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JOURNAL ARTICLE

Fetal irradiation increases androgen production by dispersed leydig cells of the rat

G. F. Jansz and D. K. Pomerantz

Damage to the seminiferous epithelium of the rat has been shown to decrease the concentration of serum testosterone. In these animals, compared to controls, the structure of the Leydig cells suggests hyperactivity. In an attempt to understand the functional changes at the Leydig cell level, we measured in vitro androgen production by whole testes, testicular fragments, and Leydig cell preparations. The androgen production of adult rats that had received 1.6 Gy of gamma radiation on day 20 of gestation was compared to that of nonirradiated controls. Leydig cells obtained from fetally-irradiated adult rats demonstrated increased basal (1.3 X) and LH-stimulated (4.4 X) testosterone production and increased hCG binding (4.8 X) per histochemically identified Leydig cell, as compared to cells obtained from nonirradiated control animals. Although the irradiated testicular tissue showed an increased responsiveness per mg/tissue compared to controls, basal and stimulated in vitro testosterone production per irradiated testis calculated from this data was diminished because of the five-fold decrease in testis size. In addition, the circulating levels of testosterone were reduced in irradiated animals. We suggest that fetal irradiation is associated with an increase of hCG binding and testosterone production per Leydig cell, and a decrease in the number of these Leydig cells per testis.