PhD Fellowship (3 years)

Mass spectrometry study of riboswitch RNA folding

Project: Riboswitches are regulatory segments of mRNA that respond to the binding of a co-factor (typically, a metabolite) by a change of conformation of their aptamer domain. This conformational change alters the expression of the protein encoded by that mRNA. The structure of some riboswitch complexes with metabolites have been solved, but their folding mechanisms were found to be very diverse, and are far from being elucidated, yet alone predicted.

Our team is specialized in mass spectrometry of intact nucleic acid structures and their complexes with cations and ligands. With the DNAFOLDIMS project, a new instrument unique in Europe will enable us to perform ion mobility spectrometry coupled to mass spectrometry (IMS-MS). For each complex separated based on its mass, IMS will make possible to distinguish compact and open conformations.

The advanced mass spectrometry approaches proposed here is uniquely suited to disentangle the interplay between cation binding, metabolite binding and conformational changes, thanks to 2D mass/mobility separation. The ultimate objective is to be able classify riboswitches according to the type of conformational response, screen small molecules for their capacity to elicit specific conformational response, and ultimately discover new molecules of pharmaceutical interest.

Funding: Public – European project – ERC Consolidator Grant 2013 "**DNAFOLDIMS**"

Recruiting organization: Institut National de la Santé et de la Recherche Médicale (Inserm), U869 unit « ARNA – Artificial and Natural Regulation of Nucleic Acids »

Workplace: Institut Européen de Chimie et Biologie - Bordeaux - FRANCE

Applicant background: higher education/training in at least one of the following: Physical, analytical, or supramolecular chemistry – Biophysics – Mass spectrometry – Biochemistry. English mandatory.

Doctoral School: The PhD student will be enrolled in the "Health and Life Sciences" doctoral school of the University of Bordeaux. For admission in the doctoral school, the candidates will have to provide credentials for their succeeded years and their ranking (for example, Master 1 in Chemistry, June 2013, ranked 3rd out of 12), and must have completed their Master thesis by early July, 2014.

To apply: Send a CV including master credentials, a letter (max. 1 page) outlining how you understand the project and why you want to contribute, and one reference letter from a professor or internship tutor, by email to Valérie Gabelica (v.gabelica@iecb.u-bordeaux.fr).

Deadline: Feb. 28, 2014 for first contact. April 30 to prepare doctoral school admission.