

Summary of the Ph.D thesis No., **12159** Faculty of Veterinary Medicine, Urmia University.

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Title: Effects of catechin and nanocatechin on testicular histoarchitecture and oxidative and apoptotic alterations, epididymal sperm characteristics and in vitro fertility following streptozotocin-induced diabetes in male mice

Abstract:

Diabetes causes many disorders in different tissues of the body. It has been found that the increase in the oxidative stress system along with the increase in blood sugar has a significant role in the emergence of biochemical, molecular and tissue changes in diabetes. The aim of study was to investigate the protective effects of catechin and nanocatechin experimental in diabetic mice. In this experimental study, 42 mice were randomly divided into 6 groups(N= 7) . In the oral control group, mice received 0.5 ml of physiological serum daily. In the injection control group, 0.2 ml of Normal saline was injected intraperitoneally. In the diabetic group, 50 mg of STZ per kilogram of body weight was injected intraperitoneally. The group of diabetic mice + catechin 50 , diabetic group + nano-catechin with doses of 50, 25 and 12.5 mg per kilogram of body weight, in these groups, diabetic mice received catechin 50, nano catechin 50, 25 and 12.5 mg per kilogram of body weight respectively. After 24 hours of the last treatment, blood samples were taken from the mice, then the mice were euthanized and the testes were weighed. Sperm parameters include sperm count, sperm motility percentage, percentage of live sperm and percentage of immature sperm and sperm with DNA damage, in vitro fertilization, morphometric changes and spermatogenesis indices of testicular tissue, malondialdehyde (MDA) level, catalase level of testicular tissue and The total antioxidant capacity (TAC) of testicular tissue and the expression of Bax, Bcl2, P53 and Caspase-3 genes were evaluated. The results of this study showed that in diabetic rats, the weight of the testis, the number, motility and viability of sperms, the percentage of fertilization and the percentage of two-celled embryos and blastocysts, as well as the TAC and the level of catalase enzyme in the testis tissue, the percentage of positive TDI, the percentage of RI, the diameter of seminiferous tubes And expression level of Bax, Bcl2 genes decreased ($p<0.05$) and the number of immature sperms and sperms with damaged DNA and the percentage of arrested embryos ($p<0.05$) had a significant increase compared to the control groups. Catechin and nano-catechin had a positive effect on spermatogenesis parameters and morphometric parameters in diabetic mice. The findings of this research revealed that catechin and nanocatechin in all three doses have a positive effect on the fertility of mice through establishing the oxidation-reduction balance and increasing the expression of apoptosis-inhibiting genes and decreasing the expression of apoptosis-causing genes.

Key words: catechin, in vitro fertility, Small white laboratory mouse, nano-catechin