Alzheimers Disease, Genes, and Pesticide Use in the Agricultural Health Study

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Country

USA

Title of project or programme

Alzheimers Disease, Genes, and Pesticide Use in the Agricultural Health Study

Source of funding information

NIH (NIA)

Total sum awarded (Euro)

€ 3,468,711.93

Start date of award

13/08/2014

Total duration of award in years

4

The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords

Pesticides, pesticide exposure, Agriculture, Alzheimer's disease risk, Alzheimer's Disease

Research Abstract

DESCRIPTION (provided by applicant): Both environmental and genetic components contribute to Alzheimer’s disease (AD), but there has been limited research determining a link between

exposure, genetics, and AD. One ubiquitous environmental exposure is pesticides, which affect the central nervous system and are associated with increased risk of AD in some studies. Current understanding of the association between pesticide exposure and AD is limited by knowledge gaps due to prior studies lacking detailed information on pesticide exposure, reliance on retrospective recall of exposure years after pesticide use, and lack of control for genes known to contribute to AD risk. We propose to address existing knowledge gaps in pesticide-related risks for AD by combining a proven method to identify individuals with AD, genetic sample collection, and detailed information on pesticide exposure in the Agricultural Health Study (AHS). We propose to identify AD cases beginning with telephone dementia screening of 4000 AHS participants, combined with an in-home evaluation of suspected cases and selected controls, leading to a consensus clinical diagnosis of AD and other dementias. Our rationale for the AHS is that it is the best-suited population study for examining pesticide exposure outcomes because it collected detailed information on pesticide use during or near the period of exposure, rather than retrospective estimates obtained years after potential exposure. A critical advantage to the AHS assessment approach is that it provides more accurate information on specific pesticide compounds, use of protective equipment, and mixing methods, leading to more advanced algorithms for estimating exposure. Because the AHS is an established longitudinal study, its well-characterized data can facilitate a prospective study of dementia that would otherwise take decades to complete if established de novo. We will leverage our research group’s extensive experience and proven methods for AD case identification and genetic analysis in population-based studies. The unique strengths of the AHS and the project team make the current proposal exceptionally well- suited to address critical scientific questions posed by the Research Funding Announcement (RFA-ES-13- 006). Our Specific Aims are to 1) examine whether AD is associated with levels of pesticide exposure and types of pesticide use among pesticide applicators in the AHS, 2) examine the association between levels of pesticide exposure and AD after accounting for known AD genes and inflammation genes, and 3) examine the association between levels of pesticide exposure and AD, stratifying by genes known to alter metabolism of pesticides. Knowledge gained from the proposed research can be used to identify modifiable risk factors for AD and to develop strategies to reduce AD risk due to environmental exposures.

Lay Summary

PUBLIC HEALTH RELEVANCE: Project Narrative/Public Health Relevance The public health relevance of the proposed project is that it furthers understanding of environmental exposures related to Alzheimer’s Disease (AD) risk and genetic vulnerabilities associated with suspected pathways of pesticide exposure and AD risk. This knowledge benefits public health through strategies to reduce AD risks related to pesticide exposure, which lowers overall disability due cognitive impairment in an aging U.S. population.

Further information available at:

Types:
Investments > €500k

Member States:
United States of America

Diseases:
Alzheimer's disease & other dementias

Years:
2016

Database Categories:
N/A

Database Tags:
N/A