WHAT IS CLAIMED IS:

1. A cell population comprising mammalian retinal progenitor cells, wherein the mammalian retinal progenitor cells express one or more markers selected from the group consisting of nestin, Sox2, Ki-67, MHC Class I, and Fas/CD95, wherein nestin is expressed by greater than 90% of the cells in the population, wherein Sox2 is expressed by greater than 80% of the cells in the population, wherein Ki-67 is expressed by % greater than 30% of the cells in the population, wherein MHC Class I is expressed by greater than 70% of the cells in the population, and wherein Fas/CD95 is expressed by greater than 30% of the cells in the population.

2. The cell population of claim 1, wherein the cells are derived from a human or a non-human mammal.

3. The cell population of claim 1, wherein the cells in the population further express one or more markers selected from the group consisting of vimentin, CD9, CD81, AQP4, CXCR4, CD15/LeX/SSEA1, GD2 ganglioside, CD133, β3-tubulin, MAP2, GFAP, OPN/SPP1, PTN, KDR, and TEK.

4. A method for isolating a population of mammalian retinal progenitor cells comprising:

harvesting mammalian fetal retinal tissue at a stage after which the retina is formed but before photoreceptor outer segments are fully formed throughout the retina and before retinal vascularization substantially completed or completed;

dissociating the harvested tissues to generate a dissociated suspension of cells and cell clusters; and

culturing the dissociated suspension for about 10-30 passages, wherein the mammalian retinal progenitor cells express one or more markers selected from the group consisting of nestin, Sox2, Ki-67, MHC Class I, and Fas/CD95, wherein nestin is expressed by greater than 90% of the cells in the population, wherein Sox2 is expressed by greater than 80% of the cells in the population, wherein Ki-67 is expressed by greater than 30% of the

cells in the population, wherein MHC Class I is expressed by greater than 70% of the cells in the population, and wherein Fas/CD95 is expressed by greater than 30% of the cells in the population.

5. The method of claim 4, wherein the tissues are harvested from a human or a non-human mammal.

6. The method of claim 4, wherein the tissues are harvested from a human fetal retina at a gestational age between about 12 weeks to about 28 weeks, or from postnatal or neonatal retina.

7. The method of claim 4, wherein the tissues are harvested from a non-human fetal retina at a gestational age between about 3 weeks to about 11 weeks, or from postnatal or neonatal retina.

8. The method of claim 4, wherein the cells are cultured at atmospheric oxygen levels.

9. The method of claim 4, wherein the cells are cultured at oxygen levels between about 0.5% to about 7%.

10. The method of claim 4, wherein the cells are cultured in serum-free or reduced serum cell culture media optionally comprising vitamin C and albumin.

11. The method of claim 4, wherein the cells in the population further express one or more markers selected from the group consisting of vimentin, CD9, CD81, AQP4, CXCR4, CD15/LeX/SSEA1, GD2 ganglioside, CD133, β3-tubulin, MAP2, GFAP, OPN/SPP1, PTN, KDR, and TEK.

12. A method for treating a retinal disease or condition in a subject in need thereof comprising administering to the subject an effective amount of a composition

comprising mammalian retinal progenitor cells, wherein the mammalian retinal progenitor cells express one or more markers selected from the group consisting of nestin, Sox2, Ki-67, MHC Class I, and Fas/CD95, wherein nestin is expressed by greater than 90% of the cells in the population, wherein Sox2 is expressed by greater than 80% of the cells in the population, wherein Ki-67 is expressed by greater than 30% of the cells in the population, wherein MHC Class I is expressed by greater than 70% of the cells in the population, and wherein Fas/CD95 is expressed by greater than 30% of the cells in the population, and optionally measuring changes in vision in the subject, thereby treating the retinal disease or condition.

13. The method of claim 12, wherein the subject is a human or a non-human mammal.

14. The method of claim 12, wherein the composition is formulated for injection into a vitreous cavity or a subretinal space of the subject.

15. The method of claim 12, wherein the retinal disease or condition comprises retinitis pigmentosa (RP), Leber's congenital amaurosis (LCA), Stargardt disease, Usher's syndrome, choroideremia, a rod-cone or cone-rod dystrophy, a ciliopathy, a mitochondrial disorder, progressive retinal atrophy, a degenerative retinal disease, age related macular degeneration (AMD), wet AMD, dry AMD, geographic atrophy, a familial or acquired maculopathy, a retinal photoreceptor disease, a retinal pigment epithelial-based disease, diabetic retinopathy, cystoid macular edema, uveitis, retinal detachment, traumatic retinal injury, iatrogenic retinal injury, macular holes, macular telangiectasia, a ganglion cell disease, an optic nerve cell disease, glaucoma, optic neuropathy, ischemic retinal disease, retinopathy of prematurity, retinal vascular occlusion, familial macroaneurysm, a retinal vascular disease, an ocular vascular diseases, a vascular disease, or ischemic optic neuropathy.

16. The method of claim 12, wherein the cells in the composition further express one or more markers selected from the group consisting of vimentin, CD9, CD81,

AQP4, CXCR4, CD15/LeX/SSEA1, GD2 ganglioside, CD133, β3-tubulin, MAP2, GFAP, OPN/SPP1, PTN, KDR, and TEK.

17. A formulation, product of manufacture or composition comprising a heterogeneous mixture of fetal neural retinal cells, made by a method comprising:

(a) harvesting a sample of cells comprising a plurality of mammalian fetal neural retinal cells from a mammalian fetus:

(i) at about 17 to 18 weeks gestational age, or at about 16 to 19 weeks gestational age, or 15 to 20 weeks, or 14 to 26 weeks, or at about 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25 or 26 weeks, gestational age for humans, or about 3, 4, 5, 6, 7, 8, 9, 10 or 11 weeks for non-human animals, optionally feline, canine or porcine cells, or 6 to 7 for feline or 6 to 9 for porcine cells;

(ii) at a stage after which a mammalian retina is clearly formed but before photoreceptor outer segments are fully formed and retinal vascularization substantially completed or completed, or at an analogous mammalian fetal staging,

wherein optionally the sample of cells comprise human or feline or canine cells;

(b) enzymatically dissociating the harvested sample of cells to make a dissociated suspension of cells and /or and small- and medium-sized cellular clusters,

wherein optionally the harvested sample of cells and/or and small cellular clusters are enzymatically dissociated using trypsin or equivalent, or TRYP-LE EXPRESS™ (TrypLE™ Express, Invitrogen-Life Technologies, Carlsbad CA) or equivalent; and

(c) culturing the cells and /or and small cellular clusters in a sterile environment comprising serum-free media or serum-comprising media, and antibiotics and antifungals or no antibiotics or anti-fungals, for no more than about 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 or more passages,

wherein optionally the cells and /or and small cellular clusters are cultured in a culture media comprising a Dulbecco's Modified Eagle Medium: Nutrient Mixture F-12™ (DMEM/F12™) media or an ADVANCED DMEM/F12™ media (Gibco-Invitrogen-Life Technologies, Carlsbad CA)) or an ULTRACULTURE™ media (BioWhittaker-Lonza Walkersville, Inc., Walkersville, MD), optionally together with N2 supplement (Invitrogen)

or B27 or B27 Xeno Free (Invitrogen), L-glutamine or GlutaMax (Invitrogen), and human recombinant growth factors consisting of EGF and bFGF (Invitrogen), or other growth factors,

and optionally the DMEM/F12™ media is used for human cells and the ULTRACULTURE™ media is used for feline or canine cells,

and optionally culturing or growing the cells under low oxygen conditions, or oxygen conditions that approximate or closely mimic oxygen levels of a developing fetal retina during gestation, or at about 2%, 2.5%, 3%, 3.5% oxygen,

and optionally the media is supplemented with vitamin C, and optionally the vitamin C is added every 1 or 2 days, and optionally the vitamin C is added in an amount to have an initial concentration of about 0.1 mg/ml or 0.05 mg/ml, or between about 0.01 mg/ml to about 0.5 mg/ml),

and optionally the media is supplemented with albumin, or human or feline or canine albumin, or recombinant albumin, or albumin is added in an amount to have an initial concentration of about 1.0 mg/ml),

and optionally the sample of cells is screened for the presence of a pathogen, a bacteria, an endotoxin, a fungus, a mycoplasma, a virus, a hepatitis virus or an HIV virus,

and optionally the sample of cells is screened for the presence of a normal karyotype,

and optionally the sample of cells does not exhibit elevated telomerase activity,

and optionally the sample of cells is screened for viability,

optionally the sample of cells is screened for tumorigenicity.

18. The formulation, product of manufacture or composition of claim 17, wherein the method for making the heterogeneous mixture of fetal neural retinal cells further comprises:

(a) selecting fetal neural retinal cells on the basis of cell surface or genetic markers, optionally selecting the cells either before culturing (prospectively) or after culturing or both,

wherein optionally the cell surface or genetic markers comprise CD15/LeX/SSEA1 and/or GD2 ganglioside; optionally CD9, CD81, CD133 or AQP4, CXCR4; or

(b) selecting fetal neural retinal cells on the basis of a fetal neural retinal cell transcriptome profile, proteome profile and/or a genomic profile.

19. A method for treating a retinal disease or condition comprising:

(a) providing a formulation, product of manufacture or composition of any of claims 17 to 18; and (b) injecting the formulation, product of manufacture or composition of (a) into a vitreous cavity or a subretinal space,

wherein optionally the vitreous cavity or subretinal space is a human or a feline or canine vitreous cavity or subretinal space, wherein optionally a standard intraocular injection procedure is used, wherein optionally the method further comprises an anterior chamber paracentesis, thereby treating the retinal disease or condition, and optionally the retinal disease or condition comprises an Usher's disease, retinitis pigmentosa (RP), a degenerative retinal disease, an age related macular degeneration (AMD), a wet AMD or a dry AMD, geographic atrophy, a retinal photoreceptor disease, a diabetic retinopathy, cystoid macular edema, uveitis, a retinal detachment, a retinal injury, macular holes, macular telangiectasia, a traumatic or an iatrogenic retinal injury, a ganglion cell or optic nerve cell disease, a glaucoma or an optic neuropathy, an ischemic retinal disease such as retinopathy of prematurity, retinal vascular occlusion, or ischemic optic neuropathy.

20. A method for improving a photopic (day light) vision, or for improving correcting visual acuity, or improving macular function, or improving a visual field, or improving scotopic (night) vision, comprising:

(a) providing a formulation, product of manufacture or composition of any of claims 17 to 18; and (b) injecting the formulation, product of manufacture or composition of (a) into a vitreous cavity or a subretinal space,

wherein optionally the vitreous cavity or subretinal space is a human or a feline or canine vitreous cavity or subretinal space, wherein optionally a standard intraocular injection procedure is used, wherein optionally the method further comprises an anterior chamber paracentesis, thereby improving the safety of the procedure; thereby improving the photopic (day light) vision, or improving correcting visual acuity, or improving macular function, or improving a visual field.

WHAT IS CLAIMED IS:

1. A method for making a population of human retinal progenitor cells comprising:

harvesting human retinal tissue at a stage after which the retina is formed but before photoreceptor outer segments are fully formed throughout the retina and before retinal vascularization substantially completed or completed, wherein the tissues are harvested from a human retina at a gestational age between about 12 weeks to about 28 weeks;

dissociating the harvested tissues mechanically and enzymatically to generate a dissociated suspension of cells and cell clusters; and

culturing the dissociated suspension of cells at atmospheric oxygen level or at low oxygen conditions that mimic oxygen levels of a developing fetal retina during gestation, or under hypoxic conditions, in serum free culture medium in culture flasks or plates coated with a xeno-free fibronectin, an ornithine, a polylysine, a laminin, or an equivalent thereof, for about 10 to 30 passages, wherein:

wherein after the culturing the human retinal progenitor cells express one or more markers selected from the group consisting of nestin, Sox2, Ki-67, MHC Class I, and Fas/CD95,

wherein nestin is expressed by greater than 90% of the cells in the population,

wherein Sox2 is expressed by greater than 80% of the cells in the population,

wherein Ki-67 is expressed by greater than 30% of the cells in the population,

wherein MHC Class I is expressed by greater than 70% of the cells in the population,

and wherein Fas/CD95 is expressed by greater than 30% of the cells in the population,

thereby making a population of human retinal progenitor cells expressing one or more markers selected from the group consisting of nestin, Sox2, Ki-67, MHC Class 1, and Fas/CD95.

2. The method of claim 1, wherein the cells in the population further express one or more markers selected from the group consisting of vimentin, CD9, CD81, AQP4, CXCR4, CD15/LeX/SSEA1, GD2 ganglioside, CD133, β3-tubulin, MAP2, GFAP, OPN/SPP1, PTN, KDR, and TEK.

3. The method of claim 1, wherein the enzyme is trypsin.

4. The method of claim 1, wherein the xeno-free fibronectin comprises human plasma fibronectin.

5. The method of claim 1, further comprising harvesting or isolating the cultured cells.

6. The method of claim 5, further comprising cryopreserving the harvested or isolated cells.

7. The method of claim 1, wherein the human retinal progenitor cells express on their cell surface a nestin, a Sox2, a Ki-67, an MHC Class I, and a Fas/CD95.

8. The method of claim 1, wherein the low oxygen conditions that mimic oxygen levels of a developing fetal retina during gestation is about 3% oxygen.