ICTS Special Colloquium

Title : Why cousins are more similar than mother-daughters: implications for cell fate control

Speaker : Shaon Chakrabarti, Harvard University and Dana Farber Cancer Institute, USA

Date : Wednesday, October 3, 2018

Time : 3:00 PM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : The origin of lineage correlations among single cells and the extent of heterogeneity in their intermitotic times (IMT) and apoptosis times (AT) remain poorly understood. We developed single cell lineage-tracking experiments and computational algorithms to uncover correlations and heterogeneity in the IMT and AT of a colon cancer cell line before and during cisplatin treatment. These correlations could not be explained using protein production-degradation models that are currently believed to underlie cell fate control. We developed a stochastic model explaining how the observed correlations can arise from oscillatory mechanisms underlying fate control. Our model was able to recapitulate the data only with specific oscillation periods that fit measured circadian rhythms, thereby strongly suggesting a role of the circadian clock in controlling cellular fates. These results provide insight into the fundamental principles of cell fate control, which we are exploring further by developing embryonic stem cells engineered with a circadian reporter.