

SUMMARY

Büyükben A. Effect of quercetin on protein and DNA damage in rats with experimental diabetes

Diabetes Mellitus is described a metabolic disorder of multiple aetiology characterized by disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion or insulin action. There was found increase of oxidative stress on diabetes. Hyperglycemia seems to promote an imbalance between the generation and elimination of reactive oxygen species. Oxidative stress in diabetes could arise from a variety of mechanisms, such as excessive production of reactive oxygen species from the auto-oxidation of glucose, glycation of proteins, and glycation of antioxidant enzymes. These changes could result in damage to cellular organelles and membranes, which may lead to diabetic complications.

In this study, the searching of protective roles of quercetin against streptozotocin-induced diabetes mellitus and oxidative stress at the levels of the protein, DNA and lipid which is aimed.

Totally 90 rats in 6 groups were included in the study. Single dose 50 mg/kg streptozotocin was injected intraperitoneally for rats of STZ and streptozotocin+quercetin groups on the purpose of diabetes. Also 20 mg/kg, 50 mg/kg and 70 mg/kg quercetin were given by gavage for the quercetin group rats during 21 days. In the 21st day after injection, blood samples, which were collected from the tail veins of all rats, were transferred in the ependorf centrifuge tubes. Blood sugar levels of the experimental groups were determined. Plasma and serum samples were extracted from the blood samples and lymphocyte cell isolation was realized. Detections of the MDA, AOPP, NT and PCO levels in the plasma and serum samples and analysis of comet in the lymphocyte samples were done.

MDA levels were increased in STZ group compared to SF group and MDA concentrations in all quercetin treatment groups were reduced with respect to STZ group ($p<0.05$).

While it was observed that AOPP, NT and PCO levels in the STZ groups were higher than SF group due to diabetes, it was determined that NT and PCO levels in quercetin treatment groups were increased in contrast with STZ group ($p<0.05$). There

were similar increases at AOPP levels of STZ+20QUER and STZ+50QUER groups but it was monitored that STZ+70QUER group was gained resistance against diabetes from the point of AOPP.

According to results of comet analysis, which was realized in order to view the level of DNA damage, it was defined that DNA damage was increased as a result of streptozotocin application. Besides it was found that DNA damages were decreased in STZ+70QUER group when compared to STZ group ($p < 0.05$).

It was determined that some damages were generated at lipid, proteins and DNA in parallel with forming of diabetes-induced oxidative stress. Therewithal quercetin, especially 70 mg/kg dosage of quercetin, showed protective effect against DNA damage and lipid peroxidation. But it was surmised that quercetin wasn't provided resistance against oxidative damage of plasma proteins sufficiently.

Key words: Diabetes Mellitus, quercetin, protein damage, DNA damage, lipid peroxidation, free radikals, antioxidants, comet assay