REGIONAL CENTRE FOR BIOTECHNOLOGY
RCB Seminar series

The Role of the Primary Cilia in Sensing Differentiation Cues and in Cerebellar Patterning- Insights from Targeted Mouse Mutants and Embryonic Stem Cell Models

Vasanta Subramanian, PhD, FSB
Department of Biology and Biochemistry,
University of Bath, Bath, United Kingdom

Thursday, April 24, 2014
2:30 PM
ATPC Seminar Room

Abstract

Primary cilia are cellular organelles (basal body + axoneme) involved in sensory and signal transduction. They are present in a large number of cell types in the body including the brain. Signalling by the Hh, Wnt and PDGF pathways are mediated through primary cilia. Defects in / or loss of primary cilia cause several different diseases collectively known as ciliopaties, as well as, lead to defective development and abnormal patterning such as looping of the heart and polydactyly. We are investigating the function of a basal body protein -talpid 3 in cellular reprogramming, differentiation and patterning of the brain.

Talpid3 was originally identified in chick in which a point mutation in this gene leads to defective limb development. We have generated a neuroectodermal specific conditional knockout of the mouse talpid 3 gene. These mice have cerebellar ataxia, hypoplastic cerebellum and defects in neuronal migration and proliferation. Human and mouse ESCs possess a primary cilium but it is unclear if the primary cilia of ES cells play a role in the regulation and coordination of differentiation and/or the maintenance of the undifferentiated state/self-renewal. In order to determine this, we have carried out reprogramming experiments on embryonic limb fibroblasts with a targeted deletion in the Talpid 3 (Ta3) gene lacking primary cilia and generated transgene free iPS cells and analysed their ability to undergo differentiation.

In my talk I will discuss the cerebellar phenotype and the results for our reprogramming experiments and effects on differentiation