Universidad de Navarra
Facultad de Ciencias

MASTER'S DEGREE IN BIOMEDICAL RESEARCH
Research Project Proposal
Academic year 2023-2024

Project Nº 05

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

Department/ Laboratory
Oncohematology department, 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 (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 process of tumor formation and progression is not only influenced by the malignant cells, but also by the mesenchymal components (microenvironment) and 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 the treatment of this pathology.** Thanks to the use of the last-generation single-cell multi-omics approach 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 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.*

Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator? NO