Universidad de Navarra
Facultad de Ciencias

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

Project Nº 07

Title: Cell-Type Specific Functions of SIRT2: Impact of Astrocytic Deletion on Brain Function and Metabolic Regulation

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Summary

Sirtuin 2 (SIRT2) is a NAD^+-dependent deacetylase involved in numerous cellular processes, including metabolism, cytoskeletal dynamics, and the regulation of inflammation. Despite its broad expression in the brain, its specific role appears to be highly cell-type dependent, making it essential to elucidate its function in distinct populations such as astrocytes.

This project aims to evaluate the role of SIRT2 in astrocytes and its impact on behavior, metabolism, and neuroinflammation. To achieve this, transgenic mice with astrocyte-specific deletion of SIRT2 will be used. These animals will be divided into two dietary conditions: a control diet and a high-fat diet, allowing the assessment of potential interactions between SIRT2 function and metabolic stress.

A series of behavioral tests will be conducted to evaluate depressive-like and anxiety-like behaviors, as well as cognitive performance, particularly memory. In parallel, metabolic status will be assessed through glucose tolerance tests (GTT) and insulin tolerance tests (ITT), providing insight into systemic metabolic alterations associated with SIRT2 deficiency in astrocytes.

Following the experimental period, animals will be sacrificed and perfused. Their brains will be collected, sectioned using a microtome, and processed for immunohistochemical analyses. These analyses will focus on astrocyte morphology, as well as markers of neuronal activity and neuroinflammation, enabling a comprehensive characterization of cellular and molecular changes.

Overall, this study combines genetic, behavioral, metabolic, and histological approaches to elucidate the functional role of SIRT2 in astrocytes under normal and high-fat diet conditions. The findings are expected to contribute to a better understanding of how astrocytic SIRT2 influences brain function and its potential involvement in neuropsychiatric and metabolic disorders.

yes	X
no	

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