

The Neural Mechanisms of Psychedelic Drug Action - Talk 1

Speaker: Dr. Friederike Holze - University of Basel Hospital

Title: Pharmacology, characterisation and dosing of classic psychedelics

Venue: Institute of Theoretical Biology, Philippstr. 12, Haus 4, Hörsaal 4, Berlin 10115, Germany

<https://goo.gl/maps/uBEkAEksdoxK89ua6>

Date: Thursday, 04.05.2023

Time: 17:00

Zoom Link (hybrid event): <https://hu-berlin.zoom.us/j/66780474019>

Abstract: Classic psychedelics and entactogens have emerged as promising candidates for the treatment of various psychiatric and neurological illnesses. This renewed interest in these substances has initiated a surge of research into their pharmacology, particularly their mechanism of action and dose-response effects. Classic psychedelics, such as psilocybin, LSD, DMT, and mescaline, share a common mechanism of action via agonism on serotonin (5-HT) 2A receptors, but diverge in their binding to other receptors. Entactogens, such as 3,4-methylenedioxymethamphetamine (MDMA), have distinct pharmacological properties, including inhibition of serotonin transporters and release of neurotransmitters such as epinephrine, dopamine and oxytocin.

Despite growing interest in the clinical use of these substances, it remains unclear how their different receptor profiles translate into clinical response. In addition, the dose equivalence of different substances, drug-drug interactions, and non-pharmacological factors are important considerations for their clinical use in psychotherapy. This talk will explore different aspects of the pharmacology of psychedelics and entactogens, including dosing strategies, drug-drug interactions, and aspects of personalized dosing. Furthermore, we will discuss the subjective effects of different doses and their implications for clinical practice. Overall, a better understanding of the pharmacology of these substances can inform their safe and effective use in the treatment of psychiatric and neurological conditions.

Yours sincerely from the organizing team,

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The Neural Mechanisms of Psychedelic Drug Action - Talk 2

Speaker: Dr. Fernanda Palhano-Fontes - Federal University of Rio Grande do Norte

Title: Rapid antidepressant effects of the psychedelic ayahuasca in treatment-resistant depression and its relationship to biomarkers

Venue: Institute of Theoretical Biology, Philippstr. 12, Haus 4, Hörsaal 4, Berlin 10115, Germany
<https://goo.gl/maps/uBEkAEksdoxK89ua6>

Date: Thursday, 01.06.2023

Time: 17:00

Zoom Link (hybrid event): <https://hu-berlin.zoom.us/j/66856745433>

Abstract: The use of ayahuasca, an indigenous brew from the Amazonian basin with psychedelic properties, has increased worldwide and its therapeutic value has been investigated. Recently, we conducted a randomized placebo-controlled trial with ayahuasca in 35 patients with treatment-resistant depression. The results suggest a significant antidepressant effect of ayahuasca with rapid onset, already one day after a single session with ayahuasca. In addition to the antidepressant effects, in this trial we also explored the sub-acute effects of ayahuasca on a number of markers such as psychiatric scales, neuropsychological tests, functional magnetic resonance imaging (fMRI), electroencephalography (EEG), and, saliva and blood tests. All assessments occurred one day before and one day after the treatment session with ayahuasca or placebo, in all patients with depression as well as in a group of 50 healthy individuals. This presentation will focus on showing some of the findings from these measurements, which should help informing on safety and on the mechanisms behind the observed antidepressant effects of ayahuasca.

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The Neural Mechanisms of Psychedelic Drug Action - Talk 3

Speaker: Dr. Enzo Tagliazucchi - University of Buenos Aires

Title: How to study the effects of serotonergic psychedelics without alienating your experimental subjects and obtaining useless data in the process

Venue: Institute of Theoretical Biology, Philippstr. 12, Haus 4, Hörsaal 4, Berlin 10115, Germany
<https://goo.gl/maps/uBEkAEksdoxK89ua6>

Date: Thursday, 15.06.2023

Time: 17:00

Zoom Link (hybrid event): <https://hu-berlin.zoom.us/j/63931747441>

Abstract: The renewed scientific interest in psychedelic drugs combines traditional questions with modern experimental paradigms and analytic methods, which aim to overcome severe limitations that characterize early research conducted during the 20th century. An important feature of contemporary methodology is the attempt to isolate one aspect of the psychedelic experience, dissociating it from potential confounding factors, a usual practice within the framework of cognitive neuroscience. In this talk, I argue that this framework is suboptimal for the study of psychedelic drugs, as they induce profound alterations in consciousness and cognitive function (mainly attention) which compromise the interpretation of results whose main outcome is a measure of task performance. Moreover, I propose that lengthy tasks without correlates in what humans naturally do during psychedelic trips can lead to anxiety and negatively affect the data and the experience of the participants. I conclude that natural tasks and settings have not been sufficiently explored in recent research, and I will show examples that combine rigorous paradigms with tasks that are natural for the participants.

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The Neural Mechanisms of Psychedelic Drug Action - Talk 4

Speaker: Dr. Javier González-Maeso - Virginia Commonwealth University

Title: Molecular target and mechanisms of psychedelic-induced plasticity

Venue: Institute of Theoretical Biology, Philippstr. 12, Haus 4, Hörsaal 4, Berlin 10115, Germany

<https://goo.gl/maps/uBEkAEksdoxK89ua6>

Date: Thursday, 29.06.2023

Time: 17:00

Zoom Link (hybrid event): <https://hu-berlin.zoom.us/j/62736858319>

Abstract: Clinical evidence suggests a potential therapeutic effect of classical psychedelics for the treatment of depression. The most outstanding and distinct characteristic is the rapid and sustained antidepressant action with one single exposure to the drug. However, the biological substrates and key mediators of psychedelics' enduring action remain unknown. Our current data suggest that a single administration of the psychedelic DOI produced fast-acting effects on mouse frontal cortex dendritic spine structure and acceleration of fear extinction via the serotonin 5-HT_{2A} receptor. Additionally, a single dose of DOI led to changes in chromatin organization particularly at enhancer regions of genes involved in synaptic assembly that stretched for days after the psychedelic exposure. DOI-induced alterations in neuronal epigenome overlapped with genetic loci associated with schizophrenia, depression and attention deficit hyperactivity disorder. Together, these data support the notion that epigenetic-driven changes in synaptic plasticity operate as the mechanistic substrate of psychedelic's long-lasting antidepressant action but also warn on the limitations in individuals with underlying risk for psychosis. If generalizable to other psychedelics currently in clinical studies, these findings could also facilitate the understanding of psychopharmacological interventions whose mechanisms of action are not fully defined.

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The Neural Mechanisms of Psychedelic Drug Action - Talk 5

Speaker: Dr. Alex Kwan - Cornell University

Title: Imaging the actions of psychedelics on dendrites

Venue: Institute of Theoretical Biology, Philippstr. 12, Haus 4, Hörsaal 4, Berlin 10115, Germany

<https://goo.gl/maps/uBEkAEksdoxK89ua6>

Date: Thursday, 27.07.2023

Time: 17:00

Zoom Link (hybrid event): <https://hu-berlin.zoom.us/j/61751893925>

Abstract: Numerous drugs have the ability to alter our perception, cognition, and mood. Some of these compounds, such as ketamine and serotonergic psychedelics, have also shown promise as treatments for depression. The behavioral effects are often long-lasting, presumably because the drugs act on synapses and dendrites to induce plasticity in the brain. In this talk, I will discuss my lab's work on understanding the impact of psychoactive drugs on neurons and neural circuits in mice. Specifically, I will describe a series of studies using subcellular-resolution two-photon imaging and other techniques to dissect the effects of psilocybin and other classical psychedelics on the structure and function of dendrites.

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The Neural Mechanisms of Psychedelic Drug Action - Talk 6

Speaker: Dr. Natasha Mason - University of Maastricht

Title: Mind-bending, Mind-“mending”? The effect of psychedelics on flexible cognition, and therapeutic implications.

Venue: Institute of Theoretical Biology, Philippstr. 12, Haus 4, Hörsaal 4, Berlin 10115, Germany
<https://goo.gl/maps/uBEkAEksdoxK89ua6>

Date: Thursday, 10.08.2023

Time: 17:00

Zoom Link (hybrid event): <https://hu-berlin.zoom.us/j/67154237348>

Abstract: Flexible cognition, such as creative thinking and perspective taking (empathy), is an essential cognitive ability linked to all areas of our everyday functioning. Thus, finding a way to enhance it is of broad interest. A large number of anecdotal reports suggest that the consumption of psychedelic drugs can enhance creative thinking and empathy; however, scientific evidence is sometimes lacking. In this lecture, I will give an overview of the work that has been done, investigating whether psychedelics alter creativity and empathy. I will then present data from a series of studies in which we investigated the effects of the psychedelics ayahuasca and psilocybin on aspects of flexible cognition. Through these studies, we have demonstrated that there is a time- and construct-dependent effect of psychedelics on both creativity and empathy. Furthermore, utilizing an ultrahigh field multimodal brain imaging approach, we found that acute and persisting changes in creativity were predicted by within- and between-network connectivity of the default mode network. Taken together, evidence suggests some support to historical claims that psychedelics can influence aspects of flexible cognition, potentially indicating them as a tool to investigate creativity, empathy, and subsequent underlying neural mechanisms. Therapeutic implications will also be discussed.

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