PhD Thesis Defense IGOR DIEGO BLANCO NUNEZ 'Diffuse Optical Monitoring of Cerebral Hemodynamics in Experimental and Clinical Neurology'

IGOR DIEGO BLANCO NUNEZ

January 30, 2015

Friday January 30, 11:00. ICFO Auditorium

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Medical Optics

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The study of the brain using diffuse optical methods has progressed rapidly in the recent years. The possibility of studying the cerebral microvasculature in addition to the portability and low cost of these devices opens a new door in the study of the cerebral

pathophysiologies.

In this scenario, the study of the cerebral hemodynamics of ischemic patients might allow neurologists to improve the performance of the early medical treatments and therapies used up to date. In this thesis, I have conducted a pioneering study where cerebral autoregulation was studied in ischemic stroke patients during the early hours after the stroke.

Similarly, some other diseases can provoke impaired cerebral autoregulation in the long term. One of them is the obstructive sleep apnoea (OSA) syndrome which can provoke a risk increase of developing cardiovascular diseases and ischemic stroke.

In this regards, I have carried out the largest to date study conducted with Diffuse Correlation Spectroscopy in patients with OSA and I have compared their hemodynamical response to an orthostatic challenge test with a control group of healthy subjects.

Finally, primary animal research is of great importance in the development of new therapies, medical strategies and in the validation of new drugs with the aim of reducing the high mortality and slow and costly recovery of ischemic patients. In consequence, many models of ischemia are reproduced in rodents where the cerebral hemodynamics are studied using expensive equipment such as MRI scanners or by techniques that involve invasive approaches like for instance removing the scalp or thinning the skull which in turn cause a worsening in the living conditions of the animal.

In relation to this point, I have developed a fully non-invasive method to study the cerebral hemodynamics in rats that allows proceeding with longitudinal studies and which I hope will be useful in future biomedical research.

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