

# Brain mechanisms in drug addiction—new brain pathways revealed

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Credit: Andrea Piacquadio from Pexels

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While the discovery was made in rats, it opens up a new target for developing treatments for drug and [alcohol addiction](#) in humans, which could include deep brain stimulation.

The study has been published in the *Journal of Neuroscience*.

Drug addiction is a chronic relapsing disorder characterised by cycles of drug abuse, abstinence and relapse.

"Current drug therapies are generally poor because we still don't completely understand how the brain's neural circuits contribute to different forms of relapse," said first author of the study, Dr Asheeta Prasad from UNSW's School of Psychology.

"Mapping these circuits is crucial if we are to move forward in treating drug and alcohol addiction," Dr Prasad said.

The researchers studied the brain's ventral pallidum (VP), which is responsible for regulating motivation, behaviour, and emotions.

Previous studies have shown that activity in the VP has been implicated in a variety of drugs of abuse including cocaine, amphetamines and alcohol. Importantly, VP is a key brain region for promoting relapse, with VP neurons activated during different forms of relapse.

The UNSW researchers identified for the first time that two distinct VP output brain pathways are necessary for different forms of alcohol-related relapse. They found that the brain pathways from the VP to the subthalamic nucleus, a small lens-shaped nucleus in the brain, and the

ventral tegmental area, part of the mid-brain, are switched on during relapse behaviour. Their study has identified a novel node in the brain circuitry for [relapse](#)

When the researchers switched off these brain pathways, drug seeking behaviour and motivation for alcohol was reduced in rats.

The finding opens up the potential for using [deep brain stimulation](#) in the treatment of addiction.

"Deep [brain stimulation](#) of the subthalamic nucleus is currently used to manage Parkinson's disease, but has not yet been tested in the treatment of addiction," Dr Prasad said.

"It is a certainly a potential future treatment for relapsing disorders such as [drug addiction](#) and obesity."

**More information:** A. A. Prasad et al. Ventral Pallidum Output Pathways in Context-Induced Reinstatement of Alcohol Seeking, *Journal of Neuroscience* (2016). [DOI: 10.1523/JNEUROSCI.2580-16.2016](#)

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