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N-Acetylcysteine Ameliorates Neurotoxic Effects of Manganese Intoxication in Rats: A Biochemical and Behavioral Study

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Abstract

Clinical and experimental evidences reveal that excess exposure to manganese is neurotoxic and leads to cellular damage. However, the mechanism underlying manganese neurotoxicity remains poorly understood but oxidative stress has been implicated to be one of the key pathophysiological features related to it. The present study investigates the effects associated with manganese induced toxicity in rats and further to combat these alterations with a well-known antioxidant N-acetylcysteine which is being used in mitigating the damage by its radical scavenging activity. The study was designed to note the sequential changes along with the motor and memory dysfunction associated with biochemical and histo-pathological alterations following exposure and treatment for 2 weeks. The results so obtained showed decrease in the body weights, behavioral deficits with increased stress markers and also neuronal degeneration in histo-pathological examination after manganese intoxication in rats. To overcome the neurotoxic effects of manganese, N-acetylcysteine was used in the current study due to its pleiotropic potential in several pathological ailments. Taken together, N-acetylcysteine helped in ameliorating manganese induced neurotoxic effects by diminishing the behavioral deficits, normalizing acetylcholinesterase activity, and augmentation of redox status.

Keywords: Behavioral deficits; Histopathology; Manganese; N-acetylcysteine; Neurotransmitters; Redox-cellular status.

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