METHODS AND COMPOSITIONS FOR TREATMENT OF RETINAL DEGENERATION

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/711,665, filed October 9, 2012, the disclosure of which is hereby incorporated by reference herein in its entirety.

STATEMENT REGARDING FEDERAL SUPPORT

[0002] Not applicable.

FIELD

[0003] The present application is in the field of cell therapies for retinal degeneration as occurs, for example, in retinitis pigmentosa and in age-related macular degeneration (AMD).

BACKGROUND

[0004] Retinal degeneration, resulting, for example, from choroidal neovascularization ("wet AMD") or from buildup of cellular debris between the retina and the choroid ("dry AMD"), is one of the major causes of blindness in the world today. Cai et al. (2012) *Front Biosci.* **17**:1976-95. Similarly, degeneration and death of photoreceptor cells (rods and cones), as occurs in Retinitis pigmentosa, can also lead to deterioration and/or loss of vision. Accordingly, treatments that block and/or reverse retinal degeneration, in particular treatments that restore photoreceptor function, are needed.

SUMMARY

[0005] Disclosed herein are methods and compositions for treating retinal degeneration, using cells descended from marrow adherent stem cells (MASCs) that have been engineered to express an exogenous Notch intracellular domain. Such cells are denoted SB623 cells for the purposes of the present disclosure.

[0006] In one aspect, the present invention provides a use of cells in the manufacture of a medicament for treatment of dry age-related macular degeneration (dry AMD) or wet age-related macular degeneration (wet AMD) by enhancing transmission of visual signals from the retina to the visual cortex in a subject, wherein said cells are descendents of marrow

adherent stem cells (MASCs) that have been engineered to express an exogenous Notch intracellular domain.

[0006A] In another aspect, the present invention provides a use of cells in the manufacture of a medicament for treatment of dry age-related macular degeneration (dry AMD) or wet age-related macular degeneration (wet AMD) by increasing electrical activity of photoreceptor cells in a subject, wherein said cells are descendants of marrow adherent stem cells (MASCs) that have been engineered to express an exogenous Notch intracellular domain.

[0006B] In yet another aspect, the present invention provides a use of cells in the manufacture of a medicament for treatment of dry age-related macular degeneration (dry AMD) or wet age-related macular degeneration (wet AMD) by preventing loss of cells of the outer nuclear layer of the retina in a subject, wherein said cells are descendants of marrow adherent stem cells (MASCs) that have been engineered to express an exogenous Notch intracellular domain.

[0006C] Also disclosed herein are methods of treating retinal degeneration by administering SB623 cells to the eye of a subject in need thereof.

Claims

1. Use of cells in the manufacture of a medicament for treatment of dry age-related macular degeneration (dry AMD) by enhancing transmission of visual signals from the retina to the visual cortex in a subject, wherein said cells are descendents of marrow adherent stem cells (MASCs) that have been engineered to express an exogenous Notch intracellular domain.

2. Use of cells in the manufacture of a medicament for treatment of dry age-related macular degeneration (dry AMD) by increasing electrical activity of photoreceptor cells in a subject, wherein said cells are descendants of marrow adherent stem cells (MASCs) that have been engineered to express an exogenous Notch intracellular domain.

3. Use of cells in the manufacture of a medicament for treatment of dry age-related macular degeneration (dry AMD) by preventing loss of cells of the outer nuclear layer of the retina in a subject, wherein said cells are descendants of marrow adherent stem cells (MASCs) that have been engineered to express an exogenous Notch intracellular domain.

4. The use of any of claims 1-3, wherein the cells are for transplantation into the eye of the subject.

5. The use of claim 4, wherein the transplantation is intravitreal.

6. The use of claim 4, wherein the transplantation is subretinal.

7. Use of cells in the manufacture of a medicament for treatment of wet age-related macular degeneration (wet AMD) by enhancing transmission of visual signals from the retina to the visual cortex in a subject, wherein said cells are descendents of marrow adherent stem cells (MASCs) that have been engineered to express an exogenous Notch intracellular domain.

8. Use of cells in the manufacture of a medicament for treatment of wet age-related macular degeneration (wet AMD) by increasing electrical activity of photoreceptor cells in a

subject, wherein said cells are descendants of marrow adherent stem cells (MASCs) that have been engineered to express an exogenous Notch intracellular domain.

9. Use of cells in the manufacture of a medicament for treatment of wet age-related macular degeneration (wet AMD) by preventing loss of cells of the outer nuclear layer of the retina in a subject, wherein said cells are descendants of marrow adherent stem cells (MASCs) that have been engineered to express an exogenous Notch intracellular domain.

10. The use of any of claims 7-9, wherein the cells are for transplantation into the eye of the subject.

11. The use of claim 10, wherein the transplantation is intravitreal.

12. The use of claim 10, wherein the transplantation is subretinal.

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Abstract

Disclosed herein are methods and compositions for treating retinal degeneration, such as occurs in retinitis pigmentosa and agerelated macular degeneration, using descendents of marrow adherent stem cells that have been engineered to express an exogenous Notch intracellular domain.

FIG. 3