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Protective effect of proanthocyanidin against oxidative ovarian damage induced by 3-nitropropionic acid in mice

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ABSTRACT. Oxidative stress, which poses a threat to reproductive health, causes many serious female reproductive diseases. In this study, we investigated whether proanthocyanidins (PC) have a protective effect against oxidative stress-induced ovarian damage. Forty female ICR mice were randomized into 4 groups: a control group, a control plus PC group, a 3-nitropropionic acid (3-NPA) group, and a 3-NPA plus PC group. An ovarian oxidative stress model induced by 3-NPA was constructed using female ICR mice. After the animals were sacrificed, their ovaries were collected to measure reactive oxygen species (ROS) levels, the activities of superoxide dismutase (SOD) and catalase (CAT), and the mRNA expression levels of relevant granulosa cell apoptosis genes (*Bcl-2*, *Bax*, *Bim*, *FasL*, and *caspase-3*). We also conducted a histological evaluation of granulosa cell apoptosis and follicular atresia. The results showed that compared to the 3-NPA group, ROS levels and activities of T-SOD and CAT in the 3-NPA plus PC group were significantly decreased ($P < 0.05$), while the ratio of

Bcl-2 to Bax in the 3-NPA plus PC group were significantly increased ($P < 0.05$). mRNA expression levels of Bim, FasL, and caspase-3 in the 3-NPA plus PC group were significantly decreased ($P < 0.05$), and the percentage of atretic follicles and granulosa cell apoptosis in the 3-NPA plus PC group was significantly decreased ($P < 0.05$). Collectively, these data indicate that PC has significant protective effects against damage induced by oxidative stress in mouse ovaries. The mechanisms of protection may be related to antioxidation and apoptosis reduction.

Key words: 3-NPA; Proanthocyanidins; Oxidative stress; Ovary

