



**TIFR Centre for Interdisciplinary Sciences  
Narsingi, Hyderabad 500075**

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**Seminar**

**Life of a single dynein in vivo**

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Cytoplasmic dynein is a motor protein that exerts force on microtubules and in doing so, drives a myriad of intracellular activities including mitotic spindle positioning and chromosome movements in meiotic prophase. To generate these forces, dynein needs to be anchored, with the anchoring sites being typically located at the cell cortex. The key question is: By what mechanism do single dyneins accumulate at sites where they can generate large collective forces? We directly observed single dyneins in fission yeast, which allowed us to identify the main steps of the dynein targeting process: (i) from the cytoplasm to the microtubule, and (ii) from the microtubule to the cortical anchors Mcp5. We uncovered that dyneins on the microtubule move, surprisingly, either in a diffusive or a directed manner, with the switch from diffusion to directed movement occurring upon binding of dynein to the cortex. This dual behavior of dynein on the microtubule, together with the two steps of binding, constitute the mechanism by which dyneins find cortical anchors in order to generate large-scale movements in the cell.

In the discussion about my future work, I will extend the lessons we learned from fission yeast and explore the existence of a default inactive state of dynein in the cell. In other words, how is dynein's activity spatially and temporally regulated in vivo at the single-molecule level?

***Tuesday, Mar 18<sup>th</sup> 2014***

***11:30 AM (Tea/Coffee at 11:15 AM)***

***Seminar Hall, TCIS***