

## PhD Thesis Project Offer

*(valid during the calendar year 2025)*

### Provisional Title of the Doctoral Thesis

Precision Nanomedicine: Therapeutic Nanosystems Targeting TDP-43 Aggregation in Amyotrophic Lateral Sclerosis (ALS) and Frontotemporal Dementia (FTD)

### Subject area\* / Research line

Sciences / Experimental Sciences

### Summary of the Doctoral Thesis (maximum 300 words)

Neurodegenerative diseases affect millions of people worldwide and are becoming increasingly prevalent due to the aging population. These conditions are among the leading causes of disability in older adults and impose a significant economic and social burden. Within this group, Amyotrophic Lateral Sclerosis (ALS) affects approximately 2 out of every 100,000 people per year, with a high incidence in individuals over the age of 50, while Frontotemporal Dementia (FTD) is one of the main causes of dementia in individuals under 65. Recent research shows a notable increase in resources allocated to understanding and combating these diseases, which entail substantial social and economic costs. In this context, nanomedicine has emerged as a key strategy for developing more efficient and sustainable treatments, with the potential to revolutionize therapeutic approaches to neurodegenerative diseases such as ALS and FTD by improving the specificity and efficacy of interventions. This discipline enables the creation of nanosystems capable of crossing complex biological barriers and delivering drugs more effectively to the central nervous system. Therefore, the main objective of this doctoral thesis will be to design, characterize, and validate innovative therapeutic nanomaterials for the delivery of drugs targeting the TDP-43 protein, which is implicated in the pathogenesis of ALS and FTD. The research will focus on the physicochemical properties, stability, biocompatibility, and efficacy of these nanosystems through in vitro biological studies, which will provide essential insights to enhance treatment strategies and deepen our understanding of how nanomedicine—and specifically the use of these novel nanomaterials—can contribute to the treatment of these diseases.

**Is the development of this thesis associated with the execution of any research project? If so, provide details of the project (title, funding entity, and execution period)**

**Title:** ROS-Generating Agents Based on Multifunctional Nanostructured Materials for Environmental and Therapeutic Applications (ROS-FUN)

**Start Date:** 01/09/2023

**End Date:** 31/08/2026

**Funding Agency:** Spanish State Research Agency (AGENCIA ESTATAL DE INVESTIGACIÓN)

**External Reference:** PID2022-136417NB-I00

**Internal Reference:** M3214

**Academic Profile of the Student (maximum 200 words)**

Bachelor's Degree in Chemistry or Experimental Sciences, with a Master's degree preferably in a field related to nanomaterials, medicinal chemistry, or biological chemistry.

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\*See the Subject Areas at <https://www.urjc.es/informacion-practica#oferta-proyectos-de-tesis>.  
Each project will be included in a single subject area.