Universidad de Navarra
Facultad de Ciencias

MÁSTER EN INVESTIGACIÓN BIOMÉDICA
Research Project Proposal
Academic year 2026-2027

Project Nº 12

Title: Co-culture Approaches to Study Human Stem Cell Competitiveness

Department/ Laboratory
CIMA TECHNOLOGICAL INNOVATION DIVISION
Biomedical Engineering Program
"In Vivo Organ Generation by Stem Cells" lab

Director 1 Xabier Aranguren
Contact: *xlaranguren@unav.es*
Codirector: Giulia Coppiello
Contact: *gcoppiello@unav.es*

Summary The generation of human organs within animal hosts represents a promising strategy for producing transplantable organs. However, a major limitation of this approach is the low capacity of human induced pluripotent stem cells (iPSCs) to efficiently integrate in the host embryo and coordinate with the endogenous cells. To date, there are no robust strategies that enable high levels of human-interspecies cellular integration.

In this Master's thesis project, we propose to use an in vitro co-culture system combining human iPSCs with mouse embryonic stem cells (ESCs) to test different approaches aimed at enhancing human cells survival. These strategies will include: (i) accelerating the proliferation rate of human cells, (ii) promoting human-mouse cell–cell adhesion to improve cellular interactions, and/or (iii) genetically modifying human cells to confer a competitive survival advantage within the co-culture environment.

The student will gain hands-on experience and training in:

- Human and mouse stem cells culture techniques
- Imaging analysis, including fluorescence and confocal microscopy
- Flow cytometry (FACS) analysis for cell quantification
- Production of lentiviral vectors and transduction of cells

This project will provide multidisciplinary training in stem cell biology, genetic engineering, and advanced cell analysis techniques, within a cutting-edge research area in regenerative medicine.

yes	
no	X

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