



Postdoc position in Cellular Neuroscience Interdisciplinary Institute for Neuroscience, Bordeaux, France

Team: Cell Adhesion Molecules in Synapse Assembly

(<https://neuro-intramuros.u-bordeaux.fr/displayresearchprojects/28/12>)

Location: Institut Interdisciplinaire de Neurosciences, Bordeaux Neurocampus

(<https://www.bordeaux-neurocampus.fr/>)

We are hiring one highly motivated postdoctoral scientist to investigate the molecular, structural and functional organization of the glutamatergic tripartite synapse. In light of recent evidence that astrocytes are not just a mere 'glue' surrounding neurons but actively regulate synaptic connections, we want to investigate the molecular interactions that drive and maintain astrocytic processes in close contact with neurons and how those interactions dynamically regulate the structure and plasticity of synapses. To address this question, we will combine whole patch-clamp recordings with single-cell RNA seq ("patch-seq"), proteomics, electrophysiology, expansion microscopy and live microscopy in the mouse hippocampus, where the role of astrocytes in synaptic plasticity is well established. We will further assess the impact of autistic mutations targeting astrocytic protein candidates that have been so far considered only from a neurocentric point of view.

Our lab is interested in understanding the molecular mechanisms by which neurons, together with glial cells, regulate synaptic plasticity at both functional and structural levels. In the recent years, we demonstrated that individual hippocampal synapses functionally interact with their neighbors through astrocytes and dendritic signaling (*Letellier et al., PNAS 2016; Letellier et al., PloS Biology 2019*) while retaining the capacity to homeostatically regulate their own strength through mechanisms involving local translation (*Letellier et al., Nature Neuroscience 2014; Dubes et al., EMBO Journal 2022*). We further unveiled the role of the cell adhesion molecule neuroligin-1 in the control of synaptic development and plasticity and showed that the dynamic nanoscale organization of neuroligin-neurexin trans-synaptic complexes critically regulates synaptic function and plasticity through aligning glutamate receptors with presynaptic release sites (*Chamma et al., Nat Commun 2016; Letellier et al., Nat Commun 2018; Haas et al., eLife 2018; Letellier et al., eLife 2020*).

For this project, the candidate should have expertise in either patch-clamp electrophysiology or microscopy and show strong interest in molecular and cellular neuroscience with a focus on neurotransmission and synaptic plasticity. The project is to be developed in the team Cell Adhesion Molecules in Synapse Assembly at the Interdisciplinary Institute for Neuroscience (IINS) of the Bordeaux Neurocampus. IINS is a leading European neuroscience institute that covers diverse fields ranging from structural biology and biophysics to integrated physiology and behavior through cell biology and microscopy development. The lab benefits from an outstanding environment provided by Bordeaux Neurocampus, the Bordeaux Imaging Center and the University of Bordeaux. The position has 2 years initial funding from ANR.

Candidates should send a CV, a brief statement of research experience and reference letters to Mathieu Letellier: mathieu.letellier@u-bordeaux.fr

Selection of publications from the host team:

- *Dubes et al. (2022). EMBO J Oct 17;41(20):e109012*
- *Letellier et al. (2020). eLife Apr 23;9:e52027*
- *Letellier et al. (2019). PLoS Biol Jun 5;17(6):e2006223*
- *Letellier et al. (2018). Nat Commun Sep 28;9(1):3979.*
- *Haas et al. (2018). Elife. Jul 25;7. pii: e31755.*
- *Letellier et al. (2016). PNAS USA 113(19):E2685-94.*
- *Chamma et al. (2016). Nat Commun (7): 1-15.*
- *Letellier et al. (2014). Nat Neurosci 17(8) :1040-2.*