

HIGH FREQUENCY OF BLADDER REFLEX CONTRACTIONS OBSERVED IN ACUTE AND CHRONIC BLADDER INFLAMMATION IS DEPENDENT UPON TRPV1 (VANILLOID RECEPTOR) EXPRESSION

Dinis P.¹, Charrua A.², Avelino A.², Cruz F.¹

¹Hospital Sao João, Urology, Porto, Portugal, ²Faculty of Medicine of Porto, Institute of Histology and Embryology and IBMC, Porto, Portugal

INTRODUCTION & OBJECTIVES: Previous studies have shown that high bladder reflex activity that accompanies acute and chronic cystitis is dependent upon sensory input conveyed in capsaicin-sensitive bladder afferents. TRPV1, the vanilloid receptor, is strongly expressed in these afferents. The objective of this study was to determine the bladder reflex activity of wild-type and TRPV1 knock-out (KO) animals during acute and chronic cystitis.

MATERIAL & METHODS: Cystometrograms were performed in adult female wild-type (WT) and TRPV1 KO mice under urethane anaesthesia (1.2 mg/kg, s.c). Intravesical pressure was monitored while saline was infused through the bladder dome at a physiological speed of 1.8 ml/h. The urethra was maintained open to allow urine expulsion without bladder over-distension. After stabilization, bladder contractions were recorded during 15 minutes. Next, infusion of 0.1% acetic acid in saline was started at the same speed and bladder contractions recorded for a similar period. In other WT and KO animals, chronic inflammation was induced by instillation of 0.001% lipopolysaccharide (LPS) for 1 h in the urinary bladder 24 hours before cystometry. WT and KO animals instilled with saline in lieu of LPS were used as controls.

RESULTS: The average number of reflex contractions of WT mice was 0.47 ± 0.09 per minute. During acetic acid instillation, this number increased to 0.83 ± 0.04 ($P < 0.001$). In KO animals, the bladder reflex activity was similar to the one of WT (0.46 ± 0.14 contractions per minute) and did not increase during acetic acid instillation (0.46 ± 0.09). In WT animals treated with LPS the bladder reflex activity was significantly higher (1.27 ± 0.05 , $P < 0.001$) than that of the control group (0.48 ± 0.07). In KO animals treated with LPS, the bladder reflex activity was not significantly increased (0.59 ± 0.12) over the control value (0.48 ± 0.13).

CONCLUSIONS: Under normal conditions, TRPV1 is not essential for bladder activity since WT and TRPV1 KO animals had the same frequency of reflex contractions. In contrast, the receptor is fundamental for the increased bladder activity accompanying acute and chronic cystitis since in TRPV1 KO mice the frequency of bladder reflex contractions was not increased neither by acute nor chronic inflammation.