Universidad de Navarra
Facultad de Ciencias

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

Project Nº 15

Title: Development of a gene therapy treatment for Wilson's Disease targeting both the hepatic and neurological pathology.

Department/ Laboratory *Laboratorio terapias Avanzadas enfermedades hepaticas raras. División médicina de DNA y RNA. CIMA. Universidad de Navarra.*

Director 1 *Oihana Murillo*
Contact: *omurillo@unav.es*
Codirector: *Gloria Gonzalez Aseguinolaza*
Contact: *ggasegui@unav.es*

Summary

Wilson disease (WD) is an autosomal recessive disorder caused by mutations in the ATP7B gene. It characterized by ceruloplasmin deficiency and copper accumulation due to defective biliary excretion. This results in progressive copper overload, primarily affecting the liver and brain, and leading to tissue damage driven largely by oxidative stress. Wilson Disease (WD) has long been considered a primary hepatic disorder with multiorgan manifestations. However, increasing evidence suggests that WD is truly a multisystemic disease. Previously, we developed an adeno-associated viral vector (rAAV) for the treatment of WD based on the expression of the missing ATP7B protein specifically in the liver. While this treatment significantly reduced hepatic copper accumulation and normalized liver pathology, it failed to normalize copper levels in the brain.

Recently, we developed a novel rAAV vector capable of highly efficient ATP7B expression in both hepatocytes and neurons. The objective of this Master's project is to evaluate the therapeutic efficacy of this dual-targeting vector and to explore whether protein expression is also required in other CNS cells, such as microglia.

This work will involve: DNA cloning techniques, AAV vector production, Animal handling and treatment, Evaluation of biochemical and histological parameters across various organs, with a primary focus on the liver and brain.

yes	X
no	

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