

## James & Esther King Biomedical Research Program

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*2008 Program  
New Investigator (3-year project)*

**Project Title:** Age-related Macular Degeneration: Experimental Model and Neuroprotection

**Project Summary:** The long-term goal of this research is to understand Age-related Macular Degeneration (AMD) and find ways to save and restore vision for AMD patients. AMD is the leading cause of irreversible vision loss in people over 65 years of age in developed countries. A well-established risk factor for AMD is tobacco smoking. AMD affects cone photoreceptors in the macula, the center of the retina critical for fine and color vision. Patients with AMD lose their central vision due to the death of cones. Currently there is no treatment for cone degeneration. Advances in research on cone degeneration are slow, partially because of the lack of well-characterized experimental models. This not only limits our understanding of cone degeneration, but also hinders the development of new treatments. There is an urgent need for cone degeneration models. Several findings from my recent studies could help to change the situation. I found that cone degeneration in a specific line of transgenic rat could serve as a good model. I also found that during cone degeneration, cones first lose outer segments (OS), the light-receiving devices of cone cells. When treated with neurotrophic factors, cones that lost OS could be stimulated to regenerate OS. This demonstrates that in early stages, cone degeneration is reversible. In this grant, the research goal is to characterize the cone degeneration in transgenic rat to establish a model for basic and preclinical studies. An additional research purpose is to study cone OS regeneration by two neurotrophic factors.