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Cannabinoids modulate stress-induced alterations in extinction and plasticity in the brain's fear circuit

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The formation of a fear memory following a traumatic event is an important mechanism for the subsequent development of post-traumatic stress disorder (PTSD).

PTSD is different from other psychiatric disorders, in that it has a very clear point of onset. Hence, it seems that what we do in the first few hours after exposure to the traumatic event might have the potential to dramatically alter the trajectory of PTSD.

We aimed to examine whether intervention in the first few hours after trauma exposure using cannabinoids would prevent stress-induced alterations in extinction and plasticity. Maladaptive synaptic plasticity processes in response to specific external challenges are believed to underlie disorders such as PTSD. Growing attention has been focused on striatal plasticity which regulates mood and motivation, as well as fear-related behaviors after stress exposure.

We show that exposure to an emotional trauma impairs extinction and plasticity in the fear circuit (hippocampus, nucleus accumbens and amygdala) and that these effects are prevented by enhancing endocannabinoid signalling. The preventive effects were found to be associated with alterations in cannabinoid CB1 and glucocorticoid receptors (GR) in the brain's fear circuit.

Biography

Akirav has completed her PhD from the University of Haifa and postdoctoral studies from the Weizmann Institute of Science in Israel. She is the director of the learning and memory lab since 2006 at the department of Psychology, University of Haifa.

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