Coumarin regulated the estrous cycle in a cyclophosphamide-induced premature ovarian failure mouse model

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Background: Premature ovarian failure (POF) can lead to an increase in the level of follicle-stimulating hormone (FSH), decrease in the level of anti-Mullerian hormone (AMH), a loss of ovarian function, and amenorrhea in women younger than 40 years. The aim of the present study was to investigate the effects of coumarin (COU) on estrous cycle and weight changes in a cyclophosphamide (CTX)-induced POF mouse model.

Methods: NMRI mice were randomly divided into three groups: control group (40 mg/kg/day oral gavage of normal saline for 14 days), POF group (600 mg/kg/day CTX for 6 days), and COU+POF group (40 mg/kg/day oral gavage of COU for 14 days + 600 mg/kg/day CTX for 6 days). Vaginal smears were taken daily throughout the 34 days of the experiment period. Mice were weighed at the beginning and the end of treatment with COU and also on the day of sacrifice. Three weeks after establishing the POF mouse models, ovaries were collected and weighed for ovarian unilateral index (ovarian weight/body weight).

Results: In the POF model, the duration of the estrous cycle was 2-fold longer than the control as well as the COU+CTX group. In the POF group, the number of regular cycles and the number of estrous cycles were decreased compared to the control and the COU+CTX groups. In both the POF and the COU+CTX groups, a significant weight loss was observed compared to the control group. In the COU+CTX group, after oral gavage of COU, a significant increase in weight was observed compared to the POF group and reached the weight of the control group. In the POF group, ovarian index decreased significantly compared to the control group.

Conclusion: Our results showed that coumarin as an antioxidant was able to increase the regular estrous cycle of mice, the weight of mice, and the unilateral index of ovary after CTX injection.

Key words: coumarin, premature ovarian failure, ovarian index, mice, estrous cycle.