Fearful sleep for the traumatized mind

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During sleep it may be possible to attenuate specific memories associated with fearful events, according to a study in mice published this week in *Molecular Psychiatry*. Current treatments for relieving fearful memories involve reactivating the memory in a safe environment while awake (a process known as extinction), which many patients find stressful and cease compliance. This study describes a non-stressful alternative technique for reactivating the fear memory in mice during sleep, thereby making it vulnerable to manipulation.

Memories have been shown to be stabilized and consolidated during sleep, and it has been suggested that the processing that occurs during this state may be accessible to manipulation. Craig Heller, Asya Rolls, Megha Makam and colleagues conditioned mice to fear a specific odor by pairing it
with foot shocks. Following brief exposures to this odor during sleep, the mice exhibited longer durations of freezing behavior, suggesting the fearful memory was reactivated during sleep and enhanced. In contrast, the fearful memory was weakened if the mice were injected with a protein synthesis inhibitor into a known fear control center in the brain prior to the sleep episode in which they experienced the puffs of odor. The protein synthesis inhibitor had no effect on the fearful memory when a control odor was applied during sleep indicating the selectivity of the treatment.

This study suggests that a fear memory can be reactivated and manipulated in mice during sleep when it is paired with a conditioned stimulus such as odor. Reactivation and reconsolidation alone appeared to strengthen the emotional content, but in the presence of a protein synthesis inhibitor, the emotional force was reduced. The authors speculate that sleep offers unique opportunities for non-stressful and non-context based therapies for emotional disorders.

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