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Changes in acid proteinase activity at different stages in the luteal phase of porcine ovary

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Tightly regulated proteolytic remodeling is required for follicular and luteal functions in the mammalian ovary. The aim of the present study was to analyze the activity and specific activity of acid proteinases at different stages of the luteal phase in ovaries of pigs between 6 and 8 months of age. Large ovaries (5.34-7.56 g) (n= 60) collected from the abattoir, were used for the selection of different stages of luteal phase. Four different stages, namely corpus haemorrhagicum (CH) (n=14), mid corpora lutea (Mid CL) (n=20), early corpus albicans (ECA) (n=20) and late corpus albicans (LCA) (n=20) were identified by their gross appearance. Corresponding luteal structures were incised and homogenized in phosphate buffered saline (pH 7.5). Activity of acid proteinases (U/ ml) and total protein concentration (mg/ml) of the luteal extracts were determined. Specific activity was expressed as the activity per mg of total protein (U/mg). Significance of the observed differences in activity and specific activity of the four different stages were analyzed using ANOVA. Data are presented as mean ± SD.

Acid proteinase activity, total protein concentration and specific activity were 29.70±9.90 U/ml, 43.89±5.43 mg/ml and 0.69±0.25 U/mg respectively for CH. Corresponding values for Mid CL were 53.64±10.69 U/ml, 15.21±1.00 mg/ml and 3.55±0.77 U/mg. Corresponding values for ECA were 214.65±19.76 U/ml, 20.09±2.60 mg/ml and 10.85±1.66 U/mg. Corresponding values for LCA were 89.66±25.79 U/ml, 10.85±0.85 mg/ml and 8.30±2.53 U/mg. Statistically significant differences of the acid proteinase activity and specific activity were found among four different stages of luteal phase. Results were compared between Mid CL & CH, Mid CL & ECA and Mid CL & LCA and the differences seen were statistically significant ($p< 0.001$ for all three comparisons for both activity and specific activity). Lowest specific activity was seen in the CH which is the first stage of luteal phase. In comparison to CH, there was approximately 5 fold increase of specific activity towards mid luteal phase and a further increase of approximately 16 fold at the early regression phase (ECA). Towards the later part of regression (LCA) there was a significant decline ($p<0.001$) of specific activity compared to that of ECA.

In conclusion, activity and specific activity of acid proteinases at different stages of the luteal phase vary significantly. These results suggest that the expression of acid proteinases in the ovary changes during the luteal phase of ovarian cycle. Hence, acid proteinases may play an important role in regulating luteal functions. Further studies are necessary to clarify the function of acid proteinases in the luteal phase.

Key words: acid proteinase, ovary, corpus luteum