EFFECT OF NECROSTATIN ON OVARIAN CRYOPRESERVATION AND TRANSPLANTATION

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Objective: Ovarian tissue cryopreservation is an optimal option for fertility preservation. However, the survival rate of cryopreserved ovarian tissue after transplantation is still not enough for adopting this procedure to routine clinical practice. Anti-necrotic agents are expected to reduce necrosis during cryopreservation and after transplantation of ovarian tissue. The purpose of this study was to investigate the effect of anti-necrotic agent necrostatin-1 (nec-1) supplementation during ovarian vitrification and transplantation.

Materials and Methods: Ovaries from 4 week-aged ICR mice were vitrified using vitrification solutions with 0, 25 or 100 uM of nec-1 (control, nec25, and nec100 groups, respectively). After warming, follicular morphology and apoptosis were assessed by histological analysis and TUNEL assay. A part of ovaries vitrified with 0, 25 or 100 mg/mL of nec-1 were warmed and autotransplanted. For each group, the same dose of nec-1 was added in warming solution and injected intraperitoneally 30 minutes before transplantation. After 2 weeks, follicular morphology and apoptosis of transplanted ovaries were assessed.

Results: The morphological analysis after vitrification and warming showed that significantly higher intact follicle ratio in nec-1 treated groups (45.1%, 51.7%, and 57.9% in control, nec25, and nec100 groups, respectively). The rate of apoptotic follicles (TUNEL positive) was lower in nec-1 treated groups (11.2%, 8.5%, and 7.2% in control, nec25, and nec100 groups, respectively). After transplantation of vitrified–warmed ovaries, the morphological analysis showed that significantly higher intact follicle ratio in nec-1 treated groups (43.1%, 60.6%, and 70.7% in control, nec25, and nec100 groups, respectively). Nec-1 treated groups showed lower apoptotic follicle rate (5.3%, 2.5%, and 2.0% in control, nec 25, and nec100 groups, respectively).

Conclusions: The results of the present study suggest that anti-necrotic agent nec-1 supplementation in the vitrification solution has a beneficial effect on survival of ovarian tissue during cryopreservation and transplantation.