

'Erasing' drug-associated memories may stop drug addiction relapses

(PhysOrg.com) -- 'Erasing' drug-associated memories may prevent recovering drug abusers from relapsing, researchers at the University of Cambridge have discovered.

The team, led by Professor Barry Everitt, was able to reduce drug-seeking behaviours in rats by blocking a brain chemical receptor important to learning and memory during the recall of drug-associated memories. Their research, which was funded by the Medical Research Council, was reported in the 13 August issue of *The Journal of Neuroscience*.

The Cambridge scientists found that by disrupting or erasing memories associated with drug use during recall, they could prevent the memories from triggering relapses and drug taking.

Memories exist in different states depending on whether they are being recalled or not. When memories are recalled, they become 'unstable' or malleable and can be altered or erased during the process called reconsolidation. Because relapse by drug abusers is often prompted when they recall drug-associated memories, the scientists found that by blocking these memories they could prevent relapse.

In order to undertake the experiments, the researchers trained rats to associate the switching on of a light with cocaine. The researchers then exposed the rats to the light, thereby 'reactivating' the memory, without the cocaine. In an effort to receive more cocaine, the rats would perform tasks that the scientists had created which would turn on the light.

When the animals were given a chemical that interfered with the action of the NMDA-type glutamate receptor (which plays an important role in memory) prior to the 'reactivation' session, the rats showed reduced cocaine-seeking behaviours. A single treatment reduced or even stopped drug-seeking behaviours for up to four weeks.

In contrast, blocking the receptors after or without the reactivation session had no effect on subsequent drug-seeking behaviours, indicating that drug-associated memories can be disrupted during but not after reconsolidation of memories.

Professor Barry Everitt said, "The results suggest that efforts should be made to develop drugs that could be given in a controlled clinical or treatment environment in which addicts would have their most potent drug memories reactivated. Such treatments would be expected to diminish the effects of those memories in the future and help individuals resist relapse and maintain their abstinence."

Dr Amy Milton, a co-author, said, "This is a new approach to the treatment of drug addiction that has great potential. Additionally, this might also be used to treat other neuropsychiatric disorders characterized by maladaptive memories, including post-traumatic stress and phobic anxiety disorders."

Provided by University of Cambridge

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