

Series of studies first to examine acupuncture's mechanisms of action

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While acupuncture is used widely to treat chronic stress, the mechanism of action leading to reported health benefits are not understood. In a series of studies at Georgetown University Medical Center (GUMC), researchers are demonstrating how acupuncture can significantly reduce the stress hormone response in an animal model of chronic stress.

The latest study was published today in the April issue of *Journal of Endocrinology*.

"Many practitioners of [acupuncture](#) have observed that this ancient practice can reduce [stress](#) in their patients, but there is a lack of biological proof of how or why this happens," says the study's lead author, Ladan Eshkevari, PhD, an associate professor of nursing at Georgetown University School of Nursing & Health Studies, a part of GUMC. "We're starting to understand what's going on at the molecular level that helps explain acupuncture's benefit."

Eshkevari, a physiologist, nurse anesthetist and certified acupuncturist, designed a series of studies in rats to test the effect of electronic acupuncture on levels of proteins and hormones secreted by biologic pathways involved in stress response.

Eshkevari used rats because these animals are often used to research the biological determinants of stress. They mount a stress response when exposed to winter-like temperatures for an hour a day.

"I used electroacupuncture because I could make sure that each animal was getting the same treatment dose," she explains.

The spot used for the acupuncture needle is called "Zusanli," which is reported to help relieve a variety of conditions including stress. As with rats, that acupuncture point for humans is on the leg below the knee.

The study utilized four groups of rats for a 10-day experiment: a control group that was not stressed and received no acupuncture; a group that was stressed for an hour a day and did not receive acupuncture; a group that was stressed and received "sham" acupuncture near the tail; and the experimental group that were stressed and received acupuncture to the Zusanli spot on the leg.

The researchers then measured blood hormone levels secreted by the hypothalamus pituitary adrenal (HPA) axis, which includes the hypothalamus, the pituitary gland and the adrenal gland. The interactions among these organs control reactions to stress and regulate digestion, the immune system, mood and emotions, sexuality and energy storage and expenditure.

They also measured levels of NPY, a peptide secreted by the sympathetic nervous system in rodents and humans. This system is involved in the "flight or fight" response to acute stress, resulting in constriction of blood flow to all parts of the body except the heart, lungs and brain (the organs most needed to react to danger). [Chronic stress](#), however, can cause elevated blood pressure and cardiac disease.

"We found that electronic acupuncture blocks the chronic, stress-induced elevations of the HPA axis hormones and the sympathetic NPY pathway," Eshkevari says. She adds that the rats receiving the sham electronic acupuncture had elevation of the hormones similar to that of the stress-only animals.

Eshkevari says this research complements her earlier reported work that focused only on NPY. In that study, Eshkevari and her team found that NPY levels were reduced in the experimental group almost to the level of the control group, while the rats that were stressed and not treated with Zusanli acupuncture had high levels of NPY (*Experimental Biology and Medicine* Dec. 2011).

"Our growing body of evidence points to acupuncture's protective effect against the stress response," she continues. Eshkevari says additional research is needed to examine if acupuncture would be effective in reducing hormone levels after the animals are exposed to the stress of cold temperatures, and whether a similar observation can be made in humans.

Provided by Georgetown University Medical Center

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