I claim:

1. An isolated expandable human neural cell wherein the cell is a progenitor cells or stem cell,

wherein the cell has been cultured under conditions effective to enrich for the expandable neural cell, said conditions comprising, a culture medium comprising an effective amount of a growth supplement,

wherein the effective amount of growth supplement in the culture medium is at least 10 μM of 1-thioglycerol to isolate **human fetal spinal cord ("HFSC") cell**,

wherein the cell maintains its capability to differentiate into neurons, astrocytes, and oligodendrocytes,

wherein the cell maintains its ability to differentiate into oligodendrocyte lineage cells efficiently throughout subsequent passages,

and wherein the cell expresses **the** cell surface antigens ~~like~~ CD133, CD140a, A2B5, and PSA-NCAM.

2. The isolated expandable human neural cell of claim 1, wherein said cell has been deposited as ATCC accession number PTA-12291.
3. The expandable human neural cell of claim 1, wherein the cell is derived from a human fetal neural tissue selected from the group consisting of spinal cord, cerebral cortex, hippocampus, striatum, basal forebrain, ventral mesencephalon, locus ceruleus, hypothalamus, cerebellum, corpus callosum and optic nerve.
4. The expandable human neural cell of claim 3, wherein said neural tissue is isolated from the human spinal cord at 8-24 weeks gestation.
5. The expandable human neural cell of claim 1, wherein the culture conditions further comprise two growth factors, and one survival factor.
6. The expandable human neural cell of claim 5, wherein said two growth factors are platelet derived growth factor (PDGF) and basic fibroblast growth factor (bFGF) and are present in a concentration of at least 5 ng/ml of PDGF and at least 2.5 ng/ml of bFGF to isolate HFSC cell.

7. The expandable human neural cell of claim 5, wherein said two growth factors are PDGF and bFGF and are present in a concentration of ~~about~~ 40 ng/ml to ~~about~~ 200 ng/ml of PDGF and ~~about~~ 5 ng/ml to ~~about~~ 40 ng/ml of bFGF to isolate HFSC cell.

8. The expandable human neural cell of claim 5, wherein said two growth factors are PDGF and bFGF and are present in a concentration of ~~about~~ 100 ng/ml of PDGF and ~~about~~ 20 ng/ml of bFGF to isolate HFSC cell.

9. The expandable human neural cell of claim 5, wherein said two growth factors are PDGF and bFGF and are present in a concentration of at least 1 ng/ml of PDGF and at least 0.5 ng/ml of bFGF to expand HFSC cell after a cell line is established and in order to maintain the cell.

10. The expandable human neural cell of claim 5, wherein said two growth factors are PDGF and bFGF and are present in a concentration of ~~about~~ 5 ng/ml to ~~about~~ 100 ng/ml of PDGF and ~~about~~ 1 ng/ml to ~~about~~ 50 ng/ml of bFGF to expand HFSC cell after the establishment.

11. The expandable human neural cell of claim 5, wherein said two growth factors are PDGF and bFGF and are present in a concentration of ~~about~~ 20 ng/ml of PDGF and ~~about~~ 20 ng/ml of bFGF to expand HFSC cell after the establishment.

12. The expandable human neural cell of claim 5, wherein said one survival factor is Insulin-like growth factor (IGF) and is present in a concentration of at least 1 ng/ml of IGF.

13. The expandable human neural cell of claim 5, wherein said one survival factor is IGF and is present in a concentration of ~~about~~ 5 ng/ml to ~~about~~ 100 ng/ml of IGF.

14. The expandable human neural cell of claim 5, wherein said one survival factor is IGF and is present in a concentration of ~~about~~ 20 ng/ml of IGF.

15. The expandable human neural cell of claim 1, wherein the cell can be frozen and thawed without losing its ability to differentiate into neurons, astrocytes, and oligodendrocytes throughout subsequent passages, and its ability to

express **the** cell surface antigens ~~like~~ CD133, CD140a, A2B5, and PSA-NCAM.

16. A method of *in vitro* culturing an expandable neural cell until an essentially homogenous expandable neural cell population is produced wherein the cell is a progenitor cell or stem cell isolated from a mammalian central nervous system wherein said cell maintains its capability to differentiate into neurons, astrocytes, and oligodendrocytes and its ability to differentiate into oligodendrocyte-lineage cells efficiently, said method comprising:
a) isolating and dissociating at least one cell from a human fetal neural tissue,
b) culturing the cell at a temperature of 37°C, in an atmosphere comprising 1-20% O_2, and 5% CO_2, and in a chemically defined serum-free culture medium, wherein the medium comprises:
-at least 5 ng/ml PDGF-AA
-at least 0.5 ng/ml bFGF, and
-at least 10 µM 1-thioglycerol,
c) passaging the cell from b)
d) repeating steps b) and c) a plurality of times to obtain said essentially homogeneous expandable human neural cell population.
17. The method of claim 16, wherein said culture medium further comprises at least 1.0 ng/ml IGF-1.
18. The method of claim 16, wherein said neural tissue is selected from the group consisting of spinal cord, cerebral cortex, hippocampus, striatum, basal forebrain, ventral mesencephalon, locus ceruleus, hypothalamus, cerebellum, corpus callosum and optic nerve.
19. The method of claim 16, wherein in step a), said neural tissue is from human fetal spinal cord at 8-24 weeks gestation.
20. The method of claim 16, wherein in step a), said isolating is performed by an isolating method which uses at least one of fluorescence activated cell sorting (FACS) or immunopanning.
21. The method of claim 17 wherein said culture medium comprises:

-40-200 ng/ml PDGF-AA,

-5-100 ng/ml bFGF,

- 10-100 µM 1-thioglycerol, and

- 5-100 ng/ml IGF-1.

22. The method of claim 17 wherein said culture medium comprises:

- ~~about~~ 100 ng/ml PDGF-AA,

- ~~about~~ 20 ng/ml bFGF,

- ~~about~~ 50 µM 1-thioglycerol, and

- ~~about~~ 20 ng/ml IGF-1.

23. The method of claim 17 wherein said culture medium comprises:

- 5-100 ng/ml PDGF-AA,

- 1-50 ng/ml bFGF,

- 10-100 µM 1-thioglycerol, and

- 5-100 ng/ml IGF-1.

24. The method of claim 17 wherein said culture medium comprises:

- ~~about~~ 20 ng/ml PDGF-AA,

- ~~about~~ 20 ng/ml bFGF,

- ~~about~~ 50 µM 1-thioglycerol, and

- ~~about~~ 20 ng/ml IGF-1.

25. The method of claim 17 wherein said culturing step takes place in a culture vessel coated with poly-ornithine or poly-lysine.

26. The method of claim 17 wherein the chemically defined serum-free culture medium comprises DMEM/F12 supplemented with non-essential amino acids, glutamine, pyruvate, B27, N-acetyl-cysteine and β-mercaptoethanol.

27. An *in vitro* culture comprising at least one isolated neural cell obtained from a mammalian central nervous system wherein the isolated cell is submerged in chemically defined serum-free culture medium comprising:

- at least 5 ng/ml PDGF-AA,

- at least 5 ng/ml bFGF, and

- at least 10 µM 1-thioglycerol.

28. The *in vitro* culture of claim 27, further comprising at least 1.0 ng/ml IGF-1.

29. The *in vitro* culture of claim 28 wherein said cell is obtained from human fetal spinal cord.
30. The *in vitro* culture of claim 29 wherein the *in vitro* culture is in a culture vessel coated with poly-ornithine or poly-lysine.
31. The *in vitro* culture of claim 29 wherein the chemically defined serum-free culture medium further comprises DMEM/F12 supplemented with non-essential amino acids, glutamine, pyruvate, B27, N-acetyl-cysteine and β-mercaptoethanol.
32. The *in vitro* culture of claim 29 wherein said neural cell is CD133-positive, CD140a-positive, A2B5-positive, and PSA-NCAM-positive.
33. ~~A method of treating a condition caused by a loss of myelin or a loss of oligodendrocytes comprising:~~

~~administering to a subject a therapeutically effective amount of a composition comprising the isolated expandable human neural cell of claim 1.~~
34. ~~The method of claim 33, wherein said condition is a demyelinating disease or a neurodegenerative disease.~~
35. ~~The method of claim 34, wherein said demyelinating disease is selected from the group consisting of spinal cord injury (SCI), multiple sclerosis (MS), hereditary leukodystrophy, transverse myelopathy/myelitis, progressive multiple focal leukoencephalopathy and other congenital demyelinating diseases.~~
36. ~~The method of claim 34, wherein said neurodegenerative disease is selected from the group consisting of Alzheimer's disease, senile dementia of Alzheimer type (SDAT), Parkinson's disease, Huntington's disease, Amyotrophic Lateral Sclerosis (ALS), ischemia, blindness and a neurodegenerative disease caused by injury to myelinated neurons.~~
37. ~~The method of claim 34, wherein the administering step comprises injecting the expandable human neural cell into neural tissue or lateral ventricles affected by the demyelinating disease or the neurodegenerative disease.~~

38. ~~The method of claim 37, wherein said neural tissue is selected from the group consisting of the spinal cord, the subventricular zone, the corpus callosum, the cerebellum, the basal ganglia, the nucleus basalis and the substantial nigra.~~

39. ~~The method of claim 34, wherein the administering step comprises injecting the expandable human neural cell into said subject by the method consisting of transuterine fetal intraventricular injection, intraventricular injection, intraparenchymal injections, intravitreal injection and intravascular administration.~~

33. A pharmaceutical ~~34~~ stem cell composition comprising an isolated expandable human neural cell as in claim 1.

34. A pharmaceutical neural stem cell composition comprising an expandable neural cell that has been *in vitro* cultured by the method of claim 16.

35. The method **of claim 33 and claim 34**, further comprising the step of differentiating the expandable human neural cell prior to ~~the~~ **an** administering step.

36. Use of the pharmaceutical composition of claim 33 or claim 34 in the preparation of a medicament for the treatment of a condition caused by a loss of myelin or a loss of oligodendrocytes.