Supervisor:
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Affiliation: Laboratoire PECSA - UMR 7195 Université Pierre et Marie Curie
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Candidate: Bachelor's / Master's degree in microfluidics and material science with experience/interest in mammalian cell culture.

Project description :

Cancer invasiveness and metastasis is still a mystery. With growing cancer incidence the need of understanding tumor cell migration in its complex microenvironment provide an important impact for cancer therapy. Fibroblasts play a key role in the malignant progression of cancer and are therefore an important target for cancer therapies. The development of miniaturized 3D *in vitro* models for the investigation of cancer cell migration could contribute to a better understanding of the fibroblast role and therefore the development of new anticancer agents.
At the LCMD we developed a method to produce millimeter-sized spherical core-shell structures using biopolymers as the shell material named "liquid pearls". In cooperation with the Institut Curie we already use the liquid pearls for tumor spheroid production. This method is planned to be adapted and combined with specific developed microfluidic PDMS gradient devices which enable the investigation of cancer migration through an extracellular membrane (EM) after the breakthrough of the primary solid tumor through the basal membrane.
The aim of the master project is to modify and optimize the existing PDMS gradient device in terms of

1. Stable, longterm gradients using fluoroprobes and fluorolabelled chemoattractants,
2. Characterization of the gradients and determination of diffusion coefficients,
3. Spheroid placement in the collagen channels and
4. First cell migration studies.

In this work an interface between material science, biophysics and microfluidic has to be established and a strong interest working in an interdisciplinary field is a requirement. We are searching for ambitious students which like to work interdisciplinary within an international group with a strong interest in cancer research field. This six months project will take place in the LCMD laboratory at ESPCI under supervisory control of Dr Anette Funfak and Pr. Jérôme Bibette.