FIGURE 1

CA170_1519 Ab sequences

CDRH1

GFTFSNYGMV SEQ ID NO: 1

CDRH2

YIDSDGDNTYYRDSVKG SEQ ID NO: 2

CDRH3

GIVRPFLY SEQ ID NO: 3

CDRL1

KSSQSLVGASGKTYLY SEQ ID NO: 4

CDRL2

LVSTLDS SEQ ID NO: 5

CDRL3

LQGTHFPHT SEQ ID NO: 6

Rat Ab 1519 VL region SEQ ID NO: 7

DVVMTQTPLS LSVALGQPAS ISCKSSQSLV GASGKTYLYW LFQRSGQSPK
RLIYLVSTLD SGIPDRFSGS GAETDFTLKI RRVEADDLGV YYCLQGTHFP
HTFGAGTKLE LK

Rat Ab 1519 VL region SEQ ID NO: 8

gatgttgtga tgacccagac tccactgtct ttgtcggttg cccttggaca
accagcctcc atctcttgca agtcaagtca gagcctcgta ggtgctagtg
gaaagacata tttgtattgg ttatttcaga ggtccggcca gtctccaaag
cgactaatct atctggtgtc cacactggac tctggaattc ctgataggtt
cagtggcagt ggagcagaga cagattttac tcttaaaatc cgcagagtgg
aagccgatga tttgggagtt tattactgct tgcaaggtac acattttcct
cacacgtttg gagctgggac caagctggaa ttgaaa

Rat Ab 1519 VL region with signal sequence underlined and italicised SEQ ID NO: 9

MMSPAQFLFL LMLWIQGTSG DVVMTQTPLS LSVALGQPAS ISCKSSQSLV
GASGKTYLYW LFQRSGQSPK RLIYLVSTLD SGIPDRFSGS GAETDFTLKI
RRVEADDLGV YYCLQGTHFP HTFGAGTKLE LK

FIGURE 1A

Rat Ab 1519 VL region with signal sequence underlined and italicised SEQ ID NO: 10

atgatgagtc ctgcccagtt cctgtttctg ctgatgctct ggattcaggg aaccagtggt gatgttgtga tgacccagac tccactgtct ttgtcggttg ccccttggaca accagcctcc atctcttgca agtcaagtca gagcctcgta ggtgctagtg gaaagacata tttgtattgg ttatttcaga ggtccggcca gtctccaaag cgactaatct atctggtgtc cacactggac tctggaattc ctgataggtt cagtggcagt ggagcagaga cagattttac tcttaaaatc cgcagagtgg aagccgatga tttgggagtt tattactgct tgcaaggtac acattttcct cacacgtttg gagctgggac caagctggaa ttgaaa

Rat Ab 1519 VH region SEQ ID NO: 11

EVPLVESGGG SVQPGRSMKL SCVVSGFTFS NYGMVWVRQA PKKGLEWVAY IDSDGDNTYY RDSVKGRFTI SRNNAKSTLY LQMDSLRSED TATYYCTTGI VRPFLYWGQG TTVTVS

Rat Ab 1519 VH region SEQ ID NO: 12

gaggtgccgc tggtggagtc tgggggcggc tcagtgcagc ctgggaggtc catgaaactc tcctgtgtag tctcaggatt cactttcagt aattatggca tggtctgggt ccgccaggct ccaaagaagg gtctggagtg ggtcgcatat attgattctg atggtgataa tacttactac cgagattccg tgaagggccg attcactatc tccagaaata atgcaaaaag caccctatat ttgcaaatgg acagtctgag gtctgaggac acggccactt attactgtac aacagggatt gtccggccct ttctctattg gggccaagga accacggtca ccgtctcg

Rat Ab 1519 VH region with signal sequence underlined and italicised SEQ ID NO: 13

*MDISLSLAFL VLFIKGVRC*E VPLVESGGGS VQPGRSMKLS CVVSGFTFSN YGMVWVRQAP KKGLEWVAYI DSDGDNTYYR DSVKGRFTIS RNNAKSTLYL QMDSLRSEDT ATYYCTTGIV RPFLYWGQGT TVTVS

Rat Ab 1519 VH region with signal sequence underlined and italicised SEQ ID NO: 14

*atggacatca gtctcagctt ggctttcctt gtccttttca taaaaggtgt ccggtgt*gag gtgccgctgg tggagtctgg gggcggctca gtgcagcctg ggaggtccat gaaactctcc tgtgtagtct caggattcac tttcagtaat tatggcatgg tctgggtccg ccaggctcca aagaagggtc tggagtgggt cgcatatatt gattctgatg gtgataatac ttactaccga gattccgtga agggccgatt cactatctcc agaaataatg caaaaagcac cctatatttg caaatggaca gtctgaggtc tgaggacacg gccacttatt actgtacaac agggattgtc cggccctttc tctattgggg ccaaggaacc acggtcaccg tctcg

FIGURE 1B

1519 gL20 V-region SEQ ID NO: 15
DIQMTQSPSS LSASVGDRVT ITCKSSQSLV GASGKTYLYW LFQKPGKAPK
RLIYLVSTLD SGIPSRFSGS GSGTEFTLTI SSLQPEDFAT YYCLQGTHFP
HTFGQGTKLE IK

1519 gL20 V-region (*E. coli* expression) SEQ ID NO: 16
gatatccaga tgacccagag tccaagcagt ctctccgcca gcgtaggcga
tcgtgtgact attacctgta aaagctccca gtccctggtg ggtgcaagcg
gcaaaaccta cctgtactgg ctcttccaga aaccgggcaa agctccgaaa
cgcctgatct atctggtgtc taccctggat agcggtattc cgtctcgttt
ctccggtagc ggtagcggta ccgaattcac gctgaccatt agctccctcc
agccggagga ctttgctacc tattactgcc tccagggcac tcattttccg
cacactttcg gccagggtac caaactggaa atcaaa

1519 gL20 V-region (mammalian expression) SEQ ID NO: 17
gatatccaga tgacccagag cccatctagc ttatccgctt ccgttggtga
tcgcgtgaca attacgtgta agagctccca atctctcgtg ggtgcaagtg
gcaagaccta tctgtactgg ctctttcaga agcctggcaa ggcaccaaaa
cggctgatct atctggtgtc taccccttgac tctgggatac cgtcacgatt
ttccggatct gggagcggaa ctgagttcac actcacgatt tcatcgctgc
aacccgagga ctttgctacc tactactgcc tgcaaggcac tcatttccct
cacactttcg gccaggggac aaaactcgaa atcaaa

1519 gL20 V-region with signal sequence underlined and italicized (*E. coli* expression) SEQ ID NO: 18
*MKKTAIAIAV ALAGFATVAQ A*DIQMTQSPS SLSASVGDRV TITCKSSQSL
VGASGKTYLY WLFQKPGKAP KRLIYLVSTL DSGIPSRFSG SGSGTEFTLT
ISSLQPEDFA TYYCLQGTHF PHTFGQGTKL EIK

1519 gL20 V-region with signal sequence underlined and italicized (*E. coli* expression) SEQ ID NO: 19
atgaaaaaga cagctatcgc aattgcagtg gccttggctg gtttcgctac
*cgtagcgcaa gct*gatatcc agatgaccca gagtccaagc agtctctccg
ccagcgtagg cgatcgtgtg actattacct gtaaaagctc ccagtccctg
gtgggtgcaa gcggcaaaac ctacctgtac tggctcttcc agaaaccggg
caaagctccg aaacgcctga tctatctggt gtctaccctg gatagcggta
ttccgtctcg tttctccggt agcggtagcg gtaccgaatt cacgctgacc
attagctccc tccagccgga ggactttgct acctattact gcctccaggg
cactcatttt ccgcacactt tcggccaggg taccaaactg gaaatcaaa

FIGURE 1C

1519 gL20 V-region with signal sequence underlined and italicized (mammalian expression)
SEQ ID NO: 20
MSVPTQVLGL LLLWLTDARC DIQMTQSPSS LSASVGDRVT ITCKSSQSLV
GASGKTYLYW LFQKPGKAPK RLIYLVSTLD SGIPSRFSGS GSGTEFTLTI
SSLQPEDFAT YYCLQGTHFP HTFGQGTKLE IK

1519 gL20 V-region with signal sequence underlined and italicized (mammalian expression)
SEQ ID NO: 21
atgtctgtcc ccacccaagt cctcggactc ctgctactct ggcttacaga
tgccagatgc gatatccaga tgacccagag cccatctagc ttatccgctt
ccgttggtga tcgcgtgaca attacgtgta agagctccca atctctcgtg
ggtgcaagtg gcaagaccta tctgtactgg ctctttcaga agcctggcaa
ggcaccaaaa cggctgatct atctggtgtc taccttgac tctgggatac
cgtcacgatt ttccggatct gggagcggaa ctgagttcac actcacgatt
tcatcgctgc aacccgagga ctttgctacc tactactgcc tgcaaggcac
tcatttccct cacactttcg gccaggggac aaaactcgaa atcaaa

1519 gL20 light chain (V + constant) SEQ ID NO: 22
DIQMTQSPSS LSASVGDRVT ITCKSSQSLV GASGKTYLYW LFQKPGKAPK
RLIYLVSTLD SGIPSRFSGS GSGTEFTLTI SSLQPEDFAT YYCLQGTHFP
HTFGQGTKLE IKRTVAAPSV FIFPPSDEQL KSGTASVVCL LNNFYPREAK
VQWKVDNALQ SGNSQESVTE QDSKDSTYSL SSTLTLSKAD YEKHKVYACE
VTHQGLSSPV TKSFNRGEC

1519 gL20 light chain (V + constant, *E. coli* expression) SEQ ID NO: 23
gatatccaga tgacccagag tccaagcagt ctctccgcca gcgtaggcga
tcgtgtgact attacctgta aaagctccca gtccctggtg ggtgcaagcg
gcaaaaccta cctgtactgg ctcttccaga aaccgggcaa agctccgaaa
cgcctgatct atctggtgtc taccctggat agcggtattc cgtctcgttt
ctccggtagc ggtagcggta ccgaattcac gctgaccatt agctccctcc
agccggagga ctttgctacc tattactgcc tccagggcac tcattttccg
cacactttcg gccagggtac caaactggaa atcaaacgta cggtagcggc
cccatctgtc ttcatcttcc cgccatctga tgagcagttg aaatctggaa
ctgcctctgt tgtgtgcctg ctgaataact tctatcccag agaggccaaa
gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag
tgtcacagag caggacagca aggacagcac ctacagcctc agcagcaccc
tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa
gtcacccatc agggcctgag ctcaccagta acaaaaagtt ttaatagagg ggagtgt

FIGURE 1D

1519 gL20 light chain (V + constant, mammalian expression) SEQ ID NO: 24

gatatccaga tgacccagag tccaagcagt ctctccgcca gcgtaggcga
tcgtgtgact attacctgta aaagctccca gtccctggtg ggtgcaagcg
gcaaaaccta cctgtactgg ctcttccaga aaccgggcaa agctccgaaa
cgcctgatct atctggtgtc taccctggat agcggtattc cgtctcgttt
ctccggtagc ggtagcggta ccgaattcac gctgaccatt agctccctcc
agccggagga ctttgctacc tattactgcc tccagggcac tcattttccg
cacactttcg gccagggtac caaactggaa atcaaacgta cggtagcggc
cccatctgtc ttcatcttcc cgccatctga tgagcagttg aaatctggaa
ctgcctctgt tgtgtgcctg ctgaataact tctatcccag agaggccaaa
gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag
tgtcacagag caggacagca aggacagcac ctacagcctc agcagcaccc
tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa
gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgt

1519 gL20 light chain with signal sequence underlined and italicized (*E. coli* expression)
SEQ ID NO: 25

*MKKTAIAIAV ALAGFATVAQ A*DIQMTQSPS SLSASVGDRV TITCKSSQSL
VGASGKTYLY WLFQKPGKAP KRLIYLVSTL DSGIPSRFSG SGSGTEFTLT
ISSLQPEDFA TYYCLQGTHF PHTFGQGTKL EIKRTVAAPS VFIFPPSDEQ
LKSGTASVVC LLNNFYPREA KVQWKVDNAL QSGNSQESVT EQDSKDSTYS
LSSTLTLSKA DYEKHKVYAC EVTHQGLSSP VTKSFNRGEC

1519 gL20 light chain with signal sequence underlined and italicized (*E. coli* expression)
SEQ ID NO: 26

atgaaaaaga cagctatcgc aattgcagtg gccttggctg gtttcgctac
*cgtagcgcaa gct*gatatcc agatgaccca gagtccaagc agtctctccg
ccagcgtagg cgatcgtgtg actattacct gtaaaagctc ccagtccctg
gtgggtgcaa gcggcaaaac ctacctgtac tggctcttcc agaaaccggg
caaagctccg aaacgcctga tctatctggt gtctaccctg gatagcggta
ttccgtctcg tttctccggt agcggtagcg gtaccgaatt cacgctgacc
attagctccc tccagccgga ggactttgct acctattact gcctccaggg
cactcatttt ccgcacactt tcggccaggg taccaaactg gaaatcaaac
gtacggtagc ggccccatct gtcttcatct tcccgccatc tgatgagcag
ttgaaatctg gaactgcctc tgttgtgtgc ctgctgaata acttctatcc
cagagaggcc aaagtacagt ggaaggtgga taacgccctc caatcgggta
actcccagga gagtgtcaca gagcaggaca gcaaggacag cacctacagc
ctcagcagca ccctgacgct gagcaaagca gactacgaga aacacaaagt
ctacgcctgc gaagtcaccc atcagggcct gagctcacca gtaacaaaaa
gttttaatag aggggagtgt

FIGURE 1E

1519 gL20 light chain with signal sequence underlined and italicized (mammalian expression) SEQ ID NO: 27

MSVPTQVLGL LLLWLTDARC DIQMTQSPSS LSASVGDRVT ITCKSSQSLV GASGKTYLYW LFQKPGKAPK RLIYLVSTLD SGIPSRFSGS GSGTEFTLTI SSLQPEDFAT YYCLQGTHFP HTFGQGTKLE IKRTVAAPSV FIFPPSDEQL KSGTASVVCL LNNFYPREAK VQWKVDNALQ SGNSQESVTE QDSKDSTYSL SSTLTLSKAD YEKHKVYACE VTHQGLSSPV TKSFNRGEC

1519 gL20 light chain with signal sequence underlined and italicized (mammalian expression) SEQ ID NO: 28

atgtctgtcc ccacccaagt cctcggactc ctgctactct ggcttacaga tgccagatgc gatatccaga tgacccagag cccatctagc ttatccgctt ccgttggtga tcgcgtgaca attacgtgta agagctccca atctctcgtg ggtgcaagtg gcaagaccta tctgtactgg ctctttcaga agcctggcaa ggcaccaaaa cggctgatct atctggtgtc taccttgac tctgggatac cgtcacgatt ttccggatct gggagcggaa ctgagttcac actcacgatt tcatcgctgc aacccgagga ctttgctacc tactactgcc tgcaaggcac tcatttccct cacactttcg gccaggggac aaaactcgaa atcaaacgta cggtagcggc cccatctgtc ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctc agcagcaccc tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgt

1519 gH20 V-region SEQ ID NO: 29

EVPLVESGGG LVQPGGSLRL SCAVSGFTFS NYGMVWVRQA PGKGLEWVAY IDSDGDNTYY RDSVKGRFTI SRDNAKSSLY LQMNSLRAED TAVYYCTTGI VRPFLYWGQG TLVTVS

1519 gH20 V-region (*E. coli* expression) SEQ ID NO: 30

gaggttccgc tggtcgagtc tggaggcggg cttgtccagc ctggagggag cctgcgtctc tcttgtgcag tatctggctt cacgttctcc aactacggta tggtgtgggt tcgtcaggct ccaggtaaag gtctggaatg ggtggcgtat attgactccg acggcgacaa cacctactat cgcgactctg tgaaaggtcg cttcaccatt tcccgcgata acgccaaatc cagcctgtac ctgcagatga acagcctgcg tgctgaagat actgcggtgt actattgcac cactggcatc gtgcgtccgt ttctgtattg gggtcagggt accctcgtta ctgtctcg

FIGURE 1F (signal sequences underlined and italicized)

1519 gH20 V-region (mammalian expression) SEQ ID NO: 31

gaggtaccac ttgtggaaag cggaggaggt cttgtgcagc ctggaggaag
tttacgtctc tcttgtgctg tgtctggctt caccttctcc aattacggaa
tggtctgggt cagacaagca cctggaaagg gtcttgaatg ggtggcctat
attgactctg acggggacaa cacctactat cgggattccg tgaaaggacg
cttcacaatc tcccgagata acgccaagag ctcactgtac ctgcagatga
atagcctgag agccgaggat actgccgtgt actattgcac aacgggaatc
gttaggcctt ttctgtactg gggacagggc accttggtta ctgtctcg

1519 gH20 V-region (*E. coli* expression) SEQ ID NO: 32

*MKKTAIAIAV ALAGFATVAQ A*EVPLVESGG GLVQPGGSLR LSCAVSGFTF
SNYGMVWVRQ APGKGLEWVA YIDSDGDNTY YRDSVKGRFT ISRDNAKSSL
YLQMNSLRAE DTAVYYCTTG IVRPFLYWGQ GTLVTVS

1519 gH20 V-region (*E. coli* expression) SEQ ID NO: 33

atgaagaaga ctgctatagc aattgcagtg gcgctagctg gtttcgccac
*cgtggcgcaa gct*gaggttc cgctggtcga gtctggaggc gggcttgtcc
agcctggagg gagcctgcgt ctctcttgtg cagtatctgg cttcacgttc
tccaactacg gtatggtgtg ggttcgtcag gctccaggta aaggtctgga
atgggtggcg tatattgact ccgacggcga caacacctac tatcgcgact
ctgtgaaagg tcgcttcacc atttcccgcg ataacgccaa atccagcctg
tacctgcaga tgaacagcct gcgtgctgaa gatactgcgg tgtactattg
caccactggc atcgtgcgtc cgtttctgta ttggggtcag ggtaccctcg
ttactgtctc g

1519 gH20 V-region (mammalian expression) SEQ ID NO: 34

*MEWSWVFLFF LSVTTGVHS*E VPLVESGGGL VQPGGSLRLS CAVSGFTFSN
YGMVWVRQAP GKGLEWVAYI DSDGDNTYYR DSVKGRFTIS RDNAKSSLYL
QMNSLRAEDT AVYYCTTGIV RPFLYWGQGT LVTVS

1519 gH20 V-region with signal sequence underlined and italicized (mammalian expression) SEQ ID NO: 35

atggaatgga gctgggtctt tctcttcttc ctgtcagtaa ctacaggagt
*ccattct*gag gtaccacttg tggaaagcgg aggaggtctt gtgcagcctg
gaggaagttt acgtctctct tgtgctgtgt ctggcttcac cttctccaat
tacggaatgg tctgggtcag acaagcacct ggaaagggtc ttgaatgggt
ggcctatatt gactctgacg gggacaacac ctactatcgg gattccgtga
aaggacgctt cacaatctcc cgagataacg ccaagagctc actgtacctg
cagatgaata gcctgagagc cgaggatact gccgtgtact attgcacaac
gggaatcgtt aggccttttc tgtactgggg acagggcacc ttggttactg tctcg

FIGURE 1G

1519gH20 Fab' heavy chain (V + human gamma-1 CH1 + hinge) SEQ ID NO: 36

EVPLVESGGG LVQPGGSLRL SCAVSGFTFS NYGMVWVRQA PGKGLEWVAY
IDSDGDNTYY RDSVKGRFTI SRDNAKSSLY LQMNSLRAED TAVYYCTTGI
VRPFLYWGQG TLVTVSSAST KGPSVFPLAP SSKSTSGGTA ALGCLVKDYF
PEPVTVSWNS GALTSGVHTF PAVLQSSGLY SLSSVVTVPS SSLGTQTYIC
NVNHKPSNTK VDKKVEPKSC DKTHTCAA

1519gH20 Fab' heavy chain (V + human gamma-1 CH1 + hinge, *E.coli* expression) SEQ ID NO: 37

gaggttccgc tggtcgagtc tggaggcggg cttgtccagc ctggagggag
cctgcgtctc tcttgtgcag tatctggctt cacgttctcc aactacggta
tggtgtgggt tcgtcaggct ccaggtaaag gtctggaatg ggtggcgtat
attgactccg acggcgacaa cacctactat cgcgactctg tgaaaggtcg
cttcaccatt tcccgcgata acgccaaatc cagcctgtac ctgcagatga
acagcctgcg tgctgaagat actgcggtgt actattgcac cactggcatc
gtgcgtccgt ttctgtattg gggtcagggt accctcgtta ctgtctcgag
cgcttctaca aagggcccat cggtcttccc cctggcaccc tcctccaaga
gcacctctgg gggcacagcg gccctgggct gcctggtcaa ggactacttc
cccgaaccgg tgacggtgtc gtggaactca ggcgccctga ccagcggcgt
gcacaccttc ccggctgtcc tacagtcctc aggactctac tccctcagca
gcgtggtgac cgtgccctcc agcagcttgg gcacccagac ctacatctgc
aacgtgaatc acaagcccag caacaccaag gtcgacaaga aagttgagcc
caaatcttgt gacaaaactc acacatgcgc cgcg

1519gH20 Fab' heavy chain (V + human gamma-1 CH1 + hinge, mammalian expression) SEQ ID NO: 38

gaggtaccac ttgtggaaag cggaggaggt cttgtgcagc ctggaggaag
tttacgtctc tcttgtgctg tgtctggctt caccttctcc aattacggaa
tggtctgggt cagacaagca cctggaaagg gtcttgaatg ggtggcctat
attgactctg acggggacaa cacctactat cgggattccg tgaaaggacg
cttcacaatc tcccgagata acgccaagag ctcactgtac ctgcagatga
atagcctgag agccgaggat actgccgtgt actattgcac aacgggaatc
gttaggcctt ttctgtactg gggacagggc accttggtta ctgtctcgag
cgcttctaca aagggcccat cggtcttccc cctggcaccc tcctccaaga
gcacctctgg gggcacagcg gccctgggct gcctggtcaa ggactacttc
cccgaaccgg tgacggtgtc gtggaactca ggcgccctga ccagcggcgt
gcacaccttc ccggctgtcc tacagtcctc aggactctac tccctcagca
gcgtggtgac cgtgccctcc agcagcttgg gcacccagac ctacatctgc
aacgtgaatc acaagcccag caacaccaag gtcgacaaga aagttgagcc
caaatcttgt gacaaaactc acacatgcgc cgcg

FIGURE 1H

1519 gH20 Fab' heavy chain with signal sequence underlined and italicized (*E. coli* expression) SEQ ID NO: 39

*MKKTAIAIAV ALAGFATVAQ A*EVPLVESGG GLVQPGGSLR LSCAVSGFTF
SNYGMVWVRQ APGKGLEWVA YIDSDGDNTY YRDSVKGRFT ISRDNAKSSL
YLQMNSLRAE DTAVYYCTTG IVRPFLYWGQ GTLVTVSSAS TKGPSVFPLA
PSSKSTSGGT AALGCLVKDY FPEPVTVSWN SGALTSGVHT FPAVLQSSGL
YSLSSVVTVP SSSLGTQTYI CNVNHKPSNT KVDKKVEPKS CDKTHTCAA

1519 gH20 Fab' heavy chain with signal sequence underlined and italicized (*E. coli* expression) SEQ ID NO: 40

atgaagaaga ctgctatagc aattgcagtg gcgctagctg gtttcgccac
cgtggcgcaa gctgaggttc cgctggtcga gtctggaggc gggcttgtcc
agcctggagg gagcctgcgt ctctcttgtg cagtatctgg cttcacgttc
tccaactacg gtatggtgtg ggttcgtcag gctccaggta aaggtctgga
atgggtggcg tatattgact ccgacggcga caacacctac tatcgcgact
ctgtgaaagg tcgcttcacc atttcccgcg ataacgccaa atccagcctg
tacctgcaga tgaacagcct gcgtgctgaa gatactgcgg tgtactattg
caccactggc atcgtgcgtc cgtttctgta ttggggtcag ggtaccctcg
ttactgtctc gagcgcttct acaaagggcc catcggtctt ccccctggca
ccctcctcca agagcacctc tgggggcaca gcggccctgg gctgcctggt
caaggactac ttccccgaac cggtgacggt gtcgtggaac tcaggcgccc
tgaccagcgg cgtgcacacc ttcccggctg tcctacagtc ctcaggactc
tactccctca gcagcgtggt gaccgtgccc tccagcagct tgggcaccca
gacctacatc tgcaacgtga atcacaagcc cagcaacacc aaggtcgaca
agaaagttga gcccaaatct tgtgacaaaa ctcacacatg cgccgcg

1519 gH20 Fab' heavy chain with signal sequence underlined and italicized (mammalian expression) SEQ ID NO: 41

*MEWSWVFLFF LSVTTGVHS*E VPLVESGGGL VQPGGSLRLS CAVSGFTFSN
YGMVWVRQAP GKGLEWVAYI DSDGDNTYYR DSVKGRFTIS RDNAKSSLYL
QMNSLRAEDT AVYYCTTGIV RPFLYWGQGT LVTVSSASTK GPSVFPLAPS
SKSTSGGTAA LGCLVKDYFP EPVTVSWNSG ALTSGVHTFP AVLQSSGLYS
LSSVVTVPSS SLGTQTYICN VNHKPSNTKV DKKVEPKSCD KTHTCAA

FIGURE 1I

1519 gH20 Fab' heavy chain with signal sequence underlined and italicized (mammalian expression) SEQ ID NO: 42

*atggaatgga gctgggtctt tctcttcttc ctgtcagtaa ctacaggagt ccattct*gag gtaccacttg tggaaagcgg aggaggtctt gtgcagcctg
gaggaagttt acgtctctct tgtgctgtgt ctggcttcac cttctccaat
tacggaatgg tctgggtcag acaagcacct ggaaagggtc ttgaatgggt
ggcctatatt gactctgacg gggacaacac ctactatcgg gattccgtga
aaggacgctt cacaatctcc cgagataacg ccaagagctc actgtacctg
cagatgaata gcctgagagc cgaggatact gccgtgtact attgcacaac
gggaatcgtt aggccttttc tgtactgggg acagggcacc ttggttactg
tctcgagcgc ttctacaaag ggcccatcgg tcttcccccct ggcaccctcc
tccaagagca cctctggggg cacagcggcc ctgggctgcc tggtcaagga
ctacttcccc gaaccggtga cggtgtcgtg gaactcaggc gccctgacca
gcggcgtgca caccttcccg gctgtcctac agtcctcagg actctactcc
ctcagcagcg tggtgaccgt gccctccagc agcttgggca cccagaccta
catctgcaac gtgaatcaca agcccagcaa caccaaggtc gacaagaaag
ttgagcccaa atcttgtgac aaaactcaca catgcgccgc g

1519gH20 IgG4 heavy chain (V + human gamma-4P constant) SEQ ID NO: 43

EVPLVESGGG LVQPGGSLRL SCAVSGFTFS NYGMVWVRQA PGKGLEWVAY
IDSDGDNTYY RDSVKGRFTI SRDNAKSSLY LQMNSLRAED TAVYYCTTGI
VRPFLYWGQG TLVTVSSAST KGPSVFPLAP CSRSTSESTA ALGCLVKDYF
PEPVTVSWNS GALTSGVHTF PAVLQSSGLY SLSSVVTVPS SSLGTKTYTC
NVDHKPSNTK VDKRVESKYG PPCPPCPAPE FLGGPSVFLF PPKPKDTLMI
SRTPEVTCVV VDVSQEDPEV QFNWYVDGVE VHNAKTKPRE EQFNSTYRVV
SVLTVLHQDW LNGKEYKCKV SNKGLPSSIE KTISKAKGQP REPQVYTLPP
SQEEMTKNQV SLTCLVKGFY PSDIAVEWES NGQPENNYKT TPPVLDSDGS
FFLYSRLTVD KSRWQEGNVF SCSVMHEALH NHYTQKSLSL SLGK

FIGURE 1J

1519gH20 IgG4 heavy chain (V + human gamma-4P constant, exons underlined) SEQ ID NO: 44

gaggtaccac ttgtggaaag cggaggaggt cttgtgcagc ctggaggaag
tttacgtctc tcttgtgctg tgtctggctt caccttctcc aattacggaa
tggtctgggt cagacaagca cctggaaagg gtcttgaatg ggtggcctat
attgactctg acggggacaa cacctactat cgggattccg tgaaaggacg
cttcacaatc tcccgagata acgccaagag ctcactgtac ctgcagatga
atagcctgag agccgaggat actgccgtgt actattgcac aacgggaatc
gttaggcctt ttctgtactg gggacagggc accttggtta ctgtctcgag
cgcttctaca aagggcccat ccgtcttccc cctggcgccc tgctccagga
gcacctccga gagcacagcc gccctgggct gcctggtcaa ggactacttc
cccgaaccgg tgacggtgtc gtggaactca ggcgccctga ccagcggcgt
gcacaccttc ccggctgtcc tacagtcctc aggactctac tccctcagca
gcgtggtgac cgtgccctcc agcagcttgg gcacgaagac ctacacctgc
aacgtagatc acaagcccag caacaccaag gtggacaaga gagttggtga
gaggccagca cagggaggga gggtgtctgc tggaagccag gctcagccct
cctgcctgga cgcaccccgg ctgtgcagcc ccagcccagg gcagcaaggc
atgccccatc tgtctcctca cccggaggcc tctgaccacc ccactcatgc
ccagggagag ggtcttctgg atttttccac caggctccgg gcagccacag
gctggatgcc cctaccccag gccctgcgca tacaggggca ggtgctgcgc
tcagacctgc caagagccat atccgggagg accctgcccc tgacctaagc
ccaccccaaa ggccaaactc tccactccct cagctcagac accttctctc
ctcccagatc tgagtaactc ccaatcttct ctctgcagag tccaaatatg
gtcccccatg cccaccatgc ccaggtaagc caacccaggc ctcgccctcc
agctcaaggc gggacaggtg ccctagagta gcctgcatcc agggacaggc
cccagccggg tgctgacgca tccacctcca tctcttcctc agcacctgag
ttcctggggg gaccatcagt cttcctgttc cccccaaaac ccaaggacac
tctcatgatc tcccggaccc ctgaggtcac gtgcgtggtg gtggacgtga
gccaggaaga ccccgaggtc cagttcaact ggtacgtgga tggcgtggag
gtgcataatg ccaagacaaa gccgcgggag gagcagttca acagcacgta
ccgtgtggtc agcgtcctca ccgtcctgca ccaggactgg ctgaacggca
aggagtacaa gtgcaaggtc tccaacaaag gcctcccgtc ctccatcgag
aaaaccatct ccaaagccaa aggtgggacc cacggggtgc gagggccaca
tggacagagg tcagctcggc ccaccctctg ccctgggagt gaccgctgtg
ccaacctctg tccctacagg gcagccccga gagccacagg tgtacaccct
gcccccatcc caggaggaga tgaccaagaa ccaggtcagc ctgacctgcc
tggtcaaagg cttctacccc agcgacatcg ccgtggagtg ggagagcaat
gggcagccgg agaacaacta caagaccacg cctcccgtgc tggactccga
cggctccttc ttcctctaca gcaggctaac cgtggacaag agcaggtggc
aggaggggaa tgtcttctca tgctccgtga tgcatgaggc tctgcacaac
cactacacac agaagagcct ctccctgtct ctgggtaaa

FIGURE 1K

1519gH20 IgG4 heavy chain (V + human gamma-4P constant) with signal sequence underlined and italicised SEQ ID NO: 45

atggaatgga gctgggtctt tctcttcttc ctgtcagtaa ctacaggagt
*ccattct*gag gtaccacttg tggaaagcgg aggaggtctt gtgcagcctg
gaggaagttt acgtctctct tgtgctgtgt ctggcttcac cttctccaat
tacggaatgg tctgggtcag acaagcacct ggaaagggtc ttgaatgggt
ggcctatatt gactctgacg gggacaacac ctactatcgg gattccgtga
aaggacgctt cacaatctcc cgagataacg ccaagagctc actgtacctg
cagatgaata gcctgagagc cgaggatact gccgtgtact attgcacaac
gggaatcgtt aggccttttc tgtactgggg acagggcacc ttggttactg
tctcgagcgc ttctacaaag ggcccatccg tcttcccccc ggcgccctgc
tccaggagca cctccgagag cacagccgcc ctgggctgcc tggtcaagga
ctacttcccc gaaccggtga cggtgtcgtg gaactcaggc gccctgacca
gcggcgtgca caccttcccg gctgtcctac agtcctcagg actctactcc
ctcagcagcg tggtgaccgt gccctccagc agcttgggca cgaagaccta
cacctgcaac gtagatcaca agcccagcaa caccaaggtg gacaagagag
ttggtgagag gccagcacag ggagggaggg tgtctgctgg aagccaggct
cagccctcct gcctggacgc accccggctg tgcagcccca gcccagggca
gcaaggcatg ccccatctgt ctcctcaccc ggaggcctct gaccacccca
ctcatgccca gggagagggt cttctggatt tttccaccag gctccgggca
gccacaggct ggatgcccct accccaggcc ctgcgcatac aggggcaggt
gctgcgctca gacctgccaa gagccatatc cgggaggacc ctgcccctga
cctaagccca ccccaaaggc caaactctcc actccctcag ctcagacacc
ttctctcctc ccagatctga gtaactccca atcttctctc tgcagagtcc
aaatatggtc ccccatgccc accatgccca ggtaagccaa cccaggcctc
gccctccagc tcaaggcggg acaggtgccc tagagtagcc tgcatccagg
gacaggcccc agccgggtgc tgacgcatcc acctccatct cttcctcagc
acctgagttc ctgggggggac catcagtctt cctgttcccc ccaaaaccca
aggacactct catgatctcc cggacccctg aggtcacgtg cgtggtggtg
gacgtgagcc aggaagaccc cgaggtccag ttcaactggt acgtggatgg
cgtggaggtg cataatgcca agacaaagcc gcgggaggag cagttcaaca
gcacgtaccg tgtggtcagc gtcctcaccg tcctgcacca ggactggctg
aacggcaagg agtacaagtg caaggtctcc aacaaaggcc tcccgtcctc
catcgagaaa accatctcca aagccaaagg tgggacccac ggggtgcgag
ggccacatgg acagaggtca gctcggccca ccctctgccc tgggagtgac
cgctgtgcca acctctgtcc ctacagggca gccccgagag ccacaggtgt
acaccctgcc cccatcccag gaggagatga ccaagaacca ggtcagcctg
acctgcctgg tcaaaggctt ctaccccagc gacatcgccg tggagtggga
gagcaatggg cagccggaga acaactacaa gaccacgcct cccgtgctgg
actccgacgg ctccttcttc ctctacagca ggctaaccgt ggacaagagc
aggtggcagg aggggaatgt cttctcatgc tccgtgatgc atgaggctct
gcacaaccac tacacacaga agagcctctc cctgtctctg ggtaaa

FIGURE 1L

1519gL20 FabFv light chain SEQ ID NO: 46

DIQMTQSPSS LSASVGDRVT ITCKSSQSLV GASGKTYLYW LFQKPGKAPK
RLIYLVSTLD SGIPSRFSGS GSGTEFTLTI SSLQPEDFAT YYCLQGTHFP
HTFGQGTKLE IKRTVAAPSV FIFPPSDEQL KSGTASVVCL LNNFYPREAK
VQWKVDNALQ SGNSQESVTE QDSKDSTYSL SSTLTLSKAD YEKHKVYACE
VTHQGLSSPV TKSFNRGECS GGGGSGGGGS GGGGSDIQMT QSPSSVSASV
GDRVTITCQS SPSVWSNFLS WYQQKPGKAP KLLIYEASKL TSGVPSRFSG
SGSGTDFTLT ISSLQPEDFA TYYCGGGYSS ISDTTFGCGT KVEIKRT

1519gL20 FabFv light chain SEQ ID NO: 47

gatatccaga tgacccagag cccatctagc ttatccgctt ccgttggtga
tcgcgtgaca attacgtgta agagctccca atctctcgtg ggtgcaagtg
gcaagaccta tctgtactgg ctctttcaga agcctggcaa ggcaccaaaa
cggctgatct atctggtgtc tacccttgac tctgggatac cgtcacgatt
ttccggatct gggagcggaa ctgagttcac actcacgatt tcatcgctgc
aacccgagga ctttgctacc tactactgcc tgcaaggcac tcatttccct
cacactttcg gccaggggac aaaactcgaa atcaaacgta cggtagcggc
cccatctgtc ttcatcttcc cgccatctga tgagcagttg aaatctggaa
ctgcctctgt tgtgtgcctg ctgaataact tctatcccag agaggccaaa
gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag
tgtcacagag caggacagca aggacagcac ctacagcctg agcagcaccc
tgacgctgtc taaagcagac tacgagaaac acaaagtgta cgcctgcgaa
gtcacccatc agggcctgag ctcaccagta acaaaaagtt ttaatagagg
ggagtgtagc ggtggcggtg gcagtggtgg gggaggctcc ggaggtggcg
gttcagacat acaaatgacc cagagtcctt catcggtatc cgcgtccgtt
ggcgataggg tgactattac atgtcaaagc tctcctagcg tctggagcaa
ttttctatcc tggtatcaac agaaaccggg gaaggctcca aaacttctga
tttatgaagc ctcgaaactc accagtggag ttccgtcaag attcagtggc
tctggatcag ggacagactt cacgttgaca atcagttcgc tgcaaccaga
ggactttgcg acctactatt gtggtggagg ttacagtagc ataagtgata
cgacatttgg gtgcggtact aaggtggaaa tcaaacgtac c

1519gL20 FabFv light chain with signal sequence underlined & italicised SEQ ID NO: 48

MSVPTQVLGL LLLWLTDARC DIQMTQSPSS LSASVGDRVT ITCKSSQSLV
GASGKTYLYW LFQKPGKAPK RLIYLVSTLD SGIPSRFSGS GSGTEFTLTI
SSLQPEDFAT YYCLQGTHFP HTFGQGTKLE IKRTVAAPSV FIFPPSDEQL
KSGTASVVCL LNNFYPREAK VQWKVDNALQ SGNSQESVTE QDSKDSTYSL
SSTLTLSKAD YEKHKVYACE VTHQGLSSPV TKSFNRGECS GGGGSGGGGS
GGGGSDIQMT QSPSSVSASV GDRVTITCQS SPSVWSNFLS WYQQKPGKAP
KLLIYEASKL TSGVPSRFSG SGSGTDFTLT ISSLQPEDFA TYYCGGGYSS
ISDTTFGCGT KVEIKRT

FIGURE 1M

1519gL20 FabFv light chain with signal sequence underlined and italicised SEQ ID NO: 49

atgtctgtcc ccacccaagt cctcggactc ctgctactct ggcttacaga tgccagatgc gatatccaga tgacccagag cccatctagc ttatccgctt ccgttggtga tcgcgtgaca attacgtgta agagctccca atctctcgtg ggtgcaagtg gcaagaccta tctgtactgg ctctttcaga agcctggcaa ggcaccaaaa cggctgatct atctggtgtc tacccttgac tctgggatac cgtcacgatt ttccggatct gggagcggaa ctgagttcac actcacgatt tcatcgctgc aacccgagga ctttgctacc tactactgcc tgcaaggcac tcatttccct cacactttcg gccaggggac aaaactcgaa atcaaacgta cggtagcggc cccatctgtc ttcatcttcc cgccatctga tgagcagttg aaatctggaa ctgcctctgt tgtgtgcctg ctgaataact tctatcccag agaggccaaa gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag tgtcacagag caggacagca aggacagcac ctacagcctg agcagcaccc tgacgctgtc taaagcagac tacgagaaac acaaagtgta cgcctgcgaa gtcacccatc agggcctgag ctcaccagta acaaaaagtt ttaatagagg ggagtgtagc ggtggcggtg gcagtggtgg gggaggctcc ggaggtggcg gttcagacat acaaatgacc cagagtcctt catcggtatc cgcgtccgtt ggcgataggg tgactattac atgtcaaagc tctcctagcg tctggagcaa ttttctatcc tggtatcaac agaaaccggg gaaggctcca aaacttctga tttatgaagc ctcgaaactc accagtggag ttccgtcaag attcagtggc tctggatcag ggacagactt cacgttgaca atcagttcgc tgcaaccaga ggactttgcg acctactatt gtggtggagg ttacagtagc ataagtgata cgacatttgg gtgcggtact aaggtggaaa tcaaacgtac c

1519gH20 FabFv heavy chain SEQ ID NO: 50

EVPLVESGGG LVQPGGSLRL SCAVSGFTFS NYGMVWVRQA PGKGLEWVAY IDSDGDNTYY RDSVKGRFTI SRDNAKSSLY LQMNSLRAED TAVYYCTTGI VRPFLYWGQG TLVTVSSAST KGPSVFPLAP SSKSTSGGTA ALGCLVKDYF PEPVTVSWNS GALTSGVHTF PAVLQSSGLY SLSSVVTVPS SSLGTQTYIC NVNHKPSNTK VDKKVEPKSC SGGGGSGGGG TGGGGSEVQL LESGGGLVQP GGSLRLSCAV SGIDLSNYAI NWVRQAPGKC LEWIGIIWAS GTTFYATWAK GRFTISRDNS KNTVYLQMNS LRAEDTAVYY CARTVPGYST APYFDLWGQG TLVTVSS

FIGURE 1N

1519gH20 FabFv heavy chain SEQ ID NO: 51

gaggtaccac ttgtggaaag cggaggaggt cttgtgcagc ctggaggaag
tttacgtctc tcttgtgctg tgtctggctt caccttctcc aattacggaa
tggtctgggt cagacaagca cctggaaagg gtcttgaatg ggtggcctat
attgactctg acggggacaa cacctactat cgggattccg tgaaaggacg
cttcacaatc tcccgagata acgccaagag ctcactgtac ctgcagatga
atagcctgag agccgaggat actgccgtgt actattgcac aacgggaatc
gttaggcctt ttctgtactg gggacagggc accttggtta ctgtctcgag
cgcgtccaca aagggcccat cggtcttccc cctggcaccc tcctccaaga
gcacctctgg gggcacagcg gccctgggct gcctggtcaa ggactacttc
cccgaaccag tgacggtgtc gtggaactca ggtgccctga ccagcggcgt
tcacaccttc ccggctgtcc tacagtcttc aggactctac tccctgagca
gcgtggtgac cgtgccctcc agcagcttgg gcacccagac ctacatctgc
aacgtgaatc acaagcccag caacaccaag gtcgataaga aagttgagcc
caaatcttgt agtggaggtg ggggctcagg tggaggcggg accggtggag
gtggcagcga ggttcaactg cttgagtctg gaggaggcct agtccagcct
ggagggagcc tgcgtctctc ttgtgcagta agcggcatcg acctgagcaa
ttacgccatc aactgggtga gacaagctcc ggggaagtgt ttagaatgga
tcggtataat atgggccagt gggacgacct tttatgctac atgggcgaaa
ggaaggttta caattagccg ggacaatagc aaaaacaccg tgtatctcca
aatgaactcc ttgcgagcag aggacacggc ggtgtactat tgtgctcgca
ctgtcccagg ttatagcact gcaccctact tcgatctgtg gggacaaggg
accctggtga ctgtttcaag t

1519gH20 FabFv heavy chain with signal sequence underlined and italicised SEQ ID NO: 52

*MEWSWVFLFF LSVTTGVHS*E VPLVESGGGL VQPGGSLRLS CAVSGFTFSN
YGMVWVRQAP GKGLEWVAYI DSDGDNTYYR DSVKGRFTIS RDNAKSSLYL
QMNSLRAEDT AVYYCTTGIV RPFLYWGQGT LVTVSSASTK GPSVFPLAPS
SKSTSGGTAA LGCLVKDYFP EPVTVSWNSG ALTSGVHTFP AVLQSSGLYS
LSSVVTVPSS SLGTQTYICN VNHKPSNTKV DKKVEPKSCS GGGGSGGGGT
GGGGSEVQLL ESGGGLVQPG GSLRLSCAVS GIDLSNYAIN WVRQAPGKCL
EWIGIIWASG TTFYATWAKG RFTISRDNSK NTVYLQMNSL RAEDTAVYYC
ARTVPGYSTA PYFDLWGQGT LVTVSS

FIGURE 1P

1519gH20 FabFv heavy chain with signal sequence underlined & italicised SEQ ID NO: 53

*atggaatgga gctgggtctt tctcttcttc ctgtcagtaa ctacaggagt ccattct*gag gtaccacttg tggaaagcgg aggaggtctt gtgcagcctg gaggaagttt acgtctctct tgtgctgtgt ctggcttcac cttctccaat tacggaatgg tctgggtcag acaagcacct ggaaagggtc ttgaatgggt ggcctatatt gactctgacg gggacaacac ctactatcgg gattccgtga aaggacgctt cacaatctcc cgagataacg ccaagagctc actgtacctg cagatgaata gcctgagagc cgaggatact gccgtgtact attgcacaac gggaatcgtt aggccttttc tgtactgggg acagggcacc ttggttactg tctcgagcgc gtccacaaag ggcccatcgg tcttcccccc ggcaccctcc tccaagagca cctctggggg cacagcggcc ctgggctgcc tggtcaagga ctacttcccc gaaccagtga cggtgtcgtg gaactcaggt gccctgacca gcggcgttca caccttcccg gctgtcctac agtcttcagg actctactcc ctgagcagcg tggtgaccgt gccctccagc agcttgggca cccagaccta catctgcaac gtgaatcaca agcccagcaa caccaaggtc gataagaaag ttgagcccaa atcttgtagt ggaggtgggg gctcaggtgg aggcgggacc ggtggaggtg gcagcgaggt tcaactgctt gagtctggag gaggcctagt ccagcctgga gggagcctgc gtctctcttg tgcagtaagc ggcatcgacc tgagcaatta cgccatcaac tgggtgagac aagctccggg gaagtgttta gaatggatcg gtataatatg ggccagtggg acgacctttt atgctacatg ggcgaaagga aggtttacaa ttagccggga caatagcaaa aacaccgtgt atctccaaat gaactccttg cgagcagagg acacggcggt gtactattgt gctcgcactg tcccaggtta tagcactgca ccctacttcg atctgtgggg acaagggacc ctggtgactg tttcaagt

Human VK1 2-1-(1) A30 JK2 acceptor framework SEQ ID NO: 54
DIQMTQSPSS LSASVGDRVT ITCRASQGIR NDLGWYQQKP GKAPKRLIYA ASSLQSGVPS RFSGSGSGTE FTLTISSLQP EDFATYYCLQ HNSYPYTFGQ GTKLEIK

Human VK1 2-1-(1) A30 JK2 acceptor framework SEQ ID NO: 55
gacatccaga tgacccagtc tccatcctcc ctgtctgcat ctgtaggaga cagagtcacc atcacttgcc gggcaagtca gggcattaga aatgatttag gctggtatca gcagaaacca gggaaagccc ctaagcgcct gatctatgct gcatccagtt tgcaaagtgg ggtcccatca aggttcagcg gcagtggatc tgggacagaa ttcactctca caatcagcag cctgcagcct gaagattttg caacttatta ctgtctacag cataatagtt acccttacac ttttggccag gggaccaagc tggagatcaa a

FIGURE 1Q

Human VH3 1-3 3-07 JH4 acceptor framework SEQ ID NO: 56

EVQLVESGGG LVQPGGSLRL SCAASGFTFS SYWMSWVRQA PGKGLEWVAN
IKQDGSEKYY VDSVKGRFTI SRDNAKNSLY LQMNSLRAED TAVYYCARYF
DYWGQGTLVT VS

Human VH3 1-3 3-07 JH4 acceptor framework SEQ ID NO: 57

gaggtgcagc tggtggagtc tgggggaggc ttggtccagc ctgggggtc
cctgagactc tcctgtgcag cctctggatt cacctttagt agctattgga
tgagctgggt ccgccaggct ccagggaagg ggctggagtg ggtggccaac
ataaagcaag atggaagtga gaaatactat gtggactctg tgaagggccg
attcaccatc tccagagaca acgccaagaa ctcactgtat ctgcaaatga
acagcctgag agccgaggac acggctgtgt attactgtgc gagatacttt
gactactggg gccagggaac cctggtcacc gtctcc

Rat Ab 1548 VL region SEQ ID NO: 58

DVVMTQTPLS LSVALGQPAS ISCKSSQSLV GASGKTYLYW LFQRSGQSPK
RLIYLVSTLD SGIPDRFSGS GAETDFTLKI RRVEADDLGV YYCLQGTHFP
HTFGAGTKLE IK

Rat Ab 1548 VL region SEQ ID NO: 59

gatgttgtga tgacccagac tccactgtct ttgtcggttg cccttggaca
accagcctcc atctcttgca agtcaagtca gagcctcgta ggtgctagtg
gaaagacata tttgtattgg ttatttcaga ggtccggcca gtctccaaag
cgactaatct atctggtgtc cacactggac tctggaattc ctgataggtt
cagtggcagt ggagcagaga cagattttac tcttaaaatc cgcagagtgg
aagccgatga tttgggagtt tattactgct tgcaaggtac acattttcct
cacacgtttg gagctgggac caagctggaa ataaaa

Rat Ab 1548 VH region SEQ ID NO: 60

EVPLVESGGG SVQPGRSMKL SCVVSGFTFS NYGMVWVRQA PKKGLEWVAY
IDSDGDNTYY RDSVKGRFTI SRNNAKSTLY LQMDSLRSED TATYYCTTGI
VRPFLYWGQG VMVTVS

FIGURE 1R

Rat Ab 1548 VH region SEQ ID NO: 61

gaggtgccgc tggtggagtc tgggggcggc tcagtgcagc ctgggaggtc
catgaaactc tcctgtgtag tctcaggatt cactttcagt aattatggca
tggtctgggt ccgccaggct ccaaagaagg gtctggagtg ggtcgcatat
attgattctg atggtgataa tacttactac cgagattccg tgaagggccg
attcactatc tccagaaata atgcaaaaag caccctatat ttgcaaatgg
acagtctgag gtctgaggac acggccactt attactgtac aacagggatt
gtccggccct ttctctattg gggccaagga gtcatggtca cagtctcg

Rat Ab 1644 VL region SEQ ID NO: 62

DVVMTQTPLS LSVAIGQPAS ISCKSSQSLV GASGKTYLYW LFQRSGQSPK
RLIYLVSTLD SGIPDRFSGS GAETDFTLKI RRVEADDLGV YYCLQGTHFP
HTFGAGTKLE LK

Rat Ab 1644 VL region SEQ ID NO: 63

gatgttgtga tgacccagac tccactgtct ttgtcggttg ccattggaca
accagcctcc atctcttgca agtcaagtca gagcctcgta ggtgctagtg
gaaagacata tttgtattgg ttatttcaga ggtccggcca gtctccaaag
cgactaatct atctggtgtc cacactggac tctggaattc ctgataggtt
cagtggcagt ggagcagaga cagattttac tcttaaaatc cgcagagtgg
aagccgatga tttgggagtt tattactgct tgcaaggtac acattttcct
cacacgtttg gagctgggac caagctggaa ctgaaa

Rat Ab 1644 VH region SEQ ID NO: 64

EVPLVESGGG SVQPGRSTKL SCVVSGFTFS NYGMVWVRQA PKKGLEWVAY
IGSDGDNIYY RDSVKGRFTI SRNNAKSTLY LQMDSLRSED TATYYCTTGI
VRPFLYWGQG TTVTVS

Rat Ab 1644 VH region SEQ ID NO: 65

gaggtgccgc tggtggagtc tgggggcggc tcagtgcagc ctgggaggtc
cacgaaactc tcctgtgtag tctcaggatt cactttcagt aactatggca
tggtctgggt ccgccaggct ccaaagaagg gtctggagtg ggtcgcatat
attggttctg atggtgataa tatttactac cgagattccg tgaagggtcg
attcactatc tccagaaata atgcaaaaag caccctatat ttgcaaatgg
acagtctgag gtctgaggac acggccactt attactgtac aacagggatt
gtccggccct ttctctactg gggccaagga accacggtca ccgtctcg

Figure 1S

Rat Ab 1496 VK region SEQ ID NO: 66

DVVMTQTPLS LSVALGQPAS ISCKSSQSLV GASGKTYLYW LFQRSGQSPK
RLIYLVSTLD SGIPDRFSGS GAETDFTLKI RRVEADDLGV YYCLQGTHFP
HTFGAGTKLE LK

Rat Ab 1496 VK region SEQ ID NO: 67

gatgttgtga tgacccagac tccactgtct ttgtcggttg cccttggaca
accagcctcc atctcttgca agtcaagtca gagcctcgta ggtgctagtg
gaaagacata tttgtattgg ttatttcaga ggtccggcca gtctccaaag
cgactaatct atctggtgtc cacactggac tctggaattc ctgataggtt
cagtggcagt ggagcagaga cagattttac tcttaaaatc cgcagagtgg
aagccgatga tttgggagtt tattactgct tgcaaggtac acattttcct
cacacgtttg gagctgggac caagctggaa ctgaaa

Rat Ab 1496 VH region SEQ ID NO: 68

EVLLVESGGG SVQPGRSMKL SCVVSGFTFS NYGMVWVRQA PKKGLEWVAY
IDSDGDNTYY RDSVKGRFTI SRNNAKSTLY LQMDSLRSED TATYYCTTGI
VRPFLYWGQG TMVTVS

Rat Ab 1496 VH region SEQ ID NO: 69

gaggtgctgc tggtggagtc tgggggcggc tcagtgcagc ctgggaggtc
catgaaactc tcctgtgtag tctcaggatt cactttcagt aattatggca
tggtctgggt ccgccaggct ccaaagaagg gtctggagtg ggtcgcatat
attgattctg atggtgataa tacttactac cgagattccg tgaagggccg
attcactatc tccagaaata atgcaaaaag caccctatat ttgcaaatgg
acagtctgag gtctgaggac acggccactt attactgtac aacagggatt
gtccggccct ttctctattg gggccaagga accatggtca ccgtctcg

1519gH20 IgG1 heavy chain (V + human gamma-1 constant) SEQ ID NO:72

EVPLVESGGG LVQPGGSLRL SCAVSGFTFS NYGMVWVRQA PGKGLEWVAY IDSDGDNTYY
RDSVKGRFTI SRDNAKSSLY LQMNSLRAED TAVYYCTTGI VRPFLYWGQG TLVTVSSAST
KGPSVFPLAP SSKSTSGGTA ALGCLVKDYF PEPVTVSWNS GALTSGVHTF PAVLQSSGLY
SLSSVVTVPS SSLGTQTYIC NVNHKPSNTK VDKKVEPKSC DKTHTCPPCP APELLGGPSV
FLFPPKPKDT LMISRTPEVT CVVVDVSHED PEVKFNWYVD GVEVHNAKTK PREEQYNSTY
RVVSVLTVLH QDWLNGKEYK CKVSNKALPA PIEKTISKAK GQPREPQVYT LPPSRDELTK
NQVSLTCLVK GFYPSDIAVE WESNGQPENN YKTTPPVLDS DGSFFLYSKL TVDKSRWQQG
NVFSCSVMHE ALHNHYTQKS LSLSPGK

Figure 1T

1519gH20 IgG1 heavy chain (V + human gamma-1 constant, exons underlined) SEQ ID NO:73

gaggtaccac ttgtggaaag cggaggaggt cttgtgcagc ctggaggaag tttacgtctc
tcttgtgctg tgtctggctt caccttctcc aattacggaa tggtctgggt cagacaagca
cctggaaagg gtcttgaatg ggtggcctat attgactctg acggggacaa cacctactat
cgggattccg tgaaaggacg cttcacaatc tcccgagata acgccaagag ctcactgtac
ctgcagatga atagcctgag agccgaggat actgccgtgt actattgcac aacgggaatc
gttaggcctt ttctgtactg gggacagggc accttggtta ctgtctcgag cgcttctaca
aagggcccat cggtcttccc cctggcaccc tcctccaaga gcacctctgg gggcacagcg
gccctgggct gcctggtcaa ggactacttc cccgaaccgg tgacggtgtc gtggaactca
ggcgccctga ccagcggcgt gcacaccttc ccggctgtcc tacagtcctc aggactctac
tccctcagca gcgtggtgac cgtgccctcc agcagcttgg gcacccagac ctacatctgc
aacgtgaatc acaagcccag caacaccaag gtcgacaaga aagttggtga gaggccagca
cagggaggga gggtgtctgc tggaagccag gctcagcgct cctgcctgga cgcatcccgg
ctatgcagcc ccagtccagg gcagcaaggc aggccccgtc tgcctcttca cccggaggcc
tctgcccgcc ccactcatgc tcagggagag ggtcttctgg ctttttcccc aggctctggg
caggcacagg ctaggtgccc ctaacccagg ccctgcacac aaaggggcag gtgctgggct
cagacctgcc aagagccata tccgggagga ccctgcccct gacctaagcc caccccaaag
gccaaactct ccactccctc agctcggaca ccttctctcc tcccagatct gagtaactcc
caatcttctc tctgcagagc ccaaatcttg tgacaaaact cacacatgcc caccgtgccc
aggtaagcca gcccaggcct cgccctccag ctcaaggcgg gacaggtgcc ctagagtagc
ctgcatccag ggacaggccc cagccgggtg ctgacacgtc cacctccatc tcttcctcag
cacctgaact cctgggggga ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc
tcatgatctc ccggacccct gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc
ctgaggtcaa gttcaactgg tacgtggacg gcgtggaggt gcataatgcc aagacaaagc
cgcgggagga gcagtacaac agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc
aggactggct gaatggcaag gagtacaagt gcaaggtctc caacaaagcc ctcccagccc
ccatcgagaa aaccatctcc aaagccaaag gtgggacccg tggggtgcga gggccacatg
gacagaggcc ggctcggccc accctctgcc ctgagagtga ccgctgtacc aacctctgtc
cctacagggc agccccgaga accacaggtg tacaccctgc ccccatcccg ggatgagctg
accaagaacc aggtcagcct gacctgcctg gtcaaaggct tctatcccag cgacatcgcc
gtggagtggg agagcaatgg gcagccggag aacaactaca agaccacgcc tcccgtgctg
gactccgacg gctccttctt cctctacagc aagctcaccg tggacaagag caggtggcag
caggggaacg tcttctcatg ctccgtgatg catgaggctc tgcacaacca ctacacgcag
aagagcctct ccctgtctcc gggtaaa

Figure 1U

1519gH20 IgG1 heavy chain (V + human gamma-1 constant) with signal sequence underlined and italicized SEQ ID NO:74

atggaatgga gctgggtctt tctcttcttc ctgtcagtaa ctacaggagt ccattctgag
gtaccacttg tggaaagcgg aggaggtctt gtgcagcctg gaggaagttt acgtctctct
tgtgctgtgt ctggcttcac cttctccaat tacggaatgg tctgggtcag acaagcacct
ggaaagggtc ttgaatgggt ggcctatatt gactctgacg gggacaacac ctactatcgg
gattccgtga aaggacgctt cacaatctcc cgagataacg ccaagagctc actgtacctg
cagatgaata gcctgagagc cgaggatact gccgtgtact attgcacaac gggaatcgtt
aggccttttc tgtactgggg acagggcacc ttggttactg tctcgagcgc ttctacaaag
ggcccatcgg tcttcccccct ggcaccctcc tccaagagca cctctggggg cacagcggcc
ctgggctgcc tggtcaagga ctacttcccc gaaccggtga cggtgtcgtg gaactcaggc
gccctgacca gcggcgtgca caccttcccg gctgtcctac agtcctcagg actctactcc
ctcagcagcg tggtgaccgt gccctccagc agcttgggca cccagaccta catctgcaac
gtgaatcaca agcccagcaa caccaaggtc gacaagaaag ttggtgagag gccagcacag
ggagggaggg tgtctgctgg aagccaggct cagcgctcct gcctggacgc atcccggcta
tgcagcccca gtccagggca gcaaggcagg ccccgtctgc ctcttcaccc ggaggcctct
gcccgcccca ctcatgctca gggagagggt cttctggctt tttccccagg ctctgggcag
gcacaggcta ggtgccccta acccaggccc tgcacacaaa ggggcaggtg ctgggctcag
acctgccaag agccatatcc gggaggaccc tgcccctgac ctaagcccac cccaaaggcc
aaactctcca ctccctcagc tcggacacct tctctcctcc cagatctgag taactcccaa
tcttctctct gcagagccca aatcttgtga caaaactcac acatgcccac cgtgcccagg
taagccagcc caggcctcgc cctccagctc aaggcgggac aggtgcccta gagtagcctg
catccaggga caggccccag ccgggtgctg acacgtccac ctccatctct tcctcagcac
ctgaactcct gggggggaccg tcagtcttcc tcttcccccc aaaacccaag gacaccctca
tgatctcccg gacccctgag gtcacatgcg tggtggtgga cgtgagccac gaagaccctg
aggtcaagtt caactggtac gtggacggcg tggaggtgca taatgccaag acaaagccgc
gggaggagca gtacaacagc acgtaccgtg tggtcagcgt cctcaccgtc ctgcaccagg
actggctgaa tggcaaggag tacaagtgca aggtctccaa caaagccctc ccagccccca
tcgagaaaac catctccaaa gccaaaggtg ggacccgtgg ggtgcgaggg ccacatggac
agaggccggc tcggcccacc ctctgccctg agagtgaccg ctgtaccaac ctctgtccct
acagggcagc cccgagaacc acaggtgtac accctgcccc catcccggga tgagctgacc
aagaaccagg tcagcctgac ctgcctggtc aaaggcttct atcccagcga catcgccgtg
gagtgggaga gcaatgggca gccggagaac aactacaaga ccacgcctcc cgtgctggac
tccgacggct ccttcttcct ctacagcaag ctcaccgtgg acaagagcag gtggcagcag
gggaacgtct tctcatgctc cgtgatgcat gaggctctgc acaaccacta cacgcagaag
agcctctccc tgtctccgggtaaa

Figure 1V

1519 gL20 light chain (V + constant, mammalian expression alternative) SEQ ID NO: 75

```
gatatccaga tgacccagag cccatctagc ttatccgctt ccgttggtga
tcgcgtgaca attacgtgta agagctccca atctctcgtg ggtgcaagtg
gcaagaccta tctgtactgg ctctttcaga agcctggcaa ggcaccaaaa
cggctgatct atctggtgtc tacccttgac tctgggatac cgtcacgatt
ttccggatct gggagcggaa ctgagttcac actcacgatt tcatcgctgc
aacccgagga ctttgctacc tactactgcc tgcaaggcac tcatttccct
cacactttcg gccaggggac aaaactcgaa atcaaacgta cggtagcggc
cccatctgtc ttcatcttcc cgccatctga tgagcagttg aaatctggaa
ctgcctctgt tgtgtgcctg ctgaataact tctatcccag agaggccaaa
gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag
tgtcacagag caggacagca aggacagcac ctacagcctc agcagcaccc
tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa
gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg agagtgt
```

1519gH20 Fab' heavy chain (V + human gamma-1 CH1 + hinge, mammalian expression one base change from SEQ ID NO: 38) SEQ ID NO: 76

```
gaggtaccac ttgtggaaag cggaggaggt cttgtgcagc ctggaggaag
tttacgtctc tcttgtgctg tgtctggctt caccttctcc aattacggaa
tggtctgggt cagacaagca cctggaaagg gtcttgaatg ggtggcctat
attgactctg acggggacaa cacctactat cgggattccg tgaaaggacg
cttcacaatc tcccgagata acgccaagag ctcactgtac ctgcagatga
atagcctgag agccgaggat actgccgtgt actattgcac aacgggaatc
gttaggcctt ttctgtactg gggacagggc accttggtta ctgtctcgag
cgcttctaca aagggcccat cggtcttccc cctggcaccc tcctccaaga
gcacctctgg gggcacagcg gccctgggct gcctggtcaa ggactacttc
cccgaaccgg tgacggtgtc gtggaactca ggcgccctga ccagcggcgt
gcacaccttc ccggctgtcc tacagtcctc aggactctac tccctcagca
gcgtggtgac cgtgccctcc agcagcttgg gcacccagac ctacatctgc
aacgtgaatc acaagcccag caacaccaag gtggacaaga aagttgagcc
caaatcttgt gacaaaactc acacatgcgc cgcg
```

1519 gH20 Fab' heavy chain with signal sequence underlined and italicized (mammalian expression one base changed from SEQ ID NO: 42) SEQ ID NO: 77

```
atggaatgga gctgggtctt tctcttcttc ctgtcagtaa ctacaggagt
ccattctgag gtaccacttg tggaaagcgg aggaggtctt gtgcagcctg
gaggaagttt acgtctctct tgtgctgtgt ctggcttcac cttctccaat
tacggaatgg tctgggtcag acaagcacct ggaaagggtc ttgaatgggt
ggcctatatt gactctgacg gggacaacac ctactatcgg gattccgtga
aaggacgctt cacaatctcc cgagataacg ccaagagctc actgtacctg
cagatgaata gcctgagagc cgaggatact gccgtgtact attgcacaac
gggaatcgtt aggccttttc tgtactgggg acagggcacc ttggttactg
tctcgagcgc ttctacaaag ggcccatcgg tcttcccccc ggcaccctcc
tccaagagca cctctggggg cacagcggcc ctgggctgcc tggtcaagga
ctacttcccc gaaccggtga cggtgtcgtg gaactcaggc gccctgacca
gcggcgtgca caccttcccg gctgtcctac agtcctcagg actctactcc
ctcagcagcg tggtgaccgt gccctccagc agcttgggca cccagaccta
catctgcaac gtgaatcaca agcccagcaa caccaaggtg gacaagaaag
ttgagcccaa atcttgtgac aaaactcaca catgcgccgc g
```

Figure 1W

1519gL20 FabFv light chain (alternative sequence to SEQ ID NO: 46) SEQ ID NO: 78

DIQMTQSPSS LSASVGDRVT ITCKSSQSLV GASGKTYLYW LFQKPGKAPK
RLIYLVSTLD SGIPSRFSGS GSGTEFTLTI SSLQPEDFAT YYCLQGTHFP
HTFGQGTKLE IKRTVAAPSV FIFPPSDEQL KSGTASVVCL LNNFYPREAK
VQWKVDNALQ SGNSQESVTE QDSKDSTYSL SSTLTLSKAD YEKHKVYACE
VTHQGLSSPV TKSFNRGECG GGGSGGGGSG GGGSDIQMTQ SPSSVSASVG
DRVTITCQSS PSVWSNFLSW YQQKPGKAPK LLIYEASKLT SGVPSRFSGS
GSGTDFTLTI SSLQPEDFAT YYCGGGYSSI SDTTFGCGTK VEIKRT

1519gL20 FabFv light chain (alternative sequence to SEQ ID NO: 47) SEQ ID NO: 79

gacatccaga tgacccagtc cccctccagc ctgtccgcct ccgtgggcga
cagagtgacc atcacatgca agtcctccca gtccctggtc ggagcctccg
gcaagaccta cctgtactgg ctgttccaga agcccggcaa ggcccccaag
cggctgatct acctggtgtc taccctggac tccggcatcc cctcccggtt
ctccggctct ggctctggca ccgagttcac cctgaccatc tccagcctgc
agcccgagga cttcgccacc tactactgtc tgcaaggcac ccacttcccc
cacaccttcg gccagggcac caagctggaa atcaagcgga ccgtagcggc
cccatctgtc ttcatcttcc cgccatctga tgagcagttg aaatctggaa
ctgcctctgt tgtgtgcctg ctgaataact tctatcccag agaggccaaa
gtacagtgga aggtggataa cgccctccaa tcgggtaact cccaggagag
tgtcacagag caggacagca aggacagcac ctacagcctc agcagcaccc
tgacgctgag caaagcagac tacgagaaac acaaagtcta cgcctgcgaa
gtcacccatc agggcctgag ctcgcccgtc acaaagagct tcaacagggg
agagtgtggt ggaggtggct ctggcggtgg tggctccgga ggcggaggaa
gcgacatcca gatgacccag agcccttcct ctgtaagcgc cagtgtcgga
gacagagtga ctattacctg ccaaagctcc ccttcagtct ggtccaattt
tctatcctgg tatcagcaaa agcccggaaa ggctcctaaa ttgctgatct
acgaagcaag caaactcacc agcggcgtgc ccagcaggtt cagcggcagt
gggtctggaa ctgactttac cctgacaatc tcctcactcc agcccgagga
cttcgccacc tattactgcg gtggaggtta cagtagcata agtgatacga
catttggatg cggcactaaa gtggaaatca agcgtacc

FIGURE 1X

1519gH20 FabFv heavy chain (alternative sequence to SEQ ID NO: 51) SEQ ID NO: 80

gaggtgcccc tggtggaatc tggcggcgga ctggtgcagc ctggcggctc
cctgagactg tcttgcgccg tgtccggctt caccttctcc aactacggca
tggtctgggt ccgacaggct cctggcaagg gactggaatg ggtggcctac
atcgactccg acggcgacaa cacctactac cgggactccg tgaagggccg
gttcaccatc tcccgggaca acgccaagtc ctccctgtac ctgcagatga
actccctgcg ggccgaggac accgccgtgt actactgcac caccggcatc
gtgcggccct ttctgtactg gggccagggc accctggtca ccgtgtcctc
tgcttctaca aagggcccat cggtcttccc cctggcaccc tcctccaaga
gcacctctgg gggcacagcg gccctgggct gcctggtcaa ggactacttc
cccgaaccgg tgacggtgtc gtggaactca ggcgccctga ccagcggcgt
gcacaccttc ccggctgtcc tacagtcctc tggactctac tccctcagca
gcgtggtgac cgtgccctcc agcagcttgg gcacccagac ctacatctgc
aacgtgaatc acaagcccag caacaccaag gtggacaaga aagttgagcc
caaatcttgt tccggaggtg gcggttccgg aggtggcggt acaggtggcg
gtgggtccga agtccagctg cttgaatccg gaggcggact cgtgcagccc
ggaggcagtc ttcgcttgtc ctgcgctgta tctggaatcg acctgagcaa
ttacgccatc aactgggtga gacaggcacc tgggaaatgc ctcgaatgga
tcggcattat atgggctagt gggacgacct tttatgctac atgggcgaag
ggtagattca caatctcacg ggataatagt aagaacacag tgtacctgca
gatgaactcc ctgcgagcag aggataccgc cgtttactat tgtgctcgca
ctgtcccagg ttatagcact gcaccctact ttgatctgtg ggggcagggc
actctggtca ccgtctcgtc c

Figure 1Y (signal sequences underlined and italicised)

Rat Ab 1548 VL region (alternative sequence to SEQ ID NO: 58) SEQ ID NO: 81
DVVMTQTPLS LSVAIGQPAS ISSKSSQSLV GAGGKTYLYW LLQRSGQSPK
RLIYLVSTLD SGIPDRFSGS GAETDFTLKI RRVEADDLGV YYCLQGTHFP
HTFGAGTNLE IK

Rat Ab 1548 VL region (alternative sequence to SEQ ID NO: 59) SEQ ID NO: 82
gatgttgtga tgacccagac tccactgtct ttgtcggttg ccattggaca
accagcctcc atctcttcta agtcaagtca gagcctcgta ggtgctggtg
gaaagacata tttgtattgg ttattacaga ggtccggcca gtctccaaag
cgactaatct atctggtgtc cacactggac tctggaattc ctgataggtt
cagtggcagt ggagcagaga cagattttac tcttaaaatc cgcagagtgg
aagccgatga tttgggagtt tattactgct tgcaaggtac acattttcct
cacacgtttg gagctgggac caacctggaa ataaaa

Rat Ab 1548 VH region (alternative sequence to SEQ ID NO: 60) SEQ ID NO: 83
EVPLVESGGG SVQPGRSMKL SCVVSGFTFS NYGMVWVRQA PKKGLEWVAY
IGSDGDNTYY RDSVKGRFTI SRNNAKSTLY LQMDSLRSED TATYYCTTGI
VRPFLYWGQG VMVTVS

Rat Ab 1548 VH region (alternative sequence to SEQ IS NO: 61) SEQ ID NO: 84
gaggtgccgc tggtggagtc tgggggcggc tcagtgcagc ctgggaggtc
catgaaactc tcctgtgtag tctcaggatt cactttcagt aactatggca
tggtctgggt ccgccaggct ccaaagaagg gtctggagtg ggtcgcatat
attggttctg atggtgataa tacttactac cgagattccg tgaagggccg
attcactatc tccagaaata atgcaaaaag caccctatat ttgcaaatgg
acagtctgag gtctgaggac acggccactt attactgtac aacagggatt
gtccggccct ttctctactg gggccaagga gtcatggtca cagtctcg

Figure 1Z

1519gH20 IgG1 heavy chain (V + human gamma-1 constant, exons underlined one base change to SEQ ID NO: 71) SEQ ID NO: 85

gaggtaccac ttgtggaaag cggaggaggt cttgtgcagc ctggaggaag tttacgtctc
tcttgtgctg tgtctggctt caccttctcc aattacggaa tggtctgggt cagacaagca
cctggaaagg gtcttgaatg ggtggcctat attgactctg acggggacaa cacctactat
cgggattccg tgaaaggacg cttcacaatc tcccgagata acgccaagag ctcactgtac
ctgcagatga atagcctgag agccgaggat actgccgtgt actattgcac aacgggaatc
gttaggcctt ttctgtactg gggacagggc accttggtta ctgtctcgag cgcttctaca
aagggcccat cggtcttccc cctggcaccc tcctccaaga gcacctctgg gggcacagcg
gccctgggct gcctggtcaa ggactacttc cccgaaccgg tgacggtgtc gtggaactca
ggcgccctga ccagcggcgt gcacaccttc ccggctgtcc tacagtcctc aggactctac
tccctcagca gcgtggtgac cgtgccctcc agcagcttgg gcacccagac ctacatctgc
aacgtgaatc acaagcccag caacaccaag gtggacaaga aagttggtga gaggccagca
cagggaggga gggtgtctgc tggaagccag gctcagcgct cctgcctgga cgcatcccgg
ctatgcagcc ccagtccagg gcagcaaggc aggccccgtc tgcctcttca cccggaggcc
tctgcccgcc ccactcatgc tcagggagag ggtcttctgg ctttttcccc aggctctggg
caggcacagg ctaggtgccc ctaacccagg ccctgcacac aaaggggcag gtgctgggct
cagacctgcc aagagccata tccgggagga ccctgcccct gacctaagcc caccccaaag
gccaaactct ccactccctc agctcggaca ccttctctcc tcccagatct gagtaactcc
caatcttctc tctgcagagc ccaaatcttg tgacaaaact cacacatgcc caccgtgccc
aggtaagcca gcccaggcct cgccctccag ctcaaggcgg gacaggtgcc ctagagtagc
ctgcatccag ggacaggccc cagccgggtg ctgacacgtc cacctccatc tcttcctcag
cacctgaact cctgggggga ccgtcagtct tcctcttccc cccaaaaccc aaggacaccc
tcatgatctc ccggaccccc gaggtcacat gcgtggtggt ggacgtgagc cacgaagacc
ctgaggtcaa gttcaactgg tacgtggacg gcgtggaggt gcataatgcc aagacaaagc
cgcgggagga gcagtacaac agcacgtacc gtgtggtcag cgtcctcacc gtcctgcacc
aggactggct gaatggcaag gagtacaagt gcaaggtctc caacaaagcc ctcccagccc
ccatcgagaa aaccatctcc aaagccaaag gtgggacccg tggggtgcga gggccacatg
gacagaggcc ggctcggccc accctctgcc ctgagagtga ccgctgtacc aacctctgtc
cctacagggc agccccgaga accacaggtg tacaccctgc ccccatcccg ggatgagctg
accaagaacc aggtcagcct gacctgcctg gtcaaaggct tctatcccag cgacatcgcc
gtggagtggg agagcaatgg gcagccggag aacaactaca agaccacgcc tcccgtgctg
gactccgacg gctccttctt cctctacagc aagctcaccg tggacaagag caggtggcag
caggggaacg tcttctcatg ctccgtgatg catgaggctc tgcacaacca ctacacgcag
aagagcctct ccctgtctcc gggtaaa

Figure 1AA

1519gH20 IgG1 heavy chain (V + human gamma-1 constant) with signal sequence underlined and italicized (one base change from SEQ ID NO:72) SEQ ID NO:86

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tgtgctgtgt ctggcttcac cttctccaat tacggaatgg tctgggtcag acaagcacct
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tccgacggct ccttcttcct ctacagcaag ctcaccgtgg acaagagcag gtggcagcag
gggaacgtct tctcatgctc cgtgatgcat gaggctctgc acaaccacta cacgcagaag
agcctctccc tgtctccgggtaaa

1519gH20 IgG4 heavy chain (V + human gamma-4 constant no P mutations) SEQ ID NO:87

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VRPFLYWGQG TLVTVSSAST KGPSVFPLAP CSRSTSESTA ALGCLVKDYF
PEPVTVSWNS GALTSGVHTF PAVLQSSGLY SLSSVVTVPS SSLGTKTYTC
NVDHKPSNTK VDKRVESKYG PPCPSCPAPE FLGGPSVFLF PPKPKDTLMI
SRTPEVTCVV VDVSQEDPEV QFNWYVDGVE VHNAKTKPRE EQFNSTYRVV
SVLTVLHQDW LNGKEYKCKV SNKGLPSSIE KTISKAKGQP REPQVYTLPP
SQEEMTKNQV SLTCLVKGFY PSDIAVEWES NGQPENNYKT TPPVLDSDGS
FFLYSRLTVD KSRWQEGNVF SCSVMHEALH NHYTQKSLSL SLGK

Figure 1BB

1519gH20 IgG4 heavy chain (V + human gamma-4 constant, exons underlined no P mutations) SEQ ID NO:88

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cttcacaatc tcccgagata acgccaagag ctcactgtac ctgcagatga
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Figure 1CC

1519gH20 IgG4 heavy chain (V + human gamma-4 constant) with signal sequence underlined and italicised– no P mutation SEQ ID NO:89

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Figure 1DD

1519 gL20 V-region (mammalian expression alternative to SEQ ID NO: 17) SEQ ID NO:90

```
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gcaagaccta cctgtactgg ctgttccaga agcccggcaa ggcccccaag
cggctgatct acctggtgtc taccctggac tccggcatcc cctcccggtt
ctccggctct ggctctggca ccgagttcac cctgaccatc tccagcctgc
agcccgagga cttcgccacc tactactgtc tgcaaggcac ccacttcccc
cacaccttcg gccagggcac caagctggaa atcaag
```

1519 gL20 light chain (V + constant, mammalian expression alternative to SEQ ID NO: 24) SEQ ID NO:91

```
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cgagtgc
```

Figure 1EE

1519 gH20 V-region (mammalian expression alternative to SEQ ID NO: 31) SEQ ID NO:92

```
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tggtctgggt ccgacaggct cctggcaagg gactggaatg ggtggcctac
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gttcaccatc tcccgggaca acgccaagtc ctccctgtac ctgcagatga
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gtgcggccct ttctgtactg gggccagggc accctggtca ccgtgtcc
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Figure 1FF

1519gH20 IgG4 heavy chain (V + human gamma-4P constant alternative to SEQ ID NO: 44) SEQ ID NO:93

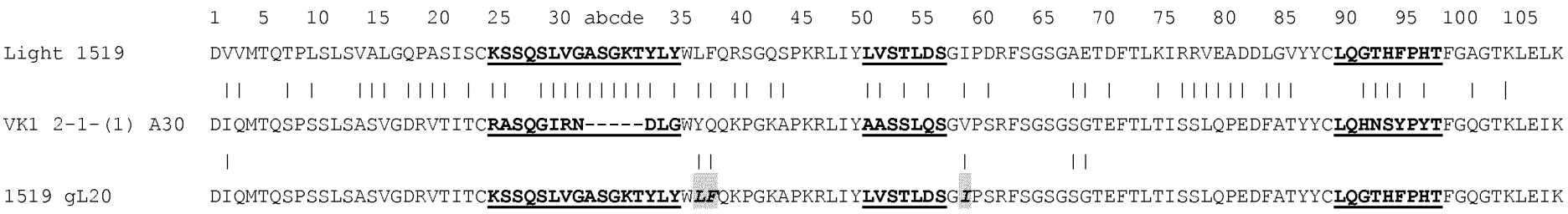
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ttcttcctgt actctcggct gaccgtggac aagtcccggt ggcaggaagg
caacgtcttc tcctgctccg tgatgcacga ggccctgcac aaccactaca
cccagaagtc cctgtccctg agcctgggca ag

Human β2M (SEQ ID NO:95)

IQKTPQIQVYSRHPPENGKPNFLNCYVSQFHPPQIEIELLKNGKKIPNIEMSDLSFSKDWSFYILAHTEFTPTETDVYA
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FIGURE 2A

LIGHT CHAIN Graft 1519



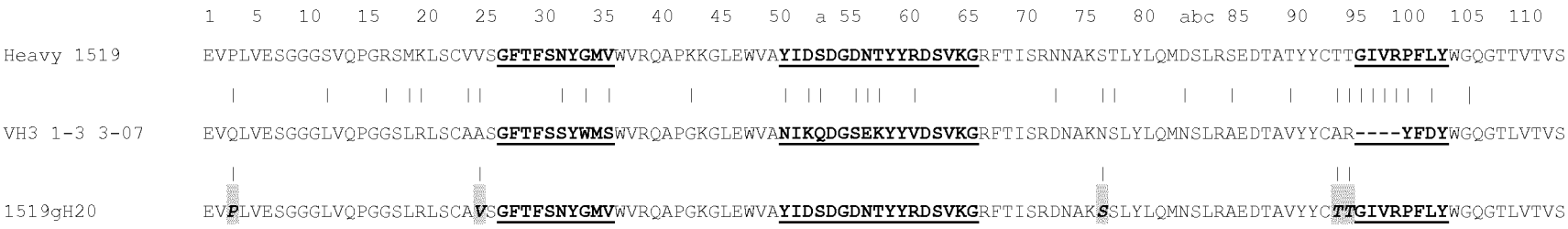
Legend

1519 = Rat variable light chain sequence
1519 gL20 = Humanized graft of 1519 variable light chain using VK1 2-1-(1) A30 human germline as the acceptor framework.

CDRs are shown in bold/underlined
Donor residues are shown in bold/italic and are highlighted: L36, F37 and I58

FIGURE 2B

HEAVY CHAIN Graft 1519



Legend

1519 = Rat variable heavy chain sequence
1519gH20 = Humanized graft of 1519 variable heavy chain using VH3 1-3 3-07 human germline as the acceptor framework.

CDRs are shown in bold/underlined
Donor residues are shown in bold/italic and are highlighted: P3, V24, S76, T93 and T94

FIGURE 3A CA170_01519.g57 Fab' binding on MDCK II clone 34 cells in acidic and neutral pH.

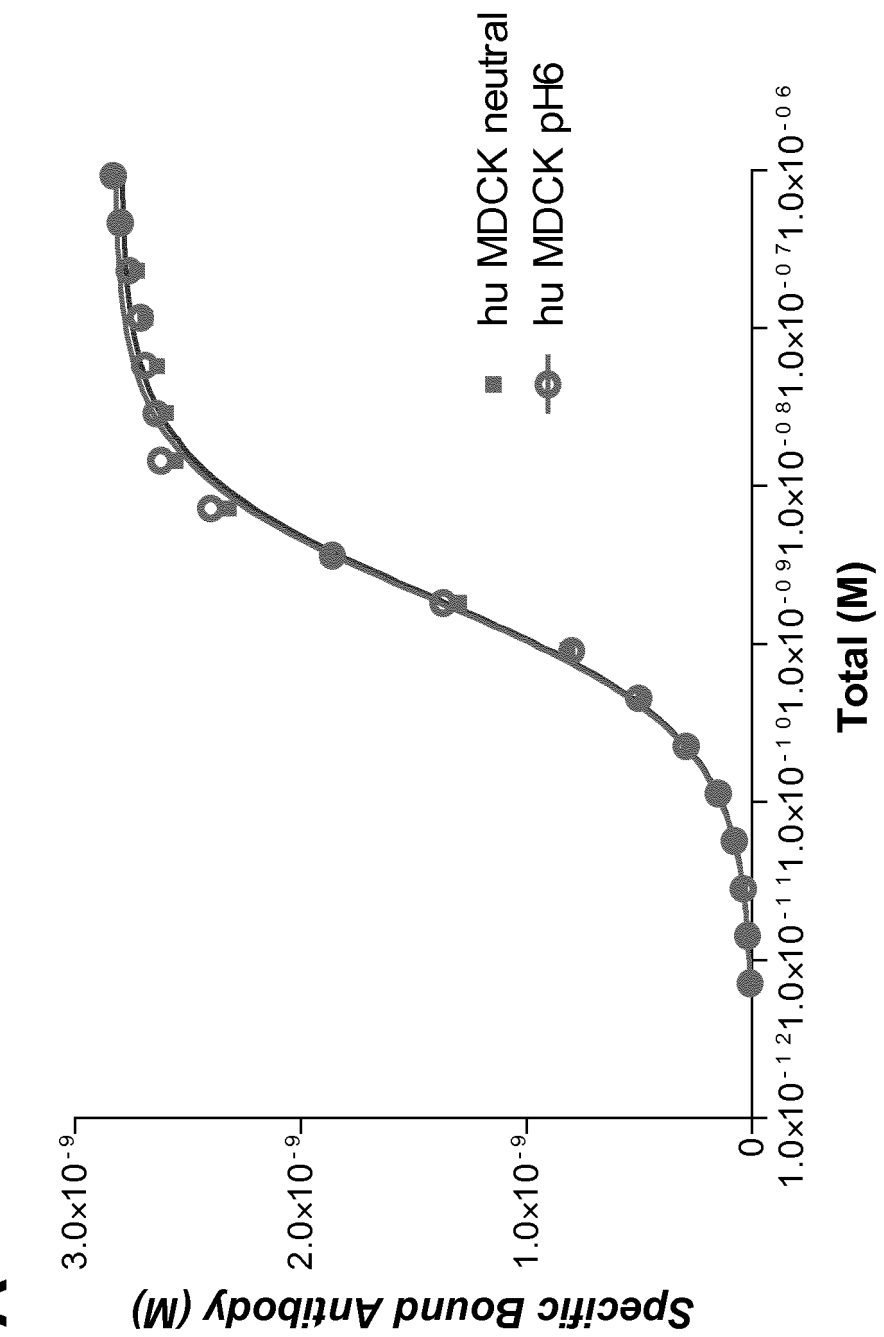


FIGURE 3B CA170_01519.g57 Fab'PEG binding on MDCK II clone 34 cells in acidic and neutral pH.

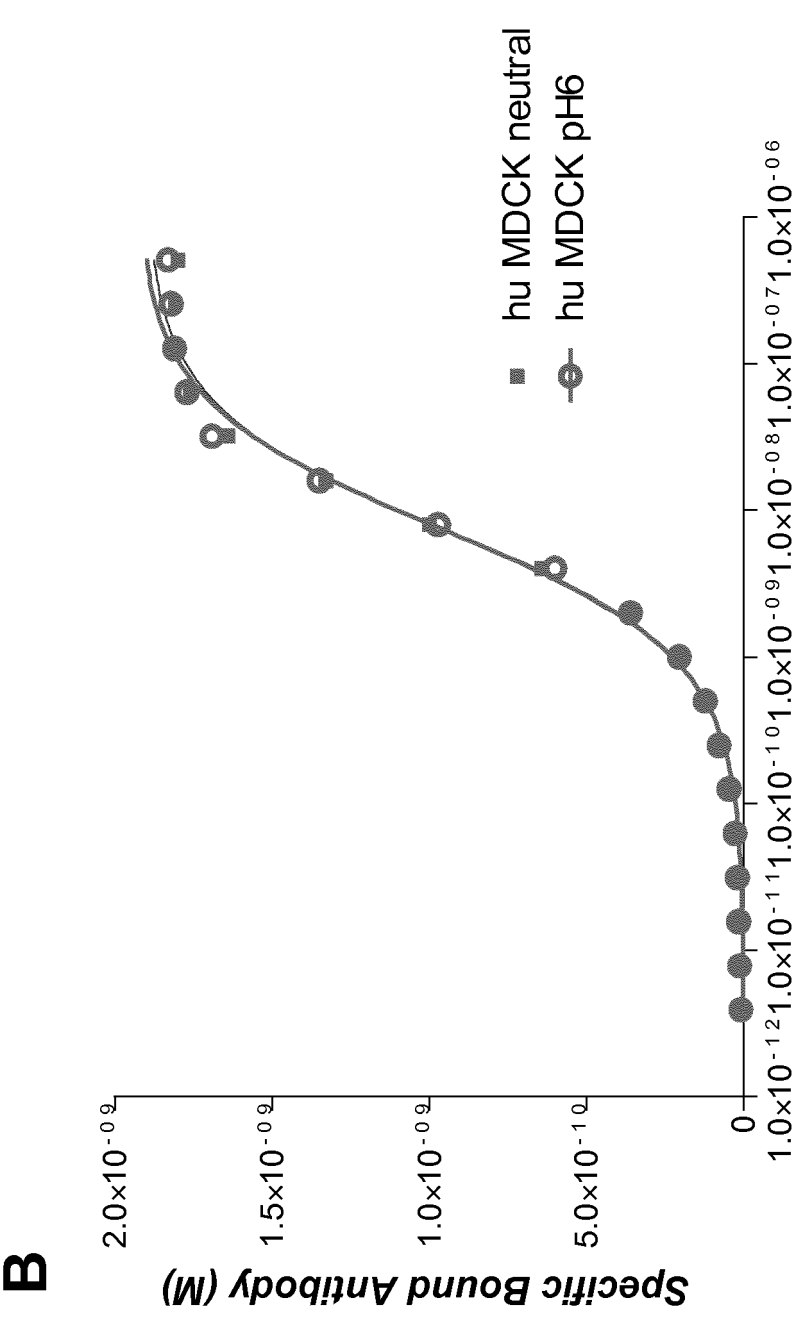
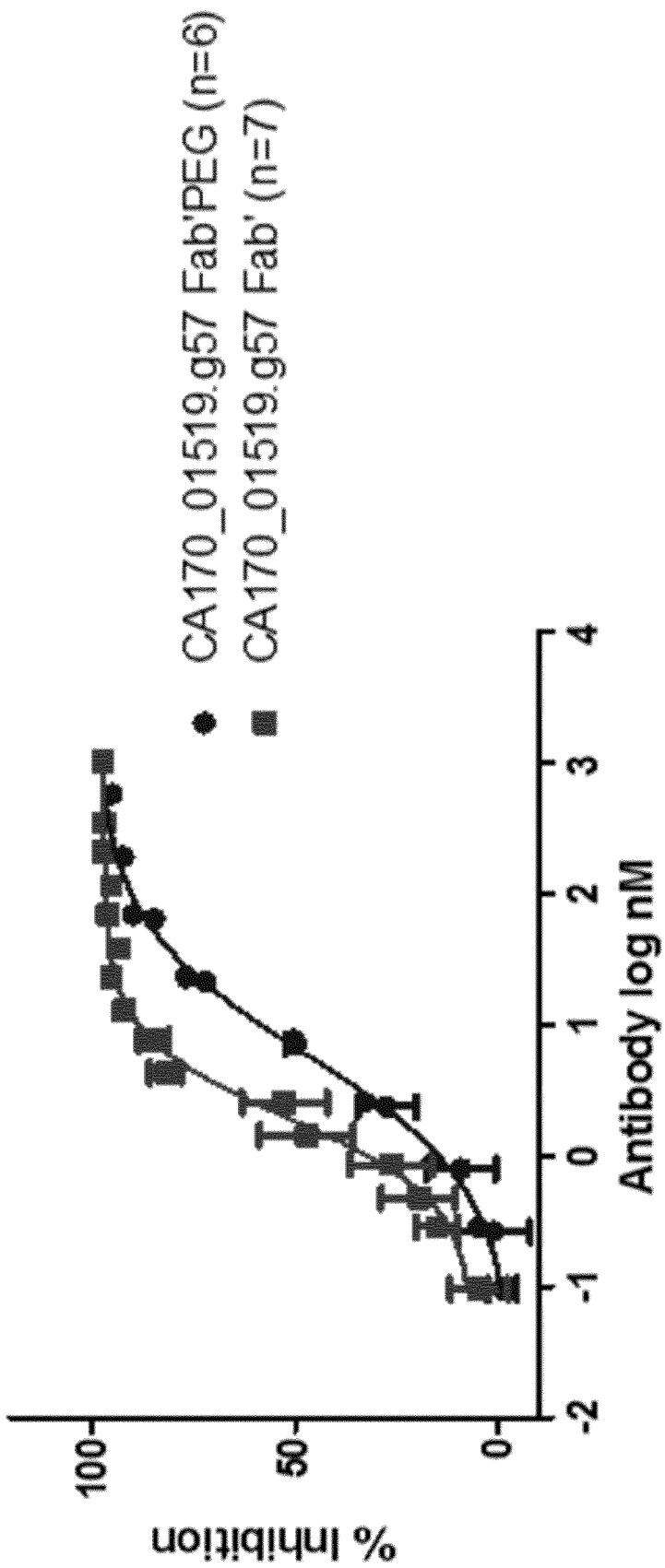


FIGURE 4 CA170_01519.g57 inhibits IgG recycling in MDCK II clone 34 cells



	1519.g57 Fab'PEG (n=6)	1519.g57 Fab' (n=7)
EC50	6.034	1.937
95% CI (nM)	4.614 to 7.891	1.426 to 2.632

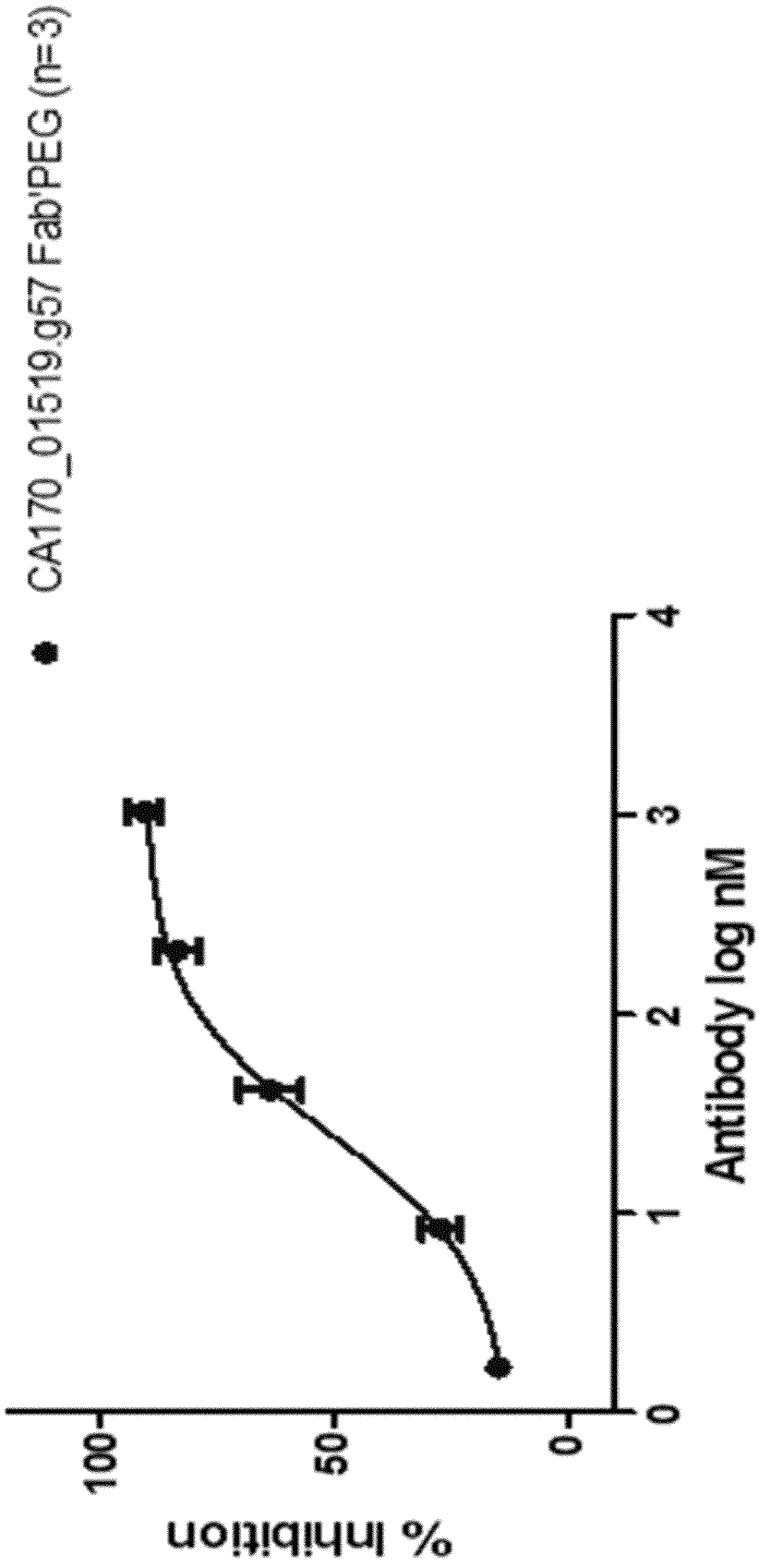


FIGURE 5 CA170_01519.g57 Fab'PEG inhibits apical to basolateral IgG transcytosis in MDCK II clone 34 cells

FIGURE 6A- CA170_01519.g57 Fab' binding on cynomoglus MDCK II (cm) cells in acidic and neutral pH

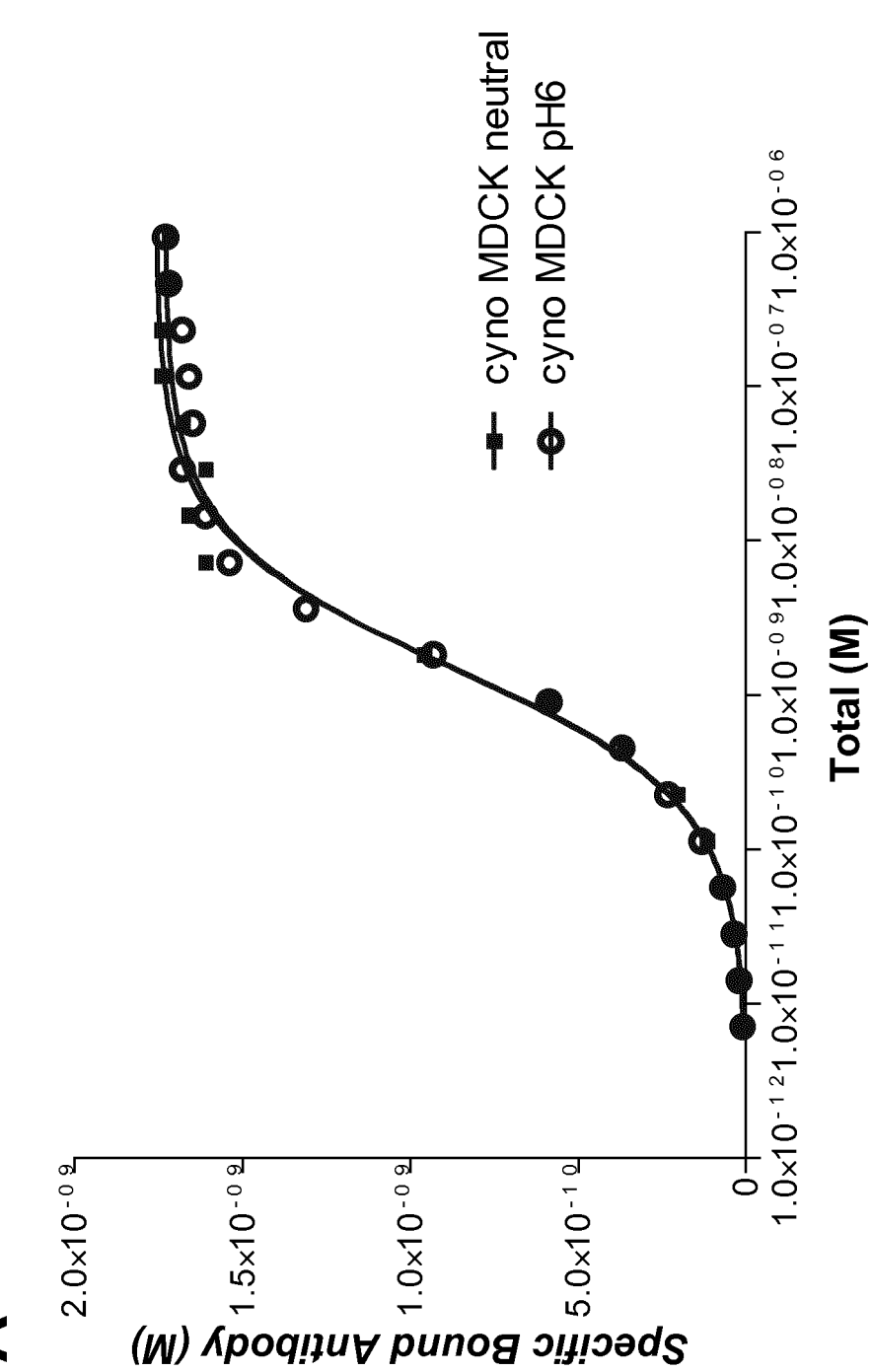


FIGURE 6B - CA170_01519.g57 Fab'PEG binding on cynomoglus MDCK II (cm) cells in acidic and neutral pH

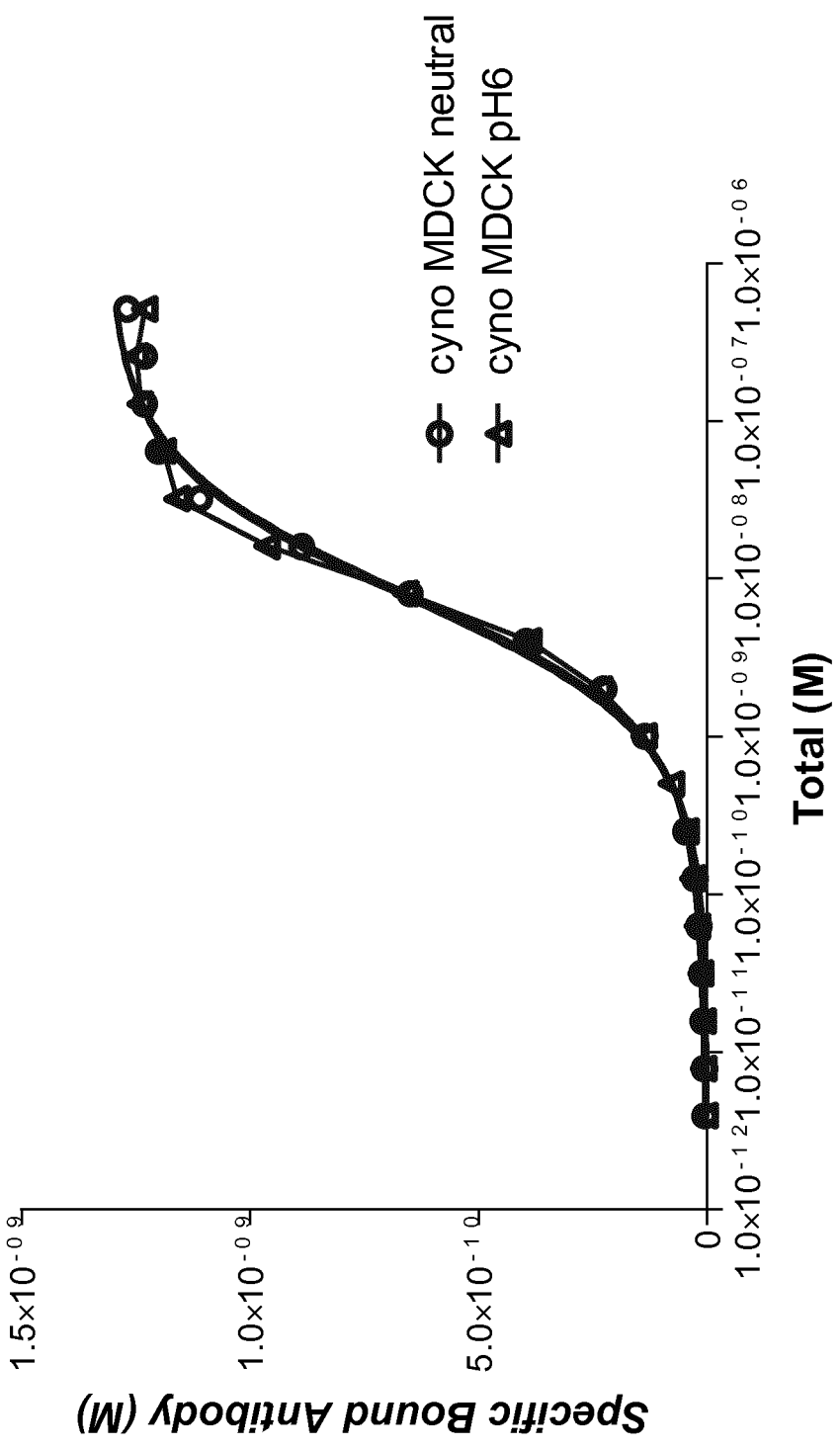


FIGURE 7 CA170_01519.g57 inhibits IgG recycling in human and cynomoglus MDCK II clone 34 cells and MDCK II (cm) cells.

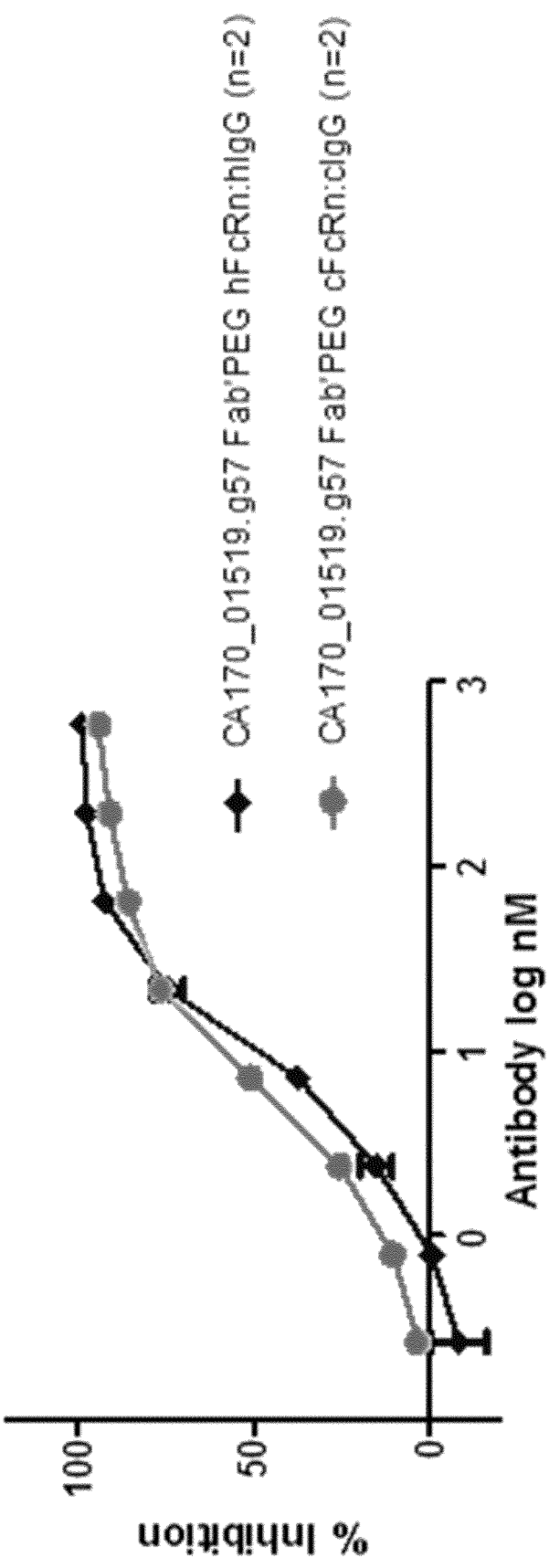


FIGURE 8 Cynomoglus Monkey- single dose of 1519 Fab'PEG on Plasma IgG levels

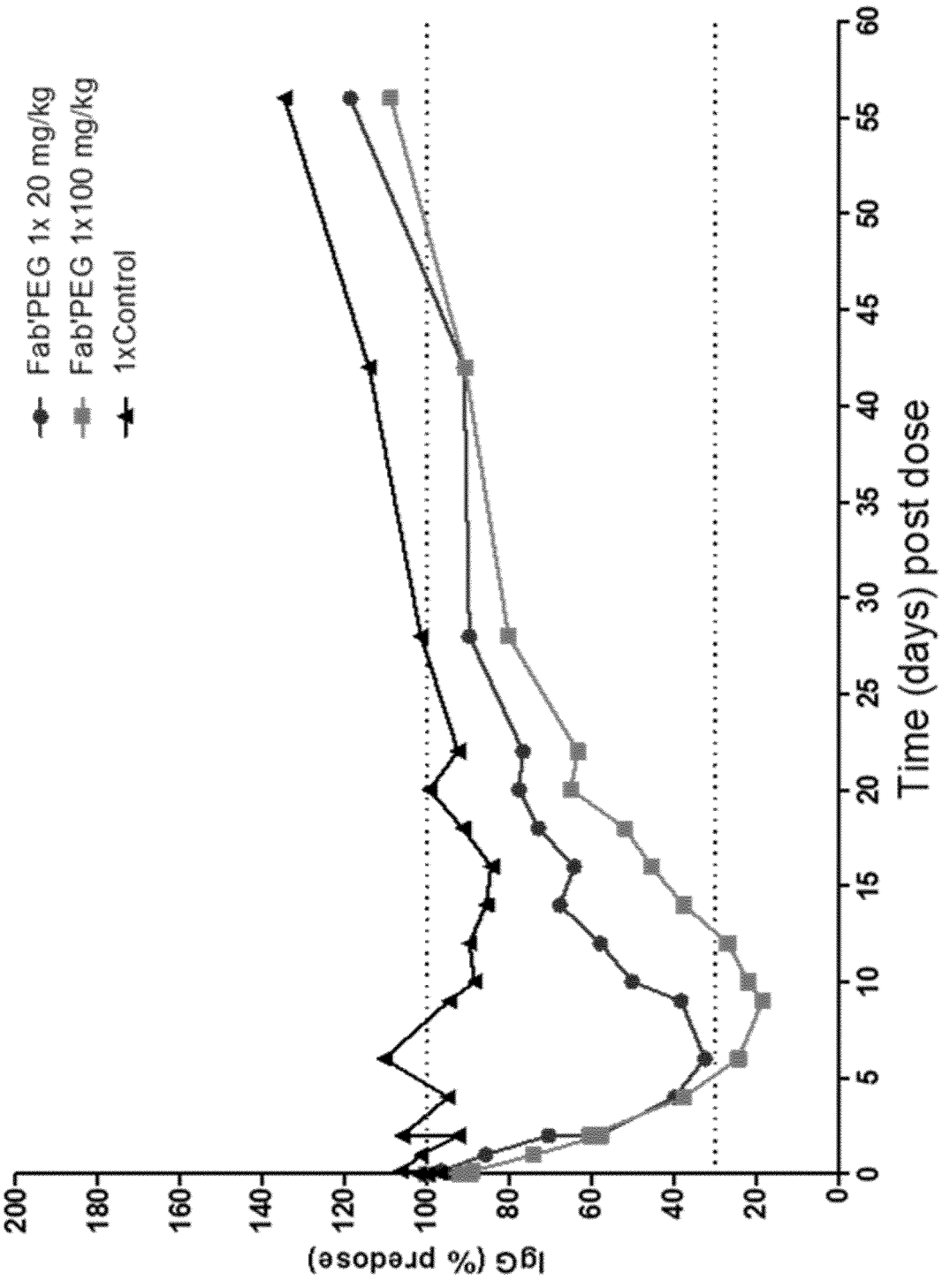
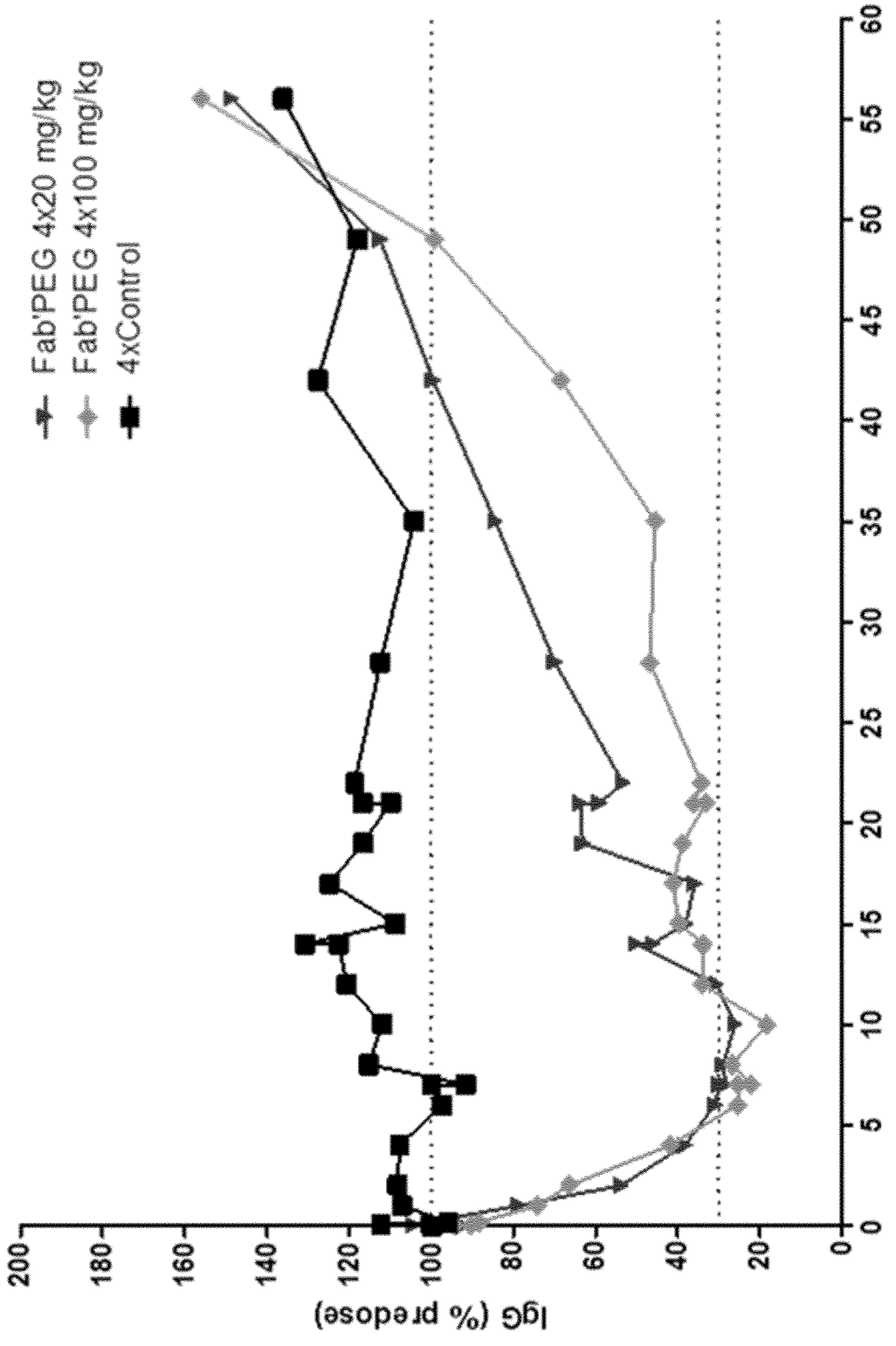


FIGURE 9 Cynomoglus Monkey 4 weekly doses of 1519 Fab'PEG on Plasma IgG Levels



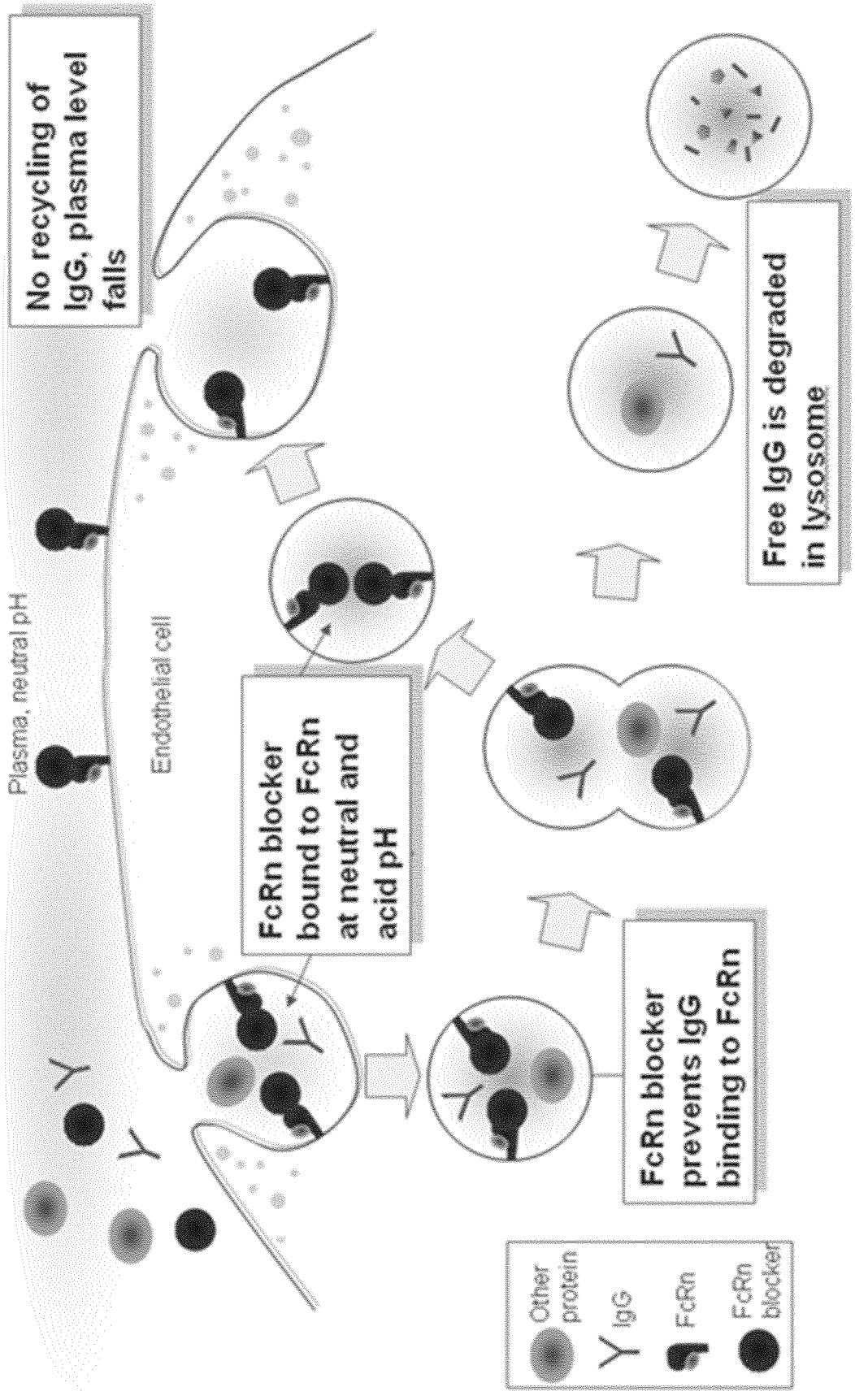

Plasma, neutral pH
Endothelial cell
No recycling of IgG, plasma level falls
FcRn blocker bound to FcRn at neutral and acid pH
FcRn blocker prevents IgG binding to FcRn
Free IgG is degraded in lysosome
Other protein
IgG
FcRn
FcRn blocker

Figure 10

Figure 11 Flow Cytometry based human IgG blocking assay using purified gamma 1 IgG Antibodies

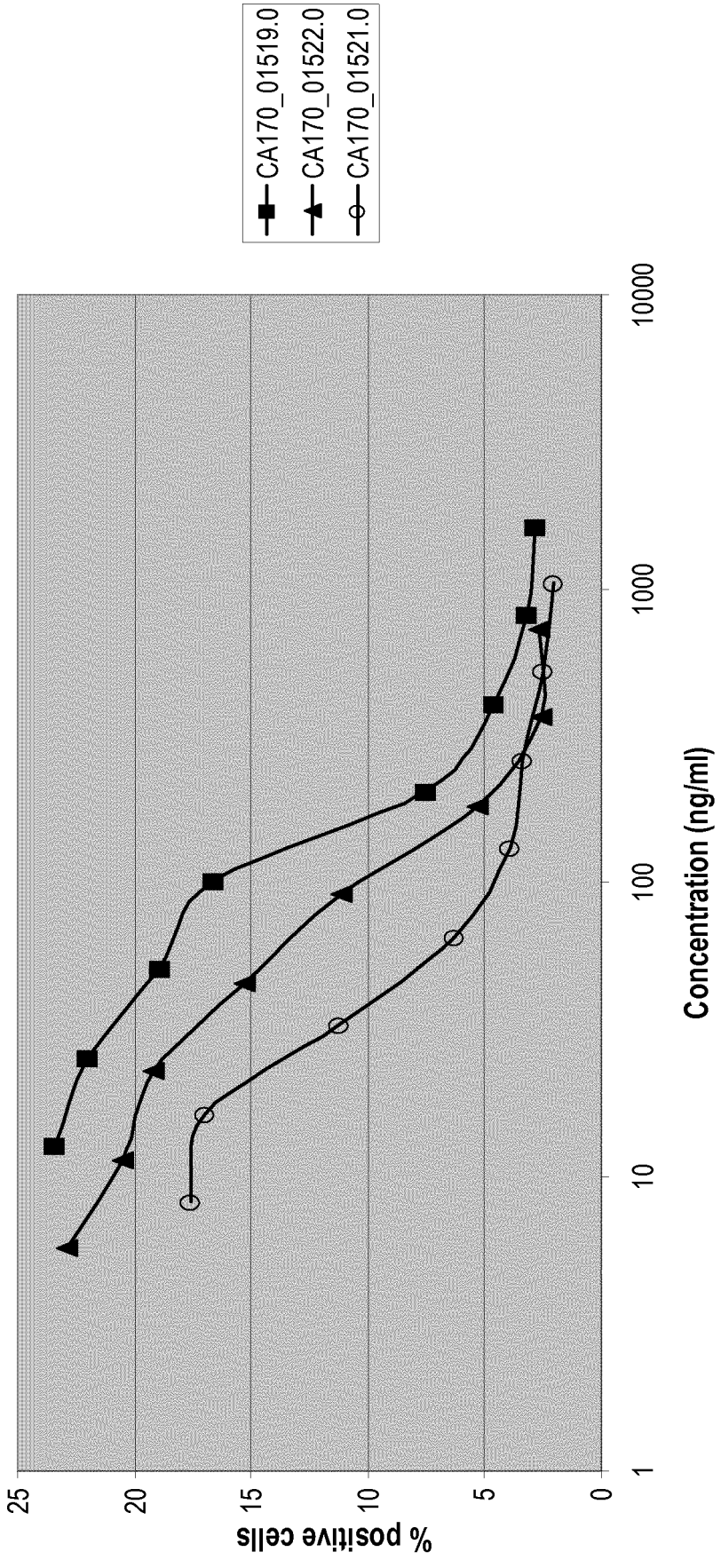


FIGURE 12 **Fab'PEG single/intermittent IV doses in Normal Cyno (4 animals n: 4-7) -1519 Fab'PEG 20mg/Kg days 1 and 67 IgG pharmacodynamics**

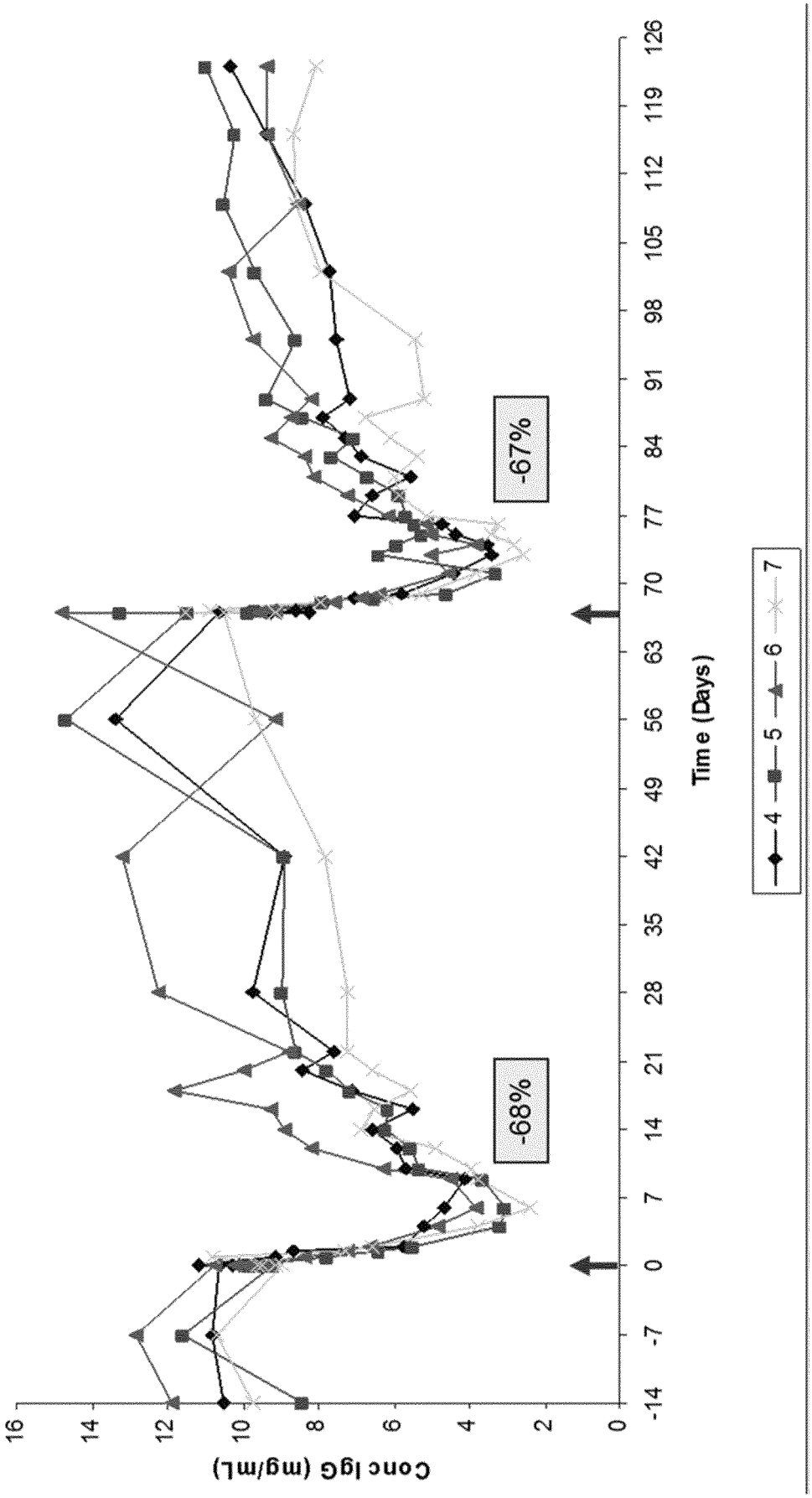


FIGURE 13 Fab'PEG: repeat IV doses in normal cyno- 4x 20 or 100 mg/Kg (top and bottom respectively) per week IgG pharmacodynamics (individual animals)

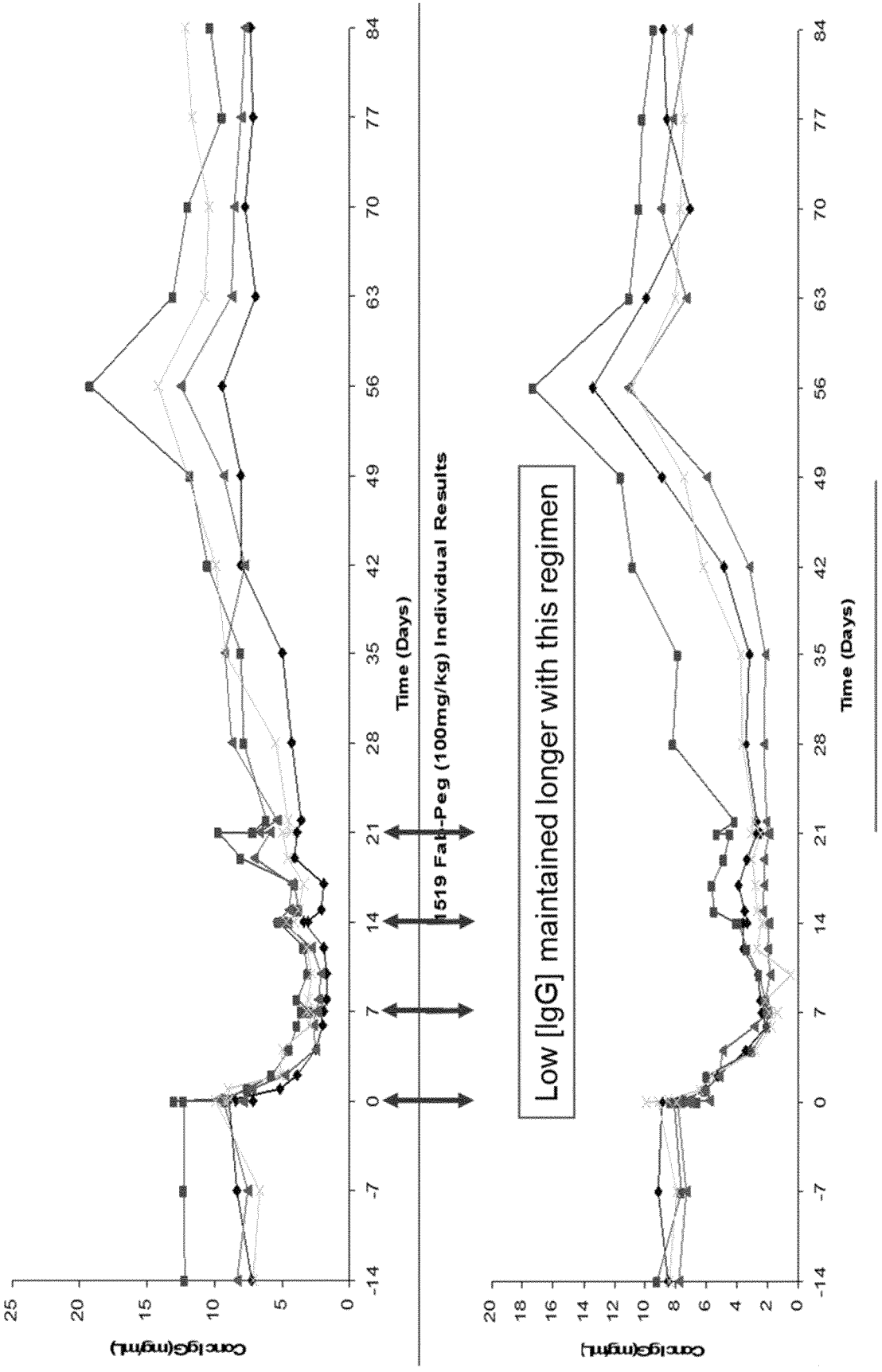


FIGURE 14 Fab'PEG single/intermittent IV doses in normal cyno 20 mg/Kg and 100 mg/Kg days 1 and 67 IgG Pharmacodynamics

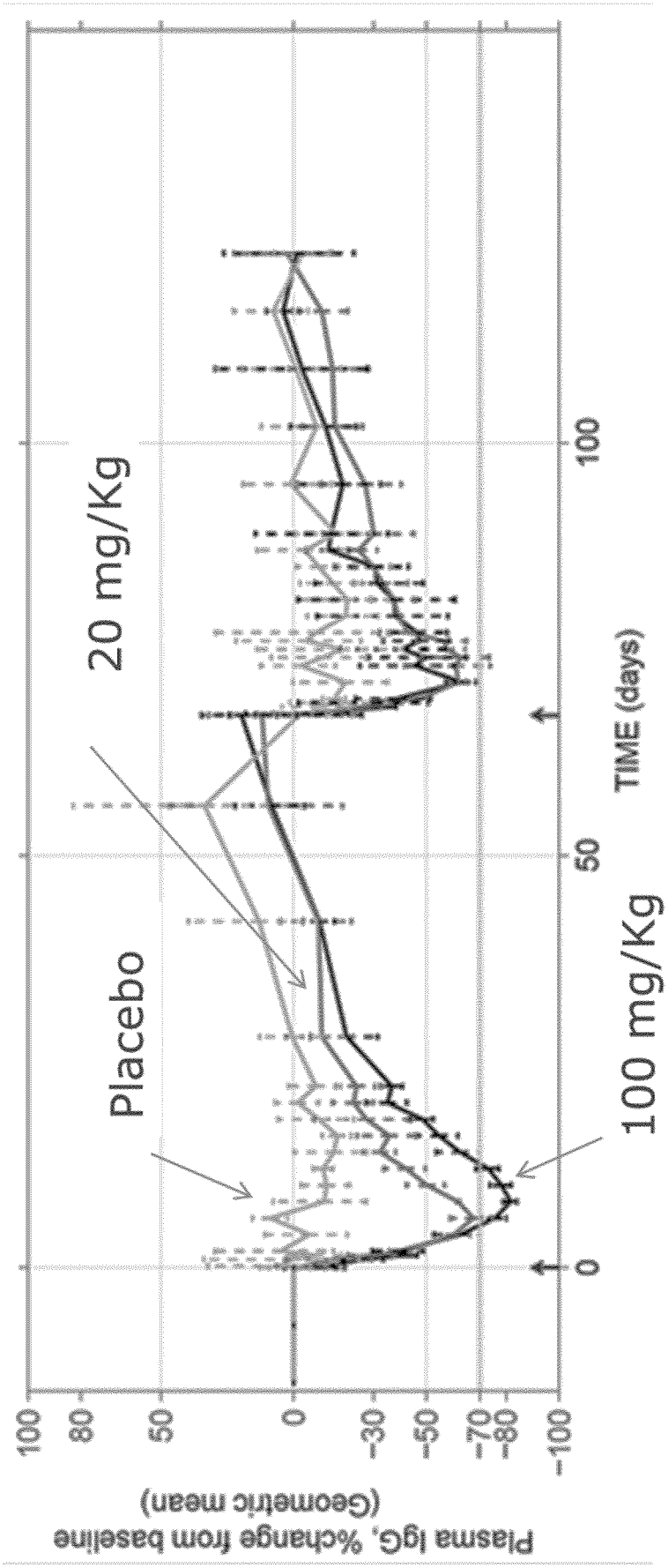


Figure 15 Change in plasma IgG levels in 4 cynomolgus monkeys after 2 IV doses of 20mg/Kg 1519.g57 Fab'PEG

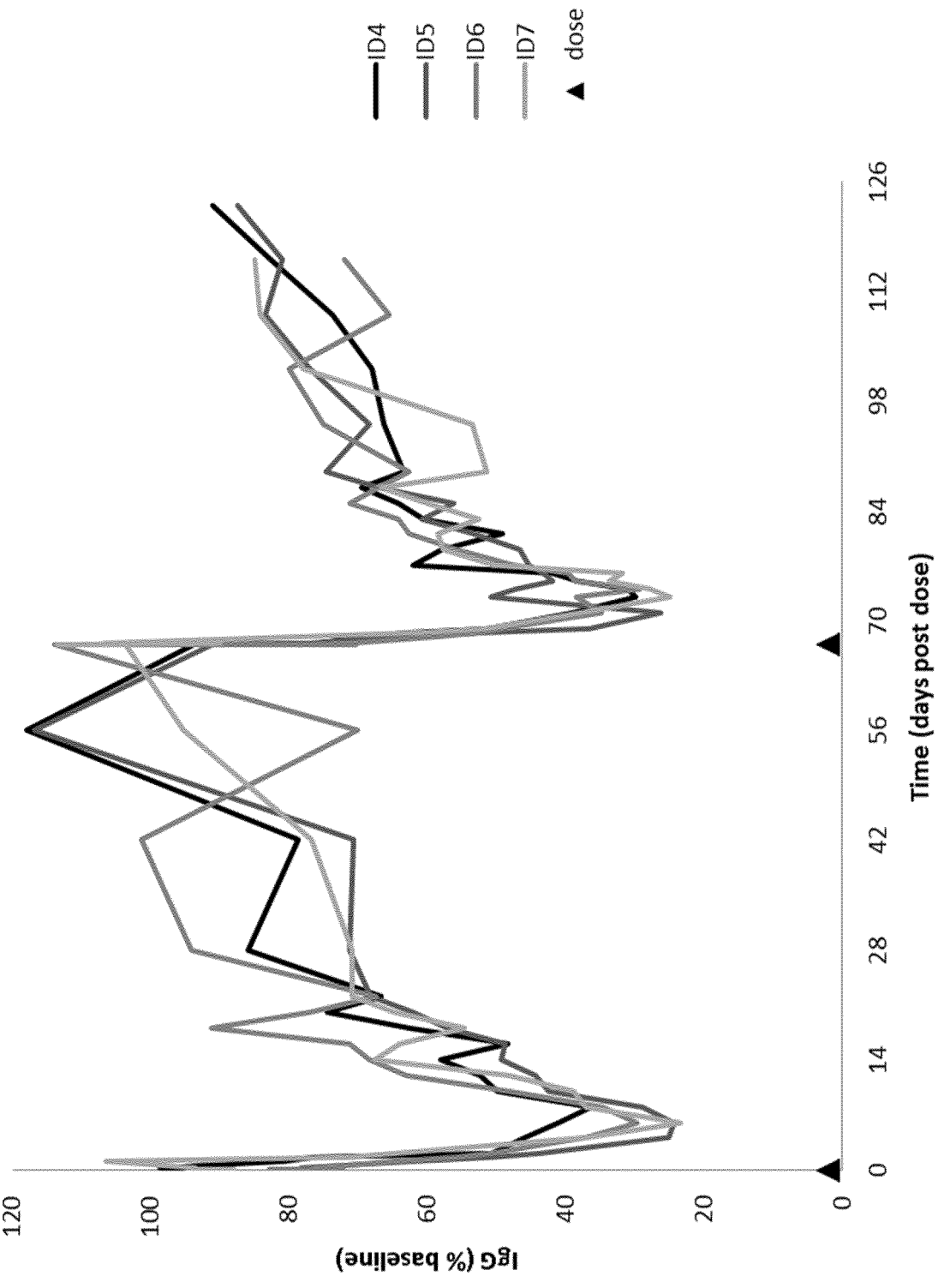


Figure 16 Change in plasma IgG levels in 4 cynomolgus monkeys receiving 10 IV doses of 20mg/Kg 1519.g57 Fab'PEG every 3 days

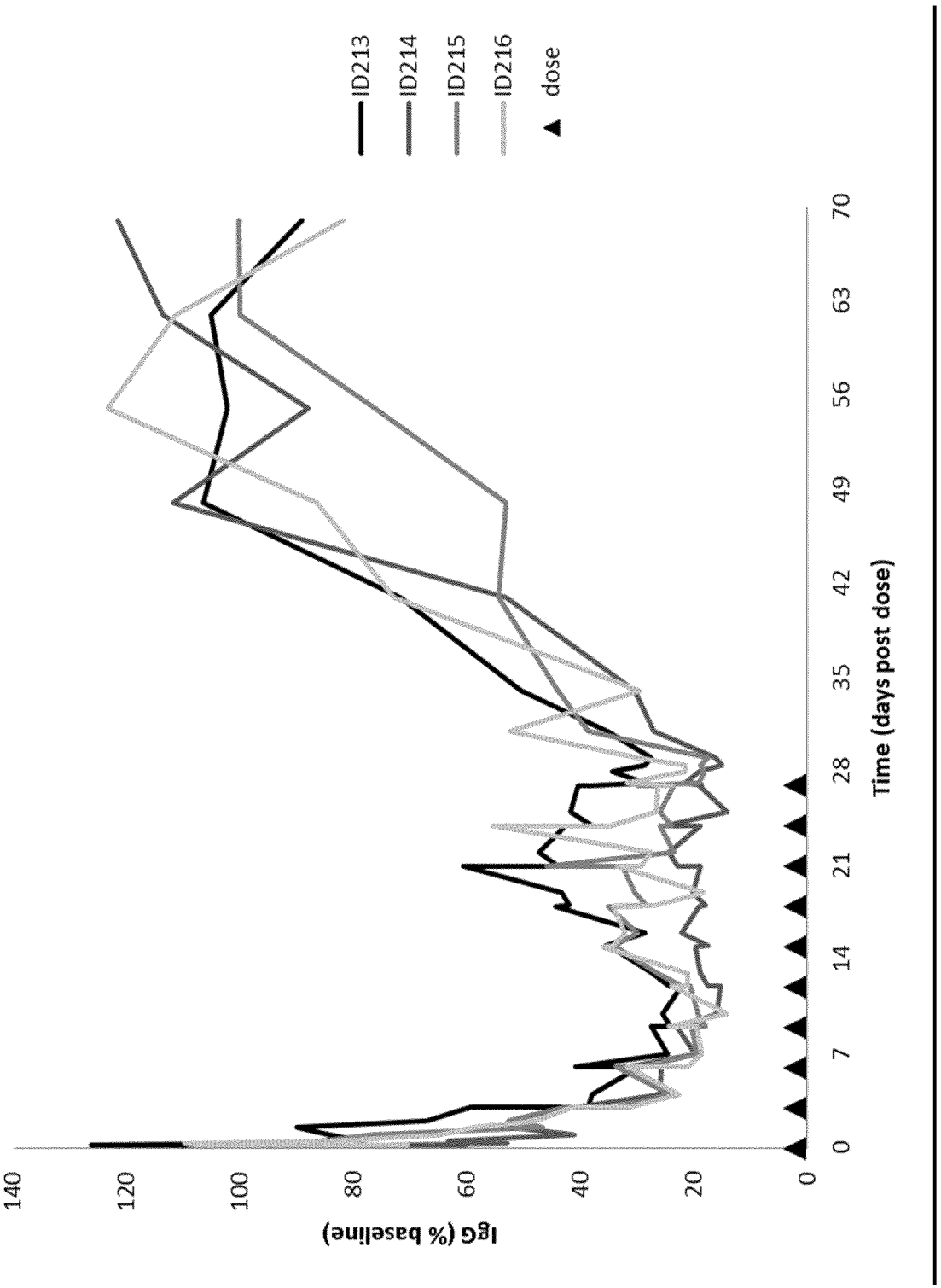


Figure 17 Change in plasma IgG levels in 4 cynomolgus monkeys after 2 IV doses of 30 mg/Kg 1519.g57 IgG4P i.v

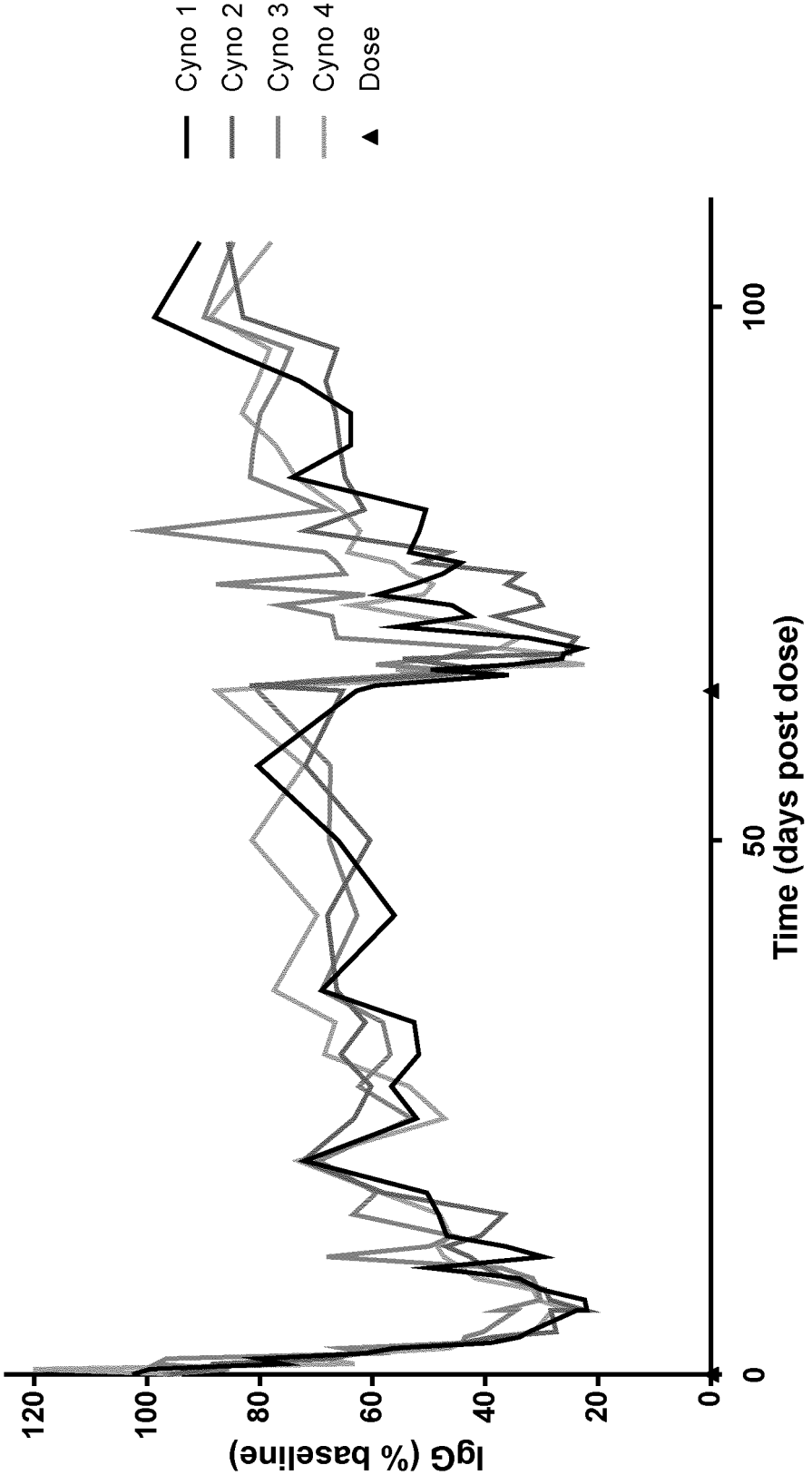


Figure 18 Change in plasma IgG levels in cynomolgus monkeys treated with 30 mg/Kg 1519.g57 IgG4P on day 0 followed by 5mg/Kg 1519.g57 IgG4P daily for 41 days

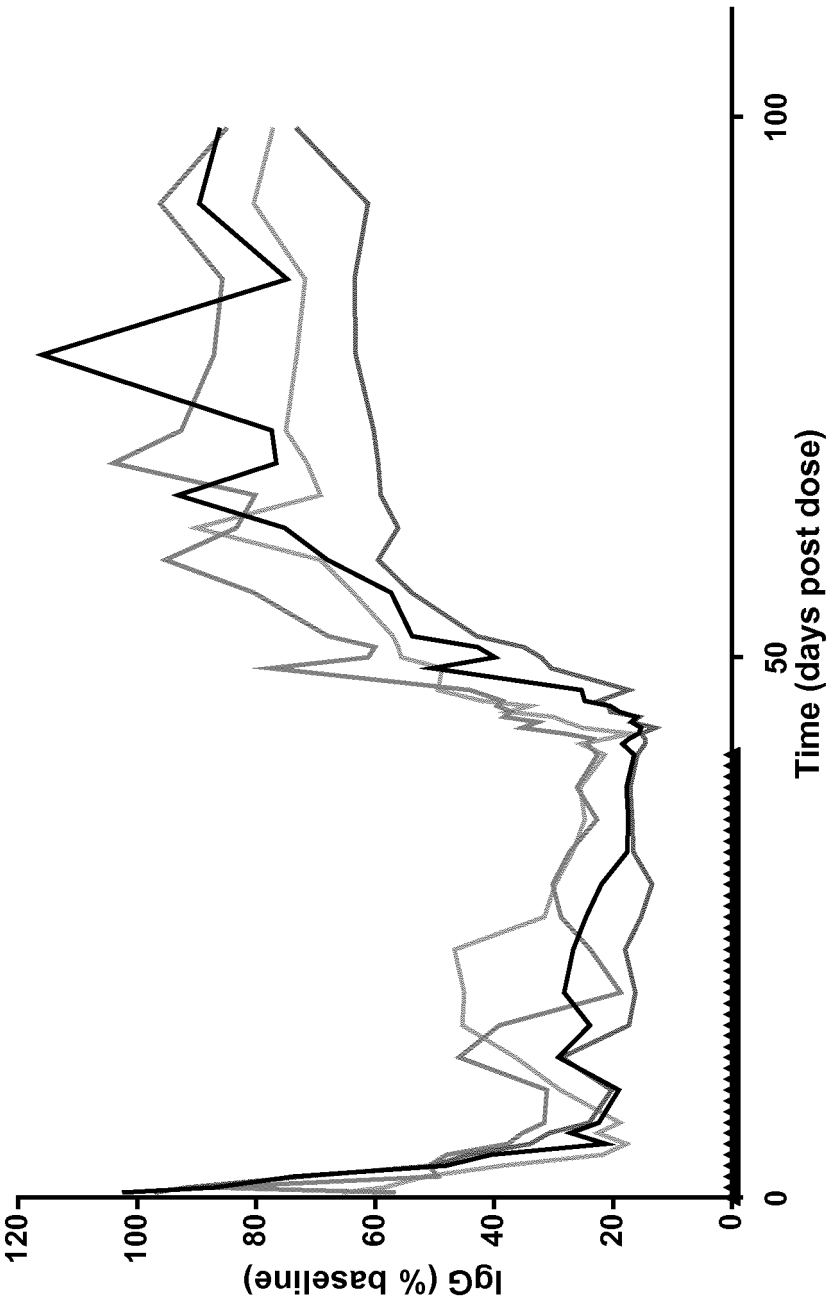


Figure 19 Change in plasma IgG levels in 4 cynomolgus monkeys receiving 42 daily doses of vehicle

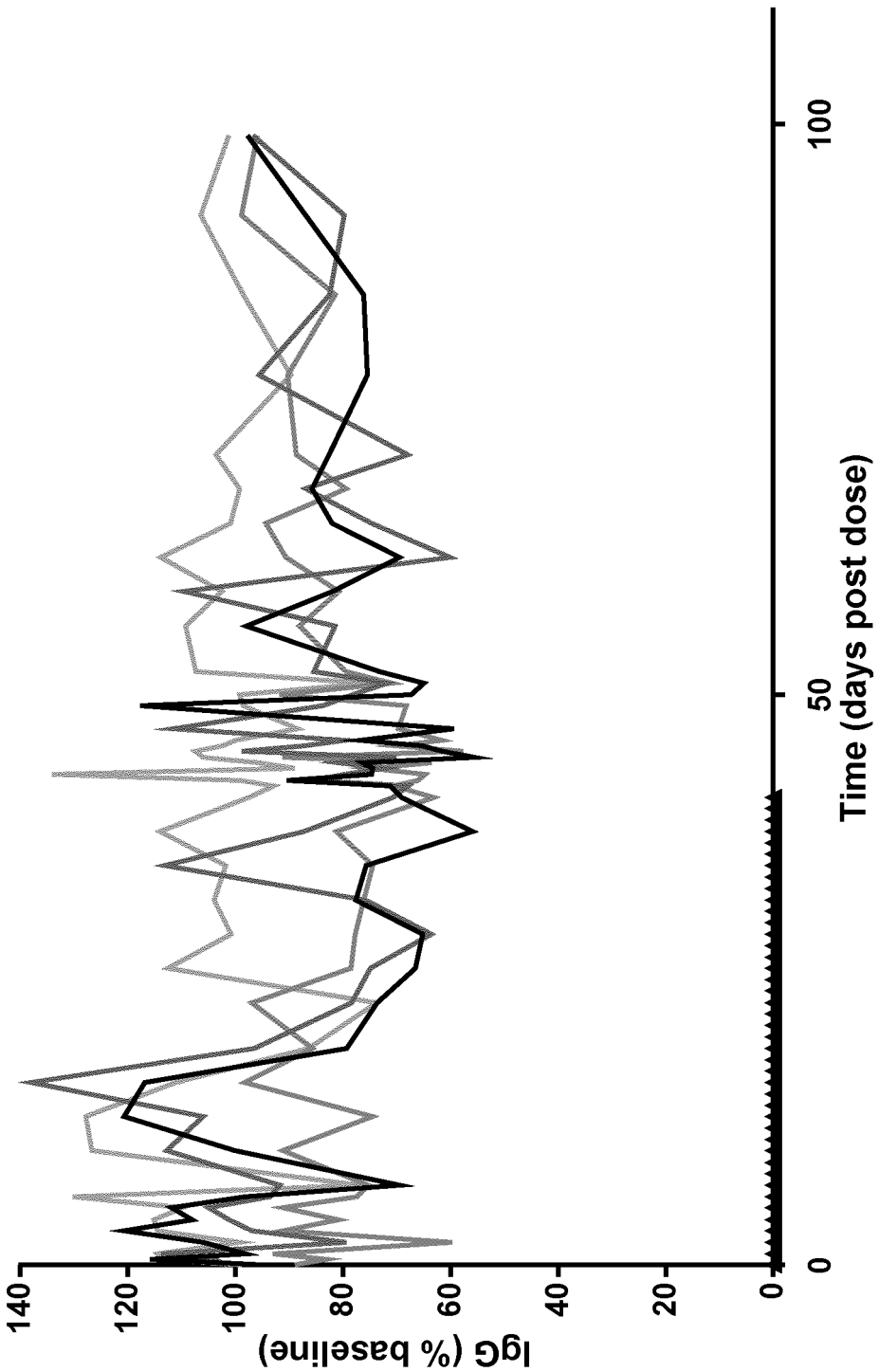


Figure 20 Increased clearance of IV hIgG in plasma of hFcRn transgenic mice treated with CA170_01519.g57 Fab'PEG or PBS IV

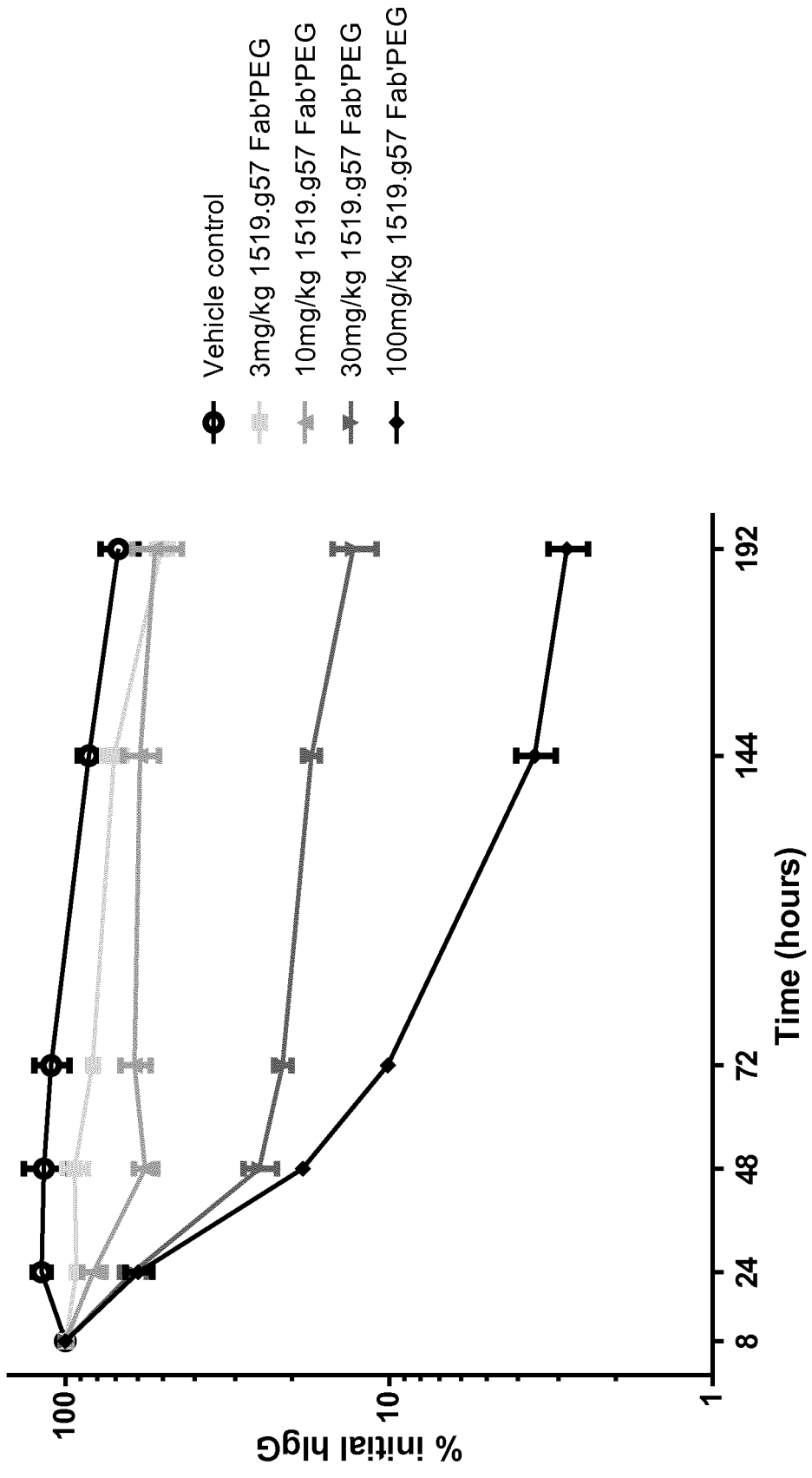


Figure 21 Increased clearance of IV hIgG in plasma of hFcRn transgenic mice treated with CA170_01519.g57 IgG1 or IgG4 or PBS IV

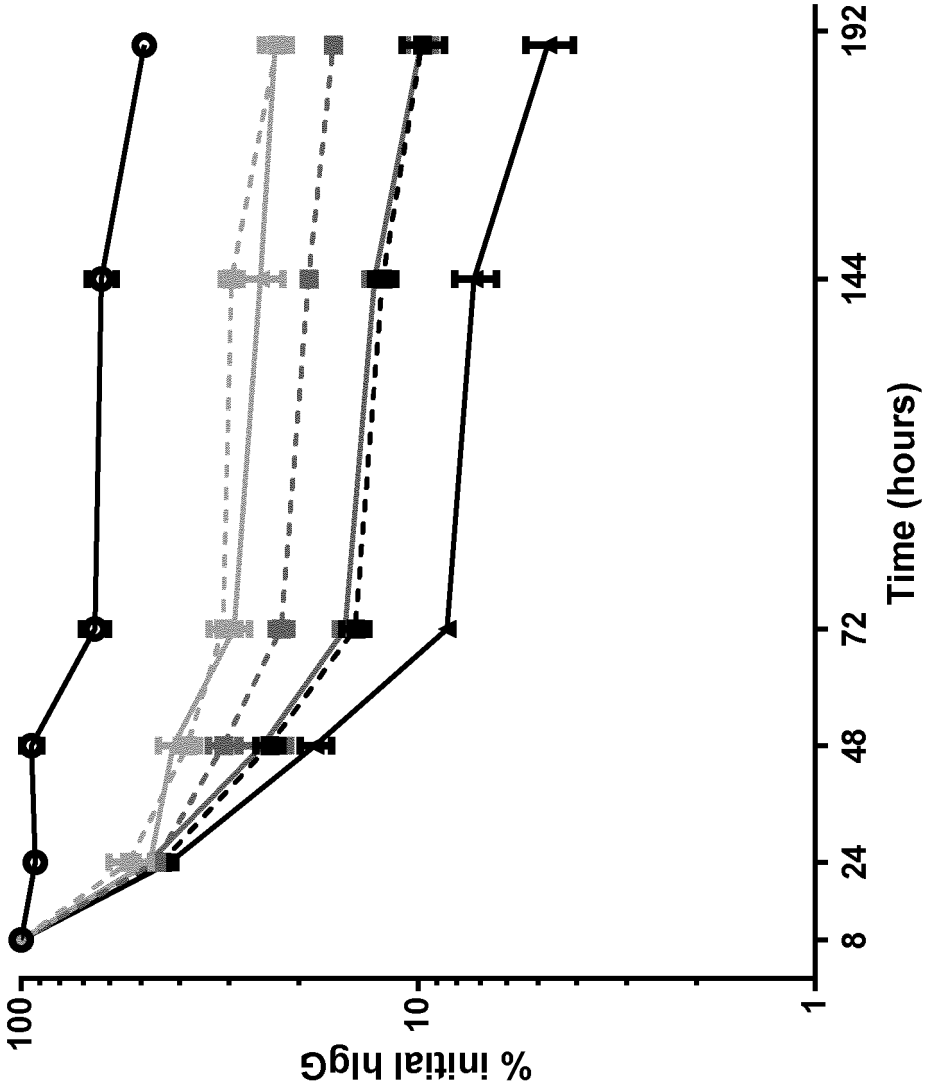


Figure 22 Increased clearance of IV hIgG in plasma of hFcRn transgenic mice treated with CA170_01519.g57 Fab'-human serum albumin or PBS IV

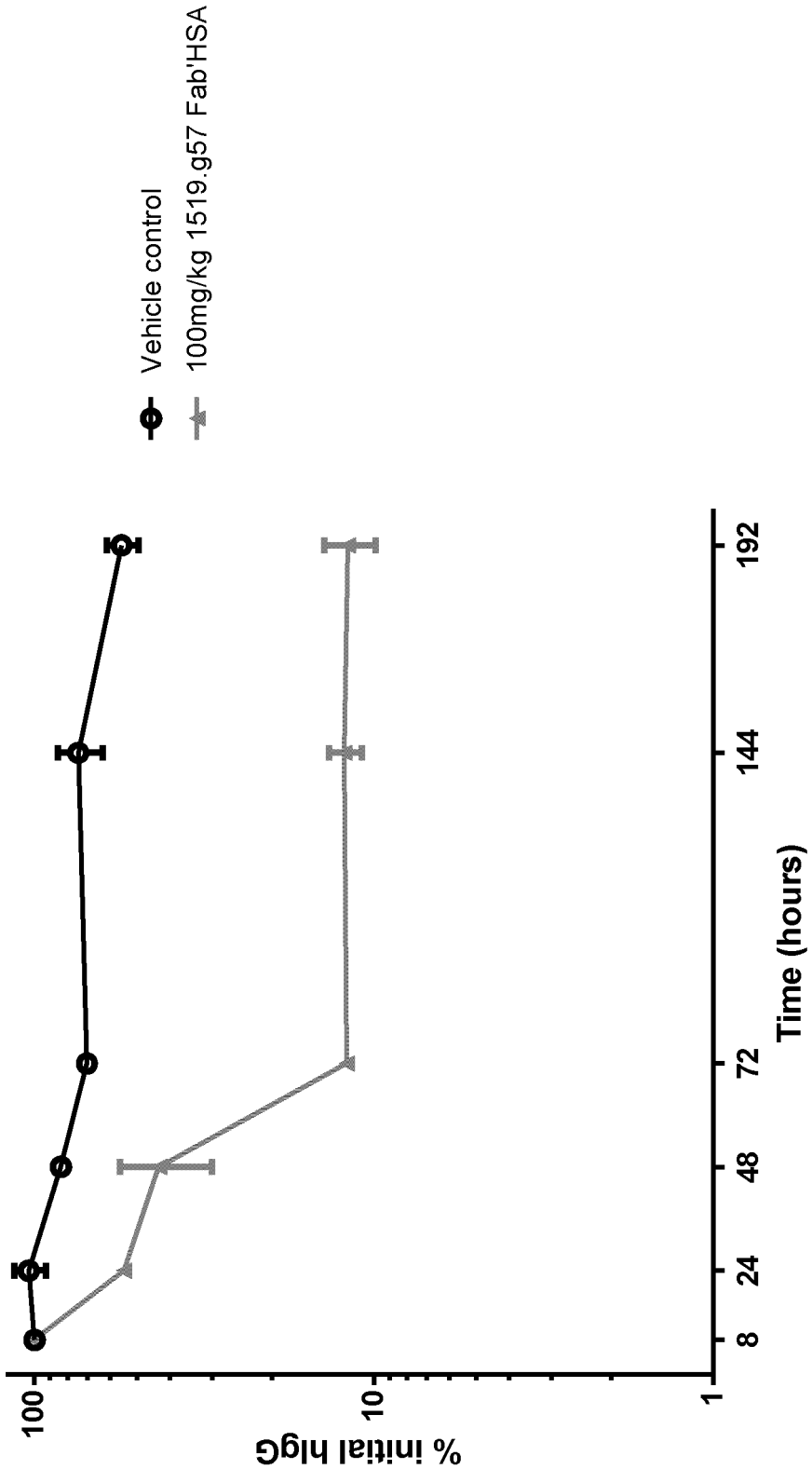


Figure 23 Increased clearance of IV hIgG in plasma of hFcRn transgenic mice treated with CA170_01519.g57 FabFv or PBS IV

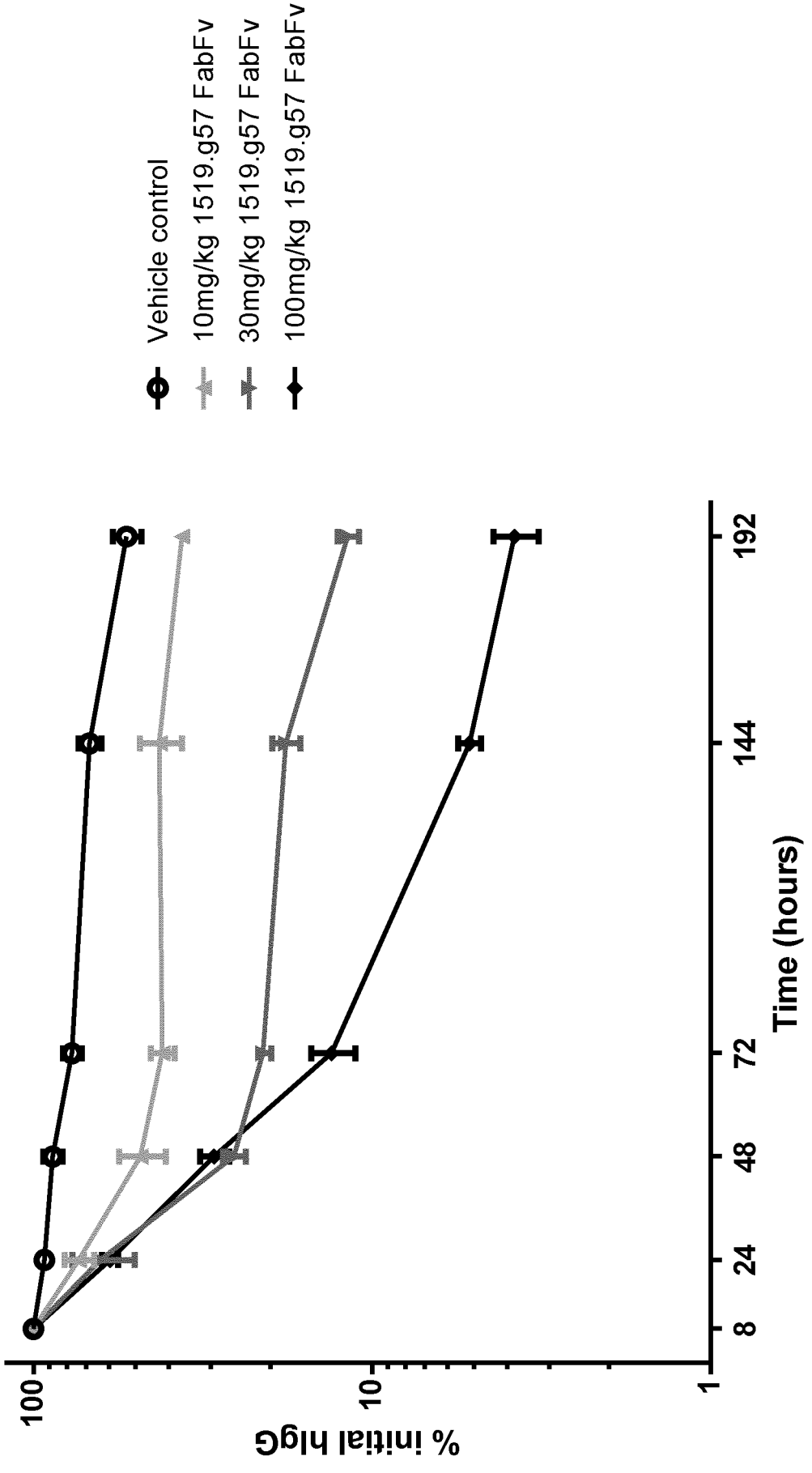


Figure 24 Increased clearance of IV hIgG in plasma of hFcRn transgenic mice treated with CA170_01519.g57 Fab or Fab'PEG or PBS IV

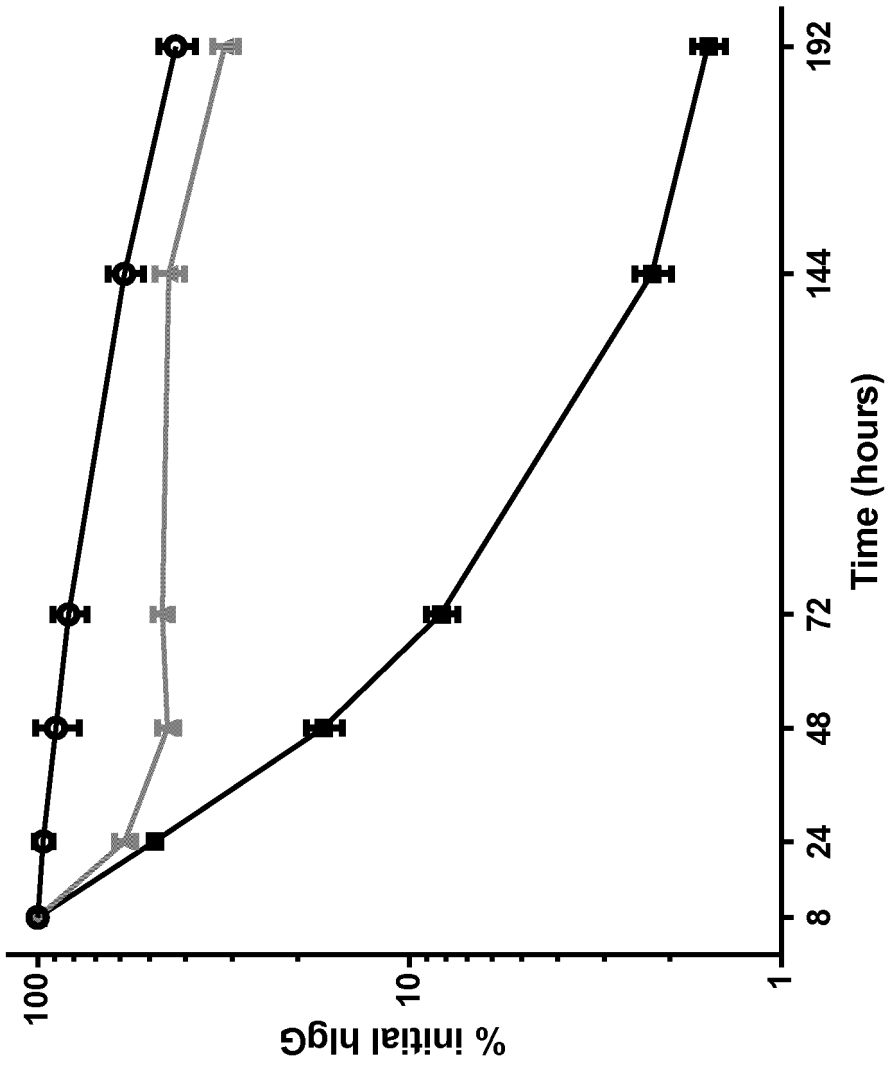


Figure 25

First Variable region of light chain VL1
First Variable region of heavy chain VH1 chain
Constant regions cKappa and CH1
Second variable region of light chain VL2
Second variable region of heavy chain VH2
Disulphide bond