

Students' Annual Seminar

Differential expression of genes located within the same topologically associated domain (TAD) is regulated by transcription factor-mediated condensation

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The phenomenon of liquid-liquid phase separation (LLPS) has emerged as a non-conventional way in which cells carry out local biochemical reactions without requiring dedicated membrane-bound organelles. In previous years, I presented data that showed how the HP1 α -mediated phase separation helps regulate DNA damage repair by dictating repair pathway choice. In this seminar, I will focus on work done in the past year toward understanding how the transcription factor ER α and its phase separation can directly regulate the signalling-dependent expression of two genes located in the same topologically associated domain (TAD). We observed that the two genes showed variable and anti-correlated expression in high expressing cells depending on the time course of signalling. Furthermore, we found that it is the nuclear levels of ER α that can directly dictate the gene expression profile. Additionally, perturbing LLPS using 1,6-hexanediol led to a change in the expression profile suggesting a direct role of TF-mediated phase separation in regulating the time-dependent expression of the two genes. Put together, this work provides evidence in support of LLPS and differential enhancer engagement in controlling local gene transcription.

Thursday, Feb 8th 2024

14:30 Hrs (Tea / Coffee 14:15 Hrs)

Seminar Hall, TIFR-H