

MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2022-2023

(internship from January to June 2023)

Host laboratory: Centre de Recherche en Neurosciences de Lyon
INSERM U1028 - CNRS UMR5292 - Université Lyon 1, Centre Hospitalier Le Vinatier -
Bâtiment 462 – Neurocampus, 95, boulevard Pinel - 69675 Bron cedex

Host team : Team CMO : Olfaction from coding to memory
(<https://www.crn1.fr/en/equipe/cmo?language=en>)

Internship supervisors :

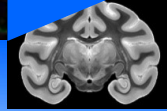
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Project title : Long-term impact of a naturalistic living environment on rodent cognitive abilities.

Project summary : Most preclinical studies in neuroscience are carried out on rodents raised in standard housing in order to avoid inter-individual variability as much as possible. Today, this environment is increasingly considered to be unsuitable for the study of cognitive functions. Indeed, even when animals are housed in pairs, their possibilities for social interaction remain limited and the expression of their natural behavioral repertoire almost impossible. In addition, unlimited and effortless access to food and reduced living space lead to increased weight gain and metabolic disorders.

Current cognitive neuroscience considers it important to return to living environments that are closer to the real life of the species. It is also considered important to take into account in the studies the individual characteristics of the animals linked to specific behavioral strategies which are themselves underpinned by singular brain processes. Our project is part of this dynamic through the development of a new complex living environment composed of many interconnected spaces in 3 dimensions. The originality of this internship lies in the monitoring over several months of a set of physiological (food intake, metabolism, stress), behavioral (social interactions and hierarchy) and sensory parameters that will allow us to characterize individual traits and to study the extent to which they are predictive of individual cognitive strategies and capacities. These cognitive abilities will be assessed by using spontaneous object exploration paradigms, variably designed to measure memory for objects, places, temporal order and object-location interrelationships. Cognitive performances will be compared to those of rats raised under standard conditions but also between animals of both sexes. In parallel to the behavioral tests, the brain integrity and function of the animals will be assessed using non-invasive imaging approaches (microPET scan and MRI) designed for small animals.

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



3-5 recent publications :

- Mouly A-M, Bouillot C, Costes N, Zimmer L, **Ravel N, Litaudon P** (2021) PET metabolic imaging of time-dependent reorganization of olfactory cued fear memory networks in rats. *Cereb. Cortex*, bhab376
- **Litaudon P**, Bouillot C, Zimmer L, Costes N, **Ravel N** (2017) Activity in the rat olfactory cortex is correlated with behavioral response to odor: a microPET study. *Brain Struct. Funct.*, 222, 577-586.
- Veyrac A, Allerborn M, Gros A, Michon F, Raguet L, Kenney J, Godinot F, Thevenet M, Garcia, S, Messaoudi B, Laroche S, **Ravel N** (2015) Memory of occasional events in rats: individual episodic memory profiles, flexibility, and neural substrate. *J. Neurosci.*, 35 : 7575-7586.
- Martin C, Grenier D, Thévenet M, Vigouroux M, Bertrand B, Janier M, **Ravel N, Litaudon P** (2007) fMRI visualization of transient activations in the rat olfactory bulb using short odor stimulations. *Neuroimage*, 36 : 1288-1293.
- Meunier D, Fonlupt P, Saive A-L, Plailly J, **Ravel N, Royet J-P** (2014) Modular structure of functional networks in olfactory memory. *Neuroimage*, 95:264-275.