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### Title

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### Permalink

<https://escholarship.org/uc/item/54d8p5d8>

### Journal

AJP Regulatory Integrative and Comparative Physiology, 315(5)

### ISSN

0363-6119

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### Publication Date

2018-11-01

### DOI

10.1152/ajpregu.00237.2018

Peer reviewed

## LETTER TO THE EDITOR

# Reply to “Letter to the Editor: Acupuncture is not a unique explanation for reflex excitatory cardiovascular responses”

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Submitted 27 July 2018; accepted in final form 6 August 2018

REPLY: Dr. Wong was questioning if insertion and rotation of an acupuncture needle with a diameter of 0.20 mm at the acupoint of the rat may damage adjacent vessels and cause local trauma, which may contribute to acupuncture's action in the modulation of cardiovascular responses other than acupuncture-induced activation of afferent fibers in the median nerve. We point out that acupuncture needles with diameters ranging 0.16–0.30 mm are applied at the acupoints in small animals, including rats and mice, in many studies (8, 16). Tissues affected by the acupuncture needle commonly include skin, subcutaneous tissue, small blood vessels, and nerve endings (15). However, studies have demonstrated that the tissues impacted by the insertion of the acupuncture needle are very limited, and the tissue damage during application of manual acupuncture is very minor (5, 7, 11). Also, in the current study, we have not noticed a hematoma in the area around the acupoint. The method used for manual acupuncture in our study (at ~2 Hz for 5 min every 10 min during a 30-min period) has been reported in many other papers (1, 16). Importantly, we observed increased discharges of the afferent fiber in the median nerve during manual acupuncture stimulation, while the afferent activity stopped after manual acupuncture (2). Thus, we believe that neural pathways involved in acupuncture stimulation mainly contribute to acupuncture's action in the regulation of cardiovascular function. This assumption is supported by numerous publications (6, 7, 9, 10, 14). In addition, as we have addressed in our paper, not only mechanical stimulation, but also the chemical substances generated during the insertion and/or manipulation of the acupuncture needle, likely contribute to activation of sensory afferent nerves that send inputs to the central nervous system, leading to regulation of cardiovascular function (2).

Dr. Wong was thinking that “the sham acupuncture should be done with manual needle rotation on the adjacent nonacupoint skin.” We agree that this is one type of sham acupuncture. There are a variety of types of sham acupuncture, including needle location (e.g., use of nonacupoints or irrelevant acupoints), degree of needle insertion (e.g., no penetration of depths believed to be suboptimal), and needle stimulation (e.g., no or suboptimal manual or electrical stimulation) (3, 4, 12, 13). We and others have noted that each of these kinds of sham acupuncture has its limitations. In previous studies, we have demonstrated that acupuncture at the P5–6 acupoints has the

specific action in modulating cardiovascular responses compared with the insertion of acupuncture needle without stimulation as well as to acupuncture applied to other acupoints or nonacupoints in the wrist (7, 10, 14, 16). Thus, in this study, we have focused on investigating the specific effect of acupuncture at P5–6 compared with the sham control in which the acupuncture needle was placed at the acupoint without either mechanical rotation or electrical stimulation. We observed that the sham acupuncture did not activate somatic sensory afferents and inhibited sympathoexcitatory cardiovascular reflexes (2). Furthermore, the sham control used in our study is highly recommended by the United States and international acupuncture societies for the experimental study of acupuncture because it can reduce a number of confounding factors compared with other types of controls (3).

### GRANTS

This work was supported by National Center for Complementary & Integrative Health Grant AT009347.

### DISCLOSURES

No conflicts of interest, financial or otherwise, are declared by the author.

### AUTHOR CONTRIBUTIONS

Z.-L.G. drafted manuscript; Z.-L.G., L.-W.F., H.-F.S., and S.C.T.-A.-L. edited and revised manuscript; Z.-L.G. approved final version of manuscript.

### REFERENCES

1. Goldman N, Chen M, Fujita T, Xu Q, Peng W, Liu W, Jensen TK, Pei Y, Wang F, Han X, Chen JF, Schnermann J, Takano T, Bekar L, Tieu K, Nedergaard M. Adenosine A1 receptors mediate local anti-nociceptive effects of acupuncture. *Nat Neurosci* 13: 883–888, 2010. doi:10.1038/nn.2562.
2. Guo ZL, Fu LW, Su HF, Tjen-A-Looi SC, Longhurst JC. Role of TRPV1 in acupuncture modulation of reflex excitatory cardiovascular responses. *Am J Physiol Regul Integr Comp Physiol* 314: R655–R666, 2018. doi:10.1152/ajpregu.00405.2017.
3. Langevin HM, Wayne PM, Macpherson H, Schnyer R, Milley RM, Napadow V, Lao L, Park J, Harris RE, Cohen M, Sherman KJ, Haramati A, Hammerschlag R. Paradoxes in acupuncture research: strategies for moving forward. *Evid Based Complement Alternat Med* 2011: 180805, 2011. doi:10.1155/2011/180805.
4. Langevin HM, Hammerschlag R, Lao L, Napadow V, Schnyer RN, Sherman KJ. Controversies in acupuncture research: selection of controls and outcome measures in acupuncture clinical trials. *J Altern Complement Med* 12: 943–953, 2006. doi:10.1089/acm.2006.12.943.
5. Lao L. Safety issues in acupuncture. *J Altern Complement Med* 2: 27–31, 1996. doi:10.1089/acm.1996.2.27.
6. Li P, Pitsillides KF, Rendig SV, Pan H-L, Longhurst JC. Reversal of reflex-induced myocardial ischemia by median nerve stimulation: a feline model of electroacupuncture. *Circulation* 97: 1186–1194, 1998. doi:10.1161/01.CIR.97.12.1186.

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7. **Li P, Tjen-A-Looi SC, Longhurst JC.** Acupuncture's role in cardiovascular homeostasis. In: *Current Research in Acupuncture*, edited by Xia Y, Dong G, Wu G-C. New York: Springer, 2013, p. 457–486.
8. **Lin D, Zhang J, Zhuang W, Yan X, Yang X, Lin S, Lin L.** The effect of Electroacupuncture versus manual acupuncture through the expression of TrkB/NF- $\kappa$ B in the subgranular zone of the dentate gyrus of telomerase-deficient mice. *Evid Based Complement Alternat Med* 2018: 1013978, 2018. doi:[10.1155/2018/1013978](https://doi.org/10.1155/2018/1013978).
9. **Longhurst JC.** Defining meridians: a modern basis of understanding. *J Acupunct Meridian Stud* 3: 67–74, 2010. doi:[10.1016/S2005-2901\(10\)60014-3](https://doi.org/10.1016/S2005-2901(10)60014-3).
10. **Longhurst JC, Tjen-A-Looi S.** Acupuncture regulation of blood pressure: two decades of research. *Int Rev Neurobiol* 111: 257–271, 2013. doi:[10.1016/B978-0-12-411545-3.00013-4](https://doi.org/10.1016/B978-0-12-411545-3.00013-4).
11. **MacPherson H, Thomas K, Walters S, Fitter M.** A prospective survey of adverse events and treatment reactions following 34,000 consultations with professional acupuncturists. *Acupunct Med* 19: 93–102, 2001. doi:[10.1136/aim.19.2.93](https://doi.org/10.1136/aim.19.2.93).
12. **MacPherson H, Nahin R, Paterson C, Cassidy CM, Lewith GT, Hammerschlag R.** Developments in acupuncture research: big-picture perspectives from the leading edge. *J Altern Complement Med* 14: 883–887, 2008. doi:[10.1089/acm.2008.SAR-5](https://doi.org/10.1089/acm.2008.SAR-5).
13. **Mayer DJ.** Acupuncture: an evidence-based review of the clinical literature. *Annu Rev Med* 51: 49–63, 2000. doi:[10.1146/annurev.med.51.1.49](https://doi.org/10.1146/annurev.med.51.1.49).
14. **Tjen-A-Looi SC, Li P, Longhurst JC.** Medullary substrate and differential cardiovascular responses during stimulation of specific acupoints. *Am J Physiol Regul Integr Comp Physiol* 287: R852–R862, 2004. doi:[10.1152/ajpregu.00262.2004](https://doi.org/10.1152/ajpregu.00262.2004).
15. **Zhang ZJ, Wang XM, McAlonan GM.** Neural acupuncture unit: a new concept for interpreting effects and mechanisms of acupuncture. *Evid Based Complement Alternat Med* 2012: 429412, 2012. doi:[10.1155/2012/429412](https://doi.org/10.1155/2012/429412).
16. **Zhou W, Fu L-W, Tjen-A-Looi SC, Li P, Longhurst JC.** Afferent mechanisms underlying stimulation modality-related modulation of acupuncture-related cardiovascular responses. *J Appl Physiol (1985)* 98: 872–880, 2005. doi:[10.1152/jappphysiol.01079.2004](https://doi.org/10.1152/jappphysiol.01079.2004).

