

Researchers reveal how the brain suppresses pain during times of stress

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New findings about how the brain functions to suppress pain have been published in the leading journal in the field *Pain*, by National University of Ireland Galway (NUI Galway) researchers. For the first time, it has been shown that suppression of pain during times of fear involves complex interplay between marijuana-like chemicals and other neurotransmitters in a brain region called the amygdala.

The work was carried out by Dr David Finn and his research team in Pharmacology and Therapeutics, Centre for [Pain](#) Research and Galway Neuroscience Centre at the National Centre for Biomedical Engineering Science, NUI Galway. The research builds on previous breakthrough findings from Dr Finn's research group on the role of marijuana-like chemicals in the brain's hippocampus in pain suppression during fear.

Pain is both a sensory and an emotional experience and is subject to modulation by a number of factors including fear and stress. During exposure to a high-stress environment or stimulus, pain transmission and perception can be potently suppressed. This important survival response can help us cope with or escape from potentially life-threatening situations. One brain region that is integral to the processing and expression of both emotional responses and pain is the amygdala.

Working with Dr Finn, first author Dr Kieran Rea was able to confirm the amygdala as a key brain region in the suppression of pain behaviour by fear (so-called fear-induced analgesia). Fear-induced analgesia was associated with increases in levels of marijuana-like substances known as

[endocannabinoids](#) in the amygdala.

Furthermore, fear-induced analgesia was prevented by injecting a drug that blocked the receptor at which these endocannabinoids act into the amygdala. Further experimentation revealed that these effects involved an interaction between endocannabinoids and the classical neurotransmitters GABA (Gamma-amino butyric acid) and glutamate. An increased understanding of the [biological mechanisms](#) involved in fear-induced analgesia is important from a fundamental physiological perspective and may also advance the search for new therapeutic approaches to the treatment of pain.

Dr David Finn, Leader of the Galway Neuroscience Centre, Co-Director of the Centre for Pain Research at NUI Galway and study leader says: "The body can suppress pain when under extreme stress, in part through the action of marijuana-like substances produced in the brain. This research provides information on the complex interactions between multiple neurotransmitter systems including endocannabinoids, GABA and glutamate in times of stress and pain. This research which was funded by a grant from Science Foundation Ireland, advances our fundamental understanding of the neurobiology of pain and may facilitate the identification of new therapeutic targets for the treatment of pain and anxiety disorders."

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