Universidad de Navarra
Facultad de Ciencias

MASTER'S DEGREE IN BIOMEDICAL RESEARCH
Research Project Proposal
Academic year 2024-2025

Project Nº 17

Title: "Deciphering the cellular complexity of the human bone marrow microenvironment and its involvement in aging and pathogenesis of multiple myeloma"

Department/ Laboratory

Hemato-oncology department, Translational hematology, bone marrow niche area (Felipe Prósper lab), CIMA-UNAV

Director 1
ISABEL CALVO ARNEDO
Contact: *icalvoa@unav.es*

Summary

Understanding aging and its relationship with cancer remains an unmet medical need. Hematological malignancies such as multiple myeloma (MM) are age-related pathologies. MM is a type of bone marrow (BM) cancer, in which there is an abnormal proliferation of the plasma cells (PC) (a type of white blood cells) of the BM. Despite important advances in the treatment of patients diagnosed with this disease, most patients ultimately relapse, and the disease is still considered incurable. The tumor formation and progression processes are influenced by the malignant cells and the mesenchymal components (microenvironment) and the interconnectedness between them. The hematopoietic stem cell niche presents an opportunity to study physiology at the tissue level in aging and neoplasia. Therefore, we propose **to define the heterogeneity of the healthy and malignant microenvironment components to identify possible therapeutic targets for treating this pathology.** Thanks to the use of the last-generation single-cell multi-omics approach, spatial transcriptomics, and new sophisticated computational tools, we will characterize (Aims 1 and 2) and functionally validate (aim 3) not only the cellular heterogeneity of BM microenvironment cells (aim 1) but also the anatomical position of these cells and the tumor-tissue interactions (aim 2) that may constitute vulnerabilities with preventive/curative potential for a nowadays-fatal disease.

Our work will provide the framework to define preventive and therapeutic strategies aimed at reducing age-associated morbidities, including cancer, adding quality of life, and ultimately contributing to alleviating pressures on health and social systems in our society.

yes	
no	X

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