

## **MASTER 2 Fundamental and Clinical Neurosciences**

### **Internship proposal 2022-2023**

*(internship from January to June 2023)*

#### **Host laboratory:**

Centre de Recherche en Neurosciences de Lyon (CRNL), équipe TIGER  
CH Le Vinatier, Bât Neurocampus, 95 Bd Pinel, 69675 Bron Cedex

#### **Host team:**

Equipe TIGER (Translational and Integrative Group in Epilepsy Research)

#### **Internship supervisors:**

Stéphane Marinesco; [Stephane.marinesco@univ-lyon1.fr](mailto:Stephane.marinesco@univ-lyon1.fr)

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#### **Project title: neurological lesions induced by severe traumatic brain injury in rats.**

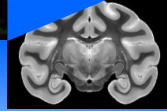
#### **Project summary:**

Severe traumatic brain injury (TBI) is a potentially lethal pathology, inducing long-term disability in most patients and a heavy socio-economic burden on society. To better understand the mechanisms of neurological lesion development and brain recovery after TBI, animal models are necessary. Our laboratory has developed a severe TBI model in rats by administering a 4 atm shockwave on the dura mater, which induces respiratory arrest and loss of consciousness like in humans. Our team has investigated a cohort of 42 male and female rats (19 sham and 23 severe TBI), that performed behavioral tests as well as MRI during two months after TBI followed by brain fixation and storage. The purpose of the internship is to analyze retrospectively the MR images of brain perfusion, blood brain barrier integrity, brain volume and density in these animals, and investigate histological lesions using 3D immunohistochemical staining with the brain clarification method followed by lightsheet microscopy. This approach will allow us to characterize brain lesions persisting two months after TBI both by MRI and histological techniques in rats, and better understand the validity of our severe TBI model in rats compared to the human pathology.

#### **3-5 recent publications:**

- 1 Chatard, C., Sabac, A., Moreno-Velasquez, L., Meiller, A. & Marinesco, S. (2018b) Minimally Invasive Microelectrode Biosensors Based on Platinized Carbon Fibers for in Vivo Brain Monitoring. *ACS Cent Sci*, **4**, 1751-1760 ;
- 2 Balança, B., Meiller, A., Bezin, L., Dreier, J., Lieutaud, T. & Marinesco, S. (2017) Altered hypermetabolic response to cortical spreading depolarizations after traumatic brain injury in rats. *Journal of cerebral blood flow and Metabolism*, **37**, 1670-1686.
- 3 Tholance Y, Barcelos GK, Perret-Liaudet A, Omar E, Carillon R, Grousseau S, Lieutaud T, Dailier F and **Marinesco S** (2017) Placing intracerebral probes to optimize detection of

Please send your proposal to [marion.richard@univ-lyon1.fr](mailto:marion.richard@univ-lyon1.fr) for publication on the Master of Neuroscience website.



delayed cerebral ischemia and prediction of patient outcome in aneurysmal subarachnoid hemorrhage. *J Cereb Blood Flow Metab* 37: 2820-2832.

- 4 Le Douce J, Maugard M, Veran J, Matos M, Jego P, Vigneron PA, Faivre E, Toussay X, Vandenberghe M, Balbastre Y, Piquet J, Guiot E, Thuy Tran N, Taverna M, **Marinesco S**, Koyanagi A, Furuya S, Gaudin-Guerif M, Goutal S, Ghetas A, Pruvost A, Bemelmans AP, Gaillard MC, Cambon K, StimmerL, Sazdovitch V, Duyckaerts C, Herard AS, Delzescaux T, Hantraye P, Brouillet E, Cauli B, Olier S, Panatier A and Bonvento G (2020) Impairment of Glycolysis-Derived L-Serine Production in Astrocytes Contributes to Cognitive Deficits in Alzheimer's Disease. *Cell Metabolism*. 31(3):503-517.e8 doi: 10.1016/j.cmet.2020.02.004.