

Stress gets under our skin

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Everyone experiences social stress, whether it is nervousness over a job interview, difficulty meeting people at parties, or angst over giving a speech. In a new report, UCLA researchers have discovered that how your brain responds to social stressors can influence the body's immune system in ways that may negatively affect health.

Lead author George Slavich, a postdoctoral fellow at the UCLA Cousins Center for Psychoneuroimmunology, and senior author Shelley Taylor, a UCLA professor of psychology, show that individuals who exhibit greater neural sensitivity to [social rejection](#) also exhibit greater increases in inflammatory activity to [social stress](#).

And although such increases can be adaptive, [chronic inflammation](#) can increase the risk of a variety of disorders, including asthma, rheumatoid arthritis, cardiovascular disease, certain types of cancer, and depression.

The study appears in the current online edition of the journal *Proceedings of the National Academy of Sciences*.

"It turns out, there are important differences in how people interpret and respond to social situations," Slavich said. "For example, some people see giving a speech in front of an audience as a welcome challenge; others see it as threatening and distressing. In this study, we sought to examine the neural bases for these differences in response and to understand how these differences relate to biological processes that can affect human health and well-being."

The researchers recruited 124 individuals — 54 men and 70 women — and put them into two awkward social situations. First, in the lab, the volunteers completed the Trier Social Stress Test (TSST), which involves preparing and delivering an impromptu speech and performing difficult mental arithmetic, both in front of a socially rejecting panel of raters wearing white lab coats. Mouth swabs were taken before and after the public-speaking tasks to test for changes in two key biomarkers of inflammatory activity — a receptor for tumor necrosis factor- α (sTNF α RII) and interleukin-6 (IL-6).

In a second session, 31 of the participants received an MRI brain scan while playing a computerized game of catch with what they believed were two other real people. The researchers focused on two areas of the brain known to respond to social stress — the dorsal anterior cingulate cortex (dACC) and the anterior insula.

At first, the game was between all three "players." Halfway through the game, however, the research subject was excluded, leading to an experience of social rejection. The researchers then examined how differences in neural activity during social rejection correlated with differences in inflammatory responses to the TSST.

Their results showed that individuals who exhibited greater neural activity in the dorsal anterior cingulate cortex and anterior insula during social rejection in the brain scanner also exhibited greater increases in inflammatory activity when exposed to acute social stress in the lab.

"This is further evidence of how closely our mind and body are connected," Slavich said. "We have known for a long time that social stress can 'get under the skin' to increase risk for disease, but it's been unclear exactly how these effects occur. To our knowledge, this study is the first to identify the neurocognitive pathways that might be involved in inflammatory responses to acute social stress."

Although increases in inflammatory activity are part of our immune system's natural response to potentially harmful situations, Slavich noted, "frequent or chronic activation of the system may increase risk for a variety of disorders, including asthma, rheumatoid arthritis, cardiovascular disease, and even depression."

One critical question raised by the present findings is why neural sensitivity to social rejection would cause an increase in inflammation. There are several possible reasons, the authors note. For one, since physical threats have historically gone hand in hand with social threat or rejection, inflammation may be triggered in anticipation of a physical injury. Inflammatory cytokines — proteins that regulate the immune system — are released in response to impending (or actual) physical assault because they accelerate wound-healing and reduce the risk of infection.

While short-term inflammation is useful in battling an injury, chronic inflammation arising from the mere perception of social rejection is not.

"Although the issue is complex, one solution is to not treat negative thoughts as facts," Slavich said. "If you think you're being socially rejected, ask yourself, what's the evidence? If there is no evidence, then revise your belief. If you were right, then make sure you're not catastrophizing or making the worst out of the situation."

Provided by University of California Los Angeles

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