IBEC International PhD Programme Fellowships

IBEC Institute for Bioengineering of Catalonia

EXCELENCIA SEVERO OCHOA

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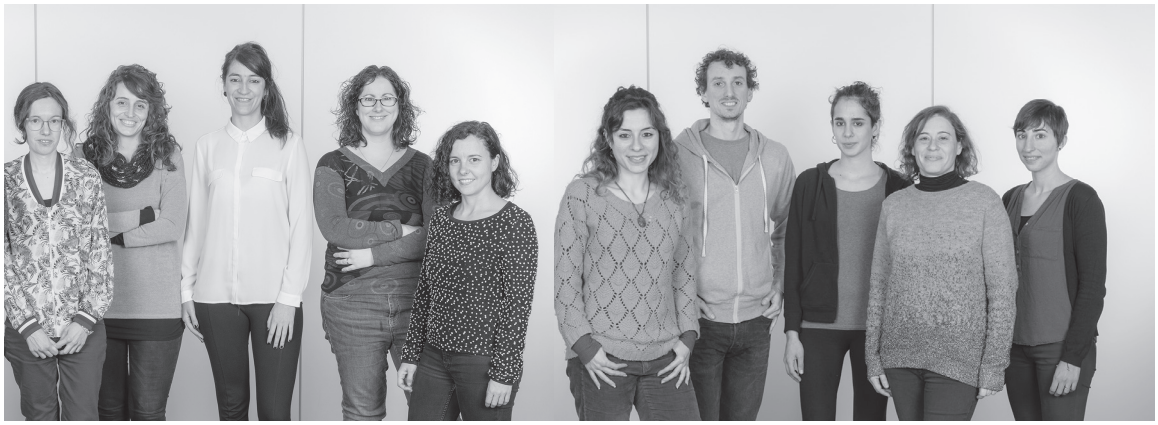
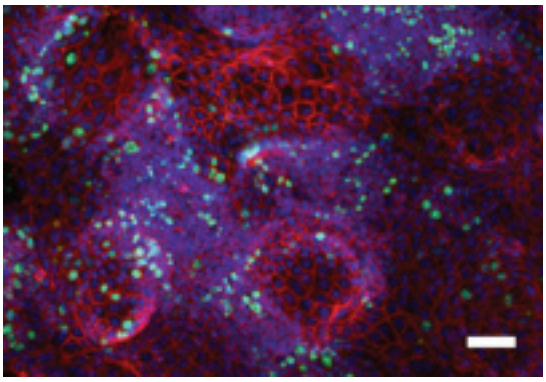


Biomimetic systems for cell engineering

Group leader: Elena Martínez

Engineering of a 3D Organotypic model of Intestinal Mucosa for Cancer Research

Although cancer research has mainly focused on tumor cell intrinsic factors, recently it has been shown that tumor microenvironment plays a significant role in cancer progression. The goal of this interdisciplinary project is to engineer a novel 3D organotypic *in vitro* colorectal cancer model, where both the tumorous tissue and the tumor microenvironment are represented. We envision to take advantage of a technology we are currently developing in our lab to establish 3D intestinal epithelial tissue models that mimic biochemical, mechanical and structural characteristics found *in vivo*. This experimental setup will be adapted to incorporate essential elements of the tumor microenvironment such as the tumor associated immune system and fibroblasts, which have been demonstrated to play a key role in both preventing and promoting the development of cancer. Our approach will lead to an up-to-date non-existent multicellular organotypic model of the intestinal mucosa, which we believe will have a wide-ranging potential as a tool for basic research as well as health and disease modelling.



Hydrogel scaffolds seeded with mouse intestinal stem cells and grown with intestinal subepithelial myofibroblasts conditioned medium. Proliferative cells are shown in green, actin in red and cell nuclei in blue. Scale bar: 50 µm.