In 1997, Debra A. Thompson, Ph.D., and her colleagues identified the gene associated with a rare but devastating children’s eye disease. Through a prescient decision to study the cells that support light response of the retina, rather than the light-absorbing cells themselves, Dr. Thompson found that a mutation in the gene RPE65 leads to Leber congenital amaurosis, a severe retinal disease that strikes at a very early age and, eventually, causes blindness.

Now it appears that her research could have significance beyond Leber’s, helping scientists to understand, and perhaps some day treat, more common retinal diseases such as age-related macular degeneration. Dr. Thompson explains that this phenomenon is not uncommon: “Scientists refer to such rare conditions as ‘orphan diseases’ and they study them to help those affected, of course, but also to learn about related disorders.” Add to this the discovery that the gene RPE65 regulates the way the eye processes vitamin A—a “survival factor” for vision—and you begin to see the broad implications of her findings.

How the gene search evolved

Dr. Thompson’s discovery stemmed from her decision to study the retinal pigment epithelium (RPE) before other scientists understood its significance in genetic visual disorders. The RPE is a single layer of cells under the retina that nourishes the rods and cones—or photoreceptors—the cells that absorb light and set off a chain of chemical events essential for vision.

Genetic Counseling: Taking on the tough questions

A young woman and several members of her family have congenital cataracts and, as is often the case, she later develops glaucoma, resulting in significant vision loss. She is planning a family and wants to know the likelihood that her child will inherit the condition. What information is available to help the woman and her husband make the best decision?

Catherine Downs, M.S., is accustomed to dealing with this kind of ambiguity. As a genetic counselor and researcher at the UM Kellogg Eye Center, she helps individuals clarify the complex issues before them, whether that involves family planning or a career decision that takes into account the chances of declining vision later in life. If there is a genetic test available for a disease that runs in the family, she leads her patients through a series of questions to help create a personal tally of the up- and downside of the decision.

Genetic testing gives straight answers on eye disease

Imagine requesting a lab test that tells whether you will inherit the eye disease that affects several members of your family. Your doctor sends a blood sample to the lab, where scientists scan it to see if it matches any of several known disease genes. About eight weeks later you meet with a genetic counselor to discuss the results. Perhaps you inherited the disease-causing mutation and now realize that you should make plans for living with impaired vision. Or you learn that you do not have the gene, and you can move on with your life, free of worry.

Kellogg scientist Radha Ayyagari, Ph.D., has developed such a system. It has already helped a handful of patients, and Dr. Ayyagari expects that many more will benefit as scientists intensify the search for disease-causing genes. The process is called Molecular Diagnostic Testing, and the UM Kellogg Eye Center is one of the very few centers to have developed this advanced genetic testing service for vision disorders and diseases. In May 2002, Kellogg received...
In the case of the young woman, Ms. Downs recorded the patient’s family history and drew a pedigree, a sort of family tree noting all known instances of the disease. She reviewed the woman’s clinical diagnosis, and explained to the couple that the child would have a 50-50 chance of developing congenital cataracts. She led the couple through a series of questions: how would they feel if a child developed the same disease? Are there new treatments that weren’t available to the mother? If the child later developed glaucoma would it necessarily be as severe as the mother’s condition? Ultimately the couple had twins, and one of the two has congenital cataracts. But the parents feel they made an informed decision and believe that their daughter is receiving excellent care at the earliest possible moment.

Ms. Downs stresses that these issues represent a whole new category of medical information. “We are the first generation to have the option of testing for genes. We cannot look to our parents to teach us how to talk about our genetic identity.” Although we have experience with other kinds of medical testing, the questions aren’t quite the same. “Learning the results of a genetic test is not the same as getting your cholesterol level or blood type,” she says.

“One of my primary challenges is to ask questions and provide information without suggesting that there is a right or wrong answer,” says Ms. Downs. “My role is to lay out the issues unique to each family and to give as much balanced information as possible.”

At a time when genetic research is booming, the number of genetic counselors is still relatively small. In the field of ophthalmology there are only about ten in the country. It is a mark of Kellogg’s foresight that two of the ten are employed at the Eye Center. According to Department Chair Paul R. Lichter, M.D., it is part of Kellogg’s strategic plan to take the lead in providing a unique and comprehensive range of genetic offerings: basic research, testing, including molecular diagnostic testing, and counseling to help individuals grapple with the information. “We have all three components in place now,” says Dr. Lichter, “and we expect our services will expand rapidly, especially as we learn more from family studies and laboratory research.”

Catherine Downs, M.S., discusses genetic aspects of vision disorders and the implications of genetic testing with patients and their families.

“Part of the power of genetics is that we can move research back into clinical care. As our genetic research brings forth more data, we can help patients use it to make better decisions about their own medical care.”

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“As a genetic counselor, I am always interested in helping individuals understand the role genetics play in their health.”

“Our goal is to assure that Kellogg maintains its leadership position in all aspects of ophthalmic genetics.”

Research: the other half of counseling
Ms. Downs joined the Eye Center in 1995 as part of a glaucoma genetics research project. The data she collects is immediately assigned a number to insure confidentiality. Then it becomes available to Kellogg scientists who study the genetics of glaucoma in hopes of finding improved diagnostic testing, new treatments and delivering better patient care. For example, as scientists identify genes that predispose an individual to glaucoma, clinicians can recommend that affected individuals have more frequent visits to an ophthalmologist who then can start treatment prior to the onset of symptoms. Genetic research may also help us determine whether surgery or medication is the best treatment for a particular patient with glaucoma. Kellogg scientists also study the possibility of tailoring medication to a person’s genetic makeup. “What if we could look at a person’s DNA and say, ‘Here’s the eye drop that will work for you,’” suggests Ms. Downs.

Studying families with AMD
Beverly Yashar, Ph.D., agrees that the link between research and counseling is crucial. In 1998 she helped launch the AMD (age-related macular degeneration) Genetic Study Group, which, like the glaucoma genetics study, seeks the genes associated with a serious and prevalent eye disease, in this case, age-related macular degeneration.

“Kellogg is ahead of many universities in establishing an AMD patient study of this magnitude,” says Dr. Yashar, who now directs the UM Medical School’s Genetic Counseling Program and holds a joint appointment at the Eye Center. “The project is daunting because AMD is genetically complex. Kellogg was one of the few centers willing to take on the search for genes in such a disease.” Like many of her colleagues, she points out that the Mendelian concept—that diseases are caused by a change (mutation) in a single gene—does not apply to many common diseases. “We are more likely to find that diseases like AMD and glaucoma are caused by changes in multiple interacting genes,” she adds.

The AMD study now includes 1920 individuals, representing 1343 families. The current clinical director, Kari Branham, M.S., observes that identifying large families with repeated instances of a disease is important to the success of genetic studies because it enables researchers to trace disease-causing mutations in many people with similar genetic make-up. By comparing this data with that from family members who do not have the disease, scientists again increase the odds of detecting a mutated gene.

Many of the study subjects are Kellogg patients; others come from referring physicians and Department alumni, and some contact the center after seeing information on the web. “When we ask a current patient to participate, they rarely turn us down,” says Ms. Branham. They understand that the research could benefit future generations. Many also say it allays some of their frustration with a disease for which there is no known cure or reliable treatment. “We are careful to let participants know that the study is not likely to benefit them directly, at least in the near term,” she says. “But this doesn’t seem to dampen their enthusiasm.”

Growth and more questions
Dr. Yashar expects the field of genetic counseling to expand rapidly, especially as we learn more from family studies and laboratory research. “Part of the power of genetics is the ability to move research findings back into clinical care. As our genetic research brings forth more data, we can help patients make better decisions about their own medical care.”

Genetic counselors face many difficult issues, but perhaps the toughest involves if or when to test children. As Dr. Yashar points out, “Parents often want answers about genetics before their children are ready. My policy is to wait until the children are old enough to decide for themselves, often around age 18.” Ms. Downs adds the caveat that counselors should test children only when the results are likely to help in making decisions about treatment. “You have to remember that the information may stigmatize the child, and that it could affect the child’s insurability well into adulthood.”

Most important, in thinking about genetic testing for adults as well as children, Ms. Downs emphasizes, “Once you learn what is in your genes, you can’t unknow it.”
A miniature telescope that is surgically implanted in the eye may help people who have lost their central vision to age-related macular degeneration (AMD). Paul R. Lichter, M.D., is performing this surgery as part of a clinical trial to evaluate the device.

“The implantable telescope is an ingenious idea,” says Dr. Lichter, Chair of the Department of Ophthalmology and Visual Sciences. “It appears to be as good or better than any other treatment currently available.” In macular degeneration, the central part of the retina deteriorates and can become scarred, preventing people from seeing faces, reading, watching television, and enjoying activities that require direct vision. The telescope works by magnifying the image two to three times, allowing the unscarred outer edges of the retina to process the image. The magnification allows an individual to see parts of the object, for example, part of a person’s face.

The magnification in one eye means that the individual must learn to adjust to two modes of vision. The eye with the telescope will have greatly magnified central vision, while the other eye retains peripheral vision. While most of us have a field of vision of 130°, the telescope allows a more limited range of 22-24°. Initially some patients experience double vision until they learn to accommodate for the two different images.

To simulate the experience, candidates for the trial must first experiment with an external telescope, clipped to their eyeglasses. Kellogg occupational therapist Cheryl Terpening Frueh, OTR, works with candidates to make sure they understand what will occur. “The brain will never learn to merge two unequal images,” she explains, “but it can eliminate confusion by suppressing one of them at a time.”

Ms. Frueh also talks with patients to make sure they have reasonable expectations. “One woman wanted to see her granddaughter’s face and to watch TV. Both are achievable goals,” she says. “Now we’re working on reading.”

According to Dr. Lichter, the implanted miniature telescope (IMT) will provide better sight than the external telescope for two reasons. Though still narrow, it provides a slightly wider field of vision than the external telescope. And the implanted telescope moves with the eye, using natural eye movements, unlike the external telescope that requires the user to move his or her head.

The surgery takes about an hour and is performed on an outpatient basis. The telescope is implanted in the eye with the worse vision. Dr. Lichter describes the procedure as similar to cataract surgery, with the surgeon removing the lens and implanting a telescope about the size of a pea. Complications tend to be minimal.

About a week after surgery, Ms. Frueh begins a training program to help patients adapt to their new vision. She stresses that there is no “wow” effect in the first days after surgery. For the first two weeks vision can be blurry, and improvements occur gradually. “At first people tend to notice images in the distance: the television, people across a room, the preacher at the front of the church,” says Ms. Frueh.

At first, she advises patients to identify everyday objects, then moves to techniques for shifting between central and peripheral vision; she does not work on reading until a month after surgery.

To qualify for the study, patients must be 55 years or older and have AMD or Stargardt’s disease in both eyes, with visual acuity not better than 20/80, but not worse than 20/800. The study, under the aegis of VisionCare OphthalmicTechnologies, Inc., will enroll 200 patients in 20 universities and clinical centers by the end of the summer.

To learn more please call 734.936.1743 or email clcaudill@umich.edu.
Oxidative Insult and Cataract Formation

In a recent publication in Investigative Ophthalmology & Visual Science, Venkat Reddy, Ph.D., adds new evidence to his extensive research on the important role oxidation plays in cataract formation. In the May issue, Dr. Reddy and colleagues report that some 1171 genes in the outer and inner layers of the human lens are significantly affected by $\text{H}_2\text{O}_2$ (commonly known as hydrogen peroxide). These data give scientists a much clearer global picture of the genes and pathways associated with oxidative stress. They identify a small number of candidate genes that scientists can study to understand oxidative stress and develop therapies to prevent cataract and other age-related diseases. The outer layer of the lens (epithelium) is especially vulnerable to $\text{H}_2\text{O}_2$ and other oxidants which are formed in the eye by the interaction of ultraviolet light and various chemicals found in our bodies. Reddy characterizes the $\text{H}_2\text{O}_2$-effect as an oxidative insult that brings about changes in the lens that lead to cataract. This research narrows the area scientists should study to progress to the next step.

Oxidative stress occurs when the level of "pro-oxidants" exceeds the ability of the cell to respond effectively through its anti-oxidant mechanisms. The result is damage to the DNA and ultimate cell death. By understanding which genes are acutely sensitive to certain oxidative insults (like $\text{H}_2\text{O}_2$) and identifying the molecular mechanisms that control them we will know what triggers a protective action and what triggers the onset of cell death. Dr. Reddy and colleagues can now focus their investigations on a subset of about 100 candidate genes that respond to nonlethal $\text{H}_2\text{O}_2$ treatment of lens cells in order to begin to formulate ways of treating — or preventing — age-related disease.

Ginkgo Biloba Effect on AMD Progression Needs More Study

Members of an American Academy of Ophthalmology (AAO) Task Force were unable to find conclusive evidence for claims that a popular extract from the ginkgo leaf is effective in treating eye disease. While one clinical trial showed potentially promising results for ginkgo biloba extract (GBE), the AAO group concluded that the study design rendered the results "equivocal."

Kellogg glaucoma specialist Sayoko E. Moroi, M.D., Ph.D., served on the AAO Complementary Therapy Task Force, which searched the medical literature to determine whether GBE could stand up to scientific scrutiny. It has been used for centuries in China to treat asthma and bronchitis. Use in Germany has expanded to include dementia, claudication, altitude sickness, tinnitus and vertigo, and sexual dysfunction. Commercial claims include benefits for depression, fatigue, and memory loss.

Members of the task force also wanted more information on the importance of GBE to vision loss. Researchers conducted a random controlled clinical trial of GBE versus a placebo. Over the course of two years, 20 patients were divided into two groups, one treated with 80 mg of ginkgo twice daily, the other treated with a placebo. After six months, researchers found that both groups showed improvements in distance vision, with the ginkgo-treated group showing greater improvement. Neither group had statistically significant changes in near vision or visual field. The most promising findings involved clinical observation of disease progression. Nine out of ten patients who took GBE showed improvement as compared to only two patients in the control group. However, the Task Force considered these findings to be equivocal due to the small size of the samples, the short length of the study, and the fact that the observers were not masked.

Test results can also help ophthalmologists to better understand disease progression. The Kellogg scientist says that although these diseases are quite rare, and some individuals want to know whether they are likely to pass the gene on to a child or whether they will inherit the disease themselves. "Not everyone wants this information," says Dr. Ayyagari, "but for those who do, we have the science, the certified lab, and expert counselors to help our patients understand and evaluate the results."

Dr. Ayyagari observes that unaffected individuals in families with recessive or X-linked diseases often wonder whether they are carriers of that disease and likely to pass it on to their children. Genetic testing may help them find answers to such concerns.

Test results can also help ophthalmologists confirm a diagnosis. Say for example, a young child has symptoms that indicate either of two diseases: one is stable, the other is progressive. The only solution now is to "wait and see" how the disease develops. In some cases, an earlier diagnosis might help the parents and doctor make better decisions about medical care.

Dr. Ayyagari’s own research has yielded a novel gene associated with an early-onset form of macular degeneration. She has also identified many other gene mutations in patients with retinal conditions. The Kellogg scientist says that she feels an obligation to keep her clients abreast of the latest research affecting their condition. She looks forward to the day when she can tell them about a breakthrough in her research that will finally bring advanced treatments and cures to those who suffer from these devastating retinal and macular degenerations.

For more information on the Kellogg Eye Center’s Molecular Diagnostic Testing Service, please call 734.647.6347.
To Dr. Thompson the approach made sense. “Once we realized the importance of RPE to rod and cone cell function, it wasn’t much of a stretch to imagine that defects in the RPE might be involved in blinding genetic diseases.” So she and her lab associates initiated studies to “crack the shell” of the RPE.

While researchers were knowledgeable about the biology of the RPE, they knew little about the mechanisms it uses to carry out key chemical reactions necessary to sustain vision. “One of these involves converting vitamin A to a substance called 11-cis retinal. The role of 11-cis retinal in initiating the light response was well known, but exactly how this compound is formed from vitamin A was essentially a black box.”

Dr. Thompson undertook an intensive screening effort to identify proteins involved in these chemical pathways in the RPE. In one approach, she found that a single protein dominated the response; further testing confirmed that she had found a unique protein expressed only in the eye, not in any other part of the body. The first RPE-specific gene to be identified, the gene was named RPE65. Here the story takes a turn not uncommon in scientific research and discovery. While Dr. Thompson completed her screening, two other labs made similar discoveries independently. One of these labs used genetically engineered mice to show that RPE65 is absolutely required for the conversion of vitamin A to 11-cis retinal.

Dr. Thompson collaborated with a geneticist from Germany, Dr. Andreas Gal, to show that mutations in RPE65 cause certain forms of childhood blindness. Interest in their work intensified after it was found that the Swedish Briard sheepdog common canine carries a disease-causing mutation in RPE65, thus identifying an animal model of Leber’s that could be used for therapeutic testing. A consortium based on the East Coast used gene replacement therapy to deliver a healthy copy of the RPE65 gene to affected Briards. Their experiments were successful in partially restoring the dogs’ sight, and have generated a great deal of optimism that similar gene-based therapies may be successful in human patients.

Dr. Thompson observes that many people are very excited about the potential for RPE65 gene therapy, and some are proposing clinical trials within the next five years. She is hopeful, but cautions that a number of basic questions must be answered before the therapy can be tested in humans.

While Dr. Thompson is not one to overstate her successes, she does acknowledge that her work stimulated others to study the RPE and its involvement in inherited disease. Since Dr. Thompson published her findings, some 60 different disease-associated mutations in RPE65 have been described, and additional disease genes that impact 11-cis retinal synthesis have been discovered. “We can say that our studies had a snowball effect, resulting in the finding that mutations at a number of points along the vitamin A processing pathway are responsible for various forms of retinal degeneration.”

More research and new questions
Where does this leave us? We have learned a lot about how the eye processes vitamin A, but we haven’t figured out every step in the metabolic pathway. “It’s still a bit of a black box,” says Dr. Thompson. “The unknown portion is simply smaller now.” We don’t really know the precise function of RPE65, and so we can’t be sure we have identified all the proteins necessary for vitamin A to 11-cis retinal.

“Each undiscovered protein may lead to another potential disease gene,” says the Kellogg biochemist. Dr. Thompson says that much remains to be learned about vision and aging. She proposes further study of the regulation of vitamin A metabolism, not just in diseases that affect the young, but in diseases affecting older populations. “If a drastic reduction in vitamin A synthesis causes a severe childhood disease, what happens during aging, when the efficiency of many metabolic processes decreases?” she asks. Could a reduction in vitamin A processing be a contributing factor in other retinal diseases, such as AMD?

The RPE is a very attractive target for gene therapy—and for further study, says Dr. Thompson. On one thing, it is accessible, compared to other parts of the eye. And understanding the factors that regulate vitamin A processing in the RPE will likely result in more specific and controlled tools for gene therapy. So she is cautiously optimistic about the future of gene therapy for retinal disease. Meanwhile, she will continue her efforts to delineate the proteins, regulators and biochemical mechanisms that determine whether the rods and cones get their essential supply of 11-cis retinal.
Richard Lewis, M.D., M.S. (retina fellowship 1971; residency 1974; former faculty member) published “Visual Loss in Patients with Cytomegalovirus Retinitis and Acquired Immunodeficiency Syndrome before Widespread Availability of Highly Active Antiretroviral Therapy” in the January issue of the Archives of Ophthalmology.

James Ravin, M.D. (residency 1974) was elected Vice President of the Academy of Medicine of Toledo and Lucas County. He is also President-elect of the Toledo Surgery Society. He recently published a Special Article in the May issue of the Archives of Ophthalmology, “An Indian Adventure: Derrick Vail’s Shikarpur Fragments.”

Corey Miller, M.D. (residency 1983) just completed a year’s term as President of the Utah Ophthalmological Society.

Anthony Adams, M.D. (residency 1989) published “VEGF-Dependent Conjunctivalization of the Corneal Surface” and “Controlled Delivery of the Anti-VEGF Aptamer EYE001 with Poly(lactic-co-glycolic) Acid Microspheres” in the January issue of IOVS and “Expression and Function of Receptors for Advanced Glycation End Products in Bovine Corneal Endothelial Cells” and “Sustained Inhibition of Corneal Neovascularization by Genetic Ablation of CCR5” in February.

Helen Wu, M.D. (residency 1990) published “Detection of Differentially Expressed Genes in Healing Mouse Corneas, Using cDNA Microarrays” in the September issue of IOVS.


Justin Gottlieb, M.D. (residency 1994) was invited to write a Special Article for the November issue of the Archives of Ophthalmology, “Helping Low-Income Patients Obtain Prescription Medications.”


Michael Hall, M.D. (residency 2000) was voted “Teacher of the Year” for the year 2002 by his residents at the University of Missouri–Kansas City.

Brian Brooks, M.D., Ph.D. (residency 2001; pediatric fellowship 2002) published “Infantile Spasms as a Cause of Acquired Perinatal Visual Loss” with Jennifer Simpson, M.D. (pediatric fellowship 1999) and Steven Archer, M.D. in the December issue of JAPOS.

In Memoriam
We mourn the passing of Don Marshall, M.D., who completed his residency in 1935, Fleming A. Barbour, M.D., who completed his residency in 1940, Robert D. Kiess, M.D., who completed his residency in 1950, William C. Wilkinson, M.D., who completed his residency in 1961, and long-time faculty member, J. Reimer Wolter, M.D.

Alumni Class Notes

Kellogg Eye Center Alumni Meet in Orlando
Over 100 people enjoyed getting together at the Ming Court for our annual alumni dinner during the AAO meeting. Make plans to join us in Anaheim this fall – November 17th – so you can catch up on old friends.

Alums Gather in Ann Arbor for Fall Alumni Day
On a beautiful October weekend former residents and fellows met in Ann Arbor to hear about the latest developments in ophthalmology at Kellogg, tour our labs, visit with old friends and watch Michigan beat Penn State in overtime. We look forward to seeing you this fall – September 5th.

In Memoriam
We mourn the passing of Don Marshall, M.D., who completed his residency in 1935, Fleming A. Barbour, M.D., who completed his residency in 1940, Robert D. Kiess, M.D., who completed his residency in 1950, William C. Wilkinson, M.D., who completed his residency in 1961, and long-time faculty member, J. Reimer Wolter, M.D.
Morton S. Cox, M.D., has joined the faculty of the Kellogg Eye Center as an Adjunct Clinical Professor. Dr. Cox received his M.D. from the University of Michigan and completed his residency here, as well. Following a retina fellowship at Harvard he joined the Department as the first formally trained retina subspecialist in the State of Michigan. For the past two decades he has been at William Beaumont Hospital, Henry Ford Hospital, and St. Joseph Mercy Hospital. He was also on the teaching faculty at Michigan State University. We are pleased that Dr. Cox has returned to his alma mater.

Philip J. Gage, Ph.D., has joined the faculty of the Kellogg Eye Center as an Assistant Professor. Dr. Gage earned his Ph.D. from the University of Michigan in microbiology and immunology and completed postdoctoral work in the U.M’s Department of Human Genetics. Dr. Gage’s research focuses on using functional genomics to elucidate normal eye development and in particular the role of the homeobox gene, Pitx2, which he cloned.

Howard R. Petty, Ph.D., has joined the faculty of the Kellogg Eye Center as a Professor. Dr. Petty received his Ph.D. from Harvard University and followed it with a fellowship at Stanford. Dr. Petty is an internationally respected biophysicist and immunologist who has made seminal contributions to the fields of imaging and inflammation over the past 20 years as a member of the faculty of Wayne State University. He will continue these avenues of investigation as well as initiate new collaborations at Kellogg.

David C. Musch, Ph.D., was asked to join the AAO’s Cornea/External Disease Preferred Practice Panel. These panels review the latest literature in order to formulate recommendations for treating specific conditions. The results of this meeting, which covered blepharitis, conjunctivitis syndrome, and dry eye, will be published later this year.

Anand Swaroop, Ph.D., has been a member of both the National Scientific Advisory Council for the American Federation for Aging Research and the Liaison Committee for the Foundation Fighting Blindness Pathophysiology Faculty.

Radha Ayyagari, Ph.D., presented a talk on the molecular genetics of macular degeneration at the Center of Genomics and Bioinformatics, University of Tennessee Health Science Center.

Terry J. Bergstrom, M.D., delivered the 17th Annual Ruedemann Lecture to the American Eye Study Club, speaking on “Reflections on the use of Mitomycin for glaucoma filtration surgery.”

Mohammad H. Dastjerdi, M.D. and Alan Sugar, M.D., published “Corneal decompensation after laser in situ keratomileusis in Fuchs’ endothelial dystrophy” in the May issue of Cornea.

Monte A. Del Monte, M.D., led two workshops at the AAO’s Annual Meeting: “Challenges in pediatric cataracts: problems and solutions” and “Double trouble: managing preoperative and postoperative diptopia.” He also served as senior author on “Large vertical rectus muscle surgery for vertical null point nystagmus,” a paper presented at that meeting by fellow, Michael Yang, M.D.

Rafal Farjo delivered a paper, “Microarray analysis of mouse models of diabetic retinopathy reveals dramatic modulation of crystallin genes in the retina,” at the recent ARVO annual meeting.

Philip J. Gage, Ph.D., co-moderated the embryology session at the recent ARVO annual meeting and also presented a paper on fate maps of neural crest and mesoderm in the mammalian eye.

Mark W. Johnson, M.D., presented “Most missed maculopathies” and “Evolving approaches to neovascular AMD” at the 2003 Retina Update meeting. He also presented a paper at the Macula Society meeting, “Surgical removal of subfoveal CNVM in older patients without age-related macular degeneration.” His article, “Clinicopathologic study after submacular removal of choroidal neovascular membranes treated with verteporfin ocular photodynamic therapy” was published in the March issue of the AJO.

Paul R. Lichter, M.D., wrote an editorial for the October issue of the Archives of Ophthalmology on “Expectations from Clinical Trials: Results of the Early Manifest Glaucoma Trial.”

Shahzad I. Mian, M.D., presented a poster with Jeffrey Zink, M.D. and Quin A. Farjo, M.D. at the recent ARVO annual meeting on the risk of traumatic endophthalmitis with and without use of intravenous antibiotic prophylaxis.

Suyaso E. Moroi, M.D., Ph.D., and Julia E. Richards, Ph.D., published “Clinicopathologic correlation and genetic analysis in a case of posterior polymorphous corneal dystrophy” in the April issue of the AJO.

David C. Musch, Ph.D., presented lectures, “Common Statistical Questions and Concerns” and “Practical Epide- miologic Principles that Apply to Reviewing a Manuscript” for the AAO annual meeting course, “How to Read and Write a Scientific Paper.” This course was led by Depart- ment alumnus and former faculty member, Richard Alan Lewis, M.S., M.D. Dr. Musch also presented a poster on CGTS findings, “Prognostic factors for failure of initial treatment of POAG” at the recent ARVO meeting.

Venkat Reddy, Ph.D., published “Activation of metallo- thioneins and re-crystallin/HSPs in human lens epithelial cells by specific metals and the metal content of aging clear human lenses” in the February issue of IOVS.

UM medical student Pauline Lim published “Septuagenarian’s phenotype leads to ascertainment of familial MYOC gene mutation” with Paul R. Lichter, M.D., Julia E. Richards, Ph.D., in the April Journal of Glaucoma.

Anand Swaroop, Ph.D., delivered a paper, “Transcriptional regulatory networks during photoreceptor differentiation,” as part of the new molecular technologies in ocular oncology mini-symposium held at the ARVO annual meeting. His lab presented many posters at this meeting on a variety of topics, including gene regulation, AMD, diabetic eye disease, and microarray technology. He also published “Interaction of retinal bZIP transcription factor Nrl with Flk-1-interacting zinc finger protein Frl1: Possible role of Frl1 as a transcriptional repressor” in the February issue of Human Molecular Genetics.

Stephen J. Saxe, M.D., presented “Intravitreal steroids for treatment of macular edema” at Grand Rounds in May at the Department of Ophthalmology at Tel Aviv University.

David N. Zacks, M.D., Ph.D. published “Caspase activation in an experimental model of retinal detachment” in the March issue of IOVS.

For a more complete listing of publications, please visit www.kellogg.umich.edu/faculty/publications
If you are considering refractive surgery, the most important thing you can do is schedule a thorough screening examination. By the end of your appointment you should know whether you are a candidate for refractive surgery and, if you are, which procedure is right for you.

At Kellogg, your physician will talk with you at length about your needs and expectations, the different procedures, expected postoperative results, and potential complications. You will have a thorough ophthalmic medical examination, including the tests listed below.

We are often asked who is likely to qualify for refractive surgery. Generally a good candidate is over the age of 21, has had a stable prescription for 6 months; is nearsighted up to 12 diopters, farsighted up to 4 diopters, or has astigmatism up to 6 diopters; is not pregnant or nursing; and has no history of herpes infection in the eye, keratoconus, advanced glaucoma or cataracts.

A thorough screening includes:

Visual Acuity: We measure your uncorrected and best-corrected distance and near visual acuity. This is the single most important way to determine if you are a candidate and which procedure will lead to the best vision.

Corneal Topography: A computer produces a topographic map of your cornea to tell us if it is irregular. This may not be detectable with other tests. We use an Orbscan II, an advanced device that can help detect early stages of corneal irregularity and prevent loss of vision that may occur after refractive surgery. Patients with irregular corneas should not have corneal refractive surgery.

Slit Lamp Examination: We examine your eyelids, conjunctiva, cornea, iris, and lens to detect any eye disease that needs to be treated before surgery or that contraindicates surgery.

Corneal Thickness: We measure the thickness of your cornea to determine which procedure is best and how much treatment is possible.

Pupil Size: Using an infrared device known as a pupillometer, we measure your pupils in dim and room light to determine the best treatment plan.

Intraocular Pressure: Elevated pressure in the eye may indicate glaucoma. Early treatment may prevent later vision loss from this disease.

Schirmer Test: This test identifies if your eyes are dry. Patients with dry eyes are more likely to have increased eye irritation after surgery.

Fundus Examination: We examine the back of the eye to assess the optic nerve, retina, and blood vessels to make sure there are no underlying eye or systemic disorders.

Ocular Motility: We determine whether your muscles can align the eyes to prevent double vision after surgery.

Aberrometry: Wavefront technology uses a beam of light that reflects off the retina to create a map of optical abnormalities.

Patient Expectations: The majority of patients are satisfied with the outcome of refractive surgery. However, some may feel that the surgery did not meet their expectations and a small minority have complications. At Kellogg, ophthalmologists discuss the risks, benefits, and probable outcomes with their patients before surgery. We want to be certain you feel comfortable and are fully informed before proceeding with refractive surgery.

If you have questions about refractive surgery, please contact us at 734.615.6914 or lasik@umich.edu.