Indian Institute of Science
Centre for BioSystems Science and Engineering
BSSE Seminar

9th December 2019 (Monday), 4:00 PM, MRDG Seminar Hall, 1st floor, Biological Sciences Building

Closed Mitosis Requires Local Disassembly of the Nuclear Envelope

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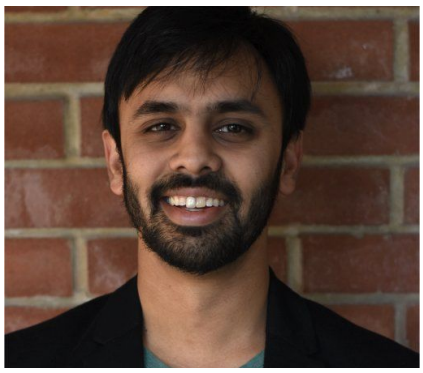
ABOUT THE SPEAKER



Gautam Dey is an evolutionary cell biologist and former Marie Sklodowska-Curie Fellow working with Buzz Baum at the UCL/MRC Lab for Molecular Cell Biology. Gautam studies the evolution of the eukaryotic cell cycle using genomics, phylogenetics and comparative experiments in archaea and fission yeast. He received his PhD from Stanford University's Department of Chemical and Systems Biology in 2015, working with Tobias Meyer. Gautam also holds a Masters (Research) degree from the National Centre for Biological Sciences in Bangalore and a BSc (Hons) from the University of Delhi.

ABSTRACT

Dividing eukaryotic cells must coordinate DNA segregation with the division of both nucleus and cytoplasm. Cells have adopted a continuum of strategies to partition the nuclear envelope (NE)- from complete disassembly/reassembly ("open"), to reshaping and division with no loss of integrity ("closed"). Despite this apparent morphological diversity, do underlying universal mechanisms exist to regulate the remodelling of the one organelle that all eukaryotes share?

In the closed mitosis of the fission yeast *S. pombe*, an intra-nuclear spindle drives expansion and remodelling of an intact nuclear envelope, producing two daughter nuclei linked by a narrow bridge. Using a combination of genetics, live imaging and correlative electron tomography, we have shown that reorganisation of the inner NE traps a subset of nuclear pore complexes in the bridge - triggering a rapid "local" nuclear envelope breakdown (NEB) that occurs without loss of nuclear integrity. We find that the regulatory logic of local NEB mirrors that of NEB in open mitosis, hinting at the existence of universal NE remodelling mechanisms with implications for our understanding of eukaryotic evolution. I will discuss our latest findings and plans to use *S. pombe* as a base for a comparative investigation of nuclear division strategies across free-living and parasitic protists.