Bar-Ilan University
אוניברסיטת בר-אילן

Faculty of Exact Sciences
Department of Chemistry

הפקולטה למדעים מדויקים
המחלקה לכימיה

SPECIAL SEMINAR

Monday 13/1/20, 12:00 pm

Building 211, seminar room

SPEAKER:

Prof. Daniella Goldfarb

Department of Chemical and Biological Physics,

Weizmann Institute of Science,

Rehovot, Israel

TOPIC:

Tracking proteins' conformations inside cells with Gd(III) spin labels

Abstract:

Observing proteins structural changes of proteins during function in-side the cell is a challenge yet to be met. The motivation for such studies is the notion the complex cellular environment affects both the conformational equilibrium and the stability of proteins. In this context, distance measurements between two spin labels attached at specific, well defined positions in a protein, by EPR (electron-paramagnetic resonance) spectroscopy, has been suggested as an attractive method to probe protein's conformations in cells. To realize the potential of such measurements the spin labels' properties in terms of chemical stability, EPR sensitivity and distance

resolution have to be optimized along with increasing measurement sensitivity, allowing measurements at physiologically relevant concentrations. We have been using Gd(III) chelates as spin labels for in-cell measurements because of their high chemical stability and the high sensitivity they exhibit at high EPR frequencies. A number of Gd(III) tags will be presented and their in-cell performance in terms of stability, sensitivity and distance resolution will be compared, showing that by tuning the chemical structure of the Gd(III) chelate all these properties can be optimized. Finally the feasibility of the methodology will be demonstrated on the dimeric BIR1 domain of the X-linked inhibitor of apoptosis protein (XIAP), which shows some difference between in the dissociation constant of the dimer and distance distributions measured in frozen solution and frozen cells. Possible reasons for the differences will be discussed.