



Life Sciences Seminar

Self-organization and symmetry breaking in intestinal organoid development

Prisca Liberali (FMI Basel)

Host: Edouard Hannezo

Intestinal organoids are complex three-dimensional structures that mimic cell type composition and tissue organization of the intestine by recapitulating the self-organizing capacity of cell populations derived from a single stem cell. Crucial in this process is a first symmetry-breaking event, in which only a fraction of identical cells in a symmetrical sphere differentiate into Paneth cells, which in turn generates the stem cell niche and leads to asymmetric structures such as crypts and villi. We here combine a quantitative imaging approach with single-cell gene expression to characterize the development of intestinal organoids from a single cell. We show that intestinal organoid development follows a regeneration process driven by transient Yap1 activation. Cell-to-cell variability in Yap1, emerging in symmetrical spheres, initiates a Notch/Dll1 lateral inhibition event driving the symmetry-breaking event and the formation of the first Paneth cell. Our findings reveal how single cells exposed to a uniform growth-promoting environment have the intrinsic ability to generate emergent, self-organized behavior resulting in the formation of complex multicellular asymmetric structures.

Tuesday, February 19, 2019 11:00am - 12:15pm
IST Austria Campus Mondi Seminar Room 3, Central Building



This invitation is valid as a ticket for the IST Shuttle from and to Heiligenstadt Station. Please find a schedule of the IST Shuttle on our webpage: http://ist.ac.at/fileadmin/user_upload/pdfs/IST_shuttle_bus.pdf The IST Shuttle bus is marked IST Shuttle (#142) and has the Institute Logo printed on the side.