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JOURNAL ARTICLE

Transforming growth factor-beta1 (TGF-beta1) in penile and prostate growth in the rat during sexual maturation

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The goal of this study was to determine whether transforming growth factor-beta1 (TGF-beta1) may contribute to the arrest of penile growth and the down-regulation of androgen receptors (AR) that occur during sexual maturation in the rat penis. For this purpose, body, penis, and prostate weights were obtained from male rats of increasing ages, and penis and prostate TGF-beta1 concentrations were determined by a sandwich enzyme-linked immunosorbent assay. The cytosol fraction was obtained from the shafts and glandes of immature (19-day-old) and adult (90-day-old) rat penises, and ARs were measured by a western blot assay. The effect of exogenous TGF-beta1 on penile growth was examined in vivo in two groups of immature rats (21 and 27 days old) implanted with miniosmotic pumps delivering either human TGF-beta1 or vehicle only directly into the corpora cavernosa for 6 days. The penises, prostates, and testes were weighed, and the AR content was estimated by western blot. The growth rate of the penis declined after 8 weeks of age, whereas the ventral prostate growth rate increased until 14 weeks of age and then slowed down. The content of penile AR protein decreased seven-fold in the adult rats compared to the immature animals. Penile TGF-beta1 concentration increased nearly three-fold from the 19-day-old rats to a peak at 60 days of age and then decreased over the next 4 months to the initial levels. In contrast, TGF-beta1 concentration in the prostate was not significantly affected by age and remained below the lowest penile values in all age groups. Transforming growth factor-beta1 given locally to the penis reduced penile shaft weight by 38 and 22% in two groups of immature rats, while the weights of the penile glans, testis, and ventral prostate remained unaffected. Androgen receptor content was higher in the glans than in the shaft and was not changed by TGF-beta1 treatment. These results suggest that the increase of TGF-beta1 levels in the penis may reinforce growth arrest caused by the down-regulation of penile ARs, whereas the maintenance of a high content of ARs and a low TGF-beta1 concentration may allow prostate growth to continue.

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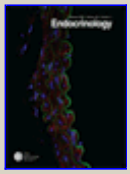

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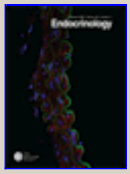

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Endocrinology, August 1, 1998; 139(8): 3569 - 3577.
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