CLAIMS

What is claimed is:

~~1. A recombinant expression vector comprising a nucleic acid encoding a polypeptide having a sequence selected from the group consisting of: SEQ ID NO: 1 to 409, 435-868, or 1726-1988, or a fragment thereof that does not encode a peptide that is identical to a sequence of any one of SEQ ID NOs: 869, 870, or 871.~~

~~2. An isolated AAV capsid protein comprising an amino acid sequence selected from the group consisting of: SEQ ID NOs: 1 to 409, 435-868 and 1726-1988, or fragment thereof.~~

~~3. An isolated AAV capsid protein comprising a sequence selected from SEQ ID NOs: 1-409, 837-852, or 1726-1814, wherein an amino acid of the sequence that is not identical to a corresponding amino acid of the sequence set forth as SEQ ID NO: 869 is replaced with a conservative substitution.~~

~~4. An isolated AAV capsid protein comprising a sequence selected from SEQ ID NOs: 435-628 or 1815-1988, wherein an amino acid of the sequence that is not identical to a corresponding amino acid of the sequence set forth as SEQ ID NO: 869 or 870 is replaced with a conservative substitution.~~

~~5. An isolated AAV capsid protein comprising a sequence selected from SEQ ID NOs: 629-836 or 853-868, wherein an amino acid of the sequence that is not identical to a corresponding amino acid of the sequence set forth as SEQ ID NO: 871 is replaced with a conservative substitution.~~

~~6. A peptide fragment of the isolated AAV capsid protein of any one of claims 2 to 5 that is not identical to a sequence of any one of SEQ ID NOs: 869, 870, or 871.~~

~~7. An isolated AAV capsid protein comprising the peptide fragment of claim 6.~~

~~8. An recombinant expression vector comprising a nucleic acid sequence encoding the isolated AAV capsid protein of any one of claims 2 to 5.~~

~~9. A composition comprising the isolated AAV capsid protein of any one of claims 2 to 5.~~

~~10. A composition comprising the isolated AAV capsid protein of any one of claims 2 to 5 and a pharmaceutically acceptable carrier.~~

~~11. A recombinant AAV (rAAV) comprising the isolated AAV capsid protein of any one of claims 2 to 5.~~

~~12. A composition comprising the recombinant rAAV of claim 11.~~

~~13. The composition of claim 12 further comprising a pharmaceutically acceptable carrier.~~

~~14. A host cell containing a nucleic acid that comprises a coding sequence of a polypeptide selected from the group consisting of: SEQ ID NO: 1-409, 435-868, and 1726-1988, that is operably linked to a promoter.~~

~~15. A composition comprising the host cell of claim 14 and a sterile cell culture medium.~~

~~16. A composition comprising the host cell of claim 15 and a cryopreservative.~~

~~17. A method for delivering a transgene to a subject comprising administering a rAAV of claim 11 to a subject, wherein the rAAV comprises at least one transgene, and wherein the rAAV infects cells of a target tissue of the subject.~~

~~18. A method for generating a somatic transgenic animal model comprising administering a recombinant rAAV of claim 11 to a non-human animal, wherein the rAAV~~

~~comprises at least one transgene, and wherein the rAAV infects cells of a target tissue of the non-human animal.~~

~~19. The method of claim 17, wherein the at least one transgene is a protein coding gene.~~

~~20. The method of claim 17, wherein the at least one transgene encodes a small interfering nucleic acid.~~

~~21. The method of claim 20, wherein the small interfering nucleic acid is a miRNA.~~

~~22. The method of claim 20, wherein the small interfering nucleic acid is a miRNA sponge or TuD RNA that inhibits the activity of at least one miRNA in the subject or animal.~~

~~23. The method of claim 22, wherein the miRNA is expressed in a cell of the target tissue~~

~~24. The method of claim of claim 17, wherein the target tissue is liver, central nervous system (CNS), ocular, gastrointestinal, respiratory, breast, pancreas, urinary tract, or uterine tissue.~~

~~25. The method of claim 18, wherein the transgene expresses a transcript that comprises at least one binding site for a miRNA, wherein the miRNA inhibits activity of the transgene, in a tissue other than the target tissue, by hybridizing to the binding site.~~

~~26. A method for generating a somatic transgenic animal model comprising administering a rAAV of claim 23 to a non-human animal, wherein the rAAV comprises at least one transgene, wherein the transgene expresses a transcript that comprises at least one binding site for a miRNA, wherein the miRNA inhibits activity of the transgene, in a tissue other than a target tissue, by hybridizing to the binding site of the transcript.~~

~~27. The method of claim 26, wherein the transgene comprises a tissue specific promoter or inducible promoter.~~

~~28. The method of claim 27, wherein the tissue specific promoter is a liver-specific thyroxin binding globulin (TBG) promoter, an insulin promoter, a glucagon promoter, a somatostatin promoter, mucin 2 promoter, a pancreatic polypeptide (PPY) promoter, a synapsin 1 (Syn) promoter, a retinoschisin promoter, a K12 promoter, a CC10 promoter, a surfactant protein C (SP-C) promoter, a PRC1 promoter, a RRM2 promoter, uroplakin 2 (UPII) promoter, or a lactoferrin promoter.~~

~~29. The method of claim 17, wherein the rAAV is administered intravenously, transdermally, intraocularly, intrathecally, orally, intramuscularly, subcutaneously, intranasally, or by inhalation.~~

~~30. The method of claim 17, wherein the subject is selected from a mouse, a rat, a rabbit, a dog, a cat, a sheep, a pig, and a non-human primate.~~

~~31. The method of claim 17, wherein the subject is a human.~~

~~32. A somatic transgenic animal model produced by the method of claim 18.~~

~~33. A kit for producing a rAAV, the kit comprising:~~

~~a container housing an isolated nucleic acid encoding a polypeptide having a sequence of any one of SEQ ID NO: 1 to 409, 435-868, or 1726-1988.~~

~~34. The kit of claim 33 further comprising instructions for producing the rAAV.~~

~~35. The kit of claim 34 further comprising at least one container housing a recombinant AAV vector, wherein the recombinant AAV vector comprises a transgene.~~

~~36. A kit comprising:~~

~~a container housing a recombinant AAV having an isolated AAV capsid protein of any one of claims 2 to 5.~~

~~37. The kit of claim 36, wherein the container is a syringe.~~

~~38. The isolated AAV capsid protein of any one of claims 2-5, wherein the capsid protein is a VP1 capsid protein.~~

~~39. The isolated AAV capsid protein of any one of claims 2-5, wherein the capsid protein is a VP2 capsid protein.~~

~~40. The isolated capsid protein of any one of claims 2-5, wherein the capsid protein is a VP3 capsid protein.~~

~~41. A pseudotyped AAV comprising the capsid protein of any one of claims 2 to 5, or 7.~~

~~42. The recombinant expression vector of claim 1, wherein the nucleic acid encodes a V1 capsid protein.~~

~~43. The recombinant expression vector of claim 1, wherein the nucleic acid encodes a V2 capsid protein.~~

~~44. The recombinant expression vector of claim 1, wherein the nucleic acid encodes a V3 capsid protein.~~

~~45. A nucleic acid comprising a sequence selected from the group consisting of SEQ ID NO: 410-434, 876-1718, and 1989-2251.~~

~~46. The nucleic acid of claim 45, wherein the nucleic acid is engineered to express an AAV capsid protein, or a variant thereof and/or an AAV assembly-activating protein (AAP), or a variant thereof.~~

~~47. The nucleic acid of claim 45, wherein the AAP is in a different open reading frame of the nucleic acid than the AAV capsid protein.~~

~~48. The nucleic acid of claim 46, wherein the AAP is AAV2 AAP (AAP-2), or variant thereof.~~

~~49. An isolated protein encoded by the nucleic acid of claim 45.~~

~~50. A recombinant AAV comprising the isolated protein of claim 49.~~

1. A recombinant expression vector comprising a nucleic acid encoding a polypeptide having a sequence selected from the group consisting of SEQ ID NOs: 1-20, 63-66, 800-801, 1726-1728, and 1987-1988.

2. An isolated adeno-associated virus (AAV) capsid protein comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 1-20, 63-66, 800-801, 1726-1728, and 1987-1988.

3. A recombinant expression vector comprising a nucleic acid sequence encoding the isolated AAV capsid protein of claim 2.

4. A recombinant AAV (rAAV) comprising the isolated AAV capsid protein of claim 2.

5. A host cell containing the recombinant expression vector of claim 3.

6. The isolated AAV capsid protein of claim 2, wherein the capsid protein is a VP1 capsid protein.

7. The recombinant expression vector of claim 1, wherein the nucleic acid encodes a VP1 capsid protein, a VP2 capsid protein, or a VP3 capsid protein.

8. The recombinant expression vector of claim 1 comprising a nucleic acid encoding a polypeptide having a sequence of SEQ ID NO: 66.

9. The isolated AAV capsid protein of claim 2 comprising an amino acid sequence of SEQ ID NO: 66.

10. A kit comprising:

a container housing a recombinant AAV having an isolated adeno-associated virus (AAV) capsid protein comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 1-20, 63-66, 800-801, 1726-1728, and 1987-1988.