



MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2024-2025

(internship from January to June 2025)

Host laboratory: Lyon Neuroscience Research Centre

Host team : Waking team

Internship supervisors :

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Project title : Chronobiological characterization of Smith Magenis syndrome and autism spectrum disorders in pediatric patients

Project summary :

The prevalence of sleep disorders in autism spectrum disorders (ASD) is high (50-80%), with insomnia in most of the cases. These sleep disorders could play an important role in the learning deficits and behavioural abnormalities observed in children with ASD, but their pathophysiology remains unclear. These disorders could be the consequence of a more general dysregulation of the circadian system. Studies have shown abnormally low levels of 6-sulphatoxymelatonin (the main metabolite of melatonin) in ASD patients, both at night and during the day, and delayed melatonin secretion (60-70% of cases).

The mechanisms responsible for abnormal melatonin secretion in ASD remain unknown. Since circadian synchronisation is mainly mediated by light, it is possible that an abnormalities in light sensitivity could be involved in the disturbances observed in clock synchronization. Recently, the pupillary reflex has become a tool of choice, enabling us to estimate the functionality of conventional retinal photoreceptors (cones, rods) and melanopsin ganglion cells. We propose to investigate the chronobiological profile of 20 ASD (6-13 y.o.), coming at the pediatric sleep unit for sleep recording. During this 48-hour hospitalization, sequential melatonin measurements (saliva samples), EEG recordings and pupillary reflex tests will be realized. During this internship, the student

will participate to patient's enrollment, data and samples collection and data analysis. Ethical agreements have been obtained.

3-5 recent publications :

1. Lecuelle F, Leslie W, Gustin MP, **Franco P**, Putois B. Treatment for behavioral insomnia in young children with neurotypical development under 6 years of age: A systematic review. *Sleep Med Rev* 2024 sous presse
2. Thieux M, Guyon A, Seugnet L, **Franco P**. Salivary α -amylase as a marker of sleep disorders: A theoretical review. *Sleep Med Rev* 2023 10.1016/j.smrv.2023.101894
3. Lalanne S, Fougerou-Leurent C, Anderson G, Schroder C, Nir T, Chokron S, Delorme R, Claustrat B, Bellissant E, Kermarrec S, **Franco P**, Denis L, Tordjman S. Melatonin: From Pharmacokinetics to Clinical Use in Autism Spectrum Disorder. *Int. J. Mol. Sci.* 2021, 22, 1490; <https://doi.org/10.3390/ijms22031490>
4. Yavuz-Kodat E, Reynaud E, Geoffray MM, Limousin N, **Franco P**, Bonnet-Brilhaut F, Bourgin P, Schroder C. Disturbances of Continuous Sleep and Circadian Rhythms Account for Behavioral Difficulties in Children with Autism Spectrum Disorder. *J. Clin. Med.* 2020, 9, 1978; doi:10.3390/jcm9061978.
5. Yavuz-Kodat E, Reynaud E, Geoffray MM, Limousin N, **Franco P**, Bourgin P, Schroder CM. Validity of Actigraphy Compared to Polysomnography for Sleep Assessment in Children with Autism Spectrum Disorder. *Front Psychiatry.* 2019; 2;10:551.