IMCB Invited Speaker



Speaker : **A/Prof. Nathan Palvos**

Head, Cellular Orthopaedic Laboratory, Centre for Orthopaedic Research
School of Surgery, The University of Western Australia, Australia

Date : 1 April 2013 (Monday)

Time : 11:00AM - 12:00PM

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

Host : Prof. Wanjin Hong

Seminar :

Membrane Trafficking in Skeletal Disease: Lessons Learned from Brain to Bone

Skeletal diseases encompass a devastating set of disorders ranging from rare heritable skeletal dysplasia like osteopetrosis through to endemic degenerate diseases such as osteoporosis and osteoarthritis. Accumulating evidence indicate that some of these disorders are directly related to dysfunction of intracellular machinery in resident skeletal cells that normally serve to orchestrate the sorting and shuttling of proteins between organelles i.e. membrane trafficking. In eukaryotes, membrane trafficking is governed by sets of evolutionary conserved protein families with Rab GTPases and SNAREs among the best characterised. Although much of what we currently understand about membrane transport has been gleamed from sophisticated trafficking events like synaptic neurotransmission, comparatively little is known about the complement of the molecular machinery that govern these processes in resident cells during skeletal development. A major drive in our laboratory has been to systemically decipher the membrane trafficking repository within the secretory and endocytic systems of skeletal cells with particular emphasis on osteoclasts. Osteoclasts are giant multinucleated cells of the monocyte-macrophage lineage whose exclusive function is the resorption of bone. Unlike other polarised cell types, osteoclasts boast a unique ensemble of membrane trafficking proteins that enables it to rapidly secrete protons and bone-digestive enzymes at its bone-apposed membrane interface while simultaneously internalising and expelling degraded bone matrix at its basolateral surface. To unravel the membrane trafficking network in osteoclasts we have employed a multidisciplinary approach, combining transcriptomics and high-resolution quantitative proteomics (iTRAQTM/LC-MS/MS) together with biochemistry and cell biology to identify core membrane trafficking constituents acquired upon osteoclast differentiation. This approach has unveiled several important regulators of the osteoclastic vesicular transport artillery including Rab proteins, their affiliated effectors and several cytoskeletal motors, each essential to the bone resorptive process. This seminar will provide recent advances in our understanding of the membrane trafficking machinery of osteoclasts and illustrate how principles discovered in brain can be applied to bone and skeletal disease.

About the Speaker :

Assoc. Prof. Nathan Pavlos completed his PhD (Cell Biology) at the University of Western Australia in 2005. He was a Visiting Researcher at the Department of Pathology, Washington University School of Medicine, St. Louis USA and carried out his post-doctoral training in the Department of Neurobiology at the Max-Planck-Institute for Biophysical Chemistry in Gottingen, Germany as a NHMRC CJ Martin (Biomedical) Research Fellow. He returned to UWA in 2010 and currently heads the Cellular Orthopaedic Laboratory within the Centre for Orthopaedic Research. His research interests include deciphering the membrane trafficking machinery of skeletal cells and their contribution to human disease with particular emphasis on bone-resorbing osteoclasts, which underpin several debilitating bone disorders such as osteoporosis, osteoarthritis and Paget's disease.

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