



# Ear acupuncture and neuromodulation

Dear reader:

The present work was developed to contribute to the knowledge and improvement of ear acupuncture treatment. It was prepared for clinicians, researchers and other individuals interested in Chinese Medicine as part of the constant search for therapeutic practices that can help patients. In addition, the present work can help increase knowledge on a technique that many therapists use routinely on their patients without an in-depth understanding of its mechanisms of action.

Interest in therapeutic approaches targeting the auricular pavilion has existed since ancient times and across several civilizations, such as the Egyptian, Greek, and Chinese civilizations, with records in books dated centuries before Christ. However, the first systematization of the auricular map with the representation of the somatic and visceral points was performed by a French doctor, Paul Nogier, who presented his work at an acupuncture congress in 1956 and later published his findings in a German scientific magazine (1).

Parallel to the advances in science, ear acupuncture has been consolidated within traditional Chinese medicine. Concomitantly, Nogier's auriculotherapy was gaining adherents in Europe. Regardless of the form of application, the therapy gained recognition from health professionals worldwide, leading to the publication of a standardized international nomenclature of auricular points by the World Health Organization in 1990 (2).

The existence of a consensus between clinicians and researchers on a possible relationship between the pinna and the rest of the body, which justifies the ear acupuncture clinical action, has always been a great challenge for science. The investigation of its biological plausibility started in 1984 when Nomura and Mizuno revealed a relationship between the auricular branch of the vagus nerve and the nucleus of the solitary tract and spinal trigeminal nucleus (3). This finding supported the development of a series of other studies mainly using experimental models in rodents. The auriculotherapy studies reproduced the relationship between the auricle and autonomic nuclei of the brainstem, showing the effectiveness of atrial stimulation in models of nociception, sepsis, and autonomic regulation.

Although there have already been a series of scientific publications on ear acupuncture potential mechanisms and a variety of attempts to validate auricular cartographies, a study published in 2015, for the first time, showed the relationship of stimulation of the auricular pavilion with brain structures in humans. Frangos *et al.* used transcutaneous electrostimulation of the auricular branch of the vagus nerve and recorded a brain image using functional magnetic nuclear resonance (4). It is believed that atrial vagus nerve stimulation is one of the main explanations for the therapeutic efficacy of auricular acupuncture in reducing acute and chronic pain (5).

Currently, the history of auricular therapy includes scientific publications that address basic science, psychometric studies, randomized controlled clinical trials, and systematic reviews. In this context, we will present a series of articles aimed at providing an overview of the state of the art of auricular acupuncture, reporting its supporting evidence, and addressing the mind-body relationship and immune response.

## Acknowledgments

We are immensely grateful to Prof. Dr. Adair R. S. dos Santos, a great friend and instructor, who contributed to our work in this journal and recently passed away, leaving us greatly missed.

**Funding:** This article was supported by Neuroscience Post-Graduate Program at the Federal University of Santa Catarina (UFSC) and National Council for Scientific and Technological Development (CNPq), Foundation for the Support of Research and Innovation of the State of Santa Catarina (FAPESC), Coordination for the Improvement of Higher Education Personnel (CAPES), and INCT-INOVAMED Program (465430/2014-7) grants.

## Footnote

**Provenance and Peer Review:** This article was commissioned by the editorial office, *Longhua Chinese Medicine* for the series "Ear Acupuncture Neuromodulation". The article did not undergo external peer review.

*Conflicts of Interest:* Both authors have completed the ICMJE uniform disclosure form (available at <https://dx.doi.org/10.21037/lcm-21-34>). The series “Ear Acupuncture Neuromodulation” was commissioned by the editorial office without any funding sponsorship. MLN and MD da Silva served as the unpaid Guest Editors of the series. The authors have no other conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

*Open Access Statement:* This is an Open Access article distributed in accordance with the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 International License (CC BY-NC-ND 4.0), which permits the non-commercial replication and distribution of the article with the strict proviso that no changes or edits are made and the original work is properly cited (including links to both the formal publication through the relevant DOI and the license). See: <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

## References

1. Wirz-Ridolfi A. The History of Ear Acupuncture and Ear Cartography: Why Precise Mapping of Auricular Points Is Important. *Med Acupunct* 2019;31:145-56.
2. WHO (WORLD HEALTH ORGANIZATION). Report of the Working Group on Auricular Acupuncture Nomenclature. France, 1990.
3. Nomura S, Mizuno N. Central distribution of primary afferent fibers in the Arnold's nerve (the auricular branch of the vagus nerve): a transganglionic HRP study in the cat. *Brain Res* 1984;292:199-205.
4. Frangos E, Ellrich J, Komisaruk BR. Non-invasive Access to the Vagus Nerve Central Projections via Electrical Stimulation of the External Ear: fMRI Evidence in Humans. *Brain Stimul* 2015;8:624-36.
5. Usichenko TI, Kuchling S, Witstruck T, et al. Auricular acupuncture for pain relief after ambulatory knee surgery: a randomized trial. *CMAJ* 2007;176:179-83.



Marcos Lisboa Neves



Morgana Duarte da Silva

**Marcos Lisboa Neves<sup>^</sup>**

(Email: [marcoslisboaneves@gmail.com](mailto:marcoslisboaneves@gmail.com))

**Morgana Duarte da Silva<sup>^</sup>**

(Email: [morganaduartesilva@gmail.com](mailto:morganaduartesilva@gmail.com))

*Program of Post-graduation in Neuroscience, Federal University of Santa Catarina, Florianópolis, Brazil.*

Received: 29 July 2021; Accepted: 20 August 2021; Published: 30 September 2021.

doi: 10.21037/lcm-21-34

**View this article at:** <https://dx.doi.org/10.21037/lcm-21-34>

doi: 10.21037/lcm-21-34

**Cite this article as:** Neves ML, da Silva MD. Ear acupuncture and neuromodulation. Longhua Chin Med 2021;4:20.

---

<sup>^</sup> ORCID: Marcos Lisboa Neves, 0000-0001-8358-3229; Morgana Duarte da Silva, 0000-0002-2487-236X.