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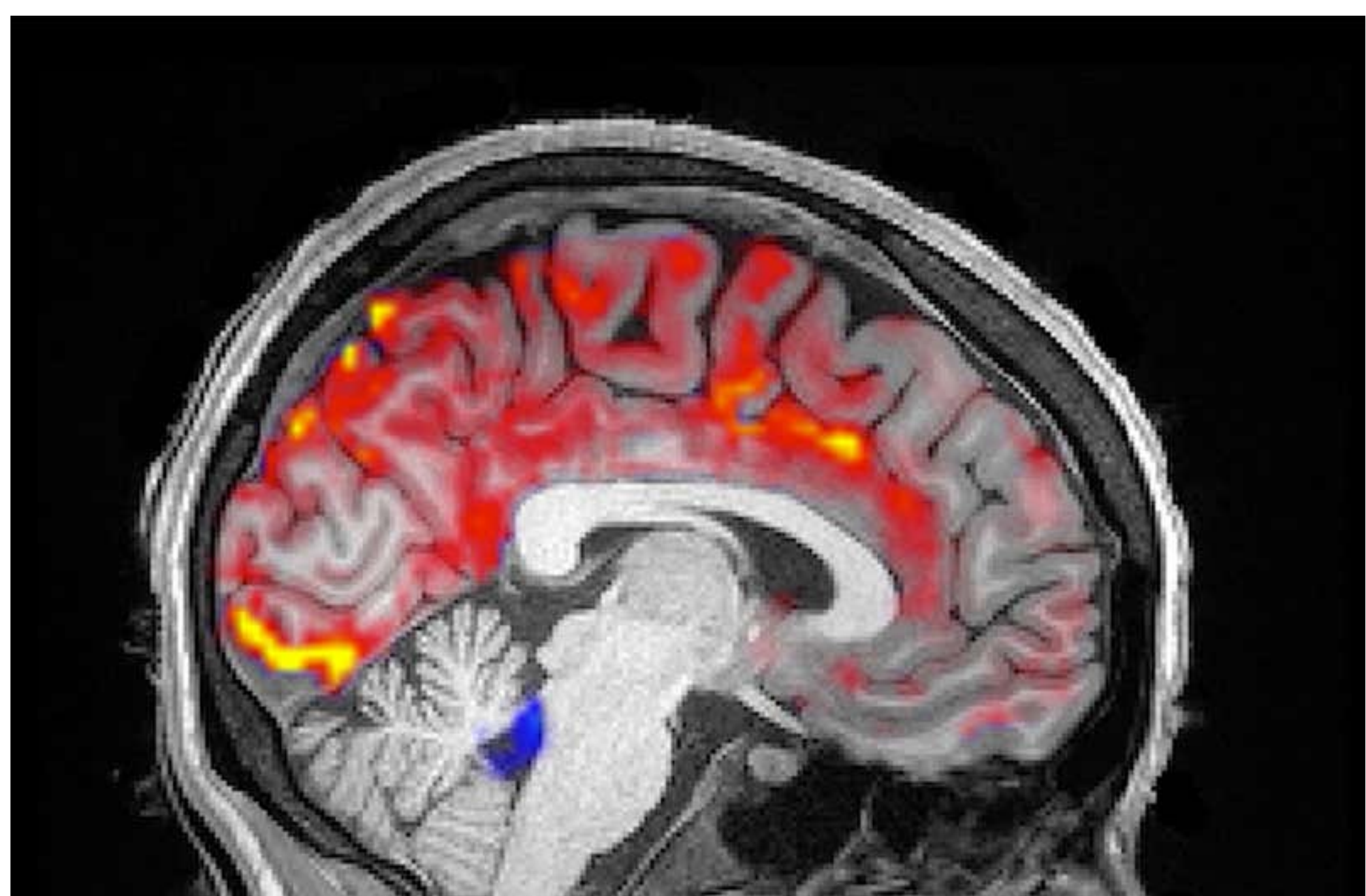
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## A type of brainwave may help clean your brain while you sleep

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By Loyal Liverpool



Oxygenated blood (red) in a sleeping brain Fultz et al. 2019

As you sleep, slow waves of electrical activity in your brain seem to help **rinse away harmful waste products** that could otherwise damage your brain cells. The process may play a role in preventing neurodegenerative conditions such as **Alzheimer's disease**.

"Sleep is really important for clearing toxic metabolic waste products from the brain," says Laura Lewis at Boston University, Massachusetts. Sleep deprivation is associated with a build-up in the brain of clumps of protein, such as beta-amyloid, which is implicated in Alzheimer's disease, she says.

Brainwaves are made by large networks of brain cells firing together in rhythm. Much about their function is unclear, but we know they are slower during deep sleep, and faster when we are awake. To see if brainwaves play a role in cleaning the brain, Lewis and her team used EEG caps to measure electrical activity in the brains of 13 people while they napped inside MRI scanners.

At the same time, the researchers also measured blood oxygen levels in their brains and the flow of **cerebrospinal fluid**, a watery liquid that surrounds the brain and spinal cord.

### Flowing in and out

They found that, during sleep, large waves of cerebrospinal fluid flow into and out of the brain every 20 seconds, a process thought to remove waste. The inward flow was preceded by patterns of slow waves of electrical activity, called delta waves.

These brainwaves are also known to play a role in consolidating memories while we sleep. The researchers found that the waves coincided with blood flowing out of the brain, which they say helps balance the total volume of fluid around the brain.

People with neurodegenerative conditions like Alzheimer's have fewer and weaker slow brainwaves, says Lewis. "So we might expect that there are also fewer and smaller waves of cerebrospinal fluid in those disorders, and that might have an impact on how waste products are cleared."

Read more: [The brain's drain: How our brains flush out their waste and toxins](#)

However, it isn't clear yet whether impaired brain cleaning during sleep might be a cause or a symptom of conditions like Alzheimer's.

**Just one bad night's sleep** can lead to more beta-amyloid building up in the brain. But there is no need to panic. "Sometimes when people haven't had enough sleep, they'll actually show much more of these electrical slow waves the next night," says Lewis. "That might be a way for the brain to make up for some of that lost sleep."

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