## Seminar/Talk

# Mechanical forces in organ growth and regeneration

**Eckhard Lammert**
Heinrich-Heine-Universität Düsseldorf

Host: Carl-Philipp Heisenberg

The lymphatic vasculature is key for immunity and fluid transport within any given mammalian organism. We have previously shown that this vasculature grows in size whenever fluid accumulates within a tissue. The expanded lymphatic vasculature subsequently helps to drain the interstitial fluid and brings it back to the blood vasculature, thus providing edema within a tissue. beta1-integrin is required for sensing an increased fluid pressure and for trans-activating VEGFR3, which triggers proliferation of the lymphatic endothelial cells and growth of the lymphatic vasculature. We now show that integrin-linked kinase (ILK) acts as a gatekeeper to prevent too much lymphatic growth upon fluid accumulation. We also show that the small vessels of the liver, the only fully regenerating inner organ in mammals, behave similar to the lymphatic vessels in that they increase their VEGFR3 activation in a beta1-integrin dependent manner when mechanically stimulated in vitro and in vivo. We provide evidence that an increased blood flow through the liver activates this mechanotransduction pathway and triggers release of signals from the liver sinusoidal endothelial cells to drive hepatocyte proliferation and liver growth. This scenario helps to explain why the liver starts to regenerate and knows when to stop growing. Our studies were performed in embryonic and adult mice, using genetic and physiologic manipulations, and are supplemented with data from human cells and human individuals. They contribute to better understanding growth and regeneration of tissues in mammals and humans.

**Tuesday, September 5, 2017 10:00am - 11:00am**
Meeting room 2nd floor / Bertalanffy Bldg. (I04.2OG - LAB)

---

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.
Please find a schedule of the ISTA Shuttle on our webpage:
https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.