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The effects of lycopene against diethylnitrosamine-induced testicular toxicity: with biochemical, spermatological and histopathological approaches

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Statement of the Problem: The aim of study was to investigate the possible protective role of lycopene on diethylnitrosamine (DEN)-induced testicular toxicity using biochemical, spermatological and histopathological approaches.

Methodology & Theoretical Orientation: The rats were divided into 8 groups as control, lycopene, DEN(1), DEN(2), lycopene+DEN(1), lycopene+DEN(2), DEN(1)+lycopene and DEN(2)+lycopene. DEN was administered to rats at 200 mg/kg/bw, a single dose i.p for 30 days in DEN(1) groups and for 90 days in DEN(2) groups. Lycopene was administered to rats every other day at 10 mg/kg/bw, gavage for 10 days. Lycopene administration was started 10 days before the DEN administration in lycopene+DEN(1) and lycopene+DEN(2) groups and together with the DEN administration in DEN(1)+lycopene and DEN(2)+lycopene groups. Malondialdehyde (MDA), reduced glutathione (GSH) levels, catalase (CAT), glutathione peroxidase (GSH-Px), glutathione-S-transferase (GST), superoxide dismutase (SOD) activities were determined in testes tissues. Also testes tissues were examined spermatological and histologically.

Findings: MDA levels significantly increased; while GSH, CAT, GST, GSH-Px and SOD activities decreased ($p < 0.001$). MDA, GSH levels and antioxidant enzyme activities reached to normal levels with the addition of lycopene; simultaneous-administration with DEN has been more effective ($p < 0.001$). Reduction sperm density and motility, weights of reproductive organs, increase in rate of abnormal sperm were observed in DEN groups. Lycopene has provided improvement in spermatological characteristics and weights of reproductive organs. Histopathologically, it was determined that the most significant microscopic change in all experimental groups were dilation in seminiferous tubules; especially in DEN(2) group ($p < 0.001$). Additionally, reduction in germinal cell thickness, disorganization and degeneration in germinal epithelium, syncytial cell formations in seminiferous tubules lumen were another change in experimental groups. Decrease in germinal cell thickness was noted in DEN(2), DEN(1), lycopene+DEN(2) and lycopene+DEN(1) groups, respectively.

Conclusion & Significance: DEN-induced oxidative stress leads to the structural and functional damages in the testicular tissue and sperm quality of rats and, lycopene has been able to eliminate these damages.

Biography

Emre Kaya is working in Department of Biochemistry, Faculty of Veterinary Medicine, Firat University, Elazig, Turkey. He is continuing his scientific Studies in various subjects in the same place. His work focuses more on oxidative stress and its prevention.

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