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JOURNAL ARTICLE

Hormonal regulation of spermatogenesis in the hypophysectomized rat: FSH maintenance of cellular viability during pubertal spermatogenesis

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The potential for follicle-stimulating hormone (FSH) to promote germ-cell survival and the cellular sites of FSH action were studied using a gonadally maturing (pubertal), hypophysectomized (Hx) rat model in which residual testosterone (T) activity was blocked by injections of an androgen-receptor antagonist, flutamide. Recombinant human FSH was given to androgen-deprived and androgen-blocked male rats at 27 days of age to determine maintenance of individual germ-cell types at 35 days of age. Follicle-stimulating hormone significantly increased testis weights and tubular diameters as compared with Hx and Hx-flutamide controls, although testis weights in FSH-treated animals were significantly lower than in pituitary-intact animals. Morphometric assays to determine ratios of germ cells to Sertoli cells and to determine the number of germ cells present per hour of development showed that the population of type A spermatogonia in the early stages of the cycle was not responsive to FSH. Follicle-stimulating hormone had a marked ability to maintain cell viability in the rapid, successive divisions that begin in the latter part of the cycle and that continue through the next cycle (i.e., from type A1 to A4 and from intermediate spermatogonia to type B spermatogonia to preleptotene spermatocytes to leptotene/zygotene spermatocytes to young pachytene spermatocytes). The data also suggest T responsiveness of these cell types since the Hx-FSH-flutamide group showed lower cell viability at the aforementioned steps when compared with the Hx-FSH group. Too few cell types were present at subsequent phases of spermatogenesis to allow a sensitive determination of FSH activity in the maintenance of cell viability. The data show the potential of FSH in the absence or relative absence of T activity to maintain cell viability. These data support the concept of overlapping and synergistic (or additive) effects of T and FSH in the immature rat and identify the cellular sites of FSH action.

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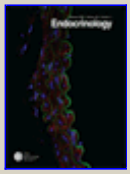

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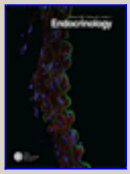

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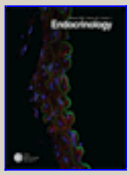

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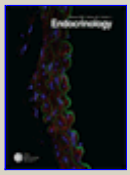

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