University of Zurich[UZH]

Institute for Regenerative Medicine (IREM)

Colloquium

Clinical Colloquium Regenerative Medicine

Monday, 1st April 2019 at 1–2pm,
Institute for Regenerative Medicine (IREM),
University of Zurich, Wagistrasse 12,
WAD-904 (Founders Lab), 8952 Schlieren

Dr. Andrea Banfi

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Therapeutic Angiogenesis – from Vascular Biology to Regenerative Medicine

Therapeutic angiogenesis, i.e. the generation of new vessels by delivery of specific factors, is required both for rapid vascularization of engineered tissues and to restore tissue function in ischemic conditions. Vascular Endothelial Growth Factor (VEGF) is the master regulator of angiogenesis, however clinical attempts at VEGF gene and protein therapy have been disappointing. Major challenges to fully exploit VEGF potency for therapy include the need to precisely control both the *in vivo* distribution of growth factor dose and the duration of expression. A key aspect of VEGF biology is that its therapeutic outcome depends on the amount in the microenvironment around each producing cell rather than on the total dose, since VEGF remains tightly bound to extracellular matrix and a few "hotspots" of high expression are sufficient to cause vascular tumors (angiomas) even if the total dose is rather low. On the other hand, short-term expression of less than about 4 weeks leads to unstable vessels, which promptly regress following cessation of the angiogenic stimulus.

Here I will present recent work aimed at: 1) translating fundamental principles of VEGF function into clinically applicable approaches to induce controlled angiogenesis, through the use of genetically modified progenitors or extracellular matrix engineering with recombinant factors; and 2) investigating the mechanisms that regulate the induction of physiological angiogenesis by VEGF *in vivo*, as well as their rapid stabilization and persistence. This knowledge can identify novel molecular targets to design safer and more effective strategies for therapeutic angiogenesis.

Organiser: Prof. Dr. Dr. Simon P. Hoerstrup / Prof. Dr. Roger M. Nitsch
Execution/Chair: Dr. Steffen M. Zeisberger / Dr. Christian Tackenberg
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