Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Students' Annual Seminar

Investigating the role of IDRs in SIRT1 for transcription factor recruitment during physiological transitions

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Gene transcription is a fundamental process in biology, and transcription factors (TFs) help orchestrate gene expression by binding to regulatory elements and ultimately initiating a cascade of molecular events involving coactivators, chromatin remodellers, and so on. Classical models fail to capture this dynamic nature of transcription within cells. An interesting observation here is the rapid localisation of TFs to specific DNA targets across the genome, pointing to the fact that diffusion alone drives this process. Recent studies propose liquid-liquid phase separation (LLPS) as a mechanism contributing to transcriptional regulation. This process involves the partitioning of TFs and related molecules near target genes.

SIRT1 (a master regulator of TFs) selectively and sequentially binds to different transcription factors during physiological transitions to initiate gene expression, i.e., whenever the body goes through fed-fast cycles. Also, having its flanking regions as unstructured domains makes it a perfect candidate to study intrinsically disordered regions (IDRs) and their role in TF recruitment. We have seen that SIRT1 N-Terminal IDRs mediate this differential interaction and interactions might happen through LLPS. We aim to investigate how IDRs in SIRT1 play a role in recruitment and what other factors aid in this selective, sequential binding.

Friday, Dec 13th 2024

14:00 Hrs (Tea / Coffee 13:45 Hrs)

Seminar Hall, TIFRH