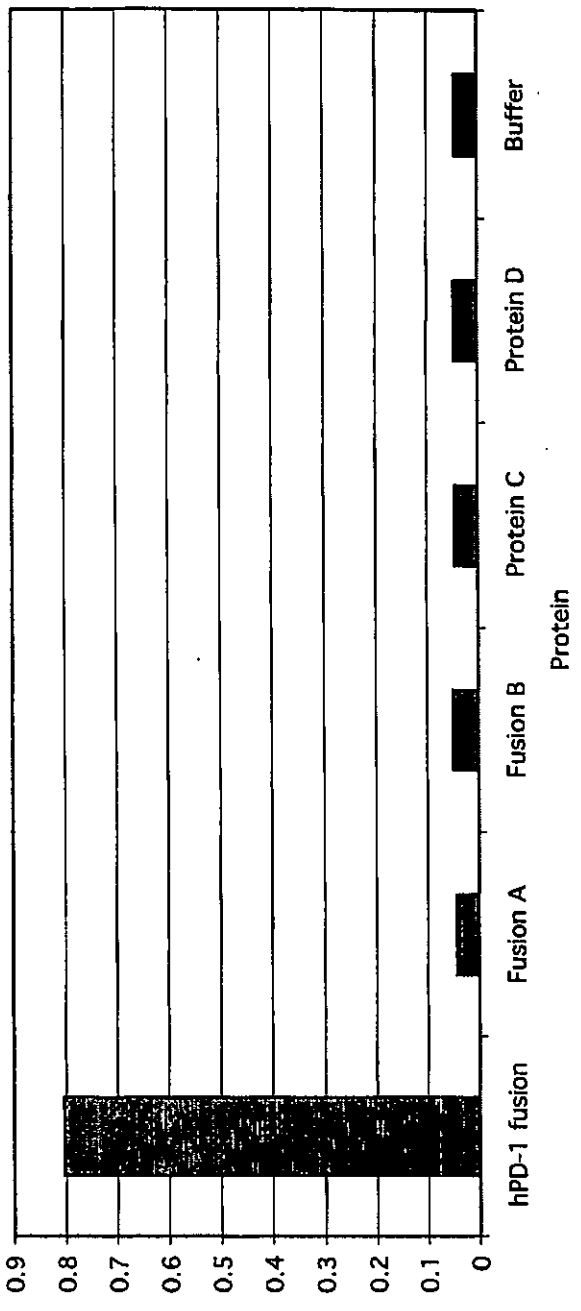

0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
hPD-1 fusion
Fusion A
Fusion B
Protein C
Protein D
Buffer
Protein

Fig. 1A

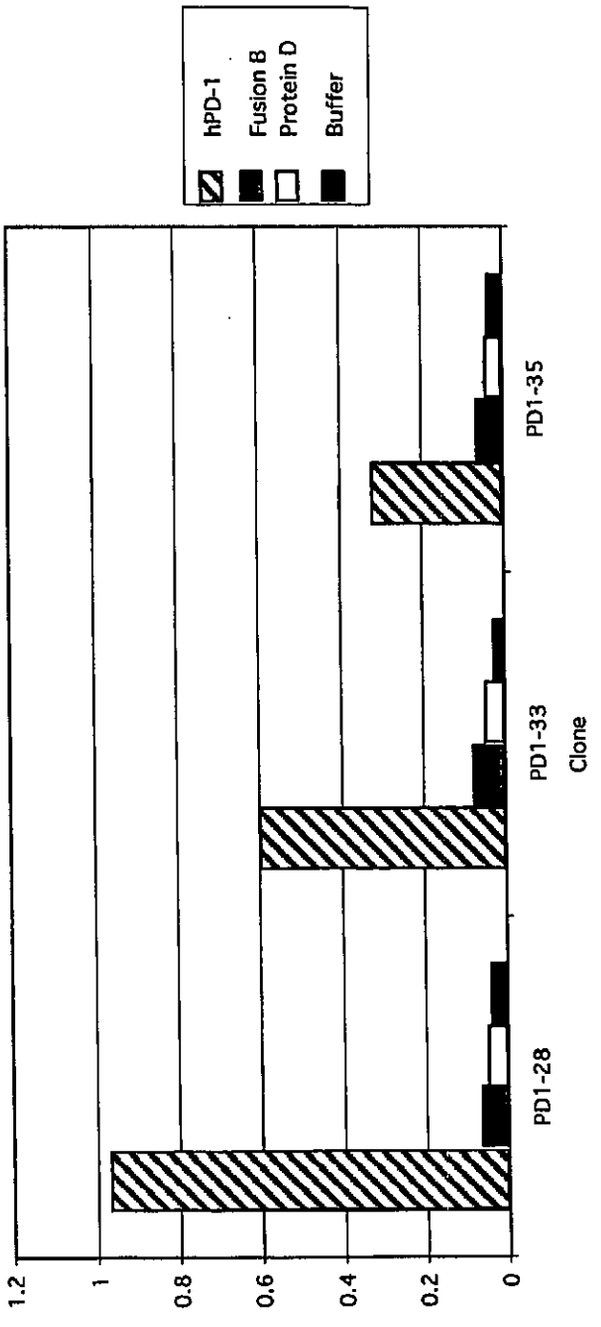

hPD-1
Fusion & Protein D
Buffer
PD1-35
PD1-33
PD1-28
Clone
1.2
1
0.8
0.6
0.4
0.2
0

Fig. 1B

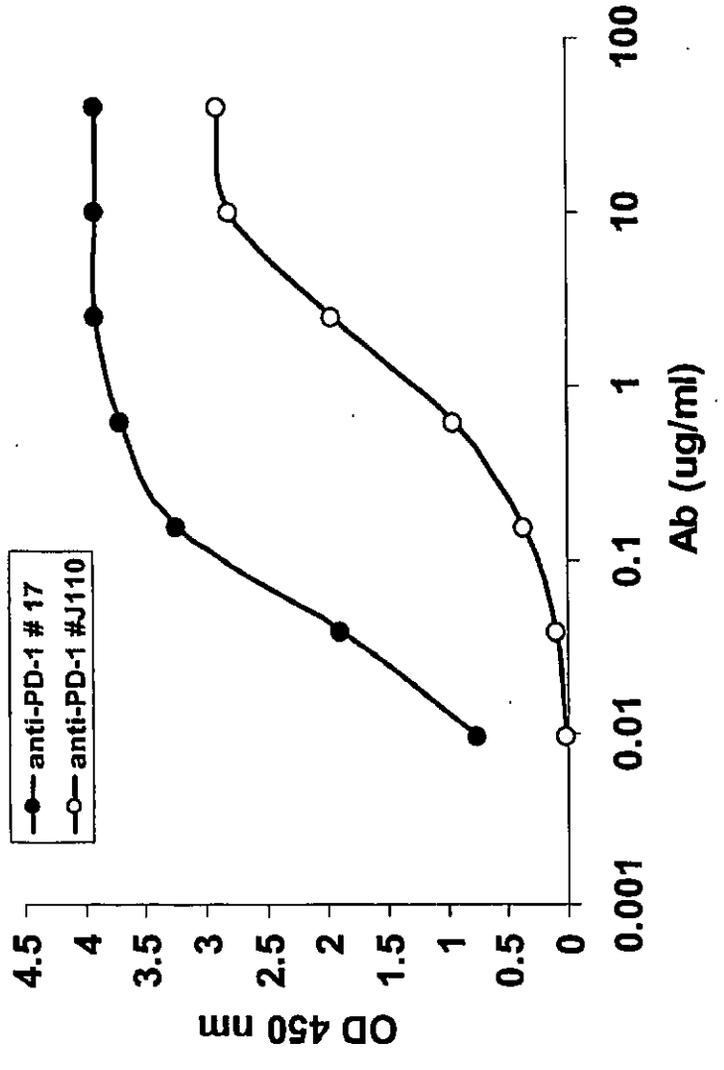

OD 450 nm
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0.001
0.01
0.1
1
10
100
Ab (ug/ml)
anti-PD-1 # 17
anti-PD-1 #J110

Fig. 2A

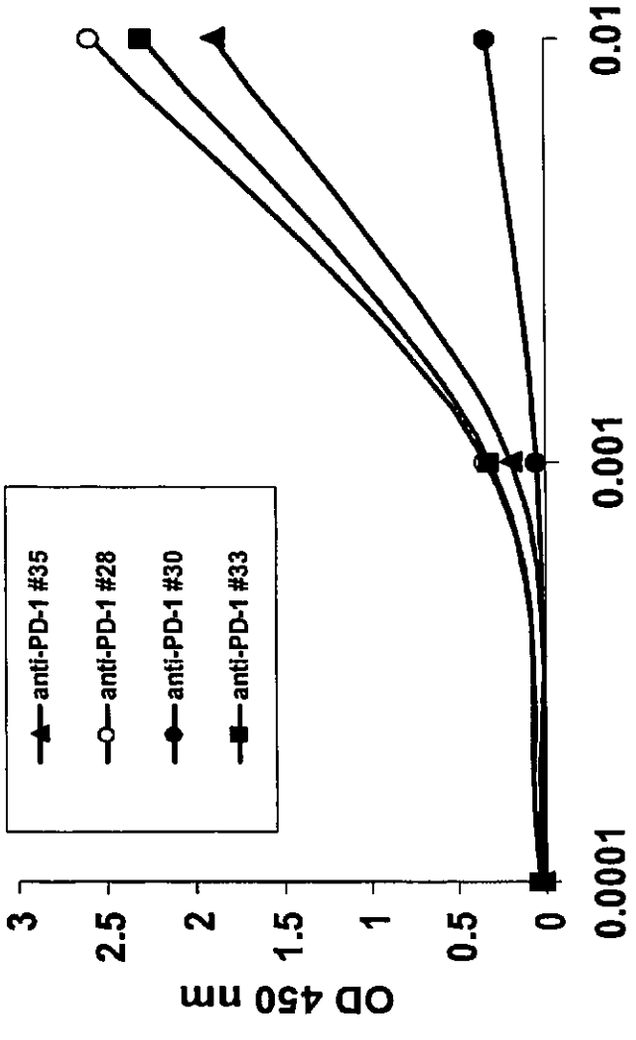

anti-PD-1 #35
anti-PD-1 #28
anti-PD-1 #30
anti-PD-1 #33
OD 450 nm
3
2.5
2
1.5
1
0.5
0
0.0001
0.001
0.01
Ab (ug/ml)

Fig. 2B

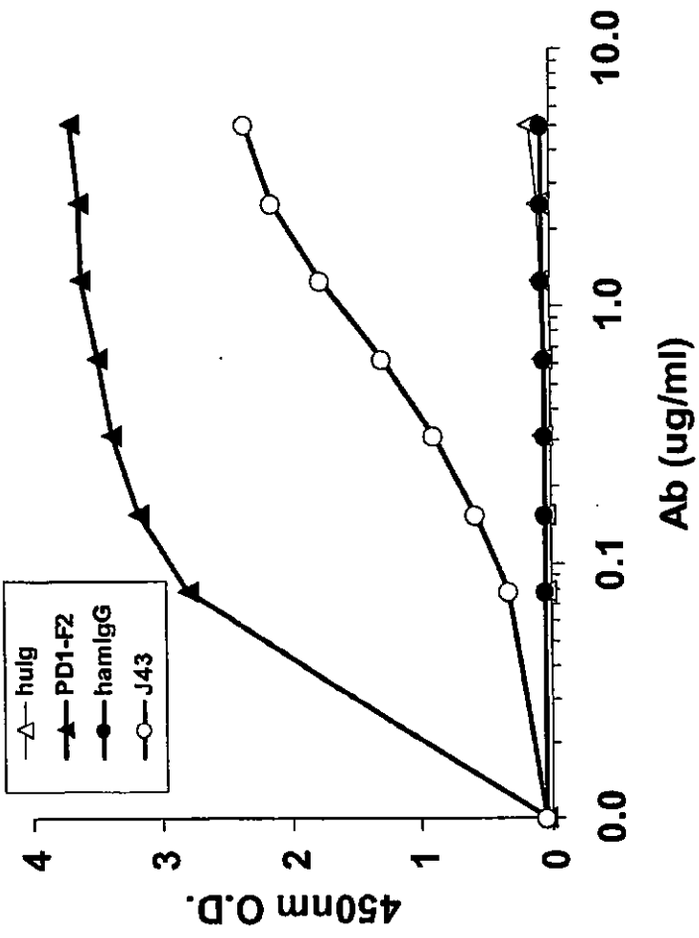


Fig. 2C

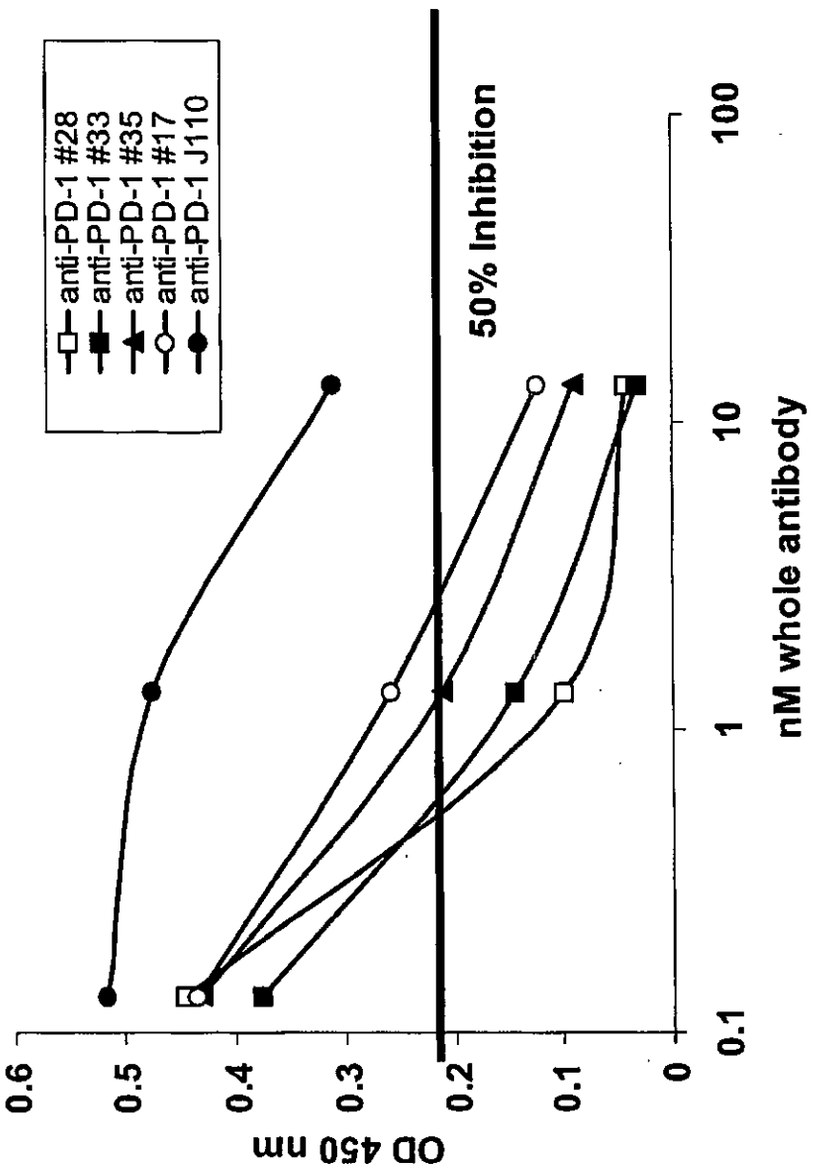

anti-PD-1 #28
anti-PD-1 #33
anti-PD-1 #35
anti-PD-1 #17
anti-PD-1 J110
50% Inhibition
OD 450 nm
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
1
10
100
nM whole antibody

Fig. 3

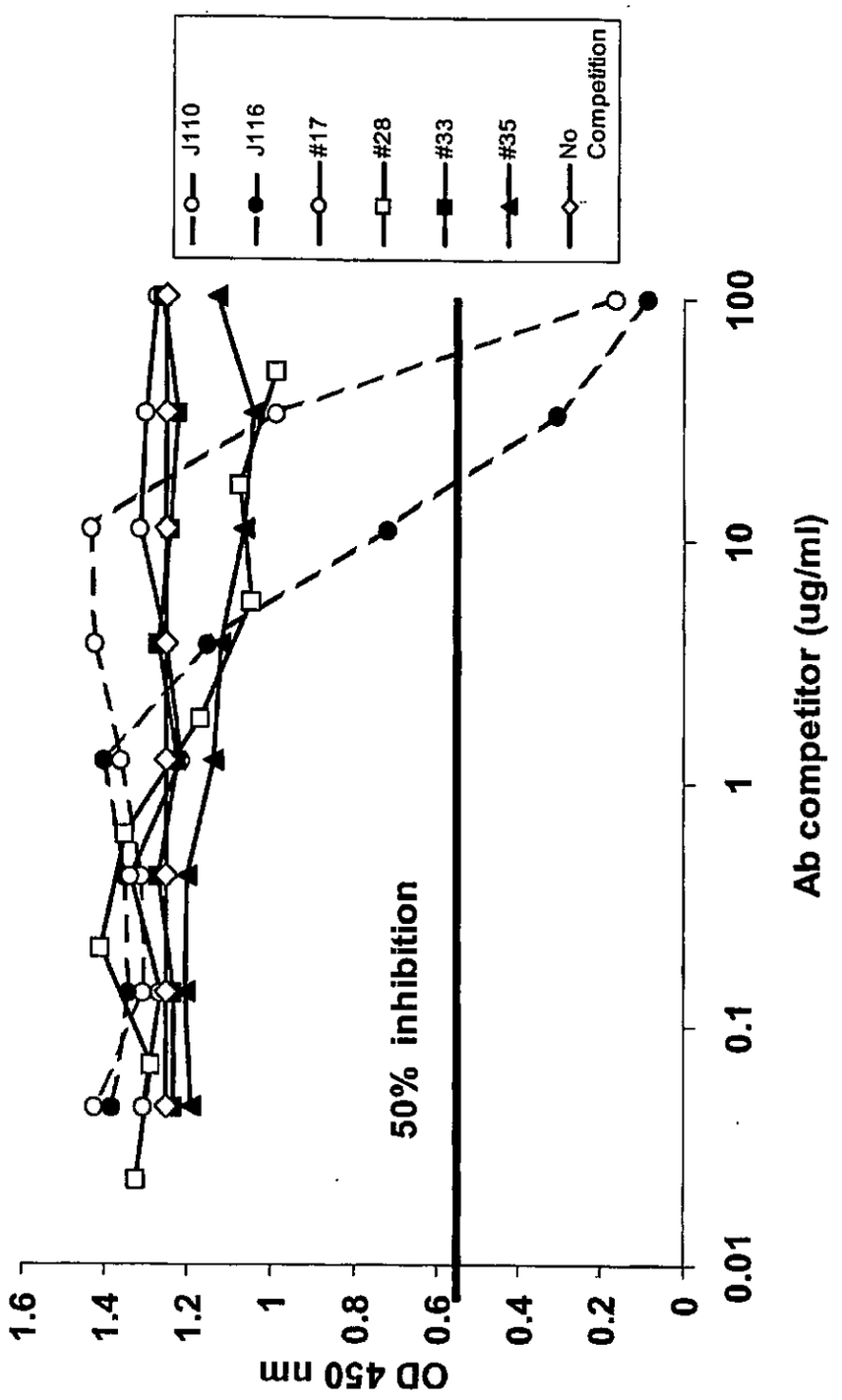

J110
J116
#17
#28
#33
#35
No Competition
50% inhibition
OD 450 nm
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0.01
0.1
1
10
100
Ab competitor (ug/ml)

Fig. 4

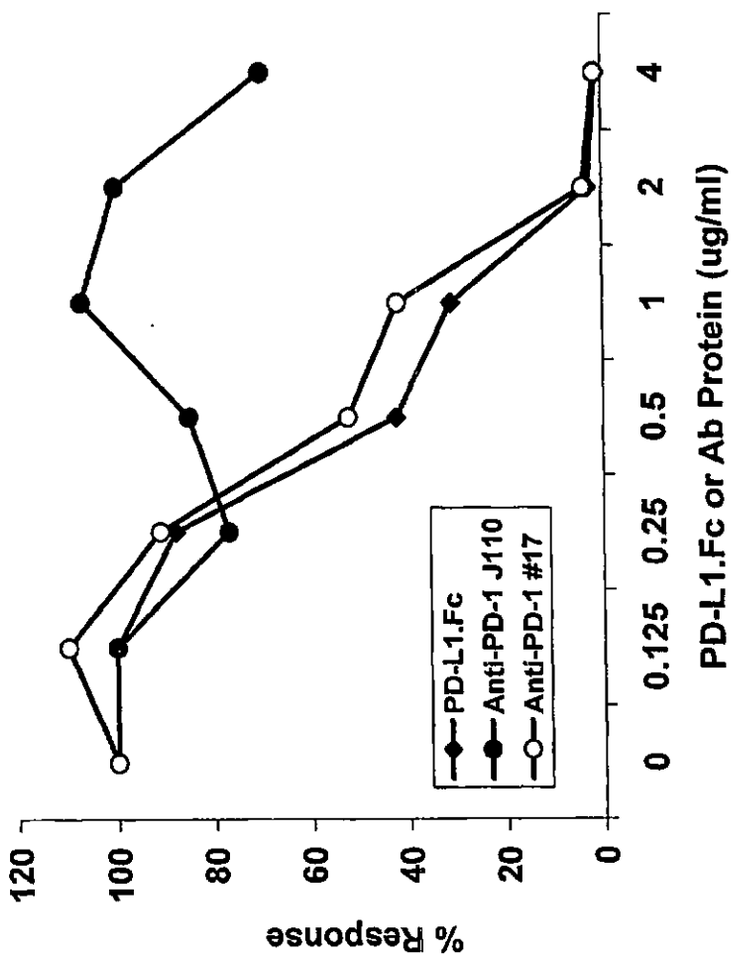

% Response
120
100
80
60
40
20
0
0
0.125
0.25
0.5
1
2
4
PD-L1.Fc or Ab Protein (ug/ml)
PD-L1.Fc
Anti-PD-1 J110
Anti-PD-1 #17

Fig. 5

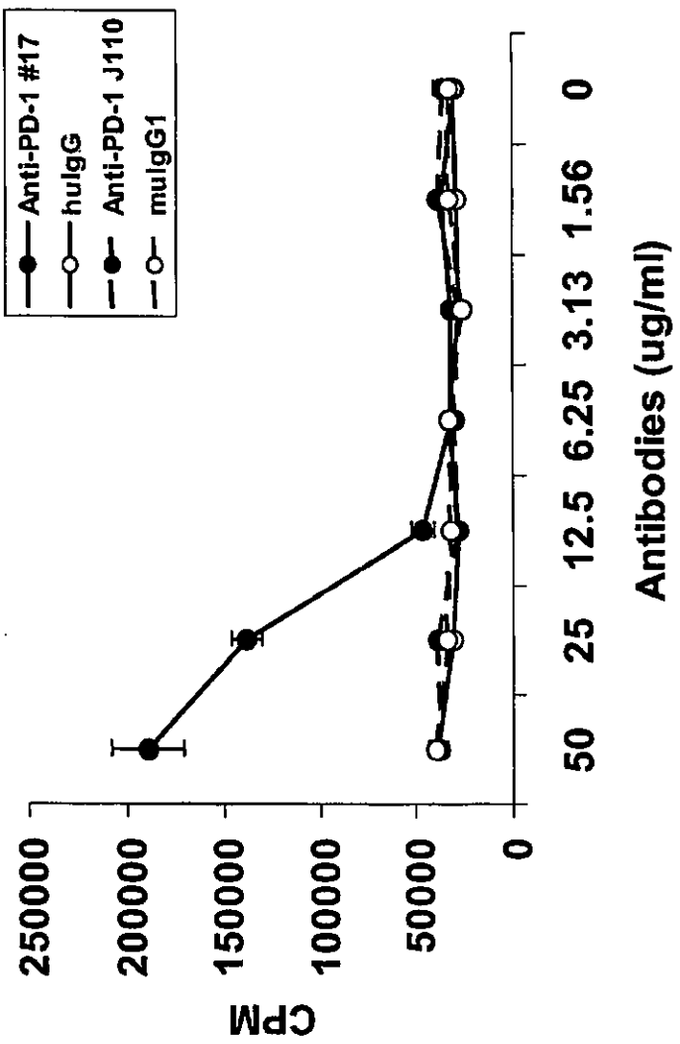

Anti-PD-1 #17
huIgG
Anti-PD-1 J110
muIgG1
CPM
250000
200000
150000
100000
50000
0
50
25
12.5
6.25
3.13
1.56
0
Antibodies (ug/ml)

Fig. 6

SEQUENCE LISTING

<110> Collins, Mary et al.

<120> ANTIBODIES AGAINST PD-1 AND USES THEREFOR

<130> 08702.6098-00000

<160> 58

<170> PatentIn version 3.1

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tggagttggg tccgccagtc cccagggaag gggctggagt ggataggcga aatctatcat 180

agtgggagca ccaactacaa cccgtccctc aagagtcgcg tcaccatatc actagacaag 240

tctaggaatc acttctccct gaggctgaac tctgtgaccg ccgcggacac ggccgtttat 300

tactgtgcga gacaggacta cggtgactcc ggcgactggt acttcgatct gtggggcaag 360

gggacaatgg tcaccgtctc ctca 384

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<212> PRT
<213> Homo sapiens

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20 25 30

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35 40 45

Gly Lys Gly Leu Glu Trp Ile Gly Glu Ile Tyr His Ser Gly Ser Thr
50 55 60

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

Ser Arg Asn His Phe Ser Leu Arg Leu Asn Ser Val Thr Ala Ala Asp
85 90 95

Thr Ala Val Tyr Tyr Cys Ala Arg Gln Asp Tyr Gly Asp Ser Gly Asp
100 105 110

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

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<212> DNA
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ccgggcagtt cccccaccac tgtgatctat gaggataacc aaagaccctc tggggtccct 180

gatcggttct ctggctccat cgacagctcc tccaactctg cctccctcac cgtctctgga 240

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ttcggcagtg ggaccaagct gaccgtccta 330

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<211> 110
<212> PRT
<213> Homo sapiens

<400> 4

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20 25 30

Ser Val Gln Trp Tyr Gln Gln Arg Pro Gly Ser Ser Pro Thr Thr Val
35 40 45

Ile Tyr Glu Asp Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Ile Asp Ser Ser Ser Asn Ser Ala Ser Leu Thr Val Ser Gly
65 70 75 80

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

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cctggacaag ggcttgagtg gatgggatgg atcagcgctt acaatggtaa cacaaactac 180

gcacagaagc tccagggcag agtcaccatg accacagaca catccacgaa cacagcctac 240

atggagctga ggagcctgag atctgacgac acggccgtgt attactgtgc gagagacgcg 300

gattatagta gtgggtctgg gtactggggc cagggaaccc tggtcaccgt ctcctca 357

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<212> PRT
<213> Homo sapiens

<400> 6

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

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

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

Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Asn Thr Ala Tyr
65 70 75 80

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

Ala Arg Asp Ala Asp Tyr Ser Ser Gly Ser Gly Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
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<212> DNA
<213> Homo sapiens

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acctgttctg gagatgcatt gccaaagcaa tatgcttatt ggtaccagca gaagccaggc 120

caggcccctg tgatggttat atataaagac actgagaggc cctcagggat ccctgagcga 180

ttctctggct ccagctcagg gacaaaagtc acgttgacca tcagtggagt ccaggcagaa 240

gacgaggctg actattattg tcaatcagca gacaacagta ttacttatag ggtgttcggc 300

ggagggacca aggtcaccgt ccta 324

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<211> 108
<212> PRT
<213> Homo sapiens

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Thr Ala Arg Ile Thr Cys Ser Gly Asp Ala Leu Pro Lys Gln Tyr Ala
20 25 30

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

Lys Asp Thr Glu Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60

Ser Ser Gly Thr Lys Val Thr Leu Thr Ile Ser Gly Val Gln Ala Glu
65 70 75 80

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

Arg Val Phe Gly Gly Gly Thr Lys Val Thr Val Leu
100 105

<210> 9
<211> 357
<212> DNA
<213> Homo sapiens

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cctggacaag ggcttgagtg gatgggaata atcaacccta gaggtgccac cataagctac 180

gcacagaagt tccagggcag agtcaccatg accagggaca cgtccacgag tacagtctac 240

atggaactga gaaacttgaa atctgaggac acggccctgt attactgtgc tactgcaggc 300

atctatggtt ttgactttga ctactggggc agaggaaccc tggtcaccgt ctcctca 357

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<212> PRT
<213> Homo sapiens

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

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

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

Gln Gly Arg Val Thr Met Thr Arg Asp Thr Ser Thr Ser Thr Val Tyr
65 70 75 80

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

Ala Thr Ala Gly Ile Tyr Gly Phe Asp Phe Asp Tyr Trp Gly Arg Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 11
<211> 333
<212> DNA
<213> Homo sapiens

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tcctgcactg gaaccagtaa tgacgttggt ggttataatt atgtctcctg gtaccaacat 120

cacccaggca aagcccccaa actcatcatt tatgatgtca ctaaccggcc ctcaggggtt 180

tctgatcgct tctctggctc caagtctggc aacacggcct ccctgaccat ctctgggctc 240

ctggctgagg acgagggtga ttattactgc agctcataca caattgttac caatttcgag 300

gttcttttcg gcggagggac caagctgacc gtc 333

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<212> PRT
<213> Homo sapiens

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1 5 10 15

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

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

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

Ser Gly Ser Lys Ser Gly Asn Thr Ala Ser Leu Thr Ile Ser Gly Leu
65 70 75 80

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

Thr Asn Phe Glu Val Leu Phe Gly Gly Gly Thr Lys Leu Thr Val
100 105 110

<210> 13
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acctgcactg tctctggtgg ctccatcagc agtggtgctt attactggag ctggatccgc 120

cagcacccag ggaagggcct ggagtggatt gggtacatct attacaatgg gaacacgtac 180

tacaacccgt ccctcaggag tctagttacc atatcagtag acgcgtctaa gaaccagttc 240

tccctgaagc tgagctctgt gactgccgcg gacacggccg tctattactg tgcgagagcg 300

tctgattacg tttgggggggg ttatcgttat atggatgctt ttgatatctg gggccgggga 360

accctggtca ccgtctcctc a 381

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<211> 127
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<213> Homo sapiens

<400> 14

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

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

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

Trp Ile Gly Tyr Ile Tyr Tyr Asn Gly Asn Thr Tyr Tyr Asn Pro Ser
50 55 60

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

Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr
85 90 95

Cys Ala Arg Ala Ser Asp Tyr Val Trp Gly Gly Tyr Arg Tyr Met Asp
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Ala Phe Asp Ile Trp Gly Arg Gly Thr Leu Ile Thr Val Ser Ser
115 120 125

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ccaggaacgg cccccaaact cctcatctat ggtaataatc agcggccctc aggggtccct 180

gaccgattct ctggctccaa gtctggcacc tcagcctccc tggccatcag tgggctccag 240

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ttcggccgag ggaccaaggt caccgtccta ggtgag 336

<210> 16
<211> 112
<212> PRT
<213> Homo sapiens

<400> 16

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Arg Val Thr Ile Ser Cys Ser Gly Ser Asn Ser Asn Ile Gly Ser Asn
20 25 30

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

Ile Tyr Gly Asn Asn Gln Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
50 55 60

Gly Ser Lys Ser Gly Thr Ser Ala Ser Leu Ala Ile Ser Gly Leu Gln
65 70 75 80

Ser Glu Asn Glu Ala Asp Tyr Tyr Cys Ala Ala Trp Asp Asp Ser Leu
85 90 95

Asn Gly Pro Val Phe Gly Arg Gly Thr Lys Val Thr Val Leu Gly Glu
100 105 110

<210> 17
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<212> PRT

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<400> 17

Ser Gly Gly Ser Ile Arg Ser Thr Arg Trp Trp Ser
1 5 10

<210> 18
<211> 16
<212> PRT
<213> Homo sapiens

<400> 18

Glu Ile Tyr His Ser Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys Ser
1 5 10 15

<210> 19
<211> 13
<212> PRT
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<400> 19

Gln Asp Tyr Gly Asp Ser Gly Asp Trp Tyr Phe Asp Leu
1 5 10

<210> 20
<211> 13
<212> PRT
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<400> 20

Thr Arg Ser Ser Gly Ser Ile Ala Ser Asn Ser Val Gln
1 5 10

<210> 21
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<212> PRT
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<400> 21

Glu Asp Asn Gln Arg Pro Ser
1 5

<210> 22
<211> 9
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<400> 22

Gln Ser Ser Asp Ser Ser Ala Val Val
1 5

<210> 23
<211> 5
<212> PRT
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<400> 23

Ser Tyr Gly Ile Ser
1 5

<210> 24
<211> 17
<212> PRT

<213> Homo sapiens

<400> 24

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

Gly

<210> 25
<211> 10
<212> PRT
<213> Homo sapiens

<400> 25

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

<210> 26
<211> 11
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<400> 26

Ser Gly Asp Ala Leu Pro Lys Gln Tyr Ala Tyr
1 5 10

<210> 27
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<212> PRT
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<400> 27

Lys Asp Thr Glu Arg Pro Ser
1 5

<210> 28
<211> 11
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<400> 28

Gln Ser Ala Asp Asn Ser Ile Thr Tyr Arg Val
1 5 10

<210> 29
<211> 5
<212> PRT
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<400> 29

Ser Tyr Tyr Ile His
1 5

<210> 30
<211> 17
<212> PRT
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<400> 30

Ile Ile Asn Pro Arg Gly Ala Thr Ile Ser Tyr Ala Gln Lys Phe Gln
1 5 10 15

Gly

<210> 31
<211> 10
<212> PRT
<213> Homo sapiens

<400> 31

Ala Gly Ile Tyr Gly Phe Asp Phe Asp Tyr
1 5 10

<210> 32
<211> 14
<212> PRT
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<400> 32

Thr Gly Thr Ser Asn Asp Val Gly Gly Tyr Asn Tyr Val Ser
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<210> 33
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<400> 33

Asp Val Thr Asn Arg Pro Ser
1 5

<210> 34
<211> 12
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<213> Homo sapiens

<400> 34

Ser Ser Tyr Thr Ile Val Thr Asn Phe Glu Val Leu
1 5 10

<210> 35
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<400> 35

Ser Gly Ala Tyr Tyr Trp Ser
1 5

<210> 36
<211> 16
<212> PRT
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<400> 36

Tyr Ile Tyr Tyr Asn Gly Asn Thr Tyr Tyr Asn Pro Ser Leu Arg Ser
1 5 10 15

<210> 37
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<400> 37

Ala Ser Asp Tyr Val Trp Gly Gly Tyr Arg Tyr Met Asp Ala Phe Asp
1 5 10 15

Ile

<210> 38
<211> 13
<212> PRT
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<400> 38

Ser Gly Ser Asn Ser Asn Ile Gly Ser Asn Ser Val Asn
1 5 10

<210> 39
<211> 7
<212> PRT
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<400> 39

Gly Asn Asn Gln Arg Pro Ser
1 5

<210> 40
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<210> 41
<211> 288
<212> PRT
<213> Homo sapiens

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

Asn Ala Thr Phe Thr Cys Ser Phe Ser Asn Thr Ser Glu Ser Phe Val
50 55 60

Leu Asn Trp Tyr Arg Met Ser Pro Ser Asn Gln Thr Asp Lys Leu Ala
65 70 75 80

Ala Phe Pro Glu Asp Arg Ser Gln Pro Gly Gln Asp Cys Arg Phe Arg
85 90 95

Val Thr Gln Leu Pro Asn Gly Arg Asp Phe His Met Ser Val Val Arg
100 105 110

Ala Arg Arg Asn Asp Ser Gly Thr Tyr Leu Cys Gly Ala Ile Ser Leu
115 120 125

Ala Pro Lys Ala Gln Ile Lys Glu Ser Leu Arg Ala Glu Leu Arg Val
130 135 140

Thr Glu Arg Arg Ala Glu Val Pro Thr Ala His Pro Ser Pro Ser Pro
145 150 155 160

Arg Pro Ala Gly Gln Phe Gln Thr Leu Val Val Gly Val Val Gly Gly
165 170 175

Leu Leu Gly Ser Leu Val Leu Leu Val Trp Val Leu Ala Val Ile Cys
180 185 190

Ser Arg Ala Ala Arg Gly Thr Ile Gly Ala Arg Arg Thr Gly Gln Pro
195 200 205

Leu Lys Glu Asp Pro Ser Ala Val Pro Val Phe Ser Val Asp Tyr Gly
210 215 220

Glu Leu Asp Phe Gln Trp Arg Glu Lys Thr Pro Glu Pro Pro Val Pro
225 230 235 240

Cys Val Pro Glu Gln Thr Glu Tyr Ala Thr Ile Val Phe Pro Ser Gly
245 250 255

Met Gly Thr Ser Ser Pro Ala Arg Arg Gly Ser Ala Asp Gly Pro Arg
260 265 270

Ser Ala Gln Pro Leu Arg Pro Glu Asp Gly His Cys Ser Trp Pro Leu
275 280 285

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<212> DNA
<213> Homo sapiens

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ccaacaaggc cacactggtg tgtctcataa gtgacttcta cccgggagcc gtgacagtgg 120

cctggaaggc agatagcagc cccgtcaagg cgggagtgga gaccaccaca ccctccaaac 180

aaagcaacaa caagtacgcg gccagcagct atctgagcct gacgcctgag cagtggaagt 240

cccacagaag ctacagctgc caggtcacgc atgaagggag caccgtggag aagacagtgg 300

cccctacaga atgttcatag 320

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<213> Homo sapiens

<400> 43

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20 25 30

Phe Tyr Pro Gly Ala Val Thr Val Ala Trp Lys Ala Asp Ser Ser Pro
35 40 45

Val Lys Ala Gly Val Glu Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn
50 55 60

Lys Tyr Ala Ala Ser Ser Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys
65 70 75 80

Ser His Arg Ser Tyr Ser Cys Gln Val Thr His Glu Gly Ser Thr Val
85 90 95

Glu Lys Thr Val Ala Pro Thr Glu Cys Ser
100 105

<210> 44
<211> 960
<212> DNA
<213> Homo sapiens

<400> 44
cctccaccaa gggcccatcg gtcttccccc tggcaccctc ctccaagagc acctctgggg 60

gcacagcggc cctgggctgc ctggtcaagg actacttccc cgaaccggtg acggtgtcgt 120

ggaactcagg cgccctgacc agcggcgtgc acaccttccc ggctgtccta cagtcctcag 180

gactctactc cctcagcagc gtggtgaccg tgccctccag cagcttgggc acccagacct 240

acatctgcaa cgtgaatcac aagcccagca acaccaaggt ggacaagaaa gttgagccca 300

aatcttgtga caaaactcac acatgcccac cgtgcccagc acctgaactc ctgggggggac 360

cgtcagtctt cctcttcccc ccaaaaccca aggacaccct catgatctcc cggacccctg 420

aggtcacatg cgtggtggtg gacgtgagcc acgaagaccc tgaggtcaag ttcaactggt 480

acgtggacgg cgtggaggtg cataatgcca agacaaagcc gcgggaggag cagtacaaca 540

gcacgtaccg tgtggtcagc gtcctcaccg tcctgcacca ggactggctg aatggcaagg 600

agtacaagtg caaggtctcc aacaaagccc tcccagcccc catcgagaaa accatctcca 660

aagccaaagg gcagccccga gaaccacagg tgtacaccct gcccccatcc cgggaggaga 720

tgaccaagaa ccaggtcagc ctgacctgcc tggtcaaagg cttctatccc agcgacatcg 780

ccgtggagtg ggagagcaat gggcagccgg agaacaacta caagaccacg cctcccgtgc 840

tggactccga cggctccttc ttcctctata gcaagctcac cgtggacaag agcaggtggc 900

agcaggggaa cgtcttctca tgctccgtga tgcatgaggc tctgcacaac cactacacgc 960

<210> 45
<211> 330
<212> PRT
<213> Homo sapiens

<400> 45

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

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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 Glu Glu
225                 230                 235                 240
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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> 46
<211> 366
<212> DNA
<213> Homo sapiens

<400> 46
ggcgcgcact ccgaggtgca gctggtgcag tctgggggag gcgtggttca gcctgggagg 60

tccctgagac tctcctgtgc agcgtctgga ttcaccttta gtagctattg gatgagctgg 120

gtccgccagg ctccagggaa ggggctggag tgggtctcag ctattagtgg tagtggtggt 180

agcacatact acgcagactc cgtgaagggc cggttcacca tctccagaga caattccaag 240

aacacgctgt atctgcaaat gaacagccta agagccgagg acacggccgt atattactgt 300

gcgaaagaga actggggatc gtacttcgat ctctgggggc aagggaccac ggtcaccgtc 360

tcctca 366

<210> 47
<211> 125
<212> PRT
<213> Homo sapiens

<400> 47

Gly Ala His Ser Glu Val Gln Leu Val Gln Ser Gly Gly Gly Val Val
1 5 10 15

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

Phe Ser Ser Tyr Trp Cys Asp Arg Met Ser Trp Val Arg Gln Ala Pro
35 40 45

Gly Lys Gly Leu Glu Trp Val Ser Ala Ile Ser Gly Ser Gly Gly Ser
50 55 60

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

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

Asp Thr Ala Val Tyr Tyr Cys Ala Lys Glu Asn Trp Gly Ser Tyr Phe
100 105 110

Asp Leu Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 48
<211> 332
<212> DNA
<213> Homo sapiens

<400> 48
ggcgtgcact ccgacatcgt gatgacccag tctccttcca ccctgtctgc atctgtagga 60

gacagagtca ccatcacttg ccgggccagt cagggtatta gtagctggtt ggcctggtat 120

cagcagaaac cagggagagc ccctaaggtc ttgatctata aggcatctac tttagaaagt 180

ggggtcccat caaggttcag cggcagtgga tctgggacag atttcactct caccatcagc 240

agtctgcaac ctgaagattt tgcaacttac tactgtcaac agagttacag taccccgtgg 300

acgttcggcc aggggaccaa gctggaaatc aa 332

<210> 49
<211> 112
<212> PRT
<213> Homo sapiens

<400> 49

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

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

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

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

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

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

Ser Thr Pro Trp Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
100 105 110

<210> 50
<211> 6
<212> PRT
<213> Homo sapiens

<400> 50

Ser Ser Tyr Trp Met Ser
1 5

<210> 51
<211> 17
<212> PRT
<213> Homo sapiens

<400> 51

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

Gly

<210> 52
<211> 9
<212> PRT
<213> Homo sapiens

<400> 52

Glu Asn Trp Gly Ser Tyr Phe Asp Leu
1 5

<210> 53
<211> 11
<212> PRT
<213> Homo sapiens

<400> 53

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

<210> 54
<211> 7
<212> PRT
<213> Homo sapiens

<400> 54

Lys Ala Ser Thr Leu Glu Ser
1 5

<210> 55
<211> 9
<212> PRT
<213> Homo sapiens

<400> 55

Gln Gln Ser Tyr Ser Thr Pro Trp Thr
1 5

<210> 56
<211> 288
<212> PRT
<213> Murine

<400> 56

Met Trp Val Arg Gln Val Pro Trp Ser Phe Thr Trp Ala Val Leu Gln
1 5 10 15

Leu Ser Trp Gln Ser Gly Trp Leu Leu Glu Val Pro Asn Gly Pro Trp
20 25 30

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

Asn Ala Thr Phe Thr Cys Ser Leu Ser Asn Trp Ser Glu Asp Leu Met
50 55 60

Leu Asn Trp Asn Arg Leu Ser Pro Ser Asn Gln Thr Glu Lys Gln Ala
65 70 75 80

Ala Phe Cys Asn Gly Leu Ser Gln Pro Val Gln Asp Ala Arg Phe Gln
85 90 95

Ile Ile Gln Leu Pro Asn Arg His Asp Phe His Met Asn Ile Leu Asp
100 105 110

Thr Arg Arg Asn Asp Ser Gly Ile Tyr Leu Cys Gly Ala Ile Ser Leu
115 120 125

His Pro Lys Ala Lys Ile Glu Glu Ser Pro Gly Ala Glu Leu Val Val
130 135 140

Thr Glu Arg Ile Leu Glu Thr Ser Thr Arg Tyr Pro Ser Pro Ser Pro
145 150 155 160

Lys Pro Glu Gly Arg Phe Gln Gly Met Val Ile Gly Ile Met Ser Ala
165 170 175

Leu Val Gly Ile Pro Val Leu Leu Leu Leu Ala Trp Ala Leu Ala Val
180 185 190

Phe Cys Ser Thr Ser Met Ser Glu Ala Arg Gly Ala Gly Ser Lys Asp
195 200 205

Asp Thr Leu Lys Glu Glu Pro Ser Ala Ala Pro Val Pro Ser Val Ala
210 215 220

Tyr Glu Glu Leu Asp Phe Gln Gly Arg Glu Lys Thr Pro Glu Leu Pro
225 230 235 240

Thr Ala Cys Val His Thr Glu Tyr Ala Thr Ile Val Phe Thr Glu Gly
245 250 255

Leu Gly Ala Ser Ala Met Gly Arg Arg Gly Ser Ala Asp Gly Leu Gln
260 265 270

Gly Pro Arg Pro Pro Arg His Glu Asp Gly His Cys Ser Trp Pro Leu
275 280 285

<210> 57
<211> 321
<212> DNA
<213> Homo sapiens

<400> 57
actgtggctg caccatctgt cttcatcttc ccgccatctg atgagcagtt gaaatctgga 60

actgcctctg ttgtgtgcct gctgaataac ttctatccca gagaggccaa agtacagtgg 120

aaggtggata acgccctcca atcgggtaac tcccaggaga gtgtcacaga gcaggacagc 180

aaggacagca cctacagcct cagcagcacc ctgacgctga gcaaagcaga ctacgagaaa 240

cacaaagtct acgcctgcga agtcacccat cagggcctga gctcgcccgt cacaaagagc 300

ttcaacaggg gagagtgtta g 321

<210> 58
<211> 108
<212> PRT
<213> Homo sapiens

<400> 58

His Met Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp
1 5 10 15

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

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

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

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

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

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