The value of time - a neural mechanism that links serotonin and depression

Initiative: Freigeist-Fellowships

Bewilligung: 13.12.2020

Laufzeit: 5 Jahre

Our time is precious - at any moment we must decide how much time to spend to realize our goals. For example, we might spend an hour to cook a meal, or invest years studying to obtain a degree. Distortions in how we value time can lead to irrational behavior and potentially contribute to psychiatric conditions such as depression. Indeed, depressive patients report an altered sense of time. Clinical trials show that psychedelics, which target the brain's serotonin system, have great potential for treating depression. Despite this connection between time, depression and psychedelics, the underlying neural mechanisms are unknown. The research group aims to identify the neural circuits for time valuation. By investigating how serotonin controls frontal cortex neurons, the project's goal is to provide a neural mechanism that explains aspects of depressive symptoms and psychedelic drug action. The project will use a cross-species decision task to quantify time valuation in depressive patients and rats. It will establish methods to measure serotonin levels in the rat's brain to test serotonin's impact in frontal cortex, and target specific neuron types that mediate time valuation using optogenetic methods and RNA sequencing. This research offers insight into psychedelics' impact on brain and behavior and a path forward to discover novel treatments for depression.

Projektbeteiligte

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