EXPRESSION OF PEPTIDE LIGANDS AT NICOTINIC ACETYLCHOLINE RECEPTORS IN RAT URINARY BLADDER

Hypothesis / aims of study
Acetylcholine (ACh) is not only a neurotransmitter in the mammalian urinary bladder, but is also a non-neuronal mediator, produced in the urothelium, and acting via muscarinic (mAChRs) and nicotinic (nAChRs) receptors. Among the various nAChRs, the α7-subtype is of particular interest since it is involved in cholinergic, anti-inflammatory modulation. The secreted mammalian Ly-6/urokinase plasminogen activator receptor-related protein-1, and -2; (SLURP-1 and -2), being endogenous peptide ligands at the α7nAChRs and α3nAChRs, respectively, have been demonstrated in various tissues, but, so far, not in the urinary bladder. In the present study, we investigated by immunohistochemistry the expression of SLURP-1 and -2 and there respective receptors in rat urinary bladder.

Study design, materials and methods
Six female rats (Wistar-Furth strain; 200-210 g bwt) were killed by anaesthetic over-dose, the urinary bladders were harvested and fixed in formalin. They were then processed for subsequent immunohistochemistry using antibodies against: α3nAChRs, α7nAChRs, SLURP-1 and SLURP-2.

Results
The α3nAChRs localized equally in the urothelium and the detrusor while the expression of the α7nAChRs was far stronger in the urothelium. SLURP-2 immunoreactivity was totally missing while that of SLURP-1 was strong in the detrusor and moderate in the urothelium, the latter tissue showing an uneven distribution. In no case there was any expression in the lamina propria. The same patterns were observed in the distal ureter being included in the specimens.

Interpretation of results
The expression pattern of the ligands and their respective receptors may suggest that SLURP-1 is an important modulator of urothelial as well as detrusor functions. SLURP-2 appears not to affect the bladder but the α3nAChRs may be activated by ACh, possibly released neurally as well as non-neurally, as judged from previous reports in the literature.

Concluding message
The peptide ligand at the α7nAChRs, SLURP-1, is expressed in the rat urothelium and the rat detrusor and participates possibly in physiological and/or pathophysiological processes in the urinary tract.