Integrating the Science of Aging and Environmental Health Research

JUNE 9-10, 2020
THE NATIONAL ACADEMIES OF SCIENCES, ENGINEERING, AND MEDICINE
ALL TIMES LISTED ARE EASTERN DAYLIGHT TIME
A VIRTUAL WORKSHOP

WITH THE GLOBAL POPULATION living longer—the number of people worldwide aged 80 years or over is projected to triple by 2050—understanding the factors that influence healthy aging throughout our lifetimes is critical for protecting public health. Scientists have long known that environment plays an important role in aging: for example, research has shown that human exposure to environmental pollutants can exacerbate age-related diseases, such as Alzheimer’s and Parkinson’s. However, many questions remain about the mechanisms through which environmental stressors influence aging, longevity, and the etiology of age-related disease. How do environmental pollutants, such as airborne particulate matter and pesticides, alter the biological processes that underlie human aging and longevity?

This workshop will explore emerging research at the intersection between aging, longevity, environmental exposures, and human health. Workshop speakers will detail emerging research findings through two lenses: (1) How environmental exposures influence or mediate aging; and (2) How aging influences environmentally-mediated health outcomes.

In addition to research opportunities, participants will also explore the translation and use of new data to inform decision-making.

TUESDAY, JUNE 9, 10:00 AM–3:45 PM

10:00 Welcome and Opening Remarks

- **Keegan Sawyer**, National Academies of Sciences, Engineering, and Medicine (NASEM)
- **Andrea Hodgson**, NASEM
- **Emma Alme**, NASEM
- **Michelle Heacock**, National Institute of Environmental Health Sciences (NIEHS)

10:15 Environmental determinants of aging—why not measure everything?—**Gary Miller**, Columbia University

10:25 Integration of the Science of Aging with Environmental Health Research Through the Perspective of Biomarkers—**Luigi Ferrucci**, National Institute of Aging (NIA)

10:45 Contributions of Toxicants to the Development of Age-Related Diseases—**Julie Andersen**, Buck Institute

11:05 Break

SESSION 1 EMERGING TRENDS AND TOOLS IN BIOLOGICAL AGING RESEARCH

11:20 Key molecular pathways of aging—**Rafael de Cabo**, Intramural Research Programs, National Institutes of Health

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Register at http://nas-sites.org/emergingscience
TUESDAY, JUNE 9 (CONTINUED)

11:35 Single cell analytical techniques in aging research—Murat Acar§, Yale University

11:50 Break for lunch

12:20 Ageotypes: molecular pathways of aging in people—Mike Snyder, Stanford University

12:35 Leveraging Omics profiling to estimate biological age—Nathan Price, Institute for Systems Biology

12:50 Panel Discussion: Exploring Potential Connections between Biological Age and Exposures

Moderator: Donna L. Mendrick§, U.S. Food and Drug Administration (FDA)
- Luigi Ferrucci, NIA
- Julie Andersen, Buck Institute
- Andrew Geller, U.S. Environmental Protection Agency (EPA)
- Nathan Price, Institute for Systems Biology

1:20 Break

SESSION 2 EXPLORING EMERGING AREAS OF INTEGRATION–EXPOSURES AND AGING PROCESS

1:35 Integrating exposure science and development of age-related neurogenerative disease in molecular and population research—Caleb Finch, University of Southern California (USC)

Air Pollution Exposures

1:50 Particle exposures and aging biomarkers: findings from the VA normative aging study—Jamaji Nwanaji-Enwerem, Harvard University

2:05 Air pollution and the development of cardiovascular disease: the MESA Air project—Joel Kaufman, University of Washington

Integrating Exposure and Other Stressors

2:20 Racial disparities in cardiometabolic risk with age—Uchechi Mitchell, University of Illinois at Chicago

2:35 Maternal stress, particle matter exposure, and development—Rosalind Wright, Mount Sinai

2:50 Break

§ Member of the workshop Organizing Committee for Integrating the Science of Aging and Environmental Health Research.

† Member of the Standing Committee on the Use of Emerging Science for Environmental Health Decisions.

3:05 Panel Discussion

Moderator: Jiu-Chiuan (JC) Chen§, USC
- Caleb Finch, USC
- Jamaji Nwanaji-Enwerem, Harvard University
- Rosalind Wright, Mount Sinai

3:35 Day 1 Closing Remarks—Mary Ann Ottinger§, University of Houston

3:45 Adjourn

WEDNESDAY, JUNE 10, 10:00 AM–2:00 PM

Chemical Exposures

10:00 Day 2 Welcome—Gary Miller†, Columbia University

10:05 Pesticides and the development of neurodegenerative disorders—Beate Ritz, University of California, Los Angeles (UCLA)

10:20 The influence of chemical exposures on development—John Meeker, University of Michigan

Heavy Metal Exposures

10:35 The effects of arsenic toxicity on telomeres—Brandon Pierce, University of Chicago

10:50 The epigenetic impact of prenatal heavy metal exposure—Andres Cardenas, University of California, Berkeley

11:05 Panel Discussion

Moderator: Kristen Malecki§, University of Wisconsin-Madison
- John Meeker, University of Michigan
- Beate Ritz, UCLA
- Emma Lavoie, U.S. EPA

11:35 Break for lunch

SESSION 3 CONSIDERATIONS FOR DECISION-MAKING
(CONCURRENT BREAKOUT BRAINSTORMING SESSIONS)

12:05 Overview of breakout session—Katherine A. James, Colorado University

12:15 Breakout Session

Group A - Critical Research Priorities to Advance the Science

- Jennifer Przybyla, Agency for Toxic Substances and Disease Registry
- Jean Harry, NIEHS
- Gina Solomon§, University of California, San Francisco (UCSF)
- Mary Ann Ottinger§, University of Houston
- Joel Kaufman, University of Washington

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Register at http://nas-sites.org/emergingscience
About the Use of Emerging Science for Environmental Health Decisions

The National Academies’ Standing Committee on the Use of Emerging Science for Environmental Health Decisions (ESEHD) examines and discusses issues on the use of new science, tools, and research methodologies for environmental health decisions. The ESEHD committee is organized under the auspices of Board on Life Sciences and the Board on Environmental Studies and Toxicology of the National Academies of Sciences, Engineering, and Medicine, and sponsored by the National Institute of Environmental Health Sciences.