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Invitation to Guest Lecture by Dr. Prince Tiwari, tomorrow, 11;00 AM, L-03, LHC

BSBE Outreach <bsbe_seminar@iiti.ac.in> Sun, Dec 22, 2024 at 9:30 PM
To: allfaculty <allfaculty@iiti.ac.in>, Allstudent <allstudent@iiti.ac.in>, All Scientists at IITI <allscientists@iiti.ac.in>
Cc: BSBE OFFICE <bsbe_office@iiti.ac.in>, BSBE Faculty Core <bsbefacultycore@iiti.ac.in>, hodbsbe IIT Indore <hodbsbe@iiti.ac.in>

Dear all,

We are delighted to invite you to an interesting guest lecture by Dr. Prince Tiwari, PhD, Assistant Professor, Department of Biosciences and Bioengineering, IIT Roorkee.

Details of the Lecture:

Lecture series: **Frontiers in Biosciences and Biomedical Engineering**

Title: “Cryo-EM structure of the switched-off state of myosin II and its relation to hypertrophic cardiomyopathy”
Date: 23rd December
Time: 11:00
Venue: L-03, LHC

Short description: Hypertrophic cardiomyopathy (HCM) is a genetic disorder where the contractile proteins, such as myosin motor, do not perform their regular function, which leads to hypercontractility of heart muscles and impaired diastole. This causes abnormal heartbeats (arrhythmias) and abnormal heart function, which can eventually lead to sudden cardiac arrest in affected people. In myosin filaments, the myosin forms a conformation called the interacting heads motif (IHM), which regulates the number of myosin heads available to interact with actin to produce force. It has been suggested that HCM mutations in myosin may increase the number of available heads by disrupting the IHM head interactions, thus leading to hypercontractility and impaired diastole of the disease. The two-headed molecule can exist in two conformations: compact (10S sedimentation coefficient) and extended (6S). The extended conformation assembles into filaments, which pull on actin to generate muscle contraction and cell motility. In the 10S structure, the tail is folded into three segments, and the heads bend back and interact with each other and the tail, switching off ATPase activity, actin-activation, and filament assembly. This energy conserving storage form can be activated by phosphorylation of its regulatory light chains (RLC) to form functional filaments. We solved the structure of 10S myosin II to 4.3 Å resolution by Cryo-EM, which revealed near-atomic insights into its structure and inhibitory function (Yang S and Tiwari P et al. Nature 2020). I will discuss the novel insights revealed, the proposed mechanism of 10S activation and how this information provides a framework for understanding their disease causing mutations.

Speaker biography: Dr. Prince Tiwari joined the BSBE, IIT Roorkee in mid-2022. As a protein structural biochemist, he mostly uses cryo-EM to understand the role of muscular regulation in cardiomyopathies and its structural implications. He graduated from the School of Life Sciences, Devi Ahilya University, Indore, with a master's degree. He began his PhD studies in Prof. Purnananda Guptasarma's lab at IISER Mohali, where he studied calcium-binding proteins such as human epithelial (E) and neuronal (N) cadherins. He moved to the United States for postdoctoral studies and joined Roger Craig’s lab at University of Massachusetts Medical School. In addition to having research publications published in journals like Nature and eLife, he received a prestigious American Heart Association (AHA) fellowship. His current research interest is Investigating cardiac myosin and its relation to cardiomyopathies.

We look forward to your participation in this interesting lecture.

Best regards
Dr. Sivaraj Mohana Sundaram

Seminar Committee
Department of Biosciences and Biomedical Engineering
Indian Institute of Technology Indore