Life Sciences Seminar

Regulation of epithelial cell specification and tissue integrity during embryogenesis

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Host: Carl-Philipp Heisenberg

Epithelium provides a physical barrier, which separates the internal environment from the external environment, and supports the structure of tissues and embryos. In the epithelial development, the regulation of epithelial cell specification and cell junction formation are crucial. We find that two uncharacterized genes, i) mab21-l3 which is one of the mab21 family members and ii) ERK3 which is an atypical mitogen-activated protein kinase, regulate epithelial cell specification and epithelial cell junction formation, respectively. i) Two specialized epithelial cells, multiciliated cells and ionocytes, are observed in the Xenopus epidermis. The multiciliated cells possess the hundreds of motile cilia and promote fluid flow through coordinated ciliary beating. Ionocytes are specialized for ion transport. During epidermal development, specification of multiciliated cells and ionocytes are commonly suppressed by the Notch pathway. However, multiciliated cells and ionocytes are governed by different master regulators, suggesting the existence of a regulator linking the Notch pathway to both multiciliate cells and ionocyte specification. We find that mab21-l3 represents the missing link. ii) Epithelial cell junctions are crucial for morphogenesis during embryonic development and maintenance of tissue architecture and integrity. A key transcription factor for epithelial-specific gene, TFAP2, directly up-regulates the cell adhesion molecule E-cadherin. However, the upstream signals of TFAP2 are largely unknown. We find that ERK3 acts upstream of TFAP2 and regulates the epithelial cell junction formation through TFAP2. Our results suggest that ERK3-TFAP2 axis acts as a new signal route for regulating epithelial cell junction.

Friday, June 30, 2017 11:00am - 12:00pm

Experimental Biology Room (I04.2OG - LAB)

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