Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
130 135 140

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
145 150 155 160

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

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

```
Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Ala Arg
        195                 200                 205

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

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

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
                245                 250                 255

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
            260                 265                 270

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
        275                 280                 285

Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
    290                 295                 300

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

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
                325                 330                 335

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
            340                 345                 350

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
        355                 360                 365

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
    370                 375                 380

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

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

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

Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440
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<210> 82
<211> 111
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 82

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 Val Ser Gly Leu Asp Leu Ser Ser Tyr
20 25 30

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

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

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
100 105 110

<210> 83
<211> 30
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 83

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 Val Ser Gly Leu Asp Leu Ser
20 25 30

<210> 84
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 84

Ser Tyr Tyr Met Gln
1 5

<210> 85

<211> 14
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 85

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

<210> 86
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 86

Val Ile Gly Ile Asn Asp Asn Thr Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 87
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 87

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

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

<210> 88
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 88

Gly Asp Ile
1

<210> 89
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 89

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Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
1               5                   10
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<210> 90
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 90

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Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1               5                   10                  15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65                  70                  75                  80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Ala
                85                  90                  95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
            100                 105                 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
        115                 120                 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
    130                 135                 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145                 150                 155                 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
                165                 170                 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
            180                 185                 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
        195                 200                 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
```

210 215 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225 230 235 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
245 250 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
260 265 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
275 280 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 91
<211> 1326
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 91
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggact cgacctcagt agctactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtatca atgataacac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgctag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agcgcctcca ccaagggccc atcggtcttc 360

cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg ctgcctggtc 420

aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct gaccagcggc 480

gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag cagcgtggtg 540

accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa tcacaagccc 600

agcaacacca aggtggacgc gagagttgag cccaaatctt gtgacaaaac tcacacatgc 660

ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt cccccaaaa 720

cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt ggtggacgtg 780

agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga ggtgcataat 840

gccaagacaa agccgcggga ggagcagtac gccagcacgt accgtgtggt cagcgtcctc 900

accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt ctccaacaaa 960

gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc ccgagaacca 1020

caggtgtaca ccctgccccc atcccgggag gagatgacca agaaccaggt cagcctgacc 1080

tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag caatgggcag 1140

ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc cttcttcctc 1200

tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt ctcatgctcc 1260

gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct gtctccgggt 1320

aaatga 1326

<210> 92
<211> 333
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 92
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggact cgacctcagt agctactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtatca atgataacac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgctag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agc 333

<210> 93
<211> 90
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 93
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggact cgacctcagt 90

<210> 94
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 94
agctactaca tgcaa 15

<210> 95

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

<220>
<223> Engineered antibody sequence

<400> 95
tgggtccgtc aggctccagg gaaggggctg gagtgggtcg ga 42

<210> 96
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 96
gtcattggta tcaatgataa cacatactac gcgagctggg cgaaaggc 48

<210> 97
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 97
cgattcacca tctccagaga caattccaag accacggtgt atcttcaaat gaacagcctg 60

agagctgagg acactgctgt gtatttctgt gctaga 96

<210> 98
<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 98
ggggacatc 9

<210> 99
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 99
tggggccaag ggaccctcgt caccgtctcg agc 33

<210> 100
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 100
gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacgcgag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggaccccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgcccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 101
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 101

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

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

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

Ile Tyr Ser Thr Ser Thr Leu Ala 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 Leu Gly Ser Tyr Asp Cys Ser

85 90 95

Ser Gly Asp Cys Phe Val Phe Gly Gly 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 Val 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> 102
<211> 113
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 102

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

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

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

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

Ser Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

Arg

<210> 103
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 103

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

Arg Val Thr Ile Asn Cys
20

<210> 104
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 104

Gln Ala Ser Gln Ser Val Tyr Asp Asn Asn Tyr Leu Ala
1 5 10

<210> 105
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 105

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

<210> 106
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 106

Ser Thr Ser Thr Leu Ala Ser
1 5

<210> 107
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 107

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

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Val Ala Thr Tyr Tyr Cys
20 25 30

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

<220>
<223> Engineered antibody sequence

<400> 108

Leu Gly Ser Tyr Asp Cys Ser Ser Gly Asp Cys Phe Val
1 5 10

<210> 109
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 109

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
1 5 10

<210> 110
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 110

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 111
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 111
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagag tgtttatgat aacaactacc tagcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtcta ggcagttatg attgtagtag tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 112
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 112
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagag tgtttatgat aacaactacc tagcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtcta ggcagttatg attgtagtag tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgt 339

<210> 113
<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 113
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgc 66

<210> 114
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 114
caggccagtc agagtgttta tgataacaac tacctagcc 39

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

<220>
<223> Engineered antibody sequence

<400> 115
tggtatcagc agaaaccagg gaaagttcct aagcaactga tctat 45

<210> 116
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 116
tctacatcca ctctggcatc t 21

<210> 117
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 117
ggggtcccat ctcgtttcag tggcagtgga tctgggacag atttcactct caccatcagc 60

agcctgcagc ctgaagatgt tgcaacttat tactgt 96

<210> 118

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

<220>
<223> Engineered antibody sequence

<400> 118
ctaggcagtt atgattgtag tagtggtgat tgttttgtt 39

<210> 119
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 119
ttcggcggag gaaccaaggt ggaaatcaaa cgt 33

<210> 120
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 120
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 121
<211> 439
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 121

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

Leu Thr Leu Thr Cys Ser Val Ser Gly Ile Asp Leu Ser Gly Tyr Tyr
20 25 30

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

Val Ile Gly Ile Asn Gly Ala Thr Tyr Tyr Ala Ser Trp Ala Lys Gly

50 55 60

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

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

Asp Ile Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
100 105 110

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

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
130 135 140

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
145 150 155 160

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

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
180 185 190

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu
195 200 205

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

Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys
225 230 235 240

Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val
245 250 255

Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
260 265 270

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr
275 280 285

Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
290 295 300

Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu
305 310 315 320

Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg

325 330 335

Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys
340 345 350

Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp
355 360 365

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

Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser
385 390 395 400

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

Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser
420 425 430

Leu Ser Leu Ser Pro Gly Lys
435

<210> 122
<211> 109
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 122

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

Leu Thr Leu Thr Cys Ser Val Ser Gly Ile Asp Leu Ser Gly Tyr Tyr
20 25 30

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

Val Ile Gly Ile Asn Gly Ala Thr Tyr Tyr Ala Ser Trp Ala Lys Gly
50 55 60

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

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

Asp Ile Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser
100 105

<210> 123
<211> 29
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 123

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

Leu Thr Leu Thr Cys Ser Val Ser Gly Ile Asp Leu Ser
20 25

<210> 124
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 124

Gly Tyr Tyr Met Asn
1 5

<210> 125
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 125

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

<210> 126
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 126

Val Ile Gly Ile Asn Gly Ala Thr Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 127
<211> 31
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 127

Arg Phe Thr Ile Ser Lys Thr Ser Ser Thr Thr Val Asp Leu Lys Met
1 5 10 15

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

<210> 128
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 128

Gly Asp Ile
1

<210> 129
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 129

Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 130
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 130

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

```
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
                85                  90                  95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
            100                 105                 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
        115                 120                 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
    130                 135                 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145                 150                 155                 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
                165                 170                 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
            180                 185                 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
        195                 200                 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
    210                 215                 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225                 230                 235                 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
                245                 250                 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
            260                 265                 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
        275                 280                 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
    290                 295                 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305                 310                 315                 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
                325                 330
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<210> 131
<211> 1320
<212> DNA

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 131
cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg ggacacccct gacactcacc 60

tgttccgtct ctggcatcga cctcagtggc tactacatga actgggtccg ccaggctcca 120

gggaaggggc tggaatggat cggagtcatt ggtattaatg gtgccacata ctacgcgagc 180

tgggcgaaag gccgattcac catctccaaa acctcgtcga ccacggtgga tctgaaaatg 240

accagtctga caaccgagga cacggccacc tatttctgtg ccagagggga catctggggc 300

ccgggcaccc tcgtcaccgt ctcgagcgcc tccaccaagg gcccatcggt cttccccctg 360

gcaccctcct ccaagagcac ctctgggggc acagcggccc tgggctgcct ggtcaaggac 420

tacttccccg aaccggtgac ggtgtcgtgg aactcaggcg ccctgaccag cggcgtgcac 480

accttcccgg ctgtcctaca gtcctcagga ctctactccc tcagcagcgt ggtgaccgtg 540

ccctccagca gcttgggcac ccagacctac atctgcaacg tgaatcacaa gcccagcaac 600

accaaggtgg acaagagagt tgagcccaaa tcttgtgaca aaactcacac atgcccaccg 660

tgcccagcac ctgaactcct gggggggaccg tcagtcttcc tcttcccccc aaaacccaag 720

gacaccctca tgatctcccg gacccctgag gtcacatgcg tggtggtgga cgtgagccac 780

gaagaccctg aggtcaagtt caactggtac gtggacggcg tggaggtgca taatgccaag 840

acaaagccgc gggaggagca gtacgccagc acgtaccgtg tggtcagcgt cctcaccgtc 900

ctgcaccagg actggctgaa tggcaaggag tacaagtgca aggtctccaa caaagccctc 960

ccagccccca tcgagaaaac catctccaaa gccaaagggc agccccgaga accacaggtg 1020

tacaccctgc ccccatcccg ggaggagatg accaagaacc aggtcagcct gacctgcctg 1080

gtcaaaggct tctatcccag cgacatcgcc gtggagtggg agagcaatgg gcagccggag 1140

aacaactaca agaccacgcc tcccgtgctg gactccgacg gctccttctt cctctacagc 1200

aagctcaccg tggacaagag caggtggcag caggggaacg tcttctcatg ctccgtgatg 1260

catgaggctc tgcacaacca ctacacgcag aagagcctct ccctgtctcc gggtaaatga 1320

<210> 132
<211> 327
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 132
cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg ggacacccct gacactcacc 60

tgttccgtct ctggcatcga cctcagtggc tactacatga actgggtccg ccaggctcca 120

gggaaggggc tggaatggat cggagtcatt ggtattaatg gtgccacata ctacgcgagc 180

tgggcgaaag gccgattcac catctccaaa acctcgtcga ccacggtgga tctgaaaatg 240

accagtctga caaccgagga cacggccacc tatttctgtg ccagagggga catctggggc 300

ccgggcaccc tcgtcaccgt ctcgagc 327

<210> 133
<211> 87
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 133
cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg ggacacccct gacactcacc 60

tgttccgtct ctggcatcga cctcagt 87

<210> 134
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 134
ggctactaca tgaac 15

<210> 135
<211> 42
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 135
tgggtccgcc aggctccagg gaaggggctg gaatggatcg ga 42

<210> 136
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 136
gtcattggta ttaatggtgc cacatactac gcgagctggg cgaaaggc 48

<210> 137
<211> 93
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 137
cgattcacca tctccaaaac ctcgtcgacc acggtggatc tgaaaatgac cagtctgaca 60

accgaggaca cggccaccta tttctgtgcc aga 93

<210> 138
<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 138
ggggacatc 9

<210> 139
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 139
tggggcccgg gcaccctcgt caccgtctcg agc 33

<210> 140
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 140
gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggacccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 141
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 141

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

Thr Val Thr Ile Asn Cys Gln Ala Ser Gln Ser Val Tyr His Asn Thr
            20                  25                  30

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

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

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

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

Asn Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Glu Val Val Val 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 Val 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
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<210> 142

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

<220>
<223> Engineered antibody sequence

<400> 142

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

Thr Val Thr Ile Asn Cys Gln Ala Ser Gln Ser Val Tyr His Asn Thr
20 25 30

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

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

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

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

Asn Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Glu Val Val Val Lys
100 105 110

Arg

<210> 143
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 143

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

Thr Val Thr Ile Asn Cys
20

<210> 144
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 144

Gln Ala Ser Gln Ser Val Tyr His Asn Thr Tyr Leu Ala
1 5 10

<210> 145
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 145

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

<210> 146
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 146

Asp Ala Ser Thr Leu Ala Ser
1 5

<210> 147
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 147

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

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

<210> 148
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 148

Leu Gly Ser Tyr Asp Cys Thr Asn Gly Asp Cys Phe Val
1 5 10

<210> 149
<211> 11
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 149

Phe Gly Gly Gly Thr Glu Val Val Val Lys Arg
1 5 10

<210> 150
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 150

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 151
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 151
caagtgctga cccagactcc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgccagg ccagtcagag tgtttatcat aacacctacc tggcctggta tcagcagaaa 120

ccagggcagc ctcccaaaca actgatctat gatgcatcca ctctggcgtc tggggtccca 180

tcgcggttca gcggcagtgg atctgggaca cagttcactc tcaccatcag cggcgtgcag 240

tgtaacgatg ctgccgctta ctactgtctg ggcagttatg attgtactaa tggtgattgt 300

tttgttttcg gcggagggac cgaggtggtg gtcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 152
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 152
caagtgctga cccagactcc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgccagg ccagtcagag tgtttatcat aacacctacc tggcctggta tcagcagaaa 120

ccagggcagc ctcccaaaca actgatctat gatgcatcca ctctggcgtc tggggtccca 180

tcgcggttca gcggcagtgg atctgggaca cagttcactc tcaccatcag cggcgtgcag 240

tgtaacgatg ctgccgctta ctactgtctg ggcagttatg attgtactaa tggtgattgt 300

tttgttttcg gcggagggac cgaggtggtg gtcaaacgt 339

<210> 153
<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 153
caagtgctga cccagactcc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgc 66

<210> 154
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 154
caggccagtc agagtgttta tcataacacc tacctggcc 39

<210> 155
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 155
tggtatcagc agaaaccagg gcagcctccc aaacaactga tctat 45

<210> 156
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 156
gatgcatcca ctctggcgtc t 21

<210> 157
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 157
ggggtcccat cgcggttcag cggcagtgga tctgggacac agttcactct caccatcagc 60

ggcgtgcagt gtaacgatgc tgccgcttac tactgt 96

<210> 158
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 158
ctgggcagtt atgattgtac taatggtgat tgttttgtt 39

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

<220>
<223> Engineered antibody sequence

<400> 159
ttcggcggag ggaccgaggt ggtggtcaaa cgt 33

<210> 160
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 160
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 161
<211> 441
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 161

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 Val Ser Gly Ile Asp Leu Ser Gly Tyr
20 25 30

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

Gly Val Ile Gly Ile Asn Gly Ala Thr Tyr Tyr Ala Ser Trp Ala Lys
50 55 60

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
100 105 110

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

Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
130 135 140

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
145 150 155 160

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

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

Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg

195 200 205

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

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

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
245 250 255

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
260 265 270

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
275 280 285

Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
290 295 300

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

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
325 330 335

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
340 345 350

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
355 360 365

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
370 375 380

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

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

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

Lys Ser Leu Ser Leu Ser Pro Gly Lys
435 440

<210> 162
<211> 111
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 162

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 Val Ser Gly Ile Asp Leu Ser Gly Tyr
20 25 30

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

Gly Val Ile Gly Ile Asn Gly Ala Thr Tyr Tyr Ala Ser Trp Ala Lys
50 55 60

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
100 105 110

<210> 163
<211> 30
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 163

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 Val Ser Gly Ile Asp Leu Ser
20 25 30

<210> 164
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 164

Gly Tyr Tyr Met Asn
1 5

<210> 165
<211> 14
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 165

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

<210> 166
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 166

Val Ile Gly Ile Asn Gly Ala Thr Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 167
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 167

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

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

<210> 168
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 168

Gly Asp Ile
1

<210> 169
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 169

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser

1 5 10

<210> 170
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 170

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
100 105 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
115 120 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
165 170 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
180 185 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
195 200 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
210 215 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225 230 235 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
245 250 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
260 265 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
275 280 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 171
<211> 1326
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 171
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacctcagt ggctactaca tgaactgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtatta atggtgccac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgctag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agcgcctcca ccaagggccc atcggtcttc 360

cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg ctgcctggtc 420

aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct gaccagcggc 480

gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag cagcgtggtg 540

accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa tcacaagccc 600

agcaacacca aggtggacaa gagagttgag cccaaatctt gtgacaaaac tcacacatgc 660

ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt cccccaaaa 720

cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt ggtggacgtg 780

agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga ggtgcataat 840

gccaagacaa agccgcggga ggagcagtac gccagcacgt accgtgtggt cagcgtcctc 900

accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt ctccaacaaa 960

gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc ccgagaacca 1020

caggtgtaca ccctgccccc atcccgggag gagatgacca agaaccaggt cagcctgacc 1080

tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag caatgggcag 1140

ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc cttcttcctc 1200

tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt ctcatgctcc 1260

gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct gtctccgggt 1320

aaatga 1326

<210> 172
<211> 333
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 172
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacctcagt ggctactaca tgaactgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtatta atggtgccac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgctag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agc 333

<210> 173
<211> 90
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 173
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacctcagt 90

<210> 174
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 174
ggctactaca tgaac 15

<210> 175
<211> 42
<212> DNA

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 175
tgggtccgtc aggctccagg gaaggggctg gagtgggtcg ga 42

<210> 176
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 176
gtcattggta ttaatggtgc cacatactac gcgagctggg cgaaaggc 48

<210> 177
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 177
cgattcacca tctccagaga caattccaag accacggtgt atcttcaaat gaacagcctg 60

agagctgagg acactgctgt gtatttctgt gctaga 96

<210> 178
<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 178
ggggacatc 9

<210> 179
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 179
tggggccaag ggaccctcgt caccgtctcg agc 33

<210> 180
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 180

gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggaccccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 181
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 181

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

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

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

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

```
Asn Gly Asp Cys Phe Val Phe Gly Gly 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 Val 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> 182
<211> 113
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 182

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

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

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

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

Asn Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
```

100 105 110

Arg

<210> 183
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 183

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

Arg Val Thr Ile Asn Cys
20

<210> 184
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 184

Gln Ala Ser Gln Ser Val Tyr His Asn Thr Tyr Leu Ala
1 5 10

<210> 185
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 185

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

<210> 186
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 186

Asp Ala Ser Thr Leu Ala Ser
1 5

<210> 187

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

<220>
<223> Engineered antibody sequence

<400> 187

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

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Val Ala Thr Tyr Tyr Cys
20 25 30

<210> 188
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 188

Leu Gly Ser Tyr Asp Cys Thr Asn Gly Asp Cys Phe Val
1 5 10

<210> 189
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 189

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
1 5 10

<210> 190
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 190

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr

50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 191
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 191
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagag tgtttatcat aacacctacc tggcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat gatgcatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtactaa tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 192
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 192
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagag tgtttatcat aacacctacc tggcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat gatgcatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtactaa tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgt 339

<210> 193
<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 193
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgc 66

<210> 194
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 194
caggccagtc agagtgttta tcataacacc tacctggcc 39

<210> 195
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 195
tggtatcagc agaaaccagg gaaagttcct aagcaactga tctat 45

<210> 196
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 196
gatgcatcca ctctggcatc t 21

<210> 197
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 197
ggggtcccat ctcgtttcag tggcagtgga tctgggacag atttcactct caccatcagc 60

agcctgcagc ctgaagatgt tgcaacttat tactgt 96

<210> 198
<211> 39
<212> DNA

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 198
ctgggcagtt atgattgtac taatggtgat tgttttgtt 39

<210> 199
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 199
ttcggcggag gaaccaaggt ggaaatcaaa cgt 33

<210> 200
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 200
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 201
<211> 441
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 201

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 Val Ser Gly Ile Asp Leu Ser Gly Tyr
20 25 30

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

Gly Val Ile Gly Ile Asn Gly Ala Thr Tyr Tyr Ala Ser Trp Ala Lys
50 55 60

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
            100                 105                 110

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

Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
    130                 135                 140

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
145                 150                 155                 160

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

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

Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Ala Arg
        195                 200                 205

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

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

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
                245                 250                 255

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
            260                 265                 270

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
        275                 280                 285

Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
    290                 295                 300

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

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
                325                 330                 335
```

```
Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
            340                 345                 350

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
        355                 360                 365

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
    370                 375                 380

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

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

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

Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440
```

<210> 202
<211> 111
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 202

```
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 Val Ser Gly Ile Asp Leu Ser Gly Tyr
            20                  25                  30

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

Gly Val Ile Gly Ile Asn Gly Ala Thr Tyr Tyr Ala Ser Trp Ala Lys
    50                  55                  60

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
            100                 105                 110
```

<210> 203

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

<220>
<223> Engineered antibody sequence

<400> 203

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 Val Ser Gly Ile Asp Leu Ser
20 25 30

<210> 204
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 204

Gly Tyr Tyr Met Asn
1 5

<210> 205
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 205

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

<210> 206
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 206

Val Ile Gly Ile Asn Gly Ala Thr Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 207
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 207

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


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

<210> 208
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 208

```
Gly Asp Ile
1
```

<210> 209
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 209

```
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
1               5                   10


<210> 210
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 210

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1               5                   10                  15


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


Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45


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


Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65                  70                  75                  80


Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Ala
```

85 90 95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
100 105 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
115 120 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
165 170 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
180 185 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
195 200 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
210 215 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225 230 235 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
245 250 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
260 265 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
275 280 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 211
<211> 1326
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 211
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacctcagt ggctactaca tgaactgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtatta atggtgccac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgctag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agcgcctcca ccaagggccc atcggtcttc 360

cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg ctgcctggtc 420

aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct gaccagcggc 480

gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag cagcgtggtg 540

accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa tcacaagccc 600

agcaacacca aggtggacgc gagagttgag cccaaatctt gtgacaaaac tcacacatgc 660

ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt cccccaaaa 720

cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt ggtggacgtg 780

agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga ggtgcataat 840

gccaagacaa agccgcggga ggagcagtac gccagcacgt accgtgtggt cagcgtcctc 900

accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt ctccaacaaa 960

gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc ccgagaacca 1020

caggtgtaca ccctgccccc atcccgggag gagatgacca agaaccaggt cagcctgacc 1080

tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag caatgggcag 1140

ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc cttcttcctc 1200

tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt ctcatgctcc 1260

gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct gtctccgggt 1320

aaatga 1326

<210> 212
<211> 333
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 212
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacctcagt ggctactaca tgaactgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtatta atggtgccac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgctag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agc 333

<210> 213
<211> 90
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 213
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacctcagt 90

<210> 214
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 214
ggctactaca tgaac 15

<210> 215
<211> 42
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 215
tgggtccgtc aggctccagg gaaggggctg gagtgggtcg ga 42

<210> 216
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 216
gtcattggta ttaatggtgc cacatactac gcgagctggg cgaaaggc 48

<210> 217
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 217
cgattcacca tctccagaga caattccaag accacggtgt atcttcaaat gaacagcctg 60

agagctgagg acactgctgt gtatttctgt gctaga 96

<210> 218
<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 218
ggggacatc 9

<210> 219
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 219
tggggccaag ggaccctcgt caccgtctcg agc 33

<210> 220
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 220
gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacgcgag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggacccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 221
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 221

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

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

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

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

Asn Gly Asp Cys Phe Val Phe Gly Gly 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 Val 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
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<210> 222

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

<220>
<223> Engineered antibody sequence

<400> 222

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

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

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

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

Asn Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

Arg

<210> 223
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 223

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

Arg Val Thr Ile Asn Cys
20

<210> 224
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 224

Gln Ala Ser Gln Ser Val Tyr His Asn Thr Tyr Leu Ala
1 5 10

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

<220>
<223> Engineered antibody sequence

<400> 225

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

<210> 226
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 226

Asp Ala Ser Thr Leu Ala Ser
1 5

<210> 227
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 227

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

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Val Ala Thr Tyr Tyr Cys
20 25 30

<210> 228
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 228

Leu Gly Ser Tyr Asp Cys Thr Asn Gly Asp Cys Phe Val
1 5 10

<210> 229
<211> 11
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 229

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
1 5 10

<210> 230
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 230

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 231
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 231
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagag tgtttatcat aacacctacc tggcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat gatgcatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtactaa tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 232
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 232
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagag tgtttatcat aacacctacc tggcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat gatgcatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtactaa tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgt 339

<210> 233
<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 233
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgc 66

<210> 234
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 234
caggccagtc agagtgttta tcataacacc tacctggcc 39

<210> 235
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 235
tggtatcagc agaaaccagg gaaagttcct aagcaactga tctat 45

<210> 236
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 236
gatgcatcca ctctggcatc t 21

<210> 237
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 237
ggggtcccat ctcgtttcag tggcagtgga tctgggacag atttcactct caccatcagc 60

agcctgcagc ctgaagatgt tgcaacttat tactgt 96

<210> 238
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 238
ctgggcagtt atgattgtac taatggtgat tgttttgtt 39

<210> 239
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 239
ttcggcggag gaaccaaggt ggaaatcaaa cgt 33

<210> 240
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 240
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 241
<211> 440
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 241

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

Ser Leu Thr Leu Thr Cys Thr Val Ser Gly Ile Asp Leu Ser Asn His
20 25 30

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

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

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

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

Gly Asp Ile Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser Ala Ser
100 105 110

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

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

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
145 150 155 160

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

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

Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val

195 200 205

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

Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro
225 230 235 240

Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val
245 250 255

Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val
260 265 270

Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
275 280 285

Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln
290 295 300

Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala
305 310 315 320

Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro
325 330 335

Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr
340 345 350

Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser
355 360 365

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

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

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

Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys
420 425 430

Ser Leu Ser Leu Ser Pro Gly Lys
435 440

<210> 242
<211> 110
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 242

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

Ser Leu Thr Leu Thr Cys Thr Val Ser Gly Ile Asp Leu Ser Asn His
20 25 30

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

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

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

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

Gly Asp Ile Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser
100 105 110

<210> 243
<211> 30
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 243

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

Ser Leu Thr Leu Thr Cys Thr Val Ser Gly Ile Asp Leu Ser
20 25 30

<210> 244
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 244

Asn His Tyr Met Gln
1 5

<210> 245
<211> 14
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 245

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

<210> 246
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 246

Val Val Gly Ile Asn Gly Arg Thr Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 247
<211> 31
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 247

Arg Phe Thr Ile Ser Arg Thr Ser Ser Thr Thr Val Asp Leu Lys Met
1 5 10 15

Thr Arg Leu Thr Thr Glu Asp Thr Ala Thr Tyr Phe Cys Ala Arg
20 25 30

<210> 248
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 248

Gly Asp Ile
1

<210> 249
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 249

Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser

1 5 10

<210> 250
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 250

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
100 105 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
115 120 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
165 170 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
180 185 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
195 200 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
210 215 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225 230 235 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
245 250 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
260 265 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
275 280 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 251
<211> 1323
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 251
caggagcagc tgaaggagtc cgggggtcgc ctggtcacgc ctgggacatc cctgacactc 60

acctgcaccg tctctggaat cgacctcagt aaccactaca tgcaatgggt ccgccaggct 120

ccagggaagg ggctggagtg gatcggagtc gttggtatta atggtcgcac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agaacctcgt cgaccacggt ggatctgaaa 240

atgaccaggc tgacaaccga ggacacggcc acctatttct gtgccagagg ggacatctgg 300

ggcccaggca ccctggtcac cgtctcgagc gcctccacca agggcccatc ggtcttcccc 360

ctggcaccct cctccaagag cacctctggg ggcacagcgg ccctgggctg cctggtcaag 420

gactacttcc ccgaaccggt gacggtgtcg tggaactcag gcgccctgac cagcggcgtg 480

cacaccttcc cggctgtcct acagtcctca ggactctact ccctcagcag cgtggtgacc 540

gtgccctcca gcagcttggg cacccagacc tacatctgca acgtgaatca caagcccagc 600

aacaccaagg tggacaagag agttgagccc aaatcttgtg acaaaactca cacatgccca 660

ccgtgcccag cacctgaact cctgggggga ccgtcagtct tcctcttccc cccaaaaccc 720

aaggacaccc tcatgatctc ccggacccct gaggtcacat gcgtggtggt ggacgtgagc 780

cacgaagacc ctgaggtcaa gttcaactgg tacgtggacg gcgtggaggt gcataatgcc 840

aagacaaagc cgcgggagga gcagtacgcc agcacgtacc gtgtggtcag cgtcctcacc 900

gtcctgcacc aggactggct gaatggcaag gagtacaagt gcaaggtctc caacaaagcc 960

ctcccagccc ccatcgagaa aaccatctcc aaagccaaag ggcagccccg agaaccacag 1020

gtgtacaccc tgcccccatc ccgggaggag atgaccaaga accaggtcag cctgacctgc 1080

ctggtcaaag gcttctatcc cagcgacatc gccgtggagt gggagagcaa tgggcagccg 1140

gagaacaact acaagaccac gcctcccgtg ctggactccg acggctcctt cttcctctac 1200

agcaagctca ccgtggacaa gagcaggtgg cagcagggga acgtcttctc atgctccgtg 1260

atgcatgagg ctctgcacaa ccactacacg cagaagagcc tctccctgtc tccgggtaaa 1320

tga 1323

<210> 252
<211> 330
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 252
caggagcagc tgaaggagtc cgggggtcgc ctggtcacgc ctgggacatc cctgacactc 60

acctgcaccg tctctggaat cgacctcagt aaccactaca tgcaatgggt ccgccaggct 120

ccagggaagg ggctggagtg gatcggagtc gttggtatta atggtcgcac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agaacctcgt cgaccacggt ggatctgaaa 240

atgaccaggc tgacaaccga ggacacggcc acctatttct gtgccagagg ggacatctgg 300

ggcccaggca ccctggtcac cgtctcgagc 330

<210> 253
<211> 90
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 253
caggagcagc tgaaggagtc cgggggtcgc ctggtcacgc ctgggacatc cctgacactc 60

acctgcaccg tctctggaat cgacctcagt 90

<210> 254
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 254
aaccactaca tgcaa 15

<210> 255
<211> 42
<212> DNA

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 255
tgggtccgcc aggctccagg gaaggggctg gagtggatcg ga 42

<210> 256
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 256
gtcgttggta ttaatggtcg cacatactac gcgagctggg cgaaaggc 48

<210> 257
<211> 93
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 257
cgattcacca tctccagaac ctcgtcgacc acggtggatc tgaaaatgac caggctgaca 60

accgaggaca cggccaccta tttctgtgcc aga 93

<210> 258
<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 258
ggggacatc 9

<210> 259
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 259
tggggcccag gcaccctggt caccgtctcg agc 33

<210> 260
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 260

gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggaccccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 261
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 261

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

Thr Val Thr Ile Asn Cys Gln Ala Ser Gln Ser Val Tyr Asn Tyr Asn
20 25 30

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

Ile Tyr Ser Thr Ser Thr Leu Ala Ser Gly Val Ser Ser Arg Phe Lys
50 55 60

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

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

```
Thr Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Glu Val Val Val 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 Val 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
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<210> 262
<211> 113
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 262

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

Thr Val Thr Ile Asn Cys Gln Ala Ser Gln Ser Val Tyr Asn Tyr Asn
            20                  25                  30

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

Ile Tyr Ser Thr Ser Thr Leu Ala Ser Gly Val Ser Ser Arg Phe Lys
    50                  55                  60

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

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

Thr Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Glu Val Val Val Lys
```

100 105 110

Arg

<210> 263
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 263

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

Thr Val Thr Ile Asn Cys
20

<210> 264
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 264

Gln Ala Ser Gln Ser Val Tyr Asn Tyr Asn Tyr Leu Ala
1 5 10

<210> 265
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 265

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

<210> 266
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 266

Ser Thr Ser Thr Leu Ala Ser
1 5

<210> 267

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

<220>
<223> Engineered antibody sequence

<400> 267

Gly Val Ser Ser Arg Phe Lys Gly Ser Gly Ser Gly Thr Gln Phe Thr
1 5 10 15

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

<210> 268
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 268

Leu Gly Ser Tyr Asp Cys Ser Thr Gly Asp Cys Phe Val
1 5 10

<210> 269
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 269

Phe Gly Gly Gly Thr Glu Val Val Val Lys Arg
1 5 10

<210> 270
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 270

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr

50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 271
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 271
caagtgctga cccagactgc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgccagg ccagtcagag tgtttataat tacaactacc ttgcctggta tcagcagaaa 120

ccagggcagc ctcccaagca actgatctat tctacatcca ctctggcatc tggggtctca 180

tcgcgattca aaggcagtgg atctgggaca cagttcactc tcaccatcag cgacgtgcag 240

tgtgacgatg ctgccactta ctactgtcta ggcagttatg actgtagtac tggtgattgt 300

tttgttttcg gcggagggac cgaggtggtg gtcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 272
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 272
caagtgctga cccagactgc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgccagg ccagtcagag tgtttataat tacaactacc ttgcctggta tcagcagaaa 120

ccagggcagc ctcccaagca actgatctat tctacatcca ctctggcatc tggggtctca 180

tcgcgattca aaggcagtgg atctgggaca cagttcactc tcaccatcag cgacgtgcag 240

tgtgacgatg ctgccactta ctactgtcta ggcagttatg actgtagtac tggtgattgt 300

tttgttttcg gcggagggac cgaggtggtg gtcaaacgt 339

<210> 273
<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 273
caagtgctga cccagactgc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgc 66

<210> 274
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 274
caggccagtc agagtgttta taattacaac taccttgcc 39

<210> 275
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 275
tggtatcagc agaaaccagg gcagcctccc aagcaactga tctat 45

<210> 276
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 276
tctacatcca ctctggcatc t 21

<210> 277
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 277
ggggtctcat cgcgattcaa aggcagtgga tctgggacac agttcactct caccatcagc 60

gacgtgcagt gtgacgatgc tgccacttac tactgt 96

<210> 278
<211> 39
<212> DNA

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 278
ctaggcagtt atgactgtag tactggtgat tgttttgtt 39

<210> 279
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 279
ttcggcggag ggaccgaggt ggtggtcaaa cgt 33

<210> 280
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 280
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 281
<211> 441
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 281

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 Val Ser Gly Ile Asp Leu Ser Asn His
20 25 30

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

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

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
            100                 105                 110

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

Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
    130                 135                 140

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
145                 150                 155                 160

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

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

Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg
        195                 200                 205

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

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

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
                245                 250                 255

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
            260                 265                 270

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
        275                 280                 285

Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
    290                 295                 300

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

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
                325                 330                 335
```

```
Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
            340                 345                 350

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
        355                 360                 365

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
    370                 375                 380

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

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

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

Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440


<210>  282
<211>  111
<212>  PRT
<213>  Artificial

<220>
<223>  Engineered antibody sequence

<400>  282

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 Val Ser Gly Ile Asp Leu Ser Asn His
            20                  25                  30

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

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

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
            100                 105                 110

<210>  283
```

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

<220>
<223> Engineered antibody sequence

<400> 283

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 Val Ser Gly Ile Asp Leu Ser
20 25 30

<210> 284
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 284

Asn His Tyr Met Gln
1 5

<210> 285
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 285

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

<210> 286
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 286

Val Val Gly Ile Asn Gly Arg Thr Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 287
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 287

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

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

<210> 288
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 288

```
Gly Asp Ile
1
```

<210> 289
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 289

```
Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
1               5                   10
```

<210> 290
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 290

```
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1               5                   10                  15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65                  70                  75                  80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
```

85 90 95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
100 105 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
115 120 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
165 170 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
180 185 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
195 200 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
210 215 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225 230 235 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
245 250 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
260 265 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
275 280 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 291
<211> 1326
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 291
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacctcagt aaccactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc gttggtatca atggtcgcac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgctag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agcgcctcca ccaagggccc atcggtcttc 360

cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg ctgcctggtc 420

aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct gaccagcggc 480

gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag cagcgtggtg 540

accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa tcacaagccc 600

agcaacacca aggtggacaa gagagttgag cccaaatctt gtgacaaaac tcacacatgc 660

ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt cccccaaaa 720

cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt ggtggacgtg 780

agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga ggtgcataat 840

gccaagacaa agccgcggga ggagcagtac gccagcacgt accgtgtggt cagcgtcctc 900

accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt ctccaacaaa 960

gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc ccgagaacca 1020

caggtgtaca ccctgccccc atcccgggag gagatgacca agaaccaggt cagcctgacc 1080

tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag caatgggcag 1140

ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc cttcttcctc 1200

tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt ctcatgctcc 1260

gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct gtctccgggt 1320

aaatga 1326

<210> 292
<211> 333
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 292
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacctcagt aaccactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc gttggtatca atggtcgcac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgctag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agc 333

<210> 293
<211> 90
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 293
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacctcagt 90

<210> 294
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 294
aaccactaca tgcaa 15

<210> 295
<211> 42
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 295
tgggtccgtc aggctccagg gaaggggctg gagtgggtcg ga 42

<210> 296
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 296
gtcgttggta tcaatggtcg cacatactac gcgagctggg cgaaaggc 48

<210> 297
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 297
cgattcacca tctccagaga caattccaag accacggtgt atcttcaaat gaacagcctg 60

agagctgagg acactgctgt gtatttctgt gctaga 96

<210> 298
<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 298
ggggacatc 9

<210> 299
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 299
tggggccaag ggaccctcgt caccgtctcg agc 33

<210> 300
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 300
gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggacccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 301
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 301

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

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

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

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

Thr Gly Asp Cys Phe Val Phe Gly Gly 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 Val 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> 302

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

<220>
<223> Engineered antibody sequence

<400> 302

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

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

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

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

Thr Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

Arg

<210> 303
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 303

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

Arg Val Thr Ile Asn Cys
20

<210> 304
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 304

Gln Ala Ser Gln Ser Val Tyr Asn Tyr Asn Tyr Leu Ala
1 5 10

<210> 305
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 305

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

<210> 306
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 306

Ser Thr Ser Thr Leu Ala Ser
1 5

<210> 307
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 307

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

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Val Ala Thr Tyr Tyr Cys
20 25 30

<210> 308
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 308

Leu Gly Ser Tyr Asp Cys Ser Thr Gly Asp Cys Phe Val
1 5 10

<210> 309
<211> 11
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 309

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
1 5 10

<210> 310
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 310

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 311
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 311
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagag tgtttacaat tacaactacc ttgcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtagtac tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 312
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 312
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagag tgtttacaat tacaactacc ttgcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtagtac tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgt 339

<210> 313
<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 313
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgc 66

<210> 314
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 314
caggccagtc agagtgttta caattacaac taccttgcc 39

<210> 315
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 315
tggtatcagc agaaaccagg gaaagttcct aagcaactga tctat 45

<210> 316
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 316
tctacatcca ctctggcatc t 21

<210> 317
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 317
ggggtcccat ctcgtttcag tggcagtgga tctgggacag atttcactct caccatcagc 60

agcctgcagc ctgaagatgt tgcaacttat tactgt 96

<210> 318
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 318
ctgggcagtt atgattgtag tactggtgat tgttttgtt 39

<210> 319
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 319
ttcggcggag gaaccaaggt ggaaatcaaa cgt 33

<210> 320
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 320
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 321
<211> 439
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 321

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

Leu Thr Leu Thr Cys Thr Val Ser Gly Ile Gly Leu Ser Ser Tyr Tyr
20 25 30

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

Val Ile Gly Ser Asp Gly Lys Thr Tyr Tyr Ala Thr Trp Ala Lys Gly
50 55 60

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

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

Asp Ile Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
100 105 110

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

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
130 135 140

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
145 150 155 160

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

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
180 185 190

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu

195 200 205

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

Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys
225 230 235 240

Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val
245 250 255

Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
260 265 270

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr
275 280 285

Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
290 295 300

Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu
305 310 315 320

Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg
325 330 335

Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys
340 345 350

Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp
355 360 365

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

Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser
385 390 395 400

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

Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser
420 425 430

Leu Ser Leu Ser Pro Gly Lys
435

<210> 322
<211> 109
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 322

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

Leu Thr Leu Thr Cys Thr Val Ser Gly Ile Gly Leu Ser Ser Tyr Tyr
20 25 30

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

Val Ile Gly Ser Asp Gly Lys Thr Tyr Tyr Ala Thr Trp Ala Lys Gly
50 55 60

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

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

Asp Ile Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser
100 105

<210> 323
<211> 29
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 323

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

Leu Thr Leu Thr Cys Thr Val Ser Gly Ile Gly Leu Ser
20 25

<210> 324
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 324

Ser Tyr Tyr Met Gln
1 5

<210> 325
<211> 14
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 325

Trp Val Arg Gln Ser Pro Gly Arg Gly Leu Glu Trp Ile Gly
1 5 10

<210> 326
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 326

Val Ile Gly Ser Asp Gly Lys Thr Tyr Tyr Ala Thr Trp Ala Lys Gly
1 5 10 15

<210> 327
<211> 31
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 327

Arg Phe Thr Ile Ser Lys Thr Ser Ser Thr Thr Val Asp Leu Arg Met
1 5 10 15

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

<210> 328
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 328

Gly Asp Ile
1

<210> 329
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 329

Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser

1 5 10

<210> 330
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 330

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
100 105 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
115 120 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
165 170 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
180 185 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
195 200 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
210 215 220

```
Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225                 230                 235                 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
                245                 250                 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
            260                 265                 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
        275                 280                 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
    290                 295                 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305                 310                 315                 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
                325                 330
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<210> 331
<211> 1320
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 331
cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg ggacacccct gacactcacc 60

tgcacagtct ctggaatcgg cctcagtagc tactacatgc agtgggtccg ccagtctcca 120

gggaggggggc tggaatggat cggagtcatt ggtagtgatg gtaagacata ctacgcgacc 180

tgggcgaaag gccgattcac catctccaag acctcgtcga ccacggtgga tctgagaatg 240

gccagtctga caaccgagga cacggccacc tatttctgta ccagagggga catctggggc 300

ccggggaccc tcgtcaccgt ctcgagcgcc tccaccaagg gcccatcggt cttccccctg 360

gcaccctcct ccaagagcac ctctgggggc acagcggccc tgggctgcct ggtcaaggac 420

tacttccccg aaccggtgac ggtgtcgtgg aactcaggcg ccctgaccag cggcgtgcac 480

accttcccgg ctgtcctaca gtcctcagga ctctactccc tcagcagcgt ggtgaccgtg 540

ccctccagca gcttgggcac ccagacctac atctgcaacg tgaatcacaa gcccagcaac 600

accaaggtgg acaagagagt tgagcccaaa tcttgtgaca aaactcacac atgcccaccg 660

tgcccagcac ctgaactcct gggggggaccg tcagtcttcc tcttcccccc aaaacccaag 720

gacaccctca tgatctcccg gacccctgag gtcacatgcg tggtggtgga cgtgagccac 780

gaagaccctg aggtcaagtt caactggtac gtggacggcg tggaggtgca taatgccaag 840

acaaagccgc gggaggagca gtacgccagc acgtaccgtg tggtcagcgt cctcaccgtc 900

ctgcaccagg actggctgaa tggcaaggag tacaagtgca aggtctccaa caaagccctc 960

ccagccccca tcgagaaaac catctccaaa gccaaagggc agccccgaga accacaggtg 1020

tacaccctgc ccccatcccg ggaggagatg accaagaacc aggtcagcct gacctgcctg 1080

gtcaaaggct tctatcccag cgacatcgcc gtggagtggg agagcaatgg gcagccggag 1140

aacaactaca agaccacgcc tcccgtgctg gactccgacg gctccttctt cctctacagc 1200

aagctcaccg tggacaagag caggtggcag caggggaacg tcttctcatg ctccgtgatg 1260

catgaggctc tgcacaacca ctacacgcag aagagcctct ccctgtctcc gggtaaatga 1320

<210> 332
<211> 327
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 332
cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg ggacacccct gacactcacc 60

tgcacagtct ctggaatcgg cctcagtagc tactacatgc agtgggtccg ccagtctcca 120

gggaggggggc tggaatggat cggagtcatt ggtagtgatg gtaagacata ctacgcgacc 180

tgggcgaaag gccgattcac catctccaag acctcgtcga ccacggtgga tctgagaatg 240

gccagtctga caaccgagga cacggccacc tatttctgta ccagagggga catctggggc 300

ccggggaccc tcgtcaccgt ctcgagc 327

<210> 333
<211> 87
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 333
cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg ggacacccct gacactcacc 60

tgcacagtct ctggaatcgg cctcagt 87

<210> 334
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 334
agctactaca tgcag 15

<210> 335
<211> 42
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 335
tgggtccgcc agtctccagg gaggggggctg gaatggatcg ga 42

<210> 336
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 336
gtcattggta gtgatggtaa gacatactac gcgacctggg cgaaaggc 48

<210> 337
<211> 93
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 337
cgattcacca tctccaagac ctcgtcgacc acggtggatc tgagaatggc cagtctgaca 60

accgaggaca cggccaccta tttctgtacc aga 93

<210> 338
<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 338
ggggacatc 9

<210> 339
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 339
tggggcccgg ggaccctcgt caccgtctcg agc 33

<210> 340
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 340
gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggacccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 341
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 341

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

Thr Val Thr Ile Asn Cys Gln Ala Ser Gln Asn Val Tyr Asn Asn Asn
20 25 30

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

Ile Tyr Ser Thr Ser Thr Leu Ala Ser Gly Val Ser Ser Arg Phe Arg
50 55 60

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

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

Arg Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Glu Val Val Val 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 Val 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> 342
<211> 113
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 342

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

Thr Val Thr Ile Asn Cys Gln Ala Ser Gln Asn Val Tyr Asn Asn Asn
20 25 30

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

Ile Tyr Ser Thr Ser Thr Leu Ala Ser Gly Val Ser Ser Arg Phe Arg
50 55 60

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

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

Arg Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Glu Val Val Val Lys
100 105 110

Arg

<210> 343
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 343

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

Thr Val Thr Ile Asn Cys
20

<210> 344
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 344

Gln Ala Ser Gln Asn Val Tyr Asn Asn Asn Tyr Leu Ala
1 5 10

<210> 345
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 345

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

<210> 346
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 346

Ser Thr Ser Thr Leu Ala Ser
1 5

<210> 347
<211> 32
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 347

Gly Val Ser Ser Arg Phe Arg Gly Ser Gly Ser Gly Thr Gln Phe Thr
1 5 10 15

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

<210> 348
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 348

Leu Gly Ser Tyr Asp Cys Ser Arg Gly Asp Cys Phe Val
1 5 10

<210> 349
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 349

Phe Gly Gly Gly Thr Glu Val Val Val Lys Arg
1 5 10

<210> 350
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 350

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 351
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 351
caagtgctga cccagactcc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgccagg ccagtcagaa tgtttataat aacaactacc tagcctggta tcagcagaaa 120

ccagggcagc ctcccaagca actgatctat tctacgtcca ctctggcatc tggggtctca 180

tcgcgattca gaggcagtgg atctgggaca cagttcactc tcaccatcag cgacgtgcag 240

tgtgacgatg ctgccactta ctactgtcta ggcagttatg attgtagtcg tggtgattgt 300

tttgttttcg gcggagggac cgaggtggtg gtcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 352
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 352
caagtgctga cccagactcc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgccagg ccagtcagaa tgtttataat aacaactacc tagcctggta tcagcagaaa 120

ccagggcagc ctcccaagca actgatctat tctacgtcca ctctggcatc tggggtctca 180

tcgcgattca gaggcagtgg atctgggaca cagttcactc tcaccatcag cgacgtgcag 240

tgtgacgatg ctgccactta ctactgtcta ggcagttatg attgtagtcg tggtgattgt 300

tttgttttcg gcggagggac cgaggtggtg gtcaaacgt 339

<210> 353

<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 353
caagtgctga cccagactcc atcccccgtg tctgcagctg tgggaagcac agtcaccatc 60

aattgc 66

<210> 354
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 354
caggccagtc agaatgttta taataacaac tacctagcc 39

<210> 355
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 355
tggtatcagc agaaaccagg gcagcctccc aagcaactga tctat 45

<210> 356
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 356
tctacgtcca ctctggcatc t 21

<210> 357
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 357
ggggtctcat cgcgattcag aggcagtgga tctgggacac agttcactct caccatcagc 60

gacgtgcagt gtgacgatgc tgccacttac tactgt 96

<210> 358
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 358
ctaggcagtt atgattgtag tcgtggtgat tgttttgtt 39

<210> 359
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 359
ttcggcggag ggaccgaggt ggtggtcaaa cgt 33

<210> 360
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 360
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 361
<211> 441
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 361

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 Val Ser Gly Ile Gly Leu Ser Ser Tyr
20 25 30

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

Gly Val Ile Gly Ser Asp Gly Lys Thr Tyr Tyr Ala Thr Trp Ala Lys
50 55 60

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

65 70 75 80

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
100 105 110

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

Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
130 135 140

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
145 150 155 160

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

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

Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg
195 200 205

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

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

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
245 250 255

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
260 265 270

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
275 280 285

Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
290 295 300

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

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
325 330 335

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met

340 345 350

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
355 360 365

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
370 375 380

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

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

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

Lys Ser Leu Ser Leu Ser Pro Gly Lys
435 440

<210> 362
<211> 111
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 362

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 Val Ser Gly Ile Gly Leu Ser Ser Tyr
20 25 30

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

Gly Val Ile Gly Ser Asp Gly Lys Thr Tyr Tyr Ala Thr Trp Ala Lys
50 55 60

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
100 105 110

<210> 363
<211> 30
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 363

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 Val Ser Gly Ile Gly Leu Ser
20 25 30

<210> 364
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 364

Ser Tyr Tyr Met Gln
1 5

<210> 365
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 365

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

<210> 366
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 366

Val Ile Gly Ser Asp Gly Lys Thr Tyr Tyr Ala Thr Trp Ala Lys Gly
1 5 10 15

<210> 367
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 367

Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Thr Thr Val Tyr Leu Gln

1 5 10 15

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

<210> 368
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 368

Gly Asp Ile
1

<210> 369
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 369

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 370
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 370

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95

```
Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
            100                 105                 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
        115                 120                 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
    130                 135                 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145                 150                 155                 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
                165                 170                 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
            180                 185                 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
        195                 200                 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
    210                 215                 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225                 230                 235                 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
                245                 250                 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
            260                 265                 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
        275                 280                 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
    290                 295                 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305                 310                 315                 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
                325                 330
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<210> 371
<211> 1326
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 371
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cggcctcagt agctactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtagtg atggtaagac atactacgcg 180

acctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtaccag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agcgcctcca ccaagggccc atcggtcttc 360

cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg ctgcctggtc 420

aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct gaccagcggc 480

gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag cagcgtggtg 540

accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa tcacaagccc 600

agcaacacca aggtggacaa gagagttgag cccaaatctt gtgacaaaac tcacacatgc 660

ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt cccccaaaa 720

cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt ggtggacgtg 780

agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga ggtgcataat 840

gccaagacaa agccgcggga ggagcagtac gccagcacgt accgtgtggt cagcgtcctc 900

accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt ctccaacaaa 960

gccctcccag ccccatcga gaaaaccatc tccaaagcca aagggcagcc ccgagaacca 1020

caggtgtaca ccctgccccc atcccgggag gagatgacca agaaccaggt cagcctgacc 1080

tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag caatgggcag 1140

ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc cttcttcctc 1200

tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt ctcatgctcc 1260

gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct gtctccgggt 1320

aaatga 1326

<210> 372
<211> 333
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 372
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cggcctcagt agctactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtagtg atggtaagac atactacgcg 180

acctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtaccag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agc 333

<210> 373
<211> 90
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 373
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cggcctcagt 90

<210> 374
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 374
agctactaca tgcaa 15

<210> 375
<211> 42
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 375
tgggtccgtc aggctccagg gaaggggctg gagtgggtcg ga 42

<210> 376
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 376
gtcattggta gtgatggtaa gacatactac gcgacctggg cgaaaggc 48

<210> 377
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 377
cgattcacca tctccagaga caattccaag accacggtgt atcttcaaat gaacagcctg 60

agagctgagg acactgctgt gtatttctgt accaga 96

<210> 378

<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 378
ggggacatc 9

<210> 379
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 379
tggggccaag ggaccctcgt caccgtctcg agc 33

<210> 380
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 380
gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggacccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 381

<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 381

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

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

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

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

Arg Gly Asp Cys Phe Val Phe Gly Gly 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 Val 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
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<210> 382
<211> 113
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 382

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

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

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

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

Arg Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

Arg

<210> 383
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 383

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

Arg Val Thr Ile Asn Cys
20

<210> 384
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 384

Gln Ala Ser Gln Asn Val Tyr Asn Asn Asn Tyr Leu Ala

1 5 10

<210> 385
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 385

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

<210> 386
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 386

Ser Thr Ser Thr Leu Ala Ser
1 5

<210> 387
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 387

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

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Val Ala Thr Tyr Tyr Cys
20 25 30

<210> 388
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 388

Leu Gly Ser Tyr Asp Cys Ser Arg Gly Asp Cys Phe Val
1 5 10

<210> 389
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 389

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
1 5 10

<210> 390
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 390

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 391
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 391
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagaa tgtttacaat aacaactacc tagcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtagtcg tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 392
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 392
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagaa tgtttacaat aacaactacc tagcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtagtcg tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgt 339

<210> 393
<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 393
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgc 66

<210> 394
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 394
caggccagtc agaatgttta caataacaac tacctagcc 39

<210> 395
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 395

tggtatcagc agaaaccagg gaaagttcct aagcaactga tctat 45

<210> 396
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 396
tctacatcca ctctggcatc t 21

<210> 397
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 397
ggggtcccat ctcgtttcag tggcagtgga tctgggacag atttcactct caccatcagc 60

agcctgcagc ctgaagatgt tgcaacttat tactgt 96

<210> 398
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 398
ctgggcagtt atgattgtag tcgtggtgat tgttttgtt 39

<210> 399
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 399
ttcggcggag gaaccaaggt ggaaatcaaa cgt 33

<210> 400
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 400
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 401
<211> 439
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 401

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

Leu Thr Leu Thr Cys Thr Val Ser Gly Ile Asp Val Thr Asn Tyr Tyr
20 25 30

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

Val Ile Gly Val Asn Gly Lys Arg Tyr Tyr Ala Ser Trp Ala Lys Gly
50 55 60

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

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

Asp Ile Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr
100 105 110

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

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu
130 135 140

Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His
145 150 155 160

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

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys
180 185 190

Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu
195 200 205

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

Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys
225                 230                 235                 240

Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val
                245                 250                 255

Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
            260                 265                 270

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr
        275                 280                 285

Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
    290                 295                 300

Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu
305                 310                 315                 320

Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg
                325                 330                 335

Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys
            340                 345                 350

Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp
        355                 360                 365

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

Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser
385                 390                 395                 400

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

Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser
            420                 425                 430

Leu Ser Leu Ser Pro Gly Lys
        435
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<210> 402
<211> 109
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 402

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

Leu Thr Leu Thr Cys Thr Val Ser Gly Ile Asp Val Thr Asn Tyr Tyr
20 25 30

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

Val Ile Gly Val Asn Gly Lys Arg Tyr Tyr Ala Ser Trp Ala Lys Gly
50 55 60

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

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

Asp Ile Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser
100 105

<210> 403
<211> 29
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 403

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

Leu Thr Leu Thr Cys Thr Val Ser Gly Ile Asp Val Thr
20 25

<210> 404
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 404

Asn Tyr Tyr Met Gln
1 5

<210> 405
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 405

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

<210> 406
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 406

Val Ile Gly Val Asn Gly Lys Arg Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 407
<211> 31
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 407

Arg Phe Thr Ile Ser Lys Thr Ser Ser Thr Thr Val Asp Leu Lys Met
1 5 10 15

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

<210> 408
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 408

Gly Asp Ile
1

<210> 409
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 409

Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 410
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 410

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
100 105 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
115 120 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
165 170 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
180 185 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
195 200 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
210 215 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu

225 230 235 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
245 250 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
260 265 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
275 280 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 411
<211> 1320
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 411
cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg gaggatccct gacactcacc 60

tgcacagtct ctggaatcga cgtcactaac tactatatgc aatgggtccg ccaggctcca 120

gggaaggggc tggaatggat cggagtcatt ggtgtgaatg gtaagagata ctacgcgagc 180

tgggcgaaag gccgattcac catctccaaa acctcgtcga ccacggtgga tctgaaaatg 240

accagtctga caaccgagga cacggccacc tatttctgtg ccagaggcga catctggggc 300

ccggggaccc tcgtcaccgt ctcgagcgcc tccaccaagg gcccatcggt cttccccctg 360

gcaccctcct ccaagagcac ctctgggggc acagcggccc tgggctgcct ggtcaaggac 420

tacttccccg aaccggtgac ggtgtcgtgg aactcaggcg ccctgaccag cggcgtgcac 480

accttcccgg ctgtcctaca gtcctcagga ctctactccc tcagcagcgt ggtgaccgtg 540

ccctccagca gcttgggcac ccagacctac atctgcaacg tgaatcacaa gcccagcaac 600

accaaggtgg acaagagagt tgagcccaaa tcttgtgaca aaactcacac atgcccaccg 660

tgcccagcac ctgaactcct gggggggaccg tcagtcttcc tcttcccccc aaaacccaag 720

gacaccctca tgatctcccg gacccctgag gtcacatgcg tggtggtgga cgtgagccac 780

gaagaccctg aggtcaagtt caactggtac gtggacggcg tggaggtgca taatgccaag 840

acaaagccgc gggaggagca gtacgccagc acgtaccgtg tggtcagcgt cctcaccgtc 900

ctgcaccagg actggctgaa tggcaaggag tacaagtgca aggtctccaa caaagccctc 960

ccagccccca tcgagaaaac catctccaaa gccaaagggc agccccgaga accacaggtg 1020

tacaccctgc ccccatcccg ggaggagatg accaagaacc aggtcagcct gacctgcctg 1080

gtcaaaggct tctatcccag cgacatcgcc gtggagtggg agagcaatgg gcagccggag 1140

aacaactaca agaccacgcc tcccgtgctg gactccgacg gctccttctt cctctacagc 1200

aagctcaccg tggacaagag caggtggcag caggggaacg tcttctcatg ctccgtgatg 1260

catgaggctc tgcacaacca ctacacgcag aagagcctct ccctgtctcc gggtaaatga 1320

<210> 412
<211> 327
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 412
cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg gaggatccct gacactcacc 60

tgcacagtct ctggaatcga cgtcactaac tactatatgc aatgggtccg ccaggctcca 120

gggaaggggc tggaatggat cggagtcatt ggtgtgaatg gtaagagata ctacgcgagc 180

tgggcgaaag gccgattcac catctccaaa acctcgtcga ccacggtgga tctgaaaatg 240

accagtctga caaccgagga cacggccacc tatttctgtg ccagaggcga catctggggc 300

ccggggaccc tcgtcaccgt ctcgagc 327

<210> 413
<211> 87
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 413
cagtcgctgg aggagtccgg gggtcgcctg gtcacgcctg gaggatccct gacactcacc 60

tgcacagtct ctggaatcga cgtcact 87

<210> 414
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 414
aactactata tgcaa 15

<210> 415
<211> 42
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 415
tgggtccgcc aggctccagg gaaggggctg gaatggatcg ga 42

<210> 416
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 416
gtcattggtg tgaatggtaa gagatactac gcgagctggg cgaaaggc 48

<210> 417
<211> 93
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 417
cgattcacca tctccaaaac ctcgtcgacc acggtggatc tgaaaatgac cagtctgaca 60

accgaggaca cggccaccta tttctgtgcc aga 93

<210> 418
<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 418
ggcgacatc 9

<210> 419
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 419
tggggcccgg ggaccctcgt caccgtctcg agc 33

<210> 420
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 420
gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggacccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 421
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 421

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

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

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

Ile Tyr Ser Thr Ser Thr Leu Ala Ser Gly Val Ser Ser Arg Phe Lys
50 55 60

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

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

Asn Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Glu Val Val Val Lys
100 105 110

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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 Val 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>  422
<211>  113
<212>  PRT
<213>  Artificial

<220>
<223>  Engineered antibody sequence

<400>  422

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

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

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

Ile Tyr Ser Thr Ser Thr Leu Ala Ser Gly Val Ser Ser Arg Phe Lys
    50                  55                  60

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

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

Asn Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Glu Val Val Val Lys
            100                 105                 110

Arg
```

<210> 423
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 423

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

Thr Val Thr Ile Asn Cys
20

<210> 424
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 424

Arg Ala Ser Gln Ser Val Tyr Tyr Asn Asn Tyr Leu Ala
1 5 10

<210> 425
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 425

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

<210> 426
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 426

Ser Thr Ser Thr Leu Ala Ser
1 5

<210> 427
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 427

Gly Val Ser Ser Arg Phe Lys Gly Ser Gly Ser Gly Thr Gln Phe Thr
1 5 10 15

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

<210> 428
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 428

Leu Gly Ser Tyr Asp Cys Ser Asn Gly Asp Cys Phe Val
1 5 10

<210> 429
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 429

Phe Gly Gly Gly Thr Glu Val Val Val Lys Arg
1 5 10

<210> 430
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 430

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys

65 70 75 80

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 431
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 431
caggtgctga cccagactgc atcccccgtg tctccagctg tgggaagcac agtcaccatc 60

aattgccggg ccagtcagag tgtttattat aacaactacc tagcctggta tcagcagaaa 120

ccagggcagc ctcccaagca actgatctat tctacatcca ctctggcatc tggggtctca 180

tcgcggttca aaggcagtgg atctgggaca cagttcactc tcaccatcag cgacgtgcag 240

tgtgacgatg ctgccactta ctactgtcta ggcagttatg attgtagtaa tggtgattgt 300

tttgttttcg gcggagggac cgaggtggtg gtcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 432
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 432
caggtgctga cccagactgc atcccccgtg tctccagctg tgggaagcac agtcaccatc 60

aattgccggg ccagtcagag tgtttattat aacaactacc tagcctggta tcagcagaaa 120

ccagggcagc ctcccaagca actgatctat tctacatcca ctctggcatc tggggtctca 180

tcgcggttca aaggcagtgg atctgggaca cagttcactc tcaccatcag cgacgtgcag 240

tgtgacgatg ctgccactta ctactgtcta ggcagttatg attgtagtaa tggtgattgt 300

tttgttttcg gcggagggac cgaggtggtg gtcaaacgt 339

<210> 433
<211> 66
<212> DNA

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 433
caggtgctga cccagactgc atcccccgtg tctccagctg tgggaagcac agtcaccatc 60

aattgc 66

<210> 434
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 434
cgggccagtc agagtgttta ttataacaac tacctagcc 39

<210> 435
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 435
tggtatcagc agaaaccagg gcagcctccc aagcaactga tctat 45

<210> 436
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 436
tctacatcca ctctggcatc t 21

<210> 437
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 437
ggggtctcat cgcggttcaa aggcagtgga tctgggacac agttcactct caccatcagc 60

gacgtgcagt gtgacgatgc tgccacttac tactgt 96

<210> 438
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 438
ctaggcagtt atgattgtag taatggtgat tgttttgtt 39

<210> 439
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 439
ttcggcggag ggaccgaggt ggtggtcaaa cgt 33

<210> 440
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 440
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 441
<211> 441
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 441

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 Val Ser Gly Ile Asp Val Thr Asn Tyr
20 25 30

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

Gly Val Ile Gly Val Asn Gly Lys Arg Tyr Tyr Ala Ser Trp Ala Lys
50 55 60

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
            100                 105                 110

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

Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
    130                 135                 140

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
145                 150                 155                 160

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

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

Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg
        195                 200                 205

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

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

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
                245                 250                 255

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
            260                 265                 270

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
        275                 280                 285

Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
    290                 295                 300

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

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
                325                 330                 335

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
            340                 345                 350
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```
Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
        355                 360                 365


Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
    370                 375                 380


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


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


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


Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440


<210>  442
<211>  111
<212>  PRT
<213>  Artificial

<220>
<223>  Engineered antibody sequence

<400>  442

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 Val Ser Gly Ile Asp Val Thr Asn Tyr
            20                  25                  30


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


Gly Val Ile Gly Val Asn Gly Lys Arg Tyr Tyr Ala Ser Trp Ala Lys
    50                  55                  60


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


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


Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
            100                 105                 110


<210>  443
<211>  30
<212>  PRT
<213>  Artificial
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<220>
<223> Engineered antibody sequence

<400> 443

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 Val Ser Gly Ile Asp Val Thr
20 25 30

<210> 444
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 444

Asn Tyr Tyr Met Gln
1 5

<210> 445
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 445

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

<210> 446
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 446

Val Ile Gly Val Asn Gly Lys Arg Tyr Tyr Ala Ser Trp Ala Lys Gly
1 5 10 15

<210> 447
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 447

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

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

<210> 448
<211> 3
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 448

Gly Asp Ile
1

<210> 449
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 449

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
1 5 10

<210> 450
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 450

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys

100 105 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
115 120 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
165 170 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
180 185 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
195 200 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
210 215 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225 230 235 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
245 250 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
260 265 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
275 280 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 451
<211> 1326
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 451

gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacgtcact aactactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtgtga atggtaagag atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgccag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agcgcctcca ccaagggccc atcggtcttc 360

cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg ctgcctggtc 420

aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct gaccagcggc 480

gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag cagcgtggtg 540

accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa tcacaagccc 600

agcaacacca aggtggacaa gagagttgag cccaaatctt gtgacaaaac tcacacatgc 660

ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt cccccaaaa 720

cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt ggtggacgtg 780

agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga ggtgcataat 840

gccaagacaa agccgcggga ggagcagtac gccagcacgt accgtgtggt cagcgtcctc 900

accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt ctccaacaaa 960

gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc ccgagaacca 1020

caggtgtaca ccctgccccc atcccgggag gagatgacca agaaccaggt cagcctgacc 1080

tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag caatgggcag 1140

ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc cttcttcctc 1200

tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt ctcatgctcc 1260

gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct gtctccgggt 1320

aaatga 1326

<210> 452
<211> 333
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 452
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacgtcact aactactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtgtga atggtaagag atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgccag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agc 333

<210> 453
<211> 90
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 453
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacgtcact 90

<210> 454
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 454
aactactaca tgcaa 15

<210> 455
<211> 42
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 455
tgggtccgtc aggctccagg gaaggggctg gagtgggtcg ga 42

<210> 456
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 456
gtcattggtg tgaatggtaa gagatactac gcgagctggg cgaaaggc 48

<210> 457
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 457
cgattcacca tctccagaga caattccaag accacggtgt atcttcaaat gaacagcctg 60

agagctgagg acactgctgt gtatttctgt gccaga 96

<210> 458
<211> 9
<212> DNA

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 458
ggggacatc 9

<210> 459
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 459
tggggccaag ggaccctcgt caccgtctcg agc 33

<210> 460
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 460
gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggaccccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 461
<211> 219
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 461

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

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

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

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

Asn Gly Asp Cys Phe Val Phe Gly Gly 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 Val 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
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<210> 462
<211> 113
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 462

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

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

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

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

Asn Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

Arg

<210> 463
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 463

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

Arg Val Thr Ile Asn Cys
20

<210> 464
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 464

Arg Ala Ser Gln Ser Val Tyr Tyr Asn Asn Tyr Leu Ala
1 5 10

<210> 465
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 465

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

<210> 466
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 466

Ser Thr Ser Thr Leu Ala Ser
1 5

<210> 467
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 467

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

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Val Ala Thr Tyr Tyr Cys
20 25 30

<210> 468
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 468

Leu Gly Ser Tyr Asp Cys Ser Asn Gly Asp Cys Phe Val
1 5 10

<210> 469
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 469

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
1 5 10

<210> 470
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 470

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 471
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 471
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccggg ccagtcagag tgtttactat aacaactacc tagcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtagtaa tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 472
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 472
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccggg ccagtcagag tgtttactat aacaactacc tagcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtagtaa tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgt 339

<210> 473
<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 473
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgc 66

<210> 474
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 474
cgggccagtc agagtgttta ctataacaac tacctagcc 39

<210> 475
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 475
tggtatcagc agaaaccagg gaaagttcct aagcaactga tctat 45

<210> 476
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 476
tctacatcca ctctggcatc t 21

<210> 477
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 477
ggggtcccat ctcgtttcag tggcagtgga tctgggacag atttcactct caccatcagc 60

agcctgcagc ctgaagatgt tgcaacttat tactgt 96

<210> 478
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 478
ctgggcagtt atgattgtag taatggtgat tgttttgtt 39

<210> 479
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 479
ttcggcggag gaaccaaggt ggaaatcaaa cgt 33

<210> 480
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 480
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 481
<211> 441
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 481

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

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

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

Cys Ile Tyr Asn Gly Asp Gly Ser Thr Tyr Tyr Ala Ser Trp Val Asn
50 55 60

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

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

Asp Leu Asp Leu Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser Ala
100 105 110

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

Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
130 135 140

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
145 150 155 160

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

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

Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg
195 200 205

Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro

210 215 220

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

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
245 250 255

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
260 265 270

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
275 280 285

Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
290 295 300

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

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
325 330 335

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
340 345 350

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
355 360 365

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
370 375 380

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

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

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

Lys Ser Leu Ser Leu Ser Pro Gly Lys
435 440

<210> 482
<211> 111
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 482

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

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

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

Cys Ile Tyr Asn Gly Asp Gly Ser Thr Tyr Tyr Ala Ser Trp Val Asn
50 55 60

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

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

Asp Leu Asp Leu Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser
100 105 110

<210> 483
<211> 29
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 483

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

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

<210> 484
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 484

Ser Asn Ala Met Trp
1 5

<210> 485
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 485

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

<210> 486
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 486

Cys Ile Tyr Asn Gly Asp Gly Ser Thr Tyr Tyr Ala Ser Trp Val Asn
1 5 10 15

Gly

<210> 487
<211> 31
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 487

Arg Phe Ser Ile Ser Lys Thr Ser Ser Thr Thr Val Thr Leu Gln Leu
1 5 10 15

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

<210> 488
<211> 4
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 488

Asp Leu Asp Leu
1

<210> 489
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 489

Trp Gly Pro Gly Thr Leu Val Thr Val Ser Ser

1 5 10

<210> 490
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 490

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
100 105 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
115 120 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
165 170 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
180 185 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
195 200 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
210 215 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225 230 235 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
245 250 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
260 265 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
275 280 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 491
<211> 1326
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 491
cagtcggtgg aggagtccgg gggaggcctg gtccagcctg agggatccct gacactcacc 60

tgcacagcct ctggattcga cttcagtagc aatgcaatgt ggtgggtccg ccaggctcca 120

gggaaggggc tggagtggat cggatgcatt tacaatggtg atggcagcac atactacgcg 180

agctgggtga atggccgatt ctccatctcc aaaacctcgt cgaccacggt gactctgcaa 240

ctgaatagtc tgacagtcgc ggacacggcc acgtattatt gtgcgagaga tcttgacttg 300

tggggcccgg gcaccctcgt caccgtctcg agcgcctcca ccaagggccc atcggtcttc 360

cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg ctgcctggtc 420

aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct gaccagcggc 480

gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag cagcgtggtg 540

accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa tcacaagccc 600

agcaacacca aggtggacaa gagagttgag cccaaatctt gtgacaaaac tcacacatgc 660

ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt cccccaaaa 720

cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt ggtggacgtg 780

agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga ggtgcataat 840

gccaagacaa agccgcggga ggagcagtac gccagcacgt accgtgtggt cagcgtcctc 900

accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt ctccaacaaa 960

gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc ccgagaacca 1020

caggtgtaca ccctgccccc atcccgggag gagatgacca agaaccaggt cagcctgacc 1080

tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag caatgggcag 1140

ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc cttcttcctc 1200

tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt ctcatgctcc 1260

gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct gtctccgggt 1320

aaatga 1326

<210> 492
<211> 333
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 492
cagtcggtgg aggagtccgg gggaggcctg gtccagcctg agggatccct gacactcacc 60

tgcacagcct ctggattcga cttcagtagc aatgcaatgt ggtgggtccg ccaggctcca 120

gggaaggggc tggagtggat cggatgcatt tacaatggtg atggcagcac atactacgcg 180

agctgggtga atggccgatt ctccatctcc aaaacctcgt cgaccacggt gactctgcaa 240

ctgaatagtc tgacagtcgc ggacacggcc acgtattatt gtgcgagaga tcttgacttg 300

tggggcccgg gcaccctcgt caccgtctcg agc 333

<210> 493
<211> 87
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 493
cagtcggtgg aggagtccgg gggaggcctg gtccagcctg agggatccct gacactcacc 60

tgcacagcct ctggattcga cttcagt 87

<210> 494
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 494
agcaatgcaa tgtgg 15

<210> 495
<211> 42
<212> DNA

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 495
tgggtccgcc aggctccagg gaaggggctg gagtggatcg ga 42

<210> 496
<211> 51
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 496
tgcatttaca atggtgatgg cagcacatac tacgcgagct gggtgaatgg c 51

<210> 497
<211> 93
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 497
cgattctcca tctccaaaac ctcgtcgacc acggtgactc tgcaactgaa tagtctgaca 60

gtcgcggaca cggccacgta ttattgtgcg aga 93

<210> 498
<211> 12
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 498
gatcttgact tg 12

<210> 499
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 499
tggggcccgg gcaccctcgt caccgtctcg agc 33

<210> 500
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 500

gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacaagag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggaccccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 501
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 501

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

Asp Thr Val Thr Ile Asn Cys Gln Ala Ser Glu Ser Leu Tyr Asn Asn
20 25 30

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

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

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

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

Ser Val Asp Gly Val Ala Phe Ala Gly Gly Thr Glu Val Val Val 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 Val 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> 502
<211> 113
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 502

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

Asp Thr Val Thr Ile Asn Cys Gln Ala Ser Glu Ser Leu Tyr Asn Asn
20 25 30

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

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

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

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

Ser Val Asp Gly Val Ala Phe Ala Gly Gly Thr Glu Val Val Val Lys

100 105 110

Arg

<210> 503
<211> 23
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 503

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

Asp Thr Val Thr Ile Asn Cys
20

<210> 504
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 504

Gln Ala Ser Glu Ser Leu Tyr Asn Asn Asn Ala Leu Ala
1 5 10

<210> 505
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 505

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

<210> 506
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 506

Asp Ala Ser Lys Leu Ala Ser
1 5

<210> 507

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

<220>
<223> Engineered antibody sequence

<400> 507

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

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

<210> 508
<211> 12
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 508

Gly Gly Tyr Arg Ser Asp Ser Val Asp Gly Val Ala
1 5 10

<210> 509
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 509

Phe Ala Gly Gly Thr Glu Val Val Val Lys Arg
1 5 10

<210> 510
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 510

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr

50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 511
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 511
gccatcgtga tgacccagac tccatcttcc aagtctgtcc ctgtgggaga cacagtcacc 60

atcaattgcc aggccagtga gagtctttat aataacaacg ccttggcctg gtttcagcag 120

aaaccagggc agcctcccaa gcgcctgatc tatgatgcat ccaaactggc atctggggtc 180

ccatcgcggt tcagtggcgg tgggtctggg acacagttca ctctcaccat cagtggcgtg 240

cagtgtgacg atgctgccac ttactactgt ggaggctaca gaagtgatag tgttgatggt 300

gttgctttcg ccggagggac cgaggtggtg gtcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 512
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 512
gccatcgtga tgacccagac tccatcttcc aagtctgtcc ctgtgggaga cacagtcacc 60

atcaattgcc aggccagtga gagtctttat aataacaacg ccttggcctg gtttcagcag 120

aaaccagggc agcctcccaa gcgcctgatc tatgatgcat ccaaactggc atctggggtc 180

ccatcgcggt tcagtggcgg tgggtctggg acacagttca ctctcaccat cagtggcgtg 240

cagtgtgacg atgctgccac ttactactgt ggaggctaca gaagtgatag tgttgatggt 300

gttgctttcg ccggagggac cgaggtggtg gtcaaacgt 339

<210> 513
<211> 69
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 513
gccatcgtga tgacccagac tccatcttcc aagtctgtcc ctgtgggaga cacagtcacc 60

atcaattgc 69

<210> 514
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 514
caggccagtg agagtcttta taataacaac gccttggcc 39

<210> 515
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 515
tggtttcagc agaaaccagg gcagcctccc aagcgcctga tctat 45

<210> 516
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 516
gatgcatcca aactggcatc t 21

<210> 517
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 517
ggggtcccat cgcggttcag tggcggtggg tctgggacac agttcactct caccatcagt 60

ggcgtgcagt gtgacgatgc tgccacttac tactgt 96

<210> 518
<211> 36
<212> DNA

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 518
ggaggctaca gaagtgatag tgttgatggt gttgct 36

<210> 519
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 519
ttcgccggag ggaccgaggt ggtggtcaaa cgt 33

<210> 520
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 520
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 521
<211> 441
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 521

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 Val Ser Gly Ile Gly Leu Ser Ser Tyr
20 25 30

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

Gly Val Ile Gly Ser Asp Gly Lys Thr Tyr Tyr Ala Thr Trp Ala Lys
50 55 60

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
            100                 105                 110

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

Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
    130                 135                 140

Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
145                 150                 155                 160

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

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

Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Ala Arg
        195                 200                 205

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

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

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
                245                 250                 255

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
            260                 265                 270

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
        275                 280                 285

Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
    290                 295                 300

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

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
                325                 330                 335
```

```
Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
            340                 345                 350

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
        355                 360                 365

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
    370                 375                 380

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

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

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

Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440


<210>  522
<211>  111
<212>  PRT
<213>  Artificial

<220>
<223>  Engineered antibody sequence

<400>  522

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 Val Ser Gly Ile Gly Leu Ser Ser Tyr
            20                  25                  30

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

Gly Val Ile Gly Ser Asp Gly Lys Thr Tyr Tyr Ala Thr Trp Ala Lys
    50                  55                  60

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

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

Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
            100                 105                 110

<210>  523
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<211> 30
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 523

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 Val Ser Gly Ile Gly Leu Ser
20 25 30

<210> 524
<211> 5
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 524

Ser Tyr Tyr Met Gln
1 5

<210> 525
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 525

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

<210> 526
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 526

Val Ile Gly Ser Asp Gly Lys Thr Tyr Tyr Ala Thr Trp Ala Lys Gly
1 5 10 15

<210> 527
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 527

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


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


<210>  528
<211>  3
<212>  PRT
<213>  Artificial

<220>
<223>  Engineered antibody sequence

<400>  528

Gly Asp Ile
1


<210>  529
<211>  11
<212>  PRT
<213>  Artificial

<220>
<223>  Engineered antibody sequence

<400>  529

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
1               5                   10


<210>  530
<211>  330
<212>  PRT
<213>  Artificial

<220>
<223>  Engineered antibody sequence

<400>  530

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1               5                   10                  15


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


Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45


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


Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65                  70                  75                  80


Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Ala
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85 90 95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
100 105 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
115 120 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
165 170 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
180 185 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
195 200 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
210 215 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225 230 235 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
245 250 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
260 265 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
275 280 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 531
<211> 1326
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 531
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cggcctcagt agctactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtagtg atggtaagac atactacgcg 180

acctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtaccag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agcgcctcca ccaagggccc atcggtcttc 360

cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg ctgcctggtc 420

aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct gaccagcggc 480

gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag cagcgtggtg 540

accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa tcacaagccc 600

agcaacacca aggtggacgc gagagttgag cccaaatctt gtgacaaaac tcacacatgc 660

ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt cccccaaaa 720

cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt ggtggacgtg 780

agccacgaag accctgaggt caagttcaac tggtacgtgg acggcgtgga ggtgcataat 840

gccaagacaa agccgcggga ggagcagtac gccagcacgt accgtgtggt cagcgtcctc 900

accgtcctgc accaggactg gctgaatggc aaggagtaca agtgcaaggt ctccaacaaa 960

gccctcccag cccccatcga gaaaaccatc tccaaagcca aagggcagcc ccgagaacca 1020

caggtgtaca ccctgccccc atcccgggag gagatgacca agaaccaggt cagcctgacc 1080

tgcctggtca aaggcttcta tcccagcgac atcgccgtgg agtgggagag caatgggcag 1140

ccggagaaca actacaagac cacgcctccc gtgctggact ccgacggctc cttcttcctc 1200

tacagcaagc tcaccgtgga caagagcagg tggcagcagg ggaacgtctt ctcatgctcc 1260

gtgatgcatg aggctctgca caaccactac acgcagaaga gcctctccct gtctccgggt 1320

aaatga 1326

<210> 532
<211> 333
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 532
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cggcctcagt agctactaca tgcaatgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtagtg atggtaagac atactacgcg 180

acctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtaccag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agc 333

<210> 533
<211> 90
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 533
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cggcctcagt 90

<210> 534
<211> 15
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 534
agctactaca tgcaa 15

<210> 535
<211> 42
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 535
tgggtccgtc aggctccagg gaaggggctg gagtgggtcg ga 42

<210> 536
<211> 48
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 536
gtcattggta gtgatggtaa gacatactac gcgacctggg cgaaaggc 48

<210> 537
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 537
cgattcacca tctccagaga caattccaag accacggtgt atcttcaaat gaacagcctg 60

agagctgagg acactgctgt gtatttctgt accaga 96

<210> 538
<211> 9
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 538
ggggacatc 9

<210> 539
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 539
tggggccaag ggaccctcgt caccgtctcg agc 33

<210> 540
<211> 993
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 540
gcctccacca agggcccatc ggtcttcccc ctggcaccct cctccaagag cacctctggg 60

ggcacagcgg ccctgggctg cctggtcaag gactacttcc ccgaaccggt gacggtgtcg 120

tggaactcag gcgccctgac cagcggcgtg cacaccttcc cggctgtcct acagtcctca 180

ggactctact ccctcagcag cgtggtgacc gtgccctcca gcagcttggg cacccagacc 240

tacatctgca acgtgaatca caagcccagc aacaccaagg tggacgcgag agttgagccc 300

aaatcttgtg acaaaactca cacatgccca ccgtgcccag cacctgaact cctgggggga 360

ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc tcatgatctc ccggacccct 420

gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc ctgaggtcaa gttcaactgg 480

tacgtggacg gcgtggaggt gcataatgcc aagacaaagc cgcgggagga gcagtacgcc 540

agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc aggactggct gaatggcaag 600

gagtacaagt gcaaggtctc caacaaagcc ctcccagccc ccatcgagaa aaccatctcc 660

aaagccaaag ggcagccccg agaaccacag gtgtacaccc tgccccatc ccgggaggag 720

atgaccaaga accaggtcag cctgacctgc ctggtcaaag gcttctatcc cagcgacatc 780

gccgtggagt gggagagcaa tgggcagccg gagaacaact acaagaccac gcctcccgtg 840

ctggactccg acggctcctt cttcctctac agcaagctca ccgtggacaa gagcaggtgg 900

cagcagggga acgtcttctc atgctccgtg atgcatgagg ctctgcacaa ccactacacg 960

cagaagagcc tctccctgtc tccgggtaaa tga 993

<210> 541
<211> 219
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 541

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

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

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

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

Arg Gly Asp Cys Phe Val Phe Gly Gly 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 Val 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> 542

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

<220>
<223> Engineered antibody sequence

<400> 542

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

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

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

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

Arg Gly Asp Cys Phe Val Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
100 105 110

Arg

<210> 543
<211> 22
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 543

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

Arg Val Thr Ile Asn Cys
20

<210> 544
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 544

Gln Ala Ser Gln Asn Val Tyr Asn Asn Asn Tyr Leu Ala
1 5 10

<210> 545
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 545

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

<210> 546
<211> 7
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 546

Ser Thr Ser Thr Leu Ala Ser
1 5

<210> 547
<211> 32
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 547

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

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Val Ala Thr Tyr Tyr Cys
20 25 30

<210> 548
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 548

Leu Gly Ser Tyr Asp Cys Ser Arg Gly Asp Cys Phe Val
1 5 10

<210> 549
<211> 11
<212> PRT

<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 549

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
1 5 10

<210> 550
<211> 106
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 550

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 551
<211> 660
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 551
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagaa tgtttacaat aacaactacc tagcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtagtcg tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgta cggtggctgc accatctgtc 360

ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg 420

ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa 480

tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc 540

agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa 600

gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgttag 660

<210> 552
<211> 339
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 552
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgccagg ccagtcagaa tgtttacaat aacaactacc tagcctggta tcagcagaaa 120

ccagggaaag ttcctaagca actgatctat tctacatcca ctctggcatc tggggtccca 180

tctcgtttca gtggcagtgg atctgggaca gatttcactc tcaccatcag cagcctgcag 240

cctgaagatg ttgcaactta ttactgtctg ggcagttatg attgtagtcg tggtgattgt 300

tttgttttcg gcggaggaac caaggtggaa atcaaacgt 339

<210> 553
<211> 66
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 553
caagtgctga cccagtctcc atcctccctg tctgcatctg taggagacag agtcaccatc 60

aattgc 66

<210> 554
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 554
caggccagtc agaatgttta caataacaac tacctagcc 39

<210> 555
<211> 45
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 555
tggtatcagc agaaaccagg gaaagttcct aagcaactga tctat 45

<210> 556
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 556
tctacatcca ctctggcatc t 21

<210> 557
<211> 96
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 557
ggggtcccat ctcgtttcag tggcagtgga tctgggacag atttcactct caccatcagc 60

agcctgcagc ctgaagatgt tgcaacttat tactgt 96

<210> 558
<211> 39
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 558
ctgggcagtt atgattgtag tcgtggtgat tgttttgtt 39

<210> 559
<211> 33
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 559
ttcggcggag gaaccaaggt ggaaatcaaa cgt 33

<210> 560
<211> 321
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 560
acggtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 561
<211> 37
<212> PRT
<213> Homo sapiens

<220>
<221> MOD_RES
<222> (37)..(37)
<223> AMIDATION

<400> 561

Ala Cys Asp Thr Ala Thr Cys Val Thr His Arg Leu Ala Gly Leu Leu
1 5 10 15

Ser Arg Ser Gly Gly Val Val Lys Asn Asn Phe Val Pro Thr Asn Val
20 25 30

Gly Ser Lys Ala Phe
35

<210> 562
<211> 37
<212> PRT
<213> Homo sapiens

<220>
<221> MOD_RES
<222> (37)..(37)
<223> AMIDATION

<400> 562

Ala Cys Asn Thr Ala Thr Cys Val Thr His Arg Leu Ala Gly Leu Leu
1 5 10 15

Ser Arg Ser Gly Gly Met Val Lys Ser Asn Phe Val Pro Thr Asn Val
20 25 30

Gly Ser Lys Ala Phe
35

<210> 563
<211> 106
<212> PRT
<213> Homo sapiens

<400> 563

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

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

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
        35                  40                  45

Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
    50                  55                  60

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

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

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
            100                 105
```

<210> 564
<211> 330
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 564

```
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1               5                   10                  15

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

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65                  70                  75                  80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
                85                  90                  95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
            100                 105                 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
        115                 120                 125
```

```
Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
    130                 135                 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145                 150                 155                 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
                165                 170                 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
            180                 185                 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
        195                 200                 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
    210                 215                 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225                 230                 235                 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
                245                 250                 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
            260                 265                 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
        275                 280                 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
    290                 295                 300

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305                 310                 315                 320

Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
                325                 330
```

<210> 565
<211> 329
<212> PRT
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 565

```
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1               5                   10                  15

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

```
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45

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

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65                  70                  75                  80

Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
                85                  90                  95

Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
            100                 105                 110

Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
        115                 120                 125

Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
    130                 135                 140

Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145                 150                 155                 160

Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
                165                 170                 175

Glu Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
            180                 185                 190

His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
        195                 200                 205

Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
    210                 215                 220

Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
225                 230                 235                 240

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
                245                 250                 255

Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
            260                 265                 270

Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
        275                 280                 285

Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
    290                 295                 300
```

```
Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305                 310                 315                 320


Gln Lys Ser Leu Ser Leu Ser Pro Gly
                325


<210>  566
<211>  440
<212>  PRT
<213>  Artificial

<220>
<223>  Engineered antibody sequence

<400>  566

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 Val Ser Gly Ile Asp Leu Ser Gly Tyr
            20                  25                  30


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


Gly Val Ile Gly Ile Asn Gly Ala Thr Tyr Tyr Ala Ser Trp Ala Lys
    50                  55                  60


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


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


Arg Gly Asp Ile Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala
            100                 105                 110


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


Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe
    130                 135                 140


Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
145                 150                 155                 160


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


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

```
Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Ala Arg
        195                 200                 205

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

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

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
                245                 250                 255

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
            260                 265                 270

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
        275                 280                 285

Gln Tyr Ala Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
    290                 295                 300

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

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
                325                 330                 335

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
            340                 345                 350

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
        355                 360                 365

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
    370                 375                 380

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

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

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

Lys Ser Leu Ser Leu Ser Pro Gly
        435                 440
```

<210> 567
<211> 1323
<212> DNA
<213> Artificial

<220>
<223> Engineered antibody sequence

<400> 567
gaggtgcagc ttgtggagtc tgggggaggc ttggtccagc ctgggggtc cctgagactc 60

tcctgtgcag tctctggaat cgacctcagt ggctactaca tgaactgggt ccgtcaggct 120

ccagggaagg ggctggagtg ggtcggagtc attggtatta atggtgccac atactacgcg 180

agctgggcga aaggccgatt caccatctcc agagacaatt ccaagaccac ggtgtatctt 240

caaatgaaca gcctgagagc tgaggacact gctgtgtatt tctgtgctag aggggacatc 300

tggggccaag ggaccctcgt caccgtctcg agcgcctcca ccaagggccc atcggtcttc 360

cccctggcac cctcctccaa gagcacctct gggggcacag cggccctggg ctgcctggtc 420

aaggactact tccccgaacc ggtgacggtg tcgtggaact caggcgccct gaccagcggc 480

gtgcacacct tcccggctgt cctacagtcc tcaggactct actccctcag cagcgtggtg 540

accgtgccct ccagcagctt gggcacccag acctacatct gcaacgtgaa tcacaagccc 600

agcaacacca aggtggacgc gagagttgag cccaaatctt gtgacaaaac tcacacatgc 660

ccaccgtgcc cagcacctga actcctgggg ggaccgtcag tcttcctctt cccccaaaa 720

cccaaggaca ccctcatgat ctcccggacc cctgaggtca catgcgtggt ggtggacgtg 780

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