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

# Comprehensive 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 in orchestrating gene expression. Classical models fail to capture this dynamic nature of transcription within cells. Interestingly there is 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. Transcriptional condensates as they are called now, suggest that TFs accumulate in stable, dynamic clusters within certain nuclear regions, interacting with mobile chromatin loops for transcription. Thus, understanding the mechanisms governing gene transcription requires a nuanced approach that incorporates dynamic TF-DNA interactions and heterogeneous organisation of transcriptional machinery within the nucleus via LLPS. These insights would then help us dig deeper into the understanding of gene expression regulation and its implications in health and disease.

SIRT1 (a master regulator of TFs) that 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. It has already been shown that SIRT1 N-Term IDRs mediate this differential interaction but no one knows whether this happens through LLPS or not. We aim to investigate how IDRs in SIRT1 play a role in recruitment and what are the other factors aiding in this selective, sequential binding.

***Tuesday, Mar 12th 2024***

***9:00 Hrs (Tea / Coffee 8:45 Hrs)***

***Auditorium, TIFR-H***