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**Title:** STANDARDIZATION OF FAST TWITCH CONTRACTILE PROPERTIES IN MALE RAT EXTERNAL URETHRAL SPHINCTER USING SPIRAL, TRANSVERSE AND CIRCULAR MUSCLE STRIP ORIENTATIONS

### **Aims of Study:**

External urethral sphincter (EUS) function has been shown to improve after muscle derived stem cell (MDSC) injection into denervated male rat urethra. There is little known about skeletal muscle contractility of male rat EUS<sup>1,2</sup>, so we attempt to establish an accurate and consistent method to analyze skeletal muscle contraction via electrical stimulation in organ bath using different (spiral, transverse, circular) muscle strip orientations.

### **Methods:**

We divided the male rat EUS into upper (U), middle (M) and lower (L) parts and using electrical field stimulation (60v, 2.5Hz), the optimal transverse portion for fast twitch contraction was identified. EUS contractility of spiral (S) orientation of the entire urethra was then compared with the transverse (T) and circular (C) configurations of the optimal transverse portion. We measured the length, width and weight of EUS strip for each group.

### **Results:**

EUS contraction amplitude of M group was statistically higher than L group (44.82±12.88 %) but not U group. Muscle strip of S group contracted 108±4.33 % of T<sub>M</sub> (Transverse, Middle of urethra) group in fast twitch contraction. Muscle strip of C<sub>M</sub> (Circular, Middle of urethra) group contracted 88.65±11.84 % of T<sub>M</sub> group. The S and T<sub>M</sub> orientations showed higher contractile amplitudes than C<sub>M</sub>. After adjusting for weight there was no statistically significant difference between the S and T<sub>M</sub> orientations.

### **Conclusions:**

We found the spiral orientation of the entire urethra to be the most optimal configuration to do fast twitch muscle contractile testing. The spiral orientation allows testing of the entire urethra independent of the actual MDSC injection site and when adjusted for weight is statistically similar to the transverse orientation of the middle urethra.

### **References:**

- (1) Watanabe H and Yamamoto TY. 1979. Autonomic innervation of the muscles in the wall of the bladder and proximal urethra of male rats. J Anat 128(4):873-886.
- (2) Parlani et al. 1992 The rat external urethral sphincter An in vitro model to evaluate the activity of drugs on the smooth and striated components of the urinary bladder outlet. J Pharmacol Methods 28(2):85-90  
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