Summary
During development, cell fates are governed by multiple microenvironmental cues and their integration by specific signal transduction pathways. This course focuses on imaging of mechanosensory cilia or of molecules implicated in specific signal transduction events during mammalian embryogenesis.

Content
A theoretical introduction will summarize known roles of one of several specific signal transduction pathways in mammalian embryogenesis and their relevance for cancer and other diseases. Students will then transfect cultured cells and microdissect mouse embryos or organs under a stereomicroscope for live imaging of either cilia-induced signaling events or of a FRET-based biosensor of proteolytic activities. It is recommended to enquire in advance on which of these systems the course will focus on because this choice will be adapted to evolving research priorities at the time of the actual experiment.

The student will be enabled to:
- microdissect mouse embryos or tissues under a stereomicroscope
- prepare small tissue samples for whole mount imaging of RNA or protein expression and localization, and to design the necessary experimental and control groups
- explain known functions of mechanosensitive primary cilia or of localized proteolysis of specific growth factors or adhesion molecules in epithelial cell differentiation and polarization
- recognize limitations of available methods to study dynamic processes in mammalian development

Note
Note that while the course is open to all first and second year EPFL doctoral students, priority will be given to 1st & 2nd-year EDMS students, given that they are mandated to take three EDMS practicals modules. Note also that doctoral students from the Constam laboratory cannot take this course. Access is limited to 4 students. Takes place every year in January.

Keywords
Embryogenesis, cancer, proteases, TGFβ signaling, primary cilia, imaging

Learning Prerequisites

Recommended courses
Basics of molecular and cell biology.

Assessment methods
Quiz (multiple choice questions)

Resources
Websites
• http://constam-lab.epfl.ch/