CLAIMS

1. A method to recover neurologic function in a human manifesting or at risk of having mucopolysaccharidosis type I (MPSI), comprising: administering intrathecally or intracerebrovascularly to the human a composition comprising an amount of a recombinant adeno-associated virus (rAAV) comprising a genome comprising an open reading frame encoding alpha-iduronidase effective to recover neurologic function, wherein the rAAV comprises an AAV9 or AAVrh10 capsid.

2. The method of claim 1 wherein the human is an adult.

3. The method of claim 1 wherein the human is not an adult.

4. The method of claim 3 wherein the human is about 6 to about 13 years old.

5. The method of claim 3 wherein the human about 4 months to about 5 years old.

6. The method of claim 3 wherein the human is less than 2.5 years old.

7. The method of any one of claims 1 to 6 wherein the human has received a bone marrow transplant or enzyme replacement therapy.

8. The method of any one of claims 1 to 7 wherein the rAAV comprises the AAV9 capsid.

9. The method of any one of claims 1 to 7 wherein the rAAV comprises the AAVrh10 capsid.

10. The method of any one of claims 1 to 9 wherein the amount reduces GAG levels in the brain or prevents or reduces hydroencephaly.

11. The method of any one of claims 1 to 10 wherein the amount decreases or prevents skeletal dysplasia or spinal cord compression.

12. The method of any one of claims 1 to 11 wherein the amount decreases hepatosplenomegaly.

13. The method of any one of claims 1 to 12 wherein the amount decreases cardiopulmonary obstruction.

14. The method of any one of claims 1 to 13 wherein the human is not treated with an immunosuppressant.

15. The method of any one of claims 1 to 13 wherein the human is treated with an immunosuppressant.

16. The method of claim 15 wherein the rAAV and the immune suppressant are co-administered or the immune suppressant is administered after the rAAV.

17. The method of any one of claims 1 to 16 wherein the human is not immunotolerized prior to administration of rAAV.

18. The method of any one of claims 1 to 16 wherein the human is immunotolerized prior to administration of rAAV.

19. The method of any one of claims 1 to 18 wherein the human is immunocompetent.

20. The method of any one of claims 1 to 19 wherein the rAAV comprises a rAAV1, rAAV3, rAAV4, rAAV5, rAAVrh10, or rAAV9 genome.

21. The method of any one of claims 1 to 20 wherein multiple doses are administered.

22. The method of any one of claims 1 to 20 wherein the composition is administered weekly.

23. The method of any one of claims 1 to 22 wherein the rAAV is intracerebrovascularly administered.

24. The method of any one of claims 1 to 22 wherein the rAAV is administered to the cisterna magna.

25. The method of any one of claims 15 to 24 wherein the immune suppressant comprises cyclophosphamide, a glucocorticoid, cytostatic agents including an alkylating agent, an anti-metabolite, a cytotoxic antibiotic, an antibody, an agent active on immunophilin, a nitrogen mustard, nitrosourea, platinum compound, methotrexate, azathioprine, mercaptopurine, fluorouracil, dactinomycin, an anthracycline, mitomycin C, bleomycin, mithramycin, IL-2 receptor- (CD25-) or CD3-directed antibodies, anti-IL-2 antibodies, ciclosporin, tacrolimus, sirolimus, IFN-β, IFN-γ, an opioid, or TNF-α (tumor necrosis factor-alpha) binding agent.

26. The method of any one of claims 1 to 25 wherein the amount of rAAV administered is 1.3 x 10^{10} GC/g brain mass to 6.5 x 10^{10} GC/g brain mass.

27. The method of any one of claims 1 to 25 wherein the amount of rAAV administered is 1 x 10^{13} to 5.6 x 10^{13} GC (flat dose per human).

28. The method of any one of claims 1 to 25 wherein the amount of rAAV administered is 1×10^{12} to 5.6×10^{13} GC (flat dose per human mammal).

29. The method of any one of claims 1 to 22 wherein the rAAV is intrathecally administered.