Research Project Proposal
Academic year 2018-2019

This form must be filled in ENGLISH

Project Nº 18

Title: *Enhancing the efficacy of CAR T-cell Therapy for the treatment of solid tumors.*

Department/ Laboratory *Program of Immunology and Immunotherapy (CIMA)*

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Summary

A new immunotherapy for cancer is the chimeric antigen receptor (CAR) T cell therapy. In this approach, immune cells are removed from a patient, armed with new proteins that allow them to recognize cancer, and given back to the patient in large numbers. These cells persist in the body, becoming "living drugs." CAR T cell therapy represents a revolutionary treatment for B-cells malignancies. However, attempts to recapitulate the success achieved with CAR T cells in haematological malignancies for solid tumors have been disappointing. Among the hurdles encountered for the application of CAR T cell therapies to solid tumors are the heterogeneity of solid tumors: solid tumors can evade CAR T cell therapy because not all tumor cells express the molecule recognized by the CAR. In this project we propose to re-arm the CAR T cells with a new tool that makes them more effective. Briefly, these re-armed CAR T cells, while destroying tumor cells, will turn the tumor into a vaccine, amplifying the immune response against the tumor and promoting the killing of even those tumor cells that cannot be directly attacked by the CAR T cells

For that purpose the following partial objectives are proposed:
- Construction and production of a retroviral vector able to express a Chimeric Antigen receptor (CAR) able to recognize tumor cells
- Engineering T-cell lines to express the CAR
- Testing expression and functionality of the CAR redirected T cell in vitro.
- Testing the antitumoral activity of CAR T-cells in tumor animal models

The project will involve the use of many different techniques, including Molecular Biology, cell culture, virus production, analysis of protein expression by flow cytometry, immunological techniques, animal models of cancer, monitorization of immune responses etc.

yes	**x**
no	

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