

Seminar

Actin treadmilling - the dogma bites back

Shashank Shekhar

Emory University, Atlanta

Actin is an essential protein. For over four decades, intracellular actin filaments have been thought to elongate at their barbed ends and depolymerise from pointed ends. This process, referred to as “treadmilling” has formed the central bedrock of our understanding of actin dynamics. Using a combination of microfluidics-assisted TIRF imaging and multispectral single molecule approaches which my lab has pioneered, our recent discoveries have called into question the universality of the treadmilling dogma. First, we recently discovered a new actin depolymerase, twinfilin, which induces depolymerisation at filament barbed ends. Interestingly, we find that the depolymerase twinfilin, polymerase formin and blocker CP form a multicomponent protein ecosystem at the filament ends. Together, these proteins allow temporal and spatial tuning of actin assembly and remodelling. Second, I will present our discovery of a new actin polymerase VopF, which processively polymerises actin filaments from their pointed ends. Our findings thus challenge the classical dogma of actin treadmilling and call for re-evaluation of molecular mechanisms governing intracellular actin dynamics.

Tuesday, Mar 12th 2024

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

Auditorium, TIFR-H