Universidad de Navarra
Facultad de Ciencias

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

Project Nº 42

Title: *Development of a new mRNA delivery system for cancer gene therapy based on viral particles*

Department/ Laboratory
Gene Therapy and Regulation of Gene Expression Program. CIMA. *Laboratory 4.06* .

Director 1: *Cristian Smerdou Picazo*
Contact: csmerdou@unav.es

Summary:

In our laboratory we have previously demonstrated significant antitumor effects when using a self-amplifying RNA viral vector based on Semliki Forest virus (SFV). In particular, we have used SFV vectors to express immunostimulatory cytokines, like interleukin-12, or antibodies against immune checkpoints, like PD-L1. In this vectors RNA replication in tumor cells leads to interferon responses and apoptosis, limiting the duration of expression. In the present project we aim to evaluate the antitumor potential of SFV vectors by generating viral particles that will package non-replicative mRNAs.

For that purpose, the following partial objectives are proposed:

- Construction of plasmids to transcribe in vitro mRNAs to be encapsidated into SFV viral particles, coding for reporter genes and immunostimulatory genes

- Testing expression and functionality of the recombinant proteins expressed by these viral particles *in vitro*

- Testing the antitumor activity of these vectors in an animal model of cancer comparing them with vectors delivering self-amplifying RNAs expressing the same transgenes

The project will involve the use of many different techniques, including molecular biology, cell culture, virus production, analysis of protein expression, immunological techniques, animal models of cancer etc.

Note: There is the possibility of performing a PhD thesis after the TFM provided a fellowship is obtained (minimun score required in universty studies: 2 in the scale 1-4)

yes	X
no	

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