

Researchers identify new genes that may contribute to Alzheimer's disease

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PET scan of a human brain with Alzheimer's disease. Credit: public domain

Researchers from Boston University School of Medicine, working with scientists across the nation on the Alzheimer's Disease Sequencing Project (ADSP), have discovered new genes that will further current

understanding of the genetic risk factors that predispose people to the development of Alzheimer's disease (AD). The ADSP was developed by the National Institutes of Health (NIH) in response to the National Alzheimer's Project Act milestones to fight AD.

The incidence of AD is increasing each year and is the most common cause of dementia. Also, it is the fifth leading cause of death in those 65-years and older, according to the CDC. AD is characterized by the formation of senile plaques (extracellular deposits of β -amyloid protein) and neurofibrillary tangles (aggregates of hyper-phosphorylated tau protein) in the brain, leading to neurodegeneration and decline in memory, and eventually death. Despite the growing prevalence of AD and cost to society, the genetic and environmental factors that make some more susceptible to the development of AD is still not well understood.

"This large and deep gene sequencing study is an important part of identifying which variations may play a part in risk of getting Alzheimer's or protection against it," said Eliezer Masliah, MD, director of the Division of Neuroscience at the National Institute on Aging, part of NIH. "Big data efforts like the ADSP are really helping research move forward. Identifying rare variants could enhance our ability to find novel therapeutic targets and advance precision medicine approaches for Alzheimer's disease."

By comparing the exomes (gene-coding portions of entire genetic sequences) of nearly 6,000 individuals with AD and 5,000 cognitively healthy older adults, the researchers were able to find rare variations in [genes](#) that they believe may contribute to the development of common AD. These newly discovered genes may suggest an inflammatory response and changes in the protein production. These combined changes are thought to contribute to the overall neurodegeneration witnessed in AD.

The researchers hope their work will help bridge the knowledge gaps of the genetic architecture related to AD, which is a necessary step toward a better understanding of mechanisms leading to AD and eventual therapeutic treatments. "Many of our findings will provide insight into disease mechanisms and targets for biological experiments to gain further understanding about the role of these genes in AD pathogenesis," explained corresponding author Lindsay A. Farrer, Ph.D., Chief of Biomedical Genetics and a professor of Medicine, Neurology, Ophthalmology, Epidemiology and Biostatistics at Boston University Schools of Medicine and Public Health.

The research team emphasizes that further research will need to be done to find other genes hidden throughout the genome, as the current paradigm is that many genes contribute to the development of AD.

These findings appear in *Molecular Psychiatry*.

Provided by Boston University School of Medicine

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