

## CHANGES OF THE SUBUROTHELIAL MYOFIBROBLASTS IN STREPTOZOTOCIN-INDUCED DIABETES MELLITUS MODEL RATS

### Hypothesis/aims of the study

The aim of this study was to investigate the alternations of suburothelial myofibroblasts in streptozotocin-induced diabetes mellitus model rats.

### Study design, materials and methods

Diabetes was induced in adult female rats by a single intraperitoneal injection of streptozotocin. Cystometry was performed on control and diabetic rats at two and eight weeks after treatment. To detect the expression of suburothelial myofibroblasts in the rat bladder, immunohistochemical staining was performed, and the findings were compared between control and diabetic rats.

### Results

The cystometric analysis demonstrated that the voided volume of diabetic rats was higher than that of the control group at two weeks, and the diabetic rats' voided inefficiently, with residual urine, but the micturition pressure of the diabetic rats was not significantly different from that of the control group at two or eight weeks after treatment. However, the urination pattern of the diabetic rats was abnormal, and the voiding was inefficient, with residual urine after treatment.

### Interpretation of results

The desire to micturate is transmitted by ligands, including ATP, acetyl choline and so on, connecting receptors on afferent nerves and suburothelial myofibroblasts (1, 2). Some reports have demonstrated that suburothelial myofibroblasts play a key role in the desire to micturate, and the vanilloid receptors and muscarinic receptors expressed on suburothelial myofibroblasts were considered to be involved in this process (3).

Previously, our group reported that angiotensin II type 1 receptors were expressed on suburothelial myofibroblasts, and suggested that the renin-angiotensin system could play a key role in micturition. Moreover, our group reported that chemical cystitis induced by the instillation of HCl could increase the number of suburothelial myofibroblasts, and chronic urinary retention induced by partial bladder outlet obstruction could decrease the number of suburothelial myofibroblasts.

During the early stage of bladder dysfunction caused by contentious hyperglycemia, the expression levels of suburothelial myofibroblasts are generally maintained, but during the late stage, there is a decrease in the number of suburothelial myofibroblasts, which might be related to the severe bladder dysfunction.

### Concluding message

Our study demonstrated that the number of suburothelial myofibroblasts in diabetic rats was significantly increased during the early stage compared to control rats. Drug therapy might be effective to help maintain the bladder function in early phase diabetic patients, because suburothelial myofibroblasts express many chemical receptors, such as the muscarinic receptor, angiotensin receptor and so on.

Table 1. The general characteristics and cystometry findings in control and diabetic rats

	Rats (n)	Rat Weight (g)	Bladder Weight (g)	Blood Glucose (mg/dl)	Bladder Capacity (ml)	Voiding Efficiency (%)	Max Voiding Pressure (ml/cm H <sub>2</sub> O)
Control	6	254±6	0.11±0.02	95±6	0.52±0.06	90.9±1.3	30.4±3.5
Diabetic 2w	6	217±9*	0.24±0.01*	401±23*	1.21±0.09*	57.6±4.8*	36±5.2
Diabetic 8w	6	225±6*	0.42±0.03	425±30*	2.60±0.14*	40.2±5.5*	39.9±5.8

\* Significantly different from controls.

Figure 1. The alternations of the cystometric findings caused by contentious hyperglycemia

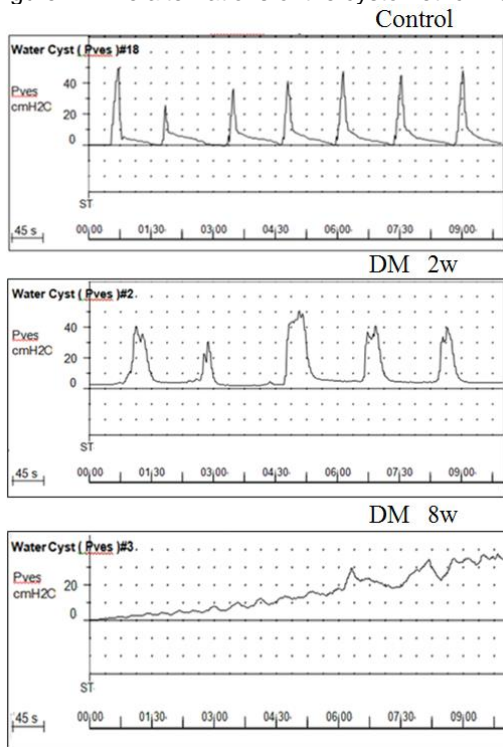
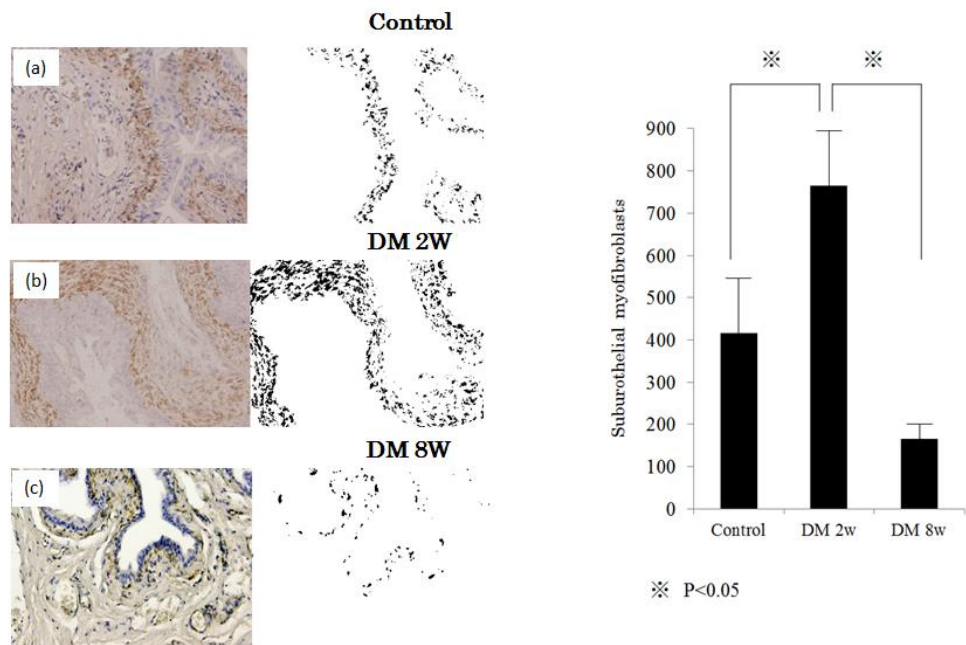


Figure 2. The immunohistochemical findings of suburothelial myofibroblasts and the alterations induced by contentious hyperglycemia



**References**

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**Disclosures**

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