



Research Project Proposal
Academic year 2017-2018

Project Nº 35
Title: Stereological estimations of serotonergic, GABAergic and glutamatergic cells in the different subfields of the dorsal raphe nucleus in control mice
Department/ Laboratory Department of Anatomy, Medical School – Ed. Los Castaños
Director: Dra. Elisa Mengual Contact: emp@unav.es Codirector: Dra. Esther Luquin Contact: meluquin@unav.es
Summary <p>Depression is the most common neuropsychiatric co-morbidity in Parkinson's disease (PD). This could be due to the fact that the nigrostriatal dopaminergic (DA) system –the one affected in PD - and the raphe serotonergic (5-HT) system –implicated in depression- are anatomically and functionally linked. In fact, both PD patients and animal models of PD undergo changes in their serotonergic system, i.e., like a hyperinnervation of specific territories deprived of dopaminergic fibers (1). In spite of this, cell losses in the dorsal raphe nucleus (DRN), the main source of serotonergic fibers to PD-related brain nuclei have not been detected thus far, either in patients or in experimental models of PD (1). Yet DRN is a heterogeneous region composed of functionally distinct subpopulations of 5-HT and non-5-HT neurons organized in diverse subnuclei; thus it is possible that changes affecting only specific subnuclei or cell subsets may have passed undetected. Actually an epilepsy-related loss of 5-HT neurons only in the interfascicular part of the DRN has been recently reported (2). The aim of this project is to analyze in detail the local architecture of DRN in control mice, as a first step to detect potential cell alterations in mice models of PD.</p> <p>Goals: To determine the total number of serotonergic, GABAergic, and glutamatergic cells in each of the different subnuclei of DRN in control mice.</p> <p>Methodology: The three neurochemically distinct subgroups will be visualized in fixed brain tissue sections of control mice using immunocytochemical and in situ hybridization techniques. Quantitative estimations of the total number of cells of each cell phenotype will be carried out using unbiased stereological methods (2, 3).</p> References <ol style="list-style-type: none">Gagnon et al (2016) Serotonin hyperinnervation of the striatum with high synaptic incidence in parkinsonian monkeys. <i>Brain Struct Funct.</i> 221(7):3675-91.



2. **Maia et al (2016)** Altered taste preference and loss of limbic-projecting serotonergic neurons in the dorsal raphe nucleus of chronically epileptic rats. Behav Brain Res. 297:28-36.
3. **Luquin et al** Stereological estimates of glutamatergic, GABAergic and cholinergic neurons in the pedunculo pontine and laterodorsal tegmental nuclei in the rat (submitted for publication)