

Cocaine changes the brain and makes relapse more common in addicts

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Credit: University of East Anglia

Cocaine use causes 'profound changes' in the brain that lead to an increased risk of relapse due to stress - according to new research from the University of East Anglia.

New research published today in *The Journal of Neuroscience* identifies a [molecular mechanism](#) in the reward centre of the brain that influences how recovering [cocaine addicts](#) might relapse after [stressful events](#).

Importantly, the study identifies a potential mechanism for protecting against such relapses with treatment.

The research team looked at the effects of cocaine in rat brain cells (in vitro) and in live rats - particularly their 'cocaine seeking' response to stress.

Lead researcher Dr Peter McCormick, from UEA's School of Pharmacy, said: "Relapse among cocaine addicts is a major problem. We wanted to find out what causes it.

"Neuropeptides are messenger molecules that carry information between neurons in the brain. They form the brain's communications system.

"We looked at the interaction between two particular neuropeptides in the part of the brain that is to do with reward, motivation and [drug addiction](#) among other things.

"We had speculated that there might be a direct communication between neuroreceptors controlling stress and reward. When we tested this, we found this to indeed be the case.

"Our research showed that the release of neuropeptides influences activity in this part of the brain and that profound changes occur at the neuroreceptor level due to exposure to cocaine.

"We showed that cocaine disrupts the interaction between receptors and these changes could increase the risk of relapse under stressful conditions.

"Importantly, we identify a potential mechanism for protection against such relapse.

"By restoring the broken interaction, we may be able to minimize stress-driven [relapse](#) in addicts. This research lays the groundwork for the development of such approaches.

"Although our study is in rodents, the same receptors have been shown to impact human stress and drug addiction.

"Cocaine has a relatively unique effect on the brain. However, the reward centre is crucial for addictive behaviours.

"Studies on [post-traumatic stress disorder](#) have shown traumatic events can have profound influences on receptors in this region of the [brain](#), perhaps rendering soldiers more prone to addiction. Although speculative, it would not surprise me to see similar results in other situations, whether drug or stress related."

More information: 'Orexin-CRF Receptor Heteromers in the Ventral Tegmental Area as Targets for Cocaine' is published in *The Journal of Neuroscience* on April 28.

Provided by University of East Anglia

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