

Elevated levels of sodium blunt response to stress, study shows

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All those salty snacks available at the local tavern might be doing more than increasing your thirst: They could also play a role in suppressing social anxiety.

New research from the University of Cincinnati (UC) shows that elevated levels of sodium blunt the body's natural responses to stress by inhibiting [stress hormones](#) that would otherwise be activated in stressful situations. These hormones are located along the hypothalamic-pituitary-adrenal (HPA) axis, which controls reactions to stress.

The research is reported in the April 6, 2011, issue of *The Journal of Neuroscience*, the official journal of the Society for Neuroscience.

"We're calling this the Watering Hole Effect," says Eric Krause, PhD, a research assistant professor in the basic science division of UC's department of [psychiatry](#) and behavioral neuroscience and first author of the study. "When you're thirsty, you have to overcome some amount of fear and anxiety to approach a communal water source. And you want to facilitate those interactions—that way everyone can get to the water source."

Krause and his team dehydrated laboratory rats by giving them sodium chloride, then exposed them to stress. Compared with a control group, the rats that received the sodium chloride secreted fewer stress hormones and also displayed a reduced cardiovascular response to stress.

"Their blood pressure and heart rate did not go up as much in response to stress as the control group's, and they returned to resting levels more quickly," says Krause.

"Also, in a social interaction paradigm with two rats interacting, we found them to be more interactive and less socially anxious."

Further research, through examination of brain and blood samples from the rats, showed that the same hormones that act on kidneys to compensate for dehydration also act on the brain to regulate responsiveness to stressors and social anxiety.

The elevated [sodium](#) level, known as hypernatremia, limited stress responses by suppressing the release of the pro-stress hormone angiotensin II. Conversely, it increased the activity of oxytocin, an anti-stress hormone.

Further research, Krause says, will examine these hormones and neurocircuits to investigate their role in [social anxiety](#) disorders and autism, a neurological disorder whose characteristics include social impairment.

"Oxytocin deficiency has been implicated in autism in previous studies," says Krause. "We'd like to investigate the possibility that dysregulation in fluid balance during pregnancy could result in autistic disorders."

Provided by University of Cincinnati Academic Health Center

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