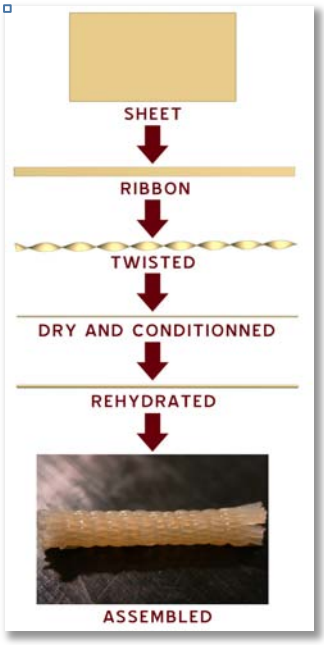
Laure Magnan, Ph.D student.
Thesis director: Nicolas L'Heureux

Research Interests:

Cardiovascular diseases constitute one of the leading causes of death or impair the quality of life for millions of individuals. For example, each year, cardiovascular diseases cause over 4 million deaths in Europe and 1.9 million deaths in the European Union. Current treatments for arterial diseases include bypass surgery, stent placement, anticoagulation, and changes in lifestyle. For these treatments, autologous veins and arteries are the preferred conduits but, because these patients typically suffer from chronic diseases, autologous vessels are often unavailable due to repeated procedures. When autologous vascular grafts are not available, polymer-based, such as expanded-polytetrafluoroethylene (ePTFE) or Dacron, synthetic vascular grafts are used clinically. However, the use of synthetic grafts is limited to large-diameter blood vessels replacements because their synthetic surfaces promote infection, fibrin deposition and thrombus formation which lead to failure in small-diameter grafts. Therefore, there is a critical clinical need for small diameter vascular grafts that have superior patency and ideally are available "off-the-shelf".

Cell-assembled matrix

To deal with graft failure with small-diameter vasculature, my thesis director has worked, for over 20 years on using the extracellular matrix produced by normal human cells in culture. This cell-assembled matrix (CAM) is a unique material that can have remarkable mechanical strength when produced in the right culture conditions. He has used this CAM to produce small-diameter, tissue-engineered blood vessels (TEBV) that display burst pressures similar to that of native human blood vessels, but without the need for any exogenous scaffolding such a synthetic polymers or animal/cadaveric tissues. To obtain



a TEBV, the CAM has to be wrapped around a tubular steel support and the different layers have to mature in a bioreactor. This process is time-consuming so we want to develop a new textile approach that aims at weaving thread of extracellular matrix to eliminate the lengthy maturation step. My project involves the production of devitalized CAM threads. Devitalization has the advantage of allowing simple and long-term storage and can reduce immune reactions after grafting. Then, I will weave these threads to generate a strong tube that can be used as a vascular graft.

Keywords/expertise:

- Human cell culture
- Tumor cell lines culture
- Fibroblasts
- Transfection
- Molecular biology
- Tissue-engineering
- Bioengineering
- Vascular graft
- Extracellular matrix
- Collagen
- Histology
- Immunofluorescence
- Electron microscopy
- Multiphoton microscopy
- Second generation harmonic
- Confocal microscopy
- Fluorescence *in situ* hybridization
- CGH-*array*

Education :

2015 – present : PhD student in Tissue Engineering Université Bordeaux, France
2013 – 2015 : Master in Genetics Université Bordeaux, France
2012 - 2013 : Licence in Cellular biology and genetics Université Rennes, France
2010 – 2012 : DUT in Biological and biochemical analysis Université Le Mans, Laval, France

Education:

Links:

Linkedin: https://www.linkedin.com/in/laure-magnan-0937ab86?trk=nav_responsive_tab_profile_pic

ReaserchGate: https://www.researchgate.net/profile/Laure_Magnan