

Seminar

Membrane active Biomimetic Polymers

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All antimicrobial agents are inherently membrane-active and their complex interactions with cellular membranes can lead to considerable conformational changes in the agents, while also inducing structural rearrangements of membrane lipids. Such structural modifications can trigger a series of events enabling the agent to affect the structural integrity of the microbial membrane and/or translocate to the interior of the microbial cell. Therapeutic use of such agents requires a detailed understanding of the interaction of such antimicrobial agents with bacterial membranes. I will discuss our efforts, using large scale simulations in collaboration with experimentalists, in probing several aspects of such membrane active polymers including the ability of these agents to acquire required functional structures, their ability to detect head-group packing defects in membranes and their unique ability to sequester charged lipids and induce phase separation, eventually leading to possible lysis of cells.

References:

1. "Influence of lipid composition of model membranes on methacrylate antimicrobial polymer - membrane interactions", Upayan Baul, Satyavani Vemparala, *Soft Matter*, 13, 7665, 2017.
2. "Synthetic random copolymers as a molecular platform to mimic host-defense antimicrobial peptides", Haruko Takahashi, Gregory Caputo, Satyavani Vemparala, Kenichi Kuroda, *Bioconjugate Chemistry*, 28, 1340, 2017.
3. "Interaction of multiple biomimetic antimicrobial polymers with model bacterial membranes", Upayan Baul, Kenichi Kuroda, Satyavani Vemparala, *The Journal of Chemical Physics* 141, 084902, 2014.

Friday, Apr 27th 2018

4:00 PM (Tea/Coffee at 03:30 PM)

Auditorium, TIFR-H