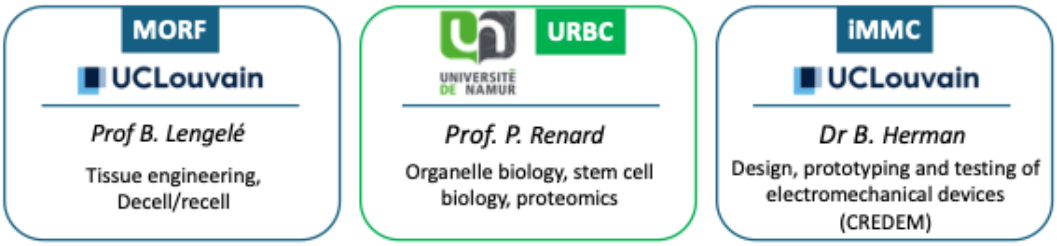

Concerted Research Action : Towards the biomanufacturing of allocompatible esophageal grafts: an experimental study on the porcine model

BioEso Project

Esophageal surgery is complex and currently still suffers from a major complication and mortality rate while the incidence of esophageal cancer increases in Europe. As an alternative to conventional surgery, the *BioEso project* aims to develop, in a porcine model, the regeneration of transplantable, functional and non-immunogenic composite esophagus.

For this purpose, we will follow the principle of decellularization of the organ, followed by recellularization with the appropriate cell type (decell/recell strategy). Preliminary results obtained revealed a novel and promising approach to esophageal decellularization. Further development will include defining the optimal decellularization conditions to best preserve the matrix, including intrinsic growth factors, and to optimize the preconditioning of this matrix prior to recellularization. On top of classical histological assessment of these steps, other approaches including proteomic analyses will allow an in-depth characterization of the matrix of the different layers of the esophagus. Then, the specific cocktails of autologous mesenchymal stromal cells and/or differentiated cells, with or without additional growth factors, will be used to seed the scaffolds. The cell-matrix interactions required for the functional recellularization of the organ will be first studied separately in the mucosal, submucosal and muscular compartments of the organ, after dissociation of the different layers of the esophageal tube by microdissection.

Finally, a 3D-composite tissue recellularization will be attempted, using various methods to explore. These steps will be accompanied by the optimization of a dynamic bi-compartmental bioreactor prototype able to reproduce the *in vivo* conditions of the esophagus (the deglutition). The role of biomechanical stimulation on the ECM remodeling and on the basic cellular in tissue regeneration will be also explored. The recellularized scaffold will then be vascularized by omentoplasty before grafting, to evaluate the functionalities of the grafted organ.

This project, aims in the long term to apply this innovative approach in selected clinical cases, knowing that our experimental setup is designed to be transposable to humans.

We are looking for two highly motivated biologists to contribute to this project. Selected candidates will be encouraged to seek external funding support; however, internal funding may be available to support the start of the PhD project for outstanding applicants.
For one candidate, based in UNamur, previous experience in cellular biology, stem cells and/or proteomics will be an advantage. For the second candidate, in co-tutelle between UCLouvain (MORF lab) and Unamur (URBC), previous experience in histology, IHC, advanced 3D imaging and characterization techniques will be an advantage.

Interested candidates should send a CV and contact information for two referees to P. Renard (patsy.renard@unamur.be) and B. Lengelé (benoit.lengele@uclouvain.be).