Ben-Gurion University of the Negev

אוניברסיטת בן גוריון בנגב

Departmental Seminar

Department of Chemistry

Monday, May 15, 2023

Time: 14:30

Bldg. 43 Room 015

Dr. Raya Sorkin

School of Chemistry, Tel Aviv University

Membrane remodeling in life processes: Unravelling membrane interactions, one vesicle at a time.

Fundamental understanding of physiological processes that occur at biological membranes, such as membrane fusion, necessitates addressing not only the biochemical aspects, but also biophysical aspects such as membrane mechanical properties and membrane curvature. In this talk, I will show how we combine membrane model systems, optical tweezers and confocal fluorescence microscopy to study membrane shaping and membrane fusion processes. I will describe a new tool we developed, where we form membrane bilayers supported on polystyrene microspheres which can be trapped and manipulated using optical tweezers. Using this approach, we demonstrate successful measurements of the interaction forces between the Spike protein of SARS CoV-2 and its human receptor, ACE2.

I will further describe how we use a similar approach to gain insight into a particular case of membrane shaping during the formation of a newly-discovered organelle termed migrasome. Migrasomes are very recently discovered signalling vesicles are generated from cell retraction fibers as a consequence of cell migration. We show that tetraspanin proteins involved in migrasome formation strongly partition into curved membrane tethers, and we reveal a novel, two-step migrasome formation process where the first stage of migrasome formation is tetraspanin independent and the second stage that leads to its stabilization is driven by tetraspanin. Overall, our findings illuminate the process of migrasome formation and provide insight into the role of tetraspanin proteins in membrane remodelling processes.