Abstract

The regulation of the urinary bladder function involves interplay of many signaling systems. Any disturbance within these principles always result in bladder dysfunction, manifested by urge to void and in many cases leading to incontinence. The main objective of this thesis was to characterize interactions between muscarinic, purinergic and adrenergic receptor systems in *in vitro* study.

The experiments were performed on rats (300-350g; Sprague-Dawley strain), that after killed with an overdose of pentobarbital, were removed a smooth muscle tissue sample (6x2 mm) and put through contraction studies in organ bath with the presence of muscarinic agonist (carbachol – reference concentration 10^{-5} M) and following agonists (ATP, 2-chloro-adenosine) and antagonists (pirenzepine, methoctramine, 4-DAMP, 8-sulfophenyltheophylline) in different, ANS active, concentrations. The volume of the substances, added to the bath, was always 100 µl.

The results revealed a high potential of antimuscarinic 4-DAMP on carbachol evoked contractions inhibition. This effect was 2000x higher compared with methoctramine and 600x higher than pirenzepine. However, it was clarified that this muscarinic receptor blockade must be necessarily connected with adrenergic and purinergic ANS receptors overactivity.

Key words: muscarinic receptors, purinoceptors, adrenoceptors, in vitro, contraction studies, organ bath, urinary bladder, rat