Universidad de Navarra
Facultad de Ciencias

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

Project Nº 06

Title: Generating self-amplifying RNA vectors with regulated expression

Department/ Laboratory *Laboratory of Cancer Gene Therapy , Program of RNA Biology and Therapy, Division of DNA and RNA Medicine, CIMA*

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Summary

In our laboratory we have extensively worked with a self-amplifying RNA vector based on Semliki Forest virus (SFV). This vector has shown remarkable antitumor properties when used to express immunostimulatory molecules, such as cytokines or antibodies against immune checkpoints. The vector has been shown to express recombinant proteins in vivo for several days, which in the case of immunostimulatory molecules could lead to toxicity.

In this project we propose to generate vectors in which transgene expression can be modulated by a small drug, in such a way that expression could be stopped in case of toxicity and reactivated when needed.

For that purpose, the following partial objectives are proposed:

- Construction of SFV vectors containing different genes, such as luciferase (as reporter gene), an immunocytokine, and a monodomain antibody (nanobody), fused to a destabilizing domain which can be “stabilized” by binding to a small drug (inducer) that can be provided in vitro or in vivo.

- Testing these new RNA vectors in cell culture, analyzing their expression in the presence and absence of the inducer.

- Testing the regulation of expression of these vectors in an animal model of cancer in which the inducer will be provided or not with drinking water.

The project will involve the use of many different techniques, including molecular biology, RNA synthesis, cell culture, virus production, analysis of protein expression, imaging techniques, 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?