

Seminar

Leveraging organic chemistry for solving biological problems: Bioconjugation and bacterial signalling as case studies

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The underlying philosophy of my research program is to utilize organic chemistry to address questions in both applied and fundamental biological sciences. In this talk, I shall discuss how I propose to employ organic chemistry for: a) developing technologies for protein bioconjugation, and b) studying c-di-GMP signalling in bacteria. In the first half of my talk which will focus on bioconjugation, I shall describe my proposed approach for bridging disulphide bonds of proteins and using this chemistry for fabricating antibody-drug conjugates, for peptide stapling and as disulphide mimics. Additionally, I shall discuss my proposed strategies for performing cysteine-independent protein bioconjugation that we are currently pursuing in my research group. The second half of my talk will focus on the bacterial second messenger, c-di-GMP, a cyclic dinucleotide that plays a major role in biofilm formation. Intriguingly, bacteria contain numerous c-di-GMP synthase enzymes (diguanylate cyclases or DGCs) which when individually deleted; engender distinct phenotypes suggesting they have distinct roles despite each being responsible for generating the same product. To elucidate the roles of individual DGCs and to understand why bacteria express so many DGCs, I propose to develop a chemical genetics-based platform that I shall describe in my talk. Additionally, I shall describe a chemoproteomic approach that I seek to develop for discovering the c-di-GMP interacting proteome of bacterial cells. I believe that the insights on c-di-GMP signalling obtained from these studies will significantly contribute towards developing novel antibacterial therapy directed at targeting this fascinating signalling mechanism.

Wednesday, Dec 6th 2017

11:30 AM (Tea/Coffee at 11:15 AM)

Class Room-3, TIFR-H