



Universidad
de Navarra

Facultad de Ciencias

MÁSTER EN INVESTIGACIÓN BIOMÉDICA

Research Project Proposal

Academic year 2025-2026

Project Nº					
Title: <i>Empowering Immunotherapy: RNA Aptamers Against Metastatic and Resistant Tumors</i>					
Department/ Laboratory <i>Therapeutic Innovation, RNA Aptamer Therapeutics, CIMA</i>					
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<p>Summary Despite remarkable advances in cancer immunotherapy, a significant proportion of patients still fail to respond or eventually relapse. There is an urgent clinical need for innovative strategies that can enhance the efficacy and durability of immune-based treatments.. In our lab, we are developing a cutting-edge RNA aptamer platform designed to precisely modulate the immune system and unleash powerful antitumor responses. Aptamers are small, single-stranded RNA molecules that act as high-affinity ligands, capable of targeting specific cell populations with extraordinary precision. Importantly, they can also deliver therapeutic RNA cargos, including immune-stimulatory molecules, directly into tumor or immune cells.</p> <p>In this project, we will harness this platform to target one of the most challenging cell populations in oncology: metastatic and therapy-resistant tumor cells. Using in vivo SELEX (Systematic Evolution of Ligands by Exponential Enrichment), we will identify RNA aptamers that selectively home to metastatic tumors in murine models, following strategies we previously validated (Maite Solá et al., Molecular Therapy - Nucleic Acids, 2020). High-throughput sequencing (HTS) and advanced bioinformatics pipelines will be used to track aptamer enrichment, guide selection, and identify top candidates.</p> <p>The most promising aptamers will be validated using state-of-the-art biophysical and cellular assays to assess binding affinity, specificity, and biodistribution. These optimized aptamers will then be functionalized with immunomodulatory RNA cargos to boost antigen presentation and enhance the effectiveness of immune checkpoint inhibitors (anti-PD-(L)1, anti-CTLA-4), paving the way for next-generation combination immunotherapies.</p>					
<table border="1"><tr><td>yes</td><td>x</td></tr><tr><td>no</td><td></td></tr></table>	yes	x	no		
yes	x				
no					
Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator?					