Pluripotent human stem cells for the treatment of retinal disease.

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Public Summary:
Despite advancements made in our understanding of ocular biology, therapeutic options for many debilitating retinal diseases remain limited. Stem cell-based therapies are a potential avenue for treatment of retinal disease, and this minireview will focus on current research in this area. Cellular therapies to replace retinal pigmented epithelium (RPE) and/or photoreceptors to treat age-related macular degeneration (AMD), Stargardt’s macular dystrophy, and retinitis pigmentosa are currently being developed. Over the past decade, significant advancements have been made using different types of human stem cells with varying capacities to differentiate into these target retinal cell types. We review and evaluate pluripotent stem cells, both human embryonic stem cells and human induced pluripotent stem cells, as well as protocols for differentiation of ocular cells, and culture and transplant techniques that might be used to deliver cells to patients.

Scientific Abstract:
Despite advancements made in our understanding of ocular biology, therapeutic options for many debilitating retinal diseases remain limited. Stem cell-based therapies are a potential avenue for treatment of retinal disease, and this minireview will focus on current research in this area. Cellular therapies to replace retinal pigmented epithelium (RPE) and/or photoreceptors to treat age-related macular degeneration (AMD), Stargardt’s macular dystrophy, and retinitis pigmentosa are currently being developed. Over the past decade, significant advancements have been made using different types of human stem cells with varying capacities to differentiate into these target retinal cell types. We review and evaluate pluripotent stem cells, both human embryonic stem cells and human induced pluripotent stem cells, as well as protocols for differentiation of ocular cells, and culture and transplant techniques that might be used to deliver cells to patients.

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