

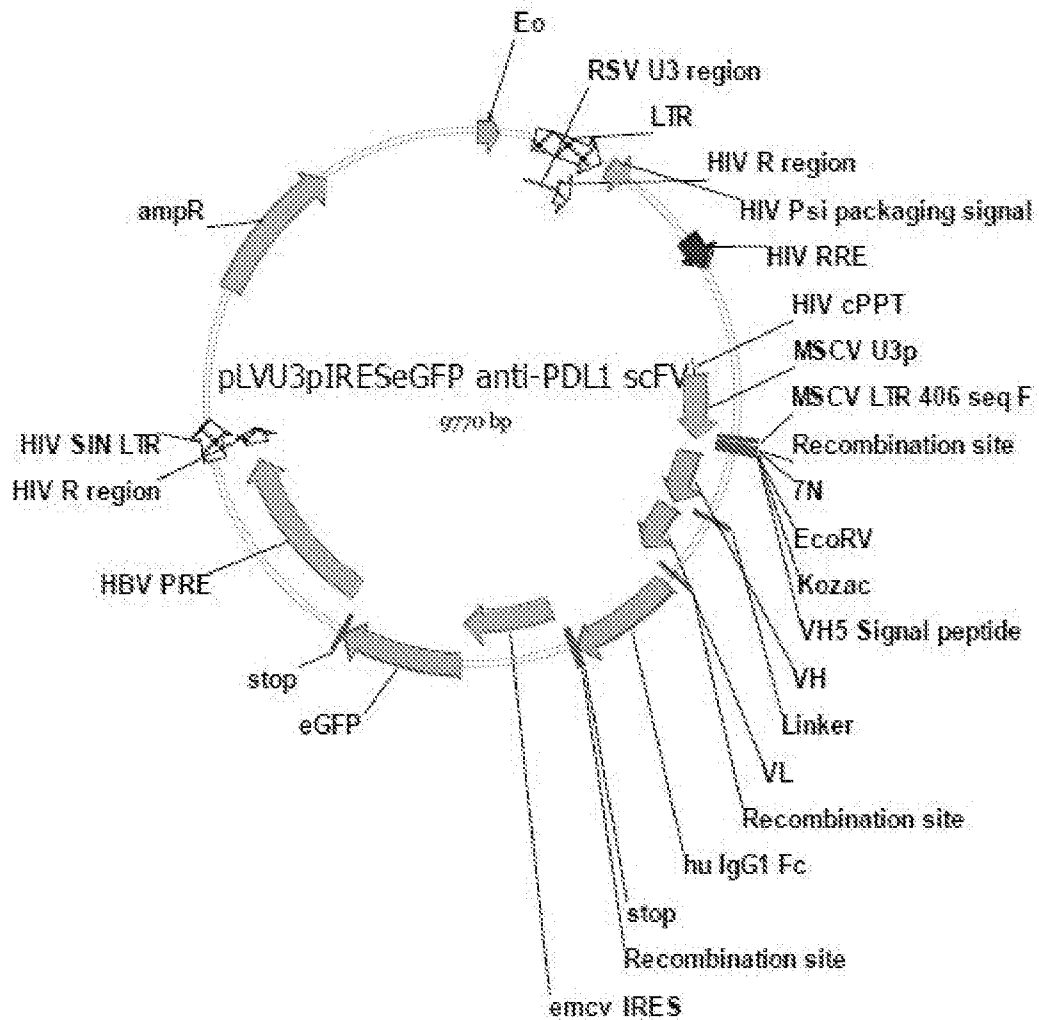
**Figure 1**

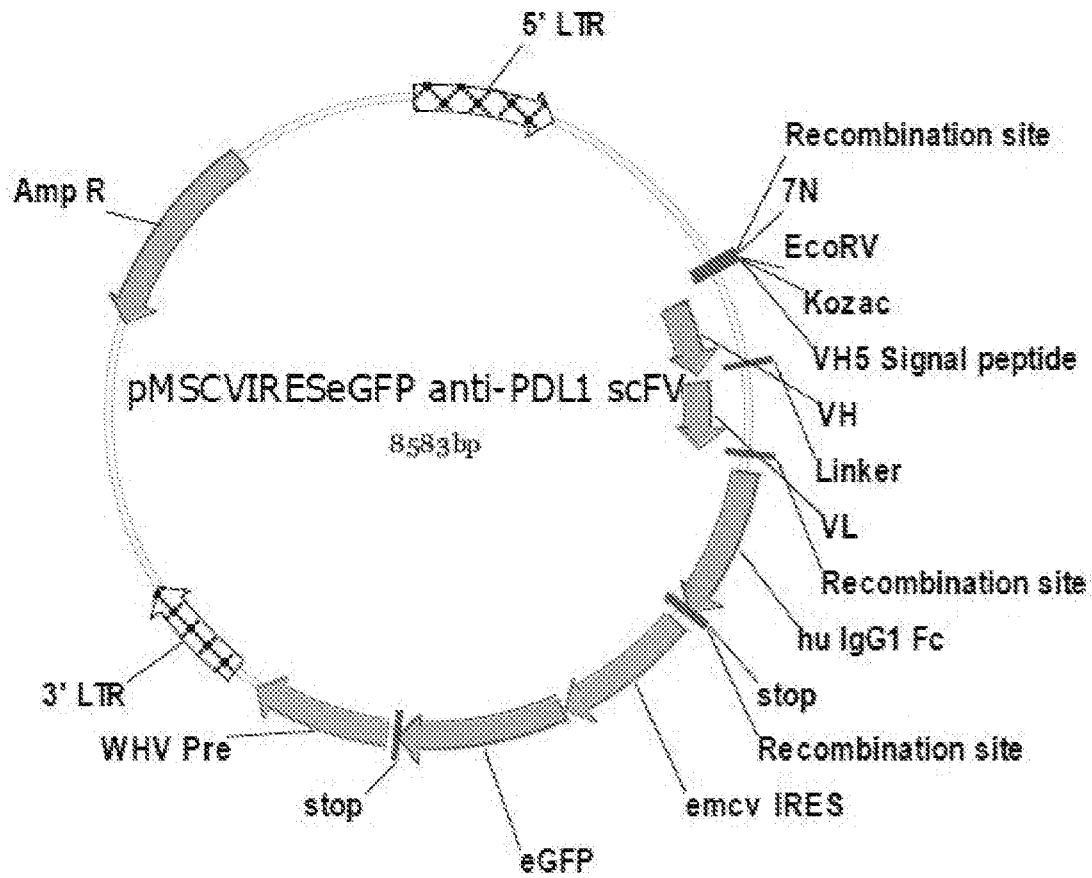
**Figure 2**

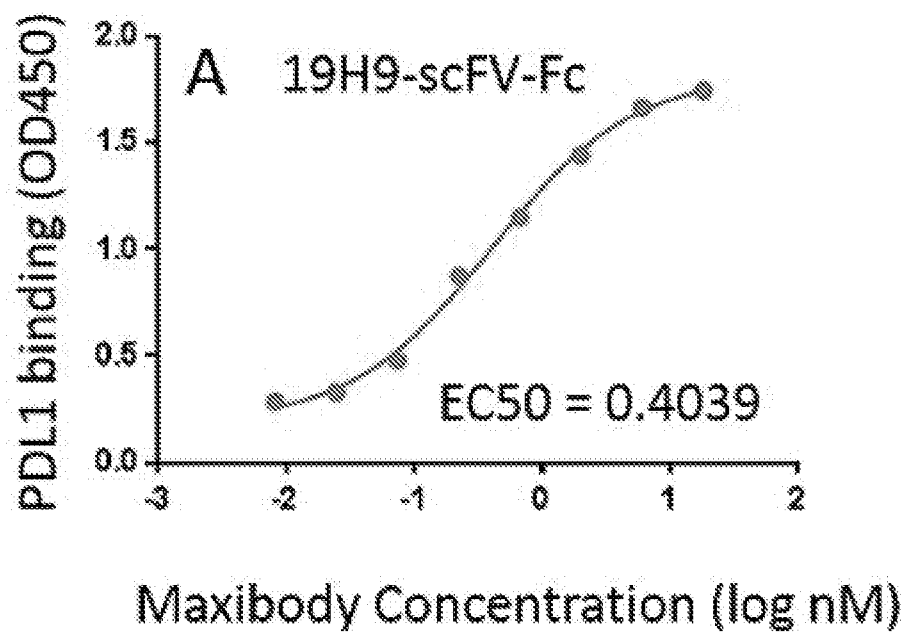
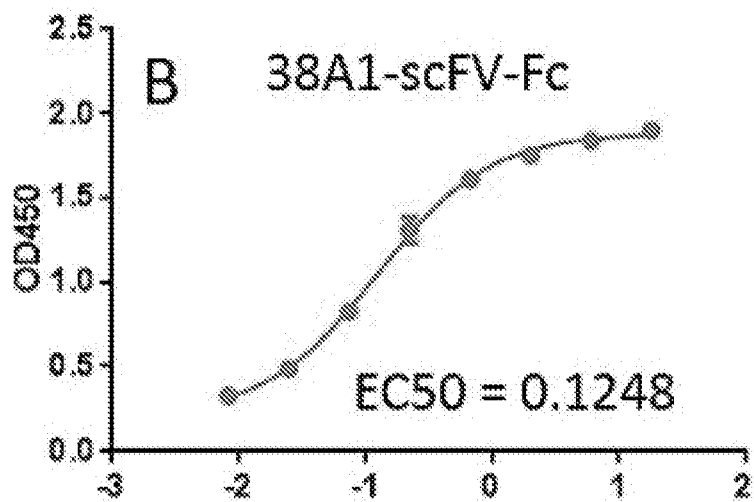
**Figure 3**

Figure 4

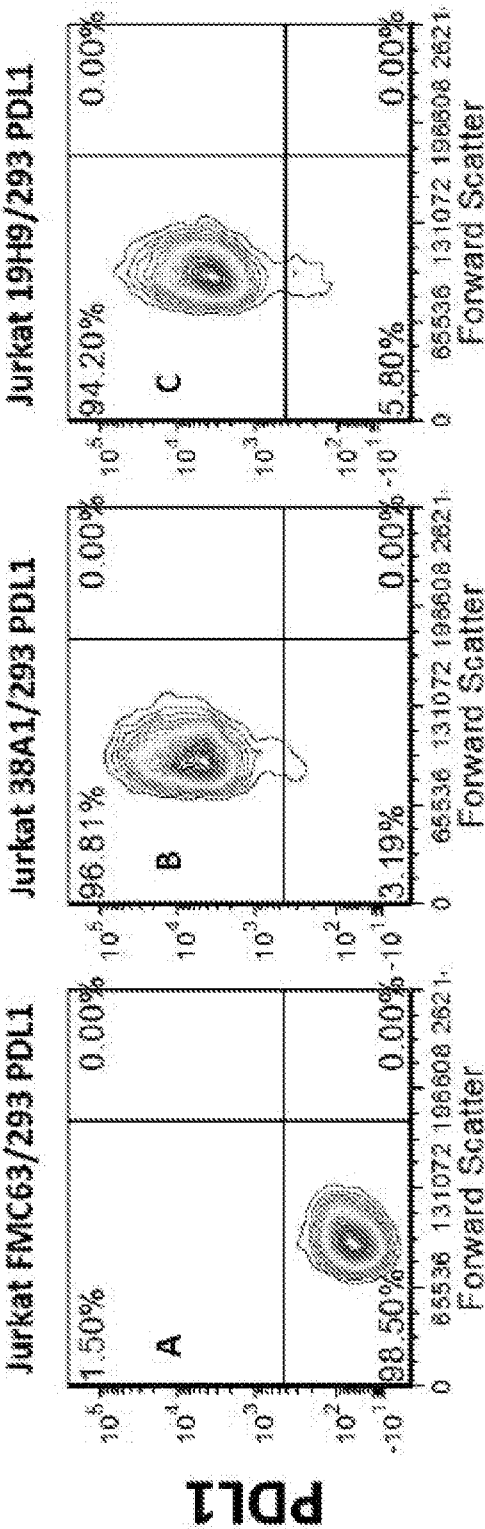


Figure 5

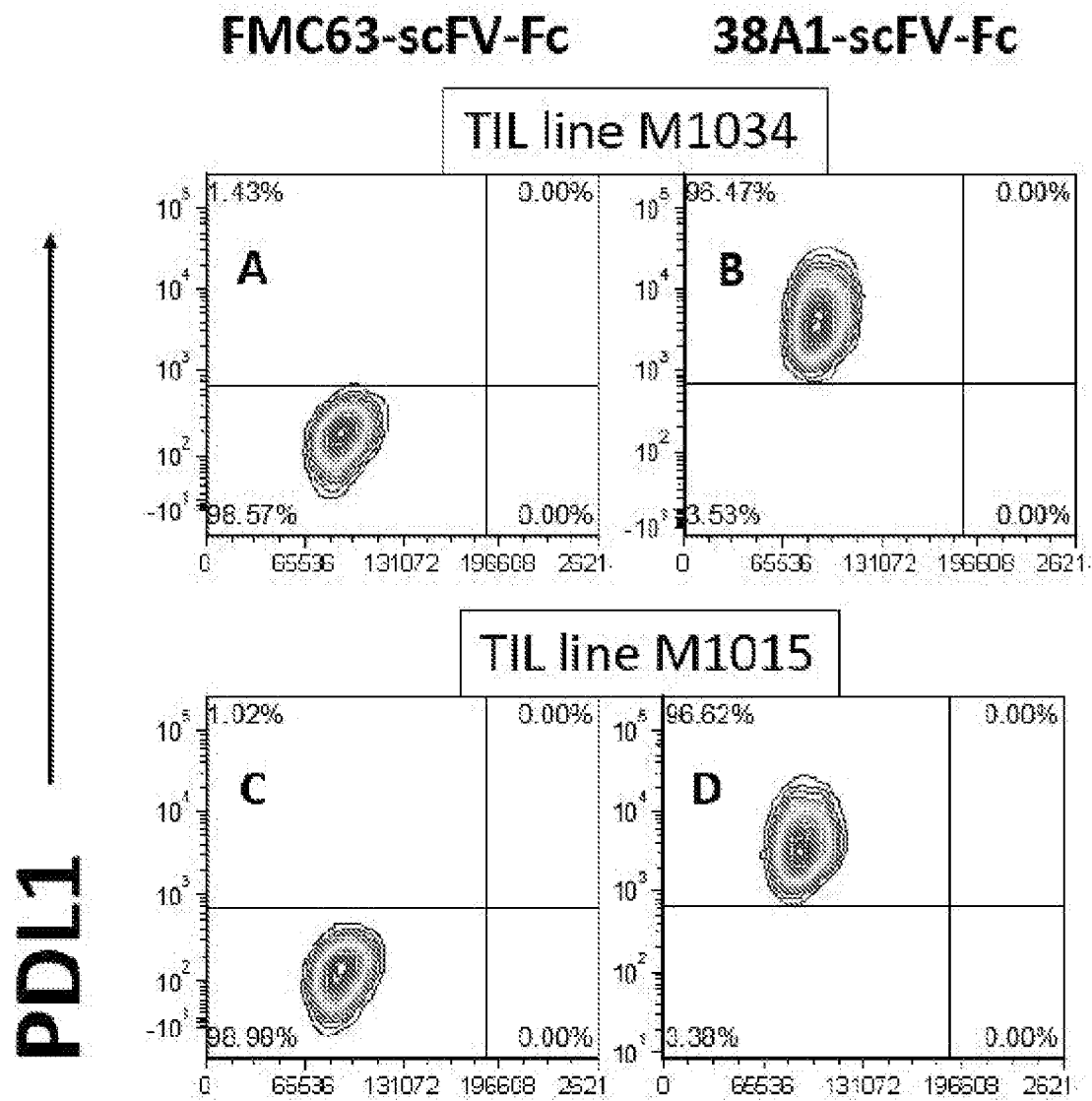


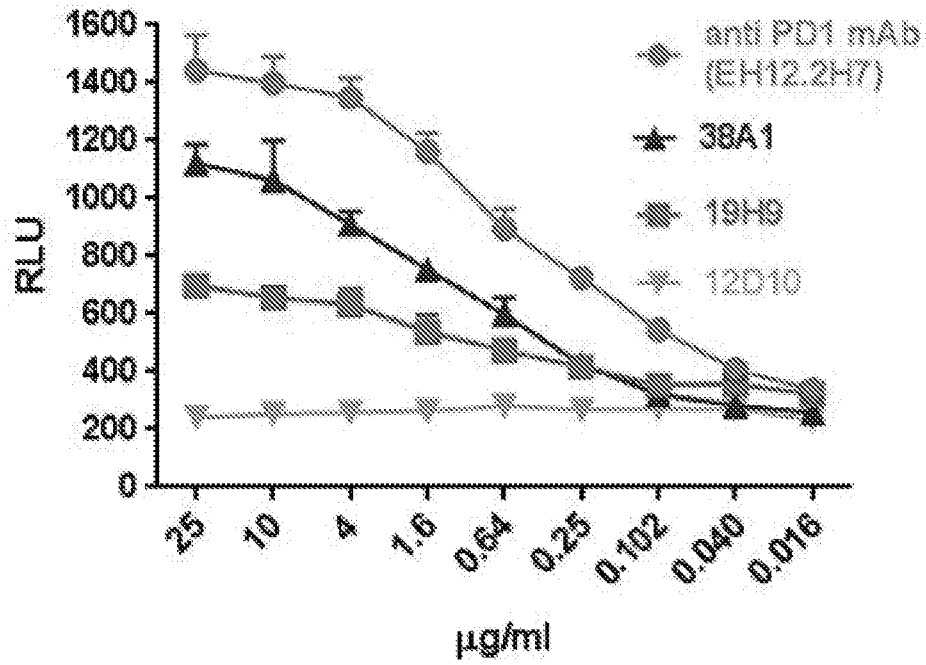
**Figure 6**

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

SYVLTQPPSVSVAPGQTARITCGGN**NIGRKI**VHWHYQQRPGQAPVLVIY**YDT**DRPAGIPERFSGSN  
 SGNMATLTISTVGAGDEADYYC**QVWDTGSDHVV**FGGGTKLTVL  
 (SEQ ID NO: 1)

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

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

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

**Heavy Chain**

EVQLVESGGGLVQPGGSLRLSCAAS**GFTFSNYA**MSWVRQAPGKGLEWVST**ISGSGGTT**YYADSVK  
 GRFTISRDNSKNTLYQMNSLRVEDTAVYYC**AKDWFRSSSPDAFDI**WGQGTTTVSA  
 (SEQ ID NO: 5)

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

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

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

**Antibody 19H9****Light Chain**

NFMLTQPHSVSESLGKVTISCTGSS**SGSIARKF**VQWYQQRPGSSPTTVIY**ENN**QRPSGVSDRFSG  
 SIGSSNSASLTISGLKTEADYYC**QSYDSSNVV**FGGGTKVTVL  
 (SEQ ID NO: 9)

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

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

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

**Heavy Chain**

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

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

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

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

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

EVQLVESGGGLVQPGGSLRLSCAASGFTFSNYAMSWVRQAPGKGLEWVSTISGSGGTTYADSVK  
 GRFTISRDN SKNTLYLQMNSLRVEDTAVYYCAKDWFRSSSPDAFDIWQGQTTVTVSAGGGGSGGG  
**GSGGGSGGAP**SYVLTPPSVSVAPGQTARITCGGNNIGRKIVHWYQQRPGQAPVLVIYYDTRPA  
 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)**

MGSTAILALLLAVLQGVSAEVQLVESGGGLVQPGGSLRLSCAASGFTFSNYAMSWVRQAPGKGLE  
WVSTISGSGGTTYADSVKGRFTISRDN SKNTLYLQMNSLRVEDTAVYYCAKDWFRSSSPDAFDI  
WGQGTTVTVSAGGGGSGGGGSGGGGSGGAPSYVLTPPSVSVAPGQTARITCGGNNIGRKIVHWYQ  
QRPGQAPVLVIYYDTRPAGIPERFSGSNSGNMATLTISTVGAGDEADYYCQVWDTGSDHVVFGG  
GTKLTVL**GPRANFVYKSGPRPKSCDKTHTCPPCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTC**  
**VVVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNK**  
**ALPAIEKTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNY**  
**KTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK**

(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  
 RFTISRDNARNSLNLQMNSLRAEDTAVYYCVRRERVEREYSGYDAFDIWQGQTTVTVSAGGGGSGGG  
**GGSGGGSGAP**NFMLTQPHSVSESLGKTVTISCTGSSGSIARKFVQWYQQRPGSSPTTVIYENNQ  
 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)**

MGSTAILALLLAVLQGVSAQVQLQESGGGLVKPGGSLRLSCAASGFTFSSYSMNWVRQAPGKGLE  
WVSGINTAGDTHYPESVKGRFTISRDNARNSLNLQMNSLRAEDTAVYYCVRRERVEREYSGYDAFD  
IWGQGTTVTVSAGGGGSGGGGSGGGGSGGAPNFMLTQPHSVSESLGKTVTISCTGSSGSIARKFVQ  
WYQQRPSSPTTVIYENNQRPSGVSDRFSGSIGSSSNSASLTISGLKTEDEADYYCQSYDSSNVV  
FGGGTKVTVL**GPRANFVYKSGPRPKSCDKTHTCPPCPAPELLGGPSVFLFPPKPKDTLMISRTPE**  
**VTCVVVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKV**  
**SNKALPAIEKTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPE**  
**NNYKTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK**

(SEQ ID NO: 20)

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

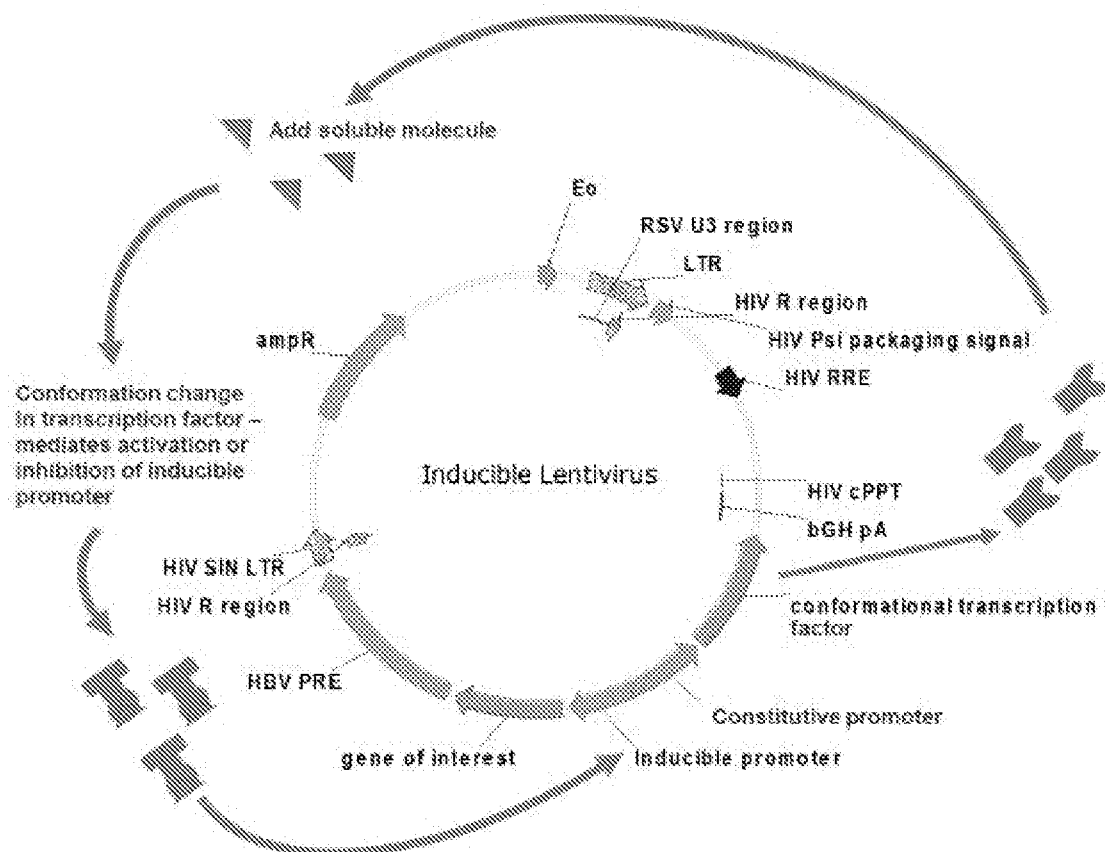
**Figure 8**

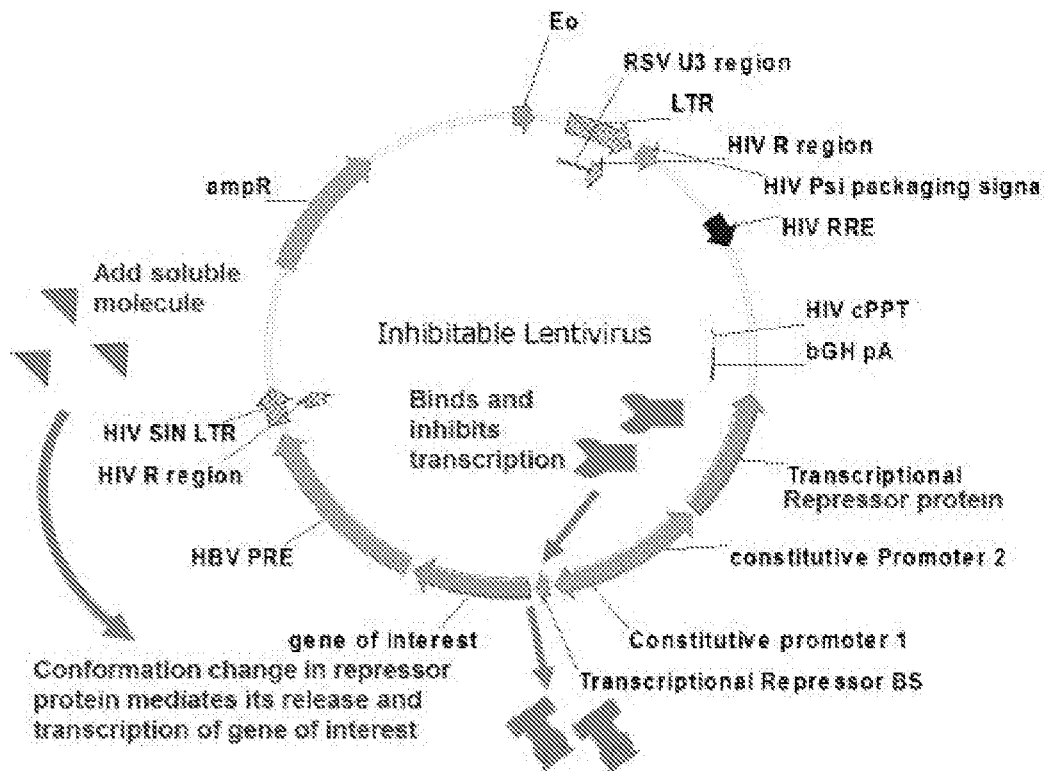
**Figure 9**

**Figure 10A**

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

cgataaccctaattcgatagcatatgcttcccgtgggtaacatatgctattgaattagggtagtctggatagtatatactactacccgggaa  
gcatatgctacccgttaggggtcaccgggtgatccggccacgatgcgtccggcgtagaggatctaattgtgagtagctcactcattaggcacc  
ccaggctttacatttatgcttccggctcgatgtgtgtggaattgtgagcggataacaatttcacacaggaacagctatgacctgattac  
gccaagcgcgaattaacctcactaaaggaacaaaagctggagctgcaagcttaattgtagtcttatgcaatactctttagtcttgaaca  
tggaacgatgagtagcaacatgccttacaaggagagaaaaagcaccgtgcatgccgattgggtggaagtaaggtgtacgatcgtgcctta  
ttaggaaggcaacagacgggtctgacatggattggacgaaccactgaattgccgattgcagagatattgtatttaagtgcctagctcgatac  
ataaacgggtctctctggtagaccagatctgagcctgggagctctctggctaactagggaaaccactgcttaagcctcaataaagcttgcctt  
gagtgcctcaagtagtgtgtcccgtctgtgtgactctggttaactagatccctcagacccttttagtcagtgtggaaaatctctagcagt  
ggcgcccgaacagggacttgaaagcgaaggggaaccagaggagctctctcgacgcaggactcggcttgtaagcgcgcacggcaaga  
ggcgagggcgcgactggtgagtacgcaaaaattttagtagcggaggctagaaggagagagatgggtgcgagagcgtcagtattaag  
cgggggagaattagatcgatgggaaaaaattcggttaaggccagggggaaagaaaaataataaataacatatagtagggcaagc  
agggagctagaacgattcgagttaatcctggcctgttagaacaacatcagaaggctgtagacaaatactgggacagctacaacctccctca  
gacaggatcagaagaacttagatcattatataacagtagcaacctctattgtgtgcatcaaaggatagagataaaagacaccaaggaa  
gcttagacaagatagaggaagagcaaaaacaaagtaagaccaccgcacagcaagcggcgtgatcttcagacctggaggaggagata  
tgagggacaattggagaagtgaattatataataataaagtagtaaaaattgaaccattaggagtagcaccaccaaggcaagagaagag  
tggtgcagagagaaaaagagcagtggaataggagcttcttcttgggtcttgggagcagcaggaagcactatgggcgcagcgtcaat  
gacgtgacggtacaggccagacaattattgtctgtatagtgcagcagcagaacaatttgctgagggtattgaggcgcaacagcatctgtt  
gcaactcacagctctgggcatcaagcagctccaggcaagaatcctggctgtggaagatacctaaggatcaacagctcctggggatttg  
ggtgtcttggaaaactcatttgaccactgctgtgccttggaaatgctagtggagtaataatctctggaacagatttggaatcacacgacct  
ggatggagtgaggacagagaaattaacaattacacaagcttaatacactccttaattgaagaatcgaaaaccagcaagaaaagaatgaac  
aagaattattggaattagataaatgggcaagttgtggaattggttaacatacaaaattggctgtgtatataaaattattcataatgatagt  
aggaggcttgtaggttaagaatagttttgtgtactttctatagtgaatagagttaggcagggatattcaccattatcgtttcagaccacc  
tcccaaccccgaggggacccgacaggcccgaaggaatagaagaagaaggtggagagagagacagagacagatccattcgattagtgaac  
ggatctcgacggtatcggttttaaaagaaaaggggggattggggggtacagtgcaggggaaagaatagtagacataatagcaacagacat  
acaaactaaagaattacaaaaacaaattacaaaaattcaaaattttatcgattttatttagtctccagaaaaaggggggaatgaaagacccc  
acctgtaggtttggcaagctagcttaagtaacgccattttgcaaggcatggaaaatacataactgagaatagagaagttcagatcaaggtta  
ggaacagagagacagcagaatatgggccaacaggatatctgtgtaagcagttcctgcccggctcagggccaagaacagatggtcccc  
agatcggttcccgcctcagcagtttctagagaacctcagatgtttccagggtgcccgaaggacctgaaatgacctgtgccttatttgaact  
aaccaatcagttcgcttctcgttctgttcgctgctccccgagctcaataaaagagcccacaacccctcactcggcgcgccagtcct  
ccgatagactgcgtgcccgggtaccgatatacaagttgtacaaaaagctgaacgagaaacgtaaaatgatataaataatcaatatatta  
aattagattttgcataaaaaacagactacataatactgtaaaacacacatatccagtcactatggcggccgattaggcaccacccaggcttta  
catttatgtcttcggctcgatataatgtgtgattttgagttaggatccgtcgagattttcaggagctaaggaaagctaaaatggagaaaaaat  
cactggatataaccacgttgatataccaatggcatcgtaaagaacattttgaggcatttcagtcagttgctcaatgtacctataaccagacc  
gttcagctggatattacggccttttaagaccgtaaaagaaaaataagcacaagtttatccggcctttattcacattcttcccgcctgatgaa  
tgctcatccggaattccgtatggcaatgaaagacggtgagctggtgataggatgttccacctgttacaccgttttccatgagcaaaact  
gaaacgttttcatcgctctggagtgaataccacgacgatttccggcagtttctacacatatattcgcaagatgtggcgtgttacggtgaaaacc  
tggcctatttccctaaagggttattgagaatatgttttctctcagccaatccctgggtgagtttaccagttttgatttaaacgtggccaatat  
ggacaacttcttgcggccttttaccatgggcaaatattatacgcaaggcgacaaggtgctgatgccgctggcagttcaggttcatcatgcc  
gtttgtgatggcttccatgtcggcagaatgcttaataaataacagtagctcgatgagtgaggcggggcgtaaacgctggatccgg  
cttactaaaagccagataacagtagctgtatttgcgcgtgattttgcggtataagaatatatactgatgtataccgaagtagtcaaaa  
agaggtatgctatgaagcagcgtattacagtgacagtgacagcagctatcagttgctcaaggcatatatgatgtcaatatctccggtct  
ggtaaagcacaacctgcagaatgaagccgtcgtctgctgcccgaacgtggaaagcggaaaaatcaggaagggtggtgaggtcggccg  
gtttattgaaatgaacggctcttttctgacgagaacaggggctggtgaaatgagtttaaggttacacctaataaagagagagccgttatc  
gtctgtttgtgagtagacagagtgatattattgacacgcccggcgacggatggtgatccccctggccagtgacgtctgctgcagataaagt

**Figure 10A (cont.)**

ctcccgtaactttaccgggtggtgcataatcggggatgaaagctggcgcatgatgaccaccgatatggccagtgtccgggtctccgttatcgg  
ggaagaagtggctgatctcagccaccgcgaaatgacatcaaaaacgccattaacctgatgtctggggaatataaatgcaggctccctta  
tacacagccagtctgcaggctgaccatagtactggatatgtgtgtttacagtattatgtagtctgttttatgcaaaatctaatttaatatat  
tgatatttatatcattttacgtttctcgttcagctttctgtacaaagtgggtattcgagtttaattaagctagcctagtgcatttgttcagtgggtc  
gtagggtcttccccactgtttggctttcagttatatggatgatgtgggtattgggggccaagtctgtacagcatcttgagtccctttttaccgctgt  
taccaattttctttgtctttgggtatacatttaaaccttaaaaaaagagatgggggtactctctaaattttatgggttatgtcattggatgt  
tatgggtccttgccacaagaacacatcatacaaaaaatcaaagaatgttttagaaaacttctattaacaggcctattgattggaaagtatgt  
caacgaattgtgggtcttttgggtttgtgcccctttacacaatgtggttatcctgcgttgatgcctttgtatgcatgtattcaatctaagcagg  
ctttcactttctcgcaacttacaaggcctttctgtgtaacaatacctgaacctttaccccggtgcccggaacggccaggctgtgccaagt  
ttgtctgacgcaacccccactgggtggggcttgctcatgggcatcagcgcatgcgtggaaccttttcgggtcctctgcgatccatactgcgg  
aactcctagccgctgtttgtctgcagcaggtctggagcaaacattatcgggactgataactctgttgcctatccgcaaatatacatcgttt  
ccatggctgtaggtgtgtgccaactggatcctgcgcgggacgtcctttgttactcctgcgcgtgaatcctgcggacgacctttctcg  
gggtcgttgggactctctcgtccccttctccgtctgcgttccgaccgaccacggggcgacctctctttacgcggactccccgtctgtccttc  
tcatctgcccggaccgtgtgacttgccttccctctgcacgtcgcgatggagaccacgtgaacgcccacaaatattgcccaaggcttacata  
agaggactcttgactctcagcaatgtcaacgaccgaccttgaggcactactcaaaagactgtttgttaaagactgggaggagtgtgggggag  
gagattagggttaaaggctttgtactaggaggcttaggcataaattggtctgcgcaccagcaccatggcgcaatcactagagcgggtacct  
ttaagaccaatgacttacaaggcagctgtagatcttagccactttttaaagaaaagggggactggaagggttaattcactcccaacgaag  
acaagatctgcttttgccttgactgggtctctgttagaccagatctgacctgggagctctctggctaactagggaacccactgcttaagc  
ctcaataaagcttgcttgagtcttaagtagtgtgtcccgctgtgtgtgactctggttaactagagatccctcagaccttttagtcagtgt  
ggaaaatctctagcagtagtagttcatgtcatcttattattcagattataacttgcaaaagaatgaatatcagagagttagaggaaactgtt  
tattgcagcttataatggttacaataaagcaatagcatcacaattttcacaataaagcattttttcactgcattctagtgtgtgtgtccaa  
actcatcaatgtatcttatcatgtctggcttagctatcccgcccttaactccgcccataactccgcccagttccgcccatttctccg  
ccccatggctgactaatttttttatgtcagaggccgaggccggatcccttgagtggctttcatcctggagcagactttgcagtctgtggact  
gcaacacaacattgcctttatgtgtaactcttggtggaagctttacaccaatgctgggggacatgtacctccaggggcccggaagactac  
gggaggctacaccaacgtcaatcagaggggcctgtgtagctaccgataagcggacctcaagagggcattagcaatagtgtttataaggcc  
ccctgttaattcttgaagacgaaaggcctctgatacgcctatttttatagggttaatgtcatgataataatgttttcttagacgtcaggtggc  
acttttcggggaaatgtgcgcggaacccctatttgtttttttaaatacattcaaatatgtatccgctcatgagacaataaacctgataaat  
gcttcaataatattgaaaaaggaagagtatgagtattcaacatttccgtgtcgccctattcccttttttcgggcattttgccttctgttttgc  
accagaaaacgctgggtgaaagtaaaagatgtgaagatcagttgggtgcacgagtgggttacatcgaactggatctcaacagcggtaagat  
ccttgagagttttcgcccgaagaacgttttcaatgatgagcacttttaaagtctgtctatgtggcgcggtattatcccgtgttgacgcccggc  
aagagcaactcggctgcgcatacactattctcagaatgacttgggtgagtactaccagtcacagaaaagcatcttacggatggcatgaca  
gtaagagaattatgcagtgtgccataacatgagtataactgcggccaacttacttctgacaacgatcggaggaccgaaggagctaa  
ccgcttttttgacaacatgggggatcatgtaactgccttgatcgttgggaaccggagctgaatgaagccatacacaacgacgagcgtgac  
accagatgcctgcagcaatggcaacaacgttgcgaaactattaactggcgaaactacttactctagcttccggcaacaattaatagactgg  
atggaggcgataaaagttgcaggaccacttctgcgtcggcccttccggctgggttattgtgataaatctggagccggtgagcgtggg  
tctcgcggtatcattgcagcactggggccagatggtgaagccctccgtagctgtagttatctacacgacggggagttaggcaactatggatgaa  
cgaaatagacagatcgctgagataggtgcctcactgattaagcattggtaactgtcagaccaagttactcatatatactttagattgatttaa  
aacttcatttttaatttaaaaggatctaggtgaagatccttttgataatctcatgacaaaatcccttaacgtgagtttcttccactgagcgt  
cagaccccgtagaaaagatcaaaggatcttcttgagatccttttttctgcgctaatctgctgcttgcacaaaaaaaaccacgctaccag  
cgggtggtttgttgcggatcaagagctaccaactcttttccgaaggtaactggcttcagcagagcgagatacacaatactgtcctttagt  
gtagcgttagttagccaccacttcaagaactctgtagcaccgctacatacctgcgtctgtaactctgttaccagtggctgctgccagtggc  
gataagtcgtgtcttaccgggttgactcaagacgatagttaccggataaggcgagcgggtcgggtgaacgggggggtcgtgcacacagcc  
cagcttgagcgcaacgacctacaccgaactgagatacctacagcgtgagcattgagaaagcggcagcttcccgaaggagaaaggcgga  
caggtatccggtaagcggcagggtcggaacaggagagcgacgagggagcttccagggggaaacgctggtatctttatagtcctgtcggg  
tttcgccacctctgacttgagcgtcgattttgtgatgctgtcagggggcgagcctatggaaaaacgccagcaacgggcctttttacggt

***Figure 10A (cont.)***

tcctggccttttgctggccttttgaagctgtccctgatggtcgtcatctacctgcctggacagcatggcctgcaacgcgggcatcccgatgccg  
ccggaagcgagaagaatcataatggggaaggccatccagcctcgctcg

**Figure 10B**

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

gtcgacggatcgggagatcaattccggcacctgtcctacgagttgcatgataaagaagacagtcataagtgcggcgacgatagtcatgcccc  
gcgcccaccggaaggagctgactgggttgaaggctctcaagggcatcggatcgatgcaggaaaaggacaagcagcgaaaattcacgcccc  
ttgggaggtggcgcatatgcaaaggatagcactcccactctactactgggtatcatatgctgactgtatgcatgaggatagcatatgcta  
cccgatacagattagtagcatatactaccagatatagattagtagcatatgctaccagatatagattagtagcctatgctacc  
agatataaattagtagcatatactaccagatatagattagtagcatatgctaccagatatagattagtagcctatgctaccaga  
tatagattagtagcatatgctaccagatatagattagtagcatatgctatccagatatattgggtagtatatgctaccagatataaatt  
aggatagcatatactaccctaattctattagtagcatatgctaccggatacagattagtagcatatactaccagatatagattagg  
atagcatatgctaccagatatagattagtagcctatgctaccagatataaattagtagcatatactaccagatatagattaggata  
gcatatgctaccagatatagattagtagcctatgctaccagatatagattagtagcatatgctatccagatatattgggtagtatatgc  
taccatggcaacattagcccaccgtgctctcagcgacctcgtaatatgaggaccaacaaccctgtgcttggcgctcaggcgcaagtgtgtg  
taatttgcctccagatcgagcaatcgcgcccctatcttggccgcccacactactatgcaggtattccccggggtgccattagtggtttgtgg  
gcaagtgggttgaccgagtggttagcggggttacaatcagccaagttattacaccttattttacagtccaaaaccgagggcgcgctgtgg  
gggctgacgcgtgccccactccacaatttcaaaaaaagagtgccacttgccttgtttatgggccccattggcgtggagccccgtttaatt  
ttcgggggtgttagagacaaccagtggagtcgctgctgcggcgtccactctcttcccttgttacaatatagagtgaacaacatgggtcac  
ctgtcttggctccctgctgggacacatcttaataacccagtatcatattgcactaggattatgtgttgcccatagccataaattcggtgagat  
ggacatccagctctttacggcttgcctccacccatggatttctattgttaaagatatcagaatgtttcattctacactagtattattgccc  
ggggtttgtgaggttatattgggtcatagcacaatgccaccactgaacccccgtccaaattttattctggggcgctcacctgaaaccttgtt  
ttcagcacctcacatacaccttactgttcacaactcagcagttattctattagctaaacgaaggagaatgaagaagcaggcgaagattcag  
gagagttcactccccgtccttgatcttcagccactgccctgtgactaaaatggttactaccctcggtgaatcctgaccccatgtaataaa  
accgtgacagctcatgggtgggagatatcgctgttccttaggaccttttactaacctaattcgatagcatatgcttccggttggttaacata  
tgctattgaattagggttagtctggatagatatatactactaccgggaagcatatgctaccggttagggttaacaaggggccttataaacac  
tattgctaattgccctcttgagggtccgcttatcggtagctacacagggccctctgattgacgttggtgtagcctccgtagtcttctggccct  
gggaggtacatgtccccagcattggtgtaagagcttcagccaagagttacacataaaggcaatgttgtgtgagtcacagactgcaaag  
tctgtccaggatgaaagccactcaaggatcttcaatattggccattagccatattattcattggttatatagcataaatcaatattggctatt  
ggccattgcatacgttgtatctatatcataatgtacatttatattggctcatgtccaatatgaccgcatgttggcattgattattgactagtta  
ttaatagtaatacattacggggcattagttcatagcccatataggagttccggttacataactacggtaaatggccgcttggtgaccg  
ccaacgacccccgccattgacgtcaataatgacgtatgttcccatagtaacgccaatagggactttccattgacgtcaatgggtggagtatt  
tacggtaaaactgccacttggcagtcacatcaagtgtatcatatgccaagtcggccccctattgacgtcaatgacggtaaatggccgctggc  
attatgccagtcacatgaccttacgggactttcctacttggcagtcacatctacgtattagtcacgtattaccatgggtgatcggttttggcag  
acaccaatgggctggatagcggtttagctacggggatttccaagtctccacccattgacgtcaatgggagttgttttggcaccacaaatca  
acgggactttccaaatgtcgttaataacccccccccgttgacgcaaatgggcggtaggcgtgtacggtgggaggtctatataagcagagctc  
gtttagtgaaccgtcagatcactagaagctttattgcggtagtttatcacagttaaattgctaacgcagtcagtgcttctgacacaacagtcctg  
aacttaagctgcagaagttggtcgtagggcactgggcaggttaagtatcaaggttacaagacaggtttaaggagaccaatagaaactgggct  
tgtcgagacagagaagactcttgcgttctgataggcacctattggcttactgacatccacttgcctttctctccacaggtgtccactccag  
tcaattacagctcttaaggctagagtacttaatacagactcactataggctagcggtaccgagctcggtaccagtagtaacggccgacagtg  
ctggaattcaacagagatcgatctgtttccttgacactatgaagtgccttttacttagcctttttattcattggggtgaattgcaagttccac  
agttttccacacaacaaaaaggaaactggaaaaatgttcttctaattaccattattgcccgtcaagctcagatttaaattggcataatgac  
ttaataggcacagccatacaagtcaaaatgcccaagagtcacaaggctattcaagcagacgggttgatgtgtcatgcttccaaatgggtcac  
tacttgtgatttccgctggataggaccgaagtataaacacagtcacatccgacccctcactccatctgtagaacaatgcaaggaaagcattgaa  
caacgaaacaaggaacttggtgaatccaggcttccctcctcaaagttgtgatatgcaactgtgacggatgccgaagcagtgattgtcca  
ggtgactcctcaccatgtgctggttgatgaatacagggagaatgggttgattcacagttcatcaacggaaaatgcagcaattacatatgcc  
cactgtccataactctacaacctggcattctgactataaggtcaaagggtatgtgatttcaacctcatttccatggacatcaccttctctcag

**Figure 10B (cont.)**

aggacggagagctatcatccctgggaaaggagggcacagggttcagaagtaactactttgcttatgaaactggaggcaaggcctgcaaaat  
gcaatactgcaagcattggggagtcagactcccatcaggtgtctggttcgagatggctgataaggatctctttgctgcagccagattccctga  
atgccagaagggtcaagtatctctgctccatctcagacctcagtggtatgaagtctaattcaggacgttgagaggatcttgattattccctct  
gccaagaaacctggagcaaaatcagagcgggtcttccaatctctccagtggtatctcagctatcttgctcctaaaaaccaggaaccggctctg  
ctttcaccataatcaatggtaccctaaaaatactttgagaccagatacatcagagtcgatattgctgctcaatctctcaagaatggctcgaat  
gatcagtggaactaccacagaaagggaactgtgggatgactgggcaccatatgaagacgtggaattggaccaatggagtctgaggacc  
agttcaggatataagtttctttatacatgattggacatggtatgttgactccgatcttcatcttagctcaaaggctcaggtgttcgaacatcct  
cacattcaagacgctgcttcgcaacttctgatgatgagagtttatttttgggtgatactgggctatccaaaaatccaatcgagctttagaagg  
ttggttcagtagttggaaaaagctctattgcctctttttcttatcatagggttaatcattggactattcttggttctccgagttggtatccatcttg  
cattaaattaaagcacaccaagaaaagacagatttatacagacatagagatgaaccgacttggaagtaactcaaactcctgcacaacagat  
tcttcatgtttggaccaaactcaactgtgataccatgctcaaagaggcctcaattatattgagtttttaattttatggaattctgcagatatcca  
tcacactggcgccgctcgagcatgcatctagaggccctattctatagtgctacctaagtctagagctcgctgatcagcctcgactgtgcct  
tctagttgccagccatctgttttggccctccccctgccttcttgacctggaagggtccactcccactgtcctttcctaataaaatgaggaa  
attgcatcgcatgtctgagtaggtgtcattctattctgggggtgggggtggggcaggacagcaagggggaggattgggaagacaatagcag  
gcatgctggggatgctgggtgggtctatggcttctgaggcgaaagaaccagctgcattaatgaatcgccaacgcgcggggagaggcggtt  
tgcgtattggcgctcttccgcttctcgtcactgactcgctcgctcggtcgctcggtcgcgagcggtatcagctcactcaaaggcggtta  
atacggttatccacagaatcaggggataacgcaggaagaacatgtgagcaaaaggccagcaaaaggccaggaaccgtaaaaaggccgc  
gttgctggcggttttccataggctcgcggccctgacgagcatcacaaaaatcgacgtcaagtcaagtcagaggtggcgaaaccgacaggactat  
aaagataccaggcggttccccctggaagctccctcgctgccttctgacccgtcgcttaccggataacctgtccgcttctccttccg  
gaagcgtggcgcttctcaatgctcacgctgtaggtatctcagttcggtgtaggtcgctccaagctgggtgtgtgcacgaacccccgtt  
cagccccagcgtgcgcttaccggttaactatcgtcttgagccaaccggtaagacacgacttatcgccactggcagcagccactggtaac  
aggattagcagagcgaggtatgtaggcggtgctacagagttctgaagtgggtggcctaactacggctacactagaaggacagtatttggtat  
ctgcgctctgctgaagccagttaccttcggaaaaagagttggttagctcttgatccggcaaaacaccacgctggttagcggtgtttttgtt  
gcaagcagcagattacgcgcagaaaaaaggatctcaagaagatcctttgatctttctacggggtctgacgctcagtggaacgaaaactca  
cgttaagggttttggctgatgattatcaaaaaggatcttcacntagatccttttaattaaaaatgaagtttaaatcaatcaaatatata  
tgagtaaaacttggtctgacagttaccaatgcttaatcagtgaggcacctatctcagcgatctgtctatttctgtcatccatagttgcctgactccc  
cgtcgtgtagataactacgatacgggagggttaccatctggccccagtgctgcaatgataccgcgagacccacgctcaccggctccagatt  
atcagcaataaaccagccagccggaaggccgagcgcaagaagggtcctgcaactttatccgctccatccagtcattatgttgcggg  
aagctagagtaagtagttcgccagttaatagtttgcgcaacgttggccattgctacaggcatcgtggtgtcacgctcgtctgttggtatggct  
tcattcagctccggttccaacgatcaaggcgagttacatgatccccatgttggtcaaaaaagcggttagctccttcggtcctccgatcgtgt  
cagaagtaagttggccgagttatcactcatggttatggcagcactgcataattcttactgtcatgccatccgtaagatgcttttctgtga  
ctggtgagtactcaaccaagtattctgagaatagtgtatgcggcgaccgagttgctcttgcggcgctcaatacgggataataccgcgccac  
atagcagaactttaaaagtgtcatcattggaaaacgttcttcggggcgaaaactctcaaggatcttaccgctgttgagatccagttcgatgta  
accactcgtgcaccaactgatcttcagcatctttactttaccagcggttctgggtgagcaaaaacaggaaggcaaaatgccgcaaaaa  
gggaataaggcgacacggaaatgtgaatactcatactcttcttttcaatattattgaagcatttatcagggttattgtctcatgagcggt  
acatatttgatgtatttagaaaaataacaatagggttccgcgcacatttccccgaaaagtccacgtgac

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

cgataaccctaattcgaatgcatatgcttcccgttgggtaacatatgctattgaattagggtagtctggatagatatatactactacccgggaa  
gcatatgctaccgttttaggggttcaccggtgatgccggccacgatgcgtccggcgtagaggatctaattgtgagttagctcactcattaggcacc  
ccaggctttacactttatgcttccggctcgtatgtgtgtggaattgtgagcggataacaatttcacacaggaaacagctatgaccatgattac  
gccaaagcgcgaattaaccctcactaaagggaacaaaagctggagctgcaagcttaattgtagtcttatgcaatactctttagtcttgaaca  
tggaacgatgagtttagcaacatgccttacaaggagagaaaaagcaccgtgcatgccgattgggtggaagtaagggtgtacgatcgtgcctta  
ttaggaaggcaacagacgggtctgacatggattggacgaaccactgaattgccgattgcagagatattgtatttaagtgcctagctcgatac  
ataaacgggtctctctggttagaccagatctgagcctgggagctctctggctaactagggaaaccactgcttaagcctcaataaagcttgcctt  
gagtgctcaagtagtgtgtgcccgtctgtgtgactctggttaactagatccctcagacccttttagtcagtgtggaaaatctctagcagt  
ggcgcccgaacagggacttgaaagcgaaagggaaccagaggagctctctcgacgcaggactcggcttgctgaagcgcgcacggcaaga  
ggcgaggggcgcgactggtagtacgcaaaaaattttgactagcggaggctagaaggagagagatgggtgcgagagcgtcagtattaag  
cgggggagaattagatcgcgatgggaaaaaattcggttaaggccagggggaaagaaaaatataaataaaacatatagtagggcaagc  
agggagctagaacgattcgagttaatcctggcctgttagaaacatcagaaggctgtagacaaatactgggacagtacaaccatcccttca  
gacaggatcagaagaacttagatcattatataatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaaggaa  
gcttttagacaagatagaggagagcaaaacaaaagtaagaccaccgcacagcaagcggccgctgatcttcagacctggaggaggagata  
tgagggacaatttgagaagtgaattatataaataaagtagtaaaaattgaaccattaggagtagcaccaccaaaggcaagagaagag  
tggtgcagagagaaaaagagcagtggaataggagctttgttcttgggttcttgggagcagcaggaagcactatgggagcagcgtcaat  
gacgctgacggtacaggccagacaattattgtctgttagtgacgagcagaacaatttgctgagggtattgaggcgcaacagcatctgtt  
gcaactcacagtctggggcatcaagcagctccaggcaagaatcctggctgtggaagatacctaaggatcaacagctcctggggatttgg  
ggtgtcttggaaaactcatttgaccactgctgtgcttggatgctagtggagtaataaatctctggaacagatttggaatcacacgacct  
ggatggagtgggacagagaaattaacaattacacaagcttaatacactccttaattgaagaatcgaaaaccagcaagaaaagaatgaac  
aagaattattggaattagataaatgggcaagtttgggaattggttaacataacaaattggctgtggtatataaaattattcataatgatagt  
aggaggcttgtaggttaagaatagttttgtctgactttctatagtgaaatagagttaggcagggatattcaccattatcgtttcagaccacc  
tccaaccccgaggggaccgacaggcccgaaggaatagaagaagaagggtggagagagagacagagacagatccattcgattagtgaac  
ggatctcgacggtatcggttttaaaagaaaagggggattgggggtacagtgcaggggaaagaatagtagacataatagcaacagacat  
acaaactaaagaattacaaaaacaaattacaaaaattcaaaattttatcgattttatttagtctcagaaaaaggggggaatgaaagacccc  
acctgtaggttggcaagctagcttaagtaacgccattttgcaaggcatggaaaatacataactgagaatagagaagttcagatcaagggtta  
ggacagagagacagcagaatatgggcaaacaggatatctgttgtaagcagttctgtcccggtcagggccaagaacagatggtcccc  
agatcggttcccgccctcagcagtttctagagaaccatcagatgttccagggtgccccaggacctgaaatgacctgtgccttatttgaact  
aaccaatcagttcgcttctgcttctgttcgcgcttctgctccccgagctcaataaaagagcccacaacccctcactcggcgcgacgtcct  
ccgatagactgcgtcgccgggtaccgatcaccaactttgtacaaaaagctgaacgatatcgccaccatgggcagcacagccattctgg  
ccctgtgctggcagtgctgcagggcggtgcagctGaagtgcagctgggtggaatctggcggcgactgggtgcagcctggcggtatctgaga  
ctgagctgtgcgacagcggttcccttcagcaactacgccatgagctgggtgcgacggccccctggaaaaggcctggaatgggtgtccac  
catcagcggtctggcggaaccactactacgccgatagcgtgaaggcggttcacatctccgggacaacagcaagaacacctgtac  
ctgcagatgaacagcctcggggtggaagataccgctgtactactgcgcaaggactggttcagaagcagcagccccgacgcttcgaca  
tctggggccagggaacaacctgaccgtgtctgtggtggagggcgatcaggcgggcgaggatcagggggaggcggaagcgagacacctt  
cttacgtgctgaccagccccctagcgtgtcagtggtcctggacagaccgccagaatcacctgtggcggaacaacatcgccggaagatc  
gtgactggtatcagcagaggcccgacaggctcccgtgctgctgactactacgacaccgacagacactgcccgcacccccagagattcag  
cggcagcaacagcggcaacatggccacctgacctcagcagagtggtggagccggcgacaggccgactactactgtcaagtgtgggacac  
cggcagcgtacacgtggtgttggaggcggcaccaagctgacagtgtgggccccggggccaactttgtatacaaaagtgcagcgagagc  
aagtacggccctccctgcccccttgcctgccccgagttctgggcggaaccagcgtgttctgttccccccaagccaaggacacctga  
tgatcagccggacccccgaggtgacctgtgtgtgtgtggacgtgtccaggaggacccccgaggtccagttcaactggtacgtggacggcgtg  
gaggtgcacaacgccaagaccaagccccgggaggagcagttcaatagcacctaccgggtggtgtccgtgtgacctgtgtgacccaggact

**Figure 11A (cont.)**

ggctgaacggcaaggaatacaagtgaaggtgtccaacaaggcctgccagcagcatcgagaaaaccatcagcaaggccaaggccag  
cctcgggagccccaggtgtacaccctgccccctagccaagaggagatgaccaagaatcagggtgtccctgacctgctggaagggttcta  
ccccagcgacatcgccgtggagtgggagagcaacggccagcccgagaacaactacaagaccacccccctgtgtggacagcgacggcag  
cttcttctgtacagcaggctgacctggacaagagccggtggcaggaggggcaacgtcttttagctgctccgtgatgcacgaggccctgcaca  
accactacaccagaagagcctgtccctgagcctgggcaagatgttcagatcttgtgatatttacatctgggcacccttggccggaatctgcgt  
ggccttctgtgtccttgatcatcactctcatctgctacggctccaccagcggctccggcaagcccggctctggcgagggtccaccagcggc  
gactacaaggacgacgatgacaagtaataggatatcggttcagcttctgtacaaagttgggattcgagttaattaagtaacgaattcccc  
ccctctccctccccccccctaactgtactggccgaagccgcttgaataaggccggtgtgcgtttgtctatatgtattttccacatattgccg  
tcttttggcaatgtgaggggccggaacacctggccctgtcttctgacgagcattcttaggggtctttccctctcgccaaaggaatgcaaggtct  
gttgatgtcgtgaaggaaagcagtttcttgaagccttctgaagacaaacaacgtctgtagcgacccttgcaggcagcggaacccccac  
ctggcgacaggtgcctctgcggccaaaagccacgtgtataagatacacctgcaaaggcggcacacccagtgccacgttgtagttggata  
gttgggaaagagtcacaaatggctctctcaagcgtattcaacaaggggctgaaggatgccagaaggtacccattgtatgggatctgatctg  
gggctcgggtgcacatgctttacatgtgttttagtcgaggttaaaaaacgtctaggccccccgaaccacggggacgtggttttctttgaaaaac  
acgatgataataaggccacaacatgggaggcggaagcggcgagggtccccctcgaggcacatggtagcaaggcgaggagctgttca  
ccgggggtggtgcccatcctggtcgagctggacggcgacgtaaacggccacaagttcagcgtgtccggcgaggggcgaggcgatgccaccta  
cggcaagctgacctgaagttcatctgcaccaccggcaagctgcccgtgcccctggccaccctctgaccaccctgacctacggcgtgcagt  
cttcagcgtctaccccgaccacatgaagcagcacgacttctcaagtccgcatgccgaaggctacgtccaggagcgacacatcttcttcaa  
ggacgacggcaactacaagaccgcgcgaggtgaagttcgaggcgacacccctgggtgaaccgcatcgactgaagggcacgacttcaa  
ggaggacggcaacatcctggggcacaagctggagtacaactacaacagccacaacgtctatatcatggccgacaagcagaagaacggcat  
caaggtgaactcaagatccgccacaacatcgaggacggcagcgtgcagctcgccgaccactaccagcagaacacccccatcggcgacgg  
ccccgtgctgctgccgacaaccactacctgagcaccagctcgccctgagcaaagaccccaacgagaagcgcatcacatggctctgctgg  
agttcgtgaccgcgcgggatcactctggcatggacgagctgtacaagtaacgcgtccgggtctagagctagcgggtaccatgcattacgt  
agtcgacgacttaattaagctagcctagtgtccattgttcagtggttcgtagggctttccccactgtttggcttcagttatatggatgatgtgg  
tattgggggccaagtctgtacagcatcttgagtcctttttaccgctgttaccattttcttttcttgggtatacatttaaacctaacaaaac  
aaagagatgggggtactctctaaattttatgggtatgtcattggatgttatgggtccttgccacaagaacacatcataaaaaaatcaaaga  
atgttttagaaaacttctattaacaggcctattgattggaagtagtcaacgaattgtgggtctttgggttttctgcccctttacacaatgt  
ggttatcctgcgttgatgcctttgtatgcatgtattcaatctaagcaggcttctactttctcgccaaactacaaggcctttctgtgtaacaatacc  
tgaacctttacccgttgcccggcaacggccaggtctgtgccaagtgtttgtgacgcaacccccactggctggggcttggtcatggccatca  
gcgatgcgtggaaccttttcggctcctctgccgatccatactgcggaactcctagccgctgttttctgcgacgaggtctggagcaaacatta  
tcgggactgataactctgttgcctatcccgaatatcatcgtttccatggctgtaggtgtgctgccaactggatcctgcgcgggacgtcc  
ttgtttacgtcccgctggcgctgaatcctgcggacgaccttctcggggtcgcttgggactctctgctcccttctccgtctgcccgtccgaccg  
accacggggcgacactctcttacgcggactccccgtctgtgccttctcatctgcggaccgtgtgcacttctcctcacctctgcacgtcgatg  
gagaccaccgtgaacgcccaccaaataattgccaaaggtctacataagaggactcttgactctcagcaatgtcaacgaccgaccttgaggc  
atacttcaaagactgtttgttaaagactgggaggagtggggggaggagattaggttaaaggtctttgtactaggaggctgtaggcataaatt  
ggtctgcgcaccagcaccatggcgcaatcactagagcgggtacctttaagaccaatgacttacaaggcagctgtagatcttagccactttt  
aaaagaaaagggggactggaagggttaattactccaacgaagacaagatctgcttttctgttactgggtctctctggttagaccagat  
ctgagcctgggagctctctggttaactaggaacccactgcttaagcctcaataaagcttgccttgagtgttcaagtagtgtgtcccgtctg  
ttgtgtgactctggttaactagagatccctcagaccttttagtcagtggtgaaaatctctagcagtagtagttcatgtcatcttattattcagtat  
ttataacttgcaagaaatgaatatcagagagttagaggaaactgtttattgagccttataatggttacaataaagcaatagcatcacaaat  
ttcacaataaagcattttttcactgcattctagtgtggtttgtcacaactcatcaatgtatcttatcatgtctggcttagctatccccccct  
aactccgccatcccggccctaactccgccaggttcgcccatctccgccccatggctgactaatttttttatttatgagaggccgaggccg  
gatcccttgagtggtttcatcctggagcagactttgcagctgtggactgcaacacaacattgcctttatgtgtaactcttggtgaagctctta

**Figure 11A (cont.)**

caccaatgctgggggacatgtacctcccaggggcccaggaagactacgggaggctacaccaacgtcaatcagaggggcctgtgtagctacc  
gataagcggaccctcaagagggcattagcaatagtggtttataaggccccctgttaattcttgaagacgaaagggcctcgtgatacgcctatt  
tttataggttaatgtcatgataataatggtttcttagacgtcaggtggcacttttcggggaaatgtgcgcggaaccctattgtttattttctaa  
atacattcaaatatgtatccgctcatgagacaataaccctgataaatgcttcaataatattgaaaaaggaagagtatgagtattcaacatttc  
cgtgtcgccttattccctttttgcggcattttgccttcctgttttgcctcaccagaaacgctggtgaaagtaaaagatgctgaagatcagttg  
ggtgcacgagtggttacatcgaactggatctcaacagcggtaagatccttgagagtttcgccccgaagaacgttttccaatgatgagcact  
tttaaagttctgctatgtggcgcggtattatcccgtgttgacgcccggcaagagcaactcggtcgcccatacactattctcagaatgacttgg  
ttgagtactcaccagtcacagaaaagcatcttacggatggcatgacagtaagagaattatgcagtgtgccataacatgagtataacact  
gctggccaacttacttctgacaacgatcggaggaccgaaggagctaaccgctttttgcacaacatgggggatcatgtaactcgccttgatcgt  
tgggaaccggagctgaatgaagccatacacaacgacagcgtgacaccacgatgcctgcagcaatggcaacaacgttgccaaactatta  
actggcgaaactacttacttagcttcccggcaacaattaatagactggatggaggcggataaagttgcaggaccacttctgcgtcggccctt  
ccggctggctggtttattgctgataaatctggagccggtagcgtgggtctcgcggtatcattgcagcactggggccagatggtaagccctcc  
cgtatcgtagtattctacacgacggggagtcaggcaactatggatgaacgaaatagacagatcgctgagataggtgcctcactgattaagca  
ttgtaactgtcagaccaagtttactcatatacttttagattgatttaaaacttcatttttaatttaaaaggatctaggtgaagatccttttgat  
aatctcatgacaaaaatccctaacgtgagtttctgttccactgagcgtcagacccgtagaaaagatcaaaggatcttcttgagatccttttt  
tctgcgcgtaaatctgctgcttgcaaacaaaaaaaccaccgctaccagcgggtggtttgtttgccggatcaagagctaccaactcttttccgaag  
gtaactggcttcagcagagcgcagatacacaataactgtccttctagtgtagccgtagttaggccaccacttcaagaactctgtagaccgcct  
acatacctcgtctgctaactctgttaccagtggtcgtgccagtgggcgataagtcgtgtcttaccgggttgactcaagacgatagttaccgg  
ataaggcgcagcggtcgggctgaacggggggttcgtgcacagcccagcttgagcgaacgacctacaccgaactgagatacctacagc  
gtgagcattgagaaagcgccacgcttccgaaggagaaaggcggacaggtatccggttaagcggcagggtcggaacaggagagcgcacg  
agggagcttcagggggaaacgctggtatctttatagtcctgtcgggtttgccacctctgacttgagcgtcgattttgtgatgctcgtcagg  
ggggcggagcctatggaaaaacgccagcaacgcggcctttttacggttcctggccttttgcctgttcctgtatggtcgtcat  
ctacctgcctggacagcatggcctgaacgcgggcatcccgatgccgccaagcgagaagaatcataatgggggaaggccatccagcctcg  
cgtcg

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

cgataaccctaattcgaatgcatatgcttcccgttgggtaacatatgctattgaattagggtagtctggatagtagtatataactactaccgggaa  
gcatatgctaccgttttaggggtcaccggtgatgccggccacgatgcgtccggcgtagaggatctaattgtgagttagctcactcattaggcacc  
ccaggctttacactttatgcttccggctcgatgtgtgtggaattgtgagcggataacaatttcacacaggaaacagctatgaccatgattac  
gccaaagcgcgaattaaccctcactaaagggaacaaaagctggagctgcaagcttaattgtagtcttatgcaatactctttagtcttgaaca  
tggaacgatgagtttagcaacatgccttacaaggagagaaaaagcaccgtgcatgccgattgggtggaagtaagggtgtacgatcgctgcctta  
ttaggaaggcaacagacgggtctgacatggattggacgaaccactgaattgccgattgcagagatattgtatttaagtgcctagctcgatac  
ataaacgggtctctctggttagaccagatctgagcctgggagctctctggctaactagggaaaccactgcttaagcctcaataaagcttgcctt  
gagtgctcaagtagtgtgtgcccgtctgtgtgactctggttaactagatccctcagacccttttagtcagtggtggaataatctctagcagt  
ggcgcccgaacagggacttgaaagcgaaagggaaccagaggagctctctcgacgcaggactcggcttgtaagcgcgcacggcaaga  
ggcgaggggcgcgactggtagtacgcaaaaaattttgactagcggaggctagaaggagagagatgggtgcgagagcgtcagtattaag  
cgggggagaattagatcgcgatgggaaaaaattcggttaaggccaggggggaaagaaaaatataaataaaacatatagtagggcaagc  
aggagctagaacgattcgagttaatcctggcctgttagaaacatcagaaggctgtagacaaatactgggacagtacaaccatcccttca  
gacaggatcagaagaacttagatcattatataatacagtagcaaccctctattgtgtgcatcaaaggatagagataaaagacaccaaggaa  
gcttttagacaagatagaggagagcaaaacaaaagtaagaccaccgcacagcaagcggcgtgatcttcagacctggaggaggagata  
tgagggacaatttgagaagtgaattatataaataaagtagtaaaaattgaaccattaggagtagcaccaccaaaggcaagagaagag  
tggtgcagagagaaaaagagcagtggaataggagcttctgtccttgggttcttgggagcagcaggaagcactatgggagcagcgtcaat  
gacgctgacggtacaggccagacaattattgtctgttagtgtagcagcagacaatttgctgagggtattgaggcgcaacagcatctgtt  
gcaactcacagtctggggcatcaagcagctccaggcaagaatcctggctgtggaagatacctaaggatcaacagctcctggggatttgg  
ggtgtcttggaactcatttgaccactgctgtgcttggatgctagtggagtaataatctctggaacagatttggaatcacacgacct  
ggatggagtgaggacagagaaattaacaattacacaagcttaatacactccttaattgaagaatcgaaaaccagcaagaaaagaatgaac  
aagaattattggaattagataaatgggcaagtttgggaattggttaacataacaaattggctgtgtatataaaattattcataatgtagt  
aggaggcttgtaggttaagaatagttttgtctgactttctatagtgaaatagagttaggcagggatattcaccattatcgtttcagaccacc  
tccaaccccgaggggaccgacaggcccgaaggaatagaagaagaagggtggagagagagacagagacagatccattcgattagtgaac  
ggatctcgacggtatcggttttaaaagaaaagggggattgggggtacagtgcaggggaaagaatagtagacataatagcaacagacat  
acaaactaaagaattacaaaaacaaattacaaaaattcaaaattttatcgattttatttagtctcagaaaaaggggggaatgaaagacccc  
acctgtaggtttggcaagctagcttaagtaacgccattttgcaaggcatggaaaatacataactgagaatagagaagttcagatcaaggtta  
ggaaacagagagacagcagaatatgggcaaacaggatatctgttgtaagcagttctgccccggctcagggccaagaacagatggtcccc  
agatcggttcccgccctcagcagtttctagagaaccatcagatgttccagggtgccccaggacctgaaatgacctgtgccttatttgaact  
aaccaatcagttcgcttctgcttctgttcgcgcttctgctccccgagctcaataaaagagcccacaacccctcactcggcgcgacgtcct  
ccgtagactgcgtcgccgggtaccgatcaccaactttgtacaaaaagctgaacgatatcgccaccatgggcagcacagccattctgg  
ccctgtgctggcagtgctgcagggcggtgcagctGaagtgcagctgggtggaatctggcggcgactgggtgcagcctggcggtatctgaga  
ctgagctgtgcgacagcggttcccttcagcaactacgccatgagctgggtgcgacaggccccctggaaaaggcctggaatgggtgtccac  
catcagcggtctggcggaaccactactacgccgatgcgtgaaggcggttcacatctcccgggacaacagcaagaacacctgtac  
ctgcagatgaacagcctcggggtggaagataccgctgtactactgcgcaaggactggttcagaagcagcagccccgacgcttcgaca  
tctggggccagggaacaacctgaccgtgtctgtggtggagggcgatcaggcgggcgaggatcagggggaggcggaagcgagacacctt  
cttacgtgctgaccagccccctagcgtgtcagtggtcctggacagaccgccagaatcacctgtggcggaacaacatcgccggaagatc  
gtgactggtatcagcagaggcccgacaggctcccgtgctgctgactactacgacaccgacagacactgcccgcacccccagagattcag  
cggcagcaacagcggcaacatggccacctgacctcagcagagtgaggcgggcgacaggccgactactactgtcaagtgtgggacac  
cggcagcgtacacgtggtgttggaggcggcaccaagctgacagtgtggggcccgggccaactttgtatacaaaagtgcagcgagagc  
aagtacggccctccctgcccccttgcctgccccgagttctggggcgacccagcgtgttctgttccccccaagccaaggacacctga  
tgatcagccggacccccgaggtgacctgtgtggtggtggacgtgtccaggaggacccccgaggtccagttcaactggtacgtggacggcggt

**Figure 11B (cont.)**

gagggtgcacaacgccaagaccaagccccgggaggagcagttcaatagcacctaccgggtggtgtccgtgctgaccgtgctgcaccaggact  
ggctgaacggcaaggaataacaagtgaaggtgtccaacaaggcgctcccagcagcatcgagaaaaccatcagcaaggccaaggccag  
cctcgggagccccaggtgtacacctgccccctagccaagaggagatgaccaagaatcaggtgtccctgacctgctggtgaagggtctta  
ccccagcgacatcgccgtggagtgggagagcaacggccagcccagagaacaactacaagaccacccccctgtgctggacagcgacggcag  
cttcttctgtacagcaggctgaccgtggacaagagccgggtggcaggagggaacgtcttttagctgtccgtgatgcacgaggccctgcaca  
accactacaccagaagagcctgtccctgagcctgggcaagatgttcagatcttgatatttacatctgggcacccctggccggaatctgcgt  
ggcccttctgctgtccttgatcatcactctcatctgctacggctccaccagcggtccggcaagcccggctctggcgagggtccaccagcggc  
gactacaaggacgacgatgacaagtaataggatatcggttcagcttcttgtaaaagtgggattcgagtaattaagtaacgaattcccc  
ccctctccctccccccccctaacgttactggccgaagccgcttggaataaggccggtgtgcgtttgtctatatgttatttccaccatattgccg  
tcttttggcaatgtgagggtcccggaaacctggccctgtcttctgacgagcattcttaggggtcttccccctctcgcaaagggaatgcaaggtct  
gttgatgtcgtgaaggaagcagttcctctggaagcttctgaagacaaacaacgtctgtagcgacccttgaggcagcggaacccccac  
ctggcgacaggtgcctctgcgccaaaagccacgtgtataagatacacctgcaaaggcggcacacccagtgccacgttgtagttggata  
gttggtgaaagagtcaaatggctctcctcaagcgtattcaacaagggtgaaggtgcccagaaggtacccattgtatgggatctgatctg  
ggcctcgggtgcacatgctttacatgtgttttagtcgaggttaaaaaacgtctaggcccccgaaaccaggggacgtggttttctttgaaaaac  
acgatgataatatggccacaacctgggagggcggaagcgggcgagggtcccctcgaggcaccatgggtgagcaaggcgaggagctgttca  
ccgggggtggtgccatcctggtcgagctggacggcgacgtaaacggccacaagttcagcgtgtccggcgagggcgaggcgatgccacctta  
cggcaagctgacctgaagttcatctgcaccaccggcaagctgcccgtgcccctggccaccctctgaccaccctgacctagggcgtgcagt  
cttcagccgtaccccgaccacatgaagcagcacgacttctcaagtcgccatgccgaaggctacgtccaggagcgacccatcttcttcaa  
ggacgacggcaactacaagacccgcccggaggtgaagttcagggcgacacccctgggaaccgcatcgagctgaagggcacgacttcaa  
ggaggacggcaacatcctggggcacaagctggagtacaactacaacagccacaacgtctatatcatggccgacaagcagaagaacggcat  
caaggtgaacttaagatccgccacaacatcgaggacggcagcgtgcagctcgccgaccactaccagcagaacacccccatcggcgacgg  
ccccgtgctgctgcccgacaaccactacctgagcaccagtcgcccctgagcaaagaccccaacgagaagcgcatcacatggtctgctgg  
agttcgtgaccgcccgggatcactctcgcatggacgagctgtacaagtaacgcgtcccgggtctagagctagcggtaccatgcattacgt  
agtcgacgacttaattaagctagcctagtgccattgttcagtggttcgtagggtttccccactgtttggctttcagttatggatgatgtgg  
tattggggccaagtctgtacagcatcttgagtcctttttaccgctgttaccattttctttgtctttgggtatacatttaaacctaacaaaac  
aaagagatgggggtactcttaaatattatgggttatgtcattggatgttatgggtccttgccacaagaacacatcataaaaaaatcaaaga  
atgttttagaaaacttctattaacaggcctattgattggaagatgtcaacgaattgtgggtcttttgggttttctgccccttttacacaatgt  
ggttatcctcgcttgatgcctttgtatgcatgtattcaatcaagcaggtttcactttctcgcaacttacaaggcctttctgttaacaatacc  
tgaacctttacccgttgcgggcaacggccaggtctgtgccaagtgtttgtgacgcaacccccactggctggggcttggtcatgggccatca  
gcgatgcgtggaaccttttcggctcctctgccgatccatactgccaactcctagccgctgttttctgcgagcaggtctggagcaaacatta  
tcgggactgataactctgtgtcctatcccgaataatacatcgtttccatggctgtaggtgtgctgccaactggatcctgcgaggacgtcc  
tttgtttacgtcccgtcggcgctgaatcctgcggacgaccttctcggggtcgcttgggactctctcgtccccttctccgtctgcccgttccgaccg  
accacggggcgcacctctctttacgaggactccccgtctgtccttctcatctgccgaccgtgtgcacttcgcttcacctctgcagctcgcag  
gagaccacgtgaacgcccacaaatattgccaaaggtcttacataagaggactcttgactctcagcaatgtcaacgaccgaccttgaggc  
atacttcaaagactgtttgttaaagactgggaggaggtggggaggagattaggttaaaggctttgtactaggaggctgtaggcataaatt  
ggtctgcgcaccagcaccatggcgcaatcactagagcgggtacctttaaagaccaatgacttacaaggcagcttagatcttagccactttt  
aaaagaaaaggggggactggaagggttaattcactccaacgaagacaagatctgcttttctgtactgggtctctctggttagaccagat  
ctgagcctgggagctctctgctaactagggaacccactgctaagcctaataaagcttgcttgagtgcttcaagtagtgtgtcccgtctg  
ttgtgtgactctggaatagagatccctcagacccttttagtcagtggtgaaaatctctagcagtagtagttcatgtcatcttattttagtat  
ttataactgcaaagaaatgaatatcagagagtgaaggaaactgtttattgagcttataatggttacaataaagcaatagcatcacaat  
ttcacaataaagcattttttcactgcattctagtgtggtttgtccaaactcatcaatgtatcttatcatgtctggcttagctatccccccct  
aactccgcccacccgcccctaactccgcccagttccgcccattctccgcccacatggctgactaattttttttattatgcagaggccgaggccg  
gatcccttgagtggctttcatcctggagcagactttgcagctgtggactgcaacacaacattgcctttatgtgaactcttggtgaagctctta

**Figure 11B (cont.)**

caccaatgctgggggacatgtacctcccaggggcccaggaagactacgggaggctacaccaacgtcaatcagaggggcctgtgtagctacc  
gataagcggaccctcaagagggcattagcaatagtggtttataaggccccctgttaattcttgaagacgaaagggcctcgtgatacgcctatt  
tttataggttaatgtcatgataataatggtttcttagacgtcaggtggcacttttcggggaaatgtgcgcggaaccctattgtttattttctaa  
atacattcaaatatgtatccgctcatgagacaataaccctgataaatgcttcaataatattgaaaaaggaagagtatgagtattcaacatttc  
cgtgtcgccttattcccttttttgcggcattttgccttcctgttttctcaccagaaacgctggtgaaagtaaaagatgctgaagatcagttg  
ggtgcacgagtgggttacatcgaactggatctcaacagcggtaagatccttgagagtttcgcccgaagaacgttttccaatgatgagcact  
tttaaagttctgctatgtggcgcggtattatcccgtgttgacgcgggcaagagcaactcggtcgcccatacactattctcagaatgacttgg  
ttgagtactcaccagtcacagaaaagcatcttacggatggcatgacagtaagagaattatgcagtgtgccataacatgagtataacact  
gctggccaacttacttctgacaacgatcggaggaccgaaggagctaaccgctttttgcacaacatgggggatcatgtaactcgccttgatcgt  
tgggaaccggagctgaatgaagccatacacaacgcagcagcgtgacaccacgatgcctgcagcaatggcaacaacgttgccaaactatta  
actggcgaaactacttacttagcttcccggcaacaattaatagactggatggaggcggataaagttgcaggaccacttctgcgtcggccctt  
ccggctggctggtttattgctgataaatctggagccggtagcgtgggtctcgcggtatcattgcagcactggggccagatggtaagccctcc  
cgtatcgtagtattctacacgacggggagtcaggcaactatggatgaacgaaatagacagatcgctgagataggtgcctcactgattaagca  
ttgtaactgtcagaccaagtttactcatataacttttagattgatttaaaacttcatttttaatttaaaaggatctaggtgaagatccttttgat  
aatctcatgacaaaaatccctaacgtgagtttctgttccactgagcgtcagacccgtagaaaagatcaaaggatcttcttgagatccttttt  
tctgcgcgtaaatctgctgcttgcaaaaaaaaccaccgctaccagcgggtggtttgttgcggatcaagagctaccaactcttttccgaag  
gtaactggcttcagcagagcgcagatacacaataactgtccttctagtgtagccgtagttaggccaccacttcaagaactctgtagaccgcct  
acatacctcgtctgctaactctgttaccagtggtcgtgccagtggcgataagtcgtgtcttaccgggttgactcaagacgatagttaccgg  
ataaggcgcagcggtcgggctgaacggggggttcgtgcacagcccagcttgagcgaacgacctacaccgaactgagatacctacagc  
gtgagcattgagaaagcgccacgcttccgaaggagaaaggcggacaggtatccggttaagcggcagggctcggaaacaggagagcgcacg  
agggagcttcagggggaaacgcctggtatctttatagtcctgtcgggtttgccacctctgacttgagcgtcgattttgtgatgctcgtcagg  
ggggcggagcctatggaaaaacgccagcaacgcggcctttttacggttcctggccttttgcctgttcctgtatggtcgtcat  
ctacctgcctggacagcatggcctgcaacgcgggcatcccgatgccggaagcgagaagaatcataatgggggaaggccatccagcctcg  
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        |

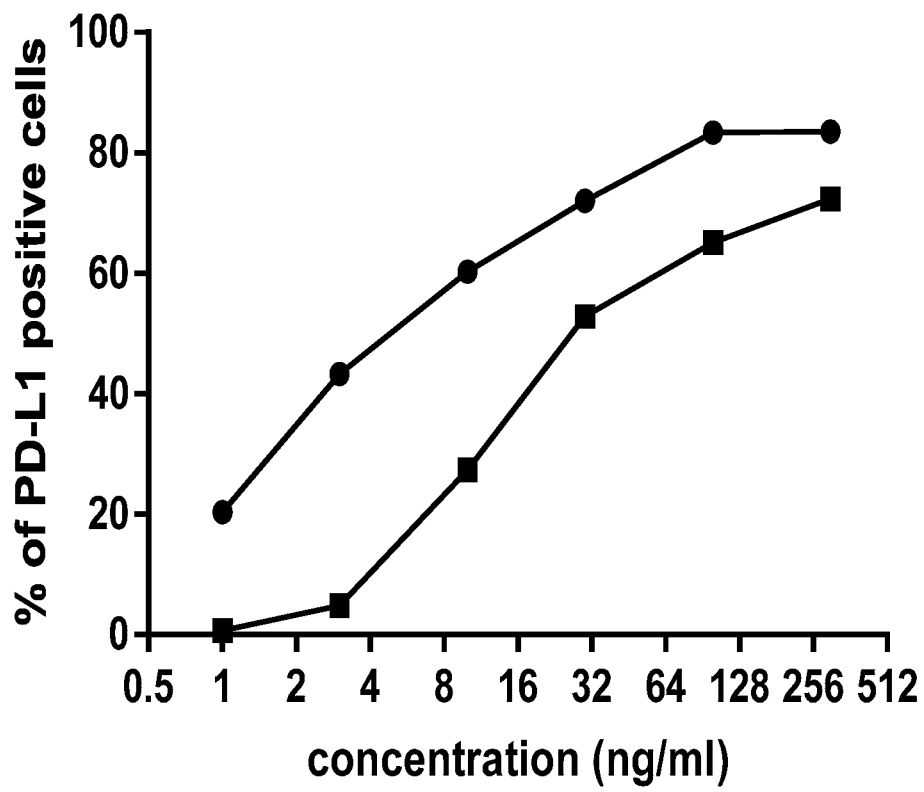
*Figure 13A*

Figure 13B

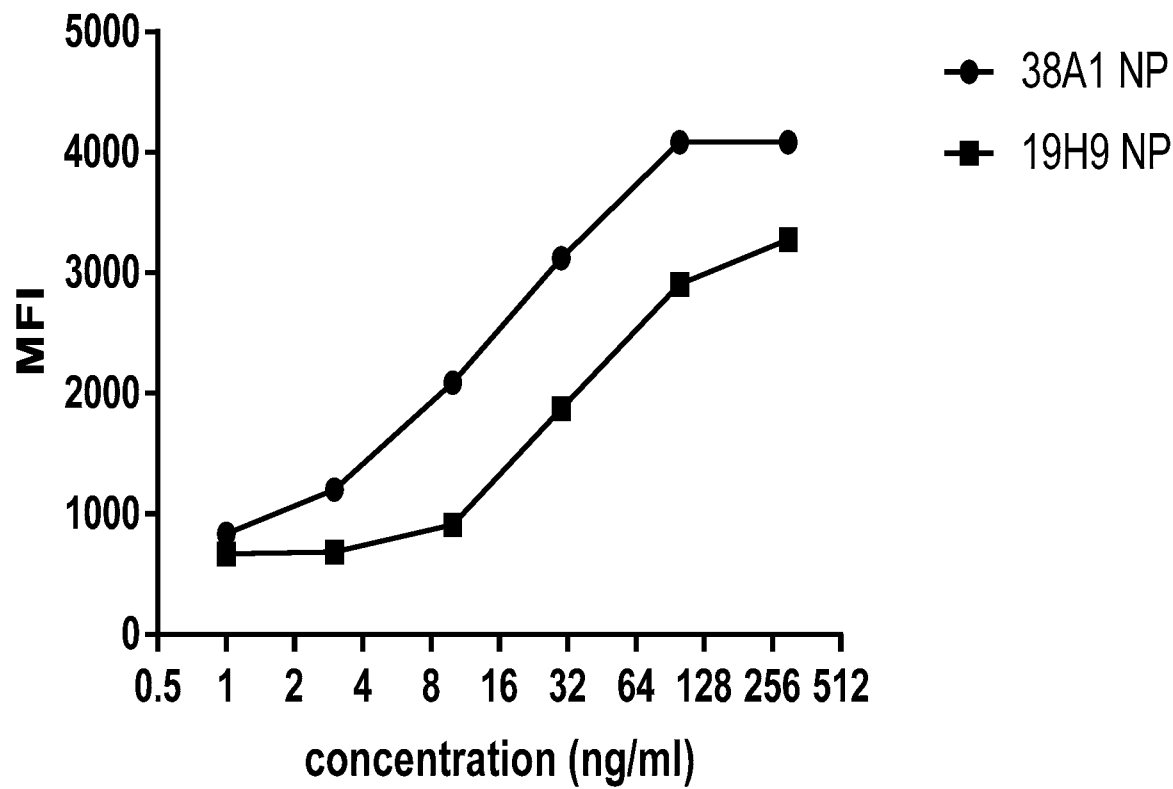


Figure 14A

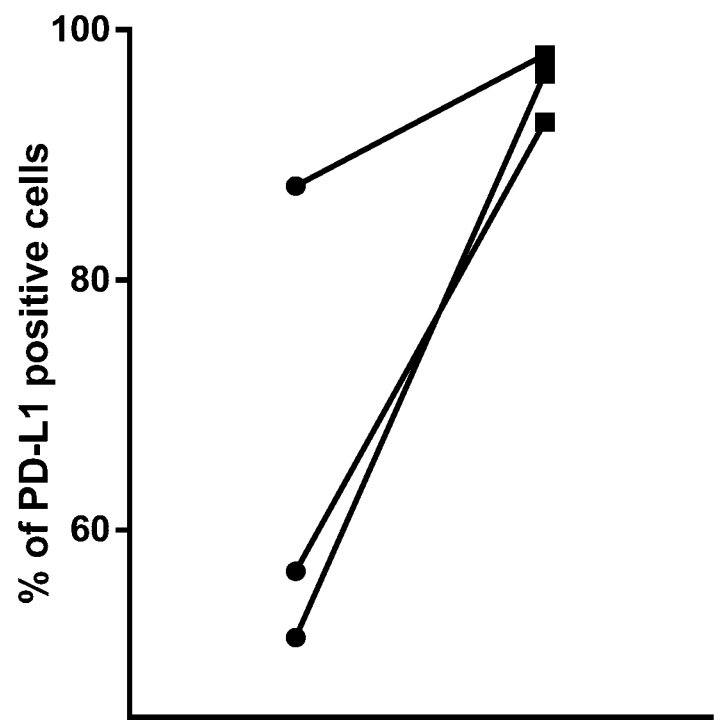


Figure 14B

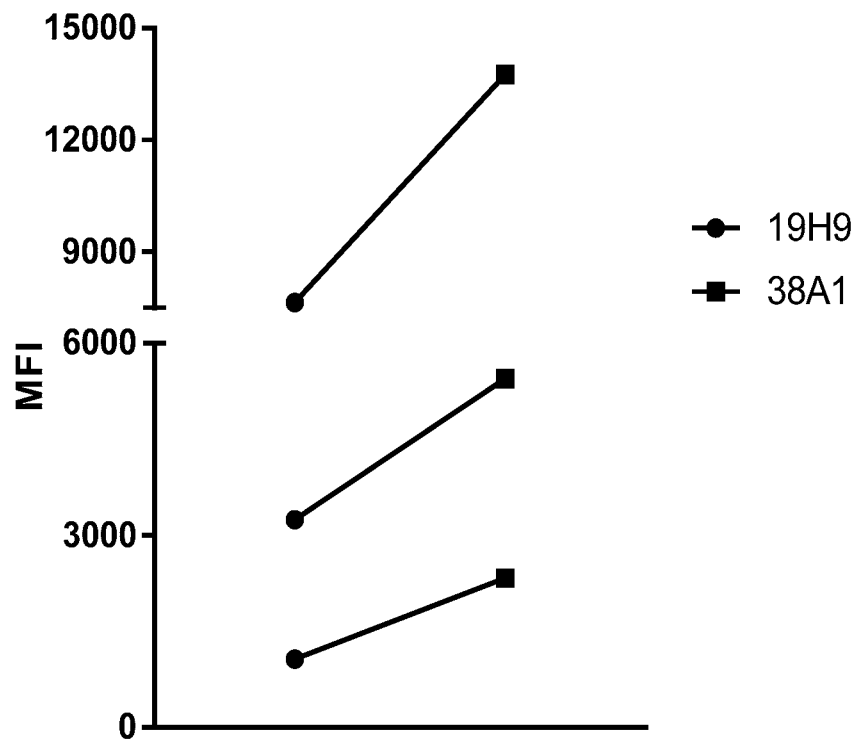


Figure 15A

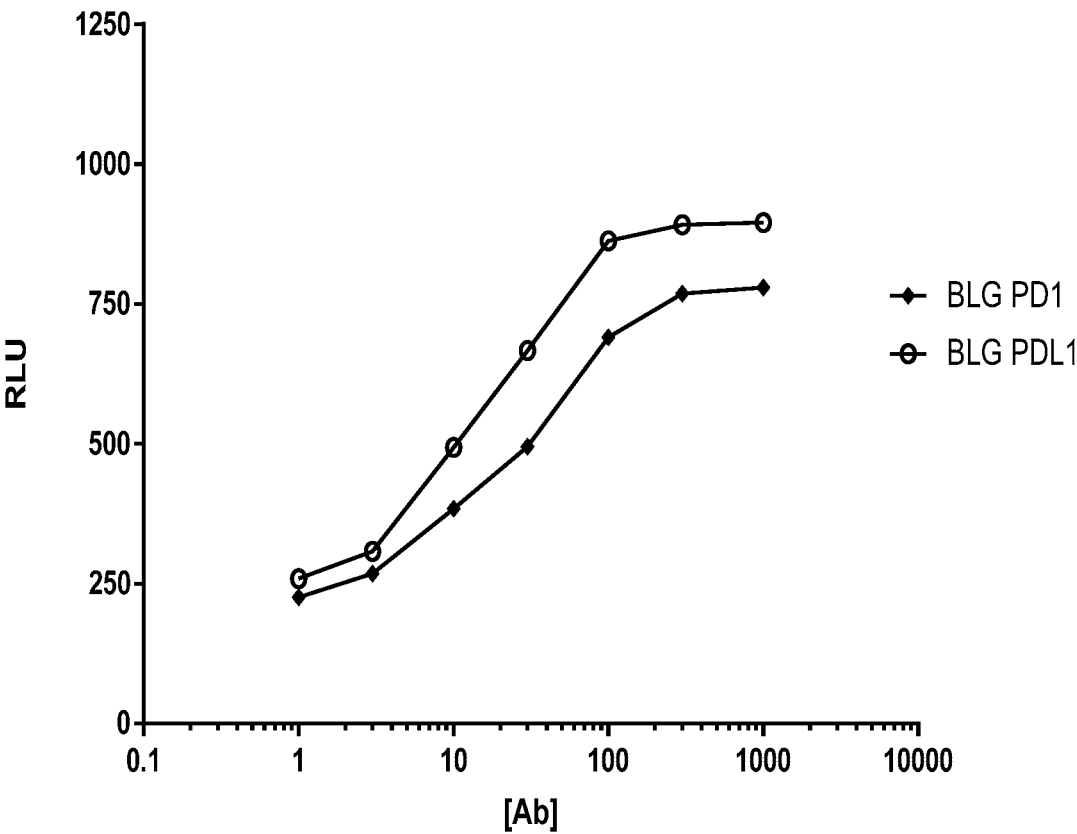


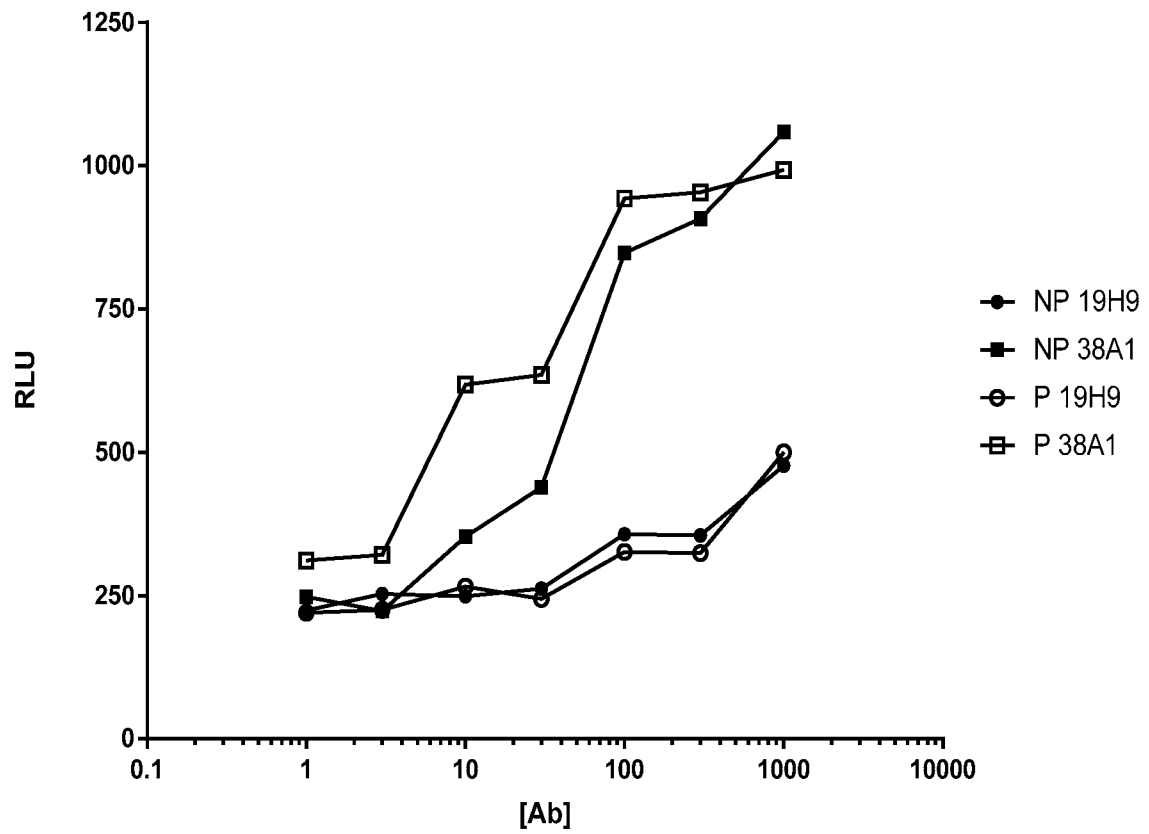
*Figure 15B*

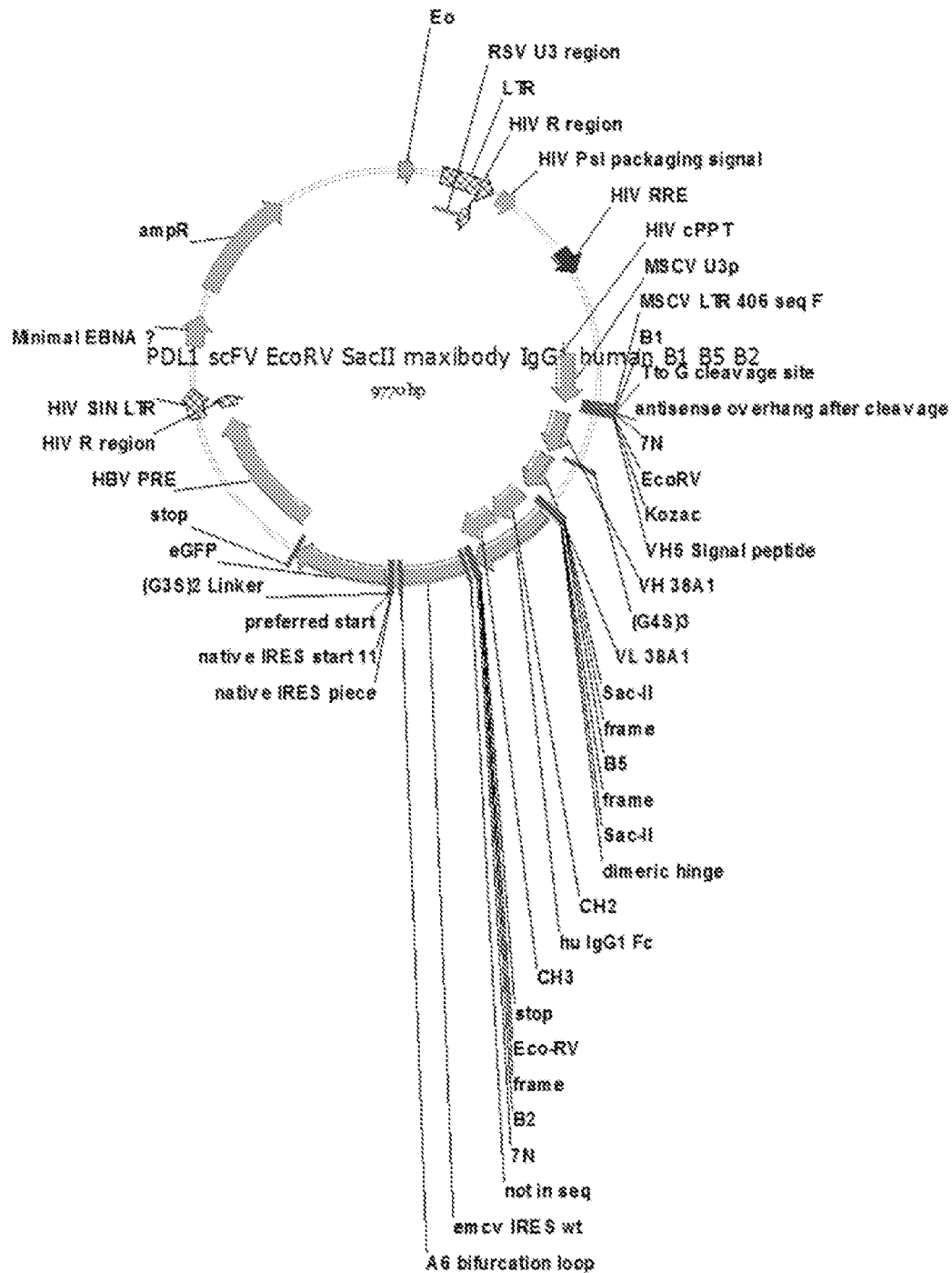
**Figure 16A****pLV4301G PDLV scFV 38A1**

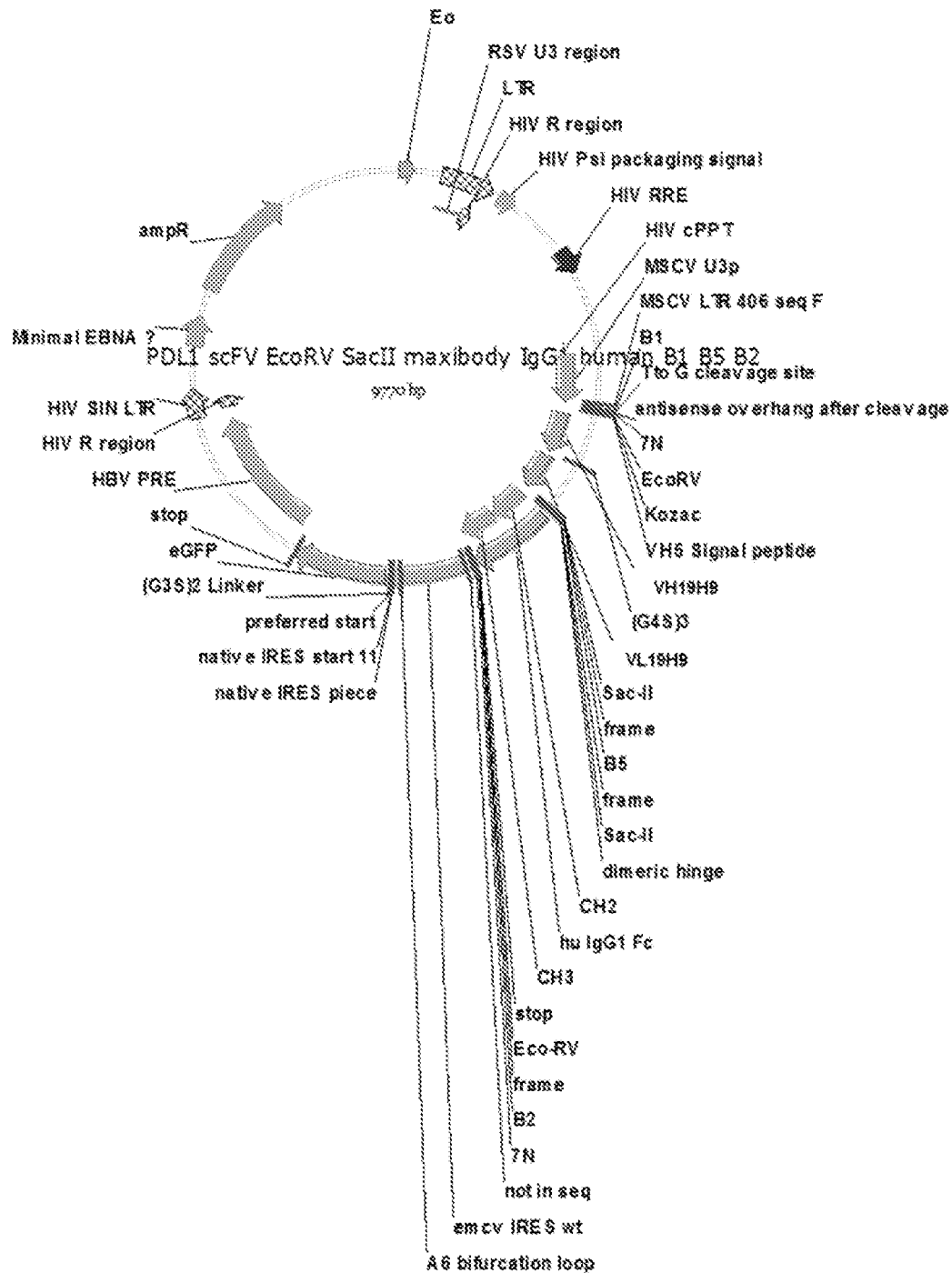
**Figure 16B****pLV4301G PDLV scFV 19H9**



**Figure 17 (cont.)**

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