MONASH University | ARMI AUSTRALIAN REGENERATIVE MEDICINE INSTITUTE

2016 EXTERNAL SPEAKER PROGRAM
Australian Regenerative Medicine Institute

Physical forces and signalling in vertebrate gut development

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Abstract

We have investigated the various signalling systems and physical forces that are involved in establishing the morphology of the vertebrate gut. In cross section, the mature gut consists of an endodermal layer, with projections known as villi extending into the lumen, surrounded by a series of distinct mesodermally derived muscle layers. We find that the muscle layers form sequentially in specific locations established through the dynamic integration of Shh and Bmp signalling. In contrast their orientation is dictated by physical forces within the gut stretching the tissue circumferentially in either a static (early) or pulsatile (late) manner. The villi of the chick gut are formed in a stepwise progression, wherein the mesenchyme and attached epithelium first fold into longitudinal ridges, then a zigzag pattern, and lastly individual villi. We find that these steps of epithelial folding depend on the sequential differentiation of the distinct smooth muscle layers of the gut, which restrict the expansion of the growing endoderm and mesenchyme, generating compressive stresses that lead to their buckling and folding.

Date: **15 December 2016**

Time: **12:00 noon – 1:00 pm**

Venue: **Lecture Theatre S12**
16 Rainforest Walk

Bio

Cliff Tabin received his A.B. in Physics from the University of Chicago in 1976. He obtained his Ph.D. in Biology from the Massachusetts Institute of Technology in 1984, working in the laboratory of Robert Weinberg. Dr. Tabin began his work in developmental biology during a brief postdoc in the laboratory of Doug Melton at Harvard University, before leaving a year later for a position as an independent Fellow, at Massachusetts General Hospital. There he began studying limb regeneration and limb development in an effort to bring modern molecular tools to classical embryological systems; work he continued when he joined the faculty of Harvard Medical School in 1989, where he currently serves as Chair of the Department of Genetics. The Tabin lab investigates genetic mechanisms at work during embryonic development to produce the exquisite morphology of the vertebrate embryo and over evolutionary time to generate the extraordinary and beautiful diversity of animal forms on this planet

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