

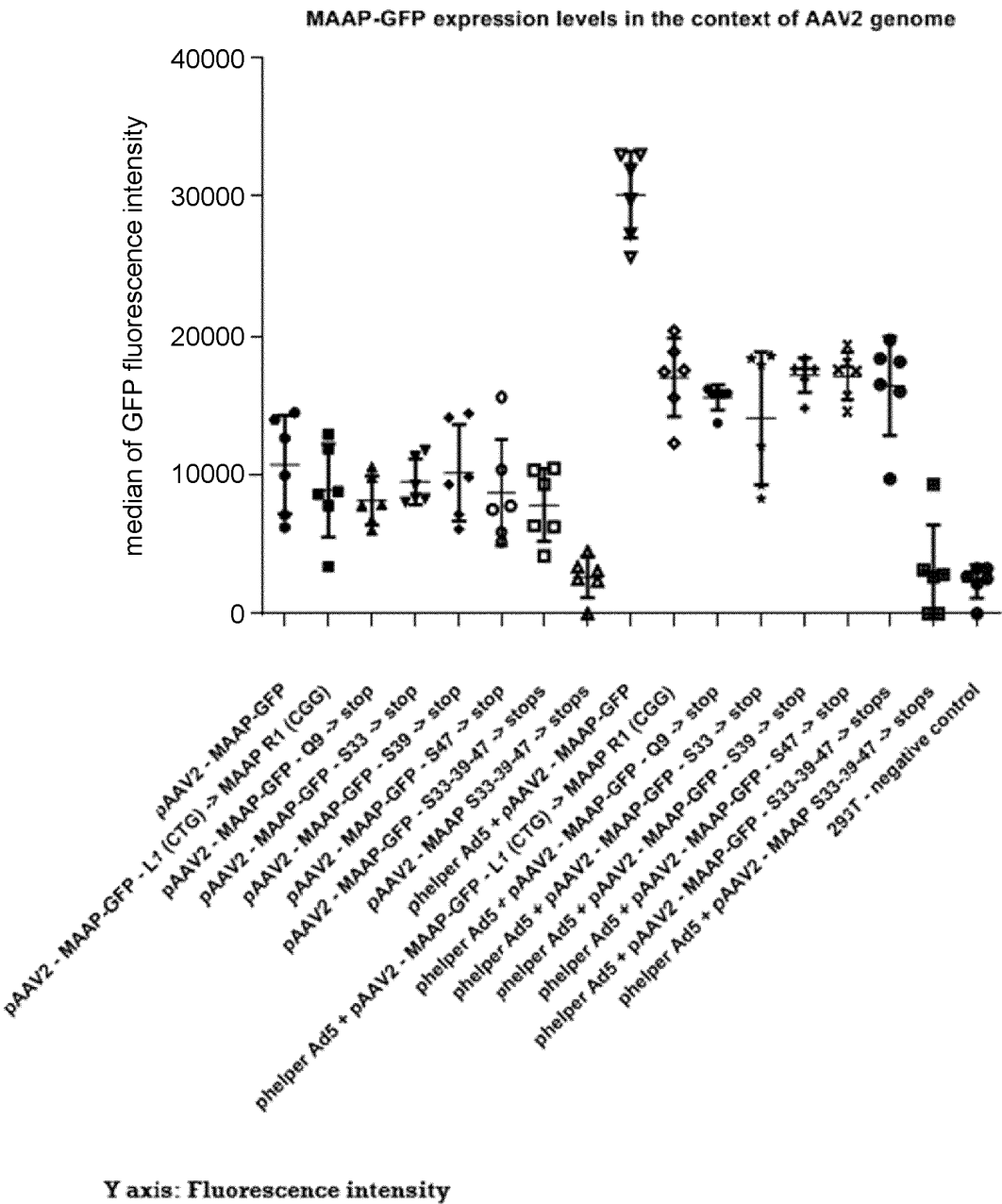


FIG. 1

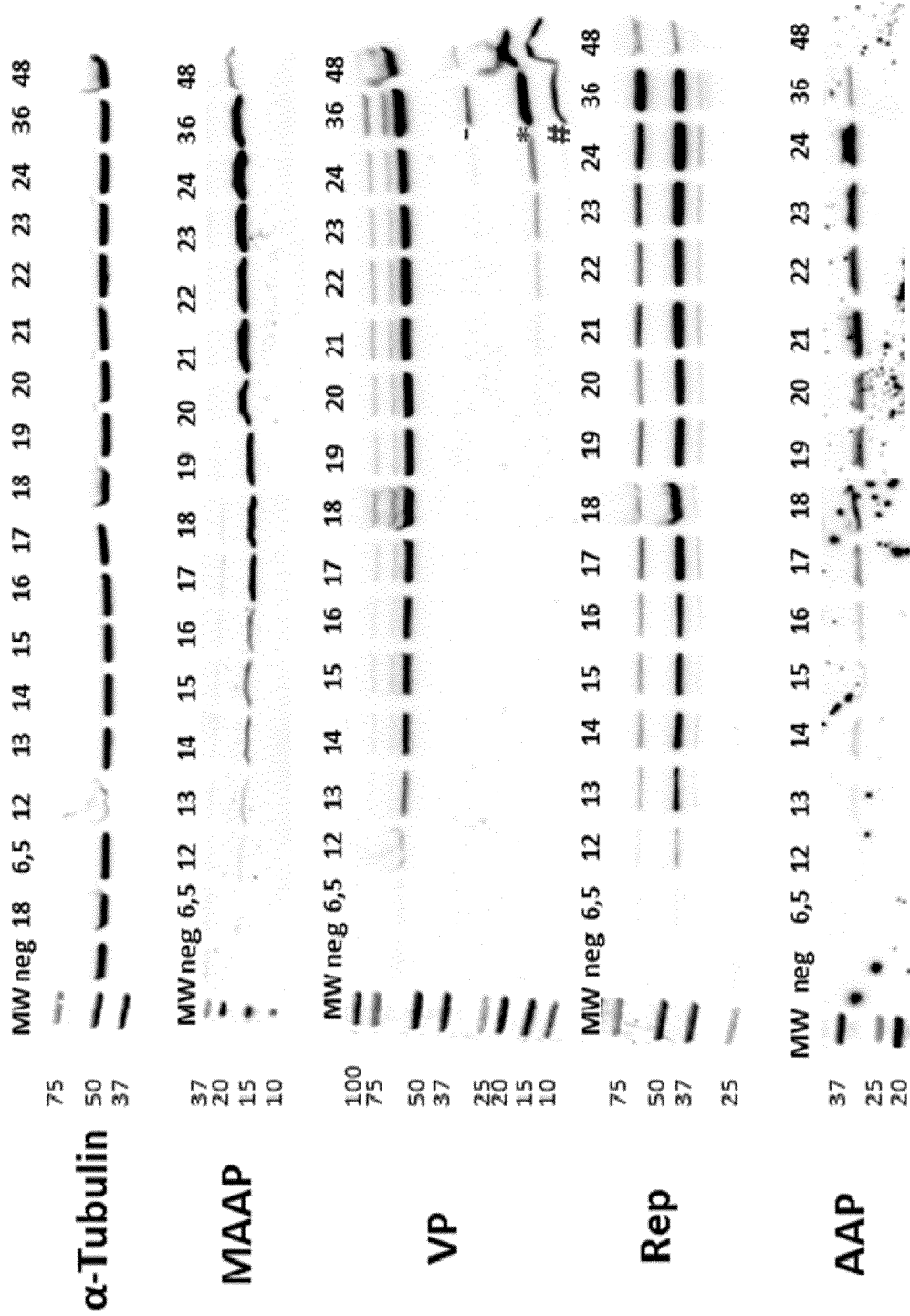


FIG. 2

3/48

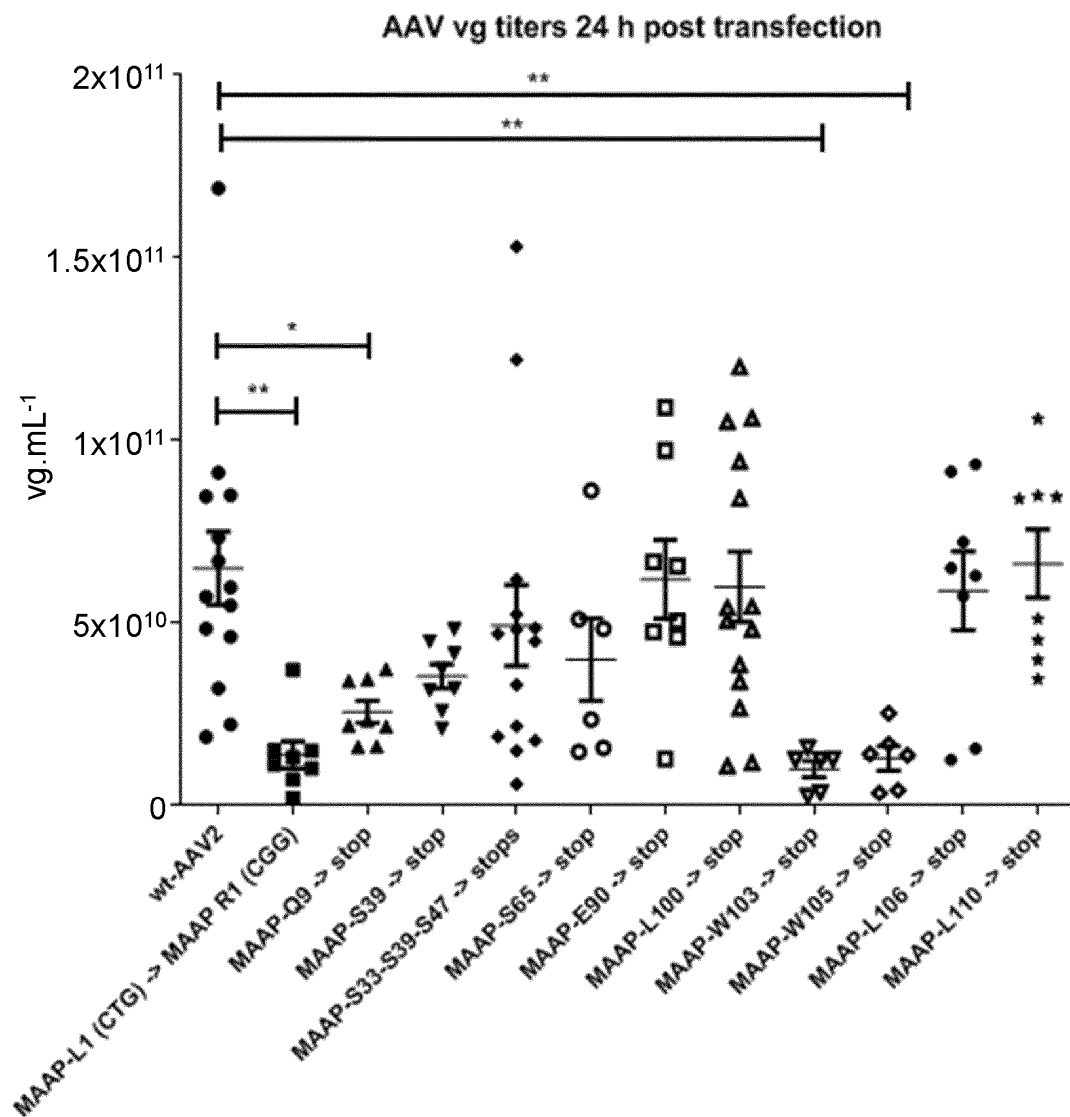


FIG. 3

4/48

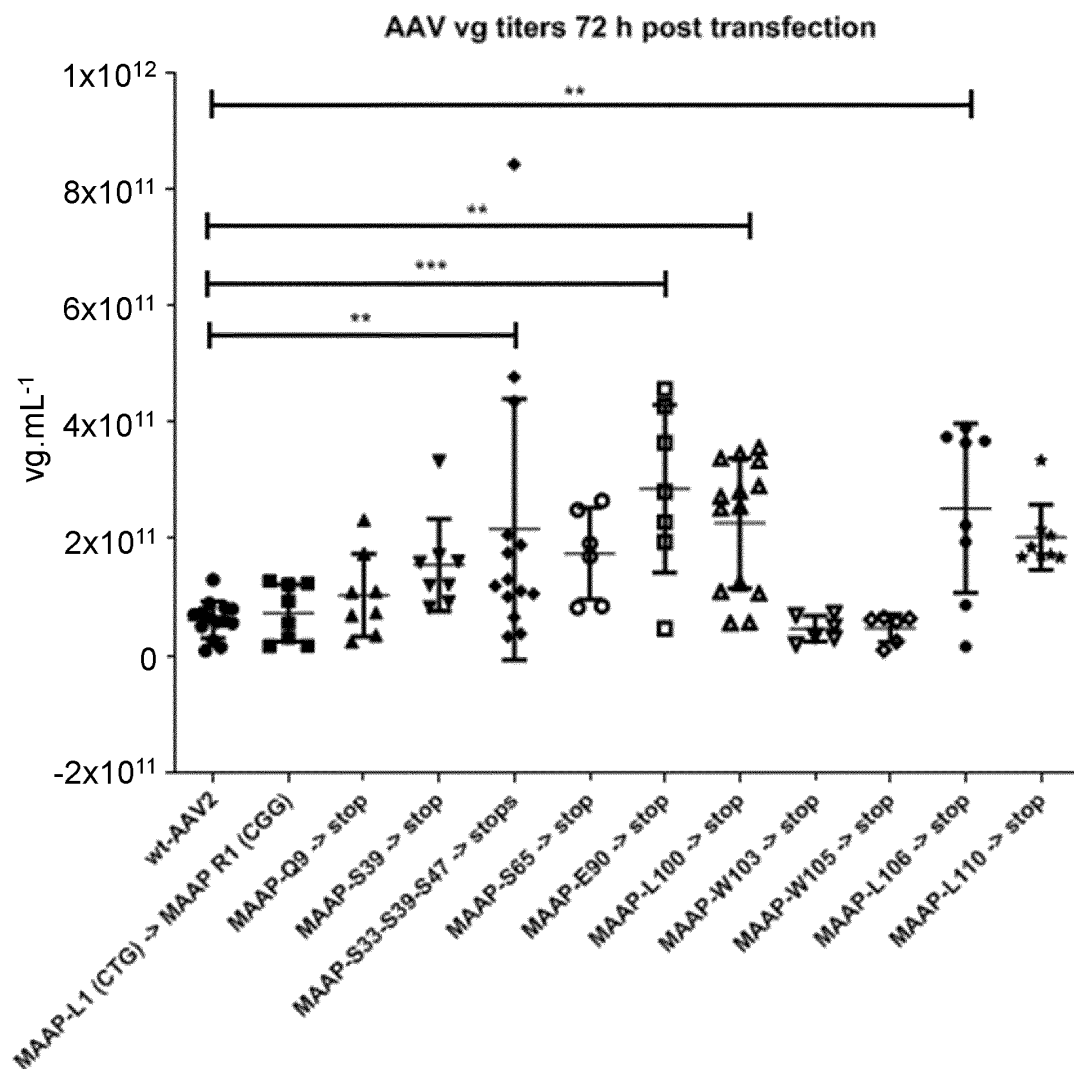


FIG. 4

5/48

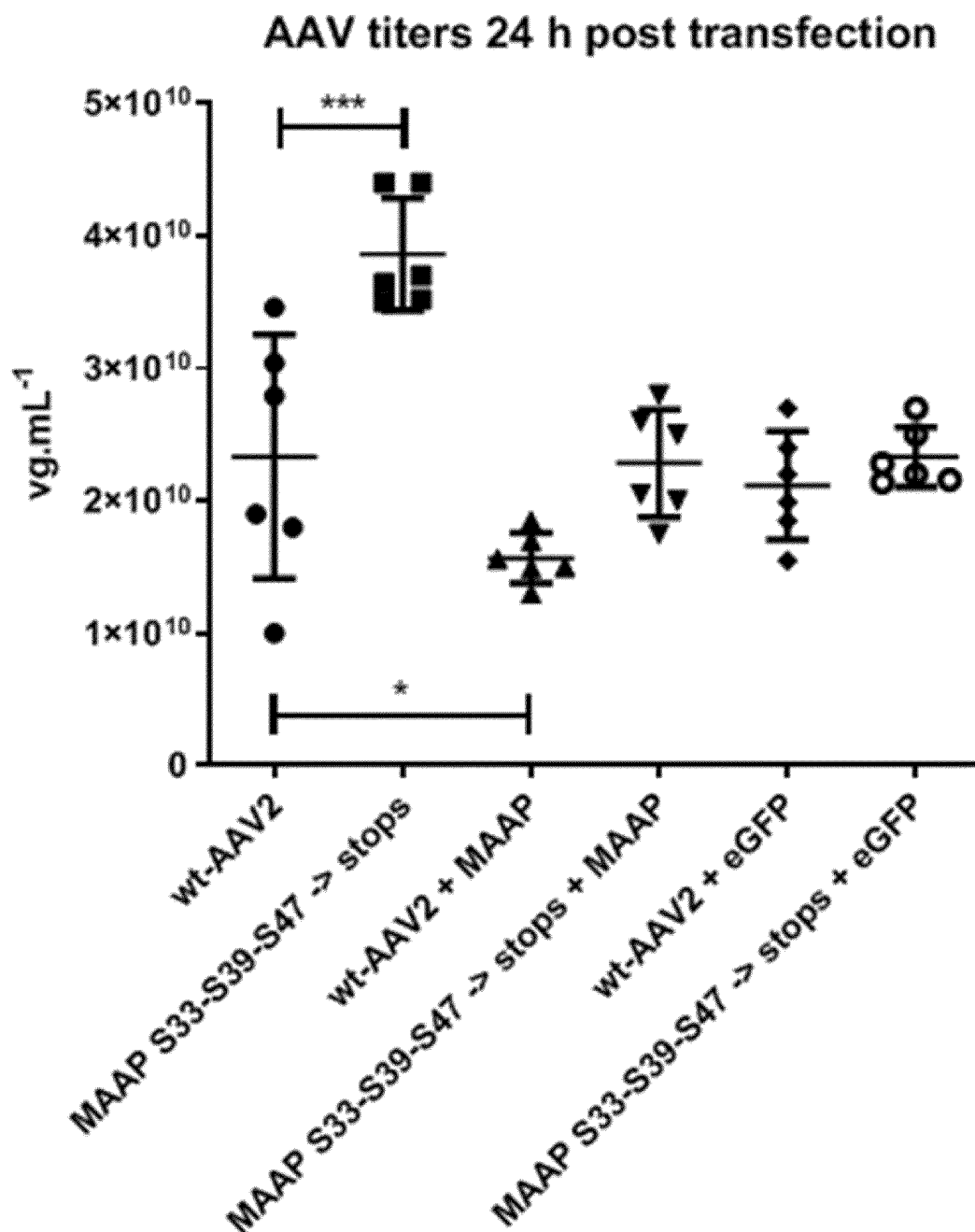


FIG. 5

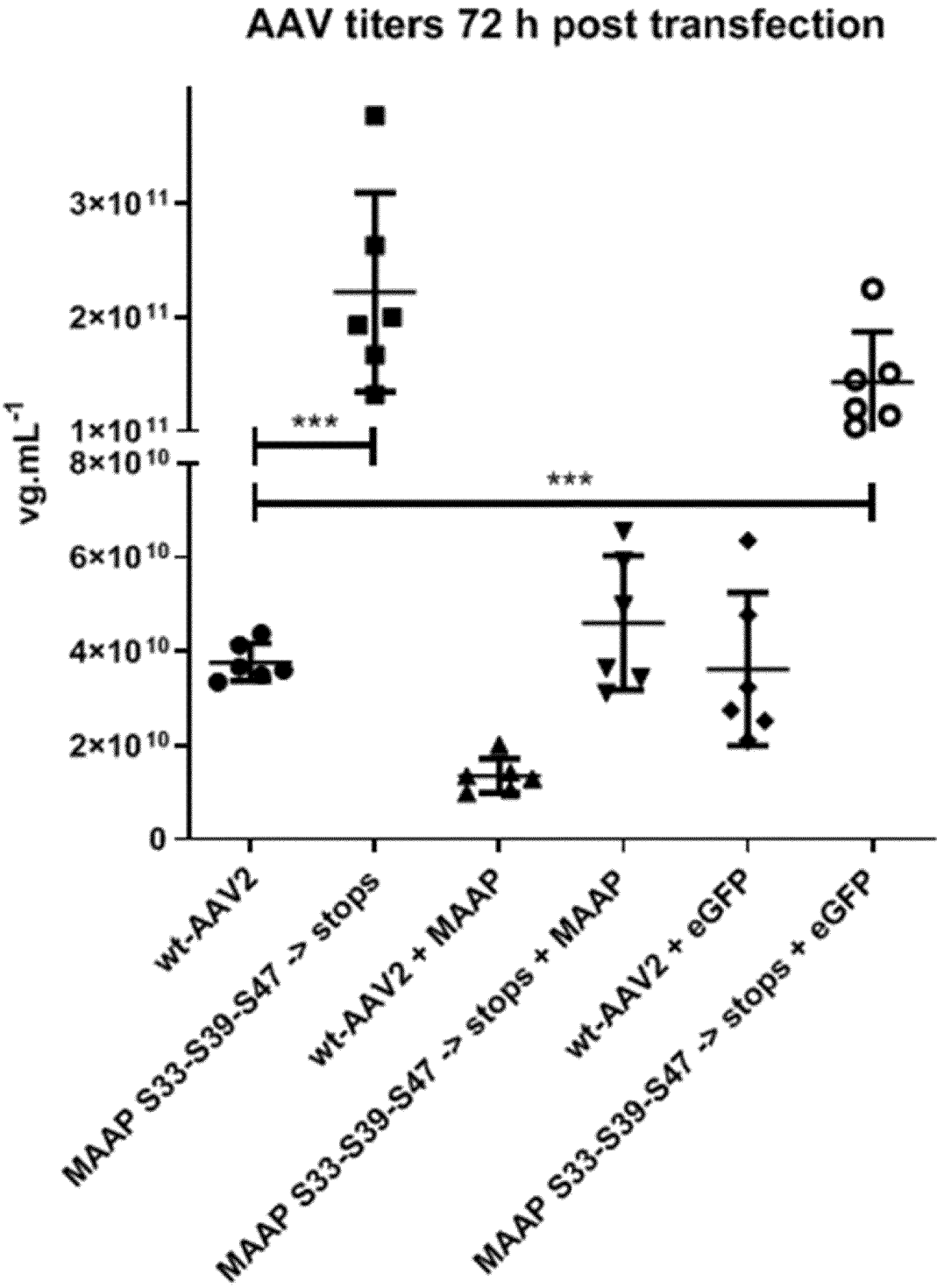
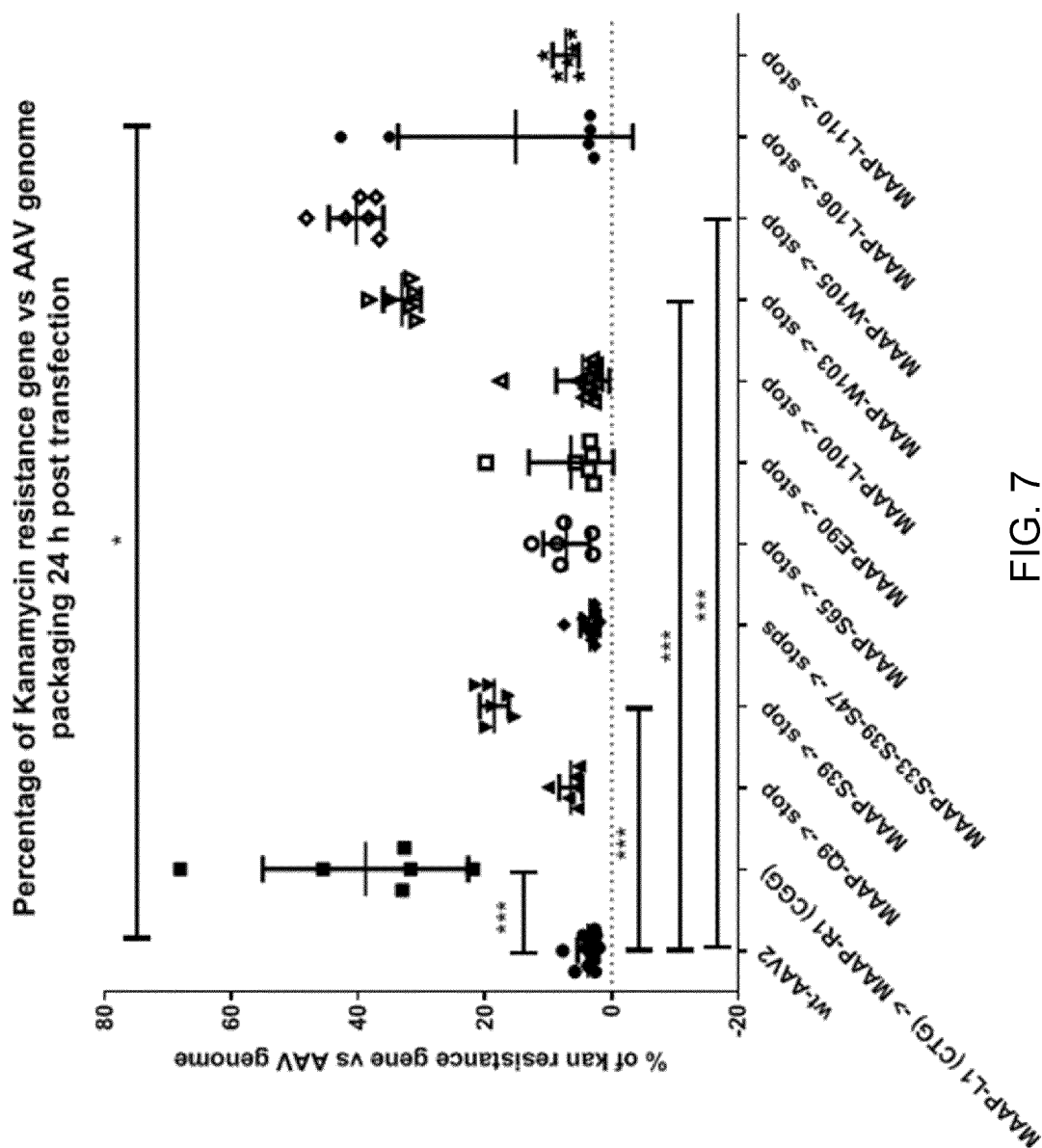
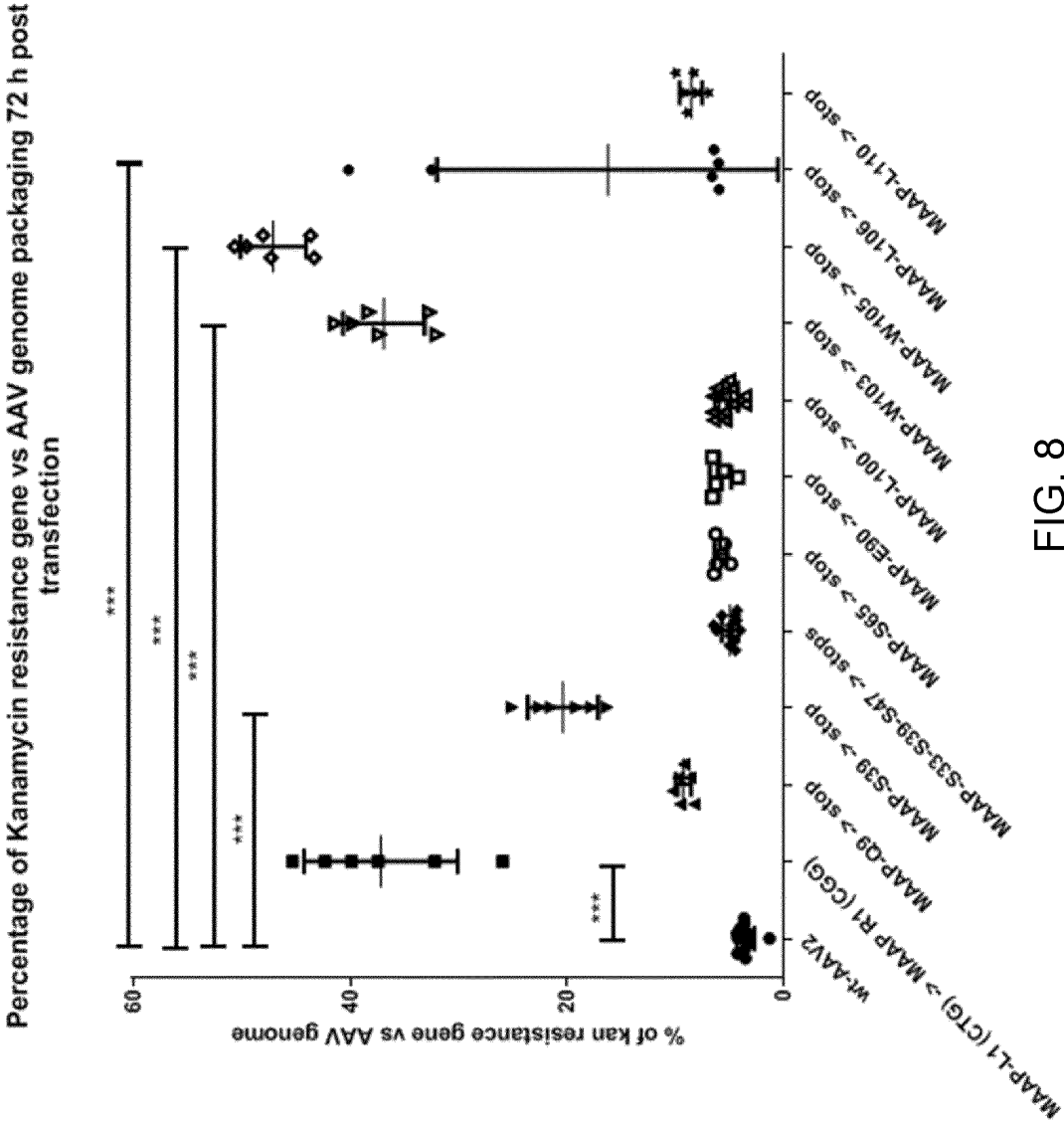


FIG. 6





Percentage of Kanamycin resistance gene vs AAV genome packaging 24 h post transfection

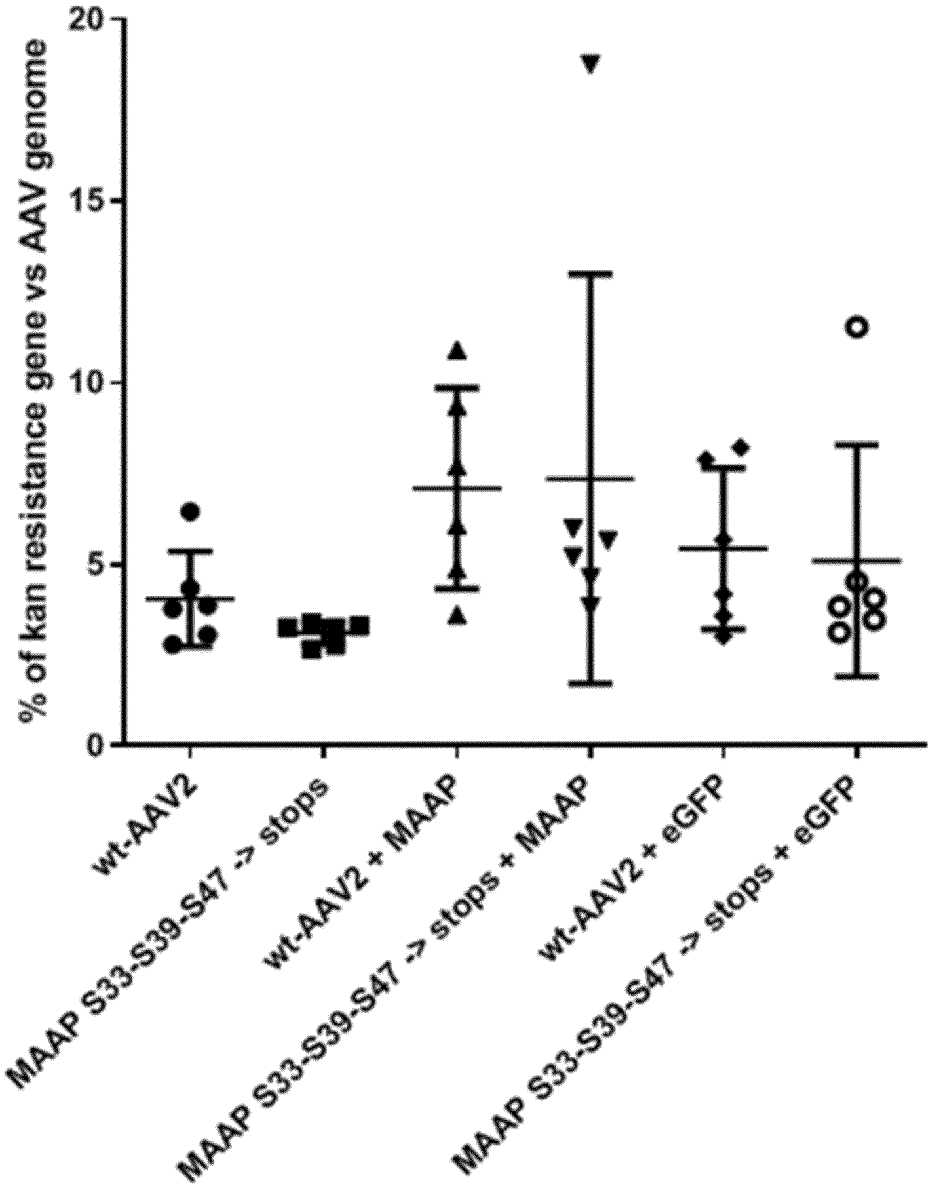


FIG. 9

10/48

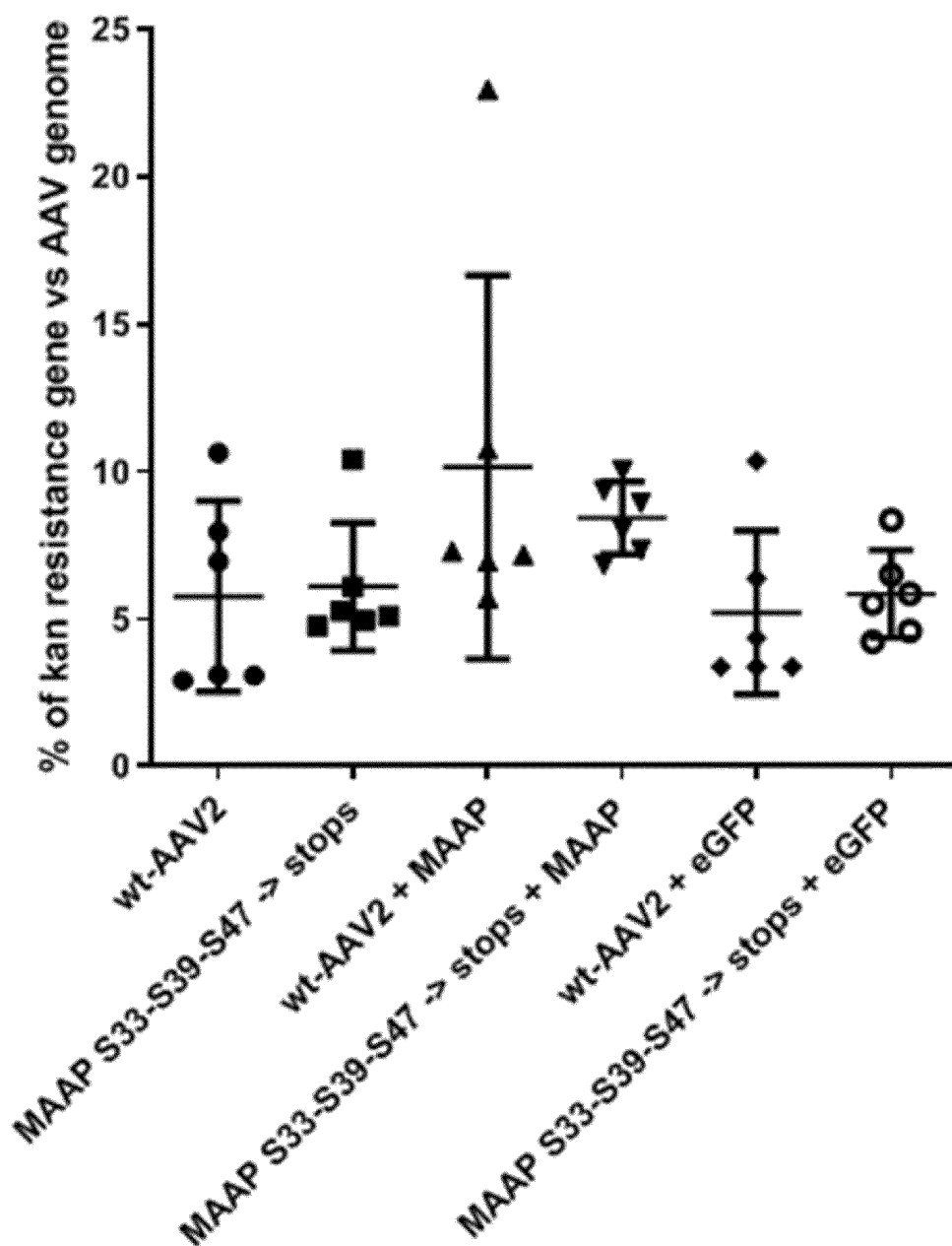
Percentage of Kanamycin resistance gene vs AAV genome packaging 72 h post transfection

FIG. 10

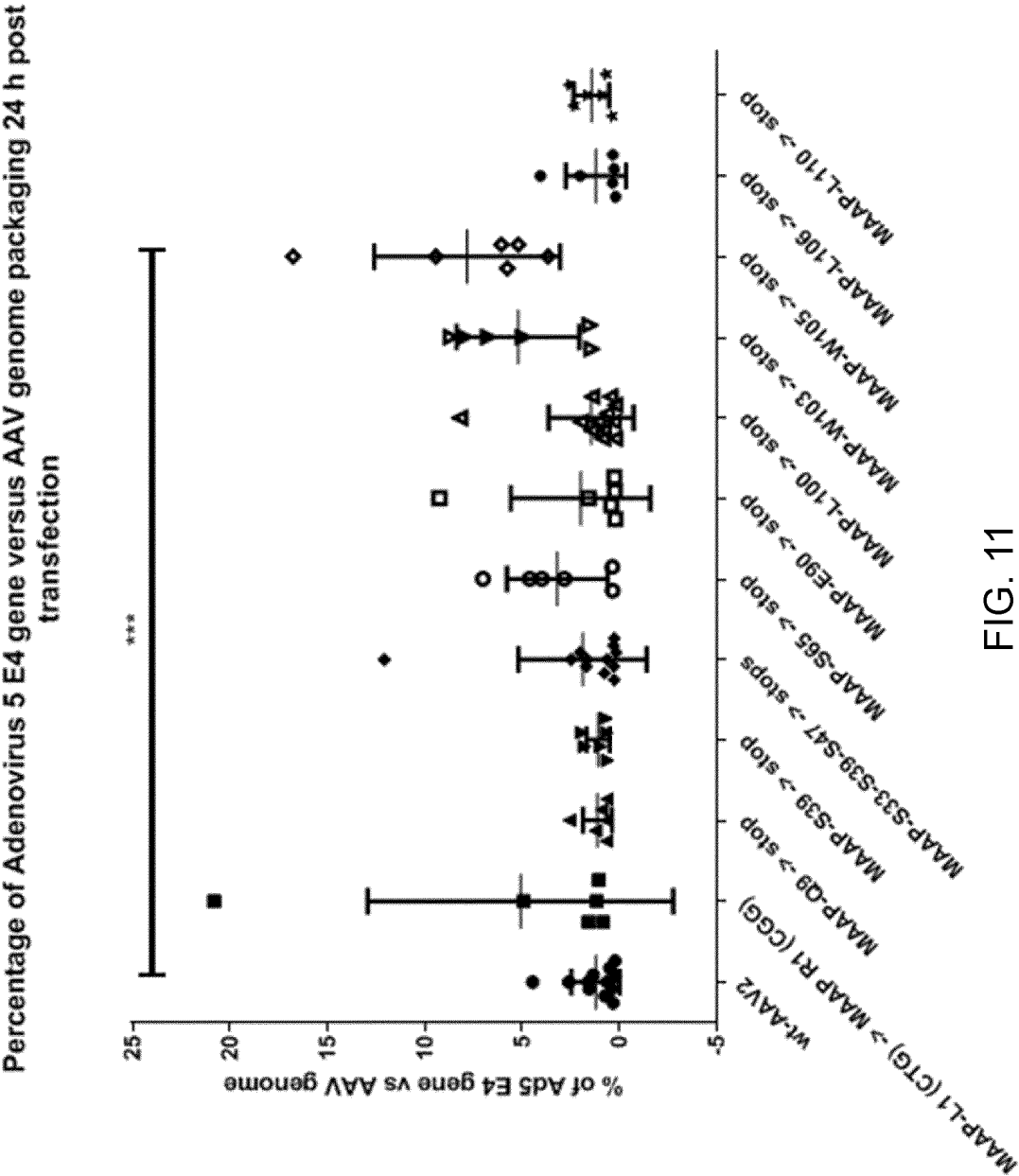


FIG. 11

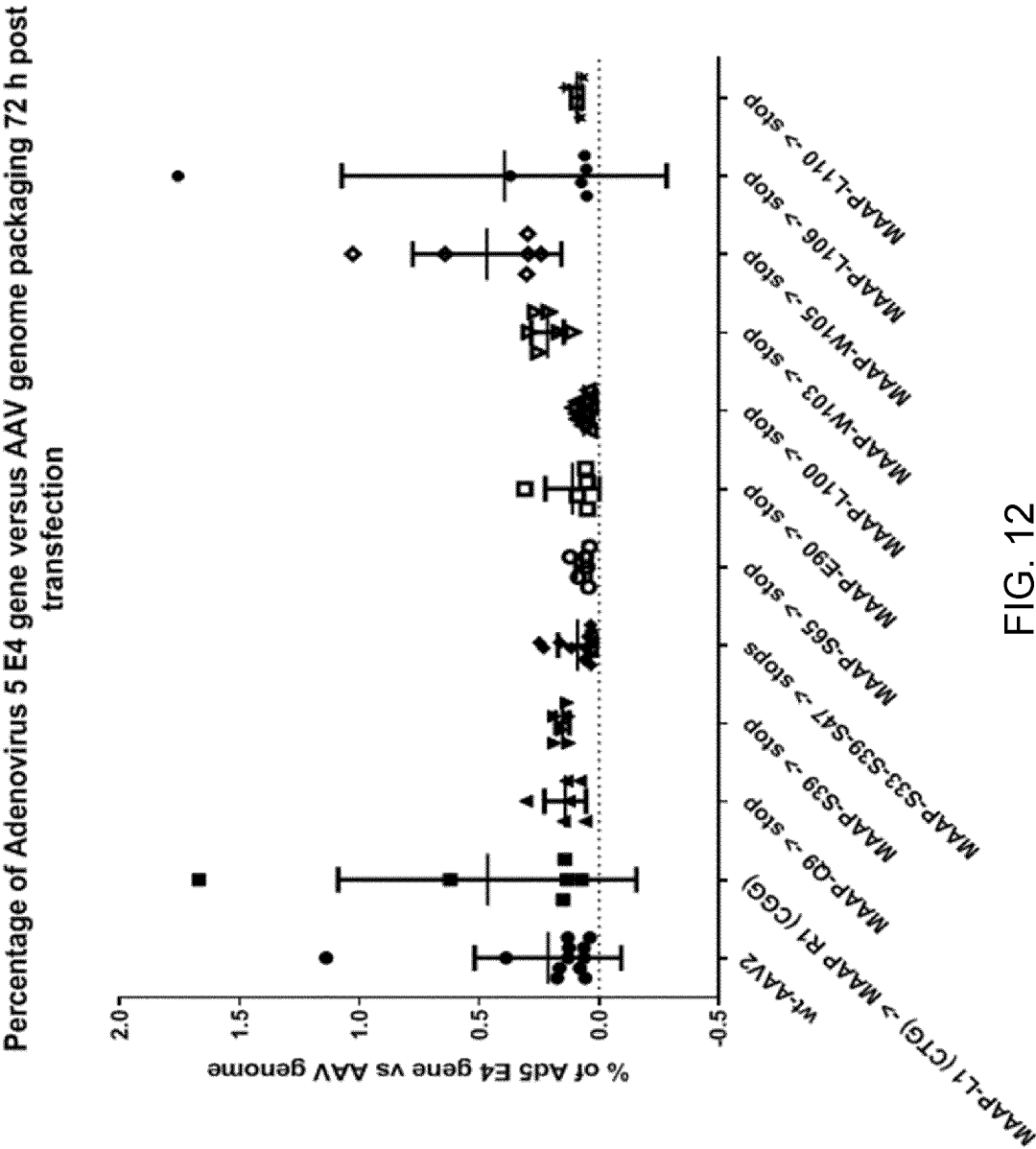


FIG. 12

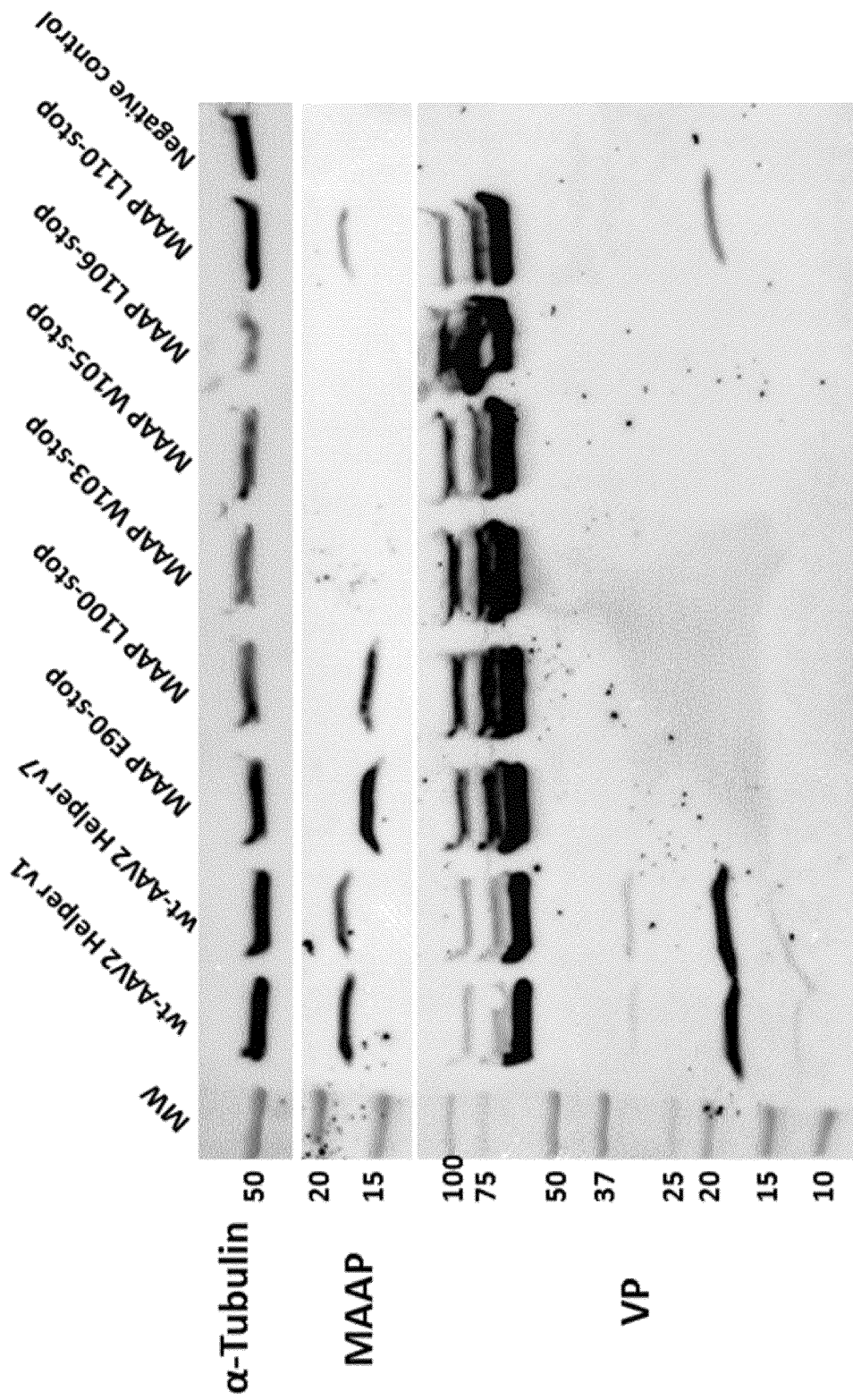


FIG. 13

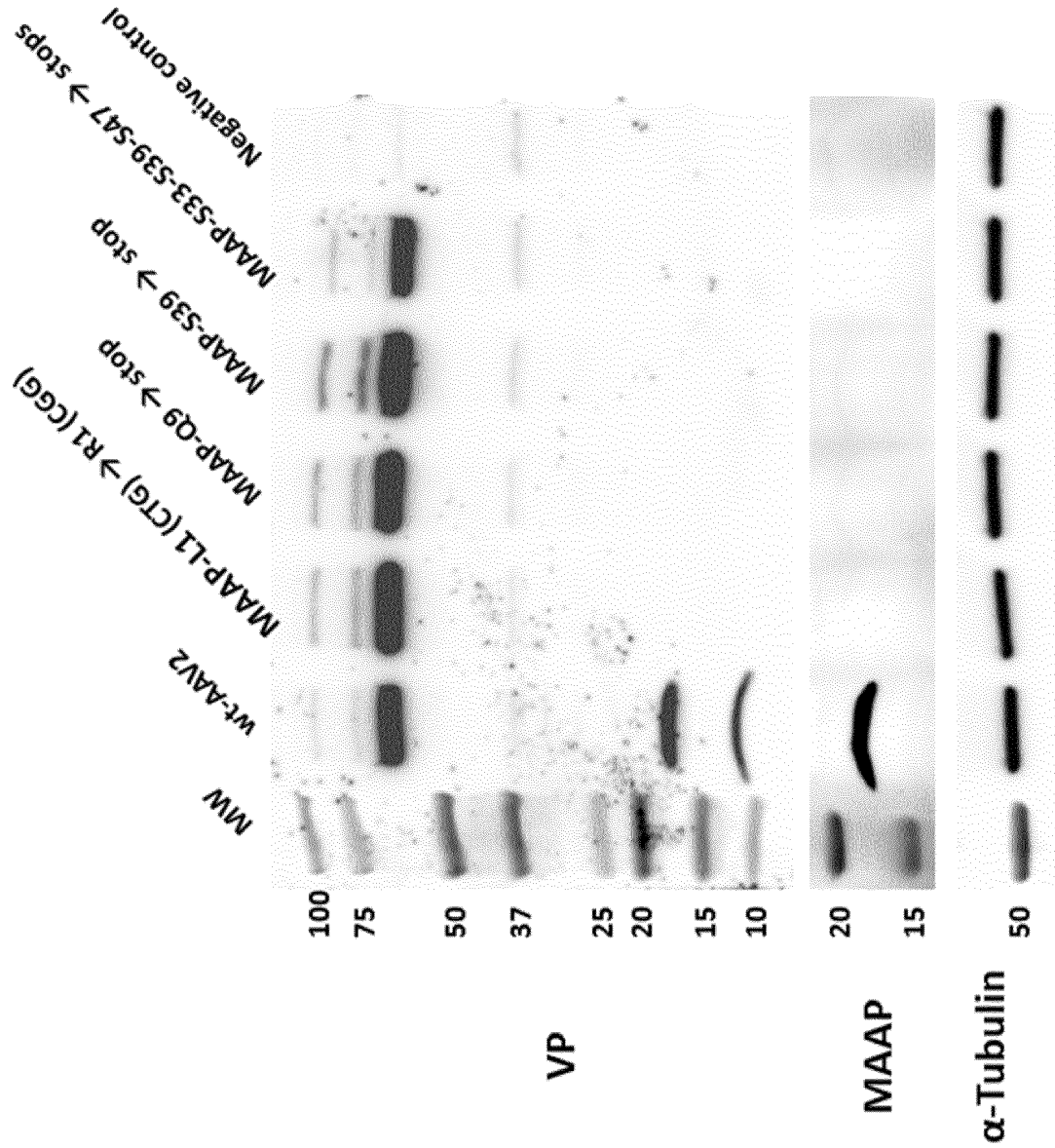


FIG. 14

Percentage of capsids containing AAV genomes vs total capsids

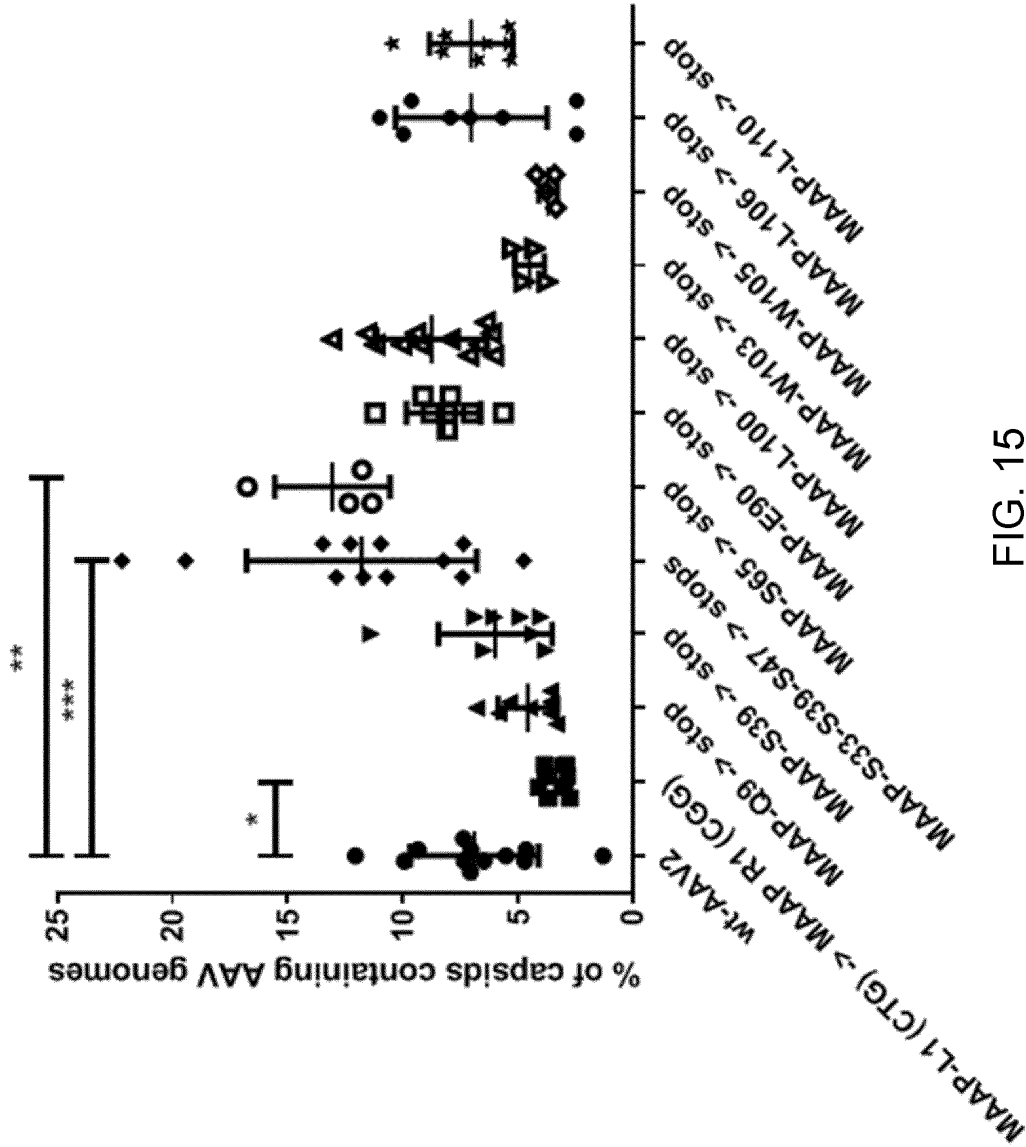
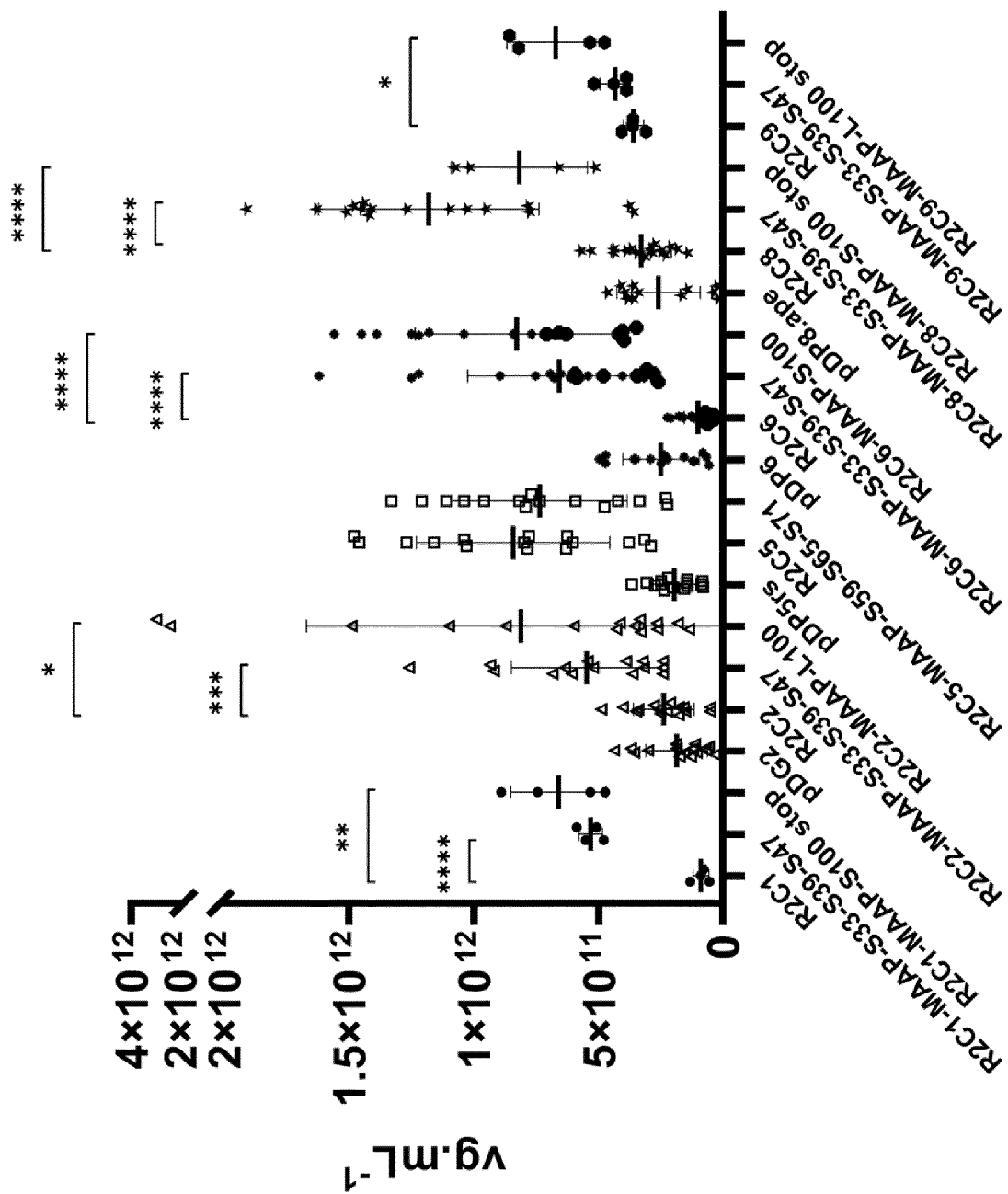


FIG. 15



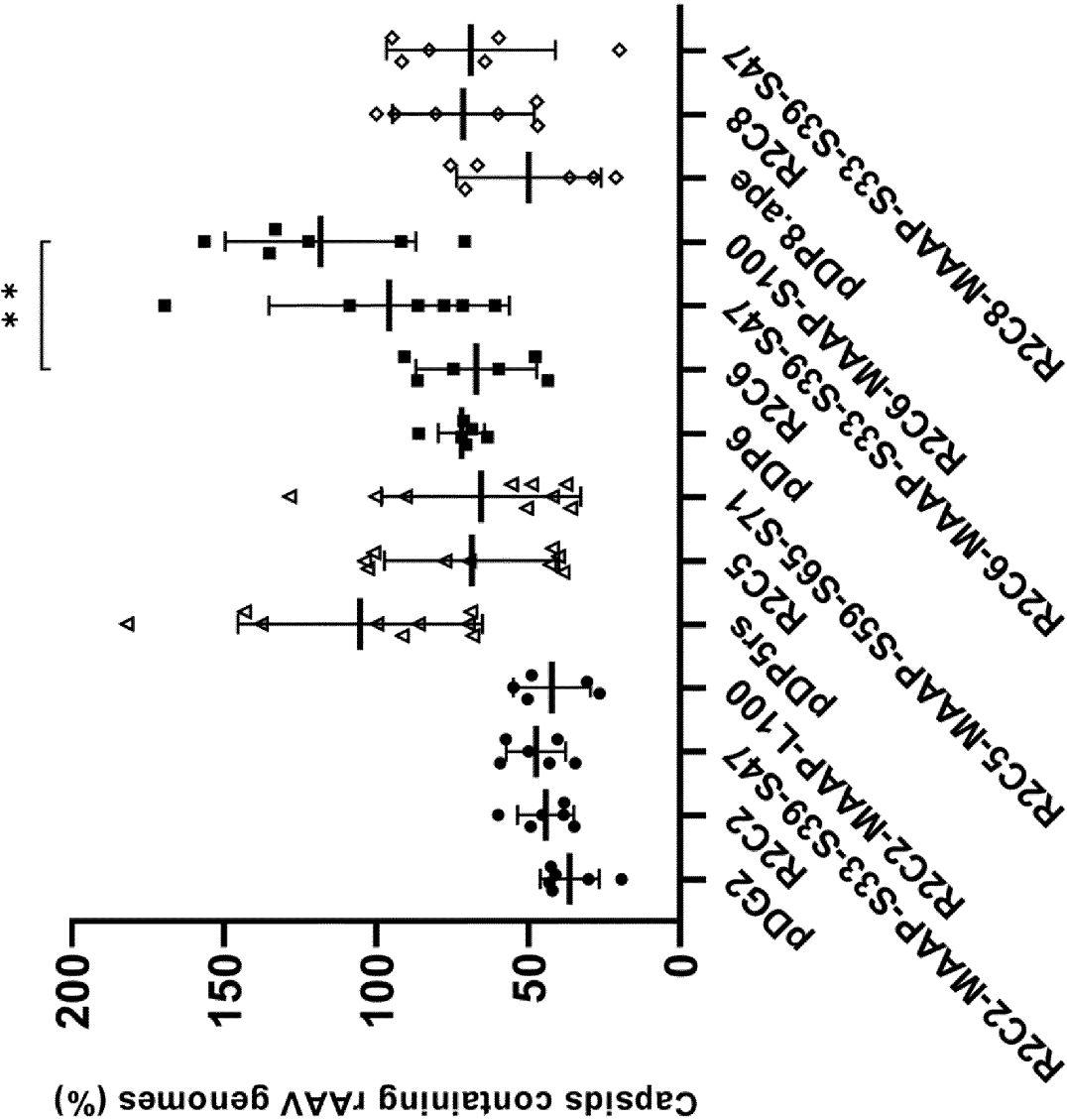


FIG. 17

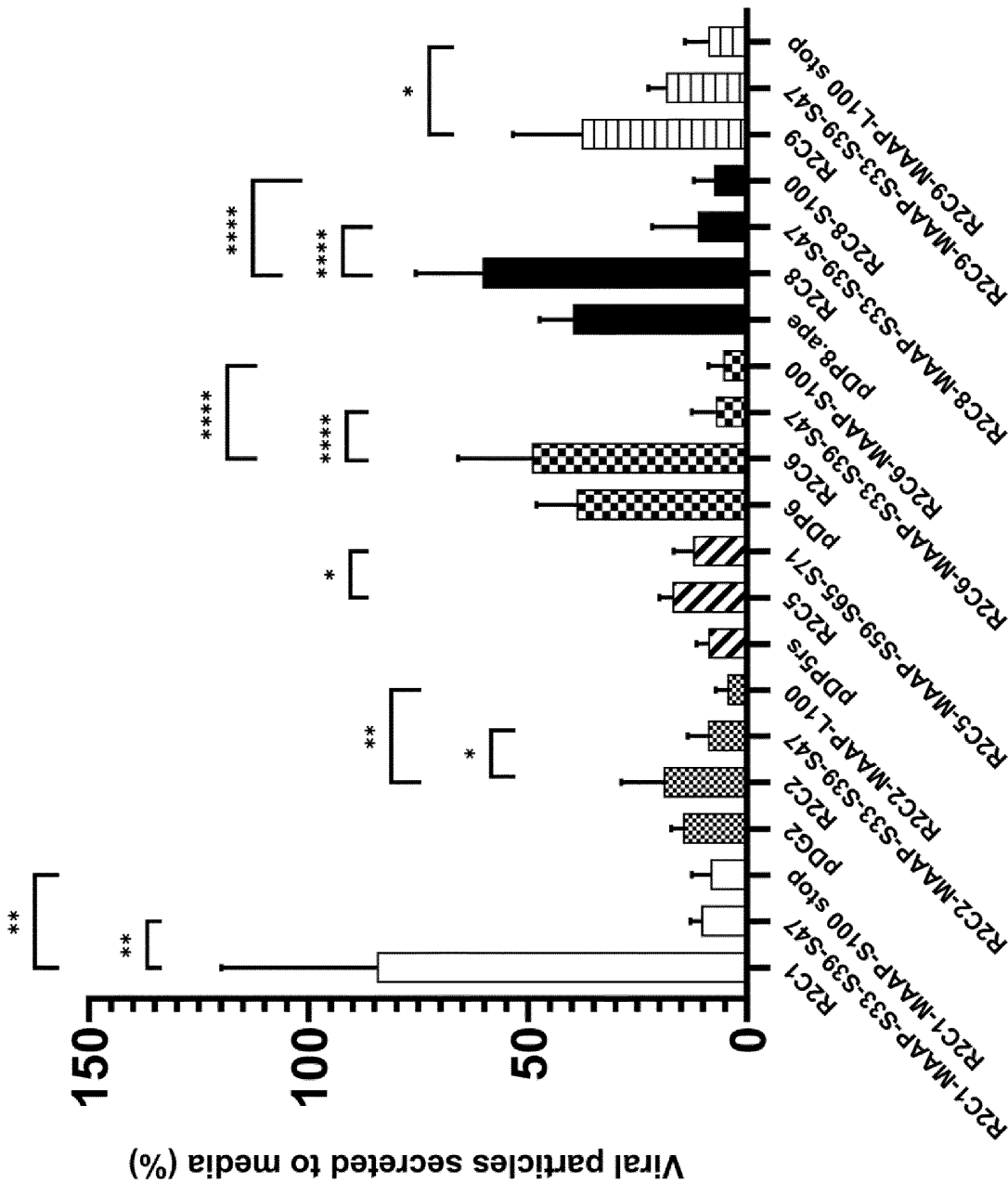


FIG. 18

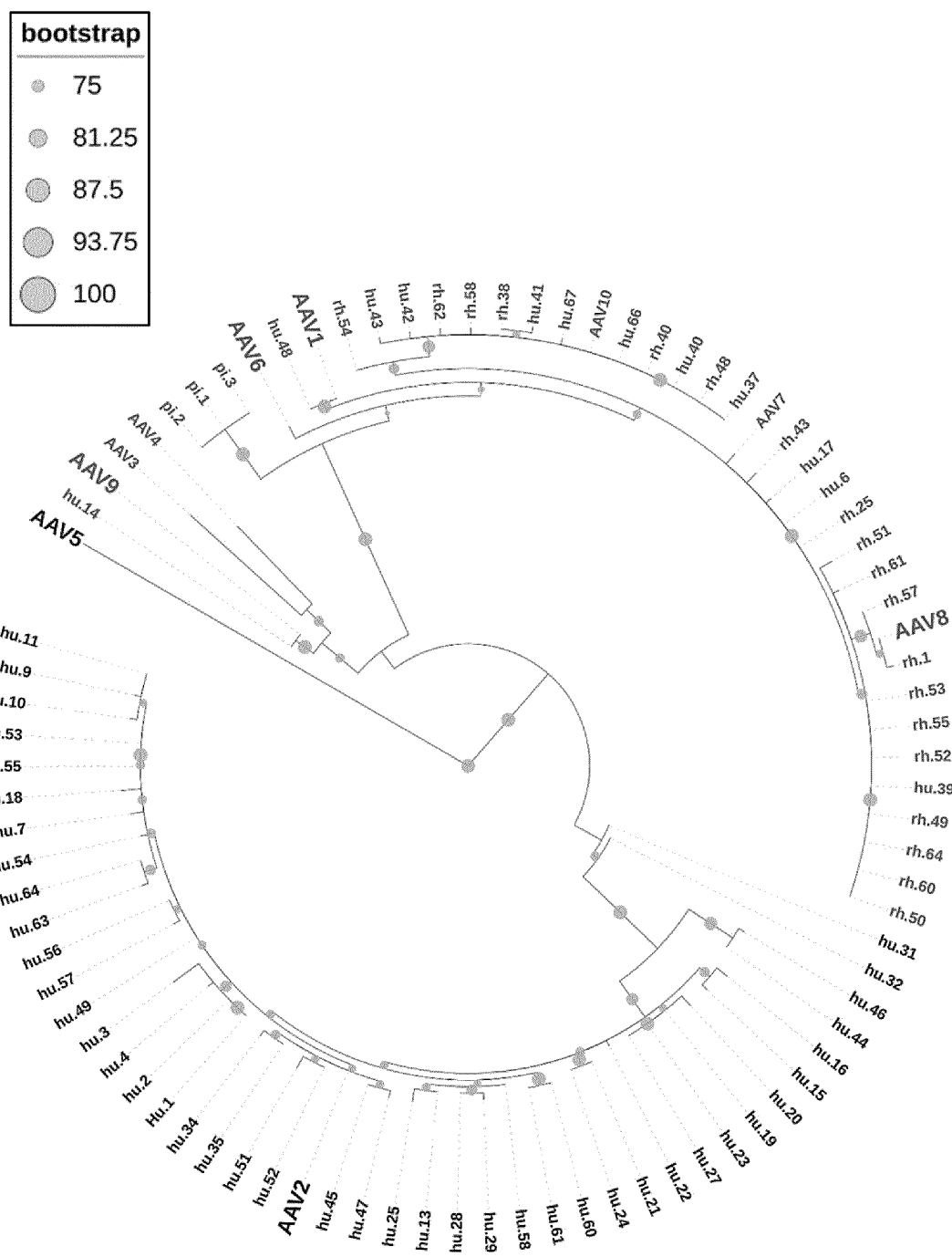


FIG. 19

20/48

FIG. 20 (1-23)

<110> Kuopio Center for Gene and Cell Therapy Oy

<120> Improved Adeno-Associated Virus Gene Therapy Vectors

<130> KCT

<160> 29

<170> PatentIn version 3.5

<210> 1

<211> 120

<212> PRT

<213> AAV1 MAAP

<400> 1

Asn Leu Glu Pro Arg Ser Pro Lys Pro Thr Ser Lys Ser Arg Thr Thr
 1 5 10 15

Ala Gly Val Trp Cys Phe Leu Ala Thr Ser Thr Ser Asp Pro Ser Thr
 20 25 30

Asp Ser Thr Arg Gly Ser Pro Ser Thr Arg Arg Thr Gln Arg Pro Ser
 35 40 45

Ser Thr Thr Pro Arg Thr Thr Ser Ser Ser Lys Arg Val Thr Ile Arg
 50 55 60

Thr Cys Gly Ile Thr Thr Pro Thr Pro Ser Phe Arg Ser Val Cys Lys
 65 70 75 80

Lys Ile Arg Leu Leu Gly Ala Thr Ser Gly Glu Gln Ser Ser Arg Pro
 85 90 95

Arg Ser Gly Phe Ser Asn Leu Ser Val Trp Leu Arg Lys Ala Leu Arg
 100 105 110

Arg Leu Leu Glu Arg Asn Val Arg
 115 120

<210> 2

<211> 119

<212> PRT

<213> AAV2 MAAP

<400> 2

Leu Ala His His His Gln Ser Pro Gln Ser Gly Ile Arg Thr Thr Ala
 1 5 10 15

Gly Val Leu Cys Phe Leu Gly Thr Ser Thr Ser Asp Pro Ser Thr Asp

21/48

FIG. 20 (2-23)

20 25 30
 Ser Thr Arg Glu Ser Arg Ser Thr Arg Gln Thr Pro Arg Pro Ser Ser
 35 40 45
 Thr Thr Lys Pro Thr Thr Gly Ser Ser Thr Ala Glu Thr Thr Arg Thr
 50 55 60
 Ser Ser Thr Thr Thr Pro Thr Arg Ser Phe Arg Ser Ala Leu Lys Lys
 65 70 75 80
 Ile Arg Leu Leu Gly Ala Thr Ser Asp Glu Gln Ser Ser Arg Arg Lys
 85 90 95
 Arg Gly Phe Leu Asn Leu Trp Ala Trp Leu Arg Asn Leu Leu Arg Arg
 100 105 110
 Leu Arg Glu Lys Arg Gly Arg
 115
 <210> 3
 <211> 120
 <212> PRT
 <213> AAV3 MAAP
 <400> 3
 Asn Leu Glu Ser Leu Asn Pro Lys Arg Thr Asn Asn Thr Arg Thr Thr
 1 5 10 15
 Val Gly Val Leu Cys Phe Arg Val Thr Asn Thr Ser Asp Pro Val Thr
 20 25 30
 Asp Ser Thr Lys Glu Ser Arg Ser Thr Arg Arg Thr Arg Gln Pro Ser
 35 40 45
 Asn Thr Thr Lys Leu Thr Thr Ser Ser Ser Arg Pro Val Thr Thr Arg
 50 55 60
 Thr Ser Ser Thr Thr Thr Pro Thr Pro Ser Phe Arg Ser Val Phe Lys
 65 70 75 80
 Lys Ile Arg Leu Leu Gly Ala Thr Leu Ala Glu Gln Ser Ser Arg Pro
 85 90 95
 Lys Arg Gly Ser Leu Ser Leu Leu Val Trp Leu Arg Lys Gln Leu Lys
 100 105 110
 Arg Leu Leu Glu Arg Arg Gly Leu

22/48

FIG. 20 (3-23)

115 120

<210> 4
 <211> 134
 <212> PRT
 <213> AAV4 MAAP

<400> 4

Arg Thr Thr Ser Leu Lys Ala Phe Glu Ser Gly Gly Arg Cys Asn Leu
 1 5 10 15

Glu Pro Leu Asn Pro Arg Gln Ile Asn Asn Ile Arg Thr Thr Leu Gly
 20 25 30

Val Leu Cys Phe Arg Val Thr Asn Thr Ser Asp Pro Ala Thr Asp Ser
 35 40 45

Thr Arg Gly Asn Pro Ser Thr Gln Arg Thr Arg Gln Pro Ser Ser Thr
 50 55 60

Thr Arg Pro Thr Thr Ser Ser Ser Arg Pro Val Thr Thr Pro Thr Ser
 65 70 75 80

Ser Thr Thr Thr Pro Thr Arg Ser Ser Ser Ser Gly Phe Arg Ala Thr
 85 90 95

His Arg Leu Gly Ala Thr Ser Ala Glu Gln Ser Ser Arg Pro Lys Arg
 100 105 110

Gly Phe Leu Asn Leu Leu Val Trp Leu Ser Lys Arg Val Arg Arg Leu
 115 120 125

Leu Glu Arg Arg Asp Arg
 130

<210> 5
 <211> 144
 <212> PRT
 <213> AAV5 MAAP

<400> 5

Ser Cys Leu Leu Leu Ile Thr Leu Gln Ile Gly Trp Lys Lys Leu Val
 1 5 10 15

Lys Val Phe Ala Ser Phe Trp Ala Leu Lys Arg Ala His Arg Asn Gln
 20 25 30

Asn Pro Ile Ser Ser Ile Lys Ile Lys Pro Val Val Leu Cys Cys Leu
 35 40 45

23/48

FIG. 20 (4-23)

Val Ile Thr Ile Ser Asp Pro Glu Thr Val Ser Ile Glu Glu Ser Leu
50 55 60

Ser Thr Gly Gln Thr Arg Ser Arg Glu Ser Thr Thr Ser Arg Thr Thr
65 70 75 80

Ser Ser Leu Arg Arg Glu Thr Thr Pro Thr Ser Ser Thr Thr Thr Arg
85 90 95

Thr Pro Ser Phe Arg Arg Ser Ser Pro Thr Thr His Pro Ser Gly Glu
100 105 110

Thr Ser Glu Arg Gln Ser Phe Arg Pro Arg Lys Gly Phe Ser Asn Leu
115 120 125

Leu Ala Trp Leu Lys Arg Val Leu Arg Arg Pro Leu Pro Glu Ser Gly
130 135 140

<210> 6
<211> 170
<212> PRT
<213> AAV6 MAAP

<400> 6

Asn Leu Glu Pro Arg Asn Pro Lys Pro Thr Ser Lys Ser Arg Thr Thr
1 5 10 15

Ala Gly Val Trp Cys Phe Leu Ala Thr Ser Thr Ser Asp Pro Ser Thr
20 25 30

Asp Ser Thr Arg Gly Ser Pro Ser Thr Arg Arg Met Gln Arg Pro Ser
35 40 45

Ser Thr Thr Arg Pro Thr Thr Ser Ser Ser Lys Arg Val Thr Ile Arg
50 55 60

Thr Cys Gly Ile Thr Thr Pro Thr Pro Ser Phe Ser Thr Ser Asp Pro
65 70 75 80

Ser Thr Asp Ser Thr Arg Gly Ser Pro Ser Thr Arg Arg Met Gln Arg
85 90 95

Pro Ser Ser Thr Thr Arg Pro Thr Thr Ser Ser Ser Lys Arg Val Thr
100 105 110

Ile Arg Thr Cys Gly Ile Thr Thr Pro Thr Pro Ser Phe Arg Ser Val
115 120 125

24/48

FIG. 20 (5-23)

Cys Lys Lys Ile Arg Leu Leu Gly Ala Thr Ser Gly Glu Gln Ser Ser
 130 135 140

Arg Pro Arg Arg Gly Phe Ser Asn Leu Leu Val Trp Leu Arg Lys Val
 145 150 155 160

Leu Arg Arg Leu Leu Glu Arg Asn Val Arg
 165 170

<210> 7
 <211> 120
 <212> PRT
 <213> AAV7 MAAP

<400> 7

Asn Leu Glu Pro Arg Asn Pro Lys Pro Thr Ser Lys Ser Arg Thr Thr
 1 5 10 15

Ala Gly Val Trp Cys Phe Leu Ala Thr Ser Thr Ser Asp Pro Ser Thr
 20 25 30

Asp Ser Thr Arg Gly Ser Pro Ser Thr Arg Arg Thr Gln Arg Pro Ser
 35 40 45

Ser Thr Thr Arg Pro Thr Thr Ser Ser Ser Lys Arg Val Thr Ile Arg
 50 55 60

Thr Cys Gly Ile Thr Thr Pro Thr Pro Ser Phe Arg Ser Val Cys Lys
 65 70 75 80

Lys Ile Arg His Leu Gly Ala Thr Ser Gly Glu Gln Ser Ser Arg Pro
 85 90 95

Arg Ser Gly Phe Ser Asn Leu Ser Val Trp Leu Arg Lys Ala Leu Arg
 100 105 110

Arg Leu Leu Gln Arg Arg Asp Arg
 115 120

<210> 8
 <211> 120
 <212> PRT
 <213> AAV8 MAAP

<400> 8

Asn Leu Glu Pro Arg Ser Pro Lys Pro Thr Ser Lys Ser Arg Thr Thr
 1 5 10 15

25/48

FIG. 20 (6-23)

Ala Gly Val Trp Cys Phe Leu Ala Thr Ser Thr Ser Asp Pro Ser Thr
20 25 30

Asp Ser Thr Arg Gly Ser Pro Ser Thr Arg Arg Thr Gln Arg Pro Ser
35 40 45

Ser Thr Thr Arg Pro Thr Thr Ser Ser Cys Arg Arg Val Thr Ile Arg
50 55 60

Thr Cys Gly Ile Thr Thr Pro Thr Pro Ser Phe Arg Ser Val Cys Lys
65 70 75 80

Lys Ile Arg Leu Leu Gly Ala Thr Ser Gly Glu Gln Ser Ser Arg Pro
85 90 95

Arg Ser Gly Phe Ser Asn Leu Ser Val Trp Leu Arg Lys Ala Leu Arg
100 105 110

Arg Leu Leu Glu Arg Arg Asp Arg
115 120

<210> 9
<211> 119
<212> PRT
<213> AAV9 MAAP

<400> 9

Leu Glu Pro Leu Asn Pro Arg Gln Ile Asn Asn Ile Lys Thr Thr Leu
1 5 10 15

Glu Val Leu Cys Phe Arg Val Thr Asn Thr Leu Asp Pro Ala Thr Asp
20 25 30

Ser Thr Arg Gly Ser Arg Ser Thr Gln Gln Thr Arg Arg Pro Ser Ser
35 40 45

Thr Thr Arg Pro Thr Thr Ser Ser Ser Arg Pro Glu Thr Thr Arg Thr
50 55 60

Ser Ser Thr Thr Thr Pro Thr Pro Ser Ser Arg Ser Gly Ser Lys Lys
65 70 75 80

Ile Arg Leu Leu Gly Ala Thr Ser Gly Glu Gln Ser Ser Arg Pro Lys
85 90 95

Arg Gly Phe Leu Asn Leu Leu Val Trp Leu Arg Lys Arg Leu Arg Arg
100 105 110

26/48

FIG. 20 (7-23)

Leu Leu Glu Arg Arg Gly Leu
115

<210> 10
<211> 120
<212> PRT
<213> AAV10 MAAP

<400> 10

Asn Leu Glu Pro Pro Ser Pro Arg Pro Thr Ser Arg Ser Arg Thr Thr
1 5 10 15

Ala Gly Val Trp Cys Phe Leu Ala Thr Ser Thr Ser Asp Pro Ser Thr
20 25 30

Asp Ser Thr Arg Gly Ser Pro Ser Thr Arg Arg Thr Gln Arg Pro Ser
35 40 45

Ser Thr Thr Arg Pro Thr Thr Ser Ser Ser Lys Arg Val Thr Ile Arg
50 55 60

Thr Cys Gly Ile Thr Thr Pro Thr Pro Ser Phe Arg Ser Val Cys Lys
65 70 75 80

Lys Ile Arg Leu Leu Gly Ala Thr Ser Gly Glu Gln Ser Ser Arg Pro
85 90 95

Arg Ser Gly Phe Ser Asn Leu Ser Val Trp Leu Arg Lys Leu Leu Arg
100 105 110

Arg Leu Leu Glu Arg Arg Asp Arg
115 120

<210> 11
<211> 120
<212> PRT
<213> AAV consensus MAAP

<220>
<221> misc_feature
<222> (5)..(5)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (8)..(8)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (10)..(10)

27/48

FIG. 20 (8-23)

```

<223> Xaa can be any naturally occurring amino acid
<220>
<221> misc_feature
<222> (12)..(12)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (24)..(24)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (39)..(39)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (45)..(45)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (78)..(79)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (90)..(90)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (110)..(110)
<223> Xaa can be any naturally occurring amino acid

<400> 11
Asn Leu Glu Pro Xaa Asn Pro Xaa Pro Xaa Ser Xaa Ile Arg Thr Thr
1      5      10      15

Ala Gly Val Leu Cys Phe Leu Xaa Thr Ser Thr Ser Asp Pro Ser Thr
20      25      30

Asp Ser Thr Arg Gly Ser Xaa Ser Thr Arg Arg Thr Xaa Arg Pro Ser
35      40      45

Ser Thr Thr Arg Pro Thr Thr Ser Ser Ser Arg Arg Val Thr Thr Arg
50      55      60

Thr Ser Ser Thr Thr Thr Pro Thr Pro Ser Phe Arg Ser Xaa Xaa Lys
65      70      75      80

Lys Ile Arg Leu Leu Gly Ala Thr Ser Xaa Glu Gln Ser Ser Arg Pro
85      90      95

```

28/48

FIG. 20 (9-23)

Arg Arg Gly Phe Ser Asn Leu Leu Val Trp Leu Arg Lys Xaa Leu Arg
 100 105 110

Arg Leu Leu Glu Arg Arg Gly Arg
 115 120

<210> 12
 <211> 6952
 <212> DNA
 <213> p0230-pUC-K-AAV2wt-Reverse

<400> 12
 gacgaaaggg cctcgtgata cgcctatatt tataggttaa tgtcatgata ataatggttt 60
 cttagacgtc aggtggcact tttcggggaa atgtgcgcgg aacccttatt tgtttatttt 120
 tctaaataca ttcaaatatg tatccgctca tgagacaata accctgataa atgcttcaat 180
 aatattgaaa aaggaagagt atgagccata ttcaacggga aacgtcttgc tctaggccgc 240
 gattaaattc caacatggat gctgatttat atgggtataa atgggctcgc gataatgtcg 300
 ggcaatcagg tgcgacaatc tatcgattgt atgggaagcc cgatgcgccca gagttgtttc 360
 tgaaacatgg caaaggtagc gttgccaatg atgttacaga tgagatggtc agactaaact 420
 ggctgacgga atttatgcct cttccgacca tcaagcattt tatccgtact cctgatgatg 480
 catggttact caccactgcg atccctggga aaacagcatt ccaggtatta gaagaatata 540
 ctgattcagg tgaaaatatt gttgatgcgc tggcagtggt cctgcgccgg ttgcattcga 600
 ttctgtttg taattgtcct tttaacagcg atcgcgattt tcgtctcgct caggcgcaat 660
 cacgaatgaa taacggtttg gttgatgcga gtgattttga tgacgagcgt aatggctggc 720
 ctgttgaaaca agtctggaaa gaaatgcata aacttttgcc attctcaccg gattcagtcg 780
 tcaactcatg tgatttctca cttgataacc ttatttttga cgaggggaaa ttaataggtt 840
 gtattgatgt tggacgagtc ggaatcgagc accgatacca ggatcttgcc atcctatgga 900
 actgcctcgg tgagttttct cttcattac agaaacggct ttttcaaaaa tatggtattg 960
 ataatcctga tatgaataaa ttgcagtttc atttgatgct cgatgagttt ttctaactgt 1020
 cagaccaagt ttactcatat atactttaga ttgattttaa acttcatttt taatttaaaa 1080
 ggatctaggt gaagatcctt tttgataatc tcatgaccaa aatcccttaa cgtgagtttt 1140
 cgttccactg agcgtcagac cccgtagaaa agatcaaagg atcttcttga gatccttttt 1200
 ttctgcgcgt aatctgctgc ttgcaaacia aaaaaccacc gctaccagcg gtggtttgtt 1260
 tgccggatca agagctacca actctttttc cgaaggtaac tggcttcagc agagcgcaga 1320
 taccaaatac tgttcttcta gtgtagccgt agttaggcca ccacttcaag aactctgtag 1380
 caccgcctac atacctcgct ctgctaatac tgttaccagt ggctgctgcc agtggcgata 1440
 agtcgtgtct taccgggttg gactcaagac gatagttacc ggataaggcg cagcggctcg 1500

29/48

FIG. 20 (10-23)

gctgaacggg gggttcgtgc acacagccca gcttgagcgc aacgacctac accgaactga 1560
gataacctaca gcgtgagcta tgagaaagcg ccacgcttcc cgaagggaga aaggcggaca 1620
ggatatccggt aagcggcagg gtcggaacag gagagcgcac gagggagctt ccagggggaa 1680
acgcctggta tctttatagt cctgtcgggt ttcgccacct ctgacttgag cgtcgatttt 1740
tgtgatgctc gtcagggggg cggagcctat ggaaaaacgc cagcaacgcg gcctttttac 1800
ggttcctggc cttttgctgg ctttttctc acatgttctt tcctgcgtta tcccctgatt 1860
ctgtggataa ccgtattacc gcctttgagt gagctgatac cgctcgccgc agccgaacga 1920
ccgagcgcag cgagtcagtg agcaggaag cggaagagcg cccaatacgc aaaccgcctc 1980
tccccgcgcg ttggccgatt cattaatgca gctggcacga caggtttccc gactggaaag 2040
cgggcagtga gcgcaacgca atttaattaa tcagatccct caatagcggc cttggccact 2100
ccctctctgc gcgctcgtc gctcactgag gccgggcgac caaaggctgc cgcacgcccg 2160
ggctttgccc gggcggcctc agtgagcgcg cgagcgcgca gagaggaggt ggccaactcc 2220
atcactaggg gttcctggag ggggtggagtc gtgacgtgaa ttacgtcata gggtttagga 2280
ggctctgtat tagaggcac gtgagtgttt tgcgacattt tgcgacacca tgtggtcacg 2340
ctgggtatatt aagcccaggt gagcacgcag ggtctccatt ttgaagcggg aggtttgaac 2400
gcgcagccgc catgccgggg ttttacgaga ttgtgattaa ggtccccagc gaccttgacg 2460
agcatctgcc cggcatttct gacagctttg tgaactgggt ggccgagaag gaatgggagt 2520
tgccgccaga ttctgacatg gatctgaatc tgattgagca ggcaccctg accgtggccg 2580
agaagctgca gcgcgacttt ctgacggaat ggcgcctgtg gagtaaggcc ccggaggccc 2640
ttttctttgt gcaatttgag aaggagagaga gctacttcca catgcacgtg ctcgtggaaa 2700
ccaccggggt gaaatccatg gttttgggac gtttcctgag tcagattcgc gaaaaactga 2760
ttcagagaat ttaccgcggg atcgagccga ctttgccaaa ctggttcgcg gtcacaaaga 2820
ccagaaatgg cgccggaggc gggaacaagg tgggtgatga gtgctacatc cccaattact 2880
tgctcccaa aaccagcct gagctccagt gggcgtggac taatatggaa cagtatttaa 2940
gcgcctgttt gaatctcacg gagcgtaaac ggttggtggc gcagcatctg acgcacgtgt 3000
cgcagacgca ggagcagaac aaagagaatc agaatcccaa ttctgatgcg ccggtgatca 3060
gatcaaaaac ttcagccagg tacatggagc tggtcgggtg gctcgtggac aaggggatta 3120
cctcggagaa gcagtggatc caggaggacc aggcctcata catctccttc aatgcggcct 3180
ccaactcgcg gtcccaaatc aaggctgcct tggacaatgc gggaaagatt atgagcctga 3240
ctaaaaccgc ccccgactac ctggtgggac agcagcccgt ggaggacatt tccagcaatc 3300
ggatttataa aattttggaa ctaaacgggt acgatccca atatgcggct tccgtctttc 3360

30/48

FIG. 20 (11-23)

tgggatgggc	cacgaaaaag	ttcggcaaga	ggaacaccat	ctggctgttt	gggcctgcaa	3420
ctaccgggaa	gaccaacatc	gcggaggcca	tagcccacac	tgtgcccttc	tacgggtgcg	3480
taaactggac	caatgagaac	tttcccttca	acgactgtgt	cgacaagatg	gtgatctggt	3540
gggaggaggg	gaagatgacc	gccaaagtcg	tggagtccgc	caaagccatt	ctcggaggaa	3600
gcaagggtcg	cgtggaccag	aaatgcaagt	cctcggccca	gatagaccgc	actcccgtga	3660
tcgtcacctc	caacaccaac	atgtgcgccg	tgattgacgg	gaactcaacg	accttcgaac	3720
accagcagcc	gttgcaagac	cggatgttca	aatttgaact	cacccgccgt	ctggatcatg	3780
actttgggaa	ggtcaccaag	caggaagtca	aagacttttt	ccggtgggca	aaggatcacg	3840
tggttgaggt	ggagcatgaa	ttctacgtca	aaaagggttg	agccaagaaa	agacccgccc	3900
ccagtgcgc	agatataagt	gagcccaaac	gggtgcgcga	gtcagttgcg	cagccatcga	3960
cgtcagacgc	ggaagcttcg	atcaactacg	cagacaggta	ccaaaacaaa	tgttctcgtc	4020
acgtgggcat	gaatctgatg	ctgtttccct	gcagacaatg	cgagagaatg	aatcagaatt	4080
caaatatctg	cttcactcac	ggacagaaag	actgtttaga	gtgctttccc	gtgtcagaat	4140
ctcaacccgt	ttctgtcgtc	aaaaaggcgt	atcagaaact	gtgctacatt	catcatatca	4200
tgggaaagg	gccagacgct	tgcactgcct	gcgatctggg	caatgtggat	ttggatgact	4260
gcattcttga	acaataaatg	atttaaatca	ggataggctg	ccgatgggta	tcttccagat	4320
tggctcgagg	acactctctc	tgaaggaata	agacagtggg	ggaagctcaa	acctggccca	4380
ccaccaccaa	agcccgagca	gcggcataag	gacgacagca	ggggtcttgt	gcttcctggg	4440
tacaagtacc	tcggaccctt	caacggactc	gacaagggag	agccgggtca	cgaggcagac	4500
gccgcggccc	tcgagcacga	caaagcctac	gaccggcagc	tcgacagcgg	agacaacccg	4560
tacctcaagt	acaaccacgc	cgacgcggag	tttcaggagc	gccttaaaga	agatacgtct	4620
tttgggggca	acctcggacg	agcagtcttc	caggcgaaaa	agagggttct	tgaacctctg	4680
ggcctggttg	aggaacctgt	taagacggct	ccgggaaaaa	agaggccggg	agagcactct	4740
cctgtggagc	cagactcctc	ctcgggaacc	ggaaaggcgg	gccagcagcc	tgcaagaaaa	4800
agattgaatt	ttggtcagac	tgagacgcga	gactcagtac	ctgaccccca	gcctctcgga	4860
cagccaccag	cagccccctc	tggtctggga	actaatacga	tggtacaggg	cagtggcgca	4920
ccaatggcag	acaataacga	gggcgccgac	ggagtgggta	attcctcggg	aaattggcat	4980
tgcgattcca	catggatggg	cgacagagtc	atcaccacca	gcacccgaac	ctgggccctg	5040
cccacctaca	acaaccacct	ctacaaacaa	atttccagcc	aatcaggagc	ctcgaacgac	5100
aatcactact	ttggctacag	caccccttgg	gggtattttg	acttcaacag	attccactgc	5160
cacttttcac	cacgtgactg	gcaaagactc	atcaacaaca	actggggatt	ccgacccaag	5220
agactcaact	tcaagctctt	taacattcaa	gtcaaagagg	tcacgcagaa	tgacggtacg	5280

31/48

FIG. 20 (12-23)

acgacgattg ccaataacct taccagcacg gttcaggtgt ttactgactc ggagtaccag 5340
ctccccgtacg tcctcggctc ggcgcaccaa ggatgcctcc cgccgttccc agcagacgtc 5400
ttcatgggtgc cacagtatgg atacctcacc ctgaacaacg ggagtcaggc agtaggacgc 5460
tcttcatttt actgcctgga gtactttcct tctcagatgc tgcgtaccgg aaacaacttt 5520
accttcagct acacttttga ggacgttcct ttccacagca gctacgtca cagccagagt 5580
ctggaccgtc tcatgaatcc tctcatcgac cagtacctgt attacttgag cagaacaaac 5640
actccaagtg gaaccaccac gcagtcaagg cttcagtttt ctcaggccgg agcaggtgac 5700
attcgggacc agtctaggaa ctggcttcct ggaccctgtt accgccagca gcgagtatca 5760
aagacatctg cggataacaa caacagtga tactcgtgga ctggagctac caagtaccac 5820
ctcaatggca gagactctct ggtgaatccg ggcccggcca tggcaagcca caaggacgat 5880
gaagaaaagt tttttcctca gagcgggggt ctcactcttg ggaagcaagg ctcagagaaa 5940
acaaatgtgg acattgaaaa ggtcatgatt acagacgaag aggaaatcag gacaaccaat 6000
cccgtggcta cggagcagta tggttctgta tctaccaacc tccagagagg caacagacaa 6060
gcagctaccg cagatgtcaa cacacaaggc gttcttccag gcatggtctg gcaggacaga 6120
gatgtgtacc ttcagggggc catctgggca aagattccac acacggacgg acattttcac 6180
ccctctcccc tcatgggtgg attcggactt aaacaccctc ctccacagat tctcatcaag 6240
aacaccccg taccgtcgaa tccttcgacc accttcagtg cggcaaagtt tgcttccttc 6300
atcacacagt actccacggg acaggtcagc gtggagatcg agtgggagct gcagaaggaa 6360
aacagcaaac gctggaatcc cgaaattcag tacacttcca actacaacaa gtctgttaat 6420
gtggacttta ctgtggacac taatggcgtg tattcagagc ctcgccccat tggcaccaga 6480
tacctgactc gtaatctgta attgcttggt aatcaataaa ccgtttaatt cgtttcagtt 6540
gaactttggt ctctgcgtat ttctttctta tctagtttcc atggctacgt agataagtag 6600
catggcgggt taatcattaa ctacaaggaa cccctagtga tggagttggc cactccctct 6660
ctgcgcgtc gctcgtcac tgaggccggg cgaccaaagg tcgcccagc cccgggcttt 6720
gcccgggagg cctcagtgag cgagcgagcg cgcagagagg gagtggccaa gccactcgag 6780
cacctaggag gcgcgccacg gccgtagtta agccagcccc gacaccgcc aacaccgct 6840
gacgcgccct gacgggcttg tctgctccc gcatccgctt acagacaagc tgtgaccgtc 6900
tccgggagct gcatgtgtca gaggttttca ccgtcatcac cgaaacgcgc ga 6952

<210> 13
<211> 360
<212> DNA
<213> AAV2 MAAP gene

32/48

FIG. 20 (13-23)

<400> 13
 ctggcccacc accaccaaag cccgcagagc ggcataagga cgacagcagg ggtcttgtgc 60
 ttcttggtga caagtacctc ggacccttca acggactcga caaggagag cccgtcaacg 120
 aggacagcgc cgcggccctc gagcacgaca aagcctacga ccggcagctc gacagcggag 180
 acaaccgta cctcaagtac aaccacgccg acgaggagtt tcaggagcgc cttaaagaag 240
 atacgtcttt tgggggcaac ctccgagcag cagtcttcca ggcgaaaaag agggttcttg 300
 aacctctggg cctggttgag gaacctgtta agacggctcc gggaaaaaag aggccggtag 360

<210> 14
 <211> 6952
 <212> DNA
 <213> p0189-AAV2WT-DS S40-S46-S54 -> stops

<400> 14
 gacgaaaggg cctcgtgata cgcctatatt tatagggttaa tgtcatgata ataattggttt 60
 cttagacgtc aggtggcact tttcggggaa atgtgcgcgg aaccctatt tgtttatttt 120
 tctaaatata ttcaaatatg tatccgctca tgagacaata accctgataa atgcttcaat 180
 aatattgaaa aaggaagagt atgagccata ttcaacggga aacgtcttgc tctaggccgc 240
 gattaaattc caacatggat gctgatttat atgggtataa atgggctcgc gataatgtcg 300
 ggcaatcagg tgcgacaatc tatcgattgt atgggaagcc cgatgcgcca gagttgtttc 360
 tgaaacatgg caaaggtagc gttgccaatg atgttacaga tgagatggtc agactaaact 420
 ggctgacgga atttatgcct cttccgacca tcaagcattt tatccgtact cctgatgatg 480
 catggttact caccactgcg atccctggga aaacagcatt ccagggtatta gaagaatatc 540
 ctgattcagg tgaaaatatt gttgatgcgc tggcagtggt cctgcgccgg ttgcattcga 600
 ttctgtttg taattgtcct tttacacagc atcgcgattt tcgtctcgct caggcgcaat 660
 cacgaatgaa taacggtttg gttgatgcga gtgattttga tgacgagcgt aatggctggc 720
 ctgttgaaac agtctggaaa gaaatgcata aacttttgcc attctcaccg gattcagtcg 780
 tcaactcatg tgatttctca cttgataacc ttatttttga cgaggggaaa ttaataggtt 840
 gtattgatgt tggacgagtc ggaatcgcag accgatacca ggatcttgcc atcctatgga 900
 actgcctcgg tgagttttct cttcattac agaaacggct ttttcaaaaa tatggtattg 960
 ataactctga tatgaataaa ttgcagtttc atttgatgct cgatgagttt ttctaactgt 1020
 cagaccaagt ttactcatat atactttaga ttgatttaaa acttcatttt taatttaaaa 1080
 ggatctaggt gaagatcctt tttgataatc tcatgaccaa aatcccttaa cgtgagtttt 1140
 cgttcactg agcgtcagac cccgtagaaa agatcaaagg atcttcttga gatccttttt 1200
 ttctgcgcgt aatctgctgc ttgcaaacaa aaaaaccacc gctaccagcg gtggtttgtt 1260
 tgccggatca agagctacca actctttttc cgaaggtaac tggcttcagc agagcgcaga 1320

33/48

FIG. 20 (14-23)

taccaaatac	tggtcttcta	gtgtagccgt	agttaggcca	ccacttcaag	aactctgtag	1380
caccgcctac	atacctcgct	ctgctaatac	tgttaccagt	ggctgctgcc	agtggcgata	1440
agtcgtgtct	taccgggttg	gactcaagac	gatagttacc	ggataaggcg	cagcggtcgg	1500
gctgaacggg	gggttcgtgc	acacagccca	gcttgagcgc	aacgacctac	accgaactga	1560
gataactaca	gcgtgagcta	tgagaaagcg	ccacgcttcc	cgaagggaga	aaggcggaca	1620
ggatatccgt	aagcggcagg	gtcgggaacag	gagagcgcac	gagggagctt	ccagggggaa	1680
acgcctggta	tctttatagt	cctgtcgggt	ttcgccacct	ctgacttgag	cgtcgatttt	1740
tgtgatgctc	gtcagggggg	cggagcctat	ggaaaaacgc	cagcaacgcg	gcctttttac	1800
ggttcctggc	cttttgctgg	ccttttgctc	acatgttctt	tcctgcttta	tcccctgatt	1860
ctgtggataa	ccgtattacc	gcctttgagt	gagctgatac	cgctcgccgc	agccgaacga	1920
ccgagcgcag	cgagtcagtg	agcgaggaag	cggaagagcg	cccaatacgc	aaaccgcctc	1980
tccccgcgcg	ttggccgatt	cattaatgca	gctggcacga	caggtttccc	gactggaaaag	2040
cgggcagtg	gcgcaacgca	atttaattaa	tcagatccct	caatagcggc	cttggccact	2100
ccctctctgc	gcgctcgtc	gtcactgag	gccgggcgac	caaaggctgc	ccgacgccc	2160
ggctttgccc	gggcggcctc	agtgagcgcg	cgagcgcgca	gagagggagt	ggccaactcc	2220
atcactaggg	gttcctggag	gggtggagtc	gtgacgtgaa	ttacgtcata	gggttaggga	2280
ggctcctgtat	tagaggtcac	gtgagtgttt	tgcgacattt	tgcgacacca	tgtggtcacg	2340
ctgggtat	aagcccaggt	gagcacgcag	ggctccatt	ttgaagcggg	aggtttgaac	2400
gcgcagccgc	catgccgggg	ttttacgaga	ttgtgattaa	gggtcccagc	gacctgacg	2460
agcatctgcc	cggcatttct	gacagctttg	tgaactgggt	ggccgagaag	gaatgggagt	2520
tgccgccaga	ttctgacatg	gatctgaatc	tgattgagca	ggcaccctg	accgtggccg	2580
agaagctgca	gcgcgacttt	ctgacggaat	ggcgcctgt	gagtaaggcc	ccggaggccc	2640
ttttctttgt	gcaatttgag	aaggagagaga	gctacttcca	catgcacgtg	ctcgtggaaa	2700
ccaccggggg	gaaatccatg	gttttgggac	gtttcctgag	tcagattcgc	gaaaaactga	2760
ttcagagaat	ttaccgcggg	atcgagccga	ctttgccaaa	ctggttcgcg	gtcacaagaa	2820
ccagaaatgg	cgccggaggc	gggaacaagg	tggtggatga	gtgctacatc	cccaattact	2880
tgctcccca	aaccagcct	gagctccagt	gggcgtggac	taatatggaa	cagtatttaa	2940
gcgcctgttt	gaatctcacg	gagcgtaaac	ggttggtggc	gcagcatctg	acgcacgtgt	3000
cgcagacgca	ggagcagaac	aaagagaatc	agaatcccaa	ttctgatgcg	ccggtgatca	3060
gatcaaaaac	ttcagccagg	tacatggagc	tggtcgggtg	gctcgtggac	aaggggatta	3120
cctcggagaa	gcagtggatc	caggaggacc	aggcctcata	catctccttc	aatgcggcct	3180

34/48

FIG. 20 (15-23)

ccaactcgcg gtcccaaatac aaggctgcct tggacaatgc gggaaagatt atgagcctga	3240
ctaaaaccgc ccccgactac ctggtgggcc agcagcccgt ggaggacatt tccagcaatc	3300
ggatttataa aattttggaa ctaaaccgggt acgatcccca atatgctggct tccgtctttc	3360
tgggatgggc cacgaaaaag ttcggcaaga ggaacacccat ctggctgttt gggcctgcaa	3420
ctaccgggaa gaccaacatc gcggaggcca tagcccacac tgtgcccttc tacgggtgcg	3480
taaactggac caatgagaac tttcccttca acgactgtgt cgacaagatg gtgatctggt	3540
gggaggaggg gaagatgacc gccaaaggtcg tggagtcggc caaagccatt ctcggaggaa	3600
gcaaggtgcg cgtggaccag aaatgcaagt cctcggccca gatagaccgc actcccgtga	3660
tcgtcacctc caacaccaac atgtgcgccg tgattgacgg gaactcaacg accttcgaac	3720
accagcagcc gttgcaagac cggatgttca aatttgaact caccgcgcgt ctggatcatg	3780
actttgggaa ggtcaccaag caggaagtca aagacttttt ccggtgggca aaggatcacg	3840
tggttgaggt ggagcatgaa ttctacgtca aaaagggtgg agccaagaaa agaccgcgcc	3900
ccagtgcgc agatataagt gagcccaaac ggggtgcgcga gtcagttgcg cagccatcga	3960
cgtcagacgc ggaagcttcg atcaactacg cagacaggta ccaaaacaaa tgttctcgtc	4020
acgtgggcat gaatctgatg ctgtttccct gcagacaatg cgagagaatg aatcagaatt	4080
caaatactcg cttcactcac ggacagaaag actgtttaga gtgctttccc gtgtcagaat	4140
ctcaaccgcg ttctgtcgtc aaaaaggcgt atcagaaact gtgtacatt catcatatca	4200
tgggaaagggt gccagacgct tgactgcct gcgatctggt caatgtggat ttggatgact	4260
gcactcttga acaataaatg atttaaatca ggtatggctg ccgatgggta tcttcagat	4320
tggctcgagg aactctctc tgaaggaata agacagtggg ggaagctcaa acctggccca	4380
ccaccaccaa agcccgaga gcggcataag gacgacagca ggggtcttgt gcttcctggg	4440
tacaagtacc tcggaccctt caacggacta gacaagggag agccggtgaa cgaggcagac	4500
gccgcggccc tagagcacga caaagcctac gaccggcagc tcgacagcgg agacaaccgc	4560
tacctcaagt acaaccacgc cgacgcggag tttcaggagc gccttaaga agatacgtct	4620
tttgggggca acctcgacg agcagtcttc caggcgaaaa agagggttct tgaacctctg	4680
ggcctgggtg aggaacctgt taagacggct ccgggaaaaa agaggccggt agagcactct	4740
cctgtggagc cagactctc ctcgggaacc ggaaaggcgg gccagcagcc tgcaagaaaa	4800
agattgaatt ttggtcagac tggagacgca gactcagtag ctgaccccca gcctctcgga	4860
cagccaccag cagccccctc tggctctggga actaatacga tggctacagg cagtggcgca	4920
ccaatggcag acaataacga gggcgccgac ggagtgggta attcctcggg aaattggcat	4980
tgcgattcca catggatggg cgacagagtc atcaccacca gcaccgaac ctgggccctg	5040
cccacctaca acaaccacct ctacaaacaa atttccagcc aatcaggagc ctcgaacgac	5100

35/48

FIG. 20 (16-23)

aatcactact ttggctacag cacccttgg gggatattttg acttcaacag attccactgc 5160
cacttttcac cacgtgactg gcaaagactc atcaacaaca actggggatt ccgacccaag 5220
agactcaact tcaagctctt taacattcaa gtcaaagagg tcacgcagaa tgacggtacg 5280
acgacgattg ccaataacct taccagcacg gttcaggtgt ttactgactc ggagtaccag 5340
ctcccgtagc tcctcggtc ggcgcatcaa ggatgcctcc cgccgttccc agcagacgtc 5400
ttcatggtgc cacagtatgg atacctcacc ctgaacaacg ggagtcaggc agtaggacgc 5460
tcttcatttt actgcctgga gtactttcct tctcagatgc tgcgtaccgg aaacaacttt 5520
accttcagct acacttttga ggacgttcct ttccacagca gctacgtca cagccagagt 5580
ctggaccgtc tcatgaatcc tctcatcgac cagtacctgt attacttgag cagaacaaac 5640
actccaagtg gaaccaccac gcagtcaagg cttcagtttt ctcaggccgg agcgagtgc 5700
attcgggacc agtctaggaa ctggcttcct ggacctgtt accgccagca gcgagtatca 5760
aagacatctg cggataacaa caacagtga tactcgtgga ctggagctac caagtaccac 5820
ctcaatggca gagactctct ggtgaatccg ggcccgcca tggcaagcca caaggacgat 5880
gaagaaaagt ttttcctca gagcggggtt ctcatctttg ggaagcaagg ctcagagaaa 5940
acaaatgtgg acattgaaaa ggtcatgatt acagacgaag aggaaatcag gacaaccaat 6000
cccgtggcta cggagcagta tggttctgta tctaccaacc tccagagagg caacagacaa 6060
gcagctaccg cagatgtcaa cacacaaggc gttcttcag gcatggtctg gcaggacaga 6120
gatgtgtacc ttcaggggcc catctgggca aagattccac acacggacgg acattttcac 6180
ccctctcccc tcatgggtgg attcggactt aaacaccctc ctccacagat tctcatcaag 6240
aacaccccg tacctgcgaa tccttcgacc accttcagt cggcaaagt tgcttccttc 6300
atcacacagt actccacggg acaggtcagc gtggagatcg agtgggagct gcagaaggaa 6360
aacagcaaac gctggaatcc cgaaattcag tacacttcca actacaacaa gtctgttaat 6420
gtggacttta ctgtggacac taatggcgtg tattcagagc ctcgccccat tggcaccaga 6480
tacctgactc gtaatctgta attgcttgtt aatcaataaa ccgtttaatt cgtttcagtt 6540
gaactttggt ctctgcgtat ttctttctta tctagtttcc atggctacgt agataagtag 6600
catggcgggt taatcattaa ctacaaggaa cccctagtga tggagttggc cactccctct 6660
ctgcgcgtc gtcgctcac tgaggccggg cgaccaaagg tcgcccgcg cccgggcttt 6720
gcccgggcgg cctcagtga cgagcgagc cgagagagg gagtggccaa gccactcgag 6780
cacctaggag gcgcgccac gccgtagtta agccagcccc gacacccgcc aacacccgct 6840
gacgcgccct gacgggcttg tctgtcccg gcatccgctt acagacaagc tgtgaccgtc 6900
tccgggagct gcatgtgtca gaggttttca ccgtcatcac cgaaacgcgc ga 6952

36/48

FIG. 20 (17-23)

```

<210> 15
<211> 735
<212> PRT
<213> p0189-AAV2WT-DS VP1 protein
<400> 15

Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Thr Leu Ser
1          5          10          15

Glu Gly Ile Arg Gln Trp Trp Lys Leu Lys Pro Gly Pro Pro Pro Pro
20          25          30          35

Lys Pro Ala Glu Arg His Lys Asp Asp Ser Arg Gly Leu Val Leu Pro
35          40          45          50

Gly Tyr Lys Tyr Leu Gly Pro Phe Asn Gly Leu Asp Lys Gly Glu Pro
50          55          60          65

Val Asn Glu Ala Asp Ala Ala Ala Leu Glu His Asp Lys Ala Tyr Asp
65          70          75          80

Arg Gln Leu Asp Ser Gly Asp Asn Pro Tyr Leu Lys Tyr Asn His Ala
85          90          95          100

Asp Ala Glu Phe Gln Glu Arg Leu Lys Glu Asp Thr Ser Phe Gly Gly
100         105         110         115

Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Val Leu Glu Pro
115         120         125         130

Leu Gly Leu Val Glu Glu Pro Val Lys Thr Ala Pro Gly Lys Lys Arg
130         135         140         145

Pro Val Glu His Ser Pro Val Glu Pro Asp Ser Ser Ser Gly Thr Gly
145         150         155         160

Lys Ala Gly Gln Gln Pro Ala Arg Lys Arg Leu Asn Phe Gly Gln Thr
165         170         175         180

Gly Asp Ala Asp Ser Val Pro Asp Pro Gln Pro Leu Gly Gln Pro Pro
180         185         190         195

Ala Ala Pro Ser Gly Leu Gly Thr Asn Thr Met Ala Thr Gly Ser Gly
195         200         205         210

Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Asn Ser
210         215         220         225

```

37/48

FIG. 20 (18-23)

Ser Gly Asn Trp His Cys Asp Ser Thr Trp Met Gly Asp Arg Val Ile
 225 230 235 240
 Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His Leu
 245 250 255
 Tyr Lys Gln Ile Ser Ser Gln Ser Gly Ala Ser Asn Asp Asn His Tyr
 260 265 270
 Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn Arg Phe His
 275 280 285
 Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asn Asn Trp
 290 295 300
 Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe Asn Ile Gln Val
 305 310 315 320
 Lys Glu Val Thr Gln Asn Asp Gly Thr Thr Thr Ile Ala Asn Asn Leu
 325 330 335
 Thr Ser Thr Val Gln Val Phe Thr Asp Ser Glu Tyr Gln Leu Pro Tyr
 340 345 350
 Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe Pro Ala Asp
 355 360 365
 Val Phe Met Val Pro Gln Tyr Gly Tyr Leu Thr Leu Asn Asn Gly Ser
 370 375 380
 Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr Phe Pro Ser
 385 390 395 400
 Gln Met Leu Arg Thr Gly Asn Asn Phe Thr Phe Ser Tyr Thr Phe Glu
 405 410 415
 Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser Leu Asp Arg
 420 425 430
 Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu Ser Arg Thr
 435 440 445
 Asn Thr Pro Ser Gly Thr Thr Thr Gln Ser Arg Leu Gln Phe Ser Gln
 450 455 460
 Ala Gly Ala Ser Asp Ile Arg Asp Gln Ser Arg Asn Trp Leu Pro Gly
 465 470 475 480

38/48

FIG. 20 (19-23)

Pro Cys Tyr Arg Gln Gln Arg Val Ser Lys Thr Ser Ala Asp Asn Asn
 485 490 495

Asn Ser Glu Tyr Ser Trp Thr Gly Ala Thr Lys Tyr His Leu Asn Gly
 500 505 510

Arg Asp Ser Leu Val Asn Pro Gly Pro Ala Met Ala Ser His Lys Asp
 515 520 525

Asp Glu Glu Lys Phe Phe Pro Gln Ser Gly Val Leu Ile Phe Gly Lys
 530 535 540

Gln Gly Ser Glu Lys Thr Asn Val Asp Ile Glu Lys Val Met Ile Thr
 545 550 555 560

Asp Glu Glu Glu Ile Arg Thr Thr Asn Pro Val Ala Thr Glu Gln Tyr
 565 570 575

Gly Ser Val Ser Thr Asn Leu Gln Arg Gly Asn Arg Gln Ala Ala Thr
 580 585 590

Ala Asp Val Asn Thr Gln Gly Val Leu Pro Gly Met Val Trp Gln Asp
 595 600 605

Arg Asp Val Tyr Leu Gln Gly Pro Ile Trp Ala Lys Ile Pro His Thr
 610 615 620

Asp Gly His Phe His Pro Ser Pro Leu Met Gly Gly Phe Gly Leu Lys
 625 630 635 640

His Pro Pro Pro Gln Ile Leu Ile Lys Asn Thr Pro Val Pro Ala Asn
 645 650 655

Pro Ser Thr Thr Phe Ser Ala Ala Lys Phe Ala Ser Phe Ile Thr Gln
 660 665 670

Tyr Ser Thr Gly Gln Val Ser Val Glu Ile Glu Trp Glu Leu Gln Lys
 675 680 685

Glu Asn Ser Lys Arg Trp Asn Pro Glu Ile Gln Tyr Thr Ser Asn Tyr
 690 695 700

Asn Lys Ser Val Asn Val Asp Phe Thr Val Asp Thr Asn Gly Val Tyr
 705 710 715 720

Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg Asn Leu

39/48

FIG. 20 (20-23)

725

730

735

<210> 16
 <211> 32
 <212> PRT
 <213> p0189-AAV2WT MAAP #1

<400> 16

Leu Ala His His His Gln Ser Pro Gln Ser Gly Ile Arg Thr Thr Ala
 1 5 10 15

Gly Val Leu Cys Phe Leu Gly Thr Ser Thr Ser Asp Pro Ser Thr Asp
 20 25 30

<210> 17
 <211> 37
 <212> PRT
 <213> p0189-AAV2WT MAAP #2

<400> 17

Leu Ala His His His Gln Ser Pro Gln Ser Gly Ile Arg Thr Thr Ala
 1 5 10 15

Gly Val Leu Cys Phe Leu Gly Thr Ser Thr Ser Asp Pro Ser Thr Asp
 20 25 30

Thr Arg Glu Ser Arg
 35

<210> 18
 <211> 44
 <212> PRT
 <213> p0189-AAV2WT MAAP #3

<400> 18

Leu Ala His His His Gln Ser Pro Gln Ser Gly Ile Arg Thr Thr Ala
 1 5 10 15

Gly Val Leu Cys Phe Leu Gly Thr Ser Thr Ser Asp Pro Ser Thr Asp
 20 25 30

Thr Arg Glu Ser Arg Thr Arg Gln Thr Pro Arg Pro
 35 40

<210> 19
 <211> 24
 <212> DNA
 <213> Rep2-PRB

<220>

40/48

FIG. 20 (21-23)

<221> misc_feature
<222> (1)..(2)
<223> ZEN

<220>
<221> misc_feature
<222> (1)..(1)
<223> 56-FAM is before residue 1.

<220>
<221> misc_feature
<222> (2)..(2)
<223> 3IABkFQ is after residue 2.

<400> 19
cccgtgtcag aatctcaacc cgtt 24

<210> 20
<211> 21
<212> DNA
<213> Rep2-FWD

<400> 20
cttcactcac ggacagaaag a 21

<210> 21
<211> 20
<212> DNA
<213> Rep2-REV

<400> 21
ctggcacctt tcccatgata 20

<210> 22
<211> 24
<212> DNA
<213> Ad5-E4-PRB

<220>
<221> misc_feature
<222> (1)..(1)
<223> 56-FAM is before residue 1.

<220>
<221> misc_feature
<222> (1)..(2)
<223> ZEN

<220>
<221> misc_feature
<222> (2)..(2)
<223> 3IABkFQ is after residue 2.

<400> 22
accagccaa cctacacatt cgtt 24

<210> 23
<211> 20

41/48

FIG. 20 (22-23)

<212> DNA
<213> Ad5-E4-FWD

<400> 23
catccaccac cgcagaataa 20

<210> 24
<211> 21
<212> DNA
<213> Ad5-E4-REV

<400> 24
acatggttct tccagctctt c 21

<210> 25
<211> 24
<212> DNA
<213> Kan-PRB

<220>
<221> misc_feature
<222> (1)..(1)
<223> 56-FAM is before residue 1.

<220>
<221> misc_feature
<222> (1)..(2)
<223> ZEN

<220>
<221> misc_feature
<222> (2)..(2)
<223> 3IABkFQ is after residue 2.

<400> 25
tcgcacctga ttgcccgcaca ttat 24

<210> 26
<211> 20
<212> DNA
<213> Kan-FWD

<400> 26
atcgggcttc ccatacaatc 20

<210> 27
<211> 19
<212> DNA
<213> Kan-REV

<400> 27
gctctaggcc gcgattaaa 19

<210> 28
<211> 20
<212> PRT
<213> anti-MAAP antigen

42/48

FIG. 20 (23-23)

<400> 28

Lys Lys Ile Arg Leu Leu Gly Ala Thr Ser Asp Glu Gln Ser Ser Arg
 1 5 10 15

Arg Lys Arg Gly
 20

<210> 29

<211> 19

<212> PRT

<213> anti-AAP antigen

<400> 29

Arg Ser Thr Ser Ser Arg Thr Ser Ser Ala Arg Arg Ile Lys Asp Ala
 1 5 10 15

Ser Arg Arg

43/48

FIG. 21 (1-6)

A. AAV1 wild-type cap gene

atggctgccgatgggttatcttccagattggctcagggacaacctctctgagggcattcgcgagtggtgggacttg
aaacctggagccccgaagcccaagccaaccagcaaaagcaggacgacggccgggtctggtgcttccctggctac
aagtacctcggacccttcaacggactcgacaaggggagcccgtaacgcggcgagcagcgccctcgagcac
gacaagggcctacgaccagcagctcaaagcgggtgacaatccgtacctgcggtataaaccacgccgacgcgagttt
caggagcgtctgcaagaagatacgtcttttgggggcaacctcgggcgagcagcttccaggccaagaagcgggtt
ctcgaacctctcggctctggtgaggaaggcgctaagacggctcctggaagaaacgtccggtagagcagtcgcca
caagagccagactcctcctcgggcatcggaagacaggccagcagcccgtaaaaagagactcaattttggtcag
actggcgactcagagtcagtcctccgatccacaacctctcggagaacctccagcaacccccgctgctgtgggacct
actacaatggcttcaggcggtggcgccacaatggcgagacaataacgaaggcgccgacggagtggttaatgcctca
ggaaattggcattgcgattccacatggctgggcgacagagtcacaccaccagcaccgcacctgggccttgccc
acctacaataaacacacctctacaagcaaatctccagtgttcaacgggggcccagcaacgacaaccactacttcggc
tacagcaccctcgggggtattttgatttcaacagattccactgccacttttcaccacgtgactggcagcgactc
atcaacaacaattggggattccggcccaagagactcaacttcaaaactcttcaacatccaagtcaaggaggtcacg
acgaatgatggcgtcacaaccatcgctaataaccttaccagcagcgttcaagtcttctcggactcggagtaggag
cttcctgtacgtcctcggctctgcgcaccagggtgcctccctcgttcccgggcgagcgtgttcatgattccgcaa
tacggctacctgacgtcaacaatggcagccaagccgtgggacgttcatccttttactgcctggaatatttccct
tctcagatgctgagaacgggcaacaactttaccttcagctacacctttgaggaagtgcctttccacagcagctac
ggcagcagccagagcctggaccggctgatgaatcctctcatcgaccaatacctgtattacctgaacagaactcaa
aatcagtcgggaagtggccaaaacaaggacttgcgttttagccgtgggtctccagctggcagctgtctgttcagccc
aaaaactggctacctggaccctgttatcggcagcagcgcgttcttaaaacaaaaacagacaacaacaacagcaat
tttacctggactggtgcttcaaatataacctcaatggcggtgaatccatcatcaacctggcactgctatggcc
tcacacaaagacgacgaagacaagttcttcccatgagcgggtgcatgatttttggaaaagagagcgccggagct
tcaaacactgcatgtggacaatgtcatgtattacagacgaagaggaaattaaagccactaacctgtggccaccgaa
agatttgggaccgtggcagtcatttccagagcagcagcagaccctgcgacccggagatgtgcatgctatggga
gcattacctggcatggtgtggcaagatagagacgtgtacctgcaggggtcccatttgggcccatttctcacaca
gatggacactttcacccgtctcctcttatggcggttttgactcaagaacccgcctcctcagatcctcatcaaa
aacagcctgttctcgcgaatcctccggcgagtttccagctacaaagtgtgcttcattcatcaccacaactactcc
acagacaagtgtggtggaattgaatgggagctgcagaaaagaaaacagcaagcgtggaatccggaagtgcag
tacacatccaattatgcaaaatctgccacgttgattttactgtggacaacaatggactttatactgagcctcgc
ccatttggcaccctgtaccttaccctccctgtaa

B. AAV2 wild-type cap gene

atggctgccgatgggttatcttccagattggctcagggacactctctctgaaggaataagacagtggtggaagctc
aaacctggcccaccaccacaaagcccgagagcggcataaggacgacagcaggggtcttgtgcttccctgggtac
aagtacctcggacccttcaacggactcgacaagggagagccggtcaacgagggcagacgcgcggccctcgagcac
gacaagcctacgaccggcagctcgacagcggagacaacctcgtaacctcaagtacaaccacgccgacgcggagttt
caggagcgccttaagaagatacgtcttttgggggcaacctcggacgagcagcttccaggcgaaaaagagggtt
cttgaacctctgggcctggtgaggaacctgttaagacggctccgggaaaaaagaggccggttagagcactcctcct
gtggagccagactcctcctcgggaaccggaaaggcgggccagcagcctgcaagaaaaagattgaattttggtcag
actggagacgagactcagtaacctgacccccagcctctcggacagccaccagcagccccctctggtctgggaact
aatacagatggctacaggcagtggtgcaccaatggcagacaataacgagggcgccgacggagtggttaattcctcg
ggaaattggcattgcgattccacatggatgggcgacagagtcacaccaccagcaccogaacctgggccttgc
acctacaacaaccacctctacaacaaatttccagccaatcaggagcctcgaacgacaatcactactttggctac
agcacccttgggggtattttgacttcaacagattccactgccacttttaccacgtgactggcagaagactcatc
aacaacaactggggattccgacccaagagactcaacttcaagctctttaaacttcaagtcaaaagaggtcacgag
aatgacggtacgacgagattgccaataaccttaccagcagcgttcaggtgttactgactcggagtaggagctc
ccgtacgtcctcggctcggcgcatcaaggatgcctcccgccgttccagcagacgtcttcatggtgccacagtat
ggatacctcaccctgaacaacgggagtcaggcagtaggacgctcttcattttactgcctggagtagctttcctct
cagatgctgctacccgaaacaactttaccttcagctacacttttgaggacgttcccttccacagcagctacgct
cacagccagagctcggaccgtctcatgaatcctctcatcgaccagtagctgtattacttgagcagaacaaact
ccaagtgaaccaccacgagtcagggttcagtttctcagcgccggagcgagtgacattcgggaccagtcagg
aactggcttctcggaccctgttaccgccaagcagcagtagtatcaagacatctcgggataacaacaacagtgaaat
tcgtggactggagctaccaagtagcacctcaatggcagagactctctggtgaatccgggcccggccatggcaga

44/48

FIG. 21 (2-6)

cacaaggacgatgaagaaaagtttttctcagagcggggttctcatctttggaagcaaggctcagagaaaaca
aatgtggacattgaaaaggtcatgattacagacgaagaggaaatcaggacaaccaatcccgtggctacggagcag
tatggttctgtatctaccaacctccagagaggcaacagacaagcagctaccgcagatgtcaacacacaaggcgtt
cttcaggcatgggtctggcaggacagagatgtgtaccttcaggggcccatctgggcaagattccacacacggac
ggacattttccacctctccctcatgggtggattcggacttaaacacctctccacagattctcatcaagaac
accccggtacctggaatccttcgaccaccttcagtgcggcaagtttgcttcttcacacagctactccacg
ggacaggtcagcgtggagatcagtgaggagctgcagaagaaaacagcaaacgctggaatcccgaattcagtac
acttccaactacaacaagtctgttaatgtggactttactgtggacactaatggcgtgtattcagagcctcgccc
attggcaccagatacctgactcgtaattctgtaa

C. AAV3 wild-type cap gene

atggctgctgacggttatcttccagattggctcaggagacaacctttctgaaggcattcgtgagtggtgggtctg
aaacctggagtcctcaacccaaagcgaaccaacaacaccaggacaacctcggggtcttggtctccgggttac
aaatacctcggacccggtaacggactcgacaaaggagagccggtcaacgaggcggacgcggcagccctcgacac
gacaaagcttacgaccagcagctcaaggccggtgacaacctgtacctcaagtacaaccacgcgcagccgagttt
caggagcgtcttcaagaagatacgtcttttgggggcaaccttggcagagcagctcttcagggccaaaaagaggatc
cttgagcctcttggtctggttgaggaagcagctaaaacggctcctggaaagaagggggtgtagatcagctcct
caggaaaccggactcatcatctggtgttggcaaatcgggcaaacagcctgccagaaaaagactaaatttcggtcag
actggagactcagagtcagtcaccagacctcaacctctcggagaaccaccagcagccccacaaagtttgggatct
aatacaatggcttcaggcgggtggcgaccaatggcagacaataacgagggtgccgatggagtggttaattcctca
ggaaattggcattgcgattcccaatggctggcgacagagtcattaccaccagcaccagaacctgggcccctgcc
acttacaacaacctctctacaagcaaatctccagccaatcaggagcttcaaacgacaaccactactttggctac
agcacccttgggggtattttgactttaacagattccactgccacttctcaccacgtgactggcagcgactcatt
aacaacaactggggattccggcccaagaaactcagcttcaaagctcttcaacatccaagttagaggggtcagcgag
aacgatggcagcagcactattgccaataaccttaccagcagcgttcaagtgtttacggactcggagtatcagctc
ccgtacgtgctcgggtcggcgaccaaggtgtctcccgcttccagcggagctcttcatgtccctcagtat
ggatacctcaccctgaacaacggaagtcaagcgggtgggacgctcatcttttactgcctggagtaacttcccttcg
cagatgctaaggactggaaataacttccaatcagctataccttcgaggatgtaccttttcacagcagctacgct
cacagccagagtttgatcgcttgatgaatcctcttattgatcagtatctgtactacctgaacagaacgcaagga
acaacctctggaacaaccaaccaatcagcgctgcttttagccaggctgggcctcagtcctatgtcttttcaggcc
agaaattggctacctgggcccctgctaccggcaacagagactttcaaagactgctaacgacaacaacaacagtaac
tttcttggacagcggccagcaaatatcatctcaatggcccgactcgctggtgaatccaggaccagctatggcc
agtcacaaggacgatgaagaaaaattttccctatgcacggcaatctaataatttggcaagaagggacaacggca
agtaacgcagaattagataatgtaatgattacggatgaagaagagattcgtaccaccaatcctgtggcaacagag
cagtatggaaactgtggcaataacttgcagagctcaaatacagctcccacgactggaactgtcaatcactcagggg
gccttacctgctcctccacgggtatcggcaaaaaggcaagcagcggctaaaaagaagctcgttttcgaagacgaa
actggagcagcgacggacccctgaggatcaacttccggagccatgtctgatgacagtgagatgcgtgcagca
gctggcggagctgcagtcgaggcggaaggtgccgatggagtggttaatgcctcgggtgattggcattgcgat
tccacctggtctgagggccacgtcacgaccaccagcaccagaacctgggtcttggccacctacaacaaccacctc
tacaagcagactcggagagagcctgcagtcacaacctacaacgattctccacccccctggggatactttgacttc
aaccgcttccactgccacttctcaccacgtgactggcagcgactcatcaacaacaactggggcatgcgacccaaa
gccatgcggtcaaaaatcttcaacatccaggtcaaggaggtcacgacgtcgaacggcgagacaacgggtggcta

D. AAV4 wild-type cap gene

atgactgacggttaccttcagattggctagaggacaacctctctgaaggcgttcgagagtggtgggcgtgcaa
cctggagccctaaacccaaggcaaatcaacaacatcaggacaacgctcggggtcttggtctccgggttacaaa
tacctcggacccggcaacggactcgacaagggggaacccgtcaacgcagcggacgcggcagccctcgagcagcag
aaggcctacgaccagcagctcaaggccggtgacaacctacctcaagtacaaccacgcgcagcggagttccag
cagcggcttcaggcgacacatcggttgggggcaacctcggcagagcagctcttcaggccaaaaagagggttctt
gaacctcttggtctggttgagcaagcgggtgagacggctcctggaaagaagagaccgttgattgaatccccccag
cagcccgactcctccacgggtatcggcaaaaaggcaagcagcggctaaaaagaagctcgttttcgaagacgaa
actggagcagcgacggacccctgaggatcaacttccggagccatgtctgatgacagtgagatgcgtgcagca
gctggcggagctgcagtcgaggcggaaggtgccgatggagtggttaatgcctcgggtgattggcattgcgat
tccacctggtctgagggccacgtcacgaccaccagcaccagaacctgggtcttggccacctacaacaaccacctc
tacaagcagactcggagagagcctgcagtcacaacctacaacgattctccacccccctggggatactttgacttc
aaccgcttccactgccacttctcaccacgtgactggcagcgactcatcaacaacaactggggcatgcgacccaaa
gccatgcggtcaaaaatcttcaacatccaggtcaaggaggtcacgacgtcgaacggcgagacaacgggtggcta

45/48

FIG. 21 (3-6)

aaccttaccagcacggttcagatctttgcggaactcgctcgtaactgccgtacgtgatggatgcggtcaagag
ggcagcctgctccttttcccaacgacgtctttatgggtgccccagtagcggtactgtggactggtagccggcaac
acttcgcagcaacagactgacagaaatgccttctactgcctggagtagctttccttcgcagatgctgcgactggc
aacaaactttgaaattacgtacagttttgagaaggtgcctttccactcgatgtacgcgcacagccagagcctggac
cggctgatgaacctctcatcgaccagtagctgtggggactgcaatcgaccaccaccggaaccaccctgaatgcc
gggactgccaccaccaactttaccaagctgcggtaccacacttttccaactttaaaagaactggctgcccggg
ccttcaatcaagcagcagggcttctcaaagactgccaatcaaaactacaagatccctgccaccgggtcagacagt
ctcatcaaatacgagacgcacagcactctggacggaagatggagtgccctgacccccggacctccaatggccacg
gctggacctgcggaacagcaagttcagcaacagccagctcatctttcgggggcctaacaacagacggcaacacggcc
accgtaccgggactctgatcttcacctctgaggaggagctggcagccaccaacgccaccgataccgacatgtgg
ggcaacctacctggcggtgaccagagcaacagcaacctgcccagcgtggacagactgacagcctggggagccgtg
cctggaatggtctggcaaacagagacatttactaccaggggtccattttgggccaagatttctcataccgatgga
cactttcaccctcaccgctgattggtgggtttgggctgaaacaccgcctcctcaaattttatcaagaacacc
ccgtacctggaatcctgcaacgaccttcagctctactccggtaaaactccttcattactcagtacagcactggc
caggtgtcgggtgacagattgactgggagatccagaaggagcgggtccaaacgctggaaccccgaggtccagtttacc
tccaaactacggacagcaaaactctctgttgggtcctccgatgcggtgggaaatacactgagcctagggtctac
ggtagccgctacctcaccaccacctgtaa

E. AAV5 wild-type cap gene

atgtctttgttgatcacctccagattggttgaagaagttggtgaaggtcttcgcgagttttgggccttgaa
gcgggcccacggaaacccaaacccaatcagcagcatcaagatcaagcccgtggtcttgtgctgctggttataac
tatctcggaccccgaaacgggtctcgatcgaggagagcctgtcaacagggcagacgaggtcgcgcgagagcagcag
atctcgtacaacagagcagcttgaggcgggagacaacccctacctcaagtacaaccacgcggacgcgagtttcag
gagaagctcgccgacgacacatccttcgggggaaacctcggaaagcagcttttcaggcccaagaaaagggtcttc
gaaccttttgccctggttgaagaggggtgctaagacggccctaccggaaagcggatagacgaccactttccaaaa
agaaagaaggtcggaccgaagaggactccaagccttccacctcgtcagacgcgaagctggacccagcggatcc
cagcagctgcaaatccagcccaaccagcctcaagtttgggagctgatacaatgtctgcgggaggtggcggccca
ttggggcacaataaccaaggtgccgatggagtgggcaatgcctcgggagattggcattgcgattccacgtggatg
ggggacagagtcgtcaccaagtccaccgaacctgggtgctgccagctacaacaaccaccagtagccagagatc
aaaagcgggtccgtcgacggaagcaacgcccaacgcctactttggatacagcacccccctgggggtactttgactt
aacgcgttccacagccactggagcccccgagactggcaaaagactcatcaacaactactgggggttcagacccccg
tccctcagagtcacaaatcttcaacattcaagtcacagaggtcacggtgcaggactccaccaccaccatcgccaac
aacctcacctccacgtccaagtgtttacggacgacgactaccagctgccctacgtcgtcggcaacgggacccgag
ggatgctgcggccttccctccgcaggtctttacgctgcgcgactacgggtacgcgacgctgaaccgcgacaac
acagaaaatcccaccgagagagcagcttcttctgcctagagtagctttccagcaagatgctgagaacgggcaac
aactttgagtttacctacaactttgaggaggtgccttccactccagcttccgtccagtcagaaacctgttcaag
ctggccaacccgctggtggaccagtagctgtaccgcttctgtgagcacaataaactggcggaggtccagttcaac
aagaacctggccgggagatacgccaacacctacaaaactgggttccgggggcccattgggcccgaacccagggctgg
aacctggggtccgggggtcaaccgcgcagtgctcagcgccttcggccacgaccaataggatggagctcgagggcgcg
agttaccaggtgcccccgagccgaacggcatgaccaacaacctccagggcagcaaacctatgccctggagaac
actatgatcttcaacagccagccggcgaaacccgggcaccaccgcacgtacctcgagggcaacatgctcatcacc
agcgagagcgagacgcagccggtgaaccgcgtggcgtacaacgctcggcgggcagatggccaccaacaaccagagc
tccaccactgcccccgacgggcacgtacaacctcaggaaaatcgtgccggcagcgtgtggtgagggagggac
gtgtacctccaaggacccatctgggccaagatcccagagacgggggcgcactttcaccctctcgggccatgggc
ggattcggactcaaacacccaccgcccattgatgctcatcaagaacacgcctgtgccgggaaatatcaccagcttc
tcggacgtgcccgtcagcagcttcatcaccagtagacacggggcaggtcaccgtggagatggagtgggagctc
aagaaggaaaactccaagaggtggaacccagagatccagtagacacaacaactacaacgacccccagtttgtggac
tttggcccgacagcaccggggaatacagaaccaccagacctatcggaaccggataccttaccgcaccccttaa

F. AAV6 wild-type cap gene

atggctgccgatggttatcttccagattggctcaggacaacctctctgagggcatttcgcgagtggtgggacttg
aaacctggagccccgaaacccaaagccaaccagcaaaagcaggacgacggccggggtctggtgcttctggttac
aagtacctcgacccttcaacggactcgacaagggggagccgctcaacgcggcgagatgcagcgccctcgagcac
gacaaggctcagaccagcagctcaagcgggtgacaatccgtacctgcggtataaacacgcgcgacgcgcaggtt
caggagcgtctgcaagaagatacgtcttttgggggcaacctcggcgagcagcttccaggccaagaagaggggtt
ctcgaaccttttggctcgttggaggaggtgctaagacggctcctggaagaaacgctccggtagagcagtcgcca

46/48

FIG. 21 (4-6)

caagagccagactcctcctcgggcattggcaagacaggccagcagcccgctaaaaagagactcaatthttggtcag
actggcgactcagagtcagtcctcccgaccacacactctcgaggagaacctccagcaacccccgctgctgtgggacct
actacaattggcttcaggcggtggcgaccaatggcagacaataacgaaggcgccgacggagtgggtaatgcctca
ggaaattggcattggcattccacatggctggcgacagagtcacaccaccagcaccggaacatgggccttgccc
acctataacaaccacctctacaagcaaatctccagtgttcaacggggggccagcaacgacaaccactacttcggc
tacagcaccctcggggtatthttgatttcaacagattccactgccatttctcaccacgtgactggcagcagctc
atcaacaacaattggggattccggcccaagagactcaacttcaagctcttcaacatccaagtcaaggaggtcacg
acgaatgatggcgctcagcaccatcgctaataaccttaccagcagcgttcaagtcttctcggaactcggaagtcacg
ttggcgtacgtcctcggtcttgcgcaccagggtgcctcctcggttcccgcgagcgtgttcatgattccgcag
tacggctacctaacgctcaacaatggcagccagcagtgaggcaggtcatccttttactgcttggaaatatttccca
tcgcagatgctgagaacgggcaataactttaccttcagctacaccttcgaggacgtgcctttccacagcagctac
gcgcacagccagagcctggaccggctgatgaatcctctcatcgaccagtacctgtattacctgaacagaactcag
aatcagtcgggaagtgcacaaaacaaggacttgctgttttagccgggggtctccagctggcatgtctgttcagccc
aaaaactggctacctggaccctgttaccggcagcagcgcgtttctaaaacaaaaacagacaacaacaacagcaac
tttacctggactgggtgcttcaaaatataaccttaatggcggtgaatctataatcaacctggcactgctatggcc
tcacacaaagacgacaagacaagttcttcccatgagcgggtgtcatgatttttggaaaggagagcgcccgagct
tcaaacactgcattggacaatgtcatgatcacagacgaagaggaatcaaaagccactaacccccgtggccaccgaa
agatttgggactgtggcagtcacatctccagagcagcagcagacacctggcagccggagatgtgcatgttatggga
gccttacctggaatgtgtggcaagacagagacgtatacttcgagggctcctatttgggccaatttctcacacg
gatggacactttcaccgctctcctctcatggcggtttggacttaagcaccgcctcctcagatcctcatcaaa
aacacgcctgttctcgcaatcctccggcagagtttctggctacaaagtgttcttcatcaccagatttcc
acaggacaagtgcagtgagattgaatgggagctgcagaagaaaacagcaaacgctggaatcccgaagtgcag
tatacatctaactatgcaaaatctgccacgttgatttctactgtggacaacaatggactttatactgagcctcgc
cccattggcaccggttacctcaccgctcccctgttaa

G. AAV7 wild-type cap gene

atggctgcccagtggttatcttccagattggctcaggagacaacctctctgagggcatttcgcgagtggtgggacctg
aaacctggagccccgaaacccaagccaaccagcaaaagcaggacaacggccgggtctggtgcttctcggtac
aagtacctcggaaccttcaacggactcgacaaggggagcccgctcaacggcgccgagcagcggccctcgagcac
gacaaggctacgaccagcagctcaagcggtgacaatccgtacctgcggtataaacacgcgcagcgcaggtt
caggagcgtctgcaagaagatagctcatttgggggcaacctcgggcgagcagtccttccaggccaagaagcggtt
ctcgaacctctcggtctggttgggaagggcgttaagacggctcctgcaagaagagaccggttagagcgtcacct
cagcgttccccgactcctccacgggcatcggaagaaaggccagcagcccgccagaaagagactcaatthtgggt
cagactggcgactcagagtcagtcctccgacctcaacctctcgagagaacctccagcagcgcctctagtgtggga
tctggtacagtggtcgagggcgtggcgaccaatggcagacaataacgaaggtgcccagcgagtggtgtaatgcc
tcaggaaattggcattgcgattccacatggctggcgacagagtcattaccaccagcaccggaacctgggcccctg
cccacttacaacaaccacctctacaagcaaatctccagtgaaactgcaggtagtaccaacgacaacacactctc
ggctacagcaccctcggggtatthttgacttttaacagattccactgccacttctcaccacgtgactggcagcga
ctcatcaacaacaactggggattccggcccaagaagctgcggttcaagctcttcaacatccaggtcaaggaggtc
acgacgaatgacggcgttacgaccatcgctaataaccttaccagcagcagttcaggtattctcggaactcggaatac
cagctgcggtacgtcctcggtctgcgcaccagggtgcctgcctccttcccgggcgagcgttctcatgattcct
cagtaaggctacactgactctcaacaatggcagtcagtcgtgtgggacgttctcctcttactgcttggagtacttc
ccctctcagatgctgagaacgggcaacaactttgagttcagctacagcttcgaggacgtgccttccacagcagc
tacgcacacagccagagcctggaccgctgatgaatccccctcatcgaccagctactgtactacctggccagaaca
cagagtaaccacaggagggcacagctggcaatcggaactgcagtttaccaggggcggttcaactatggccgaa
caagccaagaattggttacctggaccttgcttccggcaacaagaagctctccaaaacgctggatcaaaacaacaac
agcaactttgcttggactggtgccacaaatatcactgaacggcagaaaactcgttggttaatcccgcgctcgcc
atggcaactcacaaggacgacgaggaccgcttttcccatccagcggagtcctgatttttggaaaaactggagca
actaacaaaactacattggaaaaatgtgttaatgacaaatgaagaagaattcgtcctactaatcctgtagccacg
gaagaatacgggatagtcagcagcaacttacaagcggctaatactgcagcccagacacaagttgtcaacaaccag
ggagccttacctggcatggtctggcagaacgggacgtgtacctgcaggggtcccatctgggccaagattcctcac
acggatggcaactttcaccgctctcctttgatggcggtttggacttaacatccgctcctcagatcctgatc
aagaacactccggttccgctaatcctccggaggtgttactcctgccaagtttgcttctggtcatcacacagtac
agcaccggacaagtgcagcgtggaatcgagtgaggagctgcagaagaaaacagcaagcgtggaacccggagatt
cagtaacacctcaactttgaaaagcagactggtgtggaactttgcccgttgacagccaggggtgttactctgagcct
cgccctattggcactcgttacctcaccgtaactctgttaa

47/48

FIG. 21 (5-6)

H. AAV8 wild-type cap gene

atggctgccgatgggttatcttccagattggctcgaggacaacctctctgagggcattcgcgagtggtggcgctg
aaacctggagccccgaagcccaaagccaaccagcaaaagcaggacgacggccgggtctggtgcttctcggtac
aagtacctcgacccttcaacggactcgacaagggggagcccggtcaacgcggcgagcagcgccctcgagcac
gacaaggcctacgaccagcagctcgaggcgggtgacaatccgtacctgcggtataaaccacgcgcgacgagttt
caggagcgtctgcaagaagatacgtcttttgggggaacctcgggcgagcagtcctccaggccaagaagcggtt
ctcgaacctctcggtctggttgaggaaggcgctaagacggctcctggaaagaagagaccggtagagccatcacc
cagcgttctccagactcctctacggcatcggaagaaggccaacagcccgccagaaaaagactcaatttgggt
cagactggcgactcagagtcagttccagacctcaacctctcgagaacctccagcagcgccctctggtgaggga
cctaatacaatggctgcaggcgggtggcgccaatggcagacaataacgaaggcgccgacggagtggtggttcc
tcgggaaattggcattgcatccacatggctggcgacagagtcaccaccagcaccggaacctggcgccctg
cccacctacaacaaccacctctacaagcaaatctccaacgggacatcgggaggagccaccaagacaaccctac
ttcggtacagcaccctgggggtattttgactttaacagattccactgccacttttaccacgtgactggcag
cgactcatcaacaacaactggggattccggcccaagagactcagcttcaagctcttcaacatccagggtcaaggag
gtcagcgagaatgaaggcaccagaccatcgccaataacctcaccagcaccatccagggtgttacggactcgga
taccagctgccgtacgttctcggtctgcccaccagggtgcctgcctccgttcccgcgagcgtgttcatgatt
cccagtagcggtacctaactcaacaacggtagtcaggccgtgggacgctcctcttactgctggaatac
tttcttcgcagatgctgagaaccggcaacaacttccagtttactttacaccttcgaggagcgtgcttccacagc
agctacgccccacagccagagcttgagccggtgatgaatcctctgattgaccagtagctgtactactgtctcg
actcaaaacaacaggagggcagggcaataacgcagactctgggcttcagccaagggtgggcttaatacaatggccaat
caggcaaaagactggctgccaggacctgttaccggcaacaacgcgtctcaacgacaaccgggcaaaacaacaat
agcaactttgctggtgactgctgggacaaaataccatctgaatggaagaaattcattggctaatcctggcatcgct
atggcaacacacaaagacgacgaggagcgttttttccagtaacgggatcctgatttttggcaaaaaatgct
gccagagacaatgctgattacagcgatgtcatgctcaccagcgaggaagaaatcaaaaccactaacctgtgggt
acagaggaatacgggtatcggtggcagataaacttgacagcagcaaaacacggctcctcaattgggaactgtcaacagc
cagggggcttaccgggtatggtctggcagaacgggacgtgtacctgcagggtcccatctgggccaagattcct
cacacggagcggcaacttccaccgtctcggctgatgggggctttggcctgaaacatcctccgctcagatcctg
atcaagaacacgcctgtacctgcgatcctccgaccaccttcaaccagtcagagctgaactcttcatcacgcaa
tacagcaccggacaggtcagcgtggaattgaatgggagctgcagaaggaacagcaagcgtggaaccccgag
atccagtagacctccaactactacaatctacaagtgtggactttgctgttaatacagaaggcgtgtactctgaa
ccccgccccattggcaccggttacctcacccgtaactctgtaa

I. AAV9 wild-type cap gene

atggctgccgatgggttatcttccagattggctcgaggacaaccttagtgaaggaattcgcgagtggtggcctttg
aaacctggagccccctcaaccgaaggcaaatcaacaacatcaagacaacgctcgagggtcttgtgcttccgggttac
aaataccttggaccggcaacggactcgacaagggggagcccggtcaacgcagcagacggcgccctcgagcac
gacaaggcctacgaccagcagctcaaggccggagacaaccogtacctcaagtacaaccacgcgcgacgccgagttc
caggagcggctcaagaagatacgtcttttgggggaacctcgggcgagcagtcctccaggccaagaagaggtt
cttgaacctcttggctctggttgaggaagcggttaagacggctcctggaaagaagagggcctgtagagcagtcctc
caggaaccggactcctccgcggtattggcaaatcggtgcacagcccgctaaaaagagactcaatttcgggtcag
actggcgacacagagtcagtcacagacctcaaccaatcgagaaacctcccgagccccctcagggtgtgggatct
cttacaatggcttcaggtggtggcgaccagtgccagacaataacgaagggtgccgatggagtggttagttcctcg
ggaaattggcattgcatcccaatggctgggggacagagtcaccaccagcaccggaacctgggcccctgcc
acctacaacaatcacctctacaagcaaatctccaacgcacatctggaggatcttcaaatgacaacgcctacttc
ggctacagcacccttgggggtattttgacttcaacagattccactgccacttctcaccacgtgactggcagcga
ctcatcaacaacaactggggattccggcctaagcgactcaacttcaagctcttcaacattcagggtcaaaagaggtt
acggacaacaatggagtcagaccatcgccaataaccttaccagcaggtccaggtcttcacggactcagactat
cagctcccgtagctgctcggtcggtcagcagggctgctcctcccgcttccagcgagcttctcatgattcct
cagtagcgggtatctgacgcttaatgatggaagccagcgccgtgggtcgttctgctcttttactgctggaatatttc
ccgtcgcaaatgctaagaacgggtaacaacttccagttcagctacgagtttgagaacgtacctttccatagcagc
tacgtctcacagccaaagcctggacgcagactaatgaatccactcatcgaccaatacttgtaactatctctcaagact
attaacgggttctggacagaatcaacaaacgctaaaattcagtggtggccggacccagcaacatggtgtccaggga
agaaactacatacctggaccagctaccgacaacaacgtgtctcaaccactgtgactcaaaacaacaacagcgaa
tttgcttggcctggagcttcttctgggtctcaatggagcgtaatagcttgatgaatcctggacctgctatggcc
agccacaagaaggagagggaccgtttcttcttctgtctggtatcttaatttttggcaaaacgaactggaaga

48/48

FIG. 21 (6-6)

gacaacgtggatgcggaacaaagtcataacccaacgaagaagaattaaaactactaaccggtagcaacggag
tcctatggacaagtggccacaaaccaccagagtgcaccaagcacaggcgagaccggctgggttcaaaaccaagga
atacttcgggtatgggttggcaggacagagatgtgtacctgcaaggaccatttgggcaaaattcctcacacg
gacggcaacttccacccttctccgctgatgggaggggttggaaatgaagcaccgcctcctcagatcctcatcaaa
aacacacctgtacctgcggtatcctccaacggccttcaacaaggacaagctgaactcttcatcaccagatattct
actggccaagtgcagctggagatcgagtgggagctgcagaaggaaaacagcaagcgctggaaccggagatccag
tacacttccaactattacaagtctaataatgttgaatttgcgttaatactgaaggtgtatatagtgaacccgc
ccattggcaccagatacctgactcgtaattctgtaa

J. AAV10 wild-type cap gene

atggctgctgacgggttatcttcagattggctcgaggacaacctctctgagggcattcgcgagtgggtggacctg
aaacctggagcccccagcccaaggccaaccagcagaagcaggacgacggcggtctgggtgcttctggtac
aagtacctcggaaccttcaacggactcgacaaggggagcccgtaacgcggcgagcgagcgccctcgagcac
gacaaggcctacgaccagcagctcaaagcgggtgacaatccgtacctgcggtataaccacggcgagcgagttt
caggagcgtctgcaagaagatacgtcttttggggcaacctcgggcgagcagcttccaggccaagaagcgggt
ctcgaaacctctcggtctggttgaggaagctgctaagacggctcctggaaagaagagaccggtagaacctgacct
cagcgttccccgactcctccacggcatcggaagaaaggccagcagcccgctaaaaagagactgaactttggg
cagactggcgagtcagagtcagtcctcccgacctcaaccaatcggaagaaccaccagcagggccctctgggtctggga
tctggtacaatggctgcagggcgggtggcgctccaatggcagacaataacgaaggcgccgagcgagtggttagttcc
tcaggaaattggcattgcatcccatggctggggcagagagtcacaccaccagcaccgaacctggggccctg
cccacctacaacaaccacctctacaagcaaatctccaacgggacatcgggaggaagcaccacgacaacacctac
ttcggtacagcaccctgggggtattttgaacttcaacagattccactgccacttctcaccacgtgactggcag
cgactcatcaacaacaactggggattccggccaaaaagactcagcttcaagctcttcaacatccaggtaaggag
gtcagcgagaatgaaggaccaagaccatcgcaataaccttaccagcagattcaggtatttacggactcgga
taccagctgccgtacgtcctcggtccgcgcaccagggtgctgctcctccgttcccgcgagtgcttcatgatt
cccagtagcgctacctgacactgaacaatggaagtcaagccgtaggcgttccctccttctactgctggaatat
tttccatctcaaatgctgcgaactggaacaattttgaattcagctacaccttcgaggagcgtgcctttccacagc
agctacgcacacagccagagcttgaccgactgatgaatcctctcattgaccagtagctgactacttatccaga
actcagtcacaggaggaactcaaggtaccagcaattgttattttctcaagctgggcctgcaaacatgtcggt
caggccaagaactggctgctgaccttgctaccggcagcagcagctcctccagcactgtcgcaaaacaacaac
agcaactttgcttgactgggtgccacaaaatatcacctgaacggaagagactctctggtgaatccgggtgtcgcc
atggcaaccacaaggacgacgaggaacgcttcttcccgctcgagcggagtcctgatgtttggaaaacagggtgct
ggaagagacaatgtggactacagcagcgttatgctaacaagcgaagaagaattaaaaccactaacctgtagcc
acagaacaatacggcggtgggtggctgacaacttgacgaagccaatacagggcctattgtgggaaatgtcaacagc
caaggagccttacctggcatggtctggcagaaccgagacgtgtacctgcaggggtcccatctgggccaagattcct
cacacggacggcaactttcaccgtctcctctgatggcggttggacttaaacaccgcctccacagatcctg
atcaagaacacgccggtacctgcggtacctccaacaacgttcagccaggcgaaattggcttccctcatcacgcag
tacagcaccggacaggtcagcgtggaatcgagtgggagctgcagaaggagaacagcaaacgctggaaccagag
attcagtagacttcaactactacaatctacaaatgtggactttgctgtcaatacagagggaacttattctgag
cctcgccccattggtagctgttatctgacacgtaattctgtaa