Universidad de Navarra
Facultad de Ciencias

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

Project Nº 05

Title: *Pigmentation of dopaminergic neurons in long-lived rodents*

Department/ Laboratory *Laboratory of Gene Therapy for Parkinson's disease (lab 2.07 Cima)*

Director 1 *José Luis Lanciego*
Contact: *jlanciego@unav.es*

Summary

The substantia nigra pars compacta (SNpc) is made of dopaminergic neurons showing a time-dependent accumulation of neuromelanin (NMel), a black pigment resulting from the non-enzymatic oxidation of dopamine (Fedorow et al., 2005). Primates (human and non-human) are the only animal species that exhibit NMel pigmentation (Marsden, 1961), whereas the most commonly used laboratory experimental specimens (e.g. mice and rats), lack pigmentation, and for unknown reasons (Esser et al., 2025). However, the viral-mediated enhancement of tyrosinase in mice resulted in an ongoing pigmentation of dopaminergic neurons, supporting the view that these neurons retain the molecular machinery required to accumulate NMel (Chocarro et al., 2026). Accordingly, here we sought to investigate the reasons why rodents lack NMel. Our working hypothesis posits that the lack of pigmentation in the SNpc of rodents results from their short lifespan. To address this intriguing question, here we will analyze the potential pigmentation patterns of SNpc neurons in the brains of two different species of naked mole rats (*Heterocephalus glaber* and *Fukomys mechowii*), two rodentia of the bathyergidae family with a lifespan of up to 25 years of age. Brains from these specimens, sacrificed at different ages, will be obtained from our collaborators in the Czech Republic, to be further analyzed here with several histochemical and immunohistochemical stains in an attempt to characterize their pigmentation patterns. In summary, the goal of this study is to evaluate whether the long lifespan that typically characterizes naked mole rats allows these animals to accumulate NMel in dopaminergic neurons.

yes	
no	X

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