

**NATIONAL INSTITUTES OF HEALTH
NATIONAL INSTITUTE ON AGING**

Summary Minutes

The 146th Meeting

NATIONAL ADVISORY COUNCIL ON AGING

May 10-11, 2022

**National Institutes of Health
Virtual Meeting
Bethesda, MD 20892**

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Department of Health and Human Services
Public Health Service
National Institutes of Health
National Institute on Aging
NATIONAL ADVISORY COUNCIL ON AGING
SUMMARY MINUTES
May 10-11, 2022

The 146th meeting of the National Advisory Council on Aging (NACA) was convened on Wednesday, May 10-11, 2022, at 10 a.m. by videoconference. Dr. Richard Hodes, Director, National Institute on Aging (NIA), presided.

In accordance with the provisions of Public Law 92–463, the meeting was closed to the public on Tuesday, May 10, from 3 p.m. to 5 p.m. for the review, discussion, and evaluation of grant applications in accordance with the provisions set forth in Sections 552(b)(c)(4) and 552(b)(c)(6), Title 5, U.S. Code and Section 10(d) of Public Law 92–463.¹ The meeting was open to the public on Wednesday, May 11, from 10:00 a.m. to 1:30 p.m.

Council Participants:

Dr. Darren Baker
Dr. Shalender Bhasin
Dr. Anne Case
Dr. Yanira Cruz
Dr. Monica A. Driscoll
Dr. Terry T. Fulmer
Dr. Susan Greenspan
Dr. Yadong Huang
Dr. Rev. Cynthia Huling Hummel
Dr. Frank Longo
Dr. Jennifer Jaie Manly
Dr. Charlotte Peterson
Dr. David B. Reuben
Dr. Julie Schneider
Dr. Linda Van Eldik
Dr. David R. Weir
Dr. Keith E. Whitfield

In Addition to NIA Staff, Other Federal Employees Present:

Dr. Marie Bernard, Office of the Director, National Institutes of Health
Dr. Anne Ordway, National Institute on Disability, Independent Living, and Rehabilitation Research
(NIDILRR), Administration for Community Living

¹ For the record, it is noted that members absented themselves from the meeting when the Council discussed applications (a) from their respective institutions or (b) in which a conflict of interest may have occurred. This procedure only applied to applications that were discussed individually, not to “en bloc” actions.

Members of the Public Present:

Dr. Margaret A. Goodell, Baylor College of Medicine
Dr. Rose Maria Li, Rose Li and Associates, Inc.
Dr. Clifford Rosen, Tufts University School of Medicine
Mr. Alexander Sagona, Rose Li and Associates, Inc.
Dr. Noah Snyder-Mackler, Arizona State University
264 live views via NIH videocast

I. REVIEW OF APPLICATIONS

This portion of the meeting was closed to the public, in accordance with the determination that it concerned matters exempt from mandatory disclosure under Sections 552(b)(c)(4) and 552(b)(c)(6), Title 5, U.S. Code and Section 10(d) of the Federal Advisory Committee Act, as amended (5 U.S.C. Appendix).²

A total of 2044 applications requesting \$ 5,436,251,689 for all years underwent initial review. The Council recommended 1142 awards for a total of \$ 3,407,510,402 for all years. The actual funding of the awards recommended is determined by the availability of funds, percentile ranks, priority scores, and program relevance.

II. CALL TO ORDER

Dr. Hodes welcomed members to the open session of the 146th NACA meeting and called the meeting to order at 10:00 a.m. on Wednesday, May 11, 2022.

A. Director's Status Report**NIH/NIA Budget Status**

Dr. Hodes reported that the fiscal year (FY) 2022 budget appropriates \$45 billion for NIH, with \$4.22 billion reserved for NIA. Funding for Alzheimer's disease and related dementias (AD/ADRD) research increased by \$289 million from FY 2021. Other notable increases include an additional \$41 million for the *All of Us* Research Program, \$60 million for the Brain Research Through Advancing Innovative Neurotechnologies® (BRAIN) Initiative, and \$10 million for Down syndrome research. During the past decade, NIA appropriations have quadrupled from \$1.05 billion in FY 2013 to \$4.22 billion in FY 2022.

For general applications reviewed by the Center for Scientific Review (CSR) and requesting less than \$500,000 (direct costs) in any one year, pay lines are 10% for most regular research (R01) applications, 13% for new investigator applications, and 15% for early-stage investigator applications. For CSR-reviewed applications seeking \$500,000 or more, pay lines are 7% for most, 10% for new investigator, and 12% for early investigator applications. Pay lines are higher for applications focused on AD/ADRD: 28% for most, 31% for new investigator, and 33% for early-stage investigator applications.

² For the record, it is noted that members absented themselves from the meeting when the Council discussed applications (a) from their respective institutions or (b) in which a conflict of interest may have occurred. This procedure applied only to applications that were discussed individually, not to "en bloc" actions.

For NIA-reviewed applications, the priority scores for general pay lines are 15 for program projects, 15 for other NIA-reviewed research, 21 for career development awards, and 30 for fellowship awards. The corresponding AD/ADRD pay lines are 40, 40, 35, and 40, respectively.

NIA Updates

Dr. Hodes reported that from FY 2015 to FY 2021, approximately one-third of NIA's AD/ADRD awardees were either new or early-stage investigators, and approximately one-fourth of AD/ADRD awardees were new to the field. In addition, 411 NIA AD/ADRD clinical trials were active as of October 2021, including 70 pharmacological interventions, 132 non-pharmacological interventions, 178 dementia care and caregiving interventions, and 31 other trials.

Dr. Hodes commented that the NIH Intramural Center for Alzheimer's and Related Dementias (CARD) will soon open a new facility, the Roy Blunt Center for Alzheimer's Disease and Related Dementias Research, on the NIH main campus. CARD is a collaboration between NIA and the National Institute of Neurological Disorders and Stroke that supports basic, translational, and clinical research on AD/ADRD. The Alzheimer's and Related Dementias Independent Scholars (ARDIS) Program provides early-career researchers a time-limited independent Principal Investigator appointment, generous resources, and access to research cores and infrastructures within CARD and the broader NIH Intramural Research Program. Current CARD efforts include disease-relevant cellular models, datasets from induced pluripotent stem cell (iPSC) lines to study the effects of gene mutations on cellular pathways, sequencing of challenging regions of the genome, and efforts to create "personalized" stem cells for studying dementia.

NIA launched the Healthy Aging Start-Up Challenge and Bootcamp to Foster Diversity and Accelerate Innovation earlier this year. Up to 20 finalists will participate in a four-month entrepreneurial bootcamp, and up to five winners will each receive a \$60,000 prize. The prize and resources aim to help build a strong foundation of diverse start-ups that will be better positioned to compete for NIA Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) funding for innovative technologies, products, and services to promote healthy aging and combat aging-related diseases and conditions.

Dr. Hodes noted the continued collaboration between NIA's Alzheimer's Disease Research Centers and the Department of Veterans Affairs to increase the participation of veterans in AD/ADRD research. To date, the Centers have conducted more than 15 outreach events, communicated with more than 300 veterans, and recruited more than 60 veterans into AD/ADRD research.

Since the prior Council meeting, NIA has released 25 research highlights, 19 blog posts, two news announcements, and one press release. In the same timeframe, Dr. Hodes, NIA Acting Deputy Director Dr. Melinda Kelley, and/or senior NIA staff have participated in 12 stakeholder/advocacy group meetings and three Congressional briefings.

Dr. Hodes ended the NIA updates by celebrating the life and work of Dr. John Q. Trojanowski (1946-2022). Dr. Trojanowski was an NIA-funded researcher, was Director of the NIA

Alzheimer's Disease Core Center, and served on the NIA Board of Scientific Counselors, NACA, and the Neuroscience, Behavior and Sociology of Aging Review Committee.

NIH Updates

Dr. Hodes briefly outlined the proposed mission and goals of the Advanced Research Projects Agency for Health (ARPA-H). ARPA-H derives its model from the Defense Advanced Research Projects Agency, focusing on supporting transformative high-risk, high-reward research that benefits the health of all Americans by catalyzing health breakthroughs that cannot readily be accomplished through traditional research or commercial activity. Dr. Hodes highlighted that ARPA-H will be complementary to—not duplicative of—NIH programs and efforts. ARPA-H will draw on NIH's vast knowledge, expertise, and infrastructure, but will remain distinct with unique culture and organization. ARPA-H seeks to be nimble and time-bound, open and transparent, and driven and independent. In March 2022, Congress passed and the President signed the FY 2022 omnibus with \$1 billion available for three years. Last month, ARPA-H was officially transferred to NIH, and the ARPA-H director will report to the HHS Secretary. The President's FY 2023 budget requested \$5 billion for ARPA-H.

Dr. Santora closed out the session by highlighting ways to stay informed and connected to NIA, including active funding opportunities, approved concepts, and subscribing to the blog.

B. Staff Introductions

NIA senior leadership announced staffing updates (26 new hires) since the January 2022 meeting.

C. Future Meeting Dates

September 7-8, 2022 (Wednesday and Thursday), Building 45
January 18-19, 2023 (Wednesday and Thursday), Building 45
May 16-17, 2023 (Tuesday and Wednesday), Building 45
September 19-20, 2023 (Tuesday and Wednesday), Building 45

D. Consideration of Minutes from the Last Meeting

The minutes of the January 2022 Council meeting were considered. A motion was made, seconded, and passed unanimously to approve the minutes.

III. REPORT: TASK FORCE ON MINORITY AGING RESEARCH

Dr. Jennifer Manly summarized a presentation by Dr. Jacqueline Torres (University of California, San Francisco) that highlighted the nuanced perspectives on social and intergenerational relationships and aging in the context of international migration. Dr. Torres reported that 40% of Latin American immigrants make weekly calls to family and friends in their countries of origin; 52% send remittances or money to their families overseas; and 50% make cross-border contact. Similarly, 60% of Asian immigrants report cross-border contact. Further, 70% of Latin American and Asian immigrants report return visits. Dr. Torres emphasized the importance of the emotional support provided by cross-border contact and of sources of heterogeneity, including gender, nativity, documentation status, age, local experiences, stress related to legal status, and historical and political context. Dr. Torres worked with two NIA-funded studies to learn more about these links. The first study of Latinos and aging found a

significant association between measures of cross-border ties at baseline and subsequent depression in women, but the direction of the association varied by nativity; it was protective for U.S.-born women and a risk factor for Latin American-born women. There was significant association between cross-border travel and lower odds of depression in men with no variation by nativity. The second study evaluated cross-border contact and found that having an adult child in the United States among older adults living in Mexico was associated with a steeper decline in verbal memory for women. Age-stratified analyses revealed that the difference in delayed verbal memory was concentrated among women aged 50-60, but the associations were null for men overall. Dr. Torres' future work will examine these complex relationships, how immigration policies may exacerbate the length of separation or facilitate cross-border movement, and upward (i.e., child-to-parent) intergenerational transmission of socioeconomic advantages and disadvantages.

Dr. Keith Whitfield summarized a presentation by Jamelle Banks, a senior policy analyst in the NIA Office of Planning, Analysis, and Evaluation. Ms. Banks analyzed NIA diversity supplement awards and found that female awardees increased to 69%, African American and Hispanic awardees to 82%, and pre- and post-doctorate awardees to 71% from 2010 to 2021. The Division of Neuroscience had the largest percentage of awards (44%) during this time period. Diversity supplement awardees are 10 times more likely to research health disparities compared to NIA awardees overall. Half of the diversity supplement awardees achieved future grant success; they also published more on aging after receiving the diversity supplement compared to investigators who did not receive the reward. The majority of awardees have remained in academia and have progressed in their academic careers. The discussion focused on the need for additional research to track awardees' progress to determine best practices to diversify the workforce and to leverage the supplements as a training pipeline in the field of aging. Dr. Manley added that diversity supplements are one of the few mechanisms through which NIA engages and supports high school students interested in pursuing research.

Discussion

Multiple members highlighted the importance of increasing efforts to engage high school students interested in pursuing research. Dr. Manly noted the challenge of matching high school students with investigators. Dr. Whitfield suggested implementing federal infrastructure dedicated to increasing visibility and outreach to engage future researchers. Expressing concern about the low number of African American and Latino investigators who receive funding, Dr. Yanira Cruz recommended that NIA thoroughly evaluate this program to better understand its purpose and to identify creative ways to achieve that purpose. Dr. Patricia Jones encouraged NACA members to direct logistical questions about the Diversity Supplement Award program (e.g., timeline for identifying and nominating candidates) to Dr. Maria Carranza, NIA Office of Strategic Extramural Programs.

IV. REPORT: WORKING GROUP ON PROGRAM

Dr. Monica Driscoll, Chair of the Working Group on Program, led the updates.

A. FOA Concept and Contract Clearance

Dr. Driscoll invited the primary reviewers to summarize the 10 concepts submitted from five NIA units: Division of Aging Biology (DAB), Division of Behavioral and Social Research

(BSR), Division of Neuroscience (DN), Intramural Research Program (IRP), and Division of Geriatrics and Clinical Gerontology (DGCG). Three of the proposed concepts (marked with an asterisk) will be added as topics to the NIH SBIR contract solicitation PHS-2022. The Council members unanimously concurred with approval of all 10 concepts.

Division of Aging Biology (DAB)

Geroscience Course

This concept from the DAB Geroscience Interest Group (GSIG) proposes an R25 mechanism to enhance both researcher and general public awareness of the integrative principles of Geroscience and to achieve a more holistic interpretation of older adult health that optimizes function and resilience. Specifically, GSIG will support programs that integrate education in basic, applied, translational, behavioral, and clinical Geroscience research. Funded programs will seek to enhance the training of the Geroscience workforce, increase the diversity of the Geroscience workforce, recruit individuals with specific specialties or disciplinary backgrounds to research careers in Geroscience, and foster a better understanding of the Geroscience field and its importance.

Development and Maintenance of a Multigenotypic Aged Rat Colony

As understanding of the genetic and physiological components of aging increases, the need for animal models in which to test the therapeutic potential of drug and nutritional interventions also increases. Aged animals are not routinely available commercially, and most academic laboratories lack the funds or facilities to raise aged animals. Several NIA-funded basic biomedical research programs use animals as models of the aging process. Consequently, NIA has established contracts for the supply of genetically defined, barrier-reared, aged mice and rats to investigators in the aging field. This proposed concept would renew the Multigenotypic Aged Rat Colony contract, which is maintained by the Charles River Laboratories. Each year, approximately 9,000 rats are entered into the colony, and 6,000 are distributed to investigators at universities and nonprofit research institutions throughout the United States and in several foreign countries. Use of the aged rat resource has remained stable during the past six years. This concept met with strong enthusiasm because the colony is a valuable resource required for experimental continuity.

Development and Maintenance of a Non-Human Primate Tissue Bank (NHP-TB)

This proposed concept is a contract renewal to develop and maintain the NHP-TB, a DAB biological resource that supports aging research. The NHP-TB acquires, archives, and distributes excess tissue from NHPs upon natural death or from animals euthanized for research purposes at institutions around the country. Its goals are to maximize the use of already available NHP biospecimens and provide a mechanism for multiple investigators to share tissue from a single animal. Unlike other tissue banks, the NHP-TB is enriched in samples from geriatric animals. The new contract will maintain and manage a collection of tissues and blood derivatives from NHP species, with the goal of expanding its scope to more species, including, but not limited to, tamarins, great apes, and lemurs—without increasing the numbers of animals required. Council members strongly supported this concept and highlighted the need to increase awareness of the NHP-TB as a valuable resource.

Management of the Primate Aging Database (PAD)

This proposed concept is a contract renewal to maintain the PAD in the Cloud, a highly utilized resource that has collected data on normal aging in a wide range of NHPs for 20 years. The contractor will continue to implement subject de-identification, solicit and add new data from NHP colonies/centers, enhance operability, update the user roster, provide technical assistance to users, and conduct market outreach. Opportunities to enhance the resource include (1) encouraging data deposition from novel sources; (2) extracting data from the published literature and interfacing with existing data repositories; (3) adding fields to accommodate imaging, -omics, immunological and microbiome data; (4) expanding analytical capabilities; (5) improving the PAD's visibility; and (6) coordinating with the NHP-TB.

Division of Behavioral and Social Research (BSR)

Estimating the Monetary Costs of Dementia in the United States Using NIA Funded Datasets

This concept proposes a Research Project Cooperative Agreement (U01) to support creation of a comprehensive estimate of the monetary costs of dementia in the United States that is grounded in the science of simulation modeling. Guided by an expert panel, the project will convene a stakeholder/expert engagement committee, create a dataset that links datasets in the NIA data enclave, model the cost of illness, archive the dataset in the secure cloud computing environment, and publish research findings. Discussants encouraged greater specificity in any subsequent funding opportunity announcement (FOA), for example about which costs would be included, and the role of family and patients living with dementia. The project will also support pilots to examine the cost impacts of (1) specific, discrete advances (both pharmacological and non-pharmacological) in AD/ADRD treatment and prevention and (2) simulations to model care and policy changes influencing access to, quality of, and uptake of AD/ADRD prevention and treatment. The simulation studies will support and expand the representation of early-career researchers from the behavioral, social, economic, and data sciences who utilize the project dataset to engage in modeling and/or simulation research on AD/ADRD.

****AI/ML Tool for Visualizing Behavioral and Social Science Research (SBIR Topic)***

The goal of this proposed concept is to develop an artificial intelligence (AI)-based tool for BSR-specific literature visualization and hypothesis discovery that might be marketed ultimately to various institutions that consume scientific research, with an emphasis on Alzheimer's disease. Council members agreed on the need for proof-of-concept studies that establish the feasibility of an AI/machine learning (ML)-based tool for BSR-specific literature visualization and hypothesis discovery that extracts, aggregates, and visually maps variables and causal relationships tested in BRS research—allowing users to automatically generate a causally structured overview of the literature, explore it in depth, and identify latent connections between variables. Development of this AI tool would support the infrastructure and resources needed to promote high-quality research.

Division of Neuroscience (DN)

Reissue: Integrative Research to Understand the Impact of Sex Differences on the Molecular Determinants of AD Risk and Responsiveness to Treatment

The proposed concept aims to develop robust, cross-disciplinary, research programs that will explore how genes, environment, and hormonal status interact at various levels of biologic complexity to produce heterogeneous phenotypes of disease risk and variations in responsiveness to pharmacological and nonpharmacological interventions. Of note, this third iteration of the program will strive to understand the impact of sex differences on the heterogeneity of brain aging, AD/ADRD across diverse populations, and the responsiveness to interventions, which remain underexplored at the molecular/mechanistic level.

****Improving Micro Physiological Systems (MPS) for AD/ADRD Therapy Development (SBIR Topic)***

The goal of this proposed concept is to produce a system that is validated against known AD/ADRD therapeutic agents and is aligned with human “omic” data from Accelerating Medicines Partnership-Alzheimer’s Disease (AMP-AD) to demonstrate the system’s utility as a predictive tool and screening assay. Needed are proof-of-concept studies that develop a three-dimensional culture system prototype that recapitulates human AD/ADRD and demonstrates accurate prediction of clinical efficacy in the developed prototype. As part of the AMP-AD initiative, this project will help improve, diversify, and reinvigorate the AD/ADRD drug development pipeline, and micro physical systems may represent a key area for innovation.

Division of Geriatrics and Clinical Gerontology (DGCG)

****High Throughput Clonal Hematopoiesis of Indeterminate Potential (CHIP) Assay for Risk Stratification, Diagnosis, and Prognosis of Age-Related Diseases (SBIR Topic)***

This concept proposes to develop an inexpensive, high throughput assay to detect CHIP mutations for research purposes, which could eventually be translated into a diagnostic/prognostic assay for use in health care settings for patient management. The need exists for proof-of-concept studies that optimize and expand on current efforts by including additional CHIP-related genes in the assay that may be associated with aging and age-related diseases and that develop a bioinformatics workflow to analyze and report out the data in both research and clinical settings. This project would further understanding of aging biology by overcoming the limitations of existing methods to examine CHIP.

Intramural Research Program (IRP)

MEX-AD: Clinical, Epidemiological, and Genetic Characterization of Alzheimer’s Patients in the Admixed Mexican Population (CARD)

In the United States, Hispanic individuals over age 65 comprise the second largest populations affected by ADRD, yet few clinical, genetic, and biomarker studies enroll Mexican populations. CARD, in partnership with the University of California, San Francisco, proposes to establish a multi-cohort study in Mexico to characterize patients’ clinical, genetic, and phenotypic diversity. Council members expressed strong enthusiasm for this study, which may (1) address a critical

gap in knowledge of how AD/ADRD develops and progresses in the admixed Mexican population across a network of 10 clinical sites across Mexico and (2) provide a unique profile of risk factors, onset, and symptomology, which may be partly explained by genetic ancestry and social, cultural, psychosocial, and environmental characteristics.

B. 2021-2022 COUNCIL REVIEW OF THE DIVISION OF AGING BIOLOGY

Dr. Clifford Rosen and Dr. Margaret Goodell (Review Committee Co-Chairs)

Dr. Goodell provided a high-level summary of the recommendations that emerged from the 2021-2022 DAB Review Committee's assessment of the current state of DAB's research and training portfolios, biological resources, and associated scientific endeavors to determine whether DAB is effectively using its limited resources to influence research in the biology of aging and in Geroscience. The Review Committee identified six priority areas for DAB to address in the next five years.

1. Scientific Directions

Hallmarks of Aging: Seek to integrate the hallmarks of aging into a larger conceptual model of aging biology; assess whether the current hallmarks of aging should be updated; and further explore the interactions between individual hallmarks and relevant biomarkers.

Cell Biology: Continue to work on common mechanisms of aging including senescence; support the discovery, optimization, validation, and standardization of relevant biomarkers of aging biology, and generate consensus on the appropriate biomarkers based on their utility for Geroscience translational research; and strengthen current support for intercellular communication, bioinformatics, medical informatics, and other computational resources.

Integrative Physiology: Broaden DAB's approach to systems biology; support work that increases the field's understanding of heterogeneity in rates of aging, including the role of circadian biology, the exposome, and lifestyle factors; expand DAB's emphasis on microbiomes across multiple organ systems; and increase support of research examining stem cell aging and resilience.

Impact of Early to Midlife Stressors on Later Life Health: Support studies that consider the whole life experience when examining healthy aging outcomes; and include identification of suitable laboratory and animal models for studying the strength of associations between stressors and the hallmarks of aging.

2. Biological and Data Resources

Develop Metrics of Success for Resource Sharing Initiatives: Provide metrics on the effective use of the valuable animal models and biospecimens provided by DAB and evaluate whether strategies for their provision can be further optimized to accelerate research.

Emerging Technologies: Integrate emerging technologies into the Biological Resources Branch's animal model efforts and the Aging Physiology Branch's systems biology approaches.

Accessibility and Consistency in Methods and Models: Support efforts to standardize lab methods, assays for aging biomarkers, and models; and promote/advertise and increase accessibility to DAB resources.

Data Accessibility and Curation: Determine criteria for prioritizing datasets for access and retention and establish a long-term plan to improve and sustain data accessibility and preservation.

3. Human Subjects and Health Disparities Research

Amplify DAB's unique role to bring a basic biology of aging perspective to trans-NIA and trans-NIH efforts in human subject research. Areas to emphasize are (a) identifying and addressing the impact of health disparities on biology of aging and (b) promoting biomarker discovery in broadly diverse populations.

4. Training, Education, and Outreach Programs

Leverage training and education efforts to promote DAB's unique identity and vision, particularly for Geroscience and health disparities research, engage Minority Serving Institutions in DAB initiatives to promote the field's ability to recruit diverse new or early-career researchers, and foster interdisciplinary collaborations to engage with investigators from adjacent fields.

5. Common Fund and Collaborative Activities

Provide clear guidance on how cross-cutting topics, such as emerging technologies, health disparities, hallmarks of aging, biomarkers, and Geroscience, can be balanced across all three branches; and continue to leverage and expand the unique value that DAB brings to collaborative partnerships with other NIA Divisions, NIH Institutes and Centers, and international partners.

6. Staffing

Continue current plans to restructure DAB portfolios and hire staff to reduce the average and maximum number of grants/contracts per program officer, manage collaborative activities, assure the continuity of contracts for biological resources, and consider succession planning; and strongly consider adding new program officers who have additional expertise in multi-omics, modeling and bioinformatics, the peripheral nervous system, integrative and comparative physiology, data science, and clinical research (including those who can support studies that are preliminary and ancillary to clinical trials).

Dr. Goodell presented seven key takeaway actions from the Review Committee's report: (1) consider how the Hallmarks should be adapted to fit a new decade; (2) broaden DAB's emphasis on key scientific topic areas; (3) develop metrics of success; (4) continue and expand support for work on diverse and representative human subjects; (5) conduct education and training efforts to promote Geroscience and other DAB-relevant topics; (6) leverage DAB's unique identity in collaborative efforts; and (7) continue staffing to accomplish recommendations.

Discussion

In response to a question from Dr. Longo, Dr. Goodell explained that the Review Committee encourages more rigorous research on topics that are sometimes deemed "controversial," such as biomarkers and candidate therapeutics. DAB could help to resolve differences of opinion on these topics and bring uniformity to the research by designing a phase to address such topics. Further, investigators could submit unsolicited R01 applications on these topics. Dr. Shalender

Bhasin commented that the data from human studies on Geroscience and the pillars of aging are early and therefore inconclusive and advocated for broad support of Geroscience as a whole. He also suggested that NIA maintain a balance between concept proposal and program-initiated FOAs and advocated for increasing the pay line for investigator-initiated ROIs, which generate very innovative work.

V. COUNCIL GUEST SPEAKERS

Dr. Melissa Gerald introduced Dr. Noah Snyder-Mackler who currently serves as a core faculty member at the Center for Evolution and Medicine within the School of Life Sciences at Arizona State University. Dr. Hodes introduced Dr. Maria Bernard, the Chief Officer for Workforce Diversity at NIH.

Exposure to an Extreme Natural Disaster Accelerates Aging in a Non-Human Primate

Dr. Noah Snyder-Mackler

The overall goal of Dr. Snyder-Mackler's lab is to gain a better understanding of the effect of variations in both the physical and social environment on health. Most of the lab's research is conducted within the context of aging, because age is the strongest risk factor for most diseases and, as the world population ages, aging and aging-related diseases will compound issues within our economies and health care systems. Chronic stress caused by low socioeconomic status, societal integration, and adverse childhood experiences, for example, are all linked to earlier onset of age-related diseases. Researchers at Columbia University are investigating whether stress-induced changes recapitulate the effects of aging at the molecular level and whether exposure to stress accelerates the aging process. With answers to these questions, health care providers and public policymakers can develop treatments, therapies, and policies that benefit public health.

In 2013-2014, Dr. Snyder-Mackler and colleagues empirically tested the hypothesis that chronic stress directly exacerbates the process of physiological aging, using two published transcriptomic datasets—one on aging in humans and one on social adversity in macaques. They found broad similarities in gene expression within immune cells of older humans and low-status/high-adversity monkeys. This finding motivated Dr. Snyder-Mackler to pursue research of the molecular consequences of adversity and aging and how this knowledge can be harnessed to improve human health. However, the field's knowledge of aging trajectories and their links to age-related diseases is mostly limited to studies in species with substantially shorter lifespans and less complex anatomy than humans, such as rodents, worms, flies, and yeast, underscoring the need to examine basic mechanisms of aging in a more systematic manner in a species with a closer evolutionary affinity to humans, such as NHPs. The many benefits to studying macaques, for example, over humans include better experimental control, fewer complexities and confounds, and enhanced ability to isolate objective measures of behavior and environment.

When Hurricane Maria devastated Puerto Rico in 2017, Dr. Snyder-Mackler and his research team provided much-needed assistance to the Cayo research center in Santiago, which was founded in the 1930s and tasked with studying and maintaining a colony of macaques. The team already had an established relationship with the center, having collected data from the macaque colony during the decade preceding the hurricane. The hurricane presented the opportunity to

study the effects of a natural disaster on the macaques' health outcomes, specifically whether extreme stressors and adverse events accelerated aging at the molecular level.

In an opportunistic cross-sectional study, Dr. Snyder-Mackler's team analyzed pre-hurricane samples (2014-2016, N=439) and post-hurricane samples (2018, N=108) that were roughly matched by age and sex. The researchers generated RNA sequencing data to identify any effects on the macaques' immune cells. They found that Hurricane Maria significantly altered the expression of 4% (N=260) of immune-cell-expressed genes and 16% (N=1,131) of age-associated genes. Twice as many genes as expected (N=106) were significantly associated with both the age-related and hurricane-related gene expression, providing evidence that exposure to Hurricane Maria recapitulated aging effects in immune cells. The researchers also found that natural disasters disrupt proteostasis networks. Biological age in the macaques post-hurricane was roughly two years older compared to macaques pre-hurricane (controlled for chronological age). The hurricane also accelerated physical aging and reduced mobility. Further, the macaques increased social connection and tolerance after Hurricane Maria, which may reflect a social buffering strategy. Based on these findings, Dr. Snyder-Mackler and colleagues launched research into the social modifiers of aging; early results suggest faster immunological aging in the face of social adversity.

Dr. Snyder-Mackler is hopeful that this study's findings will provide insight into the long-term effects of natural disasters on aging and age-related decline, as well as the factors that predict resilience to adverse effects, ultimately reducing the burden of age-related disease.

Discussion

In response to a questions from Drs. Huang and Schneider, Dr. Snyder-Mackler explained that the research team plans to study whether the observed transcriptomic changes are reversible over time and, if so, to design appropriate interventions to support recovery to baseline, as well as to perform autopsies on macaques that experience natural deaths. He added that several researchers in this field are exploring whether the mechanism of aging, cognition, and brain changes between humans and macaques share similarities; early results suggest common signatures at the molecular level.

Update on NIH Diversity, Equity, Inclusion, and Accessibility Activities

Dr. Marie Bernard

The *Diversity at NIH Working Group and Strategic Plan* requires NIH to develop a strategic plan with short- and long-term goals to address racial, ethnic, and gender disparities at NIH and to identify and address barriers in access to NIH funding by investigators researching health disparities (as outlined by Report 116-450 on H.R. 7614). President Biden issued Executive Order (EO) 14035 to address diversity, equity, inclusion, and accessibility (DEIA) within the federal workforce. In November 2021, the government issued a strategic plan to implement EO 14035 and charged all agencies with developing their own DEIA plans by March 2022.

Dr. Bernard explained that NIH's DEIA plan (1) articulates a vision for strengthening DEIA; (2) captures activities that the NIH workforce will undertake to meet the strategic plan's vision; (3)

is harmonized with the NIH-Wide Strategic Plan Framework; and (4) is organized around three key objectives:

- **Objective 1:** Implement organizational practices to center and prioritize DEIA in the NIH workforce and all workforces at institutions supported by NIH funding.
- **Objective 2:** Grow and sustain DEIA through structural and cultural change, such as stewardship, partnerships and engagements, accountability and confidence, and management and operations.
- **Objective 3:** Advance DEIA through research focused on health and the workforce.

The vision of the NIH Chief Officer for Scientific Workforce Diversity (COSWD) is to enable NIH and NIH-funded institutions to benefit from the nation's full range of talent and to foster creativity and innovation in the sciences. The COSWD's mission is to serve as the NIH thought leader in the science of scientific workforce diversity, using evidence-based approaches to catalyze cultures of inclusive excellence. To achieve this mission, NIH will build evidence, disseminate the evidence across the biomedical research workforce ecosystem, and act on the evidence by advancing integrated, institution-wide systems.

Dr. Bernard emphasized that NIH is committed to a broad definition of diversity that includes individuals from racial and ethnic groups that the National Science Foundation has reported are underrepresented in health-related sciences on a national basis, individuals with disabilities, individuals from disadvantaged backgrounds, and women at the graduate level and beyond in scientific fields.

The DEIA's 21st Century Scholars Program is focused on building an inclusive cohort by fostering engagement, building mentoring pods and community, and enhancing work skills toward a culture of inclusivity. The Program is modeled after the successful Distinguished Scholars Program and applies to the extramural workforce. Dr. Bernard noted that a Scientific Workforce Diversity Seminar Series webinar will occur on May 17, 2022, from 1:00 to 2:30 PM ET.

Dr. Bernard next provided a brief overview of the NIH UNITE Initiative, which focuses on the intersectionality of health disparities, minority health, and health equity research; the internal workforce; and the external workforce. Shortly after UNITE was unveiled, the NIH Common Fund committed up to \$58 million toward transformative research that addresses health disparities and advances health equity. Two FOAs were released in March 2021, and 11 awards were announced in October 2021. Of these awards, six represent transformative research to address health disparities and advance health equity, and five represent transformative research to address health disparities and advanced health equity at Minority Serving Institutions.

During FY 2023, NIH expects to launch the Community Partnerships to Advance Science for Society (ComPASS) Initiatives. ComPASS aims to provide community-driven, health equity, structural interventions in collaboration with local Health Equity Research Assemblies (HERAs), a national Coordination Center with a national HERA, and Health Equity Research Hubs for Scientific Support and Partnership. NIH projects that ComPASS will receive \$23 million to \$52 million per year for the next 10 years.

Related to the internal workforce, another UNITE initiative, the Power of an Inclusive Workforce Recognition Project, aims to highlight the diversity of the NIH community and recognizes the contributions of employees from different life experiences.

Related to the external workforce, the Faculty Institutional Recruitment for Sustainable Transformation (FIRST) program was designed to create cultures of inclusive excellence outside of NIH. FIRST aims to develop (1) a faculty cohort model for hiring, multi-level mentoring, and professional development; (2) integrated, institution-wide systems to address bias, faculty equity, mentoring, and work/life issues; and (3) Coordination and Evaluation Centers that will independently evaluate programs at the faculty and institutional levels. Funding for FIRST is projected to be \$241 million over the next nine years. The initial first six cohorts involve seven universities, with Morehouse School of Medicine serving as the first Coordination and Evaluation Center.

In addition, the Institutional Excellence in Diversity, Equity, Inclusion, and Accessibility prize competition will acknowledge transformative cultures, systems, projects, and processes that institutions of higher education have developed to achieve inclusive excellence. The prize will highlight practices that have led to measurable change and a more inclusive environment for students and faculty. Dr. Bernard added that NIH is seeking input from the scientific research community, DEIA experts, and the public on topics such as the structure of the prize competition, outreach efforts, judging criteria, timing, dissemination of winning submissions, and addressing potential barriers to applying. All comments must be submitted by July 28, 2022, to the NIH COSWD Office. As a whole, all of the DEIA initiatives are intended to provide equity for all.

VI. ADJOURNMENT

The open session of the 146th meeting of the National Advisory Council on Aging adjourned at 1:30 p.m. on May 11, 2022. The next meeting is scheduled for September 7-8, 2022.

VII. CERTIFICATION

I hereby certify that, to the best of my knowledge, the foregoing minutes and attachments are accurate and complete.³

Richard J.
Hodes -S

Digitally signed by Richard J.
Hodes -S
Date: 2022.09.14 14:03:41
+04'00'

Richard J. Hodes, M.D.
Chairman, National Advisory Council on Aging
Director, National Institute on Aging

Prepared by Kenneth Santora, Ph.D.
With assistance by Rose Li and Associates, Inc.

³ These minutes will be approved formally by Council at the next meeting on September 7-8, 2022, and corrections or notations will be stated in the minutes of that meeting.