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Máster en Investigación Biomédica
Facultad de Ciencias

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Project Nº 29 ASIGNADO
Title: Analysis of brain-heart-respiratory coupling in REM sleep behavioral disorder (RBD)
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Summary REM sleep behavioral disorder (RBD) is the most common REM sleep parasomnia characterized by episodes of vigorous motor behavior, nightmares and lack of muscle atonia during REM sleep. Recent evidences suggest that RBD could precede the onset of several neurodegenerative diseases such as Parkinson's disease (PD), multiple system atrophy or Lewy body dementia. Indeed, RBD is often considered an early manifestation of such diseases. Pathophysiology of RBD has been related to the dysfunction of brainstem structures involved in REM sleep control. Lesions in pontomedular structures such as the subcoreuleus, magnocellular or sublaterodorsal nuclei in rats, mice or cats induce anomalous patterns of movement during REM sleep. These alterations include a lack of atonia that is often accompanied with complex movements such as locomotion attempts. Nevertheless, -and this has been less studied-, lesions in the ponto-medullar area should also have significant effects on the autonomic system imbalance. Indeed, our group and others have already shown how severity of PD has a significant correlation with alterations in the cardiac rhythm during REM sleep, thus providing additional clinical evidence of the autonomic impairment commonly observed in PD. Here we propose to extend these findings by investigating the existence of alterations in the brain-heart-respiratory triplet. To do that, we will analyze polysomnographic recordings coming from clinical routine test by using analytical tools coming from the complex systems field such as phase synchronization, transfer entropy or Granger causality. By doing so, we expect (i) to advance in our current knowledge about the RBD pathophysiology and (ii) to provide more reliable biomarkers for the disease. Nowadays RBD diagnosis relies on clinical and polysomnographic criteria that are often too subjective and only applicable under very specific conditions. In accomplishing this task we expect to decrease the uncertainty that jeopardizes the diagnosis and thus the use of RBD as proxy to investigate synucleinopathies. **References:** Boeve BF (2010) Ann N Y Acad Sci 1184:15–54. Palma J-A, et. al. (2013) Clin Neurophysiol 124(6). Schreiber T. (2000) Phys Rev Lett 85:461–4.