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Scientists Discover A Link Between Lack Of Deep Sleep And Alzheimer's Disease

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Heard on All Things Considered



JON HAMILTON

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Transcript

There's growing evidence that a lack of deep sleep increases the risk of Alzheimer's disease. Scientists say that's because during deep sleep, the brain removes toxins associated with Alzheimer's.

ARI SHAPIRO, HOST:

We continue to learn about the connection between sleep and Alzheimer's disease. NPR's Jon Hamilton brings us this report done with the NPR science podcast Short Wave.

JON HAMILTON, BYLINE: There's growing evidence that people who don't sleep well are more likely to develop Alzheimer's. Matthew Walker at the University of California, Berkeley, says that's no coincidence.

MATTHEW WALKER: We are now learning that there is a significant relationship between sleep and dementia, particularly Alzheimer's disease.

HAMILTON: Walker says the strongest evidence involves deep sleep. That's a time when dreams are rare, body temperature drops and the brain produces slow, rhythmic electrical waves.

WALKER: There is something about this deep sleep that is helping protect you against amyloid buildup in the brain.

HAMILTON: Amyloid or beta amyloid is a substance that forms sticky clumps in the brains of people who are likely to develop Alzheimer's. So Walker had a question.

WALKER: Can I look into your future and can I accurately estimate how much beta amyloid you're going to accumulate over the next two years, the next four years, the next six years, simply on the basis of your sleep tonight?

HAMILTON: To find out, Walker and a team studied 32 older adults who had taken part in a sleep study. None had memory problems. The scientists used brain scans to track levels of beta amyloid in each participant for up to six years. And Walker says the results, published early this month in the journal *Current Biology*, showed people who got less deep sleep had more beta amyloid.

WALKER: We have a specific sleep signature right now that seems to help us better understand where you may sit on the Alzheimer's disease risk trajectory in the future.

HAMILTON: Scientists also have some ideas about why deep sleep can reduce amyloid. In 2013, a study of mice found that their brains switched on a sort of dishwasher during sleep. Laura Lewis, a biomedical engineer at Boston University, says that appears to clear out waste products.

LAURA LEWIS: So things like amyloid beta, which are implicated in Alzheimer's disease, seem to actually be removed more rapidly from the brain when an animal is asleep versus when they're awake.

HAMILTON: In 2019, Lewis led a team that showed how this dishwasher works in people.

LEWIS: We realized that there's these waves of fluid flowing into the brain during sleep.

HAMILTON: What's more, each wave of fluid was preceded by a large, slow electrical wave. So now scientists are looking for ways to induce the slow waves that signal deep sleep. Lewis says it's easy in rodents.

LEWIS: There's a specific deep brain structure that if you stimulate it, you can cause these sleeplike slow waves in the brain.

HAMILTON: There's some evidence that rhythmic sounds can increase slow waves in people. And researchers at Washington University in St. Louis showed that treating a sleep disorder also helped. Dr. Yo-El Ju was part of a team that studied patients with sleep apnea.

YO-EL JU: They seem to have a change in their ability to clear proteins or, you know, waste products from their brain. And people with obstructive sleep apnea are at higher risk for dementia down the line.

HAMILTON: So Ju's team looked to see what happened after treatment allowed better sleep. The result - more deep sleep and more beta amyloid cleared from the brain. And Ju says there was another effect - participants' brains began making less beta amyloid.

JU: So I don't know whether it's that sleep increases clearance or whether sleep decreases the production of waste products.

HAMILTON: Either way, Ju says sleep is important to brain health, though on the day we spoke, she hadn't gotten that much.

JU: My 2-year-old decided to sleep in my bed and eat a tortilla and a banana at 2 in the morning. But usually, I get a pretty good sleep.

HAMILTON: Including plenty of deep sleep.

Jon Hamilton, NPR News.

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