Universidad de Navarra

Facultad de Ciencias

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

Project Nº 62

Title: *Characterization of NOX5 overexpression on human glomerular cells*

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Summary

Diabetic nephropathy (DN) remains the leading cause of end-stage renal disease worldwide, with type 1 diabetes mellitus (T1DM) patients bearing a disproportionate burden of progressive glomerular damage. Despite current standard-of-care interventions, a substantial proportion of patients experience renal function decline, highlighting the need for mechanistically informed therapeutic strategies.

The oxidative stress axis, and specifically NADPH oxidase-derived reactive oxygen species (ROS), has emerged as a central pathogenic driver of glomerular injury, yet the precise contribution of NOX5 to glomerular cell dysfunction in the T1DM context remains poorly defined. NOX5 is the only calcium-regulated, endothelium-enriched isoform and is absent in rodents.

This project aims to investigate the functional impact of NOX5-derived ROS on glomerular endothelial cells (GECs) under T1DM conditions, to identify NOX5 as a potential therapeutic target in DN. Using a lentiviral NOX5 overexpression model in primary human GECs, the project will integrate A) the transcriptomic profiling (RNA-seq) of NOX5-overexpressing versus control GECs to identify dysregulated pathways; B) validation at the mRNA (RT-qPCR) and protein level (western blot) of relevant molecules and pathways; C) phenotypic characterization including transwell-based permeability and migration assays to functionally link molecular alterations to endothelial barrier dysfunction.

yes	X
no	

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