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

Project Nº 29	
Title: *Finding genetic susceptibilities to overcome radioresistance in cancer*	
Department/ Laboratory *Tumor evasion and new targets lab (2.04), Solid Tumors Program (CIMA)*	
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Summary

Radiotherapy (RT) has been used as cancer treatment for over a century and now is one of the most common treatments used in virtually all cancer types. However, RT is limited by the radioresistance of cancer cells and by normal tissue toxicity. There is still a big knowledge gap in both cell-autonomous and cell-extrinsic effects of irradiation in the context of the tumor microenvironment. In the lab are investigating tumor radio-resistance mechanisms using orthogonal approaches such as functional genomics, transcriptomics and proteomics. We have performed a CRISPR-based in vivo screen to uncover resistance mechanisms using a preclinical model for melanoma. This approach allows us to identify novel therapeutic strategies that could be used in combination with RT. Given the important contribution of the immune system to the therapeutic benefits of irradiation, we have identified potential resistance mechanism in both immune-dependent and -independent fashion. The proposed work aims at the validation of some candidate genes that can mediate resistance to irradiation and the study of the mechanisms of action of radioresistance.

GOALS:

- *To generate KO tumor cell lines for candidate genes using CRISPR/Cas9 gene editing technology.*
- *To functionally validate the effects of genetic deletion of candidate genes in the context of irradiation in vitro and in vivo*

METHODOLOGY

The candidate will learn standard techniques for in vitro and in vivo work such as: cell culture, manipulation of recombinant DNA for CRISPR/Cas9 gene editing, western blot, multiparametric flow cytometry , in vivo tumor models, etc.

yes	X
no	

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