

# SHINE the LIGHT

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## RESEARCH UPDATE

### Promising vaccine research could protect us from future coronaviruses



Dr. Lbachir BenMohamed

There are well over 150 efforts underway around the world to develop a vaccine against the novel coronavirus that causes COVID-19. Most are aimed at the tell-tale spike protein believed to account for the virus's ability to penetrate human respiratory cells.

But the coronavirus officially known as SARS-CoV-2 has 11 more proteins, says Lbachir BenMohamed, PhD, professor and director of the Gavin Herbert Eye Institute's Laboratory of Cellular and Molecular Immunology. His laboratory is developing the only vaccine that targets them all.

BenMohamed is thinking long term. If successful, his vaccine wouldn't just keep people from getting COVID-19, it potentially could protect people from all coronaviruses, including viruses that cause the common cold and maybe even future viruses that could be even more dangerous than SARS-CoV-2.

"There will be an outbreak of another coronavirus," BenMohamed says. "We had coronavirus outbreaks in 2002, 2008 and 2015. It just happened that those viruses were not as highly contagious and deadly as this one."

BenMohamed's work on the vaccine started in January with \$60,000 in a donor gift to the Gavin Herbert Eye Institute. The lab then won a \$100,000 grant from



George Mason University's Mercatus Center. It was among 100 such grants selected out of 4,500 applicants for fast-tracked COVID-19 research projects. BenMohamed later received a \$3.7 million grant over five years from the National Institute for Allergy and Infectious Diseases, which is headed by Dr. Anthony Fauci.

BenMohamed's idea came from work he was doing to develop a vaccine against herpes simplex, a virus that can affect vision. COVID-19 also can affect eyes; conjunctivitis is considered a possible sign of infection. There was no reason, he figured, that both viruses couldn't be tackled with the same approach.

When Chinese scientists released genetic information for SARS-CoV-2 last January, BenMohamed and four postdoctoral fellows in his lab went to work immediately, working long hours to distill the information about the virus's proteins.

"As soon as genomic sequence of SARS-CoV-2 came out, we jumped on it," BenMohamed says. "We started identifying the building blocks and did microsurgery on the virus to identify the regions that are recognized by T-cells and antibodies."

Those areas are called epitopes, which evoke an immune response. The vaccine being developed by the lab is using

epitopes from all the proteins in SARS-CoV-2.

Previous coronaviruses have come from bats, although they sometimes were transmitted through other intermediate animals, which then exposed humans. BenMohamed says his research is focused on regions of SARS-CoV-2 that are similar to coronaviruses that affect animals and humans. Then they examined T-cell and antibody levels in laboratory animals after being exposed to the multiple epitopes.

The results so far have been promising, showing the production of T-cells and antibodies in the lab animals. BenMohamed expects to finish the preclinical stage of laboratory work by the end of 2020 and hopefully gain approval to begin early-phase clinical trials the following year.

*If the vaccine proves itself, BenMohamed believes it may be effective at preventing cases of COVID-19 by stimulating the body to build immunity against it before infection, and potentially giving it to infected people to generate a stronger immune response.*

It could also prove useful against other coronaviruses, he says, adding that the same multi-epitope method may help develop vaccines against other illnesses. "That could be flu or pneumonia, or any viral respiratory disease."

## MESSAGE FROM THE CHAIR

The year 2020 will stand out in all our minds, especially those of us in the medical world. The COVID-19 pandemic supersedes many of our usual stories of accomplishments here at Gavin Herbert Eye Institute.

Like most medical services, we were forced to slow our operations for several weeks during the beginning of the pandemic. However, the strong safety protocols we implemented allowed us to welcome patients back quickly and we are back to normal operations again.

Beyond that, it is an honor to be part of UCI Health, an academic medical system that has continued to serve thousands of patients and break new ground throughout the pandemic. Our doctors, nurses and other health professionals are devoted to saving patient lives every day.

Our head of cellular and molecular immunology, Lbakhir BenMohamed, PhD, is at the forefront of the next battle against COVID-19: the hunt for a vaccine to stop the virus in its tracks. His approach targets all the proteins in the novel coronavirus, not just the spike protein. It is unique among the vaccine research efforts worldwide because it could prevent and treat the current virus, and potentially protect people against future coronaviruses, maybe even the common cold viruses, which are also coronaviruses.

We firmly believe in BenMohamed's approach and awarded him \$60,000 in seed money from private donors to give him a start on the research. A few months later, that investment in global health has led to a \$3.7 million National Institutes of Health grant to his laboratory to continue the coronavirus research.

The pandemic hasn't stopped us from continuing our ambitious buildout plans. The final design for the second floor's expanded clinical space is nearly complete and will soon be out to bid. We're now looking at expanding our garden-level surgical suite.

Our neighbor in the complex, the Samueli College of Health Sciences, is under construction. As a result, our patients will see parking changes, with access to our building from Bison Avenue. When all the work is complete, this will be a remarkable new facility, home to the UCI schools of Medicine, Nursing, Pharmacy and Population Health. The Susan Samueli Integrative Health Institute also will be located in the new building along with conference facilities, a cafeteria and beautiful grounds, including a yoga garden.

We're happy to announce two new hires at Gavin Herbert Eye Institute. Vivek Patel, MD, recruited from USC, is the new chief of neuro-ophthalmology services. And Olivia Lee, MD, who comes to us from UCLA, is a cornea and uveitis specialist who will serve as director of the anterior eye imaging department.

We plan to hire a new glaucoma specialist in the coming months, as well as a specialist in pediatric ophthalmology to replace the widely-renowned Robert Lingua, MD, who is retiring after many years of pioneering work in the field. We're also sorry to see pediatric specialist Jennifer Simpson, MD, retire along with Janice Briggs, our amazing senior executive director of development. Briggs has raised tens of millions of dollars for Gavin Herbert Eye Institute, enabling us to carry out world-class clinical and research work. Our new initiatives would not have been possible without her.

We look forward to celebrating the retirement of these three remarkable members of our family when the situation allows it. In the meantime, be safe and well. We welcome you all to continue your care at Gavin Herbert Eye Institute, as well as your support of our mission, during these challenging times.



A handwritten signature in black ink that reads "Baruch Kuppermann". The signature is fluid and cursive.

**Baruch D. Kuppermann, MD, PhD**

*Director, Gavin Herbert Eye Institute  
Chair, Department of Ophthalmology  
Steinert Endowed Professor*



## Restoring a traveler's sight

Rod and Karen Walker were on their long dreamed-of trip to Italy in May 2019 when a stumble on uneven, rain-slick cobblestones changed everything.

After dining out in Rome, Karen decided to head to their hotel before Rod. When he returned to the hotel room, Karen wasn't there, which didn't worry him. He figured she'd joined others in their tour group for a drink in the hotel bar. He went to bed.

But when Rod woke up at 2 a.m. and Karen still wasn't there, he went searching for her.

"I was walking outside the hotel and my phone rang," he said. "It was Karen and the only words out of her mouth were, 'They want to operate on me.'"

Karen had fallen face-down on a cobblestone street. In addition to serious bruising on her face and arms, the bones around her eye were broken and the eye,

itself, was badly damaged. "She looked like a truck had run over her," Rod recalls. Thankfully, a bystander had called emergency services and she was taken quickly to a clinic.

Karen was transferred to one nearby hospital, then another. X-rays and other tests were performed. But once her condition stabilized, the Italian doctors said they didn't think there was much they could do to help. They recommended that Karen return home to Laguna Niguel for follow-up treatment.

When Rod called their usual ophthalmologist, the doctor recommended two possible places to get the best eye care, including Gavin Herbert Eye Institute. The doctor specifically recommend that Karen see Dr. Jeremiah Tao, a UCI Health specialist in ocular reconstructive surgery. (Continued on page 5)

A series of visits to Gavin Herbert Eye Institute physicians followed because Karen’s eye damage was complex. Her badly damaged left eye had to be removed and replaced with a prosthetic eye. The broken bones of her eye socket required two separate surgeries.

Months later, however, she began having vision problems with her good eye. It turned out that a lens placed during an earlier cataract surgery was not in the right position, possibly as a result of the fall, Rod says. That required another surgery.

“From the moment we got to Gavin Herbert Eye Institute, they were swift, organized and everyone was very nice,” Karen says. “Every doctor explained everything thoroughly and they seemed genuinely concerned for me.”

Rod was impressed that each time a new issue emerged, the physicians at Gavin Herbert Eye Institute knew exactly which specialist was needed and would set up the appointment immediately.

Karen’s vision is now good enough for her to enjoy most of her usual activities, including lots of reading with her book club pals of 30 years. Next, she plans to get back to driving herself around.

During the months Karen continued to receive follow-up treatment, she and Rod learned about the many programs and research projects at Gavin Herbert Eye Institute that depend on philanthropy. Grateful for her treatment and wanting to help, the Walkers contributed to the institute’s high-impact community program, the Eye Mobile for Children, which provides high-quality vision care services to Orange County’s underserved children. They also made an annual gift to the 20/20 Society, which supports groundbreaking ophthalmic research.

“It’s worth every penny,” Rod says.

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Contact Greg Muniz, senior executive director of development, Health Advancement, at [gamuniz@uci.edu](mailto:gamuniz@uci.edu) or 949-824-0091 for information about giving opportunities at Gavin Herbert Eye Institute.

## Thank you to our donors

### *Gifts of \$50,000 and above received since July 1, 2019 to support the Irving H. Leopold, MD Endowed Professorship:*

Josephine Herbert Gleis Foundation  
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### *Gifts of \$10,000 and above received since July 1, 2019 to support the Roger F. Steinert, MD Endowed Chair in Ophthalmology:*

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| Carol & Budge Collins       | Ninetta & Gavin Herbert           |
| Pamela & Stuart Cumming, MD |                                   |

### *Gifts of \$10,000 and above received since July 1, 2019 to support ophthalmology research:*

|  |  |
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### *Legacy gifts of \$50,000 and above received since July 1, 2019:*

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### *Gifts of \$10,000 and above received since July 1, 2019 to support the Eye Mobile for Children Program:*

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### *Gifts of \$5,000 and above received since July 1, 2019 to support of the National Keratoconus Foundation:*

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*A \$2,000,000 gift was made by The Allergan Foundation to establish the Allergan Endowed Chair, Ophthalmology.*

## Right place at the right time



Denise Hyde could not have imagined how much a single doctor's visit could change things.

Her vision was getting blurry, but repeated visits to opticians could not improve her vision — which she needed for her work as a hair stylist and salon owner.

Next came multiple visits to community ophthalmologists within her limited insurance plan. Finally, Hyde got a diagnosis: She needed surgery for a macular pucker (an area of scar tissue on her retina) and another surgery for cataracts, a clouding of her eye lenses.

"They told me I would have developed the problems anyway," the Irvine resident said. "But it happened much earlier because of a tumor I'd had removed 12 years earlier."

Getting her retina fixed would probably make the cataract worse, Hyde was told, so she would need two operations separated in time. A rough road lay ahead.

Then she met Dr. R. Wade Crow, a neuro-ophthalmologist at the UCI Health Gavin Herbert Eye Institute. He told her that he had colleagues who could help her.

"He moved heaven and earth and got me in the next day, and he made it work with my insurance," Hyde recalled.

"He said, 'You'll come into the office and I'll see what kind of specialist you need. And you'll get every test you need during that visit, then see the specialist. We'll come up with a plan that very day.' "

For Hyde, who was used to being shunted from one office to another and waiting weeks for various doctors to talk to each other and eventually get back to her, this was an unusual experience.

She met with retina specialist Dr. Mitul Mehta and cataract expert Dr. Sanjay Kedhar. By the end of the day, she was assured that they could perform both surgeries, one right after the other during the same visit, with one dose of anesthesia.

The surgeries went off as scheduled, not only addressing her vision problems effectively, but also avoiding the added stress of unnecessary extra visits and trying to figure out the complexities of her insurance.

Moreover, she said, "My vision has improved dramatically."

## Prolific fundraiser retires

Janice Briggs, a force in fundraising for UC Irvine, has retired after serving as senior executive director of development for UCI Health Gavin Herbert Eye Institute for more than a decade.

During her university tenure, she raised more than \$95,000,000 in support of the eye institute and the UCI Sue & Bill Gross Stem Cell Research Center.

Her proven track record in stewardship and maintaining donor relations at the highest level extended to the Kirkup Center for the Medical Treatment of Stuttering at UCI Health, as well as the UCI Medical Ethics program for UCI medical students.

Briggs treasures her work in support of the eye institute.

"It was a great pleasure and honor to be involved in creating Gavin Herbert Eye Institute," she said. "The institute stands apart from other institutions in terms of clinical practice, innovative research and education for the next generation of ophthalmologists. I am proud and grateful to have had the opportunity to work with the exceptional faculty at the institute."

## Caring for your eyes during COVID-19

### 6 tips to keep your eyes in top shape

by Dr. Sanjay Kedhar

The novel coronavirus SARS-CoV-2 - which causes COVID-19 infection - can be spread through contact with your eyes. So how can you best protect yourself?

If someone who is infected with the novel coronavirus coughs or sneezes, it's possible for aerosolized droplets containing the virus to enter your body through cells on the surface of your eyes. Similarly, you may also become infected if you touch a surface contaminated with the virus and then touch your eyes. Dr. Sanjay Kedhar, director of Gavin Herbert Eye Institute's ocular immunology and uveitis service, offers the following tips to keep your eyes in top shape.

#### 1 DO NOT TOUCH YOUR EYES



Do not touch your eyes unless you have followed handwashing guidelines. This is particularly important for patients who wear contact lenses. It's also important to follow masking and physical distancing guidelines because the most likely route for infection is through the nose and mouth.

#### 2 LIMIT YOUR SCREEN TIME



Use of a computer has been shown to reduce the rate of blinking by up to 60%, resulting in increased dry eye. We recommend using artificial tear eye drops to reduce symptoms of dry eye. Preservative-free formulations are best.

#### 3 POSITION YOUR COMPUTER



Placing your computer screen or monitor slightly below eye level can help to reduce evaporative tear loss by allowing the upper eyelid to cover more of the eye surface.

#### 4 BLINK!



Decreased blink rate can also be tied to blockage of the meibomian or oil glands in the eyelid, which can increase the risk of styes as well as worsen dry eye. Use warm compresses to help the meibomian glands flow more freely.

#### 5 20:20:20 RULE



To reduce eye strain, practice the "20-20-20" rule: for every 20 minutes spent using a screen, take 20 seconds to focus your gaze on an object or an area that is 20 feet away.

#### 6 SEE YOUR DOCTOR



Regular eye care is important, especially if you have chronic eye conditions such as macular degeneration or glaucoma, or symptoms such as eye pain, redness, acutely reduced vision, flashes or floaters.

Gavin Herbert Eye Institute is taking care to keep patients safe from COVID-19. In compliance with UCI Health protocols, all providers and support staff are screened daily for symptoms and fever risk. Clinical spaces are cleaned between every patient throughout the day. Physicians and staff working with patients are required to use hand sanitizer or wash their hands between patients. The UCI universal masking policy requires that all patients, providers and support staff in the clinic must be masked at all times.

# UCI Health Gavin Herbert Eye Institute

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Proceeds from our optical shop fund sight-saving research and help students diagnosed with keratoconus to pay for specialty lenses not covered by insurance.

## EVENTS

Join us for our free seminars where you will learn about the causes, symptoms and treatment of eye-related conditions. Our goal is to further educate the public on eye health and related topics to help improve our community's overall health and well-being.

### Dry Eyes

January 19, 7 p.m.

What you need to know about dry eye syndrome  
*Olivia Lee, MD*

### Diabetes

February 16, 7 p.m.

The effect of diabetes on the eyes  
*Mitul Mehta, MD*

Improve diabetes care with technology  
*Qin Yang, MD, PhD*

### Oculoplastics

March 16, 7 p.m.

Sags and bags  
*Lilangi Ediriwickrema, MD*

### Optical Shop

April 13, 7 p.m.

Annual eye exams  
*Patrisha Elbeck, RDO*

New Lens Technology  
*Marcial Torrez-Jiminez, ABOC*

### Age-related Retinal Diseases

May 11, 7 p.m.

Updates on age-related macular degeneration  
*Stephanie Lu, MD*

Retinal progenitor cells for treatment of retinal degeneration  
*Henry Klassen, MD, PhD*

### Cataracts and Glaucoma

June 8, 7 p.m.

How to manage glaucoma as it relates to cataract surgery  
*Igor Bussel, MD*

Novel technology in cataract surgery and how to prepare  
*Matthew Wade, MD*

### Aging Eyes

September 14, 7 p.m.

How your eyes age  
*Kavita Rao, MD*

How your eyes relate to illnesses of the body  
*Sanjay Kedhar, MD*

### Vision Therapies for Keratoconus

November 16, 7 p.m.

Crosslinking and corneal transplantation  
*Marjan Farid, MD*

Latest in contact lens technology  
*Thanh Mai, OD, FSLs*



Registration made easy!  
Access the registration form using this QR code.

For more information and to register:  
[eye.uci.edu/lecture RSVP.html](http://eye.uci.edu/lecture RSVP.html)  
949-824-7243

### Clinic locations

850 Health Sciences Road, Irvine, CA 92697

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To make an appointment 949-824-2020