Research Project Proposal
Academic year 2020-2021
Máster en Investigación Biomédica

Project Nº 09

Title: *Assessment and prevention of chemotherapic-related cardiotoxicity using cell reprogramming and tissue engineering*

Department/ Laboratory *Tissue Engineering Unit, Laboratory 1.01, Regenerative Medicine Program, Cima Universidad de Navarra*

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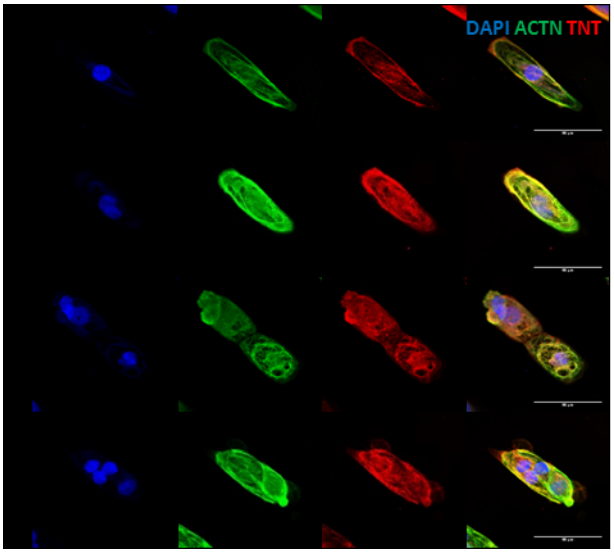
Summary

Cardiac complications constitute a severe burden for anti-cancer therapy, putting patients at risk even after successful anti-neoplasic treatment has been achieved. Moreover, the appearance of unexpected cardiotoxic events severely hinders the development, approval and marketing of novel therapeutics. With the blame on currently implemented testing systems, the fabrication of a simple, efficient and reliable tool allowing the prediction of cardiac side effects in the development/testing stage and the early detection of cardiotoxicity in a clinical setting, would significantly improve both the generation of new therapeutics and the clinical management of patients.



The aim of the present project is to evaluate the use of human pluripotent stem cell (hiPSC)-derived cells for the evaluation of cardiotoxicity. To do this, the candidate will employ 3 platforms: conventionally-cultures hiPSC-derived cells (on plastic surfaces), human cardiac engineered microtissues (in biomaterials) and human microfluidic-based platforms (on micropatterned surfaces). The toxicity of different compounds will be assayed and compared, as well as their effect on gene expression and cellular structure. A protection regime will be assayed and the best platform determined. Finally, serological samples from patients undergoing anti-cancer therapy will be evaluated.

All in all, the candidate will acquire the following expertise:

- Human induced pluripotent stem cell biology.
- hiPSC-derived cardiomyocyte differentiation, isolation and culture.
- Cardiac microtissue generation, including the use of biomaterials.
- Microchip fabrication.
- Cardiotoxicity evaluation across these systems, using classic techniques (Alamar blue, Live/dead staining), as well as imaging.
- Gene expression (RT-qPCR) and basic immunofluorescence imaging.

yes		**Does the project include the possibility of supervised animal manipulation to omplete the training for animal manipulator?**
no	**x**	