

RETINA RESEARCH FOUNDATION NEWSLETTER

Foresight for Sight

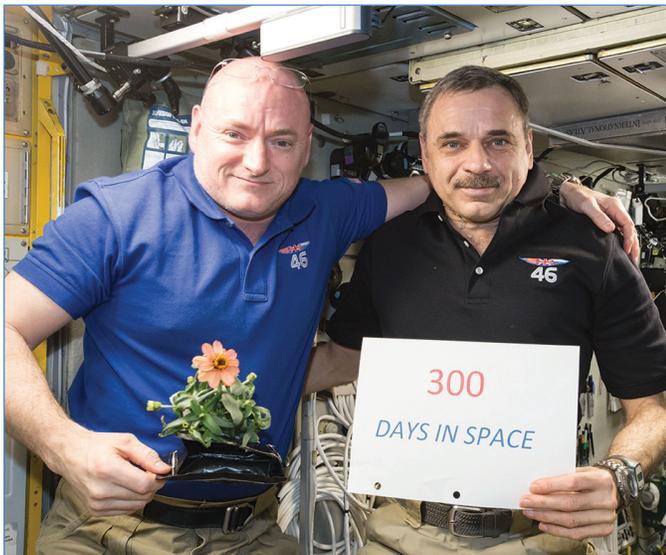
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Vision Changes in Space

During and after long spaceflights, more than half of American astronauts have experienced changes in vision and the structure of the eyes. During spaceflight, fluids in the human body shift from the lower body towards the head and upper body, and move across blood vessel and cell membranes differently than they normally do on Earth.



Scott Kelly and Mikhail Kornienko

A recent study, the Fluid Shifts investigation, is testing the relationship between these fluid shifts and the pattern of visual impairment and intracranial pressure syndrome that NASA calls VIIP. This experiment examines a variety of physiologic variables in ten, long-duration International Space Station astronauts before, during and after long-duration space flight: measuring how much fluid shifts towards the head, in or out of cells and blood vessels, and determining the impact these shifts have on fluid pressure in the head, vision changes and the structure of the eyes. The first subjects for this study are NASA astronaut

Scott Kelly and Mikhail Kornienko from the Russian Federal Space Agency.



Dr. Scott Dulchavsky

Principal Investigators are Michael B. Stenger, Ph.D, Wyle Science, Technology, and Engineering Group, Houston, TX; Scott A. Dulchavsky, M.D., Ph.D., Henry Ford Hospital, Detroit, MI; and Alan R. Hargens, Ph.D., University of California San Diego, San Diego, CA. It is hypothesized that the fluid shift towards the head that occurs during space flight leads to increased pressure in the brain, which may change the shape of the eye as the fluid pushes on the back of the eye.

“Our first aim is to assess the shift in fluids, to see where fluids go and how the shift varies in different individuals,” says Dr. Stenger. “Our second goal is to correlate fluid movement with changes in vision, the structure of the eye, and other elements of VIIP



Fluid Shifts Study in the International Space Station

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Vision Changes in Space

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syndrome.” Finally, the investigation also tests noninvasive techniques for measuring changes in pressure in the brain.

“It’s important to know what is happening because we may have to tailor preventive measures to each individual,” Dr. Stenger says. “We also may find that an exercise that is good for bone or muscle is bad for elevated intracranial pressure. Exercise is great for preserving work capacity and the musculoskeletal system but may be a contributor to increased pressure in the head.”

Understanding how blood pressure in the brain affects eye shape and vision could also benefit people who have conditions that increase pressure on the brain or who are on extended bed rest.

www.nasa.gov

The Bridge Builder

by Will Allen Dromgoole

An old man going a lone highway,
Came, at the evening cold and gray,
To a chasm vast and deep and wide.
Through which was flowing a sullen tide
The old man crossed in the twilight dim,
The sullen stream had no fear for him;
But he turned when safe on the other side
And built a bridge to span the tide.

“Old man,” said a fellow pilgrim near,
“You are wasting your strength with building here;
Your journey will end with the ending day,
You never again will pass this way;
You’ve crossed the chasm, deep and wide,
Why build this bridge at evening tide?”

The builder lifted his old gray head;
“Good friend, in the path I have come,” he said,
“There followed after me to-day
A youth whose feet must pass this way.
This chasm that has been as naught to me
To that fair-haired youth may a pitfall be;
He, too, must cross in the twilight dim;
Good friend, I am building this bridge for him!”

In remembrance of Harry E. Bovay, Jr. and his ongoing legacy of supporting RRF’s mission of preserving the sight of future generations through programs of research and education. Understanding the causes of retinal disease is the first step towards finding cures.

Michael Patrick, President of the Harry E. Bovay Jr. Foundation, serves on the RRF Board of Directors.



Harry E. Bovay, Jr.



Michael Patrick

Accelerated Diabetic Retinopathy in Some Patients

A leading cause of blindness in American adults, diabetic retinopathy, occurs when blood vessels in the retina become damaged and leak fluid. Macular edema, swelling of the macula, is often a complication of diabetic retinopathy. The macula is responsible for the eye's detailed, central vision. As the damage due to diabetes progresses, the vessels become obstructed. New blood vessels grow on the surface of the retina, but may rupture, impairing vision. Currently, there are no treatments for diabetic retinopathy beyond controlling blood sugar and blood pressure levels. The new vessels of proliferative retinopathy can be treated with laser techniques, but often at the expense of a portion of the retina.

A new study from Mass Eye and Ear and Schepens Eye Research Institute has demonstrated an association between a defective myogenic response—the regulatory increase or decrease in blood pressure to keep blood flow within the vessels of the retina constant—and early, accelerated development of retinopathy in patients with type 1 diabetes. These findings, published in *Investigative Ophthalmology and Visual Science*, identify one mechanism to explain why some patients develop diabetic retinopathy sooner than others.

“In patients with a normal myogenic response, the retinal vessels constrict when increased pressure arrives, to maintain constant blood flow and avoid damage to the smaller vessels in the retina,” said Mara Lorenzi, MD, senior scientist at Massachusetts Eye and Ear/Schepens Eye Research Institute and a professor of ophthalmology, part-time at Harvard Medical School. “But we saw that, in about half of the diabetic patients in our study, the vessels did not constrict. In fact, paradoxically, some patients’ vessels dilated, and the blood flow to the retina was increased. This becomes a mechanism of damage for the small vessels, because these tiny, delicate capillaries are exposed to a big flow of pressure that can lead to the little hemorrhages and fluid leakage that are characteristic of diabetic retinopathy.”

With the knowledge gained from the new studies, the researchers hope to target the defective myogenic response and develop therapies to prevent the development of accelerated diabetic retinopathy in this population.

Medicalxpress.com



Dr. Mara Lorenzi



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Retina Research Foundation is dedicated to the eradication of retina disease through programs in research and education.

Macular Degeneration

“Why Keep My Appointments?”

By Arthur W. Willis, MD, RRF Board member



Dr. Art Willis

We have made great progress in the diagnosis and treatment of age-related macular degeneration (AMD) over the past 10 years. If you have been diagnosed with wet AMD, your doctor will give you a series of injections into your eye and then will prescribe a schedule for observation and / or injections for the rest of your life. There are two treatment methods:

1. **Treat and extend**

With this method, you will receive regular injections and the time between injections will be gradually extended.

2. **PRN** (as necessary)

With this method, after your initial injections (usually three), your doctor will examine and test your eyes on a regular schedule and give you injections as needed.

The two most common tests that you will have performed are:

1. **Optical coherence tomography (OCT)**

An OCT is a scan of the macula.

2. **Fluorescein angiography (FA)**

In an FA, dye is injected into your vein and is monitored with a camera as it travels through the retinal blood vessels.

These tests can detect changes in your retina before they become clinically visible.

It is extremely important that you keep all scheduled appointments, so that your doctor can properly monitor your AMD and adjust your treatment schedule in accordance with his or her clinical observation and testing.

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OCT Machine

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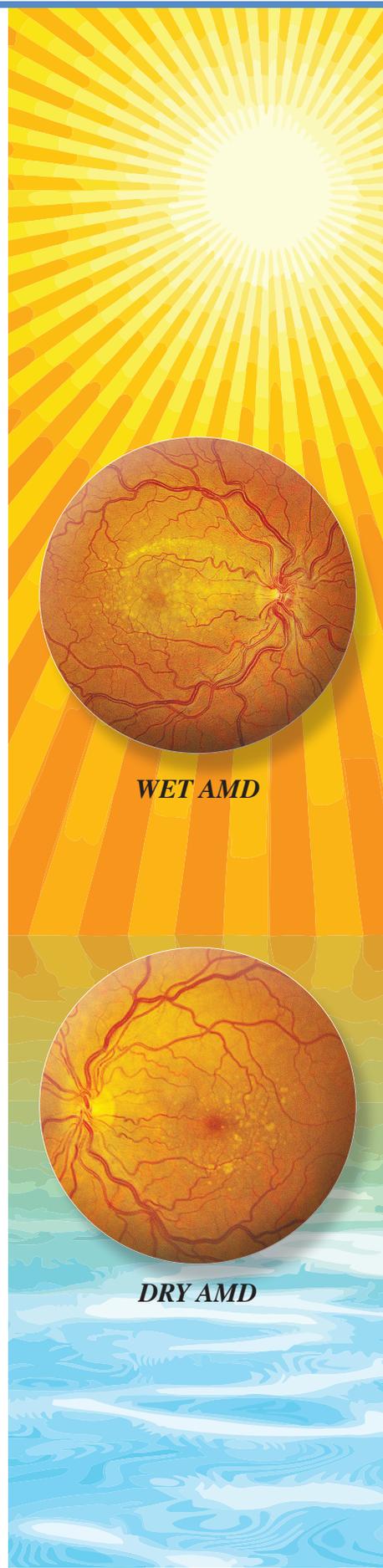
It is also important to understand that wet AMD cannot be cured. It can only be controlled, much in the way high blood pressure is controlled, so you will need long-term observation and treatment. If you are diligent about keeping your regularly scheduled appointments, you will give yourself the best chance of keeping good vision over the longest period of time.

Dry Macular Degeneration

About 75% of AMD is dry, and most people with wet AMD had dry AMD first and then converted to wet AMD. There is no cure for dry AMD, but its progression can be slowed with the use of antioxidant vitamins. Once you have been diagnosed, your doctor will set up a schedule of regular appointments. During these visits, your doctor will examine your eyes and perform tests to monitor the progress of your dry AMD. It is extremely important to keep these appointments, for three reasons:

1. Your doctor can monitor the progress of your AMD, which can vary from person to person.
2. More importantly, we can frequently discover wet AMD before it affects your vision, so that treatment can then be started early and in many cases stop the wet AMD before it affects your vision.
3. In the future, we will discover a treatment for dry AMD. It is important that you be on the schedule at your doctor's office so that he or she can notify you of any treatments that may become available in the future.

Arthur W. Willis, MD, of Retina and Vitreous of Texas, has extensive experience in treating all types of vitreoretinal disease, with special interest in the surgical treatment of macular disease, including macular pucker, macular hole and vitreoretinal traction syndrome. He is Clinical Associate Professor of Ophthalmology at Baylor College of Medicine, Houston, Texas. Dr. Willis is currently retired from the practice of medicine.



Retina Research Foundation / Joseph M. and Eula C. Lawrence Travel Grants

The RRF Lawrence Travel Scholarships provide funding for young scientists to travel to the annual meeting of The Association for Research in Vision and Ophthalmology (ARVO) and present their posters and papers. ARVO's mission is advancing research worldwide into understanding the visual system and preventing, treating and curing its disorders. Over 11,000 researchers from more than 75 countries attend the ARVO Annual Meeting.

The ARVO Annual Meeting provides a unique opportunity for trainees and early career investigators to discuss their research with leaders in their fields and receive encouragement to continue their work.

www.arvo.com

ARVO selected twenty-two researchers from fifteen states to receive the RRF Lawrence Travel Grants in 2016. Travel grant awards were based on the scientists' submitted and accepted abstracts directly related to retina research. This year the ARVO Meeting was held in May in Seattle, WA.

Over 350 RRF Lawrence Travel Grants have been awarded since 1993 to young vitreoretinal scientists.



**ARVO Foundation/Retina Research Foundation/
Joseph M. and Eula C. Lawrence Travel Grants**



A Milestone Is Now Reached

The mission of the Retina Research Foundation is to reduce retinal blindness worldwide by funding programs in research and education.

**We are proud to announce
that we have now passed the \$30 million mark
in research and educational programs
funded by RRF since 1969.**

Meet the Advisory Trustees

Kathy Orton

Kathy Orton is a native Houstonian, although she grew up in California. She received her B.A. cum laude from Sweet Briar College in Virginia and attended the University of Southampton, England, before making her way back to Houston.

Kathy is Senior Vice President, Healthcare Financial Services at Wells Fargo, leading a team serving large, not-for-profit healthcare systems in Texas and Colorado. Previously she had many senior roles at JPMorganChase, going back to Chairman, Texas Commerce Medical Bank.

Kathy serves on the board of The Alley Theatre and UTHealth. A member of the Alexis de Tocqueville Society of the United Way, Leadership Circle of the Museum of Fine Arts, and Junior League, she was previously a Directors of St. Luke's Episcopal Health System. She and John, an attorney at Thompson & Knight, have two grown daughters. They enjoy golf and skiing in Colorado in their spare time.



Kathy Orton

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Call the office for more information: 713-797-1925



Additional memorials received will appear in the next issue.