The effects of acute administration of ultra low and usual doses of morphine on retention of memory formed in the presence of forced swimming stress in rat

Sadegh A. Fereidoni M., Moghimi A., Kavoosi Z.
Department of Biology, Faculty of Sciences, Ferdowsi University of Mashhad, Mashhad, Iran

Learning and memory are essentials needs. Stress is a potent modulator of learning and memory processes and it has diversity effects. The role of opioid systems in learning and memory processes has been the focus of increasing experimental interests. There are not many studies about effects of ultra low doses of morphine on memory. In this study, effects of repeated swimming stress on learning and retention, also effects of acute administration of ultra low and usual doses of morphine on retention in the presence of repeated stress were investigated. Adult Male Wistar rats (200-250g) (n=7) were divided into 2 categories: A (rats experienced forced swimming stress 30 minutes before each training session for 4 constitutive days). Then on 5th and 12th
days memory retention was evaluated in morris water maze .B (groups which treated like as animals in category of A and received intraperitoneally different doses of morphine )1µg/kg, 10µg/kg, 100µg/kg, 1mg/kg and 10mg/kg (30 minutes before retention test on 5th day .retention tests were done without any excessive treatment on 12th day .Escape latency, mean path length from the start point to the platform in training days were learning parameters and time spent in target quadrant on 5th and 12th days was retention parameters. Repeated stress leads to decreased both learning process )P<0.001 (and retention on the 5th and 12th days )P<0.05 .(In animals treated with both repeated stress and acute morphine )excepted 1mg/kg ( retention decreased in 5th day )P<0.001(, while retention diminished for all the groups on the 12th day . Repeated stress probably causes memory impairment through changes in calcium homeostasis, Place cells functions and hippocampal structure .Repeated stress in combination with morphine in all doses )expected 1mg/kg (could cause memory impairment in Morris water maze, so both factors probably act in the same direction in the retention impairment .Repeated stress in combination with morphine at dose of 1mg/kg couldn't cause memory impairment, so ultra low in comparison with usual doses of morphine maybe have different mechanisms in memory impairment that needs more study.

Keywords: repeated swimming stress, ultra low dose of morphine, retention, learning and memory, Morris water maze, rat.