



MÁSTER EN INVESTIGACIÓN BIOMÉDICA

Research Project Proposal

Academic year 2026-2027

Project Nº 54

Title: Investigation of PLA2G4E Function in Lipid Raft Organization and Synaptic Signaling

Department/ Laboratory

Therapeutic genes for neurodegenerative diseases Lab; Gene Therapy for Neurological Disease Program, Lab 2.06, CIMA.

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Summary

Neuronal communication relies on the precise organization of the plasma membrane, where lipid rafts act as highly dynamic microdomains essential for receptor localization, signal transduction, and synaptic stability. Increasing evidence indicates that disruption of lipid raft composition contributes to synaptic dysfunction and cognitive decline in neurodegenerative disorders such as Alzheimer's disease. However, the molecular mechanisms regulating these membrane domains remain incompletely understood.

PLA2G4E is a phospholipase involved in membrane lipid remodeling whose role in the central nervous system has only recently begun to emerge. Preliminary findings from our group revealed that PLA2G4E deficiency induces synaptic alterations and dendritic spine loss, suggesting a critical role in maintaining neuronal membrane integrity. These observations highlight PLA2G4E as a potential regulator of lipid raft organization and synaptic signaling.

This project aims to investigate how PLA2G4E modulates neuronal lipid rafts and associated synaptic pathways using different mouse models. By combining lipid raft isolation with biochemical analysis and Western blot evaluation of synaptic and raft-associated proteins, this work will explore how changes in PLA2G4E expression affect membrane organization and synaptic function. Overall, the project seeks to provide new insights into the relationship between lipid metabolism, membrane dynamics, and neurodegeneration, potentially identifying novel mechanisms involved in early synaptic failure in Alzheimer's disease.

yes	x
no	

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