

NATIONAL INSTITUTES OF HEALTH
NATIONAL INSTITUTE ON AGING

Summary Minutes

The 151st Meeting
NATIONAL ADVISORY COUNCIL ON AGING
January 23-24, 2024

National Institutes of Health
Zoom Videoconference

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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
January 24, 2024

The 151st meeting of the National Advisory Council on Aging (NACA) was convened on Wednesday, January 24, 2024, 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, January 23, from 3:00 p.m. to 5:00 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, January 24, from 10:00 a.m. to 2:00 p.m.

Council Participants:

Dr. Sanjay Asthana
Dr. Darren Baker
Dr. Anne Case
Dr. Maritza Ciliberto
Dr. Yanira Cruz
Dr. Susan L. Greenspan
Dr. Yadong Huang
Dr. Rev. Cynthia Huling Hummel
Dr. Sharon K. Inouye
Dr. Sohail Khan
Dr. Frank Longo
Ms. Nancy E. Lundebjerg
Dr. Jennifer Jaie Manly
Dr. Charlotte Peterson
Dr. David B. Reuben
Dr. Julie A. Schneider
Dr. Linda J. Van Eldik
Dr. David R. Weir

Executive Secretary:

Dr. Kenneth Santora, NIA

Ex Officio Participants:

Dr. Radha Holavanahalli, Administration for Community Living (ACL)

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.

Dr. Anne Ordway, National Institute on Disability, Independent Living, and Rehabilitation Research, ACL

Ad Hoc Participants:

Dr. Elissa Epel, Weill Institute for Neurosciences, University of California, San Francisco
Dr. Robert Hummer, Carolina Population Center, University of North Carolina at Chapel Hill

In Addition to NIA Staff, Other Federal Employees Present:

Dr. Diana W. Bianchi, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development

Members of the Public Present:

Dr. Sid O'Bryant, Institute for Translational Research, University of North Texas Health Science Center at Fort Worth

188 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 2,423 applications requesting \$8,104,899,259 for all years underwent initial review. The Council recommended 1,309 awards for a total of \$5,253,861,323 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. Kenneth Santora welcomed members to the open session of the 151st NACA meeting. Dr. Hodes called the meeting to order at 10:00 a.m. on Wednesday, January 24, 2024.

A. Director's Status Report

In Memoriam

Dr. Hodes spoke about the late Dr. Judy Campisi, a pioneer in aging research with a distinguished history of service to NIA, including as a NACA member from 1999 to 2002. NACA members recognized her valued scientific and mentorship contributions to the field.

Appropriations Status for the National Institute on Aging

Currently, the National Institutes of Health (NIH) and most other federal agencies are funded through March 8, 2024, via a Continuing Resolution. On June 14, 2023, the House Labor-Department of Health and Human Services (HHS) spending bill advanced out of subcommittee

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and is awaiting consideration by the full committee, followed by the House. If enacted, NIH would receive \$43 billion, a \$3.8 billion decrease from fiscal year (FY) 2023, and NIA would receive \$4.41 billion as flat funding relative to FY 2023. On July 27, 2023, the Senate Labor-HHS spending bill advanced out of the full Committee on Appropriations and now awaits a Senate vote. If the Senate spending bill is enacted, NIH would receive \$47.8 billion, a \$943 million increase from FY 2023, and NIA would receive \$4.51 billion, an increase of more than \$100 million from FY 2023. NIH's budget includes increases of \$90 million for Alzheimer's disease and Alzheimer's disease-related dementias (AD/ADRD) research and \$12 million for palliative care research. The proposed Senate bill would also provide an additional \$10 million to the National Institute of Neurological Disorders and Stroke (NINDS) for AD/ADRD research.

Interim FY2024 Allocations for Competing Research Grant Awards

Because a new spending bill has not been enacted, NIH will remain cautious in its assumptions of available funds and interim pay lines. For grants under \$500,000 in direct costs reviewed by the NIH Center for Scientific Review (CSR), the NIA pay line is the eighth percentile (11th and 13th percentiles for new investigator [NI] and early-stage investigator [ESI] R01s, respectively). For grants over \$500,000 in direct costs reviewed by CSR, the pay line is the 5th percentile (8th and 10th percentiles for NI and ESI R01s, respectively). For AD/ADRD grants under \$5 million in direct costs reviewed by CSR, the pay line is the 12th percentile (15th and 17th percentiles for NI and ESI R01s, respectively). For AD/ADRD grants over \$5 million in direct costs reviewed by CSR, the pay line is the 10th percentile (13th and 15th percentiles for NI and ESI R01s, respectively). For NIA-reviewed grants, the interim general pay lines are an overall impact score of 10 for program projects, 10 for other NIA-reviewed research, 18 for career development awards, and 20 for fellowship awards. NIA-reviewed AD/ADRD grant interim pay lines are an overall impact score of 12 for program projects, 12 for other NIA-reviewed research, 25 for career development awards, and 30 for fellowship awards.

National Institute on Aging Updates

Dr. Hodes summarized NIA updates. NIA is supporting 488 AD/ADRD clinical trials, with 213 dementia care and caregiving trials; 171 non-pharmacological trials; 73 pharmacological trials; 23 diagnostic tools, assessments, and imaging studies; and 8 neuropsychiatric symptom treatment trials. Of the 213 dementia care and caregiving trials, 44 focus on formal care settings, 43 on improvement of caregiver health and well-being, and 27 on caregiver assessments, tools, training, and education. Of the 171 non-pharmacological studies 43 are testing exercise, 27 neurostimulation, and 20 cognitive training. Current pharmacological clinical trials target a variety of disease processes, including amyloid, inflammation, receptors, metabolism/bioenergetics, vasculature, circadian rhythm, and tau. Non-pharmacological trials focus primarily on exercise, neurostimulation, and cognitive training, but also other modalities including sleep, diet/supplements, and social engagement. The neuropsychiatric trials consist of pharmacological (5) and non-pharmacological (3) interventions.

At the request of Congress, NIA and NINDS have entered into an agreement with the National Academies of Sciences, Engineering, and Medicine to identify research priorities for preventing and treating AD/ADRD. The National Academies has formed an ad hoc committee to perform the study, with a final report expected by March 2025.

On November 27, 2023, NIA leadership met with the Cherokee Nation Chief and other tribal leaders at the Cherokee Nation Outpatient Health Center on Cherokee sovereign land. They discussed areas of mutual interest, including tribal leadership's scientific priorities for the Cherokee Nation. NIA leadership toured the outpatient center, an inpatient hospital under construction, and the Oklahoma State University-College of Medicine at the Cherokee Nation, the only college of medicine located on Native American sovereign land in the United States. The Cherokee Nation and the Oklahoma State Health Sciences Campus, along with other partners, hosted the 2023 NIA Director's Regional Meeting on November 28, 2023. This meeting provided information about NIA and career development and training opportunities in aging research and included virtual breakout sessions with representatives from NIA extramural divisions. Dr. Hodes noted that NIA leadership will continue visiting areas of the United States and institutions with historically fewer opportunities for NIA interactions.

Since September 2023, NIA has released 21 research highlights of NIA-supported publications, 18 blog posts, and 3 news announcements. In addition, senior NIA leadership has participated in 20 meetings with interest and advocacy groups as well as 6 Congressional briefings or hearings.

This year, NIA will celebrate its 50th anniversary with a series of activities throughout 2024 meant to highlight progress and inspire future generations of aging researchers. Dr. Hodes encouraged meeting participants to engage in social media regarding NIA research and career development and to share their aging research journey using #NIAWhereResearchComesOfAge.

The Breakthrough Prize Foundation awarded the 2024 Breakthrough Prize in Life Sciences to Andrew Singleton, Director of the NIH Center for Alzheimer's and Related Dementias; Ellen Sidransky, Senior Investigator at the National Human Genome Research Institute; and Thomas Gasser at the University of Tübingen, for their work in identifying risk genes for Parkinson's disease (PD) and implicating autophagy and lysosomal biology as contributors to PD pathogenesis.

NIA will co-host multiple meetings and research summits during 2024. From August 21 to 23 on the NIH Main Campus, NIA will host the Butler-Williams Scholars Program meeting for junior faculty and researchers new to the field of aging. The Cognitive Aging Summit IV will occur on March 20 and 21 at the Bethesda North Marriott Hotel & Conference Center, and the 2024 NIH Alzheimer's Disease Research Summit: Path to Precision Medicine for Treatment and Prevention will be held September 23 to 25.

National Institutes of Health Updates

On November 7, 2023, Dr. Monica Bertagnolli was confirmed as the new director of NIH. Her guiding principles for NIH institutes and centers include continued prioritization of NIH database harmonization and efforts to increase the diversity of clinical trial participants. NIH will continue to treat patients as partners in research and discovery. NIH will also prioritize use of artificial intelligence and machine learning tools to advance biomedical research. While NIH remains hopeful that budget cuts will be avoided, a flat budget will significantly impact scientific progress.

In 2023, Dr. W. Kimryn Rathmell became the 17th director of the National Cancer Institute, and Dr. Jeanne Marrazzo was named the 6th director of the National Institute of Allergy and Infectious Diseases.

Discussion

Dr. Sohail Khan thanked NIA leadership for visiting the Cherokee Nation and expressed interest in hosting other NIH leaders in the future. Dr. Hodes welcomed suggestions for other geographic areas that have historically had minimal contact with NIA and NIH as future locations for regional meetings. Dr. Jennifer Manly suggested that NIA leadership schedule visits to community colleges near larger conference locations; notably, nearby community colleges are usually invited to NIA regional meetings. Dr. Maritza Ciliberto suggested that NIA leadership consider visiting U.S. territories; a 2021 regional meeting was hosted in Puerto Rico, although it was virtual. Dr. Sharon Inouye suggested incorporating aging research into STEM outreach programs and offered to connect NIA leadership with the California State University system to engage its STEM feeder program.

Dr. Frank Longo commended NIA for the wide range of approaches, ideas, and perspectives being utilized to address AD/ADRD.

B. Staff Introductions

NIA leadership introduced new NIA staff members from the Divisions of Behavioral and Social Research (BSR), Aging Biology (DAB), and Geriatrics and Clinical Gerontology (DGCG); the Division of Extramural Activities (DEA) Grants and Contracts Management Branch (GCMB), Office of Clinical Research (OCR), and Office of Strategic Extramural Programs (OSEP); the Office of Administrative Management (OAM) Financial Management Branch (FMB) and Workforce and Administrative Management Branch (WAMB); the Office of the Associate Director (OAD); Office of Legislation, Policy, and International Activities (OLPIA); Office of Communications and Public Liaison (OCPL), and the Intramural Research Program (IRP) Office of the Scientific Director (OSD), Networks and Computing Technology Section (NCTS), Laboratory of Molecular Biology and Immunology, Laboratory of Clinical Investigation, and CARD.

Dr. Hodes also shared multiple ways that interested parties can stay informed and connected to the latest NIA news and resources.

C. Future Meeting Dates

May 21-22, 2024 (Tuesday and Wednesday), Building 45 - Natcher
September 18-19, 2024 (Wednesday and Thursday), Building 31
January 28-29, 2025 (Tuesday and Wednesday), Virtual
May 13-14, 2025 (Tuesday and Wednesday), Building 45 - Natcher
September 17-18, 2025 (Wednesday and Thursday), Building 45 - Natcher

D. Consideration of Minutes of the Last Meeting

The minutes of the September 2023 Council meeting were considered. A motion to approve the minutes was made, seconded, and passed unanimously.

III. REPORT: TASK FORCE ON MINORITY AGING RESEARCH

Dr. Yanira Cruz and her new Task Force co-chair, Dr. Julie Schneider, summarized presentations to the Task Force on Minority Aging Research by Dr. Michele Evans, Dr. Katherine Campbell, Dr. Deborah Prothrow-Stith, and Dr. Dulcie Kermah, which were centered on workforce development.

During her presentation, Dr. Evans spoke about intramural research programs and NIA efforts to diversify the next generation of scientists. As of January 2024, there are 197 NIH intramural research trainees. Dr. Evans is using two strategies to meet the diversity goals for trainee cohorts: (1) promote participation in all NIH-sponsored training programs and (2) develop NIA-specific training programs. She highlighted the Summer Training in Aging Research (STAR) program, which is for high school students aged 17 and older, as well as an NIH program for community colleges and workforce recruitment, which connects federal and private-sector employees with highly motivated students and recent graduates with disabilities. Dr. Evans also spoke about the NIH post-baccalaureate program, the Diversity in Aging Research Pipeline Program (DARPP), and the Shock Academy for Introduction to Laboratory Skills (SAILS). The three-day SAILS program aims to inspire high school students under age 17 to pursue careers in biomedical and aging research. In discussion of these programs, Task Force members noted the importance of finding new ways to include American Indian/Alaska Native (AI/AN) students in these programs as well as strategies for scaling these programs nationwide. Council participants expressed enthusiasm for the efforts at NIH and NIA to enhance the workforce pipeline.

Dr. Campbell is an Assistant Professor at St. Catherine University, which is a minority-serving institution and women's college. She spoke about training minoritized women and gender-diverse undergraduates as future leaders in geroscience and gero-justice. Gero-justice is defined as the injustices and health disparities that accumulate over the lifespan of minoritized populations, as well as a way to describe social justice within aging populations. She highlighted the R25 Katies for Aging Research and Equity (KARE) Program, which aims to advance diversity in aging research. This multi-year research education program is focused on geroscience and gero-justice and is the only Advancing Diversity in Aging Research program in the upper Midwest. All students who have completed the KARE Program are planning a career in research. Training the next generation of diverse aging researchers is fundamental to addressing the nation's health and health inequities.

Dr. Prothrow-Stith is the Dean and a Professor of Medicine at the Charles R. Drew University of Medicine and Science (CDU), which is the fourth historically black college and university to grant medical degrees. CDU and the University of California, Los Angeles (UCLA) developed the CDU/UCLA Medical Education Program, which enrolled medical student cohorts from 1981 to 2023. Future cohorts studying medicine at CDU will enroll in CDU's new medical school program. Dr. Prothrow-Stith spoke about the history of medical education and the demographics of the inaugural CDU medical school class. The first cohort will graduate in 2027. In addition to training the next generation of doctors, CDU also prioritizes research on social justice and community education.

Dr. Kermah is the Director of an R25 program at CDU. She explained that many students at CDU began at community colleges, and therefore the R25 program prioritizes engaging these

community colleges to encourage students to pursue careers in research. The R25 program is building a pipeline of aging researchers beginning at the community college level with the goal of creating a racially, ethnically, and socioeconomically diverse workforce in aging research. Task Force members discussed strategies to encourage institutions to apply for diversity supplements to further support training as well as the value of F99/K00 award mechanisms in maintaining the workforce pipeline.

Discussion

Ms. Nancy Lundebjerg commended the Task Force on Minority Aging Research members for their work and for sharing these activities with Council members.

IV. REPORT: WORKING GROUP ON PROGRAM

Dr. Greenspan, Chair of the Working Group on Program, led the updates on all 14 concept clearances. The Council members unanimously and enthusiastically concurred with approval of 13 of the 14 concepts, and recommended dividing one concept into two, as summarized below.

A. Notice of Funding Opportunity Concept Clearances: Division of Aging Biology

Dr. Greenspan invited primary reviewers to present their respective DAB concepts to the Council. Primary reviewers were Drs. Charlotte Peterson, Darren Baker, and Manly.

NIA Aging Cell Repository (Renewal)

This concept proposes the renewal of a contract to support the NIA Aging Cell Repository, a scientific resource that was established in 1974 and now maintains and distributes more than 3,000 unique cell lines to the aging research community. Notably, most of these cell lines are of human origin with about one-half from either healthy humans at various ages or humans with AD/ADRD. About 20 percent of the human cell lines were derived from non-White donors, and men and women are equally represented in the collection. Use of the repository over the years has been extensive within the United States and internationally. Although most requests are for human cell lines, DAB noted an increase in requests for non-human primate (NHP) cell lines. Use of repository cell lines resulted in 154 publications in 2020-2022, and in more than 100 additional publications in 2023. The Council expressed enthusiasm for continuing to support this valuable resource and voted strongly in favor of renewal.

Pathology Monitoring of Aged Rodent Colonies (Renewal)

The goal of this contract renewal is to continue to provide independent monitoring of aged rodent colonies distributed across NIA and other academic institutions. Pathology monitoring is outsourced to a third-party contractor, which performs complete necropsies, histopathology of suspect tissues, bacterial cultures, and ectoparasite detection methods to ensure that rodents supplied to the research community are of sufficient quality for research needs. The Council expressed strong support for this concept.

The Impact of Stressors on the Biological Mechanisms of Aging and Other Aging-Associated Outcomes in Experimental Model Systems

This concept provides a rationale for a set of applications through the R61/R33 funding mechanism. The goal is to study the impact of midlife stressors on the hallmarks of aging (e.g., telomere attrition, epigenetic alterations, chronic inflammation) in vitro and in vivo within model

systems and other wild or domesticated animal populations. Studies of combinations of stressors are necessary to understand real-world aging. The first phase of the project would focus on determining whether exposure to stressors during adulthood results in measurable changes in hallmarks of aging, and the second phase would expand on the first phase findings to determine stressor impacts on lifespan, health span, resilience, and other variables. The program agreed to require multidisciplinary teams. The Council recommended that the application materials discuss links between health disparities and external stressors to model the human world of disparities. The Council enthusiastically supported this concept.

B. Notice of Funding Opportunity Concept Clearances: Division of Behavioral and Social Research

Dr. Greenspan invited Dr. Weir, the primary reviewer, to present the DBSR concept to the Council.

Short Courses on Interdisciplinary Behavioral and Social Sciences Research Focused on Promoting the Use of the NIH Stage Model and Cognitive Data from the International Health and Retirement Study (HRS) and Harmonized Cognitive Assessment Protocol (HCAP) on Aging and AD/ADRD for Cross-National Data Analyses

This concept proposes to use the R25 mechanism to advance research using the NIH Stage Model and to train researchers in secondary analysis of aging and cognitive data collected internationally. The NIH Stage Model serves as a blueprint for developing behavioral intervention trials. Data collected by the family of international Health and Retirement Studies and Harmonized Cognitive Assessment Protocol (HCAP) contain wide and deep covariate measurements and offer unique opportunities for cross-national analyses. Although enthusiastic about these ideas, the Council noted that the training goals of NIH Stage Model trial design and secondary data analysis were quite disparate and should be considered as separate funding opportunities.

C. Notice of Funding Opportunity Concept Clearances: Division of Geriatrics and Clinical Gerontology

Dr. Greenspan invited fellow primary reviewers, Drs. Baker, Inouye, Peterson, and Sanjay Asthana, to present their respective DGCG concepts to the Council.

Facilitating T1 Translational Aging Research: Preclinical and Early Phase Human Studies

This concept proposes use of a milestone-driven, phased innovation mechanism (UH2/UH3) to support two types of projects. The first type is a conventional pathway for new drug development. The second type features data-driven computational approaches with subsequent validation of predictions and generation of proof-of-concept data in relevant animal or human (in vivo or in vitro) model systems. Projects may include multidisciplinary investigative teams that include expertise pertinent to the translational research project and its progression through translational pipeline stages, and can include collaborations with academic, nonprofit, or commercial entities to achieve the requisite expertise, experience, and resources. The Council was supportive of this concept as an opportunity to move research toward T1 translational studies.

Grants for Early Medical/Surgical Specialists' Transition to Aging Research (GEMSSTAR) Program (Renewal)

The GEMSSTAR Program supports promising early career clinician investigators with the overall goal of long-term commitment to academic research in the aging field to generate pilot data and establish a record in aging and geriatrics research. The GEMSSTAR Program provides each participant with an R03 grant to support a small research project at the intersection of aging and the participant's clinical specialty. Participants also develop professional development plans and attend an annual conference that provides support and mentorship. The program has helped accelerate the careers of more than 221 awardees, achieved success by publication and grant metrics, and launched participants into successful academic and leadership roles in their respective fields. Council members were very enthusiastic to support this concept to continue the GEMSSTAR Program and recommended broadening the team science mentoring and training provided, finding additional ways to assure adequate project support for participants, and increasing participant diversity. In addition, Council members indicated that the awards should not all be used for salary support, and that the program should continue its enhancement in response to participant feedback.

Mentored Career Development & Enhancement Awards to Build Cross-Disciplinary Knowledge and Skills for Comparative Studies of Human and Nonhuman Primate Species with Differing Life Spans

This concept is aimed at attracting and developing early- and mid-career scientists to expand the number of investigators across basic science, veterinary science, and clinical science with expertise in comparative studies of factors that contribute to NHP species lifespan differences. Two career development awards were proposed—the Mentored Research and Clinical Research Scientists (K01/K08) and the Research Career Enhancement Award for Established Investigators (K18). Notably, while DGCG is the lead division for this concept, the three other NIA divisions also support this request. Because many factors may contribute to lifespan differences in NHPs, these studies require a broad range of expertise, including in comparative biology, evolutionary genetics, anthropology, primatology, and basic and clinical aging science. Therefore, these awards are critical to develop and address innovative longevity research questions. These career development awards complement two recent companion Requests for Applications (RFAs) on Comparative Research on Determinants of Differences Among Human and Nonhuman Primate Species in Life Spans, Life Histories, and Other Aging-Related Outcomes, and Prospects for Translation, inviting R01 research projects ([RFA-AG-24-019](#)) and R61/R33 exploratory/developmental phased networking/infrastructure projects ([RFA-AG-24-020](#)). The Council was generally supportive of this concept, although members noted that it may be premature for NIA to offer early career awards before establishing the necessary research infrastructure. Therefore, the Council recommended first releasing the K18 award announcement and then releasing the K01/K08 award announcement after the establishment of the necessary foundation and infrastructure for this interdisciplinary field.

Understanding the Mechanisms Underlying Age-Related Changes in Gait Biomechanics and Increased Metabolic Cost of Walking

Mobility dysfunction impacts greater than 25 percent of the population over age 65 and is associated with changes in muscle strength, bioenergetics, balance, and joint mobility. A lack of understanding of how these changes interact with and affect the neuromuscular and skeletal muscle systems has limited the development of effective prevention and rehabilitation strategies.

This concept proposes to support multidisciplinary teams to design new controlled studies that employ innovative approaches to better understand the mechanisms underlying compensatory gait posture strategies that contribute to walking speed, metabolic cost, and fatigue. Areas of interest include the mechanisms and effects of central nervous system changes, neuromuscular changes, skeletal muscle bioenergetics, computational modeling and simulation, and changes in tissue structure and function, such as the muscle-tendon complex. Interdisciplinary collaborations are encouraged that explore interactions among multiple systems and innovative approaches such as computational modeling, imaging, and sensor technologies. The Council was enthusiastic about moving this concept forward.

Claude D. Pepper Older Americans Independence Centers (OAICs) (Renewal)

This concept proposes the continuation of the Claude D. Pepper Older Americans Independence Centers (OAICs) Program, a P30 centers grant program that focuses on innovative research on maintaining or restoring independence in older adults. OAICs have produced breakthrough research on the physiology underlying the loss of physical function and mobility, enabling identification of early signs and prevention to avoid this loss of function. OAICs have conducted well-known multi-site clinical trials, funded numerous pilot projects that have been translated into larger research programs, and continue to attract and train the next generation of researchers. The Council discussed strategies for translating OAIC findings into improved care and encouraged collaboration with minority-serving institutions and increased emphasis on expansion of diversity at multiple levels across the program. The Council was supportive of renewing the OAICs Program within its current scientific scope but recommended increasing the OAICs annual budget and the number of sites.

D. Notice of Funding Opportunity Concept Clearances: Division of Neuroscience

Dr. Greenspan invited primary reviewers to present their respective DN concepts to the Council. Primary reviewers were Drs. Yadong Huang, Baker, Longo, and Asthana.

Investigating Mitochondrial-Nuclear Communication in Brain Aging and AD/ADRD

This concept focuses on the mechanisms of communication between mitochondria and nuclei in the process of brain aging. Although mitochondria contain their own genomes, they still require nuclear DNA encoded proteins for normal function. During aging and AD/ADRD processes, mitochondria quality and activity decline, resulting in increases in reactive oxygen species and other metabolites. Prior research has indicated that mitochondrial metabolites can profoundly impact post-translational modifications of proteins and chromatin. Researchers are exploring connections between cellular metabolism, mitochondrial-nuclear communication, and aging and AD/ADRD. Current research challenges in the field stem from the dynamicity and evolution of aging and AD/ADRD processes. This concept will help to stimulate the emerging field of mitochondrial-nuclear communication and develop the tools to measure these communication processes. Because no existing study section contains all the areas of expertise required to adequately review applications in this area, the corresponding RFA will require a special review panel. The Council believed the concept proposal to be highly relevant to NIA's goals and expressed strong support.

Access and Manipulation of Brain Cell Subtypes Implicated in Aging and AD/ADRD

The focus of this concept is to encourage utilization of new adeno-associated virus (AAV) technology to address the roles of specific brain cell subtypes already implicated in various aging

and AD/ADRD processes. Several large-scale efforts already funded by NIA are identifying cell types altered in AD/ADRD brains by generating high-quality single-cell omics datasets from human tissues and model organisms. Analyses of these datasets have resulted in numerous high-impact publications that have discovered disease-associated gene signatures across all major brain cell types and have identified subtype-specific alterations in neurons, astrocytes, microglia, oligodendrocytes, and vascular cells. However, how these changes contribute to AD/ADRD-associated deficits in cell, circuit, and brain function is unclear. Therefore, this concept aims to develop novel strategies to test mechanistic hypotheses with the potential to inform future preclinical studies by (1) optimizing access to brain cell subtypes implicated in aging and AD/ADRD by generating and validating AAV-enhancer vectors and (2) using optimized AAV-enhancer tools to manipulate or monitor brain cell subtypes to address mechanistic hypotheses in aging and AD/ADRD. Using new AAV technology will enable researchers to bypass some current limitations of genetic approaches used to model AD/ADRD. The Council was supportive of this concept.

Alzheimer's Drug Development Program (ADDP) (Renewal)

This concept proposes a renewal of the ADDP, which was established in 2006 to support the most challenging and costly steps of preclinical drug development. The program funds research across the research pipeline, including the creation of candidate therapeutics, pharmacokinetics and efficacy testing in animal models, investigational new drug-enabling studies, large-scale drug synthesis for clinical trials, and first-in-human trials. To date, ADDP has funded 45 U01 projects, of which 12 have resulted in candidate therapeutics reaching human clinical trials; 7 of these candidates reached Phase II clinical trials. The program is milestone-driven with annual reviews required to maintain funding. Renewal of ADDP will expand the research and development pipeline to include additional candidate therapeutics with more diverse mechanisms of action. The program will also support the development of novel positron emission tomography (PET) ligands to support new brain imaging capabilities that enable precision medicine approaches. The Council was supportive of this renewal.

Biomarkers of Cognitive Decline and Dementias of Aging in Individuals Within the Autism Spectrum

This concept seeks to establish clinical cohorts of individuals with autism spectrum disorder (ASD) to better understand the pathophysiology and heterogeneity of ASD during the lifespan using deep phenotyping and prospective data collection through late life. Previous studies indicate that as they age, people with ASD have an increased risk of dementia compared to those without ASD, activated amyloidogenic pathways, and potential disease pathway and mechanism commonalities with AD/ADRD. Approval of this concept will enable NIA to launch systematic studies on the neurology of ASD and develop biomarkers of early diagnosis and potential therapeutics. The Council was highly supportive of this timely concept.

Deciphering the Impact of RNA Modifications on Brain Aging and AD/ADRD

Recent technological developments have enabled systematic detection and characterization of RNA chemical modifications. To date, 170 distinct modifications have been identified, and research implicates RNA modifications in the maintenance of homeostasis. In addition, RNA modifications and RNA modification machinery have direct functional effects on gene expression and regulation of physiological processes, including those implicated in the etiology of AD/ADRD. However, the diversity of these RNA modifications and the extent to which they

impact AD/ADRD remain unexplored. This concept will support innovative research aimed at characterizing RNA modifications and machinery and modification impacts on cellular and pathophysiological processes to better understand AD/ADRD heterogeneity and to identify new strategies for therapeutic development. The program will operate under open science principles; all data and analytic outcomes will be shared directly and broadly via the AD Knowledge Portal. This concept proposes to support hypothesis driven R01 research grants with multidisciplinary teams using innovative approaches, and R21 grants funding exploratory, innovative research that involves considerable risk but offers the potential for high impact. The Council expressed support for this concept.

V. COUNCIL GUEST SPEAKER

Opportunities for Collaboration Between NIA and NICHD Across the Lifespan

Dr. Diana W. Bianchi, Director, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD)

NICHD research encompassed the field of aging until 1974, when NIA was established. NICHD now “leads research and training to understand human development, improve reproductive health, enhance the lives of children and adolescents, and optimize abilities for all.” The institute also supports research on stroke rehabilitation in adults because the National Center for Medical Rehabilitation Research (NCMRR) is housed within NICHD. NICHD updated its strategic plan in 2020 to include the following research themes: (1) understanding the molecular, cellular, and structural basis of development; (2) promoting gynecologic, andrologic, and reproductive health; (3) setting the foundation for healthy pregnancies and lifelong wellness; (4) improving child and adolescent health and the transition to adulthood; and (5) advancing safe and effective therapeutics and devices for pregnant and lactating women, children, and people with disabilities. In alignment with these themes, about 55 percent of NICHD’s research portfolio is germane to pediatrics, 30 percent to reproductive health research, and 18 percent to research on intellectual and developmental disabilities and rehabilitation. NICHD also manages a Data and Specimen Hub (DASH) as a centralized resource for researchers to share de-identified data from NICHD-funded studies as well as a portal for requesting biospecimens from select NICHD studies.

Investigation of Co-Occurring Conditions Across the Lifespan to Understand Down Syndrome (INCLUDE) Program

In 2018, NICHD launched the INCLUDE Program in collaboration with NIA and the National Heart, Lung, and Blood Institute and with an initial investment of \$258 million to address health and quality-of-life needs for individuals with Down syndrome (DS). INCLUDE focuses on conditions that disproportionately affect people with DS compared to the general population, such as AD, ASD, cataracts, celiac disease, congenital heart disease, and diabetes, as well as the protective mechanisms of people with DS against developing solid tumors and myocardial infarctions. INCLUDE is also working to increase the number of researchers advancing the health of people living with DS and to engage individuals with DS and their families from diverse backgrounds. The program’s three components are to (1) conduct targeted, high-risk, high-reward basic scientific research on chromosome 21; (2) assemble a large study population of individuals with DS across the lifespan; and (3) include individuals with DS in clinical trials. The INCLUDE Data Hub is a cloud-based resource providing free access to large-scale data

resources with capabilities to explore custom-built cohort databases based on participant, biospecimen, clinical, and omics data. This hub encourages collaboration and facilitates opportunities to uncover new insights into DS and co-occurring conditions. INCLUDE's contributions to the scientific community thus far range from investigating the impact of COVID-19 on individuals with DS, to determining whether a home sleep study is as reliable as hospital-based sleep studies to identify sleep apnea, to developing and validating cognitive measures in children with DS for the NIH Toolbox.

INCLUDE also helps support the Alzheimer Biomarker Consortium-DS (ABC-DS), comprised of 92 investigators across 19 institutions. ABC-DS aims to understand biological changes underlying AD in people with DS and to develop clinical biomarkers by (1) examining genetic factors and biomarkers with disease risk-modifying potential for DS-AD; (2) developing precision medicine-ready biomarkers for DS-AD clinical trials; and (3) disseminating data and biospecimens to qualified researchers beyond ABC-DS. ABC-DS has established a longitudinal cohort that will enroll up to 600 adults aged 25 and older with DS. Participants in ABC-DS also can co-enroll in a trial-ready cohort for upcoming clinical trials.

Researchers with ABC-DS and the Dominantly Inherited Alzheimer Network tested whether the timing and spatial distribution of amyloid accumulation differ between people with DS and autosomal-dominant Alzheimer's disease (ADAD) using magnetic resonance imaging (MRI) and PET imaging. They found that amyloid plaques occur at similar levels in the brains of people with DS and people with ADAD, suggesting that individuals with ADAD or DS may benefit from participating in future clinical studies aimed at slowing amyloid plaque formation. ABC-DS also performed longitudinal evaluation of tau levels in people with DS to improve estimation of years to symptom onset for dementia. Researchers found early and rapid tau increases 2.5 to 5.0 years after amyloid beta onset, providing a potential strategy for temporal characterization of AD neuropathology progression in the DS population.

Candidate Prenatal Therapies for Down Syndrome

Dr. Bianchi's laboratory at NICHD envisions a future for noninvasive early prenatal sequencing-based detection of trisomy 21 (T21) and delivery of subsequent therapy to ameliorate the effects on fetal brain development and improve postnatal neurocognition. The Bianchi laboratory uses a two-pronged approach to preclinical studies of DS: (1) in vitro studies of initially amniocytes, then induced pluripotent stem cells (iPSCs) and neural progenitor cell-derived cells from individuals with DS to help identify safe and effective drugs that alleviate T21-associated phenotypes and (2) in vivo studies using four different mouse models of DS to test phenotypic improvement and teratogenic effects of candidate molecules in pregnant mice. Dr. Bianchi found that treating DS mice with apigenin, a naturally occurring flavonoid, increases expression of anti-inflammatory cytokines, partially rescues overexpression of multiple genes in the embryonic forebrain, and improves hippocampal memory in adult male mice.

Dr. Bianchi is also investigating the role of the placenta in the development of fetuses with DS. In DS mouse models, the placenta exhibits multiple phenotypes, including premature senescence, increased expression of amyloid precursor protein (APP), differences in cytotrophoblast fusion that result in atypical production of hormones, and an abnormal balance of antioxidants. Correction of these atypical, T21-associated placental phenotypes may result in improved fetal

development, and the results of these studies could be relevant for placental biology and fetal health more generally.

Connections Between Neonatology and Gerontology

Dr. Bianchi and her colleague, Dr. Nina Schor, published an article outlining the hypothesis that proteins implicated in neurodegenerative disorders, such as AD and PD, play important roles in brain development. Therefore, the underpinnings of neurodegeneration could be studied during the prenatal period. This hypothesis presents research opportunities to characterize protein expression, structure, and function changes from embryogenesis through senescence in both healthy controls and disease models. An important aspirational goal for the NICHD is to identify biomarkers of atypical neurodevelopment that can establish the likelihood of neurodegenerative disorders later in life.

Human Placenta Project

The placenta affects brain development and health over the full lifespan, and harmful exposures via the placenta can increase disease risks later in life. The Human Placenta Project aims to understand placental development, function, and structure through all stages of pregnancy. Thus far, the project has used enhanced imaging techniques to enable more detailed views of placental structure and the flow of blood, oxygen, and nutrients. Researchers are also contributing placental and umbilical cord data and biospecimens to DASH and are working to identify placental biomarkers in the maternal bloodstream that reflect the health and function of the placenta.

The National Longitudinal Study of Adolescent to Adult Health (Add Health)

Add Health consists of a nationally representative sample of adolescents in grades 7 through 12 in the United States in 1994 to 1995. It includes five waves of study data, with a sixth wave and omics projects under way. For wave 5 (cohort age 33 to 44 years), Add Health generated data on early-life precursors of chronic disease. For wave 6 (cohort age 39 to 49 years), Add Health is measuring cognition and will collect data that will eventually enable identification of early risk factors for dementia. Additional data corresponding to this cohort include data from peers, school administrators, parents, siblings, friends, and romantic partners. Add Health also merged existing databases with information about participants' neighborhoods and communities with its own study data.

Menarche to Menopause

Dr. Bianchi noted increased Congressional interest in menopause, including increased mentions during NIH hearings. Both NIA and NICHD fund research on menopause, which is critical because of its impacts on reproductive biology and on women's daily lives. The Society for Women's Health Research is conducting a focus group study to better understand the impact of menopause in the workplace. On November 13, 2023, President Biden announced a first-ever White House Initiative on Women's Health Research, led by Dr. Jill Biden and the White House Gender Policy Council. This initiative will (1) deliver concrete recommendations to advance research on women's health; (2) use a targeted and high-impact approach to focus on areas where additional investments could be transformative; and (3) engage the scientific, private sector, and philanthropic communities, exploring new public-private partnerships. The White House Gender Policy Council submitted research recommendations under this initiative in December 2023 with contributions from NICHD. Along with research on menopause, other

opportunities for collaboration between NICHD and NIA include research across the lifespan to understand the developmental origins of health and disease and early interventions that can benefit long-term health.

Discussion

Connections Between Pediatric and Aging Disorders

Multiple Council members expressed enthusiasm for Dr. Bianchi's research. Dr. Longo asked whether overlaps such as those between DS and AD/ABDR exist for other neurodevelopmental disorders, such as cerebral palsy. Dr. Bianchi indicated that she is unaware of specific research in this area but that the NCMRR may fund this type of research. Pediatric disorders such as cerebral palsy likely have critical components related to aging. Similarly, NIA has collaborated with NICHD on several initiatives examining the impacts of early-life events on late-life health.

While Dr. Bianchi's work focuses on DS, her colleague, Dr. Francis Collins is studying Hutchinson-Gilford progeroid syndrome (HGPS, or progeria), which is an accelerated aging syndrome involving chromosome instability. Because both DS and progeria are associated with aneuploidy, Dr. Bianchi expressed interest in studying the placentas of progeria mouse models to identify any common placental phenotypes (e.g., increased APP expression) between both syndromes. Dr. Baker expressed enthusiasm for the renewed interest in hallmarks of aging in younger individuals, including those with accelerated aging phenotypes.

Social Determinants of Health and Underserved Communities

NICHD research on social determinants of health focuses on fetal development, pregnancy and maternal health outcomes, and childhood development through adolescence. Transitioning study participants from NICHD's study cohorts to NIA cohorts could further maximize data collected across the lifespan.

Dr. Khan asked about NICHD's involvement with the AI/AN community around ASD, noting the lack of resources available in this community for those with ASD. Dr. Bianchi noted that NICHD and the National Institute of Mental Health (NIMH) fund Autism Centers of Excellence located throughout the United States but was not aware of specific activities with the AI/AN community. Drs. Khan and Bianchi will discuss the intersection of ASD and the AI/AN community at a future date.

In response to Dr. Huang's question about whether ABC-DS collected APOE data from study participants, Dr. Sid O'Bryant explained that these data are available from the Laboratory of Neuro Imaging (LONI) Image and Data Archive (IDA).

VI. PROGRAM HIGHLIGHTS (DN)

Health & Aging Brain Study – Health Disparities – Update on Progress to Date

Dr. Sid O'Bryant, Professor, Family Medicine and Osteopathic Manipulative Medicine, University of North Texas Health Science Center at Fort Worth

Dr. O'Bryant outlined the overall structure of the Health and Aging Brain Study-Health Disparities (HABS-HD) project. HABS-HD consists of seven cores and their responsibilities: (1) Administrative: overall program management; (2) Neuroimaging & Informatics: creating, approving, and processing all MRI and PET sequences; (3) Clinical: clinical assessment

procedures; (4) Omics: overseeing the biorepository and all a priori defined omics; (5) Disparities and Outreach: community outreach and recruitment; (6) Biostatistics: aims and hypothesis development and analytics; and (7) Development: training scientists. These cores support three interconnected projects within HABS-HD:

- Project 1—Amyloid, tau, and neurodegeneration (ATN) framework among diverse populations.
- Project 2—Impact of vascular, metabolic, and inflammatory factors on ATN framework among diverse populations.
- Project 3—Impact of exposome on ATN framework among diverse populations.

The Institute for Translational Research (ITR) is solely dedicated to seeing HABS-HD participants, with ample clinical space and customized information technology architecture that provides streamlined appointment scheduling and data collection. With two MRI and two PET/computed tomography scanners fully dedicated to the study, ITR currently sees 65 study participants per week and runs 200 PET scans per month, with the capacity to complete 2,400 amyloid-PET scans, 2,000 tau-PET scans, and 5,000 MRI scans annually. Notably, SOFI Dallas was the only company willing and able to meet ITR's PET ligand capacity needs (providing Amyvid and PI2620).

Dr. O'Bryant and his team set enrollment milestones (minimums) and goals (aspirations), carefully tracking study enrollment, attrition, and no-show rates to enable informed operational adjustments. With U19 funds, staff at ITR have seen more than 2,000 participants over 15 months. HABS-HD has also acquired 1,500 whole-genome sequences and more than 400,000 aliquots of biological samples from study participants, as well as emerging AD/ADRD biomarker data. Notably, longitudinal PET scans are collected every 24 months at a relatively equal distribution across racial groups (i.e., non-Hispanic White, Hispanic, and Black/African American). Dr. O'Bryant credits his team and a strong base of community-based aging research in the Dallas-Fort Worth area for this success. In addition, the Dallas-Fort Worth area's ethnic and racial composition matches that of the projected 2045 composition for the United States. HABS-HD data are linked to Centrally-Linked Longitudinal Peripheral Biomarkers of AD (CLEAR-AD) and ABC-DS data, and are currently available on the ITR website. Dr. O'Bryant and his team are working to transition these data to LONI and to submit data to the NIA Genetics of Alzheimer's Disease Data Storage Site (NIAGADS).

Dr. O'Bryant also outlined key program aspects that he and his team implemented based on prior experience. HABS-HD prioritizes transparency and communication via frequent internal core and team meetings that remain focused on specific meeting goals and include ITR staff. All HABS-HD systems are built with scalability and interconnectivity in mind to facilitate updates and expansions as well as incorporation of feedback from study participants and staff. ITR staff use a weekly, granular metric system for monitoring progress that is reported to the Principal Investigator (PI) and study team, giving staff a sense of ownership in the study's progress. This information also justifies shifting efforts to meet current study needs by hiring new research assistants, increasing participant retention, and decreasing appointment no-show rates. The HABS-HD team is currently developing a method for monitoring study participation based on monthly appointment scheduling and no-show rates. It is also developing systems to enable more

granular sample, assay, and data tracking for the Clinical and Omics Cores and to provide more accurate projections of data availability to the scientific community.

Discussion

Dr. Hodes invited Dr. O'Bryant to share recruitment strategies that have resulted in diverse study enrollment. Dr. O'Bryant explained that his team participates or hosts more than 200 community events per year, and that he speaks with the community and community leaders regularly. These community ties were built over more than a decade. Study recruitment also relies on a dedicated media team that organizes television, radio, and social media outreach and advertisement. Dr. O'Bryant emphasized that conversations with the community require researchers to first ask leaders what the community needs to establish a reciprocal relationship. For example, if a community needs education on diabetes and hypertension, the study team will organize an event or provide resources. Dr. O'Bryant also noted that he mentors several research groups on building these strong community relationships.

Dr. O'Bryant clarified that no one is removed or excluded from HABS-HD even if participating in a clinical trial, including those for AD/ADRD. Some HABS-HD participants may temporarily leave the study to participate in an amyloid therapeutic clinical trial, but the study team encourages them to resume participation in HABS-HD once the trial is complete.

Prior studies showed that certain socioeconomic factors are not related to amyloid deposition, but these results may be due to the restricted range of participants' socioeconomic status. Dr. O'Bryant explained that broad socioeconomic factors, such as neighborhood, are strongly linked to ATN, meaning the biology of aging cannot be studied in the absence of socioeconomic and sociocultural factors.

VII. INTRAMURAL RESEARCH PROGRAM UPDATE

Laboratory of Neurogenetics: Shared and Distinct Genetic Contributions to Neurodegeneration Across Diseases and Populations

Dr. Mark Cookson, Senior Investigator and Chief, Laboratory of Neurogenetics (LNG), NIA

The LNG, part of NIA IRP, consists of seven PIs. Approximately one-half of LNG's research efforts are dedicated to genome-wide associated studies (GWAS) and monogenic diseases; the other half are dedicated to functional studies using cellular and animal models. Although LNG is not considered a purely translational laboratory, some LNG findings have subsequently informed clinical trials. For example, prior research from LNG identified alterations in p38 associated with inflammation and synaptic damage in dementia with Lewy bodies (DLB), and that treatment with p38 inhibitors ameliorated these DLB phenotypes in a mouse model. In addition, a p38 modulator rescued the mislocalization of p38 from Lewy bodies to synapses. As a result, clinical trials for p38 inhibitors in DLB are now under way. LNG also collaborates with the National Center for Advancing Translational Sciences to develop candidate antisense oligonucleotide (ASO) therapeutic approaches based on findings from longitudinal clinical feature and biomarker data collected by the Advancing Research and Treatment in Frontotemporal Lobar Degeneration (ARTFL) and Longitudinal Evaluation of Familial Frontotemporal Dementia Subjects (LFFTD) programs, the two components of the ARTFL LFFTD Longitudinal Frontotemporal Lobar Degeneration (ALLFTD) Consortium.

LNG is highly collaborative, both between LNG PIs and with other NIH ICs and laboratories. These collaborations enable frequent, high-quality publications, particularly in the neurosciences and clinical neurology. Much of the work at LNG is performed by postdoctoral trainees who eventually progress to successful careers as PIs at other institutions.

Dr. Cookson summarized recent notable LNG research progress in GWAS and functional modeling of variants associated with AD/ADRD. Through research partnerships that emphasize data sovereignty, LNG published the first GWAS of people of African and African admixed ancestry with and without PD; the study identified a novel common risk factor for PD at the glucosylceramidase beta 1 (*GBA1*) locus. LNG also published the first large-scale multi-ancestry meta-analysis of PD in individuals of European, East Asian, Latin American, and African ancestry, identifying 78 independent significantly associated loci, 12 of which were novel and fine-mapped to six putative causal variants at six known PD loci. These novel variants were not previously detected in studies of only individuals of European ancestry. In another GWAS, LNG identified variants previously associated with PD and AD, suggesting a complex relationship between these neurodegenerative diseases. Notably, the number of variants identified in this GWAS is likely an underestimate because the study focused only on coding region variants and single nucleotide polymorphisms (SNPs) in noncoding regions. Therefore, LNG sought to identify structural variants in noncoding regions that are present at higher or lower frequencies in individuals with subtypes of dementia when compared to those without a dementia diagnosis. Researchers identified a noncoding region near two pore segment channel 1 (*TPCN1*) as a novel risk locus for DLB and validated this finding in multiple independent cohorts.

The model system work at LNG leverages the rich data obtained from genomic analyses to assess gene function. Dr. Cookson and his co-lead PI direct the iPSC Neurodegenerative Disease Initiative (iNDI), a program that systematically engineers isogenic cell lines of different backgrounds with mutations associated with AD/ADRD. By inducing these mutations in different, yet consistent genetic backgrounds, iNDI provides a resource for studying the mutations in the absence of other scientific confounds. In alignment with iNDI efforts, Dr. Cookson is also planning a hybrid Engineering iPSCs to Model Neurological Diseases Symposium on May 6, 2024, followed by an in-person workshop on May 7-10, 2024. LNG also uses mouse genetics to study cell type-specific effects of variants identified in GWAS. Using genetic tools and approaches in mice further enables researchers to study an allelic series and understand how mutations in the same gene can be associated with different diseases.

Dr. Cookson outlined LNG's future scientific directions as presented during the LNG IRP review. LNG continues to improve and expand global representation and trans-ancestry approaches for GWAS and human studies of complex diseases as well as long-range sequencing to resolve haplotypic association and structural variation. LNG has also established tools to scale iPSC modeling of endogenous mutations for Mendelian variants and GWAS-nominated variants and is exploring additional in vivo methods for humanized mouse models to accurately reflect endogenous gene expression patterns in humans. LNG researchers are also using mouse genetic tools to alter genes of interest in specific cell types as well as clustered regularly interspaced short palindromic repeats (CRISPR)/Cas9-mediated gene targeting via AAV vectors for acute control of gene editing. Their ASO development efforts are continuing along with other supportive roles to prepare for future clinical trials.

VIII. ADJOURNMENT

The open session of the 151st meeting of the National Advisory Council on Aging adjourned at 2:30 p.m. on January 24. The next meeting is scheduled for May 21-22, 2024.

IX. CERTIFICATION

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



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 May 21-22, 2024, and corrections or notations will be stated in the minutes of that meeting.