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Changes in neuroinflammatory factors in prefrontal cortex in priming-induced Methamphetamine reinstatement in REM sleep deprived rats

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Methamphetamine (METH) is an addictive psychostimulant that is associated with damage to regions of the brain that regulate cognitive function like Prefrontal Cortex (PFC). Evidence has shown that inflammatory factors play an important role in drug-rewarded behavior. Also, non-selective reduction of neuroinflammation inhibits METH-induced reinstatement. This shows there is a synergism between CNS and central proinflammatory signaling underlying the rewarding effects of psychostimulant. Cannabidiol (CBD) is a non-psychotomimetic compound of the herb Cannabis sativa that has anti-inflammatory effect. Our previous study showed that CBD not only prevented reinstatement of METH but also inhibited reinstatement in REM Sleep Deprived (RSD) Rats. Based on these data, the present study was undertaken to assess the changes in gene expression of cytokines include IL-1 β , 6, 10 and TNF- α in the effect of CBD on METH-induced reinstatement in RSD rats by Real Time-PCR. Our data indicated that METH-induced reinstatement in the normal and RSD rats augmented TNF- α , IL-1 β and 10 the expression in the PFC. Since our results of behavioral study demonstrated that CBD prevented reinstatement of METH-induced CPP and present study showed increase in the expression of cytokines in the PFC; therefore, we assessed changes in the expression of cytokines in the PFC of normal and RSD rats whom received ICV administration of CBD (10 μ g/5 μ L). Our results showed CBD relieved the expression level of IL-6, 10 and 1 β in the PFC in normal but not in RSD rats. Taken together, cytokines include IL-1- β , 10 and TNF- α are involved in the reward circuit is impacted by METH exposure. Moreover, CBD may effect on METH-induced reinstatement via decrease in cytokines. Previous studies demonstrated that cytokines could change in neurotransmitters that are involved in the reinstatement like dopamine and glutamate. Therefore, it was suggested cytokines may effect on neurochemistry of the brain regulate reward circuit.

Biography

Saeideh Karimi-Haghighi In her PhD thesis, she is working on "Effects of cannabidiol on methamphetamine-induced reinstatement in paradoxical sleep-deprived rats: behavioral, molecular and electrophysiological study" at the Department of Neuroscience, Shahid Beheshti University of Medical Sciences under supervision Dr. Abbas Haghighparast. She finished Behavioral (reward) and Molecular (Real-time) sections of her PhD thesis. They published the article "Cannabidiol inhibits priming-induced reinstatement of Methamphetamine in REM sleep deprived rats". in *Neuro-Psychopharmacology & Biological Psychiatry*". Now she is writing an article by their data that is extracted of molecular part of her thesis. Concurrently she's recording LFP of CA1 and prefrontal cortex in freely moving animals in CPP task.

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