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Preservation of Spermatogenesis in Spinal Cord Injured Rats With Exogenous Testosterone. Relationship With Serum Testosterone Levels and Cellular Localization of cAMP Responsive Element Modulator

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The current experiment examined the effects of exogenous testosterone (T) on spermatogenesis in rats with spinal cord injury (SCI) and their relationship with the cellular distribution of a cyclic AMP-responsive element modulator (CREM) in testicular cells. Implantation of T-filled Silastic capsules (TCs, 1-20 cm) resulted in dose-dependent, biphasic changes in testicular T levels and spermatogenesis in SCI rats. However, dose responsiveness of spermatogenesis to exogenous T in SCI rats differed from that in sham control rats. Specifically, implantation of 2-cm TCs enhanced the effects of SCI on spermatogenesis, resulting in total regression of the seminiferous epithelium. Although 3-cm TCs maintained complete spermatogenesis in sham control rats, this regimen failed to support complete spermatogenesis in SCI rats. Although complete spermatogenesis was maintained in SCI rats given 5-20-cm TC implants, various abnormalities persisted. Cellular distribution of CREM remained normal in SCI rats but was altered in those SCI rats that received 3- or 5-cm TC implants. Such effects were associated with reduced CREM proteins in testicular tissues. These results were consistent with altered cAMP signaling and its regulation in testicular cells after SCI and provided possible mechanistic explanations for the effects of SCI on spermatogenesis. Conclusion: SCI resulted in changes in the responsiveness of spermatogenesis to exogenous T. These effects were associated with altered cAMP/CREM signaling in testicular cells. Further studies, including a study of the relationship between serum T levels and normalcy of sperm functions and the role of neural-endocrine interactions in mediating the effects of SCI on spermatogenesis and sperm function, are needed so that therapeutic regimens can be designed for clinical use.

Key words: Sertoli cells, CREM, sperm

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