

## PhD Thesis in Bio-(inorganic) Chemistry on: Self-Assembly and Metal-binding of the Amyloid-beta Peptide

Place: Institut de Chimie (UMR 7177), 4 rue B. Pascal, 67000 Strasbourg (France)

Group : Biomaterials and Biological Chemistry

Group leader and supervisor: Peter Faller

**Profile:** PhD Position at interface chemistry-biology: We are looking for a candidate with a background in chemistry, biological chemistry or biochemistry to perform a PhD project at the interface of (inorganic chemistry) with biology

**Project:** There is a large body of evidence from *In vivo*, *in cellulo* and *in vitro* experiments that metal ions (mostly Cu, Zn and Fe) play an important role in the development of Alzheimer's disease (AD). Cu and Zn ions are found in high concentration in the amyloid plaques, a hallmark of AD. These metal ions are bound to the peptide called amyloid-beta ( $A\beta$ ), which is the major component of these plaques and are present in an aggregated form. Metal ions were reported to intervene in two key processes of Alzheimer's disease: the aggregation of the peptide amyloid- $\beta$  ( $A\beta$ ) (mainly Cu and Zn) and the production of reactive oxygen species (ROS) (for Cu and Fe). Compounds that counteract the metal imbalance were reported to be a promising therapeutic approach.

The objective of the project is to elucidate the role of metal ions in the aggregation of  $A\beta$ . We plan to generate  $A\beta$  peptides labeled by different fluorophores in order to probe metal-binding, aggregation and interaction with different metalloproteins in the full-length  $A\beta$  under biologically relevant conditions.

**Techniques:** chemical and biochemical methods; spectroscopy (NMR, fluorescence, FTIR, etc), microscopy (AFM, TEM), chromatography; electrophoreses; cell culture and fluorescence microscopy

**Key words:** biomaterials; bioinorganic chemistry; copper, zinc; reactive oxygen species, self-assembly; amyloids; metal trafficking; fluorophores; spectroscopies.

Recent reviews of the group:

- Nasica-Labouze J, et al. Chem Rev. 2015, 115, 3518-63.
- Faller P, et al. Acc Chem Res. 2014, 47, 2252-9.

Envisaged job starting date: 01/10/2016

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Application instructions:

<http://www.unistra.fr/index.php?id=22338> (see bottom for english version)

Group Website: <http://institut-chimie.unistra.fr/equipes-de-recherche/bcb-biomateriaux-et-chimie-biologique/>