



Centre de Neurosciences Psychiatriques

CNP SEMINAR

ANNOUNCEMENT

Friday, October 14. 2022, 11 am

Brain circuits for fear attenuation

Dr Bianca A. Silva, PhD

Circuits Neuroscience Lab, National Research Council of Italy, Institute of Neuroscience, Humanitas Research Hospital, FENS-Kavli Network of Excellence scholar.

How are consolidated memories modified on the basis of experience? In the lab we aim to unravel the neural mechanisms at the basis of memory update. Understanding this biological process allows us to decipher how new information is constantly incorporated into existing memory, how a newly formed memory is integrated into previous knowledge and how the fine balance between memory stability and memory flexibility is maintained.

By using fear memory extinction as a model of memory update, we combine neuronal circuit mapping, fiber photometry, chemogenetic and closed-loop optogenetic manipulations in mice, and showed that the extinction of remote (30-day old) fear memories depends on thalamic nucleus reuniens (NRe) inputs to the basolateral amygdala (BLA). We find that remote, but not recent (1-day old), fear extinction activates NRe to BLA inputs, which become potentiated upon fear reduction. Both monosynaptic NRe to BLA, and total NRe activity increase shortly before freezing cessation, suggesting that the NRe registers and transmits safety signals to the BLA. Accordingly, pan-NRe and pathway-specific NRe to BLA inhibition impairs, while their activation facilitates fear extinction.

These findings identify the NRe as a crucial BLA regulator for extinction, and provide the first functional description of the circuits underlying the experience-based modification of consolidated fear memories.

Invited by Chin.Eap@chuv.ch

Selected recent publications:

Silva B.A., Astori S, Burns AM, Heiser H, van den Heuvel L, Santoni G, Martinez-Reza MF, Sandi C, Gräff J. A thalamo-amygdalar circuit underlying extinction of remote fear memory. **Nature Neuroscience**. 2021

Silva B.A., Burns A.M., Gräff J. A cFos activation map of remote fear memory attenuation. **Psychopharmacology (Berl)**, 2019.

Silva B.A., Mattucci C., Krzywkowski P., Murana E., Illarionova A., Grinevich V., Canteras N.S., Ragozzino D. & Gross C.T. Independent hypothalamic circuits for social and predator fear. **Nature Neuroscience**, 2013.

Salle de séminaire, 1^{er} étage CNP
Hôpital Psychiatrique de Cery-Site de Cery, CH-1008 Prilly-Lausanne

Link for videoconference <https://chuv.webex.com/chuv/j.php?MTID=mf4eb325d73c557a415c9b65c7f097cdd>