Examining brain differences in pain modulation in people with self-injury behavior

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Researchers at Karolinska Institutet in Sweden might have found an explanation for why people with self-injury behavior generally feel less pain than others. The key seems to be a more effective pain-modulation system, a discovery that can benefit people seeking help for their self-harm. The findings are published in the journal *Molecular Psychiatry*.

Most people try to avoid pain, but some, especially adolescents and young adults, can sometimes subject themselves to physical injury. Self-harming is strongly associated with other mental health issues, such as anxiety and depression, but far from everyone with such a condition engages in self-injury.

"We have long tried to understand how people who display self-injury behavior differ from others and why the pain itself isn't a sufficient deterrent," says Karin Jensen, researcher and group leader at the Department of Clinical Neuroscience, Karolinska Institutet, and the study's corresponding author. "Previous studies how shown that people who self-harm are generally less sensitive to pain, but the mechanisms behind it are not fully understood."

Tolerated more pain

In this present study, the researchers examined these mechanisms by comparing pain modulation in 41 women who had engaged in self-injury at least five times in the past year with 40 matched women without self-injury behavior. The women, who were aged between 18 and 35, underwent laboratory pain tests at Karolinska University Hospital on two occasions in 2019-2020 during which they were asked to rate the pain they experienced from transient pressure and heat stimulations. Their brain activity during pain was also measured using MRI scans.

The researchers found that on average the self-harming women tolerated higher levels of pain than the controls. The brain scans also revealed differences in activation between the groups. Compared with the controls, the brain activity of the women with self-injury behavior displayed more connections between brain areas directly involved in the perception of pain and those linked to the modulation of pain.

Another finding was that the difference in pain modulation was not determined by how long, how often or in what way the participants had engaged in self-injury.

Clinically useful knowledge

"Our study suggests that effective pain modulation is a risk factor for self-injury behavior," says Maria Lalouni, researcher at the Department of Clinical Neuroscience, Karolinska Institutet, and the study's joint first author with Jens Fust, who recently earned his Ph.D. on the project. "It also tells us

more about differences in the brains of people who engage in self-injury, knowledge that can be used for improving the support provided to people seeking care for their behavior as well as in conversations with patients to help them understand their self-injury and the need for treatment."

Limitations to the study include the fact that women with self-injury behavior tended to report more psychiatric comorbidities than the controls. They also took more drugs, such as antidepressants, which the researchers factored into their analysis.

More information: "Augmented pain inhibition and higher integration of pain modulatory brain networks in women with self-injury behavior", *Molecular Psychiatry* (2022). DOI: 10.1038/s41380-022-01639-y

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