

Effects of ascorbic acid on spermatogenesis and sperm parameters in diabetic rats

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Abstract

Cadmium (Cd) is one of the environmental pollutants affecting various tissues and organs including testis. Harmful effect of Cd in testis is known to be germ cell degeneration and impairment of testicular steroidogenesis. Animals treated with high doses of Cd (0.2 and 0.3 mg/100g BW) showed a significant decrease in serum testosterone (T) level, but a significant induction of testicular lipid peroxidation levels. TUNEL assay showed that low doses of Cd (0.13 and 0.15 mg/100g BW) exhibited typical characteristics of apoptosis while high doses of Cd caused more necrosis than apoptosis. In contrast, supplementation with ascorbic acid reduced testicular lipid peroxidation levels. Ascorbic acid supplementation restored testicular 3beta-hydroxysteroiddehydrogenase (HSD) and 17beta-HSD enzyme activities, 3beta-HSD and cytochrome P450 side chain cleavage (P450(scc)) mRNA levels and serum T concentration to normal in Cd-administered rats. Moreover, administration of ascorbic acid prevented germ cell apoptosis as demonstrated by the reduced number of TUNEL-positive cells in germinal epithelium and inhibited Cd-induced necrosis. These results indicate that ascorbic acid have protective roles in vivo on the Cd-induced overall testicular damage including impaired steroidogenesis and germ cell death possibly through scavenging the reactive oxygen species generated by Cd administration.

Keywords:

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