



**MÁSTER EN INVESTIGACIÓN BIOMÉDICA**

**Research Project Proposal**

Academic year 2026-2027

**Project Nº 55**

**Title:** *Cardio-oncologic prophylaxis with novel natural compounds tested in 3D engineered cardiac tissues*

**Department/ Laboratory** *Cardiac Tissue Engineering, Biomedical Engineering Program, Lab 101, Cima Universidad de Navarra*

**Director 1** *Manuel M. Mazo Vega*

**Contact:** *mmazoveg@unav.es*

**Codirector:** *Daniel Plano Amatrian*

**Contact:** *dplano@unav.es*

**Summary**

Cardio-oncology deals with cardiovascular side effects of anti-cancer treatment, as they are a major concern for patients and the healthcare system. These can be acute or chronic, and appear even year after the termination of the treatment. Doxorubicin is the paradigmatic molecule, with first reports of increased cardiovascular events appearing over 20 years ago. These now have started to affect other treatments such as BTKis, bispecific antibodies or CAR-T cells. A common feature is however an increased reactive oxygen species (ROS) production, triggering multiple adverse events (such as inflammation or fibrosis). Concomitantly, the lack of adequate testing platforms truly representative of human cardiac tissue has seldom been applied in this field. In this work we will use human 3D engineered tissues to investigate the capacity of newly synthesized compounds based of Selenium and natural anti-oxidants to prevent the appearance of side effects. Firstly, the novel compounds will be characterized for their safety and efficacy by interfacing with human induced pluripotent stem cell-derived cardiomyocytes and cardiac fibroblasts. Once this is determined, we will administer them to 3D printed mini-cardiac tissues built with the above cells and melt electrowritten scaffolds (Sánchez-Bueno A, et al, JOVE 2025). The mini-tissues will be exposed to Doxorubicin in clinically-relevant doses, and their metabolic activity (alamar blue), cellular survival (Live/dead staining), function (dynamics of contraction, beating rate), gene expression (RT-qPCR) and structure (confocal IF) will be assess to determine the capacity of the new compounds to prevent cardiac damage.

yes	
no	x

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