

**Research Project Proposal**  
Academic year 2016-2017

<b>Project Nº 36 ASIGNADO</b>
<b>Title: Assessment of neurovascular uncoupling in brain tumors using magnetic resonance imaging (MRI)</b>
<b>Department/ Laboratory Radiology Department, CUN</b>
<b>Director: Dra. María A. Fernández Seara</b> <b>Contact: mfseara@unav.es</b>
<b>Summary</b> <p>Functional MRI (fMRI) techniques (1), based on Blood Oxygen Level Dependent (BOLD) contrast, are being used during presurgical mapping to identify eloquent cortical areas near or within resectable brain lesions. These techniques are based on the well-established coupling mechanism between neuronal firing and cerebrovascular dilatation, known as neurovascular coupling. However, neurovascular coupling can be compromised in cerebral diseases, which can result in false negative BOLD activation and lead to catastrophic resection of apparently "silent" eloquent cortex (2). Therefore it is critical to evaluate the risk of this lesion-induced neurovascular uncoupling in clinical fMRI studies.</p> <p>The goal of this project is to explore the use of a newly developed imaging technique (3) to measure simultaneously BOLD signal and cerebral blood flow (CBF) as a marker of neurovascular uncoupling in brain tumors.</p>
<b>References</b> <p>(1) McIntyre, M., et al. (2003) Blood oxygenation level dependent functional magnetic resonance imaging. <i>Concepts Magn Reso A</i>, 16A:5-15.</p> <p>(2) Holodny, A. I., et al. (2000) The effect of brain tumors on BOLD functional MR imaging activation in the adjacent motor cortex: Implications for image-guided neurosurgery. <i>AJNR Am J Neuroradiol</i>, 21:1415-22.</p> <p>(3) Fernández-Seara, M.A., et al. (2016) Calibrated BOLD fMRI with an Optimized ASL-BOLD Dual-Acquisition Sequence. <i>Proc Intl Soc Mag Reson Med</i>. 24.</p>