



Monday 9 September 2024 at 11:00 in aula G

Prof. Neal Devaraj

Department of Chemistry and Biochemistry University of California, San Diego, CA

will hold a lecture entitled:

Making, Breaking, and Traversing Lipid Membranes

in Artificial Cells

Lipid membranes in cells are fluid structures that undergo constant synthesis, remodeling, fission, and fusion. The dynamic nature of lipid membranes enables their use as adaptive compartments, making them indispensable for all life on Earth. Efforts to create life-like artificial cells will likely involve mimicking the structure and function of lipid membranes to recapitulate fundamental cellular processes such as growth, transport, and signal transduction. As such, there is considerable interest in chemistry that mimics the functional properties of membranes, with the express intent of recapitulating cellular phenomena while also providing clues to how life might have originated. I will present recent efforts from our lab to mimic some of the remarkable dynamic properties of living membranes. While initial investigations from our laboratory primarily vielded non-natural lipid analogs, our recent efforts have shifted towards the development of methodologies for synthesizing membranes composed of lipids identical to those naturally occurring in biological systems. Building on our work in lipid membrane growth, we have recently focused attention towards the precise control of transport mechanisms within artificial cells. A longstanding challenge has been the lack of methods to internally encode peptide epitopes for external display on the membrane surface. Recently we have been able to repurpose membrane translocating proteins to facilitate the self-encoded display of peptides on the surface of giant lipid vesicles. By programming synthetic cell-cell interactions, these studies have allowed us to achieve the de novo generation of functional synthetic tissues. Beyond artificial membranes, using selftranslocating proteins has the potential to enable the delivery of diverse molecular cargos directly across cellular membranes.

Your presence will be much appreciated

Host Leonard Prins The Head of the Department Stefano Mammi