WHAT IS CLAIMED IS:

1. A recombinant adeno-associated virus (rAAV) comprising:

   (a) an AAV capsid; and

   (b) a recombinant AAV genome comprising a human N-acetylgalactosamine-6-sulfate sulfatase (hGALNS) expression cassette flanked by AAV-inverted terminal repeats (ITRs), the hGALNS expression cassette comprising a nucleotide sequence encoding a transgene, wherein the transgene encodes a fusion protein that is hGALNS fused to an acidic oligopeptide.
2. The rAAV of claim 1, wherein the acidic oligopeptide is D8.
3. The rAAV of claim 1 or 2, wherein the hGALNS expression cassette further comprises a liver-specific promoter operably linked to the nucleotide sequence encoding the transgene.
4. The rAAV of claim 3, wherein the liver-specific promoter:
   (a) is a TBG promoter; or
   (b) comprises a nucleotide sequence that is at least about 80% identical to SEQ ID NO:13; or
   (c) comprises a nucleotide sequence that is at least about 85% identical to SEQ ID NO:13; or
   (d) comprises a nucleotide sequence that is at least about 90% identical to SEQ ID NO:13; or
   (e) comprises a nucleotide sequence that is at least about 95% identical to SEQ ID NO:13; or
   (f) comprises a nucleotide sequence that is at least about 98% identical to SEQ ID NO:13; or
   (g) comprises a nucleotide sequence that is 100% identical to SEQ ID NO:13, or
   (h) comprises a nucleotide sequence that is at least about 80% identical to SEQ ID NO:14; or

(i) comprises a nucleotide sequence that is at least about 85% identical to SEQ ID NO:14; or

(j) comprises a nucleotide sequence that is at least about 90% identical to SEQ ID NO:14; or

(k) comprises a nucleotide sequence that is at least about 95% identical to SEQ ID NO:14; or

(l) comprises a nucleotide sequence that is at least about 98% identical to SEQ ID NO:14; or

(m) comprises a nucleotide sequence that is 100% identical to SEQ ID NO:14, or

(n) comprises a nucleotide sequence that is at least about 80% identical to SEQ ID NO:15; or

(o) comprises a nucleotide sequence that is at least about 85% identical to SEQ ID NO:15; or

(p) comprises a nucleotide sequence that is at least about 90% identical to SEQ ID NO:15; or

(q) comprises a nucleotide sequence that is at least about 95% identical to SEQ ID NO:15; or

(r) comprises a nucleotide sequence that is at least about 98% identical to SEQ ID NO:15; or

(s) comprises a nucleotide sequence that is 100% identical to SEQ ID NO:15.

5. The rAAV of claim 1 or 2, wherein the hGALNS expression cassette further comprises a promoter operably linked to the nucleotide sequence encoding the transgene.
6. The rAAV of claim 5, wherein the promoter is a CAG promoter.
7. The rAAV of claim 5, wherein the promoter is a liver- and muscle-specific promoter.
8. The rAAV of claim 7, wherein the liver- and muscle-specific promoter:

(a) comprises a nucleotide sequence that is at least about 80% identical to SEQ ID NO:16; or

(b) comprises a nucleotide sequence that is at least about 85% identical to SEQ ID NO:16; or

(c) comprises a nucleotide sequence that is at least about 90% identical to SEQ ID NO:16; or

(d) comprises a nucleotide sequence that is at least about 95% identical to SEQ ID NO:16; or

(e) comprises a nucleotide sequence that is at least about 98% identical to SEQ ID NO:16; or

(f) comprises a nucleotide sequence that is 100% identical to SEQ ID NO:16.

9. The rAAV of any one of claims 1-8, wherein the rAAV is rAAV8.

10. The rAAV of any one of claims 1-8, wherein the rAAV is rAAV9.

11. The rAAV of any one of claims 1-10, wherein the nucleotide sequence encoding hGALNS or the nucleotide sequence encoding the fusion protein is codon-optimized.

12. The rAAV of any one of claims 1-11, wherein the nucleotide sequence encoding hGALNS or the nucleotide sequence encoding the fusion protein has CpG sites depleted.

13. A pharmaceutical composition comprising the rAAV of any one of claims 1-12 and a pharmaceutically acceptable carrier.

14. A polynucleotide comprising an hGALNS expression cassette flanked by AAV-ITRs, the hGALNS expression cassette comprising a nucleotide sequence encoding a transgene, wherein the transgene encodes a fusion protein that is hGALNS fused to an acidic oligopeptide.

15. The polynucleotide of claim 14, wherein the acidic oligopeptide is D8.

16. The polynucleotide of claim 14 or 15, wherein the hGALNS expression cassette further comprises a liver-specific promoter operably linked to the nucleotide sequence encoding the transgene.

17. The polynucleotide of claim 16, wherein the liver-specific promoter:

(a) is a TBG promoter; or

(b) comprises a nucleotide sequence that is at least about 80% identical to SEQ ID NO:13; or

(c) comprises a nucleotide sequence that is at least about 85% identical to SEQ ID NO:13; or

(d) comprises a nucleotide sequence that is at least about 90% identical to SEQ ID NO:13; or

(e) comprises a nucleotide sequence that is at least about 95% identical to SEQ ID NO:13; or

(f) comprises a nucleotide sequence that is at least about 98% identical to SEQ ID NO:13; or

(g) comprises a nucleotide sequence that is 100% identical to SEQ ID NO:13, or

(h) comprises a nucleotide sequence that is at least about 80% identical to SEQ ID NO:14; or

(i) comprises a nucleotide sequence that is at least about 85% identical to SEQ ID NO:14; or

(j) comprises a nucleotide sequence that is at least about 90% identical to SEQ ID NO:14; or

(k) comprises a nucleotide sequence that is at least about 95% identical to SEQ ID NO:14; or

(l) comprises a nucleotide sequence that is at least about 98% identical to SEQ ID NO:14; or

(m) comprises a nucleotide sequence that is 100% identical to SEQ ID NO:14, or

(n) comprises a nucleotide sequence that is at least about 80% identical to SEQ ID NO:15; or

(o) comprises a nucleotide sequence that is at least about 85% identical to SEQ ID NO:15; or

(p) comprises a nucleotide sequence that is at least about 90% identical to SEQ ID NO:15; or

(q) comprises a nucleotide sequence that is at least about 95% identical to SEQ ID NO:15; or

(r) comprises a nucleotide sequence that is at least about 98% identical to SEQ ID NO:15; or

(s) comprises a nucleotide sequence that is 100% identical to SEQ ID NO:15.

18. The polynucleotide of claim 14 or 15, wherein the hGALNS expression cassette further comprises a liver- and muscle-specific promoter operably linked to the nucleotide sequence encoding the transgene.

19. The polynucleotide of claim 18, wherein the liver- and muscle-specific promoter:

(a) comprises a nucleotide sequence that is at least about 80% identical to SEQ ID NO:16; or

(b) comprises a nucleotide sequence that is at least about 85% identical to SEQ ID NO:16; or

(c) comprises a nucleotide sequence that is at least about 90% identical to SEQ ID NO:16; or

(d) comprises a nucleotide sequence that is at least about 95% identical to SEQ ID NO:16; or

(e) comprises a nucleotide sequence that is at least about 98% identical to SEQ ID NO:16; or

(f) comprises a nucleotide sequence that is 100% identical to SEQ ID NO:16.

20. The polynucleotide of claim 14 or 15, wherein the hGALNS expression cassette further comprises a promoter operably linked to the nucleotide sequence encoding the fusion protein.

21. The polynucleotide of claim 20, wherein the promoter is a CAG promoter.

22. The polynucleotide of any one of claims 14-21, wherein the AAV is AAV8.

23. The polynucleotide of any one of claims 14-21, wherein the AAV is AAV9.
24. An rAAV plasmid comprising the polynucleotide of any one of claims 14-23.
25. An *ex vivo* cell comprising the polynucleotide of any one of claims 14-23 or the rAAV plasmid of claim 24.
26. A method of making an rAAV comprising transfecting an *ex vivo* cell with the rAAV plasmid of claim 24 and one or more helper plasmids collectively comprising the nucleotide sequences of AAV genes Rep, Cap, VA, E2a and E4.
27. Use of the rAAV of any one of claims 1-12 or the pharmaceutical composition of claim 13 in the manufacture of a medicament for treating a human subject diagnosed with mucopolysaccharidosis type IVA (MPS IVA).
28. Use of the rAAV of any one of claims 1-12 in the manufacture of a medicament for treating a human subject diagnosed with mucopolysaccharidosis type IVA (MPS IVA), wherein the medicament is suitable for administration to the human subject, wherein the administration allows for delivery of a therapeutically effective amount of a fusion protein that is hGALNS fused to an acidic oligopeptide to the bone, cartilage, ligament, meniscus, growth plate, liver, spleen, lung, kidney, trachea, heart muscle, and/or heart valve of the human subject.
29. The use of claim 28, wherein the hGALNS is glycosylated with mannose-6-phosphate by having been produced in and secreted from a cell of the liver.
30. Use of a fusion protein that is hGALNS fused to an acidic oligopeptide in the preparation of a composition for treating a human subject diagnosed with mucopolysaccharidosis type IVA (MPS IVA), wherein a rAAV vector carrying an expression cassette encoding the fusion protein is suitable for administration to the human subject, wherein the fusion protein is to be delivered to the bone, cartilage, ligament, meniscus, growth plate, liver, spleen, lung, kidney, trachea, heart muscle, and/or heart valve of the human subject.
31. Use of a fusion protein that is hGALNS fused to an acidic oligopeptide in the preparation of a composition for treating a human subject diagnosed with mucopolysaccharidosis type

IVA (MPS IVA), wherein the composition is to be delivered to the bone, cartilage, ligament, meniscus, growth plate, liver, spleen, lung, kidney, trachea, heart muscle, and/or heart valve of the human subject, and wherein the fusion protein is produced from an rAAV genome and is glycosylated with mannose-6-phosphate by having been produced in and secreted from a cell of the liver.

32. The use of any one of claims 28-31, wherein the rAAV is rAAV8.
33. The use of any one of claims 28-31, wherein the rAAV is rAAV9.
34. The use of any one of claims 28, 29, 32, and 33, wherein the delivery is to the bone and/or cartilage.
35. The use of any one of claims 28, 29, 32, and 33, wherein the delivery is to (a) the bone and/or cartilage, and (b) ligament, meniscus, growth plate, liver, spleen, lung, kidney, trachea, heart muscle, and/or heart valve.
36. The use of any one of claims 30-33, wherein the delivered is to the bone and/or cartilage.
37. The use of any one of claims 30-33, wherein the delivered is to (a) the bone and/or cartilage, and (b) ligament, meniscus, growth plate, liver, spleen, lung, kidney, trachea, heart muscle, and/or heart valve.