Miller School Researchers Present High-impact Findings at World's Largest Dementia Research Conference

Alzheimer's and dementia experts with the University of Miami Miller School of Medicine presented on impactful research, including unique tools for early detection of cognitive decline and dementia, Alzheimer's disease genetic sequencing, and much more at the recent 2022 Alzheimer's Association International Conference (AAIC) in San Diego.

Miller School researchers contributed more than two dozen presentations on a broad spectrum of topics at the AAIC, the world's largest and most influential dementia research conference.

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"AAIC is a unique opportunity for the world's dementia experts to come together to exchange ideas toward prevention and treatment of this devastating disease. Miller School researchers are among the leaders in the field," said Margaret A. Pericak-Vance, Ph.D., director of the John P. Hussman Institute for Human Genomics (HIHG) and the Dr. John T. Macdonald Foundation Professor of Human Genetics. For the NIH's National Institute on Aging (NIA) and the Alzheimer's Association, Dr. Pericak-Vance organized the AAIC symposium on the 10th anniversary of the NIA's Alzheimer's Disease Sequencing Project.

Drs. Pericak-Vance and Brian Kunkle, Ph.D., M.P.H., assistant professor in the Dr. John T. Macdonald Foundation Department of Human Genetics (DHG) and a member of the HIHG, spoke at the symposium.

Miller School faculty also hosted the first official meeting at the AAIC of the international group of participants of the new $46 million NIA grant awarded to the HIHG. Dr. Pericak-Vance will oversee the overall efforts of the principal investigators across several domestic and international sites of this project aimed at expanding Alzheimer's disease genetic studies in underrepresented African ancestry populations and Hispanic/Latinx groups.

Importance of Ancestry in AD Gene Discovery

To this end, Anthony Griswold, Ph.D., assistant professor of the DHG, HIHG member and vice chair of the Alzheimer's Disease Sequencing Project Cross Consortium Collaboration and Communication (EC4C) committee, gave a talk on data that he and Katrina Celis, M.D., assistant scientist at the HIHG), are researching on a variant in the AD presenilin gene that is

unique and mainly found in individuals of Puerto Rican heritage.

"Our global leadership in increasing diversity in AD research ensures that discoveries will be beneficial to all," Dr. Griswold said. "The importance of ancestry in AD gene discovery and its future impact on prevention and treatment via personalized medicine is one of the most impactful areas of AD research today."

"It was gratifying to see the increased efforts of all researchers to include diversity, as that has been a major focus of our work," said Jeffery M. Vance, M.D., Ph.D., professor in the DHG and neurology and member of the HIHG. "We continued to present data demonstrating the usefulness of research across different ancestries, which we hope will continue to promote diversity in research.

"There was a lot of interest in our work on differences in expression and chromatin access in the brain tissue of AD between different ancestries around the disease risk gene ApoE4," Dr. Vance said. "Hopefully this will stimulate further research on the ancestral variations in the regulatory aspects of DNA and AD."

Members of the Hussman Institute were major contributors and speakers for the Alzheimer Disease Genetic Consortium/The Alzheimer Disease Sequence Analysis Collaborative (ADGC/CADRE) Workshop. Drs. Kunkle, Griswold, Farid Rajabli, and Eden Martin were featured, along with Drs. Pericak-Vance and Vance. The ADGC/CADRE is one of the largest NIA genetics groups representing international efforts in diversity efforts and genetic analysis.
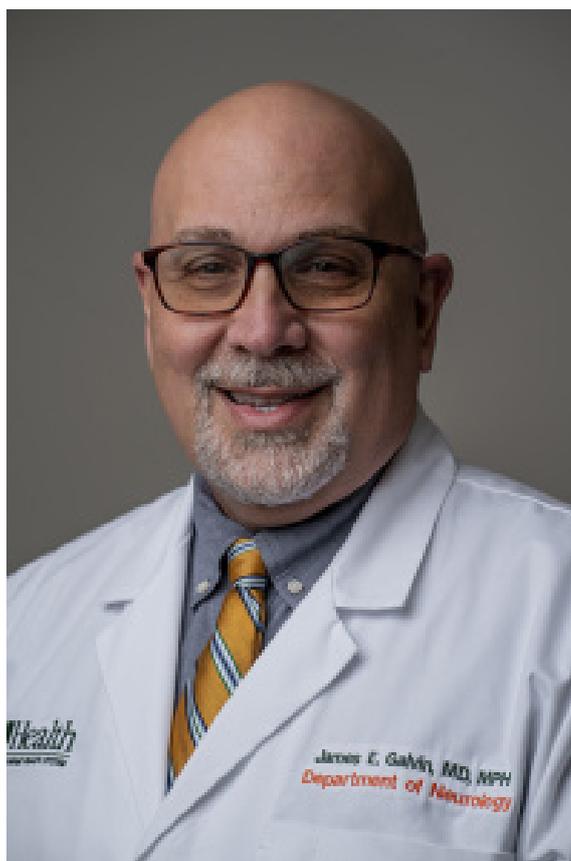
Lisette Hilton
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James Galvin, M.D., M.P.H., director of the Comprehensive Center for Brain Health and professor of neurology at the Miller School

Research Presentations and Posters

Miller School faculty and students gave several presentations and posters at this year's AAIC.

James Galvin, M.D., M.P.H., director of the Comprehensive Center for Brain Health and professor of neurology at the Miller School, presented research focused on early detection of cognitive impairment and understanding how risk and resilience factors explain differences in vulnerability to

developing AD and related disorders across racial, ethnic, and cultural groups.

"While all physicians can diagnose mild cognitive impairment and AD and related disorders, the fact is that in the U.S. most diagnoses are not made until later stages of disease," Dr. Galvin said.

A key challenge with Alzheimer's disease, he said, is that it is difficult to assess a person's brain health at the first visit and determine who is at risk and in need of a more extensive evaluation.

"Our presentation was on the Brain Health Platform, a novel paradigm to determine brain health and individuals at risk for mild cognitive impairment and AD and related dementias by considering a combination of proven measures," Dr. Galvin said. "By combining these tools, we can assess an individual's brain health in 10 to 15 minutes and accurately predict whether they are healthy or have signs of cognitive impairment or dementia requiring further investigation. This will allow us to use precision medicine-like approaches to develop personalized prevention strategies to build a better brain."

Tatjana Rundek, M.D., Ph.D., professor of neurology and scientific director of the Miller School's Evelyn F. McKnight Brain Institute, and her Miller School team presented on the role of combined neuroimaging markers in cognitive decline and dementia.

"We have shown that MRI markers of white matter disease and ultrasound markers of atherosclerotic plaque in the carotid arteries are important predictors of cognitive decline beyond traditional vascular risk factors such as hypertension,

diabetes, and hyperlipidemia," Dr. Rundek said. "Their effect was consistent across different racial and ethnic groups."

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Future research on these markers' impact on could lead to interventions aimed at reducing the risk of future cognitive decline.

William Scott, Ph.D., professor of human genetics, public health sciences, and neurology and executive director of the University of Miami Brain Endowment Bank, said that his students presented two posters on their Ph.D. research projects. One was research showing that the number of corpora amylacea (circular structures that contain various waste products from cells) is associated with specific brain changes in people with AD. Another poster highlighted work showing that inherited genetic variation in the mitochondrial genome may be associated with risk of dementia in Amish communities in Indiana and Ohio, and that this risk might be different in

men and women.

Regina Vontell, Ph.D., assistant professor of neurology and associate director of the Brain Endowment Bank, presented research focused on early detection of neurodegenerative changes seen in AD.

"Our presentation investigated an important biomarker, neurogranin, which is detected in individuals with AD cognitive disorder. Our research shows that this protein is lost in specific regions in the brain's hippocampus as the disease progresses," Dr. Vontell said. "We also show that there are structural changes to the neurons and the surrounding white matter in specific hippocampal regions."

Green Space Exposure and AD Outcomes

Lilah M. Besser, Ph.D., M.S.P.H., research assistant professor at the Comprehensive Center for Brain Health, said that her team presented a literature review of published articles looking at associations between neighborhood green space exposure and AD and related dementia outcomes.

"Our goal as scientists was to determine the extent that studies included diverse racial/ethnic groups, the diversity of the studies' geographic locations, and whether evidence suggests differences in associations depending on racial/ethnic group," Dr. Besser said.

The Miller School researchers found that nearly three-quarters of studies found at least one positive association, such that individuals living in neighborhoods with more green space demonstrated better brain health outcomes.

"However, we found that only 37% of the published studies to

date included non-white participants, 80% of the studies were conducted in Western world countries (e.g., the U.S., Canada, the U.K./Europe, Australia), and only 6% of the studies investigated differences in associations between green space and AD and related disorder outcomes depending on the individual's racial/ethnic group," Dr. Besser said. "Our study calls attention to the need for increased representation of and focus on minoritized individuals in studies investigating the potential influence of neighborhood environments on AD and related dementia outcomes."

The Miller School is a powerhouse in Alzheimer's and dementia research. Because South Florida is the gateway to Latin American and the Caribbean, researchers across disciplines are able to study a range of Alzheimer's disease across diverse cultures. In addition to the Hussman Institute and top Alzheimer's physician-scientists with the Department of Neurology, the Miller School is home to the Comprehensive Center for Brain Health, the Brain Endowment Bank, a leading Alzheimer's research center, and one of six designated brain and tissue biorepositories in the U.S.

In a larger sense, 2022 AAIC was an important return to a more traditional, in-person scientific meeting, where everyone benefits with collaboration, networking, and learning from others, according to Dr. Scott.

"The volume of research being conducted on biomarkers, early detection, and longitudinal follow-up of cognitive impairment was overwhelming, and an indicator of how quickly that part of the field is developing," Dr. Scott said.

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