Multi-level Integrative Proteomics to Alzheimers Disease Pathways

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Country

USA

Title of project or programme

Multi-level Integrative Proteomics to Alzheimers Disease Pathways

Source of funding information

NIH (NIA)

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€ 2,036,545.87

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01/09/2016

Total duration of award in years

1

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)... Biotechnology... Brain Disorders... Dementia... Genetics... Neurodegenerative... Neurosciences

Research Abstract
The long-term goal of this project is to develop and apply the latest proteomics approaches to

understand molecular dysfunction underlying the pathogenesis of Alzheimer's disease (AD). Dissection of molecular composition (e.g. DNAs, RNAs, and proteins) in clinical specimens is critical for understanding, detecting, preventing and treating disease. The evolving DNA technology has been revolutionizing medical research and patient care. National Institute on Aging has invested tens of millions of dollars to search for AD risk genes. In contrast, proteomic research is being left behind, largely due to the limitations of technology. Our lab has been developing proteomics approaches for ultra-sensitivity and high throughput for more than a decade. Recently, we have implemented a highly sophisticated platform for profiling more than 10,000 proteins. To explore the proteome alteration in human AD brains, we and collaborators initiated a study to analyze aggregated proteome, revealing unique U1 snRNP pathology in AD and raising a novel concept of RNA splicing alterations in the pathogenesis. Thus, we propose to further enhance the proteomics platform with milestones, and profile AD mouse and human brain proteomes, as well as the interactome of AD disease proteins, for identifying novel pathogenic mechanisms. Three specific aims are: (i) to establish a multiplex, quantitative platform for nearly complete coverage of human proteome as well as comprehensive protein modification analyses, (ii) to identify aberrant protein pathways in AD by profiling the whole proteome and protein modifications in human and mouse models, and (iii) to determine AD disease pathways by the interactome of AD disease proteins in human. Successful outcome of this project will enable truly global proteomic studies of clinical samples, matching the coverage of genomics. The AD study may provide novel targets for pathogenesis and therapeutic intervention.

Lay Summary
Molecular analysis of specimens is essential for understanding, detecting, preventing and treating disease. Whereas human genomics is revolutionizing patient care, near complete proteome profiling has been emerging. We propose to develop multi-level integrative proteomics approaches and apply to dissect pathogenic mechanisms underlying Alzheimer's disease, the sixth leading cause of death in the United States.

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