WHAT IS CLAIMED IS:

1. A variant adeno-associated virus (AAV) capsid protein comprising a peptide insertion in the GH-loop of the capsid protein relative to a corresponding parental AAV capsid protein, wherein the peptide insertion comprises the amino acid sequence NKTTNKD (SEQ ID NO: 14), or comprises the amino acid sequence NKIQRTD (SEQ ID NO: 13), wherein the insertion site is located between two adjacent amino acids at a position between amino acids 570 and 611 of VP1 of AAV2 (SEQ ID NO: 2) or the corresponding position in the capsid protein of another AAV serotype.

2. The variant AAV capsid protein of claim 1, wherein the peptide insertion comprises the amino acid sequence Y_1Y_2NKTTNKDY_3 or comprises the amino acid sequence Y_1Y_2NKIQRTDY_3, wherein each of Y_1-Y_3 is independently selected from Ala, Leu, Gly, Ser, Thr, and Pro.

3. The variant AAV capsid protein according to claim 2, wherein the the peptide insertion comprises the amino acid sequence LANKTTNKDA (SEQ ID NO: 27) or comprises the amino acid sequence LANKIQRTDA (SEQ ID NO:26).

4. The variant AAV capsid protein according to any one of claims 1-3, wherein the insertion site is located between amino acids corresponding to amino acids 587 and 588 of VP1 of AAV2 (SEQ ID NO:2) or the corresponding position in the capsid protein of another AAV serotype.

5. The variant AAV capsid protein according to any one of claims 1-4, wherein the AAV capsid protein comprises one or more amino acid substitutions relative to VP1 of AAV2 (SEQ ID NO:2) or one or more corresponding substitutions in the capsid protein of another AAV serotype.

6. The variant AAV capsid protein according to claim 5, wherein the peptide insertion comprises the amino acid sequence NKTTNKD (SEQ ID NO: 14) and wherein the AAV capsid protein comprises a V708I amino acid substitution relative to VP1 of AAV2 (SEQ ID NO:2) or the corresponding position in the capsid protein of another AAV serotype.

7. The variant AAV capsid protein according to claim 6, wherein the AAV capsid protein further comprises one or more of an S109T amino acid substitution, a W694C amino acid substitution and a W606C amino acid substitution relative to VP1 of AAV2 (SEQ ID NO:2) or the corresponding position(s) in the capsid protein of another AAV serotype.

8. The variant AAV capsid protein according to claim 6, wherein the AAV capsid protein comprises an amino acid sequence at least 90% identical to the entire length of the amino acid sequence set forth in SEQ ID NO:48.

9. The variant AAV capsid protein according to claim 8, wherein the AAV capsid protein comprises the amino acid sequence set forth in SEQ ID NO: 48.

10. The variant AAV capsid protein according to claim 5, wherein the peptide insertion comprises the amino acid sequence NKIQRTD (SEQ ID NO: 13) and wherein the AAV capsid protein comprises a V708I amino acid substitution relative to VP1 of AAV2 (SEQ ID NO:2) or the corresponding position in the capsid protein of another AAV serotype.

11. The variant AAV capsid protein according to claim 10, wherein the AAV capsid protein further comprises one or more of an S109T amino acid substitution, a R588M amino acid substitution and an A593E amino acid substitution relative to VP1 of AAV2 (SEQ ID NO:2) or the corresponding position(s) in the capsid protein of another AAV serotype.

12. The variant AAV capsid protein according to claim 10, wherein the AAV capsid protein comprises an amino acid sequence at least 90% identical to the entire length of the amino acid sequence set forth as SEQ ID NO:43.

13. The variant AAV capsid protein according to claim 12, wherein the AAV capsid protein comprises or consists of the amino acid sequence set forth in SEQ ID NO: 43.

14. The variant AAV capsid according to any one of claims 1-13, wherein the capsid protein confers to an infectious rAAV virion an increased infectivity of a

muscle cell compared to the infectivity of the muscle cell by an AAV virion comprising a wild-type AAV capsid protein.

15. The variant AAV capsid protein according to any one of claims 1-14, wherein the capsid protein further confers to an infectious rAAV virion an increased resistance to neutralization by a neutralizing antibody compared to an AAV comprising the corresponding parental AAV capsid protein.

16. An isolated nucleic acid comprising a nucleotide sequence that encodes a variant AAV capsid protein according to any one of claims 1 to 15.

17. An infectious recombinant AAV (rAAV) virion comprising a variant AAV capsid protein according to any one of claims 1 to 15.

18. The rAAV virion according to claim 17 further comprising a heterologous nucleic acid comprising a nucleotide sequence encoding a gene product.

19. The rAAV virion according to claim 18, wherein the gene product is a protein, a small interfering RNA, an antisense RNA, a microRNA, a short hairpin RNA or a small interfering RNA.

20. The rAAV virion according to claim 19, wherein the rAAV virion comprises a heterologous nucleic acid encoding a gene product selected from alpha galactosidase A (GLA), frataxin (FXN), dystrophin (DMD) or a functional fragment thereof, acid alpha glucosidase (GAA), and glycogen phosphorylase, muscle (PYGM).

21. The rAAV virion according to claim 20, wherein the variant AAV capsid protein comprises an amino acid sequence having at least 90%, at least 95%, or at least 99% amino acid sequence identity to the amino acid sequence set forth in SEQ ID NO:48 and wherein the heterologous nucleic acid comprises a nucleotide sequence encoding an alpha galactosidase A (GLA) protein.

22. The rAAV virion according to claim 21, wherein the variant AAV capsid protein comprises or consists of the amino sequence set forth as SEQ ID NO:48 and wherein the nucleotide sequence encoding GLA is operably linked to a CAG promoter.

23. The rAAV virion according to claim 20, wherein the variant AAV capsid protein comprises an amino acid sequence having at least 90% at least 95%, or at least 99% amino acid sequence identity to the amino acid sequence set forth in SEQ ID NO:48 and wherein the heterologous nucleic acid comprises a nucleotide sequence encoding a glycogen phosphorylase, muscle (PYGM) protein.

24. The rAAV virion according to claim 23, wherein the variant AAV capsid protein comprises or consists of the amino sequence set forth as SEQ ID NO:48 and wherein the nucleotide sequence encoding glycogen phosphorylase, muscle (PYGM) is operably linked to a CAG promoter.

25. The rAAV virion according to claim 20, wherein the variant AAV capsid protein comprises an amino acid sequence having at least 90%, at least 95%, or at least 99% amino acid sequence identity to the amino acid sequence set forth in SEQ ID NO:48 and wherein the heterologous nucleic acid comprises a nucleotide sequence encoding a dystrophin protein or a functional fragment thereof.

26. The rAAV virion according to claim 20, wherein the variant AAV capsid protein comprises an amino acid sequence having at least 90%, at least 95%, or at least 99% amino acid sequence identity to the amino acid sequence set forth in SEQ ID NO:48 and wherein the heterologous nucleic acid comprises a nucleotide sequence encoding a frataxin protein.

27. The rAAV virion according to claim 26, wherein the variant AAV capsid protein comprises or consists of the amino sequence set forth as SEQ ID NO:48 and wherein the nucleotide sequence encoding a frataxin protein is operably linked to a CAG promoter.

28. The rAAV virion according to claim 20, wherein the variant AAV capsid protein comprises an amino acid sequence having at least 90%, at least 95%, or at least 99% amino acid sequence identity to the amino acid sequence set forth in SEQ ID NO:48 and wherein the heterologous nucleic acid comprises a nucleotide sequence encoding a GAA protein.

29. The rAAV virion according to claim 28, wherein the variant AAV capsid protein comprises or consists of the amino sequence set forth as SEQ ID NO:48 and

wherein the nucleotide sequence encoding a GAA protein is operably linked to a CBA promoter.

30. A pharmaceutical composition comprising an rAAV virion according to any one of claims 18-29 and a pharmaceutically acceptable excipient.

31. An in vitro method of delivering a heterologous nucleic acid to a muscle cell comprising contacting the muscle cell with an rAAV virion according to any one of claims 18-29 or a pharmaceutical composition according to claim 30.

32. The method according to claim 31, wherein the muscle cell is a cardiac and/or skeletal muscle cell.

33. An rAAV according to any one of claims 19-29 or a pharmaceutical composition according to claim 30 for use as a medicament.

34. The use of an rAAV virion according to claim 21 or 22 or a pharmaceutical composition comprising an rAAV according to claim 21 or 22, for the manufacture of a medicament for the treatment of Fabry disease.

35. The use of an rAAV virion according to claim 23 or 24 or a pharmaceutical composition comprising an rAAV according to claim 23 or 24, for the manufacture of a medicament for the treatment of McArdle disease.

36. The use of an rAAV virion according to claim 25 or a pharmaceutical composition comprising an rAAV virion according to claim 25, for the manufacture of a medicament for the treatment of Duchenne's muscular dystrophy.

37. The use of an rAAV virion according to claim 26 or 27 or a pharmaceutical composition comprising an rAAV virion according to claim 26 or 27, for the manufacture of a medicament for the treatment of Friedreich's ataxia.

38. The use of an rAAV virion according to claim 28 or 29 or a pharmaceutical composition comprising an rAAV virion according to claim 28 or 29, for the manufacture of a medicament for the treatment of Pompe disease.

39. The use of an rAAV virion or pharmaceutical composition according to any one of claims 34-38, wherein the rAAV virion or pharmaceutical composition is for administration by intravenous and/or intramuscular injection.