Universidad de Navarra

Facultad de Ciencias

MÁSTER EN INVESTIGACIÓN BIOMÉDICA

Research Project Proposal

Academic year 2025-2026

Project Nº 27
Title: ***Design of nanoparticles as adjuvants for vaccination***
Department/ Laboratory Pharmaceutical sciences, UNAV
Director 1 *: Socorro Espuelas* **Contact:**: *sespuelas@unav.es*
Summary Nanotechnology provides an excellent platform for the development of the new generation of vaccines. These are based on purified subunit proteins or polysaccharides, recombinant proteins, synthetic peptides, or nucleic acids. These types of vaccines may be insufficiently immunogenic, thus requiring adjuvants that augment their immunogenicity. As an example, lipid nanoparticles enabled the success of COVID mRNA vaccines. These nanoparticles (nanoadjuvants) can find application for the prevention and treatment of infections, cancer and autoimmune diseases. The candidate will be enrolled in the optimization and characterization of novel nanoadjuvants based on the combination between PRR agonists and novel innate signaling pathways addressed to generate long-life and protective immune responses. The project involves training in methods for nanoparticles preparation, analysis of their physicochemical properties (size, surface, stability) and finally their immunological characterization: *in vitro* and *in vivo* immunological effects (mice models) by flow cytometry (cellular bias, cytokines), and analysis transcriptomic and metabolomic signatures.

yes	X
no	

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