Indian Journal of Experimental Biology
Vol. 62, October 2024, pp. 795-801
DOI: 10.56042/ijeb.v62i10.3070

Evaluation of ischemia/reperfusion injury in streptozotocin-induced diabetic rats and its amelioration by hazelnut

Yahya Ozel[1], Hanife Şerife Aktaş[2], Hümeysa Kiyak Kırmacı[3,4], Sarfraz Ahmad[5]*, Şermin Tetik[6], Turgut Şekerler[7], Elif Beyzanur Polat[3], Neslihan Sayir[8] & Hatice Kübra Elçioğlu[3]*

[1]Vocational School, Doğus University, Istanbul, Turkey

[2]Internal Medicine Clinic, Umraniye Training and Research Hospital, University of Health Sciences, Istanbul, Turkey [3]Department of Pharmacology, Faculty of Pharmacy, Marmara University, Istanbul, Turkey

[4]Department of Pharmacology, Faculty of Pharmacy, University of Health Sciences, Istanbul, Turkey

[5]AdventHealth Cancer Institute, Orlando, FL, USA

[6]Faculty of Pharmacy, European University of Lefke, Lefke, Northern Cyprus, TR-10 Mersin, Türkiye

[7]Department of Biochemistry, Faculty of Pharmacy, Marmara University, Istanbul, Turkey

[8]Department of Pathology, Haydarpaşa Numune Training & Research Hospital, University of Health Sciences, Istanbul, Turkey

Received 22 June 2023; revised 15 February 2024

Beneficial effects of hazelnuts on human health are well known, and recent research on heart health has generated more interest. However, studies based on its oxidative damage preventive effect are not well explained in patients with diabetes mellitus (DM). Therefore, the aim of this study was to investigate the protective effect of hazelnut against oxidative stress-induced damage in hepatic ischemia/reperfusion (I/R) injury in rats induced by streptozotocin (STZ). Rats were divided into four groups (Control, DM, DM+I/R, DH; n=6 in each). The I/R model was created four weeks after DM was induced in rats. In four weeks until the I/R model was created, the DM+I/R+Hazelnut group was fed with pellet feed (2 g/100 g/day) prepared with hazelnut. At the end of experiment, glutathione (GSH) and malondialdehyde (MDA) levels in liver tissue, tumor necrosis factor-α (TNF-α), and interleukin 6 (IL-6) levels were measured in serum. The results showed that TNF-α, IL-6, and MDA levels increased significantly in the DM+I/R group, while this increase was less in the DM+I/R+Hazelnut group. It is concluded that hepatic I/R damage caused increased inflammatory response and oxidative stress in diabetic rats, and this response was decreased/modulated by the pre-treatment with hazelnuts.

Keywords: Ischemia/reperfusion injury, Animal model, Diabetes mellitus, Hazelnut, Oxidative stress, Inflammatory response