

Centre de Neurosciences Psychiatriques

CNP SEMINAR

ANNOUNCEMENT

Friday June 13th 2025, 11:00 to 12:00 am

Neural circuits underlying sleep structure and functions

By : **Antoine Adamantidis - PhD**

University of Bern

Department of Neurology, Inselspital - University Hospital Bern



Summary : Sleep is an active state critical for processing emotional memories encoded during waking in both humans and animals. There is a remarkable overlap between the brain structures and circuits active during sleep, particularly rapid eye-movement (REM) sleep, and the those encoding emotions. Accordingly, disruptions in sleep quality or quantity, including REM sleep, are often associated with, and precede the onset of, nearly all affective psychiatric and mood disorders. In this context, a major biomedical challenge is to better understand the underlying mechanisms of the relationship between (REM) sleep and emotion encoding to improve treatments for mental health.

This lecture will summarize our investigation of the cellular and circuit mechanisms underlying sleep architecture, sleep oscillations, and local brain dynamics across sleep-wake states using electrophysiological recordings combined with single-cell calcium imaging or optogenetics. The presentation will detail the discovery of a 'somato-dendritic decoupling' in prefrontal cortex pyramidal neurons underlying REM sleep-dependent stabilization of optimal emotional memory traces. This decoupling reflects a tonic inhibition at the somas of pyramidal cells, occurring simultaneously with a selective disinhibition of their dendritic arbors selectively during REM sleep. Recent findings on REM sleep-dependent subcortical inputs and neuromodulation of this decoupling will be discussed in the context of synaptic plasticity and the optimization of emotional responses in the maintenance of mental health.

Invited by : Benjamin.Boutrel@chuv.ch

Short Bio : Le professeur Antoine Adamantidis a obtenu un PhD en 2005 à l'université de Liège (Belgique) pour sa thèse de doctorat sur les caractéristiques de la fonction physiologique des récepteurs MCH (melanin-concentrating hormone) chez la souris. De 2006 à 2008, il a travaillé comme post-doctorant à l'université de médecine de Stanford (États-Unis) et de 2008 à 2010, il a été collaborateur scientifique pour le département de psychiatrie et de sciences biologiques de l'université de médecine de Stanford (États-Unis). En 2010, il a rejoint le département de psychiatrie de l'université McGill à Montréal (Canada), où il a fondé un laboratoire sur la dissection optogénétique des stades veille-sommeil. Depuis 2014, il est professeur de neurophysiologie à l'université de Berne et directeur du centre de neurologie expérimentale de la clinique de neurologie de l'hôpital universitaire de Berne.

Publications :

1. Aime M, Calcini N, Borsa M, Campelo T, Rusterholz T, Sattin A, Fellin T, Adamantidis A. 2022. Paradoxical somatodendritic decoupling supports cortical plasticity during REM sleep. *Science*. 376(6594):724-730.
2. Boyce R, Glasgow SD, Williams S, Adamantidis A. Causal evidence for the role of REM sleep theta rhythm in contextual memory consolidation. *Science* (2016) May 13;352(6287):812-
3. Oesch L, Gazea M, Genta Th, Bandarabadia M, Gutierrez Herrera C, Adamantidis A. REM sleep stabilizes hypothalamic representation of feeding behavior. *Science* (2020)

Salle de séminaire 1er étage – CNP

Here is the link for remote connection: <https://unil.zoom.us/j/9243491517?omn=96792879158>