Supraphysiological dose of testosterone impairs the expression and distribution of sex steroid receptors during endometrial receptivity development in female Sprague–Dawley rats

ABSTRACT

This study aims to investigate the effect of a supraphysiological dose of testosterone on the levels of sex steroid hormones and the expression and distribution of sex steroid receptors in the uterus during the endometrial receptivity development period. In this study, adult female Sprague–Dawley rats (n = 24) were subcutaneously administered 1 mg/kg/day of testosterone alone or in combination with the inhibitors (finasteride or anastrozole or both) from day 1 to day 3 post-coitus, while a group of six untreated rats served as a control group. The rats were sacrificed on the evening of post-coital day 4 of to measure sex steroid hormone levels by ELISA. Meanwhile, gene expression and protein distribution of sex steroid receptors were analysed by quantitative polymerase chain reaction (qPCR) and immunohistochemistry (IHC), respectively. In this study, treatment with a supraphysiological dose of testosterone led to a significant reduction in oestrogen and progesterone levels compared to the control. The mRNA expression of the androgen receptor increased significantly in all treatment groups, while the mRNA expression of both the progesterone receptor and the oestrogen receptor-α decreased significantly in all treatment groups. The IHC findings of all sex steroid receptors were coherent with all mRNAs involved. This study shows that a supraphysiological dose of testosterone was able to interrupt the short period of the implantation window. This finding could serve as a basis for understanding the role of testosterone in endometrial receptivity in order to develop further therapeutic approaches targeting androgen-mediated disorders of endometrial receptivity