

Protein and peptides interacting with cell membranes, liposomes, and bicelles: insights from spin-labeling and Electron Paramagnetic Resonance methods

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Electron Paramagnetic Resonance spectroscopy (EPR, also known as Electron Spin Resonance, ESR) is a technique that allows the study of paramagnetic centers, whether stable or metastable. In the fields of biology, biochemistry, and biophysics EPR has been widely applied to study solution and membrane proteins, metallic cofactors in enzymes, photosynthetic systems, reactive oxygen and nitrogen species, membranes, and more. When the system is not inherently paramagnetic it can be profitably studied through the introduction of a spin label.

In this seminar, an excursus of basic and advanced EPR techniques will be made in the context of application in biological systems. Special attention will be devoted to spin labeling experiments of proteins, peptides and lipids interacting with membranes, both synthetic (liposomes, bicelles) and natural (extracted membranes or cells). It will be shown how bicelles (*bilayer micelles*) are used to determine the orientation and dynamics of spin-labeled peptides in the membrane and their membrane-disruption effects.

