

Acupuncture impacts same biologic pathways in rats that pain drugs target in humans

July 21 2015

In animal models, acupuncture appears to impact the same biologic pathways ramped up by pain and stress, analogous to what drugs do in humans. Georgetown University Medical Center (GUMC) researchers say their animal study, published online in *Endocrinology*, provides the strongest evidence to date on the mechanism of this ancient Chinese therapy in chronic stress.

"The benefits of [acupuncture](#) are well known by those who use it, but such proof is anecdotal. This research, the culmination of a number of studies, demonstrates how acupuncture might work in the human body to reduce stress and pain, and, potentially, depression," says the study's senior investigator, Ladan Eshkevari, PhD, CRNA, LAc, associate professor in the department of nursing and the department of pharmacology and physiology at GUMC.

"We have now found a potential mechanism, and at this point in our research, we need to test human participants in a blinded, placebo controlled clinical study—the same technique we used to study the behavioral effects of acupuncture in rats," says Eshkevari, a nurse anesthetist and licensed acupuncturist. She is assistant program director of the Nurse Anesthesia Program at Georgetown's School of Nursing & Health Studies.

Eshkevari and her team found that applying the technique with electroacupuncture to a single but powerful acupuncture point—stomach meridian point 36 (St36)—blunts activity in the hypothalamus pituitary

adrenal (HPA) axis, the chronic stress pathway that is also associated with chronic pain, the immune system, mood and emotions. Tuning HPA down via acupuncture reduced production of [stress hormones](#), secreted by the pathway, that are involved in the chronic stress response.

"Some antidepressants and anti-anxiety drugs exert their therapeutic effects on these same mechanisms," Eshkevari says.

She has already shown that pre-treatment with acupuncture prevents increases in HPA hormones caused by cold-induced painful stress in rats, and that the beneficial effects were long lasting.

Her series of studies uses four different groups in rats: three stress group of animals- a group that received acupuncture through electroacupuncture (a device that ensures equitable distribution of electro stimulation); those that received sham acupuncture (delivered in an area that is not an acupuncture point); and a third, placebo group that did not receive any acupuncture. The stress groups were compared to a fourth group of animals that served as controls, with no exposure to stress or acupuncture.

The first study mimicked the benefit experienced by individuals who have acupuncture regularly, while the new study looked at the benefit of acupuncture during a stressful event—"which is how acupuncture is most often utilized clinically," Eshkevari says.

They indeed found that electroacupuncture delivered at St36 minutes after chronic painful cold exposure was as effective in preventing elevation of stress hormones as it was with pretreatment with acupuncture.

The new study also used a drug to block acupuncture's manipulation of the HPA system, and found that production of stress hormones equalized

in all treatment groups. "This confirmed that electroacupuncture does affect the HPA system," she says.

Behavioral and protein analyses indicated that acupuncture appears to prevent stress induced release of hormones, as well as decrease depression and anxiety-like behavior in the rats. "This is the first report linking the effects of electroacupuncture at St36 to [chronic stress](#) induced depressive and anxious behavior in animals," Eshkevari says.

"This work provides a framework for future clinical studies on the benefit of acupuncture, both before or during chronic stressful events," she says.

Provided by Georgetown University Medical Center

Citation: Acupuncture impacts same biologic pathways in rats that pain drugs target in humans (2015, July 21) retrieved 20 April 2024 from <https://medicalxpress.com/news/2015-07-acupuncture-impacts-biologic-pathways-rats.html>

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