Journal of Andrology, Vol 15, Issue 3 234-243, Copyright © 1994 by The American Society of Andrology

JOURNAL ARTICLE

Suppression of spermatogenesis by low-level glycerol treatment

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Previous studies have shown that a single intratesticular injection with 70% glycerol results in rapid and long-term suppression of spermatogenesis. Because of the extensive testicular damage in the form of focal destruction and large numbers of acellular seminiferous tubules, it was difficult to examine the possible chemical mechanisms of antispermatogenic action. Our objective was to explore regimens of treatment that would result in significant suppression of spermatogenesis without significant testicular damage. Sexually mature Sprague-Dawley rats were injected intratesticularly with various glycerol concentrations (0, 10, 20, 40, or 70%) and with volumes of either 200 or 350 microliters per testis. At times between 1 and 36 weeks after the injection, the effect on weights of testes and accessory sex organs, testicular histology, sperm numbers, serum hormonal levels, and gonadotropin-receptor binding was examined. An injection of 350 microliters/testis of a 10% glycerol solution led to a significant decrease in weights of testes and epididymides. The treatment resulted in an overall suppression of spermatogenesis, with about 90% fewer sperm in the epididymides than in control animals. Histologically, the treatment decreased the number of normal tubules from 97% (control) to 16% and resulted in testes in which about 75% of the tubules were aspermatogenic (containing only Sertoli cells and spermatogonia). The number of acellular tubules (tubules without cytological detail) was generally less than 5% of the total, and there was negligible focal destruction. Serum levels of gonadotropins and androgens were not altered significantly by the treatment, and Sertoli cell glutamyl transpeptidase activity appeared normal. An equi-osmolar solution of glucose also resulted in significant suppression of spermatogenesis, but the effect of glycerol was significantly greater, suggesting a mechanism in addition to hyperosmolarity. This study, therefore, is further evidence for the specificity of glycerol actions and for its potential as an antispermatogenic agent.

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