



MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2022-2023

(internship from January to June 2023)

Host laboratory: Lyon's Neurosciences Research Center (U1028/UMR5292)

Host team : Translational Group in Epilepsy Research (TIGER)

Internship supervisors :

Pr Sylvain RHEIMS, team TIGER co-leader and Professor of Neurology at Lyon 1 University and Hospices Civils de Lyon. Sylvain.rheims@univ-lyon1.fr

Dr Laure PETER-DEREX, PAM TEAM, Assistant Professor of Physiology at Lyon 1 University and Hospices Civils de Lyon. laure.peter-derex@chu-lyon.fr

Project title : Sleep inertia in patients with drug-resistant epilepsy

Project summary :

Among the causes of premature deaths in patients with epilepsy, sudden and unexpected death in epilepsy (SUDEP) represents a major cause. Experimental and clinical data suggest that most SUDEP cases result from postictal brainstem dysfunction, including central respiratory arrest. Importantly, fatal post-ictal apnea could be facilitated by chronic alterations of respiratory functions. Importantly, most SUDEP occur after nocturnal seizures and there are several physiological interconnections between arousal and respiratory networks. As a matter of fact, we recently observed that arousal intensity and cardiac reactivity are lower in drug-resistant patients (Ricordeau et al., in prep). Accordingly, alteration of arousal regulation may play a key role in the pathophysiology of SUDEP.

The objective of the project is to investigate sleep inertia in patients with drug-resistant epilepsy. We will compare event-related potentials (ERPs) during waking and sleep in patients with drug-resistant focal epilepsy and in healthy subjects. The participants will first perform a target detection auditory task. Subjects will then take a nap. After 3 min of continuous sleep, frequent and rare tones were suddenly presented again (and ERPs recorded) in a forced awakening condition (Bastuji et al., 2003)

Patients' recruitment and investigations will be performed in S. Rheims' Epilepsy Department at Neurological Hospital. Data acquisition will be performed both by the medical team and the internship. The internship will be in charge of all ERPs analyses

3-5 recent publications :

*Ryvlin, P, Rheims, S, Lhatoo, SD. Risks and predictive biomarkers of sudden unexpected death in epilepsy patient. *Curr Opin Neurol* 2019; 32:205-212.*

*Rheims, S, Alvarez, BM, Alexandre, V et al. Hypoxemia following generalized convulsive seizures: Risk factors and effect of oxygen therapy. *Neurology* 2019; 92:e183-e193*

*Sveinsson, O, Andersson, T, Mattsson, P et al. Clinical risk factors in SUDEP: A nationwide population-based case-control study. *Neurology* 2019;*

*Bastuji, H, Perrin, F, Garcia-Larrea, L. Event-related potentials during forced awakening: a tool for the study of acute sleep inertia. *J Sleep Res* 2003; 12:189-206.*

Please send your proposal to marion.richard@univ-lyon1.fr for publication on the Master of Neuroscience website.