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Circadian Disruption in Polycystic Ovary Syndrome Model Rats

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Abstract : Polycystic ovary syndrome (PCOS), the most common endocrinopathy among women of reproductive age, is characterized by ovarian dysfunction, hyperandrogenism and reduced fecundity. The aim of this study is to investigate whether the circadian disruption is involved in pathogenesis of PCOS in androgen-induced animal model. We established a rat model of PCOS using single subcutaneous injection with testosterone propionate on the ninth day after birth, and confirmed their PCOS-like phenotypes with vaginal smears, ovarian hematoxylin and eosin (HE) staining and serum androgen measurement. The control group rats received the vehicle only. Gene expression was detected by real-time quantitative PCR. (1) Compared with control group, PCOS model rats of 10-week group showed persistently keratinized vaginal cells, while all the control rats showed at least two consecutive estrous cycles. (2) Ovarian HE staining and histological examination showed that PCOS model rats of 10-week group presented many cystic follicles with decreased numbers of granulosa cells and corpora lutea in their ovaries, while the control rats had follicles with normal layers of granulosa cells at various stages of development and several generations of corpora lutea. (3) In the 10-week group, serum free androgen index was notably higher in PCOS model rats than controls. (4) Disturbed mRNA expression patterns of core clock genes were found in ovaries of PCOS model rats of 10-week group. Abnormal expression of key genes associated with circadian rhythm in ovary may be one of the mechanisms for ovarian dysfunction in PCOS model rats induced by androgen.

Keywords : polycystic ovary syndrome, androgen, animal model, circadian disruption
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