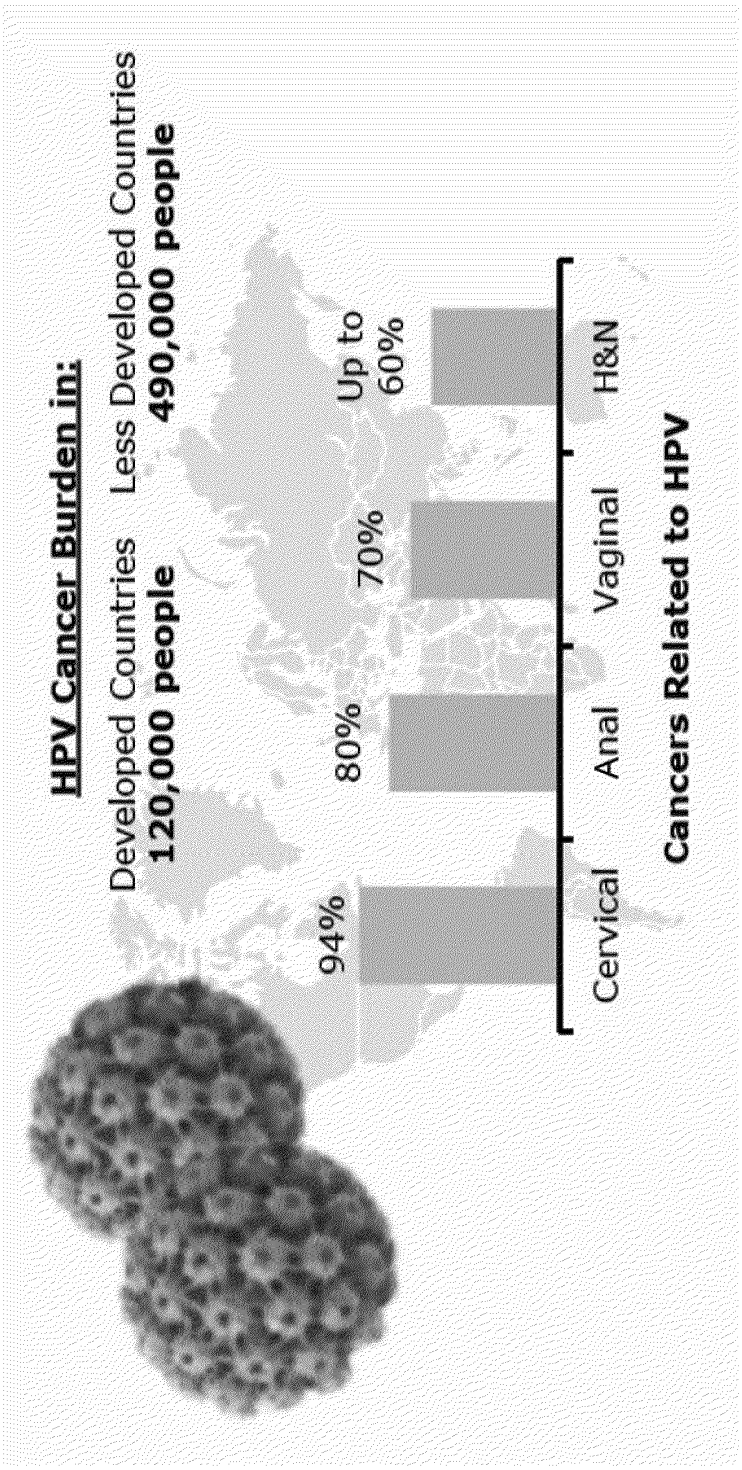

HPV Cancer Burden in:
Developed Countries
120,000 people
Less Developed Countries
490,000 people
94%
80%
70%
Up to 60%
Cervical
Anal
Vaginal
H&N
Cancers Related to HPV

FIG. 1

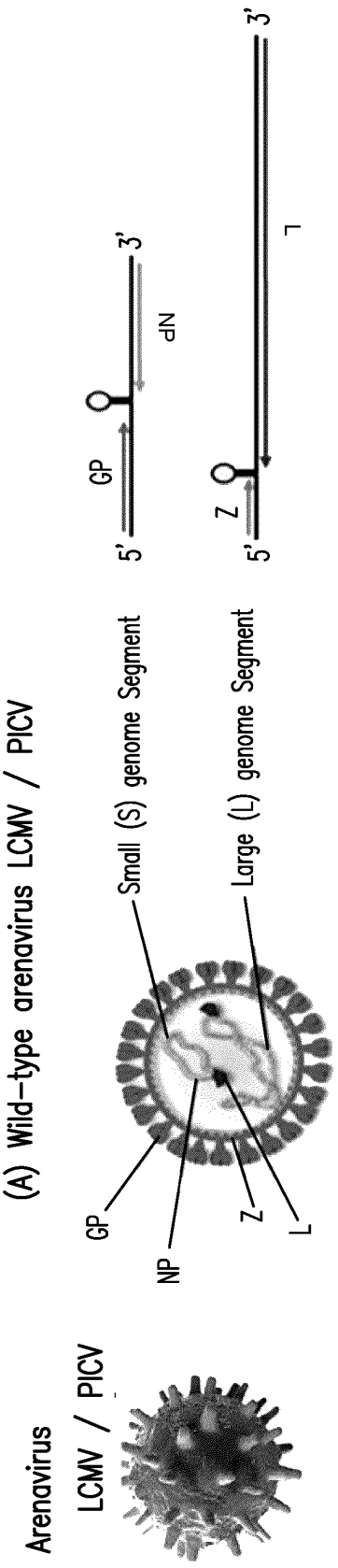

(A) Wild-type arenavirus LCMV / PICV
Arenavirus
LCMV / PICV
Small (S) genome Segment
Large (L) genome Segment
GP
NP
Z
L
5'
3'

FIG. 2A

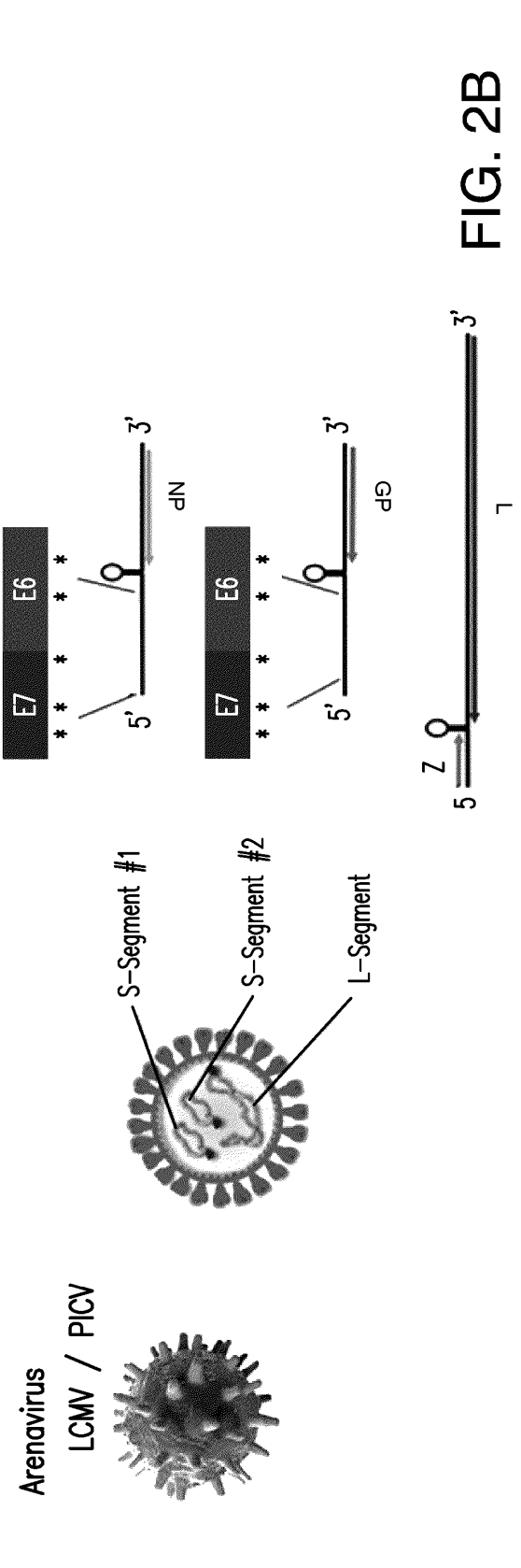

(B) Construct 1 (LCMV-based)/Construct 2 (PICV-based)
Arenavirus
LCMV / PICV
S-Segment #1
S-Segment #2
L-Segment
E7
E6
NP
GP
Z
L
5'
3'

FIG. 2B

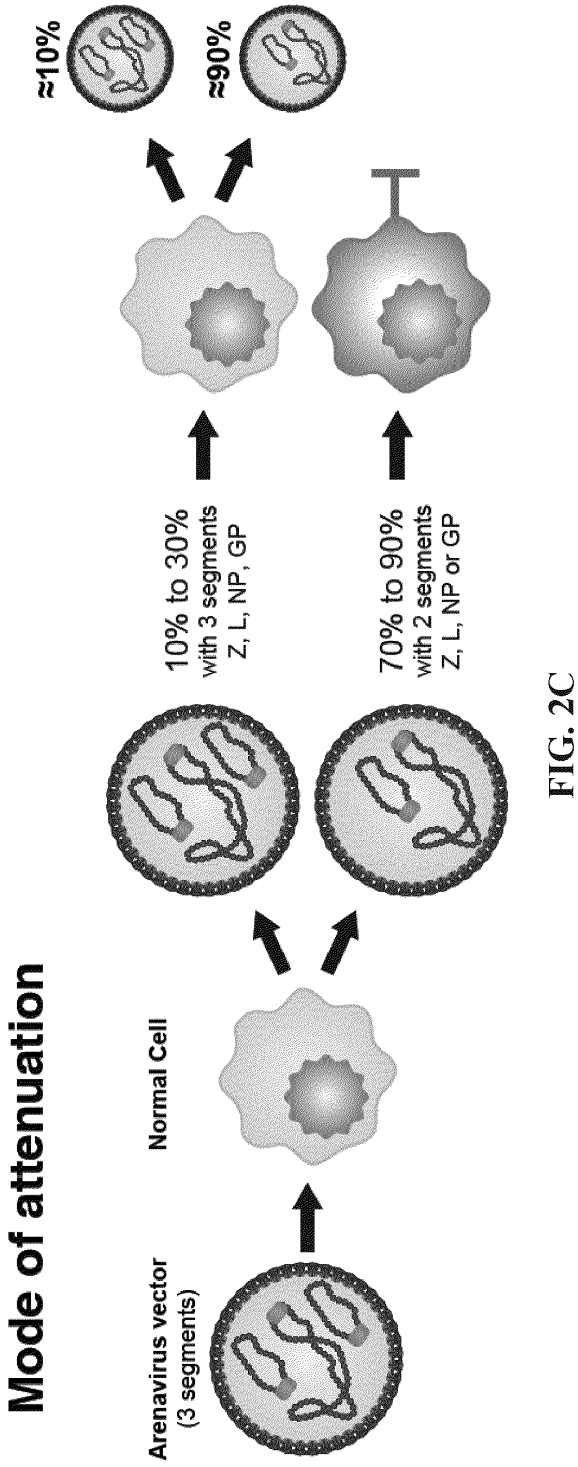

Mode of attenuation
Arenavirus vector
(3 segments)
Normal Cell
10% to 30%
with 3 segments
Z, L, NP, GP
70% to 90%
with 2 segments
Z, L, NP or GP
≈10%
≈90%

FIG. 2C

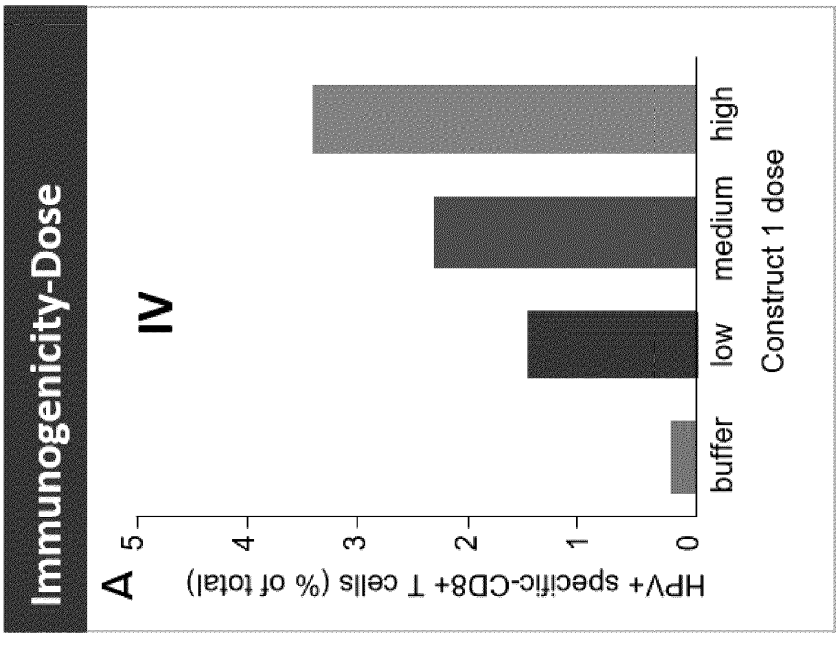

Immunogenicity-Dose
A
IV
HPV+ specific-CD8+ T cells (% of total)
0
1
2
3
4
5
buffer
low
medium
high
Construct 1 dose

FIG. 3A

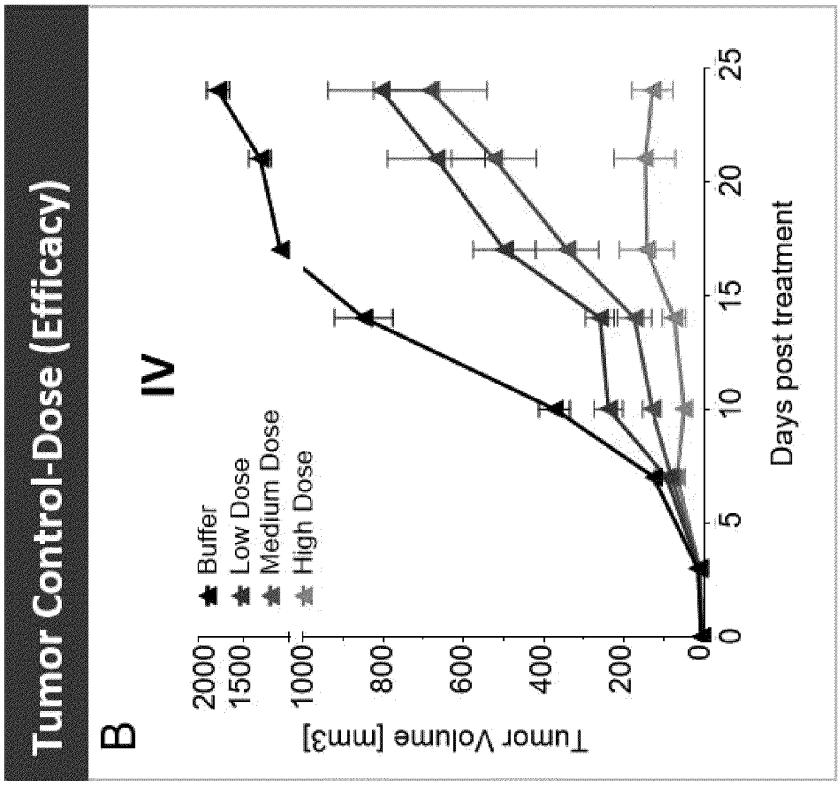

Tumor Control-Dose (Efficacy)
B
IV
Tumor Volume [mm3]
0
200
400
600
800
1000
1500
2000
Buffer
Low Dose
Medium Dose
High Dose
0
5
10
15
20
25
Days post treatment

FIG. 3B

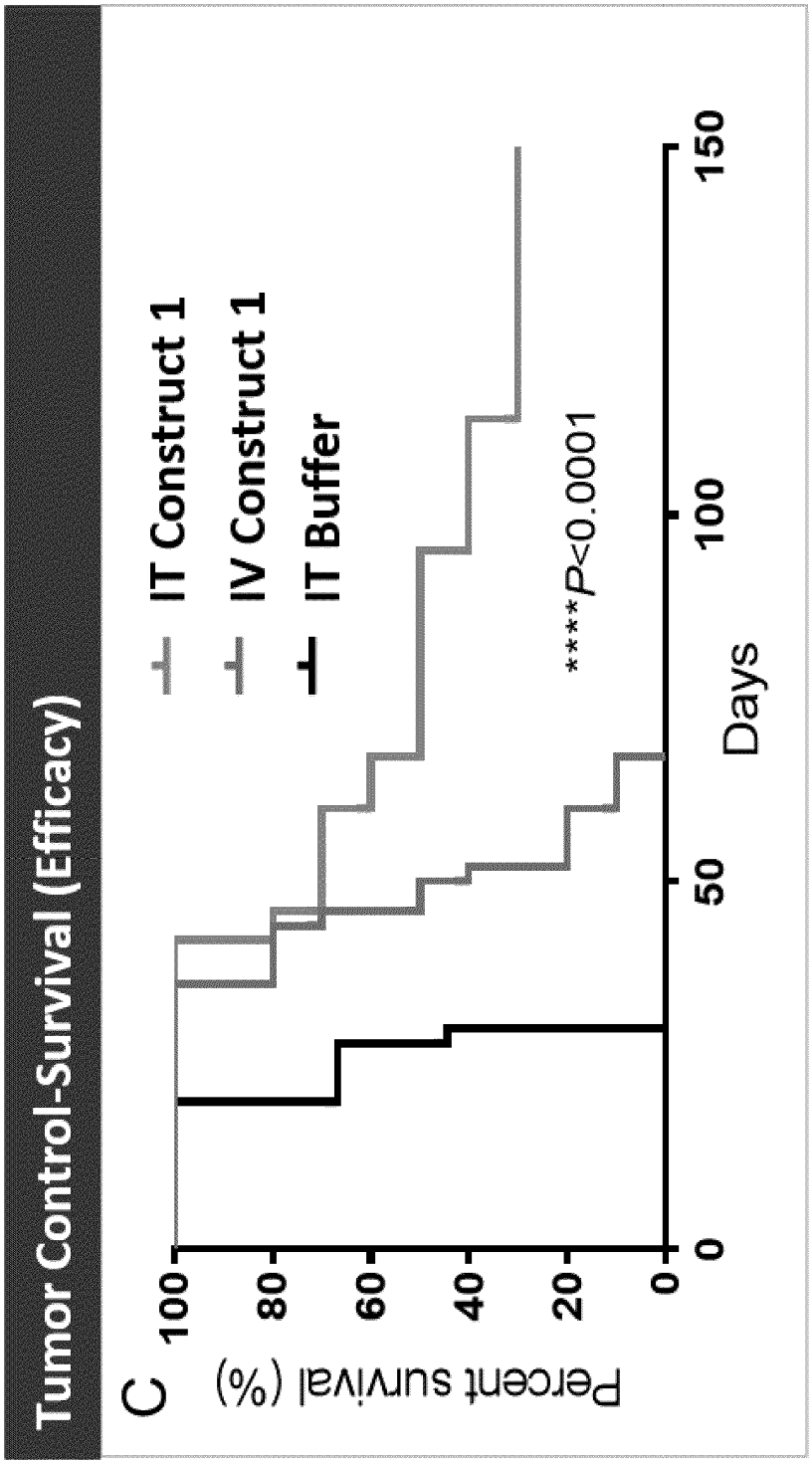

Tumor Control-Survival (Efficacy)
C
Percent survival (%)
100
80
60
40
20
0
0
50
100
150
Days
IT Construct 1
IV Construct 1
IT Buffer
****P<0.0001

FIG. 3C

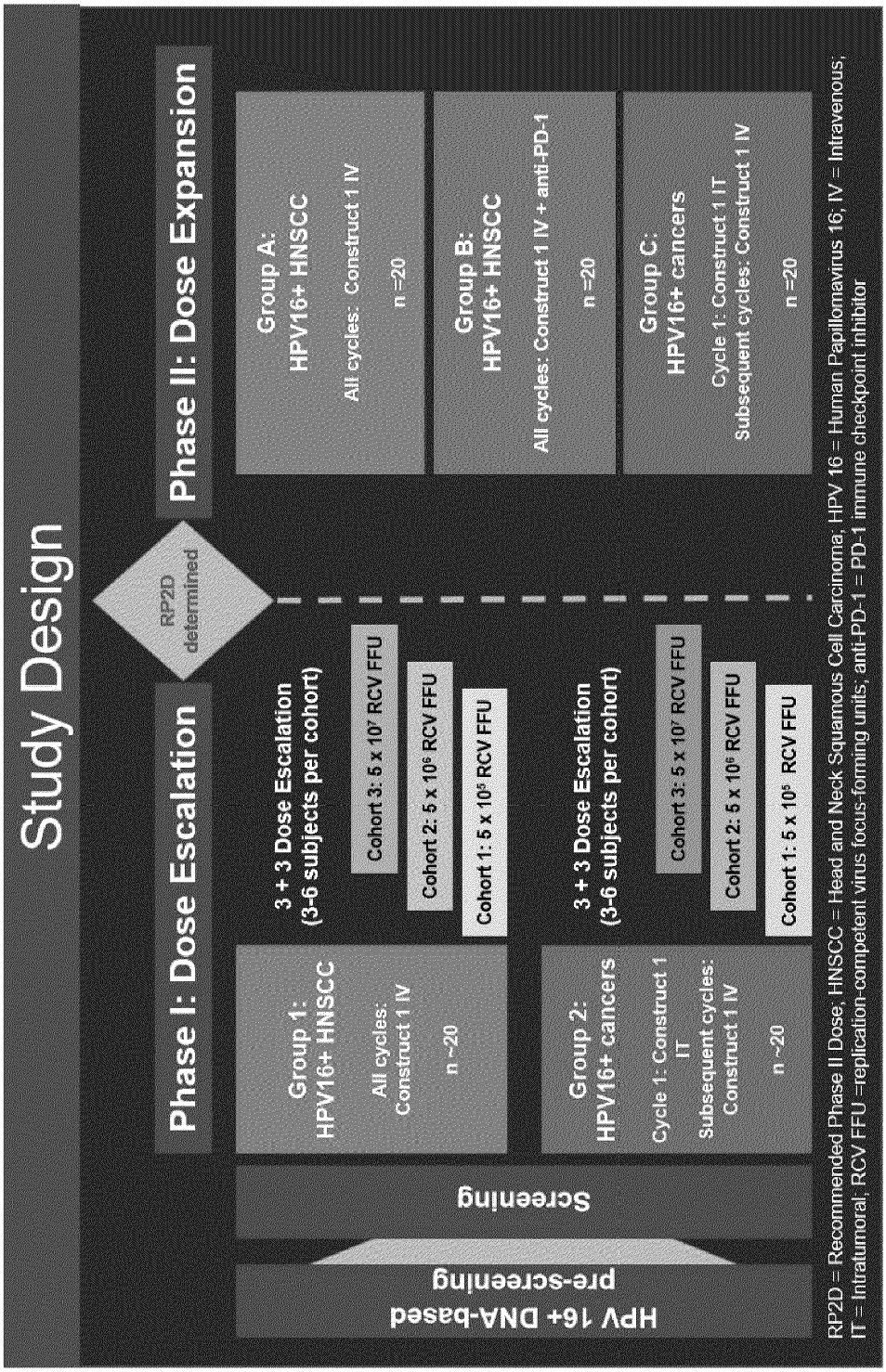

Study Design
Phase I: Dose Escalation
Phase II: Dose Expansion
RP2D determined
HPV 16+ DNA-based pre-screening
Screening
Group 1: HPV16+ HNSCC
All cycles: Construct 1 IV
n ~20
3 + 3 Dose Escalation (3-6 subjects per cohort)
Cohort 3: 5 x 10⁷ RCV FFU
Cohort 2: 5 x 10⁶ RCV FFU
Cohort 1: 5 x 10⁵ RCV FFU
Group 2: HPV16+ cancers
Cycle 1: Construct 1 IT
Subsequent cycles: Construct 1 IV
n ~20
3 + 3 Dose Escalation (3-6 subjects per cohort)
Cohort 3: 5 x 10⁷ RCV FFU
Cohort 2: 5 x 10⁶ RCV FFU
Cohort 1: 5 x 10⁵ RCV FFU
Group A: HPV16+ HNSCC
All cycles: Construct 1 IV
n =20
Group B: HPV16+ HNSCC
All cycles: Construct 1 IV + anti-PD-1
n =20
Group C: HPV16+ cancers
Cycle 1: Construct 1 IT
Subsequent cycles: Construct 1 IV
n =20
RP2D = Recommended Phase II Dose; HNSCC = Head and Neck Squamous Cell Carcinoma; HPV 16 = Human Papillomavirus 16; IV = Intravenous; IT = Intratumoral; RCV FFU =replication-competent virus focus-forming units; anti-PD-1 = PD-1 immune checkpoint inhibitor

FIG. 4

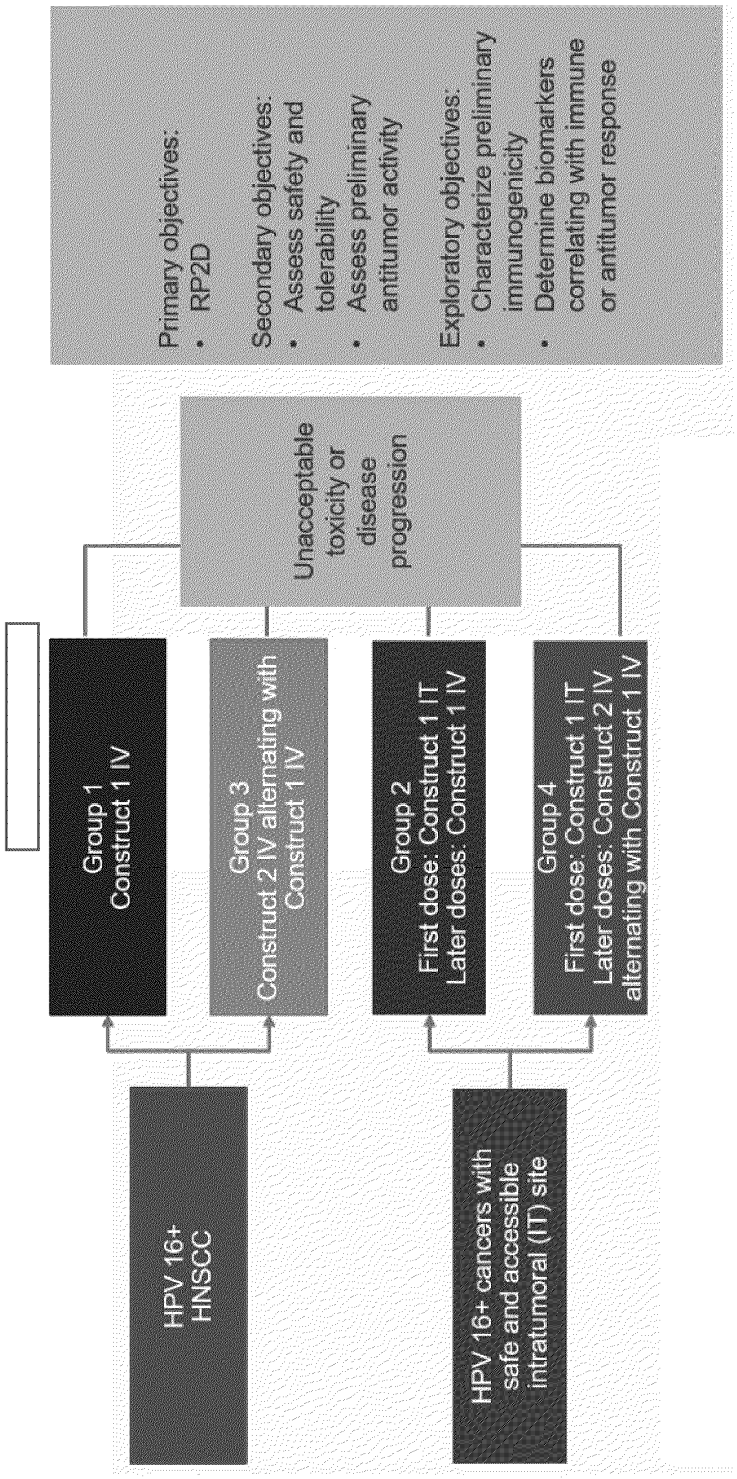

Primary objectives:
• RP2D
Secondary objectives:
• Assess safety and tolerability
• Assess preliminary antitumor activity
Exploratory objectives:
• Characterize preliminary immunogenicity
• Determine biomarkers correlating with immune or antitumor response
Unacceptable toxicity or disease progression
HPV 16+ HNSCC
HPV 16+ cancers with safe and accessible intratumoral (IT) site
Group 1 Construct 1 IV
Group 3 Construct 2 IV alternating with Construct 1 IV
Group 2 First dose: Construct 1 IT Later doses: Construct 1 IV
Group 4 First dose: Construct 1 IT Later doses: Construct 2 IV alternating with Construct 1 IV

FIG. 5

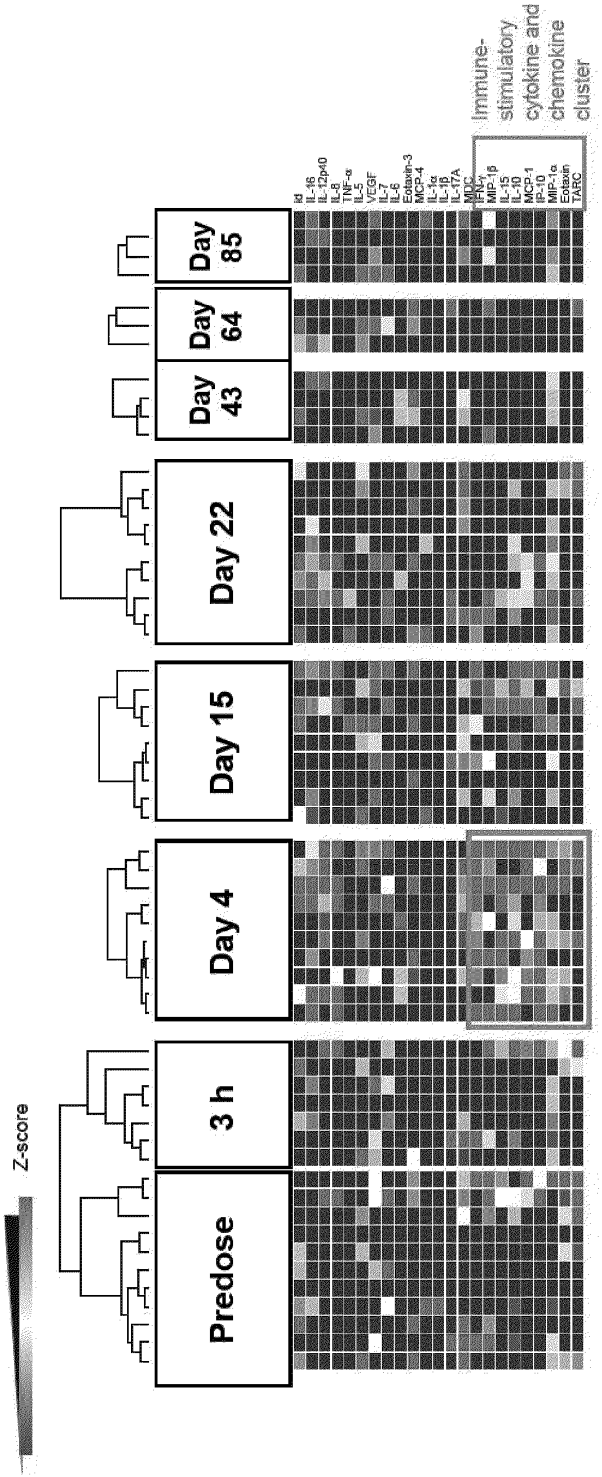

Z-score
Predose
3 h
Day 4
Day 15
Day 22
Day 43
Day 64
Day 85
Immune-stimulatory cytokine and chemokine cluster
Id
IL-16
IL-12p40
IL-8
TNF-α
IL-5
VEGF
IL-7
IL-6
Eotaxin-3
MCP-4
IL-1α
IL-1β
IL-17A
IFN-γ
MIP-1β
IL-15
IL-10
MCP-1
IP-10
MIP-1α
Eotaxin
TARC

FIG. 6A

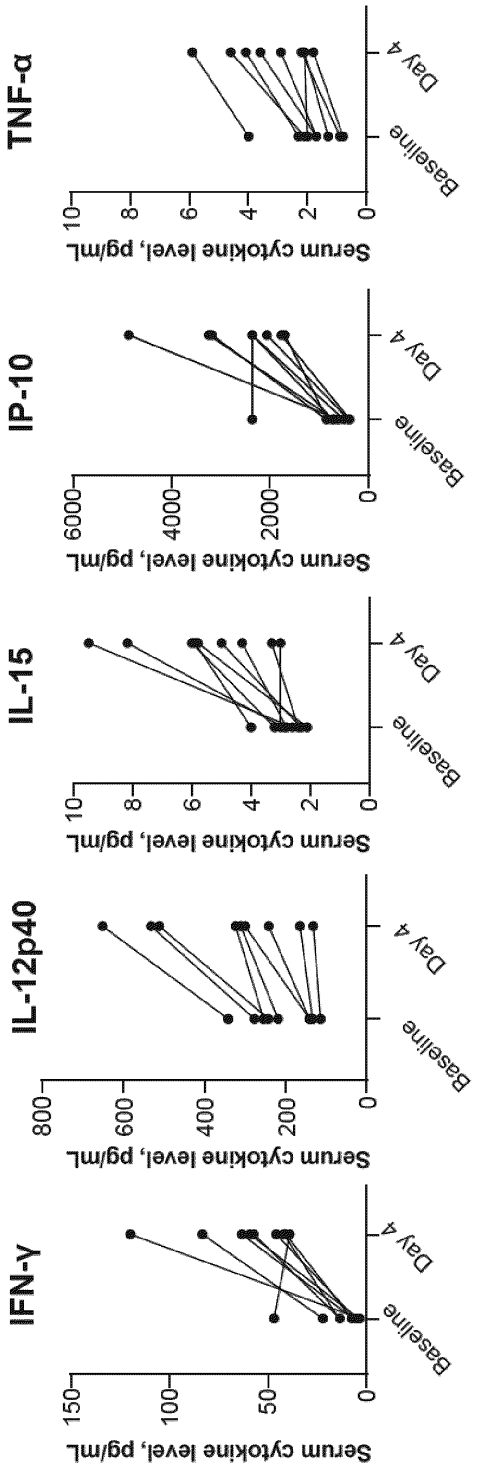

IFN-γ
IL-12p40
IL-15
IP-10
TNF-α
Serum cytokine level, pg/mL
Baseline
Day 4

FIG. 6B

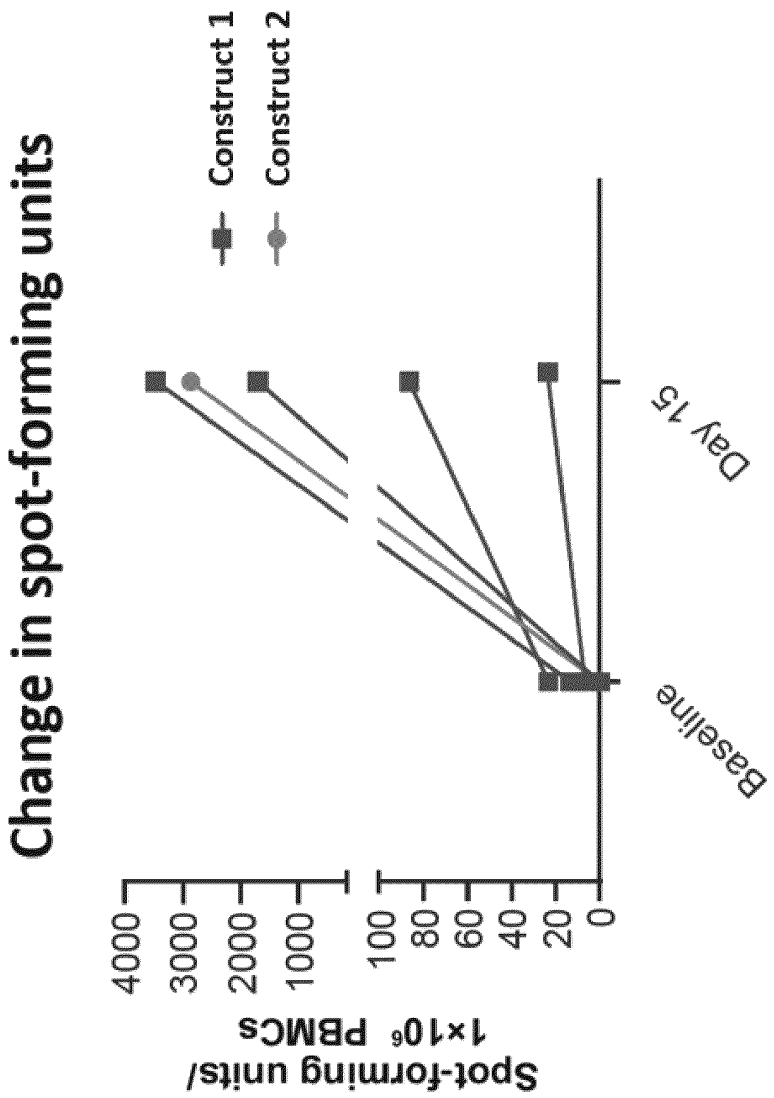

Change in spot-forming units
Construct 1
Construct 2
Spot-forming units/
1×10⁶ PBMCs
4000
3000
2000
1000
100
80
60
40
20
0
Baseline
Day 15

FIG. 7A

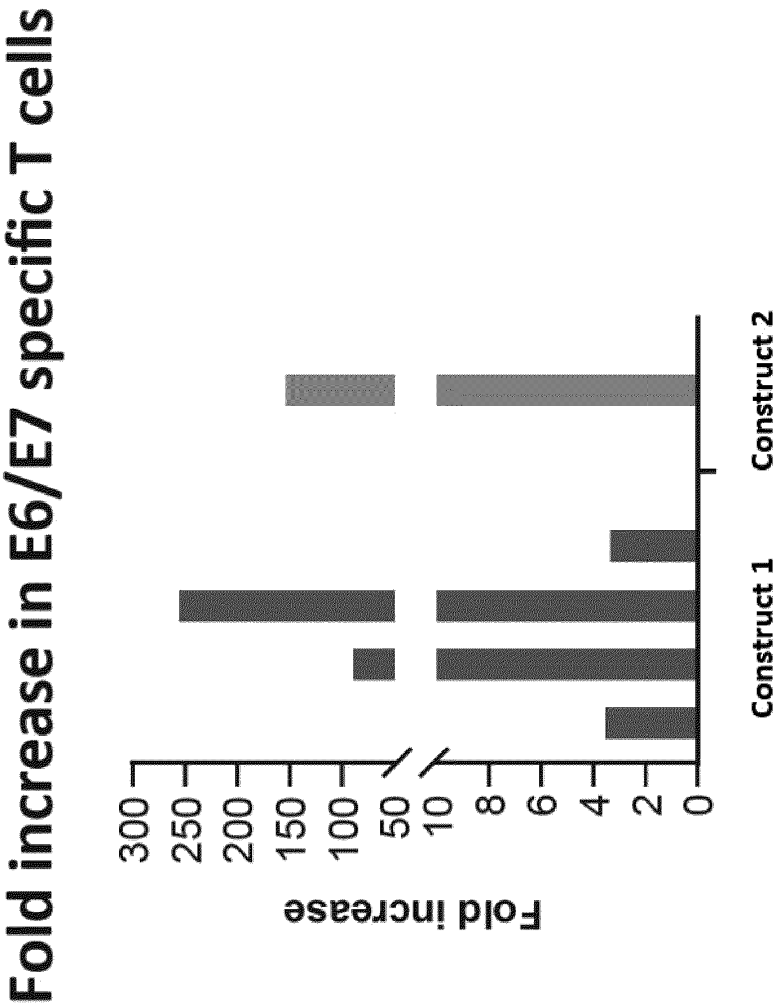

Fold increase in E6/E7 specific T cells
Fold increase
300
250
200
150
100
50
10
8
6
4
2
0
Construct 1
Construct 2

FIG. 7B

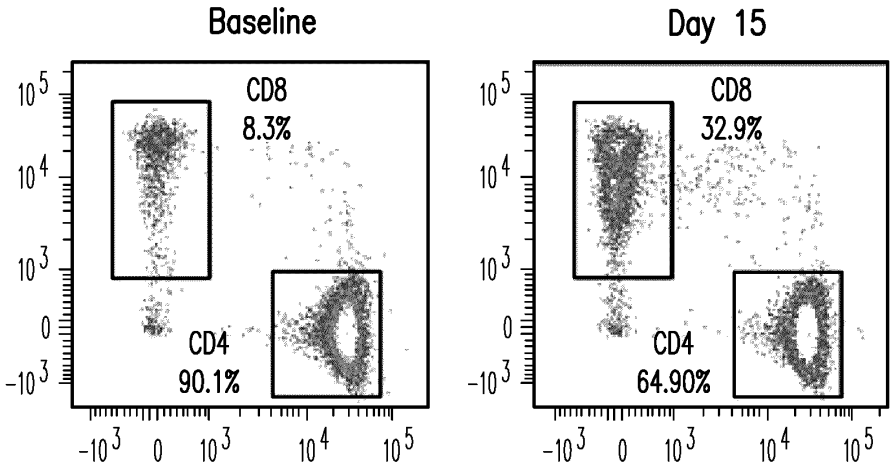


FIG. 7C

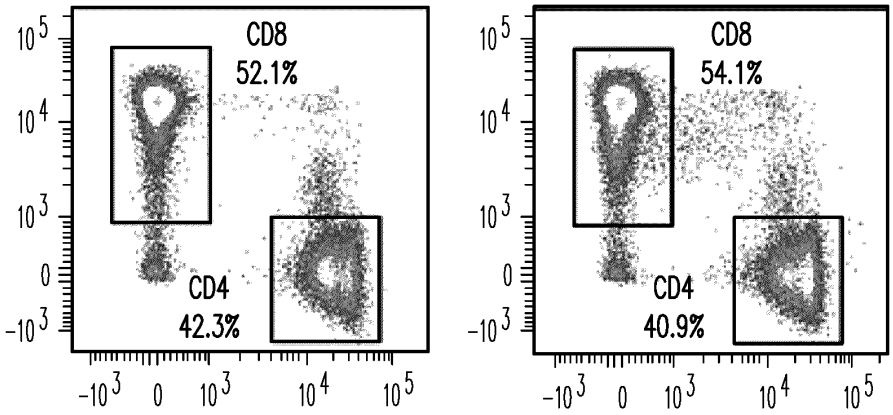


FIG. 7D

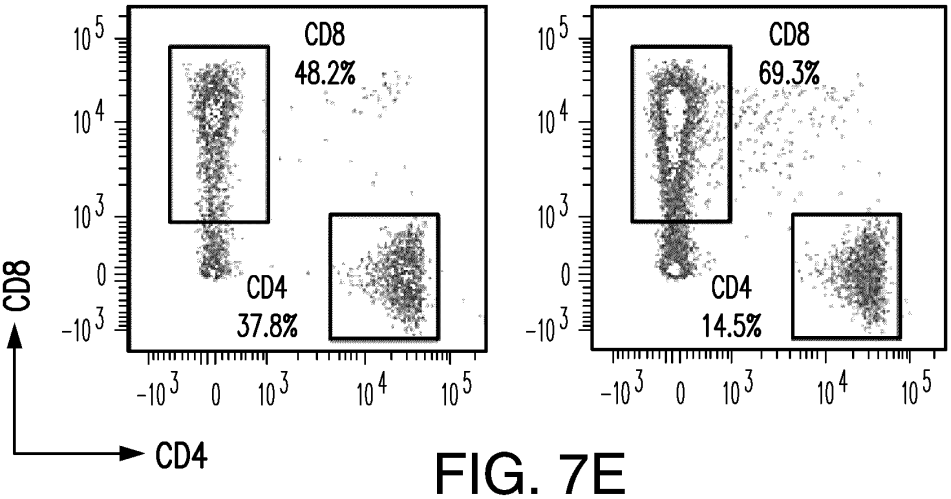


FIG. 7E

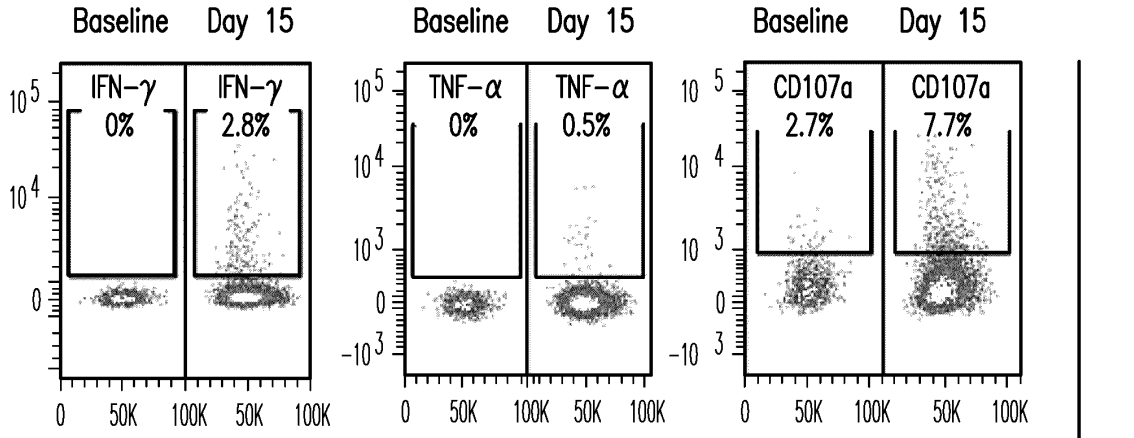


FIG. 7C continued

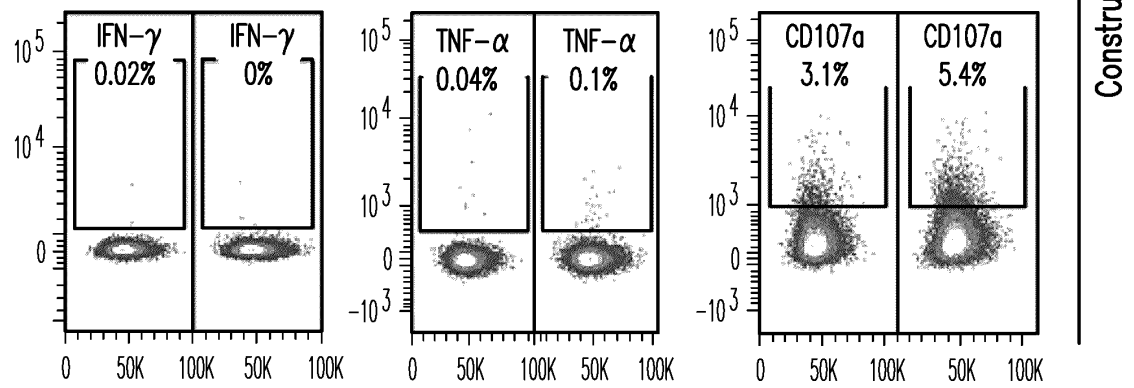


FIG. 7D continued

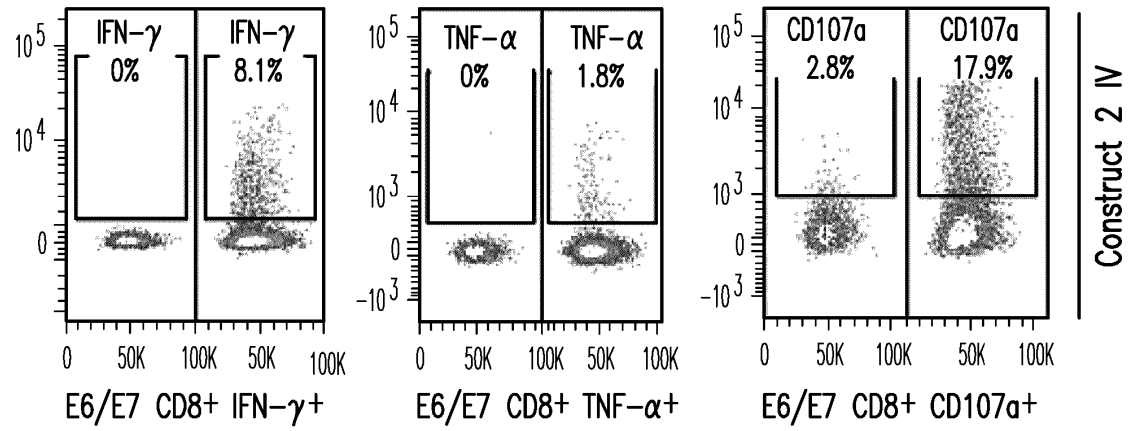


FIG. 7E continued

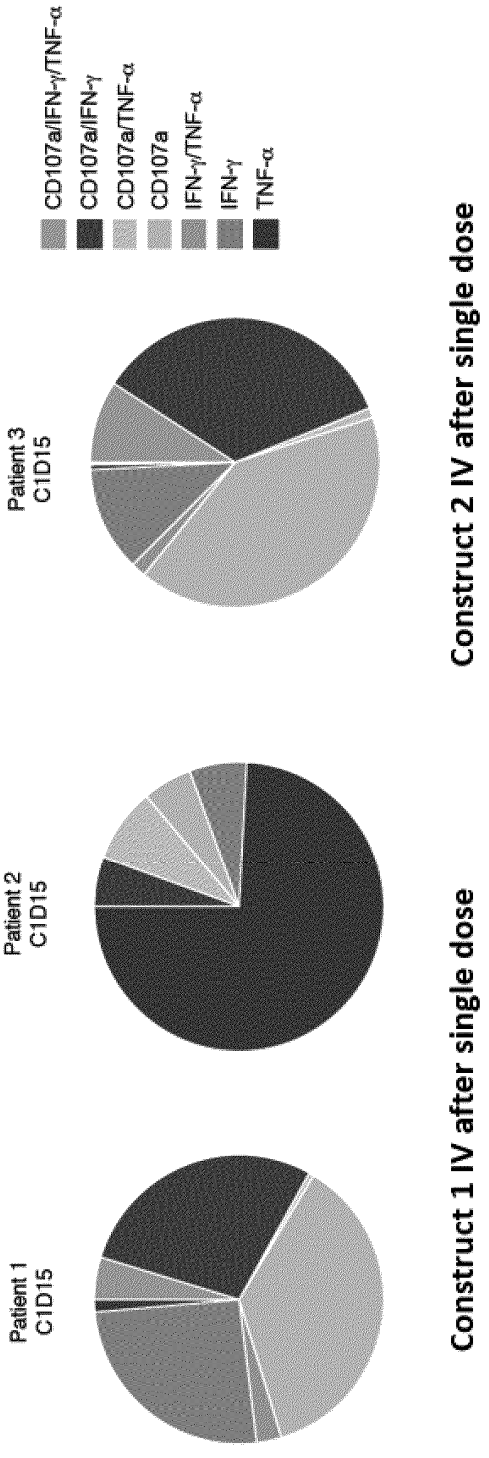

CD107a/IFN-γ/TNF-α
CD107a/IFN-γ
CD107a/TNF-α
CD107a
IFN-γ/TNF-α
IFN-γ
TNF-α
Patient 3
C1D15
Patient 2
C1D15
Patient 1
C1D15
Construct 2 IV after single dose
Construct 1 IV after single dose
C1D15, cycle 1 day 15.

FIG. 7F

```
GCGCACCGGG GATCCTAGGC TTTTTGGATT GCGCTTTCCT CTAGATCAAC 50
TGGGTGTCAG GCCCTATCCT ACAGAAGGAT GCATGGTGAC ACCCCCACCC 100
TGCATGAGTA CATGCTGGAC CTGCAGCCAG AGACCACAGA CCTGTATGGC 150
TATGGCCAGC TGAATGACAG CAGTGAGGAA GAGGATGAGA TTGATGGGCC 200
AGCAGGCCAG GCAGAACCTG ACAGAGCCCA CTACAACATT GTCACCTTCT 250
GCTGCAAGTG TGACAGCACC CTGAGACTGT GTGTGCAGAG CACCCATGTG 300
GACATCAGAA CCCTGGAAGA CCTGCTGATG GGCACCCTGG GCATTGTGGG 350
CCCCATCTGC TCCCAGAAGC CCCACCAGAA AAGAACTGCC ATGTTCCAGG 400
ACCCCCAGGA GAGGCCCAGA AAGCTGCCCC AGCTCTGCAC AGAGCTGCAG 450
ACCACCATCC ATGACATCAT CCTGGAATGT GTCTACTGCA AGCAGCAGCT 500
GCTGAGGAGA GAGGTGTATG ACTTTGCCTT CAGGGACCTG TGCATTGTGT 550
ACAGGGATGG CAACCCCTAT GCTGTGGGGG ACAAGTGCCT CAAGTTCTAC 600
AGCAAGATCA GTGAGTACAG GCACTACTGC TACAGCCTGT ATGGCACCAC 650
CCTGGAACAG CAGTACAACA AGCCCCTGTG TGACCTCCTG ATCAGATGCA 700
TCAATGGCCA GAAACCCCTC TGCCCTGAGG AAAAGCAGAG ACACCTGGAC 750
AAGAAGCAGA GGTTCCACAA CATCAGAGGC AGGTGGACAG GCAGATGCAT 800
GAGCTGCTGC AGAAGCAGCA GAACCAGAAG AGAGACCCAG CTGTGAAGAA 850
CAGCGCCTCC CTGACTCTCC ACCTCGAAAG AGGTGGAGAG TCAGGGAGGC 900
CCAGAGGGTC TTAGAGTGTC ACAACATTTG GGCCTCTAAA AATTAGGTCA 950
TGTGGCAGAA TGTTGTGAAC AGTTTTCAGA TCTGGGAGCC TTGCTTTGGA 1000
GGCGCTTTCA AAAATGATGC AGTCCATGAG TGCACAGTGC GGGGTGATCT 1050
CTTTCTTCTT TTTGTCCCTT ACTATTCCAG TATGCATCTT ACACAACCAG 1100
CCATATTTGT CCCACACTTT ATCTTCATAC TCCCTCGAAG CTTCCCTGGT 1150
CATTTCAACA TCGATAAGCT TAATGTCCTT CCTATTTTGT GAGTCCAGAA 1200
GCTTTCTGAT GTCATCGGAG CCTTGACAGC TTAGAACCAT CCCCTGCGGA 1250
AGAGCACCTA TAACTGACGA GGTCAACCCG GGTTGCGCAT TGAAGAGGTC 1300
GGCAAGATCC ATGCCGTGTG AGTACTTGGA ATCTTGCTTG AATTGTTTTT 1350
GATCAACGGG TTCCCTGTAA AAGTGTATGA ACTGCCCGTT CTGTGGTTGG 1400
AAAATTGCTA TTTCCACTGG ATCATTAAAT CTACCCTCAA TGTCAATCCA 1450
TGTAGGAGCG TTGGGGTCAA TTCCTCCCAT GAGGTCTTTT AAAAGCATTG 1500
TCTGGCTGTA GCTTAAGCCC ACCTGAGGTG GACCTGCTGC TCCAGGCGCT 1550
GGCCTGGGTG AGTTGACTGC AGGTTTCTCG CTTGTGAGAT CAATTGTTGT 1600
GTTTTCCCAT GCTCTCCCCA CAATCGATGT TCTACAAGCT ATGTATGGCC 1650
ATCCTTCACC TGAAAGGCAA ACTTTATAGA GGATGTTTTC ATAAGGGTTC 1700
CTGTCCCCAA CTTGGTCTGA AACAAACATG TTGAGTTTTC TCTTGGCCCC 1750
GAGAACTGCC TTCAAGAGAT CCTCGCTGTT GCTTGGCTTG ATCAAAATTG 1800
ACTCTAACAT GTTACCCCCA TCCAACAGGG CTGCCCCTGC CTTCACGGCA 1850
GCACCAAGAC TAAAGTTATA GCCAGAAATG TTGATGCTGG ACTGCTGTTC 1900
AGTGATGACC CCCAGAACTG GGTGCTTGTC TTTCAGCCTT TCAAGATCAT 1950
TAAGATTTGG ATACTTGACT GTGTAAAGCA AGCCAAGGTC TGTGAGCGCT 2000
TGTACAACGT CATTGAGCGG AGTCTGTGAC TGTTTGGCCA TACAAGCCAT 2050
AGTTAGACTT GGCATTGTGC CAAATTGATT GTTCAAAAGT GATGAGTCTT 2100
TCACATCCCA AACTCTTACC ACACCACTTG CACCCTGCTG AGGCTTTCTC 2150
ATCCCAACTA TCTGTAGGAT CTGAGATCTT TGGTCTAGTT GCTGTGTTGT 2200
TAAGTTCCCC ATATATACCC CTGAAGCCTG GGGCCTTTCA GACCTCATGA 2250
TCTTGGCCTT CAGCTTCTCA AGGTCAGCCG CAAGAGACAT CAGTTCTTCT 2300
GCACTGAGCC TCCCCACTTT CAAAACATTC TTCTTTGATG TTGACTTTAA 2350
ATCCACAAGA GAATGTACAG TCTGGTTGAG ACTTCTGAGT CTCTGTAGGT 2400
CTTTGTCATC TCTCTTTTCC TTCCTCATGA TCCTCTGAAC ATTGCTGACC 2450
TCAGAGAAGT CCAACCCATT CAGAAGGTTG GTTGCATCCT TAATGACAGC 2500
AGCCTTCACA TCTGATGTGA AGCTCTGCAA TTCTCTTCTC AATGCTTGCG 2550
TCCATTGGAA GCTCTTAACT TCCTTAGACA AGGACATCTT GTTGCTCAAT 2600
GGTTTCTCAA GACAAATGCG CAATCAAATG CCTAGGATCC ACTGTGCG   2648

Legend:
5´UTR and 3´UTR (not highlighted)
LCMV cl13 NP
HPV16 E7E6 dint
IGR
```

FIG. 8

```
GCGCACCGGG GATCCTAGGC TTTTTGGATT GCGCTTTCCT CTAGATCAAC 50
TGGGTGTCAG GCCCTATCCT ACAGAAGGAT GCATGGTGAC ACCCCCACCC 100
TGCATGAGTA CATGCTGGAC CTGCAGCCAG AGACCACAGA CCTGTATGGC 150
TATGGCCAGC TGAATGACAG CAGTGAGGAA GAGGATGAGA TTGATGGGCC 200
AGCAGGCCAG GCAGAACCTG ACAGAGCCCA CTACAACATT GTCACCTTCT 250
GCTGCAAGTG TGACAGCACC CTGAGACTGT GTGTGCAGAG CACCCATGTG 300
GACATCAGAA CCCTGGAAGA CCTGCTGATG GGCACCCTGG GCATTGTGGG 350
CCCCATCTGC TCCCAGAAGC CCCACCAGAA AAGAACTGCC ATGTTCCAGG 400
ACCCCCAGGA GAGGCCCAGA AAGCTGCCCC AGCTCTGCAC AGAGCTGCAG 450
ACCACCATCC ATGACATCAT CCTGGAATGT GTCTACTGCA AGCAGCAGCT 500
GCTGAGGAGA GAGGTGTATG ACTTTGCCTT CAGGGACCTG TGCATTGTGT 550
ACAGGGATGG CAACCCCTAT GCTGTGGGGG ACAAGTGCCT CAAGTTCTAC 600
AGTAAGATCA GTGAGTACAG GCACTACTGC TACAGCCTGT ATGGCACCAC 650
CCTGGAACAG CAGTACAACA AGCCCCTGTG TGACCTCCTG ATCAGATGCA 700
TCAATGGCCA GAAACCCCTC TGCCCTGAGG AAAAGCAGAG ACACCTGGAC 750
AAGAAGCAGA GGTTCCACAA CATCAGAGGC AGGTGGACAG GCAGATGCAT 800
GAGCTGCTGC AGAAGCAGCA GAACCAGAAG AGAGACCCAG CTGTGAAGAA 850
CAGCGCCTCC CTGACTCTCC ACCTCGAAAG AGGTGGAGAG TCAGGGAGGC 900
CCAGAGGGTC TCAGCGTCTT TTCCAGATAG TTTTTACACC AGGCACCTTG 950
AATGCACCAC AACTACAGAT CCCCTTGTTG GTCAAGCGGT GTGGCTTTGG 1000
ACATGAACCG CCCTTTATGT GTCTATGTGT TGGTATCTTC ACAAGATGCA 1050
GAAAGATGCT GATTAGATAT GCTGATGTTG AAAACATCAA AAGATCCATT 1100
AAGGCTAAAG GAGTACTCCC TTGTCTTTTT ATGTAGTCCT TCCTCAACAT 1150
CTCTGTGATC ATGTTATCTG CTTCTTGTTC GATTTGATCA CTAAAGTGGG 1200
TCTCATTCAA GTAGGAGCCA TTAGTGACAA GCCAGCACTT GGGTACACTA 1250
GTCTCACCAG TCTTAGCATG TTCCAGATAC CAGAACTTTG AGTAATTACA 1300
GTATGGTACC CCCATTAGAT CTCTTAGATG ATTCCTCATC AACAGCTGAT 1350
CGGAAATCAG AGAATTTACT GTTGTTTTGA ATACATGCAA GGCAGACTCT 1400
ACATCTTGCT TGAACTTACT CAGGGCGGCC TTGTTGTAAT CAATTAGTCG 1450
TAGCATGTCA CAGAACTCTT CATCATGATT GACATTACAT TTTGCAACAG 1500
CTGTATTCCC AAAACATTTG AGCTCTGCAG CAAGGATCAT CCATTTGGTC 1550
AGGCAATAAC CACCTGGATT TTCTACTCCT GAGGAGTCTG ACAGGGTCCA 1600
GGTGAATGTG CCTGCAAGTC TCCTAGTGAG AAACTTTGTC TTTTCCTGAG 1650
CAAAGAGGAT TCTAGACATC CCAAAAGGGC CTGCATATCT ACAGTGGTTT 1700
TCCCAAGTCC TGTTTTGTAT GATTAGGTAC TGATAGCTTG TTTGGCTGCA 1750
CCAAGTGGTC TTGCCATCTG AACCTGCCCA GCCCCAGCCA CTTCTCATGT 1800
ATTTTCCTCC AAAGGCAGTT CTAAACATGT CCAAGACTCT ACCTCTGAAA 1850
GTCCTACACT GGCTTATAGC GCTCTGTGGG TCCGAAAATG ACAAGTTGTA 1900
TTGAATGGTG ATGCCATTGT TAAAATCACA AGACACTGCT TTGTGGTTGG 1950
AATTCCCTCT AATACTGAGG TGCAGACTCG AGACTATACT CATGAGTGTA 2000
TGGTCAAAAG TCTTTTTGTT GAAAGCGGAG GTTAAGTTGC AAAAATTGTG 2050
ATTAAGGATG GAGTCGTTAG TGAAAGTTAG CTCCAGTCCA GAGCTTCCCA 2100
TACTGATGTA GTGATGAGAG TTGTTGGCTG AGCACGCATT GGGCATCGTC 2150
AGATTTAAGT GAGACATATC AAACTCCACT GATTTGAACT GGTAAACCCC 2200
TTTATAGATG TCGGGACCAT TAAGGCCGTA CATGCCACAG GACCTACCAG 2250
CCAAAAAAAG GAAGCTGACC AGTGCTAATA TCCCACAGGT GGCGAAATTG 2300
TACACAGCTT TGATGCTCGT GATTATAATG AGCACAATAA TGACAATGTT 2350
GATGACCTCA TCAATGATGT GAGGCAAAGC CTCAAACATT GTCACAATCT 2400
GACCCATCTT GTTGCTCAAT GGTTTCTCAA GACAAATGCG CAATCAAATG 2450
CCTAGGATCC ACTGTGCG                                    2468

Legend:
5´UTR and 3´UTR (not highlighted)
LCMV WE GP
HPV16 E7E6 dint
IGR
```

FIG. 9

```
GCGCACCGGG GATCCTAGGC GTTTAGTTGC GCTGTTTGGT TGCACAACTT 50
TCTTCGTGAG GCTGTCAGAA GTGGACCTGG CTGATAGCGA TGGGTCAAGG 100
CAAGTCCAGA GAGGAGAAAG GCACCAATAG TACAAACAGG GCCGAAATCC 150
TACCAGATAC CACCTATCTT GGCCCTTTAA GCTGCAAATC TTGCTGGCAG 200
AAATTTGACA GCTTGGTAAG ATGCCATGAC CACTACCTTT GCAGGCACTG 250
TTTAAACCTT CTGCTGTCAG TATCCGACAG GTGTCCTCTT TGTAAATATC 300
CATTACCAAC CAGATTGAAG ATATCAACAG CCCCAAGCTC TCCACCTCCC 350
TACGAAGAGT AACACCGTCC GGCCCCGGCC CCGACAAACA GCCCAGCACA 400
AGGGAACCGC ACGTCACCCA ACGCACACAG ACACAGCACC CAACACAGAA 450
CACGCACACA CACACACACA CACACCCACA CGCACGCGCC CCCACCACCG 500
GGGGGCGCCC CCCCCCGGGG GGCGGCCCCC CGGGAGCCCG GGCGGAGCCC 550
CACGGAGATG CCCATCAGTC GGTGTCCTCG GCCACCGACC CGCCTAGCCA 600
ATCGTCGCAG GACCTCCCCT TGAGTCTAAA CCTGCCCCCC ACTGTTTCAT 650
ACATCAAAGT GCTCCTAGAT TTGCTAAAAC AAAGTCTGCA ATCCTTAAAG 700
GCGAACCAGT CTGGCAAAAG CGACAGTGGA ATCAGCAGAA TAGATCTGTC 750
TATACATAGT TCCTGGAGGA TTACACTTAT CTCTGAACCC AACAAATGTT 800
CACCAGTTCT GAATCGATGC AGGAAGAGGT TCCCAAGGAC ATCACTAATC 850
TTTTCATAGC CCTCAAGTCC TGCTAGAAAG ACTTTCATGT CCTTGGTCTC 900
CAGCTTCACA ATGATATTTT GGACAAGGTT TCTTCCTTCA AAAAGGGCAC 950
CCATCTTTAC AGTCAGTGGC ACAGGCTCCC ACTCAGGTCC AACTCTCTCA 1000
AAGTCAATAG ATCTAATCCC ATCCAGTATT CTTTTGGAGC CCAACAACTC 1050
AAGCTCAAGA GAATCACCAA GTATCAAGGG ATCTTCCATG TAATCCTCAA 1100
ACTCTTCAGA TCTGATATCA AAGACACCAT CGTTCACCTT GAAGACAGAG 1150
TCTGTCCTCA GTAAGTGGAG GCATTCATCC AACATTCTTC TATCTATCTC 1200
ACCCTTAAAG AGGTGAGAGC ATGATAAAAG TTCAGCCACA CCTGGATTCT 1250
GTAATTGGCA CCTAACCAAG AATATCAATG AAAATTTCCT TAAACAGTCA 1300
GTATTATTCT GATTGTGCGT AAAGTCCACT GAAATTGAAA ACTCCAATAC 1350
CCCTTTTGTG TAGTTGAGCA TGTAGTCCCA CAGATCCTTT AAGGATTTAA 1400
ATGCCTTTGG GTTTGTCAGG CCCTGCCTAA TCAACATGGC AGCATTACAC 1450
ACAACATCTC CCATTCGGTA AGAGAACCAC CCAAAACCAA ACTGCAAATC 1500
ATTCCTAAAC ATAGGCCTCT CCACATTTTT GTTCACCACC TTTGAGACAA 1550
ATGATTGAAA GGGGCCCAGT GCCTCAGCAC CATCTTCAGA TGGCATCATT 1600
TCTTTATGAG GGAACCATGA AAAATTGCCT AATGTCCTGG TTGTTGCAAC 1650
AAATTCTCGA ACAAATGATT CAAAATACAC CTGTTTTAAG AAGTTCTTGC 1700
AGACATCCCT CGTGCTAACA ACAAATTCAT CAACCAGACT GGAGTCAGAT 1750
CGCTGATGAG AATTGGCAAG GTCAGAAAAC AGAACAGTGT AATGTTCATC 1800
CCTTTTCCAC TTAACAACAT GAGAAATGAG TGACAAGGAT TCTGAGTTAA 1850
TATCAATTAA AACACAGAGG TCAAGGAATT TAATTCTGGG ACTCCACCTC 1900
ATGTTTTTTG AGCTCATGTC AGACATAAAT GGAAGAAGCT GATCCTCAAA 1950
GATCTTGGGA TATAGCCGCC TCACAGATTG AATCACTTGG TTCAAATTCA 2000
CTTTGTCCTC CAGTAGCCTT GAGCTCTCAG GCTTTCTTGC TACATAATCA 2050
CATGGGTTTA AGTGCTTAAG AGTTAGGTTC TCACTGTTAT TCTTCCCTTT 2100
GGTCGGTTCT GCTAGGACCC AAACACCCAA CTCAAAAGAG TTGCTCAATG 2150
AAATACAAAT GTAGTCCCAA AGAAGAGGCC TTAAAAGGCA TATATGATCA 2200
CGGTGGGCTT CTGGATGAGA CTGTTTGTCA CAAATGTACA GCGTTATACC 2250
ATCCCGATTG CAAACTCTTG TCACATGATC ATCTGTGGTT AGATCCTCAA 2300
GCAGCTTTTT GATATACAGA TTTTCCCTAT TTTTGTTTCT CACACACCTG 2350
CTTCCTAGAG TTTTGCAAAG GCCTATAAAG CCAGATGAGA TACAACTCTG 2400
GAAAGCTGAC TTGTTGATTG CTTCTGACAG CAGCTTCTGT GCACCCCTTG 2450
TGAATTTACT ACAAAGTTTG TTCTGGAGTG TCTTGATCAA TGATGGGATT 2500
CTTTCCTCTT GGAAAGTCAT CACTGATGGA TAAACCACCT TTTGTCTTAA 2550
AACCATCCTT AATGGGAACA TTTCATTCAA ATTCAACCAG TTAACATCTG 2600
CTAACTGATT CAGATCTTCT TCAAGACCGA GGAGGTCTCC CAATTGAAGA 2650
ATGGCCTCCT TTTTATCTCT GTTAAATAGG TCTAAGAAAA ATTCTTCATT 2700
AAATTCACCA TTTTTGAGCT TATGATGCAG TTTCCTTACA AGCTTTCTTA 2750
CAACCTTTGT TTCATTAGGA CACAGTTCCT CAATGAGTCT TTGTATTCTG 2800
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FIG. 10

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TAACCTCTAG AACCATCCAG CCAATCTTTC ACATCAGTGT TGGTATTCAG 2850
TAGAAATGGA TCCAAAGGGA AATTGGCATA CTTTAGGAGG TCCAGTGTTC 2900
TCCTTTGGAT ACTATTAACT AGGGAGACTG GGACGCCATT TGCGATGGCT 2950
TGATCTGCAA TTGTATCTAT TGTTTCACAA AGTTGATGTG GCTCTTTACA 3000
CTTGACATTG TGTAGCGCTG CAGATACAAA CTTTGTGAGA AGAGGGACTT 3050
CCTCCCCCCA TACATAGAAT CTAGATTTAA ATTCTGCAGC GAACCTCCCA 3100
GCCACACTTT TTGGGCTGAT AAATTTGTTT AACAAGCCGC TCAGATGAGA 3150
TTGGAATTCC AACAGGACAA GGACTTCCTC CGGATCACTT ACAACCAGGT 3200
CACTCAGCCT CCTATCAAAT AAAGTGATCT GATCATCACT TGATGTGTAA 3250
GCCTCTGGTC TTTCGCCAAA GATAACACCA ATGCAGTAGT TGATGAACCT 3300
CTCGCTAAGC AAACCATAGA AGTCAGAAGC ATTATGCAAG ATTCCCTGCC 3350
CCATATCAAT AAGGCTGGAT ATATGGGATG GCACTATCCC CATTTCAAAA 3400
TATTGTCTGA AAATTCTCTC AGTAACAGTT GTTTCTGAAC CCCTGAGAAG 3450
TTTTAGCTTC GACTTGACAT ATGATTTCAT CATTGCATTC ACAACAGGAA 3500
AGGGGACCTC GACAAGCTTA TGCATGTGCC AAGTTAACAA AGTGCTAACA 3550
TGATCTTTCC CGGAACGCAC ATACTGGTCA TCACCTAGTT TGAGATTTTG 3600
TAGAAACATT AAGAACAAAA ATGGGCACAT CATTGGTCCC CATTTGCTGT 3650
GATCCATACT ATAGTTTAAG AACCCTTCCC GCACATTGAT AGTCATTGAC 3700
AAGATTGCAT TTTCAAATTC CTTATCATTG TTTAAACAGG AGCCTGAAAA 3750
GAAACTTGAA AAAGACTCAA AATAATCTTC TATTAACCTT GTGAACATTT 3800
TTGTCCTCAA ATCTCCAATA TAGAGTTCTC TATTTCCCCC AACCTGCTCT 3850
TTATAAGATA GTGCAAATTT CAGCCTTCCA GAGTCAGGAC CTACTGAGGT 3900
GTATGATGTT GGTGATTCTT CTGAGTAGAA GCACAGATTT TTCAAAGCAG 3950
CACTCATACA TTGTGTCAAC GACAGAGCTT TACTAAGGGA CTCAGAATTA 4000
CTTTCCCTCT CACTGATTCT CACGTCTTCT TCCAGTTTGT CCCAGTCAAA 4050
TTTGAAATTC AAGCCTTGCC TTTGCATATG CCTGTATTTC CCTGAGTACG 4100
CATTTGCATT CATTTGCAAC AGAATCATCT TCATGCAAGA AAACCAATCA 4150
TTCTCAGAAA AGAACTTTCT ACAAAGGTTT TTTGCCATCT CATCGAGGCC 4200
ACACTGATCT TTAATGACTG AGGTGAAATA CAAAGGTGAC AGCTCTGTGG 4250
AACCCTCAAC AGCCTCACAG ATAAATTTCA TGTCATCATT GGTTAGACAT 4300
GATGGGTCAA AGTCTTCTAC TAAATGGAAA GATATTTCTG ACAAGATAAC 4350
TTTTCTTAAG TGAGCCATCT TCCCTGTTAG AATAAGCTGT AAATGATGTA 4400
GTCCTTTTGT ATTTGTAAGT TTTTCTCCAT CTCCTTTGTC ATTGGCCCTC 4450
CTACCTCTTC TGTACCGTGC TATTGTGGTG TTGACCTTTT CTTCGAGACT 4500
TTTGAAGAAG CTTGTCTCTT CTTCTCCATC AAAACATATT TCTGCCAGGT 4550
TGTCTTCCGA TCTCCCTGTC TCTTCTCCCT TGGAACCGAT GACCAATCTA 4600
GAGACTAACT TGGAAACTTT ATATTCATAG TCTGAGTGGC TCAACTTATA 4650
CTTTTGTTTT CTTACGAAAC TCTCCGTAAT TTGACTCACA GCACTAACAA 4700
GCAATTTGTT AAAGTCATAT TCCAGAAGTC GTTCTCCATT TAGATGCTTA 4750
TTAACCACCA CACTTTTGTT ACTAGCAAGA TCTAATGCTG TCGCACATCC 4800
AGAGTTAGTC ATGGGATCTA GGCTGTTTAG CTTCTTCTCT CCTTTGAAAA 4850
TTAAAGTGCC GTTGTTAAAT GAAGACACCA TTAGGCTAAA GGCTTCCAGA 4900
TTAACACCTG GAGTTGTATG CTGACAGTCA ATTTCTTTAC TAGTGAATCT 4950
CTTCATTTGC TCATAGAACA CACATTCTTC CTCAGGAGTG ATTGCTTCCT 5000
TGGGGTTGAC AAAAAAACCA AATTGACTTT TGGGCTCAAA GAACTTTTCA 5050
AAACATTTTA TCTGATCTGT TAGCCTGTCA GGGGTCTCCT TTGTGATCAA 5100
ATGACACAGG TATGACACAT TCAACATAAA TTTAAATTTT GCACTCAACA 5150
ACACCTTCTC ACCAGTACCA AAAATAGTTT TTATTAGGAA TCTAAGCAGC 5200
TTATACACCA CCTTCTCAGC AGGTGTGATC AGATCCTCCC TCAACTTATC 5250
CATTAATGAT GTAGATGAAA AATCTGACAC TATTGCCATC ACCAAATATC 5300
TGACACTCTG TACCTGCTTT TGATTTCTCT TTGTTGGGTT GGTGAGCATT 5350
AGCAACAATA GGGTCCTCAG TGCAACCTCA ATGTCGGTGA GACAGTCTTT 5400
CAAATCAGGA CATGATCTAA TCCATGAAAT CATGATGTCT ATCATATTGT 5450
ATAAGACCTC ATCTGAAAAA ATTGGTAAAA AGAACCTTTT AGGATCTGCA 5500
TAGAAGGAAA TTAAATGACC ATCCGGGCCT TGTATGGAGT AGCACCTTGA 5550
AGATTCTCCA GTCTTCTGGT ATAATAGGTG GTATTCTTCA GAGTCCAGTT 5600
TTATTACTTG GCAAAACACT TCTTTGCATT CTACCACTTG ATATCTCACA 5650
GACCCTATTT GATTTTGCCT TAGTCTAGCA ACTGAGCTAG TTTTCATACT 5700
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FIG. 10, continued

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GTTTGTTAAG GCCAGACAAA CAGATGATAA TCTTCTCAGG CTCTGTATGT 5750
TCTTCAGCTG CTCTGTGCTG GGTTGGAAAT TGTAATCTTC AAACTTCGTA 5800
TAATACATTA TCGGGTGAGC TCCAATTTTC ATAAAGTTCT CAAATTCAGT 5850
GAATGGTATG TGGCATTCTT GCTCAAGGTG TTCAGACAGT CCGTAATGCT 5900
CGAAACTCAG TCCCACCACT AACAGGCATT TTTGAATTTT TGCAATGAAC 5950
TCACTAATAG ATGCCCTAAA CAATTCCTCA AAAGACACCT TTCTAAACAC 6000
CTTTGACTTT TTTCTATTCC TCAAAAGTCT AATGAACTCC TCTTTAGTGC 6050
TGTGAAAGCT TACCAGCCTA TCATTCACAC TACTATAGCA ACAACCCACC 6100
CAGTGTTTAT CATTTTTTAA CCCTTTGAAT TTCGACTGTT TTATCAATGA 6150
GGAAAGACAC AAAACATCCA GATTTAACAA CTGTCTCCTT CTAGTATTCA 6200
ACAGTTTCAA ACTCTTGACT TTGTTTAACA TAGAGAGGAG CCTCTCATAT 6250
TCAGTGCTAG TCTCACTTCC CCTTTCGTGC CCATGGGTCT CTGCAGTTAT 6300
GAATCTCATC AAAGGACAGG ATTCGACTGC CTCCCTGCTT AATGTTAAGA 6350
TATCATCACT ATCAGCAAGG TTTTCATAGA GCTCAGAGAA TTCCTTGATC 6400
AAGCCTTCAG GGTTTACTTT CTGAAAGTTT CTCTTTAATT TCCCACTTTC 6450
TAAATCTCTT CTAAACCTGC TGAAAAGAGA GTTTATTCCA AAAACCACAT 6500
CATCACAGCT CATGTTGGGG TTGATGCCTT CGTGGCACAT CCTCATAATT 6550
TCATCATTGT GAGTTGACCT CGCATCTTTC AGAATTTTCA TAGAGTCCAT 6600
ACCGGAGCGC TTGTCGATAG TAGTCTTCAG GGACTCACAG AGTCTAAAAT 6650
ATTCAGACTC TTCAAAGACT TTCTCATTTT GGTTAGAATA CTCCAAAAGT 6700
TTGAATAAAA GGTCTCTAAA TTTGAAGTTT GCCCACTCTG GCATAAAACT 6750
ATTATCATAA TCACAACGAC CATCTACTAT TGGAACTAAT GTGACACCCG 6800
CAACAGCAAG GTCTTCCCTG ATGCATGCCA ATTTGTTAGT GTCCTCTATA 6850
AATTTCTTCT CAAAACTGGC TGGAGTGCTC CTAACAAAAC ACTCAAGAAG 6900
AATGAGAGAA TTGTCTATCA GCTTGTAACC ATCAGGAATG ATAAGTGGTA 6950
GTCCTGGGCA TACAATTCCA GACTCCACCA AAATTGTTTC CACAGACTTA 7000
TCGTCGTGGT TGTGTGTGCA GCCACTCTTG TCTGCACTGT CTATTTCAAT 7050
GCAGCGTGAC AGCAACTTGA GTCCCTCAAT CAGAACCATT CTGGGTTCCC 7100
TTTGTCCCAG AAAGTTGAGT TTCTGCCTTG ACAACCTCTC ATCCTGTTCT 7150
ATATAGTTTA AACATAACTC TCTCAATTCT GAGATGATTT CATCCATTGC 7200
GCATCAAAAA GCCTAGGATC CTCGGTGCG                        7229
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Legend:
5´UTR and 3´UTR (not highlighted)
LCMV Z
LCMV L
IGR

FIG. 10, continued

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GCGCACCGGG GATCCTAGGC ATACCTTGGA CGCGCATATT ACTTGATCAA 50
AGATGCATGG TGACACCCCC ACCCTGCATG AGTACATGCT GGACCTGCAG 100
CCAGAGACCA CAGACCTGTA TGGCTATGGC CAGCTGAATG ACAGCAGTGA 150
GGAAGAGGAT GAGATTGATG GGCCAGCAGG CCAGGCAGAA CCTGACAGAG 200
CCCACTACAA CATTGTCACC TTCTGCTGCA AGTGTGACAG CACCCTGAGA 250
CTGTGTGTGC AGAGCACCCA TGTGGACATC AGAACCCTGG AAGACCTGCT 300
GATGGGCACC CTGGGCATTG TGGGCCCCAT CTGCTCCCAG AAGCCCCACC 350
AGAAAAGAAC TGCCATGTTC CAGGACCCCC AGGAGAGGCC CAGAAAGCTG 400
CCCCAGCTCT GCACAGAGCT GCAGACCACC ATCCATGACA TCATCCTGGA 450
ATGTGTCTAC TGCAAGCAGC AGCTGCTGAG GAGAGAGGTG TATGACTTTG 500
CCTTCAGGGA CCTGTGCATT GTGTACAGGG ATGGCAACCC CTATGCTGTG 550
GGGGACAAGT GCCTCAAGTT CTACAGCAAG ATCAGTGAGT ACAGGCACTA 600
CTGCTACAGC CTGTATGGCA CCACCCTGGA ACAGCAGTAC AACAAGCCCC 650
TGTGTGACCT CCTGATCAGA TGCATCAATG GCCAGAAACC CCTCTGCCCT 700
GAGGAAAAGC AGAGACACCT GGACAAGAAG CAGAGGTTCC ACAACATCAG 750
AGGCAGGTGG ACAGGCAGAT GCATGAGCTG CTGCAGAAGC AGCAGAACCA 800
GAAGAGAGAC CCAGCTGTGA GCCCTAGCCT CGACATGGGC CTCGACGTCA 850
CTCCCCAATA GGGGAGTGAC GTCGAGGCCT CTGAGGACTT GAGCTCAGAG 900
GTTGATCAGA TCTGTGTTGT TCCTGTACAG CGTGTCAATA GGCAAGCATC 950
TCATCGGCTT CTGGTCCCTA ACCCAGCCTG TCACTGTTGC ATCAAACATG 1000
ATGGTATCAA GCAATGCACA GTGAGGATTC GCAGTGGTTT GTGCAGCCCC 1050
CTTCTTCTTC TTCTTTATGA CCAAACCTTT ATGTTTGGTG CAGAGTAGAT 1100
TGTATCTCTC CCAGATCTCA TCCTCAAAGG TGCGTGCTTG CTCGGCACTG 1150
AGTTTCACGT CAAGCACTTT TAAGTCTCTT CTCCCATGCA TTTCGAACAA 1200
ACTGATTATA TCATCTGAAC CTTGAGCAGT GAAAACCATG TTTTGAGGTA 1250
AATGTCTGAT GATTGAGGAA ATCAGGCCTG GTTGGGCATC AGCCAAGTCC 1300
TTTAAAAGGA GACCATGTGA GTACTTGCTT TGCTCTTTGA AGGACTTCTC 1350
ATCGTGGGGA AATCTGTAAC AATGTATGTA GTTGCCCGTG TCAGGCTGGT 1400
AGATGGCCAT TTCCACCGGA TCATTTGGTG TTCCTTCAAT GTCAATCCAT 1450
GTGGTAGCTT TTGAATCAAG CATCTGAATT GAGGACACAA CAGTATCTTC 1500
TTTCTCCTTA GGGATTTGTT TAAGGTCCGG TGATCCTCCG TTTCTTACTG 1550
GTGGCTGGAT AGCACTCGGC TTCGAATCTA AATCTACAGT GGTGTTATCC 1600
CAAGCCCTCC CTTGAACTTG AGACCTTGAG CCAATGTAAG GCCAACCATC 1650
CCCTGAAAGA CAAATCTTGT ATAGTAAATT TTCATAAGGA TTTCTCTGTC 1700
CGGGTGTAGT GCTCACAAAC ATACCTTCAC GATTCTTTAT TTGCAATAGA 1750
CTCTTTATGA GAGTACTAAA CATAGAAGGC TTCACCTGGA TGGTCTCAAG 1800
CATATTGCCA CCATCAATCA TGCAAGCAGC TGCTTTGACT GCTGCAGACA 1850
AACTGAGATT GTACCCTGAG ATGTTTATGG CTGATGGCTC ATTACTAATG 1900
ATTTTTAGGG CACTGTGTTG CTGTGTGAGT TTCTCTAGAT CTGTCATGTT 1950
CGGGAACTTG ACAGTGTAGA GCAAACCAAG TGCACTCAGC GCTTGGACAA 2000
CATCATTAAG TTGTTCACCC CCTTGCTCAG TCATACAAGC GATGGTTAAG 2050
GCTGGCATTG ATCCAAATTG ATTGATCAAC AATGTATTAT CCTTGATGTC 2100
CCAGATCTTC ACAACCCCAT CTCTGTTGCC TGTGGGTCTA GCATTAGCGA 2150
ACCCCATTGA GCGAAGGATT TCGGCTCTTT GTTCCAACTG AGTGTTTGTG 2200
AGATTGCCCC CATAAACACC AGGCTGAGAC AAACTCTCAG TTCTAGTGAC 2250
TTTCTTTCTT AACTTGTCCA AATCAGATGC AAGCTCCATT AGCTCCTCTT 2300
TGGCTAAGCC TCCCACCTTA AGCACATTGT CCCTCTGGAT TGATCTCATA 2350
TTCATCAGAG CATCAACCTC TTTGTTCATG TCTCTTAACT TGGTCAGATC 2400
AGAATCAGTC CTTTTATCTT TGCGCATCAT TCTTTGAACT TGAGCAACTT 2450
TGTGAAAGTC AAGAGCAGAT AACAGTGCTC TTGTGTCCGA CAACACATCA 2500
GCCTTCACAG GATGGGTCCA GTTGGATAGA CCCCTCCTAA GGGACTGTAC 2550
CCAGCGGAAT GATGGGATGT TGTCAGACAT TTTGGGGTTG TTTGCACTTC 2600
CTCCGAGTCA GTGAAGAAGT GAACGTACAG CGTGATCTAG AATCGCCTAG 2650
GATCCACTGT GCG 2663

Legend:
5´UTR and 3´UTR (not highlighted)
HPV16 E7E6 dint
PICV NP
IGR
```

FIG. 11

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GCGCACCGGG GATCCTAGGC ATACCTTGGA CGCGCATATT ACTTGATCAA 50
AGATGCATGG TGACACCCCC ACCCTGCATG AGTACATGCT GGACCTGCAG 100
CCAGAGACCA CAGACCTGTA TGGCTATGGC CAGCTGAATG ACAGCAGTGA 150
GGAAGAGGAT GAGATTGATG GGCCAGCAGG CCAGGCAGAA CCTGACAGAG 200
CCCACTACAA CATTGTCACC TTCTGCTGCA AGTGTGACAG CACCCTGAGA 250
CTGTGTGTGC AGAGCACCCA TGTGGACATC AGAACCCTGG AAGACCTGCT 300
GATGGGCACC CTGGGCATTG TGGGCCCCAT CTGCTCCCAG AAGCCCCACC 350
AGAAAAGAAC TGCCATGTTC CAGGACCCCC AGGAGAGGCC CAGAAAGCTG 400
CCCCAGCTCT GCACAGAGCT GCAGACCACC ATCCATGACA TCATCCTGGA 450
ATGTGTCTAC TGCAAGCAGC AGCTGCTGAG GAGAGAGGTG TATGACTTTG 500
CCTTCAGGGA CCTGTGCATT GTGTACAGGG ATGGCAACCC CTATGCTGTG 550
GGGGACAAGT GCCTCAAGTT CTACAGCAAG ATCAGTGAGT ACAGGCACTA 600
CTGCTACAGC CTGTATGGCA CCACCCTGGA ACAGCAGTAC AACAAGCCCC 650
TGTGTGACCT CCTGATCAGA TGCATCAATG GCCAGAAACC CCTCTGCCCT 700
GAGGAAAAGC AGAGACACCT GGACAAGAAG CAGAGGTTCC ACAACATCAG 750
AGGCAGGTGG ACAGGCAGAT GCATGAGCTG CTGCAGAAGC AGCAGAACCA 800
GAAGAGAGAC CCAGCTGTGA GCCCTAGCCT CGACATGGGC CTCGACGTCA 850
CTCCCCAATA GGGGAGTGAC GTCGAGGCCT CTGAGGACTT GAGCTTATTT 900
ACCCAGTCTC ACCCATTTGT AGGGTTTCTT TGGGATTTTA TAATACCCAC 950
AGCTGCAAAG AGAGTTCCTA GTAATCCTAT GTGGCTTCGG ACAGCCATCA 1000
CCAATGATGT GCCTATGAGT GGGTATTCCA ACTAAGTGGA GAAACACTGT 1050
GATGGTGTAA AACACCAAAG ACCAGAAGCA AATGTCTGTC AATGCTAGTG 1100
GAGTCTTACC TTGTCTTTCT TCATATTCTT TTATCAGCAT TTCATTGTAC 1150
AGATTCTGGC TCTCCCACAA CCAATCATTC TTAAAATGCG TTTCATTGAG 1200
GTACGAGCCA TTGTGAACTA ACCAACACTG CGGTAAAGAA TGTCTCCCTG 1250
TGATGGTATC ATTGATGTAC CAAAATTTTG TATAGTTGCA ATAAGGGATT 1300
TTGGCAAGCT GTTTGAGACT GTTTCTAATC ACAAGTGAGT CAGAAATAAG 1350
TCCGTTGATA GTCTTTTTAA AGAGATTCAA CGAATTCTCA ACATTAAGTT 1400
GTAAGGTTTT GATAGCATTC TGATTGAAAT CAAATAACCT CATCGTATCG 1450
CAAAATTCTT CATTGTGATC TTTGTTGCAT TTTGCCATCA CAGTGTTATC 1500
AAAACATTTT ATTCCAGCCC AAACAATAGC CCATTGCTCC AAACAGTAAC 1550
CACCTGGGAC ATGTTGCCCA GTAGAGTCAC TCAAGTCCCA AGTGAAAAAG 1600
CCAAGGAGTT TCCTGCTCAC AGAACTATAA GCAGTTTTTT GGAGAGCCAT 1650
CCTTATTGTT GCCATTGGAG TATATGTACA GTGATTTTCC CATGTGGTGT 1700
TCTGTATGAT CAGGAAATTG TAATGTGTCC CACCTTCACA GTTTGTTAGT 1750
CTGCAAGACC CTCCACTACA GTTATTGAAA CATTTTCCAA CCCACGCAAT 1800
TTTTGGGTCC CCAATGATTT GAGCAAGCGA CGCAATAAGA TGTCTGCCAA 1850
CCTCACCTCC TCTATCCCCA ACTGTCAAGT TGTACTGGAT CAACACCCCA 1900
GCACCCTCAA CTGTTTTGCA TCTGGCACCT ACATGACGAG TGACATGGAG 1950
CACATTGAAG TGTAACTCAT TAAGCAACCA TTTTAATGTG TGACCTGCTT 2000
CTTCTGTCTT ATCACAATTA CTAATGTTAC CATATGCAAG GCTTCTGATG 2050
TTGGAAAAGT TTCCAGTAGT TTCATTTGCA ATGGATGTGT TTGTCAAAGT 2100
GAGTTCAATT CCCCATGTTG TGTTAGATGG TCCTTTGTAG TAATGATGTG 2150
TGTTGTTCTT GCTACATGAT TGTGGCAAGT TGTCAAACAT TCTTGTGAGG 2200
TTGAACTCAA CGTGGGTGAG ATTGTGCCTC CTATCAATCA TCATGCCATC 2250
ACAACTTCTG CCAGCCAAAA TGAGGAAGGT GATGAGTTGG AATAGGCCAC 2300
ATCTCATCAG ATTGACAAAT CCTTTGATGA TGCATAGGGT TGAGACAATG 2350
ATTAAGGCGA CATTGAACAC CTCCTGCAGG ACTTCGGGTA TAGACTGGAT 2400
CAAAGTCACA ACTTGTCCCA TTTTGGGGTT GTTTGCACTT CCTCCGAGTC 2450
AGTGAAGAAG TGAACGTACA GCGTGATCTA GAATCGCCTA GGATCCACTG 2500
TGCG 2504

Legend:
5´UTR and 3´UTR (not highlighted)
HPV16 E7E6 dint
PICV GP
IGR
```

FIG. 12

```
GCGCACCGGG GATCCTAGGC ATCTTTGGGT CACGCTTCAA ATTTGTCCAA 50
TTTGAACCCA GCTCAAGTCC TGGTCAAAAC TTGGGATGGG ACTCAGATAT 100
AGCAAAGAGG TCAGGAAGAG ACATGGCGAC GAAGATGTGG TGGGAAGGGT 150
CCCCATGACC CTCAATCTAC CACAGGGCCT GTATGGCAGG TTCAACTGCA 200
AATCTTGCTG GTTCGTCAAC AAAGGTCTCA TCAGGTGCAA AGACCACTAT 250
CTGTGTCTTG GGTGCTTAAC CAAAATGCAC TCCAGAGGCA ATCTCTGCGA 300
GATATGCGGC CACTCACTGC CAACCAAGAT GGAGTTCCTA GAAAGCCCCT 350
CTGCACCACC CTACGAGCCA TAAACCAGGG CCCCTGGGCG CACCCCCCTC 400
CGGGGGTGCG CCCGGGGGCC CCCGGCCCCA TGGGGCCGGT TGTTTACTCG 450
ATCTCCACTG ACTCATTGTC CTCAAACAAC TTTCGACACC TGATTCCCTT 500
GATCTTGAAG GGTCCTGTCT CGTCTGCAAT CATAACAGAT CCTAGAGTCT 550
TACTTCTTAT TATACTAAAG TGACCACAAT TCAACCAATC TTTGGCATCA 600
TGCAACATGT GTTCAAACAC TTCGGGGAAA TTTTCAATCA TGAGTCTTAA 650
ATCCTGCTCG TTCATACTTA TTCCCTTGTT GTGAGACTGT GCACTTGAAA 700
GGTACTGAAA AAGGTTGGCA ATAAATCTTG GCCTTTTCTC AGGTTCTAAT 750
GCTTCCAGTG CAATGATGAC CACCTTTGAG TCTAAGTTCA CTTCCAATCT 800
AGAAACCACT CTGTTGCCCT CTTTGATCAA CCCACCCTCT AAAATGAGGG 850
GTTGCATCCC AACATCAGGA CCAATCAACT TATAGGAAAA TTTGTTTTTC 900
AAATCCTTGA AACGATTTTT CAAATCTATT CTCACCTTCT GGAACACAGT 950
TGACCTTGAC TTGAAGTGAA TGTCTTGACC TTCCAATAGA TCATTGAAGT 1000
CTAGAACATC TTTTCCGTTG ATGAGAGGAT TCAGAACCAA AAGTGACACA 1050
CCATCCAGAC TTATGTGATT CCCGGAAGAT TGAGAAACAT AATACTCAAC 1100
AGAATGGGGG TTCAACAATA GGTAACCATC AGAGTCCAAT GAGTCCAGCA 1150
ATGACTCCCT TTCAATAAGA AATCTTAATT TTAATATGTA ATTGGTAGAC 1200
CTCTCATATC TAAATTTGTG GCTCACTCTC TTATGAGAAA ATGTTAGGTT 1250
GAGCTCAATG GGAATGACCT CAGAAGGTGA TGCTAAAATG AGTTGTTCAA 1300
TGTTCTCATA GTTATCTCTA TTCACCCAGT CAAGTTCATT AATAAATACA 1350
CTAATGTTCA AATTAACACA GGACAAAATC AGTTTGCTGC TTACAAAGCC 1400
AACATCCAAG TCATCCAGAT TCATTGTCCT AGAAGTGTTA TTCTTTTTGC 1450
AGTCACAAAT GAACTGGGTT AATTGTTTCA GATCATGTTG TGCATTGTTT 1500
GGCAACAATT CAAGCTCACC AAACCAAAAA TATTTCTTGA ACTGAGATGT 1550
TGACATAATC ACAGGCACCA ACATTGACTC AAACAAAATC TGTATCAAGA 1600
AATTTGTGCA CACTTCTTCT GGTTCAAGGT TGAATCCTCT CTCCAGTGGA 1650
TGAGACTCTC TGCTATGGGA CATTGCAAGC TCATTTTGCT TTACAATATA 1700
CAATTCTTCT CTGCGATGTT TTATAATATG ACTAACAATA CCAAGACATT 1750
CTGATGTTAT ATCAATTGCC ACACAAAGGT CTAAGAACTT TATCCTCTGA 1800
ACCCATGATA GCCTCAGCAT ATTCAAATCA GACAGGAAAG GGGATATGTG 1850
TTCATCAAAT AGTGTAGGGA AGTTCCTCCT GATTGAGTAA AGTATGTGGT 1900
TGATGCCCAC CTTGTCCTCA AGCTCAGAAT GTGTGCTTGG TTTTATTGGC 1950
CAGAAGTGAT TGGGATTGTT TAGGTGAGTG ACTATCTTGG GTACTTCAGC 2000
TTTTTGAAAC ACCCAGTTAC CCAACTCGCA AGCATTGGTT AACACAAGAG 2050
CAAAATAATC CCAAATTAAG GGTCTGGAGT ACTCACTTAC TTCACCAAGT 2100
GCTGCTTTAC AATAAACACC TTTGCGCTGA TTACAAAAGT GACAATCACG 2150
GTGTAAGATA ATCTTGCTTG TAATATCCCT GATATACTTA AATCCTCCTT 2200
TCCCATCTCT TACACATTTT GAGCCCATAC TTTTGCAAAC TCCTATGAAT 2250
CCTGATGCTA TGCTGCTCTG AAAAGCTGAT TTGTTGATAG CATCAGCCAA 2300
AATCTTCTTA GCCCCTCTGA CATAGTTCTT TGATAATTTG GACTGTACGG 2350
ATTTGACAAG ACTGGGTATT TCTTCTCGCT GCACAGTTCT TGTTGTGCTC 2400
ATTAACTTAG TACGAAGCAC CAATCTGAGA TCACCATGAA CCCTTAAATT 2450
TAACCACCTA ATATTAAGAG CATCCTCAAT AGCCTCAGTC TCGACATCAC 2500
AAGTCTCTAA TAACTGTTTT AAGCAGTCAT CCGGTGATTG CTGAAGAGTT 2550
GTTACAATAT AACTTTCTTC CAGGGCTCCA GACTGTATTT TGTAAAATAT 2600
TTTCCTGCAT GCCTTTCTGA TTATTGAAAG TAGCAGATCA TCAGGAAATA 2650
GTGTCTCAAT TGATCGCTGA AGTCTGTACC CTCTCGACCC ATTAACCCAA 2700
TCGAGTACAT CCATTTCTTC CAGGCACAAA AATGGATCAT TTGGAAACCC 2750
ACTATAGATT ATCATGCTAT TTGTTCGTTT TGCAATGGCC CCTACAACCT 2800
CTATTGACAC CCCGTTAGCA ACACATTGGT CCAGTATTGT GTCAATTGTA 2850
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FIG. 13

```
TCTGCTTGCT GATTGGGTGC TTTAGCCTTT ATGTTGTGTA GAGCTGCAGC 2900
AACAAACTTT GTAAGGAGGG GGACTTCTTG TGACCAAATG AAGAATCTCG 2950
ATTTGAACTC ACTTGCAAAG GTCCCCACAA CTGTTTTAGG GCTCACAAAC 3000
TTGTTGAGTT TGTCTGATAG AAAGTAGTGA AACTCCATAC AGTCCAATAC 3050
CAATTCAACA TTCAACTCAT CTCTGTCCTT AAATTTGAAA CCCTCATTCA 3100
AGGATAACAT GATCTCATCA TCACTCGAAG TATATGAGAT GAACCGTGCT 3150
CCATAACAAA GCTCCAATGC GTAATTGATG AACTGCTCAG TGATTAGACC 3200
ATATAAGTCA GAGGTGTTGT GTAGGATGCC CTGACCCATA TCTAAGACTG 3250
AAGAGATGTG TGATGGTACC TTGCCCTTCT CAAAGTACCC AAACATAAAT 3300
TCCTCTGCAA TTGTGCACCC CCCTTTATCC ATCATACCCA ACCCCCTTTT 3350
CAAGAAACCT TTCATGTATG CCTCAACGAC ATTGAAGGGC ACTTCCACCA 3400
TCTTGTGAAT GTGCCATAGC AATATGTTGA TGACTGCAGC ATTGGGAACT 3450
TCTGACCCAT CTTTGAGTTT GAACTCAAGA CCTTTTAATA ATGCGGCAAA 3500
GATAACCGGC GACATGTGTG GCCCCCATTT TGAATGGTCC ATTGACACCG 3550
CAAGACCACT TTGCCTAACA ACTGACTTCA TGTCTAATAA TGCTCTCTCA 3600
AACTCTTTCT CGTTGTTCAG ACAAGTATAC CTCATGTTTT GCATAAGGGA 3650
TTCAGAGTAA TCCTCAATGA GTCTGGTTGT GAGTTTAGTA TTTAAATCAC 3700
CGACATAAAG CTCCCTGTTG CCACCCACCT GTTCTTTATA AGAAAGACCA 3750
AATTTCAATC TCCCTACATT GGTGGATACA CCAGACCTCT CTGTGGGAGA 3800
CTCATCTGAA TAGAAACAGA GATTTCGTAA GGATGAGTTG GTAAAAAAGC 3850
TTTGATCCAA TCTTTTAGCT ATCGATTCAG AATTGCTCTC TCTTGAGCTT 3900
ATACGTGATG TCTCTCTAAT TTGTAGTGCT GCATCTGTGA ACCCAAGTCT 3950
GCTTCTACTT TTGTGATCAT ATCTTCCGAC TCGATTATCA TAATCGCTTG 4000
CAATGAGAAT GTATTTAAAG CACTCAAAAT AATCAGCTTC TTTGTACGCC 4050
TTCAATGTGA GGTTCTTTAT TAAAAACTCC AGAGGACACG GATTCATTAG 4100
TCTGTCTGCA AAGTACACTG ATCTAGCAGT GACATCCTCA TAGATCAAGT 4150
TTACAAGATC CTCATACACT TCTGCTGAAA ACAGGCTGTA ATCAAAATCC 4200
TTTACATCAT GAAGTGAAGT CTCTCTTTTG ATGACAACCA TTGTCGATTT 4250
GGGCCATAAT CTCTCTAGTG GACATGAAGT CTTAAGGTTG GTTTTGACAT 4300
TGGTGTCAAC CTTAGACAAT ACTTTTGCAA CTCTGGTCTC AATTTCTTTA 4350
AGACAGTCAC CCTGATCTTC TGATAGTAAC TCTTCAACTC CATCAGGCTC 4400
TATTGACTCC TTTTTTATTT GGATCAATGA TGACAACCTC TTCAGAATCT 4450
TGAAATTTAC CTCCTTTGGA TCTAACTTGT ATTTACCCTT AGTTTTGAAA 4500
TGTTCAATCA TTTCCACAAC AACAGCAGAC ACAATGGAAG AGTAATCATA 4550
TTCAGTGATG ACCTCACCAA CTTCATTGAG TTTTGGAACC ACCACACTTT 4600
TGTTGCTGGA CATATCCAAG GCTGTACTTG TGAAGGAGGG AGTCATAGGG 4650
TCACAAGGAA GCAGGGGTTT CACTTCCAAT GAGCTACTGT TAAATAGTGA 4700
TAGACAAACA CTAAGTACAT CCTTATTCAA CCCCGGCCTT CCCTCACATT 4750
TGGATTCCAG CTTTTTACCA AGTAGTCTCT CTATATCATG CACCATCTTC 4800
TCTTCTTCCT CAGTAGGAAG TTCCATACTA TTAGAAGGGT TGACCAAGAC 4850
TGAATCAAAC TTTAACTTTG GTTCCAAGAA CTTCTCAAAA CATTTGATTT 4900
GATCAGTTAA TCTATCAGGG GTTTCTTTGG TTATAAAATG GCATAAATAG 4950
GAGACATTCA AAACAAACTT AAAGATCTTA GCCATATCTT CCTCTCTGGA 5000
GTTGCTGAGT ACCAGAAGTA TCAAATCATC AATAAGCATT GCTGTCTGCC 5050
ATTCTGAAGG TGTTAGCATA ACGACTTTCA ATTTCTCAAA CAATTCTTTA 5100
AAATGAACTT CATTTACAAA GGCCATAATG TAATATCTAA AGCCTTGCAA 5150
GTAAACTTGA ATACGCTTGG AAGGGGTGCA CAGTATGCAG AGAATAAGTC 5200
GTCTGAGTAA ATCAGAAACA GAATCCAAGA GGGGTTGGGA CATAAAGTCC 5250
AACCAGGATA ACATCTCCAC ACAAGTCCTT TGAATCACAT CTGCACTAAA 5300
GATCGGTAAG AAAAATCTCT TGGGATCACA GTAAAAAGAC GCTTTTGTTT 5350
CATACAAACC CCCACTTTTG GATCTATAAG CAACAGCATA ACACCTGGAC 5400
CTCTCCCCTG TCTTCTGGTA CAGTAGTGTG AGAGAACCTC CTTCTCCAAA 5450
TCGCTGGAAG AAAACTTCGT CACAGTAAAC CTTCCCATAA AACTCATCAG 5500
CATTGTTCAC CTTCATCTTA GGAACTGCTG CTGTCTTCAT GCTATTAATG 5550
AGTGACAAAC TCAAACTTGA CAATGTTTTC AGCAATTCCT CAAACTCACT 5600
TTCGCCCATG ATGGTATAAT CAGGCTGCCC TCTTCCTGGC CTACCCCCAC 5650
ACATACACTG TGACTTTGTC TTGTATTGAA GACAGGGTTT AGCACCCCAT 5700
TCATCTAACA CTGATGTTTT CAGATTGAAG TAATATTCAA CATCAGGTTC 5750
```

FIG. 13, continued

```
CCGTAGAAGA GGGAGAATGT CATCAAGGGG AAGTTCACCA CAGACCGAGC 5800
TCAGTCTCTT CTTAGCCTTC TCTAACCAGT TGGGGTTTTT AATGAATTTT 5850
TTAGTGATTT GTTCCATCAG GAAGTCGACA TTAATCAACC TGTCATTTAC 5900
AGACGGTAAC CCTTGCATTA GGAGCACCTC TCTGAACACA GCACCTGGAG 5950
AAGACTTGTC CAAGTCACAC AAAATGTTGT ACATGATAAG GTCCAGAACC 6000
AACATGGTGT TCCTCCTTGT GTTAAAAACC TTTTGAGACT TAATTTTGTT 6050
GCATATTGAA AGTACTCTAA AATATTCTCT GCTTTCAGTT GATGAATGCT 6100
TGACCTCAGA TTGCCTGAGT TGGCCTATTA TGCCCAAAAT GTGTACTGAG 6150
CAAAACTCAC ATAATCTGAT TTCTGATTTA GGTACATCTT TGACAGAACA 6200
TTGGATAAAT TCATGGTTCT GAAGTCTAGA AATCATATCT TCCCTATCTG 6250
TAGCCTGCAG TTTCCTATCG AGTTGACCAG CAAGTTGCAA CATTTTAAAT 6300
TGCTGAAAGA TTTCCATGAT TTTTGTTCTA CATTGATCTG TTGTCAGTTT 6350
ATTATTAATG CCAGACATTA ATGCCTTTTC CAACCTCACT TTGTAAGGAA 6400
GTCCCCTTTC CTTTACAGCA AGTAGTGACT CCAGACCGAG ACTCTGATTT 6450
TCTAAGGATG AGAGGGAACT TATAAGGCGT TCGTACTCCA ACTCCTCAAC 6500
TTCTTCACCA GATGTCCTTA ATCCATCCAT GAGTTTTAAA AGCAACCACC 6550
GAAGTCTCTC TACCACCCAA TCAGGAACAA ATTCTACATA ATAACTGGAT 6600
CTACCGTCAA TAACAGGTAC TAAGGTTATG TTCTGTCTCT TGAGATCAGA 6650
ACTAAGCTGC AACAGCTTCA AAAAGTCCTG GTTGTATTTC TTCTCAAATG 6700
CTTCTTGACT GGTCCTCACA AACACTTCCA AAAGAATGAG GACATCTCCA 6750
ACCATACAGT AACCATCTGG TGTAACATCC GGCAATGTAG GACATGTTAC 6800
TCTCAACTCC CTAAGGATAG CATTGACAGT CATCTTTGTG TTGTGTTTGC 6850
AGGAGTGTTT CTTGCATGAA TCCACTTCCA CTAGCATGGA CAAAAGCTTC 6900
AGGCCCTCTA TCGTGATGGC CCTATCTTTG ACTTGTGCAA GAACGTTGTT 6950
TTTCTGTTCA GATAGCTCTT CCCATTCGGG AACCCATTTT CTGACTATGT 7000
CTTTAAGTTC GAAAACGTAT TCCTCCATGA TCAAGAAATG CCTAGGATCC 7050
TCGGTGCG 7058

Legend:
5´UTR and 3´UTR (not highlighted)
PICV Z
PICV L
IGR
```

FIG. 13, continued

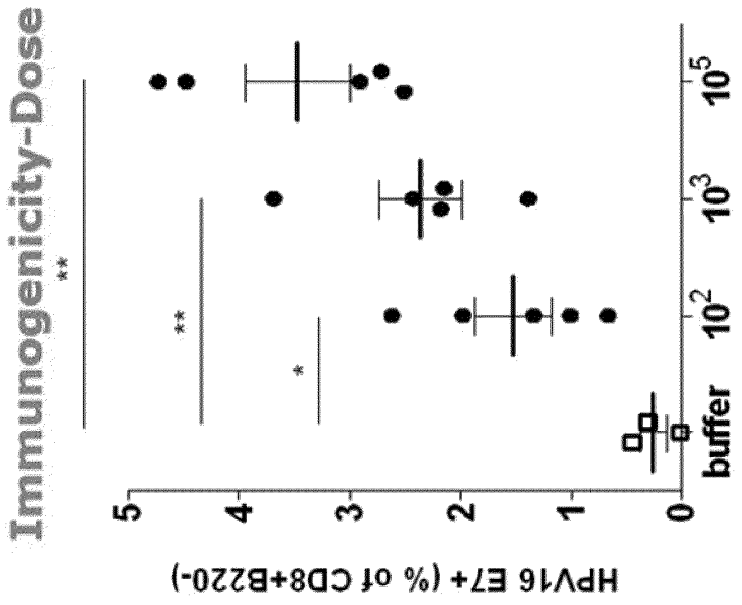

Immunogenicity-Dose
**
**
*
HPV16 E7+ (% of CD8+B220-)
5
4
3
2
1
0
buffer
10^2
10^3
10^5

FIG. 14A

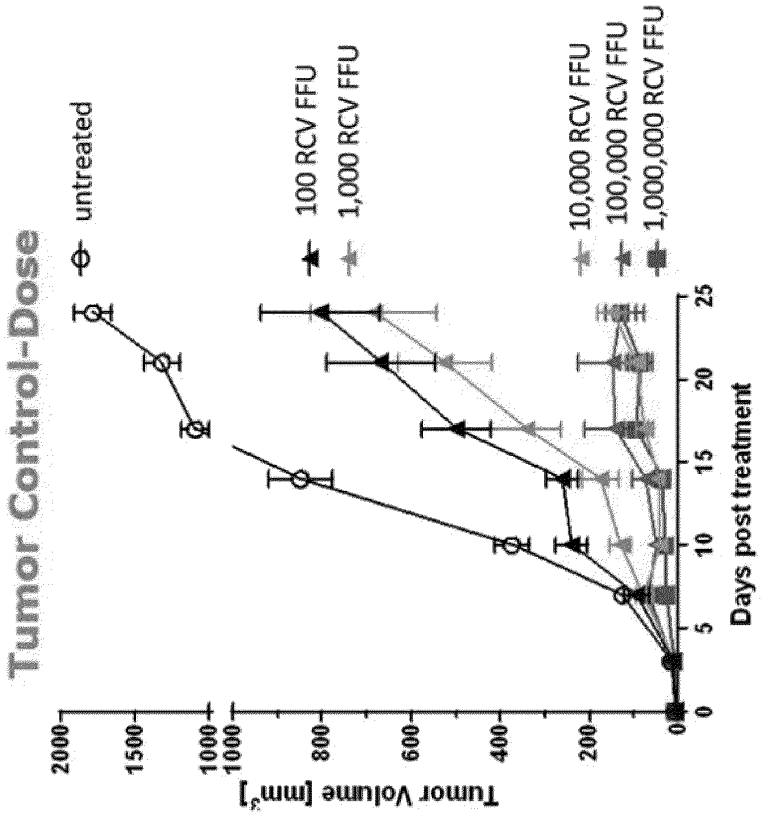

Tumor Control-Dose
untreated
100 RCV FFU
1,000 RCV FFU
10,000 RCV FFU
100,000 RCV FFU
1,000,000 RCV FFU
Tumor Volume [mm³]
Days post treatment
2000
1500
1000
1000
800
600
400
200
0
0
5
10
15
20
25

FIG. 14B

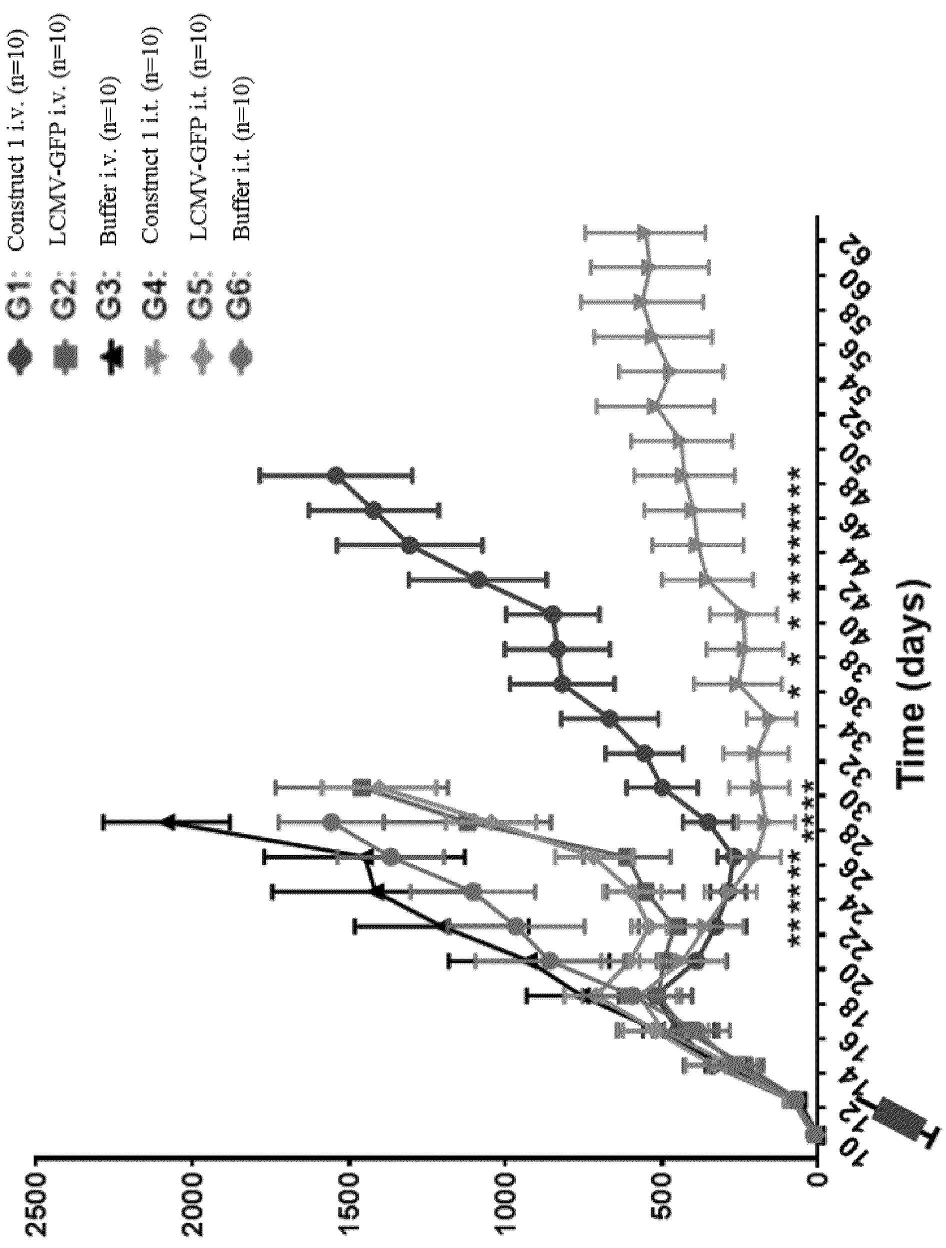

G1: Construct 1 i.v. (n=10)
G2: LCMV-GFP i.v. (n=10)
G3: Buffer i.v. (n=10)
G4: Construct 1 i.t. (n=10)
G5: LCMV-GFP i.t. (n=10)
G6: Buffer i.t. (n=10)
Tumor volume (mm3)
2500
2000
1500
1000
500
0
Time (days)
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
54
56
58
60
62

FIG. 14C

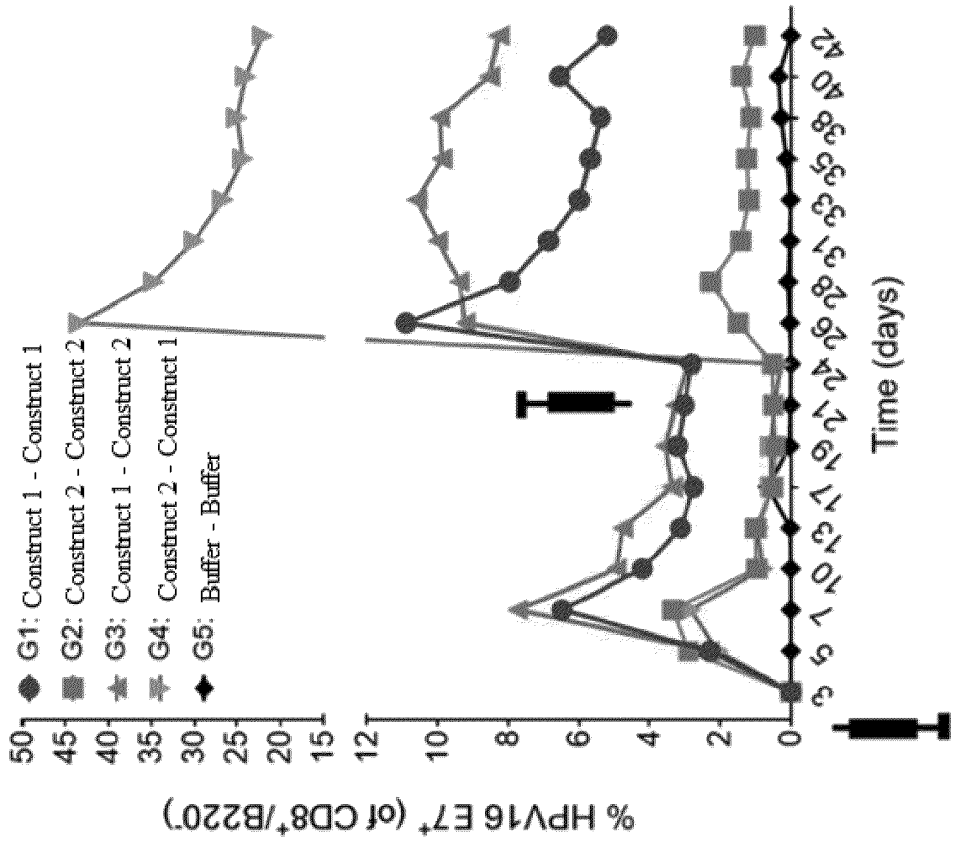

G1: Construct 1 - Construct 1
G2: Construct 2 - Construct 2
G3: Construct 1 - Construct 2
G4: Construct 2 - Construct 1
G5: Buffer - Buffer
% HPV16 E7+ (of CD8+/B220-)
Time (days)

FIG. 14D

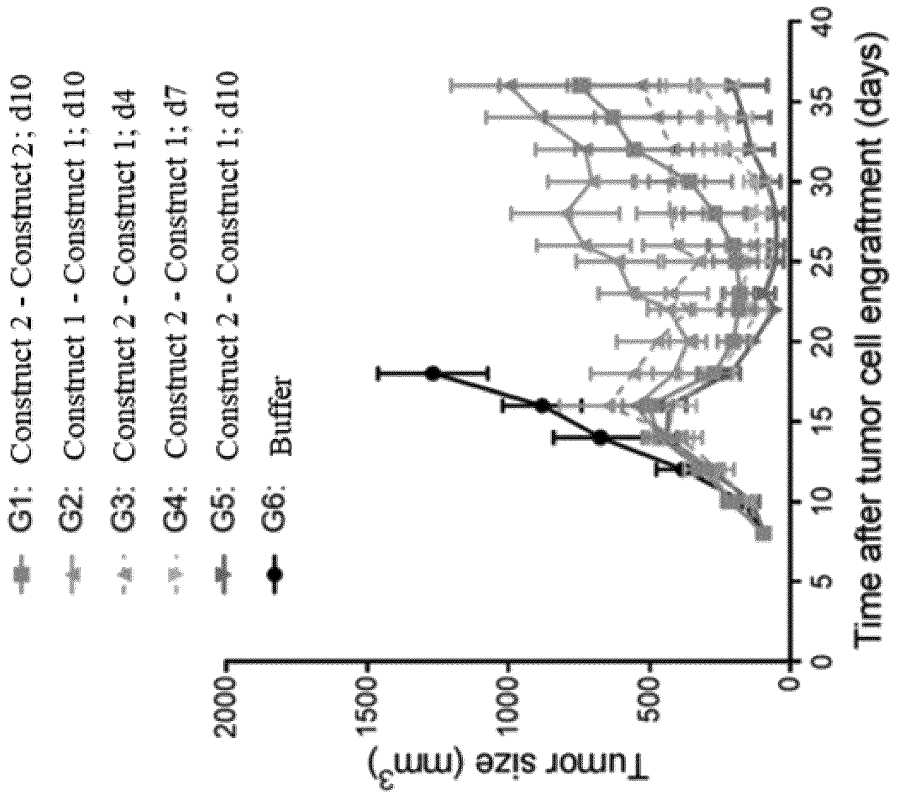

G1: Construct 2 - Construct 2; d10
G2: Construct 1 - Construct 1; d10
G3: Construct 2 - Construct 1; d4
G4: Construct 2 - Construct 1; d7
G5: Construct 2 - Construct 1; d10
G6: Buffer
Tumor size (mm³)
2000
1500
1000
500
0
0
5
10
15
20
25
30
35
40
Time after tumor cell engraftment (days)

FIG. 14E

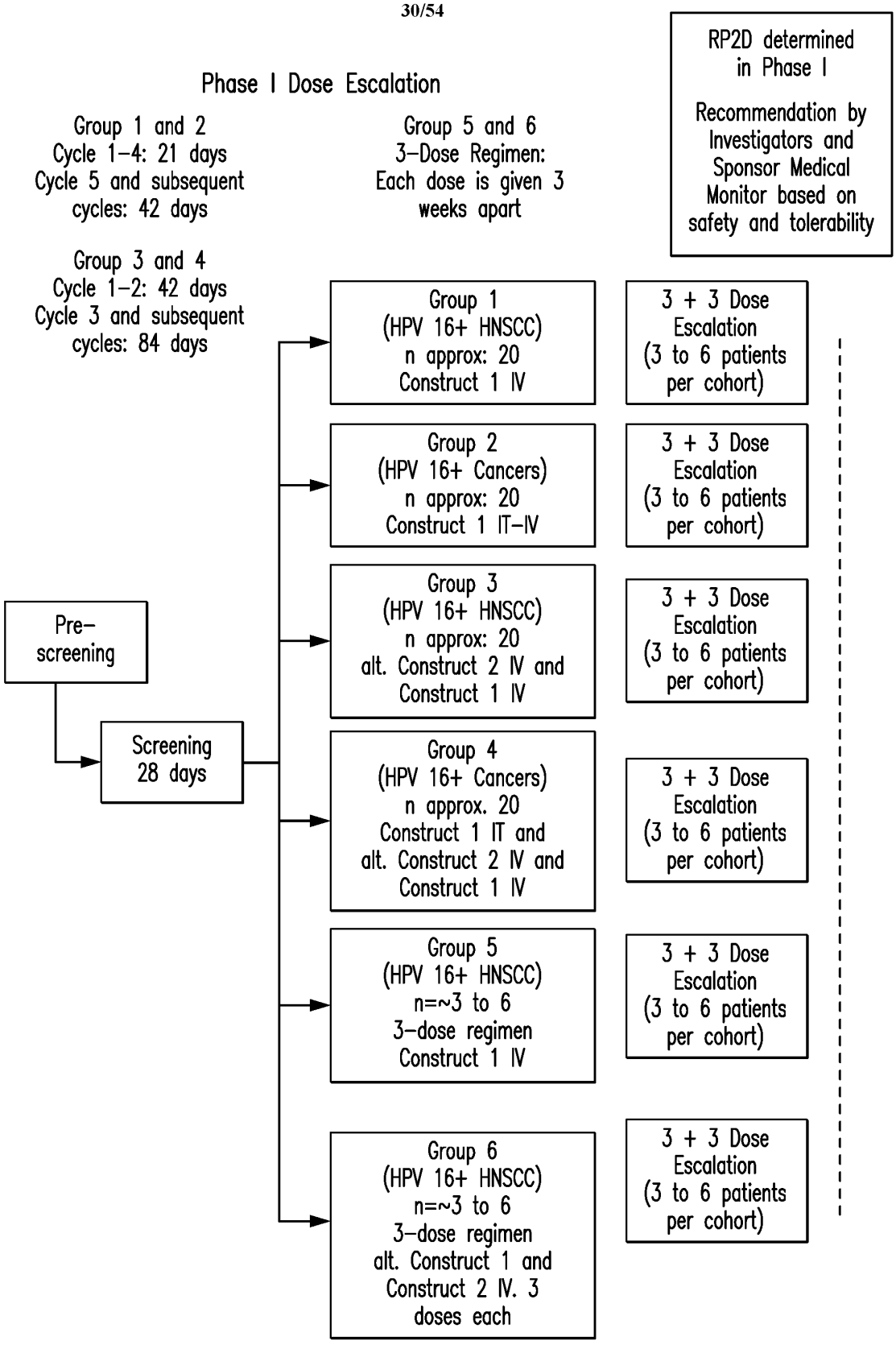

Phase I Dose Escalation
Group 1 and 2
Cycle 1–4: 21 days
Cycle 5 and subsequent cycles: 42 days
Group 3 and 4
Cycle 1–2: 42 days
Cycle 3 and subsequent cycles: 84 days
Group 5 and 6
3–Dose Regimen:
Each dose is given 3 weeks apart
RP2D determined in Phase I
Recommendation by Investigators and Sponsor Medical Monitor based on safety and tolerability
Pre–screening
Screening 28 days
Group 1 (HPV 16+ HNSCC) n approx: 20 Construct 1 IV
Group 2 (HPV 16+ Cancers) n approx: 20 Construct 1 IT–IV
Group 3 (HPV 16+ HNSCC) n approx: 20 alt. Construct 2 IV and Construct 1 IV
Group 4 (HPV 16+ Cancers) n approx. 20 Construct 1 IT and alt. Construct 2 IV and Construct 1 IV
Group 5 (HPV 16+ HNSCC) n=~3 to 6 3–dose regimen Construct 1 IV
Group 6 (HPV 16+ HNSCC) n=~3 to 6 3–dose regimen alt. Construct 1 and Construct 2 IV. 3 doses each
3 + 3 Dose Escalation (3 to 6 patients per cohort)
3 + 3 Dose Escalation (3 to 6 patients per cohort)
3 + 3 Dose Escalation (3 to 6 patients per cohort)
3 + 3 Dose Escalation (3 to 6 patients per cohort)
3 + 3 Dose Escalation (3 to 6 patients per cohort)
3 + 3 Dose Escalation (3 to 6 patients per cohort)

FIG. 15

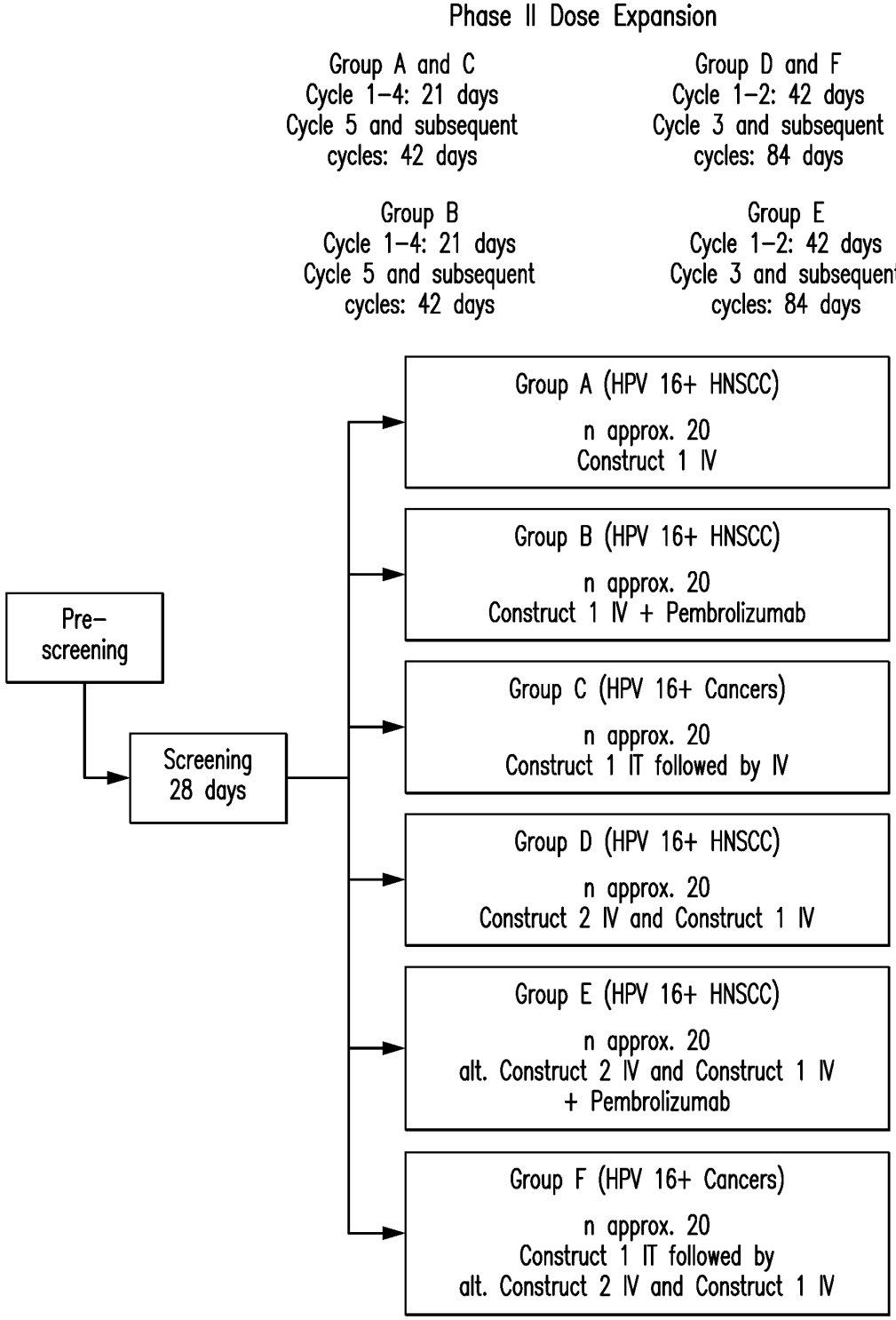


FIG. 15 continued

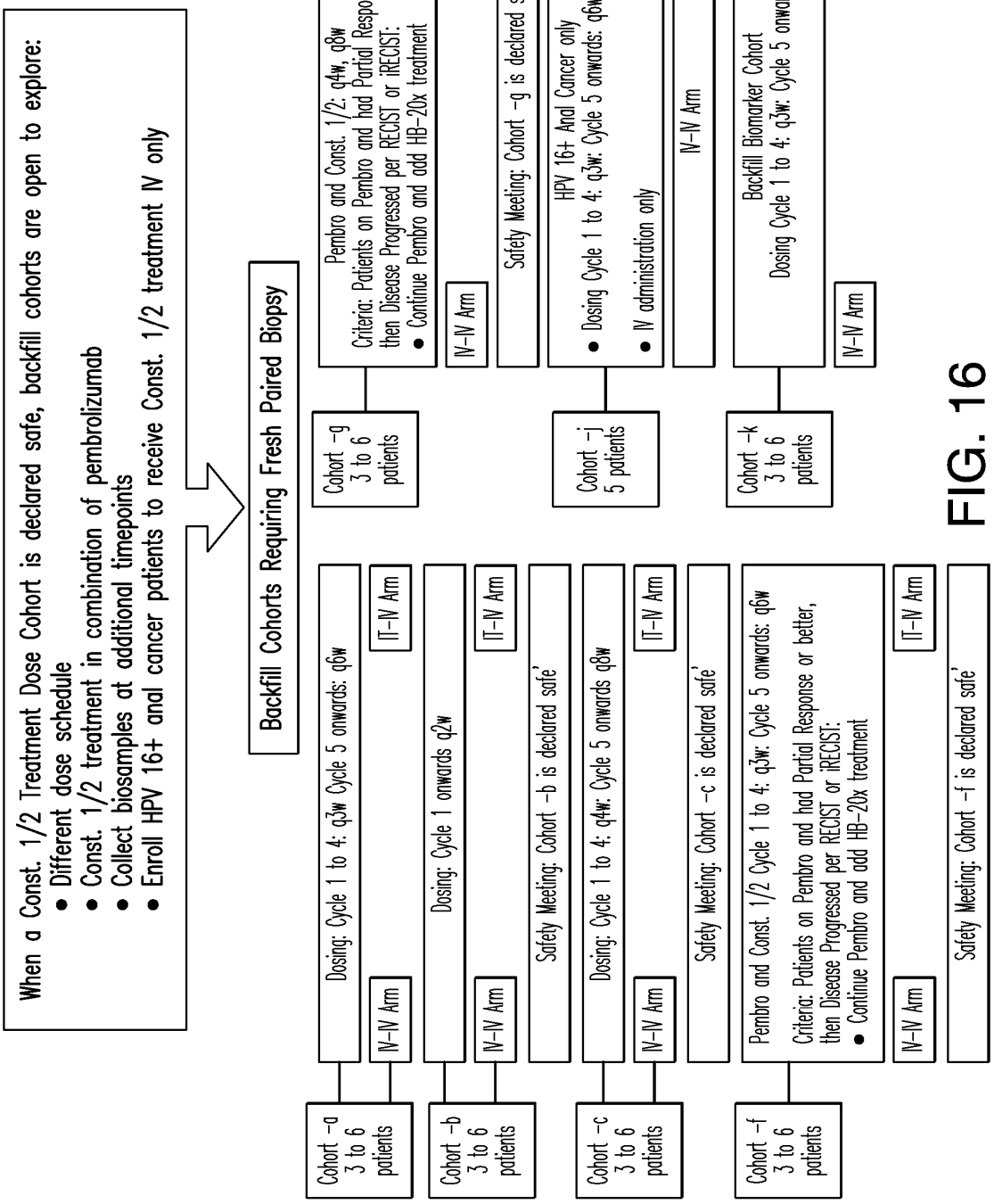

When a Const. 1/2 Treatment Dose Cohort is declared safe, backfill cohorts are open to explore:
• Different dose schedule
• Const. 1/2 treatment in combination of pembrolizumab
• Collect biosamples at additional timepoints
• Enroll HPV 16+ anal cancer patients to receive Const. 1/2 treatment IV only
Backfill Cohorts Requiring Fresh Paired Biopsy
Cohort –a 3 to 6 patients
Dosing: Cycle 1 to 4: q3w Cycle 5 onwards: q6w
IV–IV Arm
IT–IV Arm
Cohort –b 3 to 6 patients
Dosing: Cycle 1 onwards q2w
IV–IV Arm
IT–IV Arm
Safety Meeting: Cohort –b is declared safe'
Cohort –c 3 to 6 patients
Dosing: Cycle 1 to 4: q4w: Cycle 5 onwards q8w
IV–IV Arm
IT–IV Arm
Safety Meeting: Cohort –c is declared safe'
Cohort –f 3 to 6 patients
Pembro and Const. 1/2 Cycle 1 to 4: q3w: Cycle 5 onwards: q6w
Criteria: Patients on Pembro and had Partial Response or better, then Disease Progressed per RECIST or iRECIST:
• Continue Pembro and add HB-20x treatment
IV–IV Arm
IT–IV Arm
Safety Meeting: Cohort –f is declared safe'
Cohort –g 3 to 6 patients
Pembro and Const. 1/2: q4w, q8w
Criteria: Patients on Pembro and had Partial Response or better, then Disease Progressed per RECIST or iRECIST:
• Continue Pembro and add HB-20x treatment
IV–IV Arm
IT–IV Arm
Safety Meeting: Cohort –g is declared safe'
Cohort –j 5 patients
HPV 16+ Anal Cancer only
• Dosing Cycle 1 to 4: q3w: Cycle 5 onwards: q6w
• IV administration only
IV–IV Arm
Cohort –k 3 to 6 patients
Backfill Biomarker Cohort
Dosing Cycle 1 to 4: q3w: Cycle 5 onwards: q6w
IV–IV Arm
IT–IV Arm

FIG. 16

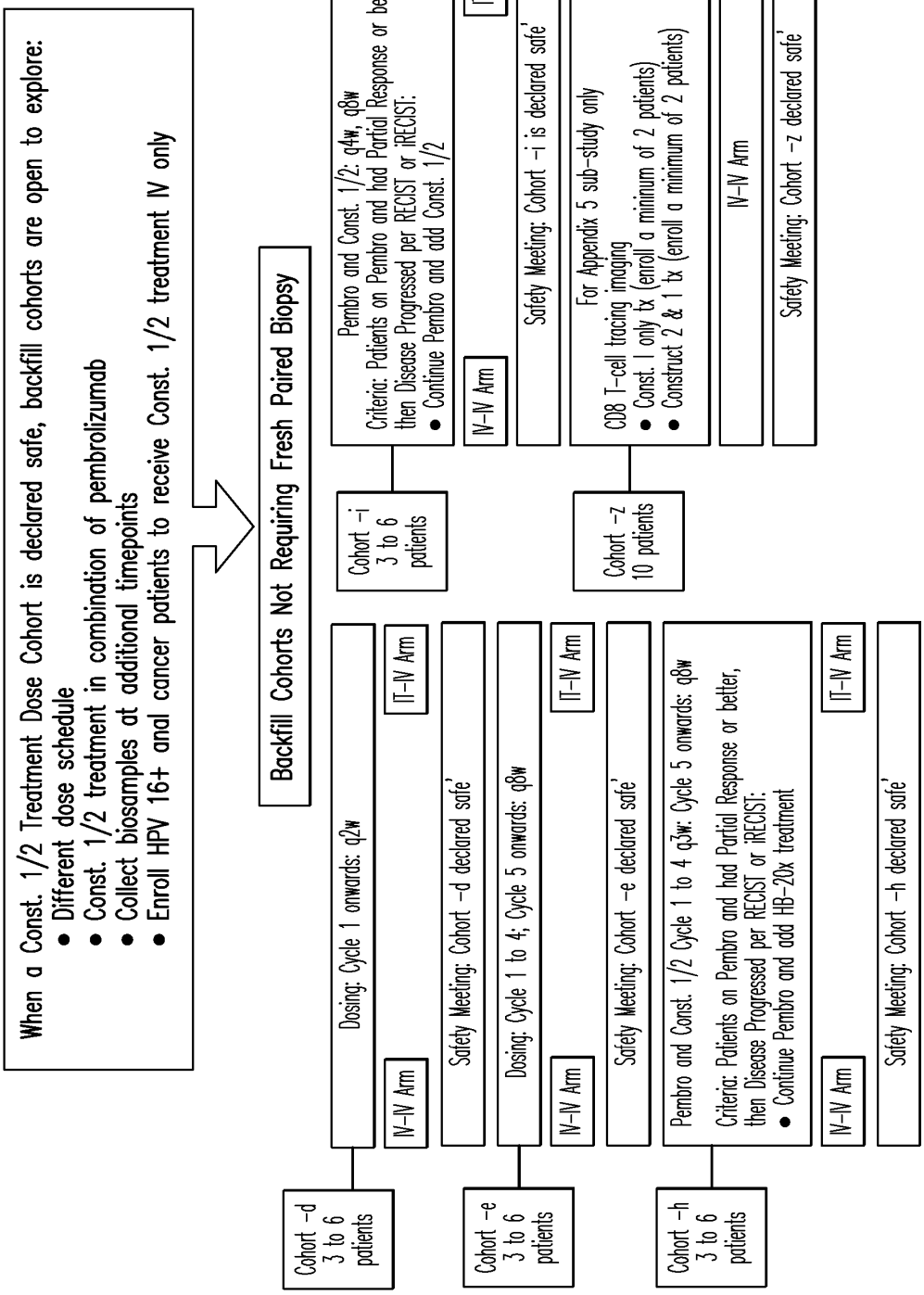


FIG. 16 continued

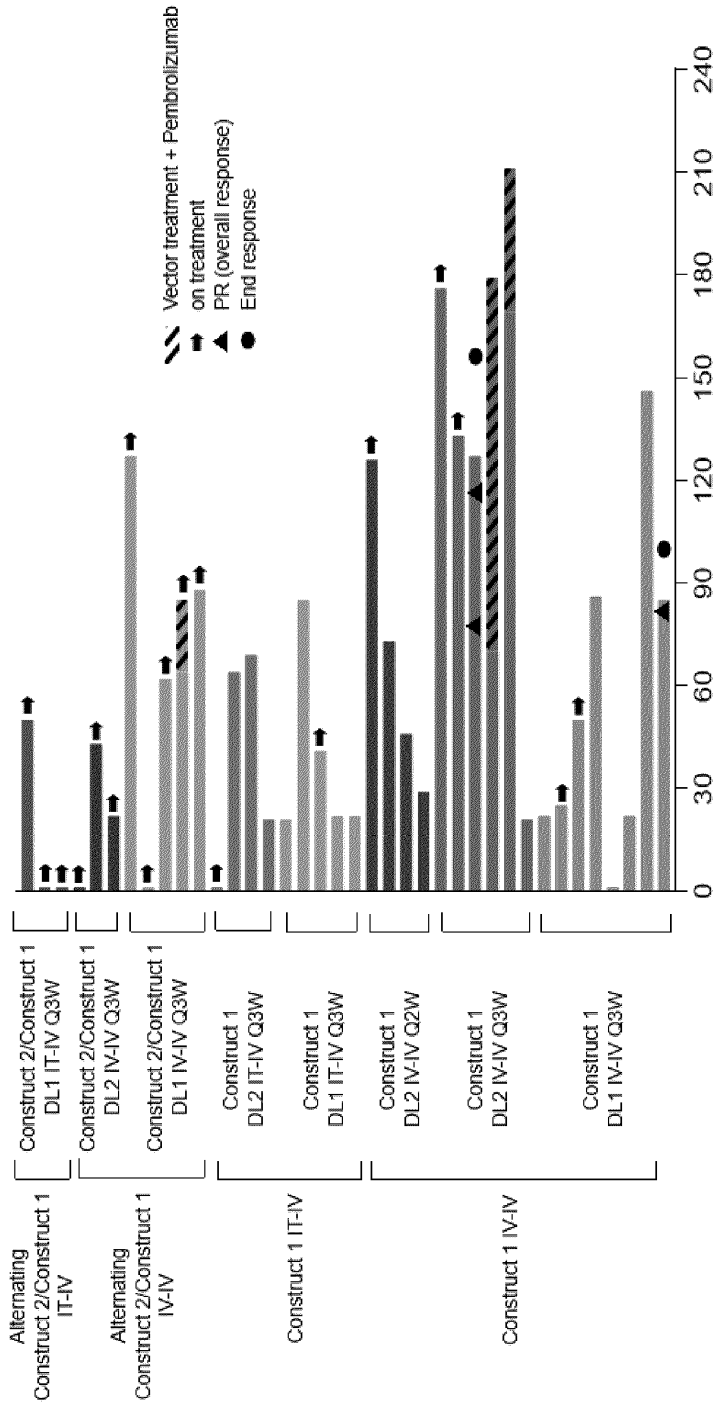

Vector treatment + Pembrolizumab
on treatment
PR (overall response)
End response
0
30
60
90
120
150
180
210
240
Time on treatment (Days)
Alternating Construct 2/Construct 1 IT-IV
Alternating Construct 2/Construct 1 IV-IV
Construct 1 IT-IV
Construct 1 IV-IV
Construct 2/Construct 1 DL1 IT-IV Q3W
Construct 2/Construct 1 DL2 IV-IV Q3W
Construct 2/Construct 1 DL1 IV-IV Q3W
Construct 1 DL2 IT-IV Q3W
Construct 1 DL1 IT-IV Q3W
Construct 1 DL2 IV-IV Q2W
Construct 1 DL2 IV-IV Q3W
Construct 1 DL1 IV-IV Q3W

FIG. 17A

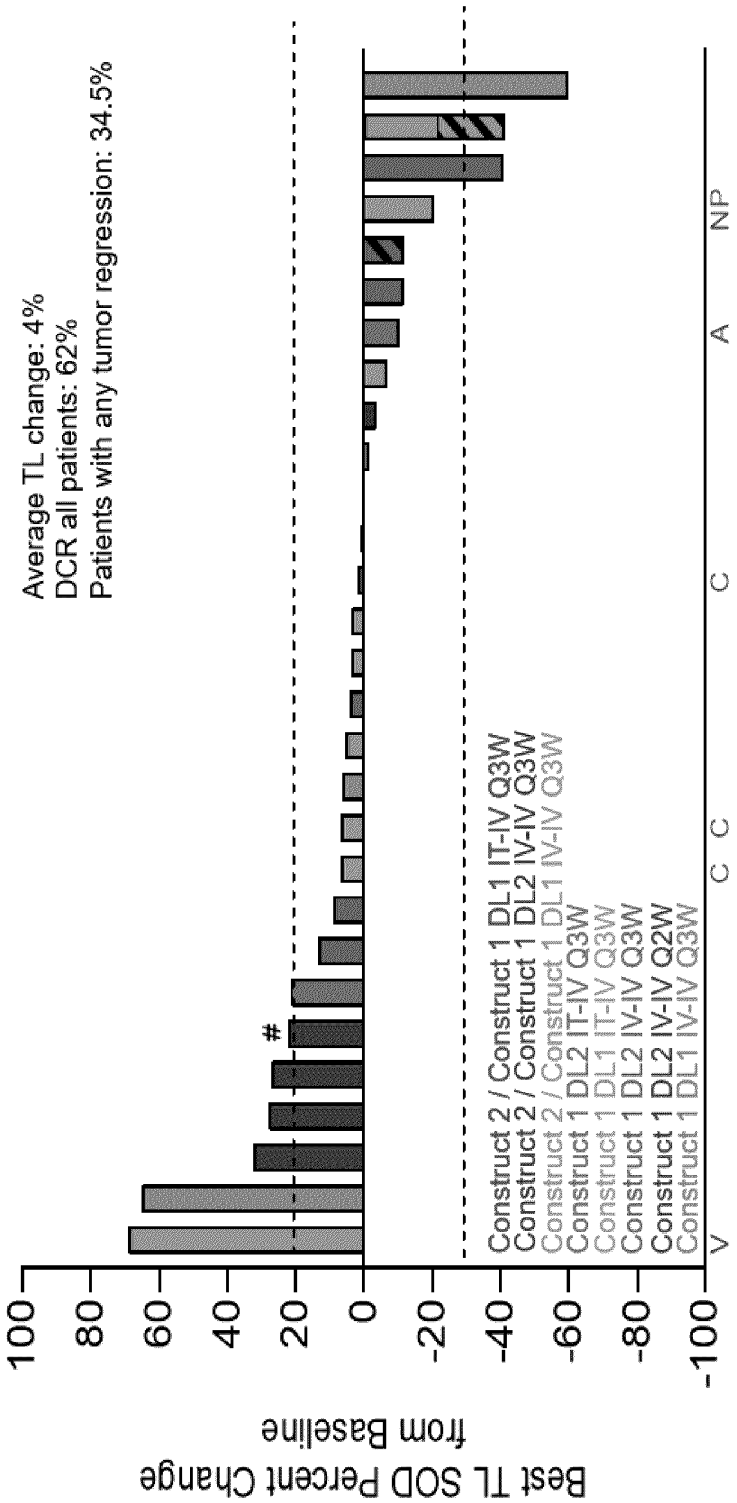

Average TL change: 4%
DCR all patients: 62%
Patients with any tumor regression: 34.5%
Best TL SOD Percent Change from Baseline
100
80
60
40
20
0
-20
-40
-60
-80
-100
#
V
C
C
C
A
NP
Construct 2 / Construct 1 DL1 IT-IV Q3W
Construct 2 / Construct 1 DL2 IV-IV Q3W
Construct 2 / Construct 1 DL1 IV-IV Q3W
Construct 1 DL2 IT-IV Q3W
Construct 1 DL1 IT-IV Q3W
Construct 1 DL2 IV-IV Q3W
Construct 1 DL2 IV-IV Q2W
Construct 1 DL1 IV-IV Q3W

FIG. 17B

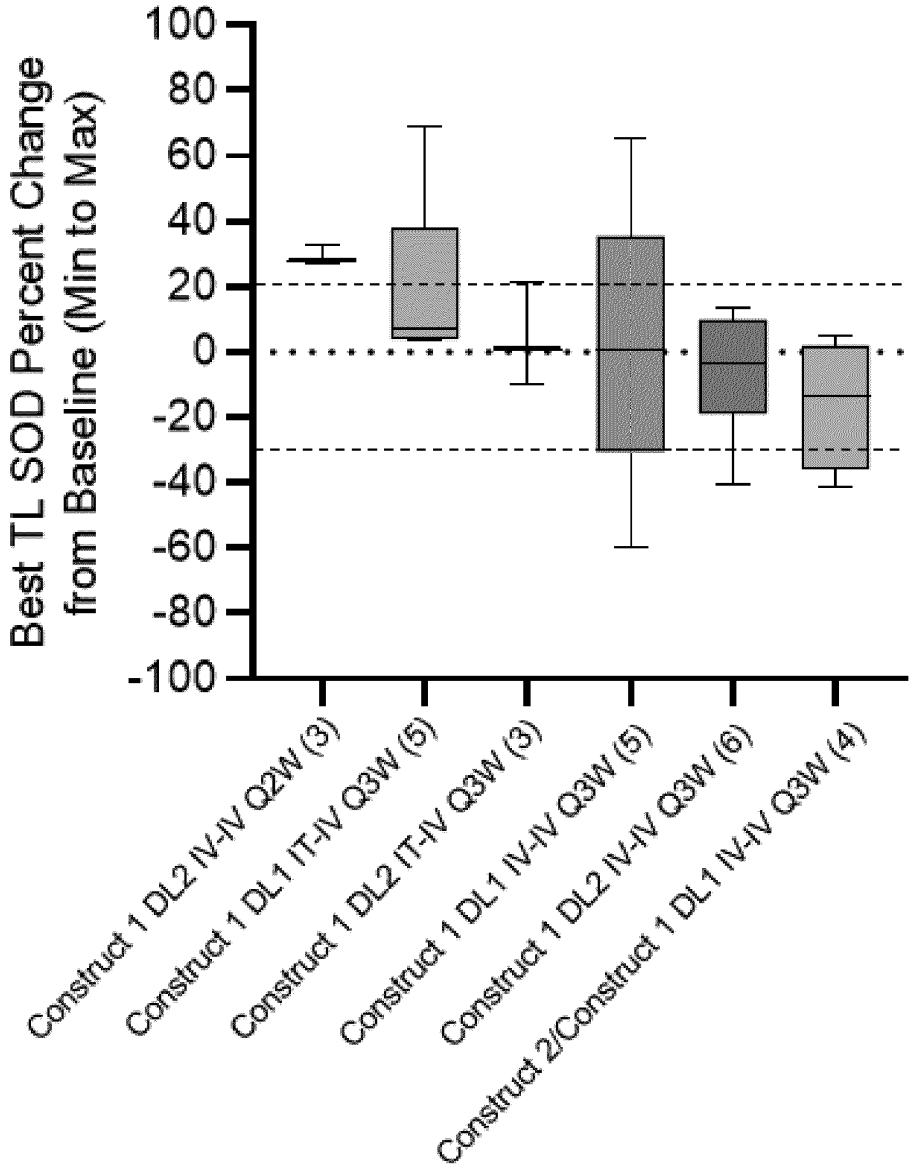

Best TL SOD Percent Change from Baseline (Min to Max)
100
80
60
40
20
0
-20
-40
-60
-80
-100
Construct 1 DL2 IV-IV Q2W (3)
Construct 1 DL1 IT-IV Q3W (5)
Construct 1 DL2 IT-IV Q3W (3)
Construct 1 DL1 IV-IV Q3W (5)
Construct 1 DL2 IV-IV Q3W (6)
Construct 2/Construct 1 DL1 IV-IV Q3W (4)

FIG. 17C

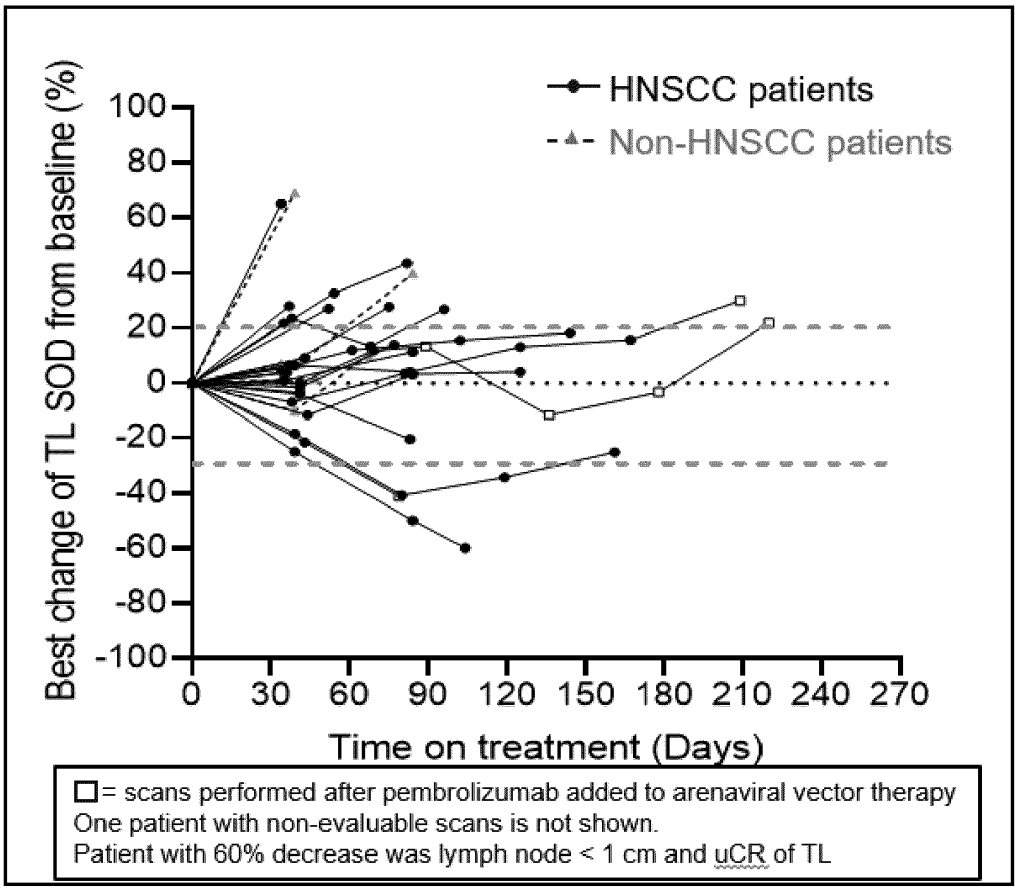

HNSCC patients
Non-HNSCC patients
Best change of TL SOD from baseline (%)
100
80
60
40
20
0
-20
-40
-60
-80
-100
0
30
60
90
120
150
180
210
240
270
Time on treatment (Days)
□= scans performed after pembrolizumab added to arenaviral vector therapy
One patient with non-evaluable scans is not shown.
Patient with 60% decrease was lymph node < 1 cm and uCR of TL

FIG. 17D

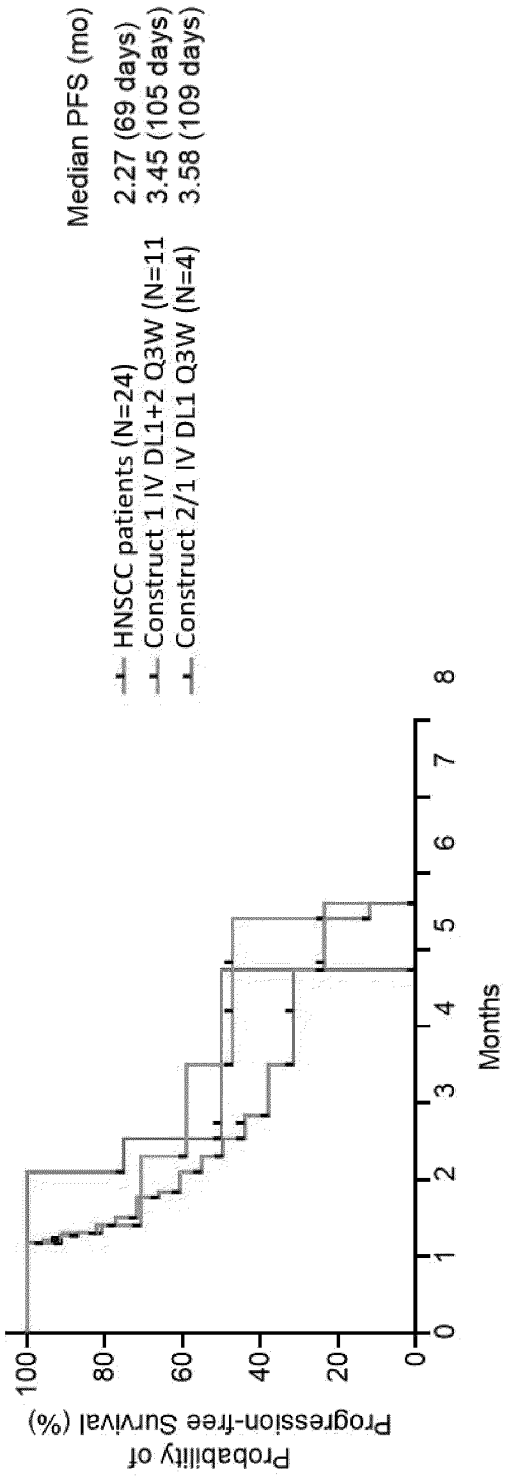

Median PFS (mo)
HNSCC patients (N=24) 2.27 (69 days)
Construct 1 IV DL1+2 Q3W (N=11 3.45 (105 days)
Construct 2/1 IV DL1 Q3W (N=4) 3.58 (109 days)
Probability of Progression-free Survival (%)
100
80
60
40
20
0
0
1
2
3
4
5
6
7
8
Months

FIG. 17E

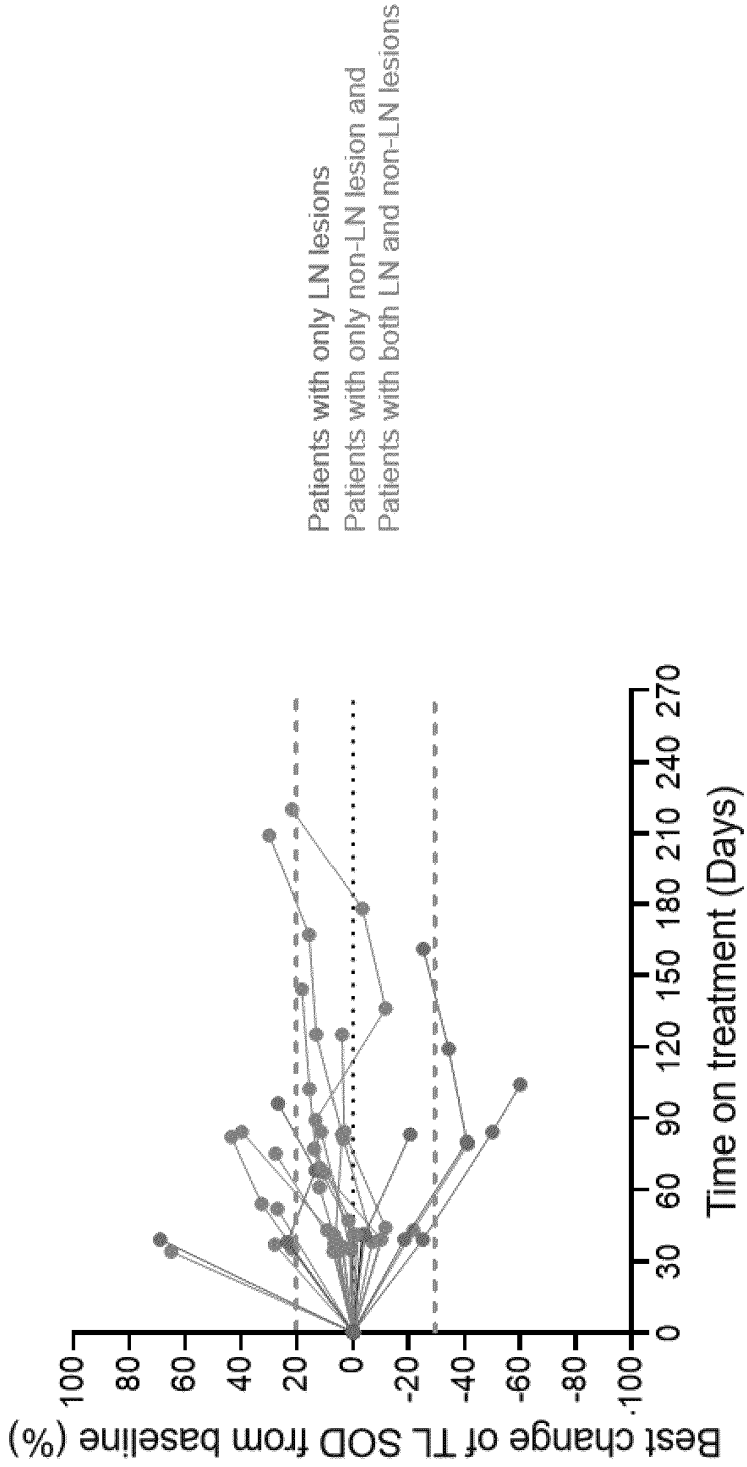

Patients with only LN lesions
Patients with only non-LN lesion and
Patients with both LN and non-LN lesions
Best change of TL SOD from baseline (%)
100
80
60
40
20
0
-20
-40
-60
-80
-100
0
30
60
90
120
150
180
210
240
270
Time on treatment (Days)

FIG. 17F

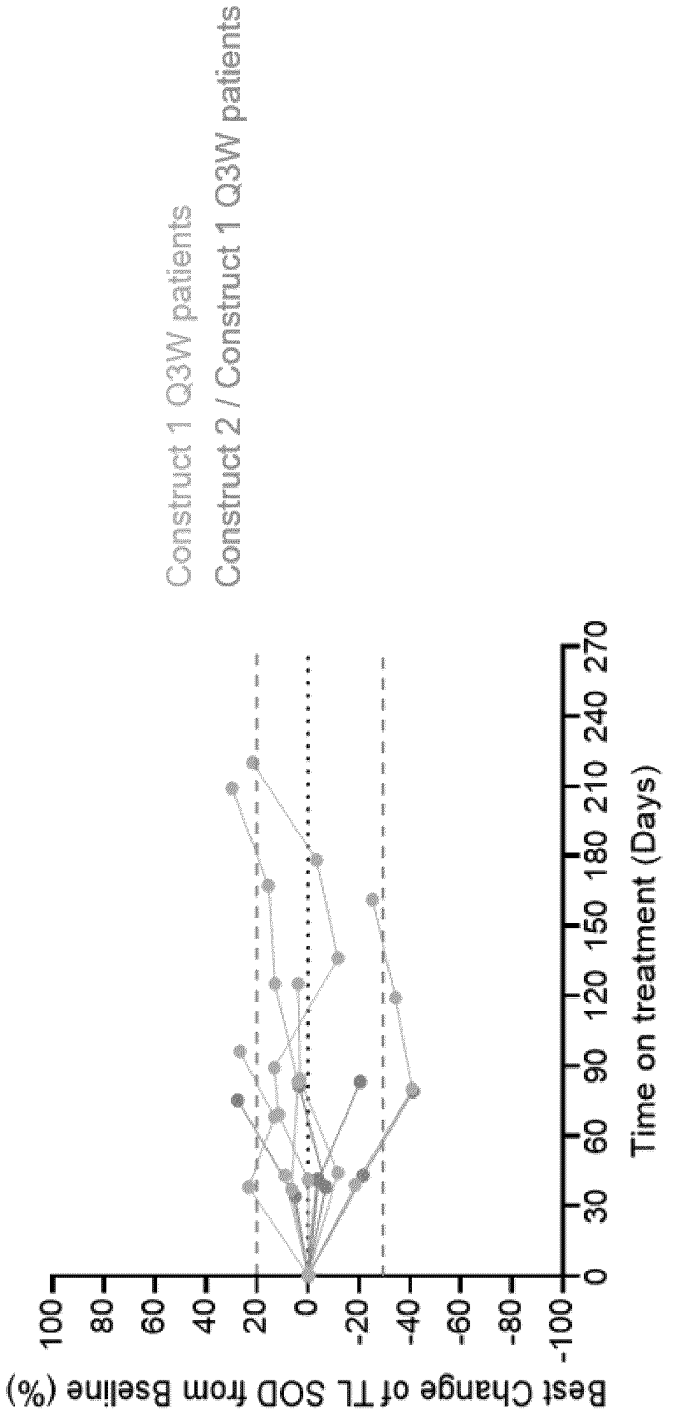

Construct 1 Q3W patients
Construct 2 / Construct 1 Q3W patients
Best Change of TL SOD from Baseline (%)
100
80
60
40
20
0
-20
-40
-60
-80
-100
0
30
60
90
120
150
180
210
240
270
Time on treatment (Days)

FIG. 17G

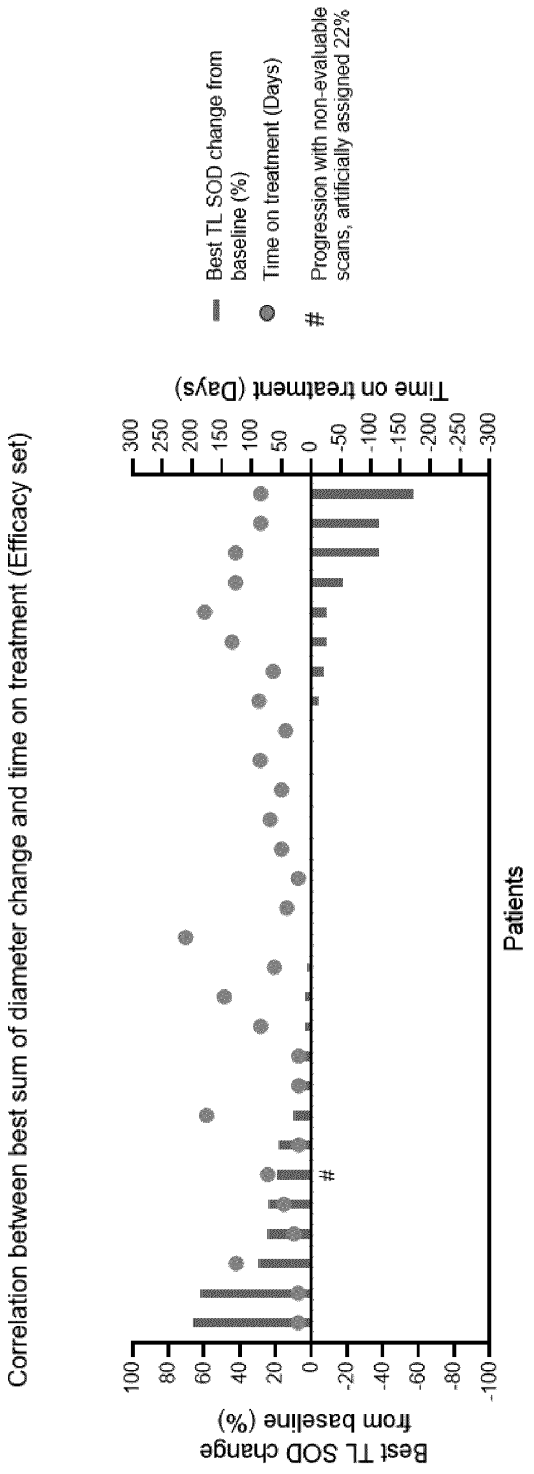

Correlation between best sum of diameter change and time on treatment (Efficacy set)
Best TL SOD change from baseline (%)
Time on treatment (Days)
Patients
Best TL SOD change from baseline (%)
Time on treatment (Days)
Progression with non-evaluable scans, artificially assigned 22%
#

FIG. 17H

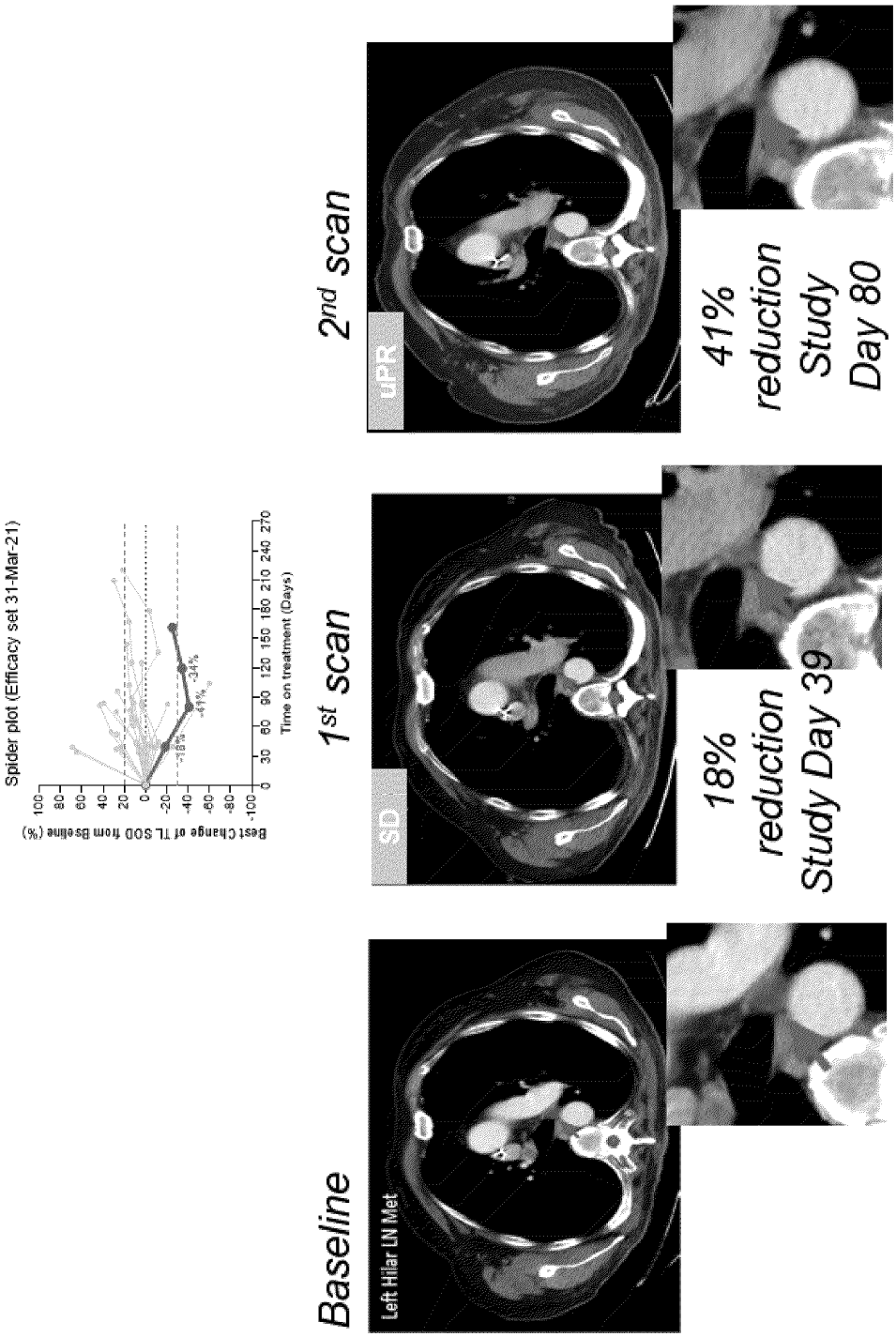

Spider plot (Efficacy set 31-Mar-21)
Best Change of TL SOD from Baseline (%)
Time on treatment (Days)
100
80
60
40
20
0
-20
-40
-60
-80
-100
0
30
60
90
120
150
180
210
240
270
-18%
-34%
-41%
Baseline
Left Hilar LN Met
1st scan
SD
18% reduction Study Day 39
2nd scan
uPR
41% reduction Study Day 80

FIG. 17I

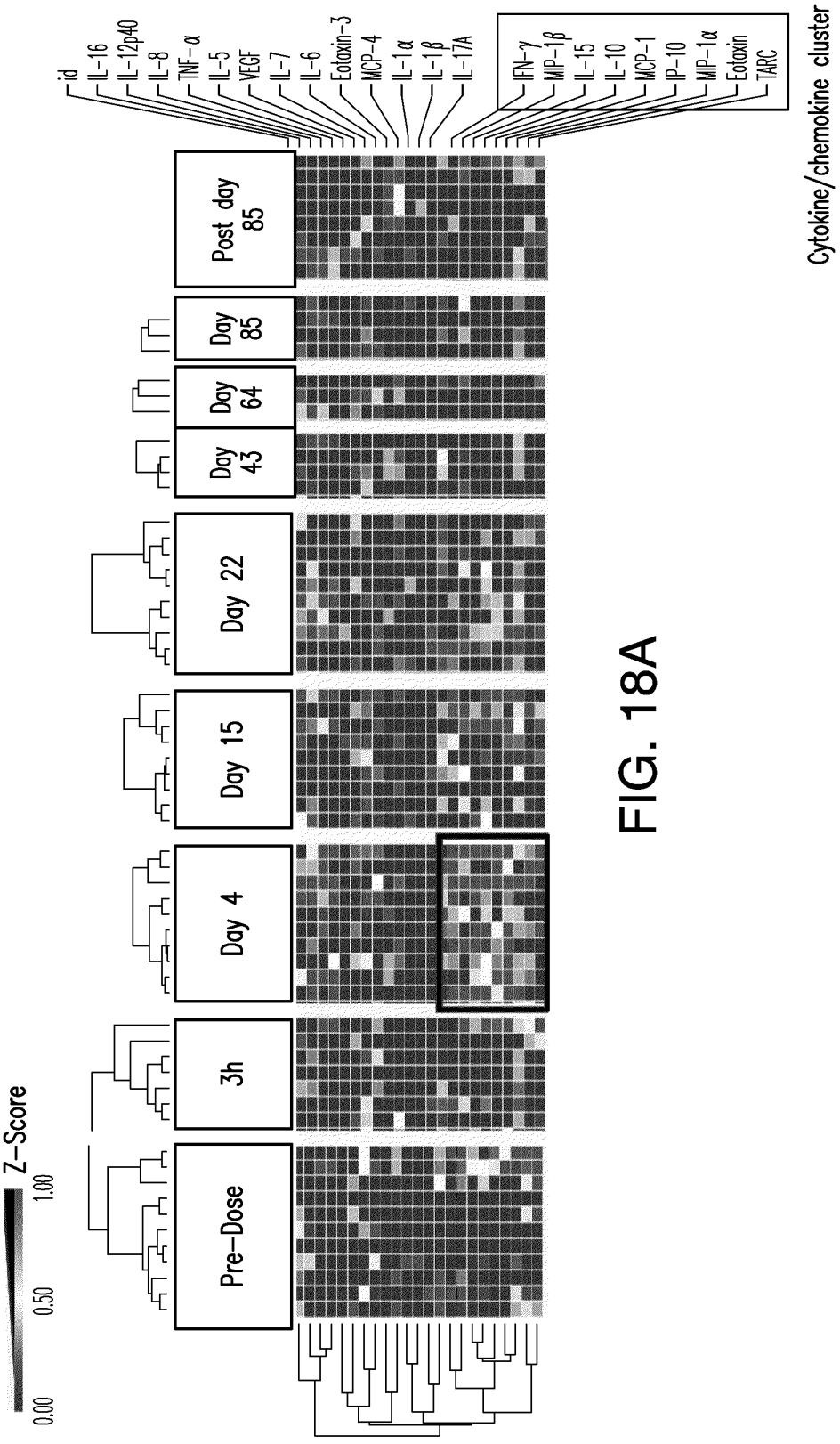

id
IL-16
IL-12p40
IL-8
TNF-α
IL-5
VEGF
IL-7
IL-6
Eotaxin-3
MCP-4
IL-1α
IL-1β
IL-17A
IFN-γ
MIP-1β
IL-15
IL-10
MCP-1
IP-10
MIP-1α
Eotaxin
TARC
Cytokine/chemokine cluster
Post day 85
Day 85
Day 64
Day 43
Day 22
Day 15
Day 4
3h
Pre-Dose
Z-Score
1.00
0.50
0.00

FIG. 18A

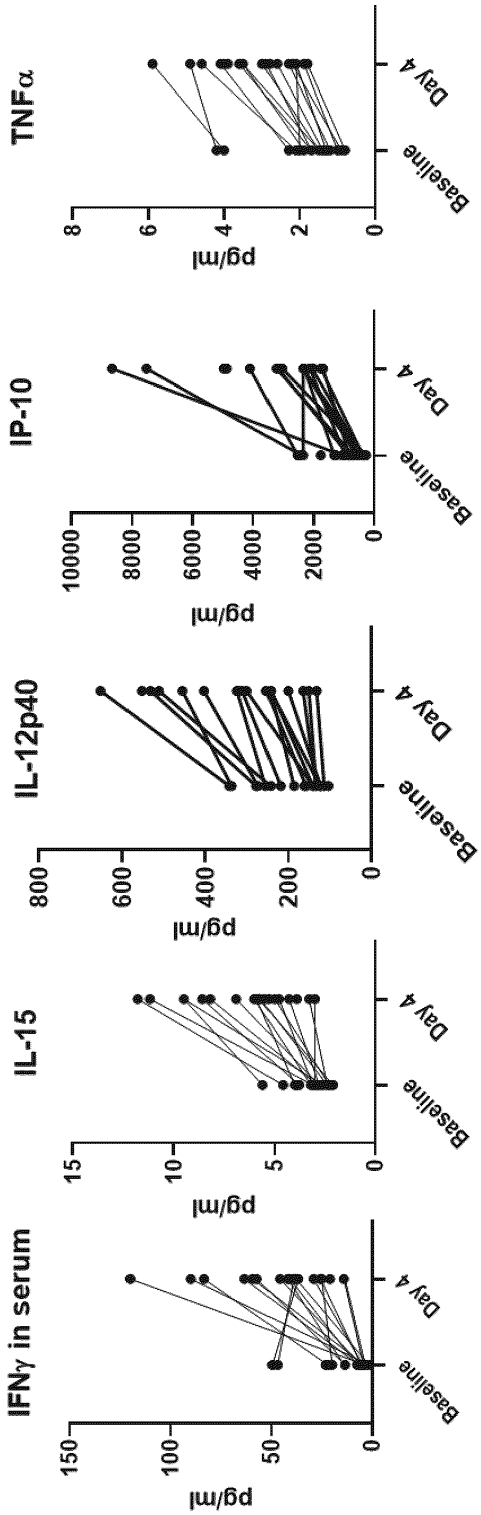

TNFα
IP-10
IL-12p40
IL-15
IFNγ in serum
pg/ml
Baseline
Day 4
0
2
4
6
8
0
2000
4000
6000
8000
10000
0
200
400
600
800
0
5
10
15
0
50
100
150

FIG. 18B

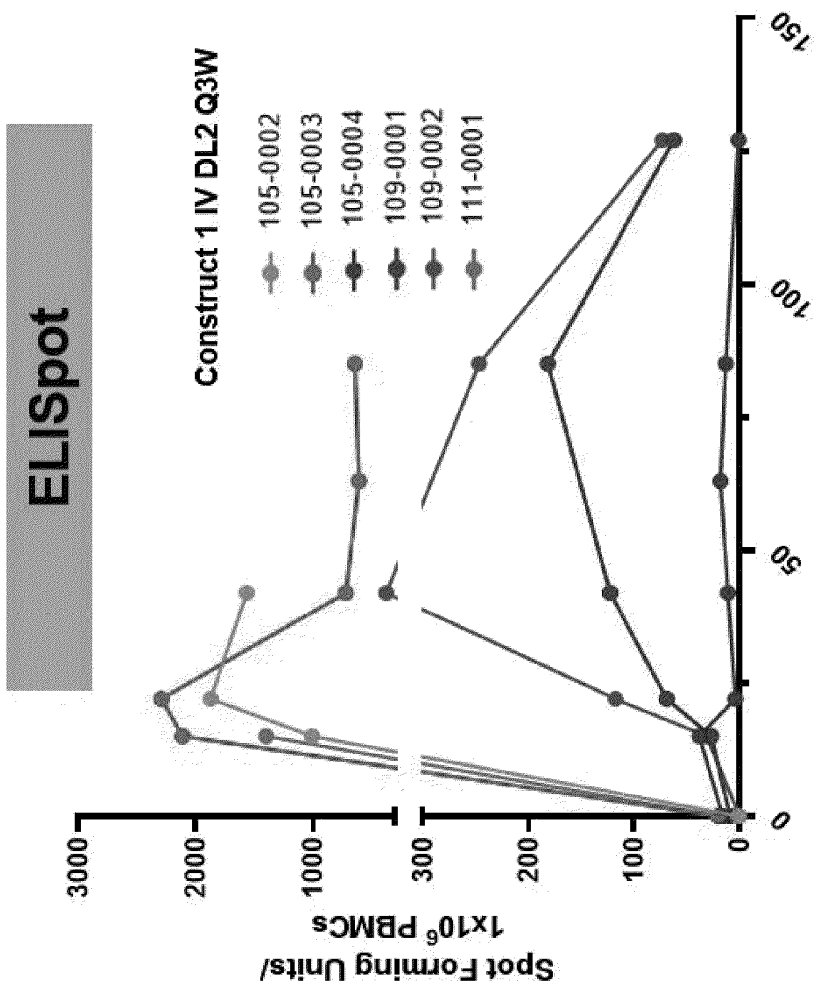

ELISpot
Construct 1 IV DL2 Q3W
105-0002
105-0003
105-0004
109-0001
109-0002
111-0001
Spot Forming Units/ 1x10^6 PBMCs
3000
2000
1000
300
200
100
0
0
50
100
150
Time (days)

FIG. 19A

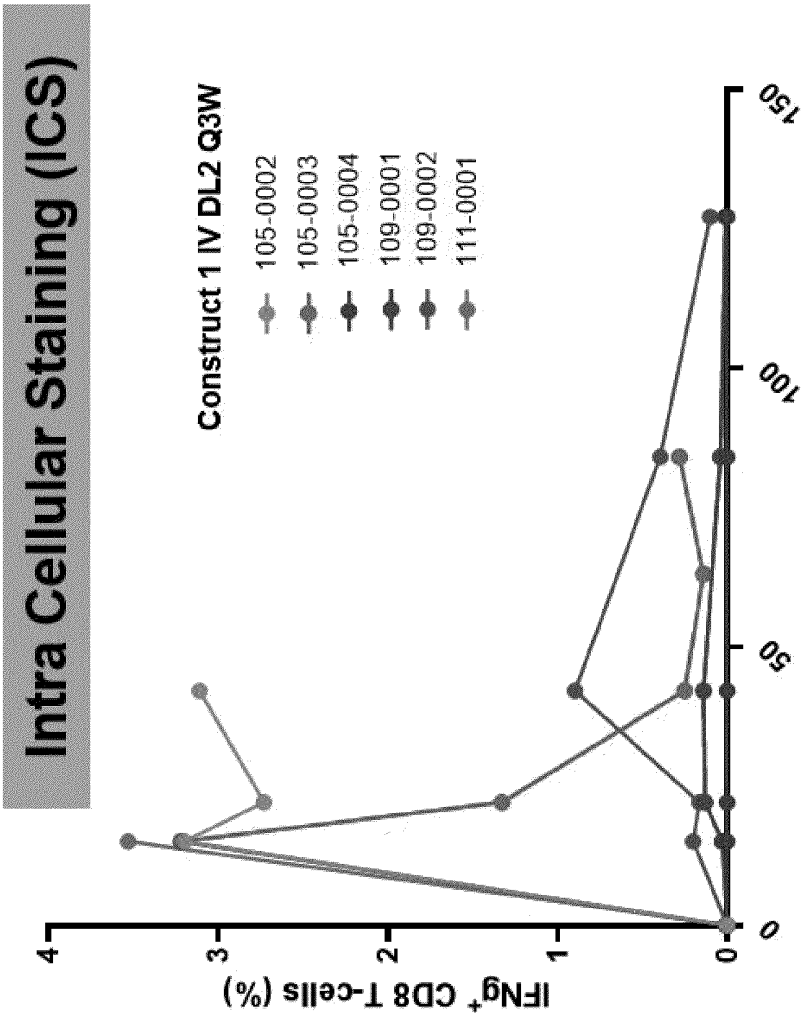

Intra Cellular Staining (ICS)
Construct 1 IV DL2 Q3W
105-0002
105-0003
105-0004
109-0001
109-0002
111-0001
IFNg+ CD8 T-cells (%)
0
1
2
3
4
0
50
100
150
Time (days)

FIG. 19B

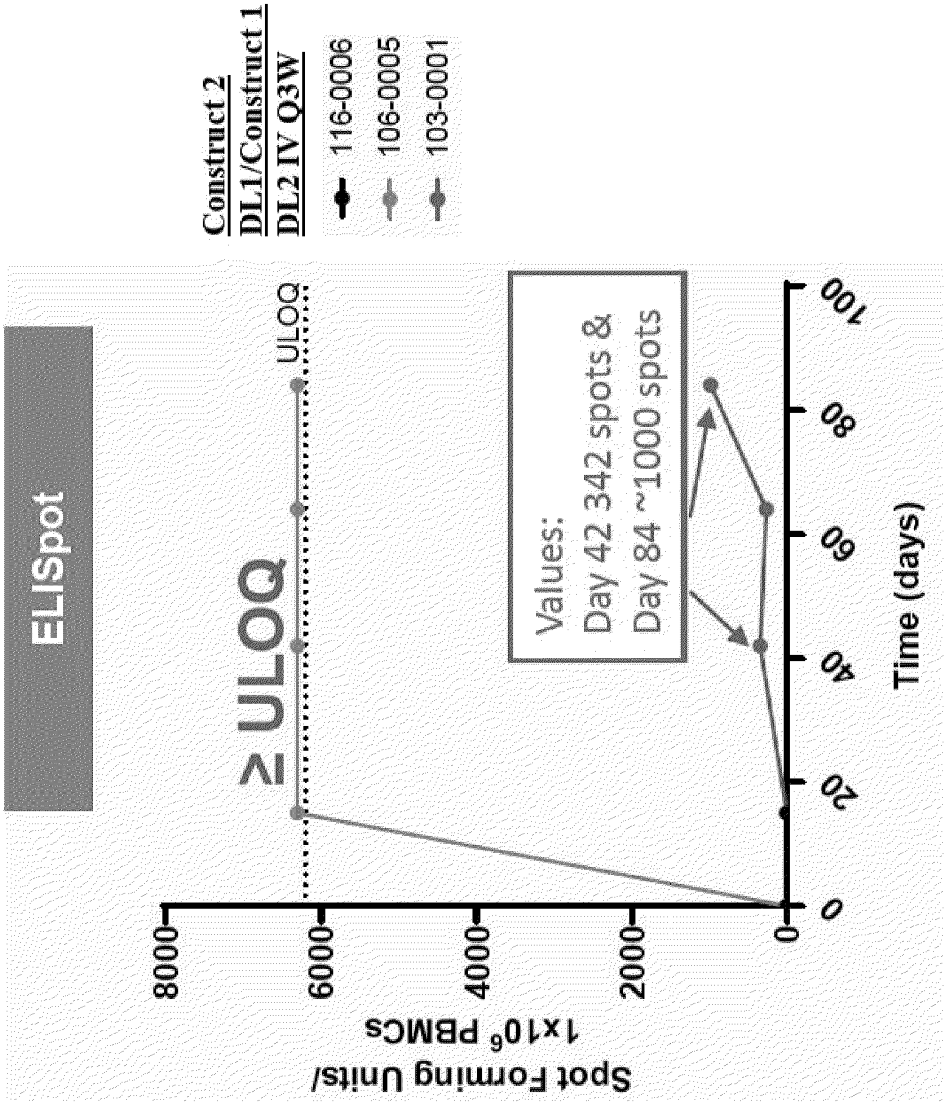

ELISpot
≥ ULOQ
ULOQ
Values:
Day 42 342 spots &
Day 84 ~1000 spots
Construct 2
DL1/Construct 1
DL2 IV Q3W
116-0006
106-0005
103-0001
Spot Forming Units/
1x10^6 PBMCs
8000
6000
4000
2000
0
0
20
40
60
80
100
Time (days)

FIG. 19C

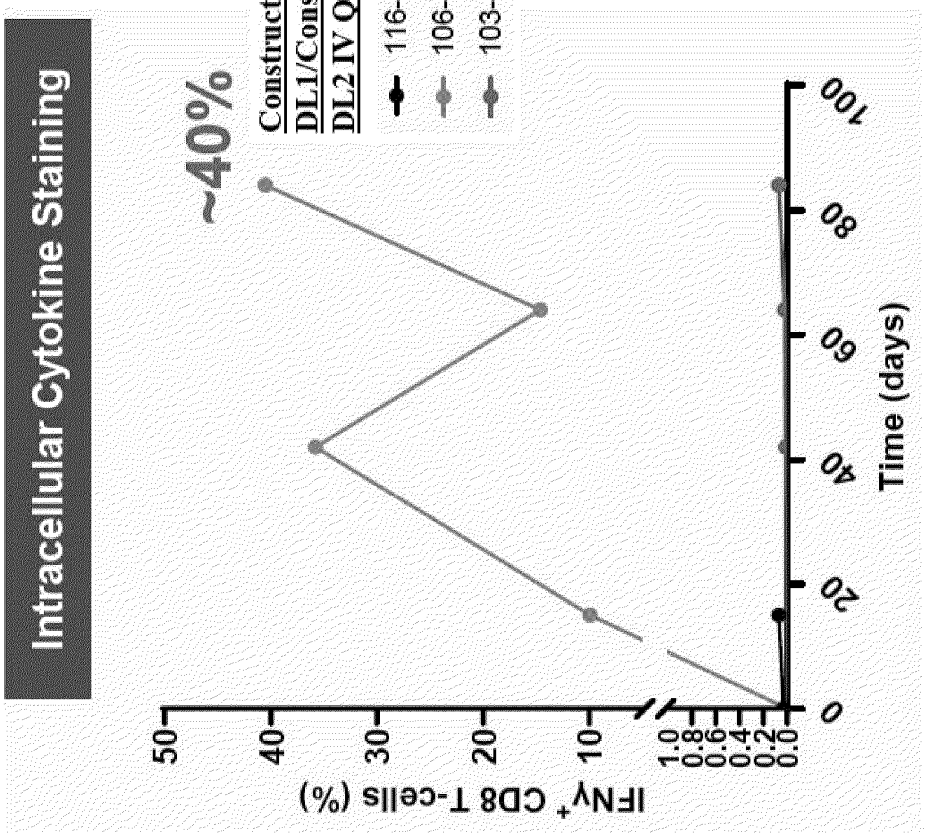

Intracellular Cytokine Staining
~40%
Construct 2
DL1/Construct 1
DL2 IV Q3W
116-0006
106-0005
103-0001
IFNγ+ CD8 T-cells (%)
Time (days)

FIG. 19D

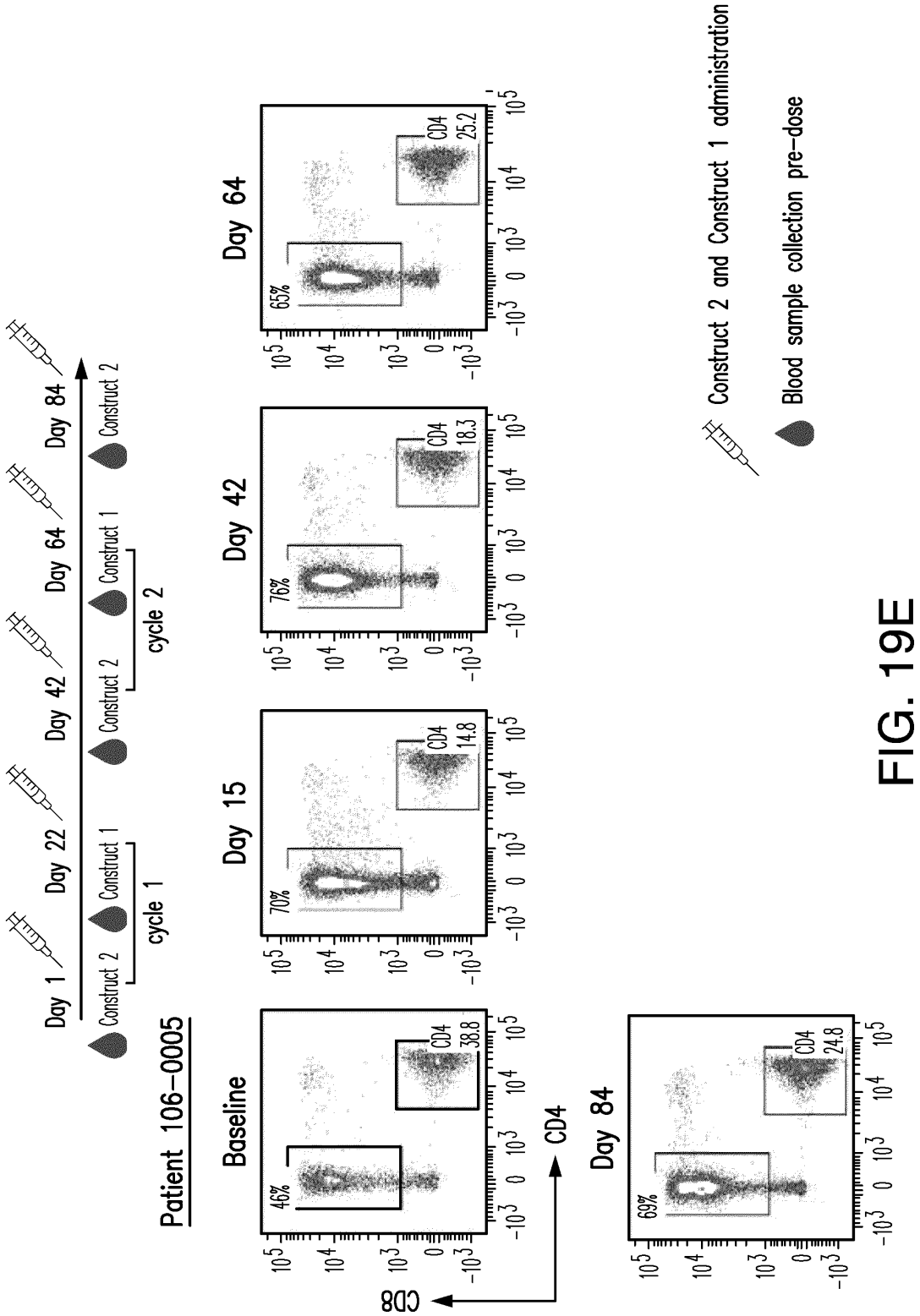

Patient 106-0005
Day 1
Day 22
Day 42
Day 64
Day 84
Construct 2
Construct 1
Construct 2
Construct 1
Construct 2
cycle 1
cycle 2
Baseline
Day 15
Day 42
Day 64
Day 84
46%
38.8
70%
14.8
76%
18.3
65%
25.2
69%
24.8
CD8
CD4
Construct 2 and Construct 1 administration
Blood sample collection pre-dose

FIG. 19E

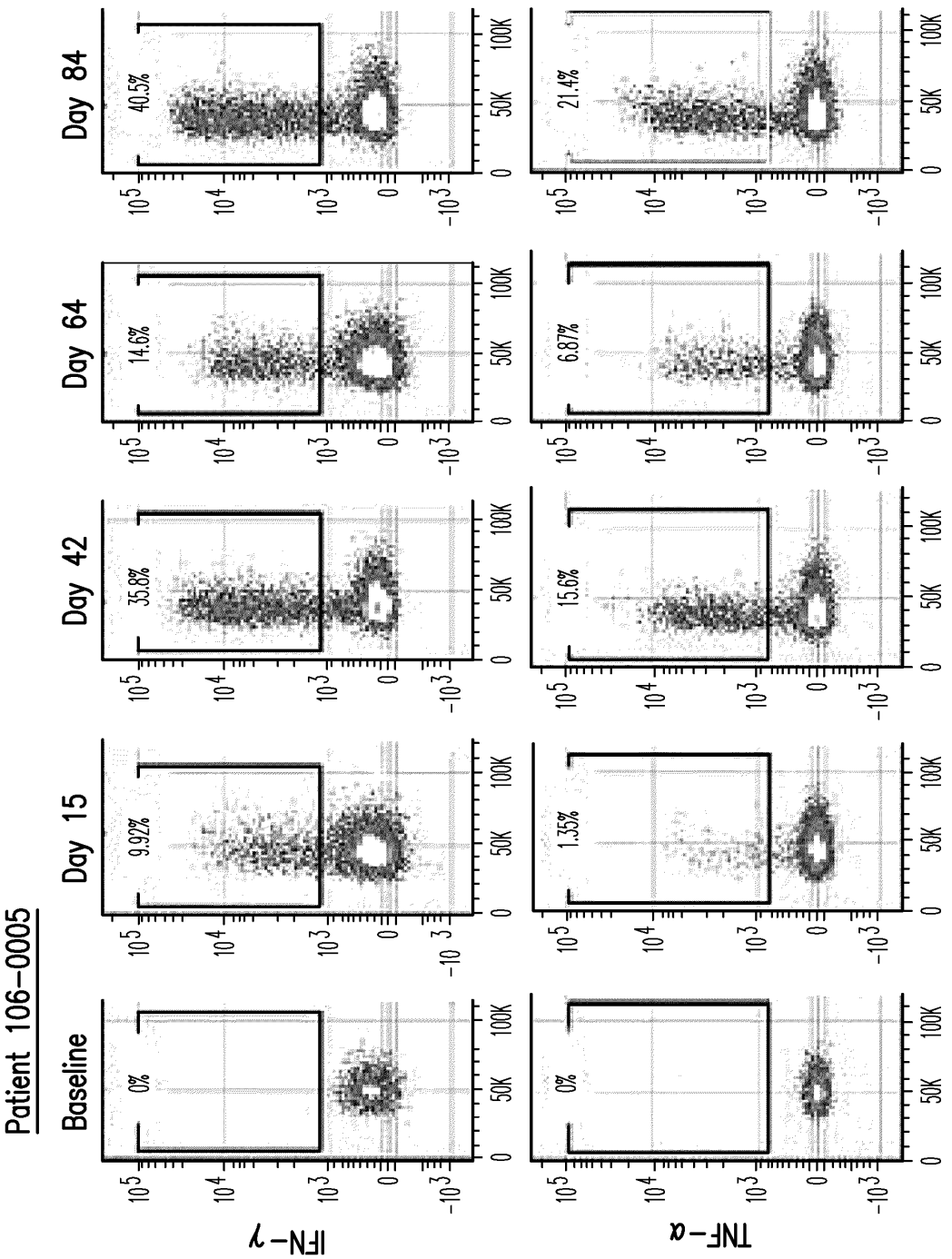

Patient 106-0005
Baseline
Day 15
Day 42
Day 64
Day 84
IFN-γ
TNF-α
0%
9.92%
35.8%
14.6%
40.5%
1.35%
15.6%
6.87%
21.4%
50K
100K

FIG. 19F

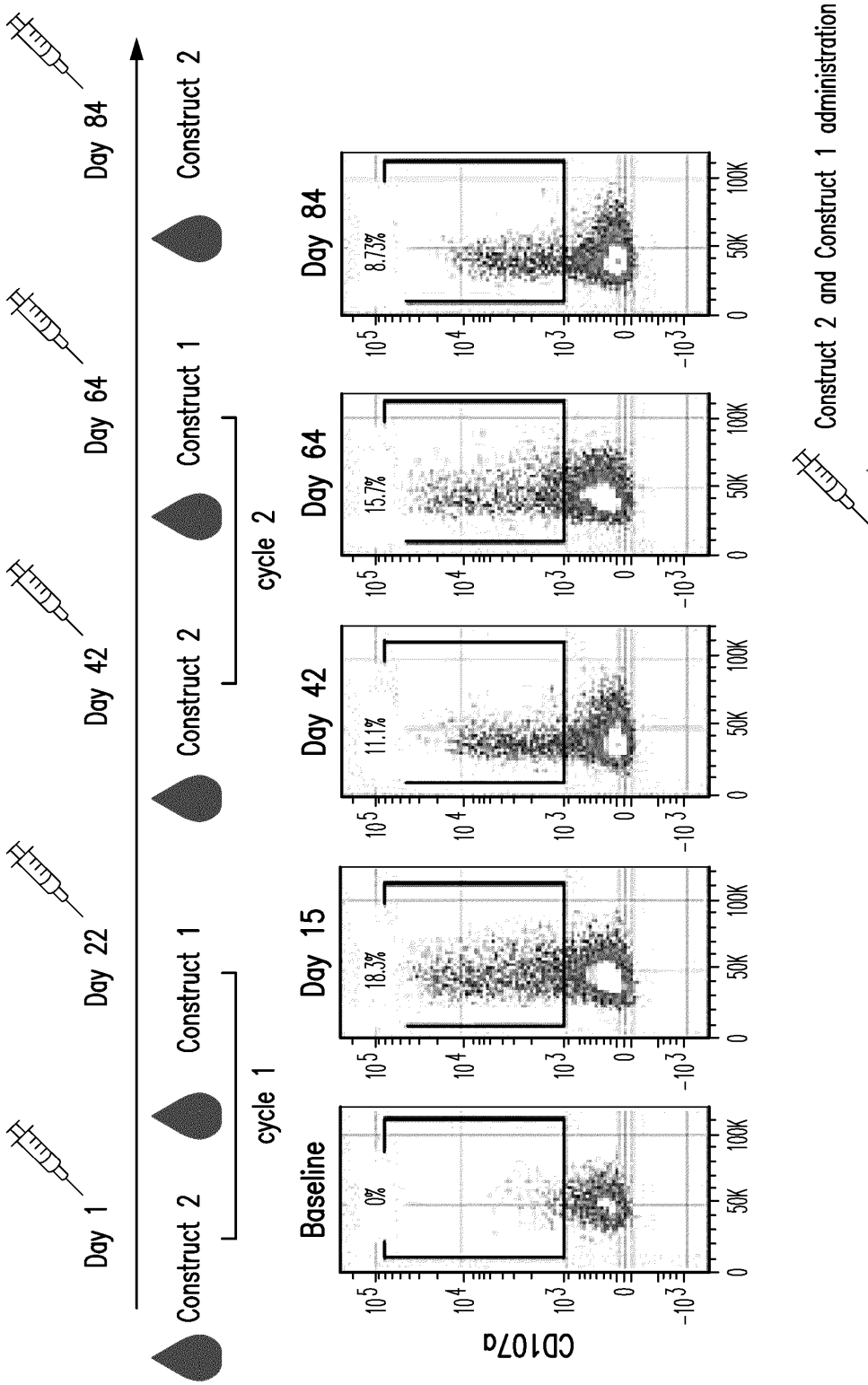


FIG. 19F continued

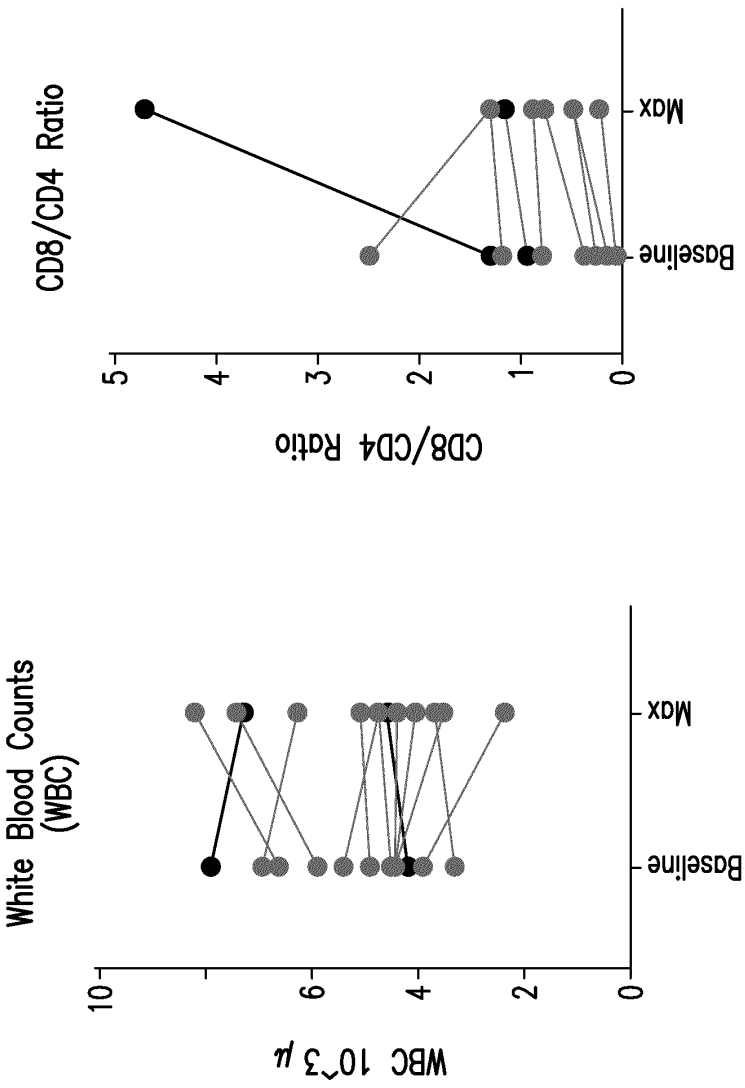

CD8/CD4 Ratio
CD8/CD4 Ratio
0
1
2
3
4
5
Baseline
Max
White Blood Counts (WBC)
WBC 10^3 µ
0
2
4
6
10
Baseline
Max
Construct 1 IV DL2
Construct 2 / Construct 1 IV alternating treatment

FIG. 19G

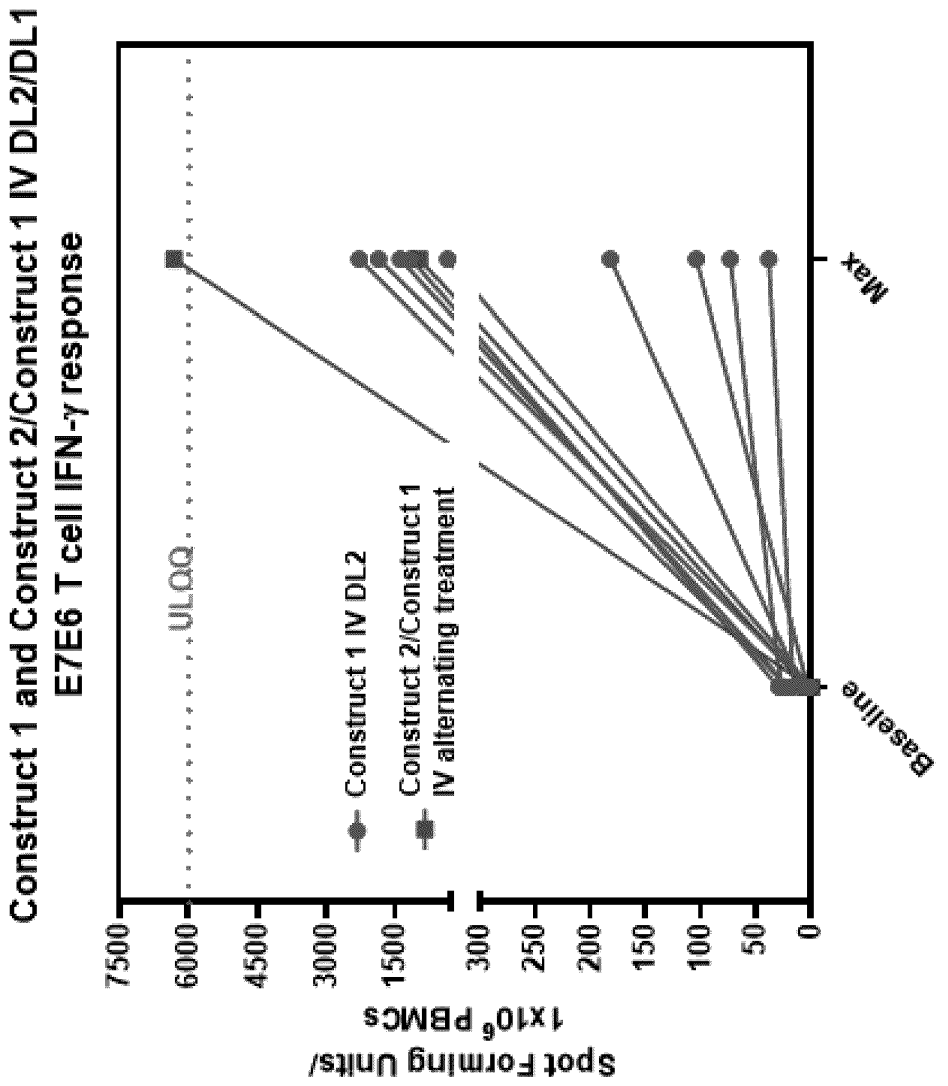

Construct 1 and Construct 2/Construct 1 IV DL2/DL1
E7E6 T cell IFN-γ response
Spot Forming Units/
1x10^6 PBMCs
7500
6000
4500
3000
1500
300
250
200
150
100
50
0
ULOQ
Construct 1 IV DL2
Construct 2/Construct 1
IV alternating treatment
Baseline
Max

FIG. 19H

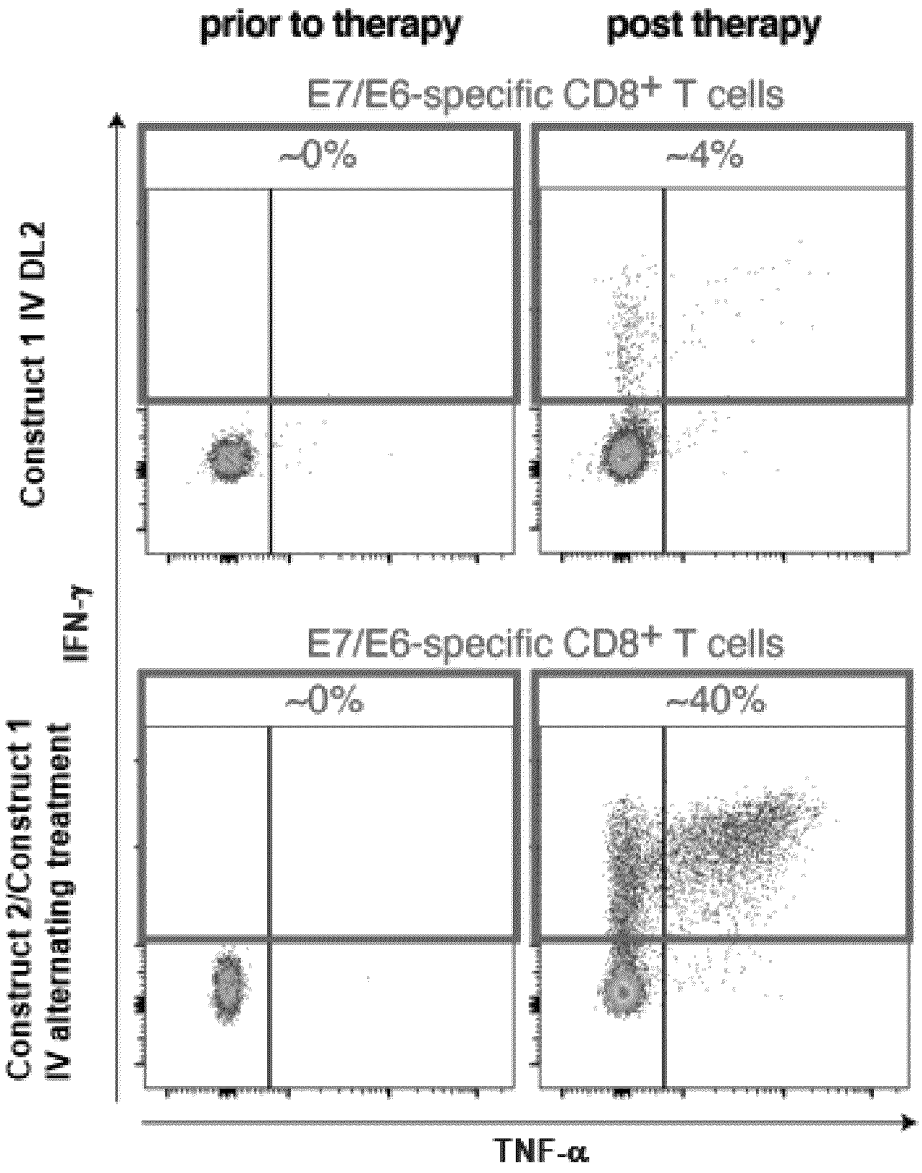

prior to therapy
post therapy
E7/E6-specific CD8+ T cells
~0%
~4%
Construct 1 IV DL2
IFN-γ
E7/E6-specific CD8+ T cells
~0%
~40%
Construct 2/Construct 1
IV alternating treatment
TNF-α

FIG. 19I