Young investigator grant leverages Eye Institute research on retinal diseases

March 14, 2012 College News - Joseph Carroll, PhD, Associate Professor in Ophthalmology, Biophysics, Cell Biology, and Neurobiology & Anatomy, has received a 2012 Alcon Research Institute (ARI) Young Investigator Grant for his work in ophthalmic research.

Over the past decade there has been rapid evolution in the ability to non-invasively image the living human retina with cellular detail using adaptive optics. In an attempt to accelerate the translation of this technology, Dr. Carroll and his team developed the Advanced Ocular Imaging Program at the Froedtert & the Medical College Eye Institute where patients from around the world have come for imaging and analysis. They have invested substantial resources in the development of new imaging technology and the infrastructure necessary to use it on a daily basis. Their new technologies uniquely positions them to make meaningful contributions to clinical challenges with incremental infusion of additional resources.

In combination with the ARI grant for his research entitled High Resolution Imaging of Retinal Disease, Dr. Carroll will leverage existing imaging resources to image the retina in two human conditions in which photoreceptor structure is of utmost relevance.

Macular holes – The degree of visual recovery varies in this condition, even in cases of successful macular hole closure. Evidence from clinical imaging tools suggests a relationship between visual recovery and the integrity of the cone photoreceptors, but the degree to which photoreceptor structure is compromised has not been quantified.

Age-related macular degeneration (AMD) – The degenerative process that leads to AMD begins long before vision loss and typically well before ophthalmic evaluation. Dr. Carroll and his colleagues will employ high-resolution retinal imaging on individuals previously diagnosed with AMD or its symptoms to characterize anatomical changes in the retina that may be among the first hallmarks of AMD.

Earlier detection of retinal degeneration in its pre-clinical phase has the potential to dramatically improve the outcome for the patient while significantly reducing the public (and personal) burden of treating the disease. Enhanced capabilities to evaluate the relative success of different surgical procedures or treatments will improve the long-term efficacy of these procedures. More broadly, Dr. Carroll views investment in development of advanced retinal imaging tools as critical for the success of therapies in retinal diseases. That these tools are broadly applicable to other diseases, including glaucoma and diabetic retinopathy, further enhances the potential impact of this research.