Seminar/Talk

Mechanical control of tissue morphogenesis

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Host: Carl-Philipp Heisenberg

The sculpting of tissues into their functional morphologies requires a tight spatiotemporal control of their mechanics. While cell-generated mechanical forces power morphogenesis, the resulting tissue movements depend on the local tissue mechanical properties, such as its stiffness and viscosity, which govern the system's response to the internally generated forces. Despite their relevance, the role of mechanical forces and mechanical properties in development processes remains largely unknown, mainly because of a lack in methodologies enabling direct in vivo and in situ measurements of cell-generated forces and mechanical properties within developing 3D tissues and organs. In this talk, I will present two novel microdroplet-based techniques that we have recently developed to quantify local cellular forces and mechanical properties within developing 3D tissues. Using zebrafish as model system, I will show that cellular forces do not vary strongly in space and time, whereas spatiotemporal changes in supra-cellular (tissue level) forces and mechanical properties correlate with morphogenetic events and spatial variations in cellular movements. These results indicate that spatiotemporal changes in tissue mechanical properties (stiffness, fluidity, etc.), rather than just cellular forces, regulate the sculpting of embryonic tissues.

Monday, March 13, 2017 11:00am - 12:00pm
Experimental Biology Room (I04.2OG - LAB)

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