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JOURNAL ARTICLE

The effects of aging on the expression of glutathione S-transferases in the testis and epididymis of the Brown Norway rat

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Glutathione S-transferases (GSTs), a family of isoenzymes, catalyze the conjugation of glutathione to a variety of electrophiles, and protect cellular constituents from electrophilic and oxidative attack. Aging is associated with an overall increase in oxidative stress and thus free radical production. The present study examines the immunocytochemical localization of Ya, Yc, Yb1, Yb2, Yo, and Yf GST subunits in the testis and epididymis of Brown Norway rats aged 3, 12, 18, and 24 months. In the testis, neither Sertoli nor germ cells showed changes in the GST staining pattern during aging. At 24 months, two types of Leydig cells were noted. Some (peritubular) formed a distinct band at the periphery of the tubule while others were seen in the interstitial space. The peritubular cells were identified as Leydig cells by specific staining for 3beta-hydroxysteroid dehydrogenase (3beta-HSD), a Leydig cell-specific marker. Both types of Leydig cells were intensely reactive for all GST subunits at all ages. In the epididymis, principal cells of all epididymal regions, except the proximal cauda region, showed no changes in GST expression at all ages examined. At 24 months, some principal cells of this region became greatly enlarged and vacuolated. These cells were unreactive for Yo, Yb1, Yb2, and Yc, while adjacent normal-appearing principal cells maintained the same intensity of expression as seen in 3-month controls. In contrast, vacuolated principal cells were reactive for the Ya subunit, while adjacent normal principal cells were unreactive. These data indicate that selective changes occur in the expression of GSTs at 24 months in principal cells having both a normal and a vacuolated appearance. The underlying mechanism responsible for these changes with age is unresolved, but we speculate that they lose the ability to handle oxidative stress. Taken together, these data show that aging affects region-specific changes in GST expression in the epididymis and Leydig cell distribution in the testis.

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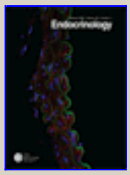

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