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To cite this article: F. Russo, R. Micaletti, G. Petrosino & A. Vittoria (2007) Neuroendocrine cells in the urogenital tract of the buffalo, Italian Journal of Animal Science, 6:sup2, 792-793, DOI: [10.4081/ijas.2007.s2.792](https://doi.org/10.4081/ijas.2007.s2.792)

To link to this article: <https://doi.org/10.4081/ijas.2007.s2.792>



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Published online: 15 Mar 2016.



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Neuroendocrine cells in the urogenital tract of the buffalo

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ABSTRACT - Neuroendocrine cells or paraneurons are cytotypes producing biogenic amines and/or hormonal peptides, scattered in the glandular and lining epithelia of the body. In this study the presence of chromogranin A-, serotonin- and somatostatin-immunoreactive neuroendocrine cells has been described immunohistochemically in the urethro-prostatic complex and female urethra of subjects of the buffalo *Bubalus bubalis*. The chromogranin A- containing neuroendocrine cells resulted the most numerous cytotype, the serotonin- containing ones the most irregular in shape for the presence of dendritic-like cytoplasmic extensions and the somatostatin- containing the rarest.

The role played by the amine serotonin in the genital tract has been related to the determinism of sexual climax and to the contraction of smooth muscle. The function played by the neuroendocrine genital somatostatin is unknown. Analogically to what described for the same gastrointestinal hormone, it could inhibit both exocrine and endocrine secretions.

Key words: Neuroendocrine cells, Genital tract, Buffalo.

INTRODUCTION - Neuroendocrine (NE) cells (Pearse, 1977) or paraneurons (Fujita, 1980) are cytotypes producing biogenic amines and hormonal peptides, scattered in the glandular and lining epithelia of the body of many vertebrates. Particularly they were detected in some organs of the genital tract in many domestic animals, including sheep, pig, cattle, horse and donkey (Vittoria et al., 1990; Czaja et al., 1996; Arrighi et al., 2004; Russo and Vittoria, 2006). In this study the presence of NE cells in genital organs of male and female subjects of the buffalo *Bubalus bubalis* is described.

MATERIAL AND METHODS - The urethro-prostatic complex and the female urethra were collected from five buffaloes of both sexes, soon after their death in a local slaughterhouse. Samples were fixed in Bouin's fluid, embedded in paraplast and routinely cut at 7 µm. The sections were stained by the avidin-biotin immunohistochemical technique in whose specific step polyclonal antibodies raised against chromogranin-A (chr-A) (Immunostar Inc., 20086), somatostatin (Immunostar Inc., 20067) and serotonin (Immunostar Inc., 20080) were used. All primary antisera were diluted 1:4000 and incubated on sections overnight at 4°C. 3-3' diaminobenzidine was used to detect the site of the immunological reactions. Nega-

tive controls were performed by substituting the specific antisera with phosphate buffer saline or by absorbing each of them with an excess of the relative peptide. The preparations were observed by a Nikon E 600 light microscope and photomicrographs were taken using a Coolpix 8400 Nikon digital camera.

RESULTS AND CONCLUSIONS - Chr-A and serotonin- containing NE cells were found in both male and female urethra, the first being more numerous than the second. Mainly the serotonin- immunoreactive cells appeared to be irregularly shaped for the presence of dendritic-like cytoplasmic extensions oriented towards the urethral lumen, neighbouring exocrine cells or subepithelial capillaries. The prostatic NE cells were found to contain chr-A, serotonin and somatostatin. They were smaller than the analogous urethral cells and more regular in shape, being round or oval. The distribution in the glandular parenchyma of the prostatic paraneurons seemed to be focal because they were often grouped in small clusters of 5-30 elements each, separated by zones completely lacking of positivities.

The serotonin secreted by the NE cells of the male and female rat urethra has been involved in the determinism of the sexual climax because the amine was found to strongly decrease the threshold of occurrence of the so-called "coitus reflex". This latter can be experimentally induced in anesthetized animals by the stimulation of the urethra of both sexes and consists of a series of events bearing many similarities with the sexual climax. Such events are, in the male, penile erection, contraction of perineal muscles and ejaculation and, in the female, contractions of perineal muscles and rhythmic vaginal and uterine movements (Marson and McKenna, 1992). Moreover, serotonin was found to stimulate the contraction of the smooth muscle of the urogenital tract in the dog. On this basis the amine was supposed to favour the emission of urogenital fluids such as urine and sperm (Hanyu et al., 1987). The hormonal peptide somatostatin has been retained to inhibit both exocrine and endocrine secretions in the gastrointestinal tract (Reichlin, 1983).

ACKNOWLEDGMENTS - This work was supported by a grant from the MIUR (FISR 2005).

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