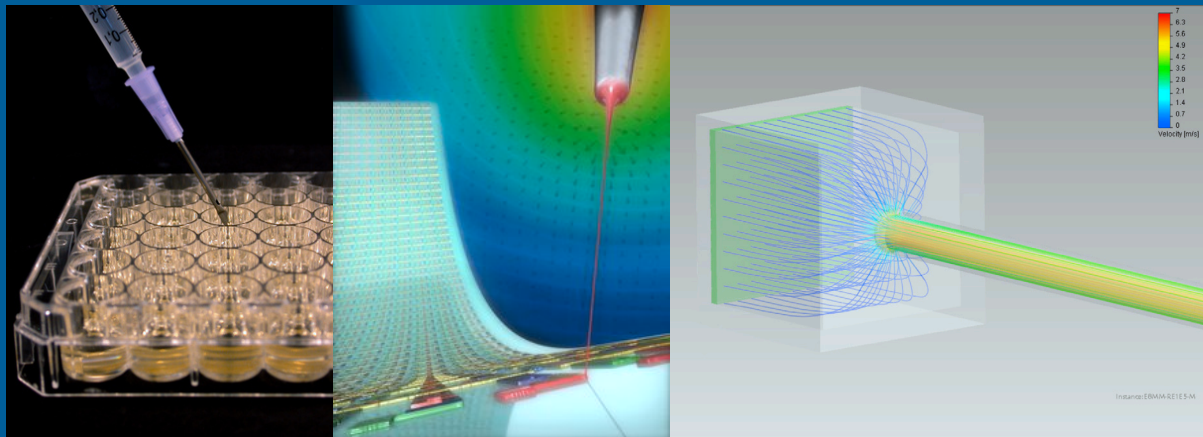


STUDENT RESEARCH PROJECT



Injection of bioactive microspheres is a powerful tool in tissue engineering. This project is aimed at optimizing a specific device in this field.

Injection of a suspension of microspheres through a syringe – A computational study

Master Project

Bioactive microspheres are commonly used in tissue engineering as carriers for the delivery of drugs or proteins in many different tissues. Injection of a suspension of these carriers allows targeting a small area in the tissue of interest. The fluid phase has to be minimized in order not to be harmful to the targeted tissue. Additionally shear stress during injection should not damage the microspheres and what they carry.

The goal of the project is to develop a parametric model of the geometry of the syringe and the suspension (bi-phase) and run fluid-dynamic simulations of the injection aimed at optimizing the system. The optimization requires the minimization of the shear stress on the particles, the diameter of the needle and the ratio fluid/particles.

A first experimental characterisation of the suspension is required in order to obtain parameters necessary for the computational study.

Previous knowledge of fluid-dynamics simulation software (Fluent) and good knowledge of English are strongly recommended.

20% experimental work, 80% computational work.

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