

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 $\alpha 7$ -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 $\alpha 7$ nAChRs and $\alpha 3$ nAChRs, 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 their 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: $\alpha 3$ nAChRs, $\alpha 7$ nAChRs, SLURP-1 and SLURP-2.

Results

The $\alpha 3$ nAChRs localized equally in the urothelium and the detrusor while the expression of the $\alpha 7$ nAChRs 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 $\alpha 3$ nAChRs 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 $\alpha 7$ nAChRs, 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.

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<i>Is this a clinical trial?</i>	No
<i>What were the subjects in the study?</i>	ANIMAL
<i>Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?</i>	Yes
<i>Name of ethics committee</i>	Local Ethical Committee of the University of Gothenburg.