Tata Institute of Fundamental Research
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Seminar

RNA as a Key Regulator of Ligand-Dependent Transcriptional Response

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Ligand induced transcriptional responses are orchestrated by distal regulatory elements known as enhancers. These responses, especially to hormones, are often rapid and require swift binding of transcription factors (TFs) to their cognate enhancers, followed by communication with gene promoters that exhibit burst like transcriptional activity. Traditionally, strong and stable transcription factor (TF) binding via high affinity DNA motifs has been considered essential for robust gene activation. However, recent findings from our lab and others have revealed that many functional enhancers surprisingly carry weaker TF binding motifs.

In this talk, I will present how RNA, through its ability to interact with transcription factors, plays a critical role in facilitating fast and dynamic transcriptional responses, particularly at weak binding sites. Our data suggest that RNA acts as a molecular modulator, enabling efficient and timely transcriptional bursts in response to acute ligand signalling. I will also discuss why evolution may have favoured weaker motifs, as they allow for greater flexibility and reversibility in transcriptional regulation, particularly during transitions between acute and chronic signalling states.

Tuesday, Aug 19th 2025

11:30 Hrs (Tea / Coffee 11:15 Hrs)

Auditorium, TIFRH