

WHAT IS CLAIMED IS:

1. A method of treating a disease and/or disorder in a subject comprising administering to the subject at least one therapeutically effective amount of a recombinant adeno-associated virus (rAAV) viral vector by injecting the at least one therapeutically effective amount of the rAAV viral vector into a vagus nerve of the subject.
2. The method of claim 1, wherein the vagus nerve is a left vagus nerve of the subject.
3. The method of claim 1, wherein the disease and/or disorder is a neurological disease and/or disorder.
4. The method of claim 3, wherein the neurological disease and/or disorder is characterized by at least one autonomic dysfunction, and wherein administration of the at least one therapeutically effective amount of the rAAV viral vector via injection into the vagus nerve alleviates at least one symptom of the at least one autonomic dysfunction.
5. The method of claim 4, wherein the at least one symptom is selected from dysarthria, dysphagia, inadequate control of gastrointestinal tract motility, inadequate control of blood pressure, respiratory difficulties, orthostatic hypotension, sweating abnormalities, inadequate control of urinary tract, sexual dysfunction, and any combination thereof.
6. The method of claim 1, wherein the disease and/or disorder is selected from Spinal muscular atrophy, Friedrich's ataxia, CLN3 Batten, CLN6 Batten, CLN7 Batten, Epileptic encephalopathy, Leigh Syndrome, Charcot Marie Tooth disease, Giant axonal neuropathy, Lafora disease, SLC13A5 Epileptic Encephalopathy, Congenital Disorder of Glycosylation, Type Iq, Kahrizi Syndrome, Angelman Syndrome, Rett Syndrome, Spastic paraplegia, Alternating hemiplegia of childhood, and Zellweger spectrum disorder.
7. The method of claim 6, wherein the disease and/or disorder is Giant Axonal Neuropathy.
8. The method of claim 1, wherein the rAAV viral vector comprises:
 - (i) an AAV capsid protein; and
 - (ii) an rAAV vector, wherein the rAAV vector comprises in a 5' to 3' direction:

- a) a first AAV ITR sequence;
- b) a promoter sequence;
- c) a transgene nucleic acid molecule, wherein the transgene nucleic acid molecule comprises a nucleic acid sequence encoding for a gigaxonin (GAN) polypeptide;
- d) a polyA sequence; and
- e) a second AAV ITR sequence.

9. The method of claim 8, wherein the GAN polypeptide comprises an amino acid sequence set forth in SEQ ID NO: 1.

10. The method of claim 8, wherein the nucleic acid sequence encoding for a GAN polypeptide is a codon optimized nucleic acid sequence encoding for a GAN polypeptide, wherein the codon optimized nucleic acid sequence encoding for a GAN polypeptide comprises a nucleic acid sequence set forth in SEQ ID NO: 3.

11. The method of claim 8, wherein the promoter sequence comprises a nucleic acid sequence set forth in SEQ ID NO: 8.

12. The method of claim 8, wherein the polyA sequence comprises a nucleic acid sequence set forth in SEQ ID NO: 9.

13. The method of claim 8, wherein the promoter sequence comprises a nucleic acid sequence set forth in SEQ ID NO: 8; the GAN polypeptide comprises a nucleic acid sequence set forth in SEQ ID NO: 3; and the polyA sequence comprises a nucleic acid sequence set forth in SEQ ID NO: 9.

14. The method of claim 13, wherein the rAAV vector comprises a nucleic acid sequence set forth in SEQ ID NO: 10.

15. The method of claim 8, wherein the AAV capsid protein is an AAV9 capsid protein.

16. The method of claim 1, wherein the rAAV viral vector is administered in an amount of about 3.5×10^{13} to about 3.5×10^{14} viral particles.

17. The method of claim 1, wherein the subject has been previously administered at least one therapeutically effective amount of an initial rAAV viral vector.

18. The method of claim 17, wherein the initial rAAV viral vector was administered to the subject intravenously, intrathecally, intracerebrally, intraventricularly, intranasally, intratracheally, intra-aurally, intra-ocularly, or peri-ocularly, orally, rectally, transmucosally, inhalationally, transdermally, parenterally, subcutaneously, intradermally, intramuscularly, intracisternally, intranervally, intrapleurally, topically, intralymphatically, intracisternally or intranerve.

19. The method of claim 18, wherein the initial rAAV viral vector was administered to the subject intrathecally.

20. The method of claim 17, wherein the initial rAAV viral vector is the same rAAV viral vector that is administered via injection into a vagus nerve of the subject.

21. The method of claim 1, wherein the subject has neutralizing antibodies against the rAAV viral vector.

22. A method of treating Giant Axonal Neuropathy in a subject comprising:

- a) intrathecally administering a first therapeutically effective amount of an rAAV viral vector to the subject and
 - b) administering an at least second therapeutically effective amount of the rAAV viral vector by injecting the at least second therapeutically effective amount of the rAAV viral vector into a left vagus nerve of the subject,
- wherein the rAAV viral vector comprises:
- (i) an AAV9 capsid protein; and
 - (ii) an rAAV vector, wherein the rAAV vector comprises a nucleic acid sequence set forth in SEQ ID NO: 10.

23. The method of claim 22, wherein the first therapeutically effective amount of the rAAV viral vector and the at least second therapeutically effective amount of the rAAV viral vector are administered sequentially.

24. The method of claim 22, wherein the first therapeutically effective amount of the rAAV viral vector and the at least second therapeutically effective amount of the rAAV viral vector are administered concurrently.