Advanced Practical Course on In-Cell NMR & Symposium on Protein Post-translational modifications by NMR

Introduction

Proteins sample a wide variety of environments *in vivo*. Depending on its sub-cellular localization they are exposed to different degrees of macromolecular crowding, varied pH values and/or experience transient interactions with other cellular components such as metabolites, lipidic membranes, nucleic acids and proteins (**Figure 1**). In addition they can be post-translationally modified in response to precise cellular stimuli and in a time dependent manner. These diverse conditions and environments modulate dramatically protein structure and function. Accordingly, proteins can be understood only under conditions similar to those for which they were selected, the so-called physiological state. However, most protein structural studies are typically performed on isolated samples, under conditions that differ substantially from *in vivo* environments of live cells. The question arises whether protein features observed *in vitro* correlate with their *in vivo* behaviors?
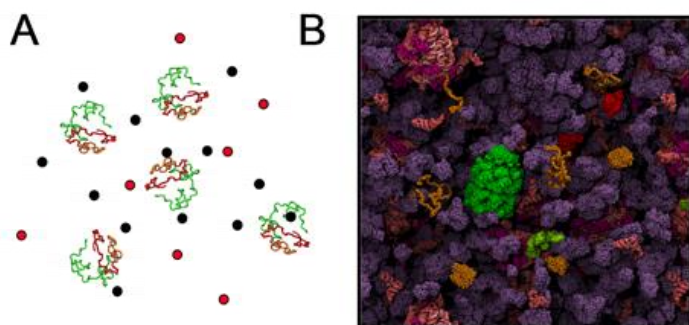

Figure 1. (A) Depiction of a protein dissolved in buffer (A) and the cytosol of a cell (B). Ribosomes and tRNA are shown in pink, chaperones in green and red and other proteins are shown in orange and purple.

In this course we will introduce to you state of the art In-cell NMR techniques to characterize proteins in their native environments. We will present applications to study the structure, folding and dynamics of proteins inside live cells as well as cellular biology process of biological relevance. The theoretical modules include the basic principles of NMR spectroscopy, sample preparation for In-cell studies and In-cell NMR data acquisition and analysis. There will be two practical modules including the recording of in-cell NMR spectra and monitoring of biologically relevant protein-post translational modifications.

The last day we will have a Symposium on Protein Post-translational modifications and how to study and interpret them by NMR. We will present examples and discuss the advantages and drawbacks against other established methods such as Mass spectrometry and immunodetection. We will have a formal poster session in the afternoon where attendants will have the opportunity to discuss their work. Poster will be in display during the whole course.

Organizers:

Andrés Binolfi (Director), Alejandro J. Vila and Rodolfo M. Rasia.

About the course:

The course will last 4 days (10 hs a day, including lunch and breaks). Total 40 hs. The Symposium will be one day (10 hs). The course will take place at IBR-CONICET, in Rosario, Argentina.

Instructors:

Philipp Selenko (Weizmann Institute of Sciences, Rehovot, IL)
François-Xavier Theillet (IBS, Paris, FR).
Roberta Pierattelli (CERM, IT)
Fabio C. L. Almeida (UFRJ, CNRMN, Rio de Janeiro, BR)
Alejandro J. Vila (IBR-CONICET, Rosario, AR)
Rodolfo M. Rasia (IBR-CONICET, Rosario, AR)
Andres Binolfi (IBR-CONICET, Rosario, AR)

Fees:

The registration fee is US$ 100 (US dollars).

We will grant "registration waivers" and "travel and/or accommodation expenses" according to exceeding budget. Please note that students from Argentina are not eligible for *"*travel and/or accommodation expenses*"*.

Who can apply?

Undergraduate and PhD students, post-docs and independent researchers and group leaders in the area of biophysics, molecular, cellular or structural biology with previous knowledge of protein NMR spectroscopy, including spectra acquisitions, data processing and analysis. While not excluding, these skills will allow you to get the most out of the course. The language of the course will be English. Good English skills are required.

According to the organization of the Practical Modules, we will restrict the number of attendees to 24. Not counting speakers and local staff/instructors.

How to apply?

Candidates should send the filled application form to binolfi@ibr-conicet.gov.ar. Please enclose a short CV (no longer than 3 pages).

Key Dates:

Application deadline: 13 of July, 2018.
Announcement of accepted candidates: 21 of July, 2018.
Announcement of travel grants and registration waivers: 7 of September, 2018.
Course: 19 to 23 of November, 2018.