

NOVEL METHODS FOR GENERATING RETINAL PIGMENT EPITHELIUM CELLS FROM INDUCED PLURIPOTENT STEM CELLS

SUMMARY

The National Eye Institute's Ophthalmic Genetics and Visual Function Branch seeks partners to co-develop the protocol for iPSC to RPE differentiation and its use in clinical, screening and translational settings.

REFERENCE NUMBER

E-251-2012

PRODUCT TYPE

- Research Materials

KEYWORDS

- differentiation
- stem cells
- retinal pigment epithelial cells
- age-related macular degeneration
- AMD

COLLABORATION OPPORTUNITY

This invention is available for licensing.

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DESCRIPTION OF TECHNOLOGY

The retinal pigment epithelial cells (RPE) make up a polarized monolayer in the vertebrate eye that separates the neural retina from the choroid, and performs a crucial role in retinal physiology by forming a blood-retinal barrier and closely interacting with photoreceptors to maintain visual function. Many ophthalmic diseases, such as age-related macular degeneration, are associated with a degeneration or deterioration of the RPE.

Researchers at NEI have developed high efficiency methods for producing retinal pigment epithelial cells (RPE) from induced pluripotent stem cells (iPSCs). The iPSCs are produced from somatic cells, including

retinal pigment epithelial cells, such as fetal RPE. These methods involve producing embryoid bodies from human iPSCs, culturing the embryoid bodies using specific media to induce differentiation into RPE and growing the differentiated RPE cells in a defined media to generate human RPE cells. The investigators also developed methods for detecting RPE cells and authenticating RPE cells; determining agents that can affect the production of RPE cells from an iPSC; and identifying an agent that can increase RPE survival in response to a proteo toxic insult or stress. These novel methods and RPE cells can be useful for both pre-clinical and clinical studies involving RPE.

POTENTIAL COMMERCIAL APPLICATIONS

- Production of RPE cells for use in screening for novel ocular therapeutics and for identifying toxic side effects of drugs
- The RPE cells produced with these methods could be used in novel cell-based therapies
- In a research setting, these cells could be used to study the pathophysiology of RPE

COMPETITIVE ADVANTAGES

- These methods dramatically increase the efficiency of iPSC differentiation into RPE and produce superior quality RPE
- The RPE cells produced using these methods are fully authenticated
- These novel methods provide ways to perform high throughput screens with RPE cells

INVENTOR(S)

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DEVELOPMENT STAGE

- Discovery (Lead Identification)

PATENT STATUS

- **U.S. Filed:** U.S. Provisional Patent Application No. 61/759,988 filed February 1, 2013

THERAPEUTIC AREA

- Eye and Ear