2015 Summer Research Projects
Orthopedics Institute of Soochow University
Suzhou, Jiangsu 215006, PR China

Project 1: Superelastic and conductive hydrogel for bone and heart tissue engineering

Contact: Prof. Lei Yang, leiy@suda.edu.cn
Openings: Max. 2 students

In this project, we will develop a novel superelastic and conductive hydrogel via green chemistry approaches and explore its promising properties and potential for bone and heart tissue regenerations. The first part of this project is designed to develop a new green fabrication method of the hydrogel based on carbohydrate molecules and to characterize its chemical, mechanical and electrical properties. The second part will move to biocompatibility and bioactivity evaluations on the hydrogel using osteoblasts (bone forming cells) and cardiomyocytes (heart muscle cells), with an emphasis on the hydrogel’s tissue regenerative abilities in vitro. The last part of the project will allow students to participate in animal studies on rabbit and/or rat. Students are expected to grasp knowledge and skills in wet-chemistry synthesis, material characterization, cell culture and assays, and experiences in animal study.

Project 2: Bioengineered scaffolds for promotion of spinal cord axon regeneration

Contact: Prof. Saijilafu, saijilafu@suda.edu.cn
Openings: Max. 2 students

Spinal cord injury (SCI) affects millions of people worldwide and causes the permanent loss of motor, sensory and autonomic function below the level of injury. Axon regeneration is essential for the restoration of neuronal connectivity and functional recovery after spinal cord injury. Unfortunately, the injured adult mammalian spinal cord displays little regenerative capacity and little functional recovery in large part due to a tissue hostile environment that is nonpermissive for regenerative axon growth. This project explores the potential of using artificial biodegradable scaffolds to provide a physical guide that allows regenerative axon growth that bridges the lesion cavity and restores functional neural connectivity. By integrating different strategies, including the use of various biomaterials and microstructures as well as incorporation of bioactive molecules and living cells, combined or synergistic effects for spinal cord repair through regenerative axon growth may be achieved.