Eyes are a window into the brain

At 20 weeks pregnant, a woman arrived at the UCI Medical Center emergency department experiencing sudden blindness in one eye and rapidly deteriorating vision in the other. Emergency specialists immediately brought in neurologists and ophthalmologists to help find the source of the problem and give her the best treatment.

“Time is vision,” explains Dr. Vivek Patel, chief of neuro-ophthalmology at the Gavin Herbert Eye Institute. “Every day that the cause of a vision problem like this goes untreated, there’s potential for permanent damage.”

Brain and vision

It is said that the eyes are the window to the soul, but they may more accurately be described as the window into the brain. Our eyes often provide clues about what’s going on deep inside our heads – from changes in blood flow to muscle control.

UCI Health neuro-ophthalmologists work closely with their UCI Health neurosurgery colleagues to treat patients with complex conditions that affect vision, such as multiple sclerosis, brain tumors, double vision, traumatic brain injuries and Parkinson’s disease-like disorders.

“The retina and optic nerve can give us a lot of information about what’s going on in the brain,” says UCI Health neurologist Dr. Claire Henchcliffe, professor and chair of the UCI School of Medicine’s Department of Neurology who specializes in Parkinson’s disease.

“As neurologists, we may have a suspicion of what the diagnosis is, but the eyes are what clinch it for us. We really need to confer with our eye experts.”

For example, one condition easily misdiagnosed as early Parkinson’s disease can be accurately identified by a neuro-ophthalmologist examining the eye for tiny
movements — the giveaway that it instead is progressive supranuclear palsy. Making that determination early on helps to get the patient started on the best treatment sooner.

Vivek Patel, MD

Patel is helping to spearhead more formal collaborations between UCI Health neurologists and neuro-ophthalmologists to further enhance patient care. These include creating a network of multidisciplinary specialists to treat traumatic brain injuries, which often affects sight. Other specialists will collaborate to better serve ataxia patients experiencing balance issues as well as vision problems. Patients with multiple sclerosis and other neurologic autoimmune conditions that can damage vision soon will be able to see a neuro-immunologist and a neuro-ophthalmologist in the same visit.

“As a young and growing department, there’s energy and enthusiasm to activate new services like these,” says Dr. Sam Spiegel, the newest addition to the neuro-ophthalmology team, which includes Patel, Dr. R. Wade Crow and Dr. Lilangi Ediriwickrema.

“In our academic medical system, we share patients, refer within our network and meet periodically to discuss our patient cases so that every individual gets the highest standard of care, even for the most complex diseases,” Spiegel adds.

Looking ahead

It’s not only current patients who benefit from the eye institute’s neuro-ophthalmologists.

“These guys are awesome teachers,” says Henchcliffe. “When we train neurologists, they need to understand a certain amount of neuro-ophthalmology. We’re fortunate that Dr. Patel and Dr. Spiegel are very involved with teaching our residents and even their peers.”

The ophthalmology department recently launched a neuro-ophthalmology fellowship, which offers advanced training to doctors who want to specialize in the field.

Henchcliffe also closely watches the research findings produced by the eye institute.

“We pride ourselves on providing superior clinical care, but we need to improve the options available to patients, and that’s where we need more research,” she says.

“As neurologists, we pay attention to the research in ophthalmology, because where they lead, we can follow.”

Henchcliffe is especially excited about neuro-ophthalmology research that is leading to better imaging techniques and identifying new biomarkers for neurological diseases.

She and her colleagues also are closely watching advances in gene therapy being developed by Krzysztof Palczewski, PhD, at the eye institute’s Center for Translational Vision Research.

Restoring sight

When Patel saw the pregnant woman who was losing her sight, he ordered special tests to identify the source of inflammation that was affecting her vision. He also coordinated with neurologists to give her intravenous immunoglobulin (IVIG) to tamp down the inflammation. Within a matter of days, her vision was restored.

“She needed the highest order of care from a team working together across multiple areas of expertise,” says Patel. “That can be more difficult to get in an outpatient setting, but is exactly what an academic medical system like UCI Health can provide.

“As neuro-ophthalmologists, we collaborate with neurologists and neuro-immunologists every day,” he adds. “In this case, we worked together to take her from blindness to seeing.”

Sam Spiegel, MD
10th anniversary of the opening of the Gavin Herbert Eye Institute

It’s hard to believe that we are about to celebrate the 10th anniversary of the opening of the Gavin Herbert Eye Institute, which has transformed our Department of Ophthalmology and eye care in Orange County.

Throughout its near 50-year history, the UCI Department of Ophthalmology has enjoyed great support from the community, the UCI School of Medicine and the university. However, with the establishment of the Gavin Herbert Eye Institute 10 years ago, our ability to offer expanded services to patients throughout Orange County and the region grew dramatically thanks to the generosity of our donors, particularly the Herbert Family. When we began serving patients in the first and ground floors of the eye institute a decade ago, the second floor and half the ground floor were left unfinished, to be built out in the future. Thanks to a partnership with UCI Health CEO Chad Lefteris, our second floor was recently completed as a clinical space, where our ophthalmology faculty began serving patients in December 2022.

We share half the second floor with the Department of Dermatology, under the leadership of professor and chair Kristen Kelly, MD. The dermatology team is an excellent neighbor and we look forward to working alongside them for several years as our number of patients and caregivers continues to grow. We also are adding two operating rooms on the ground floor, which will double our surgical capacity when they are completed this fall. These expansions represent significant investments by UCI Health in the Gavin Herbert Eye Institute and we are deeply grateful for this support.

These new clinical spaces are coming online at the perfect time. Last year, the eye institute experienced a 25% increase in patient visits — following on the heels of a 20% rise the previous year. To help meet the demand for care, our strategic plan calls for adding eight more clinicians over the next several years. This summer, we expect to welcome three new ophthalmologists, one each specializing in glaucoma, cornea and retina services. The new retina specialist will be an ocular oncologist able to treat cancerous tumors in the back of the eye, becoming Orange County’s first ocular oncologist. This will enable us to offer our patients the complete range of ophthalmic services.

Equally exciting are the research advances occurring at the eye institute. While we have historically had a strong research program, the Department of Ophthalmology is now 16th in the nation — up from 45 — as measured by National Institutes of Health research dollars. This is largely the result of high-profile researchers who have joined our team, thanks to funding and support from School of Medicine Dean Michael J. Stamos, MD. One such internationally renowned researcher is Krzysztof Palczewski, PhD, Donald Bren Professor of Ophthalmology and director of the UCI Center for Translational Vision Research. You can read more in this issue of Shine the Light about Palczewski’s work leveraging precision gene editing to find cures for blindness caused by inherited retinal diseases. This spring, we’re excited to welcome a highly regarded glaucoma researcher, Gulab Zode, PhD.

Before closing, I would like pay our respects to Robin Gibbin, a fundraising professional who joined us last year and was a delight to work with. She passed away unexpectedly this February and we are deeply saddened by her loss. We offer our condolences to her family.

As always, I’m grateful to the amazing team of individuals who truly make the Gavin Herbert Eye Institute a shining light, as well as to our wonderful supporters who enable their work.

I look forward to celebrating the Gavin Herbert Eye Institute’s 10th anniversary and honoring the incredible legacy of our leading donors, Gavin Herbert and his late mother Josephine Gleis. Hopefully, we will see many of you during the year as we mark this milestone.

Baruch D. Kuppermann, MD, PhD
Director, Gavin Herbert Eye Institute
Chair, Department of Ophthalmology
MEET OUR FACULTY

Physicians and Researchers

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*Vice Chair, Ophthalmology Faculty*
Sumit (Sam) Garg, MD
*Vice Chair, Diversity, Equity and Inclusion*
Sanjay Kedhar, MD
*Vice Chair, Clinical Research*
Olivia Lee, MD
Matthew Wade, MD

**Cataracts and Glaucoma**
Austin Fox, MD
Ken Y. Lin, MD, PhD
*Director, Clinical Research*
Sameh Mosaed, MD
*Vice Chair, Ophthalmology Faculty*

**Comprehensive Ophthalmology**
Kavita K. Rao, MD

**Low Vision**
Karen Lin, OD
Nilima Tanna, OT

**Neuro-ophthalmology**
R. Wade Crow, MD
Lilangi Ediriwickrema, MD
Vivek Patel, MD
Sam Spiegel, MD

**Oculoplastics**
Lilangi Ediriwickrema, MD
Jeremiah Tao, MD

**Ophthalmic Pathology**
Maria Del Valle Estopinal, MD

**Optometry**
Joseph Bui, OD
Timothy Scott Liegler, OD
Kailey A. Marshall, OD
Annabelle Storch, OD
Kimberly Walker, OD

**Pediatric Ophthalmology**
Charlotte Gore, MD
Stephen Prepas, MD
Donny Suh, MD

**Retina and Vitreous**
Andrew Browne, MD, PhD
Baruch D. Kuppermann, MD, PhD
*Chair, Department of Ophthalmology*
Stephanie Y. Lu, MD
*Vice Chair, Education*
Mitul C. Mehta, MD
Mohammad Riazi, MD

**Research**
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Andrew Browne, MD, PhD
James V. Jester, PhD
Tibor Juhasz, PhD
Vladimir Kefalov, PhD
M. Cristina Kenney, MD, PhD
Timothy Kern, PhD
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Philip Kiser, PhD
Baruch D. Kuppermann, MD, PhD
Anthony B. Nesburn, MD
Krzysztof Palczewski, PhD
Eric Pearlman, PhD
Magdelene Seiler, PhD
Dorota Skowronska-Krawczyk, PhD

**Strabismus**
Charlotte Gore, MD
Vivek Patel, MD
Stephen Prepas, MD
Donny Suh, MD

**Uveitis**
Sanjay Kedhar, MD
Olivia Lee, MD
Q&A with Chief of Neuro-ophthalmology
Dr. Vivek Patel

As the Gavin Herbert Eye Institute’s chief of neuro-ophthalmology, Vivek Patel, MD leads a growing team of physicians who treat an array of disorders that affect both the brain and eyes. We asked him to explain what his specialty and what drew him to it.

Q. How did you become interested in neuro-ophthalmology?
A. I was always interested in biology and anatomy, but I especially liked neuroscience. In my first year of medical school at the University of Toronto, I became fascinated by neuro-ophthalmology and asked to take a year off to do research into eye movements at a lab at Johns Hopkins University. During that time, I learned a lot about what I love — neurosurgery and ophthalmology. When I returned to medical school, I knew exactly what I wanted to specialize in, which made my path for the next three years much clearer than it was for my peers. Neuro-ophthalmology is not just intellectually interesting, but because it’s interconnected with other fields, it also opens other doors.

Q. What kinds of conditions do you treat as a neuro-ophthalmologist?
A. Neuro-ophthalmologists treat a wide range of complex diseases. Many are auto-immune disorders, such as multiple sclerosis, myelin oligodendrocyte glycoprotein antibody-associated disease (MOGAD) and neuromyelitis optica spectrum disorders (NMOSD), which we address in collaboration with neuro-immunologists. We also work with oncologists to treat cancer patients whose tumors affect the optic nerve, such as brain or pituitary tumors. We also see Parkinson’s patients who may be experiencing symptoms that affect their vision. Even double vision, or diplopia, is often caused by a faulty connection between the brain and eye muscles and may require a neuro-ophthalmologist. So, we work on really fascinating, complicated cases.

Q. What is the most common condition you treat?
A. We work with neuro-immunologists every day. A number of disorders involve the immune system attacking the brain and optic networks, sometimes causing severe vision loss and even blindness. Multiple sclerosis is the most common example.

Q. What is the benefit of choosing a neuro-ophthalmologist at an academic medical center like UCI Health?
A. I often say “time is vision,” and in an academic medical setting, patients have almost immediate access to subspecialists to help solve the most complex cases. We give patients the highest order of care, with collaboration across areas of multiple areas of expertise, giving us a broader base from which to find and attack the problem.

Q. When should a patient urgently see a neuro-ophthalmologist?
A. Any sudden loss of vision, even if it’s just for a few minutes, could mean there’s a blood-flow issue or even an impending stroke. Vision changes can be a major predictor of stroke. Likewise, the sudden onset of double vision should be evaluated immediately. In general, we regard any sudden vision change, in one or both eyes, as a diagnostic emergency.
Thank you to our donors

In special appreciation: A heartfelt thank you to our supporters whose generosity has contributed to helping us advance our mission of developing innovative technologies to diagnose and treat eye diseases and disorders; implementing clinical solutions that give our patients the most advanced medical and surgical eye care available; and supporting educational programs that prepare the next generation of ophthalmic leaders. We are incredibly grateful for their confidence and partnership. Gifts listed below were received from July 1, 2022 - March 18, 2023 for $2,000+.

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Ezzat Wassef, MD

To learn more about how you can support the Gavin Herbert Eye Institute, please contact Amber Harness, Director of Development at aharness@uci.edu
Appreciating the value of leading-edge information

Dea Stanuszek has always appreciated the value of up-to-date information and leading-edge technology. Throughout her 30-year career with AT&T, she ensured that Orange County’s largest companies had the tools and equipment to efficiently transfer data needed to run their daily operations.

As a retiree living in Newport Beach, she still keeps up to date on the latest technologies for her own life — regularly upgrading to the newest model iPhone, for example. For her vision care, she relies on the doctors at the Gavin Herbert Eye Institute because they offer the latest ophthalmic information, imaging tools and treatments.

“At UCI Health, you have access to the latest eye treatments and discoveries because of the research and clinical trials that are done there,” Stanuszek says. “A regular ophthalmologist just isn’t going to have access to the same level of information.”

Stanuszek was diagnosed with age-related macular degeneration (AMD) in her forties and immediately sought out a specialist at UCI. In those early days, she was treated by Baruch Kuppermann, MD, PhD, who is now chair of the Department of Ophthalmology and director of the eye institute. He prescribed a daily mix of vitamin and mineral supplements that National Eye Institute scientists found helped slow the progression of age-related macular degeneration. She now sees retina specialist Andrew Browne, MD, PhD, several times a year — and even helps to fund his AMD research.

Although Stanuszek no longer drives, she appreciates the eye institute’s convenient location on the university campus in Irvine — a short 10-minute jaunt from her home.

“I feel very fortunate to live so close to such a prestigious and well-run organization,” she says.

As an active community volunteer, she often sings the praises of the eye institute and regularly refers friends and acquaintances to UCI Health ophthalmologists.

“Anybody who lives in our area needs to be aware of this treasure in our own backyard,” Stanuszek says. “You’re getting an entirely different caliber of eye doctor at the Gavin Herbert Eye Institute than anywhere else in Orange County.”
Reversing inherited retinal diseases with precision gene editing

Within a decade, scientists hope to cure inherited blinding conditions suffered by millions of people around the world, using precision gene editing techniques pioneered at the UCI Health Gavin Herbert Eye Institute.

Researchers at the UCI Center for Translational Vision Research — in collaboration with researchers at the Broad Institute of MIT and Harvard — have successfully used precision gene editing to restore sight to animal models with Leber congenital amaurosis, a condition that is responsible for vision impairment in 20% of children in schools for the blind. Researchers anticipate human clinical trials of the treatment could begin during the next decade. Once fine-tuned, scientists believe the treatment could be adapted for age-related macular degeneration, glaucoma, congenital stationary night blindness and dozens of inherited eye diseases.

‘This is a cure’

The genetic causes of blindness are incredibly complicated, says Krzysztof Palczewski, PhD, Donald Bren Professor of Ophthalmology and director of the Center for Translational Vision Research.

With 270 genes involved in blindness, there are thousands upon thousands of possible combinations of mutations that can cause serious vision problems.

“You might think there is no hope, but there is hope,” says Palczewski, whose lab is leading the way with this groundbreaking treatment.

A series of major breakthroughs in the last five years have made this precision gene editing technique possible, he says. Those advances include U.S. Food & Drug Administration approval of the first-ever gene therapy, the success of mRNA vaccines against COVID-19, the Nobel Prize-winning invention of the CRISPR gene editing tool and new, high-resolution eye imaging technologies.

Palczewski compares his lab’s new precision gene editing research to creating a recipe, combining these exciting advances with a goal of developing a cure for blindness.
In a paper published last year in the Proceedings of the National Academy of Sciences, Palczewski and UCI graduate students Susie Soh and Elliot Choi described the proposed process: analyze patient’s cells to identify the blindness-causing genetic mutations and then test the most effective DNA edits on those cells in a petri dish. In animal models, the researcher would inject gene-edited pieces of customized RNA to act on the precise spot on the DNA where corrections were needed.

If human trials prove equally successful, Palczewski expects vision to be restored for good within a month after treatment.

“This would be a cure, a total treatment and rescue,” he says. “It’s not like a drug you take every day for maintenance.”

**Beyond blindness**

While Palczewski’s research priority is reversing blindness with precision gene editing, he points out that genetic mutations are not always bad. For example, people of African origin almost never acquire age-related macular degeneration (AMD) — their genes tend to protect against it. He is proposing a new project using precision gene editing techniques to replicate those protective DNA patterns in populations that are vulnerable to AMD.

He’s also excited about the potential uses for precision gene editing beyond the eye. Because all our organs are made from DNA consisting of sequences of just 4 nucleotides — adenine, cytosine, thymine and guanine — this gene editing technology might be used anywhere in the body, on any disease.

“This is not only about the eye, it has unlimited applications,” Palczewski says. “Once we solve the method of delivery, it will be ‘plug and play’ with gene editing therapies. Scientists will be able to work toward curing any genetic disease.
Shining the Light: Gavin Herbert Eye Institute celebrates ten years of saving sight

In 2005, Chancellor Ralph Cicerone approves the concept for an eye institute at UC Irvine. With a gift in 2007 from Gavin Herbert and his mother, Josephine Gleis, the project moves forward. In September 2013, the Gavin Herbert Eye Institute opens its doors. Ten years later, the institute has posted impressive list of accomplishments and draws patients from across Southern California and beyond. Significant institute milestones over the last decade include:

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<td>Eye institute awarded $3 million</td>
<td>Eye Mobile for Children hits the road</td>
<td>Keratoconus foundation moves to institute</td>
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<td>The Discovery Eye Foundation donates $2 million to complete the Gavin Herbert Eye Institute and $1 million to establish a Discovery Center for Eye Research, where foundation and institute researchers will collaborate to find sight-saving therapies.</td>
<td>In 2014, the eye institute begins taking its specially outfitted mobile eye clinic to Orange County schools. As of 2023, more than 20,000 children have received free vision screenings through this program, most of them from underserved families.</td>
<td>The National Keratoconus Foundation, the oldest and largest patient education group for the eye disorder, joins Gavin Herbert Eye Institute and continues its outreach and education work.</td>
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<td>Gavin Herbert Eye Institute opens at UCI</td>
<td>FDA greenlights testing for retinosa pigmentosa therapy</td>
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<td>Retina expert leads Gavin Herbert Eye Institute</td>
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<td>Under the direction of the institute’s founding director, Dr. Roger F. Steinert, the state-of-the-art facility opens with three surgical suites, 34 exam rooms and 1,500 square feet of conference and education space.</td>
<td>A first-of-its-kind stem cell-based treatment for retinitis pigmentosa developed by Department of Ophthalmology faculty members Dr. Henry Klassen, Dr. Jing Yang and colleagues is approved for clinical trial by the U.S. Food &amp; Drug Administration.</td>
<td></td>
<td>Baruch Kuppermann, MD, PhD, is chosen to direct the Gavin Herbert Eye Institute. He succeeds the late Roger F. Steinert as chair of the Department of Ophthalmology. Kuppermann is also named to the newly endowed chair created to honor Steinert.</td>
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Renowned vision scientist to launch UCI eye research center

Internationally regarded chemist and pharmacologist Krzysztof Palczewski, PhD, joins Gavin Herbert Eye Institute to establish the Center for Translational Vision Research, a bench-to-bedside model to bring innovative therapies to patients.

Vision research center elevated as a UCI research unit

The Center for Translational Vision Research (CTVR) is established as a UC Irvine provisional Organized Research Unit, which will foster and enhance its research enterprise.

UCI offers sight-restoring stem cell transplants

The eye institute becomes the nation’s second medical institution – and the only one on the West Coast – to offer ocular stem cell transplants for patients with severe cornea damage.

Eye institute cracks top 20 for NIH funding for the first time

With nearly $7.7 million in National Institutes of Health funding for ophthalmology studies, the Gavin Herbert Eye Institute enters the top echelon of eye research institutions. The funding paves the way for growth at the institute’s Center for Translational Vision Research (CTVR) and its efforts to cure blinding diseases and disorders.

Low Vision Rehabilitation Program opens

The Gavin Herbert Eye Institute launches one of the nation’s first programs to provide the full range of rehabilitation services to help people with low vision.

Eye institute to celebrate 10th anniversary

Since opening its doors 10 years ago, Gavin Herbert Eye Institute has expanded clinical programs, boosted grant funding, posted major research breakthroughs and served even more patients, nearly double the number seen in 2013.
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EVENTS

2023 Community Lectures

Comprehensive Ophthalmology
September 12, 2023
Why my vision is changing with age. What symptoms are important to check?
Kavita Rao, MD

Pediatric Ophthalmology
October 10, 2023
Strabismus and children’s vision
Charlotte Core, MD

Oculoplastics
November 14, 2023
Cancers around the eyes. When should I be concerned?
Jeremiah Tao, MD

RSVP: 949-824-7243 | ophthalmology@hs.ucl.edu

LASIK SURGERY SEMINARS will resume in the Fall.
Watch our calendar pages for upcoming events!

Clinical Trials
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