

Neuroscientist offers insight into how loneliness can affect health

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Efforts are underway to address the "epidemic of loneliness and isolation" affecting the country, as recently addressed by the U.S. Surgeon General Dr. Vivek Murthy who is laying out a "National

Strategy to Advance Social Connection" initiative.

Virginia Tech neuroscientist Georgia Hodes says that reports of depression and anxiety are up at least 3-fold since the start of the COVID epidemic. "While loneliness and isolation are likely contributors, the COVID infection itself triggers a depressive episode in approximately 20 percent of people. Understanding how infection impacts mood may help us find new ways to treat individuals that do not fully respond to current antidepressants."

According to the Center for Disease Control and Prevention, [social isolation](#) and loneliness have been linked to increased risk for [heart disease](#) and stroke, type 2 diabetes, depression and anxiety, suicidality and self-harm, dementia, and earlier death.

Hodes' research explores biomarkers and treatments for depression that target the body's immune response system. For studies linking loneliness and [isolation](#) to effects on the brain, she points to [one study](#) that showed "people who reported they were lonely but were otherwise healthy adults had greater pro-inflammatory immune responses to acute stress and immune activation. The data suggests that loneliness is priming the immune system to react more strongly to stress."

Hodes says that most studies on loneliness in humans have been done in older adults. She points to a [recent study](#) by Isabelle F. van der Velpen et al, that used MRI images from the Rotterdam study to examine the relationship between loneliness and brain matter volume. "At baseline higher loneliness scores were associated with decreased white matter volume. Perceived [social support](#) correlated positively with total brain and grey matter volume. In general, though there is little on perceived loneliness and specific changes in brain structures in humans."

"One of the most replicated findings is perceived loneliness in humans is

related to higher levels of the cytokine IL-6 in the periphery. Previously, in mice [we reported](#) that altering IL-6 produced in the periphery by the [white blood cells](#) could induce or block the effects of stress on [social behavior](#)" says Hodes. "This is a protein that has increased levels when someone is sick. The human data suggest that loneliness is putting people into a constant state of low-grade inflammation which may then promote social withdrawal, depression and/or anxiety."

Provided by Virginia Tech

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