REGIONAL DISTRIBUTION OF PHI, CCK, VIP AND SUBSTANCE P IN THE FELINE URINARY SYSTEM

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The peptidergic innervation of the feline urinary system was extensively investigated by radioimmunoassay and immunocytochemistry. Significant levels of PHI, CCK, VIP and Sub P were found throughout. Somatostatin, bombesin and neurotensin were undetectable. Pmol/g values are given as mean ± SEM:-

	PHI	CCK	VIP	Sub P
Dome	1.8 ± 1.1	< 0.2	9.2 ± 3.4	2.6 ± 0.5
Trigone	14.0 ± 2.3	1.2 ± 0.3	45.0 ± 16	3.8 ± 1.1
Lateral Wall	1.5 ± 0.3	< 0.2	6.3 ± 1.2	2.1 ± 0.2
Bladder Neck	11.0 ± 3.2	1.4 ± 0.3	38.0 ± 6.4	1.8 ± 0.6
Upper Ureter	2.0 ± 0.4	< 0.2	9.1 ± 3.2	0.7 ± 0.1
Middle Ureter	4.5 ± 0.9	< 0.2	53.0 ± 16.0	3.2 ± 1.0
Lower Ureter	9.2 ± 3.2	2.7 ± 1.0	38.0 ± 7.1	3.0 ± 1.0

The concentrations of all 4 peptides are lower in the upper ureter and bladder wall, but elsewhere there appears to be a particularly rich peptidergic innervation. Immunocytochemistry showed that VIP and Sub P were localized to nerve fibres in the muscle layer, beneath the transitional epithelium and around the blood vessels. In most regions, more nerves were found to contain VIP rather than Sub P, except in the dome and the lateral wall of the bladder where Sub P containing nerves were more numerous. The regional density of VIP and Sub P immunoreactive nerves in each area was in general agreement with the concentrations detected by radioimmunoassay. These peptides must have a role in the nervous control of the urinary system - this needs to be investigated.

THE EFFECTS OF SUBSTANCE P AND RELATED TACHYKININS ON THE ISOLATED SPINAL CORD OF THE NEONATAL RAT: DIFFERENTIAL ANTAGONISM BY A PEPTIDE ANTAGONIST

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The isolated hemisected spinal cord of the neonatal rat has been used to evaluate the effects of Substance P and related tachykinins on motoneurones. On a range of isolated tissues two distinct patterns of agonist potency have been suggested to reflect the existence of two sub classes of Substance P receptor (Lee et al., 1982). Substance P and physalaemin have greater affinity for "P" receptors, and kassinin and eledoisin are more active on "E" receptors. The relative potency of the tachykinins on the isolated spinal cord (eledoisin > kassinin ≥ physalaemin > Substance P) suggested that this tissue has a preponderance of Substance P E type receptors. However, agonist potency order alone is not sufficient to define the receptor types and therefore it was necessary to obtain additional evidence.

Analogues of Substance P exerting antagonism in vitro on the guinea pig ileum have recently been described by Folkers et al. (1981). Using the antagonist analogue (D-Pro^2 D-Trp^{7,9})-Substance P we were able to distinguish between the two classes of Substance P receptor on the spinal cord. When (D-Pro^2, D-Trp^{7,9})-Substance P (2.5×10^{-6}M) was continuously perfused over the spinal cord the following changes in responses to the tachykinins were seen. The responses to both eledoisin 0.05 μM, and kassinin 0.1 μM, were greatly depressed (-55%), whilst the responses to Substance P 0.5 μM, and physalaemin 0.1 μM were relatively unaffected; often a potentiation was seen (+14% and +4% respectively). These results provide further evidence for the existence of at least two receptor sub-types for the tachykinins and show that this antagonist preferentially acts on the E sub-type of receptor.

Lee et al (1982). Naunyn-Schmiedeberg's Arch.Pharmacol. 318: 281-287.
Folkers et al (1981). Acta physiol.Scand., 114: 631-633.