Biochemical studies of protein aggregation and metal binding

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

There are increasing number of pathologies, which are connected with the protein aggregation in various tissues. This group of diseases are called amyloid diseases and most well-know from them are neurodegenerative diseases like Alzheimer's disease, Parkinson's disease, Huntington's disease. In case of these diseases different proteins aggregate and form fibrils in intracellular or extracellular environment, which disturbs normal cellular functioning and leads to cell death or neurodegeneration. Enormous efforts have been invested to understand mechanisms of amyloidogenic diseases, however, the full understanding has not been reached. However, these studies have discovered important contribution of biometal ions to protein aggregation and fibrillization. Moreover, increased levels of metal ions have been found to be bound with protein aggregates in vivo, which points towards their crucial role in pathogenesis of amyloid diseases.

Understanding of the role of metal involvement in protein aggregation starts from information about thermodynamic strength of protein-metal ion interactions. For this purpose various dissociation constants of the proteins with biometals like Cu(I), Cu(II), Zn(II) have to be studied. Moreover, the effects of metal ions on aggregation and fibrillization of proteins gives additional information about their involvement in disease pathology. We are planning to study metal ion interactions with new potential metalloproteins like for example Apo E isoforms and others to unravel their unknown role in neurodegenerative diseases like AD and ALS. Biological samples from AD and ALS patients will also be analyzed for distribution of metalloproteins by using LC-ICP MS. Possibilities for new therapeutic approaches will be elaborated.

Responsibilities and tasks:

- Conducting of metal-binding studies, work with insects,
- determination of metals from various cellular and tissue samples,
- analysis of results,
- publication of papers.

Qualifications:

- Master of Science in chemistry, biochemistry, biotechnology or gene technology
- Experience in spectroscopy (UV-VIS, fluorescence, CD, ICP MS, NMR) and analytical chemistry of metal measurements

To get more information or to apply online, visit https://taltech.glowbase.com/positions/47 or scan the the code on the left with your smartphone.