

Skin Sympathetic Nerve Activity Reflects Sympathetic Overactivation in a Rat Model of OAB

Induced by partial bladder outlet obstruction

KEY MESSAGE

Skin-derived SKNA mirrors sympathetic hyperactivity in pBOO-induced OAB.

- pBOO rats developed a typical OAB phenotype.
- Sympathetic activity increased across thoracic skin, abdominal skin, and direct ganglion recordings.
- Skin-only composite SKNA was higher in Pboo ($p = 0.027$).

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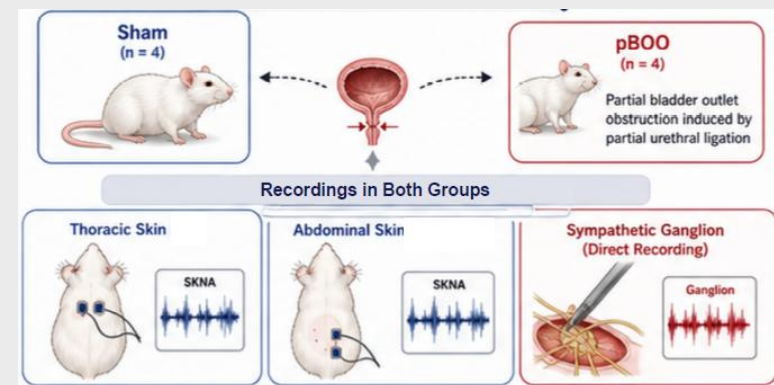
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CLINICAL QUESTION

- . Overactive bladder (OAB) has been increasingly linked to autonomic dysregulation.
- . However, direct measurement of sympathetic drive in vivo remains technically challenging.
- . Can skin sympathetic nerve activity (SKNA), recorded non-invasively from rat skin, reflect underlying sympathetic hyperactivity in experimental OAB?

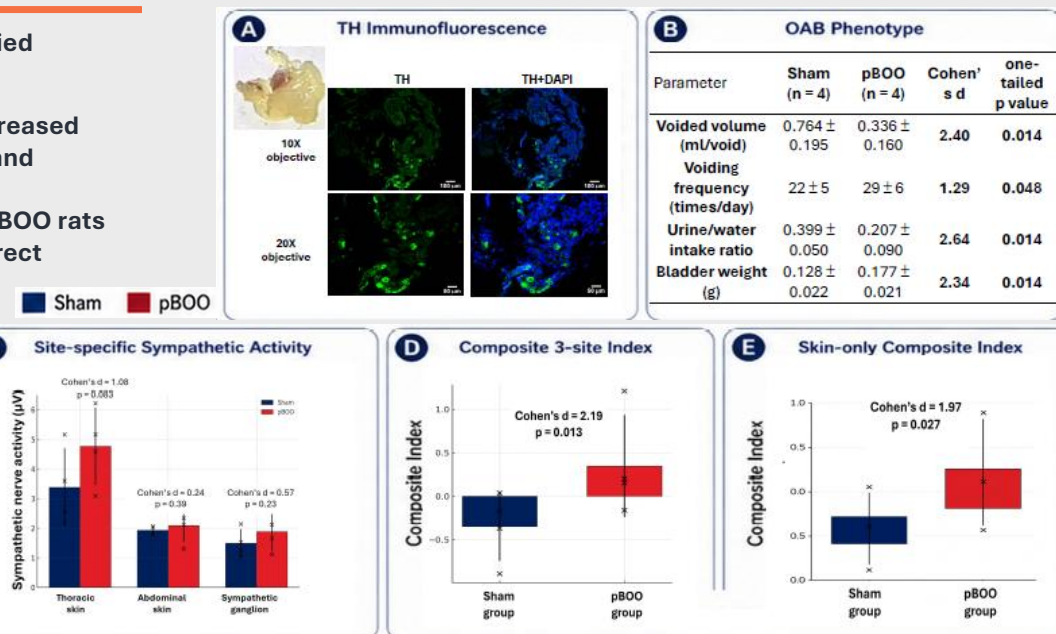
STUDY DESIGN / METHODS

- . 8 female Sprague–Dawley rats: sham ($n = 4$) and pBOO ($n = 4$).
- . Sympathetic activity was simultaneously recorded from thoracic skin, abdominal skin, and directly from the sympathetic ganglion inside a Faraday cage.
- . TH immunofluorescence verified ganglionic sympathetic identity.



RESULTS

- ✓ TH-positive neuronal structures were identified in all examined ganglia (Fig. A).
- ✓ pBOO rats showed classic OAB features: increased voiding frequency, reduced voided volume, and higher bladder weight (all $p < 0.05$) (Fig. B).
- ✓ Sympathetic nerve activity was elevated in pBOO rats across thoracic skin, abdominal skin, and direct ganglionic recordings (Fig. C).
- ✓ Composite sympathetic activity was higher in pBOO: 3-site index $p = 0.013$; skin-only composite $p = 0.027$. (Fig. D & E).



CONCLUSION

The close agreement between skin and direct ganglionic recordings provides physiological validation of SKNA as an objective, non-invasive biomarker for autonomic dysfunction in OAB.