

Protective effect of dietary walnut against cisplatin - induced neurotoxicity

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Background and Aims: Walnut is expansively used in traditional medicine for treatment of various ailments. It is described as an anticancer, anti-inflammatory, blood purifier and antioxidant agent. In this study, we investigated whether or not Walnut could protect neurons against cisplatin-induced neurotoxicity in rats.

Methods: Dietary walnut was assessed for its neuroprotective effects through the alteration in performance of hippocampus- and cerebellum-related behavioral following chronic cisplatin treatment (5 mg/kg/week for 5 weeks) in male rats. Animals had free access to food and water. In the beginning of the experiment, animals were weight-matched and randomly assigned into three groups: Saline, Cisplatin and Cisplatin + Walnut. Each group consisted of a minimum of fifteen animals (n=15). Control animals (Group I) were administered normal saline intraperitoneally [ip] (0.2 ml) for 5 weeks. Cisplatin (5 mg/kg body weight) was administered intraperitoneally for 5 weeks (Group II). Four behavioral tasks, the Open field, Rotarod, hanging and Morris water maze tasks were chosen. The first set of behavioral test was performed 24h after the last injection of cisplatin. Open field, Rotarod and grasping tests were performed to screen the muscle coordination activity and explorative behaviors of rats before subjecting them to water maze evaluation.

Results: Locomotor activity was affected by cisplatin in the open field test, a decreased level of locomotion was observed in cisplatin treated rats, and walnut did modify these alterations to some extent. We show that exposure of adolescent rats to cisplatin resulted in significant decrease in explorative behaviors and memory retention. Walnut consumption appears somewhat to improve memory and motor abilities. Histological examinations showed that cisplatin-induced damage was relatively specific to Purkinje and granule cells in the cerebellum.

Conclusions: We conclude that walnuts in the diet following anticancer drugs such as cisplatin probably protect cisplatin –induced behaviors disruption.

Keywords: Walnut; Cisplatin; Neurotoxicity; Rats