

#141 Low-carbohydrate diet prolongs voiding functions by changing the afferent pathways in rats



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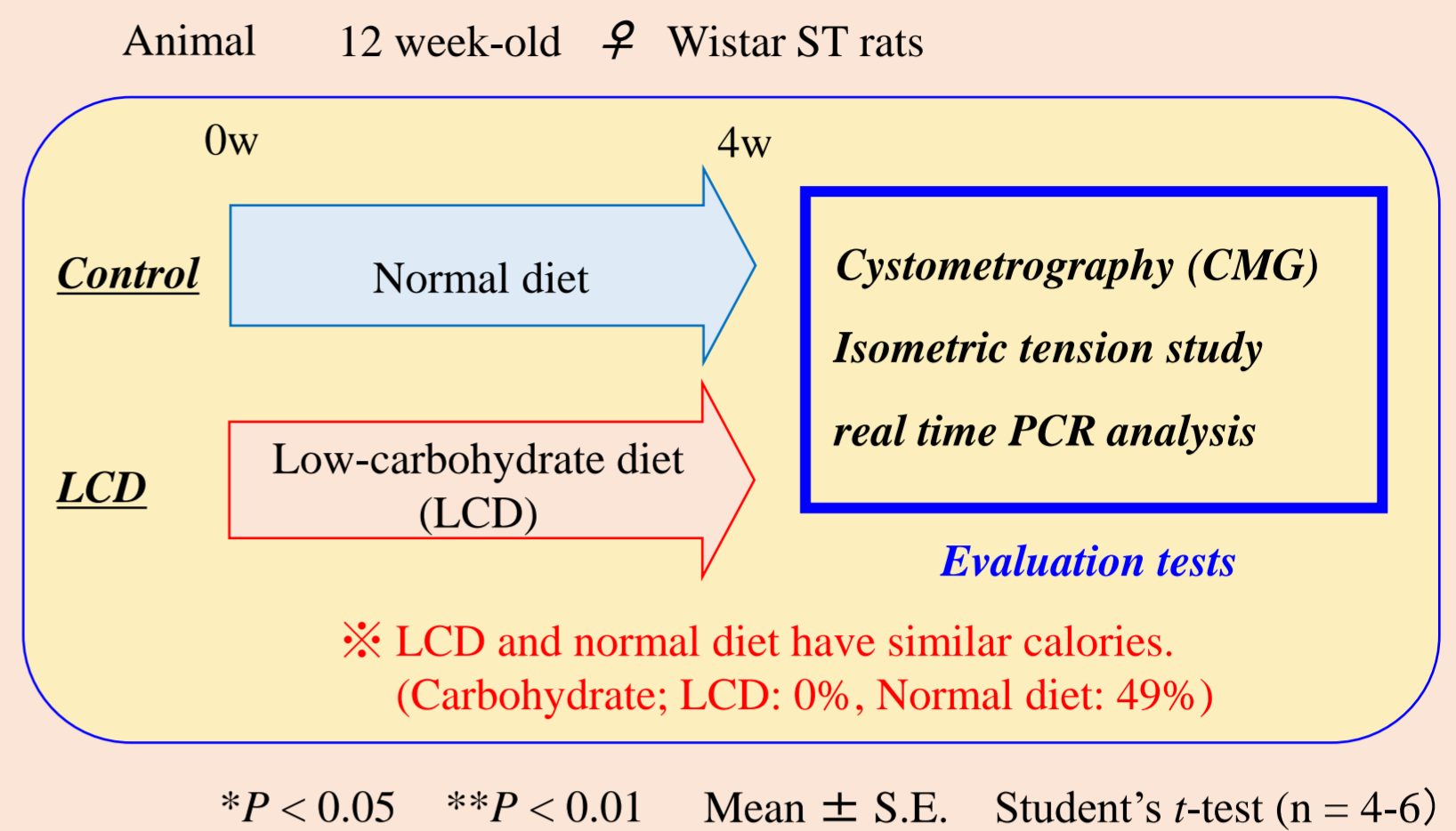
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Introduction

While the number of obese people increases due to Westernization of dietary habits all over the world, many people also do diet. Among diet booms in recent years, "low-carbohydrate diet (LCD)" is prevalent. Some people succeeded in weight loss by this method, but in a study conducted on more than 40,000 women in Sweden, the group who ingested the carbohydrate restricted diet increased the risk of developing cardiovascular disease and sudden death. These risks and lower urinary tract function are common in many cases.

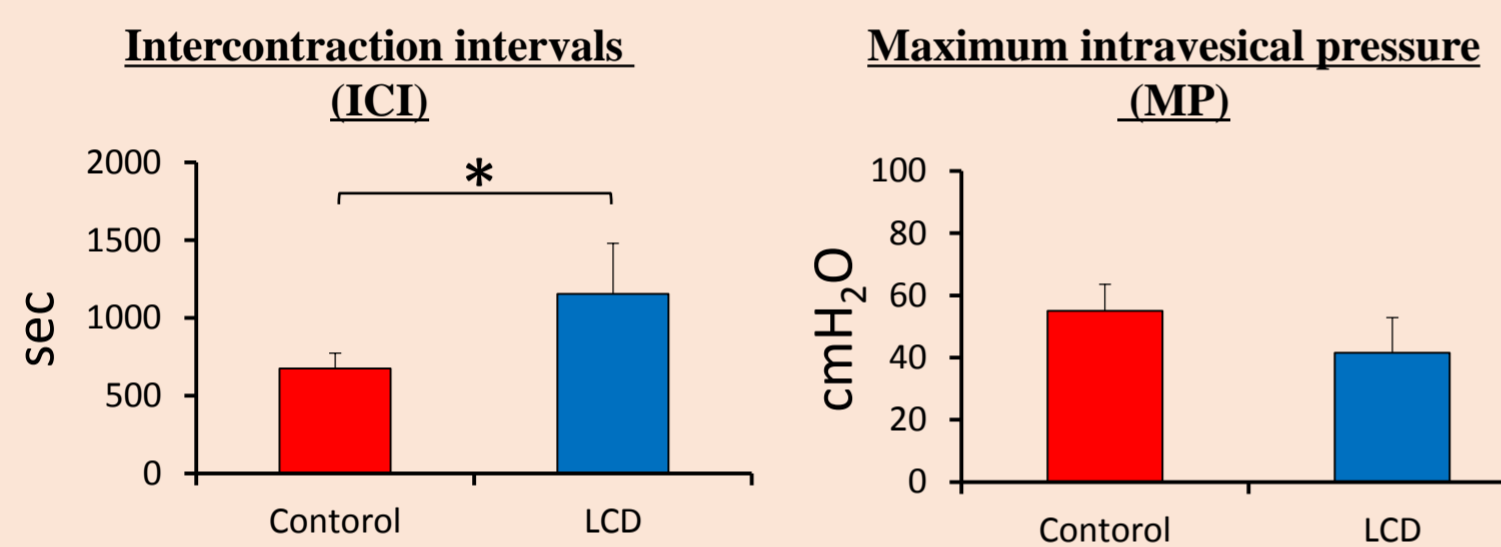
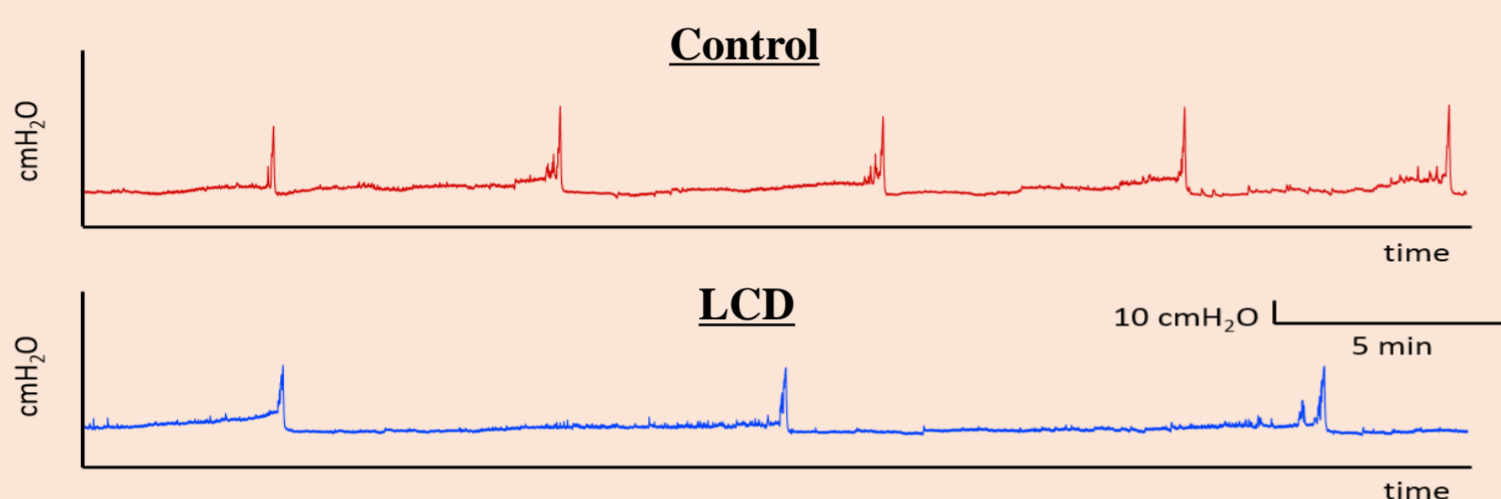
We previously reported that LCD prolonged voiding functions and weakened detrusor muscle contraction in rats. In this study, we investigated the mechanisms of LCD on lower urinary tract function using rats so as to elucidate the developmental mechanism of lower urinary tract disorder.

Protocols



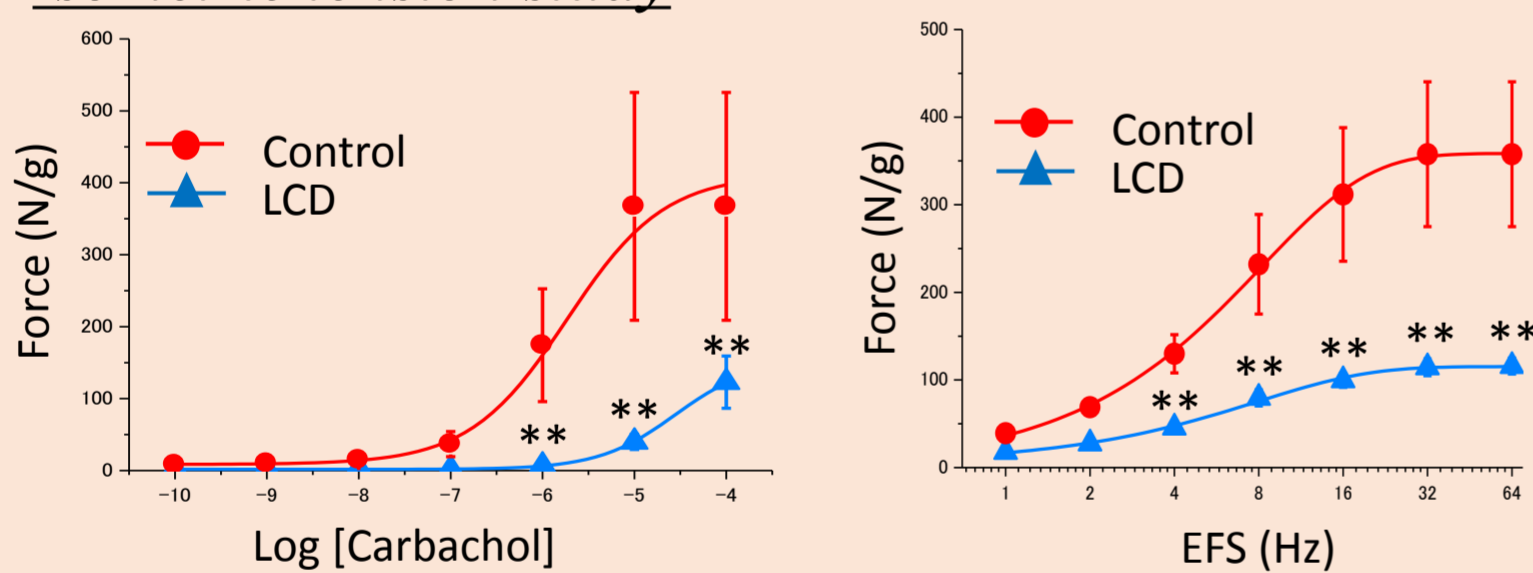
Results

Cystometry (CMG) analysis



• LCD significantly prolonged the voiding interval, and tended to decrease the maximum intravesical pressure.

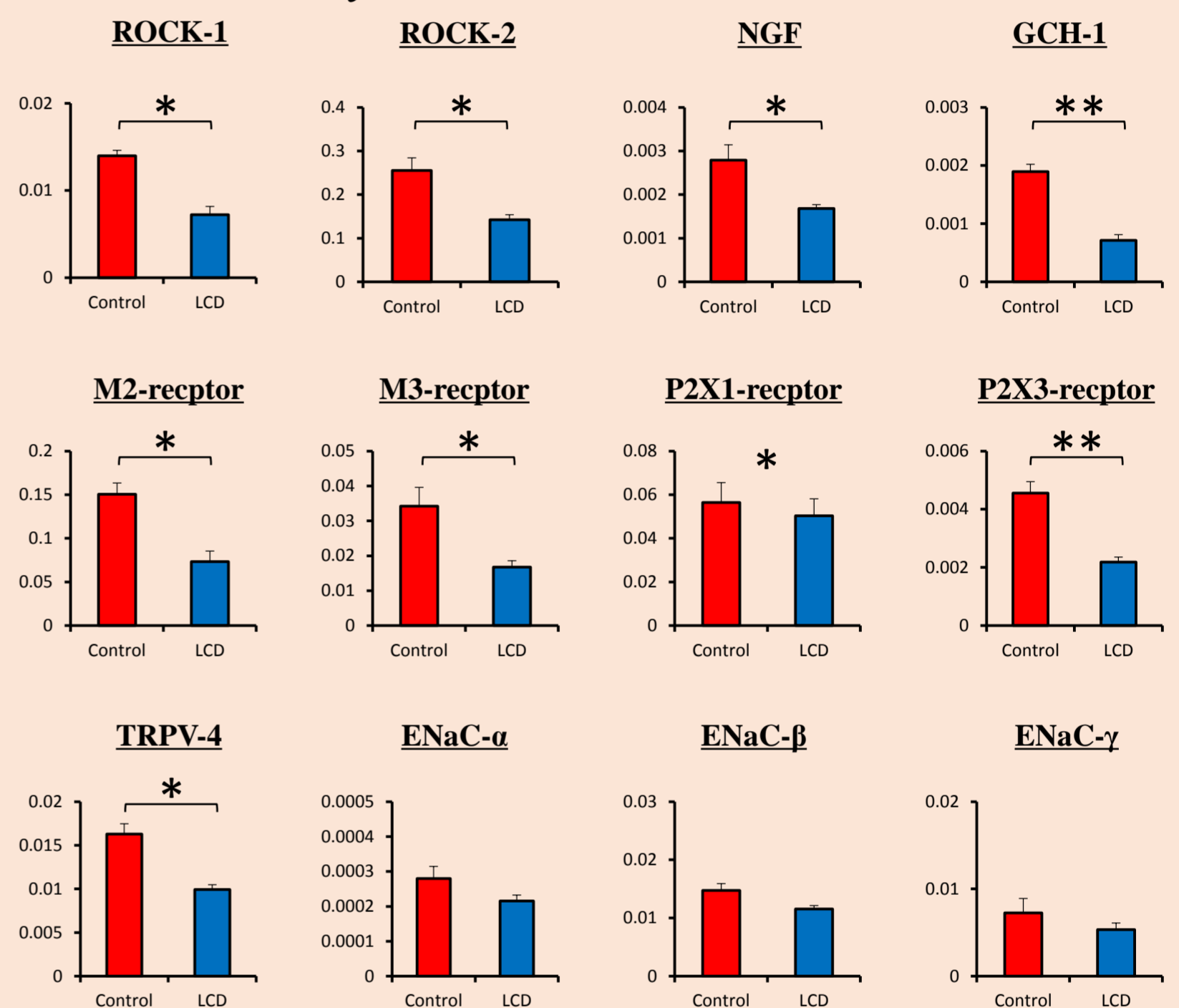
Isometric tension study



• The contractile response for carbachol decreased in the LCD group compared to the Control group.

• The contractile response for EFS in the LCD group is also lower than that of the Control group.

real time PCR analysis



• Rho-associated protein kinases (ROCK-1&ROCK-2) mRNA was lower in the LCD group than in the Control group.

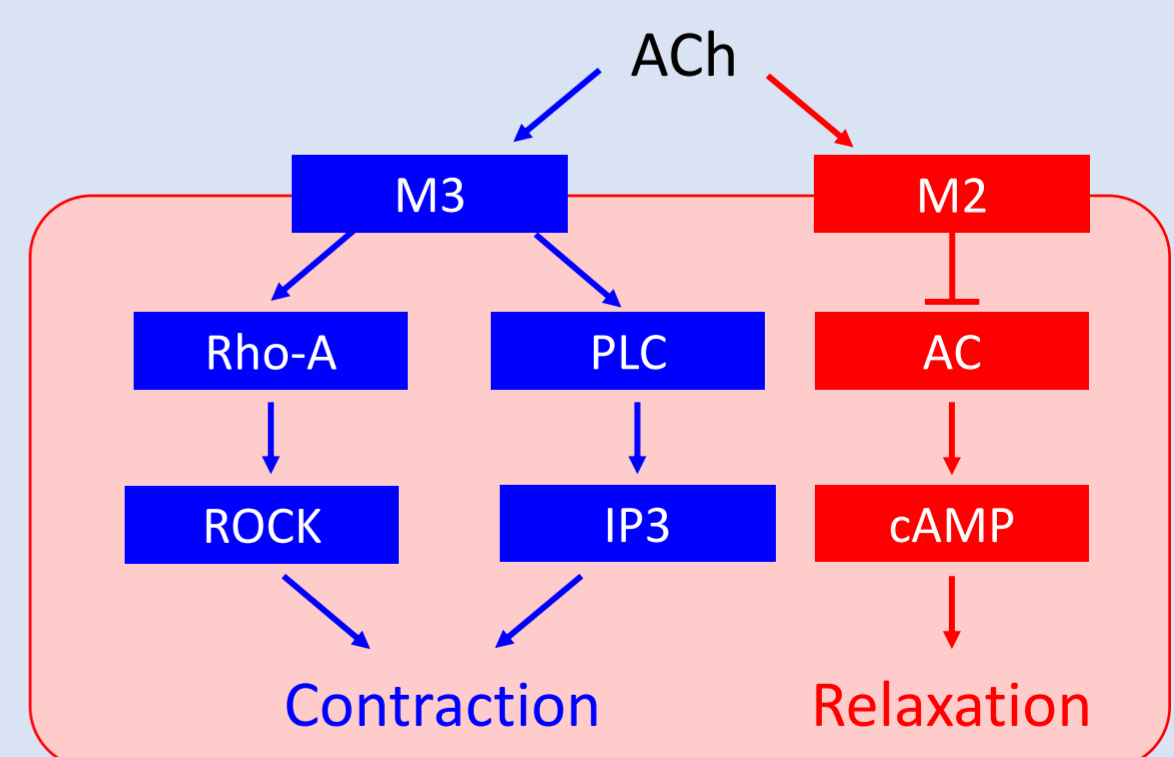
• Muscarinic (M2&M3) and purinergic (P2X3) receptor mRNA expression were significantly lower in the LCD group than the Control group.

• Nerve growth factor (NGF), GTP cyclohydrolase 1 (GCH-1), and TRPV-4 mRNA levels were significantly lower in the LCD group than the Control group.

Discussions

- LCD prolonged the voiding interval in this study. LCD also might change afferent neurons by decreasing the mRNA expression of receptors and nerve growth factors.
- LCD weakened detrusor muscle contraction. LCD decreased not only muscarinic receptors mRNA but also Rho-associated protein kinases mRNA expressions. We think that these down-regulated mRNA led to weakened detrusor muscle contraction.

Our findings indicate that excessive dieting or malnutrition may cause an underactive bladder by decreasing the response of the muscarinic and purinergic receptors and urinary bladder smooth muscles.



Muscarinic receptors in smooth muscle



Affiliations to disclose:

Nagoya City University

* All financial ties (over the last year) that you may have with any business organisation with respect to the subjects mentioned during your presentation

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