SEQUENCE LISTING

<110> Ganymed Pharmaceuticals AG
Johannes Gutenberg-Universität Mainz

<120> ANTIBODIES FOR TREATMENT OF CANCER EXPRESSING CLAUDIN 6

<130> SG4105A

<150> EP 11 004 004.5
<151> 2011-05-13

<150> US 61/486,071
<151> 2011-05-13

<160> 57

<170> PatentIn version 3.5

<210> 1
<211> 1369
<212> DNA
<213> Homo sapiens

<400> 1
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atggcctctg ccggaatgca gatcctggga gtcgtcctga cactgctggg ctgggtgaat 120

ggcctggtct cctgtgccct gcccatgtgg aaggtgaccg ctttcatcgg caacagcatc 180

gtggtggccc aggtggtgtg ggagggcctg tggatgtcct gcgtggtgca gagcaccggc 240

cagatgcagt gcaaggtgta cgactcactg ctggcgctgc cacaggacct gcaggctgca 300

cgtgccctct gtgtcatcgc cctccttgtg gccctgttcg gcttgctggt ctaccttgct 360

ggggccaagt gtaccacctg tgtggaggag aaggattcca aggcccgcct ggtgctcacc 420

tctgggattg tctttgtcat ctcaggggtc ctgacgctaa tccccgtgtg ctggacggcg 480

catgccatca tccgggactt ctataacccc ctggtggctg aggcccaaaa gcgggagctg 540

ggggcctccc tctacttggg ctgggcggcc tcaggccttt tgttgctggg tgggggttg 600

ctgtgctgca cttgcccctc gggggggtcc cagggcccca gccattacat ggcccgctac 660

tcaacatctg cccctgccat ctctcggggg ccctctgagt accctaccaa gaattacgtc 720

tgacgtggag gggaatgggg gctccgctgg cgctagagcc atccagaagt ggcagtgccc 780

aacagctttg ggatgggttc gtacctttg tttctgcctc ctgctatttt tcttttgact 840

gaggatattt aaaattcatt tgaaaactga gccaaggtgt tgactcagac tctcacttag 900

gctctgctgt ttctcaccct tggatgatgg agccaaagag gggatgcttt gagattctgg 960

atcttgacat gcccatctta gaagccagtc aagctatgga actaatgcgg aggctgcttg 1020

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gggcttccct agatgtcact ggacagctgc cccccatcct actcaggtct ctggagctcc 1140

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tctgacctct gtttcctccg tcctgataag acgtccaccc cccagggcca ggtcccagct 1260

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<210> 2
<211> 220
<212> PRT
<213> Homo sapiens

<400> 2

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

Gly Trp Val Asn Gly Leu Val Ser Cys Ala Leu Pro Met Trp Lys Val
20 25 30

Thr Ala Phe Ile Gly Asn Ser Ile Val Val Ala Gln Val Val Trp Glu
35 40 45

Gly Leu Trp Met Ser Cys Val Val Gln Ser Thr Gly Gln Met Gln Cys
50 55 60

Lys Val Tyr Asp Ser Leu Leu Ala Leu Pro Gln Asp Leu Gln Ala Ala
65 70 75 80

Arg Ala Leu Cys Val Ile Ala Leu Leu Val Ala Leu Phe Gly Leu Leu
85 90 95

Val Tyr Leu Ala Gly Ala Lys Cys Thr Thr Cys Val Glu Glu Lys Asp
100 105 110

Ser Lys Ala Arg Leu Val Leu Thr Ser Gly Ile Val Phe Val Ile Ser
115 120 125

Gly Val Leu Thr Leu Ile Pro Val Cys Trp Thr Ala His Ala Ile Ile
130 135 140

Arg Asp Phe Tyr Asn Pro Leu Val Ala Glu Ala Gln Lys Arg Glu Leu
145 150 155 160

Gly Ala Ser Leu Tyr Leu Gly Trp Ala Ala Ser Gly Leu Leu Leu Leu
165 170 175

Gly Gly Gly Leu Leu Cys Cys Thr Cys Pro Ser Gly Gly Ser Gln Gly
180 185 190

Pro Ser His Tyr Met Ala Arg Tyr Ser Thr Ser Ala Pro Ala Ile Ser
195 200 205

Arg Gly Pro Ser Glu Tyr Pro Thr Lys Asn Tyr Val
210 215 220

<210> 3
<211> 805
<212> DNA
<213> Artificial

<220>
<223> codon-optimized nucleic acid sequence encoding human claudin 6

<400> 3
caagcgcgtc aattaaccct cactaaaggg aacaaaagct gttaattaac taaggtacca 60

agcttgccac catggccagc gccggcatgc agatcctggg agtggtgctg accctgctgg 120

gctgggtgaa cggcctggtg tcctgcgccc tgcccatgtg gaaagtgacc gccttcatcg 180

gcaacagcat cgtggtggcc caggtcgtgt gggagggcct gtggatgagc tgtgtggtgc 240

agagcaccgg ccagatgcag tgcaaggtgt acgacagcct gctggccctg cctcaggatc 300

tgcaggccgc cagagccctg tgtgtgatcg ccctgctggt cgccctgttc ggcctgctgg 360

tgtacctcgc tggcgccaag tgcaccacct gtgtggagga aaaggacagc aaggcccggc 420

tggtcctgac aagcggcatc gtgttcgtga tcagcggcgt gctgacactg atccccgtgt 480

gctggaccgc ccacgccatc atccgggact tctacaaccc tctggtggcc gaggcccaga 540

agagagagct gggcgccagc ctgtatctgg gatgggccgc ctcaggactg ctgctgctgg 600

gcggaggcct gctgtgctgt acatgtccta gcggcggctc ccagggccct agccactaca 660

tggcccggta cagcaccagc gcccctgcca tcagcagagg ccccagcgag taccccacca 720

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tcgtattacg tcgcgctcac tggcc 805

<210> 4
<211> 165
<212> DNA
<213> Artificial

<220>
<223> codon-optimized nucleic acid sequence encoding the predicted extracellular loop 2 (EC2) of human claudin 6

<400> 4
ggcgcgccaa ggtaccaagc ttgccaccat ggaaaccgac accctgctgc tgtgggtgct 60

gctcctgtgg gtcccaggct ctacaggcga cgccgcccag cccagagact tctacaaccc 120

cctggtggcc gaggcccaga agctcgagtc tagagggtta attaa 165

<210> 5
<211> 38
<212> PRT
<213> Artificial

<220>
<223> predicted 2nd extracellular loop of human claudin 6 containing an Ig kappa leader sequence

<220>
<221> SIGNAL
<222> (1)..(21)
<223> Ig kappa leader sequence

<220>
<221> DOMAIN
<222> (26)..(38)
<223> predicted 2nd extracellular loop (EC2) of human claudin 6

<400> 5

Met Glu Thr Asp Thr Leu Leu Leu Trp Val Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Thr Gly Asp Ala Ala Gln Pro Arg Asp Phe Tyr Asn Pro Leu
20 25 30

Val Ala Glu Ala Gln Lys
35

<210> 6
<211> 13
<212> PRT
<213> Homo sapiens

<400> 6

Arg Asp Phe Tyr Asn Pro Leu Val Ala Glu Ala Gln Lys
1 5 10

<210> 7
<211> 53
<212> PRT
<213> Homo sapiens

<400> 7

Pro Met Trp Lys Val Thr Ala Phe Ile Gly Asn Ser Ile Val Val Ala
1 5 10 15

Gln Val Val Trp Glu Gly Leu Trp Met Ser Cys Val Val Gln Ser Thr
20 25 30

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

Asp Leu Gln Ala Ala
50

<210> 8
<211> 220
<212> PRT
<213> Homo sapiens

<220>
<221> VARIANT
<222> (143)..(143)
<223> human claudin 6 I143V polymorphism

<400> 8

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

Gly Trp Val Asn Gly Leu Val Ser Cys Ala Leu Pro Met Trp Lys Val
20 25 30

Thr Ala Phe Ile Gly Asn Ser Ile Val Val Ala Gln Val Val Trp Glu
35 40 45

Gly Leu Trp Met Ser Cys Val Val Gln Ser Thr Gly Gln Met Gln Cys
50 55 60

Lys Val Tyr Asp Ser Leu Leu Ala Leu Pro Gln Asp Leu Gln Ala Ala
65 70 75 80

Arg Ala Leu Cys Val Ile Ala Leu Leu Val Ala Leu Phe Gly Leu Leu
85 90 95

Val Tyr Leu Ala Gly Ala Lys Cys Thr Thr Cys Val Glu Glu Lys Asp
100 105 110

Ser Lys Ala Arg Leu Val Leu Thr Ser Gly Ile Val Phe Val Ile Ser
115 120 125

Gly Val Leu Thr Leu Ile Pro Val Cys Trp Thr Ala His Ala Val Ile
130 135 140

Arg Asp Phe Tyr Asn Pro Leu Val Ala Glu Ala Gln Lys Arg Glu Leu
145 150 155 160

Gly Ala Ser Leu Tyr Leu Gly Trp Ala Ala Ser Gly Leu Leu Leu Leu
165 170 175

Gly Gly Gly Leu Leu Cys Cys Thr Cys Pro Ser Gly Gly Ser Gln Gly
180 185 190

Pro Ser His Tyr Met Ala Arg Tyr Ser Thr Ser Ala Pro Ala Ile Ser
195 200 205

Arg Gly Pro Ser Glu Tyr Pro Thr Lys Asn Tyr Val
210 215 220

<210> 9
<211> 217
<212> PRT
<213> Homo sapiens

<400> 9

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

Gly Trp Leu Gly Thr Leu Val Ser Cys Ala Leu Pro Leu Trp Lys Val
20 25 30

Thr Ala Phe Ile Gly Asn Ser Ile Val Val Ala Gln Val Val Trp Glu
35 40 45

Gly Leu Trp Met Ser Cys Val Val Gln Ser Thr Gly Gln Met Gln Cys
50 55 60

Lys Val Tyr Asp Ser Leu Leu Ala Leu Pro Gln Asp Leu Gln Ala Ala
65 70 75 80

Arg Ala Leu Cys Val Ile Ala Leu Leu Leu Ala Leu Leu Gly Leu Leu
85 90 95

```
Val Ala Ile Thr Gly Ala Gln Cys Thr Thr Cys Val Glu Asp Glu Gly
            100                 105                 110

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

Gly Ile Leu Val Leu Ile Pro Val Cys Trp Thr Ala His Ala Ile Ile
    130                 135                 140

Gln Asp Phe Tyr Asn Pro Leu Val Ala Glu Ala Leu Lys Arg Glu Leu
145                 150                 155                 160

Gly Ala Ser Leu Tyr Leu Gly Trp Ala Ala Ala Ala Leu Leu Met Leu
                165                 170                 175

Gly Gly Gly Leu Leu Cys Cys Thr Cys Pro Pro Pro Gln Val Glu Arg
            180                 185                 190

Pro Arg Gly Pro Arg Leu Gly Tyr Ser Ile Pro Ser Arg Ser Gly Ala
        195                 200                 205

Ser Gly Leu Asp Lys Arg Asp Tyr Val
    210                 215
```

<210> 10
<211> 209
<212> PRT
<213> Homo sapiens

<400> 10

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

Gly Trp Leu Ala Val Met Leu Cys Cys Ala Leu Pro Met Trp Arg Val
            20                  25                  30

Thr Ala Phe Ile Gly Ser Asn Ile Val Thr Ser Gln Thr Ile Trp Glu
        35                  40                  45

Gly Leu Trp Met Asn Cys Val Val Gln Ser Thr Gly Gln Met Gln Cys
    50                  55                  60

Lys Val Tyr Asp Ser Leu Leu Ala Leu Pro Gln Asp Leu Gln Ala Ala
65                  70                  75                  80

Arg Ala Leu Val Ile Ile Ser Ile Ile Val Ala Ala Leu Gly Val Leu
                85                  90                  95

Leu Ser Val Val Gly Gly Lys Cys Thr Asn Cys Leu Glu Asp Glu Ser
            100                 105                 110

Ala Lys Ala Lys Thr Met Ile Val Ala Gly Val Val Phe Leu Leu Ala
        115                 120                 125
```

```
Gly Leu Met Val Ile Val Pro Val Ser Trp Thr Ala His Asn Ile Ile
    130                 135                 140

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

Gly Ala Ser Leu Tyr Val Gly Trp Ala Ala Ser Gly Leu Leu Leu Leu
                165                 170                 175

Gly Gly Gly Leu Leu Cys Cys Asn Cys Pro Pro Arg Thr Asp Lys Pro
            180                 185                 190

Tyr Ser Ala Lys Tyr Ser Ala Ala Arg Ser Ala Ala Ala Ser Asn Tyr
        195                 200                 205

Val
```

<210> 11
<211> 220
<212> PRT
<213> Homo sapiens

<400> 11

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

Trp Leu Gly Thr Ile Val Cys Cys Ala Leu Pro Met Trp Arg Val Ser
            20                  25                  30

Ala Phe Ile Gly Ser Asn Ile Ile Thr Ser Gln Asn Ile Trp Glu Gly
        35                  40                  45

Leu Trp Met Asn Cys Val Val Gln Ser Thr Gly Gln Met Gln Cys Lys
    50                  55                  60

Val Tyr Asp Ser Leu Leu Ala Leu Pro Gln Asp Leu Gln Ala Ala Arg
65                  70                  75                  80

Ala Leu Ile Val Val Ala Ile Leu Leu Ala Ala Phe Gly Leu Leu Val
                85                  90                  95

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

Lys Ala Lys Ile Thr Ile Val Ala Gly Val Leu Phe Leu Leu Ala Ala
        115                 120                 125

Leu Leu Thr Leu Val Pro Val Ser Trp Ser Ala Asn Thr Ile Ile Arg
    130                 135                 140

Asp Phe Tyr Asn Pro Val Val Pro Glu Ala Gln Lys Arg Glu Met Gly
145                 150                 155                 160
```

```
Ala Gly Leu Tyr Val Gly Trp Ala Ala Ala Ala Leu Gln Leu Leu Gly
                165                 170                 175

Gly Ala Leu Leu Cys Cys Ser Cys Pro Pro Arg Glu Lys Lys Tyr Thr
            180                 185                 190

Ala Thr Lys Val Val Tyr Ser Ala Pro Arg Ser Thr Gly Pro Gly Ala
        195                 200                 205

Ser Leu Gly Thr Gly Tyr Asp Arg Lys Asp Tyr Val
    210                 215                 220
```

<210> 12
<211> 159
<212> DNA
<213> Artificial

<220>
<223> codon-optimized nucleic acid sequence encoding the predicted extracellular loop 1 (EC1) of human claudin 6

<400> 12

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cccatgtgga aagtgaccgc cttcatcggc aacagcatcg tggtggccca ggtggtctgg       60

gagggcctgt ggatgagctg cgtggtgcag agcaccggcc agatgcagtg caaggtgtac      120

gacagcctgc tggccctgcc tcaggatctg caggctgct                             159
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<210> 13
<211> 106
<212> PRT
<213> Artificial

<220>
<223> predicted 1st extracellular loop of human claudin 6 containing an Ig kappa leader sequence

<220>
<221> Signal
<222> (1)..(21)
<223> Ig kappa leader sequence

<220>
<221> Domain
<222> (26)..(78)
<223> predicted 1st extracellular loop (EC1) of human claudin 6

<400> 13

```
Met Glu Thr Asp Thr Leu Leu Leu Trp Val Leu Leu Leu Trp Val Pro
1               5                   10                  15

Gly Ser Thr Gly Asp Ala Ala Gln Pro Pro Met Trp Lys Val Thr Ala
            20                  25                  30

Phe Ile Gly Asn Ser Ile Val Val Ala Gln Val Val Trp Glu Gly Leu
        35                  40                  45

Trp Met Ser Cys Val Val Gln Ser Thr Gly Gln Met Gln Cys Lys Val
    50                  55                  60
```

```
Tyr Asp Ser Leu Leu Ala Leu Pro Gln Asp Leu Gln Ala Ala Leu Glu
65                  70                  75                  80

Ser Arg Gly Pro Phe Glu Gln Lys Leu Ile Ser Glu Glu Asp Leu Asn
                85                  90                  95

Met His Thr Gly His His His His His His
            100                 105

<210>  14
<211>  13
<212>  PRT
<213>  Homo sapiens

<400>  14

Pro Met Trp Lys Val Thr Ala Phe Ile Gly Asn Ser Ile
1               5                   10

<210>  15
<211>  15
<212>  PRT
<213>  Homo sapiens

<400>  15

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

<210>  16
<211>  20
<212>  DNA
<213>  Artificial

<220>
<223>  Oligonucleotide

<400>  16
tccatgacgt tcctgacgtt                                                  20

<210>  17
<211>  43
<212>  DNA
<213>  Artificial Sequence

<220>
<223>  Oligonucleotide

<400>  17
gagaaagctt gccgccacca tgggatggag ctggatcttt ctc                         43

<210>  18
<211>  43
<212>  DNA
<213>  Artificial Sequence

<220>
<223>  Oligonucleotide

<400>  18
gagagggccc ttggtggagg ctgaagagac tgtgagagtg gtg                         43
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<210> 19
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<400> 19
gagagggccc ttggtggagg ctgaggagac tgtgagagtg gtg 43

<210> 20
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<400> 20
gagagggccc ttggtggagg ctgaggagac tgtgagagtg gtg 43

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

<220>
<223> Oligonucleotide

<400> 21
gagaaagctt gccgccacca tgcattttca agtgcagatt ttcagc 46

<210> 22
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<400> 22
cacacgtacg tttgatttcc agcttggtgc ctc 33

<210> 23
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<400> 23
cacacgtacg tttgatttcc agcttggtgc ctc 33

<210> 24
<211> 993
<212> DNA
<213> Homo sapiens

<400> 24
gcctccacca agggcccaag cgtgttcccc ctggccccca gcagcaagag caccagcggc 60

ggcacagccg ccctgggctg cctggtgaag gactacttcc ccgagcccgt gaccgtgagc 120

tggaacagcg gagccctgac ctccggcgtg cacaccttcc ccgccgtgct gcagagcagc 180

ggcctgtaca gcctgagcag cgtggtgacc gtgcccagca gcagcctggg cacccagacc 240

tacatctgca acgtgaacca caagcccagc aacaccaagg tggacaagag agtggagccc 300

aagagctgcg acaagaccca cacctgcccc ccctgcccag ccccagagct gctgggcgga 360

cccagcgtgt tcctgttccc ccccaagccc aaggacaccc tgatgatcag caggaccccc 420

gaggtgacct gcgtggtggt ggacgtgagc cacgaggacc cagaggtgaa gttcaactgg 480

tacgtggacg gcgtggaggt gcacaacgcc aagaccaagc ccagagagga gcagtacaac 540

agcacctaca gggtggtgtc cgtgctgacc gtgctgcacc aggactggct gaacggcaag 600

gaatacaagt gcaaggtctc caacaaggcc ctgccagccc ccatcgaaaa gaccatcagc 660

aaggccaagg gccagccacg ggagccccag gtgtacaccc tgcccccag ccgggaggag 720

atgaccaaga accaggtgtc cctgacctgt ctggtgaagg gcttctaccc cagcgacatc 780

gccgtggagt gggagagcaa cggccagccc gagaacaact acaagaccac cccccagtg 840

ctggacagcg acggcagctt cttcctgtac agcaagctga ccgtggacaa gtccaggtgg 900

cagcagggca acgtgttcag ctgcagcgtg atgcacgagg ccctgcacaa ccactacacc 960

cagaagtccc tgagcctgag ccccggcaag tag 993

<210> 25
<211> 330
<212> PRT
<213> Homo sapiens

<400> 25

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 Asn 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> 26
<211> 324
<212> DNA
<213> Homo sapiens

<400> 26
cgtacggtgg ccgctcccag cgtgttcatc ttcccccca gcgacgagca gctgaagtcc 60

ggcaccgcca gcgtggtgtg cctgctgaac aacttctacc cccgggaggc caaggtgcag 120

tggaaggtgg acaacgccct gcagagcggc aacagccagg agagcgtcac cgagcaggac 180

agcaaggact ccacctacag cctgagcagc accctgaccc tgagcaaggc cgactacgag 240

aagcacaagg tgtacgcctg cgaggtgacc caccagggcc tgtccagccc cgtgaccaag 300

agcttcaaca ggggcgagtg ctag 324

<210> 27

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

<400> 27

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

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

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

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

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

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

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

<210> 28
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<220>
<221> misc_feature
<222> (31)..(32)
<223> any nucleotide

<400> 28
ttttttttttt ttttttttttt ttttttttttt nn 32

<210> 29
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<400> 29
aagcagtggt atcaacgcag agtacgcggg 30

<210> 30
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<400> 30
ctgctcactg gatggtggga agatgg 26

<210> 31
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<400> 31
acaggggcca gtggatagac cgatg 25

<210> 32
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<400> 32
gtaatacgac tcactatagg gcaagcagtg gtatcaacgc agagt 45

<210> 33
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<400> 33
gtaatacgac tcactatagg gc 22

<210> 34
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VH sequence

<400> 34

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

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

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

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

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

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

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

Leu Thr Val Ser Ser
        115
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<210> 35
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VL sequence

<400> 35

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

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

His Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Leu Trp Val Tyr
        35                  40                  45

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

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

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

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
            100                 105
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<210> 36
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VH sequence

<400> 36

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

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

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

```
Gly Leu Ile Asn Pro Tyr Asn Gly Gly Thr Ile Tyr Asn Gln Lys Phe
    50                  55                  60

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

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

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

Leu Thr Val Ser Ser
        115
```

<210> 37
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VL sequence

<400> 37

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

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

His Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Leu Cys Ile Tyr
        35                  40                  45

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

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

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

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

<210> 38
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VH sequence

<400> 38

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

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

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

Gly Leu Ile Asn Pro Tyr Asn Gly Gly Ile Ile Tyr Asn Gln Lys Phe
50 55 60

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

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

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

Leu Thr Val Ser Ser
115

<210> 39
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VL sequence

<400> 39

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

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

His Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Leu Trp Ile Tyr
35 40 45

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

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

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

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

<210> 40
<211> 117
<212> PRT

<213> Artificial Sequence

<220>
<223> Antibody VH sequence

<400> 40

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

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

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

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

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

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

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

Leu Thr Val Ser Ser
115

<210> 41
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VL sequence

<400> 41

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

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

His Trp Phe Gln Leu Lys Pro Gly Thr Ser Pro Lys Leu Leu Ile Tyr
35 40 45

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

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

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

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

<210> 42
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VH CDR3 sequence

<220>
<221> MISC_FEATURE
<222> (1)..(1)
<223> Any amino acid, preferably an aromatic amino acid, more preferably Phe or Tyr, most preferably Tyr

<220>
<221> MISC_FEATURE
<222> (3)..(3)
<223> Any amino acid, preferably an aromatic amino acid, more preferably Phe or Tyr, most preferably Tyr

<220>
<221> MISC_FEATURE
<222> (5)..(5)
<223> Any amino acid, preferably Leu or Phe, more preferably Leu

<400> 42

Xaa Gly Xaa Val Xaa
1 5

<210> 43
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VH CDR3 sequence

<220>
<221> MISC_FEATURE
<222> (2)..(2)
<223> Any amino acid, preferably an aromatic amino acid, more preferably Phe or Tyr, most preferably Tyr

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> Any amino acid, preferably an aromatic amino acid, more preferably Phe or Tyr, most preferably Tyr

<220>
<221> MISC_FEATURE
<222> (6)..(6)
<223> Any amino acid, preferably Leu or Phe, more preferably Leu

<400> 43

Asp Xaa Gly Xaa Val Xaa
1 5

<210> 44

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

<220>
<223> Antibody VH CDR3 sequence

<220>
<221> MISC_FEATURE
<222> (1)..(1)
<223> Any amino acid, preferably an aromatic amino acid, more preferably Phe or Tyr, most preferably Tyr

<220>
<221> MISC_FEATURE
<222> (3)..(3)
<223> Any amino acid, preferably an aromatic amino acid, more preferably Phe or Tyr, most preferably Tyr

<220>
<221> MISC_FEATURE
<222> (5)..(5)
<223> Any amino acid, preferably Leu or Phe, more preferably Leu

<400> 44

Xaa Gly Xaa Val Xaa Asp
1 5

<210> 45
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VH CDR3 sequence

<220>
<221> MISC_FEATURE
<222> (2)..(2)
<223> Any amino acid, preferably an aromatic amino acid, more preferably Phe or Tyr, most preferably Tyr

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> Any amino acid, preferably an aromatic amino acid, more preferably Phe or Tyr, most preferably Tyr

<220>
<221> MISC_FEATURE
<222> (6)..(6)
<223> Any amino acid, preferably Leu or Phe, more preferably Leu

<400> 45

Asp Xaa Gly Xaa Val Xaa Asp
1 5

<210> 46
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VH CDR3 sequence

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> Any amino acid, preferably an aromatic amino acid, more preferably Phe or Tyr, most preferably Tyr

<220>
<221> MISC_FEATURE
<222> (6)..(6)
<223> Any amino acid, preferably an aromatic amino acid, more preferably Phe or Tyr, most preferably Tyr

<220>
<221> MISC_FEATURE
<222> (8)..(8)
<223> Any amino acid, preferably Leu or Phe, more preferably Leu

<400> 46

Ala Arg Asp Xaa Gly Xaa Val Xaa Asp Tyr
1 5 10

<210> 47
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VH CDR1 sequence

<400> 47

Gly Tyr Ser Phe Thr Gly Tyr Thr
1 5

<210> 48
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VH CDR2 sequence

<220>
<221> MISC_FEATURE
<222> (8)..(8)
<223> Any amino acid, preferably Thr, Ser or Ile, most preferably Thr

<400> 48

Ile Asn Pro Tyr Asn Gly Gly Xaa
1 5

<210> 49
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VL CDR3 sequence

<220>
<221> MISC_FEATURE
<222> (2)..(2)
<223> Any amino acid, preferably Ser or Asn, most preferably Ser

<220>
<221> MISC_FEATURE
<222> (3)..(3)
<223> Any amino acid, preferably Tyr, Ser, Ile, Asn or Thr, more preferably Tyr, Ser, or Asn, most preferably Asn

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> Any amino acid, preferably Ser or Tyr, more preferably Tyr

<400> 49

Arg Xaa Xaa Xaa Pro
1 5

<210> 50
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VL CDR3 sequence

<220>
<221> MISC_FEATURE
<222> (3)..(3)
<223> Any amino acid, preferably Ser or Asn, most preferably Ser

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> Any amino acid, preferably Tyr, Ser, Ile, Asn or Thr, more preferably Tyr, Ser, or Asn, most preferably Asn

<220>
<221> MISC_FEATURE
<222> (5)..(5)
<223> Any amino acid, preferably Ser or Tyr, more preferably Tyr

<400> 50

Gln Arg Xaa Xaa Xaa Pro Pro
1 5

<210> 51
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VL CDR3 sequence

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> Any amino acid, preferably Ser or Asn, most preferably Ser

<220>
<221> MISC_FEATURE
<222> (5)..(5)
<223> Any amino acid, preferably Tyr, Ser, Ile, Asn or Thr, more preferably Tyr, Ser, or Asn, most preferably Asn

<220>
<221> MISC_FEATURE

<222> (6)..(6)
<223> Any amino acid, preferably Ser or Tyr, more preferably Tyr

<400> 51

Gln Gln Arg Xaa Xaa Xaa Pro Pro Trp Thr
1 5 10

<210> 52
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VL CDR1 sequence

<220>
<221> MISC_FEATURE
<222> (4)..(4)
<223> Any amino acid, preferably Ser or Asn, most preferably Ser

<400> 52

Ser Ser Val Xaa Tyr
1 5

<210> 53
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VL CDR2 sequence

<400> 53

Ser Thr Ser
1

<210> 54
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VL Sequence

<400> 54

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

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

His Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Leu Gly Ile Tyr
35 40 45

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

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

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

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

<210> 55
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Antibody VL Sequence

<400> 55

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

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

His Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Leu Ser Ile Tyr
35 40 45

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

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

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

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

<210> 56
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<400> 56
gggataattt cagctgacta aacag 25

<210> 57
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide

<400> 57
ttccgtttag ttaggtgcag ttatc 25