

## **Project 1.1 Investigating the neurobiological mechanisms of the anti-addictive effects of psychedelics**

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**Laboratory:** Laboratory of Spatial Memory

### **Background:**

Investigating the Role of Psychedelics in Substance Use Disorder with a Focus on Individual and Gender Differences Substance Use Disorder (SUD) remains a major global health challenge, affecting about 36 million people. Central to SUD is the concept of craving, a compelling urge for substance use characterized by a deep longing. Recent advances have shown the potential of classic psychedelics such as LSD, psilocybin, and DMT in producing lasting improvements in mental health, including addiction, though the underlying mechanisms during withdrawal are not fully understood.

This project seeks to explore the neurobiological impact of psychedelics on addiction-related behaviors, particularly focusing on their effects on affective states and memory processes during withdrawal. We hypothesize that administering a single dose of psychedelics can trigger reconsolidation of drug-associated memories, thus reducing cravings. Our study will examine this hypothesis through two behavioral models. Task 1 investigates the impact of psychedelics on behavioral emotional responses during morphine withdrawal, and Task 2 explores their effects on reward-seeking behavior. Both tasks will incorporate advanced techniques like ultrasonic vocalization recordings, MoSeq behavioral analysis, and DeepLabCut precision tracking. In addition, Task 3 will delve into the neural and neurochemical mechanisms behind psychedelics' anti-addictive effects, employing methods such as neurochemical analysis, the CatFISH method, and mathematical modeling. This task aims to uncover how psychedelics alter brain function and communication among addiction-related brain regions.

A unique aspect of our research is the exploration of addiction behavior in terms of individual and gender differences, providing a more comprehensive understanding of addiction dynamics. Employing a multidisciplinary approach, this study aims to deepen our understanding of how psychedelics modulate craving and addiction through memory reconsolidation. The findings are expected to significantly contribute to addiction neuroscience and inform the development of more inclusive and effective therapeutic strategies, potentially integrating psychedelics into mainstream treatment and benefiting a diverse range of patients worldwide.

### **Aim:**

This project seeks to explore the neurobiological impact of psychedelics on addiction-related behaviors, particularly focusing on their effects on affective states and memory processes during withdrawal.

### **Requirements:**

- responsible person, open to teamwork,
- excellent knowledge of English;
- graduate of: medicine, pharmacy, biology, psychology, mathematics, cognitive science, telecommunications, physics, and related fields,
- determination to achieve goals, highly motivated