ABSTRACTS

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DIFFERENTIAL EXPRESSION OF PROSTAGLANDIN E\textsubscript{2} RECEPTORS IN THE CANINE LOWER URINARY TRACT OF INTACT AND GONADECTOMISED MALE AND FEMALE DOGS

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Introduction - Locally-synthesised prostaglandin E\textsubscript{2} (PGE\textsubscript{2}) plays an important role in the lower urinary tract (LUT) function. Our previous study showed that cyclooxygenase-2, a key enzyme in PG production, is expressed in the canine urinary bladder and urethra, and its expression differs between genders and reproductive statuses (intact or gonadectomised). Four subtypes of PGE\textsubscript{2} receptors are characterised; EP\textsubscript{1} and EP\textsubscript{3} are involved in muscle contraction while EP\textsubscript{2} and EP\textsubscript{4} relax the muscle.

Objectives - This study aimed at investigating the expression and distribution of PGE\textsubscript{2} receptors (EP\textsubscript{1}, EP\textsubscript{2}, EP\textsubscript{3} and EP\textsubscript{4}) in the LUT of male and female dogs, and whether there is any difference in their expressions between intact and gonadectomised dogs.

Materials and methods - All the animals were clinically healthy and included 5 intact males, 5 intact anoestrous females, 4 castrated male dogs and 6 spayed bitches. Samples of four regions of the LUT comprising body and neck of the bladder as well as proximal and distal urethra were collected. Expression of PGE\textsubscript{2} receptor subtypes (EP\textsubscript{1}, EP\textsubscript{2}, EP\textsubscript{3} and EP\textsubscript{4}) was assessed immunohistochemically using polyclonal antibodies. Three layers of each region (epithelium, sub-epithelial stroma and muscle) were examined in triplicate. The expression was estimated semi-quantitatively and was based on the percentage and the intensity of specific staining.

Results - The expression of all the receptor subtypes varied depending on gender, region and tissue layer. Regardless of tissue layers and region, intact males expressed higher levels ($P < 0.05$) of EP\textsubscript{1} and EP\textsubscript{3} compared to intact females. However, there was no difference in EP\textsubscript{2} and EP\textsubscript{4} expression between the two genders. Expression for all subtypes of PGE\textsubscript{2} receptor was found to be higher ($P < 0.05$) in proximal urethra than the bladder or distal urethra, and there were no differences between the two parts of the bladder. Irrespective of region, the highest expression for all the receptor subtypes was in the epithelium, intermediate to low in the muscle and sub-epithelial stroma. Reproductive status had an influence on PGE\textsubscript{2} receptor expression. Gonadectomised dogs had lower ($P < 0.05$) expression for EP\textsubscript{2} and EP\textsubscript{3} compared to intact dogs. However, EP\textsubscript{1} and EP\textsubscript{4} expression did not differ between the two reproductive statuses. In gonadectomised dogs, lower expression ($P < 0.05$) of EP\textsubscript{2} was observed in the bladder and proximal urethra while lower expression of EP\textsubscript{3} was found in only proximal and distal urethra compared to intact dogs. The data obtained in this study have shown the presence of PGE\textsubscript{2} receptors (EP\textsubscript{1}, EP\textsubscript{2}, EP\textsubscript{3} and EP\textsubscript{4}) in the canine LUT with variations in their expression levels, suggesting that the functional importance of each of PGE\textsubscript{2} receptor subtypes depends on tissue layer and region of the LUT. Lower expressions observed in gonadectomised dogs may affect functional role of PGE\textsubscript{2} in the LUT. Gender and reproductive status differences may partly explain different levels of risk in the development of incontinence between males and females as well as between intact and gonadectomised dogs.

Keywords: canine, prostaglandin E\textsubscript{2}, urinary bladder, urethra, spaying