Journal of Andrology, Vol 4, Issue 3 175-182, Copyright © 1983 by The American Society of Andrology

JOURNAL ARTICLE

Regulation of testicular ornithine decarboxylase in vitro. Effect of age, follicle-stimulating hormone, and luteinizing hormone

J. Osterman, E. P. Murono, T. Lin and H. R. Nankin

We have examined hormonal regulation of ornithine decarboxylase (ODC) activity in decapsulated rat testis, isolated testicular interstitial cells, and purified Leydig cells under defined conditions in vitro. Both immature (15 to 26 days old) and adult (60 to 90 days old) rat testes were employed. Basal (fresh tissue) ODC activity varied widely among rats of the same age but was similar (less than 5% difference) in pairs of testes from the same animal. For this reason, pairs of testes were compared in subsequent in vitro studies. ODC activity of decapsulated testes of adult rats declined (to 25 to 30% of basal) during 4 hours of incubation in Medium 199 + 0.1% bovine serum albumin + 0.1 mM 3-isobutyl-1-methylxanthine at 34 C. The addition of FSH, LH, prolactin, prostaglandin E2, epidermal growth factor, insulin, or 10% fetal calf serum singly or in combination failed to prevent this decline in ODC activity. In contrast, ODC activity of decapsulated testes of immature rats remained stable (versus fresh tissue) during 4 hours of incubation. The addition of FSH (100 ng/ml) caused a small but statistically significant (P less than 0.005) stimulation of the enzyme activity, and 8-bromo cyclic AMP (0.5 mM) mimicked the effect of FSH. In isolated interstitial cells from adult rats, LH stimulated ODC activity in a dose- (10 pg-200 ng/ml) and time-dependent fashion. 8-Bromo cyclic AMP mimicked the effect of LH. Prolactin, FSH, estradiol, insulin, prostaglandin E2, and epidermal growth factor did not alter the enzyme activity. LH also stimulated ODC activity of purified Leydig cells. This study demonstrates for the first time direct in vitro stimulation of rodent testicular ODC activity by gonadotropins and reveals marked age-dependent differences in regulation of this enzyme in vitro.