

Role of copper metabolism in Alzheimer's disease

Summary

School of Science, Department of Chemistry and Biotechnology, Research Group of Metalloproteomics offers a 4-year PhD position in biotechnology.

Research field:	Chemistry and biotechnology
Supervisor:	Prof. Dr. Peep Palumaa
Availability:	This position is available.
Offered by:	School of Science Department of Chemistry and Biotechnology
Application deadline:	Applications are accepted between June 01, 2020 00:00 and July 03, 2020 23:59 (Europe/Zurich)

Description

Alzheimer's disease (AD) is an age-dependent neurodegenerative disease with enormous personal tragedy and socio-economic concerns. AD is multifactorial disease and despite intensive research, the reasons of AD are still unknown. There is an increasing number of facts pointing to the relation of AD with metabolic disorders of copper in the brain. It is generally known that copper levels in AD brain are elevated especially in amygdala and hippocampus. Elevated copper content may be associated with the formation of amyloid plaques as in vitro experiments demonstrate that copper can bind to A β peptides, the major constituents of amyloid plaques, and initiate their aggregation. Similar processes may take place also in brain as amyloid plaques contain up to millimolar concentrations of copper ions and it is hypothesized that copper ions, bound to amyloid plaques are toxic to the neurons. At the same time aggregation of A β peptides can also be prevented by metal chelators, and these agents can even disaggregate amyloid plaques in Alzheimer's disease transgenic mice. These facts support the crucial role of copper in plaque formation and have opened a new attractive therapeutic approach for Alzheimer's disease called "metal chelating therapy". This approach targets copper-rich amyloid plaques as well as their toxicity and influences downstream processes from plaque formation.

In the current PhD project we try to understand the role of copper metabolism in AD by using cellular and insect AD models. Main focus of the project will be directed towards search of copper-regulating compounds, which can regulate the copper metabolism in favorable direction and alleviate cellular pathology or AD phenotype in insect model. Obtained knowledge will be used for elaboration of new therapeutic tools for prevention or treatment of AD.

Responsibilities and tasks

- Conducting of cell culture experiments, work with insects,
- determination of metals from various cellular and tissue samples,
- analysis of results,
- publication of papers.

Qualifications

- Master of Science in biotechnology or gene technology
- Experience in cell biology and analytical chemistry of metal measurements, for work with insects



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