CLAIMS

1. A kit for detecting the presence of an unknown adeno-associated virus (AAV) in a sample from cellular DNA suspected of containing a latent AAV infection, said kit comprising:

(a) a first set of primers which specifically amplify a first region comprising at least 250 bp of AAV capsid nucleic acid sequences, said first region having at least 18 base pairs of highly conserved sequence at its 5' end, a variable sequence, and at least 18 base pairs of highly conserved sequence at its 3' end, said base pairs being highly conserved relative to an alignment of at least *AAV 1, AAV2, AAV3, AAV4, AAV5 and AAV6*;

(b) optionally a second set of primers specific for a second region of the AAV nucleic acid sequences which comprises the first region of AAV sequences and sequences which are 5' to the first region, such that AAV 5' extension sequences which anneal to the 5' end of the AAV sequences amplified by the primers for the first region are obtained;

(c) optionally a third set of primers which specifically amplify a third region which comprises the first region of AAV sequences and sequences which are 3' to the first region, such that AAV 3' extension sequences which anneal to the 3' end of the AAV sequences amplified by the primers for the first region are obtained,

each of said second and third regions being predetermined based upon the alignment of the nucleic acid sequences of at least *AAV 1, AAV2, AAV3, AAV4, AAV5 and AAV6* and each of said regions comprising nucleic acid sequences which are highly conserved over at least 18 base pairs at the 5' end, optionally variable sequences in the middle, and sequences which are highly conserved over at least 18 base pairs at the 3' end of the sequences of the region, relative to the sequences of the at least *AAV 1, AAV2, AAV3, AAV4, AAV5 and AAV6*;

each of the sets of primers consisting of a 5' primer and a 3' primer, each of said primers comprising 15 nucleotides complementary to its respective highly conserved sequence and having exact identity with its respective highly conserved sequence over at least 5 base pairs in its 3' end.

2. A kit according to claim 1, wherein the 5' primer and/or the 3' primer comprises at least 18 nucleotides.

3. A kit according to claim 1, wherein the 5' primer and/or the 3' primer comprises 25 nucleotides.

4. A kit according to claim 1, wherein the 5' primer and/or the 3' primer comprises at least 9 base pairs of exact identity at its 3' end.

5. A kit according to claim 1, wherein the 5' primer and/or the 3' primer comprises at least 18 base pairs of exact identity at its 3' end.

6. The kit according to claim 1, wherein the first set of primers allows isolation of full-length adeno-associated virus capsid sequences from a sample,

the first set of primers comprising a 5' primer directed to a region located in the middle of an AAV rep gene, based on a predetermined conserved region of AAV, and a 3' primer directed to a region downstream of an AAV cap gene, based on a predetermined conserved region of AAV.

7. A kit according to claim 1, wherein the 5' primer has a sequence comprising GCTGCGTCAACTGGACCAATGAGAAC, which corresponds to nt 1398 to 1423 of SEQ ID NO:6.

8. A kit according to claim 1, wherein the 3' primer has a sequence comprising CGCAGAGACCAAAGTTCAACTGAAACGA, which corresponds to the nucleotides complementary to 4462- 4435 of SEQ ID NO:7.

9. A kit according to claim 1, wherein the sample comprises AAV integrated into the chromosome.

10. An isolated adeno-associated virus (AAV) comprising an AAV capsid having an amino acid sequence selected from the group consisting of:

AAV7, amino acids 1 to 737 of SEQ ID NO:2; C1, SEQ ID NO:60; C2, SEQ ID NO:61; C5, SEQ ID NO:62; A3-3, SEQ ID NO:66; A3-7, SEQ ID NO:67; A3-4, SEQ ID NO:68; A3-5, SEQ ID NO: 69; 3.3b, SEQ ID NO: 62; 223.4, SEQ ID NO: 73; 223-5,

SEQ ID NO:74; 223-10, SEQ ID NO:75; 223-2, SEQ ID NO:76; 223-7, SEQ ID NO: 77; 223-6, SEQ ID NO: 78; 44-1, SEQ ID NO: 79; 44-5, SEQ ID NO:80; 44-2, SEQ ID NO:81; 42-15, SEQ ID NO: 84; 42-8, SEQ ID NO: 85; 42-13, SEQ ID NO:86; 42-3A, SEQ ID NO:87; 42-4, SEQ ID NO:88; 42-5A, SEQ ID NO:89; 42-1B, SEQ ID NO:90; 42-5B, SEQ ID NO:91; 43-1, SEQ ID NO: 92; 43-12, SEQ ID NO: 93; 43-5, SEQ ID NO:94; 43-21, SEQ ID NO:96; 43-25, SEQ ID NO: 97; 43-20, SEQ ID NO:99; 24.1, SEQ ID NO: 101; 42.2, SEQ ID NO:102; 7.2, SEQ ID NO: 103; 27.3, SEQ ID NO: 104; 16.3, SEQ ID NO: 105; 42.10, SEQ ID NO: 106; 42-3B, SEQ ID NO: 107; 42-11, SEQ ID NO: 108; F1, SEQ ID NO: 109; F5, SEQ ID NO: 110; F3, SEQ ID NO:111; 42-6B, SEQ ID NO: 112; and 42-12, SEQ ID NO: 113.

11. A protein comprising a fragment of an AAV capsid protein, said fragment selected from the group consisting of:

vp2 capsid protein, amino acids (aa) 138 to 737;

vp3 capsid protein, aa 203 to 737;

hypervariable region (HVR)1 through 12: aa 146 to 152; aa 182 to 187; aa 262 to 264; aa 263 to 266; aa 263 to 266; aa 381 to 383; aa 383 to 385; aa 450 to 474; aa 451 to 475; aa 490 to 495; aa 491 to 496; aa500 to 504; aa 501 to 505; aa 514 to 522; aa 533 to 554; aa 534 to 555; aa 581 to 594; aa 583 to 596; aa 658 to 667; aa 660 to 669; and aa 705 to 719; aa 707 to 772;

aa 24 – 42, aa 25 – 28; aa 81 – 85; aa133 to 165; aa 134 – 165; aa 137 to 143; aa 154 to 156; aa 194 to 208; aa 261 to 274; aa 262 to 274; aa 171 to 173; aa 413 to 417; aa 449 to 478; aa 494 to 525; aa 534 to 571; aa 581 to 601; aa 660 to 671; aa 709 to 723; and

aa 1 to 184, aa 199 to 259; aa 274 to 446; aa 603 to 659; aa 670 to 706; aa 724 to 736; aa 185 to 198; aa 260 to 273; aa 447 to 477; aa 495 to 602; aa 660 to 669; and aa 707 to 723,

wherein the amino acid numbers are those of the AAV7 capsid, SEQ ID NO:2, and corresponding regions in the capsid of C1, SEQ ID NO:60; C2, SEQ ID NO:61; C5, SEQ ID NO:62; A3-3, SEQ ID NO:66; A3-7, SEQ ID NO:67; A3-4, SEQ ID NO:68; A3-5, SEQ ID NO: 69; 3.3b, SEQ ID NO: 62; 223.4, SEQ ID NO: 73; 223-5, SEQ ID NO:74; 223-10, SEQ ID NO:75; 223-2, SEQ ID NO:76; 223-7, SEQ ID NO: 77; 223-6, SEQ ID NO: 78; 44-1, SEQ ID NO: 79; 44-5, SEQ ID NO:80; 44-2, SEQ ID NO:81; 42-15, SEQ

ID NO: 84; 42-8, SEQ ID NO: 85; 42-13, SEQ ID NO:86; 42-3A, SEQ ID NO:87; 42-4, SEQ ID NO:88; 42-5A, SEQ ID NO:89; 42-1B, SEQ ID NO:90; 42-5B, SEQ ID NO:91; 43-1, SEQ ID NO: 92; 43-12, SEQ ID NO: 93; 43-5, SEQ ID NO:94; 43-21, SEQ ID NO:96; 43-25, SEQ ID NO: 97; 43-20, SEQ ID NO:99; 24.1, SEQ ID NO: 101; 42.2, SEQ ID NO:102; 7.2, SEQ ID NO: 103; 27.3, SEQ ID NO: 104; 16.3, SEQ ID NO: 105; 42.10, SEQ ID NO: 106; 42-3B, SEQ ID NO: 107; 42-11, SEQ ID NO: 108; F1, SEQ ID NO: 109; F5, SEQ ID NO: 110; F3, SEQ ID NO:111; 42-6B, SEQ ID NO: 112; and 42-12, SEQ ID NO: 113.

12. An artificial adeno-associated virus (AAV) capsid protein comprising one or more of the protein fragments according to claim 11.

13. A recombinant adeno-associated virus (AAV) comprising an artificial capsid according to claim 12.

14. A molecule comprising a nucleic acid sequence encoding a protein according to claim 11 to 12.

15. A molecule comprising a nucleic acid sequence encoding a novel adeno-associated virus (AAV) serotype capsid protein having an amino acid sequence selected from the group consisting of: AAV7, amino acids 1 to 737 of SEQ ID NO:2; C1, SEQ ID NO:60; C2, SEQ ID NO:61; C5, SEQ ID NO:62; A3-3, SEQ ID NO:66; A3-7, SEQ ID NO:67; A3-4, SEQ ID NO:68; A3-5, SEQ ID NO: 69; 3.3b, SEQ ID NO: 62; 223.4, SEQ ID NO: 73; 223-5, SEQ ID NO:74; 223-10, SEQ ID NO:75; 223-2, SEQ ID NO:76; 223-7, SEQ ID NO: 77; 223-6, SEQ ID NO: 78; 44-1, SEQ ID NO: 79; 44-5, SEQ ID NO:80; 44-2, SEQ ID NO:81; 42-15, SEQ ID NO: 84; 42-8, SEQ ID NO: 85; 42-13, SEQ ID NO:86; 42-3A, SEQ ID NO:87; 42-4, SEQ ID NO:88; 42-5A, SEQ ID NO:89; 42-1B, SEQ ID NO:90; 42-5B, SEQ ID NO:91; 43-1, SEQ ID NO: 92; 43-12, SEQ ID NO: 93; 43-5, SEQ ID NO:94; 43-21, SEQ ID NO:96; 43-25, SEQ ID NO: 97; 43-20, SEQ ID NO:99; 24.1, SEQ ID NO: 101; 42.2, SEQ ID NO:102; 7.2, SEQ ID NO: 103; 27.3, SEQ ID NO: 104; 16.3, SEQ ID NO: 105; 42.10, SEQ ID NO: 106; 42-3B, SEQ ID NO: 107; 42-11, SEQ ID NO: 108; F1, SEQ

ID NO: 109; F5, SEQ ID NO: 110; F3, SEQ ID NO:111; 42-6B, SEQ ID NO: 112; and 42-12, SEQ ID NO: 113.

16. A molecule comprising a nucleic acid sequence encoding a novel adeno-associated virus (AAV) serotype capsid protein, said nucleic acid sequence selected from the group consisting of: AAV5, SEQ ID NO:2; 42-2 , SEQ ID NO:9; 42-8 ,SEQ ID NO:27; 42-15 , SEQ ID NO:28; 42-5b ,SEQ ID NO: 29; 42-1b ,SEQ ID NO:30; 42-13, SEQ ID NO: 31; 42-3a , SEQ ID NO: 32; 42-4 ,SEQ ID NO:33; 42-5a , SEQ ID NO: 34; 42-10, SEQ ID NO:35; 42-3b, SEQ ID NO: 36; 42-11, SEQ ID NO: 37; 42-6b, SEQ ID NO:38; 43-1, SEQ ID NO: 39; 43-5, SEQ ID NO: 40; 43-12 ,SEQ ID NO:41; 43-20, SEQ ID NO:42; 43-21, SEQ ID NO: 43; 43-23, SEQ ID NO:44; 43-25 ,SEQ ID NO: 45; 44.1, SEQ ID NO:47; 44.5, SEQ ID NO:47; 223.10, SEQ ID NO:48; 223.2 , SEQ ID NO:49; 223.4, SEQ ID NO:50; 223.5, SEQ ID NO: 51; 223.6, SEQ ID NO: 52; 223.7, SEQ ID NO: 53; A3.4, SEQ ID NO: 54; A3.5, SEQ ID NO:55; A3.7 , SEQ ID NO: 56; A3.3 ,SEQ ID NO:57; 42.12, SEQ ID NO: 58; 44.2, SEQ ID NO: 59; AAV10 , SEQ ID NO: 117; AAV11, SEQ ID NO: 118; AAV12 ,SEQ ID NO:119; A3.1, SEQ ID NO:120; and H6, SEQ ID NO: 25.

17. A molecule comprising a nucleic acid sequence encoding a fragment of an adeno-associated virus capsid protein, said nucleic acid sequence selected from the group consisting of:

vp1, nt 825 to 3049;

vp2, nt 1234 to 3049;

vp 3, nt 1434 to 3049;

nt 468 to 3090; and

nt 725 to 3090,

wherein the nucleotides numbers are of AAV7, SEQ ID NO:1 and correspond to sequences in 42-2 , SEQ ID NO:9; 42-8 ,SEQ ID NO:27; 42-15 , SEQ ID NO:28; 42-5b ,SEQ ID NO: 29; 42-1b ,SEQ ID NO:30; 42-13, SEQ ID NO: 31; 42-3a , SEQ ID NO: 32; 42-4 ,SEQ ID NO:33; 42-5a , SEQ ID NO: 34; 42-10, SEQ ID NO:35; 42-3b, SEQ ID NO: 36; 42-11, SEQ ID NO: 37; 42-6b, SEQ ID NO:38; 43-1, SEQ ID NO: 39; 43-5, SEQ ID NO: 40; 43-12 ,SEQ ID NO:41; 43-20, SEQ ID NO:42; 43-21, SEQ ID NO: 43; 43-23, SEQ ID NO:44; 43-25 ,SEQ ID NO: 45; 44.1, SEQ ID NO:47; 44.5, SEQ ID NO:47; 223.10,

SEQ ID NO:48; 223.2 , SEQ ID NO:49; 223.4, SEQ ID NO:50; 223.5, SEQ ID NO: 51; 223.6, SEQ ID NO: 52; 223.7, SEQ ID NO: 53; A3.4, SEQ ID NO: 54; A3.5, SEQ ID NO:55; A3.7 , SEQ ID NO: 56; A3.3 ,SEQ ID NO:57; 42.12, SEQ ID NO: 58; 44.2, SEQ ID NO: 59; AAV10 , SEQ ID NO: 117; AAV11, SEQ ID NO: 118; AAV12 ,SEQ ID NO:119; A3.1, SEQ ID NO:120; and H6, SEQ ID NO: 25.

18. The molecule according to claim 12 or claim 14 to 17, wherein said molecule is a plasmid.

19. The molecule according to claim 12 or claim 14 to 17, wherein said molecule further comprises a functional AAV *rep* gene.

20. The molecule according to claim 16, wherein said nucleic acid sequence is the AAV7 sequence, SEQ ID NO:1.

21. A method of generating a recombinant adeno-associated virus (AAV) comprising an AAV serotype capsid comprising the steps of culturing a host cell containing: (a) a molecule according to any of claims 12 or claim 14 to 17 which encodes an adeno-associated virus capsid; (b) a functional rep gene; (c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene; and (d) sufficient helper functions to permit packaging of the minigene into the AAV capsid protein.

22. A host cell transfected with an adeno-associated virus according to claim 10 or a molecule according to any of claims 12, or claims 14 to 17.

23. A composition comprising an AAV according to claim 10 or claim 13, and a physiologically compatible carrier.

24. A composition comprising a molecule according to any of claims 12, or claims 14 to 17 and a physiologically compatible carrier.

25. A method of delivering a transgene to a cell, said method comprising the step of contacting the cell with an AAV according to claim 10 or claim 13, wherein said rAAV comprises the transgene.

26. A molecule comprising a heterologous adeno-associated virus (AAV) serotype 7 nucleic acid sequence, said sequence comprising:

nucleotides (nt) 1 to 107 of SEQ ID NO: 1;
nt 107 to 2215 of SEQ ID NO:1;
nt 334 to 2215 of SEQ ID NO:1;
nt 2222 to 4435 of SEQ ID NO:1.
nt 2633 to 4435 of SEQ ID NO:1;
nt 2831 to 4435 of SEQ ID NO:1; and
nt 4704 to 4721 of SEQ ID NO: 1.

27. A molecule encoding an adeno-associated virus (AAV) serotype 7 rep protein or a fragment thereof, said protein or fragment selected from the group consisting of:

amino acid (aa) 1 to 623, aa 1 to 171; aa 172 to 372, aa 373 to 444, and aa 445 to 623 of SEQ ID NO:3.

28. A host cell containing a molecule according to claim 26 or 27.

29. An adeno-associated virus (AAV) comprising a capsid protein of AAV serotype 7, wherein the capsid protein is serologically cross-reactive with antibodies to a capsid protein having the sequence of SEQ ID NO:2.

30. The AAV according to claim 29, wherein the antibodies are polyclonal antibodies generated using SEQ ID NO: 2.

31. The AAV according to claim 29, wherein said capsid protein is not neutralized by antibodies generated against AAV serotypes 1 – 6.

32. The AAV according to claim 29, which is produced recombinantly.

33. The AAV according to claim 32, wherein said AAV has a capsid protein that is 95% to 99% identical to aa 1 to 737 of SEQ ID NO:2 as determined by alignment and a Fasta program in GCG Version 6.1.

34. The AAV according to any of claims 30 to 33, wherein the recombinant AAV comprises inverted terminal repeats (ITRs) from a serotype heterologous to the capsid protein.

35. The recombinant AAV according to claim 34, wherein the ITRs are from AAV serotype 2.

36. The recombinant AAV according to any of claims 30 to 35, wherein the capsid protein is encoded by a molecule having the sequence of nt 825 to 3049 of SEQ ID NO: 1.

37. The recombinant AAV according to any of claims 30 to 36, wherein the capsid protein comprises a sequence of amino acids having the sequence of aa 138 to 737 of SEQ ID NO:2.

38. The recombinant AAV according to claim 35, wherein the capsid protein comprises a sequence of amino acids having the sequence of aa 203 to 737 of SEQ ID NO:2.

39. The recombinant AAV according to claim 35, wherein the capsid protein comprises a sequence of amino acids having the sequence of aa 1 to 737 of SEQ ID NO:2.

40. A composition comprising an AAV according to any of claims 30 to 39.

41. Use of a recombinant AAV according to any of claims 30 to 39 in preparing a medicament for delivering a heterologous molecule to a target cell.

CLAIMS

1. An adeno-associated virus (AAV) comprising an AAV8 capsid having an amino acid sequence having the sequence of amino acids 1 to 738 of SEQ ID NO: 95 or a sequence having at least 95% identity therewith, wherein said AAV further comprises a minigene having AAV inverted terminal repeats (ITRs) and a heterologous gene operably linked to regulatory sequences which direct its expression in a host cell.

2. The AAV according to claim 1 wherein the ITRs are from AAV 2.

3. A recombinant capsid protein comprising an AAV8 protein selected from the group consisting of:

vp2 capsid protein, amino acids (aa) 138 to 738 of SEQ ID NO: 95;
vp3 capsid protein, aa 203 to 738 of SEQ ID NO: 95;
or a sequence having at least 95% identity with vp1, vp2 or vp3.

4. An adeno-associated virus (AAV) comprising an AAV8 vp3 capsid having an amino acid sequence having the sequence of amino acids 203 to 738 of SEQ ID NO: 95 or a sequence having at least 95% identity therewith, wherein said AAV further comprises a minigene having AAV inverted terminal repeats (ITRs) and a heterologous gene operably linked to regulatory sequences which direct its expression in a host cell.

5. An isolated or synthetic nucleic acid molecule encoding a protein according to claim 3.

6. An isolated or synthetic nucleic acid molecule encoding a novel adeno-associated virus (AAV) 8 capsid protein having an amino acid sequence 1 to 738 of SEQ ID NO: 95.

7. An isolated or synthetic nucleic acid molecule encoding a fragment of an adeno-associated virus 8 capsid protein, said nucleic acid sequence selected from the group consisting of:

vpl, nt 2121 to 4335 of SEQ ID NO: 4;

vp2, nt 2532 to 4335 of SEQ ID NO: 4;

vp3, nt 2730 to 4335 of SEQ ID NO: 4;

and a sequence sharing at least 95% identity with vpl, vp2 or vp3.

8. A molecule according to any of claims 5 to 7, wherein said molecule is a plasmid.

9. A molecule according to any of claims 5 to 7, wherein said molecule further comprises a functional AAV *rep* gene.

10. A method of generating a recombinant adeno-associated virus (AAV) comprising an AAV serotype capsid comprising the steps of culturing a host cell containing: (a) a molecule according to any of claims 5 to 7 which encodes an adeno-associated virus capsid; (b) a functional rep gene; (c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene; and (d) sufficient helper functions to permit packaging of the minigene into the AAV capsid protein.

11. An in vitro host cell transfected with an adeno-associated virus according to any of claims 1 to 2 or a molecule according to any of claims 5 to 9.

12. A composition comprising an AAV according to claim 1 or claim 4, and a physiologically compatible carrier.

13. A composition comprising a molecule according to any of claims 6 to 9 and a physiologically compatible carrier.

14. An adeno-associated virus (AAV) comprising an AAV8 vp2 capsid having an amino acid sequence having the sequence of amino acids 138 to 738 of SEQ ID NO: 95 or a sequence having at least 95% identity therewith, wherein said AAV further comprises a minigene having AAV inverted terminal repeats (ITRs) and a heterologous gene operably linked to regulatory sequences which direct its expression in a host cell.

15. The AAV according to claim 1, 4 or 14, wherein the heterologous gene is an immunoglobulin.

16. The AAV according to claim 1, 4 or 14, wherein the heterologous gene is a Factor VIII.

17. The AAV according to claim 1, 4 or 14, wherein the heterologous gene is a Factor IX.

18. A recombinant adeno-associated virus (r AAV) comprising

an AAV capsid having an amino acid sequence selected from the group consisting of:

Cl, SEQ ID NO:60; C2, SEQ ID NO:61; C5, SEQ ID NO:62; A3-3, SEQ ID NO:66; A3-7, SEQ ID NO:67; A3-4, SEQ ID NO:68; A3-5, SEQ ID NO: 69; 3.3b, SEQ ID NO: 62; 223.4, SEQ ID NO: 73; 223-5, SEQ ID NO:74; 223-10, SEQ ID NO:75; 223-2, SEQ ID NO:76; 223-7, SEQ ID NO: 77; 223-6, SEQ ID NO: 78; 44-1, SEQ ID NO: 79; 44-5, SEQ ID NO:80; 44-2, SEQ ID NO:81; 42-15, SEQ ID NO: 84; 42-8, SEQ ID NO: 85; 42-13, SEQ ID NO:86; 42-3A, SEQ ID NO:87; 42-4, SEQ ID NO:88; 42-5A, SEQ ID NO:89; 42-1B, SEQ ID NO:90; 42-5B, SEQ ID NO:91; 43-1, SEQ ID NO: 92; 43-12, SEQ ID NO: 93; 43-5, SEQ ID NO:94; 43-21, SEQ ID NO:96; 43-25, SEQ ID NO: 97; 43-20, SEQ ID NO:99; 24.1, SEQ ID NO: 101; 42.2, SEQ ID NO:102; 7.2, SEQ ID NO: 103; 27.3, SEQ ID NO: 104; 16.3, SEQ ID NO: 105; 42.10, SEQ ID NO: 106; 42-3B, SEQ ID NO: 107; 42-11, SEQ ID NO: 108; Fl, SEQ ID NO: 109; F5, SEQ ID NO: 110; F3, SEQ ID NO:111; 42-6B, SEQ ID NO: 112; and 42-12, SEQ ID NO: 113.

19. A recombinant protein comprising a fragment of an AAV capsid protein, said fragment selected from the group consisting of:

vp2 capsid protein, amino acids (aa) 138 to 738;

vp3 capsid protein, aa 203 to 738;

hypervariable region (HVR)1 through 12: aa 146 to 152; aa 182 to 187; aa 262 to 264; aa 263 to 266; aa 263 to 266; aa 381 to 383; aa 383 to 385; aa 450 to 474; aa 451 to 475; aa 490 to 495; aa 491 to 496; aa500 to 504; aa 501 to 505; aa 514 to 522; aa 533 to 554; aa 534 to 555; aa 581 to 594; aa 583 to 596; aa 658 to 667; aa 660 to 669; and aa 705 to 719; aa 707 to 772;

aa 24 - 42, aa 25 - 28; aa 81 - 85; aa133 to 165; aa 134 - 165; aa 137 to 143; aa 154 to 156; aa 194 to 208; aa 261 to 274; aa 262 to 274; aa 171 to 173; aa 413 to 417; aa 449 to 478; aa 494 to 525; aa 534 to 571; aa 581 to 601; aa 660 to 671; aa 709 to 723; and

aa 1 to 184, aa 199 to 259; aa 274 to 446; aa 603 to 659; aa 670 to 706; aa 724 to 736; aa 185 to 198; aa 260 to 273; aa 447 to 477; aa 495 to 602; aa 660 to 669; and aa 707 to 723,

wherein the amino acid numbers are those of the AAV7 capsid, SEQ ID NO:2, and refer to the corresponding regions in the capsid of Cl, SEQ ID NO:60; C2, SEQ ID NO:61; C5, SEQ ID NO:62; A3-3, SEQ ID NO:66; A3-7, SEQ ID NO:67; A3-4, SEQ ID NO:68; A3-5, SEQ ID NO: 69; 3.3b, SEQ ID NO: 62; 223.4, SEQ ID NO: 73; 223-5, SEQ ID NO:74; 223-10, SEQ ID NO:75; 223-2, SEQ ID NO:76; 223-7, SEQ ID NO: 77; 223-6, SEQ ID NO: 78; 44-1, SEQ ID NO: 79; 44-5, SEQ ID NO:80; 44-2, SEQ ID NO:81; 42-15, SEQ ID NO: 84; 42-8, SEQ ID NO: 85; 42-13, SEQ ID NO:86; 42-3A, SEQ ID NO:87; 42-4, SEQ ID NO:88; 42-5A, SEQ ID NO:89; 42-1B, SEQ ID NO:90; 42-5B, SEQ ID NO:91; 43-1, SEQ ID NO: 92; 43-12, SEQ ID NO: 93; 43-5, SEQ ID NO:94; 43-21, SEQ ID NO:96; 43-25, SEQ ID NO: 97; 43-20, SEQ ID NO:99; 24.1, SEQ ID NO: 101; 42.2, SEQ ID NO:102; 7.2, SEQ ID NO: 103; 27.3, SEQ ID NO: 104; 16.3, SEQ ID NO: 105; 42.10, SEQ ID NO: 106; 42-3B, SEQ ID NO: 107; 42-11, SEQ ID NO: 108; Fl, SEQ ID NO: 109; F5, SEQ ID NO: 110; F3, SEQ ID NO:111; 42-6B, SEQ ID NO: 112; and 42-12, SEQ ID NO: 113.

20. An artificial adeno-associated virus (AAV) capsid protein comprising one or more of the protein fragments according to claim 19.

21. A recombinant adeno-associated virus (rAAV) comprising an artificial capsid according to claim 20.

22. A recombinant molecule comprising a nucleic acid sequence encoding a protein according to claim 19 or 20.

23. A recombinant molecule comprising a nucleic acid sequence encoding a novel adeno-associated virus (AAV) serotype capsid protein having an amino acid sequence selected from the group consisting of: Cl, SEQ ID NO:60; C2, SEQ ID NO:61; C5, SEQ ID NO:62; A3-3, SEQ ID NO:66; A3-7, SEQ ID NO:67; A3-4, SEQ ID NO:68; A3-5, SEQ ID NO: 69; 3.3b, SEQ ID NO: 62; 223.4, SEQ ID NO: 73; 223-5, SEQ ID NO:74; 223-10, SEQ ID NO:75; 223-2, SEQ ID NO:76; 223-7, SEQ ID NO: 77; 223-6, SEQ ID NO: 78; 44-1, SEQ

ID NO: 79; 44-5, SEQ ID NO:80; 44-2, SEQ ID NO:81; 42-15, SEQ ID NO: 84; 42-8, SEQ ID NO: 85; 42-13, SEQ ID NO:86; 42-3A, SEQ ID NO:87; 42-4, SEQ ID NO:88; 42-5A, SEQ ID NO:89; 42-1B, SEQ ID NO:90; 42-5B, SEQ ID NO:91; 43-1, SEQ ID NO: 92; 43-12, SEQ ID NO: 93; 43-5, SEQ ID NO:94; 43-21, SEQ ID NO:96; 43-25, SEQ ID NO: 97; 43-20, SEQ ID NO:99; 24.1, SEQ ID NO: 101; 42.2, SEQ ID NO:102; 7.2, SEQ ID NO: 103; 27.3, SEQ ID NO: 104; 16.3, SEQ ID NO: 105; 42.10, SEQ ID NO: 106; 42-3B, SEQ ID NO: 107; 42-11, SEQ ID NO: 108; Fl, SEQ ID NO: 109; F5, SEQ ID NO: 110; F3, SEQ ID NO:111; 42-6B, SEQ ID NO: 112; and 42-12, SEQ ID NO: 113.

24. A recombinant molecule comprising a nucleic acid sequence encoding a novel adeno-associated virus (AAV) serotype capsid protein, said nucleic acid sequence selected from the group consisting of: AAV5, SEQ ID NO:2; 42-2 , SEQ ID NO:9; 42-8, SEQ ID NO:27; 42-15 , SEQ ID NO:28; 42-5b , SEQ ID NO: 29; 42-lb , SEQ ID NO:30; 42-13, SEQ ID NO: 31; 42-3a , SEQ ID NO: 32; 42-4 , SEQ ID NO:33; 42-5a , SEQ ID NO: 34; 42-10, SEQ ID NO:35; 42-3b, SEQ ID NO: 36; 42-11, SEQ ID NO: 37; 42-6b, SEQ ID NO:38; 43-1, SEQ ID NO: 39; 43-5, SEQ ID NO: 40; 43-12 , SEQ ID NO:41; 43-20, SEQ ID NO:42; 43-21, SEQ ID NO: 43; 43-23, SEQ ID NO:44; 43-25 , SEQ ID NO: 45; 44.1, SEQ ID NO:47; 44.5, SEQ ID NO:47; 223.10, SEQ ID NO:48;

223.2 , SEQ ID NO:49; 223.4, SEQ ID NO:50; 223.5, SEQ ID NO: 51; 223.6, SEQ ID NO: 52; 223.7, SEQ ID NO: 53; A3.4, SEQ ID NO: 54; A3.5, SEQ ID NO:55; A3.7 , SEQ ID NO: 56; A3.3 , SEQ ID NO:57; 42.12, SEQ ID NO: 58; 44.2, SEQ ID NO: 59; AAV10 , SEQ ID NO: 117; AAV11, SEQ ID NO: 118; AAV12 , SEQ ID NO:119; A3.1, SEQ ID NO:120; and H6, SEQ ID NO: 25.

25. A recombinant molecule comprising a nucleic acid sequence encoding a fragment of an adeno-associated virus capsid protein, said nucleic acid sequence selected from the group consisting of:

vpl, nt 825 to 3049;

vp2, nt 1234 to 3049;

vp 3, nt 1434 to 3049;

nt 468 to 3090; and

nt 725 to 3090,

wherein the nucleotides numbers are of AAV7, SEQ ID NO:1 and

correspond to sequences in 42-2 , SEQ ID NO:9; 42-8 , SEQ ID NO:27; 42-15 , SEQ ID NO:28; 42-5b , SEQ ID NO: 29; 42-lb , SEQ ID NO:30; 42-13, SEQ ID NO: 31; 42-3a , SEQ ID NO: 32; 42-4 , SEQ ID NO:33; 42-5a , SEQ ID NO: 34; 42-10, SEQ ID NO:35; 42-3b, SEQ ID NO: 36; 42-11, SEQ ID NO: 37; 42-6b, SEQ ID NO:38; 43-1, SEQ ID NO: 39; 43-5, SEQ ID NO: 40; 43-12, SEQ ID NO:41; 43-20, SEQ ID NO:42; 43-21, SEQ ID NO: 43; 43-23, SEQ ID NO:44; 43-25, SEQ ID NO: 45; 44.1, SEQ ID NO:47; 44.5, SEQ ID NO:47; 223.10, SEQ ID NO:48; 223.2 , SEQ ID NO:49; 223.4, SEQ ID NO:50; 223.5, SEQ ID NO: 51; 223.6, SEQ ID NO: 52; 223.7, SEQ ID NO: 53; A3.4, SEQ ID NO: 54; A3.5, SEQ ID NO:55; A3.7 , SEQ ID NO: 56; A3.3 , SEQ ID NO:57; 42.12, SEQ ID NO: 58; 44.2, SEQ ID NO: 59; AAV10 , SEQ ID NO: 117; AAV11, SEQ ID NO: 118; AAV12 , SEQ ID NO:119; A3.1, SEQ ID NO:120; and H6, SEQ ID NO: 25.

26. The recombinant molecule according to any one of claims 22-25, wherein said molecule is a plasmid.

27. The recombinant molecule according to any one of claims 22-25, wherein said molecule further comprises a functional AAV *rep* gene.

28. A method of generating a recombinant adeno-associated virus (AAV) comprising an AAV serotype capsid comprising the steps of culturing a host cell containing: (a) a molecule according to any one of claims 22-25 which encodes an adeno-associated virus capsid; (b) a functional rep gene; (c) a minigene comprising AAV inverted terminal repeats (ITRs) and a transgene; and (d) sufficient helper functions to permit packaging of the minigene into the AAV capsid protein.

29. A host cell transfected with an adeno-associated virus according to claim 28 or a molecule according to any one of claims 22-25.

30. A composition comprising an AAV according to claim 18 or claim 21, and a physiologically compatible carrier.

31. A composition comprising a molecule according to any one of claims 22-25and a physiologically compatible carrier.

32. A method of delivering a transgene to a cell, said method comprising the step of contacting the cell with an AAV according to claim 18 or claim 21, wherein said rAAV comprises the transgene.