Aging in America

America's population is aging dramatically. More than **10,000** of the **78 million** Baby Boomers are turning **65** every day.[1] Approximately **20% of the population** will be **65** years of age and older **by 2030**.[2]

Care for older adults with multiple conditions accounts for **66% of health care spending**. Experts predict that **health care costs will increase 25% by 2030**, primarily due to this population aging. Spending for **Medicare** alone will jump by more than **60%** in the **next 10 years**, **from $555 billion** in 2011 **to $903 billion** by 2020.[3]

This aging population poses **unique scientific, medical and societal challenges** that must be met if people are to live long, healthy, and productive lives.
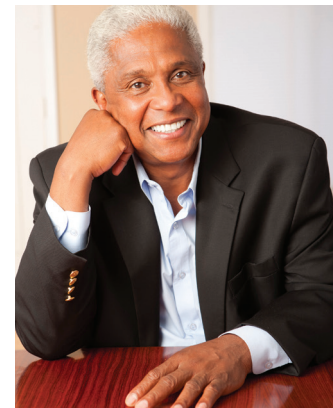
What is AFAR?

The American Federation for Aging Research (AFAR) is a national non-profit organization founded in 1981. Its mission is to support and advance healthy aging through biomedical research. **AFAR invests in medical research** to advance a **better understanding** of how **aging processes increase our vulnerabilities to diseases** as we age.

AFAR has awarded approximately **$150 million in grants** to more than **3,000** talented scientists and trainees. It funds scientists at all stages of their careers, providing **grants which range from $7,500 to $550,000**. AFAR identifies and supports cutting-edge **research** and encourages physicians to address the **needs of older adults**. AFAR provides opportunities for **scientific exchange** and **collaborations**, and updates the public on significant medical findings.

Aging and Disease

Age is a **major risk factor** for several physically, mentally, and economically devastating diseases typical of old age. **Science** provides the tools to uncover the connections between aging and illness. AFAR funds research projects which examine the impact of aging on the development and progression of diseases such as **Parkinson's disease**.

Parkinson's Disease

- Parkinson's disease is a **chronic and progressive** movement disorder

- Parkinson's disease affects **1 million Americans**[4]

- Parkinson's disease is the **14th leading cause of death** in the United States[5]

- Causes of Parkinson's disease are not well understood—most cases appear **randomly**[6]

- Parkinson's disease affects the **central nervous system** and diminishes **quality of life**

- Estimated that **50-80%** of Parkinson's disease sufferers may develop **dementia**[7]

- **Age** is one of the **most significant risk factors** for Parkinson's disease—on average, Parkinson's appears around **60 years of age**, and risk increases rapidly thereafter[8]

AFAR's Grants to Parkinson's Disease Research

- Nearly **$3 million** has been awarded to **34 scientists** researching Parkinson's disease and Parkinson's disease-related topics

- **21 male** and **13 female** scientists conducted this research at **26 institutions** in **15 states**

AFAR Grantees conducting noteworthy Parkinson's Disease Research

- **Ted M. Dawson, MD, PhD:** Director, Johns Hopkins University Udall Center of Excellence for Parkinson's Disease Research; Leonard and Madlyn Abramson Professor of Neurodegenerative Diseases
     AFAR Beeson Scholar, 1995

- **Charleen T. Chu, MD, PhD**: Professor of Pathology; Chair in Neuropathology, University of Pittsburgh
     AFAR Julie Martin Mid-Career Award Recipient, 2009
     AFAR Research Grant Recipient, 2000

- **Michael A. Schwarzschild, MD, PhD**: Professor of Neurology, Harvard Medical School; Director, Molecular Neurobiology Laboratory; Associate in Neurology, Massachusetts General Hospital
     AFAR Beeson Scholar, 2002

- **Ana Maria Cuervo, MD, PhD**: Robert and Renee Belfer Chair for the Study of Neurodegenerative Diseases; Professor, Departments of Developmental & Molecular Biology, Anatomy & Structural Biology, and Medicine; Co-Director, Einstein Institute for Aging Research
     AFAR Research Grant Recipient, 2000
     Led study on 'familial' (genetic) Parkinson's disease and how genetic mutations damage brain cells, the results of which were published in March 2013

- **Clemens R. Scherzer, MD**: Co-Director, Harvard NeuroDiscovery Biomarker Program; Associate Professor of Neurology, Harvard Medical School; Associate Neurologist, Brigham and Women's Hospital/ Massachusetts General Hospital
     AFAR Beeson Scholar, 2004
     Was featured in The Lancet: Neurology for his work in developing new methods of identifying biomarkers and treating Parkinson's disease
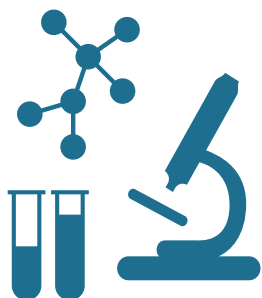
"The questions I get [from Parkinson's patients] pretty much every time I'm in the clinic, and which always make me squirm, are 'Doctor, how am I doing? What's my prognosis for the next few years? Am I responding well to my medicines? Unfortunately, with Parkinson's we just don't have the answers to any of these questions. It's essentially 19th century medicine."
—**Clemens Scherzer, MD, June 2013**

[1] Pew Research Center. "Baby Boomers Retire." 2010.
[2] Federal Interagency Forum on Aging-Related Statistics. 2012.
[3] Centers for Disease Control and Prevention. *The State of Aging and Health in America*. 2013.
[4] Alzheimer's Association. "Parkinson's Disease Dementia." 2012.
[5] Centers for Disease Control and Prevention. "Deaths: Preliminary Data for 2011." *National Vital Statistics Reports*. Oct. 2012.
[6] National Institutes of Health. "Parkinson's Disease." NIH Senior Health.
[7] Alzheimer's Association. "Parkinson's Disease Dementia." 2012.
[8] National Institutes of Health. "Parkinson's Disease." NIH Senior Health.

Aging & Parkinson's Disease | AFAR Funded Research Projects

Asa Abeliovich, MD, PhD: *Molecular Analysis of the Familial Parkinson's Disease Genes Parkin and Alpha-Synuclein,* Columbia University College of Physicians and Surgeons (2001)

Mariann Blum, PhD: *The role of EGF and bFGF gene expression in the maintenance and neurodegeneration of mesostriatal dopamine neurons,* Mount Sinai School of Medicine (1991)

William J. Bowers, PhD: *Improved HSV Amplicon Vectors for Long-term Treatment of Parkinson's Disease,* University of Rochester School of Medicine (1999)

Jesse M. Cedarbaum, MD: *Early Signs of Cognitive Impairment in Parkinson's Disease and Normal Aging,* Burke Rehabilitation Center, White Plains (1986)

Sic Lung Chan, PhD: *A novel stress response ubiquitin-domain protein counteracts mutant a-synuclein toxicity: a therapeutic target for Parkinson's disease,* University of Central Florida (2007)

Judy Y. Chen: *A clinical and molecular genetic analysis of early-onset Parkinson's disease in an Asian American Family,* Meharry Medical College (1999)

Charleen T. Chu, MD, PhD: *Superoxide and Nitric Oxide in a Parkinsonian Mouse Model,* University of Pittsburgh (2000)
Charleen T. Chu, MD, PhD: *Lysosomal basis of age-dependence in neurodegeneration,* University of Pittsburgh (2009)

Ian Creese, PhD: *Regulation of Dopamine Receptor Turnover Rates in Aging,* University of California, San Diego (1985)

Ana Maria Cuervo, MD, PhD: *Changes in the lysosomal receptor for chaperone-mediated autophagy with age,* Albert Einstein College of Medicine (2000)

Ted M. Dawson, MD, PhD: *Gene therapy for neurologic disorders,* Johns Hopkins University (1995)

Joseph P. Gaut: *A Myeloperoxidase-Dependent Pathway of Oxidative Damage in 1-Mehyl-4-Phenyl-1,2,3,6-Tetrahydropyridine-Induced Parkinson's Disease,* Washington University (1999)

Jaime M. Hatcher, MD, PhD: *Effects of Chronic Dieldrin Exposure to Organotypic Slice Cultures of Rat Striatum and Nigra, Emory University (2003)*

Michael Jakowec, PhD: *The Molecular Mechanisms Underlying Enhanced Sensitivity to MPTP in Old Squirrel Monkeys, Parkinson's Institute (1997)*

Jeffrey N. Joyce, PhD: *Neurotransmitter Alterations in Aged Striatum,* University of Pennsylvania (1987)

Deanna Marchionini, PhD: *Melatonin Treatment for Optimal Graft Survival in an Aged Rat Model of Parkinson's Disease,* Rush-Presbyterian- St. Luke's (2002)

Patrick McLaughlin, MD: *Proteomic Analysis of Proteins related to Inflammation in Parkinson's Disease,* University of Washington (2004)

Renee Miller, PhD: Gene Expression Profiling in Parkinson's Disease, University of Rochester (2000)

Xuan V. Nguyen, MD, PhD: *Age-Dependent Alterations in Dopamine and the Nigrostriatal System in Prodynophin Knockout Mice,* University of Kentucky (2004)

Jacqueline E. Payton, MD, PhD: *Functional Analysis of the Neurodegenerative Disease-Related Protein, Alpha-Synuclein*, University of Illinois Urbana-Champaign (2002)

Richard J. Perrin, MD, PhD: *Analysis of Polyunsaturated Fatty Acid-induced Modification of Alpha-Synuclein, a Protein Involved in Neurodegenerative Disease*, University of Illinois Urbana-Champaign (2003)

Chandan Prasad, PhD: *Cyclo (His-Pro) and Neuroleptic-induced Animal Model of Tardive Dyskinesia*, Louisiana State University School of Medicine (1985)

Clemens R. Scherzer, MD: *Genomic and Genetic Analysis of Parkinson's Disease*, Brigham and Women's Hospital/ Harvard Medical School (2004)

Jay S. Schneider, PhD: *The Effects of Age on Dopamine System Regeneration in a Rodent Model of Parkinsonism*, Hahnemann University (1988)

Michael A. Schwarzschild, MD, PhD: S*orting Out Clues to Parkinson's Disease: Caffeine, Postmenopausal Estrogen and Addiction*, Harvard Medical School (2002)

Shu-ou Shan, PhD: *A novel protein disaggregase - from molecular mechanisms to novel cures,* California Institute of Technology (2012)

David K. Simon, MD, PhD: *Mitochondrial DNA repair and Parkinson's disease*, Harvard Medical School (2005)

Caryl E. Sortwell, PhD: *Trophic Inhibition of Apoptosis in Mesencephalic Grafts to Aged Rats*, Rush-Presbyterian-St. Luke's (1999)

Mei Sun, PhD: *Developing gene therapy for Parkinson's Disease using helper virus-free HSV-1 vectors*, West Roxbury VA Hospital/ Harvard Medical School (2001)

Christopher H. van Dyck, MD: *Motor Correlates of Striatal Dopamine Transporter Binding with [123I] B-CIT SPECT in Older Adults*, Yale University School of Medicine (1995)

Victor S. Van Laar, PhD: *The role of parkin in neuronal mitochondrial dynamics and neurodegeneration,* University of Pittsburgh (2010)

Demetri Vassilatis, PhD: *Caenorhabditis elegans as a model for Parkinson's disease*, Baylor College of Medicine (2000)

Tessa Walters: *Biochemical and Immunocytochemical-stereologicaal Analysis of Mouse Nigrostriatal Degeneration after Exposure to Dithiocarbamates and MPTP*, Parkinson's Institute (1996)

Yongjie Zhang, PhD: *Generation and characterization of M337V TDP-43 transgenic mice: a possible model for TDP-43 proteinopath*y, Mayo Clinic College of Medicine (2009)