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JOURNAL ARTICLE

Mechanism of protection of rat spermatogenesis by hormonal pretreatment: stimulation of spermatogonial differentiation after irradiation

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Pretreatment of rats with hormones that suppress testosterone levels and sperm production enhances the recovery of spermatogenesis from stem cells after a cytotoxic insult. It is not known whether the enhanced recovery results from an increase in the numbers of surviving stem cells or whether their ability to differentiate is enhanced. In this study, untreated rats and rats pretreated with testosterone plus estradiol-17beta (T + E) were irradiated with 3.5 or 6 Gy, and the recovery of spermatogenesis from surviving stem cells was assessed at 6, 10, and 20 weeks after irradiation. T + E pretreatment did not significantly affect the numbers of A spermatogonia remaining in the tubules at 6 weeks after irradiation. In rats that were given irradiation alone, spermatogenesis steadily declined after 6 weeks because the stem cells lost their ability to differentiate. However, when rats were treated with T + E before irradiation, this decline was prevented, and in fact, at least at the lower dose of radiation, there was a progressive recovery of spermatogenesis. Given the similar spermatogonial counts at 6 weeks after irradiation in the irradiated-only and T + E-treated, irradiated rats, the hormone treatment appears not to protect stem cells from being killed by the cytotoxic agent. Rather, the later enhancement of spermatogenic recovery results from prevention of an injury-induced change in spermatogonia or in their environment, which would have otherwise resulted in failure of spermatogonial differentiation.

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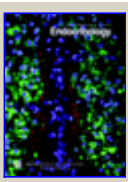
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