



DISCOVERY

THE DISCOVERY EYE FOUNDATION



Spring 2020

DEF-Supported Ocular Herpes Vaccine Moves Closer to Phase 1 Clinical Trial

Nearly half the world's population carries the herpes simplex virus type 1 (HSV-1). The vast majority of those infected people are asymptomatic, and they may never develop symptoms. But millions of people are symptomatic, when the virus activates from a dormant state to infect their eye or lips. Further, the virus can cause a blinding corneal disease called herpes stromal keratitis (HSK). There is no vaccine available for this sight-threatening viral disease.

“Without DEF support 12 years ago, none of this would be happening today.”

Currently, the only treatment for ocular herpes is antiviral topical eye medications or pills. These shorten the attack but do not eliminate the cause of the problem; the virus often reactivates itself throughout a patient's life, potentially causing loss of vision. If antivirals don't work, the only course of action is corneal transplantation.

But if Lbachir BenMohamed, PhD, a professor of ophthalmology at University of California, Irvine, has his way, that will soon change. He is developing a vaccine that stops the virus from reactivating.

During the past 12 years, BenMohamed has discovered many things about HSV-1, perhaps the most important of which is that it attacks immune white blood cells — CD8 cells — whose very job it is to kill the virus. And the virus often wins the battle, resulting in “exhaustion” of the virus-fighting white blood cells, similar to the way cancer cells exhaust healthy cells.

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The Discovery Eye Foundation supports cutting-edge research related to sight-threatening eye diseases and their treatments.

DEF Joins Fight Against COVID-19
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Dramatic Impacts

Cassie DeYoung joins DEF board to help find cure for AMD

A Southern California native, Cassie DeYoung has been a lawyer, a deputy DA and a city council member in Laguna Niguel. These days, she volunteers as a temporary judge and still does some legal work.



Continually looking to have an impact in her community, DeYoung had always wanted to be a lawyer. The desire was cemented working in the Los Angeles courthouse and even clerking for the chief judge of the US Court of Appeals in Santa Fe, NM.

DeYoung still remembers the ladies who helped her grandmother in Santa Fe listen to the books on record she enjoyed so much. “When you can’t see very well, starting a record and seeing where you left off is a challenge. The ladies came every other day to help,” DeYoung says.

She didn’t know it at the time, but her grandmother had age-related macular degeneration (AMD), as did her mother. When her mother started to lose sight in both eyes, local eye doctors diagnosed AMD and said there was nothing they could do. DeYoung turned to her cousin, Dr. Cristina Kenney, DEF’s research director. Kenney sent them to UC Irvine, where the doctor used injections to successfully delay the disease’s progression. DeYoung’s mother eventually lost all sight in one eye.

“I saw how demoralizing it was for my mother to lose her eyesight,” DeYoung says. She looked to Discovery Eye Foundation and found information about accommodations she could make to help. “I got her a huge TV, because she likes TV. I made sure the text on the computer screen is larger. It helped her dramatically,” DeYoung says.

“I joined the DEF board of directors, because I could really see that what they are doing has a dramatic impact. I toured the facilities and saw the work the scientists are doing,” she says. “I’m confident that, one day, they’ll find the cure for this debilitating disease.”

The information published in the DEF newsletter is intended to help you better understand various eye diseases and available treatment options. DEF does not sell or endorse products, treatments or procedures. Every effort has been made to ensure the accuracy of the information presented. It is not intended to be a substitute for the advice and recommendations of your professional eye-care providers.

DEF Extends Training Influence Around the World

Through a unique fellowship program, DEF is seeing its influence felt around the world. Fully trained ophthalmologists are coming to UC Irvine for a two-year fellowship from countries including India, Pakistan, Nepal, Brazil, Argentina, South Korea, Egypt and Mexico. They spend a quarter to a third of their time in the retina clinic at the Gavin Herbert Eye Institute, treating patients with institute Director and UC Irvine Department of Ophthalmology Chair Dr. Baruch Kuppermann.

The rest of the time is spent doing retinal research in the labs of Kuppermann and Dr. Cristina Kenney, DEF's research director. "They gain retina research experience, they present at national and international meetings, and they are first authors on publications based on their research," Kenney says. "It's exciting to teach these young, bright, capable and ambitious doctors. In addition to the clinical experience, they get lab experience. A lot of foreign countries don't have the infrastructure for research the United States has, so they couldn't get this kind of experience in their home countries."

This collaboration between Kuppermann, a clinician, and Kenney, a researcher, is very powerful. "To be successful in research, a scientist needs to know what is happening at the clinical level. And Dr. Kuppermann can provide that. He has such great understanding of the progression of AMD, what happens with the disease and, of course, how to treat the disease," Kenney says.

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The fellowship program has educated some two dozen fellows so far. They have gained experience and knowledge in retina research, and they have taken that knowledge back to their countries to be involved in their own academic institutions.

"We get the pleasure of educating them, but it's like disseminating the knowledge beyond UCI or Gavin Herbert Eye Institute. It's back to other countries and the institutions there, because the fellows take that knowledge, and they train their own fellows and residents," Kenney says. "It's an exponential gain of knowledge."



2019 Donor Appreciation

Generous donors who supported DEF in 2019 came together in February at Shutters on the Beach in Santa Monica for our annual Donor Appreciation Lunch. DEF-funded researchers Drs. Cristina Kenney and Anthony Nesburn presented a special update called, "Novel Approaches to Rescue Diseased Human Retinal Cells."

Ocular Herpes

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“It’s a typical fight between the host and the virus,” BenMohamed says. “Our hypothesis is that symptomatic people — those who get recurrent herpes cold sores or ocular herpes — are missing something in their immune system that makes them susceptible to the virus and to developing HSK.”

Researchers in BenMohamed’s lab compared immune cells from both symptomatic and asymptomatic patients and found that the exhausted CD8 cells of symptomatic people express specific molecules that render the immune system unable to fight the virus. BenMohamed’s ocular vaccine boosts the number of good, non-exhausted CD8 cells and

interferes with the exhaustion pathways, which in turn, efficiently stops the virus. All the preclinical trials for this ocular herpes vaccine have been completed. The next step is a Phase 1 clinical trial, which should begin within the next year or two.

“Without DEF support 12 years ago, none of this would be happening today,” BenMohamed says. “DEF made an investment at the very beginning that allowed me to create preliminary data to get NIH grants from the government. We have received several million dollars in government grants recently and are now very well-funded. We would not have gotten here without DEF.”

DEF is Fighting to Defeat COVID-19

The world is being held hostage by coronavirus (COVID-19). The number of cases — and deaths — are alarmingly climbing everyday. Scientists and pharmaceutical companies are working feverishly to create a vaccine, but it is at least a year away. There is hope that existing FDA-approved drugs, such as hydroxychloroquine and azithromycin, may be able to treat the disease and prevent deaths. These drugs need to be tested now.

During this emergency, DEF Research Director Dr. Cristina Kenney’s laboratory is applying the knowledge gained from her work on age-related macular degeneration to join the search for drug(s) that may be an immediate bridge to treat COVID-19.

Much of Kenney’s research focuses on mitochondria, which play a vital role in disease and death from infections such as COVID-19. Mitochondria may help explain the severity of disease and response to treatment in different ethnic populations and age groups.

Kenney will focus on two crucial studies using her unique laboratory systems:

1. Determine which promising experimental treatments for COVID-19 are most likely to benefit which patients.
2. Determine the role of mitochondria in susceptibility to severe COVID-19 disease and death in different ethnic/racial populations and age groups.

At this critical juncture, any financial help you can provide to our research efforts to stop the scourge of coronavirus is greatly needed and deeply appreciated. Please visit www.discoveryeye.org/covid-19-emergency-research.