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17 Aug 2023 (Thur), 3.30pm

Auditorium (Level 1)

Hosted by: Dr Naweed Naqvi

The Centromere Code Hypothesis

Dr Kaustuv SANYAL
Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), India



The chromosomal attachment site of the mitotic spindle is the centromere/kinetochore complex. In most organisms, centromeres are localized to a defined region as observed in monocentric chromosomes. In certain animals and plants, mitotic spindle fibers bind across the length of a chromosome on a holocentric chromosome. Centromeres of varying lengths in monocentric chromosomes were identified and mapped in more than 60 fungal species making it possible to find both conserved and unique species-specific centromere features (Guin et al., 2020, Ann Rev Microbiol). While centromeres are recognized genetically by exclusive centromere DNA sequence-specific binding of certain proteins in a few budding yeast species, centromeres are non-genetically/epigenetically defined in most other species. Thus, it is a paradox that there is no common DNA sequence signature that determines the centromere identity across fungal species. During the presentation, I intend to propose the centromere code hypothesis by providing evidence that a set of non-genetic factors together may determine centromere identity across fungal species.

Kaustuv Sanyal is JC Bose National Fellow, Professor and Chair of the Molecular Biology and Genetics Unit at the JN Centre for Advanced Scientific Research in Bengaluru. His laboratory studies chromatin organization, chromosome structure-function and molecular factors that regulate high fidelity chromosome segregation. He has been working in these areas for more than two decades and contributed significantly. He is an elected fellow of the American Academy of Microbiology, Indian National Science Academy, Indian Academy of Sciences, the National Academy of Sciences. He is a nominated member of the faculty of 1000 (F1000Prime), UK. He has been awarded the Sun Pharma Research Foundation Award (2022), Tata Innovation Fellowship (2017 – 2020) and the National Bioscience Award and research grant (2012 – 2015) by the Department of Biotechnology (India). Currently, he leads a group consisting of graduate students and postdoctoral researchers, and actively collaborates with many scientists across disciplines.

Recent Publications:

1. Jaitly P, Legrand M, Das A, Patel T, Chauvel M, Maufrais C, d'Enfert C, **Sanyal K.** A phylogenetically-restricted essential cell cycle progression factor in the human pathogen *Candida albicans*. ***Nature Communications*** (2022) *13:4256*

2. Sridhar S, Hori T, Nakagawa R, Fukagawa T, **Sanyal K.** Bridgin connects the outer kinetochore to centromeric chromatin. ***Nature Communications*** (2021) *12: 146*

3. Sreekumar L, Kumari K, Guin K, Bakshi A, Varshney N, Thimmappa BC, Narlikar L, Padinhateeri R, Siddharthan R, **Sanyal K.** Orc4 spatiotemporally stabilizes centromeric chromatin. ***Genome Research*** (2021) *31:607- 621*