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## POTENTIAL ROLE OF THE SPHINGOSINE KINASE 1 IN THE PATHOPHYSIOLOGY OF THE NEUROPATHIC BLADDER

### Hypothesis / aims of study

The aim of this study was to determine the bladder wall expression pattern of sphingosine kinase 1 (SPK1) in human bladder wall and to correlate it with clinical, urodynamic and pathologic features of patients with neuropathic bladder dysfunction.

### Study design, materials and methods

We assessed the SPK1 expression in bladder wall specimen obtained from cystectomy in 10 patients affected from spinal cord injury (8) and multiple sclerosis (2) with urodynamically and clinically proven neuropathic bladder dysfunction. These data were compared to 5 controls obtained from cadaveric donors. Inflammation and fibrosis were analysed with histological criteria and SPK1 expression was determined by individual immunohistochemical staining.

### Results

Significant increase in SPK1 urothelial immunoreactivity was shown in patients as compared to control ones ( $p=0.03$ ) (figure 1). By contrast, SPK1 immunoreactivity was significantly decreased in the sub-urothelium, muscles and nerves,  $p=0.02$ ; 0.01 and 0.003 respectively. Patients with detrusor overactivity had higher SPK1 urothelium expression ( $p=0.04$ ) (figure 2).

### Interpretation of results

These experiments show for the first time that SPK1 is expressed in human bladder wall. These results suggest that SPK1 pathways is involved in the complex pathophysiology of the neurogenic bladder dysfunction, especially in neurogenic detrusor overactivity.

However, while further studies are required to highlight underlying mechanisms, SPK1 may be a new potential target for alternative management of neurogenic bladder.

### Concluding message

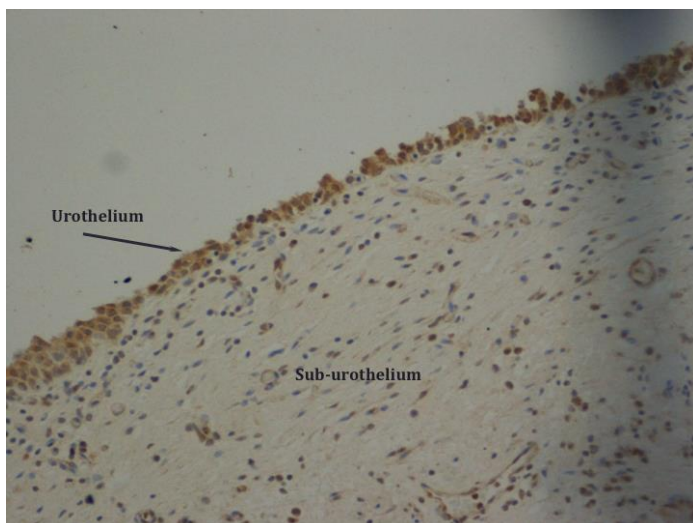
SPK1 may be involved in the detrusor pathological detrusor contraction mechanisms.

Category: Neurourology

Keywords: Spinal Cord Injury, Multiple Sclerosis, Detrusor Overactivity, Physiology, Basic Sciences

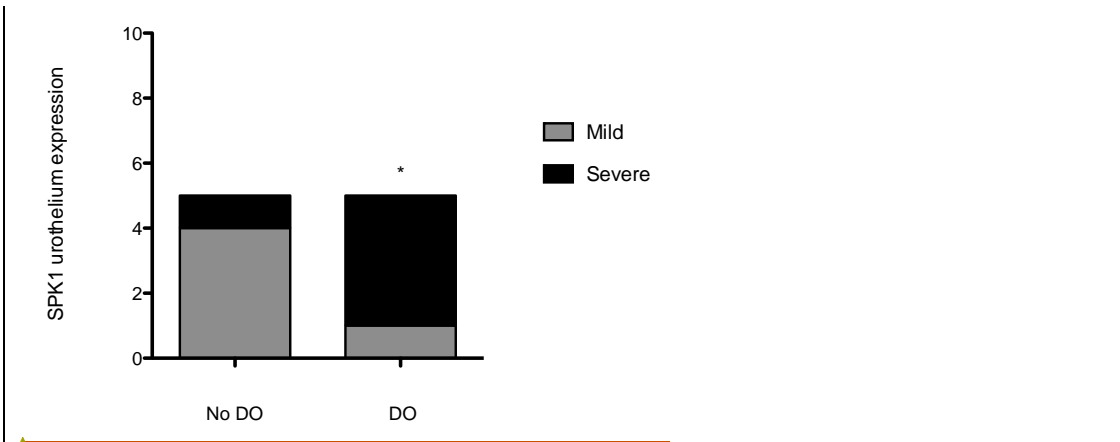
### **Figure 1 Microscopic features of Sphingosine Kinase 1 expression.**

Transverse sections after immunochemistry reactions (*Dako EnVision™ FLEX HRP, Carpinteria, CA USA*). Scale=100µm. Patient with neuropathic bladder dysfunction. Significant increased SPK1 expression is observed in the urothelium layer (arrow).



**Figure 2 Sphingosine Kinase 1 expression and detrusor overactivity**

Sphingosine Kinase 1 (SPK1) expression in bladder wall specimen of patients suffering from neuropathic bladder dysfunction (mild or severe). There was a significant increased SPK1 immunoreactivity in the urothelium layer for patients suffering from detrusor overactivity (DO),  $p=0.04$ . \*  $p\leq 0,05$ .



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Disclosures

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