IMCB Invited Speaker

Speaker : **Dr. Laurent Blanchoin**
Research Director, institute of Life Sciences Research and Technologies (iRTSV), Grenoble, France

Date : 24 June 2013 (Monday)

Time : 11:00AM - 12:00PM

Venue : IMCB Seminar Room 3-46, Level 3, Proteos, Biopolis

Host : Prof. Robert Robinson

Seminar :

Directed actin self assembly and contractility

The organization of actin filaments into higher-ordered structures governs eukaryotic cell shape and movement. Global actin network size and architecture is maintained in a dynamic steady-state through regulated assembly and disassembly. We have developed a micropatterning method that enables the spatial control of actin nucleation sites for in vitro assays (Reymann, Nat Mat, 2010). These actin templates were used to evaluate the response of oriented actin structures to myosin-induced contractility. We determine that myosins selectively contract and disassemble anti-parallel actin structures while parallel actin bundles remain unaffected. In addition, the local distribution of nucleation sites and the resulting orientation of actin filaments regulate the scalability of the contraction process. This "orientation selection" mechanism for selective contraction and disassembly reveals how the dynamics of the cellular actin cytoskeleton is spatially controlled by actomyosin contractility. Further application of the micropatterning method will be presented in particular recent data on the reconstitution of a lamellipodium-type of actin organization and the fabrication of three-dimensional electrical connections by means of directed actin self-organization.

About the Speaker :

Dr. Laurent Blanchoin is currently the Research Director, CNRS, institute of Life Sciences Research and Technologies in Grenoble, France. His postgraduate studies were completed in 1996 in University of Paris VI, Molecular and Cellular Biology. His postdoc research was completed in 2001 at Salk Institute for Biological Studies. Our aim is to understand how the cytoskeleton is dynamically organized and constrained to regulate cell morphogenesis. We have several complementary approaches from in vitro polymerization of cytoskeleton polymers in presence of physiologically relevant accessory proteins to cellular manipulation and observation. All these experimental strategies are coupled with the development of theoretical model allowing a better description on how molecular events are orchestrated to determine macroscopic properties of the cytoskeleton necessary for cellular function.

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