

Electroacupuncture alleviates overactive bladder by modulating Piezo2-mediated sensory neurons activity

Zhilin Zhang¹, Qixiang Song², Xu Li³,
Ruoyu Wu², Wei Shen⁴, Qian Zhou⁴,
Yuelai Chen³, Kangmin Tang¹

(1 School of Rehabilitation Science, Shanghai University of Traditional Chinese Medicine, Shanghai, China;
2 Department of Urology, Renji Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China;
3 Longhua Hospital, Shanghai University of Traditional Chinese Medicine, Shanghai, China;
4 School of Life Science and Technology & Shanghai Clinical Research and Trial Center, ShanghaiTech University, Shanghai, China)

Aims of study
To investigate the role of the Piezo2 pathway in mediating the treatment effects of electroacupuncture (EA) on OAB.

Study design, materials and methods
1) Intraperitoneal injection of cyclophosphamide (CYP) was used to induce overactive bladder (OAB) symptoms.
2) Twenty-four female SD rats were randomly divided into Sham CYP group (Control), CYP group, CYP+EA group and CYP+Non-acupoint electroacupuncture (NEA) group.
3) EA & NEA
EA: 5 days of needling (2 Hz, 1 mA, 20 min) in bilateral Ciliao (BL32, located in the 2nd posterior sacral foramen)
NEA: 5 days of needling in bilateral non-acupoint (1mm lateral from Ciliao).
4) Assessments of EA-induced changes

Results

1) EA reduced the number of urination spots and improved intercontraction interval, bladder compliance, and bladder contractions in OAB rats.

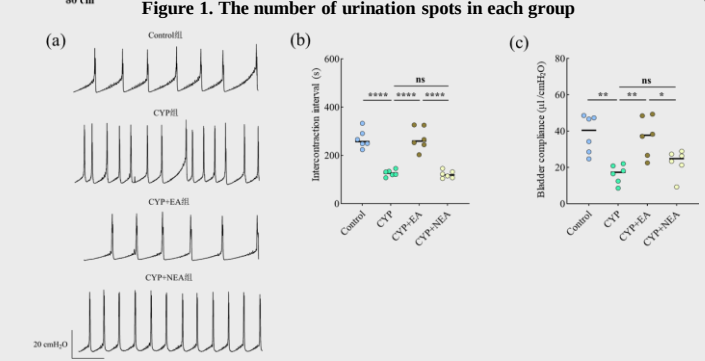
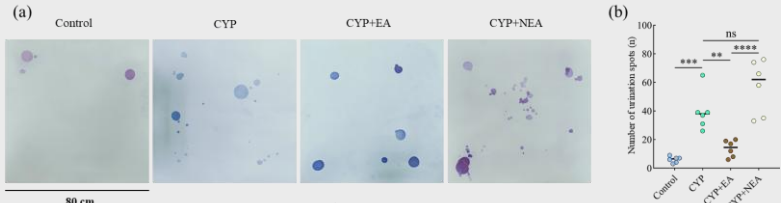


Figure 2. Urodynamic parameters in each group

2) EA reduced the mean gray value of the green channel in bladder sensory neurons labeled with Dil in DRGs, and downregulated the protein expression of Piezo2 in DRGs.

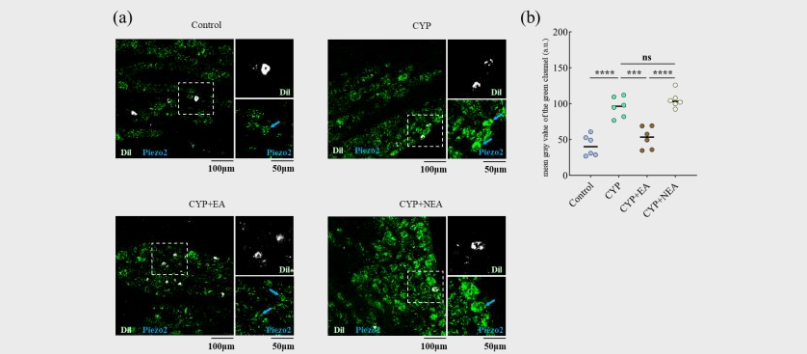


Figure 3. The Piezo2 mRNA level in bladder sensory neurons

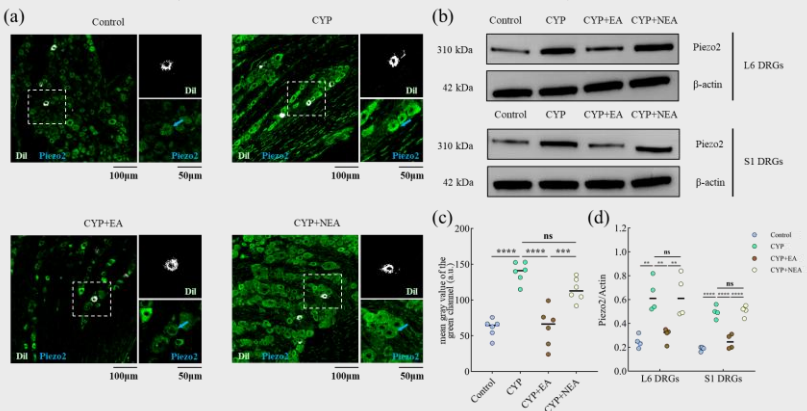


Figure 4. The expression of Piezo2 in DRG

3) EA decreased the number of c-Fos-positive neurons in the spinal cord dorsal horn.

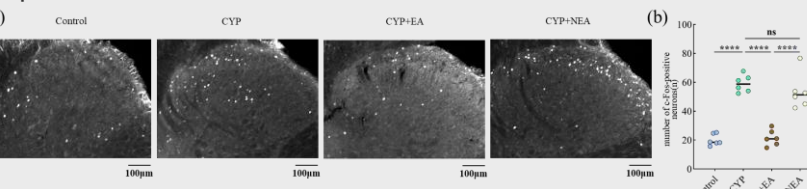


Figure 5. The number of c-Fos-positive neurons in the spinal cord dorsal horn

Conclusion

EA at Ciliao acupoints alleviates bladder overactivity in an OAB rat model, possibly by downregulating the expression of the Piezo2 channel and reducing bladder sensory neuronal activity.