

Potential new treatment for drug addiction relapse revealed

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Research published in *Addiction Biology* by scientists at the University of Bath reveals a new potential mechanism for combatting drug addiction relapse.

Relapsing into drug taking is a big problem in treating [addiction](#), where the majority of addicts return to drug-taking within 12 months of quitting. This is brought into focus by the burgeoning 'opioid epidemic' of prescription as well as recreational opioid drugs, such as morphine and heroin. Addiction [relapse](#) is associated with drug-related cues such as places, drug paraphernalia, the drug itself, or stress, highlighting that memories play a key role in addiction relapse.

In this study researchers at Bath, working with colleagues from the University of Surrey and RenaSci, used an [animal model](#) to study relapse to morphine seeking behaviour. Rats or mice learned to associate particular environmental cues with morphine. After removal of the drugs, relapse back to drug-seeking behaviour occurred in response to getting the cues again.

The Bath team wanted to test the effect of using a blocker for a brain neurotransmitter called acetylcholine, which is involved in [memory](#) processes. They tested the effect of a blocker of a specific receptor for acetylcholine—the alpha7 nicotinic receptor—to see if this might impair relapse. This drug, methyllycaconitine (MLA), that comes from Delphinium plants, selectively blocked morphine relapse (but not the initial learning to seek drugs), in both mice and rats.

This exciting novel observation led the researchers to investigate the brain region responsible for MLA's effect and identified the ventral hippocampus as the locus. The hippocampus is well known for its role in memory, and the ventral domain is particularly associated with emotional memories, an obvious link to addiction pathways.

Professor Sue Wonnacott, from the University of Bath's Department of Biology & Biochemistry, said: "It's an exciting step forward that links the cholinergic system, more commonly associated with nicotine addiction, with the mechanisms of relapse a different class of abused drug—the opioids. More work needs to be done to uncover the brain mechanisms involved, but it raises the prospect of erasing long-term [drug](#)-associated memories that underpin addiction and the propensity to relapse."

Dr. Chris Bailey, from the University of Bath's Department of Pharmacy & Pharmacology, commented: "Drug addiction is very poorly treated at present so this potential novel approach is very welcome. An important next step is to see if MLA blocks relapse to other abused drugs. We already have evidence, in the same animal model, that it is effective against the more potent opioid, heroin. If MLA has similar effects against other drugs of abuse such as cocaine it would be even more encouraging."

More information: Victoria L. Wright et al, Inhibition of alpha7 nicotinic receptors in the ventral hippocampus selectively attenuates reinstatement of morphine-conditioned place preference and associated changes in AMPA receptor binding, *Addiction Biology* (2018). DOI: [10.1111/adb.12624](https://doi.org/10.1111/adb.12624)

Provided by University of Bath

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