131

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Title (type in CAPITAL LETTERS, leave one blank line before the text):

SUPRASPINAL CENTERS INNERVATING DIFERENT PELVIC ORGANS – DIFFERENCES IN THE NUMBER OF CENTRAL NEURONS PROJECTING TO DIFFERENT PELVIC ORGANS AS REVEALED BY RETROGRADE TRANSNEURONAL TRACING OF EFFERENT PATHWAYS.

Aims of the Study: Disease in the pelvic area often involves different organs, i.e., urinary and fecal incontinence, pain and chronic "abacterial" inflammation of bladder and prostate. It is known that the Central Nervous System (CNS) plays a major role in modulating lower urinary tract function. Disturbance of peripheral and central reflex pathways are responsible for severe dysfunction and development of chronic disease in the pelvic area. Centers within the brain and brain stem modulating pelvic organ function are known. However, there are no data about differences in the number of neurons projecting to different pelvic organs. There may be differences in the number of pontine neurons projecting to the prostate and the bladder.

Methods: Adult male Sprague-Dawley rats were used for retrograde transneuronal mapping of the brain and brain stem. A pseudorabies virus (PRV) tracer (5µl, $1x10^8$pfu/ml) was injected into the bladder trigone of 32 animals and into the prostate gland of 44 animals. After 72, 96 and 120 houres post injection the animals were sacrifized and the whole CNS harvested. After immunohistochemistry a comparing analysis regarding neuron density in different areas of the brain and brain stem were carried out.

Results: There are statistically significant differences ($p < 0.05$) in the neuron density of central areas involved in innervation of the bladder trigone and prostate. The density of PRV-positive neurons after injection into bladder and prostate was found to be different within the following areas: periaquaductal gray, hypothalamus, pontine micturition center, locus coeruleus, A5 noradrenergic area and lateral reticular formation. No difference was found in the medial preoptic region, nucleus raphe and gigantocellularis.

Conclusions: There is a difference regarding the neuron number within one supraspinal area innervating different pelvic organs. Different organs receive input from same centers but there is a difference in the number of efferent cells connected to the pelvic organ.

132

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Title (type in CAPITAL LETTERS, leave one blank line before the text):

ANGIOTENSIN II IN MODULATION OF BLADDER FUNCTION

AIMS OF STUDY: Neural regulation of smooth muscle function is complemented by the modulatory effects of autocrine and paracrine regulators. Angiotensin II (Ang II) has been shown to be an important autocrine regulator in many smooth muscle systems. Although the presence of Ang II has been demonstrated in the bladder, its role in the regulation of bladder smooth muscle function remains unclear. The purpose of this study was to localize AngII in bladder tissue and determine whether Ang II modulates the regulation of bladder tone and contractility.

METHODS: The distribution pattern of Ang II and Ang II receptors in rat bladder were determined by immunohistochemistry using an ABC technique. For functional studies, bladders were harvested from anesthetized rats and placed in cold, oxygenated Kreb's solution. Bladders were cut into 2x4mm strips, mounted in perfusion chambers at 37°, placed under 2 grams of tension and equilibrated for 45 minutes. The contractile force generated in response to electric field stimulation (1-64 Hz, 10V, 5ms) and the level of spontaneous activity was measured before and after exposure to increasing concentrations of an Ang II receptor antagonist (losartan).

RESULTS: Extensive staining for AngII and its receptor were demonstrated in the rat bladder, particularly in smooth muscle bundles. The frequency and amplitude of spontaneous activity in smooth muscle tissue was completely inhibited by losartan (figure 1). Electric field stimulation resulted in a frequency dependent increase in contractile force. This response was significantly attenuated in the presence of losartan in a dose dependent manner (figure 2).

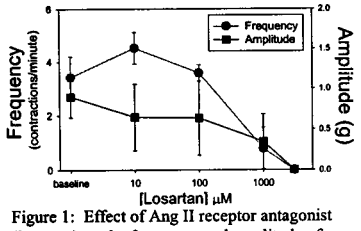

Figure 1: Effect of Ang II receptor antagonist (losartan) on the frequency and amplitude of spontaneous activity.

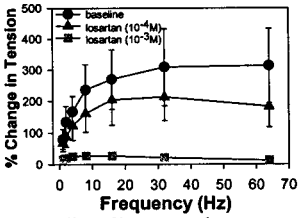

Figure 2: Effect of losartan on the response to electric field stimulation.

CONCLUSION: The extensive distribution pattern of Ang II and AngII receptor immunostaining support the concept of locally produced AngII in bladder tissue. The effect of an Ang II receptor antagonist on the bladder suggests that spontaneous activity and the response to neural stimulation are partly mediated by Ang II released from bladder smooth muscle. Thus, Ang II may play an important role in modulation of bladder smooth muscle functional response to physiologic stimuli.

133

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Title (type in CAPITAL LETTERS, leave one blank line before the text):

EVIDENCE OF GAP JUNCTIONS IN THE URINARY BLADDER

AIMS OF STUDY: Gap Junctions are transmembrane channels that link adjacent cells and facilitate intercellular communication. Formed by connexin proteins, these specialized structures play an important role in electrical and chemical coupling between neighboring cells in many tissues. Previous studies have shown that gap junctional activity plays a role in regulating vascular smooth muscle tone, coordinating uterine contractile activity during parturition and modulating pharmaco-mechanical coupling in cavernosal smooth muscle cells [1, 2, 3]. However, their presence in detrusor smooth muscles has not been established. The aim of this study was to determine the role of gap junctions in detrusor smooth muscle function.

METHODS: Urinary bladders from normal rats (Sprague-Dawley) were harvested and placed immediately in Kreb's solution. Longitudinal strips of bladder tissue (2mm x 4mm) were suspended