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JOURNAL ARTICLE

Comparison of effects of 0.5 and 3.0 Gy X-irradiation on lipid peroxidation and antioxidant enzyme function in rat testis and liver

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The prooxidant effect of X-irradiation on rat testis and liver tissue was studied with doses of 0.5 and 3.0 Gy; the latter dose kills the proliferating spermatogonia and causes a maturation-depletion process in the germ cells. The level of lipid peroxidation, measured by the formation of diene conjugates and thiobarbituric acid-reactive substances (TBARS) and the activities of the antioxidant enzymes were determined 0.5 hours, 1 day, 7 days, and 31 days after the exposure. In the liver, increased levels of diene conjugation (+36%, $P < 0.05$) in the group of 3.0 Gy at 0.5 hours indicated increased lipid peroxidation. At the same time, TBARS were increased (+25%, $P < 0.05$) in the group of 0.5 Gy, but not in the 3.0-Gy group. In the testis, diene conjugation was not determined at 0.5 hours postirradiation, and at day 1 it was at the control level. The level of TBARS in the testis was below control (-11%, $P < 0.01$) in the 3.0-Gy group at day 1. At day 31 after 3.0 Gy in the testis, an increase in the amount of conjugated dienes (+24%, $P < 0.01$) was observed in parallel with a decreased level of TBARS (-15%, $P < 0.01$). The activity of superoxide dismutase (SOD) was decreased in the testis at 0.5 hours postirradiation (-28%, $P < 0.05$, and -29%, $P < 0.05$, in the groups of 0.5 and 3.0 Gy), whereafter it returned to normal by day 7. In the liver, such inactivation of SOD was not observed.(ABSTRACT TRUNCATED AT 250 WORDS)