

# Gonadal steroids regulate aromatase P450 expression in the rat pituitary

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## SUMMARY

Rat aromatase immunohistochemical expression is different in male than in female adult rats. In order to analyze if such differences are related to the presence of gonadal steroids, a study was carried out on pituitaries of adult castrated rats and rats castrated and treated with gonadal steroids, using immunohistochemistry, Western blotting and *in situ* hybridization for rat aromatase P450. Rat aromatase P450 mRNA was detected in the pituitary of male and female rats. Sex-related variations in the mRNA evidence were observed, the mRNA signal was more abundant in males than in females. Moreover, the male pituitaries showed more immunohistochemical positive cells than females and by Western blotting the enzyme was seen to be more abundant in males than in females. With the three methods assayed, ovariectomy elicited a considerable increase in the reaction to aromatase in females. In male rats, castration reduced the number of reactive cells, although the reaction persisted. Treatment with gonadal steroids after castration modified aromatase expression in the sense that in testosterone-treated castrated males the expression of aromatase was increased while in ovariectomized females treated with oestradiol it

decreased. Our results demonstrate the synthesis of aromatase in the pituitary gland and its immunohistochemical expression in the gland of adult rats and suggest that the expression of this enzyme is sex-dependent and that it can be modified by castration and gonadal steroid administration. This in turn suggests that aromatase may be involved in the regulation of adenohypophyseal cytology by gonadal steroids.

**Key words:** Aromatase – Pituitary – Immunohistochemistry – *In situ* hybridization – Western blotting – Gonadal steroids

## INTRODUCTION

The presence of aromatase P450, the enzyme responsible for the aromatization of testosterone to oestradiol, has been demonstrated in different regions of the central nervous system, including the hypothalamus (Shinoda et al., 1989, 1990; Balthazart et al., 1990a,b, 1991a,b; Sanghera et al., 1991; Segovia and Guillamón, 1993; Dellovade et al., 1994; Tsuruo et al., 1994; Yamada et al., 1994; Foidart et al., 1994, 1995).

There are discrepancies concerning the presence of aromatase in the pituitary

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