Expression of cyclooxygenase-2 in the inflammatory changed porcine uterus

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Abstract

In the present study, the pattern of cyclooxygenase-2 (COX-2) expression in health and inflamed porcine uteri was analyzed using real-time reverse transcriptase-polymerase chain reaction (RT-PCR), Western blot and immunohistochemistry. On day 3 of the estrous cycle, 50 ml of saline or 50 ml of Escherichia coli (E. coli) suspension containing 10⁹ colony-forming units/ml, were injected into each uterine horn of the control (n=6) and experimental gilts (n=7), respectively. This latter procedure lead to a moderately (n=3) or severely intense (n=4) acute endometritis after eight days. Expression of both the COX-2 mRNA and protein was increased in the endometrium (ENDO) of animals suffering from the moderate (P<0.05, P<0.01, respectively) and severe (P<0.01) acute endometritis, as compared to the control tissues. Moreover, COX-2 mRNA level and protein content were higher (P<0.05) in the ENDO of animals with severe than with a moderately acute endometritis. An elevation in the COX-2 gene (P<0.05) and protein (P<0.001) expression was also observed in the myometrium (MYO) of animals suffering from severe endometritis, when compared with the levels observed in MYO of both the health and moderate intensely inflamed uteri. However, both the COX-2 mRNA and protein levels were similar in MYO of the control and moderately inflamed organs. The luminal epithelium, some of uterine glands and circular layer of the MYO were more intensely stained for COX-2 in animals with severe endometritis, than in animals with healthy or moderately inflamed uteri. Nonetheless, stronger COX-2 reaction was found in some of the uterine glands in latter group, when compared to that observed in uteri of the control animals. While positive COX-2-labeling was observed in the muscular layer of all arteries supplying the health and inflamed uteri, such staining was exclusively present in the endothelium of some arteries in inflamed organs. Likewise, some arteries in uteri of the animals with severe endometritis displayed immunoreaction stronger than that found in uteri of the animals with moderate inflammation. The present study revealed an up-regulation of COX-2 mRNA and protein in the inflamed porcine uterus, which was directly related to the intensity of the organ inflammation. An increase in the COX-2 expression in the uterus challenged by E. coli-induced inflammation indicates that this enzyme is crucial for elevated prostaglandins production in the inflamed organ.

Key words: COX-2 expression, inflammation, uterus, gilt

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