Titolo (provvisorio): Validation of a novel technology of drug delivery based on fluidic and electromagnetic stimuli for cardiovascular applications

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Motivazione e campo di applicazione

Alternative drug delivery systems for the treatment of cardiovascular diseases are currently under intense investigation. Nanomedicine is at the forefront in this field and promising approaches have been recently designed towards the achievement of electromagnetic guiding systems for a targeted release of therapeutic drugs to the heart.

Obiettivi generali e principali attività

The goal of this work is to evaluate the interaction of drug-loaded superparamagnetic nanoparticles with engineered capillary systems. In particular a 3D printed device mimicking the capillary system will be developed and functionalized with collagen and endothelial cells. The passage of the nanoparticles (stimulated and not by an external magnetic field) from the fluid circulating in the capillaries to the engineered walls will be assessed. The student will contribute to the realization of the device and its biological functionalization. The work will be constituted by a major experimental part (optical microscopy, fluorescence confocal microscopy) and consequent images post-production and data analysis (ImageJ).

Obiettivi di apprendimento (strumenti tecnici e analitici, metodologie sperimentali)

The goals of this thesis are

• Optical microscopy
• Fluorescence confocal microscopy
• Cell culture
• Hydrogel processing
• Image analysis
• 3D printing

Luogo/i in cui si svolgerà il lavoro: CNR – Consiglio Nazionale delle Ricerche, istituto IEIIT, UNIGE

Informazioni aggiuntive

Abilità e capacità richieste: Self-contained, interest in experimental work; initiative and curiosity.

Numero massimo di studenti: 1