

Abstract

Background: Cadmium (Cd) is a common pollutant and potential neuro-toxicant to humans. The main treatment for heavy metal toxicity is chelation therapy which is however replete with grave side effects. This study was designed to determine the neuroprotective effects of extracts of the tea beverage on experimentally induced cadmium toxicity in the brain of rats. Cadmium as CdCl₂ was administered subcutaneously while tea was given orally.

Methods: Healthy Wister rats were used to study the effects of co-administration of Cd and tea extracts on the brain. Cadmium was injected subcutaneously while tea was administered orally to the rats. Brain tissue from euthanized rats was assayed for Zinc Fingers and Homeobox Protein 1 (ZHX1), reduced glutathione (GSH), and lipid peroxidation markers Thiobarbituric Acid Reactive Substances (TBARS). Neurohistochemical and histopathological studies were also carried out on the brain tissues of the rats.

Results: Cadmium significantly induced neuronal damage exhibited by a significant ($p < 0.05$) decrease in ZHX1 in the brain tissue, significant ($p < 0.05$) increase in TBARS, as well as significant ($p < 0.05$) increase in GSH implying an impaired antioxidant defense system. Co-administration of Cd with black or green tea extracts resulted in a significant decrease in lipid peroxidation as well as maintenance of GSH and ZHX1. The neurohistochemical and histopathological studies in the brain of the rats indicated that the tea extracts significantly reduced CdCl₂ toxicity and preserved the normal histological architecture of the brain tissues.

Conclusion: This paper reports for the first time the efficacy of tea extracts in protecting rats from cadmium induced toxicity and disturbances of antioxidant defense system in the brain.