

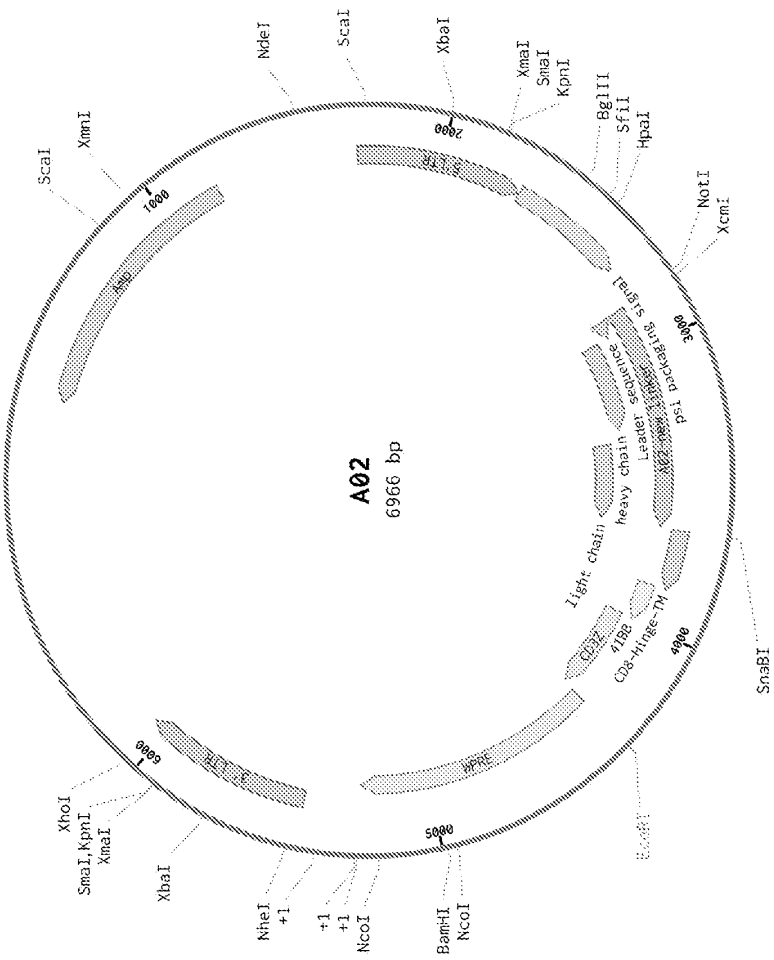
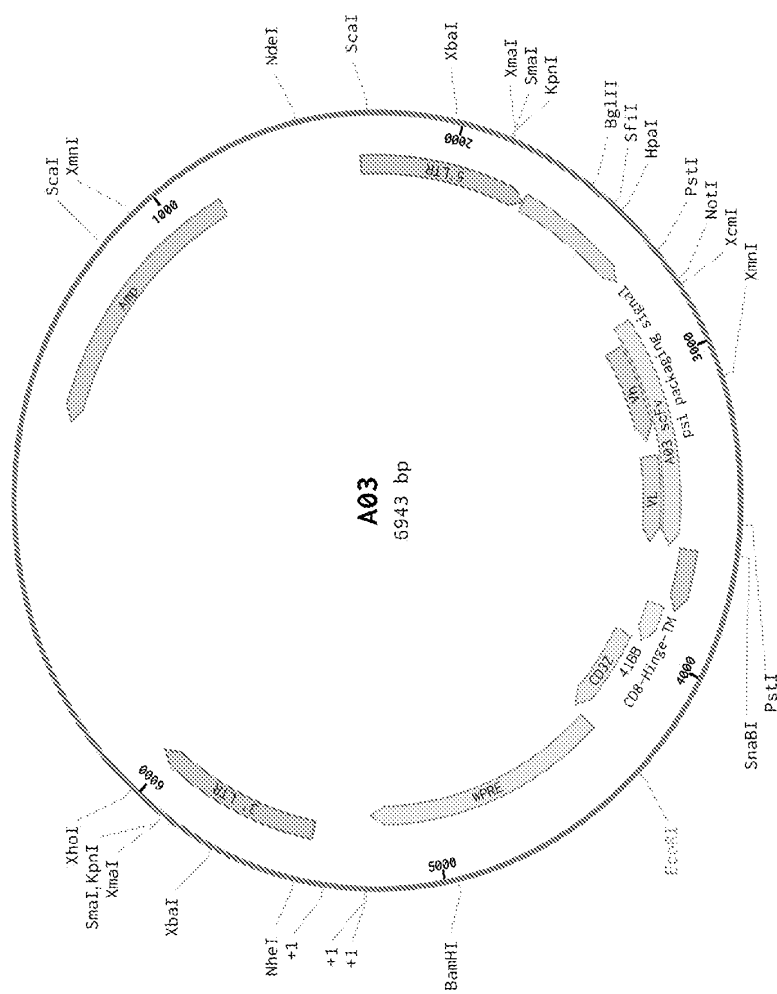


FIG. 1A



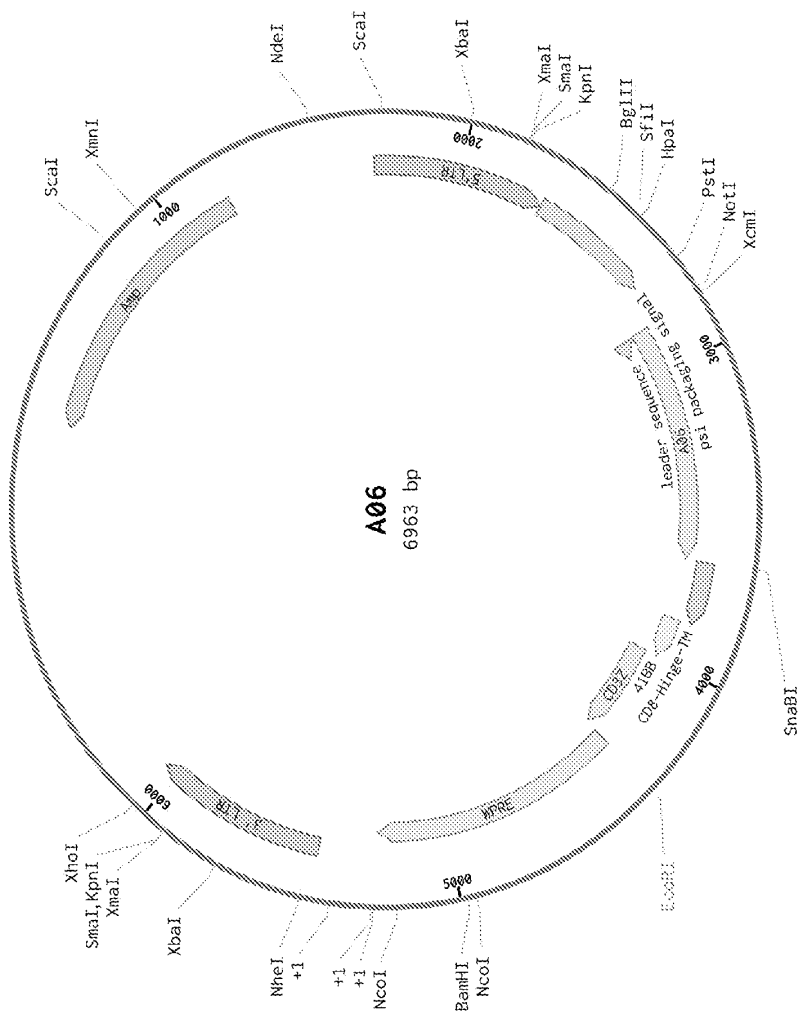


FIG. 1C

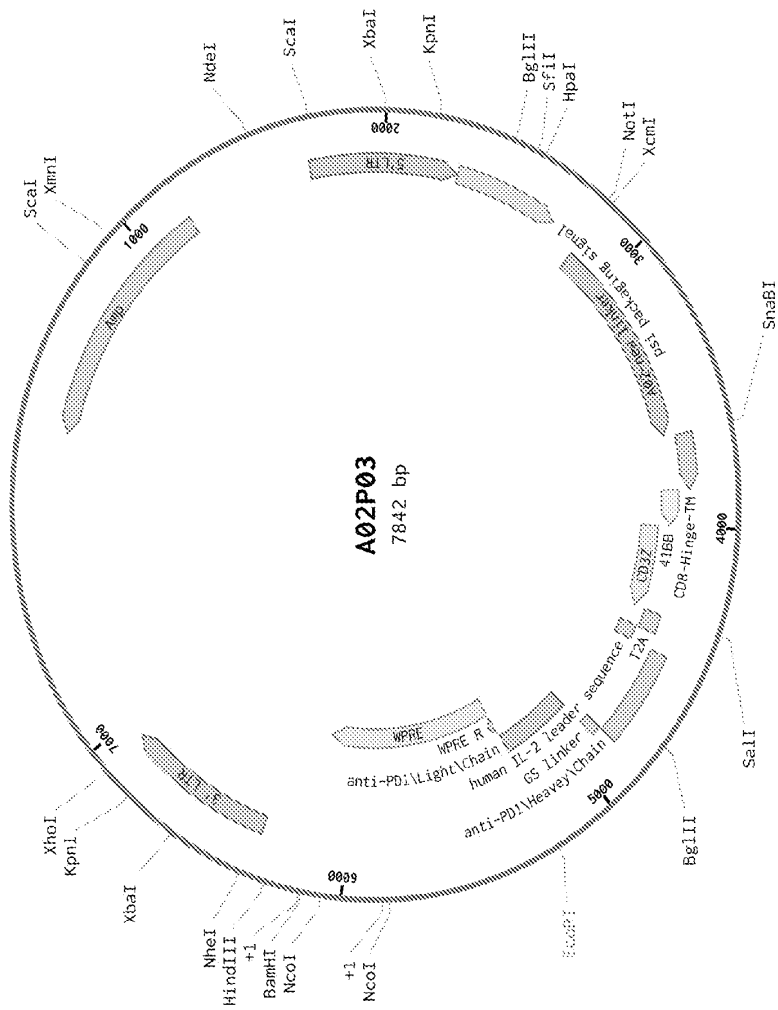


FIG. 1D

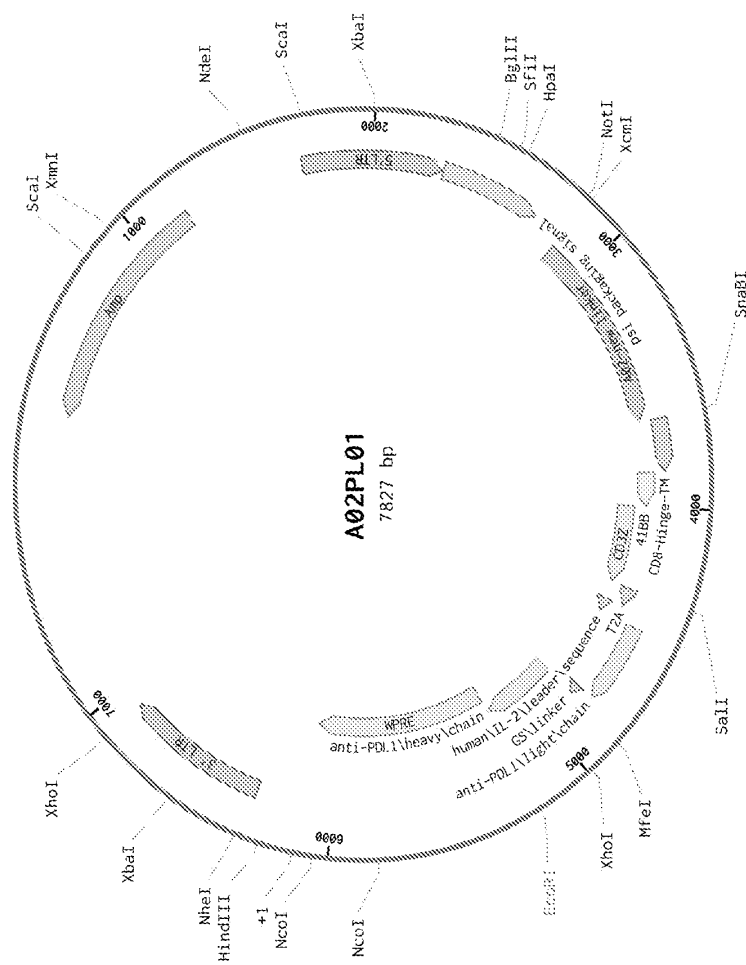


FIG. 1E

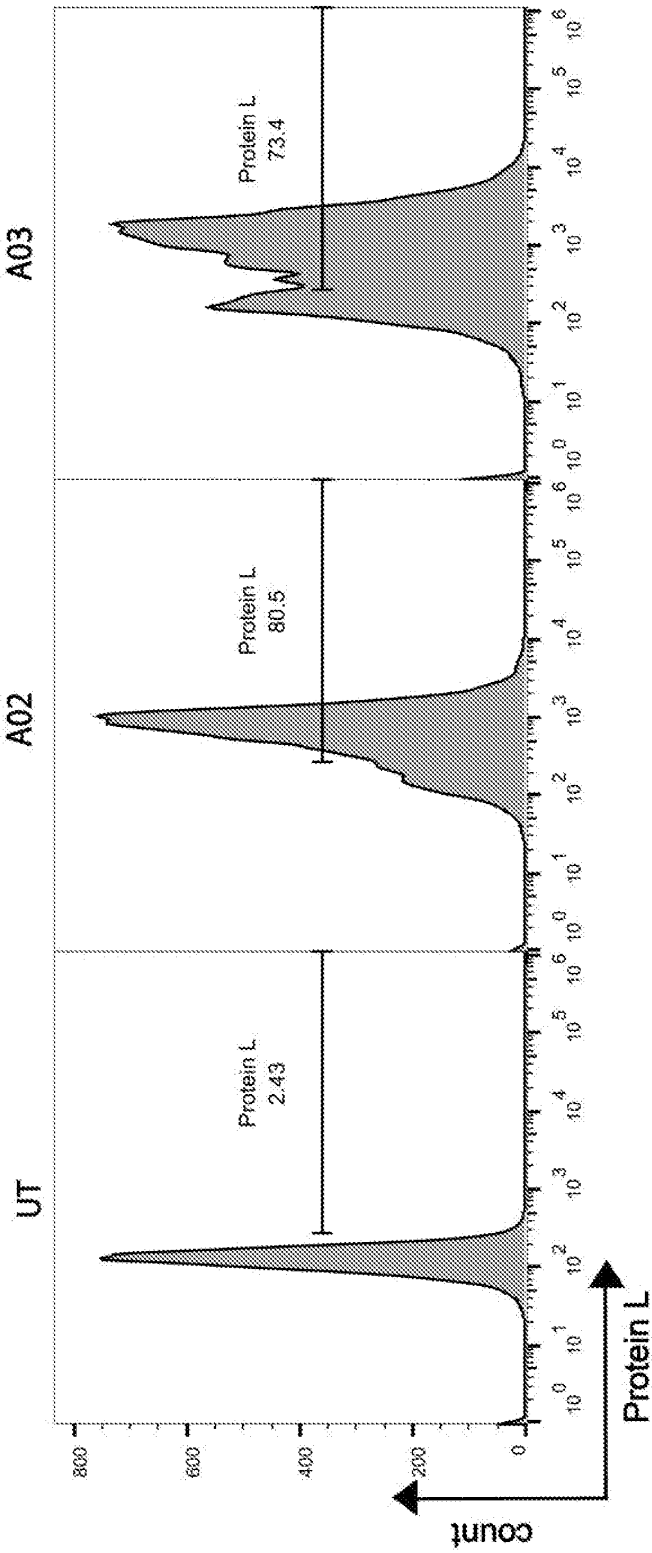


FIG. 2

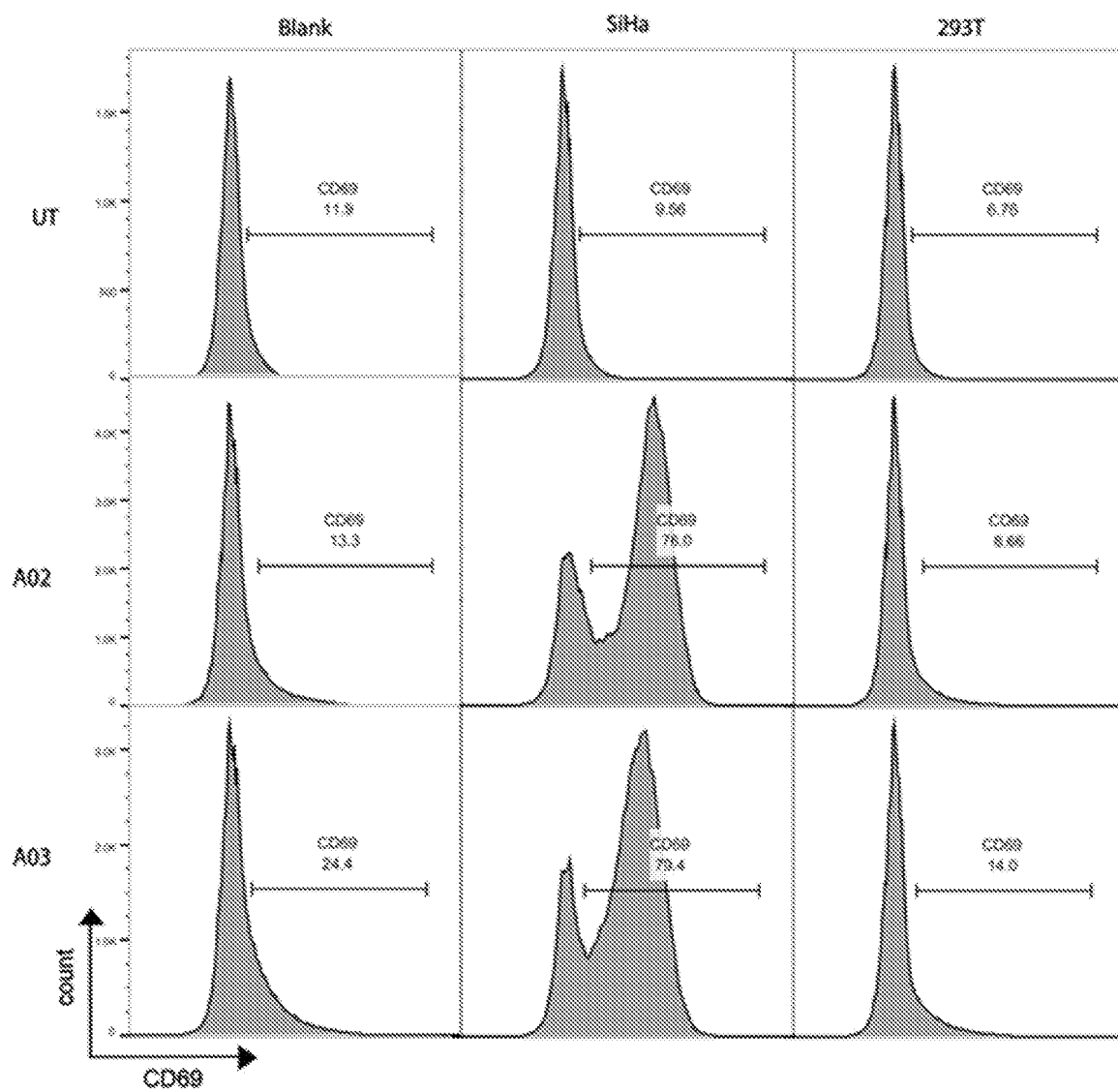


FIG. 3

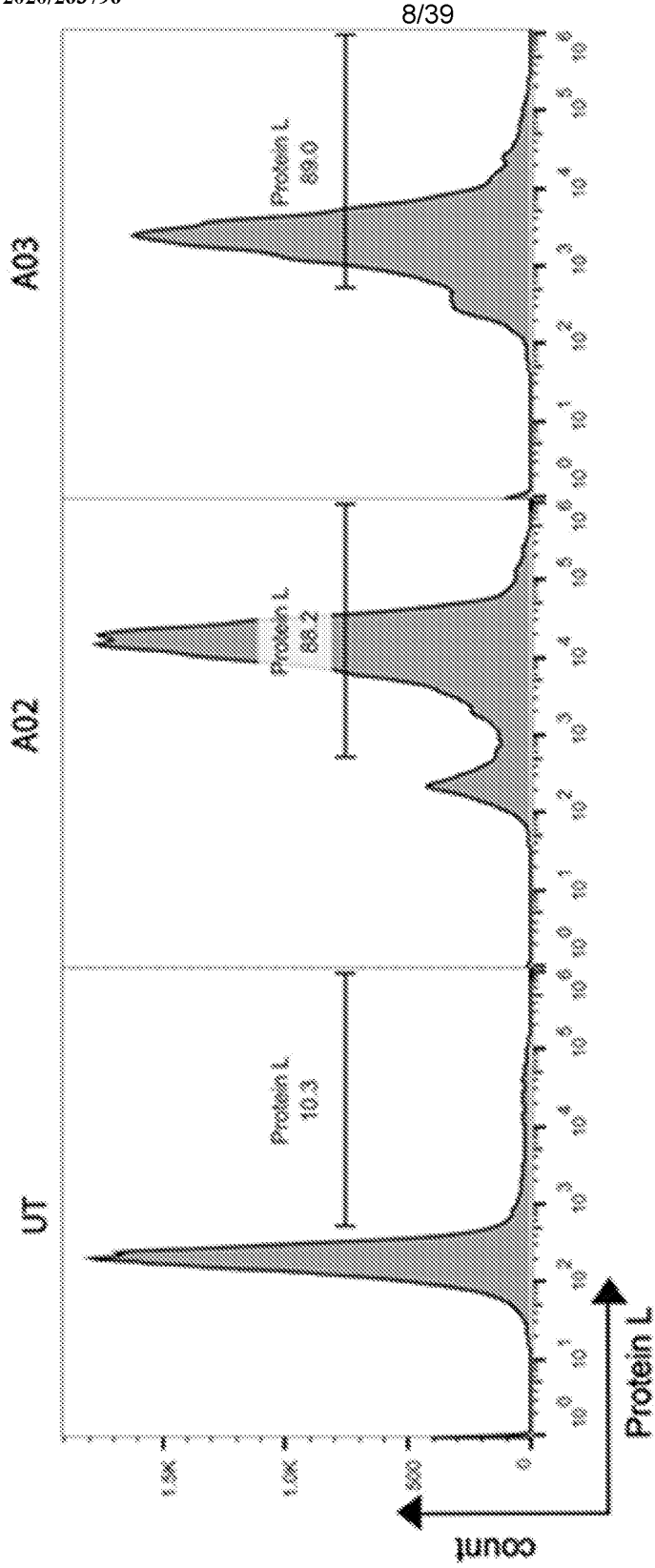


FIG. 4

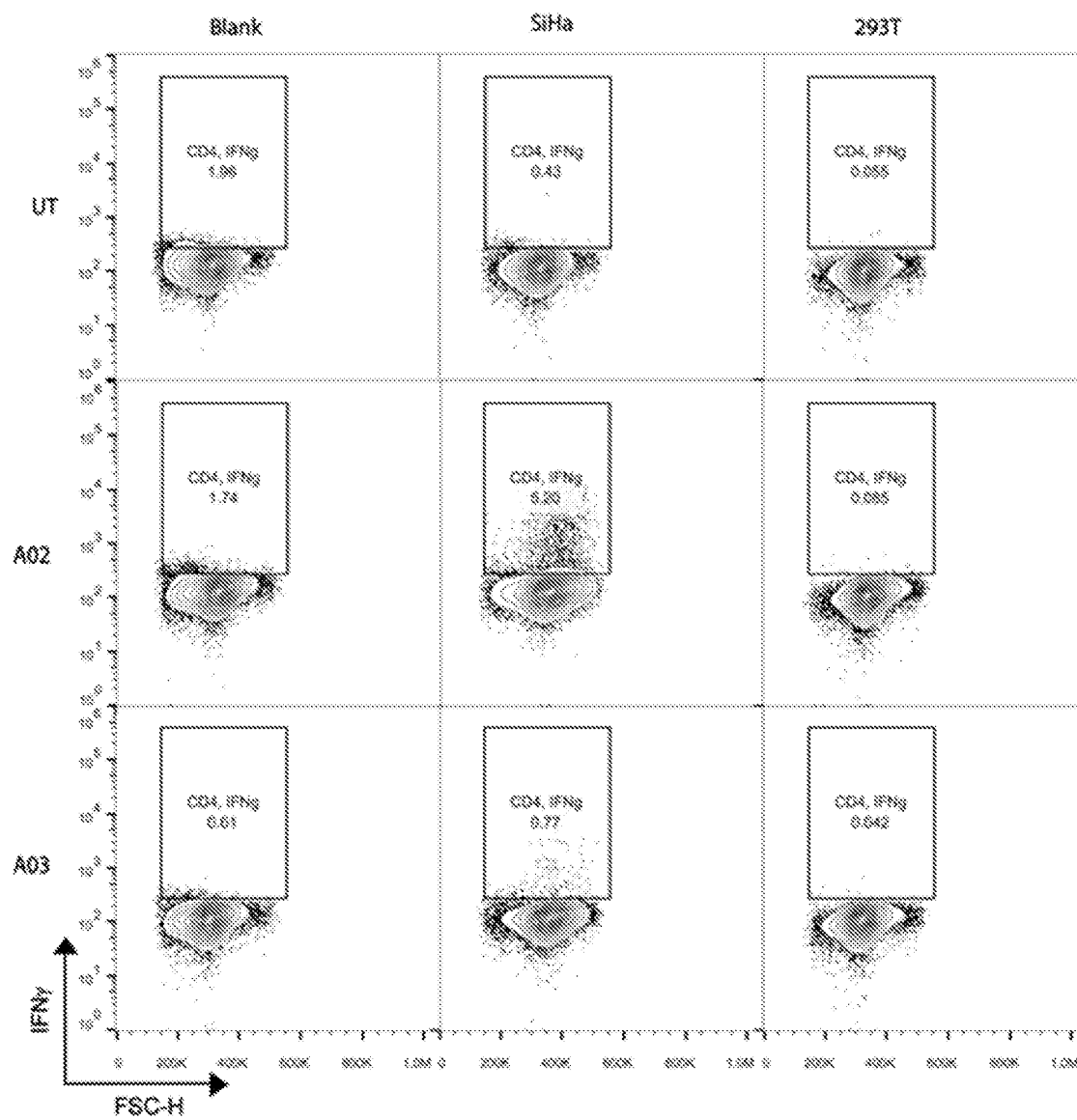


FIG. 5

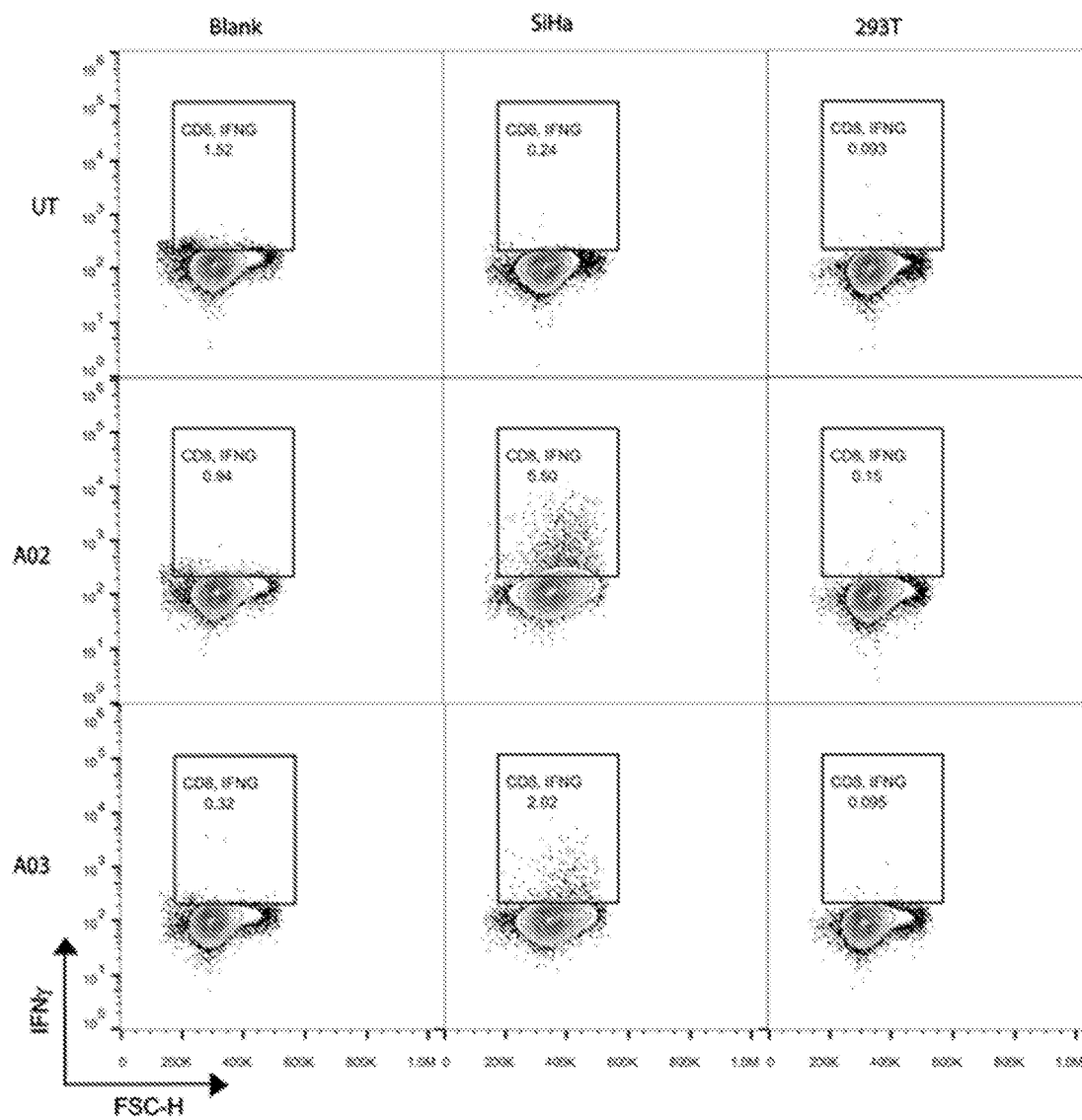


FIG. 6

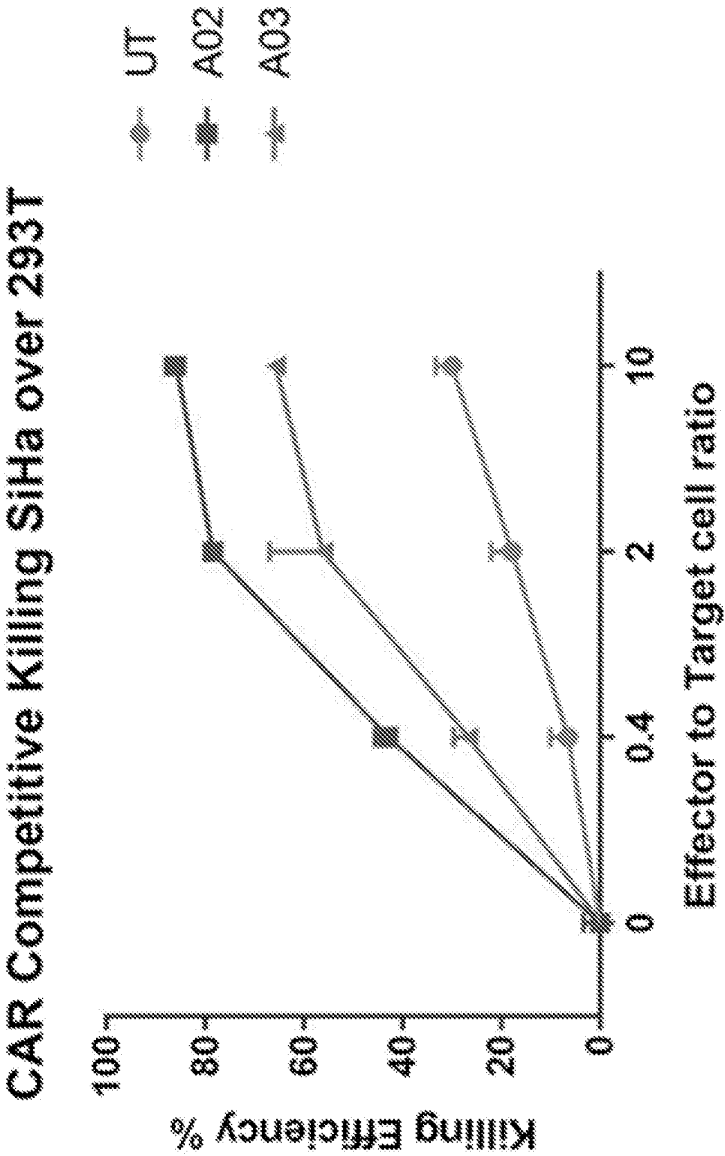


FIG. 7

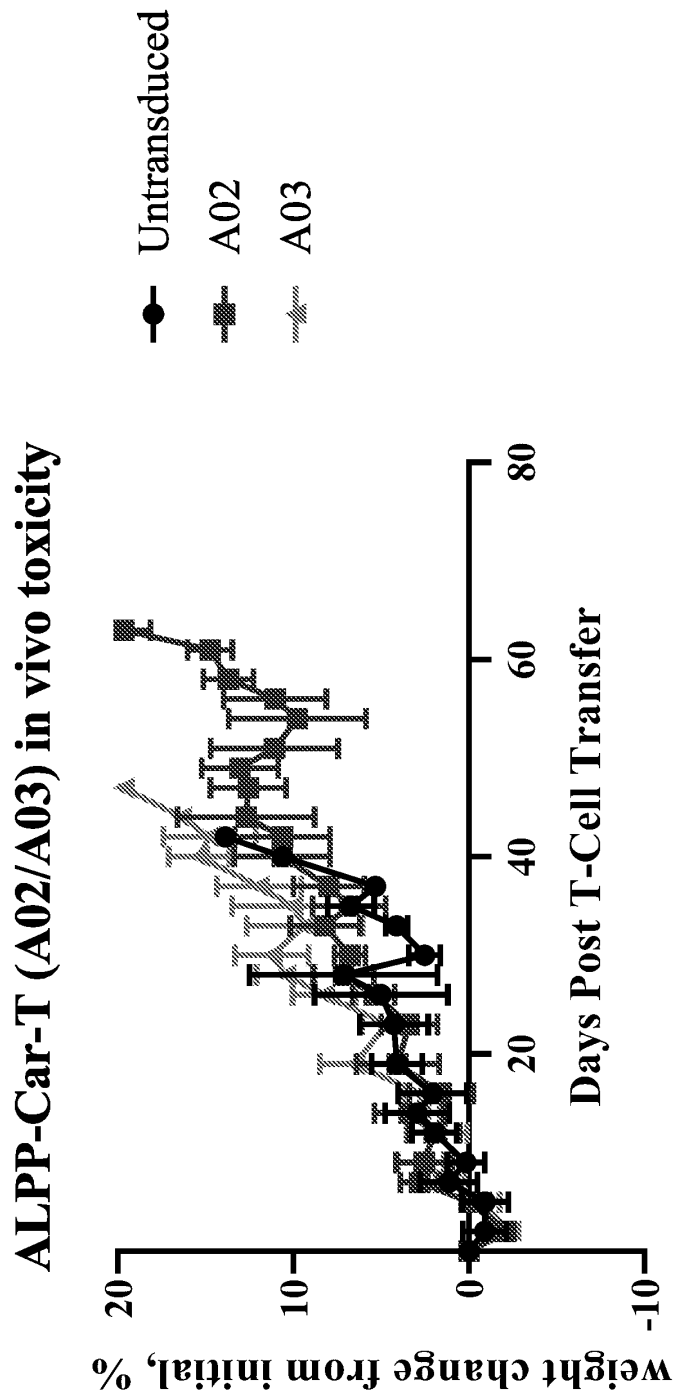


FIG. 8

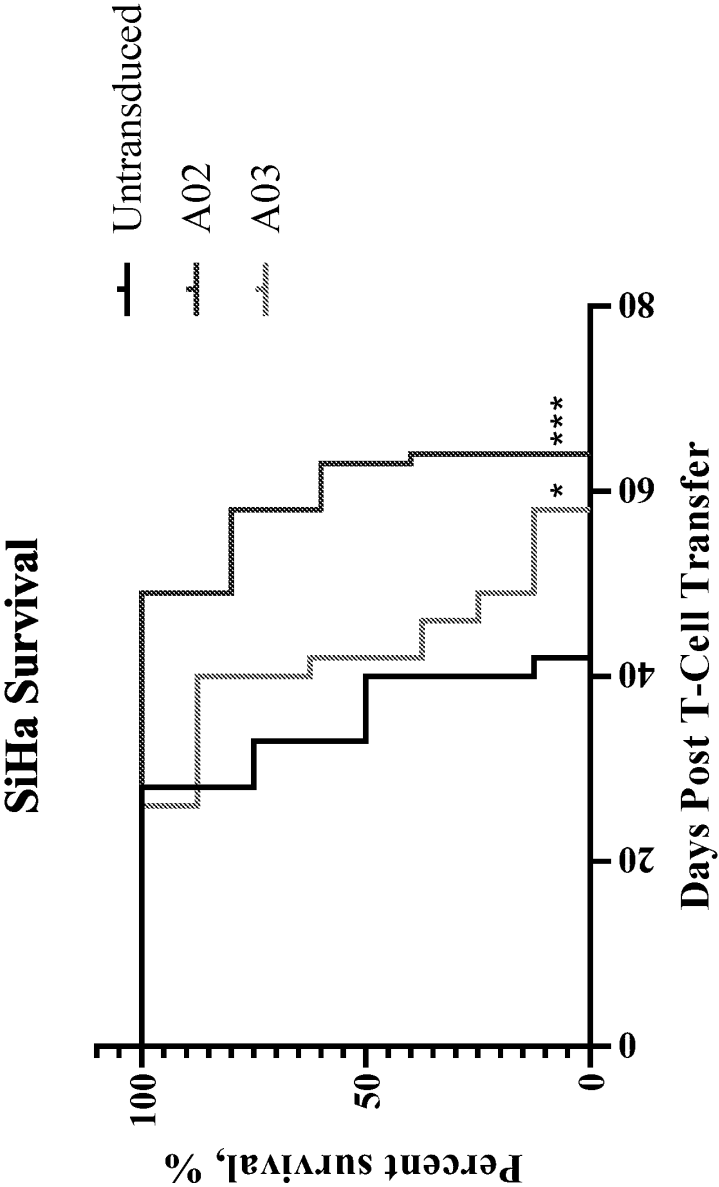


FIG. 9

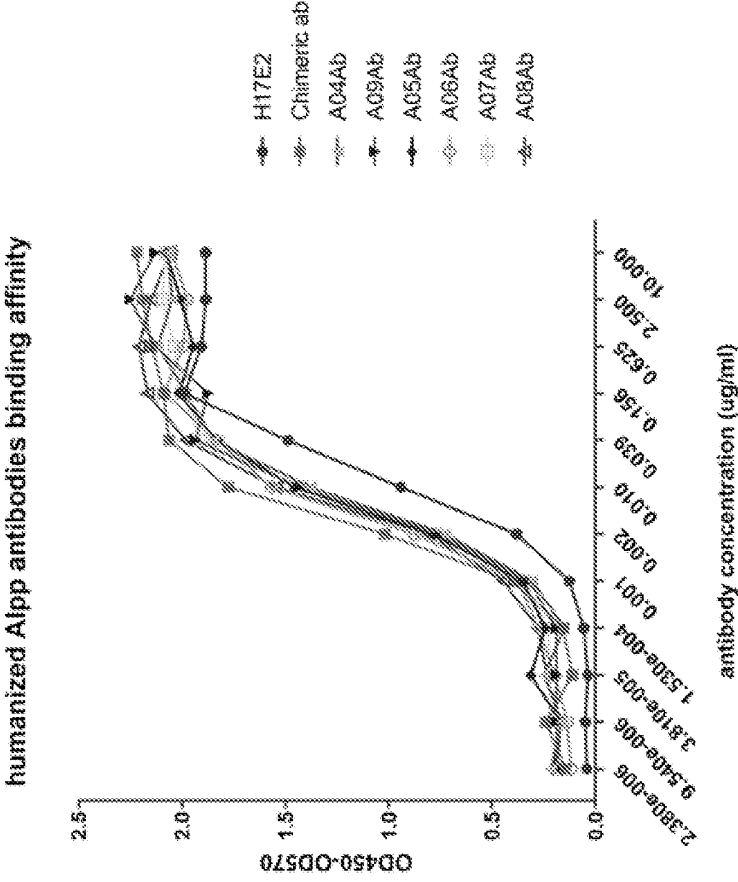


FIG. 10A

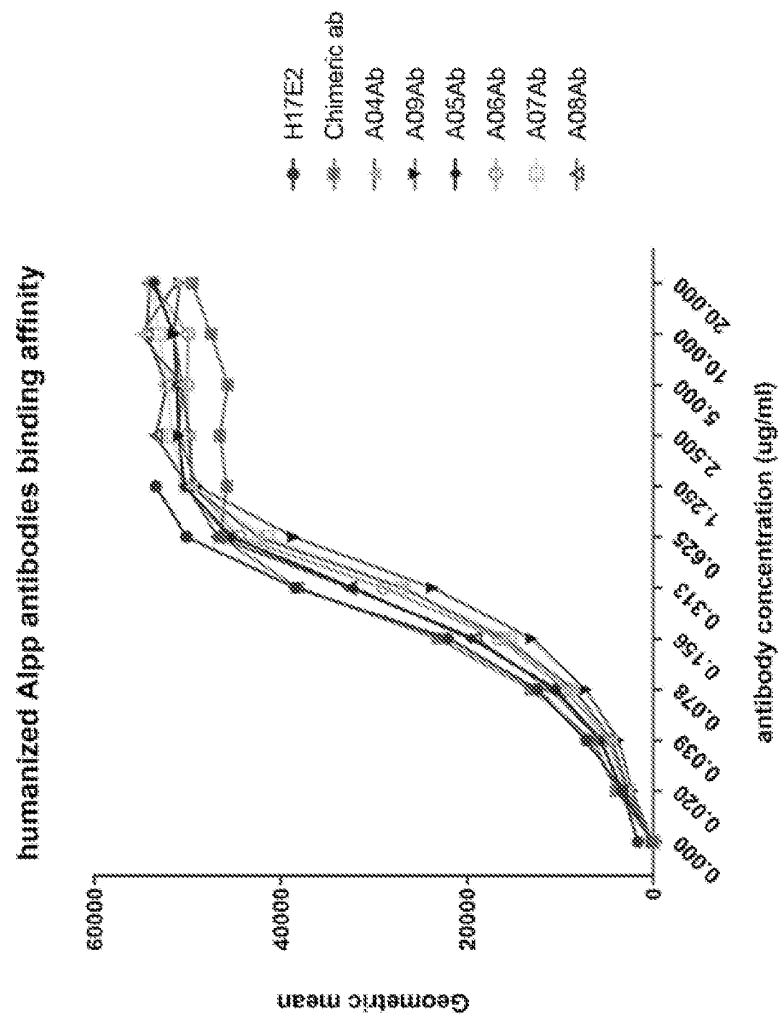


FIG. 10B

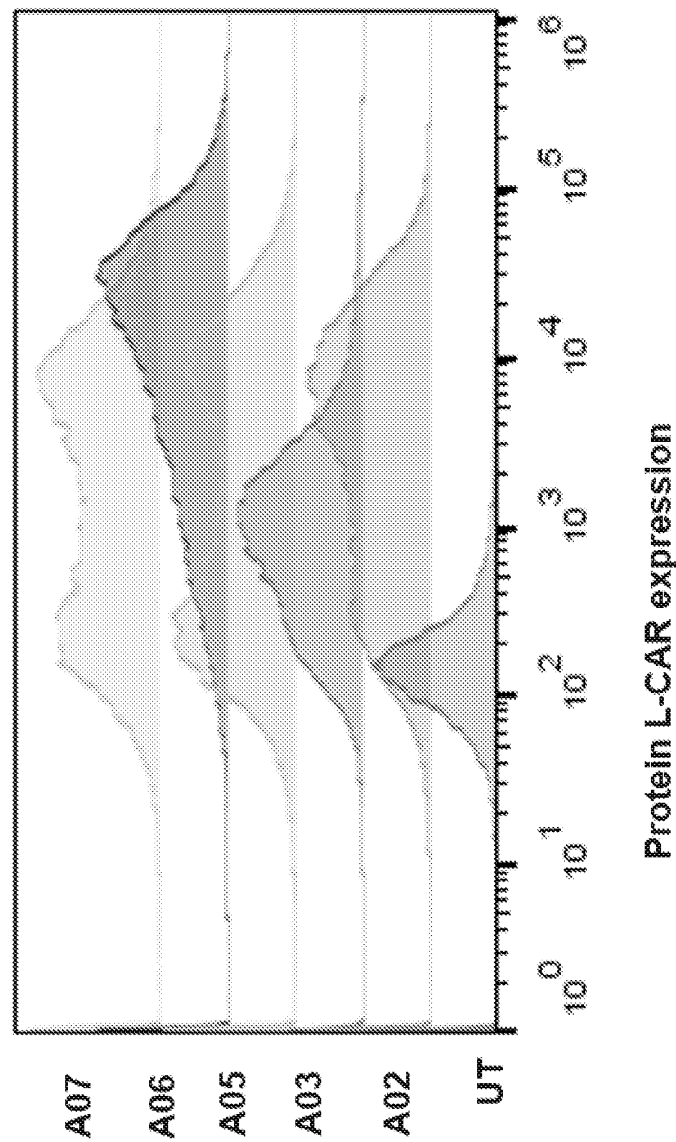


FIG. 11A

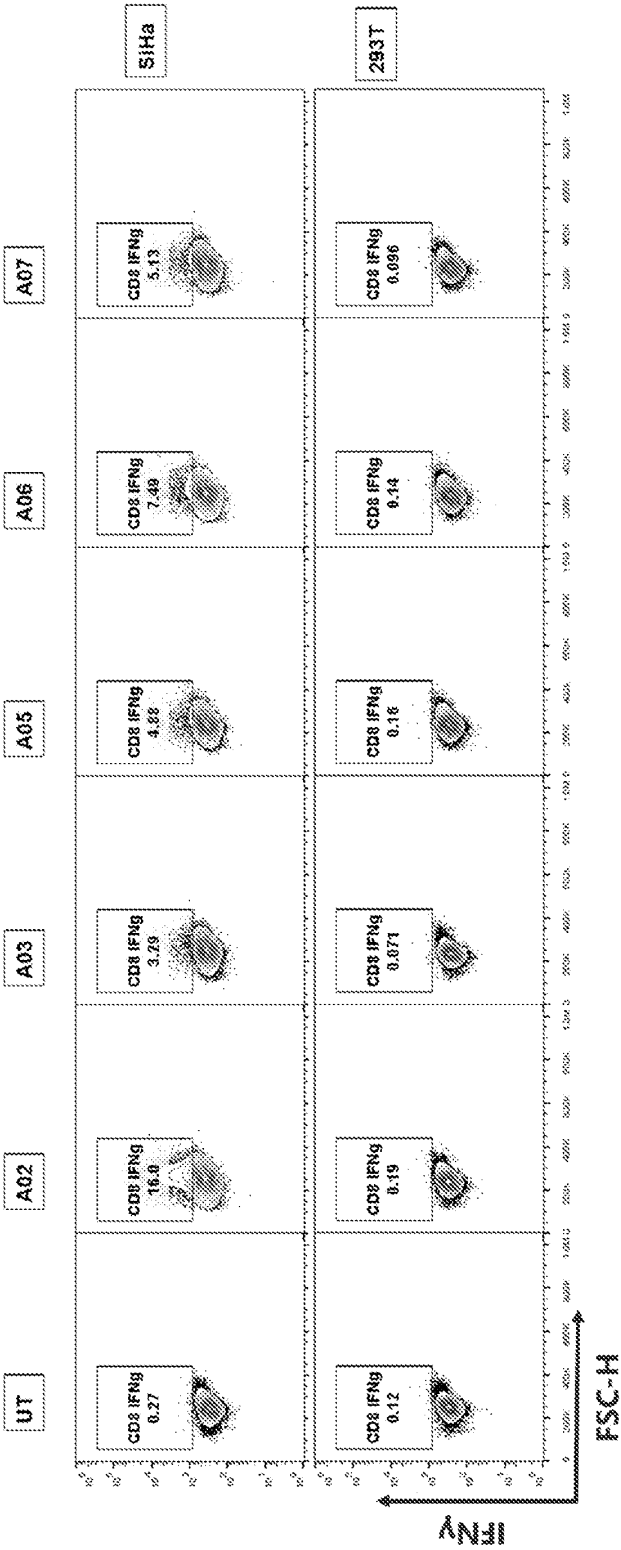


FIG. 11B

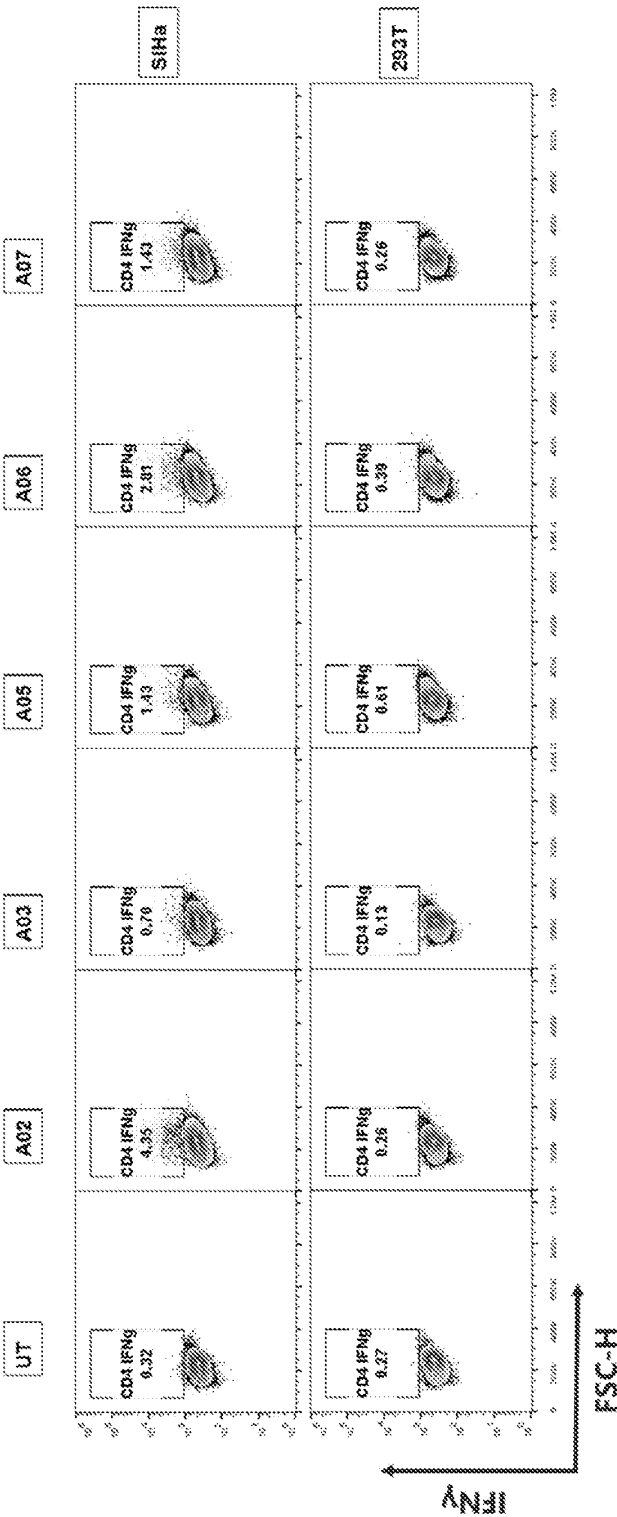


FIG. 11C

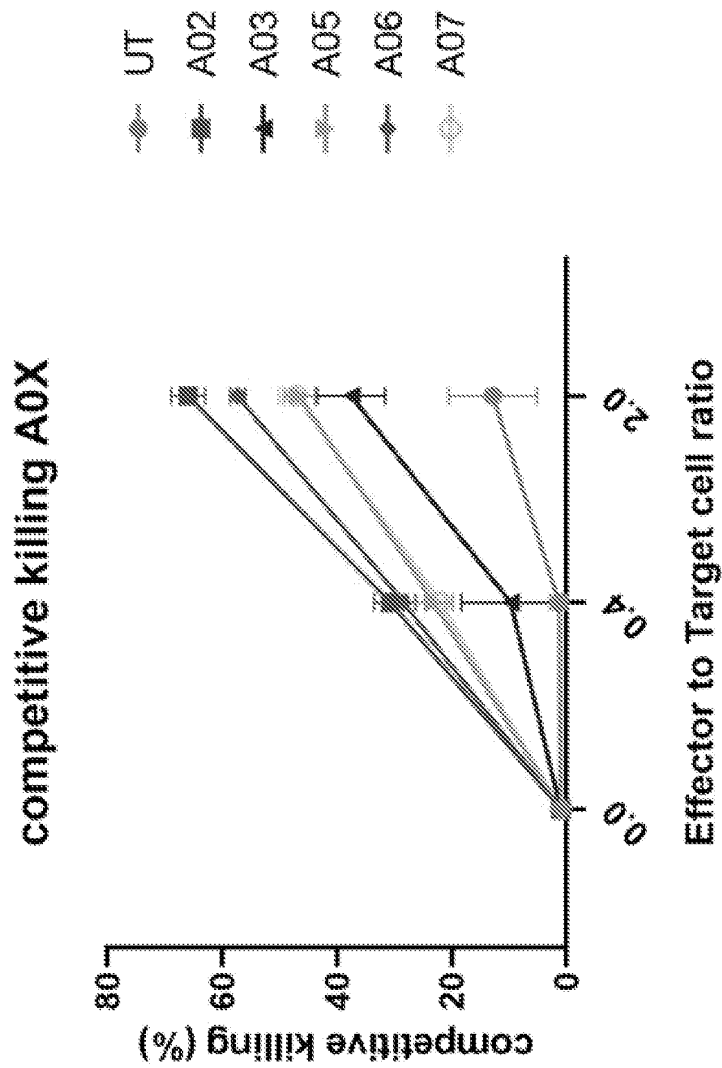


FIG. 11D

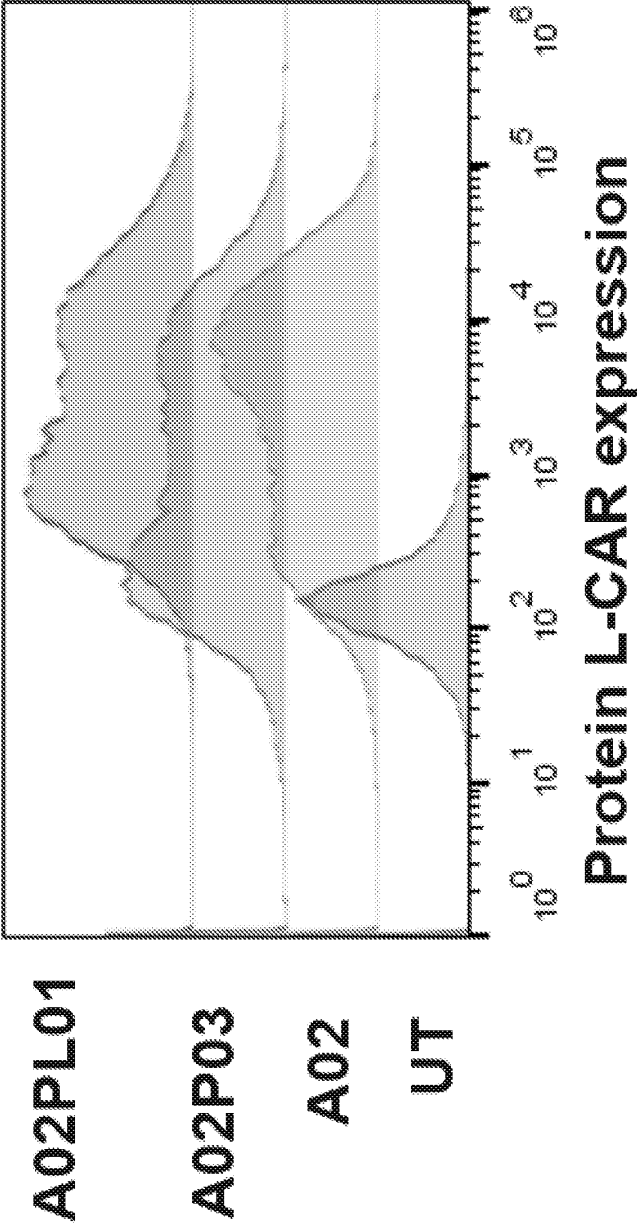


FIG. 12A

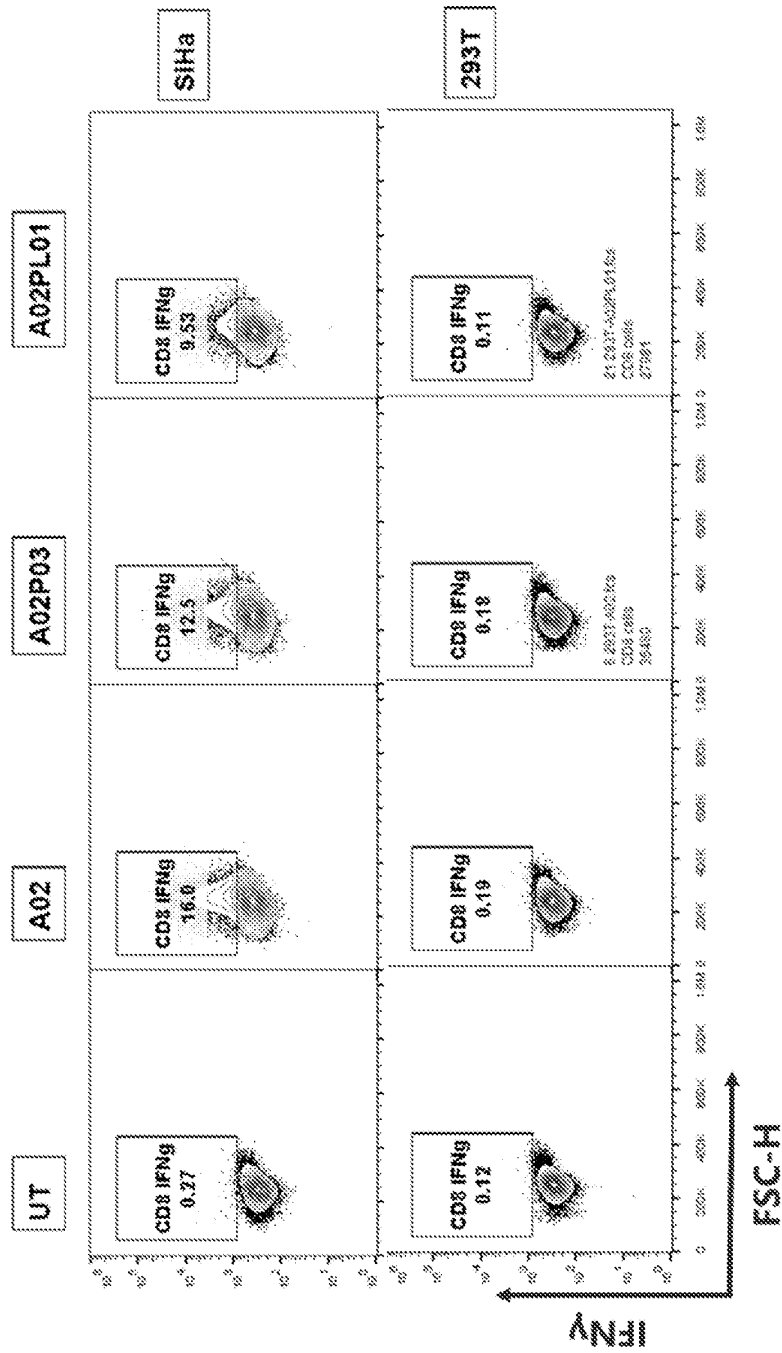


FIG. 12B

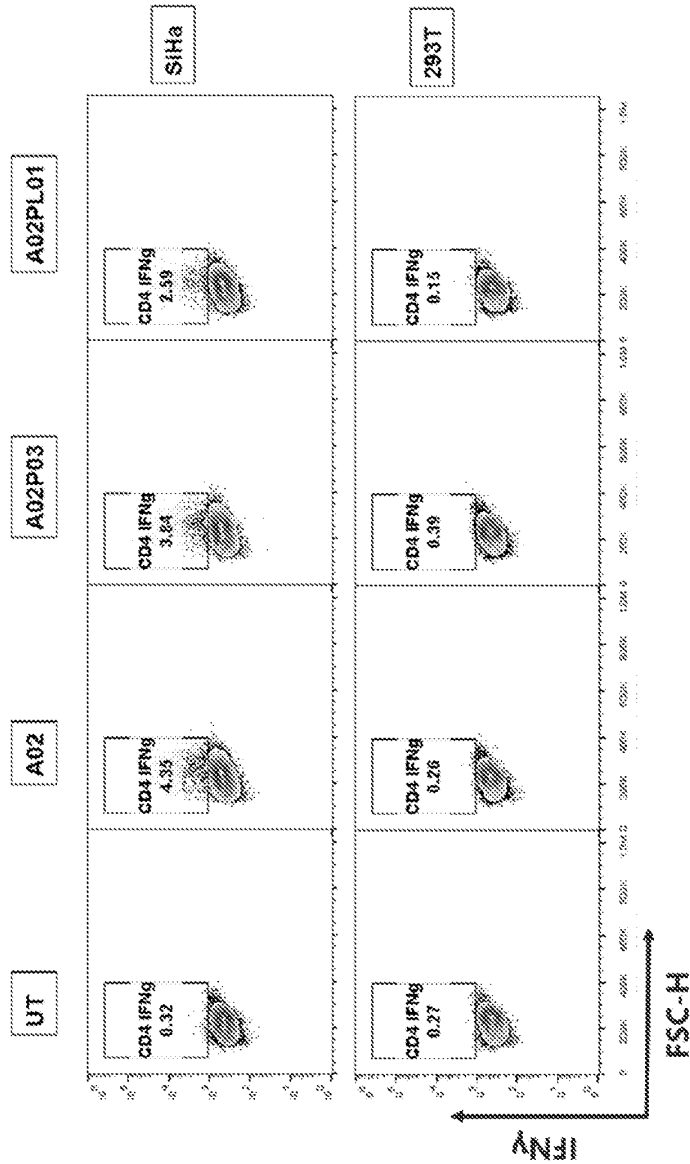


FIG. 12C

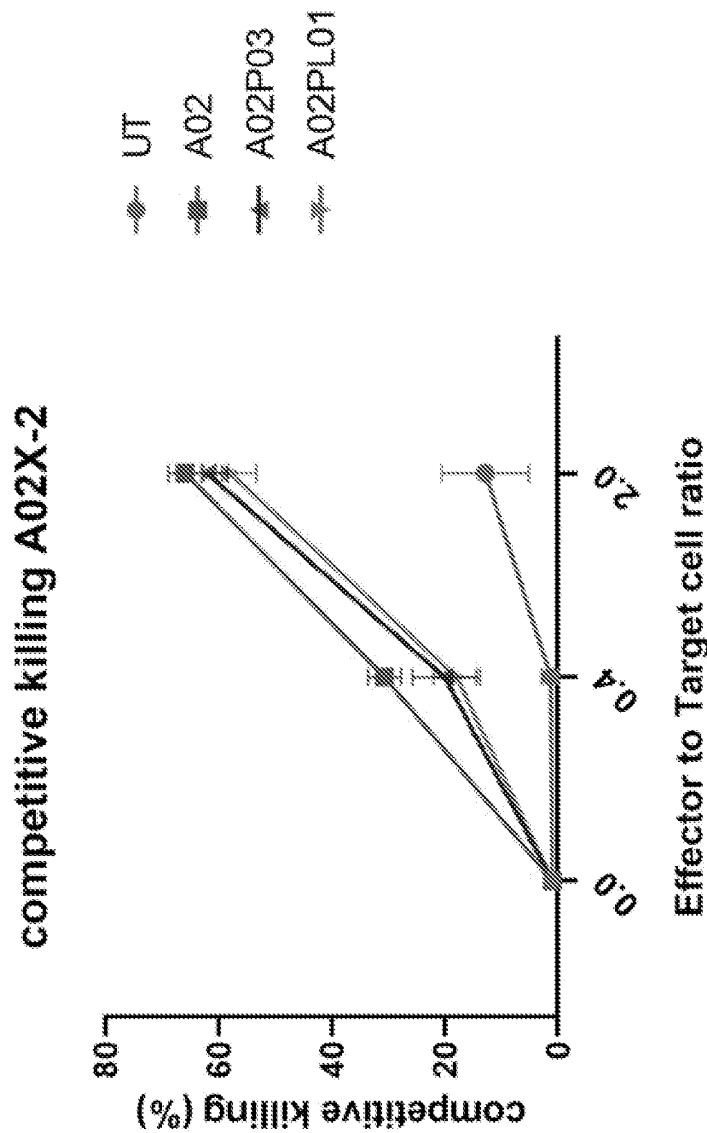


FIG. 12D

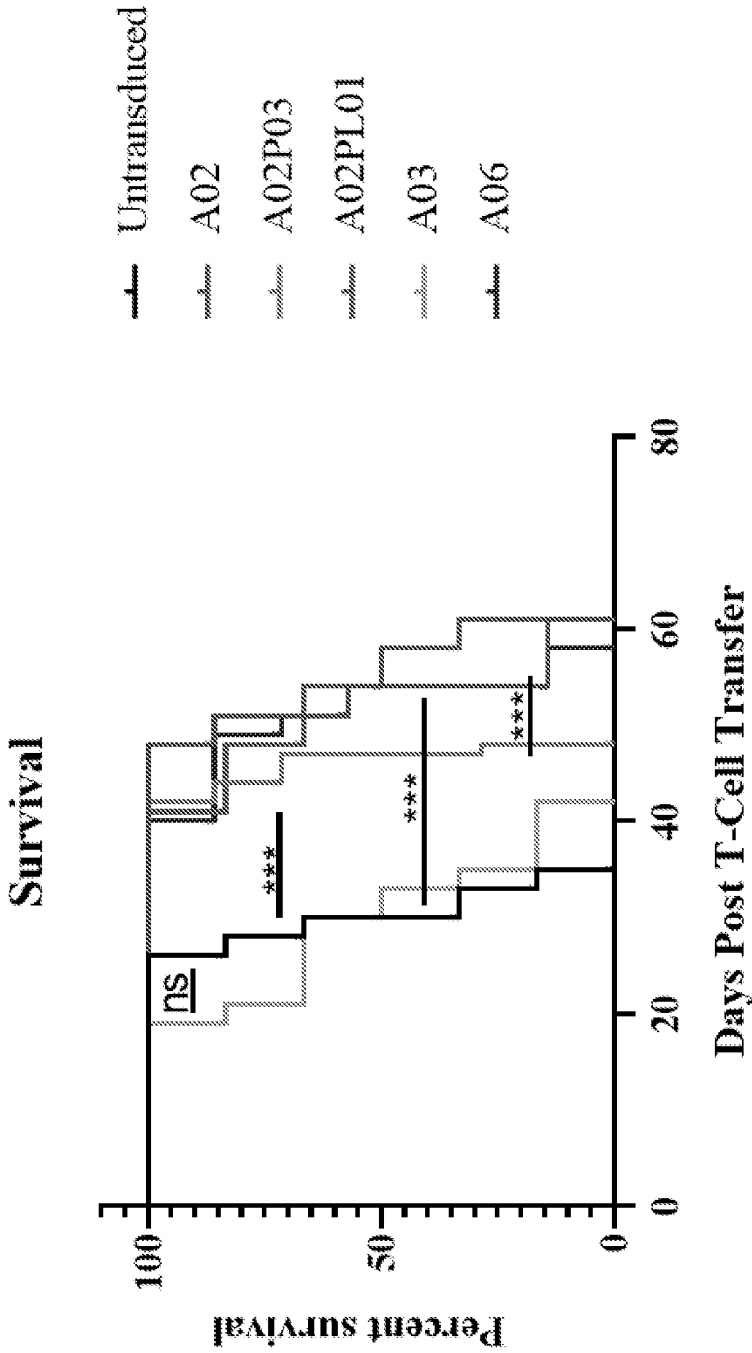


FIG. 13A

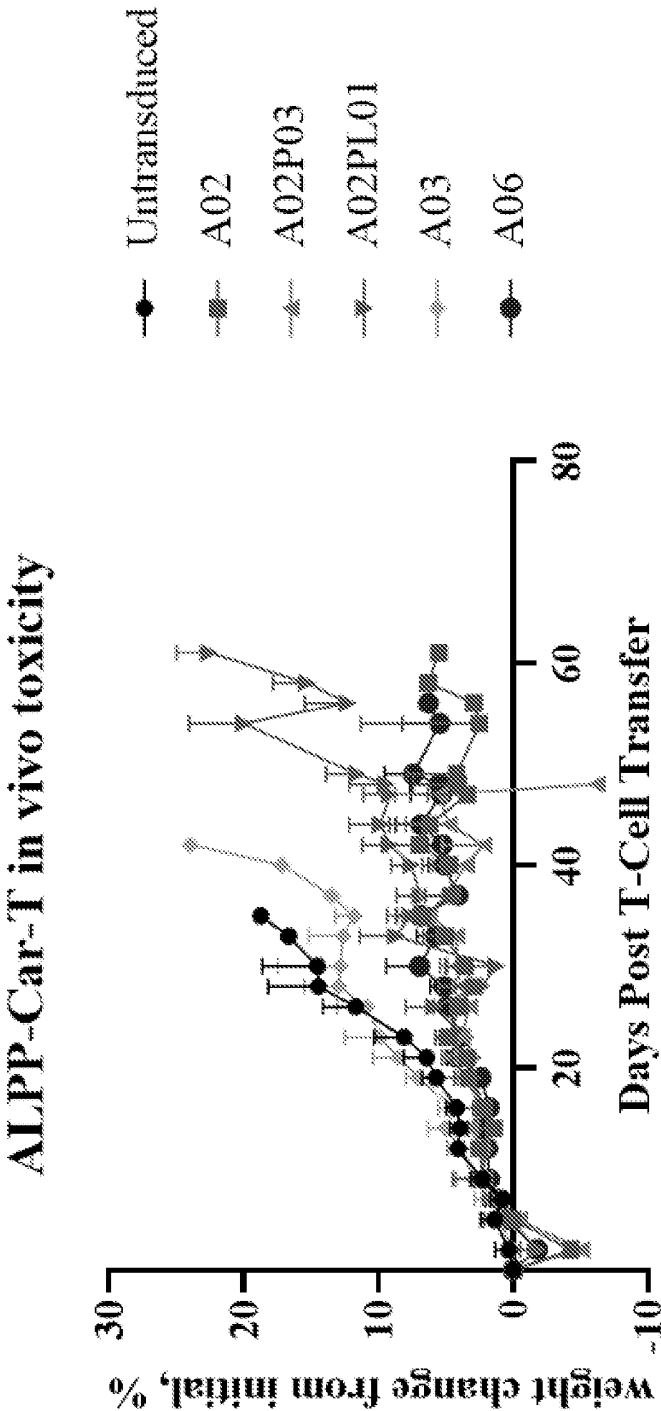


FIG. 13B

	VH			VL		
	CDR1	CDR2	CDR3	CDR1	CDR2	CDR3
A02	GFSLTSYG (SEQ ID NO: 45)	IWEDGST (SEQ ID NO: 46)	AKPHYGSSVVGAMEY (SEQ ID NO: 47)	ENIYSY (SEQ ID NO: 48)	NAK (SEQ ID NO: 49)	QHHVYSPWT (SEQ ID NO: 50)
A03	GFTFTSYG (SEQ ID NO: 51)	IWEDGST (SEQ ID NO: 52)	ARPHYGSSVVGAMEY (SEQ ID NO: 53)	ENIYSY (SEQ ID NO: 54)	NAK (SEQ ID NO: 55)	QHHVYSPWT (SEQ ID NO: 56)
A04	GFSLTSYG (SEQ ID NO: 57)	IWEDGST (SEQ ID NO: 58)	ARPHYGSSVVGAMEY (SEQ ID NO: 59)	ENIYSY (SEQ ID NO: 60)	NAK (SEQ ID NO: 61)	QHHVYSPWT (SEQ ID NO: 62)
A05	GFSLTSYG (SEQ ID NO: 63)	IWEDGST (SEQ ID NO: 64)	ARPHYGSSVVGAMEY (SEQ ID NO: 65)	ENIYSY (SEQ ID NO: 66)	NAK (SEQ ID NO: 67)	QHHVYSPWT (SEQ ID NO: 68)
A06	GFSLTSYG (SEQ ID NO: 69)	IWEDGST (SEQ ID NO: 70)	AKPHYGSSVVGAMEY (SEQ ID NO: 71)	ENIYSY (SEQ ID NO: 72)	NAK (SEQ ID NO: 73)	QHHVYSPWT (SEQ ID NO: 74)
A07	GFSLTSYG (SEQ ID NO: 75)	IWEDGST (SEQ ID NO: 76)	AKPHYGSSVVGAMEY (SEQ ID NO: 77)	ENIYSY (SEQ ID NO: 78)	NAK (SEQ ID NO: 79)	QHHVYSPWT (SEQ ID NO: 80)
A08	GFSLTSYG (SEQ ID NO: 81)	IWEDGST (SEQ ID NO: 82)	ARPHYGSSVVGAMEY (SEQ ID NO: 83)	ENIYSY (SEQ ID NO: 84)	NAK (SEQ ID NO: 85)	QHHVYSPWT (SEQ ID NO: 86)

FIG. 14

FIG. 15**A02 CAR VH (SEQ ID NO: 1)**

QVQLKESGPGLVAPSQSLSTCTVSGFSLTSYGVSWVRQPPRKGLEWLGVIWEDGSTNYHSA
LISRLSINKDNSKSKVFLKLNLSLQTDATYYCAKPHYGSSYVGAMEYWGQGSTVTVSS

A02 CAR VL (SEQ ID NO: 2)

DIQMTQSPASLTASVGETVTITCRASENIYSYVAWYQQKQKSPQFLVYNAKSLAEGVPSRF
SGSGSGTQFSLKINSLQPEDFGNYQCQHHYVSPWTFGGGTKLEIK

A03 CAR VH (SEQ ID NO: 3)

QVQLQESGPGLVRPSTLSLTCTVSGFTFTSYGVSWVRQPPGRGLEWIGVIWEDGSTNYHSA
LISRVTMLVDTSKNQFSLRLSSVTAADTAVYYCARPHYGSSYVGAMEYWGQGS�TVSS

A03 CAR VL (SEQ ID NO: 4)

DIQMTQSPSSLSASVGDRVTITCRASENIYSYVAWYQQKPGKAPKLLIYNAKSLAEGVPSRF
SGSGSGTDFFTISSLQPEDATYYCQHHYVSPWTFGQGTKVEIKR

A04 CAR VH (SEQ ID NO: 5)

QVQLQESGPGLVAPSQTLSTCTVSGFSLTSYGVSWIRQPPGKLEWIGVIWEDGSTNYHSA
LISRVSISVDTSKSKQFSLKLSSVDAADTAVYYCARPHYGSSYVGAMEYWGQGTTVTVSS

A04 CAR VL (SEQ ID NO: 6)

DIQMTQSPSSLSASVGDRVTITCRASENIYSYVAWYQQKPGKAPKFLIYNAKSLAEGVPSRF
SGSGSGTDFTLTISSLQPEDFANYCQHHYVSPWTFGQGTKVEIK

A05 CAR VH (SEQ ID NO: 7)

QVQLKESGPGLVAPSQTLSTCTVSGFSLTSYGVSWIRQPPGKLEWIGVIWEDGSTNYHSA
LISRVSISVDTSKSKQFSLKLSSVDAADTAVYYCARPHYGSSYVGAMEYWGQGTTVTVSS

A05 CAR VL (SEQ ID NO: 8)

DIQMTQSPSSLSASVGDRVTITCRASENIYSYVAWYQQKPGKAPKFLIYNAKSLAEGVPSRF
SGSGSGTDFTLTISSLQPEDFANYCQHHYVSPWTFGQGTKVEIK

A06 CAR VH (SEQ ID NO: 9)

QVQLKESGPGLVAPSQTLSTCTVSGFSLTSYGVSWIRQPPGKLEWIGVIWEDGSTNYHSA
LISRVSISVDTSKSKQFSLKLSSVDAADTAVYYCAKPHYGSSYVGAMEYWGQGTTVTVSS

A06 CAR VL (SEQ ID NO: 10)

DIQMTQSPSSLSASVGDRVTITCRASENIYSYVAWYQQKPGKAPKLLIYNAKSLAEGVPSRF
SGSGSGTDFTLTISSLQPEDFANYCQHHYVSPWTFGQGTKVEIK

FIG. 15 (Continued)**A07 CAR VH (SEQ ID NO: 11)**

QVQLKESGPGLVAPSQTLSLTCTVSGFSLTSYGVSWIRQPPGKGLEWIGVIWEDGSTNYHSA
LISRVSISVDTSKSKQFSLKLSSVDAADTAVYYCAKPHYGSSYVGAMEYWGQGTTVTVSS

A07 CAR VL (SEQ ID NO: 12)

DIQMTQSPSSLSASVGDRVITITCRASENIYSYVAWYQQKPGKAPKFLIYNKSLAEGVPSRF
SGSGSGTDFTLTISLQPEDFANYCQHHYVSPWTFGQGTKVEIK

A08 CAR VH (SEQ ID NO: 13)

QVQLQESGPGLVKPSQTLSLTCTVSGFSLTSYGVSWIRQPPGKGLEWIGVIWEDGSTNYHSA
LISRVSISVDTSKSKQFSLKLSSVDAADTAVYYCARPHYGSSYVGAMEYWGQGTTVTVSS

A08 CAR VL (SEQ ID NO: 14)

DIQMTQSPSSLSASVGDRVITITCRASENIYSYVAWYQQKPGKAPKFLIYNKSLAEGVPSRF
SGSGSGTDFTLTISLQPEDFANYCQHHYVSPWTFGQGTKVEIK

Anti-PD-1 scFv VH (SEQ ID NO: 15)

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYYMYWVRQAPGQGLEWIGGINPSNGGTNENE
KFKNKATMTVDKSTSTAYMELSSLRSEDTAVYYCTRRDYNIDGGFDYWGQGLTVTVSS

Anti-PD-1 scFv VL (SEQ ID NO: 16)

DIVLTQSPATLSLSPGERATLSCRASKSVSTSGFNMYHWYQQKPGQAPRLLIIFLASNLASGV
PARFSGSGSGTDFTLTISLQPEDFAVYYCQHGRELPLTFGQGTKLEI

A02 CAR nucleic acid sequence (SEQ ID NO: 17):

ATGCTGCTGCTGGTCACATCTCTGCTGCTGTGCGAGCTGCCCCATCCTGCCTTTCTGCTGAT
TCCTCAGGTGCAGCTGAAAGAGTCTGGCCCTGGACTGGTGGCCCCAAGCCAGTCTCTGAGCA
TCACCTGTACCGTGTCCGGCTTCAGCCTGACAAGCTATGGCGTGTCTGGGTCCGACAGCCT
CCTAGAAAAGGCCTGGAATGGCTGGGCGTGATCTGGGAGGATGGCAGCACCAATTACCACAG
CGCCCTGATCAGCAGACTGTCCATCAACAAGGACAACAGCAAGAGCCAGGTGTTCCCTGAAGC
TGAACAGCCTGCAGACCGACGACACCGCCACCTACTATTGTGCCAAGCCTCACTACGGCAGC
AGCTACGTGGGCGCTATGGAATATTGGGGCCAGGGCACAAGCGTGACCGTGTCTAGCGAAAA
GGGAAGAAGTGGCGGCGGAGGATCTGGCGGAGGTGGAAGCGGAGGCGGTGGATCTGATATCC
AGATGACACAGAGCCCCGCCAGCCTGACTGCTTCTGTGGGAGAGACAGTGACCATCACATGC
CGGGCCAGCGAGAACATCTACTCCTACGTGGCCTGGTATCAGCAAAAGCAGGGCAAGAGCCC
TCAGTTCCTGGTGTACAACGCCAAGTCTCTGGCCGAGGGCGTGCCAAGCAGATTTTCTGGCT
CTGGCAGCGGCACCCAGTTCTCCCTGAAGATCAATTCCCTGCAGCCAGAGGACTTCGGCAAC
TACTACTGCCAGCACCACTATGTGTCTCCCTGGACCTTTGGCGGAGGCACCAAGCTGGAAAT
CAAACGGTaccgtaacgacgacaccagcaccctccctcccacaccagcgcctacgatcgcca
gcccaaccattgtcactgcgccctgaggcttgacagaccagctgccggtggagccgtccacaca
cgcggaacttgactttgcttgcgacatctacatctgggctcctctcgcaggcacctgcggtgt
actgcttctctcactgggtcattacactctattgccgatttagtgtggtcaaacgagccgaa

FIG. 15 (Continued)

aaaaactcctttatatcttcaaacagcctttcatgagacctgtgcaaacaaccaggaagaa
gacggttgctcttgccgctttcccgaagaagaaggaggttgcaactgagagttaaatt
ctctaggtctgcccagccccctgctaccagcagggccagaaccagctgtataacgaactga
acctcggacgacgagaagaatatgatgtactcgataaaagacgcggaagggacccccgaaatg
ggcgggaagccccggaggaagaaccacaggagggctctgtataatgaactccagaaagacaa
aatggcccgaagcatattcagaaattggcatgaaaggggaacgaagcggggttaaagggcacg
atggcctttatcagggacttagcacagccacaaaagacacttatgacgctctgcacatgcaa
gccctccccccacggtag

A02 CAR amino acid sequence (SEQ ID NO: 18):

MLLLVTSLLLCELPHPAFLLIPQVQLKESGPGLVAPSQSL SITCTVSGFSLTSYGVSWVRQP
PRKGLEWLGVWEDGSTNYHSALISRLSINKDNSKSKVFLKLNLSLQDDTATYYCAKPHYGS
SYVGAMEYWGQTSVTVSSEKGRSGGGSGGGSGGGSDIQMTQSPASLTASVGETVTITC
RASENIYSYVAWYQQKQKSPQFLVYNAKSLAEGVPSRFSGSGSGTQFSLKINSLPEDFGN
YYCQHYYVSPWTFGGGKLEIKRYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHT
RGLDFACDIYIWAPLAGTCGVLLSLVITLYCRFSVVKRGRKKLLYIFKQPFMRPVQTQEE
DGCSCRFPEEEEGGCELRVKFSRSADAPAYQQGQNQLYNELNLGRREEYDVLDRRGRDP
GGKPRRKNPQEGLYNELQKDKMAEAYSEIGMKGERRRGKGGHDGLYQGLSTATKDTYDALHMQ
ALPPR

A03 CAR nucleic acid sequence (SEQ ID NO: 19):

ATGCTGCTGCTGGTCACATCTCTGCTGCTGCGAGCTGCCCCATCCTGCCTTTCTGCTGAT
TCCTCAGGTCCAGCTGCAAGAGTCTGGCCCTGGACTCGTCAGACCTAGCCAGACACTGAGCC
TGACCTGTACCGTGTCCGGCTTCACCTTTACCAGCTACGGCGTGTCTGGGTCCGACAGCCT
CCTGGAAGAGGACTGGAATGGATCGGCGTGATCTGGGAGGACGGCAGCACC AATTATCACAG
CGCCCTGATCAGCAGAGTGACCATGCTGGTGGACACCTCCAAGAACAGTTCAGCCTGAGAC
TGAGCAGCGTGACAGCCGCCGATACAGCCGTGTACTACTGTGCCAGACCTCACTACGGCAGC
AGCTATGTGGGCGCCATGGAATATTGGGGCCAGGGCTCTCTGGTCACCGTGTCTAGCGAAAA
GGGAAGAAAGTGGCGGCGGAGGATCTGGCGGAGGTGGAAGCGGAGGCGGTGGATCTGATATCC
AGATGACACAGAGCCCCAGCAGCCTGTCTGCCTCTGTGGGAGACAGAGTGACAATCACCTGT
CGGGCCAGCGAGAACATCTACAGCTACGTGGCCTGGTATCAGCAAAAGCCCGGCAAGGCCCC
TAAGCTGCTGATCTACAATGCCAAGTCTCTGGCCGAGGGCGTGCCAGCAGATTTTCTGGTT
CTGGCAGCGGCACCGACTTTACCTTTACAATCAGCTCCCTGCAGCCTGAGGATATCGCCACC
TACTACTGCCAGCACCCTACGTGTCCCCATGGACATTTGGCCAGGGCACCAAGGTGGAAAT
CAAGCGGtacgtaacgacgacaccagcaccctccctccacaccagcgcctacgatcgcca
gccaaccattgtcactgcggcctgaggcttgacagaccagctgccggtggagccgtccacaca
cgcgacttgactttgcttgacatctacatctgggtcctctcgcaggcacctgcggtgt
actgcttctcactggtcattacactctattgccgatttagtgtgtgtaaacgagggcgaa
aaaaactcctttatatcttcaaacagcctttcatgagacctgtgcaaacaaccaggaagaa
gacggttgctcttgccgctttcccgaagaagaaggaggttgcaactgagagttaaatt
ctctaggtctgcccagccccctgctaccagcagggccagaaccagctgtataacgaactga
acctcggacgacgagaagaatatgatgtactcgataaaagacgcggaagggacccccgaaatg
ggcgggaagccccggaggaagaaccacaggagggctctgtataatgaactccagaaagacaa
aatggcccgaagcatattcagaaattggcatgaaaggggaacgaagcggggttaaagggcacg

FIG. 15 (Continued)

atggcctttatcagggacttagcacagccacaaaagacacttatgacgctctgcacatgcaa
gccctccccccacggtag

A03 CAR amino acid sequence (SEQ ID NO: 20):

MLLLVTSLLLCELPHPAFLLIPQVQLQESGPGLVSRPSQTLSLTCTVSGFTFTSYGVSWVRQP
PGRGLEWIGVIWEDGSTNYHSALISRVTMLVDTSKNQFSLRLSSVTAADTAVYYCARPHYGS
SYVGAMEYWGQGS LVTVSSEKGRSGGGSGGGSGGGSDIQMTQSPSSLSASVGRVTITC
RASENIYSYVAWYQQKPGKAPKLLIYNKSLAEGVPSRFSGSGSGTDFTFTISSLQPEDIA
YYCQHMYVSPWTFGQGTKVEIKRYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHT
RGLDFACDIYIWAPLAGTCGVLLLSLVITLYCRFSVVKRGRKLLYIFKQPFMRPVQTTQEE
DGCSCRFPEEEEGGCELRVKFSRSADAPAYQQGQNQLYNELNLGRREEYDVLDRRRGRDP
GGKPRRKNPQEGLYNELQKDKMAEAYSEIGMKGERRRGKGHDGLYQGLSTATKDTYDALHMQ
ALPPR

A04 CAR nucleic acid sequence (SEQ ID NO: 21):

ATGCTGCTGCTGGTCACATCTCTGCTGCTGTGCGAGCTGCCCCATCCTGCCTTTCTGCTGAT
TCCTCAGGTCCAGCTGCAAGAGTCTGGCCCTGGACTGGTTGCCCCAAGCCAAACACTGAGCC
TGACCTGTACCGTGTCCGGCTTAGCCTGACAAGCTACGGCGTGTCTGGATCAGACAGCCT
CCTGGCAAAGGCCTGGAATGGATCGGAGTGATCTGGGAGGACGGCAGCACCAATTACCACAG
CGCCCTGATCAGCCGGGTGTCATCTCTGTGGATACCAGCAAGAGCCAGTTCAGCCTGAAGC
TGTCTAGCGTGGACGCCGCCGATACAGCCGTGTACTATTGTGCCAGACCTCACTACGGCAGC
AGCTACGTGGGCGCTATGGAATATTGGGGCCAGGGCACCACCGTGACCGTGTCTAGTGAAAA
GGGAAGATCCGGCGGAGGCGGATCTGGTGGCGGAGGTAGTGGCGGCGGAGGATCTGACATTC
AGATGACACAGAGCCCCAGCAGCCTGTCTGCCTCTGTGGGAGACAGAGTGACCATCACCTGT
CGGGCCAGCGAGAACATCTACTCCTACGTGGCCTGGTATCAGCAAAAGCCCGGCAAGGCCCC
TAAGTTCTTGATCTACAACGCCAAGTCTCTGGCCGAGGGCGTGCCAAGCAGATTTTCTGGCT
CTGGCAGCGGCACCGACTTCACCCTGACAATATCTAGCCTCCAGCCTGAGGACTTCGCCAAC
TACTACTGCCAGCACCACTATGTGTCTCCCTGGACCTTTGGCCAGGGAACAAAGGTGGAAT
CAAGtacgtaacgacgacaccagcaccgcccccgccctccacaccagcgcctacgatcgccagcc
aaccattgtcactgcggcctgaggttgagaccagctgccggtggagccgtccacacacgc
ggacttgactttgcttgcgacatctacatctgggctcctctcgcaggcacctgcggtgtact
gcttctctcactggtcattacactctattgccgatttagtgtgtgtcaaacgaggccgaaaaa
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ggttgctcttgccgctttccgaagaagaagaaggaggttgcgaaactgagagttaaattctc
taggtctgccgagccccctgcctaccagcagggccagaaccagctgtataacgaaactgaacc
tcggacgacgagaagaatatgatgtactcgataaaagacgcggaagggaaccccgaaatgggc
gggaagccccggagggaagaacccacaggaggtctgtataatgaactccagaaagacaaaat
ggccgaagcatattcagaaattggcatgaaaggggaacgaaggcggggtaaagggcacgatg
gcctttatcagggacttagcacagccacaaaagacacttatgacgctctgcacatgcaagcc
ctccccccacggtag

A04 CAR amino acid sequence (SEQ ID NO: 22):

MLLLVTSLLLCELPHPAFLLIPQVQLQESGPGLVAPSQTLSLTCTVSGFSLTSYGVSWIRQP
PGKLEWIGVIWEDGSTNYHSALISRVSISVDTSKSQFSLKLSSVDAADTAVYYCARPHYGS

FIG. 15 (Continued)

SYVGAMEYWGQGT TVTVSSEKGRSGGGSGGGSGGGSDIQMTQSPSSLSASVGDRVITIC
RASENIYSYVAWYQQKPGKAPKFLIYNAKSLAEGVPSRFSGSGSGTDFTLTISLQPEDFAN
YYCQHMYVSPWTFGQGTKVEIKYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHTR
GLDFACDIYIWAPLAGTCGVLLLSLVITLYCRFSVVKRGRKKLLYIFKQPFMRPVQTTQEED
GCSCRFP EEEEEGGCEL RVKFSRSADAPAYQQGQNQLYNELNLGRREEYDVLDKRRGRDP E MG
GKPRRNKPQEGLYNELQDKMAEAYSEIGMKGERRRRGK GHDGLYQGLSTATKDTYDALHMQA
LPPR

A05 CAR nucleic acid sequence (SEQ ID NO: 23):

ATGCTGCTGCTGGTCACATCTCTGCTGCTGTGCGAGCTGCCCCATCCTGCCTTTCTGCTGAT
TCCTCAGGTGCAGCTGAAAGAGTCTGGCCCTGGACTGGTGGCCCCAAGCCAAACACTGAGCC
TGACCTGTACCGTGTCCGGCTTTAGCCTGACAAGCTACGGCGTGTCTGGATCAGACAGCCT
CCTGGCAAAGGCCTGGAATGGATCGGAGTGATCTGGGAGGACGGCAGCACCAATTACCACAG
CGCCCTGATCAGCCGGGTGTCCATCTCTGTGGATACCAGCAAGAGCCAGTTCAGCCTGAAGC
TGTCTAGCGTGGACGCCGCCGATACAGCCGTGTACTATTGTGCCAGACCTCACTACGGCAGC
AGCTACGTGGGCGCTATGGAATATTGGGGCCAGGGCACCACCGTGACCGTGTCTAGTGAAAA
GGGAAGATCCGGCGGAGGCGGATCTGGTGGCGGAGGTAGTGGCGGCGGAGGATCTGACATTC
AGATGACACAGAGCCCCAGCAGCCTGTCTGCCTCTGTGGGAGACAGAGTGACCATCACCTGT
CGGGCCAGCGAGAACATCTACTCCTACGTGGCCTGGTATCAGCAAAAAGCCCGGCAAGGCCCC
TAAGTTCCTGATCTACAACGCCAAGTCTCTGGCCGAGGGCGTGCCAAGCAGATTTTCTGGCT
CTGGCAGCGGCACCGACTTCACCCTGACAATATCTAGCCTCCAGCCTGAGGACTTCGCCAAC
TACTACTGCCAGCACCCTATGTGTCTCCCTGGACCTTTGGCCAGGGAACAAAGGTGGAAAT
CAAGtactgtaacgacgacaccagcaccgccctccacaccagcgccctacgatcgccagcc
aaccattgtcactgcgccctgaggttgacagaccagctgcccgtggagccgtccacacacgc
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tcggacgacgagaagaatatgatgtactcgataaaagacgcggaagggaaccccgaaatgggc
gggaagccccggaggaagaacccacaggagggctctgtataatgaactccagaaagacaaaat
ggccgaagcatattcagaaattggcatgaaaggggaacgaaggcggggtaaagggcacgatg
gcctttatcagggacttagcacagccacaaaagacacttatgacgctctgcacatgcaagcc
ctccccccacggtag

A05 CAR amino acid sequence (SEQ ID NO: 24):

MLLLVTSLLLCELPHPAFLIPQVQLKESGPGLVAPSQTLSLTCTVSGFSLTSYGVSWIRQP
PGKGLEWIGVIWEDGSTNYHSALISRVSISVDTSKQFSLKLSSVDAADTAVYYCARPHYGS
SYVGAMEYWGQGT TVTVSSEKGRSGGGSGGGSGGGSDIQMTQSPSSLSASVGDRVITIC
RASENIYSYVAWYQQKPGKAPKFLIYNAKSLAEGVPSRFSGSGSGTDFTLTISLQPEDFAN
YYCQHMYVSPWTFGQGTKVEIKYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHTR
GLDFACDIYIWAPLAGTCGVLLLSLVITLYCRFSVVKRGRKKLLYIFKQPFMRPVQTTQEED
GCSCRFP EEEEEGGCEL RVKFSRSADAPAYQQGQNQLYNELNLGRREEYDVLDKRRGRDP E MG

FIG. 15 (Continued)

GKPRRNPNQEGLYNELQKDKMAEAYSEIGMKGERRRGKGHDLGLYQGLSTATKDTYDALHMQA
LPPR

A06 CAR nucleic acid sequence (SEQ ID NO: 25):

ATGCTGCTGCTGGTCACATCTCTGCTGCTGTGCGAGCTGCCCCATCCTGCCTTTCTGCTGAT
TCCTCAGGTGCAGCTGAAAGAGTCTGGCCCTGGACTGGTGGCCCCAAGCCAAACACTGAGCC
TGACCTGTACCGTGTCCGGCTTTAGCCTGACAAGCTACGGCGTGTCTGGATCAGACAGCCT
CCTGGCAAAGGCCTGGAATGGATCGGAGTGATCTGGGAGGACGGCAGCACCAATTACCACAG
CGCCCTGATCAGCCGGGTGTCCATCTCTGTGGATACCAGCAAGAGCCAGTTCAGCCTGAAGC
TGTCTAGCGTGGACGCCGCCGATACAGCCGTGTACTATTGTGCCAAGCCTCACTACGGCAGC
AGCTACGTGGGCGCTATGGAATATTGGGGCCAGGGCACCACCGTGACCGTGTCTAGTGAAAA
GGGAAGATCCGGCGGAGGCGGATCTGGTGGCGGAGGTAGTGGCGGCGGAGGATCTGACATTC
AGATGACACAGAGCCCCAGCAGCCTGTCTGCCTCTGTGGGAGACAGAGTGACCATCACCTGT
CGGGCCAGCGAGAACATCTACTCCTACGTGGCCTGGTATCAGCAAAAAGCCCGGCAAGGCCCC
TAAGCTGCTGATCTACAATGCCAAGTCTCTGGCCGAGGGCGTGCCAGCAGATTTTCTGGTT
CTGGCAGCGGCACCGACTTCACCCTGACAATATCTAGCCTCCAGCCTGAGGACTTCGCCAAC
TACTACTGCCAGCACCCTATGTGTCTCCCTGGACCTTTGGCCAGGGAACAAAGGTGGAAT
CAAGtacgtaacgacgacaccagcaccgccctccacaccagcgctacgatcgccagcc
aaccattgtcactgcggtgaggttgagaccagctgcccgtggagcggtccacacagc
ggacttgactttgcttgacatctacatctgggtcctctcgcaggcacctgcggtgact
gcttctctcactggtcattacactctattgcccatttagtggtgcaaacgaggccgaaaaa
aactcctttatatcttcaaacagcctttcatgagacctgtgcaacaaccagggaagaagac
ggttgctcttgccgctttcccgaagaagaagaaggaggttgcaactgagagttaaattctc
taggtctgcccagcgccttgcctaccagcagggccagaaccagctgtataacgaactgaacc
tcggacgacgagaagaatatgatgtactcgataaaagacgcggaaggaccccgaaatgggc
gggaagccccggaggaagaacccacaggagggctgtataatgaactccagaaagacaaaat
ggccgaagcatattcagaaattggcatgaaaggggaacgaaggcgggtaagggcacgatg
gcctttatcagggacttagcacagccacaaaagacacttatgacgctctgcacatgcaagcc
ctccccccacggtag

A06 CAR amino acid sequence (SEQ ID NO: 26):

MLLLVTSLLLCELPHPAFLLIPQVQLKESGPGLVAPSQTLSLTCTVSGFSLTSYGVSWIRQP
PGKGLEWIGVIWEDGSTNYHSALISRVSISVDTSKSKQFSLKLSSVDAADTAVYYCAKPHYGS
SYVGAMEYWGQGTITVTSSEKGRSGGGSGGGSGGGSDIQMTQSPSSLSASVGRVTITC
RASENIYSYVAWYQQKPKGKAPKLLIYNKSLAEGVPSRFSGSGSGTDFTLTISSLQPEDFAN
YYCQHHYVSPWTFGQGTKVEIKYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHTR
GLDFACDIYIWAPLAGTCGVLLLSLVITLYCRFSVVKRGRKLLYIFKQPFMRPVQTTQEED
GCSCRFPEEEEGGCELRVKFSRSADAPAYQQGQNQLYNELNLGRREEYDVLDKRRGRDPENMG
GKPRRNPNQEGLYNELQKDKMAEAYSEIGMKGERRRGKGHDLGLYQGLSTATKDTYDALHMQA
LPPR

A07 CAR nucleic acid sequence (SEQ ID NO: 27):

ATGCTGCTGCTGGTCACATCTCTGCTGCTGTGCGAGCTGCCCCATCCTGCCTTTCTGCTGAT

FIG. 15 (Continued)

TCCTCAGGTGCAGCTGAAAGAGTCTGGCCCTGGACTGGTGGCCCCAAGCCAAACACTGAGCC
TGACCTGTACCGTGTCCGGCTTTAGCCTGACAAGCTACGGCGTGTCTGGATCAGACAGCCT
CCTGGCAAAGGCCTGGAATGGATCGGAGTGATCTGGGAGGACGGCAGCACCAATTACCACAG
CGCCCTGATCAGCCGGGTGTCCATCTCTGTGGATAACCAGCAAGAGCCAGTTCAGCCTGAAGC
TGTCTAGCGTGGACGCCGCCGATACAGCCGTGTACTATTGTGCCAAGCCTCACTACGGCAGC
AGCTACGTGGGCGCTATGGAATATTGGGGCCAGGGCACCACCGTGACCGTGTCTAGTGAAAA
GGGAAGATCCGGCGGAGGCGGATCTGGTGGCGGAGGTAGTGGCGCGGAGGATCTGACATTC
AGATGACACAGAGCCCCAGCAGCCTGTCTGCCTCTGTGGGAGACAGAGTGACCATCACCTGT
CGGGCCAGCGAGAACATCTACTCCTACGTGGCCTGGTATCAGCAAAAGCCCGGCAAGGCCCC
TAAGTTCCTGATCTACAACGCCAAGTCTCTGGCCGAGGGCGTGCCAAGCAGATTTTCTGGCT
CTGGCAGCGGCACCGACTTCACCCTGACCATATCTAGCCTGCAGCCAGAGGACTTCGCCAAC
TACTACTGCCAGCACCCTATGTGTCTCCCTGGACCTTTGGCCAGGGAACAAAGGTGGAAAT
CAAGtacgtaacgacgacaccagcaccgccctccacaccagcgctacgatcgccagcc
aaccattgtcactgcgccctgaggttgagaccagctgcccgtggagccgtccacacacgc
ggacttgactttgcttgcgacatctacatctgggctcctctcgcaggcacctgcccgtgtact
gcttctctcactggtcattacactctattgccgatttagtggtgtaaacgagggccgaaaaa
aactcctttatattcctcaaacagcctttcatgagacctgtgcaacaaccagggaagaagac
ggttgctcttgccgctttcccgagaagaagaaggaggttgcaactgagagttaaattctc
taggtctgccgacgcccctgcctaccagcagggccagaaccagctgtataacgaactgaacc
tcggacgacgagaagaatatgatgtactcgataaaagacgcggaagggaacccgaaatgggc
gggaagccccggaggaagaacccacaggaggtctgtataatgaactccagaaagacaaaat
ggccgaagcatattcagaaattggcatgaaaggggaacgaaggcggggtaaagggcacgatg
gcctttatcagggacttagcacagccacaaaagacacttatgacgctctgcacatgcaagcc
ctccccccacggtag

A07 CAR amino acid sequence (SEQ ID NO: 28):

MLLLVTSLLLCELPHPAFLLIPQVQLKESGPGLVAPSQTLSLTCTVSGFSLTSYGVSWIRQP
PGKGLEWIGVIWEDGSTNYHSALISRVSISVDTSKSKQFSLKLSSVDAADTAVYYCAKPHYGS
SYVGAMEYWQGTTVTVSSEKGRSGGGSGGGSGGGSDIQMTQSPSSLSASVGRVITTC
RASENIYSYVAWYQQKPGKAPKFLIYNAKSLAEGVPSRFSGSGSGTDFTLTISLQPEDFAN
YYCQHHYVSPWTFGQGTKVEIKYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHTR
GLDFACDIYIWAPLAGTCGVLLLSLVITLYCRFSVVKRGRKKLLYIFKQPFMRPVQTTQEED
GCSCRFEEEEGGCELRVKFSRSADAPAYQQGQNQLYNELNLGRREEYDVLDRRGRDPMEG
GKPRRKNPQEGLYNELQDKMAEAYSEIGMKGERRRGKRGHDGLYQGLSTATKDTYDALHMQA
LPPR

A08 CAR nucleic acid sequence (SEQ ID NO: 29):

ATGCTGCTGCTGGTCACATCTCTGCTGCTGTGCGAGCTGCCCCATCTGCCTTTCTGCTGAT
TCCTCAGGTCCAGCTGCAAGAGTCTGGCCCTGGACTGGTCAAGCCTAGCCAGACACTGAGCC
TGACCTGTACCGTGTCCGGCTTTAGCCTGACAAGCTACGGCGTGTCTGGATCAGACAGCCT
CCTGGCAAAGGCCTGGAATGGATCGGAGTGATCTGGGAGGACGGCAGCACCAATTACCACAG
CGCCCTGATCAGCCGGGTGTCCATCTCTGTGGATAACCAGCAAGAGCCAGTTCAGCCTGAAGC

FIG. 15 (Continued)

TGTCTAGCGTGGACGCCGCCGATACAGCCGTGTA CTATTGTGCCAGACCTCACTACGGCAGC
AGCTACGTGGGCGCTATGGAATATTGGGGCCAGGGCACCACCGTGACCGTGTCTAGTGAAAA
GGGAAGATCCGGCGGAGGCGGATCTGGTGGCGGAGGTAGTGGCGGCGGAGGATCTGACATTC
AGATGACACAGAGCCCCAGCAGCCTGTCTGCCTCTGTGGGAGACAGAGTGACCATCACCTGT
CGGGCCAGCGAGAACATCTACTCCTACGTGGCCTGGTATCAGCAAAAAGCCCGGCAAGGCCCC
TAAGTTCTTGATCTACAACGCCAAGTCTCTGGCCGAGGGCGTGCCAAGCAGATTTTCTGGCT
CTGGCAGCGGCACCGACTTCACCCTGACCATATCTAGCCTGCAGCCTGAGGACTTCGCCAAC
TACTACTGCCAGCACCCTATGTGTCTCCCTGGACCTTTGGCCAGGGAACAAAGGTGGAAAT
CAAGtacgtaacgacgacaccagcaccgccctccacaccagcgctacgatcgccagcc
aaccattgtcactgcggcctgaggcttgacagaccagctgccggtggagccgctccacacagc
ggacttgactttgcttgacatctacatctgggctcctctcgcaggcacctgcggtgtact
gcttctctcactggtcattacactctattgccgatttagtgtgtggtcaaacgaggccgaaaaa
aactcctttatatcttcaaacagcctttcatgagacctgtgcaacaaccagggaagaagac
ggttgctcttgccgctttccgaagaagaagaaggaggttgcgaaactgagagttaaattctc
taggtctgccgacgcccctgcctaccagcagggccagaaccagctgtataacgaactgaacc
tcggacgacgagaagaatatgatgtactcgataaaagacgcggaagggaaccccgaaatgggc
gggaagccccggaggaagaacccacaggagggctgtataatgaactccagaaagacaaaat
ggccgaagcatattcagaaattggcatgaaaggggaacgaaggcggggtaaagggcacgatg
gcctttatcagggaacttagcacagccacaaaagacacttatgacgctctgcacatgcaagcc
ctccccccacggtag

A08 CAR amino acid sequence (SEQ ID NO: 30):

MLLLVTSLLLCELPHPAFLIPQVQLQESGPGLVKPSQTLSTCTVSGFSLTSYGVSWIRQP
PGKGLEWIGVIWEDGSTNYHSALISRVISVDTSKSQFSLKLSSVDAADTAVYYCARPHYGS
SYVGAMEYWGQGTITVTSSEKGRSGGGSGGGSGGGSDIQMTQSPSSLSASVGRDVTITC
RASENIYSYVAWYQQKPKGKAPKFLIYNKSLAEGVPSRFSGSGSGTDFTLTISLQPEDFAN
YYCQHYYVSPWTFGQGTKVEIKYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHTR
GLDFACDIYIWAPLAGTCGVLLLSLVITLYCRFSVVKRGRKLLYIFKQPFMRPVQTQEED
GCSCRFPEEEEGGCEL RVKFSRSADAPAYQQGQNQLYNELNLGRREEYDVLDRRGRDPFMG
GKPRRKNPQEGLYNELQKDKMAEAYSEIGMKGERRRGKGDGLYQGLSTATKDTYDALHMQA
LPPR

Anti-PD-L1 scFv VH (SEQ ID NO: 31)

EVQLVESGGGLVQPGGSLRLSCAASGFTFSDSWIHWRQAPGKLEWVAWISPYGGSTYYAD
SVKGRFTISADTSKNTAYLQMNSLRAEDTAVYYCARRHWPGGFDYWGQGLTVTVSS

Anti-PD-L1 scFv VL (SEQ ID NO: 32)

DIQMTQSPSSLSASVGRDVTITCRASQDVSTAVAWYQQKPKGKAPKLLIYSASFLYSGVPSRF
SGSGSGTDFTLTISLQPEDFATYYCQYLYHPATFGQGTKVEIK

A02P03 nucleic acid sequence (SEQ ID NO: 33):

ATGCTGCTGCTGGTCACATCTCTGCTGCTGTGCGAGCTGCCCCATCCTGCCTTTCTGCTGAT
TCCTCAGGTGCAGCTGAAAGAGTCTGGCCCTGGACTGGTGGCCCCAAGCCAGTCTCTGAGCA

FIG. 15 (Continued)

TCACCTGTACCGTGTCCGGCTTCAGCCTGACAAGCTATGGCGTGTCTGGGTCCGACAGCCT
CCTAGAAAAGGCCTGGAATGGCTGGGCGTGATCTGGGAGGATGGCAGCACCAATTACCACAG
CGCCCTGATCAGCAGACTGTCCATCAACAAGGACAACAGCAAGAGCCAGGTGTTCCCTGAAGC
TGAACAGCCTGCAGACCGACGACACCGCCACCTACTATTGTGCCAAGCCTCACTACGGCAGC
AGCTACGTGGGCGCTATGGAATATTGGGGCCAGGGCACAAGCGTGACCGTGTCTAGCGAAAA
GGGAAGAAGTGGCGGGGAGGATCTGGCGGAGGTGGAAGCGGAGGCGGTGGATCTGATATCC
AGATGACACAGAGCCCCGCCAGCCTGACTGCTTCTGTGGGAGAGACAGTGACCATCACATGC
CGGGCCAGCGAGAACATCTACTCCTACGTGGCCTGGTATCAGCAAAAGCAGGGCAAGAGCCC
TCAGTTCCCTGGTGTACAACGCCAAGTCTCTGGCCGAGGGCGTGCCAAGCAGATTTTCTGGCT
CTGGCAGCGGCACCCAGTTCTCCCTGAAGATCAATTCCCTGCAGCCAGAGGACTTCGGCAAC
TACTACTGCCAGCACCCTATGTGTCTCCCTGGACCTTTGGCGGAGGCACCAAGCTGGAAAT
CAAACGGTtacgtaacgacgacaccagcaccgccctccacaccagcgctacgatcgcca
gcccaaccattgtcactgcggcctgaggettgacagaccagctgccggtggagcgctccacaca
cgcggaacttgactttgcttgcgacatctacatctgggctcctctcgagggcacctgcgggtgt
actgcttctctcactggctcattacactctattgccgatttagtggtggtcaaacgagggcgaa
aaaaactcctttatatcttcaaacagcctttcatgagacctgtgcaaacaaccagggaagaa
gacggttgctcttgccgctttcccgagaagaagaaggaggttgcgaaactgagagttaaatt
ctctaggtctgcgacgccccctgctaccagcagggccagaaccagctgtataacgaactga
acctcggacgacgagaagaatatgatgtactcgataaaagacgcggaagggaccccgaaatg
ggcggaagccccggaggaagaaccacaggaggggtctgtataatgaactccagaaagacaa
aatggccgaagcatattcagaaattggcatgaaaggggaacgaagcggggttaaagggcacg
atggcctttatcagggacttagcacagccacaaaagacacttatgacgctctgcacatgcaa
gccctccccccacggGTCGACagagccaagcggggctctggcgagggcagaggtctctgct
gacctgcggagatgtggaagaaaatccccggccctatgtacagaatgcagctggtgtcttgta
ttgccccttctctcgccctcgtaacaaattcaCAAGTCCAGCTTGACAAAGCGGTGCCGAA
GTGAAAAAACCGGGCGCAAGCGTCAAGGTTTCATGCAAGGCGAGTGGATACACCTTTACCAA
CTATTACATGTACTGGGTGCGGCAGGCACCCGGGCAGGGACTGGAATGGATCGGTGGTATTA
ACCCAAGTAATGGTGGTACAAATTTCAACGAAAAGTTTAAGAACAAAAGCGACGATGACAGTA
GACAAATCTACAAGTACCGCATACATGGAGCTGAGCTCACTGAGATCTGAGGACACCGCAGT
CTATTACTGCACACGGCGAGATTACAATTACGATGGAGGGTTCGACTACTGGGGCCAAGGGA
CTTTGGTGACTGTATCCTCCGGCGGGGAGGGTCAGGTGGAGGAGGAAGCGGTGGAGGAGGT
AGTGACATCGTCCTTACGCAAAGCCCGGCACCCCTCAGTTTGAGCCCTGGGGAAAGAGCAAC
GCTGTCTTGTAGAGCATCCAAATCAGTCTCAACTTCTGGTTTTAATTACATGCACTGGTATC
AACAGAAGCCAGGACAAGCACCTAGATTGCTGATCTTTCTGGCGTCAAATCTGGCCTCTGGC
GTTCCAGCCCGGTTTAGCGGTTCTGGAAGCGGAACGGACTTTACCCTTACCATATCATCACT
CGAACCAGAGGACTTTGCGGTATATTACTGCCAACATGGACGGGAGCTGCCCTTGACGTTTG
GTCAAGGAACGAAGTTGGAGATataa

A02P03 amino acid sequence (SEQ ID NO: 34):

MLLLVTSLLLCELPHPAFLLIPQVQLKESGPGLVAPSQSL SITCTVSGFSLTSYGVSWVRQP
PRKGLEWLGVIEDGSTNYHSALISRLSINKDNSKSVFLKLNLSLQDDTATYYCAKPHYGS
SYVGAMEYWGQGSVTVSSEKGRSGGGSGGGSGGGSDIQMTQSPASLTASVGETVTITC
RASENIYSYVAWYQQKQKSPQFLVYNAKSLAEGVPSRFSGSGSGTQFSLKINSLQPEDFGN
YYCQHYYVSPWTFGGGKLEIKRYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHT

FIG. 15 (Continued)

RGLDFACDIYIWAPLAGTCGVLLLSLVITLYCRFSVVKRGRKKLLYIFKQPFMRPVQTTQEE
DGCSCRFPEEEEGGCELRVKFSRSADAPAYQQGQNQLYNELNLGRREEYDVLDRKRRGRDPEM
GGKPRRKNPQEGLYNELQKDKMAEAYSEIGMKGERRRGKGHDGLYQGLSTATKDTYDALHMQ
ALPPRVDRAKRGSGEGRSLLTCGDVEENPGPMYRMQLLSICIALSLALVTNSQVQLVQSGAE
VKKPGASVKVSKASGYTFTNYMYWVRQAPGGGLEWIGGINPSNGGTNFNEKFKNKATMTV
DKSTSTAYMELSSLRSEDVAVYYCTRRDYNIDGGFDYWGGTLVTVSSGGGSGGGGSGGGG
SDIVLTQSPATLSLSPGERATLSCRASKSVSTSGFNMHYQQKPGQAPRLLIIFLASNLAGS
VPAFRFSGSGSGTDFTLTISISLEPEDFAVYYCQHGRELPLTFGQGTKLEI

A02PL01 nucleic acid sequence (SEQ ID NO: 35):

ATGCTGCTGCTGGTCACATCTCTGCTGCTGTGCGAGCTGCCCCATCCTGCCTTTCTGCTGAT
TCCTCAGGTGCAGCTGAAAGAGTCTGGCCCTGGACTGGTGGCCCCAAGCCAGTCTCTGAGCA
TCACCTGTACCGTGTCCGGCTTCAGCCTGACAAGCTATGGCGTGTCTGGGTCCGACAGCCT
CCTAGAAAAGGCCTGGAATGGCTGGGCGTGATCTGGGAGGATGGCAGCACCAATTACCACAG
CGCCCTGATCAGCAGACTGTCCATCAACAAGGACAACAGCAAGAGCCAGGTGTTCTGAAGC
TGAACAGCCTGCAGACCGACGACACCGCCACCTACTATTGTGCCAAGCCTCACTACGGCAGC
AGCTACGTGGGCGCTATGGAATATTGGGGCCAGGGCACAAGCGTGACCGTGTCTAGCGAAAA
GGGAAGAAGTGGCGGCGGAGGATCTGGCGGAGGTGGAAGCGGAGGCGGTGGATCTGATATCC
AGATGACACAGAGCCCCGCCAGCCTGACTGCTTCTGTGGGAGAGACAGTGACCATCACATGC
CGGGCCAGCGAGAACATCTACTCCTACGTGGCCTGGTATCAGCAAAAAGCAGGGCAAGAGCCC
TCAGTTCCTGGTGTACAACGCCAAGTCTCTGGCCGAGGGCGTGCCAAGCAGATTTTCTGGCT
CTGGCAGCGGCACCCAGTTCTCCCTGAAGATCAATTCCTGCAGCCAGAGGACTTCGGCAAC
TACTACTGCCAGCACCCTATGTGTCTCCCTGGACCTTTGGCGGAGGCACCAAGCTGGAAT
CAAACGGTaccgtaacgacgacaccagcaccgccctccacaccagcgccctacgatcgcca
gcccaaccattgtcactgcgccctgaggcttgacagaccagctgccggtggagccgtccacaca
cgcggaacttgactttgcttgcgacatctacatctgggctcctctcgcaggcacctgcggtgt
actgcttctctcactgggtcattacactctattgccgatttagtggtgtaaaccagggccgaa
aaaaactcctttatatcttcaaacagcctttcatgagacctgtgcaaacaccagggaagaa
gacggttgctcttgccgctttccgaagaagaaggaggttgcaactgagagttaaatt
ctctaggctctgccgacgccctgctaccagcagggccagaaccagctgtataacgaactga
acctcggacgacgagaagaatatgatgtactcgataaaagacgcggaagggaaccccgaaatg
ggcggaagaccccgaggaagaacccacaggaggggtctgtataatgaactccagaaagacaa
aatggccgaagcatattcagaaattggcatgaaagggaacgaaggcggggttaaaggcgacg
atggcctttatcagggaacttagcacagccacaaaagacacttatgacgctctgcacatgcaa
gccctccccccacggGTCGACagagccaagcgggctcttgccgagggcagaggctctctgct
gacctgcggagatgtggaagaaaatcccgccctatgtacagaatgcagctgttgctctgta
ttgccctttctctcgccctcgtaacaaattcagatatccagatgacacaatctccgagctcc
ttgtccgcatcagtggggatagagttaccataaacttgccgcgctctcaggatgtctccac
tgctgtcgcgtggtatcagcagaagccgggaaaggccccgaagttgctcatttactccgcta
gttttttgattccggcggttcccagtcggttttctgggtcaggcagcggtaccgactttaca
cttacgattagttctctgcagcctgaggatttcgccacctattattgtcagcagtatattgta
ccaccctgcaactttcggccagggaacaaaggtggaataaaggcggtggtggaagtggag
gaggggatccggaggcggggttctgaagtccaattggttgagtcggcgaggccttgct

FIG. 15 (Continued)

caaccaggggatcacttcggctgtcatgcgcggccagtgggttcacgtttagtgcacagctg
gattcattgggtaagacagcgccccgggaaaggtctcgagtgggtagcttgatttctcctt
acggaggttctacCtattatgcggattctgttaaaggctcgattcacgatctctgcagatact
agcaagaatacggcgtatcttcaaatagaatagccttcgggctgaggacaccgcggtgtacta
ctgtgccgaagacattggccgggaggattcgattattggggtcagggcactcttgtgacgg
tcagctcataa

A02PL01 amino acid sequence (SEQ ID NO: 36):

MLLLVTSLLLCELPHPAFLIPQVQLKESGPGLVAPSQSLITCTVSGFSLTSYGVSWVRQP
PRKGLEWLGVWEDGSTNYHSALISRLSINKDNSKSQVFLKLNLSLQDDTATYYCAKPHYGS
SYVGAMEYWGQTSVTVSSEKGRSGGGSGGGSGGGSDIQMTQSPASLTASVGETVTITC
RASENIYSYVAWYQQKQKSPQFLVYNAKSLAEGVPSRFSGSGSGTQFSLKINSLQPEDFGN
YYCQHYYVSPWTFGGGKLEIKRYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHT
RGLDFACDIYIWAPLAGTCGVLLLSLVITLYCRFSVVKRGRKKLLYIFKQPFMRPVQTTQEE
DGCSCRFPEEEEEGGCELRVKFSRSADAPAYQQGQNQLYNELNLGRREEYDVLDKRRGRDPEM
GGKPRRKNPQEGLYNELQKDKMAEAYSEIGMKGERRRGKGGHDGLYQGLSTATKDTYDALHMQ
ALPPRVDRAKRGSGEGRSLTCDVEENPGPMYRMQLLSLALVTNSDIQMTQSPSS
LSASVGDVRTITCRASQDVSTAVAWYQQKPGKAPKLLIYSASFYSGVPSRFSGSGSGTDFT
LTISLQPEDFATYYCQYLYHPATFGQGTKVEIKGGGGSGGGSGGGGSEVQLVESGGGLV
QPGGSLRLSCAASGFTFSDSWIHWRQAPGKGLEWVAWISPYGGSTYYADSVKGRFTISADT
SKNTAYLQMNSLRAEDTAVYYCARRHWPGGFDYWGQGLVTVSS

Linker peptide amino acid sequence between CAR VH and VL (SEQ ID NO: 37):

EKGRSGGGSGGGSGGGGS

CD8-Hinge-TM amino acid sequence (SEQ ID NO: 38):

TTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHTRGLDFACDIYIWAPLAGTCGVLLLS
LVITLYC

4-1BB intracellular signaling domain amino acid sequence (SEQ ID NO: 39):

RFSVVKRGRKKLLYIFKQPFMRPVQTTQEEDGCSCRFPEEEEEGGCEL

CD3 zeta amino acid sequence (SEQ ID NO: 40):

RVKFSRSADAPAYQQGQNQLYNELNLGRREEYDVLDKRRGRDPEMGGKPRRKNPQEGLYNEL
QKDKMAEAYSEIGMKGERRRGKGGHDGLYQGLSTATKDTYDALHMQALPPR

T2A amino acid sequence (SEQ ID NO: 41): GSGEGRSLTCDVEENPGP**IL-2 leader amino acid sequence (SEQ ID NO: 42):**

MYRMQLLSLALVTNS

FIG. 15 (Continued)**Anti-PD-1 scFv amino acid sequence (SEQ ID NO: 43):**

QVQLVQSGAEVKKPGASVKVSCKASGYTFNYYMYWVRQAPGQGLEWIGGINPSNGGTNFNE
KFKNKATMTVDKSTSTAYMELSSLRSEDVAVYYCTRRDYNVDGGFDYWGQGLTVTVSSGGGG
SGGGSGGGGSDIVLTQSPATLSLSPGERATLSCRASKSVSTSGFNYMHYQQKPGQAPRL
IFLASNLASGVPARFSGSGSGTDFTLTISLSEPEDFAVYYCQHGRELPLTFGQGTKLEI

Anti-PD-L1 scFv amino acid sequence (SEQ ID NO: 44):

DIQMTQSPSSLSASVGDRTITCRASQDVSTAVAWYQQKPGKAPKLLIYSASFLYSGVPSRF
SGSGSGTDFTLTISLQPEDFATYYCQYLYHPATFGQGTKVEIKGGGSGGGSGGGGSEV
QLVESGGGLVQPGGSLRLSCAASGFTFSDSWIHWRQAPGKGLEWVAWISPYGGSTYYADSV
KGRFTISADTSKNTAYLQMNSLRAEDTAVYYCARRHWPGGFDYWGQGLTVTVSS

Linker peptide amino acid sequence (SEQ ID NO: 87):

GGGGSGGGSGGGGS

Linker peptide amino acid sequence (SEQ ID NO: 88):

GGGS

CD28 intracellular signaling domain amino acid sequence (SEQ ID NO: 89)

RSKRSRLHSDYMNMTPRRPGPTRKHYQPYAPPRDFAAYRS

CD28 and 4-1BB intracellular signaling domain amino acid sequence (SEQ ID NO: 90)

RSKRSRLHSDYMNMTPRRPGPTRKHYQPYAPPRDFAAYRSRFSVVKRGRKKLLYIFKQPFM
RPVQTTQEEDGCSCRFPEEEEGGCEL

A02 third generation CAR amino acid sequence (SEQ ID NO: 91):

MLLLVTSLLLCELPHPAFLLIPQVQLKESGPGLVAPSQSLSTCTVSGFSLTSYGVSWSVRQP
PRKGLEWLGVIWEDGSTNYHSALISRLSINKDNSKSQVFLKLSLQTDATATYYCAKPHYGS
SYVGAMEYWGQTSVTVSSEKGRSGGGSGGGSGGGSGGGSDIQMTQSPASLTASVGETVTITC
RASENIYSYVAWYQQKQKSPQFLVYNAKSLAEGVPSRFSGSGSGTQFSLKINSLQPEDFGN
YYCQHMYVSPWTFGGGTKLEIKRYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHT
RGLDFACDIYIWAPLAGTCGVLLLSLVITLYCRSKRSRLHSDYMNMTPRRPGPTRKHYQPY
APPRDFAAYRSRFSVVKRGRKKLLYIFKQPFMRPVQTTQEEDGCSCRFPEEEEGGCELRVKF
SRSADAPAYQQGQNQLYNELNLGRREYDVLDKRRGRDPEMGGKPRRKNPQEGLYNELQKDK
MAEAYSEIGMKGERRRGKHDGLYQGLSTATKDTYDALHMQALPPR

A03 third generation CAR amino acid sequence (SEQ ID NO: 92):

MLLLVTSLLLCELPHPAFLLIPQVQLQESGPGLVSRPSQTLSTCTVSGFTFTSYGVSWSVRQP
PGRGLEWIGVIWEDGSTNYHSALISRVTMLVDTSKNQFSLRLSSVTAADTAVYYCARPHYGS
SYVGAMEYWGQSLVTVSSEKGRSGGGSGGGSGGGSGGGSDIQMTQSPSSLSASVGDRTITC
RASENIYSYVAWYQQKPGKAPKLLIYNAKSLAEGVPSRFSGSGSGTDFTFTISLQPEDIAT
YYCQHMYVSPWTFGQGTKVEIKRYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHT

FIG. 15 (Continued)

RGLDFACDIYIWAPLAGTCGVLLLSLVITLYCRSKRSRLLHSDYMNMTPRRPGPTRKHYQPY
APPRDFAAYRSRFSVVKRGRKKLLYIFKQPFMRPVQTTQEEDGCSCRFPEEEEGGCELRVKF
SRSADAPAYQQGQNQLYNELNLGRREEYDVLDKRRGRDPEMGGKPRRKNPQEGLYNELQKDK
MAEAYSEIGMKGERRRGKGHDGLYQGLSTATKDTYDALHMQALPPR

A06 third generation CAR amino acid sequence (SEQ ID NO: 93):

MLLLVTSLLLCELPHPAFLIPQVQLKESGPGLVAPSQTLSLTCTVSGFSLTSYGVSIRWIRP
PGKGLEWIGVIWEDGSTNYHSALISRVSISVDTSKQFSLKLSSVDAADTAVYYCAKPHYGS
SYVGAMEYWGQTTVTVSSEKGRSGGGSGGGSGGGSDIQMTQSPSSLSASVGDRVTITC
RASENIYSYVAWYQQKPGKAPKLLIYNKSLAEGVPSRFSGSGSGTDFTLTISLQPEDFAN
YYCQHHYVSPWTFGQGTKVEIKYVTTTPAPRPPTPAPTIASQPLSLRPEACRPAAGGAVHTR
GLDFACDIYIWAPLAGTCGVLLLSLVITLYCRSKRSRLLHSDYMNMTPRRPGPTRKHYQPYA
PPRDFAAYRSRFSVVKRGRKKLLYIFKQPFMRPVQTTQEEDGCSCRFPEEEEGGCELRVKFS
RSADAPAYQQGQNQLYNELNLGRREEYDVLDKRRGRDPEMGGKPRRKNPQEGLYNELQKDKM
AEAYSEIGMKGERRRGKGHDGLYQGLSTATKDTYDALHMQALPPR