

Reduced activity of an important enzyme identified among suicidal patients

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Credit: George Hodan/Public Domain

It is known that people who have attempted suicide have ongoing inflammation in their blood and spinal fluid. Now, a collaborative study from research teams in Sweden, the US and Australia published in *Translational Psychiatry* shows that suicidal patients have a reduced activity of an enzyme that regulates inflammation and its byproducts.

The study is the result of a longstanding partnership between the research teams of Professor Sophie Erhardt, Karolinska Institutet, Professor Lena Brundin at Van Andel Research Institute in Grand Rapids, USA, and Professor Gilles Guillemin at Macquarie University in Australia. The overall aim of the research is to find ways to identify suicidal patients.

Biological factors

"Currently, there are no biomarkers for psychiatric illness, namely [biological factors](#) that can be measured and provide information about the patient's psychiatric health. If a simple blood test can identify individuals at risk of taking their lives, that would be a huge step forward", said Sophie Erhardt, a Professor at the Department of Physiology and Pharmacology at the Karolinska Institutet, who led the work along with Lena Brundin.

The researchers analyzed certain metabolites, byproducts formed during infection and [inflammation](#), in the blood and cerebrospinal fluid from patients who tried to take their own lives. Previously it has been shown that such patients have ongoing inflammation in the blood and [cerebrospinal fluid](#). This new work has succeeded in showing that patients who have attempted suicide have reduced activity of an [enzyme](#) called ACMSD, which regulates inflammation and its byproducts.

"We believe that people who have reduced activity of the enzyme are especially vulnerable to developing depression and suicidal tendencies when they suffer from various infections or inflammation. We also believe that inflammation is likely to easily become chronic in people with impaired activity of ACMSD," said Brundin

Important balance

The substance that the enzyme ACMSD produces, picolinic acid, is greatly reduced in both plasma and in the [spinal fluid](#) of suicidal patients. Another product, called quinolinic acid, is increased. Quinolinic acid is inflammatory and binds to and activates glutamate receptors in the brain. Normally, ACMSD produces picolinic acid at the expense of quinolinic acid, thus maintaining an important balance.

"We now want to find out if these changes are only seen in individuals with suicidal thoughts or if [patients](#) with severe depression also exhibit this. We also want to develop drugs that might activate the enzyme ACMSD and thus restore the balance between quinolinic and picolinic acid," Erhardt said.

More information: L Brundin et al. An enzyme in the kynurenine pathway that governs vulnerability to suicidal behavior by regulating excitotoxicity and neuroinflammation, *Translational Psychiatry* (2016). [DOI: 10.1038/tp.2016.133](https://doi.org/10.1038/tp.2016.133)

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