

**Towards Cartilage Regeneration:
Biomaterial-assisted Cell-free Approach in a
Physiological Joint-like Environment**

- 1 A key concept in regenerative medicine is the selection of a 3D hydrogel template that supports cell infiltration, differentiation and guide tissue remodeling. *(this thesis)*
- 2 The fine-tuning of a hydrogel's cross-linking density modulates the gradient concentration of the bioactive agents, foster cell homing and mechanical remodeling of the microenvironment. *(this thesis)*
- 3 Biomimetic fibrin-hyaluronic acid hydrogel allows good endogenous cell recruitment and provides an amenable microenvironment for cartilage repair. *(this thesis)*
- 4 Implementation of physiological joint-like mechanical stimuli to conventional osteochondral culture models is a necessary step of biomimicry to obtain a fully functional cartilage tissue. *(this thesis)*
- 5 Mechanically stimulated *ex vivo* osteochondral model is a pre-clinical screening tool for biomaterials and biomolecules, which offers a better understanding of endogenous mechanisms for focal defect repair. *(this thesis)*
- 6 The emerging field of regenerative medicine will one day revolutionize the way we perform surgery, transforming traditional surgical practice into personalized *in situ* additive manufacturing of precision biomaterials and advanced therapies.
- 7 It always seems impossible until it is done. *(Nelson Mandela)*
- 8 We cannot work better to explain the facts we know than by trying to discover new ones. *(Abraham Trembley, Memoirs, 1744)*
- 9 The global pandemic makes us discover we are all equal, fragile and in danger. Despite the progress of the knowledge of ourselves and the world, we are always animated by that special tension that urges us to find solutions and chances of salvation for every individual human being.
- 10 Nothing has such power to broaden the mind as the ability to investigate systematically and truly all that comes under thy observation in life. *(Marcus Aurelius)*
- 11 Look past the silk smooth chocolate, cowbells, yodeling, magic mountains and crisp air is all about an epic journey and sublime experience. *(L.P., Davos, Switzerland)*