Sleeping pills stop the brain's system for cleaning out waste



"When we used the flow fiber photometry method to look into the brains of mice, we saw these slow waves of norepinephrine, but we also saw how it works in synchrony with fluctuation in the blood volume," Hauglund says.

Every time the norepinephrine level went up, it caused the contraction of the blood vessels in the brain, and the blood volume went down. At the same time, the contraction increased the volume of the perivascular spaces around the blood vessels, which were immediately filled with the cerebrospinal fluid.

When the norepinephrine level went down, the process worked in reverse: the blood vessels dilated, letting the blood in and pushing the cerebrospinal fluid out. "What we found was that norepinephrine worked a little bit like a conductor of an orchestra and makes the blood and cerebrospinal fluid move in

synchrony in these slow waves," Hauglund says.

And because the study was designed to monitor this process in freely moving, undisturbed mice, the team learned exactly when all this was going on. When mice were awake, the norepinephrine levels were much higher but relatively steady. The team observed the opposite during the REM sleep phase, where the norepinephrine levels were consistently low. The oscillatory behavior was present exclusively during the NREM sleep phase.

So, the team wanted to check how the glymphatic clearance would work when they gave the mice zolpidem, a sleeping drug that had been proven to increase NREM sleep time. In theory, zolpidem should have boosted brain-clearing. But it turned it off instead.

Non-sleeping pills

"When we looked at the mice after giving them zolpidem, we saw they all fell asleep very quickly. That was expected—we take zolpidem because it makes it easier for us to sleep," Hauglund says. "But then we saw those slow fluctuations in norepinephrine, blood volume, and cerebrospinal fluid almost completely stopped."

https://arstechnica.com/science/2025/01/how-sleeping-pills-interfere-with-the-brains-internal-cleaning-mechanism/