

Title: PRIMARY CILIA AS CELLULAR MECHANOSENSORS

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Date: 4 November 2009 (Wednesday)

Time: 11:00am – 12:00noon

Venue: Room 7-37, Haking Wong Building, HKU

The ability of non-specialized non-excitable cells to sense and respond to mechanical stimulation is central to proper physiologic function in a surprisingly wide range of cell types including endothelial cells, liver, lung and kidney epithelial cells, chondrocytes, neurons, and osteocytes. Cellular mechanosensation is critical in diseases responsible for enormous human suffering including atherosclerosis, osteoarthritis, cancer, and osteoporosis. Primary cilia are solitary linear cellular extensions that extend from the surface of virtually all cells. As a result, large local strains occur as they are deflected suggesting that they may act as a cellular strain concentrators. For decades, the biologic function of this enigmatic structure was elusive, however, recent data suggest that it functions as a complex nexus where both physical and chemical extracellular signals are sensed and coordinated responses initiated. For example, it is important in sensing the biochemical signals hedgehog (Hh), wntless, and platelet derived growth factor, as well as mechanosensing in the kidney and embryonic node. In our laboratory we have collected data that primary cilia act as molecular mechanical sensors in bone cells with both in vitro and in vivo models. Furthermore, we have found that the intracellular signaling pathway activated by primary cilia in bone is distinct from those observed in other tissues such as kidney. This suggests that the primary cilium has a rich potential to transduce many signals through multiple mechanisms and may undergo functional specialization as a function of tissue or cell type.

ALL INTERESTED ARE WELCOME

For further information, please contact Dr. Y. Lin at 2859 7955.