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Effect of PMSG on the follicular atresia and apoptosis of granulosa cells in the ovary of immature female mice

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The present study investigated the effects of PMSG on the follicular atresia and the apoptosis of granulosa cells and to examine a possible involvement of apoptosis in follicular atresia. Immature female mice were admistrated with 5, 20, or 40IU PMSG. The ovaries were removed 12, 24, 36, 48, 60, and 72 hrs after treatment and processed for histological observation and in situ DNA 3'-end labelling to detect the granulosa cell apoptosis. Hitological examination reveals that the percentage of atretic follicles decreased 12 to 48 hrs and then increased 60 to 72 hrs after treatment in 5IU group, compared with that in control group. The percentage of atretic follicles in 20 or 40IU group decreased 12hrs and continuously by 72 hrs after treatment. Apoptotic granulosa cells were mainly observed in small- to medium-sized antral follicles and the apoptotic signal of granulosa cells was strong in those atretic follicles. In conclusion, PMSG inhibits the apoptosis of granulosa cells in immature mice. And occurence of granulosa cell apoptosis is restricted to the preantral, early antral, and small antral follicles showing atresia.

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Cytofluorometric analysis of granulosa cell cycle in atretic follicles of PMSG-treated rat ovary

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The arrest of cell cycle of granulosa cells in ovarian atretic follicles is known to be an indication of follicular atresia. Thus, we analysed the changes of percentages of cells with degraded DNA in relation to the induction of follicular atresia and whether the cell cycle(G_0/G_1, S, G_2/M) of granulosa cells are related to the incidence of morphological atresia. Follicles were dissected on Days 0, 1, 2, 3, 4, or 5 from rat ovaries after 15IU PMSG treatment. Whole ovaries were prepared for histological observation and isolated granulosa cells were prepared for flow cytometry and DNA fragmentation analysis. Histological signs of follicular atresia were obvious after Day 4. And the degree of DNA fragmentation, a hallmark of apoptosis, was increased on Day 4 to 5. DNA histogram shows that granulosa cells with degraded DNA(A_0 cells) contains less fluorescence than the G_0/G_1 peak. The percentage of A_0 cells was greater on Day 4 and 5 when the ovarian follicles are atretic than on Day 1, 2, or 3. The increased incidence of granulosa cells with low DNA fluorescence, that is, degraded DNA seems to be a new, biochemical marker for granulosa cell apoptosis and follicular atretsia in the PMSG-primed rat.