Original Research Article

**Estradiol and testosterone inhibit rat seminiferous tubule development in a hormone-specific way**

Renata Walczak-Jędrzejowska, Katarzyna Marchlew ska, Elżbieta Oszukowska, Eliza Filipiak, Jolanta Słowikowska-Hilczer, Krzysztof Kula

Abstract

Follicle stimulating hormone (FSH), testosterone (T) and estradiol (E2) are known to regulate testis maturation, and changes in FSH secretion induced by sex steroid treatment may mediate the effects of sex hormones. The aim of this study was to compare the effects of T and E2 on the pre-meiotic steps of first spermatogenesis and FSH level in rats. Male rat pups were injected daily with 17β-estradiol benzoate (EB; 12.5 μg) or testosterone propionate (TP; 2.5 mg) with the use of one of the two administration modes: 1/transient mode; hormone injections on postnatal days (PND) 1–5 followed by daily vehicle injections until PND 15 (t-EB and t-TP, respectively) or 2/continuous mode; hormone injections on PND 1–15 (c-EB and c-TP, respectively). The control group was injected with vehicle alone. On PND 16, blood was taken for serum hormone measurement and testes were collected for analysis of seminiferous tubule morphometry as well as cell number, proliferation and apoptosis. Testis weight, tubule length, Sertoli and germ cell numbers were reduced, and cell apoptosis in seminiferous epithelium was increased after transient EB and TP treatments. Despite normal or increased FSH secretion, the c-EB treatment inhibited pre-meiotic germ cell development and augmented cell apoptosis, whereas the c-TP treatment reduced the spermatocyte number and inhibited the formation of seminiferous tubule lumen. In conclusion, transient administration of EB or TP during PND 1–5 inhibited testis growth, whereas continuous administration (PND 1–15) impaired pre-meiotic germ cell development in a hormone-specific way.

Keywords

Estradiol; Testosterone; Testis growth; Spermatogenic onset; Spermatogonial development