Research Project Proposal  
Academic year 2015-2016

**Project Nº 18 * ASIGNADO**

**Title:** Alpha synuclein-dependent mechanisms of neurodegeneration.

**Department/ Laboratory** *Cellular Neurobiology laboratory (2.05), Neurosciences Department-CIMA*

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**Summary**

Abnormal accumulation of alpha-synuclein into Lewy Bodies (LBs) is a hallmark of neurodegenerative disorders like Parkinson’s disease, dementia with Lewy Bodies and others, commonly known as synucleopathies. Point mutations and duplications/triplications of the alpha-synuclein gene cause autosomal dominant Parkinson’s disease, pointing towards alpha-synuclein cellular levels as a causative factor of neuronal death. Yet, how alpha-synuclein is causally tied to the death of selected neuronal populations affected on these disorders is unknown.

**Aim:** We seek to identify alpha-synuclein dependent mechanisms of neurodegeneration. Specifically; we want to determine how the expression of wild-type and mutant versions of alpha-synuclein as well as post-translational modifications affecting the protein (phosphorylation and N-terminal acetylation) influence particular cellular pathways and neuronal survival.

**Methodology:** We will use a microscopy based-system that we have established to follow individual neurons over long periods of time and simultaneously monitoring events of interest (i.e. expression levels, protein turnover) and survival. Using this approach -named longitudinal survival analysis- and observing the same neuron repeatedly we link the appearance of a particular feature with its ultimate fate. By using longitudinal survival analysis we will determine if/how transient expression of wild-type and mutant versions of alpha-synuclein and activation of a particular cellular pathway affects neuronal survival. The project requires molecular biology techniques, protein techniques (western blot, immunofluorescence) preparation and transfection of primary neurons, microscopy and statistics.
References


POSSIBILITY OF PhD

I would like the project to be continued with a Ph.D. It will depend on the performance of the fellow and the available financial support at the moment.