



Laboratoire de Chimie Physique et Microbiologie pour les Matériaux et l'Environnement

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Postdoctoral position

Physical chemistry of model biomembranes for Alzheimer disease deciphering combining atomic force microscopy and infrared spectroscopy

Background and research description:

The frustrating lack of fundamental knowledge with regard to Alzheimer disease (AD) molecular and cellular mechanisms is directly responsible for the dramatic and prolonged absence of any efficient therapy or preventive strategies for combatting this disease. A crucial need to frame new hypotheses has become urgently imperative and necessitates a firm re-questioning of our current understanding of the mechanisms of AD. In this project, we propose to investigate a novel hypothesis concerning the initial events of AD and fill in the blank where most teams omit reflection. Indeed, the membrane represents the site of the initial steps of the amyloid cascade involved in AD, but the role of the membrane and the influence of its physicochemical properties remain a mystery.

We propose to investigate the physicochemical impact of the membrane composition (notably cholesterol and ganglioside occurrences) on the mechanisms of interaction of the amyloid β ($A\beta$) peptide and the β -secretase-derived fragment ($CTF\beta$) which are precursors of AD. A relevant combination of complementary tools (IR spectroscopy in attenuated total reflection mode and Atomic Force Microscopy) will be used, enabling us to reconsider the current hypotheses of amyloid cascade on controlled model membranes.

The investigation of the physicochemical properties of biological interfaces is one of the main themes of the LCPME. This research is a part of a bigger project founded by the LUE/ANR, and it will be performed in collaboration with biologists experts in AD and theoretical chemists (MD simulations) also involved in the project. The researcher will support the development of experiments combining AFM and infrared spectroscopy to characterize the model membranes interacting with the peptides to decipher the molecular mechanisms involved in AD.

Skills and professional experience:

Ph.D. in chemistry / physics / biophysics.

Experience in AFM and / or in infrared spectroscopy is mandatory

Laboratory: LCPME – UMR7564 CNRS-UL in Nancy (FRANCE)

Contract / Duration: Temporary, 12 months (possible starting from 01st October 2018)

Contract Type: Public (LUE/ANR)

Gross salary: ~2160 € / month net

Contacts:

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