

## PhD position in Biomedicine – Mechanisms of Therapeutic Angiogenesis

We are seeking a highly motivated and enthusiastic PhD student to pursue a project in translational vascular biology funded by the Swiss National Science Foundation (SNF).

The group of Regenerative Angiogenesis aims at promoting vascular growth for tissue repair, combining expertise on vascular biology and mesenchymal progenitor cells. We focus on: 1) elucidating the basic mechanisms governing the growth of blood vessels under therapeutically relevant conditions, and 2) translating these concepts into rational regenerative medicine approaches, to restore blood flow in ischemia and to regenerate vascularized tissues, in particular bone. A core competence is the engineering of controlled signaling microenvironments by factor-decorated smart biomaterials.

Stimulation of blood vascular growth by therapeutic angiogenesis fills an important unmet clinical need for cardiovascular ischemic diseases and regenerative medicine approaches. However, the delivery of the angiogenic master regulator Vascular Endothelial Growth Factor (VEGF) requires careful control over the distribution of dose in tissues to avoid aberrant vascular growth, which is challenging to ensure clinically. Therefore, there is a clear need to better understand the molecular and cellular mechanisms regulating vascular growth by VEGF, in order to identify druggable targets for rational strategies ensuring both safety and efficacy.

The Candidate will use single-cell transcriptomics to comprehensively dissect the cellular and molecular mechanisms of normal vs aberrant angiogenesis in skeletal muscle under therapeutically relevant conditions of angiogenic factor delivery. She/he will take advantage of the unique expertise developed by the Banfi group. We employ a variety of platforms to deliver controlled levels and combinations of growth factors, such as genetically modified progenitors and state-of-the-art matrix-bound recombinant growth factors (bypassing the transfer of genetic material). We also have significant expertise in advanced quantitative microscopy and we are part of the Nikon Center of Excellence Microscopy Core Facility.

The group is embedded in the multi-disciplinary Department of Biomedicine of the University of Basel, in close collaboration with the clinical Department of Surgery, and provides a unique opportunity to develop bench-to-bedside projects. Integration in several European networks provides access to a wide range of innovative technologies.

The candidate should have a background in biology, medicine or biotechnology. Excellent communication skills, strong drive and self-motivation, a passion for research and ability to work in a team are required. Familiarity with or knowledge of bioinformatic tools for single-cell transcriptomic analyses is a definite plus.

Please send your CV, a motivation letter and names with e-mail addresses of referees/letters of reference to Dr. Andrea Banfi: [andrea.banfi@usb.ch](mailto:andrea.banfi@usb.ch)

*Application Deadline:* 15th April 2023

*Starting date:* As soon as mutually agreed from August 2023.

<https://biomedizin.unibas.ch/en/research/research-groups/banfi-lab/>

### Selected Publications

- 1) Grosso A. et al. VEGF dose controls the coupling of angiogenesis and osteogenesis in engineered bone. *NPJ Regen. Med.* (2023).
- 2) Di Maggio N. and Banfi A. The osteo-angiogenic Signaling Crosstalk for Bone Regeneration: Harmony out of Complexity. *Curr. Opin. Biotechnol.* (2022).
- 3) Gianni-Barrera R. et al. Therapeutic vascularization in regenerative medicine. *Stem Cells Transl Med* (2020).
- 4) Forget A. et al. Mechanically Defined Microenvironment Promotes Stabilization of Microvasculature, Which Correlates with the Enrichment of a Novel Piezo-1<sup>+</sup> Population of Circulating CD11b<sup>+</sup>/CD115<sup>+</sup> Monocytes. *Adv Mater.* 31:e1808050 (2019).
- 5) Groppa E. et al. EphrinB2/EphB4 signaling regulates non-sprouting angiogenesis by VEGF. *EMBO Rep.* e45054 (2018).