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excellent research groups to host the fellows



Nanobioengineering group

Group leader: Josep Samitier (jsamitier@ibecbarcelona.eu)

Microfluidic cancer-on-a-chip platform: personalizing cancer treatment using microfluidic devices

One of the main problems in clinical oncology is to assign the right therapy to every cancer patient since in most cases there are no good predictive biomarkers. The research project consists in developing novel microfluidic cell-based assays to test anticancer treatments directly in cells isolated from patient biopsies in order to improve personalized cancer treatment. For this purpose we will combine the expertise of Prof. Samitier in microfluidic devices' development (Caballero et al., Lab Chip 2017,) with Dr. Montero's in functional cell-based assays and translational cancer research (Montero et al., Cell 2015).

To be able to develop drugs that specifically target the pathophysiology of an individual patient, we need more knowledge about the molecular and cellular mechanisms of tumor development and metastasis, and about the interaction between cancer cells and the body's immune system. This requires in-vitro human model systems of cancer. The tumor microenvironment is known to play an influential role in the angiogenic and metastatic progression of cancer and is regulated by several factors (stromal fibroblasts, extracellular matrix (ECM) proteins and endothelial cells) present in the complex milieu.

To address this challenge, a microfluidic oncomimetic platform will be defined, where cancer cells are co-cultured with a complex intricate vascular network. We further investigated the effect of migration of cancer cells into surrounding vasculature and the ability of standard cancer drugs to perfuse through the vasculature and target cancer cells.

Job position description

We are seeking a strong motivated PhD student to closely work in the interface of basic research with clinical application to find new treatments for different types of cancer.

This PhD position is co-supervised by Dr. Joan Montero (jmontero@ibecbarcelona.eu)

The Nanobioengineering group is a truly multidisciplinary team composed by researchers coming from very diverse backgrounds working together in applying micro & nanotechnology for the development of new biomedical systems and devices, mainly for diagnostic purposes, and integrated microfluidic Organ-on-Chip devices for the study of organ physiology, disease etiology, or drug screening.

The goal is to fabricate microsystems containing living cells that recapitulate tissue and organ level functions in vitro and new portable diagnosis devices that can be used as Point-of-Care systems. The projects carried out by the group are focused on clinical and industrial problems.