
Generation of fibroblast cell lines in patients with common blinding eye diseases

Grant Award Details

Generation of fibroblast cell lines in patients with common blinding eye diseases

Grant Type: Tissue Collection for Disease Modeling

Grant Number: IT1-06601

Project Objective: The project objective is to recruit patients and collect samples from individuals with blinding diseases of aging and from appropriate control individuals.

Investigator:

| | |
|---------------------|-------------------------------------|
| Name: | Kang Zhang |
| Institution: | University of California, San Diego |
| Type: | PI |

Disease Focus: Vision Loss

Award Value: \$1,034,425

Status: Closed

Progress Reports

Reporting Period: Year 1

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Reporting Period: Year 2

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Reporting Period: NCE Year 3

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Grant Application Details

Application Title: Generation of fibroblast cell lines in patients with common blinding eye diseases

Public Abstract: Age-related macular degeneration (AMD), primary open-angle glaucoma (POAG), and proliferative diabetic retinopathy (PDR) are the major causes of irreversible vision loss worldwide. Although the exact causes and mechanisms of these diseases are not completely understood, it is known that genetic and environmental factors contribute to the development of these diseases. Recent scientific advances have enabled the reprogramming of already-differentiated tissues such as skin cells back to cells called induced pluripotent stem cells (iPSCs). iPSCs have the potential to be programmed into different cells in the eye, which are lost in degeneration.

We therefore propose to obtain skin biopsies from patients with the above mentioned eye disease. The goals are to provide samples from a well-characterized patient population whose members exhibit the target eye diseases. Although there are animal models of eye diseases, retinal cells derived from iPSC will provide a better and faster way for disease modeling in the dish, novel tools for drug screening. The iPSC-derived retinal cells can also be used to replace degenerated or damaged retinal cells to restore vision for millions of patients, such as retinal pigment epithelium (RPE) cells to treat AMD and retinal ganglion cells to treat glaucoma.

Statement of Benefit to California: Blindness or impaired vision affects 3.3 million Americans ages 40 and over, or one in 28, according to a study sponsored by NIH. This figure is projected to reach 5.5 million by the year 2020. The rate of low vision and blindness increases significantly with age, particularly in people over age 65. California has the largest population in the United States. With the aging of the population, the number of Californians with age-related eye diseases is increasing, and vision loss is expected to remain a major public health and societal economic concern in addition to its substantial effect on individual living quality. Our proposed study of tissue collection from patients with major eye diseases will provide new means and materials to understand mechanisms of susceptibility to ocular diseases. It is innovative and promises a number of unique contributions to the field of regenerative medicine. By integration of clinical and genome-wide association datasets, we will be able to perform a comprehensive and coordinated study designed to identify and understand the complex interplay of genetic, developmental and environmental factors, and their contributions to the development and progression of major eye disorders. This should open a new avenue for future functional studies and could eventually help facilitate the prediction, development of improved treatment, and prevention of devastating blindness-causing diseases.

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