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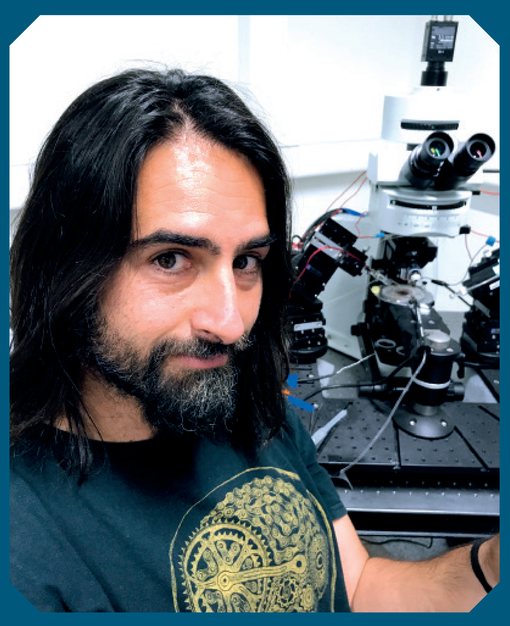

PROJECT TYPE ERC Starting Grant (FP7)

TITLE Mapping the synaptic circuits for salience

ACRONYM SALIENSY

DURATION 01.03.2014 – 28.02.2019

BUDGET 1 500 000 €

An unpredicted salient event – rewarding or aversive – triggers a rapid emotional reaction that has profound impact in making a future choice. Importantly, disruption of such processing promote the emergence of psychiatric disorders including addiction and depression.

The early neurobiological processes behind salience encoding and its pahtophysiology are matter of intense study. However, the hierarchical anatomical and functional organization as well as the cellular mechanisms underlying acute perception of reward and aversive events remains unknown. Intriguingly, salience experience alters the activity of neurons located in the medial globus pallidus of the basal ganglia, the lateral habenula (LHb) as well as of dopamine and serotonin neurons. Here, I hypothesize that rewarding and aversive experiences require the precise habenular circuits, and rapid cellular adaptations in LHb to orchestrate dopamine and serotonin systems. To test this my specific aims are:

1 - Anatomical-functional circuit dissection to map LHb inputs, and LHb outputs to the midbrain using viral-based mapping
2 – Assess the effect of salience (reward, aversion) on the LHb using synaptic physiology and optogenetics and
3 - Causally link LHb activity with behaviours modelling reward/aversion, and in rodent models of addiction and depression to probe LHb function at the network level using in vivo electrophysiology and optogenetics.

I propose to unravel early cellular processes fundamental to “pursue a reward, escape a danger”, which is relevant for encoding rewarding and aversive stimuli in health and neuropsychiatry (i.e. addiction, depression, post-traumatic stress disorders).