

Electroacupuncture releases stem cells to relieve pain, promote tissue repair, study finds

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A study led by Indiana University School of Medicine researchers demonstrates how electroacupuncture triggers a neurological mechanism that can help promote tissue repair and relieve injury-induced pain.

Their findings, published online March 16 in the journal *Stem Cells*, provide the most comprehensive picture yet of how electroacupuncture stimulates the brain to facilitate the release of [stem cells](#) and adds new insight relating to the cells' healing properties.

Electroacupuncture is a form of acupuncture that uses a small electrical current to augment the ancient Chinese medical practice of inserting fine needles into the skin at pre-determined points throughout the body.

For the study, a team of more than 40 scientists at institutions in the United States and South Korea was led by four senior authors including IU School of Medicine's Maria B. Grant, MD, Marilyn Glick Professor of Ophthalmology and co-corresponding author; Mervin C. Yoder, MD, IU Distinguished Professor, Richard and Pauline Klingler Professor of Pediatrics, associate dean for entrepreneurial research at IU School of Medicine, director of the Herman B Wells Center for Pediatric Research and co-corresponding author; and Fletcher A. White, PhD, Vergil K. Stoelting Chair of Anesthesia, professor of anesthesia, pharmacology and toxicology.

"This work is a classic example of the power of team science, where investigators in different institutions with specific expertise worked together to unravel the complexity of how electroacupuncture works to help the body respond to stressors," said Dr. Yoder.

The researchers performed a series of lab tests involving humans, horses and rodents that follow the effects of electroacupuncture from the stimulus of the needle all the way to the brain, resulting in the release of reparative [mesenchymal stem cells](#) (MSCs) into the bloodstream.

Depending on the species, electroacupuncture led to activation of the hypothalamus—a part of the brain that controls the nervous system and involuntary bodily functions such as heart rate and digestion—within nine to 22 minutes. The stem cells were mobilized within two hours.

"The acupuncture stimulus we're giving these animals has a rapid effect on neuroanatomical pathways that connect the stimulus point in the arm to responsive neurons in the spinal cord and into a region in the brain called the hypothalamus. In turn, the hypothalamus directs outgoing signals to stem cell niches resulting in their release," said Dr. White, who is a neuroscientist at the Richard L. Roudebush VA Medical Center in Indianapolis.

The researchers found electroacupuncture treatments resulted in higher thresholds for injury-induced pain, as well as considerable increases in the presence of a type of collagen that promotes tendon repair and anti-inflammatory cells known to be predictors of faster healing time.

Dr. White said these findings could lead to new strategies for [tissue repair](#) and pain management related to injuries.

"We could potentially capture the MSCs from an individual's blood following electroacupuncture and save the cells for future re-

introduction in the patient post-surgery or to treat chronic pain due to an injury," he said.

The horses used in the study had been injured during training for international dressage competitions, and the six people who took part were healthy volunteers, who still showed activation of their hypothalamus through brain imaging.

More information: Tatiana E. Salazar et al, Electroacupuncture Promotes CNS-Dependent Release of Mesenchymal Stem Cells, *STEM CELLS* (2017). [DOI: 10.1002/stem.2613](https://doi.org/10.1002/stem.2613)

Provided by Indiana University

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