Moving towards Precision Public Health for Minority Health and Health Disparities Research

Damali Martin, PhD, MPH
Chief, Population Studies and Genetics Branch
National Institute on Aging, NIH

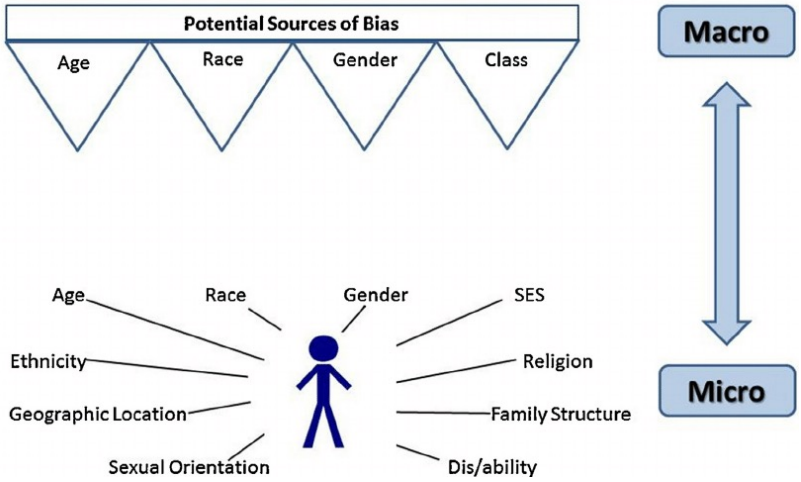
NIH National Institute on Aging

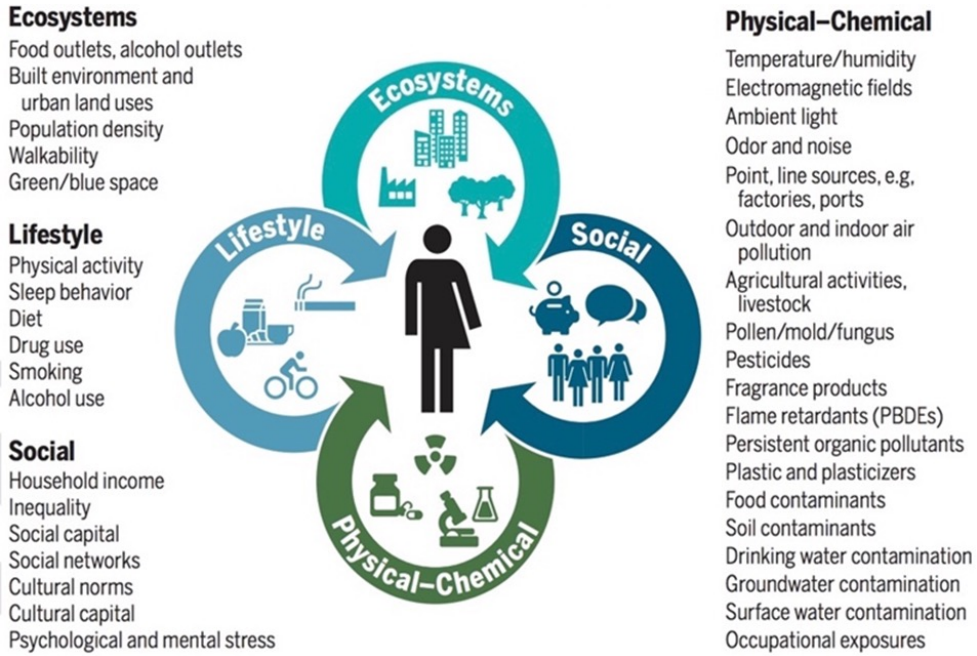
Outline

- Precision medicine, Precision Public Health and Health Disparities Framework.
- Overview of Division of Neuroscience
- Support research and research infrastructure

NIH National Institute on Aging

Factors Influencing AD/ADRD Risk/Resilience





Co-morbidities:

- Familial (genetics)
- Down Syndrome
- Co-morbidities (CVD, HIV-status, oral frailty, etc.)

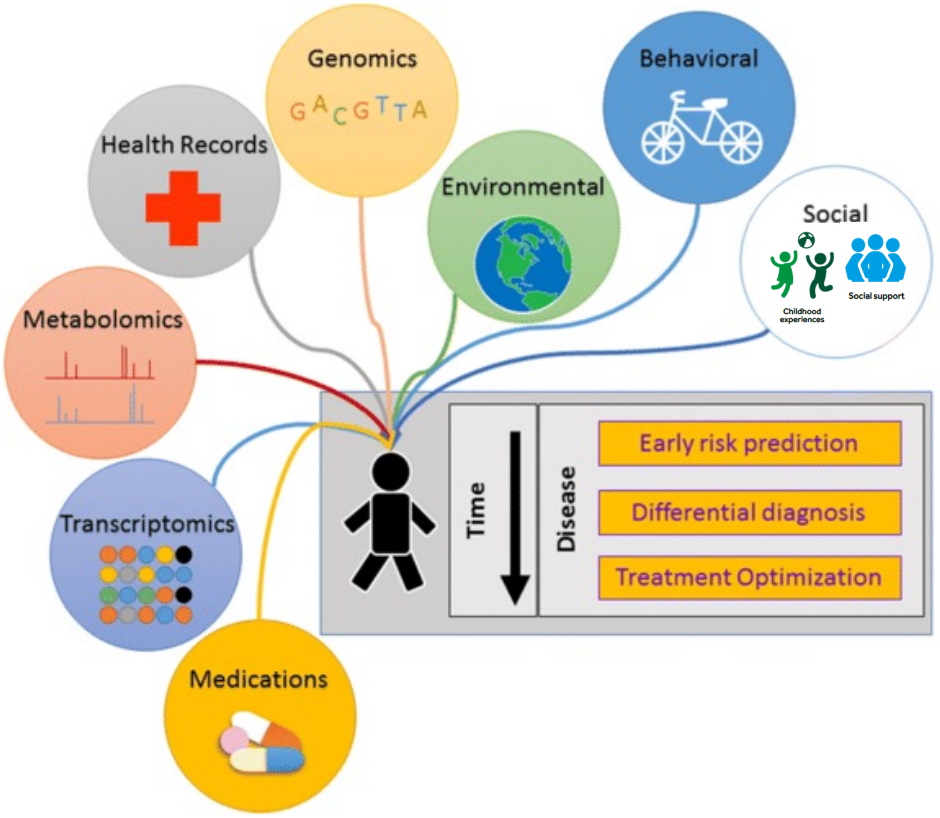
Vermeulen et al., Science, 367: 392-396, 2020.
Nadan et al., Child Abuse and Neglect, 41: 40 – 48, 2015

NIH National Institute on Aging

Precision Medicine.

"approach for disease treatment and prevention that takes into account individual variability in genes, environment, and lifestyle for each person"

NIH definition



Prosperi et al., BMC Medical Informatics and Decision Making, (Open Access) Article 139, 2018
Collins and Varmus. New Engl J Med, 372: 793-795, 2015

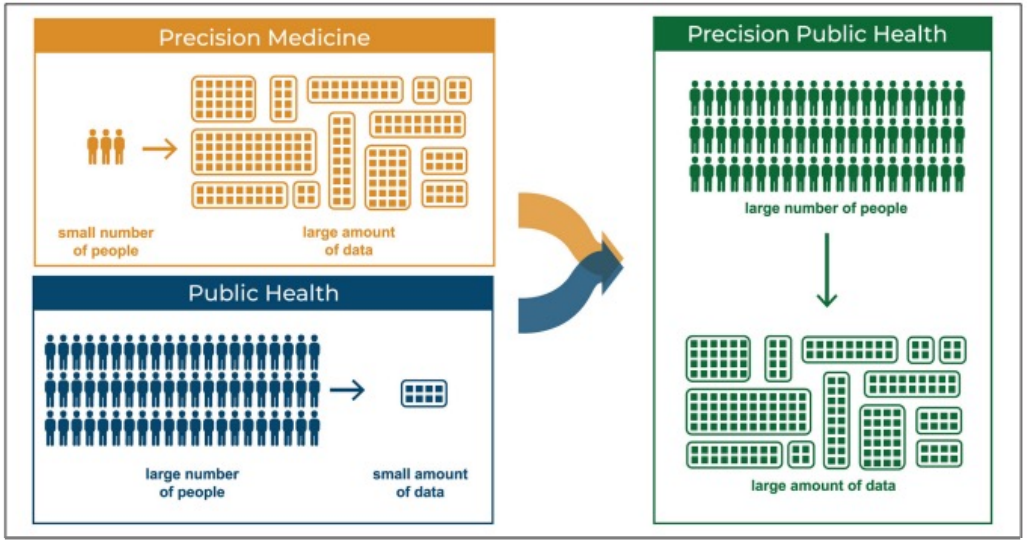
NIH National Institute on Aging

Precision Public Health.

"Delivering the right intervention at the right time, every time, to the right people"

Muin Khoury

FIGURE 1 | Big Data is the glue that brings precision medicine and public health together, allowing researchers to study interactions between comics, clinical, social, and environmental data.



Velmovitsky et al., Frontiers in Public Health, 9, 2021
Khoury. Centers for Disease Control and Prevention, 2016 (https://blogs.cdc.gov/genomics/2016/04/21/shift/)

NIH National Institute on Aging

NIA Health Disparities Framework.

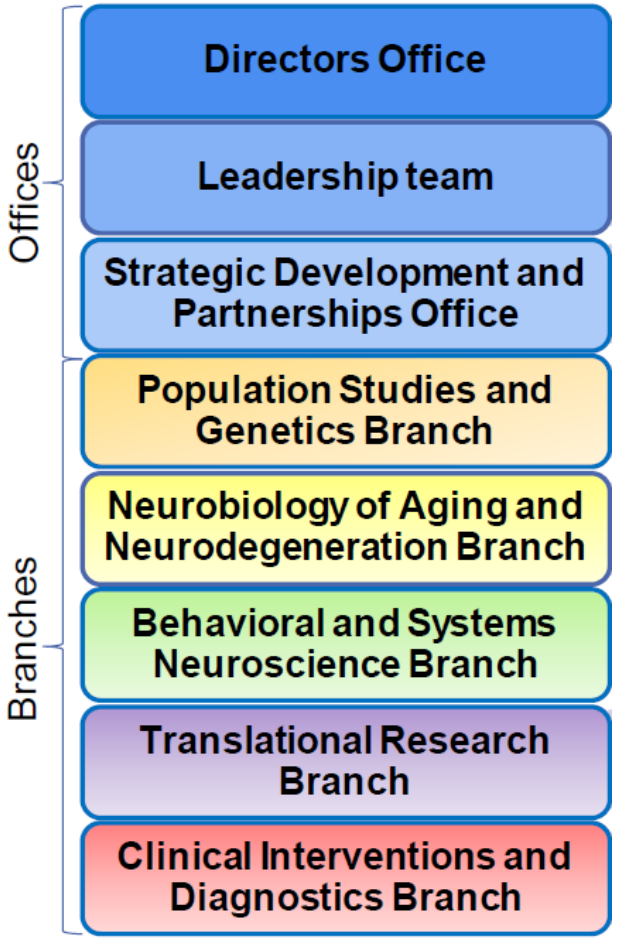
PRIORITY POPULATIONS +			
Environmental	**Sociocultural**	**Behavioral**	**Biological**
Geographical and Political Factors	Cultural Factors	Coping Factors	Physiological Indicators
Socioeconomic Factors	Social Factors	Psychological Risk/Resilience	Genetic Stability
Health Care	Psychological Factors	Health Behaviors	Cellular Function and Communication
LIFECOURSE PERSPECTIVE +			

Hill CV et al., Ethnicity and Disease, 25: 245-254, 2015.

NIH National Institute on Aging

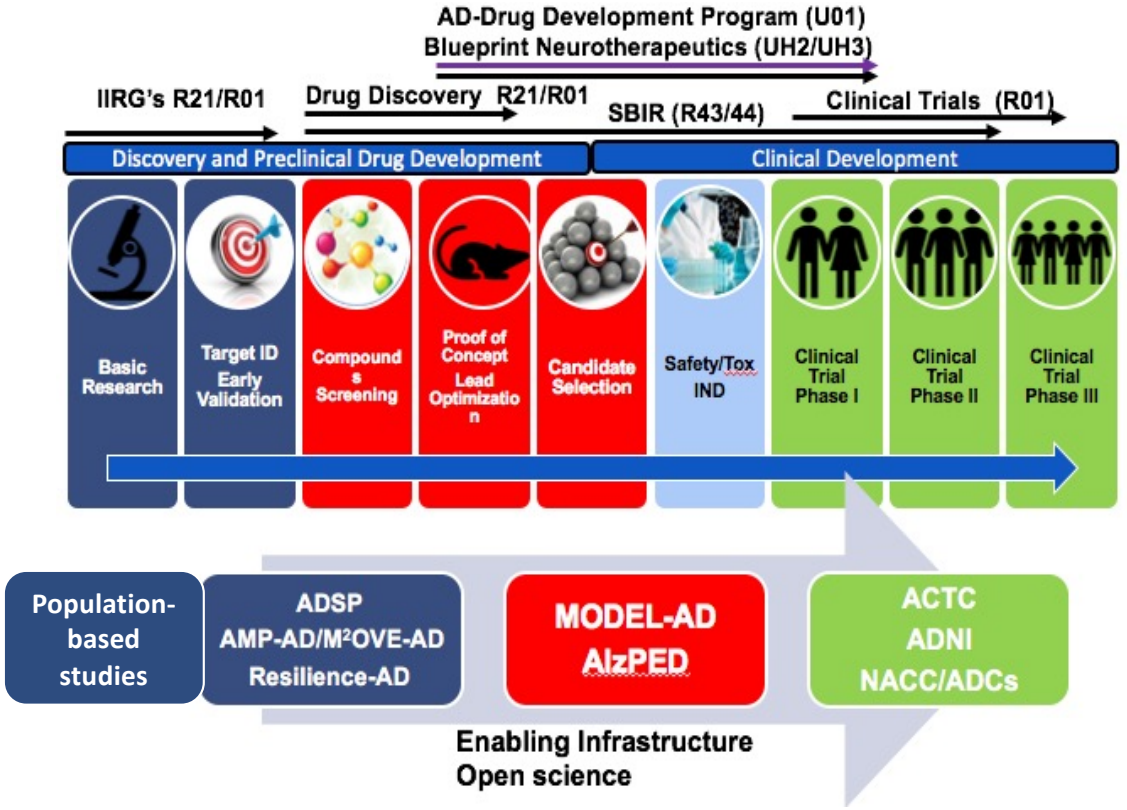
Division of Neuroscience

- To advance research leading to better understanding of mechanisms of brain aging and Alzheimer's Disease and related dementias
- ***Minority Health, Health Disparities and Health Equity is cross-cutting.***
- DN develops and supports research infrastructure that allows precision public health approaches for minority health and health disparities research.



NIH National Institute on Aging

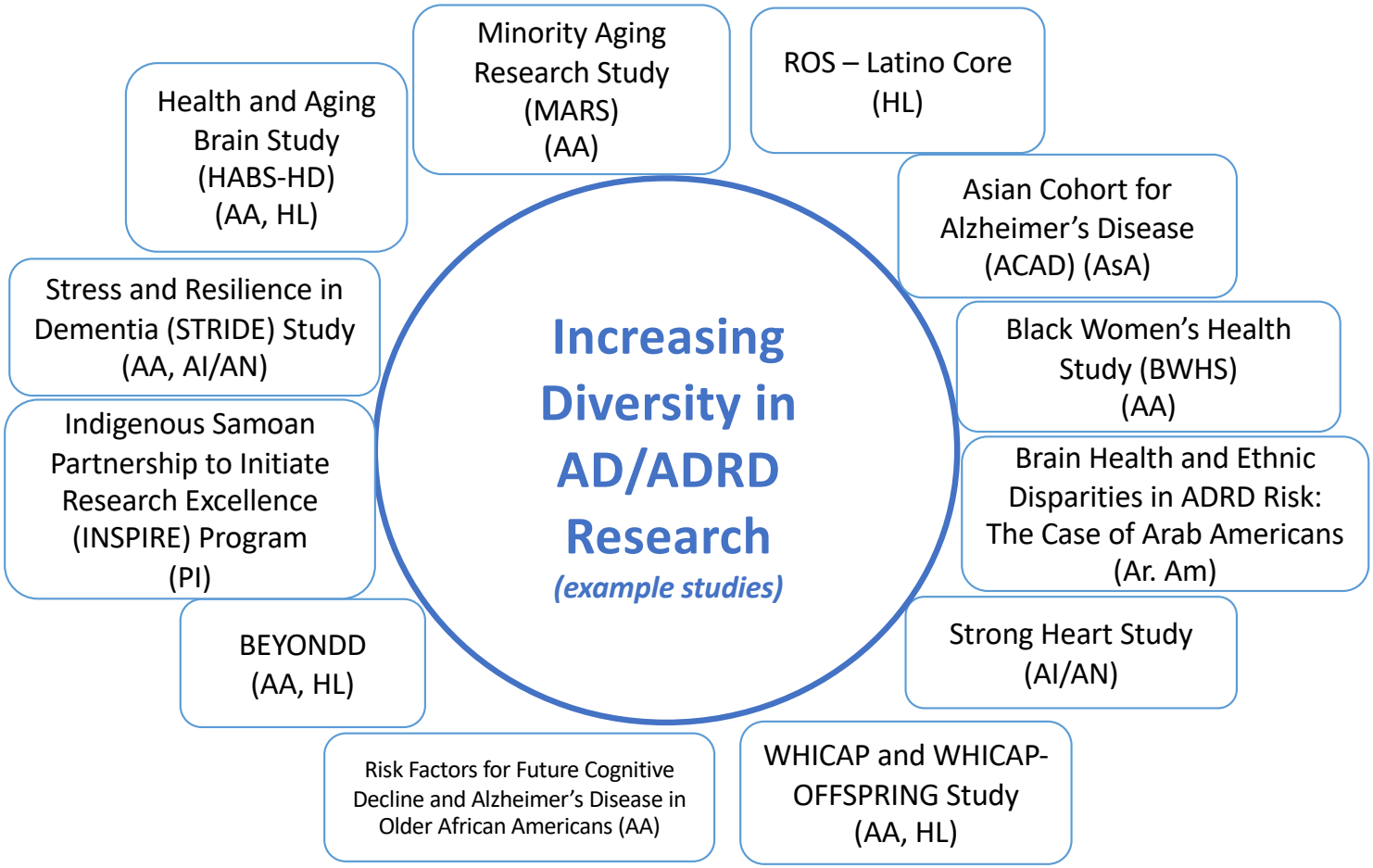
NIA-AD programs from "*bench to bedside*"



Core principles: *data sharing, transparency, rigor in science*

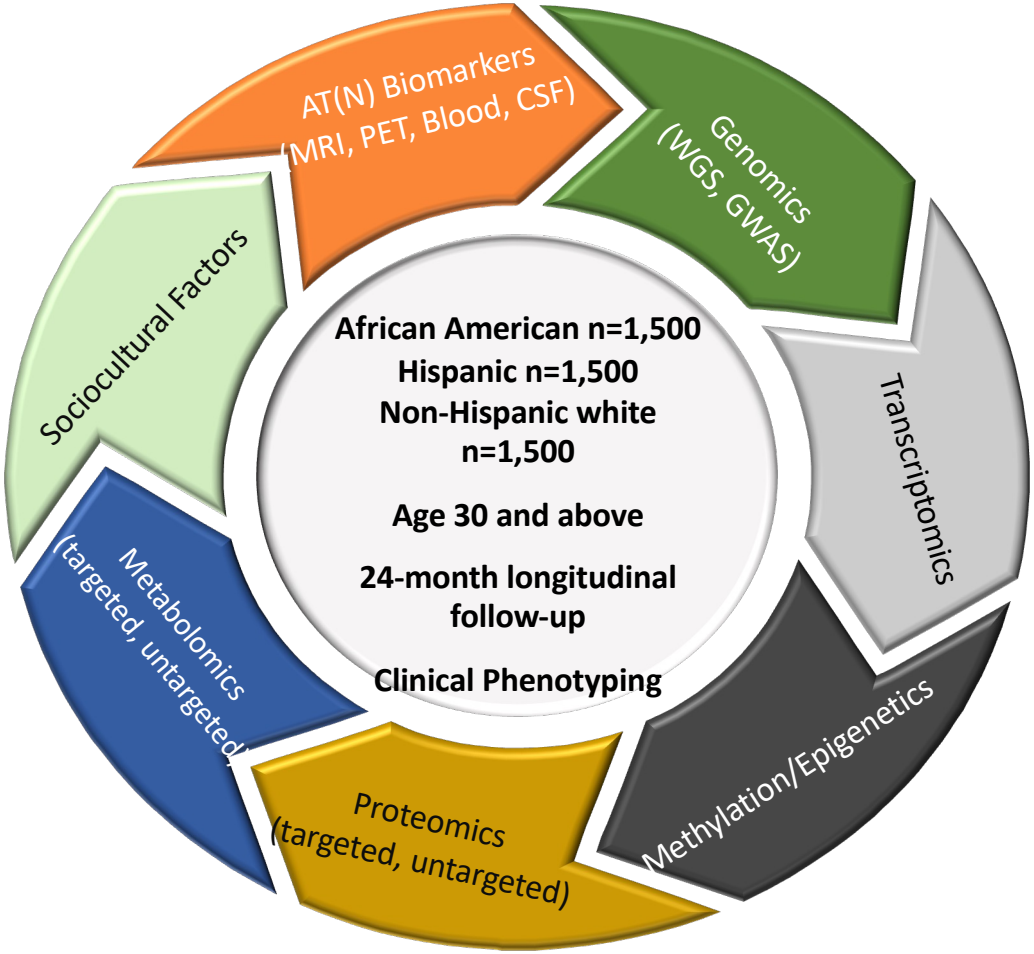
NIH National Institute on Aging

DN-supported research: Population-based studies



NIH National Institute on Aging

PI: O'Bryant, Sid



HEALTH & AGING BRAIN STUDY

U19: The Health & Aging Brain Study - Health Disparities (HABS-HD)
MPI: **O'Bryant**, Toga, Yaffe, Rissman, Johnson.

- 1,500 Mexican Americans (>1,000 enrolled)
- 1,500 Blacks/African Americans (>600 enrolled)
- 1,500 non-Hispanic whites (>1,000 enrolled)
- 24-month follow-up intervals (>1,000 V2 completed)
- Ages 30+ (enrollment of 1,500 age 30-49 to begin soon)

- HABS-HD data currently readily available

NIH National Institute on Aging

RFA-AG-23-020: Building Infrastructure for Precision Medicine Research on Minority Health and Disparities in Alzheimer's Disease (AD) and AD-Related Dementias (UH2/UH3)

- Focus on ***understudied populations with AD/ADRD***.
- Develop or scale up ***research infrastructure*** and resources for studies of AD/ADRD in understudied populations.
- Bring together ***transformative, multi-disciplinary teams*** to address disparities in health outcomes, disease burden, and/or resilience among understudied populations with AD/ADRD.
- Pilot projects that incorporate ***multi-level assessments and approaches*** to elucidate intersecting behavioral, social, environmental, neural, and physiological pathways affecting or mitigating AD/ADRD outcomes in these populations.

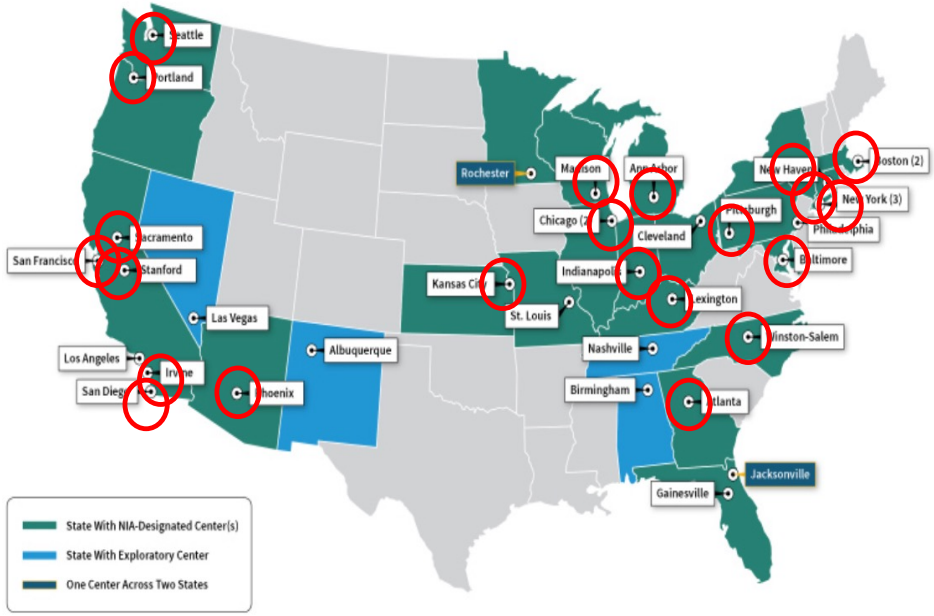
NIH National Institute on Aging

The Neighborhoods Study (MPI: Kind and Bendlin)

Multi-site initiative to examine the impact, mediators and moderators of life-course exposome on AD-specific pathologic features, vascular burden and cognitive decline.

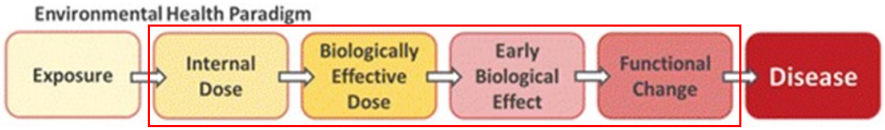
- ADRC clinical core participants (n= 9,234)
- ADRC brain bank decedents (n= 10,469)

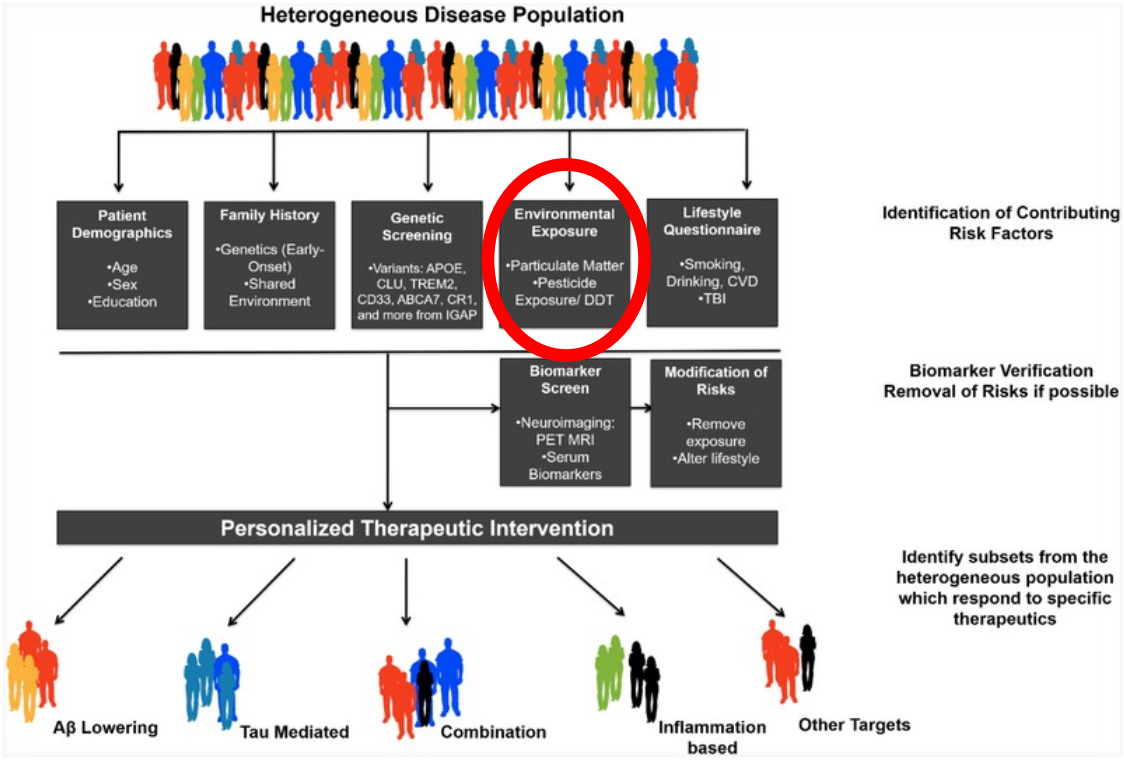
Includes 22 ADRCs across the US



NIH National Institute on Aging

New RFA-AG24-022: Quantifying the Impact of Environmental Toxicants on AD/ADRD Risk in Cohort Studies





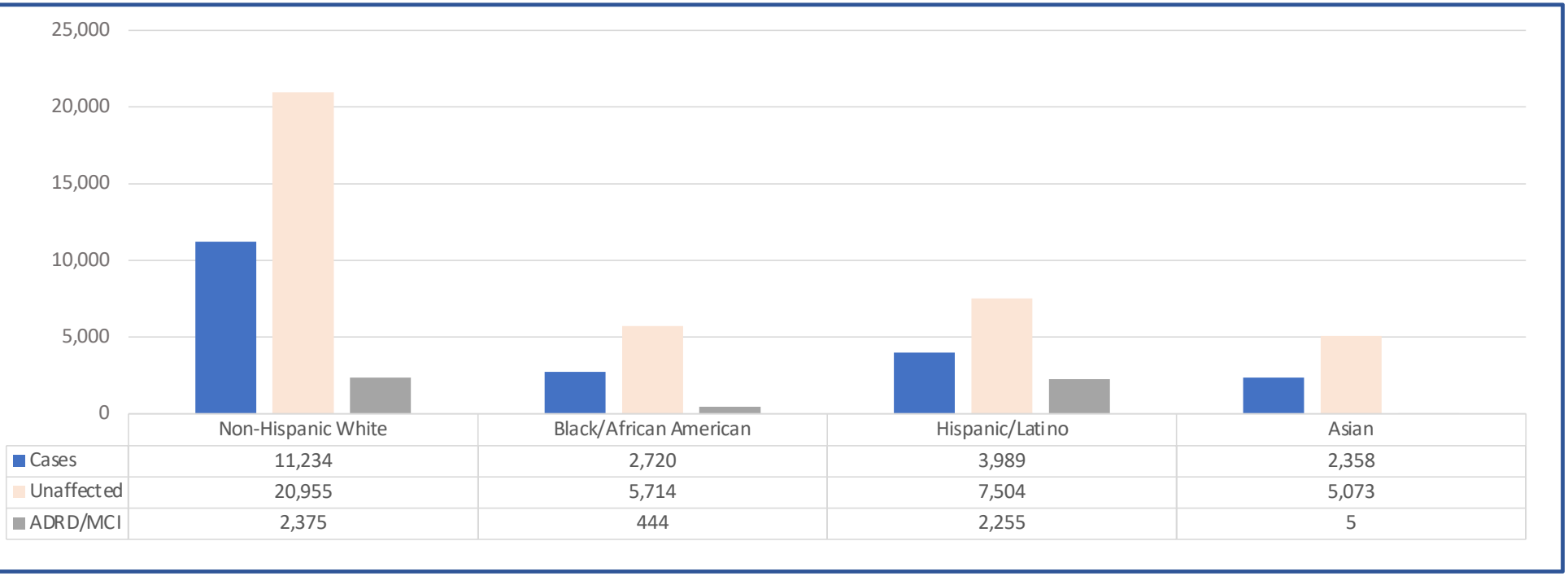
Quantifying toxicants in biological samples

Enrich existing longitudinal cohorts with:

1. Measures of exposures to individual toxicants or combinations of toxicants
2. Multi-omic molecular profiling that reflects the body's response to exposure(s).

NIH National Institute on Aging

Alzheimer's Sequencing Disease Project (ADSP)
Currently Funded WGS by Race/ethnicity (thru 2023)



	Non-Hispanic White	Black/African American	Hispanic/Latino	Asian
Cases	11,234	2,720	3,989	2,358
Unaffected	20,955	5,714	7,504	5,073
ADRD/MCI	2,375	444	2,255	5

Cases

Unaffected

Other Dementia/
Mild Cognitive Impairment (MCI)

NIH National Institute on Aging

AMP AD 1.0 Biomarkers in Clinical Trials Project

AMP AD 1.0 Project A supplemented the NIA-supported secondary prevention trials (A4 & DIAN-TU) testing several anti-amyloid therapies with tau PET imaging (AV1451).

A4 Trial: One of the largest collections of longitudinal Tau PET in the world (>1,000 scans to date). The first trial ever to make screening data and biosamples available prior to trial completion (GWAS data, plasma samples, raw PET and MR imaging data made available via LONI within 12 months after enrollment)

- Over 600 data requests to date
- Multiple manuscripts published, many more in review, including several independent site papers:

Original Investigation | Neurology

July 6, 2021

Disparities by Race and Ethnicity Among Adults Recruited for a Preclinical Alzheimer Disease Trial

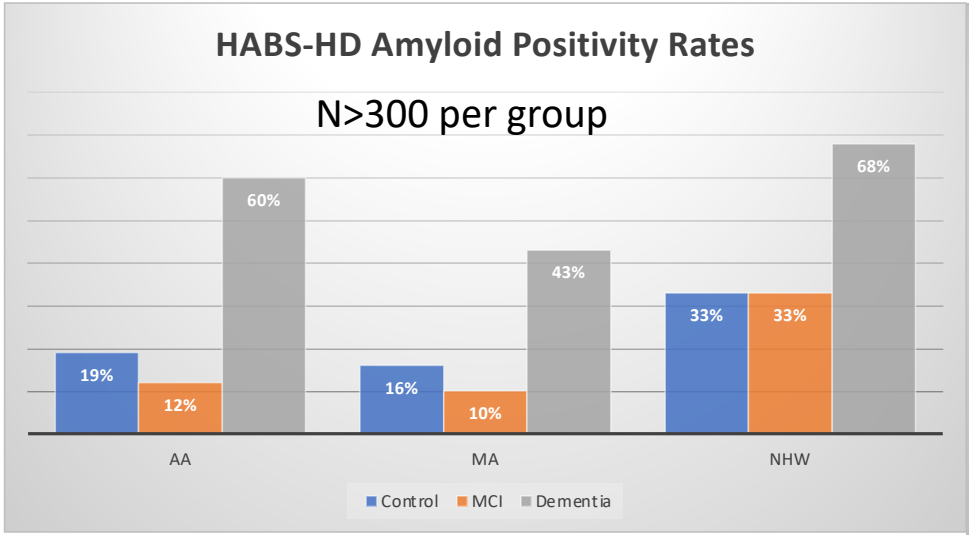
Rema Raman, PhD[1]; Yakeel T. Quiroz, PhD[2,3]; Oliver Langford, MS[1]; et al

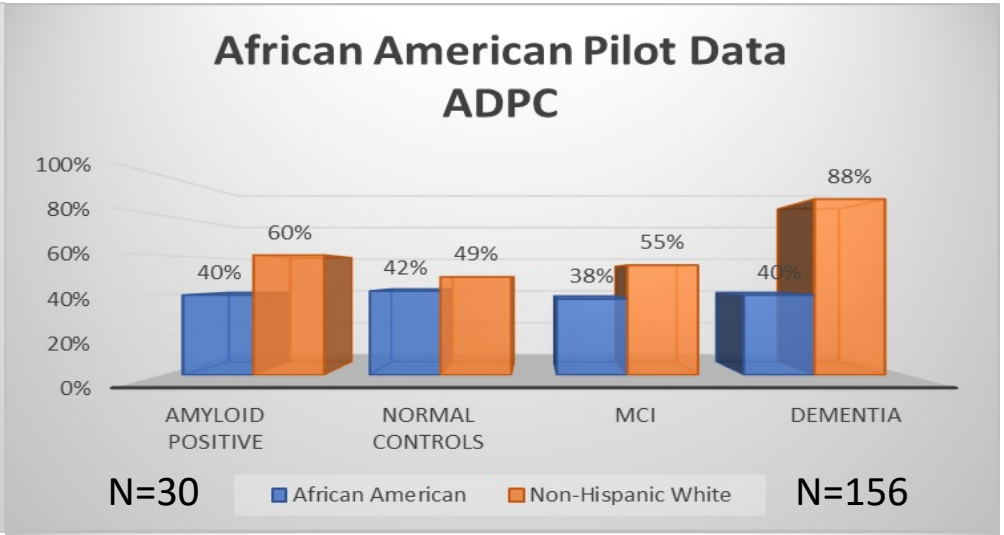
Author Affiliations | Article Information

JAMA Netw Open. 2021;4(7):e2114364. doi:10.1001/jamanetworkopen.2021.14364

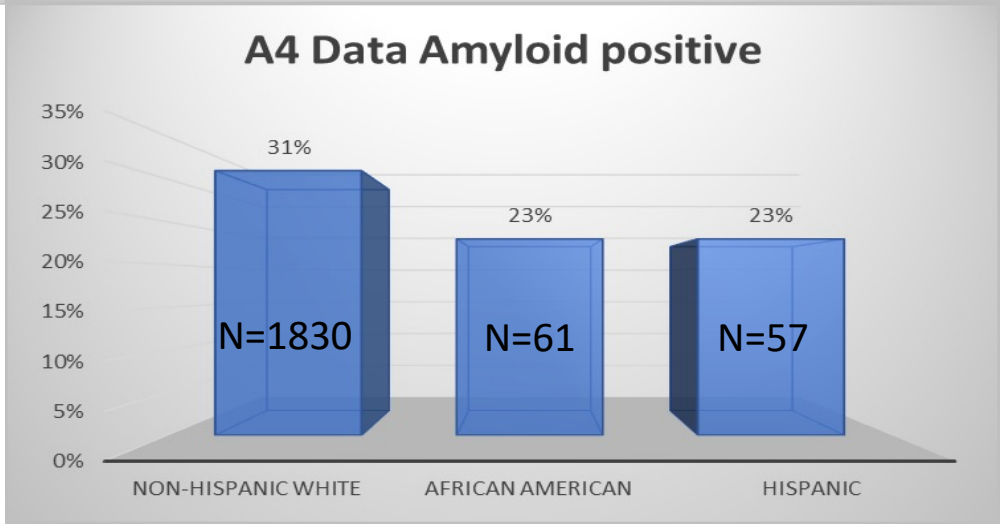
- Nearly 1/3 of participants were excluded based on screening results at screening visit 1 – most frequent: CDR (20.9%) and Logical Memory II scores (42.7%)
- Non-White participants were excluded more frequently than were White participants based on cognitive/clinical scores
- Among 3937 participants undergoing amyloid imaging, 69.0% were excluded because they did not demonstrate elevated amyloid
- Black and Asian participants were less likely to demonstrate elevated amyloid compared with White participants when controlling for covariates; Hispanic participants also showed a trend toward less frequently demonstrating elevated amyloid.

15





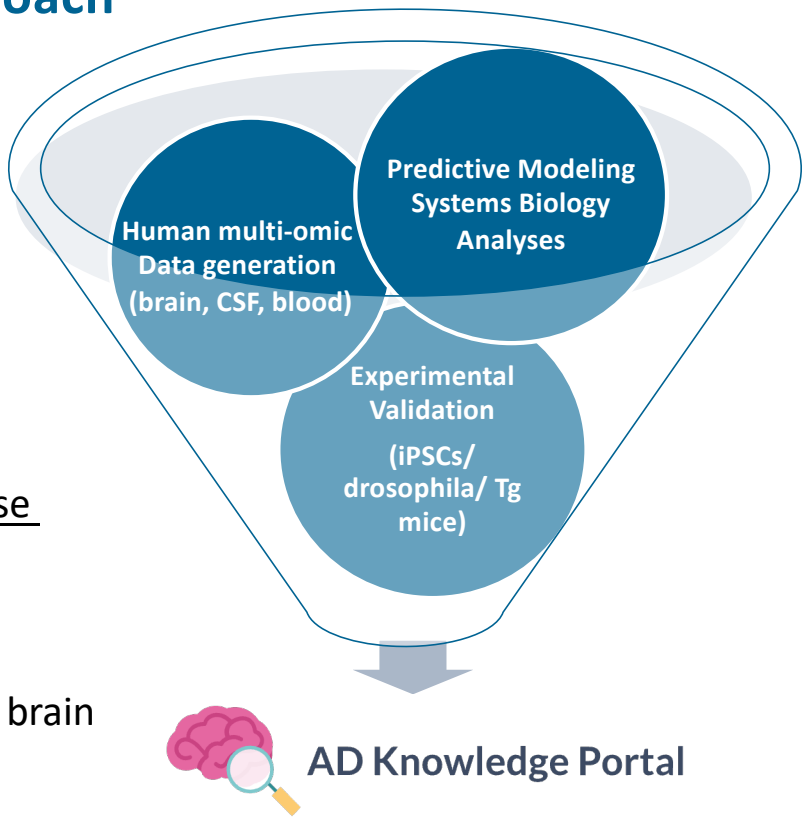
- All p<0.05
- HABS-HD currently scheduling approximately 45 new amyloid PET scans weekly
- N>600 participants already awaiting consent process
- **O'Bryant et al 2021 DADM Special Collection**



HEALTH & AGING BRAIN STUDY

AMP AD 2.0: Enabling a Precision Medicine Approach to Target and Biomarker Discovery

- Expand multi-omic profiling in samples (brain, CSF, blood) from diverse cohorts (African American and Latin American)
- Generate longitudinal immunologic profiling data across diverse cohorts (Caucasian, African American, and Latin American)
- Expand the existing sn/sc molecular profiling efforts to multiple brain regions and in samples from diverse cohorts



Examining Diversity, Recruitment and Retention in Aging Research

Projects:

Fifteen projects

Covers several minoritized and medically underserved populations

- Race: African Americans, Asian Americans, Pacific Islanders
- Ethnicity: Caribbean immigrants, Hispanic/Latino,
- Languages: English, Spanish, Mandarin, Cantonese, Vietnamese, Korean
- Medically underserved: Elderly, Hearing-, Vision-, and Mobility-impaired; Sexual Gender Minorities; Rural populations; Under-resourced populations.

NIH National Institute on Aging

PI: Park, Van

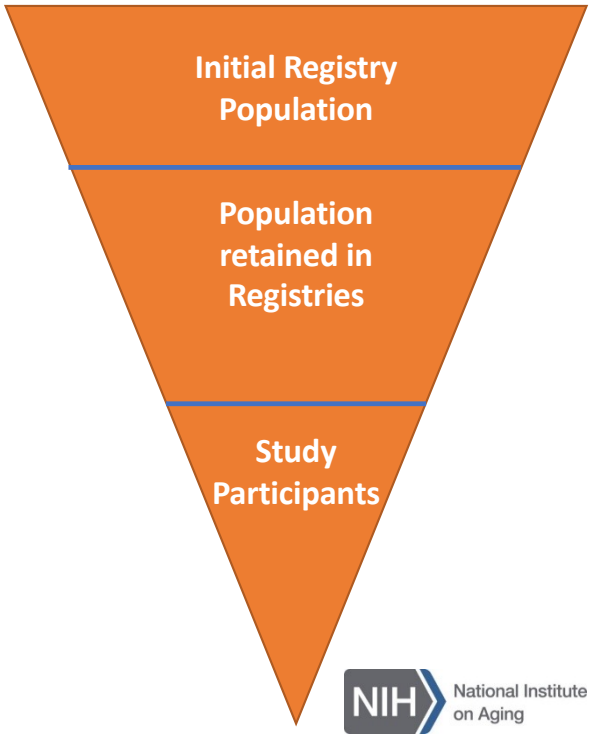
CARE
COLLABORATIVE APPROACH FOR ASIAN AMERICANS, NATIVE HAWAIIANS & PACIFIC ISLANDERS RESEARCH & EDUCATION

Launched in October 2020 to improve representation of AANHPI groups in ADRD, aging, and caregiving research.

- Enrolled 9,277 AANHPI adults.
- 61.5% (n=32) of 53 investigators' requests for registry participant referrals were for ADRD-related research;
- Referred >5,500 participants to 27 studies that are in various stages of recruitment and study completion.

CARE 2.0 will:

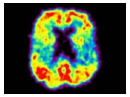
- Examine factors associated with attitudes and willingness to participate in health research
- Employ innovative approaches (e.g., the Lightning Report Method) to identify registry retention strategies
- Develop and test the effectiveness of new retention strategies to advance retention science
- Target efforts to promote CARE registry participants in aging studies
- Assess to factors associated with actual research enrollment decisions

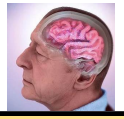


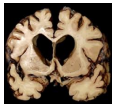
NIH National Institute on Aging

Translating AD/ADRD studies in diverse populations to personalized medicine

NIA Program Directors: N. Silverberg, C. Elliot, M. Miller, A. Yao, J. Larkin, D. Martin, D. Anderson, S. Petanceska, L. Ryan, N. Arunkumar







Genetic and Genomic Data | Multi-OMICS Data | Clinical Data | Biomarkers Data | Neuropath Data

Data Harmonization*

ADSP/NEW COHORTS — NIAGADS

ADRC's, DIVERSE DPPOS, COHORTS — NACC

AMP-AD DIVERSITY — AD Knowledge Portal

ADNI4, HABS-HD, ACTC — LONI Laboratory of Neuro Imaging

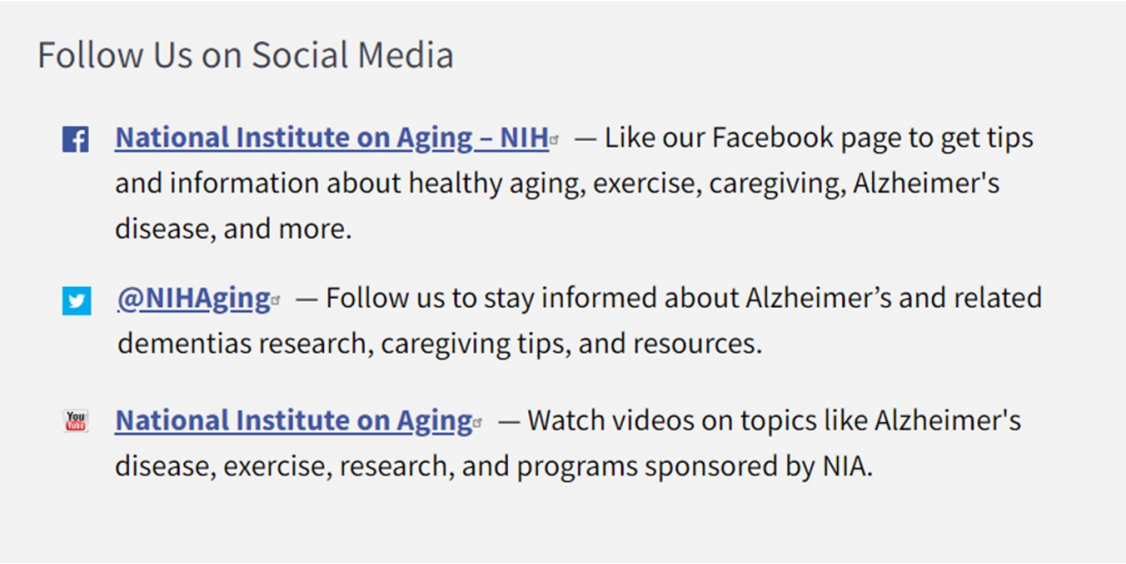
Personalized Medicine

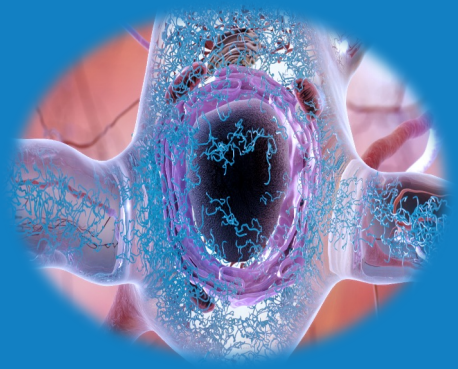
NIH National Institute on Aging

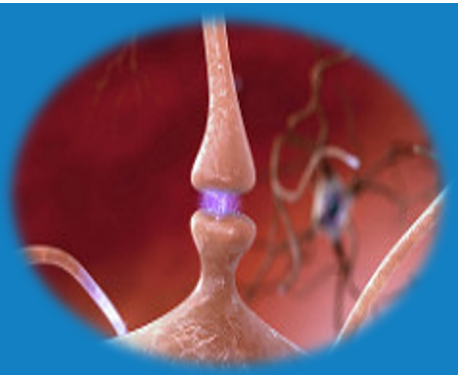
Stay Connected:

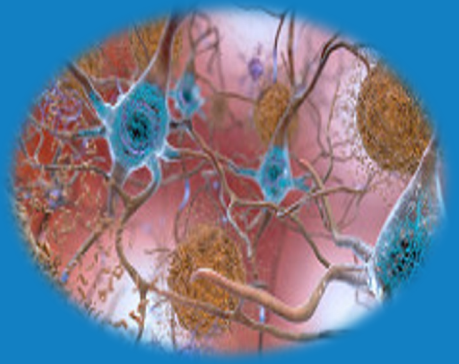
NIA Funding Opportunities: https://www.nia.nih.gov/research/grants-funding/how-find-nia-funding-opportunities

Inside NIA (NIA's blog page to investigators): https://www.nia.nih.gov/research/blog









NIA

The Leader in Aging Research