SPRING
2018

THE SCIENCE OF
AGING

IOA HOSTS 11th ANNUAL VINCENT J. CRISTOFALO LECTURESHIP

On Tuesday, February 6, 2018, the Institute on Aging (IOA) at the University of Pennsylvania hosted their 11th annual Vincent J. Cristofalo Lectureship. This year's lecture titled "The Surprising Role of Nuclear Architecture in Aging" was presented by Tom Misteli, PhD, Director, Center for Cancer Research at the National Cancer Institute, National Institutes of Health (NIH).

Dr. Misteli is an internationally renowned cell biologist who pioneered the use of imaging approaches to study genomes and gene expression in living cells. His lab's interest is to uncover the fundamental principles of 3D genome organization and function and to apply this knowledge to the development of novel diagnostic and therapeutic strategies for cancer and aging.

This lectureship celebrates the spirit and continuing research of our colleague, mentor, and friend, Vincent J. Cristofalo, PhD. Dr. Cristofalo, a pioneer in research in aging, is the founder of the Center for the Study of Aging, now known as the Institute on Aging (IOA), at the University of Pennsylvania's Perelman School of Medicine.

"This annual tribute to Vincent Cristofalo is to acknowledge in perpetuity his contributions to aging research, his critical scientific thinking, as well as his commitment to mentees, colleagues, friends and family." – Robert Pignolo, MD, PhD

IN THIS ISSUE:

ANNOUNCEMENTS:

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The mission of the Institute on Aging at the University of Pennsylvania is to improve the health of older adults by increasing the quality and quantity of clinical and basic research as well as educational programs focusing on normal aging and aging-related diseases across the entire Penn campus.

Institute on Aging
University of Pennsylvania

RALSTON CENTER

PROMOTING HEALTHY AGING FOR SENIORS IN WEST PHILADELPHIA

As part of their mission to improve the health and quality of life for older adults in Philadelphia, the Ralston Center has recently started an education program to inform seniors in and around West Philadelphia on various hot topics of healthy aging.

Their first session, "Healthy Heart Habits for Older Adults," focused on steps that individuals can take to better their cardiovascular health and overall well-being. Keynote speaker, Elisabeth Collins, MD, a Geriatric Fellow in the University of Pennsylvania's Department of Geriatrics kicked off her lecture by addressing some of the "normal" and not-so-normal heart changes that individuals experience as they get older.

As we age, it is normal to experience things such as a slower heart rate, a slight increase in blood pressure, and sometimes even developing a slight heart murmur as a result of natural stiffening of our heart valves. Since these changes are relatively common, they are typically not a cause for concern as long as the changes you are experiencing are minor. However, some of the "not-so-normal" changes include conditions such as coronary heart disease, heart failure, and heart attacks, which are much more serious.

As important as it is to understand these changes and how to recognize whether or not something you are experiencing is normal, it is equally as important to know how to modify your risk factors for these diseases. Dr. Collins suggests modifying your diet to include low-calorie, nutrient rich foods that are low in bad fats and sugars. Many studies suggest that following a Mediterranean diet -- a diet consisting of healthy fats like olive oil instead of butter, and lean meats and poultry such as chicken, turkey, or fish instead of red meat -- can be very beneficial for heart health. She also recommends you try to get at least 30 minutes of exercise a day, at least 4 days a week.

The Ralston Center's most recent session, "Aging Well Through Good Nutrition and Movement," reiterated the importance of a healthy diet and active lifestyle. Keynote speaker, Stella L. Volpe, PhD, RD, LDN, FACSM, Professor and Chair of the Department of Nutrition Sciences at the Drexel College of Nursing and Health Professions, led a Q&A style discussion on empowering yourself to live a healthier lifestyle by incorporating good nutrition and more movement into your day and other ways to feel better as you age.

"Anytime you get a chance to do something that may challenge you, do it," says Dr. Volpe. "It doesn't have to be a marathon -- just anything that will challenge *you*. And remember, it is okay if you need assistance." Whether it is a little change throughout your day like taking a few extra trips up and down your stairs instead of trying to carry all of your laundry at once or deliberate work out sessions like aerobics, "the best kind of exercise is one that you'll do," explained Dr. Volpe.

She also shared many tips on how to provide our body the nutrients it needs through certain fruits, vegetables, and dietary supplements. For example, Dr. Volpe suggests trying to get around 1,000mg of calcium a day to help keep your bones healthy and strong. For better absorption, she generally recommends calcium citrate twice a day -- 500mg in the morning and 500mg at night -- with vitamin D. She also said that increasing your potassium, when necessary, through foods like bananas, strawberries, and potatoes or adding natural probiotics such as yogurt to your diet can also be very beneficial.

To learn more about the Ralston Center and their upcoming education programs, visit www.ralstoncenter.org

INTRODUCING LYNETTE M. KILLEN

The Ralston Center recently welcomed Lynette M. Killen as their new Executive Director. Killen previously served as CEO of Chandler Hall, a Quaker-based, long-term-care residential community and hospice in Bucks County as well as administrator for geriatric services at Albert Einstein Medical Center and director positions in social work for Philadelphia College of Osteopathic Medicine and Methodist Hospital.

> **"Working in geriatric services gives me an opportunity to both give and take in a society that does not always respect and offer dignity to elders."**
>
> - Lynette M. Killen

For more on Lynette M. Killen, visit:
www.penninstituteonaging.wordpress.com

2019 INSTITUTE ON AGING (IOA) + ALZHEIMER'S DISEASE CORE CENTER (ADCC) PILOT AWARDS

IOA-FUNDED PILOTS

Psychological Stress Exposure, Biological Functioning, and Cognitive Change across the Life Course
PI: Courtney E. Boen, PhD, MPH

Defining the epidemiology and functional outcomes after surgery of older adults with cognitive impairment and dementia
PI: Timothy G. Gaulton, MD, MSc

Development of a Goal-Directed Behavior App: Changing Apathy into Action in Neurodegenerative Diseases
PI: Dawn Mechanic-Hamilton, PhD

The role of telomeric protein TRF2 in dilated cardiomyopathy
PI: Foteini Mourkioti, PhD

ADCC-FUNDED PILOTS

Sleep modification to transform brain aging in health and disease
PI: Matthew S. Kayser, MD, PhD

Intercellular coordination of autophagy between neurons and glia in models of neurodegenerative disease
PI: Sandra Maday, PhD

For more information, including pilot abstracts, visit:
www.med.upenn.edu/aging/PilotAwards.html

WHAT'S NEW?

HIGHLIGHTING SOME OF THE LATEST AGING-RELATED RESEARCH AT PENN & BEYOND

BRAIN IMMUNE SYSTEM IS KEY TO RECOVERY FROM MOTOR NEURON DEGENERATION

// A PENN MEDICINE NEWS RELEASE

The selective demise of motor neurons is the hallmark of Lou Gehrig's disease, also known as amyotrophic lateral sclerosis (ALS). Yet neurologists have suspected there are other types of brain cells involved in the progression of this disorder -- perhaps protection from it, which could light the way to treatment methods for the incurable disease. To get to the bottom of this question, researchers in the Perelman School of Medicine at the University of Pennsylvania engineered mice in which the damage caused by a mutant human TDP-43 protein could be reversed by one type of brain immune cell. TDP-43 is a protein that misfolds and accumulates in the motor areas of the brains of ALS patients.

First author **Krista J. Spiller, PhD**, a postdoctoral fellow at the University of Pennsylvania's Center for Neurodegenerative Disease Research (CNDR), and senior author **Virginia M.-Y. Lee, PhD**, director of CNDR, found that microglia, the first and primary immune response cells in the brain and spinal cord, are essential for dealing with TDP-43-associated neuron death. This study is the first to demonstrate how healthy microglia respond to pathological TDP-43 in a living animal.

> "The prevailing view in the field has been that immune system inflammation contributes to the death of neurons in ALS, but this study shows the opposite," said Lee.

The number of microglia cells remained stable in mice with ALS symptoms. However, after the researchers chemically suppressed expression of pathological human TDP-43 in the mice, microglia dramatically proliferated and changed their shape and what genes they expressed.

The researchers were perplexed as to why the microglia did not react automatically to the presence of mutant TDP-43 and how subduing its expression incited microglia to react. "This is still a mystery, but one that we'd very much like to figure out in future studies," Spiller said.

To read the full Penn Medicine News Releases published by Karen Kreeger, visit: www.pennmedicine.org/news/news-releases

"EPIGENETIC LANDSCAPE" IS PROTECTIVE IN NORMAL AGING, IMPAIRED IN ALZHEIMER'S DISEASE

// A PENN MEDICINE NEWS RELEASE

Although certain genetic variants increase the risk of Alzheimer's disease (AD), age is the strongest known risk factor. But the way in which molecular processes of aging predispose people to AD, or become impaired in AD remains a mystery.

A team of Penn Medicine researchers including **Shelley Berger, PhD**, professor of Cell and Developmental Biology, **Nancy Bonini, PhD**, professor of Biology, and **Brad Johnson, MD, PhD**, associate professor of Pathology and Laboratory Medicine and Associate Director of the IOA, profiled the epigenomic landscape of AD brains, specifically in one of the regions affected early in AD, the lateral temporal lobe. They compared these to both younger and elderly cognitively normal control subjects. The team described the genome-wide enrichment of a chemical modification of histone proteins that regulates the compaction of chromosomes in the nucleus (called acetylation of lysine 16 on histone H4, or H4K16ac for short).

Changes to the way H4K16ac is modified along the genome in disease versus normal aging brains may signify places for future drug development. Because changes in H4K16ac govern how genes are expressed, the location and amount of epigenetic alterations is called the "epigenetic landscape."

> "Our results establish the basis for an epigenetic link between aging and Alzheimer's disease," said Berger.

The team found that, while normal aging leads to increasing H4K16ac in new positions along the genome and an increase in where it is already present, in great contrast, AD entails losses of H4K16ac in the proximity of genes linked to aging and AD. In addition, the team discovered an association between the location of H4K16ac changes and genetic variants identified in prior AD genome-wide association studies.

A three-way comparison of younger, older, and AD brain tissue revealed a specific class of H4K16ac changes in AD compared to normal age-established changes in the brain. This finding indicates that certain normal aging changes in the epigenome may actually protect against AD and when these goes awry, a person may become predisposed to AD.

EVENTS

Penn Frontotemporal Degeneration Center
Caregiver Conference

The Penn Frontotemporal Degeneration (FTD) Center is a national leader in research and treatment for FTD and related conditions such as ALS.
The Institute on Aging is a proud sponsor of this event.

Friday, June 8, 2018 | 8am-4:30pm | Smilow Center

This conference includes: information from leading experts in neuropsychology, clinical care, genetics and cognitive neuroscience, the latest research, practical caregiving strategies, legal considerations related to FTD, networking for caregivers and advocates, and so much more! ***New this year*** Small break-out sessions + a poster session!

To learn more + Register: Contact Katie at katie.pizziketti@uphs.upenn.edu or 215-349-5873

PENN'S 5K FOR THE IOA | The Institute on Aging
& THE MEMORY MILE WALK

Save the date: Sunday, September 23, 2018 @ Penn Park

Join us for our 7th Annual 5K for the IOA and Memory Mile Walk to help support Alzheimer's and aging-related research and care at Penn's Institute on Aging!
More details coming soon!

IOA TEAM

John Q. Trojanowski, MD, PhD
Director

F. Bradley Johnson, MD, PhD
Associate Director

M. Kathryn Jedrziewski, PhD
Deputy Director

Nicolette Patete Calcavecchia
Digital Media Specialist

Ebony Fenderson
Financial Administrative Coordinator

Elizabeth Yannes
Penn Medicine Development

Hannah Messinger
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MAKE A GIFT

To support aging-related research & care at Penn's Institute on Aging, contact:
Aubre Naughton, Penn Medicine Development
aubren@upenn.edu or 215-898-9174

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Learn more at:
www.med.upenn.edu/aging/fellows.html

EXTERNAL ADVISORY BOARD

Meet our External Advisory Board (EAB) at:
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