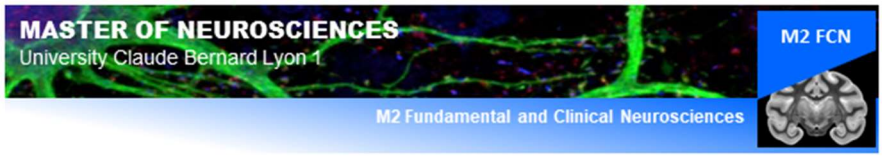

MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2024-2025

(internship from January to June 2025)

Host laboratory:
INSERM U1208, Stem cell and Brain Research Institute - SBRI,
Directeur: Dr. Colette Dehay

18 avenue du Doyen Lépine, 69500, Bron

Host team :
Equipe d'accueil: « Cellular programming in the brain »

http://www.sbri.fr/

Internship supervisors : *name + position + email*
Olivier Raineteau, DR2, olivier.raineteau@inserm.fr

Project title :
Whole brain quantifications of cell responses to adverse conditions.

Project summary : *approx 10 lines*

Big data is a field that treats ways to analyze, systematically extract information from data sets that are too large or complex to be dealt with by traditional data-processing approaches. Big data has gradually invaded all domains of neurosciences, from transcriptomic to histology. In histology, this applies to large series of sections that need to be analyzed so that cell numbers can be accurately quantified, while minimizing the time of processing. This approach is frequently associated to single cell approaches that allow extracting transcriptional information from the variety of cell types present within the tissue.

The hosting lab works on the long-term consequences of perinatal brain injuries. These consequences can be multiple, ranging from abnormal development of brain cells (e.g. oligodendrocytes), reactivity of microglial cells, ultimately resulting in abnormal neuronal circuits formation/functioning. These injuries result in long-term secondary sequels that remains to be fully characterized.

During this training period, you will use a recently developed approach for quantifying oligodendrocytes and/or microglial cells throughout the entire brain. Comparison of control mice to perinatal injured ones, will allow you to spatially and quantitatively explore the consequences of adverse conditions on brain development and microglial reactivity. Additionally, students interested in single-cell approaches will be able to supplement these histological analyses with transcriptional studies of these cell types.

By the end of this training period, you will have acquired advanced knowledge in histological techniques routinely used in most laboratories. In addition, you will have acquired a unique expertise in big data handling which represents a promising development of image analysis in neurosciences.

3-5 recent publications:

• Foucault L et al., […] Raineteau O (2024) Neonatal brain injury unravels transcriptional and signaling changes underlying the reactivation of cortical progenitors. Cell Rep. 43(2):113734

• Marcy G, Foucault L, […] Raineteau O (2023) Single-cell analysis of the postnatal dorsal V-SVZ reveals a role for Bmpr1a signaling in silencing pallial germinal activity. Sci Adv. 9(18):eabq7553

• Donega, V., Marcy, G., Lo Giudice, Q., Zweifel, S., Angonin, D., Fiorelli, R., Abrous, D. N., Rival-Gervier, S., Koehl, M., Jabaudon, D. et al. (2018). Transcriptional Dysregulation in Postnatal Glutamatergic Progenitors Contributes to Closure of the Cortical Neurogenic Period. Cell Reports 22, 2567-2574.

• Azim, K., Angonin, D., Marcy, G., Pieropan, F., Rivera, A., Donega, V., Cantu, C., Williams, G., Berninger, B., Butt, A. M. et al. (2017). Pharmacogenomic identification of small molecules for lineage specific manipulation of subventricular zone germinal activity. PLoS Biol 15, e2000698.

• Fiorelli R, Fischer B, Azim K, and Raineteau O (2015) Adding a spatial dimension to postnatal ventricular-subventricular zone neurogenesis. Development, 142(12):2109-20