

The complex relationship between psychoactive substances and their effects on the brain is a critical area that needs to be studied due to its potential implications in psychotherapy and clinical settings. Among such substances, 3,4-methylenedioxymethamphetamine (MDMA) has emerged as a compound of interest due to its recent use in psychotherapeutic settings for conditions such as post-traumatic stress disorder (PTSD).

This study seeks to understand the effects of MDMA on the expression of brain-derived neurotrophic factor (BDNF) within the amygdala and dorsal hippocampus (DH)—regions implicated in the modulation of emotions and memory. We aim to address the hypothesis that MDMA administration results in increased BDNF expression, potentially contributing to the neurological changes associated with memory processing and emotional regulation. Previous studies have highlighted MDMA's role in enhancing the extinction of traumatic memories in PTSD therapy. However, there is limited understanding of the molecular pathways and regional brain effects. We aim to fill this gap by employing reverse transcription-quantitative polymerase chain reaction techniques to quantitatively measure BDNF mRNA levels in the amygdala and DH following MDMA administration. Through our findings, we seek to provide valuable information on the potential of MDMA to facilitate therapeutic outcomes in PTSD treatment, through BDNF-mediated neuroplasticity.

We found a notable upregulation of BDNF mRNA in the amygdala and DH, supporting the notion that MDMA could modulate neurological factors in a way that is beneficial for treatment. The implications of our results can allow us better to understand the relationship between psychoactive substances and the brain.