Universidad de Navarra

Facultad de Ciencias

MÁSTER EN INVESTIGACIÓN BIOMÉDICA
Research Project Proposal
Academic year 2025-2026

Project Nº 06
Title: *Exploring the human peripheral nerve tumor microenvironment using pluripotent stem cell models*
Department/ Laboratory *Institute of Oncology Research (IOR), Faculty of Biomedical Sciences, Università della Svizzera Italiana, Switzerland.*
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Summary

This project aims to establish a human pluripotent stem cell (hPSC)-derived model of the peripheral nerve tumor microenvironment to study tumor-microenvironment interactions in Neurofibromatosis type 1 (NF1) and type 2 (NF2). We will generate key cellular components of the microenvironment, including peripheral neurons, Schwann cells, fibroblasts, and immune cells (macrophages and mast cells), using hPSC differentiation protocols. NF1 and NF2 tumor models will be developed using the CRISPR/Cas9-technology.

The goal is to recreate a complex, fully human tumor microenvironment *in vitro* to explore how different cell types interact, adapt, and contribute to tumor progression (for example to MPNST) and aggressiveness. We will analyze cellular crosstalk, microenvironmental remodeling, and mechanisms of tumor adaptation. Methodologies will include pluripotent stem cell differentiations, genome editing, 3D co-culture systems, immunofluorescence imaging, flow cytometry/FACS, transcriptomics, and functional assays to assess tumor-microenvironment interactions. Moreover, we aim to also compare our models with relevant patient samples.

This model will provide insights into the dynamic interactions between tumor cells and their microenvironment, offering a platform for future therapeutic exploration targeting the human nerve tumor niche.

yes	
no	X

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