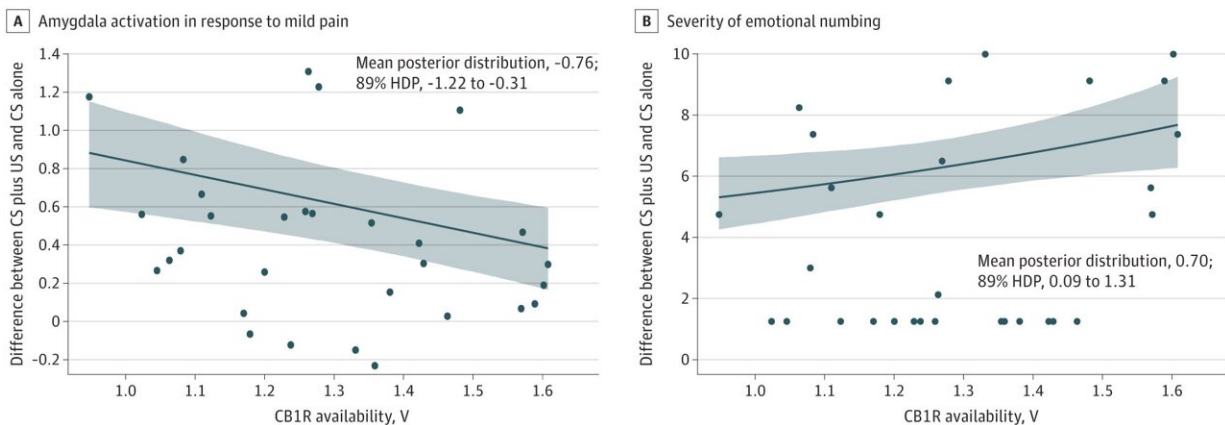


Endocannabinoids are associated with emotional numbing in PTSD: Study

September 10 2024, by Mallory Locklear



Cannabinoid receptor 1 (CB1R) availability in the amygdala and amygdala activation to shocks and emotional numbing severity. Credit: *JAMA Network Open* (2024). DOI: 10.1001/jamanetworkopen.2024.32387

In previous studies, Yale researchers found that in people diagnosed with post-traumatic stress disorder (PTSD), the amygdala—an area of the brain associated with emotional processing—reacts less strongly to mild physical or emotional pain compared with people without the disorder.

In a new study, the researchers show that a particular neuromodulator system in the brain may play a key role in this phenomenon.

The endocannabinoid system is made up of several

neuromodulators—molecules that send signals between neurons—and their [receptors](#), which are located throughout the nervous system.

"The endocannabinoid system is crucial for pain modulation and is involved in stress-related disorders like PTSD," said Nachshon Korem, an associate research scientist at Yale School of Medicine (YSM) and lead author of [the study](#) published Sept. 9 in *JAMA Network Open*.

"Based on our earlier findings, we suspected it might contribute to this low reactivity of the [amygdala](#)."

Korem is part of the lab of Ilan Harpaz-Rotem, a professor of psychiatry at YSM and senior author of the study.

For the study, the researchers used PET scans to measure the amount of cannabinoid receptor 1 availability in the amygdala (or, the number of open receptors available for a marker to attach to, which makes the receptors viewable by PET scan); the amygdala's reactivity to mild shocks through fMRI; and the severity of participants' emotional numbness (or the under-expression of emotions) with clinical assessments. Participants included 30 trauma-exposed adults, nine of whom had received PTSD diagnoses.

"We found that the more cannabinoid receptor 1 availability was in the amygdala, the less reactive the amygdala was to mild pain and the more emotional numbing symptoms a person presented," said Korem.

"Endocannabinoids have a large inhibiting effect on the amygdala, and here it seems that when there is more receptor availability, endocannabinoids can suppress the amygdala's response to mild pain more strongly."

People with PTSD can experience both under-expression and over-expression of emotions. Research suggests that under-expression in response to something mildly aversive may lead to exaggerated reactions

later. The findings of the current study help explain under-expression of emotions and suggest a route for treatment, the researchers said.

"If you can help people with PTSD have appropriate reactions to smaller irritations, maybe it would prevent the sort of all-or-nothing responses common in the disorder," said Korem. "The endocannabinoid system might be a target for that type of treatment."

Going forward, the researchers are looking into how to target this particular part of the [endocannabinoid system](#) pharmacologically and investigating interactions between the endocannabinoid and the opioid system.

More information: Nachshon Korem et al, Amygdala Cannabinoid 1 Receptor, Pain Response, and Emotional Numbing in Trauma-Exposed Individuals, *JAMA Network Open* (2024). [DOI: 10.1001/jamanetworkopen.2024.32387](#)

Provided by Yale University

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