



MASTER 2 Neurosciences Fondamentales et Cliniques

Internship proposal 2021-2022

(internship from January to end of May 2022)

Host laboratory : Institut NEUROMYOGÈNE, CNRS UMR5310-INSERM U1217

Host team : Team Julien COURCHET, Energy Metabolism and Neuronal Development

Internship supervisors : Evelyne Goillot. Evelyne.Goillot@univ-lyon1.fr

Project title : Modulation of mitochondrial metabolism by the regulation of the RNA splicing machinery during the development of cortical circuits

Project summary :

The formation of cortical circuits relies on a cascade of tightly regulated cellular processes whose disruption can lead to life-altering neurodevelopmental disorders. Recent evidence uncovered critical roles for mitochondria to support the development of cortical connectivity. Yet the molecular mechanisms regulating mitochondrial activity in developing neurons remain partially understood. In our laboratory, we study NUAK1, an autism-associated protein kinase that controls cortical axon branching through the regulation of mitochondria trafficking and metabolic activity at axonal branchpoints. We identified novel interactors of NUAK1 involved in the regulation of mRNA processing, providing an unexpected link between gene expression regulation and metabolic homeostasis. Our goal overall is to understand how mRNA biology, and specifically mRNA splicing, underlie a dynamic regulation of mitochondria and metabolic activity in axon outgrowth/branching during the development of cortical circuits.

3-5 recent publications :

1. Meyer-Dilhet, G. & Courchet, J. STAR protocols 1, 100027 (2020).
2. Lanfranchi, M. et al. bioRxiv 2020.05.18.102582 (2020).
3. Rangaraju, V. et al. J neurosci 39, 8200–8208 (2019).
4. Courchet, V. et al. Nature communications 9, 4289 (2018).
5. Courchet, J. et al. Cell 153, 1510–1525 (2013).

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