MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2026-2027

(internship from January to June 2027)

Host laboratory:

Centre de Recherche en Neurosciences de Lyon (Dir L. Bezin), Centre Hospitalier Le Vinatier, Bâtiment 462 Neurocampus Michel Jouvet, 95 boulevard Pinel, 69500 Bron

Host team :

PATHPARK team – Pathophysiology of Parkinson disease and related disorders (Dir: B. Ballanger et S. Thobois), Centre de recherche en Neurosciences de Lyon, Bron

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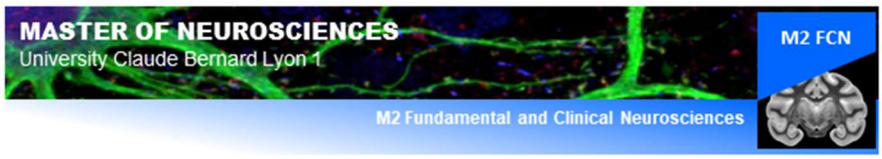

Project title :

Role of the opioid and noradrenergic systems in central Parkinson's pain: PAINPARK

Project summary : *approx 10 lines*

Pain is one of the main non-motor symptoms of Parkinson's disease (PD). Pain specifically associated with PD can be nociceptive (related to motor symptoms such as dystonic pain) or nociplastic, independent of motor symptoms—what is known as "central Parkinsonian pain." This type of central pain is based on a dysfunction in the central processing of the pain stimulus, directly linked to the pathophysiology of PD. In the general population, it is known that opioid systems are involved, in close interaction with other neurotransmitters such as dopamine, norepinephrine, or serotonin, in pain processing (Shackleton et al. 2019, Navratilova et al. 2015, Bahari & Meftahi 2019; Gyires et al. 2009, Stein, 2016).
The primary objective of this study is to investigate alterations in the opioid and noradrenergic neurotransmission systems in individuals with Parkinson's disease who exhibit symptoms of central pain (PD-P) and in individuals with Parkinson's disease who do not exhibit symptoms of central pain (PD-NP), by collecting PET-MRI data and using two radiotracers: [11C] buprenorphine to study the opioid system and [11C] yohimbine to study the noradrenergic system.

3-5 recent publications :

- Laurencin, C., Lancelot, S., Brosse, S., Mérida, I., Redouté, J., Greusard, E., Lamberet, L., Liotier, V., Le Bars, D., Costes, N., Thobois, S., Boulinguez, P., & Ballanger, B. (2023). Noradrenergic alterations in Parkinson's disease : A combined 11C-yohimbine PET/neuromelanin MRI study. Brain. 2024;147(4):1377-1388.
- Marques, A., Attal, N., Bouhassira, D., Moisset, X., Cantagrel, N., Rascol, O., Durif, F., & Brefel-Courbon, C. How to diagnose parkinsonian central pain? Parkinsonism & Related Disorders, 2019; 64, 50-53.
- Prange S, Metereau E, Klinger H, Huddlestone M, De Oliveira M, Duperrier S, Courault P, Redoute J, Tremblay L, Sgambato V, Lancelot S, Thobois S. Serotonergic dysfunction in patients with impulse control disorders in Parkinson's disease. Brain. 2025 Brain. 2025;148(6):2108-2121.
- Prange S, Lin Z, Nourredine M, Danaila T, Laurencin C, Lagha-Boukbiza O, Anheim M, Klinger H, Longato N, Phillipps C, Voirin J, Polo G, Simon E, Mertens P, Rolland AS, Devos D, Metereau E, Tranchant C, Thobois S; Predistim study group. Limbic stimulation drives mania in STN-DBS in Parkinson disease: a prospective study. Ann Neurol. 2022 Sep;92(3):411-417.
- Prange S, Klinger H, Laurencin C, Danaila T, Thobois S. Depression in Patients with Parkinson's Disease: Current Understanding of its Neurobiology and Implications for Treatment. Drugs Aging 2022 Jun;39(6):417-439.