

Evaluation of acid phosphatase activity alterations in mouse ovary after ovarian hyperstimulation in early stages of pseudo and normal pregnancies until implantation time

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Abstract

Introduction: Acid phosphatase (ACP) is a lysosomal enzyme which contributes in ovarian metabolic functions such as oocyte maturation, resumption of mitotic divisions, germinal vesicle breakdown and ovulation. It digests the corpus luteum and helps the atresia of follicles by autophagia and heterophagia activities. Considering the hormonal control of this enzyme, the present study was designed to determine the ovarian ACP activity after ovulation stimulation by the administration of PMSG and hCG during preimplantation period.

Materials & Methods: For this purpose a number of 6 to 10-week old female NMRI mice were selected and randomly divided into control and hyperstimulated groups after the administration of PMSG and hCG, and later to pregnant and pseudopregnant groups. The mice were rendered pseudopregnant by mechanical vaginal stimulation. Five mice in each group were sacrificed by cervical dislocation at the first to the sixth day of pregnancy for biochemical assays. The ovarian samples were obtained and were homogenized and centrifuged at 14000 g. The activity of the enzyme was determined using paranitrophenyl phosphate as substrate and later the specific activity of the enzyme was calculated according to the amount of total protein. The data were analysed by Mann Whitheny test. Statistical significance was indicated by a P value less than 0.05. For histochemical evaluations, the samples were obtained from one of the ovaries in each mouse and then 5 μm thick cryosections were prepared. Cryosections were stained by Gomori method.

Results: The ACP activity of ovarian tissues in the first day of pregnancy in the normal pregnant and pseudopregnant control groups, hyperstimulated normal pregnant and pseudopregnant groups were 0.34 ± 0.04 IU/mg, 0.39 ± 0.04 IU/mg, 0.4 ± 0.08 IU/mg, 0.45 ± 0.01 IU/mg respectively and in the fourth day were 0.69 ± 0.1 IU/mg, 0.61 ± 0.06 IU/mg, 1.09 ± 0.10 IU/mg and 0.79 ± 0.05 IU/mg. The results showed that biochemical findings correlated with histochemical observations. The ACP reaction changes were seen mainly in granulosa cells with a minimum enzyme activity in the first day (zero activity) and a maximum activity in the fourth day of pregnancy (+3).

Conclusion: The increased ACP activity on the 3rd- 4th days of pregnancy, may be due to the steroidogenic activity of granulosa cells. Also, the results showed that ovarian hyperstimulation could not change the pattern of ovarian ACP activity during early stages of pregnancy. More research is required in this area for a better understanding of the processes.

Key Words: Acid phosphatase, Ovulation Induction, Ovary, Implantation, Pseudopregnancy, Preimplantation, Steroidogenesis.

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