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

Students' Annual Seminar

Studying the effects of nuclear mechanics on DNA damage responses in live cells

Shantam Yagnik

ATM (Ataxia Telangiectasia Mutated) and ATR (Ataxia telangiectasia and Rad3 related) are members of the family of phosphoinositide 3-kinase (PI3K) related kinases that catalyse phosphorylation of multiple proteins involved in the DNA damage response (DDR) pathway. The recruitment of ATR and its downstream signalling in maintaining replication fork stability and coordinating cell cycle progression have been extensively studied. However, recent studies have also focused on ATR as a sensor of mechanical forces across the nuclear envelope. Whether these roles of ATR are independent of its roles in DDR remains to be investigated. Further, both mechanical forces and ATR have also been shown to regulate the nuclear levels of YAP, a key transcriptional coactivator. In light of these studies, pertinent questions remain as to how the nuclear envelope serves as a mechanotransducer in the context of DNA damage and how these changes modulate DDR or transcriptional programmes to bring about an effective response. In this talk, I will be discussing results about the interplay of nuclear mechanics DDR and also YAP signalling. I will first describe how nuclear mechanics and ATR response might be linked to one another. I will also show how DDR, through ATM and ATR, influences YAP nuclear localisation, and possibly its activity.

Friday, May 26th 2023

2:00 PM (Tea / Coffee 1.45 PM)

Seminar Hall, TIFR-H