

# Environment and cognitive decline in older Hispanics

<https://neurodegenerationresearch.eu/survey/environment-and-cognitive-decline-in-older-hispanics/>

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### Country

USA

## Title of project or programme

Environment and cognitive decline in older Hispanics

## Source of funding information

NIH (NIA)

## Total sum awarded (Euro)

€ 1,688,668.81

## Start date of award

01/05/2015

## Total duration of award in years

3

## The project/programme is most relevant to:

Alzheimer's disease & other dementias

## Keywords

Pesticides, Hispanics, Air Pollution, Pyrethrins, traffic-related air pollution

## Research Abstract

? DESCRIPTION (provided by applicant): Progressive loss of cognitive function and the development of dementia strongly and negatively impact health related quality of life in the elderly. The related human and financial costs are expected to grow rapidly as populations age.

Minority populations are particularly understudied for these issues. The goal of the proposed research is to investigate whether long-term exposure to two ubiquitous environmental exposures, air pollution and pesticides, contribute to cognitive decline and dementia in elderly Mexican Americans (MA) from the “Sacramento Area Latino Study on Aging” (SALSA) cohort. Recent experimental data showed that ultrafine particulates from air pollution reach the brain and can cause pathology similar to Alzheimer’s disease. Some commonly used pesticides interfere with neurotransmission, challenge neuronal protein handling, mitochondrial function, glucose and lipid metabolism, and cause oxidative stress, and it is important to know whether chronic low level exposure contributes to cognitive impairment and dementia in the aging. As pesticides are deliberately introduced into the environment and combustion related particles affect large populations world- wide, it is of great importance to understand whether and how they might affect brain aging and function in the aging. SALSA (NIA AG12975; PI Haan) is a cohort of 1,789 MAs aged 60+ at baseline in 1998 who reside in the Sacramento Valley area and participated in annual multi-domain neuropsychological testing of cognition for up to 9 years as well as detailed clinical assessments for dementia. Our research team previously developed sophisticated Geographic Information System (GIS) models to estimate exposures to agricultural pesticide applications and for traffic related air pollution in California. Here, we propose to capitalize upon our unique expertise in modeling air pollution and pesticide exposure and the unique systems of state-mandated pesticide use reporting and air monitoring in California. We plan to model 1) long and short term regional, local, and traffic related air pollution using monitored criteria pollutants, CALINE4 – emissions and land use regression (LUR) models; and 2) long-term exposures to pesticides of specific chemical classes (e.g., organophosphate (OP), organochlorine, carbamate, and pyrethrin/pyrethroid) with our GIS model based on pesticide use reports and land use that we developed and validated previously; and 3) assess impairment and decline in cognitive domains or overall and the onset of dementia longitudinally based on multiple complex environmental exposure patterns while taking into account vulnerability due to genetic and physiologic risk factors for dementia. This study will add a novel and unique environmental component to a minority cohort study with excellent longitudinal data collection for cognition and dementia allowing us to investigate these hypotheses in a cost and time effective manner. Providing an understanding about the impacts of chronic exposure to toxins ubiquitous in the environment on neurodegeneration/cognition is expected to spark new avenues of therapeutic and preventive investigation and inform public policy decisions on air pollution and pesticide regulations.

### **Lay Summary**

**PUBLIC HEALTH RELEVANCE:** The goal of the proposed research is to investigate whether and how long-term exposure to two classes of ubiquitous environmental exposures, air pollution and pesticides, contribute to cognitive decline and dementia in an elderly population of Mexican Americans enrolled in the “Sacramento Area Latino Study on Aging” (SALSA) cohort study. This research proposal capitalizes on our extensive expertise in assessing and modeling these environmental exposures and the unique resource of the SALSA cohort providing us with detailed longitudinal data on cognitive decline and dementia.

**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