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Research Project Proposal
Academic year 2020-2021

Máster en Investigación Biomédica

Project Nº 24
Title: *Understanding Tumor Initiation using 3D organoid models, microfluidics and advanced three-dimensional microscopy*
Department/ Laboratory *Laboratory of Preclinical Models and Analysis Tools. Solid Tumors and Biomarkers Program. Center for Applied Medical Research (CIMA).*
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Summary

Lung cancer is the leading cause of cancer death for both men and women, reaching up to a 25% of all cancer deaths worldwide. New clinically relevant models are urgently needed to understand lung cancer progression and improve the prognosis of the disease.

In this regard, recent advances in microfluidic engineering and 3D organoid cultures have opened up new opportunities for cancer modelling, overcoming the fundamental limitations of traditional 2D *in vitro* cultures and animal models.

The goal of this project is to develop new lung cancer models by integrating 3D organoids into microfluidic devices to investigate the role of the cellular microenvironment in the initial stages of tumor formation.

The successful candidate will culture lung cancer organoids into 3-dimensional hydrogels and implant them in our previously developed microfluidic devices, creating biomimetic models of the tumor microenvironment conditions.

The development of the organoids will be monitored *in vivo* using fully automated light microscopy techniques to visualize the interaction of the cancer organoids with the ECM. Viability and the phenotypic changes arising at the different stages of the tumour organoid development will be investigated by fluorescence microscopy using commercially available fluorescent markers and quantified using advanced image analysis tools.

This work will contribute towards building better lung cancer models that can be of major importance for drug discovery and translational medicine.

yes		**Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator?**
no	x	