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Short Commentary

Brief Comment and Review of "Electroacupuncture Promotes Neuroplasticity of Central Auditory Pathway: An Auditory Evoked Potentials Study"

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Our study "Electroacupuncture promotes neuroplasticity of central auditory pathway: An auditory evoked potentials study" investigated the effect of electroacupuncture on the neuroplasticity of the central auditory pathway using auditory evoked potentials in healthy rats [1]. This study found that electroacupuncture at the right TE3 may cause peak latency shift of waves I, III, and V on Auditory Brain Response (ABR) and waves P0, Nb, and Pb on Late Latency Response (LLR), suggesting the possibility of neuromodulation in the central auditory pathway.

It is important to note that this study was conducted on animals and may be a preliminary study in nature, and further research would be needed to investigate the effects of electroacupuncture on the auditory disorders in humans. Additionally, the study design could be improved by including a control group and investigating the molecular mechanisms underlying the observed effects.

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Many past studies have shown that tinnitus is generated from peripheral damage, such as damage to the cochlea, auditory nerve, or middle ear, and it affects the central auditory system [2]. These damages may lead to the overexcitement of sensory neurons, which could result in tinnitus in the central auditory system [3]. Some studies have also suggested that tinnitus may be related to regulatory mechanisms in the central nervous system, such as attention and emotional regulation [4]. These mechanisms may affect the intensity and perception of tinnitus. Overall, tinnitus is a complex phenomenon involving multiple bodily systems, including the peripheral and central auditory systems, regulatory systems in the nervous system, and attention and emotional regulation systems. Therefore, treating tinnitus requires a comprehensive consideration of the roles of these systems.

Neuroplasticity may play a critical role in the development of tinnitus. ABR and LLR recordings are commonly used clinically to assess the function of the auditory pathway. Acupuncture therapy, including electroacupuncture, is a widely used complementary therapy based on the meridian theory described in Traditional Chinese Medicine (TCM). The TE3 acupoint is believed to treat auditory disorders such as tinnitus and deafness [5]. The study builds upon previous research demonstrating that electroacupuncture at the right TE3 acupoint can enhance auditory recovery and reduce the loss of spiral ganglion neurons in rats with noise-induced hearing loss [6].

The study aimed to investigate the effect of electroacupuncture on ABR and LLR in rats. Twelve male Sprague Dawley rats were divided into two groups: control (n=6) and electroacupuncture (n=6). ABR and LLR were recorded at baseline, day 3 (D3), day 5 (D5), and day 8 (D8). In the electroacupuncture group, electroacupuncture was delivered on D3, D4, and D5. Statistical analysis was performed using a mixed-effects model and the Tukey multiple comparisons test in the Prism program. The peak latency and interpeak latency of waves I, III, and V were measured for ABR, and the peak latencies of P0, Na, Pa, Nb, and Pb waves and the interpeak amplitudes of P0–Na, Na–Pa, Pa–Nb, and Nb–Pb were measured for LLR.

The animals were divided into two groups: electroacupuncture group and control group. The electroacupuncture group received electroacupuncture stimulation at the right TE3, while the control group received no treatment. ABR and LLR were recorded on baseline and on post-treatment days 3, 5, and 8. The results showed that electroacupuncture at the right TE3 had a prolong significant effect on ABR and LLR peak latency, with larger latency shifts in the electroacupuncture group compared to the control group. These effects were most pronounced on post-treatment days 3 and 5.

The results of the study suggest that electroacupuncture at the right TE3 acupoint can induce changes in the auditory pathway, as reflected by the shift in ABR waves and interpeak latencies. This effect may be related to the promotion of auditory recovery and protection of spiral ganglion neuronal cell damage in rats with noise-induced hearing loss [6]. Furthermore, electroacupuncture at TE3 may also induce central auditory neuroplasticity, as reflected by the changes in LLR evoked potentials, such as the latency shift of P0, and the interpeak amplitude shift of Na-Pa.

The limitations of the study include the unknown origin generation of LLR, the use of healthy rats which may not be generalizable to human beings or diseased animals, and the lack of examination of microarchitecture changes in neurons in the auditory cortex of rats. Overall, the study provides insight into the potential therapeutic effects of acupuncture on the auditory pathway and neuroplasticity.

It is interesting to see that electroacupuncture at the right TE3 could modulate the neuroplasticity of the central auditory pathway in healthy rats. Conducting clinical trials to investigate the effect of electroacupuncture at TE3 on hearing in patients with hearing loss is necessary to determine its effectiveness in treating hearing problems. Measuring the changes in ABR, MLR, and LLR can provide insights into how the central auditory pathway responds to the treatment and can help evaluate the treatment's effectiveness.

Overall, this preliminary study provides an interesting direction for future research and highlights the potential of electroacupuncture in treating hearing-related problems. However, more research is needed to fully understand its effectiveness and applicability in clinical settings.

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