Institute of Molecular and Cell Biology
A*STAR

SEMINAR ANNOUNCEMENT

We would like to invite you to attend this seminar hosted by Prof. Wang Yue:

Date: 17 June 2014, Tuesday
Time: 10:00AM – 11:00AM
Venue: Level 3, IMCB Seminar Room 3-46, Proteos, Biopolis

Speaker: Dr. Basile Tarchini, Research Associate, Institut de Recherches Cliniques de Montreal (IRCM), Canada
Title: Apical membrane partitioning guides functional polarity in the inner ear

Hair cells in the cochlea transform sound-induced deflection of stereocilia protruding at their apical surface into electrical impulses relayed to the brain. Since only deflections along the cochlea medio-lateral axis efficiently modulate electric currents, a property known as functional polarity, development of hair cell planar polarity is essential for hearing. Planar polarization is observed at two levels: asymmetry of the cytoskeleton in each cell exemplified by the V-shaped stereocilia bundle, and 'planar cell polarity' (PCP) reflected in the uniform orientation of this structure across neighboring hair cells. While the latter requires core PCP signaling, the mechanism generating asymmetry in single cells remains unclear. We focused on an underappreciated region of the hair cell apical membrane that is uniquely devoid of protrusions during development. This 'bare zone' hosts the polarized localization of two scaffolding proteins, mInsc and LGN, as well as the Gαi subunit. These proteins collectively create and expand the bare zone while restraining the aPKC kinase to a complementary domain, partitioning the apical membrane to regulate cytoskeleton asymmetry. The interface between lateral mInsc/LGN/Gαi and medial aPKC notably defines the edge of the V-shaped stereocilia bundle. Interestingly, inactivating Gαi but not mInsc/LGN disrupts the uniform orientation of hair cells in the sensory epithelium in addition to cytoskeleton asymmetry in each cell. Therefore, binding between Gαi and LGN is a candidate mechanism to couple population and cell-intrinsic levels of planar polarity.

Biography:
During my doctoral training with Denis Duboule at the University of Geneva, Switzerland, I generated mouse lines with systematic gene deletions and duplications in the *HoxD* complex. This large mutant array allowed new insight into the mechanism of colinearity, the graded temporal and spatial transcriptional activation of contiguous *Hox* genes along developing body axes, and its patterning of the limb bud and the spinal cord. Aided by a fellowship from Human Frontiers, I joined Michel Cayouette at the 'Institut de recherches cliniques de Montréal' (IRCM), Canada for my post-doctoral studies. There, I contributed to the laboratory interest in temporal control of retinal neurogenesis, but also initiated more independent projects focused on sensory hair cells in the inner ear. This latter work showed that conserved proteins recognized to orient the mitotic spindle also regulate the acquisition of planar polarity in differentiating hair cell, and shape the stereocilia bundle responsible for sensory perception.

ALL ARE WELCOME *(No registration required)*