Alzheimer's disease (AD) is a progressive neurodegenerative memory disorder and is characterized by the accumulation of abnormal protein aggregates in the brain, specifically in the dorsal hippocampus (DH) and the amygdala. The amyloid precursor protein (APP) is an integral membrane protein in rats involved in neural development and is associated with the formation of the amyloid plaques commonly seen in the brains of individuals with AD. In mice, APP is expressed in several brain regions, including the DH and amygdala, which are responsible for long term memories and fear/emotional memories, respectively.
3,4-Methylenedioxymethamphetamine (MDMA), a synthetic stimulant and hallucinogen, disrupts certain functions of the amygdala and dorsal hippocampal region of mice brains. It was hypothesized that MDMA exposure would lead to a decrease in APP expression. In order to identify the effects of MDMA on APP expression in the DH and amygdala, the drug was administered subcutaneously twice, 24-hr and 1 hour prior to the removal of the brains. Tissue punches were taken from those regions in adult male rats, and subsequent RT-qPCR techniques were performed to determine the amount of APP gene expression in the samples. It was determined that, after exposure to MDMA, APP gene expression was significantly increased in the DH and unchanged in the amygdala. The differences found in APP expression in response to MDMA administration can aid in the determination of a relationship between APP expression and the accumulation of amyloid plaques in the DH and amygdala, which may affect the pathogenesis of AD.