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JOURNAL ARTICLE

# The effect of selective destruction and regeneration of rat Leydig cells on the intratesticular distribution of testosterone and morphology of the seminiferous epithelium

J. M. Bartlett, J. B. Kerr and R. M. Sharpe

This study was designed to explore the relationship between the intratesticular distribution of testosterone and spermatogenesis by completely destroying the Leydig cells of mature male rats with injection of a single i.p. dose of ethane dimethanesulphonate. After such treatment, testosterone levels in serum, testicular interstitial fluid, seminiferous tubules, and whole testis declined significantly 6 to 24 hours after injection and fell below assay detection limits between 3 and 7 days. At 3 and 7 days, serum LH and FSH levels rose significantly and remained elevated up to 4 and 6 weeks, respectively, in comparison with vehicle-treated controls. Leydig cells disappeared from the interstitium by day 3, but between 2 and 4 weeks postinjection a new generation of fetal-like Leydig cells repopulated the testicular interstitium and, during weeks 6 to 10, were transformed into, or replaced by, Leydig cells with an adult type of morphology. Histologic examination of the seminiferous tubules showed progressive disruption of spermatogenesis between 3 and 14 days post-ethane dimethanesulphonate. The first histologic sign of spermatogenic damage was noted at day 3, with the occurrence of stage-specific degenerating pachytene primary spermatocytes at stages VII to VIII of the spermatogenic cycle. On day 7, these cells and degenerating round, or step 19, spermatids often were observed during stages VII to XI, although qualitatively normal spermatogenesis also was seen in these and all other stages of the cycle. Maximum impairment of spermatogenesis occurred 2 weeks post-ethane dimethane sulphonate, at which time the tubules commonly lacked one or more germ cell generations or, alternatively, showed accumulation of lipid inclusions, extracellular spaces, and variable numbers of degenerating germ cells. Following repopulation of the testis by Leydig cells during weeks 3 and 4, spermatogenesis recovered. By 10 weeks after treatment, qualitatively normal spermatogenesis was seen in the great majority of seminiferous tubules, although a few tubules still remained in which the germ cell complement was severely reduced, and contained only Sertoli cells and spermatogonia. (ABSTRACT TRUNCATED AT 400 WORDS)



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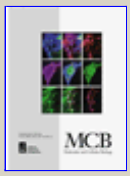

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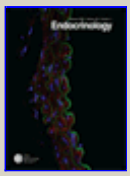

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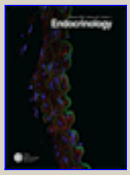

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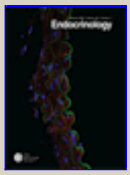

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