

The relationship between size of normal and cystic bovine ovarian follicles with follicular fluid levels of nitric oxide and estradiol

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Abstract

Introduction: Nitric oxide (NO) is a small fast acting neurotransmitter, which is synthesized from L-arginine by nitric oxide synthase. Studies show that NO affects a wide range of reproductive functions. Steroidal hormones synthesis, LH surge during ovulation, follicular growth and ovulation are all affected by NO. Therefore, the objective of this study was to evaluate the relationship between NO and estradiol (E₂) production in ovarian follicles and cysts in bovines.

Materials & Methods: Two experiment groups were formed and serum and follicular fluid levels of NO and estradiol (E₂) was measured. In the first group, follicular fluids were obtained from 30 slaughtered cows. Follicles were divided into three groups according to follicular diameter: Small follicles, <5mm, medium-sized follicles, 5 to 10mm, and large follicles, >10mm. 30 follicles were randomly selected within each group. Blood samples were obtained via jugular vein. NO concentrations in blood and ovarian follicular fluids were measured by Griess reaction method and radioimmunoassay respectively. In the second group: 12 cows in follicular phase and with cystic follicles were selected and a cystic follicle was obtained from each. NO and E₂ levels were measured as done for the first experiment group. The data were analyzed by SAS software using ANOVA and Duncan's test.

Results: NO concentrations of follicular fluids from large follicles were significantly higher than those of the medium and small-sized ones. There were significant differences in the concentrations of nitrite and nitrate (Stable metabolites of NO) between large and cystic follicles, with extremely low NO and high E₂ levels in cystic follicles (p<0.01).

Conclusion: The results suggest that paracrine effects of NO may play an important role in the control of ovarian follicle growth and development of cystic follicles in bovines. It seems that NO dictates its effects through inhibition of ovarian steroidal synthesis.

Key Words: Nitric oxide, Estradiol, Cystic follicle, Cow, Oogenesis, Oocyte maturation, Follicular fluid.

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