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N-acetylcysteine for treating cocaine addiction – A systematic review

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Abstract

The aim of this paper is to extensively review the current literature available on N-acetylcysteine (NAC) treatment for cocaine dependence (clinical and experimental studies). We screened all articles published before February 2016 reporting on the use of NAC as a pharmacological intervention for cocaine dependence or discussed its potential as a therapeutic approach for cocaine dependence. We described our results qualitatively. 21 studies matched our search criteria: 6 clinical trials and 15 animal studies. Four clinical studies showed NAC's capacity to reduce craving, desire to use cocaine, cocaine-cue viewing-time and cocaine-related spending. Studies in animal models also support this reinstatement prevention application of NAC. NAC reverses the disruption of glutamate homeostasis caused by long-term cocaine use restoring function of the cystine-glutamate exchanger in glial cells and reversing the downregulated GLT-1 receptor. Current data suggest promising potential for NAC as an anti-relapse agent, as a double-blind placebo trial was mainly negative, except in the subgroup of patients who were already abstinent. An optimal dose for relapse prevention may be one that restores extrasynaptic glutamate to physiological levels and predominantly activates mGluR2 and 3, but not mGluR5 receptors, which are linked to relapse. NAC may be better suited for avoiding relapse in already abstinent subjects.

1. Introduction