What is claimed is:

1. Use of a recombinant expression vector encoding a recombinant human iduronate-2-sulfatase (rIDS) in the preparation of a pharmaceutical composition for treating a human subject diagnosed with mucopolysaccharidosis II (MPS II), wherein the recombinant human iduronate-2-sulfatase (rIDS) is produced by the human subject's neuronal or glial cells transduced with the recombinant expression vector and the recombinant expression vector is to be administered to the human subject at a dose that is determined by the human subject's brain mass, wherein the human subject's brain mass is determined by brain magnetic resonance imaging (MRI), and wherein the recombinant expression vector is to be administered to the cerebrospinal fluid (CSF) of the human subject at a volume that does not exceed 10% of the total CSF volume of the human subject.

2. Use of a recombinant expression vector encoding a recombinant iduronate-2-sulfatase (rIDS) in the manufacture of a medicament for treating a human subject diagnosed with mucopolysaccharidosis II (MPS II), wherein the recombinant expression vector is to be administered at a dose that is determined by the human subject's brain mass, wherein the human subject's brain mass is determined by brain magnetic resonance imaging (MRI), and wherein the recombinant expression vector is to be administered to the cerebrospinal fluid (CSF) of the human subject at a volume that does not exceed 10% of the total CSF volume of the human subject.

3. The use of claim 2, wherein the rIDS is produced by the human subject's neuronal or glial cells after the recombinant expression vector is to be administered to the human subject.

4. The use of claim 1 or 3, wherein the rIDS produced by the neuronal or glial cells is to be delivered to the cerebrospinal fluid of the human subject.

5. The use of any one of claims 1-4, wherein the rIDS:

a) is secreted at a detectable level as measured by polyacrylamide gel electrophoresis;

b) is expressed under the control of a CB7 promoter;

c) is expressed from a cDNA encoding a human IDS precursor;

d) is about 90 kDa as measured by polyacrylamide gel electrophoresis;

e) comprises the amino acid sequence of SEQ ID NO: 1; and/or

f) comprises a formylglycine.

6. The use of any one of claims 1-5, wherein the recombinant expression vector is a recombinant adeno-associated virus (AAV).

7. The use of claim 6, wherein the recombinant AAV is a recombinant AAV9 or a recombinant AAVrh10.

8. The use of any one of claims 1-7, wherein the rIDS: (a) is α2,6-sialylated; (b) does not contain detectable NeuGc as measured by HPLC or mass spectrometry; (c) does not contain detectable α-Gal antigen as measured by ELISA or mass spectrometry; (d) contains tyrosine-sulfation; and/or (e) is mannose-6-phosphorylated.

9. The use of any one of claims 1-8, wherein the human subject's brain mass is converted from the human subject's brain volume by multiplying the human subject's brain volume in cm^3 by a factor of 1.046 g/cm^3, wherein the human subject's brain volume is obtained from the human subject's brain MRI.

10. The use of any one of claims 1-9, wherein the recombinant expression vector is to be administered at a dose of about 1.3×10^{10} genome copies (GC)/g brain mass as determined by MRI, about 6.5×10^{10} GC/g brain mass as determined by MRI, or about 2.0×10^{11} GC/g brain mass as determined by MRI.

11. The use of any one of claims 1-10, wherein the human subject is 5 years old or older and less than 18 years old, or 4 months old or older and less than 5 years old.

12. The use of any one of claims 1-11, wherein the recombinant expression vector is to be administered at a dose according to the table below:

Brain Mass (in g) of the Human Subject			**Dose: Total GC (about 6.5×10^{10} GC/g brain mass)**
Min	**Max**		
801	900		5.5×10^{13}
901	1050		6.3×10^{13}
1051	1200		7.3×10^{13}
1201	no upper limit		8.5×10^{13}

13. The use of any one of claims 1-11 1, wherein the recombinant expression vector is to be administered at a dose of Dose 1, Dose 2, or Dose 3 according to the table below:

Brain Mass (in g) of the Human Subject				
Min	**Max**		**Dose 1** **Total GC** (about 1.3×10^{10} GC/g brain mass)	**Dose 2** **Total GC** (about 6.5×10^{10} GC/g brain mass)
no lower limit	700		8.5×10^{12}	4.2×10^{13}
701	800		9.8×10^{12}	4.9×10^{13}
801	900		1.1×10^{13}	5.5×10^{13}
901	1050		1.3×10^{13}	6.3×10^{13}
1051	1200		1.5×10^{13}	7.3×10^{13}
1201	no upper limit-		1.7×10^{13}	8.5×10^{13}

Brain Mass (in g) of the Human Subject			**Dose 3 Total GC** (about 2.0×10^{11} GC/g brain mass)
Min	**Max**		
no lower limit	474		9.0×10^{13}
475	524		1.0×10^{14}
525	574		1.1×10^{14}
575	624		1.2×10^{14}
625	674		1.3×10^{14}
675	724		1.4×10^{14}
725	774		1.5×10^{14}
775	824		1.6×10^{14}
825	874		1.7×10^{14}
875	924		1.8×10^{14}
925	974		1.9×10^{14}
975	1024		2.0×10^{14}
1025	1074		2.1×10^{14}

1075	1124		2.2×10^{14}
1125	1174		2.3×10^{14}
1175	1224		2.4×10^{14}
1225	1274		2.5×10^{14}
1275	>1300		2.6×10^{14}

14. The use of any one of claims 1-13, wherein the recombinant expression vector is to be administered via intracisternal (IC) administration or intracerebroventricular (ICV) administration.

15. The use of any one of claims 1-14, wherein the rIDS is to be delivered to lysosomes of cells in the CNS of the human subject.

16. The use of any one of claims 1-15, wherein an immunosuppressive therapy is to be administered to the human subject starting before or concurrently with the first administration of the recombinant expression vector, and optionally wherein the immunosuppressive therapy is to be continued thereafter.

17. The use of claim 16, wherein the immunosuppressive therapy is to be administered after or concurrently with one or more antibiotics and/or one or more antifungal therapies to the human subject.

18. The use of any one of claims 1-17, wherein one or more of the following biomarkers are suitable to be measured after administration of the recombinant expression vector: (a) level of glycosaminoglycans (GAGs) in CSF; (b) level of iduronate-2-sulfatase (IDS) in CSF; (c) level of GAGs in plasma; (d) level of IDSin plasma; (e) level of leukocyte IDS enzyme activity; and (f) level of GAGs in urine.

19. The use of claim 18, wherein:

a) the GAGs in CSF comprise heparan sulfate in CSF;

b) the GAGs in CSF are heparan sulfate in CSF;

c) the GAGs in plasma comprise heparan sulfate in plasma;

d) the GAGs in plasma are heparan sulfate in plasma;

e) the GAGs in urine comprise heparan sulfate in urine; and/or

f) the GAGs in urine are heparan sulfate in urine.

20. The use of any one of claims 1-19, wherein the recombinant expression vector comprises the nucleotide sequence of SEQ ID NO: 45.