Journal of Dietary Supplements

ISSN: 1939-0211 (Print) 1939-022X (Online) Journal homepage: http://www.tandfonline.com/loi/ijds20

Gallic Acid Ameliorates Cyclophosphamide-Induced Neurotoxicity in Wistar Rats Through Free Radical Scavenging Activity and Improvement in Antioxidant Defense System

Ademola Adetokunbo Oyagbemi, Temidayo Olutayo Omobowale, Adebowale Bernard Saba, Ebunoluwa Racheal Olowu, Racheal Omolola Dada & Akinleye Stephen Akinrinde

Journal of Dietary Supplements, Early Online:1–18, 2016

DOI: 10.3109/19390211.2015.1103827

Taylor & Francis
Taylor & Francis Group

ARTICLE

Gallic Acid Ameliorates Cyclophosphamide-Induced Neurotoxicity in Wistar Rats Through Free Radical Scavenging Activity and Improvement in Antioxidant Defense System

Ademola Adetokunbo Oyagbemi[1], Temidayo Olutayo Omobowale[2], Adebowale Bernard Saba[1], Ebunoluwa Racheal Olowu[1], Racheal Omolola Dada[1], & Akinleye Stephen Akinrinde[1]

[1]Faculty of Veterinary Medicine, Department of Veterinary Physiology, Biochemistry and Pharmacology, University of Ibadan, Ibadan, Nigeria, [2]Faculty of Veterinary Medicine, Department of Veterinary Medicine, University of Ibadan, Ibadan, Nigeria

ABSTRACT. Cyclophosphamide (CPA) is a widely used anticancer chemotherapeutic agent and its toxicity has been associated with its toxic metabolites phosphormide mustard. Therefore, the ameliorative effect of Gallic acid against neurotoxicity was examined in this study. Sixty rats were grouped into 10 rats per group. Group 1 received saline orally. Group 2 received CPA at 100 mg/kg single dose intraperitoneally on day 1. Groups 3 and 4 were treated with Gallic acid (GA) at 60 and 120 mg/kg body weight only for 10 days and also received a single dose of CPA (100 mg/kg) intraperitoneally on day 1, respectively. Rats in groups 5 and 6 received GA at 60 and 120 mg/kg body weight only for 10 days. Groups 3, 4, 5, and 6 received GA orally. The cerebellar and cerebral malondialdehyde (MDA) contents and hydrogen peroxide generation were significantly ($p < .05$) elevated. The cerebellar and cerebral catalase (CAT), superoxide dismutase and glutathione-S-transferase (GST) activities were significantly ($p < .05$) reduced in CPA treated group. The activity of glutathione peroxidase (GPx) was significantly increased in rats that were treatment with CPA. Also, nitrite content was significantly elevated in the brain of rats that received the toxic dose of CPA. All these findings suggest that treatment with GA (60 and 120 mg/kg) ameliorated the neurotoxicity induced by CPA via reduction of oxidative stress and increase in antioxidant defense system. Combining all, chemotherapeutic agents with structure/function similar to GA could be of potential benefit to the pharmaceutical industries as an adjuvant in chemotherapy with little or no side effects.

KEYWORDS. antioxidant, cyclophosphamide, gallic acid, neurotoxicity, oxidative stress

Address correspondence to: Dr. A.A. Oyagbemi, Department of Veterinary Physiology, Biochemistry and Pharmacology, Faculty of Veterinary Medicine, University of Ibadan, Ibadan, Nigeria. (Email: aa.oyagbemi@ui.edu.ng)
Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/ijds