IMCB Invited Speaker

Speaker : **Prof. Robert Parton**

Group leader, Institute for Molecular Bioscience,
Deputy Director, Centre for Microscopy and Microanalysis,
The University of Queensland, Brisbane, Australia

Date : 26 June 2013 (Wednesday)

Time : 11:00AM - 12:00PM

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

Host : Prof. Wanjin Hong

Seminar :

New insights into the molecular mechanisms underlying the formation and function of caveolae

Caveolae are abundant cell-surface pits that have been implicated in lipid regulation, signal transduction, and endocytosis. Caveolins, the major membrane proteins of caveolae, play a crucial role in the formation of caveolae. Mutations in caveolins are associated with breast cancer and with a number of muscle diseases, including limb girdle muscular dystrophy. We have studied how caveolin-lipid interactions generate the unique architecture of the caveolar domain by studying caveola formation in a model prokaryotic system. Vesicle formation is induced by expression of wild-type caveolins, but not caveolin mutants defective in caveola formation in mammalian systems. In addition, cryo-electron tomography shows that the induced membrane domains are equivalent in size and caveolin density to native caveolae and reveals a possible polyhedral arrangement of caveolin oligomers. The caveolin-induced vesicles form by budding in from the cytoplasmic membrane, generating a membrane domain with distinct lipid composition. We propose a model in which caveolin oligomers expand the cytoplasmic leaflet and generate membrane curvature. Our recent studies have identified a new family of coat proteins, termed cavins, that regulate caveola formation in vertebrate cells. Study of the cavins and their dynamics of caveola association/dissociation provides new insights into the role of caveolae in mechanosensation.

About the Speaker :

Robert Parton studied biochemistry in the UK before moving to the European Molecular Biology Laboratory in Heidelberg, Germany. He received Royal Society and EMBO postdoctoral fellowships before becoming a group leader in 1990 studying plasma membrane domains and cell surface dynamics. In 1996, he moved to the University of Queensland, Brisbane, Australia. He is currently a group leader in the Institute for Molecular Bioscience and Deputy Director of the Centre for Microscopy and Microanalysis. His research centres on the microdomains of the plasma membrane, with a particular focus on caveolae and caveolins. In 2009 he received an NHMRC Australia Fellowship and was elected to the Australian Academy of Science. He is currently an Associate Editor of the *Journal of Cell Biology, Traffic, and Molecular Biology of the Cell*.

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