James & Esther King Biomedical Research Program

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Molecular Genetics and Microbiology
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2009 Program
Shared Instrument Grant
(1-year project)

Project Title: Spectral Domain Instrumentation for Macular Degeneration Research

Project Summary: Age related macular degeneration (AMD) is the leading cause of blindness among the elderly in the United States. Smoking is the most important environmental risk factor for AMD. This project team consists of a group of five scientists collaborating to study this disease and to develop a cure using mouse models of macular degeneration. We are developing both stem cell and gene therapy approaches to treat the disease. Grant funding is for the purchase of a spectral domain optical coherence tomography (SD-OCT) instrument to obtain high-resolution images of the retina in living animals. Optical coherence tomography is a method for acquiring and processing optical signals in complex media. It permits the production of high-resolution, 3-dimensional images from within biologic tissues. In SD-OCT, a full-depth scan can be acquired within a single exposure. This method permits cross-sectional analysis of the retina with resolution that rivals that of microscopy, allowing us to monitor the course of disease and the efficacy of treatment in one cohort of living animals. The instrument provides not only the latest spectral domain OCT capability but also multiple other ocular imaging methods that permit detection of leaking blood vessels characteristic of late-stage AMD and dead or dying photoreceptors. Currently we have no other instrument that will perform these tasks at high resolution.