

2018-07-19 CTN-006PC_ST25 (003).txt
SEQUENCE LISTING

<110> COMPASS THERAPEUTICS LLC

<120> AGONIST ANTIBODIES THAT BIND HUMAN CD137 AND USES THEREOF

<130> CTN-006PC

<140> PCT/US2018/041612

<141> 2018-07-11

<150> US 62/531,259

<151> 2017-07-11

<150> US 62/577,257

<151> 2017-10-26

<150> US 62/531,190

<151> 2017-07-11

<150> US 62/568,231

<151> 2017-10-04

<150> US 62/577,259

<151> 2017-10-26

<160> 133

<170> PatentIn version 3.5

<210> 1

<211> 330

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<222> (1)..(330)

<223> Human IgG1

<400> 1

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

2018-07-19 CTN-006PC_ST25 (003).txt

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

Lys 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 Asp Glu
225 230 235 240

2018-07-19 CTN-006PC_ST25 (003).txt

Leu 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> 2
 <211> 326
 <212> PRT
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> (1)..(326)
 <223> Human IgG4 mutant (S228P/C-terminal K truncation)

<400> 2

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

Ser Thr Ser Glu Ser 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

2018-07-19 CTN-006PC_ST25 (003).txt

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

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

Arg Val Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro
100 105 110

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

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

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

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe
165 170 175

Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
180 185 190

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

Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg
210 215 220

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

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

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

2018-07-19 CTN-006PC_ST25 (003).txt

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

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

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

Leu Ser Leu Ser Leu Gly
325

<210> 3
<211> 255
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)..(255)
<223> Human CD137

<400> 3

Met Gly Asn Ser Cys Tyr Asn Ile Val Ala Thr Leu Leu Leu Val Leu
1 5 10 15

Asn Phe Glu Arg Thr Arg Ser Leu Gln Asp Pro Cys Ser Asn Cys Pro
20 25 30

Ala Gly Thr Phe Cys Asp Asn Asn Arg Asn Gln Ile Cys Ser Pro Cys
35 40 45

Pro Pro Asn Ser Phe Ser Ser Ala Gly Gly Gln Arg Thr Cys Asp Ile
50 55 60

Cys Arg Gln Cys Lys Gly Val Phe Arg Thr Arg Lys Glu Cys Ser Ser
65 70 75 80

Thr Ser Asn Ala Glu Cys Asp Cys Thr Pro Gly Phe His Cys Leu Gly
85 90 95

Ala Gly Cys Ser Met Cys Glu Gln Asp Cys Lys Gln Gly Gln Glu Leu
100 105 110

Thr Lys Lys Gly Cys Lys Asp Cys Cys Phe Gly Thr Phe Asn Asp Gln
115 120 125

Lys Arg Gly Ile Cys Arg Pro Trp Thr Asn Cys Ser Leu Asp Gly Lys
130 135 140

Ser Val Leu Val Asn Gly Thr Lys Glu Arg Asp Val Val Cys Gly Pro
145 150 155 160

Ser Pro Ala Asp Leu Ser Pro Gly Ala Ser Ser Val Thr Pro Pro Ala
165 170 175

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

Ala Leu Thr Ser Thr Ala Leu Leu Phe Leu Leu Phe Phe Leu Thr Leu
195 200 205

Arg Phe Ser Val Val Lys Arg Gly Arg Lys Lys Leu Leu Tyr Ile Phe
210 215 220

Lys Gln Pro Phe Met Arg Pro Val Gln Thr Thr Gln Glu Glu Asp Gly
225 230 235 240

Cys Ser Cys Arg Phe Pro Glu Glu Glu Gly Gly Cys Glu Leu
245 250 255

<210> 4
<211> 126
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VH1 amino acid sequence

<400> 4

2018-07-19 CTN-006PC_ST25 (003).txt

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

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

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

Ser Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 5
<211> 384
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic: VH1 nucleic acid sequence

<400> 5
gaagtgcaat tattggaatc cggcggcggg ttagttcagc caggtggctc tttgaggctg 60
agttgcgcag cctctggatt cacttttagt tcgtatgcaa tgcgtgggt tcgccaggcg 120
cccggtaagg gtctggagtg ggtgagtgct atttccggct ctggcggatc tacctattac 180
gccgactctg tgaaaggctg ttttaccata agccgcgaca attctaagaa tactttatat 240
cttcaaatga attcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca 300
ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caagggtaca 360

actgtcaccg tctcctcagc tagc

384

<210> 6
 <211> 107
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL1 amino acid sequence

<400> 6

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

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

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

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

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

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

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

<210> 7
 <211> 327
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL1 nucleic acid sequence

<400> 7

gatattcaga tgacacagag cccgtcatca gtaagtgcaa gcgtcggaga tcgggttaca

60

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

<210> 9
 <211> 384
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH2 nucleic acid sequence

<400> 9
 gaagtgaat tattggaatc cggcggcggg ttagttcagc caggtggctc tttgaggctg 60
 agttgcgcag cctctggatt cacctttaac tattacgcaa tgtcttgggt tcgccaggcg 120
 cccggtaagg gtctggagtg ggtgtctgca atcgatggtt ctggtgataa cactacttac 180
 gccgactctg tgaaaggctc ttttaccata agccgcgaca attctaagaa tactttatat 240
 cttcaaataa attcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca 300
 ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caagggtaca 360
 actgtcaccg tctcctcagc tagc 384

<210> 10
 <211> 126
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH3 amino acid sequence

<400> 10

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

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

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

Ala Ala Ile Ser Gly Ser Gly Asp Gly Thr Tyr Tyr Ala Asp Ser Val
 50 55 60

2018-07-19 CTN-006PC_ST25 (003).txt

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 11
<211> 384
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic: VH3 nucleic acid sequence

<400> 11
gaagtgaat tattggaatc cggcggcggt ttagttcagc caggtggctc tttgaggctg 60
agttgcgcag cctctggatt caccttaac tattacgaa tgtcttgggt tcgccaggcg 120
cccggtaagg gtctggagtg ggtggcagca atctctggtt ctggtgatgg tacttactac 180
gccgactctg tgaaaggctg ttttaccata agccgcgaca attctaagaa tactttatat 240
cttcaaatga attcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca 300
ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caagggtaca 360
actgtcaccg tctcctcagc tagc 384

<210> 12
<211> 126
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VH4 amino acid sequence

<400> 12

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

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

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

Ser Ala Ile Ser Gly Ser Gly Asp Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 13
<211> 384
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic: VH4 nucleic acid sequence

<400> 13
gaagtgcaat tattggaatc cggcggcggg ttagttcagc caggtggctc tttgaggctg 60
agttgcgcag cctctggatt cacctttaac tattacgcaa tgtcttgggt tcgccaggcg 120
cccggtaagg gtctggagtg ggtgtctgca atctctgggt ctggtgattc tacttactac 180
gccgactctg tgaaaggctc ttttaccata agccgcgaca attctaagaa tactttatat 240
cttcaaatga attcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca 300
ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caagggtaca 360
actgtcaccg tctcctcagc tagc 384

<210> 14
 <211> 126
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH5 amino acid sequence

<400> 14

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

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

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

Ala Ala Ile Ser Gly Gly Gly Asp Ala Thr Tyr Tyr Ala Asp Ser Val
 50 55 60

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
 100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
 115 120 125

<210> 15
 <211> 384
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH5 nucleic acid sequence

<400> 15
gaagtgcaat tattggaatc cggcggcggt ttagttcagc caggtggctc tttgaggctg 60
agttgcgcag cctctggatt cacctttaac tattacgaa tgtcttgggt tcgccaggcg 120
cccggtaagg gtctggagtg ggtggcagca atctctggtg gtggtgatgc aacttactac 180
gccgactctg tgaaaggctg ttttaccata agccgcgaca attctaagaa tactttatat 240
cttcaaataa attcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca 300
ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caagggtaca 360
actgtcaccg tctcctcagc tagc 384

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

<220>
<223> Synthetic: VH6 amino acid sequence

<400> 16

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

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

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

Ser Ser Ile Ser Gly Ser Gly Asp Val Thr Tyr Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
 115 120 125

<210> 17
 <211> 384
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH6 nucleic acid sequence

<400> 17
 gaagtgaat tattggaatc cggcggcggg ttagttcagc caggtggctc tttgaggctg 60
 agttgcgcag cctctggatt caccttttat ggttacgcaa tgtcttgggt tcgccaggcg 120
 cccggttaagg gtctggagtg ggtgtcttct atctctggtt ctggtgatgt tacttactac 180
 gccgactctg tgaaaggctc ttttaccata agccgcgaca attctaagaa tactttatat 240
 cttcaaata gaattcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca 300
 ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caagggtaca 360
 actgtcaccg tctcctcagc tagc 384

<210> 18
 <211> 126
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH7 amino acid sequence

<400> 18

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

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

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

2018-07-19 CTN-006PC_ST25 (003).txt

Ala Ala Ile Ser Gly Ser Gly Asp Gly Thr Tyr Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 19
<211> 384
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic: VH7 nucleic acid sequence

<400> 19
gaagtgcaat tattggaatc cggcggcggt ttagttcagc caggtggctc tttgaggctg 60
agttgcgcag cctctggatt caccttttat ggttacgcaa tgtcttgggt tcgccaggcg 120
cccggtaagg gtctggagtg ggtggcagca atctctggtt ctggtgatgg tacttactac 180
gccgactctg tgaaaggctc ttttaccata agccgcgaca attctaagaa tactttatat 240
cttcaaatga attcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca 300
ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caagggtaca 360
actgtcaccg tctcctcagc tagc 384

<210> 20
<211> 126
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VH8 amino acid sequence

<400> 20

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

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

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

Ser Ala Ile Ser Gly Phe Gly Glu Ser Thr Tyr Tyr Ala Asp Ser Val
 50 55 60

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
 100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
 115 120 125

<210> 21

<211> 384

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic: VH8 nucleic acid sequence

<400> 21

gaagtgcaat tattggaatc cggcggcggt ttagttcagc caggtggctc tttgaggctg 60

agttgcgcag cctctggatt cacctttaga aactacgcaa tgtcttgggt tcgccaggcg 120

cccggtaagg gtctggagtg ggtgtctgca atctctggtt ttggtgaatc tacttactac 180

gccgactctg tgaaaggctg ttttaccata agccgcgaca attctaagaa tactttatat 240

cttcaaatga attcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca 300

ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caaggggtaca 360

actgtcaccg tctcctcagc tagc 384

<210> 22

<211> 126

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH9 amino acid sequence

<400> 22

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

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

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

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

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 23

<211> 384

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic: VH9 nucleic acid sequence

<400> 23

```

gaagtgcaat tattggaatc cggcggcggg ttagttcagc caggtggctc tttgaggctg      60
agttgcgcag cctctggatt cacctttaac tattacgcaa tgaactgggt tcgccaggcg      120
cccggtaagg gtctggagtg ggtggcagca atctctggtt ctggtggtag aacttactac      180
gccgactctg tgaaaggtcg ttttaccata agccgcgaca attctaagaa tactttatat      240
cttcaaataa attcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca      300
ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caagggtaca      360
actgtcaccg tctcctcagc tagc                                           384

```

<210> 24

<211> 126

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH10 amino acid sequence

<400> 24

```

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

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

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

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

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

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

```

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 25
<211> 384
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic: VH10 nucleic acid sequence

<400> 25
gaagtgcaat tattggaatc cggcggcggt ttagttcagc caggtggctc tttgaggctg 60
agttgcgcag cctctggatt caccttttat ggttacgcaa tgtcttgggt tcgccaggcg 120
cccggtaagg gtctggagtg ggtgtctgca atctctgggt ctggtggtaa cacttcttac 180
gccgactctg tgaaaggctc ttttaccata agccgcgaca attctaagaa tactttatat 240
cttcaaatga attcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca 300
ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caaggggtaca 360
actgtcaccg tctcctcagc tagc 384

<210> 26
<211> 126
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VH11 amino acid sequence

<400> 26

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

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

2018-07-19 CTN-006PC_ST25 (003).txt

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

Ala Ala Ile Ser Gly Ser Gly Asp Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 27
<211> 384
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic: VH11 nucleic acid sequence

<400> 27
gaagtgcaat tattggaatc cggcggcggg ttagttcagc caggtggctc tttgaggctg 60
agttgcgcag cctctggatt caccttttat ggttacgcaa tgtcttgggt tcgccaggcg 120
cccggtaagg gtctggagtg ggtggcagca atctctggtt ctggtgattc tacttactac 180
gccgactctg tgaaaggctg ttttaccata agccgcgaca attctaagaa tactttatat 240
cttcaaatga attcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca 300
ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caagggtaca 360
actgtcaccg tctcctcagc tagc 384

<210> 28
<211> 107
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic: VL2 amino acid sequence

<400> 28

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

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

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

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

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

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Gly Asp Arg Phe Pro Leu
85 90 95

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

<210> 29

<211> 327

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic: VL2 nucleic acid sequence

<400> 29

gacatccaga tgacccagtc tccttcacc ctgtctgcat ctgtaggaga cagagtcacc 60

atcacttgcc gggccagtca gaatattcat aactggttg cctggtatca gcaaaaacca 120

gggaaagccc ctaagctcct gatctataag gcgtctggtt tggaaagtgg ggtcccatca 180

agattcagcg gcagtggatc tgggacagag ttcacttca ccatcagcag cctgcaacct 240

gatgattttg caacttacta ctgtcaacag ggtgacagat tccctctcac tttcggcgga 300

gggaccaagg tggagatcaa acgtacg

327

<210> 30
 <211> 107
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL3 amino acid sequence

<400> 30

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

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

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

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

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

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

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

<210> 31
 <211> 327
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL3 nucleic acid sequence

<400> 31

gacatccaga tgaccacgctc tccttccatc ctgtctgcat ctgtaggaga cagagtcact

60

atcacttgcc gggccagtca gagtatcagt aggtggttgg cctggtatca gcagaagcca 120
 gggaaacccc ctaaactcct gatctttaag gcgtctgctt tagaaagtgg ggtcccatcg 180
 aggttcagcg gcagtggata tgggacagat ttcactctca ccatcagcaa cctgcagcct 240
 gaagactttg caacttactt ctgtcaacag ggtaatagtt tccctctcac tttcggcgga 300
 gggaccaaag tggatatcaa acgtacg 327

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

<220>
 <223> Synthetic: VL4 amino acid sequence

<400> 32

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

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

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

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

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

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

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

<210> 33
 <211> 327

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic: VL4 nucleic acid sequence

<400> 33

```
gacatccaga tgaccagtc tccttcacc ctgtctgcat ctgtaggaga cagagtcacc      60
atcacttgcc gggccagtca gaatattgat atctggttgg cctggatatca gtggaaacca    120
gggaaggccc ctaaactcct gatctataag gcgtctggtt tagaaactgg ggtcccttca    180
aggttcagcg gcagtggatc tgggacagaa ttactctca ctatcagcag cctgcagcca    240
gaggattttg cgacttacta ttgtcaacag ggtaaccagt tcccgtcac ctcggccaa     300
gggacacgac tggagattaa acgtacg                                     327
```

<210> 34

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL5 amino acid sequence

<400> 34

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

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

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

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

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

```
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Gly Asn Ser Phe Pro Leu
85           90           95
```

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

<210> 35
<211> 327
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic: VL5 nucleic acid sequence

<400> 35
gacatccaga tgacccagtc tccttcctcc ctgtctgcat ctgtaggaga cagagtcacc 60
atcacttgcc gggccagtca gagtatcggg aggtggttgg cctgggtatca gcagaaacca 120
gggaaagccc ctaaactcct gatctttaag gcgtctgctt tagaagttgg ggtcccatca 180
aggttcagcg gcagtgggtc tgggacagat ttactctca ccatcagcag cctgcagcct 240
gaagattttg caacttacta ttgtcaacag ggtaacagtt tcccgtcac tttcggcgga 300
gggaccaaag tggatatcaa acgtacg 327

<210> 36
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL6 amino acid sequence

<400> 36

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

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

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

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

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

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

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

<210> 37
<211> 327
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic: VL6 nucleic acid sequence

<400> 37
gacatccagt tgacccagtc tccttcacc ctgtctgcat ctgtaggaga cagagtcacc 60
atcacttgcc gggccagtca gagtattagt agctggttgg cctggtatca gcagaaacca 120
gggaaagccc ctaaactcct gatctatgct gcatccgctt tgcaaagtgg ggtcccatca 180
aggttcagcg gcagcggatc tgggacagat ttactctca ctatcagcag cctgcagccc 240
gaagattttg caacttacta ttgtcaacag ggtgacagtt tccctctcac tttcggcgga 300
gggaccaagg tggagatcaa acgtacg 327

<210> 38
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL7 amino acid sequence

<400> 38

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

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

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

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

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

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

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

<210> 39
 <211> 327
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL7 nucleic acid sequence

<400> 39
 gacatccaga tgaccagtc tccttcacc ctgtctgcat ctgtaggaga cacagtcacc 60
 ttcagttgcc gggccagtca gagtattaac acctggttgg cctggtatca gcaaaagcca 120
 gggaaagccc ctaaactcct tatctataag gcgtctgctt tagaaaatgg ggtcccatca 180
 aggttcagcg gcagtggatc tgggacagag ttactctca caatcagcag cctgcagcct 240
 gaagattttg caacttacta ttgtcaacag gggaacagtt tccctctcac tttcggcgga 300
 gggaccaagg tggagatcaa acgtacg 327

<210> 40
 <211> 107
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL8 amino acid sequence

<400> 40

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

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

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

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

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

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Gly His Ser Phe Pro Leu
85 90 95

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

<210> 41

<211> 327

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic: VL8 nucleic acid sequence

<400> 41

gacatccaga tgacccagtc tccatcctcc ctgtctgcat ctgtaggaga cagagtcacc 60

atcacttgcc gggccagtca gagtattagt agctggttgg cctggtatca gcagaaacca 120

gggaaagccc ctaaactcct catctataag gcgtctgctt tagaaagtgg ggtcccatca 180

aggttcagcg gcggtggatc tgggacagaa ttcacttca ccatcagcag cctgcagcct 240

gaagattttg caacttacta ttgtcaacag ggtcacagtt tccctctcac tttcggcgga 300

gggaccaagc tggagatcaa acgtacg 327

<210> 42
 <211> 107
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL9 amino acid sequence

<400> 42

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

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

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

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

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

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

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

<210> 43
 <211> 327
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL9 nucleic acid sequence

<400> 43

gacatccagt tgaccagtc tccatcctcc ctgtctgcat ctgtaggaga cagagtcacc 60
 atcacttgcc gggccagtc gagtattagt gactggttg cctggtatca gcagaagcca 120
 ggtaaagccc ctaaactcct gatctttaag gcttctgctt tagaaggtgg ggtcccatca 180

```

aggttcagcg gcagtggatc tgggacagat ttactctca ccatcagcag cctgcagcct      240
gaagattttg caacttacta ttgtcaacag ggtaacagtt tcccgatcac cttcgccaa      300
gggacacgac tggagattaa acgtacg                                         327

```

<210> 44
 <211> 107
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL10 amino acid sequence

<400> 44

```

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

```

```

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

```

```

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

```

```

Tyr Glu Ala Ser Ala Leu Gln Gly Gly Val Pro Ser Arg Phe Ser Gly
50           55           60

```

```

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

```

```

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

```

```

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

```

<210> 45
 <211> 327
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Synthetic: VL10 nucleic acid sequence

```

<400> 45
gacatccaga tgaccagtc tccagccacc ctgtctgcat ctgttgaga cagggtcacc      60
atcacttgcc gggccagtca gagggttgat aggtggttgg cctggtacca gcagaaacca      120
gggaaagccc ctaacctcct aatctatgag gcgtctgcct tacaaggtgg ggtcccgta      180
aggttcagcg gcagtggatc tgggacagat ttactctca ccatcagcag cctgcagcct      240
gaagattttg caacttacta ttgtcaacag ggtgatagtt tccctctcac tttcggcgga      300
gggaccaagg tggagatcaa acgtacg                                          327

```

<210> 46

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL11 amino acid sequence

<400> 46

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

<210> 47
 <211> 327
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL11 nucleic acid sequence

<400> 47
 gacatccagt tgaccagtc tccatcttcc gtgtctgcat ctgtaggaga cagagtcacc 60
 atcacttgctc gggcgagtca ggggtattagc agctggtag cctgggtatca gcagaaacca 120
 gggaaagccc ctaagctcct gatctatgct gcatccggtt tgcaaaatgg ggtcccatca 180
 aggttcagcg gcagtggatc tgggacagat ttactctca ccatcagcag cctgcagcct 240
 gaagattttg caacttacta ttgtcaacag ggtgacaggt tcccgtcac tttcggcgga 300
 gggaccaagg tggagatcaa acgtacg 327

<210> 48
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH CDR1

<400> 48

Phe Thr Phe Ser Ser Tyr Ala Met Ser
 1 5

<210> 49
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH CDR1.1

<400> 49

Phe Thr Phe Asn Tyr Tyr Ala Met Ser
 1 5

<210> 50
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH CDR1.2

<400> 50

Phe Thr Phe Tyr Gly Tyr Ala Met Ser
 1 5

<210> 51
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH CDR1.3

<400> 51

Phe Thr Phe Arg Asn Tyr Ala Met Ser
 1 5

<210> 52
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH CDR1.4

<400> 52

Phe Thr Phe Asn Tyr Tyr Ala Met Asn
 1 5

<210> 53
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH CDR1.5

<220>

<221> misc_feature
<222> (9)..(9)
<223> X = S or N

<400> 53

Phe Thr Phe Asn Tyr Tyr Ala Met Xaa
1 5

<210> 54
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VH CDR1.6

<220>
<221> misc_feature
<222> (4)..(4)
<223> X = S, N, Y, R;

<220>
<221> misc_feature
<222> (5)..(5)
<223> X = S, N, Y, G

<400> 54

Phe Thr Phe Xaa Xaa Tyr Ala Met Ser
1 5

<210> 55
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VH CDR1.7

<220>
<221> misc_feature
<222> (4)..(4)
<223> X = S, N, Y, R

<220>
<221> misc_feature
<222> (5)..(5)

<223> X = S, N, Y, G

<220>

<221> misc_feature

<222> (9)..(9)

<223> X = S or N

<400> 55

Phe Thr Phe Xaa Xaa Tyr Ala Met Xaa
1 5

<210> 56

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR2

<400> 56

Ser Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr
1 5 10

<210> 57

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR2.1

<400> 57

Ser Ala Ile Asp Gly Ser Gly Asp Asn Thr Thr Tyr
1 5 10

<210> 58

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR2.2

<400> 58

Ala Ala Ile Ser Gly Ser Gly Asp Gly Thr Tyr Tyr

<400> 59

<400> 60

<400> 61

```
<220>
<223> Synthetic: VH CDR2.6
```

<400> 62

Ser Ala Ile Ser Gly Phe Gly Glu Ser Thr Tyr Tyr
1 5 10

<210> 63

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR2.7

<400> 63

Ala Ala Ile Ser Gly Ser Gly Gly Arg Thr Tyr Tyr
1 5 10

<210> 64

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR2.8

<400> 64

Ser Ala Ile Ser Gly Ser Gly Gly Asn Thr Ser Tyr
1 5 10

<210> 65

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR2.9

<400> 65

Ala Ala Ile Ser Gly Ser Gly Asp Ser Thr Tyr Tyr
1 5 10

<210> 66

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR2.10

<220>

<221> misc_feature

<222> (6)..(6)

<223> X = S or G

<220>

<221> misc_feature

<222> (8)..(8)

<223> X = D or G

<220>

<221> misc_feature

<222> (9)..(9)

<223> X = S, R, G, A

<400> 66

Ala Ala Ile Ser Gly Xaa Gly Xaa Xaa Thr Tyr Tyr

1

5

10

<210> 67

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR2.11

<220>

<221> misc_feature

<222> (1)..(2)

<223> Xaa can be any naturally occurring amino acid

<220>

<221> misc_feature

<222> (4)..(4)

<223> Xaa can be any naturally occurring amino acid

<220>

<221> misc_feature

<222> (6)..(6)

<223> Xaa can be any naturally occurring amino acid

<220>

<221> misc_feature
<222> (8)..(9)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (11)..(11)
<223> Xaa can be any naturally occurring amino acid

<400> 67

Xaa Xaa Ile Xaa Gly Xaa Gly Xaa Xaa Thr Xaa Tyr
1 5 10

<210> 68
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VH CDR3

<400> 68

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
1 5 10 15

Met Asp

<210> 69
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL CDR1

<400> 69

Arg Ala Ser Gln Gly Ile Ser Ser Trp Leu Ala Trp
1 5 10

<210> 70
<211> 12
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR1.1

<400> 70

Arg Ala Ser Gln Asn Ile His Asn Trp Leu Ala Trp
1 5 10

<210> 71

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR1.2

<400> 71

Arg Ala Ser Gln Ser Ile Ser Arg Trp Leu Ala Trp
1 5 10

<210> 72

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR1.3

<400> 72

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

<210> 73

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR1.4

<400> 73

Arg Ala Ser Gln Ser Ile Gly Arg Trp Leu Ala Trp
1 5 10

<210> 74

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

<220>
<223> Synthetic: VL CDR1.5

<400> 74

Arg Ala Ser Gln Ser Ile Ser Ser Trp Leu Ala Trp
1 5 10

<210> 75
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL CDR1.6

<400> 75

Arg Ala Ser Gln Ser Ile Asn Thr Trp Leu Ala Trp
1 5 10

<210> 76
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL CDR1.7

<400> 76

Arg Ala Ser Gln Ser Ile Ser Asp Trp Leu Ala Trp
1 5 10

<210> 77
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL CDR1.8

<400> 77

Arg Ala Ser Gln Ser Val Asp Arg Trp Leu Ala Trp

1

5

10

<210> 78
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL CDR2

<400> 78

Tyr Ala Ala Ser Ser Leu Gln Ser
1 5

<210> 79
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL CDR2.1

<400> 79

Tyr Lys Ala Ser Gly Leu Glu Ser
1 5

<210> 80
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL CDR2.2

<400> 80

Phe Lys Ala Ser Ala Leu Glu Ser
1 5

<210> 81
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL CDR2.3

<400> 81

Tyr Lys Ala Ser Gly Leu Glu Thr
1 5

<210> 82

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR2.4

<400> 82

Phe Lys Ala Ser Ala Leu Glu Val
1 5

<210> 83

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR2.5

<400> 83

Tyr Ala Ala Ser Ala Leu Gln Ser
1 5

<210> 84

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR2.6

<400> 84

Tyr Lys Ala Ser Ala Leu Glu Asn
1 5

<210> 85

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR2.7

<400> 85

Tyr Lys Ala Ser Ala Leu Glu Ser
1 5

<210> 86

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR2.8

<400> 86

Phe Lys Ala Ser Ala Leu Glu Gly
1 5

<210> 87

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR2.9

<400> 87

Tyr Glu Ala Ser Ala Leu Gln Gly
1 5

<210> 88

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR2.10

<400> 88

Tyr Ala Ala Ser Gly Leu Gln Asn
1 5

<210> 89
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL CDR3

<400> 89

Gln	Gln	Gly	His	Leu	Phe	Pro	Ile	Thr	Phe
1				5					10

<210> 90
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL CDR3.1

<400> 90

Gln	Gln	Gly	Asp	Arg	Phe	Pro	Leu	Thr	Phe
1				5					10

<210> 91
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL CDR3.2

<400> 91

Gln	Gln	Gly	Asn	Ser	Phe	Pro	Leu	Thr	Phe
1				5					10

<210> 92
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VL CDR3.3

<400> 92

Gln Gln Gly Asn Gln Phe Pro Leu Thr Phe
1 5 10

<210> 93
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL CDR3.4

<400> 93

Gln Gln Gly Asp Ser Phe Pro Leu Thr Phe
1 5 10

<210> 94
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL CDR3.5

<400> 94

Gln Gln Gly His Ser Phe Pro Leu Thr Phe
1 5 10

<210> 95
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VL CDR3.6

<400> 95

Gln Gln Gly Asn Ser Phe Pro Ile Thr Phe
1 5 10

<210> 96
<211> 10
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR3.7

<220>

<221> misc_feature

<222> (4)..(5)

<223> Xaa can be any naturally occurring amino acid

<220>

<221> misc_feature

<222> (8)..(8)

<223> Xaa can be any naturally occurring amino acid

<400> 96

Gln Gln Gly Xaa Xaa Phe Pro Xaa Thr Phe
1 5 10

<210> 97

<211> 254

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<222> (1)..(254)

<223> Human CD137L Uniprot ID P41273

<400> 97

Met Glu Tyr Ala Ser Asp Ala Ser Leu Asp Pro Glu Ala Pro Trp Pro
1 5 10 15

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

Ala Gly Leu Leu Leu Leu Leu Leu Ala Ala Ala Cys Ala Val Phe
35 40 45

Leu Ala Cys Pro Trp Ala Val Ser Gly Ala Arg Ala Ser Pro Gly Ser
50 55 60

Ala Ala Ser Pro Arg Leu Arg Glu Gly Pro Glu Leu Ser Pro Asp Asp
65 70 75 80

Pro Ala Gly Leu Leu Asp Leu Arg Gln Gly Met Phe Ala Gln Leu Val
85 90 95

Ala Gln Asn Val Leu Leu Ile Asp Gly Pro Leu Ser Trp Tyr Ser Asp
100 105 110

Pro Gly Leu Ala Gly Val Ser Leu Thr Gly Gly Leu Ser Tyr Lys Glu
115 120 125

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

Phe Gln Leu Glu Leu Arg Arg Val Val Ala Gly Glu Gly Ser Gly Ser
145 150 155 160

Val Ser Leu Ala Leu His Leu Gln Pro Leu Arg Ser Ala Ala Gly Ala
165 170 175

Ala Ala Leu Ala Leu Thr Val Asp Leu Pro Pro Ala Ser Ser Glu Ala
180 185 190

Arg Asn Ser Ala Phe Gly Phe Gln Gly Arg Leu Leu His Leu Ser Ala
195 200 205

Gly Gln Arg Leu Gly Val His Leu His Thr Glu Ala Arg Ala Arg His
210 215 220

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

Thr Pro Glu Ile Pro Ala Gly Leu Pro Ser Pro Arg Ser Glu
245 250

<210> 98
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: FLAG

<400> 98

Asp Tyr Lys Asp Asp Asp Asp Lys
1 5

<210> 99

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: 6-His

<400> 99

His His His His His His
1 5

<210> 100

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: HA

<400> 100

Tyr Pro Tyr Asp Val Pro Asp Tyr Ala
1 5

<210> 101

<211> 126

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH12 amino acid sequence

<400> 101

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

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

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

Ser Ala Ile Ser Gly Ser Gly Asp Thr Thr Tyr Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 102
<211> 384
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic: VH12 nucleic acid sequence

<400> 102
gaagtgcaat tattggaatc cggcggcggt ttagttcagc caggtggctc tttgaggctg 60
agttgcgcag cctctggatt cacctttaga aactacgaa tgtcttgggt tcgccaggcg 120
cccggtaagg gtctggagtg ggtgtctgca atctctggtt ctggtgatac tacttactac 180
gccgactctg tgaaaggctg ttttaccata agccgcgaca attctaagaa tactttatat 240
cttcaaatga attcgctgcg ggcagaagac acggccgtct attactgcgc aaaggactca 300
ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caagggtaca 360
actgtcaccg tctcctcagc tagc 384

<210> 103
<211> 126
<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH13 amino acid sequence

<400> 103

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

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

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

Ser Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 104

<211> 384

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic: VH13 nucleic acid sequence

<400> 104

gaagtgcaat tattggaatc cggcggcggt ttagttcagc caggtggctc tttgaggctg 60

agttgcgcag cctctggatt cacctttggt tcttacgcaa tgtcttgggt tcgccaggcg 120

```

cccggtaagg gtctggagtg ggtgtctgca atctctggtt ctggtgggtc tacttactac      180
gccgactctg tgaaaggctg ttttaccata agccgcgaca attctaagaa tactttatat      240
cttcaaatga attcgctgcg ggcagaagac acggccgtct attactgctc aaaggactca      300
ccttttctat tagacgacta ctactactac tactacatgg acgtatgggg caagggtaca      360
actgtcaccg tctcctcagc tagc                                           384

```

```

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

```

```

<220>
<223> Synthetic: VL12 amino acid sequence

```

```

<400> 105

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

Thr Phe Gly Gln Gly Thr Arg Leu Glu
          100          105

```

```

<210> 106
<211> 315
<212> DNA

```

<213> Artificial Sequence

<220>

<223> Synthetic: VL12 nucleic acid sequence

<400> 106

gacatccagt tgaccagtc tccatcctcc ctgtctgcat ctgtaggaga cagagtaacc 60

atcacttgcc gggcaagtca ggatattggg gactgggttg cctgggtatca gcagaagcct 120

gggaaagccc ctaagctcct gatctataag gcgtctggtt tacaaagtgg ggtcccatca 180

agattcagtg gcagtggatc tgggacagaa ttactctca ctatcagcaa cctgcagcca 240

gaggattttg cgacttacta ttgtcaacag ggtaaccagt tcccgtcac cttcggccaa 300

gggacacgac tggag 315

<210> 107

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR1.8

<400> 107

Phe Thr Phe Gly Trp Tyr Ala Met Ser

1 5

<210> 108

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR2.12

<400> 108

Ser Ala Ile Ser Gly Ser Gly Asp Thr Thr Tyr Tyr

1 5 10

<210> 109

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR1.9

<400> 109

Arg Ala Ser Gln Asp Ile Gly Asp Trp Leu Ala Trp
1 5 10

<210> 110

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VL CDR2.11

<400> 110

Tyr Lys Ala Ser Gly Leu Gln Ser
1 5

<210> 111

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR3.1

<400> 111

Ala Lys Ala Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
1 5 10 15

Met Asp

<210> 112

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR3.2

<400> 112

Ala Lys Asp Ala Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr

<210>	113
<211>	18
<212>	PRT
<213>	Artificial Sequence

<400> 113

Met Asp

<210>	114
<211>	18
<212>	PRT
<213>	Artificial Sequence

<400> 114

Met Asp

$\langle 210 \rangle$	115
$\langle 211 \rangle$	18
$\langle 212 \rangle$	PRT
$\langle 213 \rangle$	Artificial Sequence

<400> 115

Ala Lys Asp Ser Pro Phe Ala Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
1 5 10 15

Met Asp

<210> 116
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VH CDR3.6

<400> 116

Ala Lys Asp Ser Pro Phe Leu Ala Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
1 5 10 15

Met Asp

<210> 117
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VH CDR3.7

<400> 117

Ala Lys Asp Ser Pro Phe Leu Leu Ala Asp Tyr Tyr Tyr Tyr Tyr Tyr
1 5 10 15

Met Asp

<210> 118
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: VH CDR3.8

<400> 118

Ala Lys Asp Ser Pro Phe Leu Leu Asp Ala Tyr Tyr Tyr Tyr Tyr Tyr
1 5 10 15

Met Asp

<210> 119

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR3.9

<400> 119

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Ala Tyr Tyr Tyr Tyr Tyr
1 5 10 15

Met Asp

<210> 120

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR3.10

<400> 120

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Ala Tyr Tyr Tyr Tyr
1 5 10 15

Met Asp

<210> 121

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR3.11

<400> 121

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Ala Tyr Tyr Tyr
1 5 10 15

Met Asp

<210> 122

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR3.12

<400> 122

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Ala Tyr Tyr
1 5 10 15

Met Asp

<210> 123

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR3.13

<400> 123

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Ala Tyr
1 5 10 15

Met Asp

<210> 124

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR3.14

<400> 124

Ala	Lys	Asp	Ser	Pro	Phe	Leu	Leu	Asp	Asp	Tyr	Tyr	Tyr	Tyr	Tyr	Ala
1				5				10						15	

Met Asp

<210> 125

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR3.15

<400> 125

Ala	Lys	Asp	Ser	Pro	Phe	Leu	Leu	Asp	Asp	Tyr	Tyr	Tyr	Tyr	Tyr	Tyr
1				5				10						15	

Ala Asp

<210> 126

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: VH CDR3.16

<220>

<221> misc_feature

<222> (2)..(5)

<223> Xaa can be any naturally occurring amino acid

<220>

<221> misc_feature

<222> (7)..(10)

<223> Xaa can be any naturally occurring amino acid

<220>
 <221> misc_feature
 <222> (12)..(12)
 <223> Xaa can be any naturally occurring amino acid

<220>
 <221> misc_feature
 <222> (15)..(15)
 <223> Xaa can be any naturally occurring amino acid

<400> 126

Asp	Xaa	Xaa	Xaa	Xaa	Leu	Xaa	Xaa	Xaa	Xaa	Tyr	Xaa	Tyr	Tyr	Xaa
1				5					10					15

<210> 127
 <211> 15
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic: VH CDR3.17

<220>
 <221> misc_feature
 <222> (2)..(2)
 <223> Xaa can be any naturally occurring amino acid

<220>
 <221> misc_feature
 <222> (5)..(5)
 <223> Xaa can be any naturally occurring amino acid

<220>
 <221> misc_feature
 <222> (8)..(9)
 <223> Xaa can be any naturally occurring amino acid

<220>
 <221> misc_feature
 <222> (15)..(15)
 <223> Xaa can be any naturally occurring amino acid

<400> 127

Asp	Xaa	Pro	Phe	Xaa	Leu	Asp	Xaa	Xaa	Tyr	Tyr	Tyr	Tyr	Tyr	Xaa
1				5					10					15

<210> 128

```

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

<220>
<223> Synthetic: VH CDR3.18

<220>
<221> misc_feature
<222> (2)..(2)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (3)..(3)
<223> Xaa is a non-polar amino acid or proline

<220>
<221> misc_feature
<222> (4)..(4)
<223> Xaa is a non-polar amino acid or phenylalanine or tryptophan

<220>
<221> misc_feature
<222> (5)..(5)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (7)..(7)
<223> Xaa is a polar amino acid or aspartic acid or glutamic acid

<220>
<221> misc_feature
<222> (8)..(8)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (9)..(9)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (10)..(10)
<223> Xaa is a polar amino acid or tyrosine

<220>
<221> misc_feature
<222> (12)..(12)
<223> Xaa is a polar amino acid or tyrosine

```

<220>

<221> misc_feature

<222> (15)..(15)

<223> Xaa can be any naturally occurring amino acid

<400> 128

Asp Xaa Xaa Xaa Xaa Leu Xaa Xaa Xaa Xaa Tyr Xaa Tyr Tyr Xaa
1 5 10 15

<210> 129

<211> 452

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: mAb1 heavy chain

<400> 129

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

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

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

Ser Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala Ser
115 120 125

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

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

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
165 170 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
180 185 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr
195 200 205

Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215 220

Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe
225 230 235 240

Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
245 250 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val
260 265 270

Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val
275 280 285

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser
290 295 300

Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu
305 310 315 320

Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser
325 330 335

Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro
340 345 350

Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln
355 360 365

Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala
370 375 380

Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr
385 390 395 400

Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu
405 410 415

Thr Val Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser
420 425 430

Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser
435 440 445

Leu Ser Leu Gly
450

<210> 130

<211> 454

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: mAb8 heavy chain V1

<400> 130

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

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

2018-07-19 CTN-006PC_ST25 (003).txt

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

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

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

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

Tyr Cys Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr
100 105 110

Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
115 120 125

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

Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
145 150 155 160

Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
165 170 175

Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
180 185 190

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr
195 200 205

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

Arg Val Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro
225 230 235 240

2018-07-19 CTN-006PC_ST25 (003).txt

Glu Phe Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys
245 250 255

Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val
260 265 270

Asp Val Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp
275 280 285

Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe
290 295 300

Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
305 310 315 320

Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu
325 330 335

Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg
340 345 350

Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys
355 360 365

Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp
370 375 380

Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys
385 390 395 400

Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser
405 410 415

Arg Leu Thr Val Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser
420 425 430

Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser
435 440 445

Leu Ser Leu Ser Leu Gly
450

<210> 131
<211> 452
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic: mAb8 heavy chain V2

<400> 131

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

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

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

Ser Ala Ile Ser Gly Ser Gly Asp Thr Thr Tyr Tyr Ala Asp Ser Val
50 55 60

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala Ser
115 120 125

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

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

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
165 170 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
180 185 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr
195 200 205

Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215 220

Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe
225 230 235 240

Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
245 250 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val
260 265 270

Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val
275 280 285

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser
290 295 300

Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu
305 310 315 320

Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser
325 330 335

Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro
340 345 350

Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln
355 360 365

Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala
370 375 380

Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr
385 390 395 400

Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu
405 410 415

Thr Val Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser
420 425 430

Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser
435 440 445

Leu Ser Leu Gly
450

<210> 132

<211> 452

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: mAb10 heavy chain

<400> 132

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

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

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

Ala Ala Ile Ser Gly Ser Gly Asp Ser Thr Tyr Tyr Ala Asp Ser Val
50 55 60

2018-07-19 CTN-006PC_ST25 (003).txt

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

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

Ala Lys Asp Ser Pro Phe Leu Leu Asp Asp Tyr Tyr Tyr Tyr Tyr Tyr
100 105 110

Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala Ser
115 120 125

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

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

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val
165 170 175

His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser
180 185 190

Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr
195 200 205

Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val
210 215 220

Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe
225 230 235 240

Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
245 250 255

Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val
260 265 270

2018-07-19 CTN-006PC_ST25 (003).txt

Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val
275 280 285

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser
290 295 300

Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu
305 310 315 320

Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser
325 330 335

Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro
340 345 350

Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln
355 360 365

Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala
370 375 380

Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr
385 390 395 400

Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu
405 410 415

Thr Val Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser
420 425 430

Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser
435 440 445

Leu Ser Leu Gly
450

<210> 133

<211> 214

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic: mAb1, mAb8 and mAb10 light chain

<400> 133

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

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

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

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

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

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

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

Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

2018-07-19 CTN-006PC_ST25 (003).txt

Ala	Cys	Glu	Val	Thr	His	Gln	Gly	Leu	Ser	Ser	Pro	Val	Thr	Lys	Ser
	195						200					205			

Phe	Asn	Arg	Gly	Glu	Cys
210					