

<110> DINONA INC

<120> Antibody binding to Carbonic anhydrase and use thereof

<130> OPP20174986KR

<150> KR 10-2016-0151382

<151> 2016-11-14

<160> 63

<170> KoPatentIn 3.0

<210> 1

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> epitope of humanized 27B6

<400> 1

Trp Thr Tyr Phe Gly Pro Asp

1

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<210> 2

<211> 14

<212> PRT

<213> Artificial Sequence

<220>

<223> epitope of humanized 27B6

<400> 2

Ala Pro Val Asn Gly Ser Lys Trp Thr Tyr Phe Gly Pro Asp

1

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10

<210> 3

<211> 14

<212> PRT
 <213> Artificial Sequence

<220>
 <223> epitope of humanized 4B4

<400> 3
 Gly Glu Asn Ser Trp Ser Lys Lys Tyr Pro Ser Cys Gly Gly
 1 5 10

<210> 4
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> epitope of humanized 4B4

<400> 4
 Gly Glu Asn Ser Trp Ser Lys Lys Tyr Pro Ser Cys Gly Gly Leu Leu
 1 5 10 15

Gln Ser Pro

<210> 5
 <211> 354
 <212> PRT
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<220>
 <223> Amino acid sequence of CA XII derived from human

<400> 5
 Met Pro Arg Arg Ser Leu His Ala Ala Ala Val Leu Leu Leu Val Ile
 1 5 10 15

Leu Lys Glu Gln Pro Ser Ser Pro Ala Pro Val Asn Gly Ser Lys Trp

20	25	30
Thr Tyr Phe Gly Pro Asp Gly Glu Asn Ser Trp Ser Lys Lys Tyr Pro		
35	40	45
Ser Cys Gly Gly Leu Leu Gln Ser Pro Ile Asp Leu His Ser Asp Ile		
50	55	60
Leu Gln Tyr Asp Ala Ser Leu Thr Pro Leu Glu Phe Gln Gly Tyr Asn		
65	70	75
80		
Leu Ser Ala Asn Lys Gln Phe Leu Leu Thr Asn Asn Gly His Ser Val		
85	90	95
Lys Leu Asn Leu Pro Ser Asp Met His Ile Gln Gly Leu Gln Ser Arg		
100	105	110
Tyr Ser Ala Thr Gln Leu His Leu His Trp Gly Asn Pro Asn Asp Pro		
115	120	125
His Gly Ser Glu His Thr Val Ser Gly Gln His Phe Ala Ala Glu Leu		
130	135	140
His Ile Val His Tyr Asn Ser Asp Leu Tyr Pro Asp Ala Ser Thr Ala		
145	150	155
160		
Ser Asn Lys Ser Glu Gly Leu Ala Val Leu Ala Val Leu Ile Glu Met		
165	170	175
Gly Ser Phe Asn Pro Ser Tyr Asp Lys Ile Phe Ser His Leu Gln His		
180	185	190
Val Lys Tyr Lys Gly Gln Glu Ala Phe Val Pro Gly Phe Asn Ile Glu		
195	200	205
Glu Leu Leu Pro Glu Arg Thr Ala Glu Tyr Tyr Arg Tyr Arg Gly Ser		
210	215	220
Leu Thr Thr Pro Pro Cys Asn Pro Thr Val Leu Trp Thr Val Phe Arg		
225	230	235
240		
Asn Pro Val Gln Ile Ser Gln Glu Gln Leu Leu Ala Leu Glu Thr Ala		
245	250	255

Leu Tyr Cys Thr His Met Asp Asp Pro Ser Pro Arg Glu Met Ile Asn
 260 265 270

Asn Phe Arg Gln Val Gln Lys Phe Asp Glu Arg Leu Val Tyr Thr Ser
 275 280 285

Phe Ser Gln Val Gln Val Cys Thr Ala Ala Gly Leu Ser Leu Gly Ile
 290 295 300

Ile Leu Ser Leu Ala Leu Ala Gly Ile Leu Gly Ile Cys Ile Val Val
 305 310 315 320

Val Val Ser Ile Trp Leu Phe Arg Arg Lys Ser Ile Lys Lys Gly Asp
 325 330 335

Asn Lys Gly Val Ile Tyr Lys Pro Ala Thr Lys Met Glu Thr Glu Ala
 340 345 350

His Ala

<210> 6

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> VH-CDR1 of 27B6 antibody

<400> 6

Gly Tyr Ser Phe Thr Asn Tyr Trp

1

5

<210> 7

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> VH-CDR2 of 27B6 antibody

<400> 7

Ile Asp Pro Ser Asp Ser Glu Thr
1 5

<210> 8

<211> 13

<212> PRT

<213> Artificial Sequence

<220>

<223> VH-CDR3 of 27B6 antibody

<400> 8

Thr Arg Gly Ile Arg Gly Gly Tyr Tyr Ala Met Asp Tyr
1 5 10

<210> 9

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> VL-CDR1 of 27B6 antibody

<400> 9

Gln Asp Ile Ser Asn Tyr
1 5

<210> 10

<211> 3

<212> PRT

<213> Artificial Sequence

<220>

<223> VH-CDR2 of 27B6 antibody

<400> 10

Tyr Thr Ser

1

<210> 11

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> VH-CDR3 of 27B6 antibody

<400> 11

Gln Gln Gly Asp Thr Leu Pro Arg Thr

1

5

<210> 12

<211> 120

<212> PRT

<213> Artificial Sequence

<220>

<223> Heavy chain variable region of 27B6 antibody

<400> 12

Gln Val Gln Leu Gln Gln Ser Gly Pro Gln Leu Val Trp Pro Gly Ala

1

5

10

15

Ser Val Lys Ile Ser Cys Asn Thr Ser Gly Tyr Ser Phe Thr Asn Tyr

20

25

30

Trp Ile His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile

35

40

45

Gly Met Ile Asp Pro Ser Asp Ser Glu Thr Arg Leu Asn Gln Lys Phe

50

55

60

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

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

Thr Arg Gly Ile Arg Gly Gly Tyr Tyr Ala Met Asp Tyr Trp Gly Gln
 100 105 110

Gly Thr Ser Val Thr Val Ser Ser
 115 120

<210> 13

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Light chain variable region of 27B6 antibody

<400> 13

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

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

Leu Asn Trp Tyr Gln Gln Lys Pro Glu Gly Thr Val Lys Leu Leu Ile
 35 40 45

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

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

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

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

<210> 14
 <211> 8
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VH-CDR1 of 4B4 antibody

<400> 14
 Gly Tyr Ser Tyr Thr Asp Tyr Asn
 1 5

<210> 15
 <211> 8
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VH-CDR2 of 4B4 antibody

<400> 15
 Ile Asp Pro Ala Asn Gly Asp Thr
 1 5

<210> 16
 <211> 14
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VH-CDR3 of 4B4 antibody

<400> 16
 Ala Arg Pro Ile Tyr Tyr Gly Val Tyr Trp Tyr Phe Asp Val
 1 5 10

<210> 17
 <211> 11
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VL-CDR1 of 4B4 antibody

<400> 17
 Lys Ser Leu Leu His Ser Asn Gly Asn Thr Tyr
 1 5 10

<210> 18
 <211> 3
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VL-CDR2 of 4B4 antibody

<400> 18
 Arg Met Ser
 1

<210> 19
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VL-CDR3 of 4B4 antibody

<400> 19
 Met Gln His Leu Glu Tyr Pro Phe Thr
 1 5

<210> 20
 <211> 120
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Heavy chain variable region of 4B4 antibody

<400> 20
 Glu Ile Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly Ala
 1 5 10 15

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

Asn Ile Tyr Trp Val Arg Gln Ser Gln Gly Lys Ser Leu Asp Trp Ile
 35 40 45

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

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

Met His Leu Asn Ser Leu Thr Ser Asp Gly Ser Ala Val Tyr Phe Cys
 85 90 95

Ala Arg Pro Ile Tyr Tyr Gly Val Tyr Trp Tyr Phe Asp Val Trp Gly
 100 105 110

Ala Gly Thr Thr Val Thr Val Ser
 115 120

<210> 21
 <211> 112
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Light chain variable region of 4B4 antibody

<400> 21

Asp Ile Val Met Thr Gln Ala Ala Pro Ser Val Pro Val Thr Pro Gly

1

5

10

15

Glu Ser Val Ser Ile Ser Cys Arg Ser Ser Lys Ser Leu Leu His Ser

20

25

30

Asn Gly Asn Thr Tyr Leu Tyr Trp Phe Leu Gln Arg Pro Gly Gln Ser

35

40

45

Pro Gln Leu Leu Ile Tyr Arg Met Ser Asn Leu Ala Ser Gly Val Pro

50

55

60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Ala Phe Thr Leu Arg Ile

65

70

75

80

Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Met Gln His

85

90

95

Leu Glu Tyr Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu Glu Ile Lys

100

105

110

<210> 22

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide derived from 27B6 ntibody

<400> 22

Gln Phe Leu Leu Thr Asn Asn Gly His Ser Val Lys

1

5

10

<210> 23

<211> 14

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide derived from 27B6 ntibody

<400> 23

Trp Thr Tyr Phe Gly Pro Asp Gly Glu Asn Ser Trp Ser Lys
1 5 10

<210> 24

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide derived from 27B6 ntibody

<400> 24

Gly Gln Glu Ala Phe Val Pro Gly Phe Asn Ile Glu Glu Leu Leu Pro
1 5 10 15

Glu Arg

<210> 25

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide derived from 27B6 ntibody

<400> 25

Tyr Lys Gly Gln Glu Ala Phe Val Pro Gly Phe Asn Ile Glu Glu Leu
1 5 10 15

Leu Pro Glu Arg
20

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

 <220>
 <223> Peptide derived from 4B4 antibody

<400> 26
 Glu Met Ile Asn Asn Phe Arg
 1 5

<210> 27
 <211> 9
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> Peptide derived from 4B4 antibody

<400> 27
 Gly Val Ile Tyr Lys Pro Ala Thr Lys
 1 5

<210> 28
 <211> 14
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VH-CDR3 of DNP004 antibody

<400> 28
 Ser Arg Pro Ile Tyr Tyr Gly Ala Tyr Trp Tyr Phe Asp Val
 1 5 10

<210> 29
 <211> 7
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VL-CDR1 of DNP004 antibody

<220>
 <221> MISC_FEATURE
 <222> (4)
 <223> X is P or S

<400> 29
 Ala Ser Ser Xaa Val Thr Tyr
 1 5

<210> 30
 <211> 7
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VL-CDR2 of DNP004 antibody

<220>
 <221> MISC_FEATURE
 <222> (1)
 <223> X is A, G or R

<220>
 <221> MISC_FEATURE
 <222> (4)
 <223> X is S, R, H, Q, D, E or M

<220>

<221> MISC_FEATURE
 <222> (6)
 <223> X is A, V, I or M

<220>
 <221> MISC_FEATURE
 <222> (7)
 <223> X is P or S

<400> 30
 Xaa Thr Ser Xaa Leu Xaa Xaa
 1 5

<210> 31
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VL-CDR3 of DNP004 antibody

<400> 31
 Gln Gln Trp Ser Ser Asn Pro Leu Thr
 1 5

<210> 32
 <211> 7
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VL-CDR1 of DNP004 antibody

<400> 32
 Ala Ser Ser Pro Val Thr Tyr
 1 5

<210> 33
 <211> 7
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VL-CDR1 of DNP004 antibody

<400> 33
 Ala Ser Ser Ser Val Thr Tyr
 1 5

<210> 34
 <211> 7
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VL-CDR2 of DNP004 antibody

<400> 34
 Ala Thr Ser Ser Leu Ala Pro
 1 5

<210> 35
 <211> 7
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> VL-CDR2 of DNP004 antibody

<400> 35
 Ala Thr Ser Ser Leu Val Ser
 1 5

<210> 36
 <211> 7
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> VL-CDR2 of DNP004 antibody

<400> 36
 Gly Thr Ser Arg Leu Val Ser
 1 5

<210> 37
 <211> 7
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> VL-CDR2 of DNP004 antibody

<400> 37
 Ala Thr Ser His Leu Val Ser
 1 5

<210> 38
 <211> 7
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> VL-CDR2 of DNP004 antibody

<400> 38
 Gly Thr Ser Gln Leu Val Ser
 1 5

<210> 39

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

<220>
<223> VL-CDR2 of DNP004 antibody

<400> 39
Arg Thr Ser Asp Leu Ile Ser
1 5

<210> 40
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> VL-CDR2 of DNP004 antibody

<400> 40
Ala Thr Ser Glu Leu Met Ser
1 5

<210> 41
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> VL-CDR2 of DNP004 antibody

<400> 41
Gly Thr Ser Met Leu Ala Ser
1 5

<210> 42
<211> 7

<212> PRT
 <213> Artificial Sequence

<220>
 <223> VL-CDR2 of DNP004 antibody

<400> 42
 Ala Thr Ser Ser Leu Ala Ser
 1 5

<210> 43
 <211> 25
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Frame work #1 of VH-humanized

<400> 43
 Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
 1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser
 20 25

<210> 44
 <211> 17
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Frame work #2 of VH-humanized

<400> 44
 Ile Tyr Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Gly
 1 5 10 15

Tyr

<210> 45
 <211> 38
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Frame work #3 of VH-humanized

<400> 45
 Thr Tyr Asn Gln Lys Phe Lys Gly Arg Ala Thr Ile Ser Val Asp Lys
 1 5 10 15

Ser Lys Asn Thr Ala Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
 20 25 30

Thr Ala Val Tyr Tyr Cys
 35

<210> 46
 <211> 11
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Frame work #4 of VH-humanized

<400> 46
 Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
 1 5 10

<210> 47
 <211> 24
 <212> PRT
 <213> Artificial Sequence

<220>

<223> Frame work #1 of VL-humanized

<400> 47

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
 20

<210> 48

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> Frame work #2 of VL-humanized

<220>

<221> MISC_FEATURE

<222> (5)

<223> X is Q or H

<220>

<221> MISC_FEATURE

<222> (13)

<223> X is R or K

<400> 48

Met His Trp Tyr Xaa Gln Lys Pro Gly Lys Ala Pro Xaa Pro Trp Ile
 1 5 10 15

Tyr

<210> 49

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> Frame work #2 of VL-humanized

<400> 49

Met His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Arg Pro Trp Ile
 1 5 10 15

Tyr

<210> 50

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> Frame work #2 of VL-humanized

<400> 50

Met His Trp Tyr His Gln Lys Pro Gly Lys Ala Pro Lys Pro Trp Ile
 1 5 10 15

Tyr

<210> 51

<211> 32

<212> PRT

<213> Artificial Sequence

<220>

<223> Frame work #3 of VL-humanized

<400> 51

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

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

<210> 52
 <211> 10
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Frame work #4 of VL-humanized

<400> 52
 Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
 1 5 10

<210> 53
 <211> 121
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Heavy chain variable region of DNP004 antibody

<400> 53
 Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
 1 5 10 15

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

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

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

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

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

Ser Arg Pro Ile Tyr Tyr Gly Ala Tyr Trp Tyr Phe Asp Val Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 54

<211> 106

<212> PRT

<213> Artificial Sequence

<220>

<223> #1 Light chain variable region of DNP004 antibody

<400> 54

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 Ser Pro Val Thr Tyr Met
20 25 30

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

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

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

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

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

<210> 55
 <211> 106
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> #2 Light chain variable region of DNP004 antibody

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

<210> 56
 <211> 106
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> #8 Light chain variable region of DNP004 antibody

<400> 56

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 Ser Ser Val Thr Tyr Met
 20 25 30

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

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

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

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

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

<210> 57

<211> 106

<212> PRT

<213> Artificial Sequence

<220>

<223> #11 Light chain variable region of DNP004 antibody

<400> 57

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 Ser Ser Val Thr Tyr Met
 20 25 30

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

Ala Thr Ser His Leu Val Ser Gly Val Pro Ser Arg Phe Ser Gly Ser

50 55 60
 Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu
 65 70 75 80
 Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Leu Thr
 85 90 95
 Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
 100 105

<210> 58
 <211> 106
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> #15 Light chain variable region of DNP004 antibody

<400> 58
 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 Ser Ser Val Thr Tyr Met
 20 25 30
 His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Pro Trp Ile Tyr
 35 40 45
 Gly Thr Ser Gln Leu Val Ser Gly Val Pro Ser Arg Phe Ser Gly Ser
 50 55 60
 Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu
 65 70 75 80
 Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Leu Thr
 85 90 95
 Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
 100 105

<210> 59
 <211> 106
 <212> PRT
 <213> Artificial Sequence

<220>

<223> #19 Light chain variable region of DNP004 antibody

<400> 59

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 Ser Ser Val Thr Tyr Met
 20 25 30

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

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

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

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

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

<210> 60
 <211> 106
 <212> PRT
 <213> Artificial Sequence

<220>

<223> #22 Light chain variable region of DNP004 antibody

<400> 60

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 Ser Ser Val Thr Tyr Met
 20 25 30

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

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

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

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

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

<210> 61

<211> 106

<212> PRT

<213> Artificial Sequence

<220>

<223> #25 Light chain variable region of DNP004 antibody

<400> 61

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 Ser Ser Val Thr Tyr Met
 20 25 30

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

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

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

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

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

<210> 62

<211> 106

<212> PRT

<213> Artificial Sequence

<220>

<223> #26 Light chain variable region of DNP004 antibody

<400> 62

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 Ser Pro Val Thr Tyr Met
20 25 30

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

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

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

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

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

<210> 63
 <211> 106
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> #30 Light chain variable region of DNP004 antibody

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