Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad - 500107

Seminar

The γH2A.X Peak in the S phase after UV irradiation corresponds to sites of DNA replication and not DNA damage

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Cell cycle encapsulates all the processes that go on inside a cell to ensure a faithful transmittance of genetic information to the next generation. This makes the cell cycle an important regulator of most processes inside a cell and particularly those dealing with genome stability. Many of the existing methods to study cell cycle-dependent regulation of cellular processes do not yield information about subcellular localization and cell-to-cell heterogeneity of such processes. In this presentation I describe a novel microscopy-based method of cell cycle staging which addresses some of these shortcomings. I further use the technique in combination with DNA FISH*, single molecule RNA FISH (smFISH) and immunofluorescence for Cyclin A2 gene to investigate links between nuclear architecture and cell cycle-dependent gene expression. Finally I use these methods to study DNA damage responses in the context of the cell cycle. I show that the peak in γH2A.X, a general DNA damage marker, in the S phase cells after UV irradiation corresponds to the active replication sites at the time of UV irradiation and not to the actual damage. The thesis poses new questions as to the roles of γH2A.X in the maintenance of genome stability at the replication forks by challenging the conventional idea of γH2A.X as simply a mediator of DNA damage repair, and indicates that it is the damage response and not the damage itself that is cell cycle-dependent.

* FISH: Fluorescence in situ Hybridization

Tuesday, Sep 17th 2019

4:00 PM (Tea/Coffee at 3:30 PM)

Auditorium, TIFR-H