

the science of AGING

an Institute on Aging publication // Winter 2017



S. Jay Olshansky, PhD (far left) and John Q. Trojanowski, MD, PhD, director of the IOA, with the family of Vincent J. Cristofalo.

The Longevity Dividend

On Tuesday, November 29, 2016, the Institute on Aging (IOA) hosted its annual Vincent J. Cristofalo Lectureship and reception featuring this year's keynote speaker, **S. Jay Olshansky, PhD**, professor of public health at the University of Illinois at Chicago. Dr. Olshansky's research focuses primarily on human longevity, exploring the health and public policy implications associated with individual and population aging, global implications of the re-emergence of infectious and parasitic diseases, and most recently, the topic of his Cristofalo Lecture; the pursuit of the scientific means to slow aging in people, or as he calls it "*The Longevity Dividend*."

"The Longevity Dividend," a term borrowed from the "peace dividend" era, is basically the idea that if we can find a way to slow the basic biological aging process, both society and individuals will reap huge economic and health benefits.

Over the years, human life expectancy has become longer but the success of extended lifespans comes with a price. With the ridding of many infectious diseases came the rise of other conditions such as cardiovascular disease, cancer, and Alzheimer's disease; three different diseases with one thing in common—the process of aging being their most powerful risk factor.

In addition to his current research on "The Longevity Dividend," Dr. Olshansky and his colleagues have also conducted research on "facial analytics" combined with biodemography. The study of facial analytics uses components of the face to measure disease risk, longevity risk, and survival prospects. Through this research, Dr. Olshansky and his team are trying to find new ways of allowing organizations and industries to use what we know about ourselves to improve the ways that they do assessments of health and survival.

Recently, Dr. Olshansky and his colleagues published an article in *Computer* that sets the framework for building a "health data economy."

"I think a new form of 'currency' will be developed and this 'currency' will be your own health data," explained Dr. Olshansky. The idea is to take data from Fit Bits and other wearable monitoring devices and monetize this information, for instance, by selling your recorded health data to companies and organizations in exchange for things like money, lower premiums on health insurance policies, coupons, and more. He believes that this resource could be the new form of collecting health data and could inspire a whole new generation of citizen scientists.

Learn more at: www.penninstituteonaging.wordpress.com

What's Inside?

Delirium in Aging
New Alzheimer's Animal Model
New ALS therapy program at Penn
and more!

DELIRIUM [in aging]

Delirium, a medical condition characterized by acute confusion, disorientation, or other mental health disruptions that affect thinking and behavior, affects nearly 7 million hospitalized Americans annually. While this condition can occur at any age, it mainly affects individuals 65 years or older and is often misdiagnosed as dementia.

As stated in an article originally published by *Kaiser Health News* and shared by *Next Avenue*, “while delirium and dementia can coexist, they are distinctly different illnesses. Dementia develops gradually and worsens progressively, while delirium occurs suddenly and typically fluctuates during the course of a day.” Particularly susceptible patients are those on ventilators or being heavily sedated in intensive care units, as well as those recovering from surgery.

“After an older adult undergoes anesthesia, they can often experience postoperative delirium,” explained **Lee A. Fleisher, MD**, chair of Anesthesiology and Critical Care at Penn, in a recent Penn Medicine News Blog on postoperative delirium and the uncertainties of anesthesia. “Patients in this state may hallucinate, they may forget why they are in the hospital, or have difficulty communicating or understanding what is going on around them.”

However, delirium can also result from something as simple and easily treated as a urinary tract infection.

According to research published in 2009 and referenced by *Next Avenue*, an estimated 40% of delirium cases are actually preventable; yet, the underlying cause is still unknown.

With all of this in mind, health care professionals, government agencies, and related nonprofit organizations gathered at the American Society of Anesthesiologists’ Brain Health Summit to discuss, among other topics, the postoperative risks of delirium and delayed cognitive recovery and whether or not they are significant enough to include in consent and patient education

materials. They also considered ways to reduce the risks and to increase research funding.

The Penn Medicine News Blog states that “while the Summit provided some direction and tactics for industry leaders to act upon, there are still other options that can be explored and implemented to advance learning, protect patients, and uncover the uncertainties around anesthesia and postoperative delirium.”

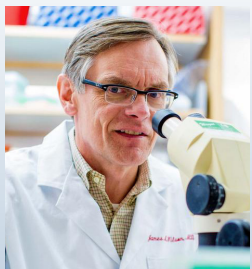
“Encouraging patients to follow a balanced diet and exercise regularly in the lead up to surgery, allowing patients to bring mementos and family photos to their hospital room after surgery, even asking families and caregivers to keep a close eye on small declines in patients’ cognitive function preoperatively – simple things like the patient not being as sharp as he or she once were – may help clinicians properly prepare for patient care, and may help patients readjust after surgery and avoid postoperative delirium,” Fleisher said. *“While these have not been scientifically proven to help, we think that even the smallest measures may make a difference for patients who are coming out of anesthesia.”*

To learn more about delirium and aging, join the Institute on Aging on Tuesday, April 18, 2017 for our Visiting Scholars Series lecture by **Edward Marcantonio, MD, SM**.

Dr. Marcantonio is the Section Chief for Research in the Division of General Medicine and Primary Care at Beth Israel Deaconess Medical Center and Professor of Medicine at Harvard Medical School. His research concentrations focus on delirium and cognitive function.

For more information, visit: www.med.upenn.edu/aging/events.html

University of Pennsylvania launches new ALS GENE THERAPY & GENOME EDITING PROGRAM



Jeff Fusco/Philadelphia Business Journal

Researchers at the University of Pennsylvania’s Orphan Disease Center (ODC) recently launched the Program of Excellence for Motor Neuron Disease, a program designed to discover ways to use gene therapy and genome editing to treat Amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig’s Disease.

“I am convinced that it is time to make a serious effort to treat ALS using gene therapy,” said **James Wilson, MD, PhD**, director of the Orphan Disease Center (ODC) and its affiliated Gene Therapy Program in a recent Penn Medicine News Release. “To do so, we will leverage the exciting clinical results that have been achieved in gene therapy for spinal muscular atrophy using our vectors, as well as the robust infrastructure in gene therapy translational research we have at the Orphan Disease Center and Gene Therapy Program at Penn.”

This new program will continue the gene-focused ALS research already underway at the ODC and will proceed in three phases. As described in the news release, “initial studies will focus on gene therapy for inherited forms of ALS, beginning with patients who have defects in the *C9orf72* gene. In parallel, Wilson and his colleagues will evaluate strategies based on the expression of genes encoding neuroprotective factors. This approach has the potential to benefit a larger population of patients with ALS, although it is associated with more technical risk of failure. Third, the researchers will explore the use of genome editing technologies as a more precise and durable approach to correcting mutations in genes such as *C9orf72*.”

For more information, visit: www.pennmedicine.org/news/news-releases

what's new in **AGING RESEARCH?**

at Penn...

NEW "HUMAN-LIKE" ANIMAL MODEL BETTER MIRRORS TANGLES IN ALZHEIMER'S DISEASE BRAINS

Researchers at the University of Pennsylvania's Center for Neurodegenerative Disease Research (CNDR) have developed a new mouse model to better replicate the neurofibrillary tangles that form in the brains of patients with Alzheimer's disease (AD).

In a recent video interview, **Virginia M.-Y. Lee, PhD, MBA**, Director of CNDR and senior author of the study, explains that until now, researchers have been using synthetic tau tangles made in the lab — engineering mice to overexpress the tau proteins in order for the tangles to form. The new study instead uses authentic tangles taken from Alzheimer's brains and injected into normal mice to provide a more accurate model not only of the properties in AD brains, but also how the disease spreads over time.

These findings are especially important in terms of moving forward with developing potential treatments for Alzheimer's disease.



"It is essential for us to have animal models so we can use them to test the efficacy of potential treatments before they go into humans."

- Virginia M.-Y. Lee, PhD, MBA

This study was published in the Journal of Experimental Medicine and featured by ALN.

Watch the video interview at:
www.penninstituteonaging.wordpress.com

For the full Penn Medicine News Release, visit:
www.pennmedicine.org/news/news-releases

& beyond...

CAN POSTPONING ILL-HEALTH VIA COMPREHENSIVE DAMAGE REPAIR EXTEND HUMAN LIFE-SPAN INDEFINITELY?

On Tuesday, December 6, 2016, the Institute on Aging (IOA) welcomed **Aubrey de Grey, PhD**, Chief Science Officer at the SENS Research Foundation, for a Visiting Scholars Series lecture on "Rejuvenation biotechnology: Postponing ill-health via comprehensive damage repair."

The SENS Research Foundation is a public charity doing biomedical research with a focus on developing new medicines that may be more effective than current methods in postponing the ill-health of old age.

Dr. de Grey compared this idea to the example of restoring vintage cars. He explained that since we are able to keep cars going essentially forever just by periodic and comprehensive preventative maintenance, we should be able to do the same thing for the human body to ultimately maintain people in "truly youthful health indefinitely."



"I do think that the general concept of eliminating damage that the body does to itself is something in which the sky is the limit."

- Aubrey de Grey, PhD

While he does recognize that the human body is much more complex, Dr. de Grey believes that "the further we get in the process of developing methods for eliminating the various types of damage that the body does to itself, the more slowly we will accumulate damage because we will only be left with the residual damage that we haven't yet worked out how to fix."

Institute on Aging
3615 Chestnut Street
Philadelphia, PA 19104-2676

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Aubre Naughton, Penn Medicine Development
aubren@upenn.edu or 215-898-9174

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Mark Your Calendars

Tuesday, April 18, 2017

Visiting Scholars Series
Edward Marcantonio, MD, SM
3:00 - 4:00pm
Biomedical Research Building
(BRB) II/III Auditorium
Tentative Topic:
Delirium

Wednesday, May 10, 2017

Visiting Scholars Series
Lisa Barnes, PhD
3:00 - 4:00pm
Biomedical Research Building
(BRB) II/III Auditorium
Tentative Topic:
Risk factors for
Alzheimer's disease and
determinants of racial health
disparities

Tuesday, May 23, 2017

Sylvan M. Cohen Annual Retreat
& Poster Session
Philip De Jager, MD, PhD
11:30am - 5:00pm
Smilow Center
"Genetics of aging-related
neurodegeneration"

www.med.upenn.edu/aging/events.html

MEET OUR // IOA TEAM

John Q. Trojanowski, MD, PhD
Director

M. Kathryn Jedrzejewski, PhD
Deputy Director

Nicolette Patete
Digital Media Specialist

Ebony Fenderson
Administrative Assistant

Aubre Naughton
Penn Medicine Development

Queen Muse
Penn Medicine Communications

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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.