

## **Students' Annual Seminar**

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

**Souvik Sen**

The nucleus serves as the store house for our genetic material, and its physical properties play a crucial role in protecting the DNA in different tissue environments. The cell nucleus can sense different mechanical cues and adjust its physical properties accordingly to adapt to its surroundings. Nuclear morphology and stiffness are altered in cancer cells. Diseases such as laminopathies, which result from abnormalities in a key component of nuclear mechanics, the nuclear lamins, exhibit defects in DNA damage repair pathways such as HR, NHEJ and BER. 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. 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.

***Friday, Dec 20<sup>th</sup> 2024***

***14:00 Hrs (Tea / Coffee 13:45 Hrs)***

***Seminar Hall, TIFRH***