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JOURNAL ARTICLE

Oxidative stress differentially regulates the expression of gamma-glutamyl transpeptidase mRNAs in the initial segment of the rat epididymis

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Reactive oxygen species (ROS) have a powerful cytotoxic effect on spermatozoa and have been implicated in spermatozoal dysfunction and male infertility. gamma-Glutamyl transpeptidase (GGT) is essential to the metabolism of the antioxidant glutathione and, as such, is believed to be important in protecting spermatozoa against oxidative stress. The aims of this study were 1) to establish in vitro conditions in which ROS were generated and 2) to determine whether oxidative stress regulated the expression of GGT mRNAs I-IV in the initial segment of the epididymis. Initial segments were collected from adult male rats and incubated in culture media to which ROS-generating compounds, hypoxanthine and xanthine oxidase, were added. By 6.5 hours, incubation of tissue in high-oxidative stress conditions caused a 56% decrease in reduced glutathione concentration, a concomitant 240% increase in oxidized glutathione concentration, and a 25% decrease in adenosine triphosphate concentration. RNase protection analyses demonstrated an approximate 70% up-regulation of GGT mRNAs II-IV in a differential manner, depending on the concentration of oxidizing agents and the type of ROS generated. gamma-Glutamyl transpeptidase mRNA I was not expressed. These results support the hypothesis that expression of GGT mRNAs is regulated by oxidative stress in the initial segment of the rat epididymis.

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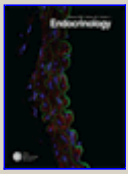
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