

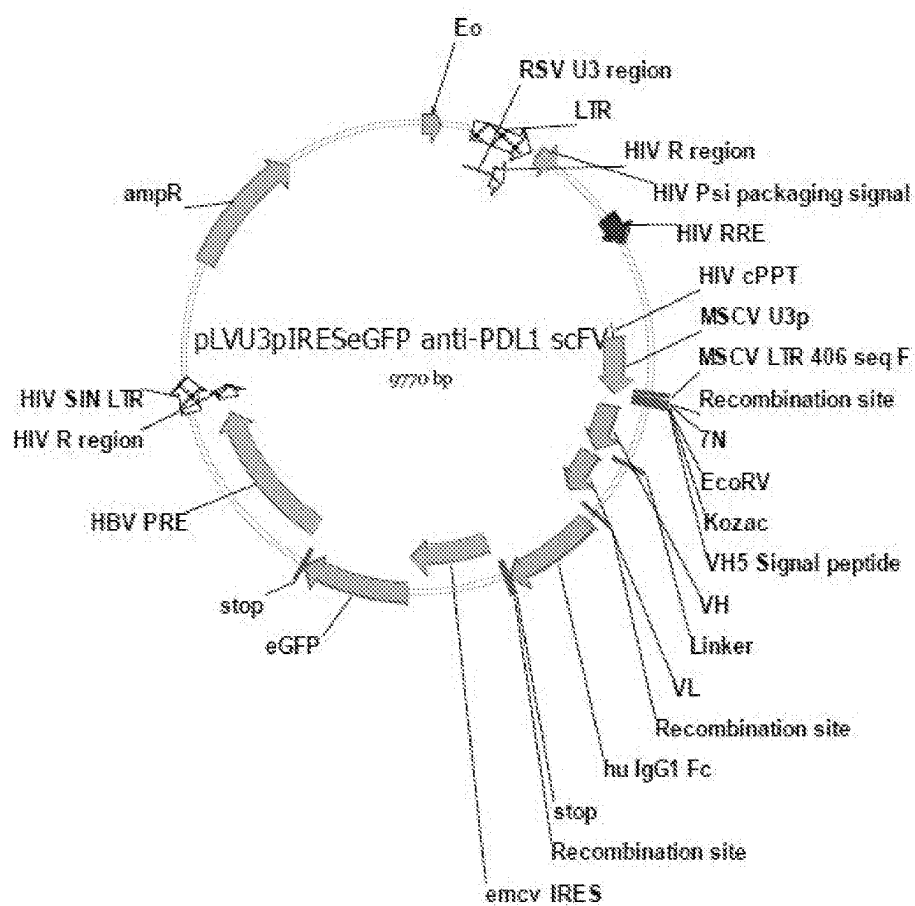
Figure 1

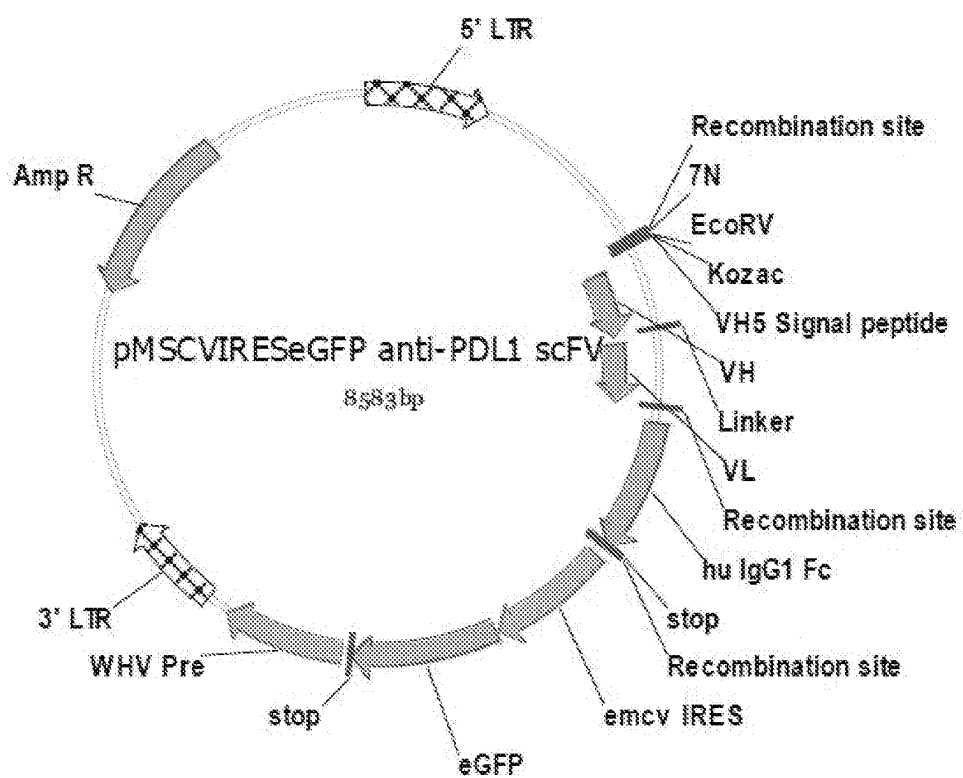
Figure 2

Figure 3

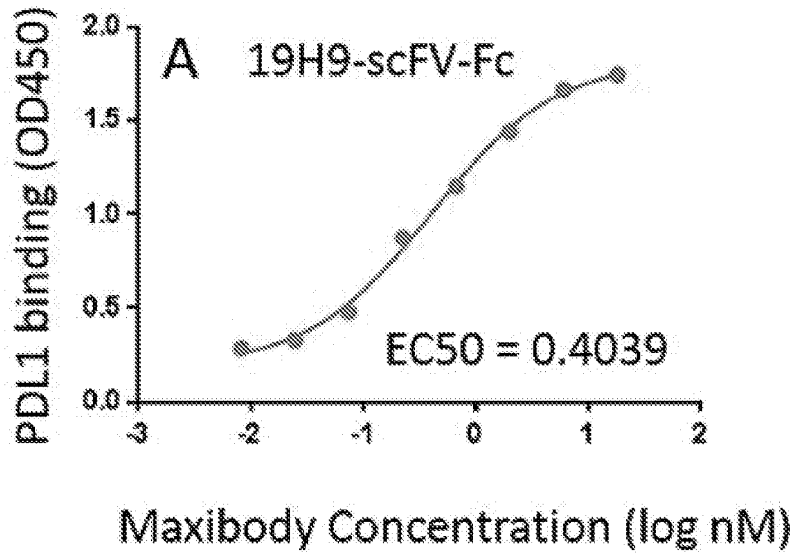
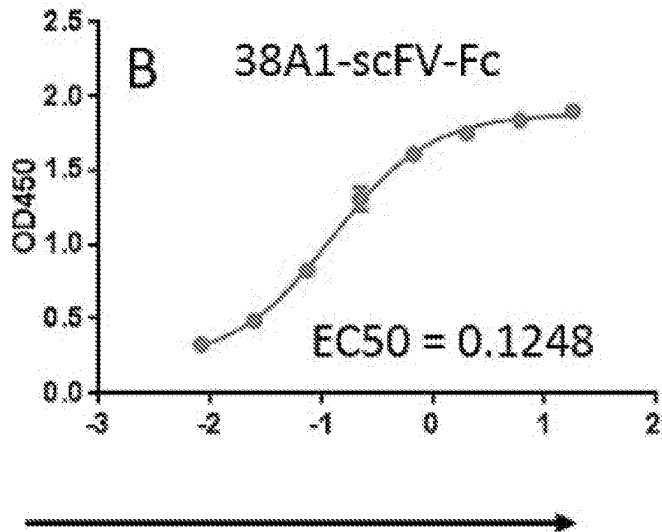


Figure 4

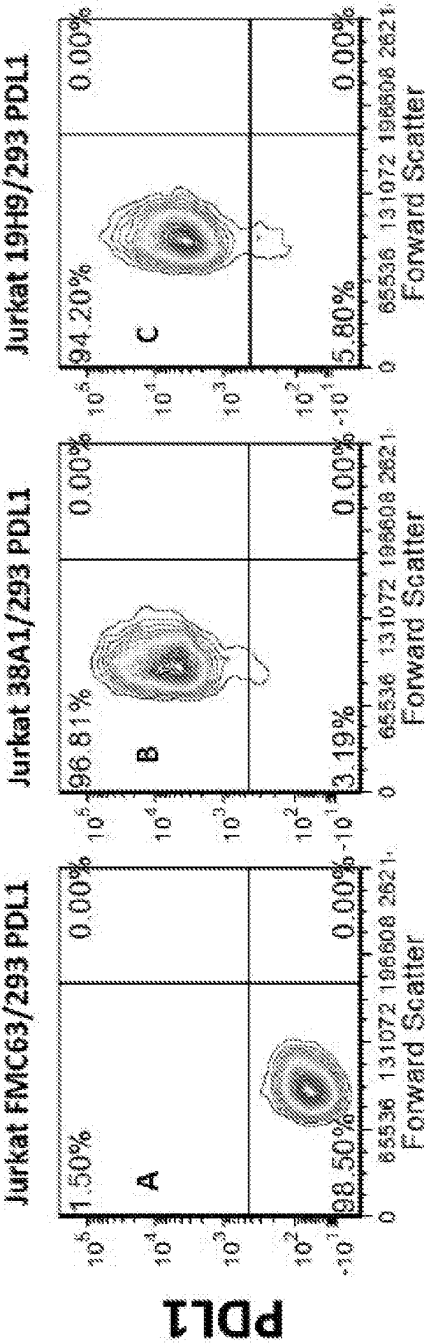


Figure 5

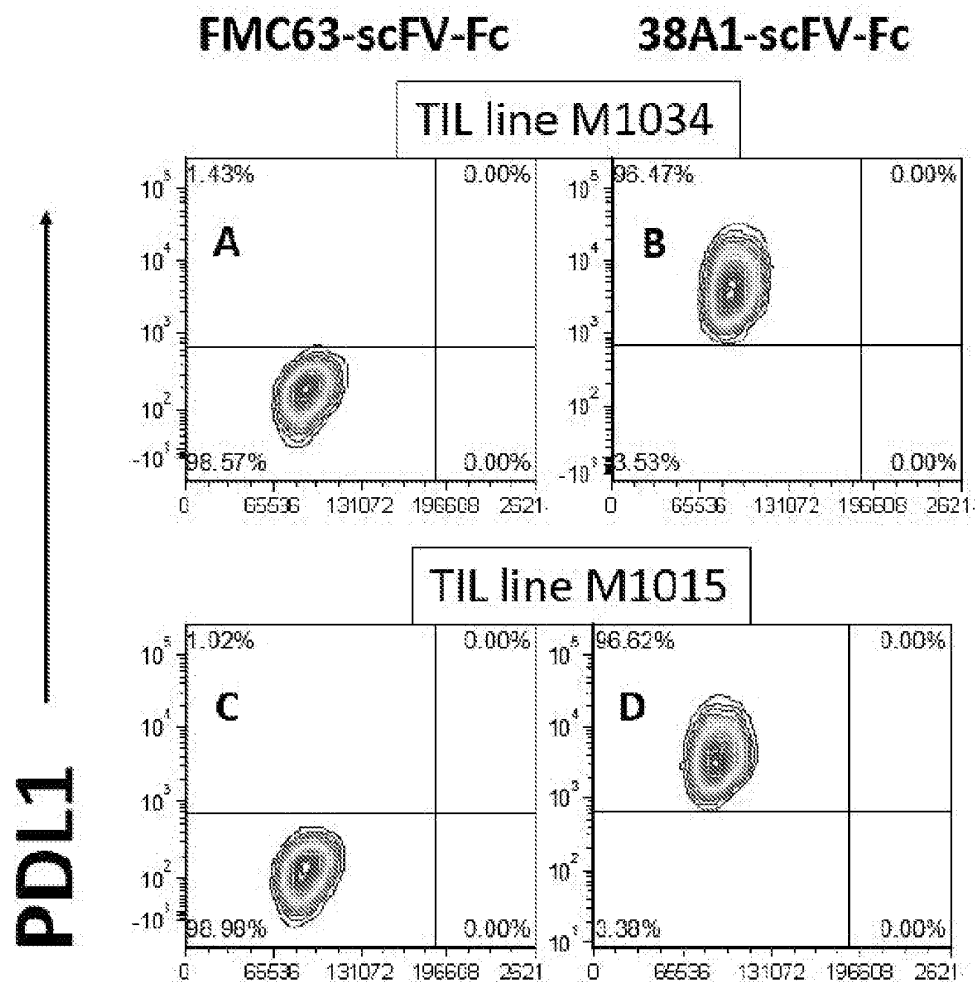


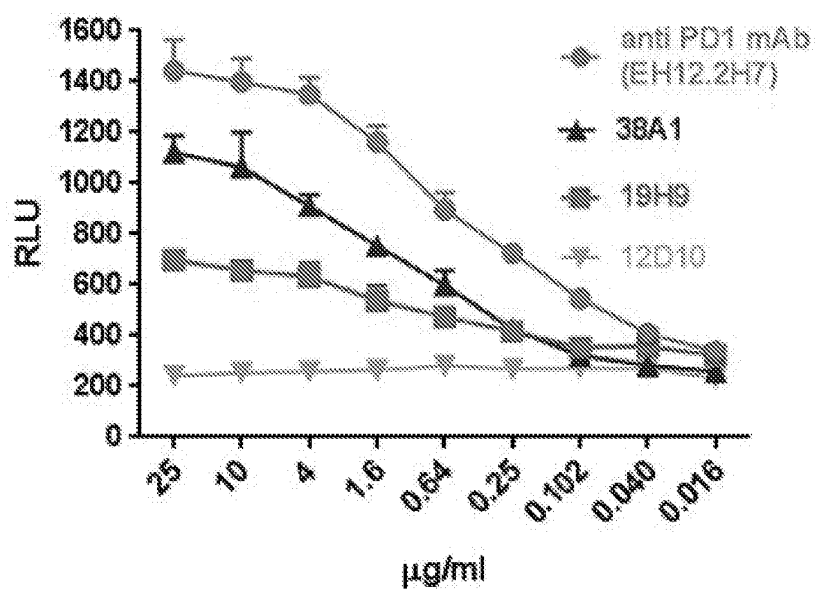
Figure 6

Figure 7**Antibody 38A1****Light Chain**

SYVLTQPPSVSVAPGQTARITCGGN**NIGRK**I VHWYQQRPGQAPVLVIY**YDT** DRPAGIPERFSGSN
SGNMATLTISTVGAGDEADYYC**QVWDTGSDHV**V FGGGTKLTVL
(SEQ ID NO: 1)

CDR1 (CDR-L1) : NIGRKI (SEQ ID NO: 2)

CDR2 (CDR-L2) : YDT (SEQ ID NO: 3)

CDR3 (CDR-L3) : QVWDTGSDHV (SEQ ID NO: 4)

Heavy Chain

EVQLVESGGGLVQPGGSLRLSCAAS**GFTFSNYA**MSWVRQAPGKGLEWVST**ISGSGGTT**YYADSVK
GRFTISRDN SKNTLYLQMNSLRVEDTAVYYC**AKDWFRSSPD**AFDIWGQGTTTVSA
(SEQ ID NO: 5)

CDR1 (CDR-H1) : GFTFSNYA (SEQ ID NO: 6)

CDR2 (CDR-H2) : ISGSGGTT (SEQ ID NO: 7)

CDR3 (CDR-H3) : AKDWFRSSPD (SEQ ID NO: 8)

Antibody 19H9**Light Chain**

NFMLTQPHSVSESLGKTVTISCTGS**SGSIARKE**VQWYQQRPGSSPTTVIY**ENN**QRP SGVSDRFSG
SIGSSNSASLTISGLKTEDEADYYC**QSYDSSNV**V FGGGTKVTVL
(SEQ ID NO: 9)

CDR1 (CDR-L1) : SGSIARKE (SEQ ID NO: 10)

CDR2 (CDR-L2) : ENN (SEQ ID NO: 11)

CDR3 (CDR-L3) : QSYDSSNV (SEQ ID NO: 12)

Heavy Chain

QVQLQESGGGLVKPGGSLRLSCAAS**GFTFSSYS**MNWVRQAPGKGLEWVSG**INTAGDT**HYPESVKG
RFTISRDNARNSLNLQMNSLRAEDTAVYYC**VRERVERESGYDA**FDI WGQGTTTVSA
(SEQ ID NO: 13)

CDR1 (CDR-H1) : GFTFSSYS (SEQ ID NO: 14)

CDR2 (CDR-H2) : INTAGDT (SEQ ID NO: 15)

CDR3 (CDR-H3) : VRERVERESGYDA (SEQ ID NO: 16)

Figure 7 (cont.)**Example of a 38A1 ScFv**

EVQLVESGGGLVQPGGSLRLSCAASGFTFSNYAMSWVRQAPGKGLEWVSTISGSGGTYYADSVK
 GRFTISRDN SKNTLYLQMNSLRVEDTAVYYCAKDWFRSSSPDAFDIWGQGT TTVTSAGGGGSGGG
GSGGGSGAPSYVLTQPPSVSVAPGQTARITCGGNNIGRKIVHWYQQRPGQAPVLVIYYDTRPA
 GIPERFSGSNSGNMATLTISTVGAGDEADYYCQVWDTGSDHVVFGGGTKLTVL
 (SEQ ID NO: 17)

*The 38A1 heavy chain (SEQ ID NO: 5) is followed by a
 linker (bold/underline), which is followed by the 38A1
 light chain (SEQ ID NO: 1).

Example of a protein with a 38A1 ScFv fused to an Fc domain (IgG1)

MGSTAILALLAVLQGVSAEVQLVESGGGLVQPGGSLRLSCAASGFTFSNYAMSWVRQAPGKGLE
WVSTISGSGGTYYADSVKGRFTISRDN SKNTLYLQMNSLRVEDTAVYYCAKDWFRSSSPDAFDI
WGQGT TTVTSAGGGGSGGGGSGGGSGAPSYVLTQPPSVSVAPGQTARITCGGNNIGRKIVHWYQ
QRPGQAPVLVIYYDTRPAGIPERFSGSNSGNMATLTISTVGAGDEADYYCQVWDTGSDHVVFGG
GTKLTVLGPRANFVYKSGPRPKSCDKTHTCPPCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTC
VVVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNK
ALPAPIEKTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNY
KTTTPVLDSGDSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

(SEQ ID NO: 18)

*The protein of SEQ ID NO: 17 (italic/underline) is
 followed by an IgG1 Fc domain (bold/underline).

Example of a 19H9 ScFv

QVQLQESGGGLVKPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLEWVSGINTAGDTHYPESVKG
 RFTISRDNARNSLNLQMNSLRAEDTAVYYCVRRERVEREYSGYDAFDIWGQGT TTVTSAGGGGSGG
GSGGGSGAPNFMLTQPHSVSESLGKTVTISCTGSSGSIARKFVQWYQQRPGSSPTTVIYENNQ
 RPSGVSDRFSGSIGSSSNSASLTISGLKTEDEADYYCQSYDSSNVVFGGGTKVTVL
 (SEQ ID NO: 19)

*The 19H9 heavy chain (SEQ ID NO: 13) is followed by a
 linker (bold/underline), which is followed by the 19H9
 light chain (SEQ ID NO: 9).

Example of a protein with a 19H9 ScFv fused to an Fc domain (IgG1)

MGSTAILALLAVLQGVSAQVQLQESGGGLVKPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLE
WVSGINTAGDTHYPESVKGRFTISRDNARNSLNLQMNSLRAEDTAVYYCVRRERVEREYSGYDAFD
IWGQGT TTVTSAGGGGSGGGGSGGGSGAPNFMLTQPHSVSESLGKTVTISCTGSSGSIARKFVQ
WYQQRPGSSPTTVIYENNQRPSGVSDRFSGSIGSSSNSASLTISGLKTEDEADYYCQSYDSSNVV
FGGGTKVTVLGPRANFVYKSGPRPKSCDKTHTCPPCPAPELLGGPSVFLFPPKPKDTLMISRTPE
VTCVVVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKV
SNKALPAPIEKTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTTPVLDSGDSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

(SEQ ID NO: 20)

*The protein of SEQ ID NO: 19 (italic/underline) is
 followed by an IgG1 Fc domain (bold/underline).

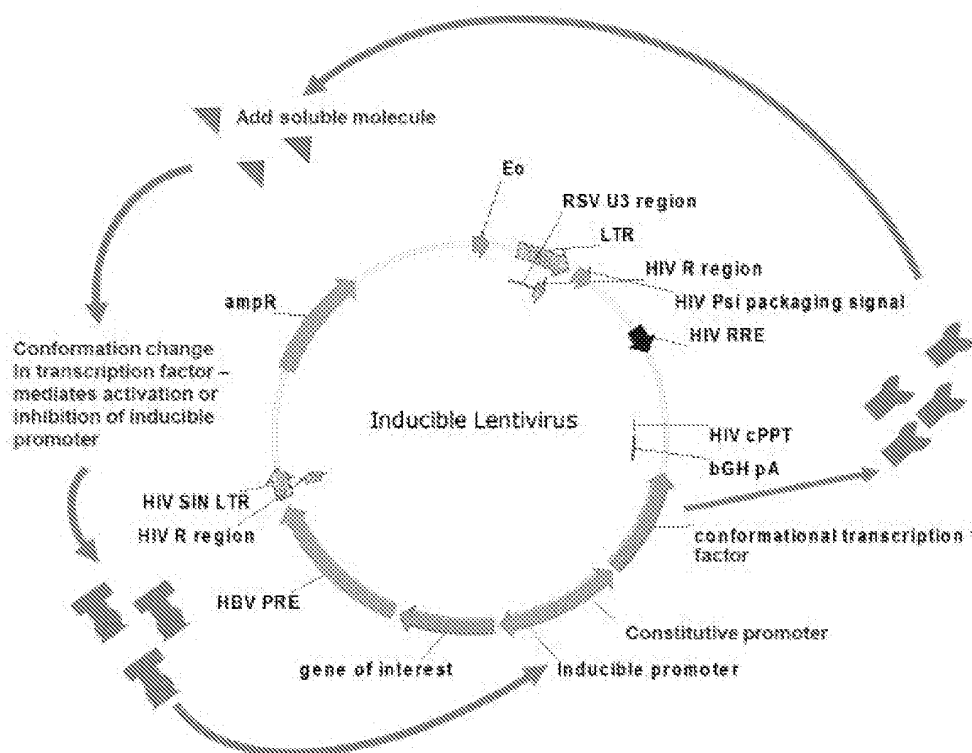
Figure 8

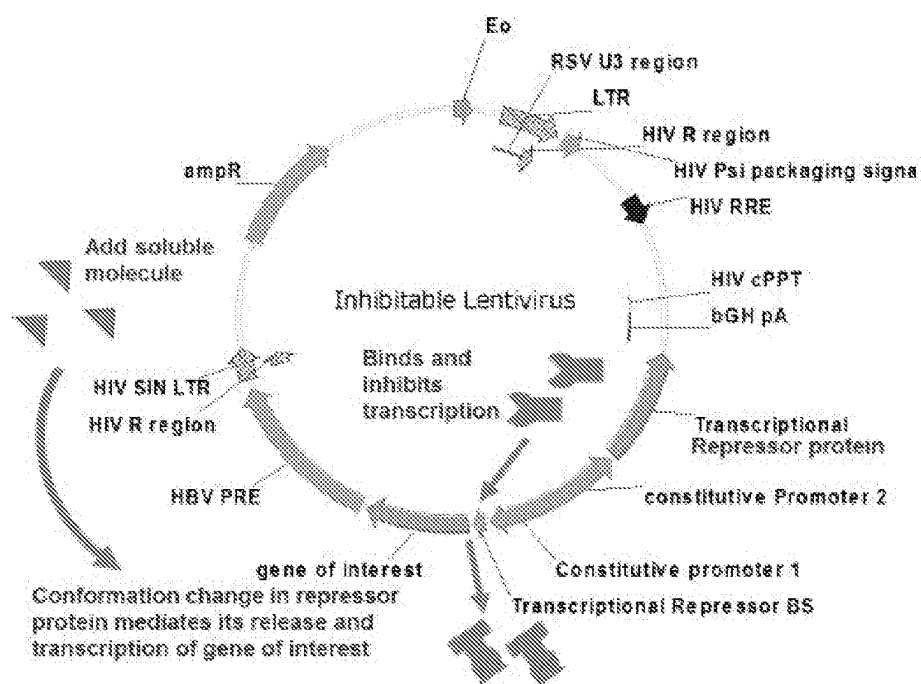
Figure 9

Figure 10A

pLV430G (Lentiviral Vector) (SEQ ID NO:35)

cgataaccctaattcgatagcatatgcttccgttgggtaacatatgctattgaattagggttagtctggatagtatatactactaccgggaa
gcatatgctaccgtttaggggtcaccgggtgatgccggccacgatgcgtccggcgtagaggatctaattgtgagtttagctcactcattaggcacc
ccaggctttacactttatgcttccggtcgtatgttgtgtggaattgtgagcggataacaatttcacacaggaaacagctatgacatgattac
gccaagcgcgcaattaaccctcactaaagggaacaaaagctggagctgcaagcttaattgtagtcttatgcaatactctttagtcttgaaca
tggtaacgatgagtttagcaacatgccttacaaggagagaaaaagcaccgtgcatgccgattggaggaaagtaagggtgacgatcgctgcctta
ttaggaaggcaacagacgggtctgacatggattggacgaaccactgaattgccgcattgcagagatattgtatttaagtcctagctcgatac
ataaacgggtctctctggttagaccagatctgagcctgggagctctctggctaactagggaacccactgcttaagcctcaataaagcttgcctt
gagtcttcaagtagtgtgtgcccgtctgtgtgtgactctgtaactagagatccctcagacccttttagtcagtggtgaaaatctctagcagt
ggcgcccgaacagggacttgaagcgaagggaacacagaggagctctctgcacgcaggactcggcttgctgaagcgcgacggcaaga
ggcgaggggcgcgactggtagtacgcaaaaaatttgactagcggaggctagaaggagagagatgggtgagagcgtcagttattaag
cgggggagaattagatcgcatgggaaaaaattcggttaaggccgggggaagaaaaataataaataaacatagtagtggaagc
aggagctagaacgattcgagttaatcctggcctgttagaaacatcagaaggctgtagacaaatactgggacagctacaacatcccttca
gacaggatcagaagaacttagatcattatataatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaaggaa
gcttttagacaagatagaggaagagcaaaacaaaagtaagaccaccgcacagcaagcggcgtgatcttcagacctggaggaggagata
tgagggacaattggagaagtgaattatataataataaagtagtaaaaattgaaccattaggagtagcaccaccaaggcaagagaagag
tggtgcagagagaaaaagagcagtggaataggagcttcttcttgggttcttgggagcagcaggaagcactatggcgcgagcgtcaat
gacgtgcaggtacaggccagacaattattgtctggtatagtcagcagcagaacaatttgctgagggtattgaggcgcaacgacatctgtt
gcaactcacagctcggggcatcaagcagctccaggcaagaatcctggctgtggaagatacctaaggatcaacagctcctggggatttgg
ggtgtcttggaaaactatttgcaccactgctgtgccttgaatgctagttggagtaataaatctctggaacagatttggatcacacgacct
ggatggagtgggacagagaaattaacaattacacaagcttaatacactccttaattgaagaatcgaaaaccagcaagaaaagaatgaac
aagaattattggaattagataaatggcaagtttgggaattggttaacatacaaaattggctgtgttatataaaattattcataatgatagt
aggaggcttgtaggtttaagaatagttttgtctgtactttctatagtagaattaggttaggcaggatattcaccattatcgtttcagaccacc
tcccaaccccgaggggacccgacagggccgaaggaatagaagaagagtgaggagagagacagagacagatccattcgattagtgaa
ggatctgcagcgttatcggttttaaaagaaaagggggattggggggtacagtgcaggggaaagaatagtagacataatagcaacagacat
acaaactaaagaattacaaaacaaattacaaaattcaaaattttatcgattttatttagtctccagaaaaaggggggaatgaagacccc
acctgtaggttttggcaagctagcttaagtaacgccattttgcaaggcatggaatacataactgagaatagagaagttcagatcaaggtta
ggaacagagagacagcagaatatgggccaacaggatatctgtgtaagcagttcctgccccggctcagggccaagaacagatggtcccc
agatgcgggtccgcccctcagcagttctagagaacatcagatgtttccagggtgccccaggacctgaaatgacctgtgcttatttgaact
aaccaatcagttcgcttctcgcttctgttcgctgctccccgagctcaataaaagagcccaacccctcactggcgccgagctcct
ccgatagactgcgtgcccgggtaccgatatcacaagttgtacaaaaagctgaacgagaacgtaaaatgatataaatatcaatatatta
aattagattttgcataaaaaacagactacataactgtaaaacacacatatccagtcactatggcgccgcattaggcaccaggcttta
cactttatgcttccggctcgtataatgtgtgattttgagttaggatccgtcgagattttcaggagctaaggaagctaaaatggagaaaaaat
cactggatataccaccgttgatataatccaatggcatcgtaagaacattttgaggcatttcagtcagttgctcaatgtacctataaccagacc
gttcagctggatattacggcctttttaaagaccgtaaagaaaaataagcacaagttttatccggcctttattcacattcttggccgctgatgaa
tgctcatccggaattccgtatggcaatgaaagacggtagctgggtgatgggagatgttccacctgttacaccgttttccatgagcaaaact
gaaacgttttcatcgctcgtgagtgaaataccacgacgatttccggcagtttctacacatatattcgcaagatgtggcgtgttacgggtgaaaacc
tggcctatttccctaaagggttattgagaatatgttttctgctcagcaatccctgggtgagtttaccagttttgatttaaacgtggccaatat
ggacaacttcttgcctccctgttttaccatgggcaaatattatacgaaggcgacaaggctgctgatgccgtggcgattcaggttcatcatgcc
gtttgtgatggcttccatgtcggcagaatgcttaatgaattacaacagtactgcgatgagtgaggcggggcggtaaacgcgtggatccgg
cttactaaaagccagataaacgatgctgatttgcgcgtgatttttgcgtgataagaatatatactgatattatataccgaagtatgtcaaaa
agaggtatgctatgaagcagcgtattacagtgcagttgacagcgacagctatcagttgctcaaggcatatatgatgtcaatatctccggtct
ggtaagcacaacatgcagaatgaagcccgtcgtcgtgctgcccgaacgttggaagcggaaaatcaggaagggtgaggtgaggtcggcg
gtttattgaaatgaacggctcttttctgacgagaacaggggctggtaaatgagtttaacacctataaaagagagagccgttatc
gtctgtttgtgagtgtagagtgatattattgacacgcccggcgacggatggtgatccccctggccagtgacgctcgtctgcagataaagt

Figure 10A (cont.)

ctcccgtaactttaccgggtggtcatatcggggatgaaagctggcgcatgatgaccaccgatatggccagtggtccggtctccgttatcgg
ggaagaagtggctgactcagccaccgcgaaaatgacatcaaaaacgccattaacctgatgttctggggaatataatgtcagggtccctta
tacacagccagtgctcaggtcgaccatagtgactggatatgtgtgtttacagtattatgtagtctgtttttatgcaaaatctaatttaatatat
tgatatttatacattttacgtttctcgttcagctttctgtacaaagtgggtgattcaggttaattaagctagcctagtgccattgttcagtggttc
gtagggtcttccccactgtttgctttcagttatatggatgatgtggtattgggggccaagtctgtacagcatcttgagtcctttttaccgctgt
taccaattttctttgtctttgggtatacatttaaacctaacaacaaagagatgggggttactctctaaattttatgggttatgtcattggatgt
tatgggtcttggcacaagaacacatcatacaaaaaatcaagaatgttttagaaaacttctattaacaggcctattgattggaagtatgt
caacgaattgtgggtcttttgggttttctgccccttttacacaatgtggttatcctgctgtgatgcctttgtatgcatgtattcaatcaagcagg
ctttactttctgccaacttacaaggcctttctgtgtaacaataacctgaacctttaccctgtgcccggcaacggccaggtctgtgccagt
ttgtcagcgaacccccactggctggggtctgtcatggccatcagcgcatgctggaacctttcggtcctctgccgatccatactgcgg
aactcctagccgtgttttctcgcagcaggtctggagcaaacattatcgggactgataactctgttgcctatcccgaataatacatcgtt
ccatggctcgtaggtgtgctccaactggatcctgctggcgacgtcctttgttacgtcccgtcggcgtgaatcctcggacgaccttctc
gggtcgttgggactctctgtccccttctcgtctgctgctgacccagccacggggcgacctctctttacgggactccccgtctgtgcctc
tcctcgtccggaccgtgtgcacttgccttacctctgcacgtcgtcagggagaccacgtgaacgcccaccaaatattgccaaggtcttacata
agaggactcttgactctcagcaatgtcaacgaccgaccttgaggcactactcaaaagactgtttgtttaaagactgggaggagtgggggag
gagattagggttaaaggctttgtactagaggctgtaggcataaattggtctgctgcaccagcaccatggcgcaatcactagagcggggtacct
ttaagaccaatgacttacaaggcagctgtatcttagccacttttaaaagaaaagggggactggaagggttaattcactccaacgaag
acaagatctgcttttctgtactgggtctctctggttagaccagatctgagcctgggagctctctggctaactagggaacccactgcttaagc
ctcaataaagctgcttgagtgctcaagtagtggtgcccgtctgtgtgactctggttaactagagatccctcagaccttttagtcagtgt
ggaaaatctctagcagtagtagttcatgtcatcttattattcagttatataactgcaaaagaaatgaatatcagagagttagaggaaactgtt
tattgcagcttataatggttacaataaagcaatagcatcacaatttcacaataaagcattttttcactgcattctagtgtgtgttgcctca
actcatcaatgtatcttatcatgtctggcttagctatcccgccctaactccgcccataactccgcccagttccgcccattctccg
ccccatggctgactaattttttttatgtatgcagaggccgaggccggtaccttgagtggttcatcctggagcagactttgagctgtggact
gcaacacaacattgcctttatgttaactcttggtgaagctcttacaccaatgtctgggggacatgtacctccaggggccagggaagactac
gggagggtacaccaacgtcaatcagagggtctgtgtagctaccgataagcggaacctcaagagggttagcaatagtgtttataaggcc
ccctgttaattcttgaagacgaaagggtcgtgatacgcctattttataggttaatgtcatgataataatggttcttagagctcaggtggc
acttttcggggaatgtgcggaacccctattgtttattttctaatacattcaaatatgtatccgctcatgagacaataacccgtataaat
gcttcaataatattgaaaaggaagagtatgagtattcaacatttcggtgctgccttattcccttttttgcggcattttgcttctgttttgc
accagaacacgtggtgaaagttaaagatgtgaagatcagttgggtgcacgagtggttacatgaaatggatctcaacagcggtgaagat
ccttgagagttttcggccgaagaacgttttccaatgatgagcactttaaagtctgctatgtggcggttattatcccgtgtgacgccccg
aagagcaactcggtcgcgcatacactattctcagaatgacttgggtgagtactaccagtcacagaaaagcatcttacggatggcatgaca
gtaagagaattatgcagtgtgcatcaacatgagtgataaacctgcggccaacttactctgacaacgatcggaggaccgaaggagctaa
ccgctttttgcacaacatgggggatcatgtaactgccttgatcgttggaacggagctgaatgaagccatacacaacgacgagcgtgac
accagatgcctgcagcaatggcaacaacgttgcgcaactattaactggcgaactacttactctagcttcccggcaacaattaatagactgg
atggaggcggataaagttgcaggaccacttctgcgtcggcccttccggctggctggttattgctgataaatctggagccggtgagcgtggg
tctcgcggtatcattgcagcactggggccagatggttaagccctccgatatcgtagtattctacacgacgggagtcaggcaactatggatgaa
cgaaatagacagatcgtgagataggtgcctcactgattaagcattggttaactgtcagaccaagtttactcatatactttagattgattaa
aacttcattttaattaaaaggatctaggtgaagatccttttgataatctcatgacaaaatcccttaacgtgagttttcgttccactgagcgt
cagacccttagaaaagatcaaaagatcttctgagatccttttttctgcgctaactctgctgttcaaaacaaaaaaccacgcgtaccag
cgtgtgtgttttccggatcaagagctaccaactcttttccgaaggtaactggcttgcagagcgagatacacaataactgtccttctagt
gtagccgtagttaggcaccacttcaagaactctgtagaccgcctacatactcgtctgctaatcctgttaccagtggctgctgccagtggc
gataagtcgtgtcttaccgggttgactcaagacgatagttaccggataaggcgagcggtcgggtgaacgggggttctgtgcacacagcc
cagcttgagcgcaacgacctacccaactgagatacctacagcgtgagcattgagaagcgccacgtctccgaaggagaaaaggcgga
caggtatccggtaagcgggcaggtcggaacaggagagcgacgagggagcttcagggggaaacgctgtatctttatagtcctgtcggg
tttccacctctgacttgagcgtcgatttttgtgatgctcgtcagggggcgagcctatggaaaaacgcagcaacgcgcccttttacggt

Figure 10A (cont.)

tcctggccttttgctggccttttgaagctgtccctgatggtcgtcatctacctgcctggacagcatggcctgcaacgcgggcatcccgatgccg
ccggaagcgagaagaatcataatggggaaggccatccagcctcgctcg

Figure 10B

pCIGO-VSV.G (VSVG) (SEQ ID NO:36)

gtcgacggatcgggagatcaattccggcacctgtcctacgagttgcatgataaagaagacagtcataagtgcggcgacgatgtcatgcccc
gcgcccaccggaaggagctgactgggtgaaggctctcaaggcatcggtcgatgcaggaaaaggacaagcagcgaataatcacgcccc
ttgggaggtggcgcatatgcaaaggatagcactccactctactactgggtatcatatgctgactgtatatgcatgaggatagcatatgcta
cccgatacagattaggatagcatatactaccagatatagattaggatagcatatgctaccagatatagattaggatagcctatgctacc
agatataaattaggatagcatatactaccagatatagattaggatagcatatgctaccagatatagattaggatagcctatgctaccaga
tatagattaggatagcatatgctaccagatatagattaggatagcatatgctaccagatatattgggtagtatatgctaccagatataaatt
aggatagcatatactaccctaattctctattaggatagcatatgctaccggatacagattaggatagcatatactaccagatatagattagg
atagcatatgctaccagatatagattaggatagcctatgctaccagatataaattaggatagcatatactaccagatatagattaggata
gcatatgctaccagatatagattaggatagcctatgctaccagatatagattaggatagcatatgctaccagatatattgggtagtatatgc
taccatggcaacattagcccacgtgctctcagcgacctcgtgaatatgaggaccaacaacctgtgcttggcgctcaggcgcaagtgtgtg
taattgtcctccagatcgagcaatcgcgccctctcttggccgcccacctaattgacaggtattccccggggtgccattagtggtttgtg
gcaagtgggttagccgcagtggttagcggggtacaatcagccaagtattacacccctattttacagtcacaaaccgcaggcgccgtgtgg
gggctgacgctgccccactccacaatttcaaaaaaagagtgccacttcttcttattgggccccattggcgtggagccccgtttaatt
ttcgggggtgttagagacaaccagtgagtcgctgctgcggcgctcactctcttcccttgttacaatagagtgtacaacatgggtcac
ctgtcttggctccctgctgggacacatcttaataacccagtatcatattgactaggattatgtgttgccatagccataaattcgtgtgagat
ggacatccagctcttacgcttgcctccacccatggatttctattgttaaagattcagaatgtttcattctacactagattatttgcctcaa
ggggtttgtgagggttatattggtgcatagcacaatgccaccactgaacccccgtccaaattttattctggggcgctcacctgaacctgtt
ttcagcacctcacatacaccttactgttcacaactcagcagttattctattagctaaacgaaggagaatgaagaagcaggcggaagattcag
gagagttcactgcccgtccttgatcttcagccactgccctgtgactaaaatggttactaccctcgtggaatcctgacccatgtaataaa
accgtgacagctcatggggtgggagatatcgctgttcttaggacctttactaacctaattcgatagcatatgcttccgttggttaacata
tgctattgaattagggttagcttgatgtatatactactaccgggaagcatatgctaccgtttagggttaacaaggggccttataaacac
tattgctaattgccctcttgagggtccgcttactcggtagctacacagccccctgtgattgacgttggttagcctccgttagcttctctgggccct
gggaggtacatgtccccagcattggtgtaagagcttcagccaaggttacacataaaggcaatgttggttgtagcctccagactgcaaaag
tctgtccaggtgaaagccactcaaggatcttcaatattggccattagccatatttattcattggttatatagcataaatacattggctatt
ggccattgcatagctgtatctatatacataatgtacatttatattggctcatgtccaatagaccgcatgttgccattgattattgactagtta
ttaatagtaatacattacgggtcattagttcatagcccatatagagttccggttacataactacggttaaaggccgctgctgaccg
ccaacgacccccccattgacgtcaataatgacgtatgttcccatagtaacgcaatagggactttccattgacgtcaatgggtggagatt
tacggtaaactgcccacttgccagtcacatcaagtgtatcatatgccaagtccgccccctattgacgtcaatgacggttaaatggccgctggc
attatgccagtcacatgaccttacgggactttctacttgccagtcacatctacgtattagtcacgtattacatggtgtgctgtttggcag
acacaaatggcggtgtagcggttgactcacggggtttccaagtctccacccattgacgtcaatgggagtttgggttgccacaaaatca
acgggactttccaaaatgtcgtaataacccgccccgttgacgcaaatggcggttagcggtgtacggtgggaggtctatataagcagagctc
gttagtgtaaccgtcagatcactagaagctttattgcggtagttatcacagttaaattgctaacgcagtcagtgcttctgacacaacagtcctg
aacttaagctgcagaagttgctgtaggactgggcaggttaagtatcaagggtacaagacaggttaaggagaccaatagaactgggct
tgtcgagacagagaagactcttgcgttctgataggcacctattggtcttactgacatccacttgccttctctccacaggtgtccactccag
tcaattacagctcttaaggctagagtactaatacagctcactataggctagcggtaccgagctcggtaccagtagtaacggccgctggtg
ctggaattcaacagagatcgatctgttcttgacactatgaagtgcctttgtactagccttttattcattggggtgaattgcaagttccacat
agttttccacacaacaaaaaggaaactggaaaaatgttcttctaattaccattattgccgctcaagctcagatttaattggcataatgac
ttaataggcacagccatacaagtaaaaatgcccaagagtcacaaggctattcaagcagacggttgatgtgcatgcttcaaatgggtcac
tactgtgatttccgctggtatggaccgaagtataacacagtcctatccgatccttactccatctgtagaacaatgaaggaaagcattgaa
caaacgaacaaggaaacttgctgaatccaggctccctcctcaaagtttggtatgcaactgtgacggatgccaagcagtgattgtcca
ggtagctcctcaccatgtgctggtgatgaatacacaggagaatgggtgattcacagttcatcaacggaaaaatgcagaattacatatgcc
cactgtccataactctacaacctggcattctgactataaggtcaaagggtatgtgattctaacctcatttccatggacatcaccttctctcag

Figure 10B (cont.)

aggacggagagctatcatccctgggaaaggaggcacagggttcagaagtaactactttgcttatgaaactggaggcaaggcctgcaaaat
gcaatactgcaagcattggggagtcagactcccatcagggtgtctggttcgagatggctgataaggatctcttctgctgagccagattccctga
atgccagaagggtcaagtatctctgctccatctcagacctcagtgtagtgaagtctaattcaggacgttgagaggatcttgattattccctct
gccaagaaacctggagcaaaatcagagcgggtctccaatctctccagtggatctcagctatcttctcctaaaaaccaggaaaccggctctg
ctttaccataatcaatggtagcctaaaaatactttgagaccagatacatcagagtcgatattgctgctccaatcctctcaagaatggctggaat
gatcagtggaactaccacagaagggaactgtgggatgactgggcaccatataagacgtggaaattggacccaatggagttctgaggacc
agttcaggatataagtttctttatcatgattggacatggatgttggactccgatcttcatcttagctcaaggctcagggttctgaacatcct
cacattcaagacgctgcttcgcaacttctgatgatgagagttatttttgggtgatactgggctatccaaaaatccaatcgagcttgtagaagg
ttggttcagtagttggaaaagctctattgcctctttttctttatcatagggttaatcattggactattcttggttctccgagttggatccatcttg
cattaaattaaagcacaccaagaaaaagacagatttatacagacatagagatgaaccgacttggaagtaactcaaatcctgcacaacagat
tcttcatgtttggaccaaatcaacttggataccatgtctaaaggcctcaattatattgagtttttaattttatggaattctgcagatatcca
tcacactggcgccgctcagcatgcatctagaggccctattctatagtgtcacctaaatgctagagctcgtgatcagcctcactgtgcct
tctagttgccagccatctgtgtttgccctccccgtgccttcttgaccctggaagggtccactcccactgtcctttcctaataaaataggaa
attgatcgcattgtctgagtaggtgtcattctattctgggggtgggggtggggcaggacagcaaggggaggattgggaagacaatagcag
gcatgctgggatgcggtgggctctatggcttctgaggcggaagaaccagctgcattaatgaatcgccaacgcgcggggagaggcggtt
tgcgtattggcgctcttcgcttctcgtcactgactcgtgcgtcggttcggttcggtcgcgcgagcggtatcagctcactcaaggcggtta
atacggttatccacagaatcaggggataacgcaggaaagaacatgtgagcaaaaggccagcaaaaggccaggaaaccgtaaaaaggcgc
gttgcgtggcgttttccataggtcgcctccctgacgagcatcacaataatcgacgtcaagtcagaggtggcgaacccgcacaggactat
aaagataccaggcggtttccccctggaagctcctcgtgcgtctcctgttccgacctgcccgttaccggatacctgtccgctttctccttcg
gaagcgtggcgctttctcaatgctcagctgtaggtatctcagttcgggtgtaggtcgttcccaagctgggctgtgtgcacgaacccccgtt
cagcccaccgctcgccttatccgtaactatcgtcttgagtcacacccgtaagacacgacttatcgccactggcagcagccactgtaac
aggattagcagagcgaggtatgtaggcggtgtacagagttcttgaagtgggtggcctaactacggctacactagaaggacagtatttggat
ctgcgctctgtgaagccagttaccttcggaagaaagagttgtagctcttgatccggcaaaacacccagctgtagcggtggtttttgtt
gcaagcagcagattacgcgcagaaaaaaaggatctcaagaagatcctttgatctttctacggggtctgacgctcagtggaacgaaactca
cgtaagggtatttggatcatgagattatcaaaaaggatcttcacctagatccttttaattaaaaatgaagtttaaatcaatcaaaagtata
tgagtaaacttggctgacagttaccaatgcttaatcagtgaggcacctatctcagcagatctgtctatttctgctcatcatagttgcctgactccc
cgtcgtgtagataactacgatacgggagggttaccatctggccccagtgctgcaatgataccgcgagaccacgctaccggctccagattt
atcagcaataaaccagccagccggaaggccgagcgagaagtggtcctgcaactttatccgctccatccagcttattaattgttgcggg
aagctagagtaagtagttccagtttaatagtttgcgcaacgttgttgcattgctacaggcatcgtggtgtcacgctcgtcttggatggct
tcattcagctcgggtcccaacgatcaaggcgagttacatgatccccatgttgtgcaaaaaagcggttagctccttcggtcctccgatcgtgt
cagaagtaagttggcgagtggtatcactcatggttatggcagcactgcataattcttactgtcatgccatccgtaagatgcttttctgtga
ctggtgagtactaaccaagtcattctgagaatagtgatgcggcgaccagttgctcttgcggcgctcaatacgggataataacgcgccac
atagcagaacttttaaagtgtctcatcattggaacgttcttcggggcgaaaactctcaaggatcttaccgctgttgagatccagttcgatgta
accactcgtgcaccaactgatcttcagcatctttactttcaccagcgttcttggtgagcaaaaacaggaaaggcaaatgccgcaaaaa
gggaataaggcgacacggaaatgttgaaatactatactcttcttttcaatattattgaagcatttatcagggttattgtctcatgagcgat
acatatttgaatgtatttagaaaaataacaaatagggttcgcgcacatttccccgaaaagtgcacctgac

Figure 11A**PLV4301G38A1 (also referred to as pLV4301G PDLV scFV 38A1) (SEQ ID NO:37)**

cgataaccctaattcgatagcatatgcttccgttggtgaacatatgctattgaattagggttagtctggatagtatatactactaccgggaa
gcatatgctaccggttaggttcaccggtgatgcccgcacgatgctccggcgttagaggatctaattgtgagtttagctcactcattaggcacc
ccaggctttacactttatgcttccggctcgtatgttgtgtggaattgtgagcggataacaatttcacacaggaaacagctatgacatgattac
gccaagcgcgaattaaccctcactaaagggaacaaaagctggagctgcaagcttaattgtagtcttatgcaatactctttagtcttgaaca
tggtaacgatgagtttagcaacatgccttacaaggagagaaaaagcaccgtgcatgccgattggtggaagtaagggtgtacgatcgtgcctta
ttaggaaggcaacagacgggtctgacatggattggacgaaccactgaattgcccgttagcagagatattgtattaaagtccttagctcgatac
ataaacgggtctctggttagaccagatctgagcctgggagctctctggctaactagggaaccactgcttaagcctcaataaagcttcctt
gagtgtctcaagtgtgtgtcccgtctgtgtgtgactctgtaactagagatccctcagacccttttagtcagtgtggaataatcttagcagt
ggcggccgaacaggacttgaagcgaagggaacacagaggagctctctgacgcaggactcggctgtgaagcgcgcacggcaaga
ggcgaggggcgcgactggtgagtacgcaaaaaatttgactagcggaggctagaaggagagagatgggtgcgagagcgtcagtattaa
cgggggagaatttagatcgcatgggaaaaaattcggttaaggccaggggggaagaaaaataaaatataacatatagtagtggaagc
aggagctagaacgattcgcatgtaattcctggcctgttagaaacatcagaaggctgtagacaaatactgggacagctacaacctccctca
gacaggatcagaagaacttagatcattatataatacagtagcaacctctattgtgtgcatcaaaggatagagataaaagacaccaaggaa
gctttagacaagatagagggaagcaaaacaaaagtaagaccaccgcacagcaagcggcgtgatcttcagacctggaggaggagata
tgagggaacaattggagaagtgaattatataataataaagtagtaaaattgaaccattaggagtagcaccaccaaggcaagagaagag
tggtgcagagagaaaaaagcagtggtgaataggagcttggctcctgggtcttgggagcagcaggaaagcactatggcgagcgtcaat
gacgtgacggtacaggccagacaattattgtctgtatagtcagcagcagaacaatttgctgagggtattgaggcgcaacagcatctgtt
gcaactcacagtctggggcatcaagcagctccaggcaagaatcctggctgtggaagatacctaaggatcaacagctcctggggatttgg
ggtgtcttggaaaactattgcaccactgctgtccttgaatgtagttggagtaataaatctctggaacagatttgaatcacacgacct
ggatggagtgggacagagaaattaacaattacacaagcttaatacactccttaattgaagaatcgaaaaccagcaagaaaaatgaac
aagaattattggaattagataaatgggcaagtttgggaattggttaacatacaaaattggctgtgtatataaaattattcataatgtagt
aggaggcttgtaggtttaagaatagttttgctgtactttatagtgaaatagagttaggcagggtattaccattatcgtttcagaccacc
tcccaaccccgaggggacccgacaggcccgaaggaaatagaagaagaaggtggagagagagacagagacagatccattcgattagtgaac
ggatctcgacggtatcggttttaaaagaaaagggggattggggggtacagtgcaggggaaagaatagtagacataatagcaacagacat
acaaactaaagaattacaaaaacaaattacaaaaattcaaaatttatcgattttatttagtctccagaaaaaggggggaatgaagacccc
acctgtaggtttggcaagctagcttaagtaacgccattttgcaaggcatggaaaatacataactgagaatagagaagttcagatcaaggtta
ggaacagagagacagcagaatatgggcaaacaggatatctgtgtaagcagttcctgccccggctcaggggcaagaacagatggtcccc
agatgcgggtcccgcctcagcagttttagagaacctcagatgttccagggtgccccaggacctgaaatgacctgtgccttatttgaact
aaccaatcagttcgttctcgttctgttgcgcgcttctgctccccgagctcaataaaagagcccacaacctcactcggcgccgagctct
ccgatagactgcgtcgcgggtaccgatatcaccaactttgtacaaaaagctgaacgatatcgccacctgggagcagcagccattctgg
ccctgtctgtgagtgctgcaggcggtgtagctGaagtgcagctggtggaatctggcggcggactggtgagcctggcggtatcttgaga
ctgagctgtgccccagcggttcaccttcagcaactacgcatgagctgggtgcgccaggcccctggaaaaggcctggaatgggtgtccac
catcagcggctctggcggaaccactactacgcatagcgtgaaggccggttcacatctccgggacaacagcaagaacacctgtac
ctgcagatgaacagcctgcgggtggaagataccgctgtactactgcgcaaggactggttcagaagcagcagccccgacgcttcgaca
tctggggccagggaacaacctgacgtgtctgtggtggaggcggatcaggcggcggaggatcagggggaggcggaagcgagcacctt
cttacgtgctgaccgacccccctagcgtgtcagtggtcctggacagaccgcaaatcacctgtggcggaacaacatcgccggaagatc
gtcactggtatcagcagaggcccgacaggctccgtgtctgtatctactacgacaccgacagacctcgggcatccccgagagattcag
cggcagcaacagcggcaacatggccacctgacctcagcacagtgggagcggcgacgagccgactactactgtcaagtgtgggacac
cggcagcgtacacgtggtgttggaggcggcacaagctgacagtgtgggcccggggccaactttgtatacaaaagtgtcagcgagagc
aagtacggccctccctcccccttgccctgccccgagttcctgggcggaccagcgtgttctgttccccccaagccaaggacacctga
tgatcagcgggacccccgagtgacctgtgtgtgtggtgacgtgtccagggagacccccgaggtccagttaactggtacgtggacggcgtg
gaggtgcacaacccaagaccaagccccgggaggagcagttcaatagcacctaccgggtggtgtccgtgtgacctgtgcaccaggact

Figure 11A (cont.)

ggctgaacggcaaggaatacaagtgaagggtccaacaaggcctgccagcagcatcgagaaaaccatcagcaaggccaaggccag
cctcgggagccccagggtgtacacctgccccctagccaaggagatgaccaagaatcagggtgccctgacctgctggtaagggtctta
ccccagcgacatcgccgtggagtgaggagagcaacggccagcccgagaaactacaagaccacccccctgtgtgacagcgacggcag
cttcttctgtacagcagggtgacctggacaagagccggtggcaggagggaacgtcttttagctgctccgtgatgcacaggccctgcaca
accatacaccagaagagcctgtcccgtgacctgggcaagatgttcagatcttggatattacatctgggacccctggccgaatctcggt
ggcccttctgtctcttgatcatcactctcatctgctacggctccaccagcggctccggcaagccggctctggcgagggtccaccagcggc
gactacaaggacgacgatgacaagtaataaggatcggttcagcttcttgtacaaagtgggattcgagttaattaagttaacgaattcccc
ccctctccctccccccccctaactgtactggcgaagccgcttggaataaggccggtgtgcgtttgtctatatgttattttccaccatattgccg
tcttttggcaatgtgagggcccgaaacctggccctgtcttctgacgagcattcctaggggtctttccctctcgccaaaggaatgcaaggtct
gttgatgtcgtgaaggaagcagttcctctggaagcttctgaagacaaacacgtctgtagcgacctttgcaggcagcggaacccccac
ctggcgacaggtgctctcgggccaaaaggccagtgataagatacacctgcaaaggcggcacaacccagtgccacgttgtagttggata
gttggtgaaagagtaaatggctctctcaagcgtattcaacaagggtggaaggatcccagaaggatcccccattgtatgggtctgtatctg
gggctcgtgtcacatgctttacatgtgttttagtcgaggttaaaaaacgtctaggccccgaaccacggggacgtgtgtttctttgaaaaac
acgatgataatatggccacaacctgggaggcggaagcggcgagggtccctcgaggcaccatggtgagcaaggcgaggagctgttca
ccggggtggtgccatcctggtcgagctggacgacgtaaacggccacaagttcagcgtgtccggcgaggcgaggcgatgccacctta
cggcaagctgacctgaagttcatctgaccaccggcaagctgcccgtgcccggccaccctcgtgaccacctgacctacggcgtgcagt
cttcagccgctaccccgaccacatgaagcagcagcacttctcaagtcccatgcccgaaggctacgtccaggagcgaccatcttctcaa
ggacgacggcaactacaagaccgcccggaggtgaagttcgaggggcagaccctggtgaaccgcatcgagctgaaggcgatcgactcaa
ggaggacggcaacatcctggggcacaagctggagtacaactacaacagccacaacgtctatatcatggcgacaagcagaagaacggcat
caaggtgaacttcaagatccgccacaacatcgaggacggcagcgtgcagctcgccgaccactaccagcagaacacccccatggcgacgg
ccccgtgtgtgcccgacaaccatacctgagcaccagctccgctgagcaaagacccaacgagaagcgcatcacatggtctgtctggt
agttcgtgaccgcccgggatcactctcgcatggacgagctgtacaagtaacgctccgggtctagagctagcggtaccatgcattacgt
agtcgacgacttaattaagctagcctagtgcatttgtcagtggtctgtagggctttccccactgtttggcttctcagttatatggatgtgtg
tattggggccaagtctgtacagcatcttgagtcctttttaccgctgttaccattttcttcttgggtatatacttaaacctaacaaaac
aaagagatggggttactctctaaattttatgggttatgtcattggatgttatgggtccttgccacaagaacacatcatacaaaaaatcaaaga
atgttttagaaaacttcttataacaggcctattgattgaaagtatgtcaacgaattgtgggtcttttgggtttgtgcccctttacacaatgt
ggttatcctgctgtatgccttctgtatgcatgtattcaatcaagcaggtcttcaacttctcgcaacttacaaggccttctgtgtaacaatacc
tgaacctttacccgttcccggcaacggccaggtctgtccaagtgttctgtacgcaacccccactggctggggcttggtcatgggccatca
gcgcatgctggaaccttttggctcctctgccatccatactcggaactcctagccgctgttttctgcgacgaggtctggagcaaacatta
tcgggactgataactctgttctatcccgaataatacatctttccatggctgtaggctgtgtgccaactggatcctgcggggacgtcc
ttgtttacgtcccgctggcgctgaatcctgaggacgaccttctcggggtcgttgggactctctgtccccttctccgtctgctgacctgacgg
accacggggcgacactctctttacgaggactccccgtctgtccttctcatctgcccggaccgtgtgcaacttgccttccctctgcacgtcgatg
gagaccaccgtgaacgccaccacaaatattgccaaggtcttacataaggagactcttggaactctcagcaatgtcaacaccgaccttgaggc
atacttcaaagactgtttgttaagactgggaggaggtggggaggagattaggttaaaggcttctgtactaggaggctgtaggcataaatt
ggtctgcgaccagcaccatggcgcaatcactagagcgggtacctttaaagcaatgactacaaggcagctgtagatcttagccactttt
aaaagaaaagggggactggaagggttaattcactcccaacgaagacaagatctgttttctgtactgggtctctgtggttagaccagat
ctgagcctgggagctctctggctaactaggaacccactgctaagcctaataaagcttgccctgagtgcttcaagtagtgtgtgccgtctg
ttgtgtgactctggtaactagatccctcagacccttttagtcagtggtgaaaatctctagcagtagtagttcatgtcatctattattcagtat
ttataacttcaaagaatgaatatcagagagttagaggaactgtttatttcagcttataatggttacaataaagcaatagcatcacaaat
ttcaaaaataagcattttttcactgactttagttgtgtttgtccaaactcatcaatgtatcttatcatgtctggcttagctatccccccct
aactccgccatccccccctaactccgccagttccgccattctccgccatggctgactaatttttttatttatgcagaggccgaggccg
gatcccttgagtggtttcatcctggagcagactttgcagctgtggactgcaacacaacattgcctttatgttaactcttggctgaagctctta

Figure 11A (cont.)

caccaatgctggggacatgtacctccaggggcccaggaagactacgggaggctacaccaacgtcaatcagagggcctgtgtactacc
gataagcggaccctcaagagggcattagcaatagtgtttataaggccccctgttaattctgaagacgaaagggcctcgtgatacgcctatt
tttatagggttaatgtcatgataataatggtttcttagacgtcaggtggcacttttcggggaaatgtgcggaacccctattgtttattttctaa
atacattcaaatatgtatccgctcatgagacaataaccctgataaatgcttcaataattgaaaaaggaagagtatgagtattcaacatttc
cgtgtcgccttattccctttttgcgccattttgcttctgttttctcaccagaacgctggtgaaagtaaaagatgctgaagatcagttg
gggtgcacgagtgggttacatcgaactggatctcaacagcggtaagatccttgagagtttcgccccgaagaacgtttccaatgatgagcact
tttaaagttctgtatgtggcggttattatccgtgttgacgccgggcaagagcaactcggtcgcccatatactattctcagaatgacttgg
ttgagtactcaccagtcacagaaaagcatcttacggatggcatgacagtaagagaattatgcagtgtgcataacatgagtataacact
gcggccaacttacttctgacaacgatcggaggaccgaaggagctaaccgctttttgcacaacatgggggatcatgtaactcgccttgatcgt
tgggaaccggagctgaatgaagccatacacaacgacgagcgtgacaccacgatccctgcagcaatggcaacaacgttgcgcaaaactatta
actggcgaactacttactctagcttcccgcaacaattaatagactggatggaggcggataaagttgcaggaccacttctgcctcggccctt
ccggctggctggtttattgctgataaatctggagcgggtgagcgtgggtctcgcggtatcattgcagcactggggccagatggttaagccctcc
cgtatcgtagtattctacacgacggggagtcaggcaactatggatgaacgaatagacagatcgctgagataggtgcctcactgattaagca
ttgtaactgtcagaccaagtttactcatatatacttttagattgatttaaaacttcatttttaatttaaaaggatctagggtgaagatccttttgat
aatctcatgacaaaaatcccttaacgtgagtttctgtccactgagcgtcagacccgtagaaaagatcaaaggatcttcttgagatccttttt
tctgcgctaactctgtgcttgcaacaaaaaaaccaccgctaccagcgggtgtgtttgtccggatcaagagctaccaactcttttccgaag
gtaactggcttcagcagagcgcagatacacaatactgtcctttagttagccgtagtagccaccacttcaagaactctgtagcaccgcct
acatacctcgtctgctaactcgtttaccagtggtgctgctccagtgccgataagtcgtgtcttaccgggttgactcaagacgatagttaccgg
ataaggcgcagcggctgggctgaacggggggttctgtcacacagcccagcttgagcgaacgacctacaccgaactgagatacctacagc
gtgagcattgagaagcgccacgcttccgaaggagaaaggcggacaggtatccggtgaagcggcagggtcggaacaggagagcgcacg
aggagcttccaggggaaacgcctggtatctttatagtcctgtcgggttcgccacctctgacttgagcgtcgattttgtgatgctcgtcagg
ggggcggagcctatgaaaaacgccagcaacggccttttacgggtcctggccttttctggccttttgaagctgtccctgatggtcgtcat
ctacctgctggacagcatggcctgaacgcggcatcccgatccgcccgaagcgagaagaatcataatggggaaggccatccagcctcg
cgtcg

Figure 11B**PLV4301G19H9 (also referred to as pLV4301G PDLV scFV 19H9) (SEQ ID NO:38)**

cgataaccctaattcgatagcatatgcttccgttgggtaacatatgctattgaattagggttagtctggatagtatatactactaccgggaa
gcatatgctaccggttaggttcaccgggtgatgccggccacgatgcgtccggcgtagaggatctaattgtagttagctcactcattaggcacc
ccaggctttacactttatgcttccggctcgtatgttgtgtggaattgtgagcggataacaatttcacacaggaaacagctatgacctgattac
gccaagcgcgaattaaccctcactaaagggaacaaaagctggagctgcaagcttaattgtagtcttatgcaatactctttagtcttgaaca
tggtaacgatgagttagcaacatgccttacaaggagagaaaaagcaccgtgcatgccgattgggtggaagtaagggtgtacgatcgtgcctta
ttaggaaggcaacagacgggtctgacatggattggacgaaccactgaattgccgattgcagagatattgtattaaagtcctagctcgatac
ataaacgggtctctctggttagaccagatctgagcctgggagctctctggctaactagggaaccactgcttaagcctcaataaagcttcctt
gagtgtctcaagtgtgtgtcccgtctgtgtgtgactctgtaactagagatccctcagacccttttagtcagtgtggaataatcttagcagt
ggcggccgaacaggacttgaagcgaagggaacacagaggagctctctgcagcaggactcggcttctgaagcgcgcacggcaaga
ggcgaggggcgcgactggtgagtacgcaaaaaatttgactagcggaggctagaaggagagagatgggtgcgagagcgtcagtattaa
cgggggagaattagatcgcatgggaaaaaattcggttaaggccaggggggaagaaaaataaaataaaacatatagtatgggcaagc
aggagctagaacgattcgcatgtaaatcctggcctgttagaaacatcagaaggctgtagacaaatactgggacagctacaacctcccttca
gacaggatcagaagaacttagatcattatataatacagtagcaacctctattgtgtgcatcaaaggatagagataaaagacaccaaggaa
gctttagacaagatagaggaaagcaaaacaaaagtaagaccaccgcacagcaagcggcgtgatcttcagacctggaggaggagata
tgagggaacaattggagaagtgaattatataataataaagtagtaaaattgaaccattaggagtagcaccaccaaggcaagagaagag
tggtgcagagagaaaaagagcagtggaataggagcttggcttctgggttctgggagcagcaggaaagcactatggcgagcgtcaat
gacgtgacggtagcggccagacaattattgtctgtatagtcagcagcagaacaatttgtaggggctattgaggcgcaacagcatctgtt
gcaactcacagtctggggcatcaagcagctccaggcaagaatcctggctgtggaagatacctaaggatcaacagctcctggggatttgg
ggtgtcttggaaaactatttgcaccactgctgtccttggaaatgtagttggagtaataaatcttggaaacagatttggaaatcacacgacct
ggatggagtgggacagagaaattaacaattacacaagcttaatacactccttaattgaagaatcgaaaaccagcaagaaaaaatgaac
aagaattattggaattagataaatgggcaagtttgggaattgggttaacatacaaaattggctgtgtatataaaattattcataatgatagt
aggaggcttggtaggtttaagaatagttttgtgtacttttatagtgaaatagagttaggcagggatattcaccattatcgtttcagaccacc
tcccaaccccgaggggacccgacaggcccgaaggaaatagaagaagaaggtggagagagagacagagacagatccattcgattagtgaac
ggatctcgacggtatcggttttaaaagaaaagggggattggggggtacagtgcaggggaaagaatagtagacataatagcaacagacat
acaaactaaagaattacaaaaacaaattacaaaaattcaaaatttatcgattttatttagtctccagaaaaaggggggaatgaagacccc
acctgtaggtttggcaagctagcttaagtaacgccattttgcaaggcatggaaaatacataactgagaatagagaagttcagatcaaggtta
ggaacagagagacagcagaatatgggccaacaggatatctgtgtaagcagttcctgccccggctcaggggccaagaacagatggtcccc
agatcggtcccgccctcagcagtttctagagaacctcagatgttccagggtgccccaggacctgaaatgacctgtgccttatttgaact
aaccaatcagttcgttctcgttctgttgcgcgcttctgtctcccgagctcaataaaagagcccacaacccctcactcggcgcgagctcct
ccgatagactgcgtcgccgggtaccgatatcaccaactttgtacaaaaagctgaacgatatcgccacctgggagcacagccattctgg
ccctgtctgtgagtgctgcaggcggtgtcagctGaagtgcagctgggtggaatctggcggcggactggtgcagcctggcggtatcttgaga
ctgagctgtgccccagcggttcaccttcagcaactacgcatgagctgggtgcgcccaggcccctggaaaaggcctggaatgggtgtccac
catcagcggctctggcggaaccactactacgcatagcgtgaaggccggttcacatctccgggacaacagcaagaacacctgtac
ctgcagatgaacagcctgcggtggaagataccgctgtactactcgccaaggactggttcagaagcagcagccccgacgcttcgaca
tctggggccagggaacaacctgacgtgtctgtggtggagggagcagcggcgaggatcagggggaggcggaagcgagcacctt
cttacgtgtgacctgacccccctagcgtgtcagtggtcctggacagaccgccaagaatcacctgtggcggaacaacatcgccggaagatc
gtcactggtatcagcagaggcccgacaggctccgtgtctgtatctactacgacaccgacagacctgcccgcacccccgagagattcag
cggcagcaacagcggcaacatggccaccctgacctcagcacagtgaggagccggcgacgagccgactactactgtcaagtgtgggacac
cggcagcgtacacgtgtgttggaggcggaaccaagctgacagtgtgggcccggggccaactttgtatacaaaagtgtcagcgagagc
aagtacggccctccctgcccccttgcctgccccgagttcctggcgagaccagcgtgttctgttccccccaagccaaggacacctga
tgatcagccggacccccgaggtgacctgtgtgtgtggacgtgtccagggagacccccgaggtccagttcaactggtacgtggacggcgtg

Figure 11B (cont.)

gagggtgcacaacccaagaccaagccccgggaggagcagttcaatagcacctaccgggtggtgtccgtgctgaccgtgctgcaccaggact
ggctgaacggcaaggaatacaagtgtaagggttccaacaagggcctgccagcagcatcgagaaaaccatcagcaaggccaaggccag
cctcgggagccccagggtgtacacctccccctagccaagaggagatgaccaagaatcagggtgtccctgacctgctgggtgaagggttcta
ccccagcgacatcgccgtggagtgaggagagcaacggccagcccgagaaactacaagaccacccccctgtgtggacagcgacggcag
cttcttctgtacagcaggctgacctggacaagagccgggtggcaggagggaacgtctttagctgctccgtgatgcacgaggccctgcaca
accatacaccagaagagcctgtccctgagcctgggcaagatgttcagatcttgtgatattacatctgggcacccctggccggaatctgcgt
ggcccttctgtcttctgtatcatcactctcatctgctacggctccaccagcggctccggcaagccggctctggcgagggtccaccagcggc
gactacaaggacgacgatgacaagtaataaggatcggttcagcttctgtacaaagttgggattcgagttaattaagttaacgaattcccc
ccctctccctccccccccctaactgtactggccgaagccgcttgaataaggccgggtgtgcgtttgtctatatgttattttccaccatattgcg
tcttttggcaatgtgagggcccgaaacctggccctgtcttctgacgagcattcctaggggtcttccctctcgccaaaggaatgaaggtct
gttgatgtcgtgaagggaagcagttcctctggaagcttctgaagacaaacacgtctgtagcgacctttgcaggcagcggaacccccac
ctggcgacaggtgctctcgcccaaaagccacgtgtataagatacacctgcaaaggcggcacaacccagtgccacgttgtgagtggata
gttggtaaagagtaaatggctctctcaagcgtattcaacaaggggctgaaggatgccagaaggatcccatgtatgggatctgatctg
gggctcgtgacatgctttacatgtgttagtcgaggttaaaaaacgtctagggccccgaaccacggggacgtggttttcttgaaaaac
acgatgataatatggccacaacctgggagggcggaagcggcgagggtccctcgaggcacatgggtgagcaaggcgaggagctgttca
ccgggggtggtgccatcctggtcgagctggagcgcgacgtaaacggccacaagttcagcgtgtccggcgaggcgaggcgaggtgccaccta
cggcaagctgacctgaagttcatctgcaccaccggcaagctgcccgtgcccggccaccctcgtgaccaccctgacctacggcgtgcagt
cttcagccgtacccccaccacatgaagcagcagcacttctcaagtcgccatgcccgaaggctacgtccaggagcgcaccatcttctcaa
ggacgacggcaactacaagaccgcccgaagtggaagttcgaggggcagaccctggtgaaccgcatcgagctgaaggcgatcgactcaa
ggaggacggcaacatcctggggcacaagctggagtacaactacaacagccacaacgtctatatcatggcgacaagcagaagaacggcat
caaggtgaacttcaagatccgccacaacatcgaggacggcagcgtcgagctcgccgaccactaccagcagaacacccccatggcgacgg
ccccgtgctgctcccgacaacctacactgagcaccacgtccgcttagcaagacccaacgagaagcgatcacatggtctctgctgg
agttcgtgaccgcccgggacatctcggcatggacgagctgtacaagtaacgctccgggtctagagctagcggtaccatgcattacgt
agtcgacgacttaattaagctagcctagtgcatttgttcagtggttcgtagggttccccactgtttggctttcagttatatggatgatgtg
tattggggccaagtctgtacagcatcttgagtcctttttaccgtgttaccatttttctttgtctttgggtatacatttaaaccttaacaaac
aaagagatggggttactctctaaattttatgggttatgtcattggatgttatgggtccttgcacaagaacacatcataaaaaatcaaaga
atgttttagaaaacttctattaaacaggcctattgattgaaagtatgtcaacgaattgtgggtcttttgggtttgtgccccctttacacaatgt
ggttatcctgctgttatgccttgtatgcatgtattcaatcaagcaggttttacttctcgcacactacaaggccttctgtgtaacaatacc
tgaacctttacccgttcccggcaacggccaggtctgtccaagtgttctgacgcaacccccactggctggggcttggtcatgggcatca
gcgcatgctggaaccttttgggtcctctgccgatccatactcggaactcctagccgctgttttctcgcagcaggtctggagcaaacatta
tcgggactgataactctgttcttatcccgaataatacatggttccatggctgtaggtgtgctgccaactggatcctgcggggacgtcc
ttgtttacgtcccgctggcgctgaatcctcgggacgaccttctcgggtgcttgggactctctgctcccttctccgtctgctgctccgacgg
accagggcgccacctctttacgaggactccccgtctgtccttctcatctgcccggaccgtgtgcacttcgcttcacctctgcacgtcgatg
gagaccaccgtgaacgccaccaaataattgccaaaggtcttacataagaggactctggactctcagcaatgtcaacgaccgaccttgaggc
atacttcaaagactgtttgttaagactgggaggagttggggaggagattaggttaaaggctttgtactaggaggctgtaggcataaatt
ggtctcgccaccagcaccatggcgcaatcactagagcgggtacctttaaagcaatgacttacaaggcagctgtagatcttagccactttt
aaaagaaaaagggggactggaagggttaattcactccaacgaagacaagatctgcttttctgtactgggtctctctggttagaccagat
ctgagcctgggagctctctggctaactagggaacccactgcttaagcctcaataaagcttgccttgagtgttcaagtagtgtgtcccgtctg
ttgtgtgactctggttaactagagatccctcagacccttttagtcagtggtgaaaatcttagcagtagtagttcatgtcatctattattcagtat
ttataactgcaaagaaatgaatatcagagagttagaggaaactgtttattgagcttataatggttaacaaataaagcaatagcatcacaat
ttcacaataaagcattttttcactgactttagttgtgttgcacaaactcatcaatgtatcttcatgtctggcttagctatccccccct
aactccgccatccccccctaactccgccagttccgccattctcgcgccatggctgactaattttttatttatgagagggccgaggccg
gatcccttgagtggtttcatcctggagcagactttgcagctgtggactgcaacacaacattgcctttatgtgaactcttggtgaagctctta

Figure 11B (cont.)

caccaatgctggggacatgtacctccaggggcccaggaagactacgggaggctacaccaacgtcaatcagaggggcctgtgtagctacc
gataagcggaccctcaagagggcattagcaatagtgtttataaggccccctgttaattctgaagacgaaagggcctcgtgatacgcctatt
tttatagggttaatgtcatgataataatggtttcttagacgtcaggtggcacttttcggggaatgtgcggaacccctattgtttattttctaa
atacattcaaatatgtatccgctcatgagacaataaccctgataaatgcttcaataattgaaaaaggaagagtatgagtattcaacatttc
cgtgtcgccttattccctttttgcgcattttgcttctgttttctcaccagaaacgctggtgaaagtaaaagatgctgaagatcagttg
gggtcacgagtggtgtacatcgaactggatctcaacagcggtaagatccttgagagtttcgccccgaagaacgtttccaatgatgagcact
tttaaagttctgctatgtggcggttattatccgtgttgacgccgggcaagagcaactcggtcgcccatatactattctcagaatgacttgg
ttgagtactcaccagtcacagaaaagcatcttacggatggcatgacagtaagagaattatgcagtgtgcataacatgagtataacact
gcggccaacttacttctgacaacgatcggaggaccgaaggagctaaccgtttttgcacaacatgggggatcatgtaactcgccttgatcgt
tgggaaccggagctgaatgaagccatacacaacgacgagcgtgacaccacgatccctgcagcaatggcaacaacgttgcgcaaaactatta
actggcgaactacttactctagcttcccgcaacaattaatagactggatggaggcggataaagtgcaggaccacttctgcctcgccctt
ccggctggctggtttattgctgataaatctggagcgggtgagcgtgggtctcgcggtatcattgcagcactggggccagatggttaagccctcc
cgtatcgtagtattctacacgacggggagtcaggcaactatggatgaacgaatagacagatcgctgagataggtgcctcactgattaagca
ttgtaactgtcagaccaagtttactcatatatacttttagattgtttaaaacttcatttttaatttaaaaggatctagggtgaagatccttttgat
aatctcatgacaaaaatcccttaacgtgagtttctgtccactgagcgtcagacccgtagaaaaagatcaaaggatcttcttgagatccttttt
tctgcgctaactctgctgttgcaacaaaaaaaccaccgtaccagcgggtgtgtttgtccggatcaagagctaccaactctttttcgaag
gtaactggcttcagcagagcgcagatacacaatactgtcctttagttagccgtagtaggaccacttcaagaactctgtagcaccgcct
acatacctcgtctgctaactcgtttaccagtggtcgtcgcagtgcgataagtcgtgtcttaccgggttgactcaagacgatagttaccgg
ataaggcgcagcggctgggctgaacggggggttctgtcacacagcccagcttgagcgaacgacctacaccgaactgagatacctacagc
gtgagcattgagaagcgccacgcttccgaaggagaaaggcggacaggtatccggttaagcggcagggcgtggaacaggagagcgcacg
aggagccttcagggggaaacgcctggtatctttatagtcctgtcgggttcgccacctctgacttgagcgtcgattttgtgatgctcgtcagg
ggggcggagcctatgaaaaacgccagcaacggccttttacgggtcctggccttttctggcctttttgaagctgtccctgatggtcgtcat
ctacctgctggacagcatggcctgaacgcggcatcccgatccgccggaagcgagaagaatcataatggggaaggccatccagcctcg
cgtcg

Figure 12

	19H9	38A1
Cell Conc. (per ml)	3.23e6	2.99e6
Volume	120 mL	120 mL
Total Cells	3.88E+08	3.59E+08
aPDL1 Conc.	31.76 ug/mL	20.20 ug/mL
Total aPDL1 (mg)	3.81	2.42
Secretion capacity (ug per 1e6 cells)	9.82	6.75

Figure 13A

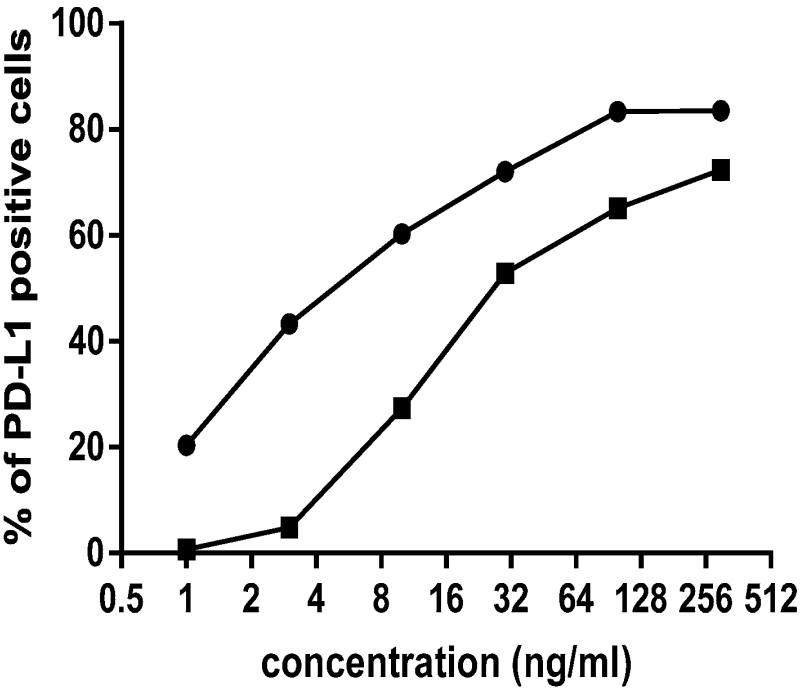


Figure 13B

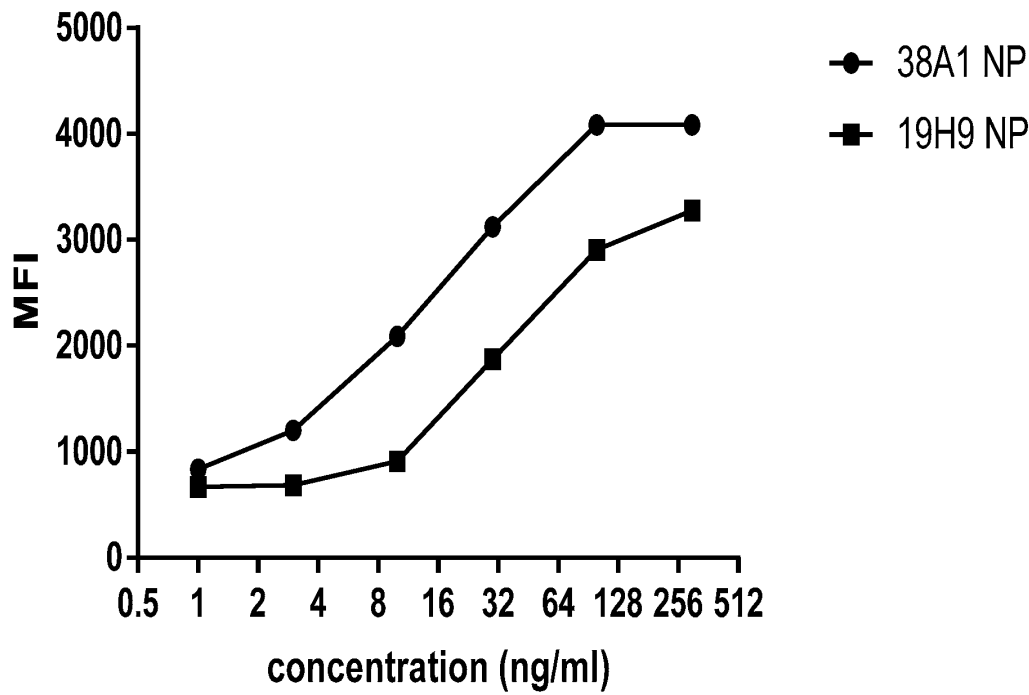


Figure 14A

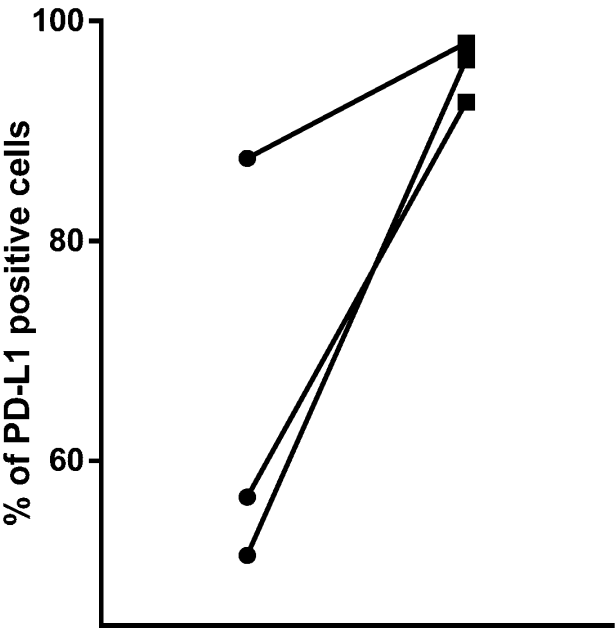


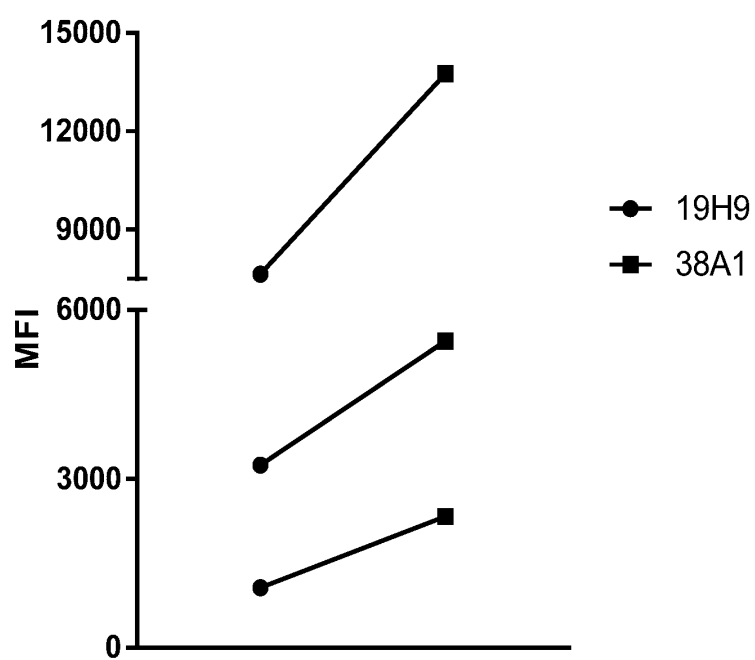
Figure 14B

Figure 15A

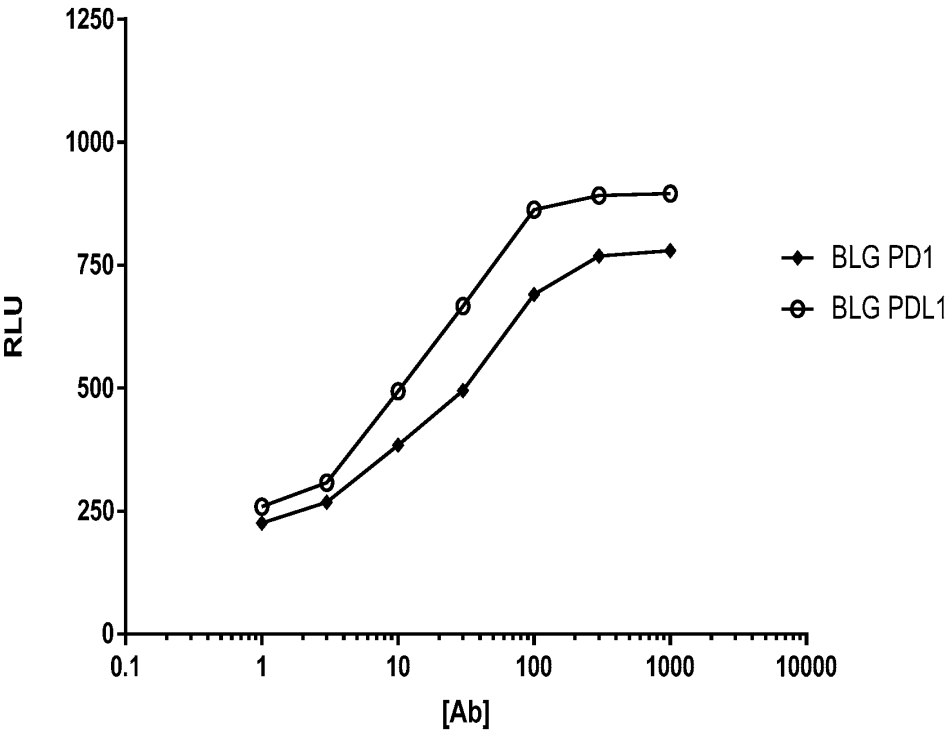


Figure 15B

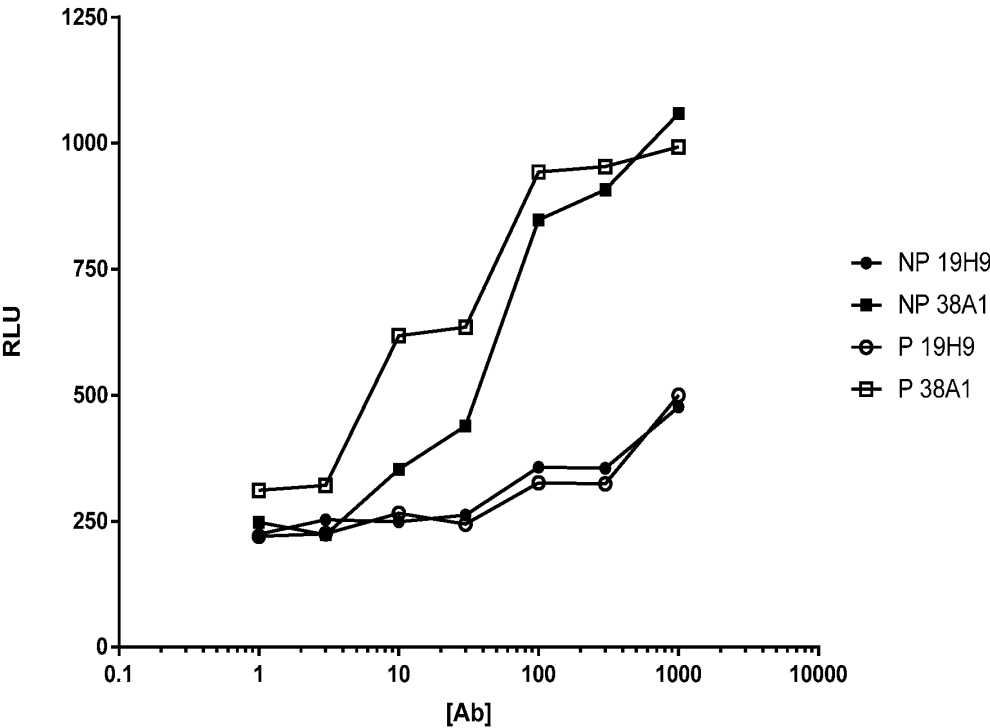


Figure 16A

pLV4301G PDLV scFV 38A1

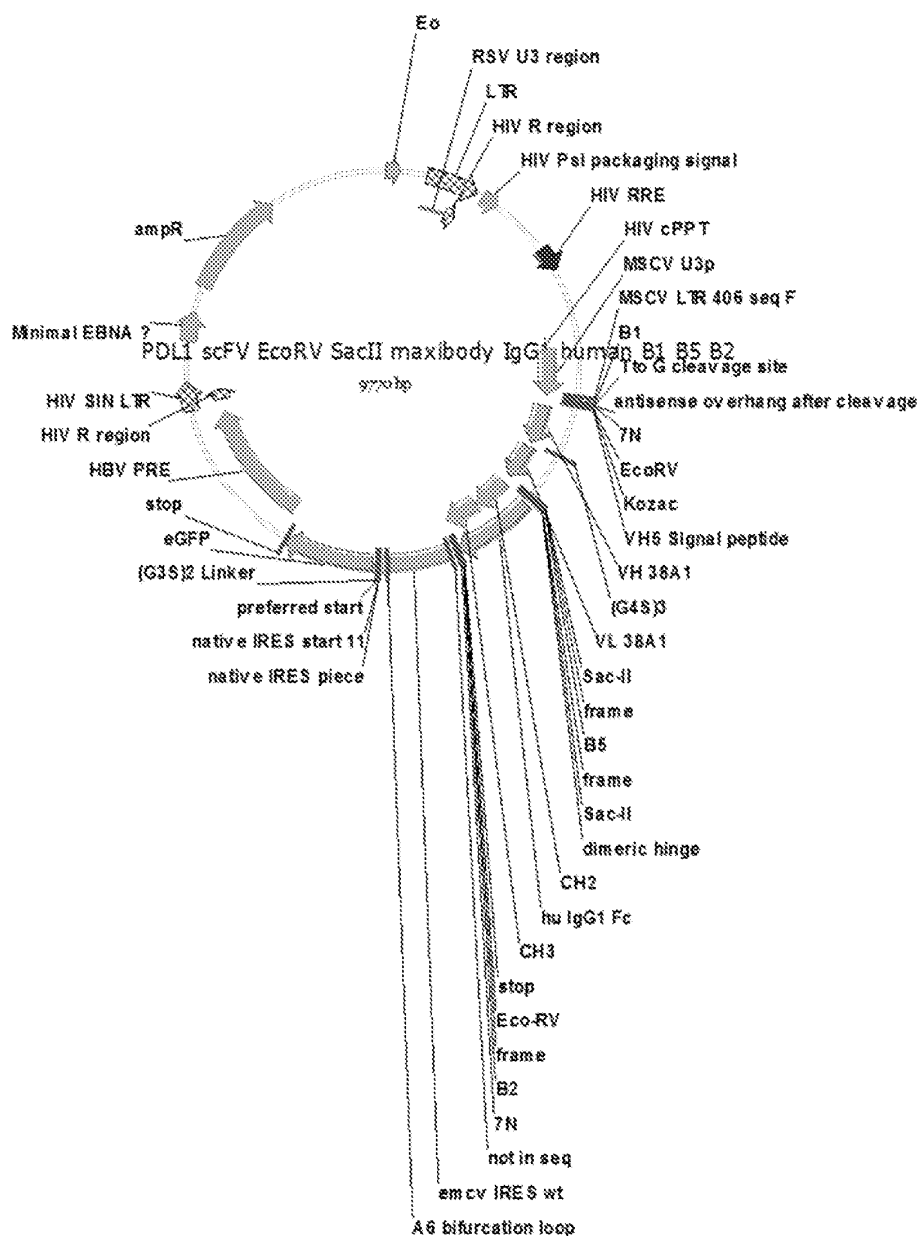


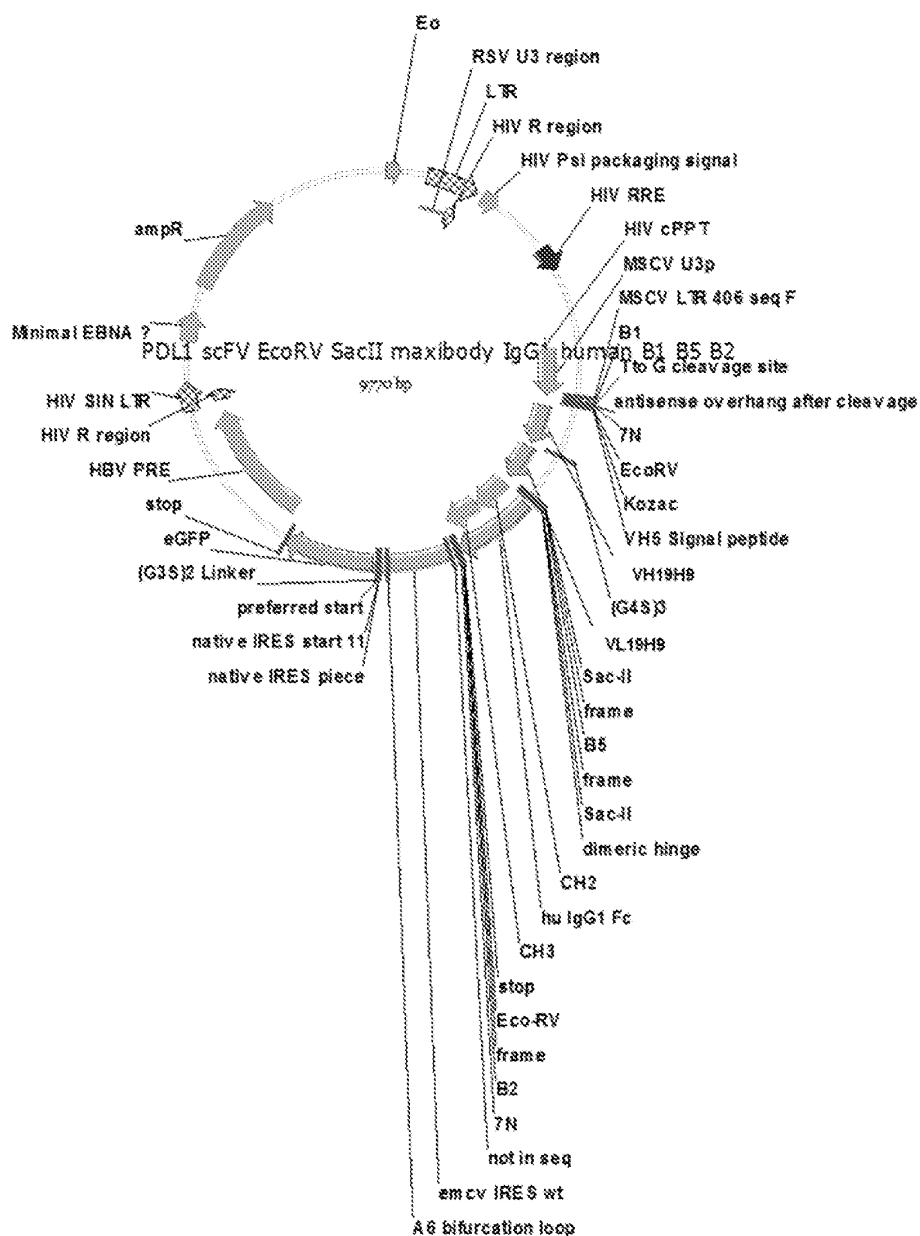
Figure 16B**pLV4301G PDLV scFV 19H9**

Figure 17

CH1																	
EU Index	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134
IgG1	A	S	T	K	G	P	S	V	F	P	L	A	P	S	S	K	S
IgG2	A	S	T	K	G	P	S	V	F	P	L	A	P	C	S	R	S
IgG3	A	S	T	K	G	P	S	V	F	P	L	A	P	C	S	R	S
IgG4	A	S	T	K	G	P	S	V	F	P	L	A	P	C	S	R	S
EU Index	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155
IgG1	T	A	A	L	G	C	L	V	K	D	Y	F	P	E	P	V	T
IgG2	T	A	A	L	G	C	L	V	K	D	Y	F	P	E	P	V	T
IgG3	T	A	A	L	G	C	L	V	K	D	Y	F	P	E	P	V	T
IgG4	T	A	A	L	G	C	L	V	K	D	Y	F	P	E	P	V	T
EU Index	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176
IgG1	S	G	A	L	T	S	G	V	H	T	F	P	A	V	L	Q	S
IgG2	S	G	A	L	T	S	G	V	H	T	F	P	A	V	L	Q	S
IgG3	S	G	A	L	T	S	G	V	H	T	F	P	A	V	L	Q	S
IgG4	S	G	A	L	T	S	G	V	H	T	F	P	A	V	L	Q	S
EU Index	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197
IgG1	S	L	S	S	V	V	T	V	P	S	S	S	L	G	T	Q	T
IgG2	S	L	S	S	V	V	T	V	P	S	S	N	F	G	T	Q	T
IgG3	S	L	S	S	V	V	T	V	P	S	S	S	L	G	T	Q	T
IgG4	S	L	S	S	V	V	T	V	P	S	S	S	L	G	T	K	T
EU Index	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218
IgG1	V	N	H	K	P	S	N	T	K	V	D	K	K	V	E	P	K
IgG2	V	D	H	K	P	S	N	T	K	V	D	K	T	V	E	R	K
IgG3	V	N	H	K	P	S	N	T	K	V	D	K	R	V	E	L	K
IgG4	V	D	H	K	P	S	N	T	K	V	D	K	R	V	E	S	K
Hinge																	
EU Index	221				222	223	224	225		226	227	228	Fc >				
IgG1	D				K	T	H	T	C	P	P						
IgG2					V		E		C	P	P						
IgG3	L	G	D	T	T	H	T	C	P	R	C	P	E	P	K	S	C
IgG4						P	P	C	P	S							
EU Index																	
IgG1																	
IgG2																	
IgG3	P	C	P	R	C	P	E	P	K	S	C	D	T	P	P	C	P
IgG4																	
EU Index														229	230	231	232
IgG1														C	P	A	P
IgG2														C	P	A	P
IgG3	E	P	K	S	C	D	T	P	P	P	C	P	R	C	P	A	P
IgG4														C	P	A	P

Figure 17 (cont.)

CH2	
EU Index	237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257
IgG1	G P S V F L F P P K P K D T L M I S R T P
IgG2	G P S V F L F P P K P K D T L M I S R T P
IgG3	G P S V F L F P P K P K D T L M I S R T P
IgG4	G P S V F L F P P K P K D T L M I S R T P
EU Index	258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278
IgG1	E V T C V V V D V S H E D P E V K F N W Y
IgG2	E V T C V V V D V S H E D P E V  F N W Y
IgG3	E V T C V V V D V S H E D P E V  F N W Y
IgG4	E V T C V V V D V S  E D P E V  F N W Y
EU Index	279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299
IgG1	V D G V E V H N A K T K P R E E Q V N S T
IgG2	V D G V E V H N A K T K P R E E Q  N S T
IgG3	V D G V E V H N A K T K P R E E Q Y N S T
IgG4	V D G V E V H N A K T K P R E E Q  N S T
EU Index	300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320
IgG1	Y R V V S V L T V L H Q D W L N G K E Y K
IgG2	 R V V S V L T V  H Q D W L N G K E Y K
IgG3	 R V V S V L T V L H Q D W L N G K E Y K
IgG4	Y R V V S V L T V L H Q D W L N G K E Y K
EU Index	321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340
IgG1	C K V S N K A L P A P I E K T I S K A K
IgG2	C K V S N K  L P A P I E K T I S K  K
IgG3	C K V S N K A L P A P I E K T I S K  K
IgG4	C K V S N K  L P  I E K T I S K A K
CH3	
EU Index	341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361
IgG1	G Q P R E P Q V Y T L P P S R D E L T K N
IgG2	G Q P R E P Q V Y T L P P S R  E  T K N
IgG3	G Q P R E P Q V Y T L P P S R  E  T K N
IgG4	G Q P R E P Q V Y T L P P S  E  E  T K N
EU Index	362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382
IgG1	Q V S L T C L V K G F Y P S D I A V E W E
IgG2	Q V S L T C L V K G F Y P S D I A V E W E
IgG3	Q V S L T C L V K G F Y P S D I A V E W E
IgG4	Q V S L T C L V K G F Y P S D I A V E W E
EU Index	383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403
IgG1	S N Q Q P E N N Y K T T P P V L D S D G S
IgG2	S N Q Q P E N N Y K T T P P  L D S D G S
IgG3	S  G Q P E N N Y  T T P P  L D S D G S
IgG4	S N Q Q P E N N Y K T T P P V L D S D G S
EU Index	404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424
IgG1	F F L Y S K L T V D K S R W Q Q G N V F S
IgG2	F F L Y S K L T V D K S R W Q Q G N V F S
IgG3	F F L Y S K L T V D K S R W Q Q G N  F S
IgG4	F F L Y S  L T V D K S R W Q  G N V F S
EU Index	425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445
IgG1	C S V M H E A L H N H Y T Q K S L S L S P
IgG2	C S V M H E A L H N H Y T Q K S L S L S P
IgG3	C S V M H E A L H N  T Q K S L S L S P
IgG4	C S V M H E A L H N H Y T Q K S L S L S 
EU Index	446 447
IgG1	G K
IgG2	G K
IgG3	G K
IgG4	G K