Vital Partnership

Our donors play a critical role in supporting Kellogg’s mission to treat and cure blinding eye disease.
Your contributions to the Kellogg Eye Center Annual Fund and the Alumni Annual Fund are critical to the success of our research program. With your help, discoveries by our vision scientists are advancing research for the benefit of our patients and people around the world.

Genetics researcher Julia E. Richards, Ph.D., continues her work on the discovery of new genes for eye diseases, thanks in part to support from the Annual Fund. Dr. Richards uses the latest sequencing technology—next generation sequencing—to sift through sequences in the human genome to find new disease-causing genes.

“By studying large families with many affected individuals we can compare the genetic blueprint present in family members who have a genetic trait—against the genetic blueprint present in unaffected family members—to find the cause of the disease,” says Dr. Richards.

Last year, using this approach, Dr. Richards collaborated with researchers in Michigan and New York to find a cluster of mutations responsible for congenital cataracts in one large family. More recently she joined glaucoma specialist Sayoko E. Moroi, M.D., Ph.D., and U-M medical student Lev Prasov, M.D., Ph.D., to find a new angle-closure glaucoma gene. Together, they are working to learn more about this disease gene through functional studies of the mutant form of the protein produced by the disease gene.

“One key to this work is the wonderful interdisciplinary environment at the Kellogg Eye Center, where basic scientists and physicians work in close proximity,” says Dr. Richards. “With samples and information available from more large families, we are poised to accelerate the use of next-generation sequencing to discover new genes involved in traits for diseases such as glaucoma.”

Support from the Annual Fund has helped Dr. David Musch achieve a greater understanding of glaucoma, a common and visually disabling eye disease. “Treatment for glaucoma focuses on reducing eye pressure,” says Dr. Musch. “My research group has recently published a significant finding, demonstrating that effective glaucoma treatment not only stabilizes the disease’s effects on the eye, but can actually improve the eye’s visual function. This evidence could stimulate more basic research on how treatment that reduces eye pressure affects the cells that control vision.”

Dr. Musch is also working on research to improve screening and follow-up care for children with common vision problems. “We want to improve the early detection of and care for children’s vision disorders—from babies born prematurely who suffer from potentially blinding eye disease to children who need glasses or more advanced treatment to correct their vision,” he explains. “Our efforts could lead to resources to meet these needs and thereby reduce current disparities in eye care for children.”

Thanks to the support of the Annual Fund, Dr. Maria Woodward is advancing her studies of health care delivery and implementation with a special focus on telemedicine. “There are currently no validated methods to perform telemedicine for the front of the eye,” says Dr. Woodward. “Through our project, MISight, we are working on protocols and collaborating with engineers to develop new portable camera systems to accurately image the anterior eye.”

Dr. Woodward’s research could ultimately lead to safe and reliable methods of remote imaging of the eye—from primary care offices or a patient’s home—for earlier detection of eye conditions such as cornea disease, infections, and eyelid lesions. “Our goal is to establish new clinical guidelines for remote eye care and to provide high-level care for the millions of Americans with inadequate access to eye care,” says Dr. Woodward.
David N. Zacks, M.D., Ph.D.
Associate Professor, Ophthalmology and Visual Sciences

The support that Dr. David Zacks received this year from the Annual Fund has allowed him to study the mechanisms controlling cell death and survival during retinal diseases, such as retinal detachment and age-related macular degeneration.

“Specifically, we are focusing on the role of the autophagy pathway, a fundamental intra-cellular pathway that controls cell survival,” says Dr. Zacks. “We have discovered a complex set of pathways activated during disease that regulate the death of cells. The autophagy pathway acts as a central regulator of many of these processes.”

By understanding the molecular biology of these pathways, Dr. Zacks and his research team aim to develop targeted therapeutics to increase cell survival, and thus improve visual outcomes.

Raymond S. Douglas, M.D., Ph.D.
Eye Plastic, Orbital and Facial Cosmetic Surgery; Professor, Ophthalmology and Visual Sciences

Dr. Raymond Douglas studies Graves’ disease, an autoimmune disorder that causes the overproduction of thyroid hormones and results in hyperthyroidism. Approximately 50 percent of patients with Graves’ disease develop thyroid eye disease (TED) — with symptoms ranging from dry eye, eye pain, redness, swelling of the eyelids, double vision, and vision loss.

With continued support from the Annual Fund, Dr. Douglas is working to better understand the physiological events present in the immune system that initiate TED, and how to prevent the development of the disease. “Our findings indicate that patients with Graves’ disease have an increased number of immune cells called fibrocytes in peripheral blood,” says Dr. Douglas. “These cells infiltrate the orbit, recruit other immune cells causing tissue remodeling, and produce pro-inflammatory agents called cytokines. But when fibrocytes are treated with teprotumumab, the drug currently being assessed for TED treatment in a multicenter clinical trial that includes the Kellogg Eye Center, production of pro-inflammatory cytokines is diminished.” Better understanding of this event may lead to the development of an agent that controls fibrocyte frequency of blood in patients with TED.

Howard R. Petty, Ph.D.
Professor of Ophthalmology and Visual Sciences; Professor of Microbiology and Immunology

Thanks to support from the Annual Fund, Dr. Howard Petty is studying a new nanoparticle that has the potential to kill tumor cells inside the eye. “If you inject this nanoparticle into a tumor cell, it will take the nutrients and molecules from inside the cell and synthesize a toxin — called a hydroxyl radical — in that tumor cell,” says Dr. Petty. “This toxin is highly reactive and delivers a big punch — one that we can’t duplicate with radiation or with advanced chemotherapy.”

This treatment offers many advantages. “Most importantly, there are no side effects for the patient because we’re not injecting the toxin into the patient’s blood. Instead, we’re injecting the nanoparticle into the blood, so it goes to where the tumor is — blasting it with about 20 million toxins per hour,” says Dr. Petty. “Another advantage is that the nanoparticle is activated by light — so it can be turned on and off simply by exposing it to light.”

This nanoparticle has the potential to be used for multiple indications in ophthalmology. “We’re especially going after ocular cancer so that we can reduce the need to remove the eyes of patients with ocular metastases,” says Dr. Petty.

Kwoon Y. Wong, Ph.D.
Assistant Professor, Ophthalmology and Visual Sciences
Assistant Professor, Molecular, Cellular & Developmental Biology

Thanks to support from the Annual Fund, Dr. Kwoon Wong is studying subconscious visual responses including constriction of the pupil, regulation of hormone secretion, and synchronization of circadian rhythms such as sleep to the solar day. “Vision is our most important sense, enabling us to discern the identity and movement of objects in our surroundings,” says Dr. Wong. “But our visual system also supports various non-image-forming responses to light, which profoundly influence our well-being. Inadequate or mistimed induction of these responses can cause depression, cognitive impairment, sleep disorders, and certain forms of cancer.” Dr. Wong’s research may lead to new treatments for seasonal affective disorder and jet lag.
Thank you for giving me hope.

A teenager sent an email to us after hearing about Roger Pontz, who received one of the first retinal prostheses in the nation — often called the bionic eye. Mr. Pontz, who was blind from retinitis pigmentosa, can now see shapes and forms to help him navigate in his home and identify his grandson and other family members.

Hello. I am a 15 year-old high school student. My grandma has been blind ever since she lost her eyesight to retinal detachment. I heard about Roger on the news and all I could do was cry. I have been telling my grandma that she will see before her life is over. I promised her. Learning about something this amazing makes my promise feel more real.

I know it will probably be impossible for you to make her see or for you to even get this message, but I just wanted to thank you so very much for giving me hope, and for giving hope to many others. I want you and the entire team to know that I love you guys and what you are doing. I am so grateful for brilliant and determined people like you. You have changed so many people’s lives, especially mine.

“Thank you for your support of the annual fund. Your generous giving helps advance research to cure blinding eye diseases that rob us and our loved ones of sight.”

— Paul R. Lichter, M.D., M.S.
Immediate Past Chair
Department of Ophthalmology and Visual Sciences

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To learn how you can leave a legacy at Kellogg, please contact the Kellogg development office: Becky Spaly, 734.763.0874, bsp@umich.edu, or Lindsay Baden, 734.763.0875, linmwell@umich.edu