MÁSTER EN INVESTIGACIÓN BIOMÉDICA
Research Project Proposal
Academic year 2022-2023

Project Nº 10
Title: Reprograming *Leishmania* permissive macrophages with nanoparticles
Department/ Laboratory *Tropical Health Institute* *Chemistry and Pharmaceutical Technology Department*
Director 1 *Mª Socorro Espuelas Millán* **Contact:** *sespuelas@unav.es*

Summary

Our awareness of infectious diseases has recently been heightened by the current outbreak of coronavirus. The crisis is unprecedented and devastating. Yet, another crisis, this time provoked by microorganism resistant to existing antibiotics, or 'superbugs', is looming nearby. Antimicrobials, long revered as the miracle drugs, are rapidly losing effectiveness. The use of nanoparticles (NP) have risen to tackle this problem by multiple mechanisms. In a first category, NP may act as carriers of antimicrobials, overcome cellular barriers and deliver the antimicrobials more effectively to intracellular microorganisms. In the second category, nanomaterials confer entirely new mechanisms that kill pathogens without using drugs. In a third category, nanomaterials can modulate immune system to fight itself against the pathogens. In any case, NP may enhance the drug efficacy at lower concentrations and decrease the risk of emerging resistance by reducing overall drug exposure.

The aim of this work is the preparation and optimization of NP to combat the intracellular parasite *Leishmania spp*, responsible of the one of the most important Neglected Tropical Diseases. *Leishmania spp.* harbors specifically the macrophages and polarize them towards M2-phenotype to survive inside them. Nanoparticles will be designed for specific targeting of macrophages (via Dectin receptor) and their polarization from M2 to M1 phenotype.

The development of the project will involve training in nanoparticles preparation procedures, conjugation chemistry, cell cultures, leishmaniasis mice models, PCR and flow cytometry.

yes	X
no	

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