



Centre de Recherche
en Neurosciences de Lyon

Le comité d'organisation du cycle des conférences CRNL a le plaisir de vous annoncer la prochaine **Conférence du CRNL** le **mercredi 29 juin 2022 à 11h00** dans l'amphithéâtre du Neurocampus :

Pierre-Yves Plaçais : "Metabolic regulation of memory formation in Drosophila"

Abstract: Essential brain functions, such as forming long-term memory (LTM), acutely increase the energetic burden of implicated neuronal circuits, as shown in many species from *Drosophila* flies to humans. Thus, inability of meeting such fast demands results in pathological states that can range from loss of circuit coding precision to reduced survival. In neurons, mitochondria provide most of the required energy for neuronal function. The primary metabolite consumed by mitochondria is pyruvate, derived from glucose, which fuels the tricarboxylic acid cycle. Currently we miss a global picture of how energy metabolism intervenes in higher brain functions such as memory.

Drosophila, despite having a much simpler brain compared to mammalian models, can feature elaborated memory processes involving well-described neuronal networks. Moreover, our lab has developed pioneer 2-photon imaging protocols to measure in vivo intracellular metabolic fluxes in neurons (1,2) using genetically-encoded FRET metabolic sensors. Using this model, we showed that an acute upregulation of mitochondrial pyruvate uptake within the fly's major memory center, the mushroom body (MB), is both necessary and sufficient to drive LTM formation (3). This establishes mitochondria as an unexpected critical regulatory checkpoint in the formation of LTM. But how do mitochondria exert such a control, and how is pyruvate provided to mitochondria for memory fueling?

Our recent results show that glial cells are essential in providing pyruvate to neurons, establishing in vivo that the nature of the neuron-glia metabolic coupling is key in determining memory persistence and properties.

1. de Tredern, É. et al. Glial glucose fuels the neuronal pentose phosphate pathway for long-term memory. *Cell Rep.* 36, 109620 (2021).
2. Silva, B. et al. Glia fuel neurons with locally synthesized ketone bodies to sustain memory under starvation. *Nat. Metab.* 4, 213–224 (2022).
3. Plaçais, P.-Y. et al. Upregulated energy metabolism in the *Drosophila* mushroom body is the trigger for long-term memory. *Nat. Commun.* 8, 15510 (2017).

Pierre-Yves Plaçais est Chercheur en neurobiologie au laboratoire Plasticité du cerveau et co-directeur d'une équipe spécialisée dans le métabolisme énergétique cérébral et la mémoire chez la drosophile.

Afin d'organiser au mieux la conférence et le pot qui suivra, nous vous remercions de bien vouloir vous inscrire sur le sondage ci-après :

<https://evento.renater.fr/survey/conference-crnl-pierre-yves-placais-t8h5k39l>

The CRNL conference series organizing committee is pleased to announce the next **CRNL Conference** on **wednesday, june 29 at 11:00 am** in the amphitheatre of Neurocampus :

Pierre-Yves Plaçais : "Metabolic regulation of memory formation in Drosophila"

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Pierre-Yves Plaçais is a researcher in neurobiology at the Brain Plasticity Laboratory and co-director of a team specialising in cerebral energy metabolism and memory in Drosophila.

In order to organize the conference and the following drink, we thank you for registering on the following survey:

<https://evento.renater.fr/survey/conference-crnl-pierre-yves-placais-t8h5k39l>