Universidad de Navarra

Facultad de Ciencias

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

Project Nº 38

Title: *Study of aberrant hematopoiesis in human induced pluripotent stem cell-derived models*

Department/ Laboratory *Laboratory where the project will be carried out indicating Department, Area, Faculty, CUN, CIMA etc.*
Myeloid Neoplasia laboratory, Hematology-Oncology Program, CIMA

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Summary Short summary of the project with a maximum extension of 250 words, including the goals and the methodology that will be used.
Myelodysplastic syndromes (MDS) are hematopoietic stem cell (HSC) cancers that lead to inefficient blood cell production (hematopoiesis) and that have very poor survival rates owing to the very limited treatment options available. A better characterization of the HSC-specific mechanisms leading to altered hematopoiesis is urgently required for the identification of novel therapeutic strategies for patients with MDS.
One of the main limitations in MDS research is the lack of good study models that allow the identification and validation of therapeutic targets. Induced pluripotent stem cells (iPSCs), which can be differentiated into HSCs and their progeny, have emerged as promising tools for the mechanistic study of hematopoiesis and as a platform of great interest for drug screening and validation of therapeutic targets in hematologic malignancies, such as MDS.
MDS are sustained by HSCs in distinct differentiation states, which are associated with specific genetic profiles and determine the cells' oncogenic dependencies and drug sensitivity. In this project, we will genetically edit an iPSC line to harbor pathogenic mutations associated with a specific MDS HSC state (granulomonocytic precursor) in order to model granulomonocytic-biased hematopoietic trajectories. Edited iPSCs will be differentiated into HSCs and progenitor cells and the resulting hematopoietic trajectories will be analyzed by multiparameter flow cytometry and RNA sequencing to identify the mechanisms leading to hematopoietic rewiring in MDS and cellular processes susceptible of therapeutic manipulation.

yes	
no	X

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