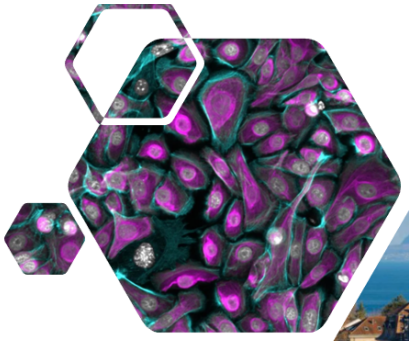
Université de Lausanne

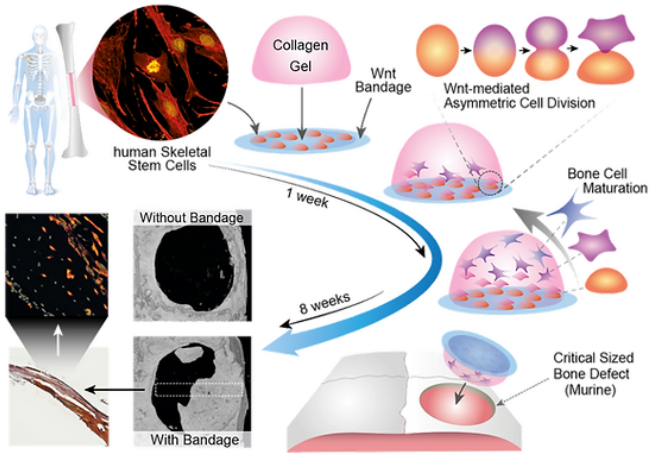


PhD position in Stem Cell Bioengineering

Are you interested in stem cells and regenerative medicine, and want to work in a diverse and multicultural lab at the heart of the Swiss Alps in the scenic city of Lausanne?

A PhD studentship position in tissue engineering is available in the Habib lab (www.habiblab.org) at the department of Biomedical Sciences at the University of Lausanne.

Large fractures represent a major cause of disabilities and result in enormous costs for health and social care systems. Wnt proteins regulate the function of many types of mammalian stem cells as well tissue patterning. The Habib lab have recently developed a novel Wnt-bandage that can maintain stem cells and induce a cascade of differentiation in 3D engineered scaffold; the Wnt-Induced Osteogenic Tissue Model (WIOTM). Wnt-bandage treatment doubles bone repair in critical-sized bone defects that cannot heal by themselves; the WIOTM-bandage triples bone repair. This work has resulted in a patent, interest from orthopaedic surgeons for clinical trials, over 107 news articles, and aired on CBS news. This project aims to apply novel chemistry and advanced materials to produce a second generation of the bandage that is more efficient and can improve the formation of the WIOTM and shorten the period of *in vivo* repair of critical size defects of bones of adult and old animals.



Our pipeline for skeletal stem cell technology and bone repair. The immobilised Wnt3a directs regeneration.

To do this, we aim to:

1) Developing the second-generation bandage using a novel chemistry and protein engineering. This bandage will increase the covalent binding of active molecules and will have the potential to further improve the healing.
2) Form the WIOTM on the novel Wnt-bandages and study the process of tissue patterning by advanced imaging techniques. We will utilise novel scaffolds with controllable stiffness to mimic the bone niche and improve the WIOTM formation.
3) Investigate the ability of the Wnt-bandage and the WIOTM-bandage to repair severe bone defect of in adult and old animals, where healing is even more compromised.

Overall, this project will provide the PhD student with a wide spectrum of expertise int biomaterials, protein biochemistry, stem cell biology, advanced imaging techniques, tissue engineering and regenerative medicine.