



**Research Project Proposal**  
Academic year 2021-2022  
**Máster en Investigación Biomédica**

**Project Nº 43**

Title: Biotechnological modification of RNA levels for anticancer RNA vaccines

Department/ Laboratory Laboratory where the project will be carried out indicating Department, Area, Faculty, CUN, CIMA etc.  
Departments of Immunology and Immunotherapy and Gene Therapy (CIMA)

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Summary:

SARSs-CoV-2 pandemic has served as a worldwide demonstration of the safety and efficacy of RNA vaccines. The moment has come to expand and improve this technology and develop novel anti-tumor RNA vaccines for the benefit of cancer patients. Such vaccines should contain a lipid nanoparticle embracing an mRNA that encodes for tumor specific antigens.

During the last years key experiments have allowed to set up successful mRNA synthesis protocols and to find proper mRNA modifications that modulate immune activation in dendritic cells while enabling expression of antigens. However, in the case of tumors, several additional sequences could still be implemented to increase antigen expression and determine whether this results in an increased anticancer immune response. To this aim, the master student will introduce several sequences affecting intracellular RNA levels, RNA stability, immunity and translatability. The effect of such sequences will be evaluated with reporter genes to identify those that increase expression levels. Then, the different candidates will be evaluated in animal models to quantify their immunogenicity and their efficacy as anticancer vaccines. The results obtained in this project will be combined with the outcomes of other efforts carried out in the department to identify novel cancer-specific epitopes with the final goal of developing novel therapies for the treatment of hepatocellular carcinoma.

yes	<input checked="" type="checkbox"/>	Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator?
no	<input type="checkbox"/>	