

Genes, environments, interactions, and cognitive decline in the HRS

<https://neurodegenerationresearch.eu/survey/genes-environments-interactions-and-cognitive-decline-in-the-hrs/>

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Country

USA

Title of project or programme

Genes, environments, interactions, and cognitive decline in the HRS

Source of funding information

NIH (NIA)

Total sum awarded (Euro)

€ 803,643.12

Start date of award

30/09/2014

Total duration of award in years

3

The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords

Acquired Cognitive Impairment... Aging... Alzheimer's Disease... Alzheimer's Disease including Alzheimer's Disease Related Dementias (AD/ADRD)... Behavioral and Social Science... Brain Disorders... Dementia... Epidemiology And Longitudinal Studies... Genetics... Health Disparities for IC Use... Human Genome... Neurodegenerative... Neurosciences... Prevention

Research Abstract

DESCRIPTION (provided by applicant): Genes, environments, interactions, and cognitive decline in the HRS Project Summary: Alzheimer's disease (AD) is a heterogeneous disease with a potentially wide range of contributing environmental and genetic risk factors. A long pre-clinical period of cognitive decline accompanies the accumulation of neuropathology and precedes the onset of AD. Navigating the many pathways to cognitive decline and dysfunction requires a multifaceted approach that incorporates both epidemiology and genetics. The role of epidemiology is crucial for identifying modifiable factors that may reduce AD risk; the role of genetics in AD has proven to be very complex. Early studies identified genes in the inflammatory pathways and genes associated with stress. Although some of these genes have shown evidence of environmental interactions, few have been investigated for interactions in AD and few have been replicated in genome wide association studies (GWAS). Instead, GWAS have yielded risk genes with relatively small effects, many of which have been tied to cognitive decline as well as AD. We propose to study interactions between AD risk genes, genes from the inflammatory pathway, environmental risk factors, and their combined influence on cognitive decline. Such interactions could explain a portion of AD prevalence that is currently unexplained. The Health and Retirement Study (HRS) longitudinal data coupled with newly released GWA data from over 11,000 participants age 65 and older provides an ideal opportunity to study these associations in a powerful way. Using latent trajectory models, we will define groups of individuals based on cognitive test performance over time. Using random forests, we will study the associations between cognitive trajectories and AD risk genes, inflammation genes, environmental factors, and their interactions. This approach, combining complex methods, will allow us to study in greater detail the interrelationships between genes, environments, and their interactions as they influence the rate of cognitive decline.

Lay Summary

PUBLIC HEALTH RELEVANCE: There are significant genetic and environmental contributions to the risk of cognitive decline and Alzheimer's disease. To date, few studies have had the appropriate phenotypes, genotypes, and sufficient power to study gene-environment and gene-gene interactions in cognitive decline. These studies are crucial to the identification of factors that may modify cognitive trajectories and Alzheimer's disease risk. Elucidation of genetic and environmental interactions will contribute greatly to disease prevention strategies and the development of targeted and effective therapies.

Further information available at:

Types:

Investments > €500k

Member States:

United States of America

Diseases:

Alzheimer's disease & other dementias

Years:

2016

Database Categories:

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