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JOURNAL ARTICLE

Catalase mRNA expression in the male rat reproductive tract

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Reactive oxygen species (ROS) have been shown to impair sperm function. The actions of ROS are reduced by antioxidant enzymes, including catalase. Although catalase-like activity has been demonstrated in semen, there has been no localization or characterization of catalase mRNA expression in the male reproductive tract. Catalase mRNA levels were evaluated by northern blot analysis and in situ hybridization from the male reproductive organs of normal 60-day-old rats, testes of 10- to 90-day-old rats, and testes of rats subjected to efferent duct ligation. Radioactive DNA probes were synthesized using a Klenow polymerase-based specific primer synthetic procedure with a known published sequence for rat catalase. All tissues demonstrated a single transcript of 2.5 kilobases (kb). Low levels of catalase mRNA were detected in the normal testis, epididymis, vas deferens, and prostate. No expression was detectable with northern analysis in seminal vesicle. The levels of catalase mRNA in reproductive organs were compared with the high levels of expression detectable in rat liver. In the testis, catalase expression was primarily localized to peritubular and interstitial cells. In the epididymis and prostate, mRNA was detected in the epithelium. The observed decrease in catalase mRNA levels in the maturing rat testis is consistent with its interstitial localization. The increase in testicular catalase mRNA levels seen in parallel with progressive thinning of the germinal epithelium after efferent duct ligation is also in keeping with a peritubular or interstitial cell localization. The relatively low levels of catalase mRNA expression in the normal adult male reproductive tract undermine the role of catalase as a major antioxidant enzyme in these tissues. The low levels of catalase mRNA in the testis, and the undetectable levels in the seminiferous epithelium, however, imply that the germinal epithelium is predisposed to an oxidative state. These findings may help to explain the known susceptibility of the testis to oxidative stress.

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T. T. Turner and J. J. Lysiak
Oxidative Stress: A Common Factor in Testicular Dysfunction
J Androl, September 1, 2008; 29(5): 488 - 498.
[Abstract] [Full Text] [PDF]

JOURNAL OF MOLECULAR ENDOCRINOLOGY HOME

A. Zamoner, K. P. Barreto, D. W. Filho, F. Sell, V. M. Woehl, F. C. R. Guma, R. Pessoa-Pureur, and F. R. M. B. Silva
Propylthiouracil-induced congenital hypothyroidism upregulates vimentin phosphorylation and depletes antioxidant defenses in immature rat testis
J. Mol. Endocrinol., March 1, 2008; 40(3): 125 - 135.
[Abstract] [Full Text] [PDF]

BIOLOGY of REPRODUCTION HOME

A. Nenicu, G. H Luers, W. Kovacs, M. Bergmann, and E. Baumgart-Vogt
Peroxisomes in Human and Mouse Testis: Differential Expression of Peroxisomal Proteins in Germ Cells and Distinct Somatic Cell Types of the Testis
Biol Reprod, December 1, 2007; 77(6): 1060 - 1072.
[Abstract] [Full Text] [PDF]

Journal of ANDROLOGY HOME

H. Chen, P. H. Chow, S. K. Cheng, A. L. M. Cheung, L. Y. L. Cheng, and W.-S. O
Male Genital Tract Antioxidant Enzymes: Their Source, Function in the Female, and Ability to Preserve Sperm DNA Integrity in the Golden Hamster
J Androl, September 1, 2003; 24(5): 704 - 711.
[Abstract] [Full Text] [PDF]

BIOLOGY of REPRODUCTION HOME

S. Reisse, G. Rothardt, A. Völkl, and K. Beier
Peroxisomes and Ether Lipid Biosynthesis in Rat Testis and Epididymis
Biol Reprod, June 1, 2001; 64(6): 1689 - 1694.
[Abstract] [Full Text]

HUMAN REPRODUCTION HOME

R.J. Potts, T.M. Jefferies, and L.J. Notarianni
Antioxidant capacity of the epididymis
Hum. Reprod., October 1, 1999; 14(10): 2513 - 2516.
[Abstract] [Full Text] [PDF]