



**S N BOSE NATIONAL CENTRE  
FOR BASIC SCIENCES**

*Block JD, Sector III, Salt Lake, Kolkata 700 106*

**DEPARTMENTAL SEMINAR**  
**Chemical, Biological & Macro-Molecular Sciences**

**16<sup>th</sup> November'2021**

**4.00 PM**

**ONLINE**

**SPEAKER**

**Dr. Sabyasachi Rakshit, Associate Professor,  
Department of Chemical Sciences  
Centre for Protein Science Design and Engineering  
Indian Institute of Science Education and Research, Mohali, Punjab, India**

**TITLE OF THE TALK**

***Dynamics of a tip-link couple in hearing***

**ABSTRACT**

Discovery of mechanical transducers that help us to convert the touch into nerve impulses earned Professor Ardem Patapoutian the Nobel Prize in Physiology or Medicine 2021. Hearing is similarly a mechano transduction process where a protein-couple, jointly known as tip-links, serve as gating-springs and convey the input mechanical force of varying intensities from sound-stimuli to electrical signal. Importantly, tip-links maintain the integrity of their marriage under periodic tension from input sound. With an overarching objective to decipher the force-responsive behaviors of tip-link complexes and their alterations with aging, here we probe the viscoelastic properties of the tip-links directly under mechanical stimuli at the single-molecule level.

In this talk, I shall present how tip-links form a counterintuitive 'catch-bonds' to overcome the mechanical pulses from sound, and as gear-box, accelerate the lifetime of the complex while conveying force for transduction. Further, tip-links serve as guardians to the non-regenerative hair-cells from the sudden impact of loud noise and at the cost of their marriage. Tip-links dissociate, however, re-engage fast. Towards the end, I shall discuss how tip-link proteins undergo phase separation on a cell membrane to accelerate the re-formation of tip-links and cell-cell adhesion.

**HOST FACULTY**

**Prof. Rajib K Mitra and Dr. Suman Chakrabarty**  
**CHEMICAL, BIOLOGICAL & MACRO-MOLECULAR SCIENCES**

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