

Longevity hormone is lower in stressed and depressed women

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Credit: George Hodan/Public Domain

Women under chronic stress have significantly lower levels of klotho, a hormone that regulates aging and enhances cognition, researchers at UC San Francisco have found in a study comparing mothers of children on the autism spectrum to low-stress controls.

The researchers found that the women in their study with clinically

significant [depressive symptoms](#) had even lower levels of klotho in their blood than those who were under stress but not experiencing such symptoms.

The study, published Tuesday, June 16, in *Translational Psychiatry*, is the first to show a relationship between psychological influences and klotho, which performs a wide variety of functions in the body.

"Our findings suggest that klotho, which we now know is very important to health, could be a link between [chronic stress](#) and premature disease and death," said lead author, Aric Prather, PhD, an assistant professor of psychiatry at UCSF. "Since our study is observational, we cannot say that chronic stress directly caused lower klotho levels, but the new connection opens avenues of research that converge upon aging, mental health, and age-related diseases."

Scientists know from their work in mice and worms that, when klotho is disrupted, it promotes symptoms of aging, such as hardening of the arteries and the loss of muscle and bone, and when klotho is made more abundant, the animals live longer.

In previous work, senior author Dena Dubal, MD, PhD, showed that a genetic variant carried by one in five people is associated with having more klotho in the bloodstream, better cognitive function and a larger region of the prefrontal cortex. Carriers also tend to live longer and have lower rates of age-related disease. Dubal and colleagues found that increasing klotho in mice boosted their cognition and increased resilience to Alzheimer-related toxins, suggesting a therapeutic role for klotho in the brain.

The current study included 90 high-stress caregivers and 88 low-stress controls, most of whom were in their 30s and 40s and otherwise healthy. Klotho is known to decline with age, but in this cross-sectional study of

relatively young women, this decline only happened among the high-stress women. The low-stress women did not show a significant reduction in klotho with aging.

"Chronic stress transmits risk for bad health outcomes in aging, including cardiovascular and Alzheimer's disease," said Dubal, an assistant professor in the UCSF Department of Neurology and the David A. Coulter Endowed Chair in Aging and Neurodegenerative Disease. "It will be important to figure out if higher levels of klotho can benefit mind and body health as we age. If so, therapeutics or lifestyle interventions that increase the longevity hormone could have a big impact on people's lives."

The researchers hypothesized that lower levels of klotho could contribute to stress and depression, since klotho acts on a variety of cellular, molecular and neural pathways that link to stress and depression.

Provided by University of California, San Francisco

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