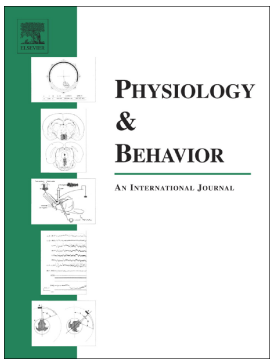

REM deprivation but not sleep fragmentation produces a sex-specific impairment in extinction

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REM Deprivation but not Sleep Fragmentation Produces a Sex-Specific Impairment in Extinction

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Abstract

REM sleep is essential for learning and memory processes, particularly emotional learning. Manipulations of REM sleep impair learning and memory and sleep architecture is often altered following a learning experience; for example, short term REM deprivation immediately after fear conditioning results in impaired extinction. In light of research demonstrating sex-dependent differences in fear conditioning as well as differences in sleep architecture, the present study investigated the effects of short term REM deprivation on the extinction of conditioned fear in male and female rats. In addition, given evidence that sleep fragmentation, which is a consequence of REM deprivation, can negatively impact learning and memory, this manipulation was compared to REM deprivation and a control condition. Male and female rats were exposed to fear conditioning followed by 6 hours of REM deprivation, sleep fragmentation, or a control condition. Two extinction sessions were conducted at 48 hour intervals after conditioning. REM deprivation, but not sleep fragmentation or the control condition, impaired extinction of conditioned fear. However, this effect was seen only in male rats. This study is the first to explore the effects of sleep manipulations on memory in female rats and suggests that female rats are more resilient to the deleterious effects of REM deprivation. In addition, it demonstrates that REM deprivation but not fragmentation of sleep is responsible for impairment in extinction of conditioned fear.