PARABEN DISRUPT OVARIAN FUNCTION BY INHIBITING FOLLICULAR GROWTH AND STEROIDOGENESIS

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Context: Parabens are widely used preservatives in basic necessities such as cosmetic and pharmaceutical products. In our previous studies, action of parabens as xenoestrogen had been reported in immature rat model and rat pituitary cell line (GH3 cells). The relationship between parabens and ovarian failure has not discovered.

Objective: In present study, the influence of parabens on ovarian folliculogenesis and steroidogenesis were investigated.

Methods: 4-Vinylcyclohexene diepoxide (VCD, 40 mg/kg), a disruptor of ovarian small pre-antral follicles, was used as a positive control to induce POF. Methyl-paraben (MP, 100 mg/kg), propyl-paraben (PP, 100 mg/kg), butyl-paraben (BP, 100 mg/kg) dissolved in corn oil were treated in female 8 week-age Spargue-Dawley rats during 5 weeks. Estrus cycle was checked by vaginal smear test every day. We investigated ovarian function (follicle development and steroid synthesis) through real-time PCR method and histological analysis.

Results: Diestrus phase in VCD, PP and BP groups drew out compared to vehicle group. VCD significantly decreased mRNA level of folliculogenesis-related genes (Foxl2, Kitl and Amh). However, parabens significantly increased mRNA level of Amh and unchanged one of Foxl2 and Kitl acting in primordial follicles. VCD and MP slightly increased Star and Cyp11a1 related to initial step of steroidogenesis. VCD and parabens increased FSH level in serum and significantly decreased the number of follicles. Increased FSH means impairment in ovarian function by VCD or parabens.

Conclusion: These results suggest possibilities that VCD suppress both formation and development of follicle, but parabens inhibit follicle-developmental process through elevated AMH level in small antral follicles. Thus parabens can act as a cause of ovarian failure.