



MÁSTER EN INVESTIGACIÓN BIOMÉDICA
Research Project Proposal
Academic year 2026-2027

Project Nº 47

Title: *Immunomodulatory Effects of Radiotherapy in Pediatric Brain Tumors*

Department/ Laboratory

CIMA/ Solid Tumors Department / Radioimmunotherapy for pediatric tumors

Director 1 *Sara Labiano*

Contact: *slalminana@unav.es*

Summary

Radiotherapy is a cornerstone in the treatment of pediatric brain tumors due to its dual role: directly inducing tumor cell death and modulating the tumor microenvironment, including the activation of immune responses. However, therapeutic outcomes vary significantly depending on factors such as tumor anatomical location and the specific irradiation regimen applied. Tumors of the central nervous system in children, particularly diffuse midline gliomas, are associated with poor prognosis and limited responsiveness to current standard therapies, underscoring the urgent need to better understand the biological mechanisms underlying treatment responses. This master's thesis aims to investigate how radiotherapy influences immune responses in preclinical models of pediatric brain tumors, with particular attention to the role of tumor location and radiation schemes. Both in vitro and in vivo models will be employed to provide a comprehensive analysis of these effects. The study will focus on evaluating immune cell infiltration and activation, including key populations such as microglia, macrophages, and lymphocytes, as well as profiling the expression of inflammatory mediators following different radiotherapy regimens, including single-dose and fractionated approaches. Additionally, the project will explore how the anatomical context of the tumor, such as cortical versus brainstem locations, shapes the immune landscape and response to irradiation. A combination of molecular biology techniques, flow cytometry, and imaging approaches will be used to generate an integrated view of these processes. Ultimately, this work seeks to identify differential immune patterns associated with radiotherapy variables, providing insights that may guide the optimization of combined radiotherapy and immunotherapy strategies for pediatric brain tumors.

yes	X
no	

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