Master de Sciences et Technologies
Mention Biologie Intégrative et Physiologie
Parcours : Neurosciences
Responsable : Professeur Régis Lambert

Internship Proposal
Academic Year 2018-2019

1. Host team:

Research Unit (e.g. Department or Institute) :
Institute for Ecology and Environmental Sciences of Paris (iEES Paris), UMR 1392

Research Unit Director :
Luc ABBADIE, Professor in Sorbonne University

Research Team Director :
Philippe LUCAS, Senior Scientist in INRA

Team name :
NeuroEthology of Olfaction (NEO)

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Supervisor of the Research Intern for this project:
Matthieu DACHER, Associate Professor in Sorbonne University

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2. Internship project title:

Role of nicotinic receptors in a non-associative learning, gustatory habituation

3. Internship Description:

Habituation to sucrose is a non-associative learning we recently adapted and reported in the moth *Agrotis ipsilon*. This quick and reliable protocol allows the study of feeding behavior of adults in this pest species. We obtained results in behavioral neuropharmacology on the role of biogenic amines (modulatory neurotransmitters) in this learning. However, besides these molecules, acetylcholine is known to play an essential role in insect learning, similar to glutamate in mammals. Indeed, it is their main excitatory neurotransmitter, and we showed in bees that distinct types of nicotinic receptors are involved in single- and repeated-trial learnings, including in sucrose habituation.

Thus, the objective of this internship will be to study the role of nicotinic receptors in habituation in *Agrotis ipsilon*, using behavioral pharmacology; the underlying hypothesis is that receptors sensitive to methyllycaconitin and α-bungarotoxin are specifically involved in this learning. To test this hypothesis, agonists and antagonists of nicotinic receptors (including methyllycaconitin) will be injected in the animals' brain before the habituation protocol. Our previous experiments on bees and moths will guide the choice of drugs and of their concentrations. A preliminary set of experiments will be done to make sure sucrose sensitivity is not affected by these drugs.

A successful candidate should have knowledge and/or interest for the neurobiological bases of memory (especially habituation) and/or neuropharmacology and/or invertebrate neuroethology. Following the internship, a PhD thesis is expected, subject to the granting of a PhD stipend from the Doctoral School "Brain, Behavior, Cognition". The internship will take place in INRA in Versailles, which can provide cheap housing (upon booking during Fall).

Keywords: habituation, learning, invertebrate, nicotinic receptors, neuropharmacology

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