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

Comprehensive Seminar

Roles of A-type Lamins and nuclear Mechanics in regulating DNA damage responses (DDR)

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The nucleus serves as the store house for our genetic material, and its primary role is safeguarding the genome against potential harm from both physical forces and chemical damage. The physical properties of nucleus play a crucial role in protecting the DNA in different tissue environments. The cell nucleus has the ability to sense different mechanical cues and adjust its physical properties accordingly to adapt to its surroundings. Nuclear morphology and stiffness are found to be altered in cancer cells. Diseases such as laminopathies, resulting from abnormalities in a key player in nuclear mechanics, the nuclear lamina, exhibit deficiencies in the repair of DNA damage. Defects in double-strand breaks (DSBs) and base excision repair (BER) pathways are observed in A-type lamin-deficient cells. Recent studies have shown an interplay between key proteins involved in DDR pathways like ATM, ATR, p53, 53BP1, PARP1 and A-type lamins. Our preliminary results also suggest that two key DDR proteins, ATM and PARP1, respond to mechanical stimuli. So, how nuclear mechanics is regulated in context of DNA damage and how the change in physical properties of nucleus affects DDR need further investigation. We concentrate on elucidating the interplay between key DDR factors and A-type lamins, which maintain nuclear mechanics to ensure optimal repair outcomes.

Tuesday, May 7th 2024

10:00 Hrs (Tea / Coffee 09:45 Hrs)

Auditorium, TIFR-H