Vision granted for stem cell research

New research brings insight into herpes eye disease

The cutting edge of zig and zag

Blind adventure travel society: The blind leading the blind

Henry Klassen, MD, PhD, a retinal specialist at The Gavin Herbert Eye Institute, comes a monumental step closer to finding a cure for retinitis pigmentosa.

After receiving the highest score among all applicants on his research proposal, Klassen, assistant professor of ophthalmology at UC Irvine and member of The Sue and Bill Gross Stem Cell Research Center, was awarded a $3.85 million grant by the California Institute for Regenerative Medicine toward using stem cells as a groundbreaking treatment for retinitis pigmentosa.

An inherited disease, retinitis pigmentosa is caused by progressive damage to cells in the back of the eye that detect light. It can cause blindness at any age stage of life, from birth to adulthood. Currently, there are no treatments available. Although some doctors believe taking vitamin A supplements can slow the disease.

A cure in sight

With the grant, Klassen wants to build on his success with transplants in animals and start a clinical trial on human eyes during the next several years. He plans to create healthy retinal stem cells from immature retinas and then transplant them to repair or replace the damaged cells in affected eyes.

Klassen also believes his work will pave the way to cures using stem cells in other specialties. “The eye is an important proving ground for stem cell-based therapies and provides a stepping stone to many otherwise incurable diseases of the brain and spinal cord.”

Klassen’s research takes place in the heart of Orange County, which is home to many medical device and eye care companies. The proximity to these companies, along with the support and collaboration opportunities at UC Irvine and The Gavin Herbert Eye Institute, attracts many leading specialists researching new cures for other eye diseases.

While he is excited by how his research will affect the future of therapies using stem cells, Klassen’s goal is clear: “Through my research at UCI, I hope to bring a cure for retinitis pigmentosa to patients here in Orange County, as well as all over the world.”

For more information on The Gavin Herbert Eye Institute faculty and their research, visit www.ghei.uci.edu.

For more information about The Gavin Herbert Eye Institute, please call (949) 824-0166.

THE GAVIN HERBERT EYE INSTITUTE

UNIVERSITY OF CALIFORNIA - IRVINE

www.ghei.uci.edu
With the site dedication of The Gavin Herbert Eye Institute, we are even closer to building a world-class eye care center in Orange County that will foster collaboration and advancements like the new ocular herpes vaccine and corneal transplant laser treatments featured in this issue. Your support of the Shine The Light campaign helps us to continue making breakthroughs in vision care.

Sincerely,

Roger Steinert, MD
Chair, Department of Ophthalmology

Please call Susan Totten, Interim Assistant Vice Chancellor, Academic Health Centers Advancement, at (949) 824-0166 for more information on how you can help.

NEW RESEARCH BRINGS

INSIGHT INTO HERPES EYE DISEASE

While most people know that the symptoms of herpes are recurring blisters and lesions, few realize that it’s also one of the leading causes of blindness. The same types of cold sores that appear around the mouth can also occur on the surface of the eye. Ocular herpes is sometimes referred to as a “cold sore in the eye.”

About half a million Americans have ocular herpes, which is called type 1 herpes simplex virus or HSV-1. It is often inactive, but the virus can be activated by psychological, chemical, or environmental factors. HSV-1 can infect the cornea part of the eye, which is the outer layer, and can sometimes cause a potentially blinding condition called herpetic stromal keratitis (her-PEH-tic STROH-mul kare-uh-TIE-tus).

While current drug therapies can treat ocular herpes, they do not prevent future attacks. Ibachir BenMohamed, PhD, associate professor of immunology, Department of Ophthalmology, and Anthony Nesburn, MD, adjunct professor and vice chair for research, at The Gavin Herbert Eye Institute have developed a promising vaccine for ocular herpes. This vaccine is intended to give long-term protection from HSV-1 becoming active and attacking the cornea.

Getting to the root

So far, the HSV-1 vaccine produced excellent results in preclinical tests. BenMohamed and Nesburn have found it to also work against genital herpes, which puts people at a significantly higher risk of contracting HIV.

“Our goal is to attack the virus at the root of the disease,” says BenMohamed, a member of UC Irvine’s Institute for Immunology. “While tests are proving the vaccine effective for eye herpes diseases, it also might help curb genital herpes diseases and, potentially, the AIDS epidemic.”

The vaccine is unique because it’s given as eye drops rather than injected. BenMohamed says that this is helpful in two ways, “Vaccines in the form of eye drops are easier and less expensive to produce, and patients can conveniently apply it themselves without using syringes.”

The National Institutes of Health and Discovery Eye Foundation have supported BenMohamed and Nesburn’s research for the past eight years. “Developing a vaccine consumes time and resources, but we’ve been fortunate to have the support to make it this far,” BenMohamed says. “We plan to have FDA-approved human trials in the next two to three years. If those go well, the millions of people suffering from the herpes virus will have access to treatment that is inexpensive and easy to use.”

www.ghei.uci.edu
SYMPTOMS AND SIGNS OF EYE HERPES

- Inflammation of the cornea, causing irritation or sudden severe pain
- Cloudy, then blurry vision
- Swelling around the eyes
- Tearing
- Recurrent eye infections
- Foreign body sensation
- Redness
- Sores
- Watery discharge
- Sensitivity to light

Types of Eye Herpes

- **Herpes keratitis** Generally affects the top layer of the cornea and usually heals without scarring
- **Stromal keratitis** Infects the deeper layers of the cornea, causing scarring, loss of vision, and occasionally blindness
- **Iridocyclitis** Iris and surrounding eye tissue become inflamed, causing severe sensitivity to light, blurred vision, pain, and redness.

MAKE A GIFT OF SIGHT

Through your generous support, The Gavin Herbert Eye Institute can continue to develop new therapies and cures for blindness. Your gifts advance sight-saving research, help retain and attract doctors, and build state-of-the-art eye care facilities.

Visit [http://www.healthcare.uci.edu/make_a_gift.asp](http://www.healthcare.uci.edu/make_a_gift.asp) for more information. To make a donation, visit the Make a Gift page above and then click “Make an online gift.” In the search for your area of interest box, type “eye” and click search. Select Gavin Herbert Eye Institute and follow the instructions.

Thank you for helping us find a cure for blindness and treatments that save vision.

George Baerveldt, MD
Libachir BenMohamed, PhD
Swaraj Bose, MD
Donald J. Brown, PhD
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Marjan Farid, MD
Sumit Garg, MD
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TO CONTACT FACULTY MEMBERS OR TO MAKE AN APPOINTMENT, CALL 949-824-2020 (IRVINE) OR 714-456-7183 (ORANGE)
Most people will develop cataracts when they reach between 60 and 70 years of age. Don’t worry, because cataracts are a common vision disorder that affects everyone as they get older. According to the 2009 Annual Cataract Surgeon Survey by Market Scope, there are about 15 million cataract surgeries performed around the world every year. In fact, it is one of most commonly performed surgeries today.

The cataract procedure usually takes less than 30 minutes. Typically, only one eye is treated at a time. The cloudy discolored natural crystalline (KRIH-stuh-lyn) lens in the eye is removed, and an artificial intraocular (in-truh-AH-kyu-lur) lens or IOL replaces it (see Figure 1). Many patients report seeing clearly right after the surgery.

First things first
If you or someone you know has cataracts, the first step is going to see a doctor who specializes in treating the eyes, called an ophthalmologist (op-thuh-MOL-uh-gist). After an ophthalmologist has determined that cataracts have formed, a few tests will be done. The doctor will look at your eyes to check the cataract development, measure the cornea and eye, and look at the retina, which is located in the back of the eye. After a consultation, your doctor will recommend an artificial lens that is ideal for your vision and lifestyle.

Before your surgery, the doctor will give you information as well as instructions to prepare for the cataract procedure. Be sure to bring someone who can drive you home afterward.

What to expect during cataract surgery
In most cases, you will be awake during the procedure. Your doctor will use anesthetic drops to numb your eye, so you will not feel any pain during surgery.

Because this is a minimally invasive procedure, your doctor will make a very tiny incision or slit on the side of the eye. Your doctor will insert a very small needle-sized tube in the incision for phacoemulsification (fay-ko-ee-mul-suh-fuh-KAY-shun). This means the tiny tube uses ultrasound waves to soften and break up the cataract lens, and then removes the pieces using a vacuum-like action (see Figure 2).

After phacoemulsification, the new artificial lens or IOL is placed inside the eye. Since IOLs are flexible, they can be folded or rolled and placed in a specially designed device that fits in the very tiny slit. The IOL will naturally unfold inside the eye (see Figure 3).

As your vision improves, you can get back to activities or hobbies you enjoyed before.
After the IOL is inserted, your doctor will check your vision and then place a bandage over the eye. The procedure usually takes a total of 15 to 30 minutes.

**Vision after cataracts**
Your doctor will give you instructions after the surgery, such as not touching or rubbing your eye and how to apply medicated eyedrops to prevent infection. You may experience some itching and mild discomfort, which should decrease after a couple days. Also, your eye will be sensitive to light, so you may need to wear eye shields. Because you are recovering from surgery, your doctor may limit your physical activity.

You will continue seeing your doctor to make sure the eye is healing properly. You will most likely be able to see clearly right away. Many people have reported that colors are richer and brighter. As the brain and eye begins to adapt, your vision will continue to improve. As your vision improves, you can get back to activities or hobbies you enjoyed before your cataracts.

If you think you or someone you know has cataracts, call The Gavin Herbert Eye Institute at 949-824-2020 (Irvine) or 714-456-7183 (Orange) to make an appointment with an ophthalmologist. Or visit www.ghei.uci.edu to make an appointment online and learn more about the eye institute.

**TYPES OF INTRAOCULAR LENSES (IOLS)**

Artificial IOLs are medical devices that are designed to act like the natural crystalline lens in the eye. There are different types of IOLs with unique features that will meet your individual eye health and lifestyle needs. Only an ophthalmologist can decide which lens is best suited for you.

Typically, Medicare and most health insurance plans will cover traditional or monofocal lenses. Other types of lenses are considered premium IOLs and you will need to pay the extra costs.

- **Monofocal lens.** This is a traditional lens that helps you see clearly in the distance, such as driving or watching a movie. For intermediate or near vision, such as using the computer or reading, you will probably need to wear glasses.

- **Toric lens.** This lens is specially designed to correct astigmatism in addition to cataracts. You will most likely need to wear glasses for near and intermediate vision.

- **Multifocal lens.** This lens allows people to see clearly at all distances without wearing glasses. For people who lead an active lifestyle and find glasses inconvenient, the multifocal lens is a good choice.

- **Accommodating lens.** This lens moves with the muscles in the eye to help focus at different distances. The lens will move closer to the front of the eye to see items up close, and move toward the back of the eye to focus on items far away. Like a multifocal lens, many people may not need to wear glasses for near vision.
Laser specialists Marjan Farid, MD, and Sumit Garg, MD, are part of the leading surgical team at The Gavin Herbert Eye Institute, who have developed breakthrough surgical techniques for corneal transplants using femtosecond laser technology.

As with the rest of the human body, our eyes are not immune to the effects of aging. As many of us reach middle age, our sharp distance vision begins to become blurry, reading becomes more difficult, and halos appear surrounding outdoor lights at night. In addition, cataracts can cloud the lenses, which can result in blurry vision and faded colors.

Fortunately, there are solutions for our aging vision.

Ophthalmologists at The Gavin Herbert Eye Institute’s Refractive Surgery LASIK Center use state-of-the-art laser technology to treat age-related conditions, as well as problems like nearsightedness and astigmatism. They also invented and advanced a laser-assisted corneal transplant technique.

Founded by world-renowned refractive surgeon Roger Steinert, MD, ophthalmology chair and institute director, the center is the only one in Orange County dedicated to laser refractive surgery training, research, and patient care.

“All our refractive surgeons are fellowship-trained corneal specialists,” says Marjan Farid, MD, assistant professor of ophthalmology and the center’s director of cornea, cataract, and refractive surgery. “Also, we perform all of the preoperative evaluations and postoperative visits.”

To schedule a consultation with a refractive surgeon at the eye institute, call (949) 824-9970.

“All our refractive surgeons are fellowship-trained corneal specialists. We also perform all of the preoperative evaluations and postoperative visits.”

— Marjan Farid, MD
For most of the 40,000 Americans who have corneal transplants each year, their recovery is uncomfortable and slow. It can, at times, take as long as six months. Even then, clear vision may not be fully restored.

Ophthalmologists or eye care specialists at The Gavin Herbert Eye Institute have developed a surgical technique that allows patients to heal faster and see better. Marjan Farid, MD, assistant professor; Sumit Garg, MD, assistant professor; Ronald Gaster, MD, adjunct professor, and Roger Steinert, MD, director and chairman of ophthalmology, are revolutionizing corneal transplantation, which is when a diseased or damaged cornea is replaced by donor tissue.

Instead of using a traditional scalpel and cutting the shape of a round disc or “button,” these doctors use a laser and make a zigzag incision on the “front window” of the eye.

Approved by the U.S. Food and Drug Administration in 2005, the procedure uses a femtosecond-pulsed laser, one of most advanced, safest lasers available. “We’ve seen lasers used reliably in countless Lasik procedures, and it makes sense that they be used in corneal transplants,” says Garg, who joined the eye institute in July 2009 after completing a residency and fellowship at UC Irvine.

A perfect fit

Studies on transplants using lasers have found that the treated area heals much faster—within three months—and may be as much as 10 times stronger than with conventional transplants. Still, a majority of corneal transplants are done the traditional way, with a scalpel, and not everyone is a candidate for the laser procedure.

So that the new transplanted cornea joins together better with the eye, the UC Irvine team created a more precise cutting pattern. Instead of a straight incision, the laser makes zigzag slices around the patient’s eye and the donor cornea. The cuts interlock like puzzle pieces, so the new cornea fits perfectly, and surgeons don’t need to stitch the eye as tightly.

“The laser can create shapes that are simply impossible to produce with conventional surgery,” Farid says. “We’re using technology to raise corneal transplantation to a new level.”

The Gavin Herbert Eye Institute is the only facility in Orange County offering laser-assisted corneal transplants. It is part of UC Irvine’s comprehensive effort to bring together researchers and clinicians in a single setting to study eye diseases, pioneer treatments, and train tomorrow’s ophthalmologists.

“The institute allows us to make the most of our talents,” says Steinert. “It’s satisfying to make breakthroughs and improvements that branch out and reach more and more patients. All the pieces of our eye institute—research, clinical, education—continue to fall perfectly into place.”

Four years ago, Polly Smith woke up one morning and opened her eyes. Instead of seeing her familiar bedroom surroundings, she was greeted with a cloudy, blurry image. She was recommended to retinal specialist Stephanie Lu, MD, at UC Irvine.

Polly was first diagnosed with drusen, which then progressed to wet age-related macular degeneration (AMD), a condition that affects approximately 40% of Americans over the age of 65 and ultimately can lead to loss of central vision, leaving only peripheral or side vision. “Blonde, blue-eyed, northern European female—yes, that’s me!” recalls Polly. “On the Internet, I found it could affect women with those characteristics, which was frightening.”

Hitting close to home

Polly’s condition spurred her to get more involved in finding a cure for AMD. “I want to support one of the best research institutes in the world, because of their reputation for being at the forefront of patient care and research.”

Polly continues to receive treatment to keep the AMD under control. Although she has had to stop driving, Polly is still able to read with good light and good contrast. Her positive attitude, which is an inspiration to her family, friends, and support groups, lead to active involvement and leadership in AMD research. “The research probably won’t be able to help me, but it can help my children and grandchildren, as well as future generations. I decided I could either be sad and do nothing, or help and do something.”

Contributing to developing treatment and a cure means everything for the people and their families affected by this condition.
On November 6, 2010, 40 mountain bikers, including six blind riders, rode together on a six-mile trail through Irvine Regional Park.

The Blind Adventure Travel Society, or BATS, started mountain biking together about a decade ago after two mobility instructors, one fully sighted and one completely blind, pioneered a way to help blind riders be aware of and follow other bikers. By attaching zip ties to the wheel, riders can hear clicking against the spokes of bicycles in front of and behind them, picking up cues for turns, rocky patches, and even stream crossings.

Activities like mountain biking instill confidence and courage in blind participants, but they aren’t the only ones who benefit. After the biking with the blind riders, sighted mountain biker Mark Warrick said, “It was inspiring and soul lifting. I’m glad I could be a part of it.”

Members of BATS went on to found and run World Access for the Blind, a nonprofit focused on life skills, mobility, and sports programs for blind youth. Their “no limits” philosophy has helped them continue to find creative ways to equip the blind such as FlashSonar, which uses echolocation to determine the size and shape of nearby objects through sound waves.

For upcoming events and more information on World Access for the Blind, visit www.waftb.org or contact Kelly Husted at (323) 744-0370 or kelly.husted@worldaccessfortheblind.org.