TIFR Centre for Interdisciplinary Sciences
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Students' Annual Seminar

Capturing the cell cycle dependence of DNA damage responses (DDR) through microscopy

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A normal cell, in its lifetime, undergoes a finite number of cell-division cycles characterised by the Hay flick limit. Cancer cells on the other hand can divide indefinitely because of the mutations in the genes responsible for the proper functioning of the cell cycle. Specific checkpoints in the cell cycle and genome surveillance mechanisms regulate the fidelity of the replication of the genetic message across cell generations. In fact, the choice of DNA repair pathways is itself cell cycle-dependent. The importance of the cell cycle in regulating DDR can hardly be overstated. Biochemical approaches to study the cell cycle dependence of DDR and associated gene expression patterns report on the mean population level responses and are not sensitive to the diversity among individual cells in a population. Furthermore chemical arrests used in these studies may themselves affect the damage response. Flow cytomtery is used for single cell-level cell cycle responses but cannot report on localization of studied gene products and are susceptible to biases from cell debris. In the work that I will describe, we report a novel microscopy-based method to study the cell cycle-dependent gene expression at the transcript- and protein level which addresses the shortcomings of the extant methods. We will discuss this in the context of damage markers like γH2A.X and the important tumor suppressor gene TP53.

Wednesday, May 17th 2017

4:30 PM (Tea/Coffee at 3:45 PM)

Seminar Hall, TCIS