THAT WHICH IS CLAIMED IS:

1. A method for producing human oligodendrocytes in vitro, the method comprising:

inducing in a pluripotent stem cell suspension culture a neural fate to provide a spheroid of neural progenitor cells;

differentiating the neural progenitor cells in a spheroid to differentiate into human oligodendro-spheroids (hOS) including oligodendrocytes;

maintaining the hOS spheroid for an extended period of time in neural medium to derive cultures that include myelinating oligodendrocytes, neurons and astrocytes

2. The method of Claim 1, wherein the cells comprise at least one allele associated with a myelin disorder.

3. The method of any of claims 1-2, wherein the pluripotent stem cells are induced pluripotent stem cells.

4. The method of any of claims 1-3, wherein the pluripotent stem cell suspension culture is induced to a neural fate by culturing intact colonies of the pluripotent stem cells in medium comprising an effective dose of an inhibitor of BMP and an inhibitor of TGFβ.

5. The method of any of claims 1-4, wherein the medium comprises a dose of dorsomorphin and SB-431542 effective to induce pluripotent stem cells to a neural fate.

6. The method of Claim 5, wherein the suspension culture is feeder layer free.

7. The method of Claim 6, wherein the medium further comprises an effective dose of an inhibitor of wnt.

8. The method of Claim 7, wherein cells are differentiated into neural progenitors by culture in neural medium comprising a dose of FGF2 and EGF effective to maintain neural progenitor cells.

9. The method of Claim 8, further comprising patterning spheroids with sonic hedgehog pathway agonists and retinoic acid or with sonic hedgehog pathway agonists and Wnt inhibitors

10. The method of Claim 9, further comprising differentiating neural progenitors into oligodendrocytes by culture in neural media lacking FGF2 and EGF, and comprising an effective dose of PDGF-AA, IGF-1, HGF, BDNF, NT3, insulin, cAMP, T3, and biotin.

11. The method of Claim 10, further comprising maintaining oligodendro-spheroids thus produced for an extended period of time in neural medium lacking growth factors but including ascorbic acid, insulin, cAMP, T3, and biotin.

12. The method of Claim 11, further comprising isolating oligodendrocytes from a cortical sphere by flow cytometry, magnetic immunoselection, or immunopanning.

13. The method of Claim 12, wherein isolated oligodendrocytes are exposed to a candidate agent or treatment of interest.

14. The method of Claim 13, wherein the oligodendrocytes are combined with neurons or neuronal progenitor cells.

15. A population of oligodendrocytes obtained by the method of Claim 9 or 10.

16. A method determining the effect of a candidate agent on a human oligodendrocytes, the method comprising: contacting the candidate agent with one or a panel of astrocytes differentiated from induced human pluripotent stem cells (hiPSC) according to the method of Claim 9 or 10, wherein the oligodendrocytes optionally comprise at least one allele encoding a mutation associated with a neural disease; and determining the effect of the agent on morphologic, genetic or functional parameters.

17. The method of claim 16 wherein the candidate agent is an immune effector cell or an immune modulatory agent.

18. The method of Claim 16, wherein a panel of oligodendrocytes comprises at least two astrocytes having differing genotypes.

19. The method of Claim 18, wherein a panel of oligodendrocytes comprises oligodendrocytes under differing environmental conditions.