BIG QUESTIONS, BREAKTHROUGH SCIENCE.
Research, at its core, is about asking questions. Scientific inquiry has been an essential element of the American Federation for Aging Research’s DNA from the beginning. As the promise of aging research gains more momentum and attention, many of us are increasingly curious about how and when this research will move from the laboratory into our lives.

In AFAR’s 2018 Annual Report, we focus on three of the big questions most commonly asked about aging research today: Will there be a pill to slow aging? What can I do now to stay healthier, longer? Is it ever too late to improve your health?

To answer these questions, we highlight a small sample of the breakthrough science led by AFAR investigators. The research AFAR supports is driving a new generation of bold and creative clinical trials designed to translate this knowledge into novel drugs and therapies. Researchers also are advancing the science that shows how exercise, nutrition, and lifestyle interventions can improve health, even late in life.

AFAR experts are leading the conversation on how we can stay healthier, for longer, as we grow older. This year marked an important milestone for aging research in the medical community: the esteemed *Journal of the American Medical Association* (JAMA) invited five AFAR experts to contribute articles on geroscience, the research paradigm that seeks to understand the genetic, molecular, and cellular mechanisms that make aging a major risk factor and driver of common chronic conditions and diseases of older people.

In his JAMA article, board member S. Jay Olshansky, PhD, argues that “life extension should no longer be the primary goal of medicine when applied to people over age 65.” Instead, he writes, “the principal outcome and most important metric of success should be the extension of healthspan.”

James L. Kirkland, MD, PhD, President-Elect and 2012 grantee, explains in JAMA the potential for senolytic drugs to “transform care of older adults and patients with multiple chronic diseases that now can only be managed and have not been amenable to disease-modifying interventions.”

And Scientific Director Steven Austad, PhD, Deputy Scientific Director Nir Barzilai, MD, and 2000 grantee Ana Maria Cuervo, MD, PhD, note in a co-authored article: “The discovery of cellular and molecular pathways that modulate healthy aging in diverse species across great evolutionary distances offers an unprecedented opportunity for intervention.”

AFAR scientists are at the forefront of geroscience, and AFAR’s generous donors make possible the breakthrough science you will read about here. The investments we make in extraordinary scientists throughout their careers builds the pipeline of innovative research that will help us live healthier, longer. Championed by AFAR, the foundation of basic research in the biology of aging inspires new questions every day, and we are excited by the answers.

Stephanie Lederman
Executive Director
Will there be a pill to slow aging?

There won’t be a single pill, but a number of drugs and compounds that—combined with exercise, diet, and other healthy behaviors—will help us live healthier, longer.

“Research into the basic biological processes of aging led by AFAR experts for nearly four decades has built a pipeline of about 50 compounds that show some degree of promise in targeting the biological processes of aging in animal models,” says AFAR President-Elect and grantee James L. Kirkland, MD, PhD.

We now know that aging is the major risk factor for most chronic diseases, including cancer, stroke, heart disease, type 2 diabetes, and Alzheimer’s disease.

Moving into Clinical Trials

Currently, however, there is no U.S. Food and Drug Administration (FDA) indication for treatments that specifically target aging, as opposed to individual diseases.

That’s why AFAR is planning a large clinical trial — Targeting Aging with Metformin (TAME) — designed to establish proof-of-concept that the condition of aging is a treatable composite of age-related diseases. Led by AFAR Deputy Scientific Director and multiple grantee Nir Barzilai, MD (left), the TAME trial will investigate whether participants who take metformin, a widely used type 2 diabetes drug, experience delayed development or progression of age-related chronic diseases compared with those who take a placebo.

If the FDA considers aging an indication for treatment, the door would open to a range of drugs and compounds on the horizon to delay age-related diseases and extend years of health.

Senolytic drugs, which target damaged or senescent cells that tend to accumulate as we age, also are moving into clinical trials. Kirkland was part of the Mayo Clinic team that in 2015 reported the first senolytic drugs. In 2018, he was senior author on a study that found that a combination of the leukemia drug dasatinib and the supplement quercetin extended not just how long mice live, but also the time they live in good health. The first small pilot trial in humans was completed in early 2019, paving the way for larger trials.

In the Pipeline

AFAR experts are behind many of the scientific breakthroughs in aging research that have occurred in recent years—one or more of which may lead to new interventions:

Fisetin, a natural product found in many fruits and vegetables, also extends health and lifespan in mice by clearing out senescent cells, a 2018 study reported. Laura J. Niedernhofer, MD, PhD, 2018 Vincent Cristofalo Rising Star Award in Aging Research recipient, co-authored the study along with Kirkland and grantees Christin Burd, PhD (right), and Ming Xu, PhD.

SS-31, a mitochondrial-targeted peptide, reverses age-related oxidation reduction (redox) stress and improves tolerance of exercise in aged mice, according to a 2018 study co-authored by grantees David Marcinek, PhD. His research has already led directly to human trials as he investigates whether shifts in the redox homeostasis of the cell are a key mechanism underlying loss of function and impaired stress response with age.

NAD boosters are molecules that restore levels of nicotinamide adenine dinucleotide (NAD), a compound found in all living cells that naturally decreases by half as we age. A 2018 study led by AFAR board member and grantee David A. Sinclair, PhD, showed that a NAD precursor, NMN, stimulates blood vessel growth and boosts stamina and endurance in mice. An earlier study found that it also restores the ability of cells in older mice to repair DNA to youthful levels. NAD boosters are already in Phase 1 and 2 clinical trials to test their safety and effectiveness in humans.

Kirkland cautions that further research and clinical trials will determine whether these and other compounds, which have been shown to target the biological processes of aging in animals, will work in humans. In addition, researchers will also need to test “intelligent combinations” of compounds and develop biomarkers to measure the effects of different approaches.

“AFAR researchers are spearheading drug therapies that show great hope for delaying multiple age-related diseases and extending healthspan.”

– James L. Kirkland, MD, PhD
AFAR President-Elect
What can I do now to stay healthier, longer?

A lot, as it turns out. Research increasingly supports how exercise and nutrition can help you live independently and in good health as you age.

“Science shows that everyday lifestyle choices such as regular exercise and paying attention to not only what you eat, but when you eat, can help you live longer and better,” says AFAR President and Beeson scholar Mark S. Lachs, MD, MPH.

AFAR-supported research is helping to deepen our understanding of the essential role exercise and nutrition play in delaying the illnesses and ailments many of us associate with growing older.

The Cellular Benefits of Exercise

While the fact that exercise is good for our health is widely known, we’re just now beginning to appreciate the extent of the lifetime health benefits it bestows. Regular moderate to vigorous physical activity lowers the risk of heart disease, stroke, diabetes, frailty, dementia, cancer, and early death.

AFAR experts are blazing new trails by exploring the impact exercise has even at the cellular level as we age.

AFAR board member Rudy E. Tanzi, PhD, recently found that exercise can improve cognition in a mouse model of Alzheimer’s. The study shows that exercise not only turns on neurogenesis, inducing the production of new neurons in the brain, but also cleans up the hostile inflammatory environment associated with Alzheimer’s—allowing the new cells to survive and thrive.

And the research of Beeson scholar Ozioma Okonkwo, PhD (right), shows that exercise can help protect people against Alzheimer’s disease, even if they are at high genetic risk. Okonkwo’s research has found that a moderate-intensity active lifestyle actually boosts neuronal function. This probably is a pathway through which exercise prevents cognitive decline in middle life.

Research by grantee Ian R. Lanza, PhD, found that interval exercise in particular strengthens and increases mitochondria—the so-called powerhouses of cells—that had previously been weakened and reduced from aging.

Exercise can even help protect against harmful consequences of unhealthy diets on a cellular level. A study led by grantee Nathan LeBrasseur, PhD, found that exercise helps prevent diabetes-like symptoms by decreasing the effects of an unhealthy diet as well as levels of premature senescent cell accumulation.

It’s not just What You Eat, but When

Groundbreaking research in nutrition, dietary timing, and caloric restriction is led by grantees Valter D. Longo, PhD, and Satchidananda Panda, PhD.

Longo has pioneered research on a “fasting-mimicking diet” that includes periodically reducing caloric intake for five days. His studies have shown that a diet that imitates fasting by periodically reducing calories decreases risk factors for age-related diseases such as heart disease and cancer, among others.

Research by Panda (left) supports aligning our eating patterns with the natural circadian rhythms that are programmed into our DNA. That means limiting food intake to eight to 12 hours a day, and fasting the rest of the time. Research with mice shows that adhering to time-restricted eating reduced fat mass, reduced inflammation, reversed type 2 diabetes and fatty liver disease, and increased endurance—even when mice ate an unhealthy diet high in fat and sugar.

Three Beeson scholars are exploring the science behind the benefits of the Mediterranean diet. A 2017 study authored by Claire McEvoy, PhD (right), Kristine Yaffe, MD, and Kenneth Langa, MD, PhD, found that participants aged 50 and older with middle- to high-level adherence to the diet were less likely to have poor cognitive performance than those with lower adherence levels. A study by McEvoy and Yaffe has since linked adult adherence to the Mediterranean diet to improved cognitive performance at midlife.

We already know that lifestyle choices can extend healthspan. AFAR-supported research is revealing the biological underpinnings of specific benefits from exercise and healthy eating habits.

“AFAR experts are advancing the science behind exercise, nutrition, and aging. What you do today can extend your health tomorrow.”

– Mark S. Lachs, MD, MPH
AFAR President
Is it ever too late to improve your health?

In a word, no. Research shows that both drug therapies and lifestyle interventions can improve health, even late in life.

“In recent years, research has accumulated that shows how health can be transformed in our later years through both lifestyle interventions and emerging drug therapies,” notes AFAR Scientific Director Steven N. Austad, PhD.

Some of the drugs now in the pipeline that target the biological processes of aging, such as senolytics and rapamycin, provide substantial benefits even when given very late in life, animal studies show. And changes in exercise and diet also can have a positive impact on health even into our eighth, ninth, or tenth decades.

Lab Studies Turn Back Time

In a groundbreaking 2009 study co-authored by grantee Richard A. Miller, MD, PhD, mice that were given rapamycin in their food starting at the mouse equivalent of about 60 human-years-old lived about 30 percent longer than untreated mice from the time they began receiving the drug.

Another study, co-authored by multiple grantee Matt Kaeberlein, PhD, found that mice that were given rapamycin at the human equivalent of 70 years old also showed health improvements. Kaeberlein, who is the Co-Director of the Nathan Shock Center of Excellence in the Biology of Aging at the University of Washington, is now exploring rapamycin’s impact on canine longevity in order to better understand human healthspan through the Dog Aging Project.

Likewise, senolytic drugs, which reduce the number of senescent cells that accumulate throughout the body with age, have shown remarkable effects in older mice, improving kidney, heart, and lung functions, among other health benefits.

President-Elect James L. Kirkland, MD, PhD, and five AFAR grantees and/or awardees—Yuji Ikeno, MD, PhD, Nathan LeBrasseur, PhD, Laura Niedermhofer, MD, PhD, Allyson Palmer, MD, PhD (right), and Ming Xu, PhD—found that in mice, senolytic drugs that clear away these so-called “zombie cells” can improve health and extend life. The team gave senolytics to mice who are naturally aging, roughly equivalent to 80 human years old. Compared to untreated mice, these very old mice had a lower risk of early death and their post-treatment lifespan increased by about 36 percent.

Studies exploring how blood from younger animals can rejuvenate the cells and tissues of older animals also hold promise. Much of this research has been led by board member and multiple grantee Thomas A. Rando, MD, PhD.

“In recent studies, transfusing blood or even serum of blood from young mice into mice at the human equivalent of about 50 years old improved the health of their muscles, hearts, and brains,” Austad says. “There’s no reason to think that similar effects wouldn’t be found in even older mice.”

Reinvigorating Health through Exercise

The benefits of exercise—even if started late in life—are well supported. One study of especially frail people in their 90s found that three months of weight training significantly enhanced their strength, increased their walking speed, improved their balance, and prevented falls, even if they had previously been sedentary their whole lives.

AFAR-funded scientists are conducting research that has implications for late-in-life exercise and muscle strength.

Grantee Troy J. Cross, PhD (left), is studying how neural information arising from breathing and limb muscles may be involved in increased perceptions of breathlessness and limb fatigue as we age. His research may identify new therapeutic targets that could reduce these symptoms during physical activity, increasing the likelihood that older people will exercise more frequently, for longer periods, and at higher intensities.

Grantee Rizwan Qaisar, PhD, is studying age-related muscle weakness and atrophy in mice, with a goal of using a compound called CND1163 or a related compound to help prevent muscle loss in people as they age.

At any age, exercise and drug therapies can help people live healthier, science shows.

“AFAR investigators are exploring how both drug and lifestyle interventions can revitalize health and reverse damage in our 60s, 70s, 80s, or even 90s. We can improve our health even late in life.”

—Steven N. Austad, PhD
AFAR Scientific Director
AFAR grants are selected through a meticulous process. AFAR’s scientifically rigorous grant reviews help ensure that only the most promising science receives our support. Members of our Scientific Review Committees are accomplished scientists representing a wide range of expertise in biomedical research on aging. They volunteer their time and expertise to review hundreds of grant applications each year and select scientists and research projects that have the greatest likelihood of making significant contributions to help us stay healthier longer as we grow older. Many are also past AFAR grantees, and they play an important role in identifying the talent and research that AFAR supports. We are grateful for their contributions, which are essential in shaping the impact and reputation of AFAR’s grant programs.

Since 1981, AFAR has provided more than $178 million to more than 4,100 investigators and students.

AFAR is grateful to the Glenn Foundation for Medical Research for its support of this grant program.

GLENNS FOUNDATION FOR MEDICAL RESEARCH POSTDOCTORAL FELLOWSHIPS IN AGING RESEARCH

Joel Blanchard, PhD
Postdoctoral Associate,
Massachusetts Institute of Technology

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Research Fellow,
Harvard University

Ukrae Cho, PhD
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Sanford-Burnham Prebys Medical Discovery Institute

Sean James Miller, PhD
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Sharon Owino, PhD, MSCR
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Emory University

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University of Southern California

Kristoffer Svensson, PhD
Postdoctoral Researcher,
University of California, San Diego

Stephen Treaster, PhD
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Boston Children’s Hospital

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University of Wisconsin
Catherine Kaczorowski, PhD
The Jackson Laboratory
Edward Koo, MD
University of California, San Diego and National University of Singapore
Meng Wang, PhD
Baylor College of Medicine
Ashley Webb, PhD
Brown University

NEW INVESTIGATOR AWARDS IN ALZHEIMER’S DISEASE

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Johns Hopkins University

Andrea Soranno, PhD
Assistant Professor,
Washington University in St. Louis

Vivek Swarup, PhD
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Kim Green, PhD
University of California, Irvine
Itamar Kahn, PhD
Technion - Israel Institute of Technology
M. Paul Murphy, PhD
University of Kentucky

AFAR is grateful to The Rosalinde and Arthur Gilbert Foundation for its support of this grant program.

SCHOLARSHIPS FOR RESEARCH IN THE BIOLOGY OF AGING

Andree-Anne Berhiaum
Seattle Children’s Research Institute /
The Medical University of South Carolina

Ryan Castro
Virginia Polytechnic Institute and State University

Michael Cooney
Harvard University

Albina Ilbryeha
University of Southern California / The Buck Institute

Andrew Kane
Harvard University

Gavin Pharaoh
University of Oklahoma Health Sciences Center

Jason Wan
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Xiaotian Wu
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UT Health San Antonio
Vyacheslav Labunskyy, PhD
Boston University School of Medicine
David Lombard, MD, PhD
University of Michigan
John Newman, MD, PhD
The Buck Institute and University of California, San Francisco

AFAR is grateful to the Glenn Foundation for Medical Research for its support of these grant programs.
ADVANCING TRANSLATION, SUPPORTING POSTDOCS

The Irene Diamond Fund and AFAR established a new award in 2017 to help advance research poised for translation, led by early-career investigators. The Irene Diamond Fund/AFAR Postdoctoral Transition Awards in Aging program focuses on basic aging discoveries that have clearly articulated pathways toward clinical relevance and impacting the health and well-being of older adults. To date, the program has supported 15 postdoctoral fellows, whose research has implications for treating a range of age-related issues including cognitive impairment, exercise intolerance, frailty and inflammation, immune health, muscle loss, osteoporosis, post-stroke recovery, and more.

Research by 2018 Diamond/AFAR postdoctoral fellow Jenna Bartley, PhD, for example, may translate to interventions that improve general immune responses in older people. Bartley is studying whether the drug metformin can enhance T-cell function and boost the flu vaccine’s effectiveness in vulnerable older adults. Reduced response to the flu vaccine leaves many people age 65 and older unprotected from influenza—one of the leading killers of older adults.

Bartley notes that receiving this support at this point in her research path “will allow me to develop my own independent research line and grow tremendously as a scientist. I believe this grant has helped solidify my future career in academia and will be integral to my future success and transition to faculty.”

AFAR is grateful to board member Peter Kimmelman for his leadership, on behalf of AFAR and the Irene Diamond Fund, in developing this program.

THE IRENE DIAMOND FUND/AFAR POSTDOCTORAL TRANSITION AWARDS IN AGING

Bumsoo Ahn, PhD
Postdoctoral Fellow, Oklahoma Medical Research Foundation

Jenna Bartley, PhD
Postdoctoral Fellow, University of Connecticut School of Medicine

John Collins, PhD
Postdoctoral Fellow, University of North Carolina at Chapel Hill

Troy Cross, PhD
Senior Research Fellow, Mayo Clinic

Shelli Farhadian, MD, PhD
Postdoctoral Fellow, Yale University School of Medicine

Amy Gleichman, PhD
Postdoctoral Fellow, University of California, Los Angeles

Claire Gustafson, PhD
Postdoctoral Fellow, Stanford University

Emilie Reas, PhD
Postdoctoral Fellow, University of California, San Diego

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Johns Hopkins University School of Medicine

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Mayo Clinic, Rochester

Sean Leng, MD, PhD
Johns Hopkins University School of Medicine

Christian Sell, PhD
Drexel University College of Medicine

AFAR is grateful to The Irene Diamond Fund for its support of this grant program.

PHYSICIAN TRAINING GRANTS

AFAR’s Physician Training grant programs help faculty researchers and medical students become academic and clinical leaders prepared to meet the increasing healthcare needs of an ever-growing older population. The necessity to sensitize physicians to the needs of older patients could not be clearer, and AFAR’s Physician Training grants strengthen the research that will help older Americans stay healthier, longer.

THE PAUL B. BEESON EMERGING LEADERS CAREER DEVELOPMENT AWARDS IN AGING (K76)

Rebecca Brown, MD, MPH
Assistant Professor of Medicine, University of Pennsylvania

Kathryn Callahan, MD
Assistant Professor, Wake Forest School of Medicine

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Assistant Professor of Internal Medicine (Geriatrics), Yale University

Guido Falcone, MD, ScD, MPH
Assistant Professor of Neurology, Yale School of Medicine

Andrea Gilmore-Bykovskyi, PhD, RN
Assistant Professor, University of Wisconsin-Madison

Rasheeda Hall, MD
Assistant Professor of Medicine, Duke University Medical Center

Biren Kamdar, MD, MBA, MHS
Assistant Clinical Professor, University of California, San Diego School of Medicine

Jennifer Portz, PhD, MSW
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Nancy Schoenborn, MD
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2018 Beeson Scholars are fully funded through the National Institute on Aging (NIA) of the National Institutes of Health (NIH). The Beeson Annual Meetings are supported through The John A. Hartford Foundation and the NIA.

MEDICAL STUDENT TRAINING IN AGING RESEARCH (MSTAR) PROGRAM

MSTAR students privately funded at Weill Cornell Medicine

Sarah Dion - University of Cincinnati College of Medicine
James Gang, Max Morin, Tatiana Requijo - Weill Cornell Medicine

Funded by Lile and John Gibbons, The John A. Hartford Foundation, John and Rebecca Mach, Earl (Trip) and Allyson Samson, Norman Volk, and the Kathryn Wriston Fund.
CLARENCE PEARSON FELLOWSHIP IN GLOBAL HEALTH AND AGING

AFAR board member Clarence Pearson dedicated his career to building relationships across the public, private, and nonprofit sectors in order to raise awareness about the impact of the growing aging population worldwide. In his honor, this fellowship provides graduate public health students the opportunity to gain deeper knowledge of scientific, clinical, and social science research in age-related health concerns. Antonella Fegan (left), an MPA candidate at Seton Hall University, analyzed messaging strategies of aging research organizations worldwide during her fall 2018 Pearson Fellowship.

NATIONAL SCIENTIFIC ADVISORY COUNCIL (NSAC)

AFAR is grateful for the commitment of our NSAC members for lending their scientific expertise to our grant review process.

Peter Adams, PhD
Glasgow University

Shawn Ahmed, PhD
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WORKING WITH NIA TO FOSTER RESEARCH COLLABORATIONS ACROSS DISCIPLINES

The National Institute on Aging (NIA) of the National Institutes of Health (NIH) selected AFAR to serve as the Coordinating Center for the Nathan Shock Centers of Excellence in the Basic Biology of Aging to strengthen coordination and cooperation among the Shock Centers as well as increase outreach to the aging research field. Together with Wake Forest University School of Medicine, AFAR manages the new Research Centers Collaborative Network (RCCN), which aims to catalyze cross-disciplinary research across the six NIA Center Programs.

AFAR has served as the Coordinating Center for the Nathan Shock Centers (NSC), which is funded by NIA’s Division of Aging Biology, since 2017. AFAR’s role as the NSC Coordinating Center includes:

• Enhancing NSC external communications, expanding information resources, and serving as scientific exchange forum among NSC sites

• Working with the NSC directors to develop and implement data quality control and sharing between centers and with the scientific community at large

• Providing logistical support to the NSCs for interactions with NIA staff

• Developing and implementing evaluation strategies for assessing the effectiveness of the NSCs and the Coordinating Center.

In 2018, the NIA selected AFAR and Wake Forest School of Medicine to co-manage the new RCCN. The RCCN supports multidisciplinary efforts in aging research across the NIA center programs through five complementary strategies: conferences, pilot programs, early career faculty education, web-based resource identification tools, and fundraising development. The NIA center programs include: Alzheimer’s Disease Research Centers (ADRCs), Centers on the Demography and Economics of Aging (CDEAs), Claude D. Pepper Older Americans Independence Centers (OAIcs), Resource Centers for Minority Aging Research (RCMARs), and Roybal Centers for Translational Research on Aging, as well as the Nathan Shock Centers. These NIA center programs include more than 80 individual centers.

Through our leadership of these NIA programs, AFAR deepens its commitment to interdisciplinary and multidisciplinary research to improve the health of older adults.

Visit www.nathanshockcenters.org and www.rccn-aging.org to learn more.
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<td>Paul Salvaterra, PhD</td>
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<td>Tuxiang Sun, MD, PhD</td>
<td>Texas A&amp;M University</td>
</tr>
<tr>
<td>Mark Supiano, MD</td>
<td>University of Utah</td>
</tr>
<tr>
<td>Karen Swisshelm, PhD</td>
<td>University of Colorado Denver</td>
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<tr>
<td>Nektarios Tavvarakis, PhD</td>
<td>Hellas Medical School, University of Crete</td>
</tr>
<tr>
<td>J. Andrew Taylor, PhD</td>
<td>Harvard Medical School / Spaulding Hospital Cambridge</td>
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<tr>
<td>Qiang Tong, PhD</td>
<td>Baylor College of Medicine</td>
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<tr>
<td>John Tower, PhD</td>
<td>University of Southern California</td>
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<tr>
<td>Kelly Tremblay, PhD</td>
<td>University of Washington</td>
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<tr>
<td>R. Scott Turner, MD, PhD</td>
<td>Georgetown University Medical Center</td>
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<tr>
<td>Dennis Turner, MD</td>
<td>Duke University Medical Center</td>
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<tr>
<td>Zoltan Ungvari, MD</td>
<td>University of Oklahoma Health Sciences Center</td>
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<tr>
<td>Dario Riccardo Valenzano, PhD</td>
<td>Max Planck Institute for the Biology of Ageing</td>
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<tr>
<td>Linda Van Eldik, PhD</td>
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<tr>
<td>Holly Van Rommel, PhD</td>
<td>Oklahoma Medical Research Foundation</td>
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<tr>
<td>Marc Vervuelt, MSc, PhD</td>
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<td>Ruben Vidal, PhD</td>
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<tr>
<td>David Vlcek, PhD</td>
<td>CECAD, University of Cologne</td>
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<tr>
<td>Amy Wagers, PhD</td>
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<td>Meng Wang, PhD</td>
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<td>Xin Wang, PhD</td>
<td>Brigham and Women’s Hospital</td>
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<td>Huber Werner, PhD</td>
<td>Georgia State University</td>
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<tr>
<td>Gordon Warren, PhD</td>
<td>Brown University</td>
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<tr>
<td>Noah Weisleder, PhD</td>
<td>The Ohio State University Wexner Medical Center</td>
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<tr>
<td>Edward Weiss, MSc, PhD</td>
<td>Saint Louis University</td>
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<td>Flescher White, PhD</td>
<td>Indiana University School of Medicine</td>
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<td>John Woodward, PhD</td>
<td>Wayne State University</td>
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<tr>
<td>Dean Yamaguchi, MD</td>
<td>VA Greater Los Angeles Healthcare System</td>
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<tr>
<td>Andrew Yoo, PhD</td>
<td>Washington University School of Medicine</td>
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<tr>
<td>Xiyian Zheng, PhD</td>
<td>Carnegie Institution for Science</td>
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<tr>
<td>Shuanhu Zhou, PhD</td>
<td>Brigham and Women’s Hospital</td>
</tr>
<tr>
<td>Nicholas Ziai, PhD</td>
<td>Cass Western Reserve University</td>
</tr>
<tr>
<td>Driss Zoukhri, PhD</td>
<td>Tufts University</td>
</tr>
</tbody>
</table>

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- Make a gift to underwrite or endow a named research grant. Naming opportunities in support of AFAR research grants or disease-specific grants are available at multiple levels of giving. AFAR can also help design grant programs.
- Make a gift to our annual fund, the central vehicle for supporting our core research grant programs. Gifts may be made annually, as well as monthly and quarterly as a sustaining donor.
- Sponsor a scientific conference or public educational program. Opportunities for sponsorship are available at many levels.
- Make a planned gift as a member of the Irving S. Wright Legacy Society.
- Make a memorial or a tribute gift to honor a loved one or special occasion.
- Make a gift of stock or other tangible property. This is a win-win: while supporting aging research, you avoid paying capital gains taxes.
- Designate AFAR as the recipient of your donor advised fund.

We welcome the opportunity to speak with you about how your gift can help support AFAR’s work to advance research that will help us all live healthier, longer. For more information, please contact AFAR at 212.703.9977.

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IRVING S. WRIGHT LEGACY SOCIETY
We want to thank individuals who have named AFAR in their estate plans:

George E. Doty*
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Barbara Wright Gatje
Diana Jacobs Kalman
Robert and Bette Nielson
Leonard Rokaw
Mary Ann Sanford*

*Deceased

BREAKTHROUGHS IN HEALTHY AGING
START WITH YOUR SUPPORT

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AFAR hosted its Annual Awards Dinner and Scientific Symposium on November 6, 2018 in New York City at Lotte New York Palace.

AFAR presented the George E. and Mary J. Doty Award to Jim Mellon, Chairman and Co-Founder of Juvenescence Limited. A UK-based entrepreneur, Mellon aims to develop therapies for aging and the diseases of aging.

“It is an honor to be recognized by AFAR, an organization that is a pioneer in aging research,” Mellon said. “The field could not have advanced to where we are today without AFAR’s vision and willingness to take chances on funding the scientists who are conducting innovative studies that serve as the basis for so many of the therapies that are being developed today.”

AFAR also recognized its Scientific Awards of Distinction recipients. Laura J. Niedernhofer, MD, PhD, of the University of Minnesota was honored with the Vincent Cristofalo Rising Star Award in Aging Research. We presented our Irving S. Wright Award to David A. Sinclair, PhD, of Harvard Medical School, who shared how his 2000 AFAR grant supported his research path.

Emmy-Award winning producer Meredith Vieira served as Master of Ceremonies. Vieira also recently hosted the PBS documentary Incredible Aging, which features 14 AFAR experts.

New Therapies & Investment Opportunities Symposium

Preceding the dinner, AFAR hosted a scientific symposium discussing new therapies in aging research and highlighting opportunities for investment. The panel featured Deputy Scientific Director and multiple grantee Nir Barzilai, MD, BIG Award Selection Committee member Veronica Galvan, PhD, board member and multiple grantee Thomas A. Rando, MD, PhD, and the event’s honoree David Sinclair, PhD. Board Member Pol Vandenbroucke, MD (Senior Vice President and Chief Development Officer, Pfizer Essential Health) facilitated.

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### SUMMARIZED OPERATING RESULTS

#### OPERATING REVENUE

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
<th>%</th>
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<tbody>
<tr>
<td>Contributions</td>
<td>5,139,575</td>
<td>83</td>
</tr>
<tr>
<td>Investment Income, Net</td>
<td>76,888</td>
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<tr>
<td>Endowment Earnings</td>
<td>305,426</td>
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<td>Government Grants</td>
<td>705,652</td>
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<tr>
<td>Other</td>
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<tr>
<td><strong>Total Operating Revenue</strong></td>
<td>6,227,521</td>
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#### EXPENSES

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<td>Research Grants and Scholarships</td>
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<td>Meetings and Public Education</td>
<td>1,021,312</td>
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<tr>
<td><strong>Total Program Expense</strong></td>
<td>5,116,653</td>
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<tr>
<td>Management and General</td>
<td>458,366</td>
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<td>Fundraising</td>
<td>574,476</td>
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<td><strong>Total Supporting Expense</strong></td>
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<td><strong>Total Operating Expense</strong></td>
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<td><strong>Total Operating Income</strong></td>
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### SUMMARIZED BALANCE SHEET

#### Assets

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<th>Category</th>
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<td>Cash</td>
<td>3,138,557</td>
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<tr>
<td>Contributions Receivable</td>
<td>4,134,737</td>
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<td>Investments</td>
<td>12,474,700</td>
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<td>Other</td>
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<tr>
<td><strong>Total Assets</strong></td>
<td>21,139,592</td>
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#### Liabilities and Net Assets

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<tr>
<td>Research Grants and Scholarships Payable</td>
<td>1,712,975</td>
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<tr>
<td>Other</td>
<td>179,432</td>
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<td><strong>Total Liabilities</strong></td>
<td>1,892,407</td>
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#### Net Assets

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<tr>
<td>Net Assets without Donor Restrictions</td>
<td>5,601,346</td>
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<tr>
<td>Net Assets with Donor Restrictions</td>
<td>13,645,839</td>
<td>71</td>
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<tr>
<td><strong>Total Net Assets</strong></td>
<td>19,247,185</td>
<td>91</td>
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**AFAR is proud to maintain high fiscal standards internally, and we require the same of our grantee institutions.**

The above summarized financial information is derived from the organization’s audited financial statements, which are available at www.afar.org and upon request.

For the sixth consecutive year, AFAR has earned a 4-star rating from Charity Navigator, America’s largest and most-utilized independent evaluator of charities. This is the highest possible rating and shows that AFAR adheres to sector best practices and executes its mission in a financially efficient way.

Only 8% of the charities evaluated by Charity Navigator have received at least six consecutive 4-star evaluations, indicating that AFAR outperforms most other charities and exceeds industry standards.

Special thanks to all of the featured experts for lending their time and insights to this report.

AFAR 2018 Annual Report Creative Team:
SCP Communications - Copywriting; Elizabeth Hanson - Copyediting; John Chaich, MFA - Design.

All photographs courtesy of AFAR or the featured expert, as well as Nir Arieli Photography (p.22), Albert Einstein College of Medicine (p. 2, 8), Chris Keeney Photography (p. 5), Mayo Clinic (p. 4, 6), Ohio State University (p. 3), UConn School of Medicine (p. 12), University of Alabama at Birmingham (p. 7), and University of Wisconsin School of Medicine (p. 4).
Our mission: to support and advance healthy aging through biomedical research.