Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad - 500107

Seminar

Computational systems biology of cancer metastasis: Can theory help understand cancer biology?

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Gulf Coast Consortia, Houston

Metastasis – the spread of cancer to distant organs – causes above 90% of all cancer-related deaths. More than 95% of metastases are formed by cancer cells leaving the primary tumor as clusters of 5-8 cells. What underlying mechanisms can drive the formation of such clusters?

I have developed mechanism-based mathematical models for regulatory networks driving this behavior, and identified multiple 'phenotypic stability factors' (PSFs) that can stabilize a hybrid epithelial/mesenchymal (E/M) phenotype that facilitates collective migration. Modeling the interconnections among these networks with those controlling tumor-initiation potential predicts how hybrid E/M cells are much more likely to form metastases. These predictions have been validated in many *in vitro* and *in vivo* experiments, and are supported by the association of poor patient outcome with high levels of PSFs across cancer types.

Collectively, my work highlights how an iterative crosstalk between mathematical modeling and experiments can both generate novel insights into the dynamics of cellular plasticity and uncover previously unknown accelerators of metastasis.

Friday, Nov 24th 2017

04:00 PM (Tea/Coffee at 03:30 PM)

Class Room - 3, TIFR-H