

Project Title:

Contrast agents for micro-computed tomography (microCT) imaging of soft biological tissues and scaffold materials

Academic Supervisors:

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Project Description:

In tissue-engineering it is important to be able to monitor newly-forming tissue, and good imaging techniques are required to visualise this. One method, is the use of contrast agents to stain the scaffold material on which the new tissue will grow.

MicroCT is a valuable imaging technology for visualising structure, however objects of interest need to absorb x-rays in order to be seen. For many soft biological materials, including tissue-engineered scaffold materials, this is not the case. In this project, the goal is to investigate and develop contrast agents for visualising soft biological tissues (cartilage, ligament and tendon) and scaffold materials. Students may wish to investigate commercially-available contrast agents or develop their own agent.

Contrast agents must:

- allow visualisation and delineation of soft tissues & scaffold materials with microCT
- be biocompatible (cells and tissues)
- be easily introduced (injection, immersion) and rinsed out
- be synthesised in a highly-reproducible manner

Preference will be made for students possessing engineering, chemistry or materials science skills and a willingness to work with biological tissues.

Tasks

10% literature review & project planning

20% investigation of potential solutions

60% agent development and proof-of-concept work

10% report & presentation preparation

Suitable as either a year-long (two semester), a single semester project, or an international internship.

Keywords: contrast agent; tissue engineering; micro computed tomography

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