

CLAIMS

1. A recombinant adeno-associated virus (rAAV) vector comprising a gene cassette comprising a promoter consisting of the polynucleotide sequence of SEQ ID NO: 2, an SV40 intron, a polynucleotide sequence encoding a methyl-CpG-binding protein 2 (MECP2) and a synthetic polyadenylation signal sequence, wherein the gene cassette is flanked by a mutant AAV2 inverted terminal repeat and a wild type inverted terminal repeat.
2. The rAAV vector of claim 1, wherein the rAAV vector is self-complementary (scAAV).
3. The rAAV vector of claim 1 or 2, wherein the rAAV is rAAV9.
4. The rAAV9 vector of claim 3, wherein the polynucleotide sequence encoding MECP2 comprises the polynucleotide sequence of SEQ ID NO: 3.
5. The rAAV vector of any one of claims 1-3, wherein the rAAV comprises nucleotides 151-2558 of SEQ ID NO: 1.
6. The rAAV vector of any one of claims 1-5, wherein the polyadenylation signal sequence comprises the polynucleotide sequence of SEQ ID NO: 4.
7. A virus comprising the viral vector of any one of claims 1-6.
8. The virus of claim 7, further comprising one or more capsid proteins.
9. A pharmaceutical composition comprising the rAAV vector of any one of claims 1-6 or the virus of any one of claims 7-8.
10. The pharmaceutical composition of claim 9, wherein the composition is formulated for intrathecal (IT) administration.
11. The pharmaceutical composition of any of claims 9-10 for use in treating Rett syndrome.
12. The pharmaceutical composition according to claim 11, administered by intrathecal (IT) administration.
13. The pharmaceutical composition of claim 11 or 12, wherein the use further comprising a non-ionic, low-osmolar contrast agent to the patient.
14. The pharmaceutical composition of claim 13, wherein the non-ionic, low-osmolar contrast agent comprises one or more of iobitridol, iohexol, iomeprol, iopamidol, iopentol, iopromide, ioversol, and ioxilan.

15. The pharmaceutical composition of claim 14, wherein the non-ionic, low-osmolar contrast agent comprises iohexol.
16. Use of an rAAV vector of any of claims 1-6, the virus of any of claims 7-8, or the pharmaceutical composition of any of claims 9-10 for the preparation of medicament for treating Rett syndrome.
17. The use of claim 16, wherein the medicament is formulated for intrathecal (IT) administration.
18. The use of claim 16 or 17, wherein the medicament further comprises a non-ionic, low-osmolar contrast agent to the patient
19. The use of claim 18, wherein the non-ionic, low-osmolar contrast agent comprises one or more of iobitridol, iohexol, iomeprol, iopamidol, iopentol, iopromide, ioversol, and ioxilan.
20. The use of claim 19, wherein the non-ionic, low-osmolar contrast agent comprises iohexol.