

## Sleeping neurones linked to mistakes

By Clare Pain for ABC Science Online

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**When you are sleep deprived some of your neurones actually fall asleep and can lead you to make mistakes, new research has found.**

Professor Giulio Tononi of the [University of Wisconsin-Madison](#) in the US, and colleagues, report their study on rats in the journal [Nature](#).

Professor Tononi's team kept rats awake for four hours beyond their normal bedtime and recorded the activity of some individual neurones as they became more and more sleep deprived.

Outwardly the rats appeared to be completely awake, but the brain cell recordings told a different story.

It is well known that nerve cells can exist in two states: their awake functioning on state, and an off state in which they are unresponsive.

During normal non-dreaming sleep large groups of neurones oscillate a few times a second between the two states, giving rise to the slow waves (characteristic of sleep) that can be seen on an electroencephalogram (EEG).

The longer the rats stayed up, the more cells would start to flick into the off state for brief periods.

Interestingly, the researchers found neurones in one small area could be asleep, whilst in another part of the brain they were awake.

"What is distinct about this research is that they have looked at an animal that has been forced to stay awake," said Professor Christopher Colwell, an expert in circadian rhythms from the [University of California, Los Angeles](#).

"This is something we all have to do sometimes, and research has consistently shown that performance goes down. This can be very important for some jobs - air traffic controllers for instance," he said.

Professor Tononi's team also made the rats learn a new task while they were sleep deprived, getting them to reach out for a sugar pellet.

They noticed that the rats were more likely to miss the pellet if some neurones in their motor cortex, which controls movement, had been in the off state shortly before they reached out.

"This is exciting because it raises the possibility that what is happening when performance goes down is that



*The researchers found neurones in one small area could be asleep, whilst in another part of the brain they were awake. (Getty Images: Peter Macdiarmid)*

some of the cells involved are moving into the sleep mode," Professor Colwell said.

"And we have every reason to suspect that what is going on in the rats is happening in humans too."

**Tags:** [neuroscience](#), [sleep](#), [united-states](#)

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