Gene and protein expression of connexins 37 and 43 in cumulus-oocytes complexes throughout the canine oestrous cycle

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Abstract

The aim of this study was to evaluate the expression of connexin (Cx) 37 and Cx43 in canine cumulus-oocyte complexes (COCs) during the oestrous cycle. Cx localisation was analysed by immunohistochemistry and immunofluorescence, whereas protein and gene expression was evaluated by western blotting and quantitative polymerase chain reaction respectively; comparisons were made using analysis of variance. Both Cx37 and Cx43 were expressed in all follicular stages; Cx43 was identified in cumulus cells and Cx37 was identified in cumulus cells, zonae pellucida and oocytes. Immunofluorescence analyses showed that Cx37 remained unchanged during the preovulatory stage but decreased after ovulation, whereas Cx43 remained unchanged before and after ovulation. Cx43 transcripts increased ($P < 0.05$) during anoestrus and dioestrus in medium-sized follicles but remained unaltered during the pro-oestrus and antral stages during oestrus, before and after ovulation. Cx37 mRNA levels decreased in ovulated COCs ($P < 0.05$). The highest levels of Cx37 protein ($P < 0.05$) were detected in the preantral stage during anoestrus. In contrast, strong Cx43 signals were detected in oestrus and in medium-sized antral follicles in dioestrus ($P < 0.05$). Overall, we demonstrated that Cx37 and Cx43 exhibit different expression patterns, suggesting specific roles throughout growth. Maintenance of Cx expression before ovulation indicates the involvement of Cx37 and Cx43 in the prolonged meiotic arrest.

Keywords

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