Universidad de Navarra
Facultad de Ciencias

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

Project Nº 26

Title: *Identification and validation of novel radiosensitizers as boosters in immunotherapy*

Department/ Laboratory
Program in *Solid Tumors. Lab of Adhesion and Metastasis 2.07 (CIMA).*

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Summary
We investigate molecular mechanisms driving resistance to genotoxic and oxidative stress induced by radiotherapy in triple-negative breast cancer (TNBC). Using an in-house tissue microarray of paired human tumor samples obtained at diagnosis and after radiotherapy, we identified a transcriptomic program associated with enhanced treatment resistance. Through gain- and loss-of-function approaches, we have validated several key mediators that confer an increased capacity to tolerate genotoxic insults. While many of these factors regulate oxidative stress responses and mitochondrial homeostasis to promote cell-intrinsic radioresistance, they also intersect with immunosuppressive pathways that impair tumor immune surveillance. The molecular links between stress resistance and immune evasion remain ill defined.

This project employs a multipronged strategy relying on cutting-edge technologies including the use of immunophenotyping, spatial transcriptomics, RNA-seq and single cell RNA-seq, lentiviral transduction systems, bioinformatic and computational tools and molecular pathway dissection to:

a) Define novel mechanisms by which selected candidate genes suppress antitumor immunity.
b) Evaluate additive or synergistic effects of these candidates using available genetic and pharmacologic tools.
c) Exploit these mechanisms therapeutically by testing combinatorial immunotherapy approaches in syngeneic TNBC models.
The work aims to elucidate actionable targets that bridge radiotherapy resistance and immune escape, informing future combinatorial treatment strategies for TNBC.

References
1. B. Ruiz. (…) **F. Lecanda**. Cancer Discovery (2022)
2. B. Ruiz (…) **F. Lecanda**. Clinical Cancer Res (2023)
2. B. Ruiz (…) **F. Lecanda**. Signal Transduction and Targeted Therapy (2025)

yes	X
no	

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