Universidad de Navarra
Facultad de Ciencias

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

**Project Nº 05**

**Title:** Transcriptomic (RNAseq and microRNAseq) and proteomic analysis of circulating Extracellular vesicles (liquid biopsy) for novel biomarker and therapeutic target discovery in vascular pathologies and diabetes.

**Department/ Laboratory**
Laboratory of Atherothrombosis. Program of Cardiovascular Diseases. Cima Universidad de Navarra

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**Summary**

In this project we address two highly prevalent medical conditions, peripheral arterial disease (PAD) and diabetes, which are expected to increase considerably with the aging of the population, becoming a serious health and social problem in the future. Although both pathologies are associated with an elevated CV risk and mortality independently, in combination they result in accelerated vascular deterioration with a 2-3 times higher risk of amputation and mortality compared to patients with PAD without diabetes. To find novel therapeutic targets and diagnostic and prognostic biomarkers (personalized medicine), we will study the molecular profile of circulating extracellular vesicles (EVs) in PAD patients with/without diabetes. EVs are small lipid bilayer spheres that are released into the bloodstream by most cells types and contain nucleic acids, lipids and proteins from the cells of origin, reflecting their activation state. To achieve our objective, the mRNA, microRNA and protein content of blood EVs (liquid biopsy) will be analyzed by means of adapted -Omic techniques. Data obtained by sequencing and proteomics will be integrated using bioinformatics tools to obtain protein and RNA interaction networks, as well as their regulation by microRNAs. The functionality of these networks will be studied in cultured endothelial cells after glucose stimulation, and the expression of the most important components of these pathways will be analyzed in aorta and kidney tissues of diabetic mice. One of the studied proteins will be determined in blood to evaluate its association with poor prognosis in the complete cohort of PAD patients (n=168 PAD, n=196 PAD with diabetes).

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|---|---|
| yes | |
| no | X |

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

In vivo samples are already available in our lab, although if students are interested in completing their training for animal manipulator we offer also that possibility.