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

Comprehensive Seminar

Mechanism of DNA replication initiation and its regulation

Promeet Halder

DNA replication is a tightly regulated process which ensures faithful duplication of the genome and maintain its integrity. At the heart of DNA replication initiation, is the helicase (MCM2-7), which unwinds the DNA. Replication initiation is comprised of three distinct steps- Loading, Activation, Firing, in which the helicase undergoes various conformation changes and dynamics. Loading of the helicase on DNA is temporally regulated while the activation and firing are regulated both temporally and spatially.

The steps in the initiation process are controlled by various proteins like CDT1, CDC45 and MCM10. CDT1 is a loading factor which loads excess MCM2-7 helicase during G1 phase of the cell cycle. Only a subset of these excess loaded helicases are actually activated and fired under the control of CDC45 and MCM10 respectively. The mechanisms by which replication factors selectively activate specific origins and establish this temporal program of origin firing remain major unanswered questions in the field.

In this seminar, I will talk about the roles of these factors in DNA replication initiation and how they regulate the MCM2-7 helicase. I would also talk about the conformational changes of the helicase during the replication initiation process. Finally, I would highlight open questions in the field, some of which I am currently investigating.

Friday, Jul 10th 2026

10:00 Hrs (Tea / Coffee 9:45 Hrs)

Auditorium, TIFRH