Dear Colleagues

I am pleased to present the 2010 Cleveland Clinic Cole Eye Institute Special Edition of Ophthalmology Update.

As you will see in the pages that follow, we have had a busy year with many new innovations, and increasing involvement in clinical trials and cutting-edge research programs. We continue to see significant growth in our retina program and in many other areas, including our expansion of services into the community at additional regional sites.

We also are excited to report that our ophthalmology program was recently ranked among the top 10 programs in the nation by U.S. News & World Report. We thank our referring physicians from across the country for making this possible. We pledge to continue to provide you with excellent service and to restore each patient to your care with the best possible outcome.

In this year’s Special Edition, you can read about why we now often opt for DSAEK over PK (page 4), and how adaptive optics technology may transform refractive surgery (page 6). You’ll find an update on the CRUISE study comparing treatments for foveal center-involved macular edema secondary to CRVO (page 8), and learn about a new technique pioneered by Dr. Julian Perry together with Dr. Craig Lewis for closure of full-thickness eyelid defects (page 10). We discuss recent findings that indicate implanted lenses may not be superior to contacts for infants with cataracts (page 13). We also present a case study in which our team’s involvement in a community vision screening program and swift action saved a child’s life (page 14).

We hope you enjoy these articles showcasing our recent work. We will be back in touch in 2011, when we anticipate reporting on the Comparison of Age-Related Macular Degeneration Treatments Trial (CATT). CATT, for which I serve as Study Chairman, is a seminal study sponsored by the NIH/National Eye Institute comparing ranibizumab and bevacetuzumab for the treatment of neovascular (wet) AMD. The results of this trial are expected to clarify the optimal drug and dosing frequency required to achieve the best visual outcome.

We thank you for picking up this issue of Ophthalmology Update and invite you to contact us with any comments or questions about this publication or our institute.

Sincerely,

Daniel F. Martin, MD
Chairman | Cole Eye Institute
INVESTIGATIONS
Striving for Answers
DSAEK OFFERS MANY DISTINCT ADVANTAGES OVER PK

Corneal surgeons at Cleveland Clinic’s Cole Eye Institute, who have about five years of progressive experience with Descemet stripping automated endothelial keratoplasty (DSAEK), say it represents a dramatic leap forward. DSAEK allows them to replace only the portion of a cornea that is dysfunctional instead of performing a full-thickness penetrating keratoplasty (PK).

“This is a game-changer for corneal endothelial disease that allows us to see the fruits of our labors much more quickly,” says William J. Dupps, MD, PhD, one of several Cole Eye Institute surgeons now offering DSAEK. “It is our first consideration for any patient with endothelial disease.”

Colleague Steven E. Wilson, MD, says he now performs DSAEK in about half of cases in which corneal tissue is damaged, with PK making up the remaining ones.

“For the right patients, DSAEK is a wonderful procedure,” he says. “These include eyes in which the corneal endothelium is no longer functioning, such as Fuchs’ corneal dystrophy and bullous keratopathy.”

Eye conditions in which PK is still preferable include bullous keratopathy accompanied by scars through the center of the cornea and infections, corneal melts that threaten to perforate and keratoconus, he explains.

DSAEK has many benefits in the right patient, including faster recovery of visual acuity. Sutures can be removed four to six weeks after surgery, which is at least six months earlier than with PK. Any induced astigmatism clears up rapidly, allowing many patients to see well with glasses or even sometimes without them.

“With PK, we can’t even begin to address the astigmatism for several more months,” says Dr. Wilson. “When we can, we can start with selective suture removal and achieve good short-term results, but the astigmatism can return as the sutures erode and break away over time. Patients can be left with as much as 3 or 4 diopters of astigmatism, which is something that almost never happens with DSAEK.”

These patients then have to face the possibility of wearing much stronger glasses or even rigid gas-permeable lenses, which can be a huge adjustment, especially considering that the typical patient is over 60 years of age.

Astigmatism after PK also can be worsened by the often-avoidable and unpredictable mechanical mismatches that exist between the donor and the recipient eyes, notes Dr. Dupps. With DSAEK, the front of the cornea, where optics are centered, isn’t affected.

He says that DSAEK is most frequently done on eyes that are pseudophakic, and when it is planned concurrently with or shortly after cataract surgery, careful IOL selection can leave even more patients spectacle-free. PRK or LASIK are other options to help achieve this goal after DSAEK, and the results of laser surgery may be more predictable than after PK.
Another benefit of DSAEK is that there may be less risk of graft rejection since it only requires transplantation of corneal endothelium and a small amount of stromal tissue. The small incision size also reduces the risk of serious intraoperative complications such as expulsive choroidal hemorrhage. “The small incision in DSAEK is far less risky than the ‘open sky’ required for PK,” says Dr. Dupps.

Furthermore, if a repeat procedure becomes necessary, repeat DSAEK is much less invasive and risky than repeat PK, notes Dr. Wilson, as it simply involves slipping out the failed disc of tissue and replacing it with a new one. “Each time you do PK, you face increased difficulty,” he says.

If the second DSAEK fails, you can easily convert the eye to a PK at that point, he adds.

Dr. Dupps notes that earlier forms of endothelial keratoplasty required surgeons to perform manual dissection of the donor tissue, but new microkeratome techniques have made the procedure technically accessible to more surgeons. Also, many eye banks now are able to prepare the tissue for facilities that don’t have microkeratome access.

Most Cole Eye Institute corneal surgeons cut their own tissue with a microkeratome system, and Dr. Dupps is conducting a study of how differing cutting pressures affect refractive outcomes and endothelial cell counts. “We are randomizing patients to low pressure cutting or high pressure cutting,” he explains. “It represents a small potential tweak to a very successful surgery, but could ultimately help further improve outcomes.”

Corneal surgeons today are fortunate to have two great surgical approaches available for endothelial disease, concludes Dr. Wilson.

“We believe that all corneal specialists should be striving to add this to their armamentarium because when it goes well, DSAEK is one of the most gratifying procedures you can perform.”

“However,” he adds, “it is much more technically demanding than PK, so proper training and experience are essential.”

Contact Dr. William Dupps or Dr. Steven Wilson at ophthalmologyupdate@ccf.org.
The precursor of adaptive optics, wavefront aberrometry, has had a great impact on the diagnostics and therapeutics of refractive surgery over the past 10 years. The incredible success of wavefront customized laser vision correction and diagnostic aberrometry has begun to see a research expansion into the area of adaptive optics. The Cleveland Clinic Cole Eye Institute has become one of the first institutes in the United States to become involved in performing clinical research using adaptive optics in the quest for finding better treatment options for presbyopia.

With this new technology, it is possible to selectively induce higher-order aberrations for the expansion in depth of focus with spectacle-free vision.

“Patients who are presbyopic and need to use reading glasses want to avoid using them in the future,” says Ronald R. Krueger, MD, MSE, Medical Director of the Department of Refractive Surgery at the Cole Eye Institute. “We can help them achieve that goal by simulating the maximum amount of spherical aberration they can tolerate while still maintaining 20/20 distance vision, with the hope of offering them a customized presbyopic treatment in the future. Adaptive optics technology helps us determine the ideal aberration level by simulating the potential change patients can expect in their visual performance prior to undergoing a surgical procedure.”

The Crx1 adaptive optics visual simulator (AOVS) (Imagine Eyes, Orsay, France) was used to perform vision studies by both inducing and correcting selective aberrations. Dr. Krueger states that the vision simulator may become an essential tool for all refractive clinics in the future, as it allows surgeons to show their patients any customized visual improvement or compromise before actually undergoing a surgical procedure.

AOVS has both a Shack-Hartmann wavefront sensor and electromagnetic deformable mirror, which together measure and modify the aberrations in individual subjects. The aberrations are expressed as Zernike polynomials, and divided into low-order and higher-order aberrations. The low-order aberrations (myopia, hyperopia and astigmatism) can be corrected with spectacles, while the higher-order aberrations (spherical aberration, coma, trefoil and others) cannot, and therefore cannot be simulated by conventional means. The advantage of adaptive optics is to manipulate and test the clinical effect of higher-order aberrations.

In a recent review article published in the 2010 Proceedings of the SPIE, an optical engineering journal, Dr. Krueger used the Crx1 visual simulator to perform three adaptive optics-related studies. AOVS was used to simulate aberrations in nine normal eyes for visual acuity (VA) change, to expand depth of focus (DoF) in 10 cyclopleged eyes and to simulate the visual potential achieved in correcting 20 highly aberrated eyes.
The results were very promising. In the first study, the visual acuity was improved up to one line compared to the best spectacle correction by correcting higher-order aberrations. By inducing higher-order aberrations, there was an expected loss in visual acuity, and this loss was greater when the induced aberration magnitude was higher (i.e., 0.9µm).

In the second study, DoF was measured with a standard pupil size of 6 mm and a 20/50 letter size. DoF was most enhanced by up to 2.0 D with the introduction of negative and positive spherical aberrations of 0.6µm magnitude. Meanwhile, inducing aberration values greater than 0.6µm magnitude led to poorer visual outcomes with no improvement in DoF. No significant DoF changes were seen with the introduction of coma and trefoil.

In the last study, the correction of higher-order aberrations in highly aberrated eyes (keratoconus and symptomatic post-refractive surgery patients) improved their best corrected visual acuity (BCVA) by one to two lines. Although greater improvement might have been expected due to the high magnitude of these aberrations, the inability to neuroadapt to the brief visual simulation was likely responsible for its limited improvement, Dr. Krueger says. Nevertheless, the visual perception of the corrected patient improved greatly, so they could appreciate the improved image quality.

In conclusion, AOVS is expected to become a useful diagnostic tool in refractive surgery. It provides the possibility of simulating higher-order aberrations by adding or correcting according to the specific results the patient desires. It can be used in different clinical settings by improving visual performance in normal eyes and highly aberrated eyes, and by enhancing DoF in the correction of presbyopia. AOVS allows simulation of a patient’s potential future visual performance and potential compromise prior to any surgical procedure, Dr. Krueger says.

“Adaptive optics technology helps us determine the ideal aberration level by simulating the potential change patients can expect in their visual performance prior to undergoing a surgical procedure.”

– Ronald R. Krueger, MD, MSE

**REFERENCES**


INTERIM PHASE 3 STUDY RESULTS SUGGEST A NEW ERA OF TREATMENT FOR CRVO

Macular edema due to central retinal vein occlusion (CRVO) continues to be an important cause of vision loss due to a lack of safe and effective treatments. Laser photocoagulation reduces macular edema, but fails to improve vision. Recently, the results of the Standard Care versus Corticosteroid for Retinal Vein Occlusion study showed intravitreal triamcinolone acetonide injection significantly improved visual acuity compared with observation. However, intravitreal triamcinolone is accompanied by a significant risk for steroid-related complications, including the development of cataracts, elevated IOP and glaucoma.

The association between CRVO and high intravitreal levels of VEGF provides a rationale for investigating anti-VEGF therapy for rehabilitating vision in eyes with macular edema secondary to CRVO, and a number of investigators using ranibizumab (Lucentis, Genentech) and bevacizumab (Avastin, Genentech) as off-label treatment have reported promising efficacy. However, establishing a viable role for widespread use of this intervention in clinical practice depends on outcomes from more rigorous evaluation in the setting of large prospective, randomized controlled trials.

Launched in 2007, the CRUISE study is a Phase 3, prospective, randomized, double-masked randomized trial comparing ranibizumab 0.3 mg, ranibizumab 0.5 mg, and sham injections in patients with foveal center-involved macular edema secondary to CRVO. The Cole Eye Institute is one of 95 investigational sites across the United States participating in CRUISE and was one of the leading centers for patient enrollment. Vitreoretinal specialist Rishi P. Singh, MD, is the principal investigator for CRUISE at the Cole Eye Institute and presented the top-line results from a six-month interim analysis at the retinal subspecialty day meeting preceding the annual meeting of the American Academy of Ophthalmology in November 2009.

As reported by Dr. Singh, the data showed monthly intravitreal injections of ranibizumab effectively reduced foveal thickness and provided patients with rapid, significant and stable improvement in visual acuity. Compared with the sham-treated controls, patients treated with either dose of ranibizumab achieved significantly greater gains in visual acuity as early as seven days after the first injection. Visual acuity continued to improve with further ranibizumab injections and the significant benefit for the ranibizumab groups versus sham injection was maintained at six months. During this interval, there were no recorded serious ocular or systemic adverse events in either of the ranibizumab groups.

“Ranibizumab has promise to be a huge breakthrough in the management of CRVO and for initiating a new era in the treatment of this vision-threatening disease state. However, CRUISE is a two-year trial, and it will be important to see if the positive efficacy and safety profiles observed so far are maintained with ongoing follow-up,” says Dr. Singh, who presented the results.
“Ranibizumab has promise to be a huge breakthrough in the management of CRVO and for initiating a new era in the treatment of this vision-threatening disease state.”

– Rishi P. Singh, MD

from 12 months of follow-up at the Retinal Subspecialty Day Meeting at the 2010 AAO conference in Chicago in October.

Patients were eligible for participation in CRUISE if they had been diagnosed within the previous 12 months and they had BCVA between 20/40 and 20/320 and a central subfield thickness >250 microns. Prior treatment with intravitreal corticosteroid or anti-VEGF injections was allowed if it had not occurred within the previous three months.

During the first six months of the study, patients received their assigned treatment monthly. Thereafter, patients randomized to sham treatment were switched over to receive ranibizumab 0.5 mg. However, beginning at six months, all ranibizumab injections were administered on a “prn” basis only if central subfield thickness exceeded 250 microns or if the BCVA was worse than 20/40.

At baseline, the three study groups were similar in their demographic and disease characteristics. Mean ETDRS BCVA for the entire population was 49 letters and mean central foveal thickness was 680 microns.

Change from baseline in ETDRS BCVA was analyzed as the primary endpoint. At six months, mean improvements were 14.9 letters in the ranibizumab 0.5 mg group, 12.7 letters for patients treated with ranibizumab 0.3 mg, and 0.8 letters for the control group. Statistically significant differences favoring ranibizumab over sham treatment were also achieved in secondary efficacy endpoints analyzing proportions of patients gaining 15 letters of BCVA (almost 50 percent of patients in both ranibizumab dose groups compared with 17 percent of the controls in the sham group) and proportions of patients losing 15 or more letters of BCVA (ranibizumab 0.3 mg, 3.8 percent; ranibizumab 0.5 mg, 1.5 percent; sham, 15.4 percent).

The CRUISE protocol also includes a number of planned subgroup analyses that are designed to better understand responses to ranibizumab. These will investigate potential factors predicting a positive response, including the effects of early versus later initiation of treatment and of prior therapy. Rates of iris neovascularization and neovascular glaucoma also are being studied, and the eyes are being observed for the appearance of collateral retinal vessels that are thought to be beneficial in recovery after CRVO.

Safety monitoring includes recording of arterial thromboembolic events using the Antiplatelet Trialists Collaboration Definition.

“So far, the safety profile of ranibizumab is consistent with that noted in the Phase 3 studies leading to its approval for use in choroidal neovascularization secondary to age-related macular degeneration,” says Dr. Singh.

Contact Dr. Rishi Singh at ophthalmologyupdate@ccf.org.

“Ranibizumab has promise to be a huge breakthrough in the management of CRVO and for initiating a new era in the treatment of this vision-threatening disease state.”

– Rishi P. Singh, MD
One of the primary difficulties in closing eyelid defects following skin cancer surgery is to return the eyelid to a fully functional role. There also is the issue of cosmetics. As the size of the defect increases, functionality and cosmetics both become more challenging.

But a new technique pioneered at Cleveland Clinic Cole Eye Institute allows for closure of full-thickness eyelid defects too large for primary closure, avoiding the more invasive external lateral canthotomy/cantholysis. The procedure, transconjunctival lateral cantholysis, was developed by Julian D. Perry, MD, Oculoplastics and Orbital Surgery, Cole Eye Institute, and Craig D. Lewis, MD, an American Society of Ophthalmic Plastic and Reconstructive Surgery fellow.

Dr. Perry, who describes transconjunctival lateral cantholysis as “elegant, efficient and very rapid,” was the first surgeon to perform the procedure in 2007.

Traditionally, eyelid defects were typically closed using a stepladder approach, Dr. Perry explains. Smaller defects could be closed primarily, but when the defect was too large, surgeons would perform a lateral canthotomy/cantholysis. Surgeons make an incision in the outer corner of the eyelid through the tissue, and then dissect the ligaments from the bone in order to mobilize the eyelid. For bigger defects, surgeons make the incision even further toward the cheek and hairline in order to mobilize the tissue.

The result was more downtime, invasive surgery, scarring and complications from sutures. There was more discomfort, and the deep sutures used to re-suspend the eyelid to the periosteum would sometimes result in granuloma formation.

“With larger defects, we either can’t pull the two ends together or, when we do pull them together, there is too much tension,” Dr. Perry says. “This causes a gradual widening, and it creates a notch in the eyelid.”

Transconjunctival lateral cantholysis represents a more patient-friendly approach to improve mobility, allowing for straightforward eyelid advancement and preserving eyelid function and aesthetics. Dr. Perry says the technique works best in patients with preexisting eyelid laxity and with central eyelid defects that do not involve the lateral or medial canthus.

Transconjunctival lateral cantholysis eliminates facial scars and the risk of infection because of stitches. “We don’t use stitches to close the area that we create from inside the eyelid,” Dr. Perry says. Without the extra dissections, incisions and sutures, patients heal much faster, especially in the lateral canthus of the eyelid. “The canthus is where the deep stitches were placed, and those sutures often caused discomfort that lasted weeks and occasionally produced infection,” he points out.

Relative contraindications to transconjunctival lateral cantholysis include active cicatricial disease and preexisting forniceal shortening.
Patient pool expands

As he gains experience with the technique, Dr. Perry has been able to offer transconjunctival lateral cantholysis to a larger pool of patients. Initially, he performed the procedure on defects that were too large for primary closure but not for very large defects. However, he has expanded the indications to defects that involve half or more of the eyelid, thereby avoiding more drastic surgeries.

The postoperative regimen for transconjunctival lateral cantholysis includes ice compresses for two days and a topical antibiotic ointment. Patients are evaluated about one week postoperatively and then again at six weeks, three months and six months.

If the technique were to fail, Dr. Perry says surgeons can use standard procedures to close the defect. Thus far the procedure has a 100 percent success rate, he stresses. However, complications such as lid notching and canthal dystopia occur with greater frequency with larger defects.

He says the patient pool is probably at maximum because there are limitations to the size of the defect that can be closed. But he adds, “I’ve closed defects that have been nearly total eyelid using this technique.”

Dr. Perry has lectured on transconjunctival lateral cantholysis and says he believes the technique is catching on rapidly.

Contact Dr. Julian Perry at opthalmologyupdate@ccf.org.
OPTICAL COHERENCE ELASTOGRAPHY OF THE CORNEA

Cole Eye Institute staff ophthalmologist William J. Dupps, Jr., MD, PhD, is developing noninvasive technology for evaluating the biomechanical properties of the cornea.

Along with collaborating biomedical engineers Andrew Rollins, PhD, and PhD student Matthew Ford at Case Western Reserve University, he has developed a prototype system that uses high-speed optical coherence tomography (OCT) to map tissue displacements throughout the layers of the cornea during a simple eye pressure measurement.

The magnitude and direction of the movements are dependent upon local material properties of the cornea, such as stiffness. Software analysis provides a map of these properties that may help distinguish normal corneas from those with diseases such as keratoconus (Figure 1) that affect the mechanical integrity of the cornea early in the disease and account for many of the corneal transplants performed around the world.

In addition to assisting in the early detection of diseases like keratoconus, this new method for quantifying corneal biomechanical behavior has the potential for integration into whole-eye computer simulations of individual patients being considered for corrective corneal surgeries (Figure 2).

Using sophisticated data on the shape, mechanical behavior and loading pressure of the eye, procedures can be tested on a computational representation of the eye and refined to improve clinical outcomes.

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Figure 1. Axial stretch ratio under a change in pressure of 10 mmHg in a human corneal explant with keratoconus. “A” indicates the cone location based on clinical corneal topography. In this OCT elastogram, the mechanically weak cone demonstrates the highest concentration of strain (stretch) and the lowest resistance to deformation.

Figure 2. Computer model of the whole globe with patient-specific corneal geometry.
Among infants with congenital cataracts, surgical lens replacement appears to cause more complications and achieve the same treatment benefits as contact lenses, a study published in the July 2010 Archives of Ophthalmology suggests. The study was conducted in part at Cleveland Clinic Cole Eye Institute.

Elias I. Traboulsi, MD, Head of the Department of Pediatric Ophthalmology and Strabismus, and Director of the Center for Genetic Eye Diseases, was a co-investigator for the multicenter trial that re-examined the use of contact lenses – the standard treatment for aphakia since the 1970s.

"Their use during infancy, however, can be challenging owing to problems with insertion and removal of lenses by parents, lens loss, difficulties with fitting the steep corneas of infants and compliance problems," the authors write. "These factors among others probably contribute to the poor visual outcome of many children with unilateral aphakia."

In recent years, the technology to surgically implant an intraocular lens (IOL) has improved considerably, the authors note. Their study compared visual outcomes and adverse events among 114 infants (median or midpoint age at surgery, 1.8 months) randomly assigned to receive either an intraocular lens or contact lens after cataract surgery.

The rate of complications during surgery was 16 of 57 (28 percent) in the intraocular lens group and six of 57 (11 percent) in the contact lens group. At 1 year of age, visual acuity results did not differ between the two groups.

However, more adverse events had occurred among children with intraocular lenses (44 or 77 percent vs. 14 or 25 percent), and these children also were five times more likely to undergo additional intraocular operations (36 or 63 percent compared with 7 or 12 percent).

"Thus, there appears to be no short-term visual benefit and some increased risk to implanting IOLs in infants," the authors write. "However, since there remains a possibility that IOLs may be found to be beneficial after a longer follow-up, we feel it would be premature to recommend that IOLs not be implanted in infants."

Instead, they advise practitioners who are considering IOL implantation for infants to proceed with caution. Longer follow-up of study participants may shed further light on the eventual role of IOL implantation in infancy, they suggest.

The Infant Aphakia Treatment Study was supported by grants from the National Institutes of Health, and in part by a National Institutes of Health Developmental Core Grant and by Research to Prevent Blindness.

Contact Dr. Elias Traboulsi at ophthalmologyupdate@ccf.org.
Vision First, a program that screens vision in 4- to 6-year-olds in the Cleveland Metropolitan School District, along with prompt collaboration among staff ophthalmologists recently saved the life of a young boy with a rare presentation of retinoblastoma. Vision First is a combined venture by Cleveland Clinic Cole Eye Institute and the Cleveland Browns NFL football team.

The 4-1/2-year-old boy was examined in June by staff optometrist Heather Cimino and technician Rhonda Wilson, who visit elementary schools in Cleveland for routine vision screenings. He reported no visual complaints. However, upon examination, the vision in his left eye was found reduced to the perception of hand movements.

He was referred to Cole Eye Institute pediatric ophthalmologist Paul Rychwalski, MD, that same day. Suspecting a retinal detachment and vitreous hemorrhage (Figure 1), Dr. Rychwalski referred the patient to Jonathan Sears, MD, a staff ophthalmologist with special expertise in pediatric retinal diseases.

Upon further examination, Dr. Sears began to suspect the existence of a tumor, and collaborated with Arun D. Singh, MD, Director of the Department of Ophthalmic Oncology at the Cole Eye Institute. Subsequent ultrasound (Figure 2) and magnetic resonance imaging (Figure 3) confirmed that he had a diffuse infiltrating retinoblastoma, a very rare presentation of a life-threatening cancer.

Making an accurate diagnosis was particularly important in this case because treating the eye for a retinal detachment via vitrectomy would have dispersed the cancerous cells, opening the door for metastasis to the optic nerve, orbit or elsewhere.

“Upon initial examination, it could easily have been mistaken for a retinal detachment with vitreous hemorrhage, as the tumor had no mass and no calcification,” says Dr. Singh. “It presented more as a case of retinal thickening.”

Making an accurate diagnosis was particularly important in this case because treating the eye for a retinal detachment via vitrectomy would have dispersed the cancerous cells, opening the door for metastasis to the optic nerve, orbit or elsewhere.

Although the news was very difficult for the boy’s family to accept, given that the child had previously reported no problems with his vision, Dr. Singh fully discussed the potentially serious risks of untreated retinoblastoma, and they consented to urgent enucleation.

“It was the only option, and it resulted in him being completely cured,” says Dr. Singh. “It is the only treatment he will ever need. The retinoblastoma had irreversibly destroyed the child’s visual potential many months before, and therefore enucleation was indicated to provide a greater than 95
percent chance of survival. We were especially grateful that the pathology specimen revealed no additional risk factors for metastasis (Figure 4).

“Such an excellent outcome for this child would not have been possible without the alertness and multispecialty collaboration of the entire staff, which allowed this family to see three specialists in one day,” he says. “There were no missteps along the way.”

Dr. Singh reports that the boy’s postoperative progress has been excellent, and he is being fitted with a prosthetic eye.

“He was smiling last time I saw him,” he says. “He didn’t know there was anything wrong with his vision before and he doesn’t notice anything wrong with his vision now. This is truly a great outcome.”

Contact Dr. Arun Singh at ophthalmologyupdate@ccf.org.
INNOVATIONS
Defining What Makes Us Different
Institute Overview

At Cleveland Clinic Cole Eye Institute, we have assembled a team of the world’s foremost clinicians and researchers who are committed not only to delivering the finest healthcare available, but also to improving tomorrow’s care through innovative basic, clinical and translational research.

We believe that research and patient care are interdependent. Therefore, we forge synergistic relationships through analytical and integrative processes, such as surgical outcomes analysis. We are pioneering treatment protocols for complex vision-threatening disorders through our clinical trials and aggressive research programs to shorten the gap between the laboratory discoveries of today and the patient care of tomorrow. Our goal: Answering tomorrow’s medical problems through today’s laboratory and research endeavors.
Clinical Expertise

As one of the country’s leading comprehensive eye institutes, we are able to enhance the lives of our patients and to serve our referring physicians by providing early, accurate diagnosis and excellent, efficient state-of-the-art care. Our ophthalmology program was ranked among the top 10 programs in the nation in the most recent annual U.S. News & World Report survey.

We have some of the largest patient volumes in the United States, with more than 140,000 patient visits and more than 5,000 surgeries per year. We offer primary, secondary and tertiary ophthalmologic services for all ages. Our internationally recognized staff of 37 ophthalmologists and researchers is composed almost entirely of subspecialists, and seven optometrists round out our comprehensive services.

Patient-Centered Facilities

Cleveland Clinic Cole Eye Institute offers state-of-the-art care at our main campus and in the community. The goal is to deliver maximum patient comfort, service and quality. Our main campus building demonstrates this dedication to putting patients first by offering one-stop care. Exam lanes, a diagnostic services suite and operating rooms are all housed in one building, with features such as:

- Windows with special filters to minimize light on dilated or newly treated eyes.
- A comfortable waiting room with a special play area for children.
- Valet parking and an easy postoperative pickup area.
- Conveniently located food services.

For patients’ convenience, our regional eye care program brings care into the community. Cole Eye Institute specialists offer services at seven locations and surgery at three locations.
Fostering Innovation

Our institute is specially designed to enable clinicians to develop tomorrow’s advances. Our facility includes an Experimental Surgery Suite, one of the few in the country with full operating capacity. Training future eye specialists is greatly enhanced in the Education Pavilion, with the James P. Storer Conference Center (designed with tele-video technology), as well as video rooms, resident carrels and ample conference space.

2009 Key Statistics

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<th>Total Clinic Visits</th>
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<td>Total Surgeries</td>
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<td>Total Surgical Procedures (surgeries in OR and all outpatient procedures)</td>
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<td>Total Intraocular Drug Therapies</td>
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Unique Programs at Cole Eye Institute

The Center for Genetic Eye Diseases: The Center for Genetic Eye Diseases provides multidisciplinary clinical diagnostic and therapeutic services for patients with inherited eye conditions such as corneal and retinal dystrophies and microphthalmia. Patients with inherited disorders that involve the eye, such as neurofibromatosis, albinism, neurodegenerative disorders and Marfan syndrome, are referred to the center by physicians from around the country. A regular specialty clinic is dedicated to patients with retinal dystrophies and their families.

National Eye Donor Program: The Foundation Fighting Blindness Center, a central collection agency for eyes donated by individuals across the United States for blindness research, shares tissue samples with researchers worldwide. Formally known as the Retinal Degeneration Pathophysiology Facility, the collection center accepts eye donations after death from any person of any age who had normal vision or any degree of vision loss resulting from a retinal degenerative disease. Cole Eye Institute staff members prepare a detailed medical report about each donated eye to help researchers track the effects of eye disease in different types of people and environments.

For more information or to refer a patient, please call 216.444.2020 or 800.223.2273, ext. 42020, or visit clevelandclinic.org/OUspecial.
How We Measure Up

Our key evaluatory measures continue to be visual acuity and the rate of surgical complications, and we continue to use ETDRS protocol refraction as the means of measuring visual acuity. The key measurement variables are mentioned under each section in the book. In addition to clinical outcomes, world-class customer service is very important to us. Consequently, we have spent significant time understanding patient flow process and experience. We continue to seek best practice measurement processes for both clinical and administrative areas. We strive to set the standard for excellence by innovating, and by consistent follow-up and measurement to evaluate our overall clinical proficiency.

The Outcomes book has data from across the full spectrum of ophthalmic surgery, including:

- Cataract surgery
- Cornea surgery
- Glaucoma surgery
- Oculoplastic surgery
- Oncologic eye procedures
- Refractive surgery
- Vitreoretinal surgery
- Strabismus surgery

Almost all of the surgical procedures performed at the Cole Eye Institute have been tracked and reported. As a regional, national and international referral center, many of our patients are followed by their local ophthalmologists, and the data do not include patients who are not followed at the Cole Eye Institute.

The scope of the Cole Eye Institute outcomes project is significant, our approach is innovative and, in spite of the complexity of cases and lack of a clear benchmark, our outcomes are excellent. Our physicians strive to push the boundaries of science and technology to provide excellence for our patients. We hope that by reviewing and analyzing information, we will continue to improve and offer patients better outcomes.

Cleveland Clinic has created a series of Outcomes books for all its institutes. These contain a summary of our surgical and medical trends and approaches; data on patient volume and outcomes; and a review of new technologies and innovations. To view all of our Outcomes books or to download a copy of Cole Eye Institute’s 2009 Clinical Outcomes book, visit Cleveland Clinic’s Quality Web site at clevelandclinic.org/quality/outcomes.
PROFESSIONAL STAFF
Identifying Who We Are
COLE EYE INSTITUTE WELCOMES RETINA SPECIALIST

Justis P. Ehlers, MD, vitreoretinal surgeon, joined Cole Eye Institute in September 2010. He specializes in the diagnosis and management of medical and surgical vitreoretinal diseases, including age-related macular degeneration, retinal vascular occlusive disease, diabetic retinopathy, retinal detachment and ocular trauma. Dr. Ehlers has a particular interest in advanced vitreoretinal imaging, including intraoperative optical coherence tomography, and in contrast agents for OCT.

He graduated from Washington University School of Medicine in St. Louis, and completed his residency at the Wills Eye Institute in Philadelphia and his vitreoretinal surgery fellowship at Duke University in Durham, N.C.

Dr. Ehlers has authored numerous peer-reviewed articles, book chapters and abstracts, and was a co-chief editor of The Wills Eye Manual, 5th Edition. He can be reached at 216.636.0183 or ehlersj@ccf.org.

COLE EYE INSTITUTE WELCOMES RETINA AND UVEITIS SPECIALIST

Sunil Srivastava, MD, a vitreoretinal surgeon, joined Cole Eye Institute in October 2010. He specializes in the diagnosis and management of ocular inflammatory diseases such as uveitis, retinal vasculitis and retinal infectious diseases. He also specializes in medical and surgical vitreoretinal diseases, including age-related macular degeneration, retinal vascular diseases, diabetic retinopathy and retinal detachment.

Dr. Srivastava’s research interests include the genetics of uveitis, retinal infectious diseases (with a particular focus on acute retinal necrosis) and intraoperative optical coherence tomography. He has been principal investigator for multiple clinical trials on uveitis and retinal diseases, sponsored both by the NIH and by industry.

A graduate of the State University of New York at Buffalo School of Medicine, Dr. Srivastava completed his ophthalmology residency at Emory University Hospitals and School of Medicine in Atlanta. He completed a Uveitis, Ocular Immunology and Medical Retina Fellowship at the National Eye Institute, followed by a vitreoretinal surgery fellowship at Duke University Medical Center in Durham, N.C.

Dr. Srivastava can be reached at 216.636.2286 or at srivass2@ccf.org.

CLEVELAND-AREA OPHTHALMOLOGISTS JOIN COLE EYE INSTITUTE

Drs. Martin Markowitz (left), Scott Wagenberg (center) and Sheldon Oberfeld (right) have long been in private practice together. They will continue to see patients together in the Hillcrest Hospital Atrium Medical Building, now known as Cole Eye Institute, Hillcrest. This arrangement provides their patients with streamlined access to Cleveland Clinic specialists and subspecialists in ophthalmology and other disciplines.
LEADERSHIP ROLES

Roles in Publishing

American Association of Pediatric Ophthalmology & Strabismus

Reviewer
Gregory S. Kosmorsky, DO

American Journal of Ophthalmology

Executive Editor (Oculoplastics)
Julian D. Perry, MD

Executive Editor (Genetics)
Elias I. Traboulsi, MD

Editorial Board Member
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Steven E. Wilson, MD

Archives in Ophthalmology

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Careen Y. Lowder, MD, PhD
Paul Rychwalski, MD
Andrew P. Schachat, MD
Jonathan E. Sears, MD

Clinical Ophthalmology

Reviewers
Gregory S. Kosmorsky, DO
Edward J. Rockwood, MD

Contemporary Ophthalmology

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Cornea

Editorial Board
Steven E. Wilson, MD

Reviewer/Referee
Ronald R. Krueger, MD

Referee
Steven E. Wilson, MD

Current Eye Research

Reviewer/Referee
Ronald R. Krueger, MD

Developmental Neuropsychology

Reviewer
Paul Rychwalski, MD

British Journal of Ophthalmology

Editor-in-Chief (U.S.)
Arun D. Singh, MD

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Rishi P. Singh, MD

Canadian Journal of Ophthalmology

International Advisory Board
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Clinical Ophthalmic Oncology

Section Editor
Julian D. Perry, MD

Clinical Ophthalmology

Reviewers/Referees
Gregory S. Kosmorsky, DO

Archives in Ophthalmology

Reviewers/Referees
Gregory S. Kosmorsky, DO

Cornea

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Steven E. Wilson, MD

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Ronald R. Krueger, MD

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Paul Rychwalski, MD

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Canadian Journal of Ophthalmology

International Advisory Board
Elias I. Traboulsi, MD

Clinical Ophthalmic Oncology

Section Editor
Julian D. Perry, MD
American Society of Ophthalmic Plastic and Reconstructive Surgery
Awards Committee
Julian D. Perry, MD

Fellowship
Julian D. Perry, MD

The Association for Research in Vision and Ophthalmology (ARVO)
Chair, CME Committee
Arun D. Singh, MD

American Society of Retina Specialists
Board Member
Andrew P. Schachat, MD

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School of Medicine
Chairman, Annual Fund of the CWRU School of Medicine
Allen S. Roth, MD

Medical Alumni Association Board
Allen S. Roth, MD

Cleveland Eye Bank
Board of Directors
Allen S. Roth, MD

Assistant Medical Director
Allen S. Roth, MD

Chairman, Medical Advisory Committee
Allen S. Roth, MD

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Advisory Board
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Scientific Advisory Board
Bela Anand-Apte, PhD

Cell Biology Committee
Joe G. Hollyfield, PhD

GANSU, Inc.
(Gaining a New Sight for Unsighted in China)
President, Board of Directors
Ronald R. Krueger, MD

Helen Keller Eye Research Foundation
Scientific Advisory Board
Joe G. Hollyfield, PhD

Director, External Research
Joe G. Hollyfield, PhD

International Society for Genetic Eye Disease and Retinoblastoma
Executive Vice President
Elias I. Traboulsi, MD

International Society of Refractive Surgery of the American Academy of Ophthalmology (AAO)
Chair, Program Committee
Ronald R. Krueger, MD

Executive Committee
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Counselor, North America
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Pan-American Association of Ophthalmology
Member, Board of Directors
Careen Y. Lowder, MD, PhD

Pan-American Ocular Inflammatory Disease Society
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Careen Y. Lowder, MD, PhD

Society of Heed Fellows Foundation
Executive Secretary
Froncie A. Gutman, MD

South African Retinitis Pigmentosa Foundation
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Joe G. Hollyfield, PhD

Quebec Consortium for Drug Discovery (Canada)
Scientific Advisory Board
Bela Anand-Apte, PhD

University of Oklahoma Medical Sciences Center
CORRE External Advisory Committee, Department of Ophthalmology
Joe G. Hollyfield, PhD

Roles at Conferences
American Academy of Ophthalmology
Senior Instructor, “How to Evaluate a Patient with Uveitis.” “Infectious Uveitis: Diagnosis and Treatment,” Joint Meeting: XXVIII Pan-American Congress of Ophthalmology & 113th Meeting AAO
Careen Y. Lowder, MD, PhD

American Society of Retina Specialists
Co-Chair, Refractive Surgery Subspecialty Meeting, AAO Annual Meeting, 2009 & 2010
Ronald R. Krueger, MD

Co-Chair, Retina Subspecialty Symposium
Daniel F. Martin, MD

Cosmetic Surgery and Personal Appearance (COS) Foundation
Co-Chair, COS April Meeting
Julian D. Perry, MD

Pan-American Academy of Ophthalmology
Refractive Surgery Convenor, Beijing, China, 2010 & Sydney, Australia, 2011
Careen Y. Lowder, MD, PhD

Cleveland Ophthalmological Society
Co-Chair, COS April Meeting
Julian D. Perry, MD

Course Director and Moderator, Ocular Infections
Careen Y. Lowder, MD, PhD

Course Director and Moderator, Anterior Segment Surgery
Careen Y. Lowder, MD, PhD

Hawaiian Eye 2010, 2011
Program Planning Committee
Andrew P. Schachat, MD

11th International Congress on Wavefront & Presbyopic Refractive Corrections
Co-Founder and Organizer
Ronald R. Krueger, MD

Innovations in Ophthalmology, 2009
Course Director
Andrew P. Schachat, MD

International Society for Eye Research (ISER)
Cornea Section Organizer 2010
Steven E. Wilson, MD

International Symposium on Retinal Degeneration
Co-Organizer
Joe G. Hollyfield, PhD
Awards and Recognition

41st Jules Stein Lecturer, JSEI Clinical & Research Seminar, UCLA Department of Ophthalmology
Joe G. Hollyfield, PhD

American Academy of Ophthalmology Life Achievement Honor, 2009
Andrew P. Schachat, MD

American Academy of Ophthalmology’s Secretariat Awards, October 2009
Daniel F. Martin, MD
Edward J. Rockwood, MD

American Association for Pediatric Ophthalmology and Strabismus, Honors Award
Paul Rychwalski, MD

America’s Top Pediatricians
Andreas Marcotty, MD

Annual W. Bruce Jackson Lecture Award, Canadian Cornea Society, Canadian Ophthalmological Society, 2009
Steven E. Wilson, MD

Asociación Oftalmológica de Costa Rica, Honorary Membership, 2009
Elias I. Traboulsi, MD

Barraquer Award, International Society for Cataract and Refractive Surgery, 2010
Steven E. Wilson, MD

Best Doctors 2009-2010
Daniel F. Martin, MD
William J. Dupps, Jr., MD, PhD
Peter K. Kasier, MD
Gregory S. Kosmorsky, DO
Ronald R. Krueger, MD, MSE
Careen Y. Lowder, MD, PhD
Andreas Marcotty, MD
David M. Meisler, MD
Julian D. Perry, MD
Edward J. Rockwood, MD
Paul Rychwalski, MD
Andrew P. Schachat, MD
Jonathan E. Sears, MD
Elias I. Traboulsi, MD
Steven E. Wilson, MD

Cleveland Best of the Best Award, University of Illinois-Chicago, Department of Ophthalmology, 2010
Joe G. Hollyfield, PhD

Great Ormond Street Hospital Gold Medal Visiting Professor, London, UK, 2009
Elias I. Traboulsi, MD

Inaugural Joseph Calhoun, MD, Memorial Lectureship, Wills Eye Hospital, 2009
Elias I. Traboulsi, MD

International Society of Refractive Surgery of the American Academy of Ophthalmology, President’s Award, 2010
Steven E. Wilson, MD

Kritzinger Memorial Lecture Award by the ISRS/AAO
Ronald R. Krueger, MD

Llura and Gordon Gund Endowed Chair in Ophthalmology Research, 2009
Joe G. Hollyfield, PhD

Premier Surgeons Magazine PS250 List
Ronald R. Krueger, MD

Proctor Medal, Association for Research in Vision and Ophthalmology, 2009
Joe G. Hollyfield, PhD

Richard G. Rich, MD, Memorial Lectureship, University of Maryland Hospital, 2010
Elias I. Traboulsi, MD

Theresa M. and Wayne M. Caygill, MD, Lectureship, University of California, San Francisco, 2009
Elias I. Traboulsi, MD
<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Phone</th>
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<tbody>
<tr>
<td>Chairman, Cole Eye Institute</td>
<td>Daniel F. Martin, MD</td>
<td>216.444.0430</td>
</tr>
<tr>
<td>Comprehensive Ophthalmology</td>
<td>Richard E. Gans, MD</td>
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</tr>
<tr>
<td></td>
<td>Philip N. Goldberg, MD</td>
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<td></td>
<td>Martin A. Markowitz, MD</td>
<td>440.461.4733</td>
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<td></td>
<td>Shari Martyn, MD</td>
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<td>Michael E. Milstein, MD</td>
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<td></td>
<td>Allen S. Roth, MD</td>
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<td></td>
<td>David B. Sholiton, MD</td>
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<td></td>
<td>Scott A. Wagenberg, MD</td>
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<tr>
<td>Cornea &amp; External Disease</td>
<td>William J. Dupps Jr., MD, PhD</td>
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<td></td>
<td>Roger H.S. Langston, MD</td>
<td>216.444.5898</td>
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<td></td>
<td>Martin A. Markowitz, MD</td>
<td>440.461.4733</td>
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<tr>
<td></td>
<td>David M. Meisler, MD</td>
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<td></td>
<td>Sheldon M. Oberfeld, MD</td>
<td>440.461.4733</td>
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<td>Scott A. Wagenberg, MD</td>
<td>440.461.4733</td>
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<td></td>
<td>Steven E. Wilson, MD</td>
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<tr>
<td>Glaucoma</td>
<td>Jonathan A. Eisengart, MD</td>
<td>216.445.9429</td>
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<tr>
<td></td>
<td>Edward J. Rockwood, MD</td>
<td>216.444.1995</td>
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</table>
Keratorefractive Surgery
William J. Dupps Jr., MD, PhD ............... 216.444.8396
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Ronald R. Krueger, MD, MSE ................. 216.444.8158
Michael E. Millstein, MD ...................... 216.831.0120
Allen S. Roth, MD ............................. 216.831.0120
Steven E. Wilson, MD ......................... 216.444.5887

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Gregory S. Kosmorsky, DO ...................... 216.444.2855
Lisa D. Lystad, MD ............................. 216.445.2530

Oculoplastics & Orbital Surgery
Julian D. Perry, MD ............................. 216.444.3635

Ophthalmic Anesthesia
Marc A. Feldman, MD .......................... 216.444.9088

Ophthalmic Oncology
Arun D. Singh, MD ............................. 216.445.9479

Ophthalmic Research
Bela Anand-Apte, MBBS, PhD ............... 216.445.9739
John W. Crabb, PhD ........................... 216.445.0425
Joe G. Hollyfield, PhD ......................... 216.445.3252
Neal S. Peachey, PhD ......................... 216.445.1942

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Andreas Marcotty, MD ......................... 440.878.2500
Paul Rychwalski, MD .......................... 216.444.4821
Elias I. Traboulsi, MD .......................... 216.444.4363

Retina
Justis P. Ehlers, MD ............................. 216.636.0183
Froncie A. Gutman, MD ....................... 216.444.5888
Peter K. Kaiser, MD ............................ 216.444.6702
Daniel F. Martin, MD ......................... 216.444.0430
Andrew P. Schachat, MD ..................... 216.444.7963
Jonathan E. Sears, MD ....................... 216.444.8157
Rishi P. Singh, MD ............................. 216.445.9497
Sunil Srivastava, MD ......................... 216.636.2286

Uveitis
Careen Y. Lowder, MD, PhD ................. 216.444.3642

Patient Referral Information
To refer a patient to the Cole Eye Institute, please call 216.444.2020 or 800.223.2273, ext. 42020.
EDUCATION
Helping Professionals Continue to Develop
Residency/Fellowship Programs

Cleveland Clinic Cole Eye Institute is committed to offering some of the best residency and fellowship programs in the United States. These programs are highly competitive and produce superbly trained clinical and academic ophthalmologists.

Residency Program

The Cole Eye Institute Residency Training Program’s mission is to prepare participants to become leaders in patient care, teaching and vision research. The program meets all the requirements of the American Board of Ophthalmology and the Accreditation Council for Graduate Medical Education (ACGME). Currently there are 13 residents in the three-year training program, with four residents who match into the program annually. Residents rotate among the Institute’s nine departments, Cleveland Clinic Lakeland, Huron Road Hospital and a resident-run clinic at MetroHealth Medical Center. They work under the direct supervision of the staff during each rotation in the following areas:

- Cornea, external disease, anterior segment
- Glaucoma
- Neuro-ophthalmology/oncology
- Ophthalmic pathology
- Ophthalmic plastic, reconstructive and orbital surgery
- Pediatric ophthalmology and adult strabismus
- Refractive surgery
- Retina, vitreous, low vision
- Uveitis, ocular inflammatory disease & immunology

This curriculum provides a balanced exposure to all subspecialty areas of ophthalmology, ensuring graduates the ability to perform general ophthalmology with skill, knowledge and confidence. Each resident works in a one-on-one relationship with a staff physician to provide the best opportunity to study disease processes and their medical and surgical management. This arrangement also provides excellent supervision and optimal continuity of patient care in the outpatient and hospital settings.

Residents are expected to participate in clinical and basic research activities utilizing the staff’s expertise. They complete independent clinical research projects which involve reviewing the literature, developing a hypothesis and designing and executing the study. Activities are carefully supervised by an experienced clinical investigator. Residents are expected to submit and present their research at national meetings and to write several papers for publication based on their research activities. Each June, ophthalmology residents, fellows and staff participate in the Annual Research, Residents and Alumni Meeting, a scientific forum for the presentation of research projects.

Residency Graduates, 6/10
Jeffrey Goshe, MD; Christopher Hood, MD; Mary Beth Turell, MD

Residents, 1st Year, 7/10
Elizabeth Aponte, MD; John Au, MD; Igor Estrovich, MD; Sumit Sharma, MD

Residents, 2nd Year, 7/10
Baseer Ahmad, MD; Eric Ahn, MD; Theodore Pasquali, MD; Xiang Werdich, MD, PhD

Residents, 3rd Year, 7/10
James Kim, MD, PhD; Breno Lima, MD; Benjamin Nicholson, MD; Reecha Sachdeva, MD (Chief Resident); Ahmad Tarabishy, MD
Fellowship Program

Cleveland Clinic Cole Eye Institute also offers high-quality fellowship training opportunities in a variety of subspecialties. These fellowships train the next generation of academic leaders in their respective fields by combining an excellent academic environment with mentorship support in a state-of-the-art eye care facility. A new fellowship program was added in July 2010 for ophthalmic oncology.

Fellowships include:

• 2-year vitreoretinal fellowship (4 positions)
• 1-year cornea, external disease and refractive surgery fellowship (2 positions)
• 1-year glaucoma fellowship (1 position)
• 1-year pediatric ophthalmology fellowship (1 position)
• 2-year oculoplastics fellowship (1 position; sponsored by ASOPRS)
• 1-year ophthalmic oncology fellowship (1 position)

For more information about Cole Eye Institute fellowship programs, visit clevelandclinic.org/eyefellowship or contact Jane Sardelle at sardelj@ccf.org.

Fellow Graduates, 6/10

Cornea, External Disease and Refractive Surgery
Hooman Harooni, MD; Ravindra Shah, MD

Oculoplastics
Craig Lewis, MD

Vitreoretinal
Mark Barakat, MD

Fellows, 7/10

Cornea, External Disease and Refractive Surgery
Brian Armstrong, MD; Edgar Espana, MD

Glaucoma
Matthew Willett, MD

Oculoplastics
Milap Mehta, MD

Ophthalmic Oncology
Mary Beth Turell, MD

Pediatric Ophthalmology
Alison Schutt-Smith, MD

Vitreoretinal
Omar Ahmad, MD; Dilsher Dhoot, MD; Nathan Steinle, MD, Alex Yuan, MD, PhD

**JOE G. HOLLYFIELD DELIVERS STEIN LECTURE**

Joe G. Hollyfield, PhD, Cole Eye Institute Director of Ophthalmic Research, delivered the 41st Annual Jules Stein Eye Institute Lecture at the JSEI Clinical and Research Seminar on May 4, 2010.

He spoke about the molecular link between oxidative damage and inflammation in age-related macular degeneration. Dr. Hollyfield is only the second basic science researcher to give this lecture in its 41-year history. The other basic science researcher was Nobel laureate Gobind Khornha, who was awarded the Nobel Prize in 1968 for his work on the interpretation of the genetic code and its function in protein synthesis.
GRAND ROUNDS

Cole Eye Institute hosts Grand Rounds every Monday from 7 to 8 a.m. during the academic year (except during holidays and major meeting times). For the academic year 2010-2011, meetings will begin in mid-September and run through mid-June. The meetings are designed for residents, fellows and staff physicians of the Cole Eye Institute, as well as other comprehensive and subspecialty ophthalmologists. We are pleased to offer Category 1 continuing education credits for each meeting. Evaluations are offered online following each meeting, and attendance certificates can be printed or saved for record-keeping purposes.

The Grand Rounds forum consists of two clinical cases presented by Cole Eye Institute residents or fellows, followed by extensive discussion. Cases selected for presentation represent outstanding teaching examples and are either difficult-to-manage cases, unusual presentations of common disorders, rare conditions or cases that highlight state-of-the-art diagnosis or management. In addition, approximately three or four times per year, M&M cases are presented and discussed by third-year residents with follow-up discussion.

The meetings are held in the James P. Storer Conference Room on the first floor of the Cole Eye Institute. Registration is not required to attend. Park in the patient/visitor lot at E. 102nd Street (facing the front of the Cole Eye Institute), or the patients/visitors garage at E. 100th Street and Carnegie Avenue. Pre-paid parking tickets are available by request at all of the meetings.

For questions, email Jane Sardelle at sardelj@ccf.org.

PROGRAMS IN OPHTHALMIC EDUCATION 2011

Physicians are invited to attend the following ophthalmic continuing medical education courses at Cleveland Clinic’s Cole Eye Institute:

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Location</th>
<th>Activity Director</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uveitis Update</td>
<td>April 9, 2011</td>
<td>Cole Eye Institute</td>
<td>Careen Lowder, MD, PhD</td>
</tr>
<tr>
<td>North Coast Retina Symposium</td>
<td>May 12 - 13, 2011</td>
<td>Cole Eye Institute</td>
<td>Daniel F. Martin, MD</td>
</tr>
<tr>
<td>Annual Research, Residents &amp; Alumni Meeting</td>
<td>June 16 - 17, 2011</td>
<td>Cole Eye Institute</td>
<td>Andrew P. Schachat, MD</td>
</tr>
</tbody>
</table>

For more information, contact Jane Sardelle, program coordinator, at 216.444.2010 or 800.223.2273, ext. 42010, or at sardelj@ccf.org.
Cleveland Clinic Cole Eye Institute is proud to present the 2010 Distinguished Lecture Series, which provides a forum for renowned researchers in the visual sciences to present their latest research findings. This series of lectures will feature advances in many areas of ophthalmic research presented by noted basic and clinical scientists from throughout the world. Ample opportunity for questions and answers is provided.

Please join us for these insights into ophthalmic research and the promises they hold for patient care. No registration is required; call 216.444.5832 with any questions.

All programs will be held in the James P. Storer Conference Center of the Cole Eye Institute from 7 to 8 a.m. Attendees should park in the East 102nd Street parking lot (facing the front of the Cole Eye Institute) or the visitor’s parking garage at East 100th Street and Carnegie Avenue. We will validate your parking ticket.

UPCOMING DLS LECTURES

Jan. 20, 2011
Regulating Photoreceptor Regeneration from Muller Glia: An Adult Stem Cell Population in the Zebrafish Retina
David R. Hyde, PhD
Professor of Biology
Rev. Howard J. Kenna C.S.C. Memorial Director,
Center for Zebrafish Research, University of Notre Dame,
Notre Dame, Ind.

Feb. 17, 2011
Why do People with Diabetes Lose Vision?
Thomas Gardner, MD
Professor of Ophthalmology & Physiology
Kellogg Eye Center
University of Michigan, Ann Arbor

March 17, 2011
Functionalizing Cell-Based Therapy for Age-Related Macular Degeneration
Marco A. Zarbin, MD, PhD
Lions Eye Research Professor and Chair,
Institute of Ophthalmology and Visual Science
New Jersey Medical School, University of Medicine and Dentistry of New Jersey, Newark

April 21, 2011
Age-related Macular Degeneration: Any More Genes Left to Find?
Bernhard Weber, PhD
Professor, Institute of Human Genetics
University of Regensburg, Regensburg, Germany

May 19, 2011
The Biology of Latent Infection with Herpes Simplex Virus
Todd P. Margolis, MD, PhD
Director, Francis I. Proctor Foundation
Director, Ralph and Sophie Heintz Research Laboratory
Professor of Ophthalmology
University of California, San Francisco
RESEARCH
Pursuing Answers
CLINICAL TRIALS

The following studies are either currently enrolling new patients or are pending approval by the Institutional Review Board and should be enrolling shortly.

Age-Related Macular Degeneration

**A Phase II Multicenter, Prospective, Randomized, Comparator Controlled, Dose Ranging Study Evaluating PF-04523655 Versus Ranibizumab in the Treatment of Subjects with Choroidal Neovascularization (MONET Study)**

Objective: The aim of the study is to evaluate whether PF-04523655 is effective in the treatment of neovascular/wet AMD and at which dose.

Contact: Peter K. Kaiser, MD, 216.444.6702, or Lynn Bartko, RN, 216.445.2750

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A Phase II Dose Ranging Study of Pazopanib to Treat Neovascular Age-Related Macular Degeneration (GSK AMD)

Objective: The purpose of this study is to determine the safety and efficacy of different dosage regimens of pazopanib eye drops for the treatment of neovascular age-related macular degeneration.

Contact: Andrew P. Schachat, MD, 216.444.7963, or Laura Holody, 216.445.3762

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Cornea/Refractive Surgery

**Donor Preparation Pressure and Refractive Shift in Descemet Stripping Automated Endothelial Keratoplasty (DSAEK)**

Objective: The purpose of the study is to determine if the infusion pressure used during DSAEK (Descemet stripping automated endothelial keratoplasty) donor tissue preparation affects postoperative graft morphology, refractive outcome, and graft endothelial cell count in the recipient.

Contact: William J. Dupps, MD, PhD, 216.444.8396, or Ly Pung, RN, 216.445.6497

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Genetics

**Studies of the Molecular Genetics of Eye Diseases (BRTT)**

Objective: The objective of this project is to study the molecular genetics of ophthalmic disorders through the compilation of a collection of DNA, plasma and eye tissue samples from patients and from families with a broad range of eye diseases and malformations.

Contact: Elias Traboulsi, MD, 216.444.4363, or Patrice Nerone, RN, 216.445.9886
Retinal Vein Occlusion

Fluocinolone Acetonide Intravitreal Inserts for Vein Occlusion in Retina (FAVOR)

Objective: This study will assess the safety and efficacy of fluocinolone acetonide intravitreal inserts in subjects with macular edema secondary to RVO.

Contact: Peter K. Kaiser, MD, 216.444.6702, or Lynn Bartko, RN, 216.445.2750

Uveitis

An Open-Label, Multicenter, Phase II Trial of Adalimumab (Humira) in the Treatment of Refractory Non-infectious Uveitis (HUMIRA)

Objective: This study will assess the safety and efficacy of adalimumab, a humanized monoclonal antibody against TNF-α (Abbott), in the treatment of refractory, vision-threatening, non-infectious uveitis.

Contact: Careen Lowder, MD, PhD, 216.444.3642, or Laura Holody, 216.445.3762

Safety and Efficacy of AIN457 in Patients With Active Non-infectious Uveitis (INSURE)

Objective: This study will assess the safety and efficacy of AIN457 as adjunctive therapy for the treatment of intermediate uveitis, posterior uveitis, or panuveitis requiring systemic immunosuppression.

Contact: Careen Lowder, MD, PhD, 216.444.3642, or Lynn Bartko, RN, 216.445.2750
Other

**Safety Study of a Single IVT Injection of QPI-1007 in Chronic Optic Nerve Atrophy and Recent Onset NAION Patients (NAION)**

Objective: This is an open-label, dose-escalation, safety, tolerability and pharmacokinetic study, where active study drug (QPI-1007) will be given to all patients who participate. This study will determine whether QPI-1007 is safe when it is injected into the eye. The study will also reveal if there are any side effects of the drug and how long it takes for the body to clear the drug.

Contact: Rishi P. Singh, MD, 216.445.9497, or Laura Holody, 216.445.3762

The studies below have completed patient enrollment in the last year at Cole Eye Institute and are in follow-up:

- **A Clinical Safety and Efficacy Comparison of Nevanac® 0.1% to Vehicle Following Cataract Surgery in Diabetic Retinopathy Patients (NEVANAC)**

- **A Randomized, Double-masked, Sham-controlled Phase III Study of the Efficacy, Safety and Tolerability of Repeated Intravitreal Administration of VEGF Trap-Eye in Subjects With Macular Edema Secondary to Central Retinal Vein Occlusion (CRVO)**

- **A Randomized, Double-masked, Active-controlled Phase III Study of the Efficacy, Safety, and Tolerability of Repeated Doses of Intravitreal VEGF Trap in Subjects with Neovascular Age-Related Macular Degeneration (VEGF Trap)**

- **A Phase I Open-label, Dose Escalation Trial of REDD14NP Delivered by a Single Intravitreal Injection to Patients with Choroidal Neovascularization Secondary to Exudative Age-related Macular Degeneration (QUARK)**

- **A 24-month Randomized, Double-masked, Controlled, Multicenter, Phase IIIB Study Assessing Safety and Efficacy of Verteporfin (Visudyne®) Photodynamic Therapy Administered in Conjunction with Ranibizumab (Lucentis™) Versus Ranibizumab (Lucentis™) Monotherapy in Patients with Subfoveal Choroidal Neovascularization Secondary to Age-related Macular Degeneration (DENALI)**

- **A Phase III, Multicenter, Randomized, Sham-controlled Study of the Efficacy and Safety of Ranibizumab Compared with Sham in Subjects with Macular Edema Secondary to Central Retinal Vein Occlusion (CRVO)**

- **A Phase III, Double-masked, Multicenter, Randomized, Sham-controlled Study of the Efficacy and Safety of Ranibizumab Injection in Subjects with Clinically Significant Macular Edema with Center Involvement Secondary to Diabetes Mellitus (DME)**

- **An Eight-Week, Multicenter, Masked, Randomized Trial to Assess the Safety and Efficacy of 700 µg and 350 µg Dexamethasone Posterior Segment Drug Delivery System Applicator System Compared with Sham DEX PS DDS Applicator System in the Treatment of Non-Infectious Ocular Inflammation of the Posterior Segment in Patients with Intermediate Uveitis (POSURDEX UVEITIS)**

- **A Two-year, Multicenter, Randomized, Controlled, Masked, Dose-finding Trial to Assess the Safety and Efficacy of Multiple Intravitreal Injections of AGN 211745 in Patients with Subfoveal Choroidal Neovascularization Secondary to Age-related Macular Degeneration (SIRIUS)**

- **Infant Aphakia Treatment Study: A randomized, open-label efficacy study to determine whether infants with a unilateral congenital cataract are more likely to develop better vision following cataract extraction surgery if they undergo primary implantation of an intraocular lens or if they are treated primarily with a contact lens. (IATS)**


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Expert Opin Investig Drugs

Expert Rev Ophthalmol

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J Biol Chem


J Cataract Refract Surg


J Genet


J Neurosci


J Pediatr Ophthalmol Strabismus


J Refract Surg


Med Phys


Mol Cell Proteomics


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