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CENTRAL INNERVATION OF THE PROSTATE GLAND AS REVEALED BY THE TRANSNEURONAL TRANSPORT OF PSEUDORABIES VIRUS

Aim of the Study: The prostate gland is involved in different functional pathologies of the lower urinary tract (LUT). Because the central innervation plays a key role in LUT function the neuroanatomy of the prostate was explored. Recent progress in neuroscience methodology allows now a transneuronal tracing by using a self amplifying virus tracer – Pseudorabiesvirus (PRV).

Methods: 44 individual adult male Sprague-Dawley rats were used for retrograde transneuronal mapping of the spinal cord and brain stem. A PRV-tracer (5µl, 1x10⁸ pfu/ ml) was injected into the prostate. After a survival time of 72, 96 or 120 hours the animals were sacrificed. The brain and spinal cord were harvested via a dorsal laminectomy. After cutting on a freezing microtome the tissue was immunostained for PRV.

Results: PRV-positive cells were found within the sacral (S1-S2) and the thoracolumbar (T12-L2) spinal cord. At the supraspinal level positive cells were found within the following regions: nucleus raphe, lateral reticular formation, nucleus gigantocellularis, A5 noradrenergic cell region, locus coeruleus, pontine micturition center, hypothalamus, medial preoptic region and periaqueductal gray.

Conclusion: There is a broad central representation of neurons involved in the control of the prostate gland. It's obvious, comparing data from the literature, that there is a broad overlap in the innervation of pelvic visceral organs (bladder, rectum, urethra). The appreciation of this neuroanatomical circumstances allow a deeper understanding of common urological pathologies within the pelvis (pelvic pain, prostatism and BPH, neurogenic bladder and bowel dysfunction).

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ULTRASTRUCTURAL EVIDENCE FOR A DIRECT PATHWAY FROM THE LUMBOSACRAL SPINAL CORD TO THE PONTINE MICTURITION CENTER OF RATS

AIMS OF STUDY

The behavioral pattern of micturition and urinary continence differs strongly among species. For example, cats and humans urinate primarily in a safe environment (**guarded urination**), while voiding in rats is more reflexively (**reflex urination**). The synergic action between the detrusor muscle of the bladder and the external urethral sphincter during micturition is coordinated by a group of neurons in the dorsolateral pontine tegmentum, called M-region or pontine micturition center (PMC). This study in adult male rats investigates the existence of direct lumbosacral cord projections to the pontine micturition center (PMC), which is absent in cats. Electron microscopical analysis is necessary to determine whether sacral afferents are in direct contact with spinally projecting PMC neurons.

METHODS

In three adult male rats injections with the retrograde and anterograde neuronal tracer wheat germ agglutinin horseradish peroxidase