CLAIMS

What is claimed is:

1. A cell culture article for culturing oligodendrocyte progenitor cells in a chemically defined medium, comprising:

a substrate having a surface;

a polymer material disposed on the surface, wherein the polymer material comprises

(i) a homopolymer formed from tetra (ethylene glycol) diacrylate or

(ii) a copolymer formed from

tetra(ethylene glycol) diacrylate and neopentyl glycol ethoxylate diacrylate,

glycerol dimethacrylate and tetra(ethylene glycol) diacrylate,

glycerol dimethacrylate and tri(ethylene glycol) dimethacrylate,

glycerol dimethacrylate and di(ethylene glycol) dimethacrylate,

glycerol dimethacrylate and tetraethylene glycol dimethacrylate,

glycerol dimethacrylate and 1,6-hexanediol propoxylate diacrylate,

glycerol dimethacrylate and 1,6-hexanediol ethoxylate diacrylate,

tri(ethylene glycol) dimethacrylate and trimethylolpropane triacrylate,

1,4-butanediol dimethacrylate and 1,9 nonanediol diacrylate,

1,6-hexanediol diacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate ,

1,6-hexanediol diacrylate and 1,6-hexanediol ethoxylate diacrylate,

1,6-hexanediol diacrylate and neopentyl glycol ethoxylate diacrylate,

neopentyl glycol propoxylate (1PO/OH) diacrylate and neopentyl glycol ethoxylate diacrylate,

di(ethylene glycol) dimethacrylate and neopentyl glycol diacrylate,

di(ethylene glycol) dimethacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,

tetra(ethylene glycol) dimethacrylate and 1,4-butanediol dimethacrylate,

tetra(ethylene glycol) dimethacrylate and neopentyl glycol ethoxylate diacrylate,

1,6-hexanediol propoxylate diacrylate and neopentyl glycol ethoxylate diacrylate,

neopentyl glycol diacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,

neopentyl glycol diacrylate and 1,6-hexanediol ethoxylate diacrylate,

neopentyl glycol diacrylate and poly(propylene glycol) diacrylate,

trimethylolpropane ethoxylate (1 EO/OH) methyl diacrylate and 2,2,3,3,4,4,5,5 octafluoro 1, 6 hexanediol diacrylate,

neopentyl glycol ethoxylate diacrylate and di(ethylene glycol) dimethacrylate,

trimethylolpropane triacrylate and 1,4-butanediol dimethacrylate,

trimethylolpropane triacrylate and di(ethylene glycol) dimethacrylate;

trimethylolpropane triacrylate and neopentyl glycol diacrylate,

trimethylolpropane triacrylate and neopentyl glycol dimethacrylate,

2,2,3,3,4,4,5,5 octafluoro 1, 6 hexanediol diacrylate and tetra(ethylene glycol) dimethacrylate,

2,2,3,3,4,4,5,5 octafluoro 1, 6 hexanediol diacrylate and neopentyl glycol diacrylate, or

poly(propylene glycol) diacrylate and glycerol 1,3-diglycerolate diacrylate.

2. The article of claim 1, wherein the article is produced by a process of:

diluting one or more monomers in a volatile organic solvent;

depositing the diluted monomers on the substrate surface of the article;

evaporating substantially all of the solvent; and

polymerizing the monomers to form the polymer layer attached to the surface.

3. The article of claim 2 wherein the volatile solvent is ethanol.

4. The article of claim 1 wherein the polymer material disposed on the surface of the article has a surface area greater than about $5mm^2$.

5. The article of claim 1, further comprising a well, wherein the surface of the substrate on which the polymer material is disposed is in the well.

6. The article of claim 5, wherein the article is selected from the group consisting of a multi-well plate, a petri dish, a beaker, a tube, and a flask.

7. A culture of oligodendrocyte progenitor cells, comprising:

an article comprising a polymer material disposed on a surface;

the oligodendrocyte progenitor cells disposed on the polymer material; and

a culture medium in which the oligodendrocyte progenitor cells are cultured,

wherein the polymer material comprises

(i) a homopolymer formed from tetra(ethylene glycol) diacrylate or

(ii) a copolymer formed from

tetra(ethylene glycol) diacrylate and neopentyl glycol ethoxylate diacrylate,

glycerol dimethacrylate and tetra(ethylene glycol) diacrylate,

glycerol dimethacrylate and tri(ethylene glycol) dimethacrylate,

glycerol dimethacrylate and di(ethylene glycol) dimethacrylate,

glycerol dimethacrylate and tetraethylene glycol dimethacrylate,

glycerol dimethacrylate and 1,6-hexanediol propoxylate diacrylate,

glycerol dimethacrylate and 1,6-hexanediol ethoxylate diacrylate,

tri(ethylene glycol) dimethacrylate and trimethylolpropane triacrylate,

1,4-butanediol dimethacrylate and 1,9 nonanediol diacrylate,

1,6-hexanediol diacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate ,

1,6-hexanediol diacrylate and 1,6-hexanediol ethoxylate diacrylate,

1,6-hexanediol diacrylate and neopentyl glycol ethoxylate diacrylate,

neopentyl glycol propoxylate (1PO/OH) diacrylate and neopentyl glycol ethoxylate diacrylate,

di(ethylene glycol) dimethacrylate and neopentyl glycol diacrylate,

di(ethylene glycol) dimethacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,

tetra(ethylene glycol) dimethacrylate and 1,4-butanediol dimethacrylate,

tetra(ethylene glycol) dimethacrylate and neopentyl glycol ethoxylate diacrylate,

1,6-hexanediol propoxylate diacrylate and neopentyl glycol ethoxylate diacrylate,

neopentyl glycol diacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,

neopentyl glycol diacrylate and 1,6-hexanediol ethoxylate diacrylate,

neopentyl glycol diacrylate and poly(propylene glycol) diacrylate,

trimethylolpropane ethoxylate (1 EO/OH) methyl diacrylate and 2,2,3,3,4,4,5,5 octafluoro 1, 6 hexanediol diacrylate,

neopentyl glycol ethoxylate diacrylate and di(ethylene glycol) dimethacrylate,

trimethylolpropane triacrylate and 1,4-butanediol dimethacrylate,

trimethylolpropane triacrylate and di(ethylene glycol) dimethacrylate;

trimethylolpropane triacrylate and neopentyl glycol diacrylate,

trimethylolpropane triacrylate and neopentyl glycol dimethacrylate,

2,2,3,3,4,4,5,5 octafluoro 1, 6 hexanediol diacrylate and tetra(ethylene glycol) dimethacrylate,

2,2,3,3,4,4,5,5 octafluoro 1, 6 hexanediol diacrylate and neopentyl glycol diacrylate, or

poly(propylene glycol) diacrylate and glycerol 1,3-diglycerolate diacrylate.

8. The culture of claim 7, wherein the oligodendrocyte progenitor cells are stem cell derived oligodendrocyte progenitor cells.

9. The culture of claim 7, wherein the oligodendrocyte progenitor cells are human embryonic stem cell derived oligodendrocyte progenitor cells.

10. A method for culturing oligodendrocyte progenitor cells, comprising:

depositing a suspension comprising the oligodendrocyte progenitor cells on a polymer material; and

culturing the deposited oligodendrocyte progenitor cells in a cell culture medium,

wherein the polymer material comprises

(i) a homopolymer formed from tetra(ethylene glycol) diacrylate or

(ii) a copolymer formed from

tetra(ethylene glycol) diacrylate and neopentyl glycol ethoxylate diacrylate,

glycerol dimethacrylate and tetra(ethylene glycol) diacrylate,

glycerol dimethacrylate and tri(ethylene glycol) dimethacrylate,

glycerol dimethacrylate and di(ethylene glycol) dimethacrylate,

glycerol dimethacrylate and tetraethylene glycol dimethacrylate,

glycerol dimethacrylate and 1,6-hexanediol propoxylate diacrylate,

glycerol dimethacrylate and 1,6-hexanediol ethoxylate diacrylate,

tri(ethylene glycol) dimethacrylate and trimethylolpropane triacrylate,

1,4-butanediol dimethacrylate and 1,9 nonanediol diacrylate,

1,6-hexanediol diacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,

1,6-hexanediol diacrylate and 1,6-hexanediol ethoxylate diacrylate,

1,6-hexanediol diacrylate and neopentyl glycol ethoxylate diacrylate,

neopentyl glycol propoxylate (1PO/OH) diacrylate and neopentyl glycol ethoxylate diacrylate,

di(ethylene glycol) dimethacrylate and neopentyl glycol diacrylate,

di(ethylene glycol) dimethacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,

tetra(ethylene glycol) dimethacrylate and 1,4-butanediol dimethacrylate,

tetra(ethylene glycol) dimethacrylate and neopentyl glycol ethoxylate diacrylate,

1,6-hexanediol propoxylate diacrylate and neopentyl glycol ethoxylate diacrylate,

neopentyl glycol diacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,

neopentyl glycol diacrylate and 1,6-hexanediol ethoxylate diacrylate,

neopentyl glycol diacrylate and poly(propylene glycol) diacrylate,

trimethylolpropane ethoxylate (1 EO/OH) methyl diacrylate and 2,2,3,3,4,4,5,5 octafluoro 1, 6 hexanediol diacrylate,

neopentyl glycol ethoxylate diacrylate and di(ethylene glycol) dimethacrylate,

trimethylolpropane triacrylate and 1,4-butanediol dimethacrylate,

trimethylolpropane triacrylate and di(ethylene glycol) dimethacrylate;

trimethylolpropane triacrylate and neopentyl glycol diacrylate,

trimethylolpropane triacrylate and neopentyl glycol dimethacrylate,

2,2,3,3,4,4,5,5 octafluoro 1, 6 hexanediol diacrylate and tetra(ethylene glycol) dimethacrylate,

2,2,3,3,4,4,5,5 octafluoro 1, 6 hexanediol diacrylate and neopentyl glycol diacrylate, or

poly(propylene glycol) diacrylate and glycerol 1,3-diglycerolate diacrylate.

11. The method of claim 10, wherein the cell culture medium is a chemically defined medium.

12. The method of claim 10, wherein the oligodendrocyte progenitor cells are stem cell derived oligodendrocyte progenitor cells.

13. The method of claim 10, wherein the oligodendrocyte progenitor cells are human embryonic stem cell derived oligodendrocyte progenitor cells.

What is claimed is:

1. A culture of human stem cell derived oligodendrocyte progenitor cells, comprising:

an article comprising a polymer material disposed on a surface, wherein the polymer material supports adhesion of the human stem-cell derived oligodendrocyte progenitor cells;

the human stem cell derived oligodendrocyte progenitor cells disposed on the polymer material; and

a culture medium in which the oligodendrocyte progenitor cells are cultured, wherein the polymer material comprises an acrylate selected from:

a homopolymer formed from tetra(ethylene glycol)diacrylate; and

a copolymer selected from:

tetra(ethylene glycol)diacrylate and neopentyl glycol ethoxylate diacrylate,

glycerol dimethacrylate and tetra(ethylene glycol)diacrylate,

glycerol dimethacrylate and tri(ethylene glycol) dimethacrylate,

glycerol dimethacrylate and di(ethylene glycol) dimethacrylate,

glycerol dimethacrylate and tetraethylene glycol dimethacrylate,

glycerol dimethacrylate and 1,6-hexanediol propoxylate diacrylate,

glycerol dimethacrylate and 1,6-hexanediol ethoxylate diacrylate,

tri(ethylene glycol)dimethacrylate and trimethylolpropane triacrylate,

1,4-butanediol dimethacrylate and 1,9 nonanediol diacrylate,

1,6-hexanediol diacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,

1,6-hexanediol diacrylate and 1,6-hexanediol ethoxylate diacrylate,

1,6-hexanediol diacrylate and neopentyl glycol ethoxylate diacrylate,
neopentyl glycol propoxylate (1PO/OH) diacrylate and neopentyl glycol ethoxylate diacrylate,
di(ethylene glycol)dimethacrylate and neopentyl glycol diacrylate,
di(ethylene glycol)dimethacrylate and
tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,
tetra(ethylene glycol)dimethacrylate and 1,4-butanediol dimethacrylate,
tetra(ethylene glycol)dimethacrylate and neopentyl glycol ethoxylate diacrylate,
1,6-hexanediol propoxylate diacrylate and neopentyl glycol ethoxylate diacrylate,

neopentyl glycol diacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,
neopentyl glycol diacrylate and 1,6-hexanediol ethoxylate diacrylate,
neopentyl glycol diacrylate and poly(propylene glycol) diacrylate,
trimethylolpropane ethoxylate (1 EO/OH) methyl diacrylate and 2,2,3,3,4,4,5,5 octafluoro 1,6 hexanediol diacrylate,
neopentyl glycol ethoxylate diacrylate and di(ethylene glycol)dimethacrylate,
trimethylolpropane triacrylate and 1,4-butanediol dimethacrylate,
trimethylolpropane triacrylate and di(ethylene glycol)dimethacrylate,
trimethylolpropane triacrylate and neopentyl glycol diacrylate,
trimethylolpropane triacrylate and neopentyl glycol dimethacrylate,
2,2,3,3,4,4,5,5 octafluoro 1,6 hexanediol diacrylate and tetra(ethylene glycol)dimethacrylate,
2,2,3,3,4,4,5,5 octafluoro 1,6 hexanediol diacrylate and neopentyl glycol diacrylate, and
poly(propylene glycol)diacrylate and glycerol 1,3-diglycerolate diacrylate.

2. The culture of claim 1, wherein the human stem cell derived oligodendrocyte progenitor cells are human embryonic stem cell derived oligodendrocyte progenitor cells.

3. A method for culturing human stem cell derived oligodendrocyte progenitor cells, comprising:

depositing a suspension comprising the human stem cell derived oligodendrocyte progenitor cells on a polymer material; and

culturing the deposited human stem cell derived oligodendrocyte progenitor cells in a cell culture medium, wherein the polymer material comprises an acrylate selected from:

a homopolymer formed from tetra(ethylene glycol)diacrylate; and

a copolymer selected from:

tetra(ethylene glycol)diacrylate and neopentyl glycol ethoxylate diacrylate,

glycerol dimethacrylate and tetra(ethylene glycol)diacrylate,

glycerol dimethacrylate and tri(ethylene glycol) dimethacrylate,

glycerol dimethacrylate and di(ethylene glycol) dimethacrylate,

glycerol dimethacrylate and tetraethylene glycol dimethacrylate,

glycerol dimethacrylate and 1,6-hexanediol propoxylate diacrylate,

glycerol dimethacrylate and 1,6-hexanediol ethoxylate diacrylate,

tri(ethylene glycol)dimethacrylate and trimethylolpropane triacrylate,

1,4-butanediol dimethacrylate and 1,9 nonanediol diacrylate,

1,6-hexanediol diacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,

1,6-hexanediol diacrylate and 1,6-hexanediol ethoxylate diacrylate,

1,6-hexanediol diacrylate and neopentyl glycol ethoxylate diacrylate,

neopentyl glycol propoxylate (1PO/OH) diacrylate and neopentyl glycol ethoxylate diacrylate,

di(ethylene glycol)dimethacrylate and neopentyl glycol diacrylate,

di(ethylene glycol)dimethacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,

tetra(ethylene glycol)dimethacrylate and 1,4-butanediol dimethacrylate,

tetra(ethylene glycol)dimethacrylate and neopentyl glycol ethoxylate diacrylate,

1,6-hexanediol propoxylate diacrylate and neopentyl glycol ethoxylate diacrylate,

neopentyl glycol diacrylate and tricyclo[5.2.1.$0^{2,6}$]decanedimethanol diacrylate,

neopentyl glycol diacrylate and 1,6-hexanediol ethoxylate diacrylate,

neopentyl glycol diacrylate and poly(propylene glycol) diacrylate,

trimethylolpropane ethoxylate (1 EO/OH) methyl diacrylate and 2,2,3,3,4,4,5,5 octafluoro 1,6 hexanediol diacrylate,

neopentyl glycol ethoxylate diacrylate and di(ethylene glycol)dimethacrylate,

trimethylolpropane triacrylate and 1,4-butanediol dimethacrylate,

trimethylolpropane triacrylate and di(ethylene glycol)dimethacrylate,

trimethylolpropane triacrylate and neopentyl glycol diacrylate,

trimethylolpropane triacrylate and neopentyl glycol dimethacrylate,

2,2,3,3,4,4,5,5 octafluoro 1,6 hexanediol diacrylate and tetra(ethylene glycol)dimethacrylate,

2,2,3,3,4,4,5,5 octafluoro 1,6 hexanediol diacrylate and neopentyl glycol diacrylate, and

poly(propylene glycol)diacrylate and glycerol 1,3-diglycerolate diacrylate;

wherein the polymer material supports adhesion of the human stem cell derived oligodendrocyte progenitor cells.

4. The method of claim 3, wherein the cell culture medium is a chemically defined medium.

5. The method of claim 3, wherein the human stem cell derived oligodendrocyte progenitor cells are human embryonic stem cell derived oligodendrocyte progenitor cells.

6. The culture of claim 1, wherein the acrylate comprises tetra(ethylene glycol)dimethacrylate and 1,4-butanediol dimethacrylate.

7. The method of claim 3, wherein the acrylate comprises tetra(ethylene glycol)dimethacrylate and 1,4-butanediol dimethacrylate.

8. A culture of human stem cell derived oligodendrocyte progenitor cells, comprising:

an article comprising a polymer material disposed on a surface, wherein the polymer material supports adhesion of the human stem cell derived oligodendrocyte progenitor cells;

the human stem cell derived oligodendrocyte progenitor cells disposed on the polymer material; and

a culture medium comprising insulin, transferrin, progesterone, putrescin, selenium, triiodothyroidin and B27 in which the human stem cell derived oligodendrocyte progenitor cells are cultured, wherein the polymer material comprises tetra(ethylene glycol)dimethacrylate and 1,4-butanediol dimethacrylate.

9. A culture of human stem cell derived oligodendrocyte progenitor cells, comprising:

an article comprising a polymer material disposed on a surface, wherein the polymer material supports adhesion of the human stem cell derived oligodendrocyte progenitor cells;

the human stem cell derived oligodendrocyte progenitor cells disposed on the polymer material; and

a culture medium comprising triiodothyroidin and B27 in which the human stem cell derived oligodendrocyte progenitor cells are cultured, wherein the polymer material comprises tetra(ethylene glycol)dimethacrylate and 1,4-butanediol dimethacrylate.