# TOWARD SUCCESSFUL AGING

Marco Pahor, M.D.

**Dear friends and colleagues,**

We all want to age successfully. That means more than simply accumulating the years as if the mere act of growing old is the entire goal itself. Our aspiration also should be to live active, healthy and independent lives, free of disease or disability, so that we can do the things we love, with the ones we love.

That is at the heart of the UF Institute on Aging's work. In research, clinical care and education, 2018 saw us continue to make great strides in advancing this mission.

We were delighted in May to celebrate the grand opening of the **Jacksonville Aging Studies Center, or JAX-ASCENT, a state-of-the art, multidisciplinary clinical translational research facility.** The center's mission is to train future research leaders and to conduct translational research on aging and independence of underserved, minority older adults. The center already has five active studies and more than 1,200 individuals from the Jacksonville area enrolled to participate in ongoing investigations.

Our geriatrics clinical practice, staffed by an outstanding team of providers, experienced another superb year. Indeed, **our practice was once again rated as one of the best in the nation in a ranking by U.S. News & World Report.**

Our graduate offerings continued their healthy growth. At the close of the year, **22 students were enrolled in our online master's program and 11 in the graduate certificate in aging and geriatric practice.**

And we welcomed **three new Institute faculty members** in 2018: Deepa Ramamurthi, M.D., Sung Min Han, Ph.D. and Mamoun Al-Mardini, Ph.D.

We will continue to build on the remarkable progress we have made in recent years. Your support is vital to the Institute and its work and helps us build a foundation for successful aging that will enrich all our lives. Thank you.

**Marco Pahor, M.D.**
**Director, UF Institute on Aging**

# A STEP INTO THE FUTURE

UF Health took a major step in solidifying its reputation as a national leader in aging studies with the spring 2018 grand opening of a groundbreaking research center in Jacksonville.

**The Jacksonville Aging Studies Center (JAX-ASCENT) is a hub for behavioral, nutritional and pharmacological clinical trials targeting older adults, particularly racial minorities and people of low socioeconomic status.** One research focus of the center is to study the social determinants of health contributing to chronic disease and functional decline in those demographic groups.

A key missions for JAX-ASCENT includes speeding the incorporation of research findings in aging and independent living into clinical care. This is known as translational research.

The center already has proven useful to researchers. More than 1,200 volunteers from greater Jacksonville have signed up for the center's registry to participate in ongoing research. Being able to draw participants from a city with a far greater population than Gainesville is one of the strengths of JAX-ASCENT, said Marco Pahor, M.D., director of the UF Institute on Aging. About 1.8 million people live in the Jacksonville area.

"The center also marks our commitment to training the next generation of scientists who will be the future leaders of geriatric medicine and research," said Pahor.

To that end, JAX-ASCENT joins an existing Junior Scholars program first initiated in Gainesville that offers grants to clinical and basic science researchers who are junior faculty or postdoctoral associates. The first Jacksonville recipients of Junior Scholars grants are Michael Pizzi, D.O., Ph.D., and Sophia S. Sheikh, M.D.

Sheikh's Junior Scholars research project involves the development of a risk-prediction screening tool for older adults who have been prescribed opioids in an emergency department. Pizzi is studying the degradation of the blood-brain barrier in ischemic stroke patients.

# UNDERSTANDING EXERCISE

UF Institute on Aging researchers and colleagues across the country completed preparations in 2018 for launching a major study to discover the underlying mechanisms of exercise that produce physical benefits.

**The initiative, called Molecular Transducers of Physical Activity in Humans, or MoTrPAC, is a research consortium involving 25 universities and research centers. The study, which received $170 million in National Institutes of Health funding, seeks to better understand how exercise impacts the body's "molecular map" of proteins, peptides, circulating nucleic acids, lipids, hormones and other molecules.**

Marco Pahor, M.D., Institute director, said researchers have finalized protocols that include an outline of the study's timetable, objectives, methods and procedures. Field operations are expected to begin by the summer of 2019.

Scientists have long known that regular exercise is associated with lowered risks of cancer, heart disease, stroke and diabetes, and can help weight control. But the exact biological mechanisms are not well-understood.

"Physicians preach the benefit of exercise to their patients with good reason. It works," said Pahor. "Exercise may be beneficial to longevity. But we just don't know how this happens. MoTrPAC brings to bear multidisciplinary expertise to unravel this mystery."

In conjunction with Wake Forest University and the University of Vermont, Pahor leads the consortium's coordinating center, which is managing the implementation of the study's protocols in humans and animals.

The study is expected to be finished in 2022.

**The initiative, called Molecular Transducers of Physical Activity in Humans, or MoTrPAC, is a research consortium involving 25 universities and research centers.**



# MIND IN MOTION

UF Institute on Aging researchers and collaborators around UF began work in 2018 on a $5.6 million study to better understand how aging of the brain influences walking ability. The study is called Mind in Motion and seeks to fill a gap in knowledge on how the brain controls walking.

The study, funded by the National Institutes of Health, will aid scientists in developing and testing future brain-related therapies to help people maintain physical independence.

While the brain controls every human movement, scientists remain puzzled about how brain aging affects mobility. One idea researchers said they will explore is a hypothesis that the aging brain loses some "reserve capacity," making it harder to control the legs and body during complex walking tasks, such as walking over bumpy paths.

The Mind in Motion study benefits from new tools that allow scientists to better investigate the brain during movement, researchers said.

Walking ability is critical to maintaining a high quality of life and living independently. About 30 percent of people age 60 to 69 suffer from mobility disability. The percentage increases with age: 40 percent of those age 70 to 79; and 55 percent for individuals over the age of 80.

## WOULD YOU LIKE TO PARTICIPATE?

**If you or friends and family members would like to learn more about the study, or would like to be screened by telephone to find out if you qualify to participate, please contact research staff by at 352-273-5919 or recruit@aging.ufl.edu. Compensation is provided for each study visit.**

*The project's NIH grant number is AG061389. Its principal investigators are David Clark, Sc.D., Todd Manini, Ph.D., and Rachael Seidler, Ph.D.*

# A NATIONAL REPUTATION

The excellence of UF Health geriatrics was once again recognized by U.S. News & World Report in 2018. In the publication's 2018-19 "Best Hospitals" survey, UF Health's geriatrics specialty ranked in the nation, joining five other specialties at UF Health Shands Hospital to achieve a top-50 national ranking. The "Best Hospitals" rankings are based largely or entirely on objective measures such as risk-adjusted survival and readmission rates, patient volume, patient experience and safety, and quality of nursing, among several metrics. U.S. News evaluated about 4,500 medical centers nationwide in 25 specialties, procedures and conditions. Only 158 hospitals were ranked in at least one specialty.

# FIGHTING CHRONIC PAIN

Older adults are at an increased risk of debilitating chronic pain, particularly from osteoarthritis, the leading cause of disability for those age 65 and older. Available pain therapies for osteoarthritis are only partially effective.

Researchers affiliated with the UF Institute on Aging, Yenisel Cruz-Almeida, Ph.D., and Natalie Ebner, Ph.D., have received a five-year, $1.6 million National Institutes of Health grant to study whether oxytocin might have pain-relief properties.

The project's goal is to determine oxytocin's pain-relieving effects in older adults with chronic osteoarthritis of the knee and to understand the individual characteristics that account for a positive response to treatment.

Oxytocin is best known as a hormone commonly used intravenously to stimulate labor contractions. Ebner, an associate professor in the UF College of Liberal Arts and Sciences' department of psychology, is an expert on oxytocin. Cruz-Almeida, an assistant professor in the UF College of Medicine's department of aging and geriatric research, is an expert on pain.

**Natalie Ebner, Ph.D., shows a participant how to apply an oxytocin nasal spray.**



# UNDERSTANDING HEARING LOSS

The worm could hardly be more different from the scientists studying it. This is patently obvious. Caenorhabditis elegans is a nematode the size of a pencil point with a mere 959 cells.

The cell count in the average human is roughly 30 trillion. Humans are capable of high reason (86 billion neurons). The worm — well, it wiggles (302 neurons).

A UF Institute on Aging scientist and Chinese collaborators, however, discovered the mechanism behind a hereditary hearing loss affecting tens of millions of people by examining two proteins the worm and humans share, even 600 million or so years after their common ancestor split down two forks in the evolutionary road.

**"THE BEAUTY OF BASIC SCIENTIFIC RESEARCH IS THAT IT IS SOMETIMES UNPREDICTABLE."**

**— Rui Xiao, Ph.D.**

Their research expands the fundamental understanding of cell mechanics and could one day assist researchers in curing hearing loss or other genetic diseases that may yet be tied to related proteins.

"We are very excited by this finding," said Rui Xiao, Ph.D., an assistant professor in the UF College of Medicine. "The beauty of basic scientific research is that it is sometimes unpredictable. You really don't know where the project will lead you or who it might ultimately help."

Researchers discovered that these two "transmembrane channel-like" proteins, known as TMC1 and TMC2, influence how neurons and muscle cells conduct electrical signals, said Xiao.

Genetic mutations in one or both of the TMC1 and TMC2 genes can cause partial or total hearing loss in humans, though the mechanism had been unknown. The study suggests that TMC proteins may act like an errant gatekeeper in the cell's protective plasma membrane. Mutations of TMC will prevent a normal electrical signal, generated when hair cell sensory receptors in our inner ears respond to sound waves, from flowing through neurons leading to the brain. That means the brain is unable to interpret the signal as sound.

# 2018 YEAR IN REVIEW

**UF CLAUDE D. PEPPER OLDER AMERICANS INDEPENDENCE CENTER:**
**KEY RESEARCH FINDINGS**

**55**
**RESEARCH PROJECTS**

**513**
**INSTITUTE RESEARCH STUDY PARTICIPANTS**

**249**
**PUBLICATIONS**

**11**
**AFFILIATED UF COLLEGES**

- Agricultural and Life Sciences
- Dentistry
- Education
- Engineering
- Health and Human Performance
- Liberal Arts and Sciences
- Medicine
- Nursing
- Pharmacy
- Public Health and Health Professions
- Veterinary Medicine

## Inflammation and cognitive deficits

Mounting evidence associates cognitive impairment with systemic immune activation. However, to our knowledge, previous studies have not directly examined the mediatory role of systemic inflammation on cognitive aging. The present study directly tests the mediatory role of systemic inflammation on age-related differences in cognitive processing speed and short-term memory in 93 participants. Our findings establish systemic inflammation as a potential mechanism underlying cognitive impairments in aging. These results highlight the importance of reducing inflammation to promote cognitive health. Preventative measures, such as regular aerobic exercise and medications to reduce inflammation, adopted across one's lifespan, might prove particularly important to protect against cognitive decline, especially among older adults.

*Lin T, Liu GA, Perez E, Rainer RD, Febo M, ★ Cruz-Almeida Y, ★ Ebner NC. Front Aging Neurosci.*

*2018 Aug 6;10:236. doi: 10.3389/fnagi.2018.00236. eCollection 2018.*

★ in front of name indicates UF Institute on Aging researcher

## Optimism and pain

An optimistic outlook promotes mental and physical wellbeing, research has suggested. In this study, we examined the associations among optimism, psychological resilience, clinical knee pain and the body's ability to inhibit pain. Our findings suggest that optimism is associated with endogenous pain inhibition (the body's ability to suppress pain) and lower knee pain. But for those who are more pessimistic, there might be a silver lining. Our research indicates psychological resilience, which is the ability to adapt to stressful events in the face of adverse conditions, is also associated with pain suppression. Further research is needed. But the good news is that these findings suggest endogenous pain inhibition mechanisms can be influenced by a number of positive psychological factors.

*Thompson KA, Bulls HW, ★ Sibille KT, Bartley EJ, Glover TL, Terry EL, Vaughn IA, Cardoso JS, Sotolongo A, Staud R, Hughes LB, Edberg JC, Redden DT, Bradley LA, Goodin BR, Fillingim RB.*

*Clin J Pain. 2018 Dec;34(12):1164-1172. doi: 10.1097/AJP.0000000000000642.*

## Measuring walking impairment

Stroke-related motor impairments restrict mobility, including reduced community movement, independence and participation in life-role activities. An important factor that helps explain mobility restrictions after stroke is the perceived challenge of walking as measured by self-reported levels of anxiety, fear of falling, low mobility self-efficacy and poor balance confidence. But self-reports are susceptible to measurement bias. Our study examines the measurement of sympathetic nervous system activity with skin conductance to detect physiological stress response. The study supports the feasibility of this method to gauge the perceived challenge of walking tasks in people post-stroke.

*Chatterjee SA, Daly JJ, Porges EC, Fox EJ, Rose DK, McGuirk TE, Otzel DM, Butera KA, ★ Clark DJ.*

*J Neurol Phys Ther. 2018 Oct;42(4):224-232. doi: 10.1097/NPT.0000000000000238.*

## Maintaining weight loss

Researchers have long known that most people have difficulty maintaining weight loss long-term. But existing research tells us little about when individuals begin to regain weight. In the present study, participants received "smart" scales that sent weights directly to our research servers so we could investigate individual patterns during a three-month weight-loss program. We believed we would observe in most people a period of weight loss followed by a period of maintenance, with a later transition to weight gain. Surprisingly, our results demonstrate participants transitioned immediately from weight loss to weight regain, with no maintenance period, followed by a slower rate of regain. Future studies should investigate whether extended-care programs change or merely delay this pattern.

*Ross KM, Qiu P, You L, Wing RR.*

*Obesity. 2018 Feb;26(2):318-323. doi: 10.1002/oby.22083.*

## Genetic link to walking speed

How fast someone walks can be a good sign of health. Indeed, a slower gait is associated with an array of problems, including disability and chronic illness. So, it's important to understand how walking speed declines as we age. We looked at in the DNA of the mitochondria — the energy powerhouse of our cells — to better understand its impact on walking speed. In a meta-analysis, we identify several mitochondrial DNA variants associated with different walking speeds. These results might help scientists better understand the interplay between walking speed and this genetic fingerprint. It also might help identify people at risk of mobility impairment.

★ *Manini TM, Buford TW, Kairalla JA, McDermott MM, Vaz Fragoso CA, Fielding RA, Hsu FC, Johannsen N, Kritchevsky S, Harris TB, Newman AB, Cummings SR, King AC, ★ Pahor M, Santanasto AJ, Tranah GJ.*

*Geroscience. 2018 Dec;40(5-6):497-511. doi: 10.1007/s11357-018-0043-x. Epub 2018 Oct 18.*

# 2018 YEAR IN REVIEW

**UF CLAUDE D. PEPPER OLDER AMERICANS INDEPENDENCE CENTER:**
**KEY RESEARCH FINDINGS**

**10,275**
**PATIENT CARE VISITS**

- 2,570 Skilled nursing facilityat Oak Hammock
- 971 Skilled nursing facility at Palm Garden Health and Rehab Center
- 1,876 Skilled nursing facility at Park Meadows Health and Rehab Center
- 812 Skilled nursing facility at Signature HealthCARE of Gainesville
- 1,719 UF Health Shands Cancer Hospital
- 1,993 UF Health Shands Hospital
- 303 UF Health Heart & Vascular and Neuromedicine Hospital
- 31 Other

**260**
**TRAINEES**

- 4 graduate students
- 34 volunteers
- 7 postdoctoral associates
- 5 cinical fellows
- 6 cinical shadowing students
- 14 visiting fellows
- 130 clerkship students
- 2 student assistants
- 39 master's students
- 19 certificate students

## Choreographing aging

Aging is a body-wide process. As animals and humans get older, tissues and organs age and lose function, albeit at different rates, resulting in an increased probability of death. Tissue-to-tissue communication plays a key role in choreographing this process. But relatively little is known about how this cross-talk between different cell types or tissues affects longevity, nor how genes regulate the process. Using the worm C. elegans, our study identifies two distinct neuroendocrine signaling circuits by which the worm's nervous system senses cool and warm environmental temperatures through cool- and warm-sensitive neurons and then signals the gut to extend and shorten lifespan, respectively.

*Zhang B, Gong J, Zhang W, ★Xiao R, Liu J, Xu XZS.*

*Genes Dev. 2018 Feb 1;32(3-4):258-270. doi: 10.1101/gad.309625.117.*

## Effects of Resveratrol on cognitive ability

Few therapies have been identified to treat cognitive decline or improve cognitive performance in older adults. The supplement Resveratrol has potent antioxidant activity and accumulating evidence of neuro-protective effects. In a pilot study involving 32 healthy, community dwelling, overweight older adults, we found that a daily 1,000-mg dose of Resveratrol for 90 days selectively improves psychomotor speed. But it does not significantly affect other areas of cognitive function, including working memory, verbal fluency and attention, among others. A dosage of 300 mg did show a 30 percent improvement in word recall, though this was not statistically significant.

*★Anton SD, Ebner N, Dzierzewski JM, Zlatar ZZ, Gurka MJ, Dotson VM, Kirton J, ★Mankowski RT, Marsiske M, ★Manini TM.*

*J Altern Complement Med. 2018 Jul;24(7):725-732. doi: 10.1089/acm.2017.0398.*

## Understanding sensory systems

Organisms react to the world around them differently depending on the strength of any particular stimulus. A moth is attracted to light. We pull our hand from a fire's heat. But how organisms neurologically decode stimulus into complex behavior is poorly understood. In this study, we use the worm C. elegans to better understand this. The chemical quinine is repulsive to the worm. Depending on the concentration of quinine, the worm will either reverse its movement or feed less. We found that a lone neuron in C. elegans that transmits signals between other neurons creates distinct signal patterns depending on the intensity of the quinine stimulus. This is potentially a key insight in the neuroscience of sensory systems.

*Zou W, Fu J, Zhang H, Du K, Huang W, Yu J, Li S, Fan Y, Baylis HA, Gao S, ★ Xiao R, Ji W, Kang L, Xu T.*

*Nat Commun. 2018 Oct 17;9(1):4311. doi: 10.1038/s41467-018-06819-5.*

## Staving off mobility disability

An exercise program can help older adults improve their health and stave off disability. A short-term exercise intervention might be an inexpensive way of slowing functional decline, if participants continue exercising after the program's completion. But in a follow-up to the Lifestyle Interventions and Independence for Elders (LIFE) study, we found that, although sedentary at-risk older adults increased their physical activity during a structured intervention, they did not continue at this level on their own following its conclusion. Future exercise interventions need to include novel methods to support older adults in continued physical activity following structured interventions.

*Henderson RM, Miller ME, Fielding RA, Gill TM, Glynn NW, Guralnik JM, King A, Newman AB, *Manini TM, Marsh AP, ★Pahor M, McDermott MM, Rejeski J, Tudor-Locke C, Kritchevsky SB; LIFE Study Investigators.*

*J Gerontol A Biol Sci Med Sci. 2018 Apr 17;73(5):688-694. doi: 10.1093/gerona/glx231.*

## Effect of exercise on frailty

As we age, our risk of becoming frail inevitably increases. The bad news doesn't stop there for older adults. Frailty brings with it a higher risk of surgical complications, morbidity, disability and even death. Exercise is a key element of a healthy lifestyle. But older, frailer people might benefit less. So we used information from the Lifestyle Interventions and Independence for Elders (LIFE) trial to see if we could clear up the picture. Our findings show that a structured, moderate-intensity physical activity program had the same mobility and walking benefits to older frail adults as non-frail people.

*Trombetti A, Hars M, Hsu FC, Reid KF, Church TS, Gill TM, King AC, Liu CK, ★Manini TM, McDermott MM, Newman AB, Rejeski WJ, Guralnik JM, ★Pahor M, Fielding RA.*

*Ann Intern Med. 2018 Mar 6;168(5):309-316. doi: 10.7326/M16-2011. Epub 2018 Jan 9.*

★ in front of name indicates UF Institute on Aging researcher

# SOLVING INFLAMMATION

Inflammation is the enemy of healthy aging.

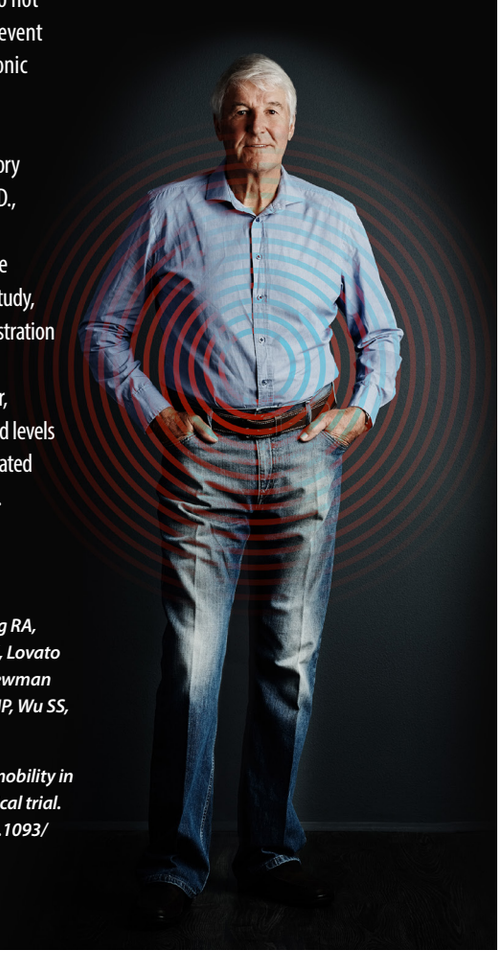
Not the inflammation that comes with a twisted ankle or an acute infection. Instead, low-grade, chronic inflammation throughout the body is more insidious, and often unnoticed. It brings with it a higher risk of disability, impaired mobility and slower walking speed.

It was with that in mind that UF Institute on Aging researchers embarked with colleagues from five other institutions on a three-year, $5.3 million pilot study to test whether fish oil and the blood pressure medication losartan, which have previously been shown to lower inflammation, could help improve physical function in older adults. The study is called Enabling Reduction of Low-Grade Inflammation in Seniors, or ENRGISE.

Study results from nearly 300 participants do not support the use of either fish oil or losartan to prevent mobility loss in older adults with low-grade, chronic inflammation.

"The results were quite unexpected, given the preliminary evidence regarding the anti-inflammatory effects of losartan and fish oil," said Marco Pahor, M.D., Institute director and a co-principal investigator of the study. "Our finding may possibly be related to the characteristics of the population recruited into this study, particularly older, frail participants, or to the administration of an insufficient dosage."

Study participants already had, or were at risk for, impaired mobility and included people with elevated levels of interleukin 6, the protein most consistently associated with difficulty in mobility. Their average age was 78.



*Pahor M, Anton SD, Beavers DP, Cauley JA, Fielding RA, Kritchevsky SB, Leeuwenburgh C, Lewis KH, Liu CK, Lovato LC, Lu J, Manini TM, McDermott MM, Miller ME, Newman AB, Radziszewska B, Stowe CL, Tracy RP, Walkup MP, Wu SS, Ambrosius WT.*

*Effect of losartan and fish oil on plasma IL-6 and mobility in older persons. The ENRGISE Pilot randomized clinical trial. J Gerontol A Biol Sci Med Sci. 2018. Dec 12. doi: 10.1093/gerona/gly277*



# WELCOME, NEW FACULTY

Sung Min Han, Ph.D

**Sung Min Han, Ph.D.**, an assistant professor in the UF College of Medicine's department of aging and geriatric research, earned his doctorate from the University of Alabama at Birmingham, where he studied cell biology. He later worked as a postdoctoral fellow at the Yale School of Medicine. His current research goal is to understand the underlying mechanisms of adult neurons' axon regeneration to provide a therapeutic strategy against axonal damage during aging.

Mamoun Mardini, Ph.D

**Mamoun Mardini, Ph.D.**, is an assistant professor in the UF College of Medicine's department of aging and geriatric research. He earned his doctorate in computer science at the University of North Carolina-Charlotte. His research interests include data science with an emphasis on health care analytics, precision health, remote health care monitoring systems, mobile health and the internet of things.

Deepa Ramamurthi, M.D.

**Deepa Ramamurthi, M.D.**, an assistant professor in the UF College of Medicine's department of aging and geriatric research, earned her medical degree from the Ross University School of Medicine in Dominica, West Indies. She is board-certified in family medicine, board-eligible in geriatric medicine and has completed fellowship training at the Icahn School of Medicine at Mount Sinai's Brookdale department of geriatrics and palliative medicine in New York City. Ramamurthi also has completed a residency in family and community medicine from the University of Texas Health Science Center at Houston and is the assistant program director for the UF College of Medicine fellowship in geriatric medicine. Her research interests include medical education, improving primary care and inpatient hospital outcomes.

# SPOTLIGHT ON AGING RESEARCH EVENT

**The UF Institute on Aging held its 8th annual Spotlight on Aging Research event in April 2018 with the theme, "Focus on data science." Researchers from the Institute and across UF made presentations.**



# WHY EVERY DOLLAR COUNTS

Unlocking life's mysteries — particularly the secrets of how long and how well we live — is the distinct focus of the UF Institute on Aging.

Our scientists and physicians are dedicated to achieving a better understanding of the biological mechanisms of aging and of how we can enhance our physical independence and cognitive abilities.

Your gift can make the critical difference in funding new scientific endeavors. Imagine discoveries that fuel positive cellular changes or lead to new therapies to help rehabilitate aging bones and joints ... private philanthropy makes all this and much more possible.

## YOU CAN HELP

**To learn about ways you can invest in a healthier and more independent tomorrow for us all, please contact Joseph Mandernach jmandern@ufl.edu, 352-273-9620.**

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# PROGRESS

2015
2016
2017
2018 ◀ Annual Report
2019

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