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4 days of REM sleep deprivation contributes to a reduction of cell proliferation in rats

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Four days' exposure to a REM sleep deprivation procedure reduces cell proliferation in the part of the forebrain that contributes to long-term memory of rats, according to a study published in the February 1 issue of the journal SLEEP.

The study, authored by Dennis McGinty, PhD, of the V.A. Greater Los Angeles Healthcare System, focused on male Sprague-Dawley rats. REM sleep deprivation was achieved by a brief treadmill movement initiated by automatic online detection of REM sleep. A yoked-control (YC) rat was placed in the same treadmill and experienced the identical movement regardless of the stage of the sleep-wake cycle.

According to the results, REM sleep was reduced by 85 percent in REM sleep deprived rats and by 43 percent in YC rats. Cell proliferation was reduced by 63 percent in REM sleep deprived rats compared with YC rats. Across all animals, cell proliferation exhibited a positive correlation with the percentage of REM sleep.

"Several studies have shown that sleep contributes to brain plasticity in general, and to adult neurogenesis, in particular," said Dr. McGinty. "Neurogenesis is a concrete example of brain plasticity, suppression of adult neurogenesis is thought to be important in pathologies such as depression. One current question has to do with the relative contribution of the two sleep states, non-REM and REM, which have very different, even opposite, physiological properties. This study showed that REM sleep has a critical role in facilitating brain plasticity. The study does not

exclude an equally important role for non-REM sleep. In other recent work, we have shown that sleep fragmentation can also suppress adult neurogenesis. How sleep affects the molecular mechanisms underlying neurogenesis remains to be explored."

It is recommended that older adults get between seven and eight hours of nightly sleep.

Source: American Academy of Sleep Medicine