

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

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

*(internship from January to June 2023)*

#### **Host laboratory:**

*Lyon Neuroscience Research Center (CRNL), CH Le Vinatier, Bron*

#### **Host team :**

*CRNL-BIORAN (Biomarqueurs Radiopharmaceutiques et Neurochimiques), located at CERMEP, Groupement Hospitalier Est, Bron (<https://www.crnl.fr/fr/equipe/bioran>)*

#### **Internship supervisors :**

*Fabien Chauveau, Chargé de Recherche CNRS : [chauveau@cermep.fr](mailto:chauveau@cermep.fr)  
In collab. with Marlène Wiart (DR CNRS, CarMeN lab) : [marlene.wiart@univ-lyon1.fr](mailto:marlene.wiart@univ-lyon1.fr)*

#### **Project title :**

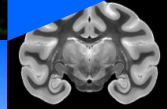
*Functional impact of focal vasoconstriction in the rat brain studied by multimodal neuroimaging*

#### **Project summary :**

*The vasoconstrictor Endothelin-1 has long been employed to model human cerebrovascular diseases in rodents. The focal, stereotaxic injection enables a versatile use as i) a model of major stroke when injected around the middle cerebral artery (MCA) [1], ii) a model of lacunar stroke when injected in the grey matter (GM) [2], iii) a model of small vessel disease when injected in the white matter (WM) [3].*

*However the functional correlates in these different scenario remain largely unexplored, and imaging biomarkers are needed to design innovative therapeutic intervention in a preclinical setting with translational endpoints. We propose to characterize the functional impact of Endothelin-1 micro-injections in Middle Cerebral Artery, by combining multimodal MRI (Diffusion and Perfusion-Weighted Imaging) [4] and functional Ultrasound (fUS) [5] in a longitudinal follow-up.*

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



**3-5 recent publications :**

- [1] S. Nikolova, S. Moyanova, S. Hughes, M. Bellyou-Camilleri, T.-Y. Lee, and R. Bartha, "Endothelin-1 induced MCAO: Dose dependency of cerebral blood flow," *J. Neurosci. Methods*, vol. 179, no. 1, pp. 22–28, Apr. 2009, doi: 10.1016/j.jneumeth.2009.01.009.
- [2] R. Schirrmacher *et al.*, "Which Aspects of Stroke Do Animal Models Capture? A Multitracer Micro-PET Study of Focal Ischemia with Endothelin-1," *Cerebrovasc. Dis.*, vol. 41, no. 3–4, pp. 139–147, 2016, doi: 10.1159/000442997.
- [3] L. Otero-Ortega *et al.*, "White matter injury restoration after stem cell administration in subcortical ischemic stroke," *Stem Cell Res. Ther.*, vol. 6, no. 1, p. 121, Jun. 2015, doi: 10.1186/s13287-015-0111-4.
- [4] F. Chauveau *et al.*, "Brain-targeting form of docosahexaenoic acid for experimental stroke treatment: MRI evaluation and anti-oxidant impact," *Curr Neurovasc Res*, vol. 8, no. 2, pp. 95–102, May 2011.
- [5] B. Vidal *et al.*, "Functional ultrasound imaging to study brain dynamics: Application of pharmaco-fUS to atomoxetine," *Neuropharmacology*, vol. 179, p. 108273, Nov. 2020, doi: 10.1016/j.neuropharm.2020.108273.