Universidad de Navarra

Facultad de Ciencias

MÁSTER EN INVESTIGACIÓN BIOMÉDICA
Research Project Proposal
Academic year 2022-2023

Project Nº 21
Title: Validation of a Microfluidic device for CTCs sorting based on dielectrophoresis forces
Department/ Laboratory Laboratorio de Modelos Preclínicos y Herramientas de Análisis. Programa de Tumores Sólidos. CIMA
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Summary

Cancer is the second cause of death after cardiovascular disease, being the metastatic spread responsible for 90% of cancer-related deaths. Several studies point at circulating tumor cells in the bloodstream (CTCs) as responsible for the metastatic cascade. Isolated CTCs could become an alternative to tissue biopsy for cancer diagnosis and prognosis as the number and the molecular profile of isolated CTCs could be used for patient stratification and personalized treatment. This approach would be even more interesting in tumor types for which there are no effective early screening methods available.

The goal of this project is to contribute to the development and validation of a dielectrophoretic-based microfluidic device for the detection and isolation of CTCs in blood of liver cancer patients.

The successful candidate will contribute to the optimization of the microfluidic device. Concretelly:

i) The candidate will help with the characterization of the dielectric phenotype of cancer cells and the rest of cell types of the blood;

ii) The candidate will operate the microfluidic device using blood samples from cancer patients, and will analyze the results by fluorescence microscopy, flow cytometry and low-content RNA or DNA sequencing of the isolated CTCs. In this context, the candidate will also work on the development of a micro-dissection protocol of the CTCs from the final sample that may contribute to improving the sequencing performance.

This work will contribute towards building an optimized microfluidic device for CTC isolation that can contribute to developing an integrated platform for cancer early detection, patient stratification, and personal treatment definition.

yes	
no	X

Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator?