Live Healthier, Live Longer
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Aging in America:

- Over the past 10 years, the population age 65 and over increased from 37.2 million in 2006 to 49.2 million in 2016 (a 33% increase) and is projected to almost double to 98 million in 2060.

- The 85 and over population is projected to more than double from 6.4 million in 2016 to 14.6 million in 2040 (a 129% increase).

- The number of Americans aged 45-64—who will reach age 65+ the next two decades—increased by 12% between 2006 and 2016.

- About one in every seven, or 15.2%, of the population is an older American.

- Persons reaching age 65 have an average life expectancy of an additional 19.4 years (20.6 years for females and 18 years for males).

- There were 81,896 persons age 100 and over in 2016 (0.2% of the total age 65 and over population).

THE LONGEVITY DIVIDEND:

$ 4 trillion savings

"The economic value of delayed aging is estimated to be $7.1 trillion over fifty years. The greater investment in research to delay aging appears to be a highly efficient way to forestall disease, extend healthy life, and improve public health."

From “Substantial Health And Economic Returns From Delayed Aging May Warrant A New Focus For Medical Research,” in Health Affairs, by David Goldman, Prof of Public Policy and Pharmaceutical Economics USC; David Cutler, Prof of Economics, Harvard University; John W. Rowe, Prof of Health Policy and Management, Columbia University; Pierre-Carl Michaud, Prof of Economics, U of Quebec; Jay Olshansky, Prof of Epidemiology, University of Illinois Chicago; Jeffrey Sullivan and Desi Peneva, Precision Healthy Economics, LA.
What if we could stay healthier for longer by targeting the Biology of Aging?
The American Federation for Aging Research (AFAR) is a national non-profit organization that supports and advances pioneering biomedical research that is revolutionizing how we live healthier and longer.

For nearly four decades, AFAR has been the field’s talent incubator, providing more than $181 million in research grants to some 4,200 scientists at more than 50 major research institutions across the US, Europe, and the Middle East. A trusted leader and strategist, AFAR also works with public and private funders to steer high quality grant programs and interdisciplinary research networks.

AFAR-funded researchers are finding that modifying the basic cellular processes can delay—or even prevent—many chronic diseases, often at the same time. They are discovering that it is never too late—or too early—to improve health. This groundbreaking science is paving the way for innovative new therapies that promise to improve and extend our quality of life—at any age.

AFAR’s visionary leadership is transforming the future of healthy aging by:

- **ADVANCING RESEARCH**
- **FURTHERING THE FIELD**
- **DRIVING INNOVATION**
- **SHARING INSIGHTS**
- **BUILDING THE FUTURE**
Life expectancy—the number of years that people can, on average, expect to live—has increased by an astounding 30 years in the past century. In the United States, members of the baby boom generation turn 65 at a rate of 10,000 people a day.

AFAR’s founder, Dr. Irving S. Wright, was among the first to look ahead to the medical needs of this growing population of older people. Wright was an internationally recognized cardiologist and geriatrician who pioneered the modern use of anticoagulants in therapies like bypass surgery. In 1981, he started AFAR to develop resources for scientific research on aging and clinical care for an aging society. In AFAR’s first newsletter after the organization’s founding, Wright wrote: “We are tackling the greatest health problem of today and the coming years—the innumerable and complex disabilities of the aging population.”

Wright’s legacy also continues on at The Irving Sherwood Wright Center on Aging at Weill Cornell Medicine in New York, New York.

From the beginning, AFAR’s mission was to fund and nurture talented scientists and physicians and encourage them to pursue lifelong careers in research focused on aging processes and age-related diseases. The more than $181 million in grants and scholarships that AFAR’s grant programs have provided to some 4,200 scientists, physicians, and students at top-tier academic institutions since its founding have helped researchers lay the scientific foundation for understanding the biology of aging. AFAR’s grant programs also have been structured to build up the scientific field of aging research.

AFAR’s grants support critical stages of scientists’ careers, providing resources that allow a continued focus on aging research as grantees progress from postdoctoral researchers, or medical students, to tenured professors.

AFAR’s conferences have forged a community of researchers working on age-related topics, by bringing grantees together to exchange knowledge, promote collaboration, and plan future research.

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Advancing Biomedical Research

AFAR’s Biology of Aging grant programs have demonstrated over the years that by studying the basic biology of aging and aging mechanisms underlying age-related diseases, we can potentially delay many common, chronic diseases, including cancer, stroke, heart disease, type 2 diabetes, and Alzheimer’s disease.

Selected through a rigorously reviewed process led by expert committees, 35-40 grants and scholarships are awarded by AFAR each year.

These grants support research along a continuum, from very basic studies of model systems, molecules and cells, to studies that are building on very early stage translational research addressing human aging and health span.

AFAR’s core grant programs include:

- Arthritis and Aging Research Grant
- The Irene Diamond Fund/AFAR Postdoctoral Transition Awards in Aging
- Glenn Foundation for Medical Research and AFAR Grants for Junior Faculty
- Glenn Foundation for Medical Research Breakthroughs in Gerontology (BIG) Award
- Glenn Foundation for Medical Research Postdoctoral Fellowships in Aging Research
- Diana Jacobs Kalman/AFAR Scholarships for Research in the Biology of Aging
- Small Research Grant Program for the Next Generation of Researchers in Alzheimer’s Disease (R03)

Training Physician-Researchers

Currently, fewer than 7,500 physicians have the expertise to care for older Americans. The projected need is for 36,000 geriatricians by the year 2030. The U.S. also faces a dearth of individuals who have the combination of medical, academic, and scientific training to teach new practitioners and lead others in improving the care of older people.

To address this need, AFAR’s physician training grants nurture both a cadre of practitioners and a new generation of leaders in academic geriatrics and aging. Grants for medical students support research and training, opening the path to a career in geriatric medicine. Other awards support mid-career MDs and PhDs to their careers as leaders in geriatric research.

- The Paul B. Beeson Emerging Leaders Career Development Award in Aging (K76)
- Medical Student Training in Aging Research (MSTAR) Program

In a single decade, from 2005-15, 76 AFAR grantees went on to receive the coveted R01 grant from the NIH.

More than 1/2 of the Beeson Scholars now hold leadership positions in their institution.
AFAR grants are selected through a meticulous, scientifically rigorous review process to ensure that only the most promising science receives our support.

Members of AFAR’s Scientific Review Committees—over 200 members strong—are accomplished experts in biomedical research on aging, including past AFAR grantees.

AFAR’s grant review process is regarded as the gold-star standard in the field.

“When you apply for an AFAR grant, you know that your work will be evaluated and critiqued by the best aging experts. The satisfaction that your scientific views are appreciated by the leaders in our field is the biggest encouragement that a young scientist can get.”

Subhash D. Katewa, PhD
Buck Institute for Research on Aging
2014 AFAR Research Grant for Junior Faculty

AFAR : Talent Incubator

According to respondents in a recent AFAR Grantee Survey:

- Nearly 100% of grantees reported that their AFAR-funded research laid the groundwork for future studies.
- 99% continue to conduct aging-related research.
- 93% continue to develop the research topic initiated under their AFAR research grant.
- 69% published the results of their AFAR-sponsored research; 33% have had their research profiled in the media.
- 53% noted that AFAR-supported research stimulated follow-up studies by others.

AFAR has funded investigators at leading research institutions across the U.S., creating a lab without walls to foster scientific exchange and build the research pipeline.
In the nearly four decades since its founding, AFAR has been instrumental in building the body of knowledge and discourse that has developed the field of biomedical research on aging. With AFAR’s support, science has led to innumerable discoveries that are bringing us closer to the development of therapies that will extend healthspan, or our years of health as we age. Here are just a few examples of the science behind some of the most promising and far-reaching lab and lifestyle interventions that AFAR experts are driving.

**Senescent Cells Do Have a Damaging Impact as We Age—But Can Be Removed.**

These are cells that could once replicate to repair aging tissue but have now lost that capacity due to internal damage. It turns out that they degrade surrounding tissue by secreting harmful molecules. A long-time controversy has been whether senescent cells really had any damaging impact on us. We now know that they do—and why. Researchers have discovered methods to get rid of accumulating senescent cells. This has proven to have many beneficial effects on health in mice, such as preventing cancer and preserving heart and kidney function. We are now ready to translate this to humans.

**Young Blood Has Rejuvenating Properties.**

Blood of young animals contains molecules that can actually rejuvenate damaged heart, brain, and muscle in older adult animals. Although the identity of these molecules is still uncertain, researchers are curious to learn if humans have similar molecular rejuvenation patterns, which could help prevent or delay disorders like dementia and heart failure.

Support from AFAR through a 1990 Paul B. Beeson Emerging Leaders Career Development Award in Aging and a 2008 Glenn/AFAR Breakthroughs in Gerontology (BIG) Award, helped shape the research of **Thomas Rando, MD, PhD**, of Stanford University and lead to his expertise in the role of young blood in reversing aging processes. Dr. Rando is a Professor in the Department of Neurology and Neurological Sciences at Stanford University School of Medicine; Director of The Glenn Center for the Biology of Aging at Stanford University School of Medicine; and Deputy Director of the Stanford Center on Longevity (SCL). Dr. Rando is also an AFAR Board member.
EXERCISE HAS CELLULAR AND COGNITIVE BENEFITS

In addition to established benefits of preserving cardiovascular health, reducing body fat, and lowering blood sugar, we now also know that exercise slows age-related processes within our cells, which can benefit the brain. AFAR experts are blazing new trails by exploring the impact exercise has even at the cellular level as we age.

At the Mayo Clinic, 2002 Glenn/AFAR Scholarship for Research in the Biology of Aging and 2019 Vincent Cristofalo Rising Star Award in Aging Research recipient Nathan LeBrasseur, PhD, has 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. Dr. LeBrasseur is an Associate Professor and Director of the Healthy Aging and Independent Living Program at the Kogod Aging Center at the Mayo Clinic.

At Harvard, 2003 Paul B. Beeson Emerging Leaders Career Development Award in Aging Scholar Reisa Sperling, MD, has spearheaded and authored significant studies on the role of physical activity, walking in particular, in cognition and neurodegeneration in clinically normal older adults. Dr. Sperling is the Director of the Center for Alzheimer’s Research and Treatment at the Massachusetts Alzheimer’s Disease Research Center, and a Professor of Neurology, Harvard Medical School.

Restricting certain foods—without restricting calories—can increase healthspan. It’s also not just what you eat, but when.

Research shows that the restriction of certain food components, such as protein, or even just foods containing a certain amino acid, methionine, may preserve health without restricting calories themselves. Dietary timing also may extend health.

1998 AFAR Research Grant for Junior Faculty and 2013 Vincent Cristofalo Rising Star Award in Aging Research recipient Valter D. Longo, PhD, 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. Dr. Longo is the Director of the USC Longevity Institute, Edna M. Jones Professor of Gerontology, and a Professor of Biological Sciences at the USC Leonard Davis School of Gerontology.

2014 Julie Martin Mid-Career Award in Aging Research Satchidananda Panda, PhD, has led research on the health benefits of aligning our eating patterns with the natural circadian rhythms 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. Dr. Panda is a Professor at the Salk Institute for Biological Studies, where he leads the Panda Lab.
From family foundations to large federal government agencies, AFAR has worked closely with numerous organizations to help them maximize the impact of their investments in aging research, including:

**National Institute on Aging**

In 2017, The National Institute on Aging (NIA) of the National Institutes of Health (NIH) selected AFAR to serve as the Coordinating Center for the six NIA-funded Nathan Shock Centers of Excellence in the Basic Biology of Aging. AFAR fosters external communications and scientific exchange among NSC sites to developing and implementing evaluation strategies for assessing the effectiveness of the NSCs and the Coordinating Center. AFAR helped support seven NSC International Perspectives on Geroscience Meetings in 2019.

In 2018, the NIA selected AFAR and Wake Forest University School of Medicine to co-manage the new Research Centers Collaborative Network (RCCN). The RCCN aims to catalyze cross-disciplinary research across the six NIA Center Programs: the Alzheimer’s Disease Research Centers, Centers on the Demography and Economics of Aging, Claude D. Pepper Older Americans Independence Centers, Resource Centers for Minority Aging Research, Roybal Centers for Translational Research on Aging, as well as the Nathan Shock Centers. The RCCN consists of over 80 individual centers and five coordinating centers.

In 2019, the NIA awarded nearly $4.5 million in support of a new Clinician-Scientists Trans-disciplinary Aging Research (Clin-STAR) Coordinating Center. AFAR serves as the Clin-STAR National Program Office. The Clin-STAR Coordinating Center will develop a multi-faceted, national platform to promote and enrich the career development, training and trans-disciplinary research of clinician-investigators across the U.S., particularly early stage investigators who are committed to careers in aging research.

AFAR and the Glenn Foundation for Medical Research have collaborated to support a range of grant programs for several years: the Glenn Foundation for Medical Research and AFAR Grants for Junior Faculty, Glenn Foundation for Medical Research Breakthroughs in Gerontology (BIG) Award, and Glenn Foundation for Medical Research Postdoctoral Fellowships in Aging Research. AFAR and the Glenn Foundation also host annual scientific meetings in Santa Barbara, CA, which convene emerging investigators and established leaders in the field.

The National Academy of Medicine (NAM) has sought AFAR’s respected grant review expertise to strengthen its new Grand Challenge for Healthy Longevity. This major global initiative seeks to catalyze transformative innovation and inform policies and priorities to advance healthy aging and longevity globally. AFAR’s grant review process will help NAM select up to 80, two-year awards of $50,000 each.

The **NIA leverages AFAR’s foundational support to expand Alzheimer’s Funding**

As part of its National Plan addressing Alzheimer’s disease, the NIA looked to the success of the New Investigator Awards in Alzheimer’s Disease program, which AFAR managed with The Rosalinde and Arthur Gilbert Foundation. The New Investigator program proved to be essential to building the next generation of scientists advancing the research, strategies, and tools to tackle Alzheimer’s. Recognizing this, the NIA had the vision to evolve the New Investigator awards into a new Small Research Grant Program for the Next Generation of Clinical Researchers in Alzheimer’s Disease in 2018. Whereas the New Investigator program gave three grants of $100K a year, the new NIA Small Research Grant program funds close to 40 awards at $200K. The Gilbert Foundation and AFAR continue to support and organize the program’s Annual Meetings, to nurture scientific exchange and community.
Researchers supported by AFAR are leading significant advances in understanding the relationship between aging and genetics, cell function, and other molecular processes. Studies in laboratory animals have shown that the rate of biological aging can indeed be slowed, through caloric restriction, pharmaceuticals, and manipulating genetics, and the field is moving toward human trials.

**GEROSCIENCE**

AFAR experts are now beginning to translate laboratory findings into therapies that can delay, slow, or stop aging processes—the processes that underlie age-related chronic diseases, such as Alzheimer’s, diabetes, cancer, heart disease, and arthritis.

This interdisciplinary approach is referred to as **Geroscience**. The goal of geroscience research ultimately is to develop interventions that delay biological changes that happen with aging, prevent age-related diseases across-the-board, and extend healthspan—the time a person lives independently, free from serious disease and disability.

**To move society closer to realizing this goal of living healthier, longer, AFAR is planning a large clinical trial to establish proof-of-concept that the condition of aging is a treatable composite of age-related diseases.**

**THE TAME TRIAL**

The **TAME (Targeting Aging with Metformin) Trial** will investigate whether participants who take metformin—a widely used type 2 diabetes drug with a 60-year safety record—experience delayed development or progression of age-related chronic diseases compared with those who take a placebo.

The TAME Trial will seek to convince the U.S. Food and Drug Administration to approve aging itself as an indication for treatment—opening the door to an infusion of needed research and development funding for a range of drugs and compounds that are already in the pipeline including senolytics, rapamycin, NAD boosters, humanin, and fistetin.
The TAME (Targeting Aging with Metformin) Trial

**OPPORTUNITY**

The TAME (Targeting Aging with Metformin) Trial will establish a clinical trial to provide proof-of-concept that aging can be treated, just as we treat diseases.

Studies show that metformin—a safe, affordable drug approved for Diabetes—may influence metabolic and cellular processes that are associated with the development of age-related conditions.

Metformin and other drugs in development are expected to prevent the onset of these major diseases.

**CHALLENGE**

We hope the FDA will approve aging as an indication, to signify that aging can be “treated.” In medical terms, an “indication” for a drug refers to the use of that drug for treating a particular disease.

If aging is made an indication, the TAME Trial will mark a paradigm shift: from treating each age-related medical condition separately, to treating these conditions together, by targeting aging per se.

**NEED**

The estimated cost of the TAME Trial is $55 million, but targeting aging and age-related diseases through drug interventions holds the promise of extending years of health while saving trillions of dollars.

**The TAME TEAM**

**EXECUTIVE MANAGER:** Stephanie Lederman, American Federation for Aging Research

**TAME Executive Committee**

- Nir Barzilai, MD, PI
  Albert Einstein College of Medicine
- Steve Austad, PhD
  Nathan Shock Center of Excellence, University of Alabama Birmingham, AFAR Scientific Director
- James L. Kirkland, MD, PhD
  Director, Kogod Center on Aging, Mayo Clinic
- S. Jay Olshansky, PhD
  University of Illinois at Chicago
- David Sinclair, PhD
  Director, Glenn Center for the Biology of Aging, Harvard Medical School

**TAME Trial Committee**

- Nir Barzilai, MD, Co-PI
- Steve Kritchevsky, PhD,
  Wake Forest School of Medicine
  Co-PI: Clinical and Multi-Center studies
- Mark Espeland, PhD
  Wake-Forest School of Medicine,
  Co-PI: Study Design and Statistical
- George Kuchel, MD
  UConn Health Biomarker Development
- Vanita Aroda, MD
  Harvard Medical School Multi-Center Studies
- Jamie Justice, PhD
  Wake Forest School of Medicine Coordinator

**TAME Trial Sites**

- Johns Hopkins University
- University of Alabama
- Albert Einstein College of Medicine
- Northwestern University
- University of Connecticut
- University of Florida
- University of Tennessee
- University of Miami and Miami VA
- HealthPartners Institute
- Yale University
- University of Pittsburgh
- Brown University
- Brigham and Women’s Hospital
- Wake Forest School of Medicine
AFAR lends expertise and develops resources to share insights within the field and with the general public.

**Conferences and Symposiums**

At annual conferences, AFAR grantees share and discuss work, network, and shape the research agendas that move the field of aging research forward. Smaller AFAR-sponsored meetings foster crucial partnerships between scientists in academia and industry. With decades invested in the field and its network of thousands of current and former grantees, AFAR is at the hub of aging research.

AFAR also provides trustworthy information to the public on new medical findings that can help people live healthier as they grow older. AFAR engages the public through webinars, conferences, and the online resource InfoAging, found at afar.org, which features more than two-dozen downloadable guides, edited by guest experts on topics ranging from the biological causes of human aging to information on specific aging-related diseases to healthy lifestyle tips. InfoAging also features a series of Ask the Expert interviews with influential AFAR-supported scientists discussing their research.

**Multi-Media Expertise**

AFAR Scientific Director Steven N. Austad, PhD contributes a regular column to the PBS website, NextAvenue.org.

AFAR worked closely with producers to curate the content of two major TV specials:

- **Incredible Aging on PBS**, hosted by Meredith Vieira, in 2018
- **Breakthroughs: The Age of Aging, on National Geographic Channel**, directed by Ron Howard, in 2016.

AFAR-supported research and experts are frequently featured in respected scientific popular media, such as:
From 2015-2017, the AFAR Board of Directors engaged in a Strategic Planning Process, which affirmed AFAR’s commitment to its core programs while evolving its capacity to evolve the field of aging research in order to:

**BUILDING THE FUTURE | Strategic Planning**

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**Expand basic research on the molecular mechanisms that are thought to influence aging and susceptibility to disease.**

The past two decades in the field have seen a tidal wave of discoveries identifying cellular processes that influence the length of healthy life in animal models. Refining and extending these discoveries are necessary steps toward developing effective lifestyle, dietary, and pharmacological interventions to enhance and extend healthy years in humans.

**Foster proof-of-concept studies and develop outcome measures needed to advance translation into clinical interventions.**

A major gap exists in the pipeline of translation from animal studies that successfully target aging to implementation of those discoveries in people. AFAR seeks to provide research and training in the technical skills and knowledge necessary to close this gap. Doing so will accelerate the pace at which laboratory discoveries become available as health-prolonging treatments.

**Expand drug discovery and other medical intervention efforts that might target multiple age-related diseases and conditions.**

The above-mentioned discoveries have given us the capacity to medically target those processes in the same way that we target individual disease processes. For instance, once we understood some of the processes affecting heart disease and stroke, we could develop pharmaceuticals that target high blood pressure and cholesterol. This has led to a 35% drop in age-adjusted deaths from these diseases just since the turn of the 21st century. Targeting aging processes could be much more effective—delaying or preventing death and debility from many or most diseases of later life as a group. Addressing the many maladies of aging one at a time—the traditional medical approach—only extends the period of ill health as one disease replaces another. Targeting aging can preserve health itself.

**Develop clinical trial paradigms needed to evaluate effective interventions targeting the processes of aging.**

How can one test promising interventions that target the processes of aging? Pharmaceutical companies have avoided research and development in this area because they have assumed that it would take many decades to convince regulatory bodies such as the FDA that their drugs effectively did what they promised. Researchers with AFAR have shown that this assumption is wrong. They have developed and continue improving clinical trial paradigms to make such trials relatively short and cost-effective. Further work in this area will hasten the passage of health-extending drugs from the laboratory to the home medicine cabinet.
**EARLY INVESTMENT**
Your gift invests early in high-impact, long-term research. Promising young investigators leverage their AFAR grants to receive larger federal grants later in their careers, advancing innovations and interventions.

**NATIONAL REACH**
Your gift helps build the pipeline of research and network of scientific exchange. AFAR grants are not limited to a singular institution. Your support helps AFAR cultivate the “hive-mind” of ideas that researchers are evolving and advancing together.

**FISCAL FITNESS**
Your gift has optimum impact as the majority will directly fund our mission. AFAR’s intentionally responsible resource management results in low indirect costs, helping AFAR earn consistently the highest rankings from Charity Navigator and Guidestar.

**HEALTHY FUTURES**
Your gift helps move research from the labs into our lives. AFAR grantees are evolving basic research into clinical interventions that can help you and your loved ones enjoy more years of health and vibrancy as you grow older.
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Learn more at www.afar.org or follow AFARorg on Twitter and Facebook.