

Environmental copper exposure and its impact on microglial Abeta clearance

<https://www.neurodegenerationresearch.eu/survey/environmental-copper-exposure-and-its-impact-on-microglial-abeta-clearance/>

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Country

USA

Title of project or programme

Environmental copper exposure and its impact on microglial Abeta clearance

Source of funding information

NIH (NIA)

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Start date of award

19/09/2014

Total duration of award in years

1

The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords

Abeta clearance, Copper, neuroinflammation, Alzheimer's Disease, Microglia

Research Abstract

DESCRIPTION (provided by applicant): Environmental and occupational copper exposure has long been considered one of the environmental risk factors for Alzheimer's disease (AD).

However, the late life impact of the chronic copper (Cu) exposure and its mechanisms of action in the central nervous system (CNS) have not been fully elucidated. While its direct toxicity on neurons and interaction to amyloid-beta (A β) species are currently being studied, its chronic impact on other non-neuronal cells in the CNS has been overlooked. We hypothesize that a chronic environmentally-relevant Cu exposure impairs the activation of microglial phagocytosis and neuroinflammatory responses, promoting a pathological buildup of A β species, synaptic loss and cognitive decline. The objective of this study is to determine whether the copper-mediated functional impairment of glial activity promotes neurodegeneration and AD neuropathology in vivo. To achieve our goal, we propose to apply two novel techniques to determine microglia- and astrocyte-specific transcriptome dynamics following chronic Cu exposure in vivo. Our proposed project will uncover the critical pathogenic impact of Cu exposure on microglia, astrocytes and neuroinflammation, and the underlying molecular mechanism by which glial dysfunction leads to the onset and progression of AD in a temporal manner.

Lay Summary

PUBLIC HEALTH RELEVANCE: Environmental Cu exposure may increase the risk for Alzheimer's disease in later life. We will study how chronic environmental Cu exposure triggers Alzheimer's disease neuropathology, such as amyloid-beta (A β) plaque deposition, neuronal death and cognitive decline in a mouse model of the disease. Findings from this project will provide key involvement of environmental risk factors on the onset of the disease and potential therapeutic strategies to treat or prevent Alzheimer's disease among people who are at high risk.

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