

Seminario de Química Orgánica

Miércoles 7 de agosto de 2019, 13 hs
Aula de Seminario - Departamento de Química Orgánica

“High resolution structural biology in live cells
and multicellular organisms”

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Proteins in their native environments do not exist as isolated, unperturbed entities. They can be post-translationally modified or be part of large macromolecular complexes, and depending on their sub-cellular localization they are exposed to different degrees of macromolecular crowding, varied pH values and/or transient interactions with other proteins, metabolites, nucleic acids or lipidic membranes. All of these modulate the structure and function of proteins and to understand protein behavior in detail one needs to look at them in their native environments. In this regard, in-cell NMR spectroscopy represents a powerful method to directly interrogate protein structures, dynamics and activity in live cells. Here, I will show multidimensional in-cell NMR results on the structural and dynamic properties of proteins in live mammalian cells. Next, I will present high-resolution NMR studies of protein post-translational modifications, including protein oxidation and phosphorylation and their dynamic cross-talk. Finally, I will introduce real-time NMR results using oxidatively modified, isotopically enriched synthetic substrates to delineate endogenous enzymatic redox activities in live multicellular organisms. Overall, these results provide the experimental benchmarks for NMR routines in native environments paving the way for high-resolution, structural and functional studies of biomolecules *in vivo*.