

## MORPHOLOGICAL INVESTIGATIONS ON MAST CELLS IN FELINE PELVIC URETHRA

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The data about the localization, distribution, dimensions and shape of mast cells in the pelvic urethra in mammals are few. There are reports about the occurrence of mast cells in male genital organs in men, rats, mice and boars, both in normal and pathological conditions (Galli, 1993; Majeed, 1994; Pinart *et al.*, 2001; Qo, 1994).

In the skin and the urogenital tract of humans, rats and mice, mast cells are located in the connective tissue under the epithelial layers adjacently to blood and lymph vessels and peripheral nerves (Galli, 1993; Majeed, 1994).

In men, the normal spermatogenesis is accompanied by a presence of tryptase-positive mast cells in the interstitium of testes and near the Leydig cells (Meineke *et al.*, 2000). In cases of abnormal spermatogenesis, the number of mast cells was significantly increased. It was observed that mast cells and their secretory products were involved in the thickening of the wall of convoluted seminiferous tubules and other tissue changes in sterile testes (Meineke *et al.*, 2000).

Depending on their localization, human testicular mast cells are divided into interstitial and peritubular. The former are located among Leydig and other connective tissue cells, near the blood vessels whereas the latter – into the propria of

seminiferous tubules (Appa *et al.*, 2002).

Both the number and density of mast cells in the genitals of male rats are high. Their prevalence in the ventral part of prostate in the rat during the puberty is considerable and decreases with age (Hammel *et al.*, 1990).

Few mast cells and fibroblasts, small blood vessels and plenty of differentiated Leydig cells are observed in the testicular interstitium of healthy boars. In boars with unilateral abdominal cryptorchism, mast cells were few whereas in bilateral cryptorchids, there were numerous mast cells (Pinart *et al.*, 2001).

The number of mast cells in the testicular interstitium of newborn, sexually immature and adult mice were found to be considerable in the intact testis after transperitoneal unilateral torsion of the other testis (Qo, 1994).

These literature data support the views about the importance of mast cells for the functioning of the urogenital tract (Wrobel, 1988; Vodenicharov & Chouchkov, 1999).

The lack of data about the localization and the distribution of mast cells in the pelvic urethra of male cats motivated the present study in order to elucidate their role in the function of male urethra in this animal species.

Pelvic urethras of 9 clinically healthy, sexually mature male European shorthair cats (at the age of 1–2 years), weighing 2.8–4 kg were studied. The cats were euthanized by i.v. injection of 200 mg thiopental sodium (Thiopental, Biochemie, Austria).

The material was fixed in Carnoi's fixative for 4 hours, then put in 70° ethanol for 12 hours, dehydrated in an ascending alcohol series, cleared in xylene and embedded in paraffin.

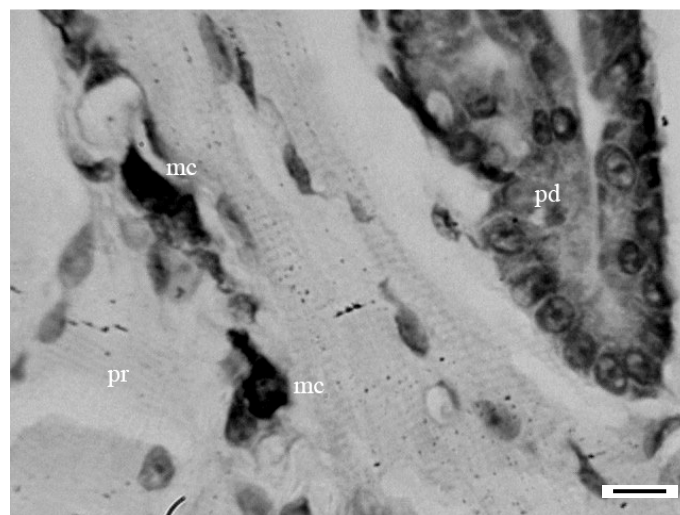
The cross-sections (5–7 µm) were stained with 0.1% solution of toluidine blue in McIvane's buffer, pH 3 (Pearce, 1960).

The localization and the shape of mast cells were determined via light microscopy.

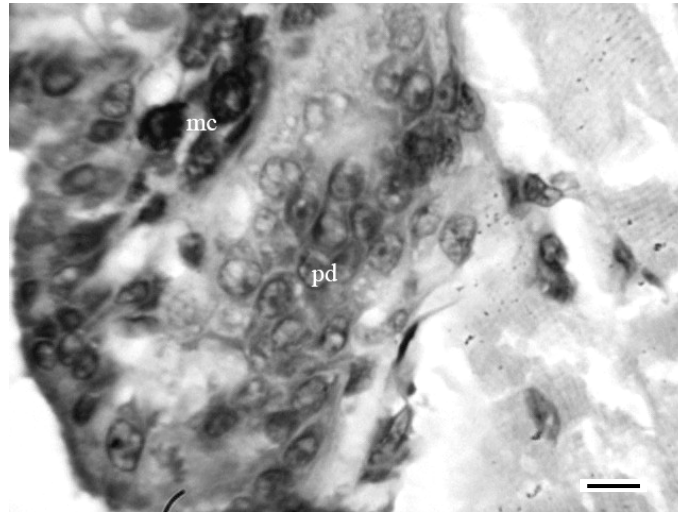
The light microscopic study showed that the most significant localization of mast cells occurred in the propria of pelvic urethra. Most cells were near the lobules of disseminate prostate, the caverns of the erectile layer, blood vessels and be-

tween connective tissue elements (Fig. 1). A considerable part was located close to the basal membrane of glandular epithelial cells and blood vessels. In disseminate prostate, mast cells were observed under the basal membrane of epithelial cells. Relatively less frequently, cells with intra-epithelial localization were present (Fig. 2). In the muscular part of the pelvic urethra, mast cells were observed primarily in the connective tissue between the different muscular layers and more rarely – among the muscle cells (Fig. 1). Significantly higher mast cell density was observed in the internal longitudinal smooth muscle layer followed by the middle and the external layer.

The present study describes for the first time mast cells in feline pelvic urethra, observing a considerable predilectional, connective tissue localization. The obtained data added to the knowledge about these cells' distribution in the interstitial tissue of male genitals in rats, mice, boars, gerbils and humans (Hammel *et al.*,



**Fig. 1.** Mast cells (mc), located in the propria (pr) of pelvic urethra and in vicinity of lobules of disseminate prostate (pd). Bar = 10 µm.



**Fig. 2.** Mast cells (mc), located intraepithelially, into the lobules of disseminate prostate (pd). Bar = 10  $\mu$ m.

1990; Majeed, 1994; Pinart *et al.*, 2001; Sales, 1975).

The connective tissue localization of mast cells in feline pelvic urethra, observed by us, was similar to the described interstitial testicular distribution of these cells in impaired spermatogenesis, in cryptorchism and after castration (Appa *et al.*, 2002; Meineke *et al.*, 2000; Pinart *et al.*, 2001; Sales, 1975). The data allowed us to support the assumption about the dominating affinity of mast cells towards the fibroelastic elements of pelvic urethra (König, 1992; Wrobel, 1998). This was in accordance with their known localization in the testicular interstitium in rats, mice and men (Appa *et al.*, 2002; Hammel *et al.*, 1990; Meineke *et al.*, 2000; Qo, 1994).

Taking into consideration the opinion of some authors (Galli, 1993; Majeed, 1994) about the localization of mast cells in intact tissues and the attitude of others (Kollur *et al.*, 2004) about their site in inflammations and neoplasms, it could be

suggested that mast cells observed in the connective tissue of feline pelvic urethra participate in local homeostasis.

A similar close position of mast cells nearby the basal membrane of epithelial cells as well as their intraepithelial localization was described in sheep (Huntley *et al.*, 1984), as well as in the wall of the proximal renal tubule in pigs (Vodenicharov & Chouchkov, 1999).

The intraepithelial localization of mast cells among the epithelial cells of feline disseminate prostate, observed by us, is reported for the first time. Similarly to cited authors, we consider that this localization was most probably due to migration through the basal membrane, occurring by an unknown mechanism.

In conclusion, the results of our study showed convincingly that the topographic traits of mast cells in pelvic urethra were variable and depending primarily on their localization. It is evident that future histochemical studies are needed in order to determine more precisely the composition

of granules and to make clear the role of mast cells in the function of urethra.

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