

# Analysis reveals link between suicide and inflammation

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One American dies from suicide every 12.8 minutes, making suicide the tenth leading cause of death in the United States according to the American Foundation for Suicide Prevention. There is consensus that if we could better predict who was at risk for suicide, then we could more effectively intervene to reduce this terrible burden on individuals, families and public health.

A new analysis of existing studies strongly supports the idea that there are increased levels of chemicals, called cytokines, in the body and brain that promote inflammation in individuals who are contemplating or have attempted suicide, even when compared to patients being treated for the same psychiatric disorders who are not suicidal.

These cytokines are known to be involved in problems in other body organs, such as the joints (arthritis), the coronary arteries (atherosclerosis) and the lungs (asthma). Studies have long suggested that cytokines are released under conditions of psychological stress and that inflammation in the brain contributes to depression. Thus, the current study suggests that suicide emerges in the context of a relatively greater activation of the immune system than typical stress or depression.

To conduct this work, Drs. Carmen Black and Brian Miller at Georgia Regents University collected and pooled data from 18 published studies, resulting in a combined total of 583 psychiatric patients with suicidality, 315 [psychiatric patients](#) without suicidality and 845 healthy control subjects. Their analysis revealed that patients with suicidality had

significantly increased interleukin (IL)-1 $\beta$  and IL-6 levels in blood and postmortem brain.

"Our findings contribute to a growing body of evidence that immune system dysfunction, including inflammation, may be involved in the pathophysiology of major [psychiatric disorders](#) in some individuals. Specifically, cytokine levels may help distinguish patients with suicidality from patients without suicidality and controls," explained Miller. "That levels of IL-1 $\beta$  and IL-6 were altered in both blood and postmortem brain supports the robustness of our findings, as changes in the periphery might not be mirrored in the central nervous system."

The limitation of this study is that the relationship between elevated cytokine levels and suicide may be non-specific, i.e., increased levels may not determine whether a specific person is going to attempt suicide at a specific time. As a result, the ultimate achievement – a specific suicide test – is still a distant goal. However, by identifying biological markers generally associated with suicide, we may be gradually approaching an era where simple blood tests might help doctors predict long-term risk, much in the way that increased blood pressure may predict medical problems years or decades later.

By implication, studies are still needed to evaluate whether controlling inflammation earlier in life has a long-term protective effect. In addition, rigorously designed studies of large and diverse patient samples are still needed to confirm the presence of these cytokine alterations, but if replicated, such findings could contribute to more personalized medicine for patients.

"Inflammation affects every organ in the body. It is increasingly evident that we need to take a long-term perspective on the effects of [inflammation](#) on the brain," said Dr. John Krystal, Editor of Biological Psychiatry. "The path to preventing suicide may be to intervene early in

long-term processes that increase the risk for suicide rather than to focus solely on the elusive short-term predictors of suicide."

Miller agrees and added, "Given that suicide is a major area of [public health](#) concern, it is critical to investigate potential markers of [suicidality](#) that could be used to assess treatment effectiveness, advance [suicide prevention](#) efforts and even help pave the way for future immune-based therapeutic interventions."

**More information:** "Meta-analysis of Cytokines and Chemokines in Suicidality: Distinguishing Suicidal Versus Nonsuicidal Patients." *Biological Psychiatry*, [DOI: 10.1016/j.biopsych.2014.10.014](https://doi.org/10.1016/j.biopsych.2014.10.014)

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