

## The distribution of corpora lutea and ovarian follicular development in pregnant goats

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### SUMMARY

The main objective of the study was to determine the number of growing follicles (diameter  $\geq 4$  mm) with regards to the distribution of corpora lutea (CL) on the ovaries in pregnant goats. Growing follicles with a diameter greater than 5 mm i.e. large follicles were also recorded and analyzed. Daily ultrasonography (USG) examinations of ovaries were made in six Polish White Goats starting from the day of estrus detection (December/January) until parturition (May/June). An individual profile of follicular growth during the entire pregnancy was recorded for every goat. Three goats with CL present only on one ovary were included into group CL/0, and the three other goats with CL on both ovaries were in CL/CL group. The mean numbers of growing ( $52.0 \pm 11.3$ ) and large ( $21.0 \pm 7.1$ ) follicles during the entire pregnancy in group CL/0 were significantly ( $p \leq 0.05$ ) higher than those of group CL/CL (growing follicles:  $30.0 \pm 2.8$ , large follicles:

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10.0±2.8). The mean numbers of growing (13.7±2.1) and large (4.4±0.9) follicles on the CL-bearing ovary were significantly ( $p \leq 0.01$ ) lower than those on the CL-free ovary (growing follicles: 41.0±7.0, large follicles: 18.0±5.0). In conclusion, the distribution of CL in the ovaries affected a number of growing follicles during caprine pregnancy. The majority of growing follicles during this period was observed on the CL-free ovaries. *Reproductive Biology* 2010 **10** 1: 53-66.

**Key words:** goat, pregnancy, ovary, folliculogenesis, corpus luteum

## INTRODUCTION

Follicular growth during the estrous cycle as well as anestrus occurs in a wave pattern in goats [7, 9, 15, 24, 25]. In comparison to those of cattle or sheep, mechanisms of follicular development during recruitment and selection in goats are not well recognized. As in other ruminants, the follicular wave in this species emerges after an increase in serum FSH concentration [15]. The development of the largest follicle in a wave is associated with increased estradiol ( $E_2$ ) and inhibin concentrations [7, 15]. These hormones suppress pituitary FSH secretion which is consistent with an idea of follicular dominance. However, a large frequency of double or triple ovulations is observed in most of goat breeds. Thus, in small ruminants, the most plausible hypothesis is associated with co-dominance and the occurrence of the dominance depends on the stage of the estrous cycle [6, 9, 12, 18, 24, 27].

It is possible that a lack of follicular dominance during the luteal phase is due to the suppressive effect of progesterone ( $P_4$ ) on LH secretion [1, 9, 13, 23]. De Castro et al. [7] found an relationship between  $P_4$  concentration during the early luteal phase and the number of follicular waves emerging during the estrous cycle in goats. A higher  $P_4$  concentration shortens the first follicular wave due to its suppressive effect on the largest follicle development. Those observations were confirmed with the use of exogenous  $P_4$  [16]. The  $P_4$  effect is related to its important role within the hypothalamo-pituitary-ovarian axis. However, the local effect of corpus luteum (CL) on follicular development was also demonstrated [4, 8, 20]. A larger number of antral follicles growing on the

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