

MDMA, chemically known as 3,4-methylenedioxymethamphetamine, has historically derived its popularity as a recreational street drug, however it has also recently begun to gain popularity as a pharmacotherapeutic approach in post-traumatic stress disorder (PTSD) treatment for its ability to decrease fear-based learning. But, as for all drug use, MDMA use comes with side effects whose mechanisms have not fully been studied, specifically the cognitive defects that could be caused by MDMA's effect on corticotropin releasing hormone (CRH) and amyloid precursor protein (APP) gene expression levels. Many of these cognitive defects include memory deficits that are a result of the memory functions of the dorsal hippocampus (DH). This alteration in functioning of the DH produces cognitive deficits that appear similar to, if not have a direct link to, Alzheimer's Disease (AD) pathology. Previous research has established: (1) a direct relationship between MDMA exposure and increased production of a CRH derivative, cortisol, (2) a direct relationship between MDMA use and an increase in APP's derivative, amyloid plaques, that aggregate to form amyloid pathology, and (3) a relationship between these precursors (CRH and APP). This relationship between CRH and APP has been extensively studied in AD pathology/genesis research, therefore it is essential that MDMA's effects on CRH and APP expression be studied, to uncover if the increased use of MDMA as a form of pharmacotherapy could have implications for future development of AD pathology. To better understand MDMA's effects on CRH/APP expression, RNA from the dorsal hippocampus of 20 male Sprague Dawley rats was isolated and amplified so that qPCR could be conducted to compare gene expression levels between animals given either MDMA or saline 1 hour prior to sacrifice. It was found that animals that received subcutaneous MDMA injection had increased levels of APP expression and increased levels of CRH expression when compared to animals that had received saline. These results indicate that MDMA administration does have an effect on both the stress and amyloid pathology pathways and this should be considered as MDMA continues to gain popularity as a pharmacotherapeutic treatment approach.