



## HEALTH

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# Fragmented sleep 'harms memory'

**Broken sleep affects the ability to build memories, a study of mice suggests.**

[The Proceedings of the National Academy of Science findings](#) could help explain memory problems linked to conditions including Alzheimer's and sleep apnoea.

The Stanford University research found disrupting sleep made it harder for the animals to recognise familiar objects.

A UK sleep expert said the brain used deep sleep to evaluate the day's events and decide what to keep.

This study looked at sleep that was fragmented, but not shorter or less intense than normal for the mice.

It used a technique called optogenetics, where specific cells are genetically engineered so they can be controlled by light.

They targeted a type of brain cell that plays a key role in switching between the states of being asleep and being awake.

### Mouse memory test

The researchers then sent light pulses directly into the brains of mice while they slept.

This meant they could disrupt their sleep without affecting total sleep time or the quality or composition of sleep.

The animals were then placed in a box with two objects, one of which they had encountered before.

Mice would naturally spend more time examining the newer object, and those who had been allowed uninterrupted sleep did just that.

But those whose sleep had been disrupted were equally interested in both objects, suggesting their memories had been affected.

Writing in the journal, the researchers, led by Dr Luis de Lecea, said: "Sleep continuity is one of the main factors affected in various pathological conditions that impact memory, including Alzheimer's and other age-related cognitive deficits."

Broken sleep also affects people addicted to alcohol, and those with sleep apnoea - a condition in which the throat repeatedly narrows or closes during sleep, restricting oxygen and causing the patient to wake up.

The researchers add there is no evidence of a causal link between sleep disruption and any of these conditions.

But they added: "We conclude that regardless of the total amount of sleep or sleep intensity, a minimal unit of uninterrupted sleep is crucial for memory consolidation."

Independent sleep expert Dr Neil Stanley, a former chairman of the British Sleep Society, said: "During the day, we accumulate all these memories.

"At some point we have to sort through what's happened during the day.

"There are some things that we need to 'lock down' as a permanent hard memory.

"That process occurs in deep sleep. So anything that affects sleep will have an effect on that process to a greater or a lesser extent."

Dr Stanley said there was particularly striking evidence that people with sleep apnoea had particular problems "locking down" memories.

And he added that people with Alzheimer's often had trouble sleeping, but said: "There is something there. But whether it's the degeneration of the brain that causes poor sleep, or poor sleep that aids the degeneration of the brain has not been determined."

Miranda Watson, director of communications at the British Lung Foundation, said: "For patients with the dangerous sleep disorder, obstructive sleep apnoea, this study will come as no surprise.

"Patients regularly stop breathing during the night when their airways become blocked depriving them of a full night's rest.

"This interrupted sleep can cause extreme day time tiredness and memory loss."

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