



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

Project Nº 16

Title: Advanced hydrogels for the delivery of CAR-T therapies in solid tumors

Department/ Laboratory

Group Bioengineering in Regeneration and Cancer (https://cipitrialab.com)
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Summary

Breast cancer has a high incidence and global mortality and therefore represents an urgent medical need. Current therapies consist of chemotherapy, radiotherapy, and targeted therapies only for some tumor subtypes. Chimeric antigen receptor-based cell therapies (CAR-T) have been shown to be effective in the treatment of hematological tumors resulting in their regulatory approval. In the case of solid tumors, there are barriers that limit the use of CAR-T therapies, including the difficulty of the cells in penetrating the malignant tissue and toxicity resulting from the release of pro-inflammatory cytokines as a result of the high number of cells transferred to the patient.

In the framework of a collaborative project with a multidisciplinary team from Biodonostia HRI, UPV/EHU, and CIC bioGUNE, our overall objective is the development of new technologies that allow the prolonged time release of CAR-T cells, favoring their access to the malignant tissue and limiting the toxicity associated with high levels of cytokines. Our vision is the development of new technologies in advanced therapies that can be transferred to the industrial tissue and the patient.

Specific objectives of this project consist of:

- Synthesis, fabrication and characterization of 3D hydrogels
- Encapsulation of CAR-T cells together with immunostimulatory cytokines
- Characterization of the cytotoxic effect on tumor cells through in vitro assays
- Optional: Characterization of the cytotoxic effect on breast tumors in vivo in collaboration with the Breast Cancer group at Biodonostia HRI (depending on progress of project until Spring 2024)

Table with 2 columns and 2 rows: yes, maybe, no, (empty)

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