ABSTRACTS

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The localization of Toll-like receptor 2 (TLR2) in endometrium and cervix of dogs at different estrous stages and pyometra

Chotimanukul, S and Sirivaidyapong, S

Department of Obstetrics, Gynaecology and Reproduction, Faculty of Veterinary Science, Chulalongkorn University, Bangkok, 10330, Thailand

s_sudson@yahoo.co.uk

OBJECTIVES AND METHODS: The aim of this study was to localize and evaluate the role of TLR2 in the endometrium and cervix of bitches at different stages of estrus and pyometra dogs. In this study, 67 nulliparous dogs, ranging in age from 1-13 years were allocated into five groups (proestrus; n=7, estrus; n=10, diestrus; n=16, anestrus; n=11, pyometra; n=23). The blood samples were collected for measurement of progesterone concentration. Tissues collected from uterine horn and cervix were fixed in 4% paraformaldehyde (1) for immunohistochemical examination of TLR2. The expression of TLR2 was assessed by semi-quantitative method (2). Multiple analysis of variance using SAS was used to compare the differences in protein expression level between groups and tissue layers. Differences with P < 0.05 were regarded as statistically significant, P < 0.01 as highly statistically significant.

RESULTS: In this study, no pathological changes of uterine samples were found from all healthy dogs. And, the mean of progesterone concentration in each group were 1.07 ng/ml (proestrus), 8.04 ng/ml (estrus), 25.93 ng/ml (diestrus), 0.48 ng/ml (anestrus) and 11.17 (pyometra). In pyometra, the glandular epithelium expressed TLR2 more intensely than the surface epithelium (P < 0.05). The expression of TLR2 in the glandular epithelium was significantly higher in healthy dogs at estrus, diestrus and dogs with pyometra compared with anestrous dogs (P < 0.01). While, the expression of TLR2 in the stroma was not observed in the group of healthy dogs at all stages. The surface epithelium of cervix in dogs with pyometra expressed TLR2 significantly more intensely than the stoma (P < 0.01). While, the expression of TLR2 at estrus and diestrous stage were absent in the stroma of cervix.

CONCLUSION: This study provides the first report in immunohistochemical localization of TLR2 in the canine reproductive tract. In the present study, TLR2 was expressed in endometrial epithelium but absent in the endometrial stroma of healthy dogs at all estrous stages. These findings may indicate the type-dependent differential expression of TLR in a distinct cell type (3). On the other hand, the lack of TLR2 in the stroma of healthy uteri of dogs may promote the infection from the invading pathogens once the epithelial cells have been destroyed by the pathogens especially Gram-positive bacteria. Nevertheless, TLR2 would be inducible post-infection by TNF-α (4). These may explain why TLR2 expression was found increased in the endometrial stroma of dogs with pyometra in this study. However, in infected endometrium of dogs suffering from pyometra, TLR2 was not highly expressed in the endometrial surface epithelium as found in TLR4 expression in the previous study (5). The possibility is that the endometrium has increased expression of other receptors such as TLR4 which also increased production of cytokines in response to infection (6). This result may indicate a protective role for TLR2 in canine uterine infection which can decrease the uterine pathology due to unfavorable inflammation and improved balance between protective and pathological inflammatory responses to maintain the uterine homeostasis (7). In dogs with pyometra, the expression of TLR2 was significantly more intensely in the surface epithelium of the cervix. To protect the host from the infection, the recognition of the invading bacteria in dogs suffering from pyometra shown to be mediated by TLR2 in the cervix which may resulting in an increased expression of TLR2 in the surface epithelium of these tissues. Interestingly, the expression of TLR2 were absent in the stroma of the cervix at estrus and diestrus. In dog, the cervix usually opens about 2 days before the LH peak which close to the time of mating in estrous stage (8). In this period, bacteria could enter to the uterus easily. Consequently, from the result of this study, if the epithelial barrier has been destroyed at this time, pathogens may invade into the reproductive tract and cause the uterine infection in dogs.