Research Project Proposal
Academic year 2021-2022

Máster en Investigación Biomédica

Project Nº 07

Title: Multimodal study of preclinical synaptic changes in Parkinson's disease

Department/ Laboratory
Neuroscience Department, CIMA

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Summary

We seek a motivated and enthusiastic student with a strong interest in the brain and neuroscience to perform a research project in our multidisciplinary team at CIMA-Universidad de Navarra.

The biggest challenge in Parkinson's disease (PD) is to detect neuronal degeneration before motor manifestations. The synapse is the most active neuronal compartment and synaptic failure could be the first step in the degeneration of dopaminergic cells. Alpha-synuclein (a-syn) is most abundant at the presynaptic level where its aggregation is a key factor for the synaptic failure counting for abnormal synaptic plasticity and reduced neurotransmitter release Our aim is to study the temporal sequence of the earliest functional and structural events in the cortex in a rat model of progressive parkinsonism induced by overexpression of human α-synuclein (hα-syn) with A53T mutation (rAAV-hα-syn) .

We seek to study mitochondrial respiration, ATP reduction and Long Term Potentiation (LTP) in cortical synaptosomes and ultrastructural changes .

Specifically, the candidate will perform the study of *in vivo* synaptic alterations in the dendritic spines of the prefrontal cortex by multiphoton microscopy related to behavioral and cognitive disorders. The last goal is focused on developing new therapeutic approaches aimed at restoring this synaptic failure.

Methodology: Behavioural animal test (motor and cognitive), immunohistochemistry, immunofluorescence and cutting-edge techniques such as flow cytometry, proteomics, and confocal/multiphoton microscopy.

yes	**X**
no	

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