Seminar

What does not kill cancer can make it stronger: Dynamical modelling of drug-induced cell-state transitions

Mohit Kumar Jolly

IISc, Bangalore

Therapy resistance and consequent tumour relapse are major unsolved clinical challenges in cancer treatment. While pre-existing subpopulations of genetically distinct drug-resistant cells have been shown to contribute to this phenomenon, recent studies have revealed the role of drug-induced cell-state switching in aggravating disease outcomes by enabling cell-state transitions to new phenotypes that are not always observed prior to treatment. To overcome this challenge, it is essential to understand the emergent dynamics of underlying regulatory networks enabling such phenotypic switching. I will present several examples from our work in ER+ breast cancer and melanoma, integrating computational modelling of regulatory networks, single-cell high-throughput data analysis and experimental validation to better understand what trajectories cancer cells take to evade targeted therapy as well as immunotherapy. We elucidate the design principles of cellular decision-making networks in cancer, and present an in silico platform to rationally identify combinatorial therapies to minimise cancer aggressiveness.

Wednesday, Dec 11ᵗʰ 2024

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFRH