

New insights into how sleep helps the brain to reorganise itself

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Credit: public domain

A study has given new insights into how sleep contributes to brain plasticity – the ability for our brain to change and reorganise itself – and could pave the way for new ways to help people with learning and memory disorders.

Researchers at the Humboldt and Charité Universities in Berlin, led by Dr Julie Seibt from the University of Surrey, used cutting edge techniques to record activity in a particular region of [brain cells](#) that is

responsible for holding new information – the dendrites.

The study, published in *Nature Communications*, found that activity in dendrites increases when we sleep, and that this increase is linked to specific [brain](#) waves that are seen to be key to how we form memories.

Dr Julie Seibt, lecturer in Sleep and Plasticity at the University of Surrey and lead author of the study, said: "Our brains are amazing and fascinating organs – they have the ability to change and adapt based on our experiences. It is becoming increasingly clear that sleep plays an important role in these adaptive changes. Our study tells us that a large proportion of these changes may occur during very short and repetitive brain waves called spindles.

"Sleep spindles have been associated with memory formation in humans for quite some time but nobody knew what they were actually doing in the brain. Now we know that during spindles, specific pathways are activated in dendrites, maybe allowing our memories to be reinforced during sleep.

"In the near future, techniques that allow brain stimulation, such as [transcranial magnetic stimulation](#) (TMS), could be used to stimulate dendrites with the same frequency range as spindles. This could lead to enhance cognitive functions in patients with learning and [memory disorders](#), such as dementia."

More information: Julie Seibt et al. Cortical dendritic activity correlates with spindle-rich oscillations during sleep in rodents, *Nature Communications* (2017). [DOI: 10.1038/s41467-017-00735-w](https://doi.org/10.1038/s41467-017-00735-w)

Provided by University of Surrey

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