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Antinephritic Potential of Eicosapentaenoic Acid In High Fat-Diet/Alloxan-Induced Diabetes In Male Rats

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Objectives : Eicosapentaenoic acid (EPA) is widely employed for prevents the blood from clotting easily, reduces triglyceride levels in the blood, and has effects that might reduce pain and swelling. Studies report fish oil based lipid emulsions contain high amounts of omega-3 polyunsaturated fatty acids. Omega-3 fatty acids are part of a healthy diet that helps lower risk of heart disease. Hence, we assessed changes produced by the administration of EPA on biomarkers related to lipid metabolism and antioxidant systems in kidney and liver of high fat-diet diabetic male rats.

Methods : The study was carried out on 64 diabetic male albino rats; a high-fat diet (HFD) and a single dose of alloxan (25 mg/kg) were utilized for experimental model induction. Diabetic rats were received EPA (100 and 200 mg/kg) intragastrically by gavage per day for 30 days.

Results : Administration of EPA caused a remarkable recovery of liver and kidney function, and aldosterone level, particularly. The hypolipidemic activity of EPA was confirmed by the normalization of total cholesterol, triglycerides, and low- and high-density lipoprotein cholesterol in diabetic rats. Inhibitory effects on albuminuria, creatinine, urea nitrogen, and n-acetyl- β -d-glucosaminidase verified EPA 's renal and hepatic protective activity in diabetic rats. Furthermore, EPA exerted beneficial modulation of inflammatory factors and oxidative enzymes. Compared with untreated diabetic rats, EPA decreased the expression of phosphor-AKT and phosphor-GSK-3 β in the kidneys. Proapoptotic, antiapoptotic and inflammatory markers were significantly improved and showing a great retain to their normal levels specifically in EPA (200mg/kg)-treated groups.

Conclusions : EPA has a great protective influence on liver and kidney injury of HFD/alloxan-induced diabetic rats. These findings indicate that EPA can be considered as a potential candidate for in vivo and clinical studies against various metabolic disease.