Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Seminar

The molecular 'ballet' between Rho GTPases and DOCK GEFs generate their mutual specificities

Kiran Kulkarni

NCL, Pune

Rho GTPases are the master regulators of diverse biological processes such as cell proliferation, apoptosis and cell migration. These molecules work as bio-switches, which are 'ON' (active) when bound to GTP and 'OFF' (inactive) when bound to GDP. The shuttling between ON and OFF states is regulated by two antagonistic class of proteins known as the guanine nucleotide exchange factors (GEFs) and the GTPase-activating proteins (GAPs). GEFs activate GTPases by promoting the exchange of GDP for GTP, whereas GAPs switch off the GTPases by enhancing their intrinsic rate of hydrolysis of bound GTP to GDP. Upon activation Rho GTPases interact with various downstream signalling proteins to regulate several important biological processes. Recently, the DOCK family of non-canonical GEFs have emerged as key regulators of tumour cell migration. The eleven DOCK GEFs (Dock1 to 11) from humans activate just two (Rac and Cdc42) of the known twenty Rho GTPases. A complex network of interaction between them generate mutual specificity. I will present some of our work that addresses switching mechanism in Rho/Ras GTPases and the factor that determine the mutual DOCK-Rac/Cdc42 specificities. I shall show how this information could augment the development of new anti-metastatic drugs.

Monday, Jul 1st 2024

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

Auditorium, TIFR-H