

Common sleep medication may prevent brain from clearing 'waste'



- How might sleeping aids affect brain health? A mouse study aims to shed some light on this matter.
- As many as 70 million people have consistent sleeping issues.
- Not getting enough sleep each night can raise a person's risk for several health concerns, including cognitive decline and dementia.
- For the first time a new study describes the synchronized oscillations during sleep that power the brain's glymphatic system to help remove 'waste' associated with neurodegenerative diseases, via a mouse model.
- Researchers also found that a commonly prescribed sleep aid might suppress those oscillations, disrupting the brain's waste removal during sleep.
- Looking at all the possible factors that might contribute to potential cognitive decline risk is important, particularly as new research estimates that dementia risk the risk after the age of 55 among Americans has now more than doubled.

Although doctors recommend that adults over the age of 18 get at least 7 hours ^{Trusted Source} of quality sleep each night, the most recent data suggest that many may face consistent sleep issues, such as insomnia and sleep apnea.

Data from 2022 suggest that, in the United States alone, 39% of adults ^{Trusted Source} over the age of 45 were not getting sufficient sleep.

Past studies report that not getting enough sleep each night can increase a person's risk for several health concerns, including brain-related conditions, such as cognitive decline^{Trusted Source} and dementia.

“Sleep allows the brain to go offline, shut down processing of the external world and focus on maintenance tasks, such as immune surveillance and removal of waste,” Natalie Hauglund, PhD, a postdoctoral fellow at the Universities of Copenhagen in Denmark, and Oxford in the United Kingdom, explained to Medical News Today. “The lack of sleep is associated with cognitive impairment and disease development.”

But could some sleep aids also contribute to poorer brain health as we age? It is now more important than ever to study all the possible factors that might contribute to cognitive decline, particularly seeing that a new study published in *Nature Medicine*^{Trusted Source} estimates that dementia risk after the age of 55 among Americans has more than doubled, compared to past figures.

Hauglund is the first author of another study, which appears in the journal *Cell*^{Trusted Source}, and that, for the first time, describes the synchronized oscillations during sleep that power the brain's glymphatic system to help remove “waste” associated with neurodegenerative diseases, via a mouse model.

The study also reports that the commonly prescribed sleep aid zolpidem^{Trusted Source} — marketed under the name Ambien — may suppress those oscillations, disrupting the brain's waste removal during sleep.

What powers the brain's ‘waste-removal’ system?

For this study, researchers used various technologies to record brain activity while mice were both awake and asleep.

Scientists observed that slow synchronized oscillations of the neurotransmitter norepinephrine, along with cerebral blood and cerebrospinal fluid (CSF)^{Trusted Source}, combine during non-rapid eye movement (non-REM) sleep, essentially power the brain's waste-removing glymphatic system.

“Our brain is unique in that it does not have lymphatic vessels, which removes waste products such as dead cells and bacteria from the rest of our body,” Maiken Nedergaard, MD, PhD, professor at the Universities of Rochester and Copenhagen and lead author of this study told MNT.

“Instead, the brain uses cerebrospinal fluid, a brain fluid that is produced inside the brain, to flush the brain tissue and wash away unwanted molecules,” she explained.

“The cleaning system of the brain is called the glymphatic system. Importantly, the glymphatic system is only on during the deep part of sleep called non-REM sleep. This is because of a

neuromodulator called norepinephrine, which during non-REM sleep is released in slow cycles roughly every 50 seconds.”

– Maiken Nedergaard, MD, PhD

“Norepinephrine binds to the muscle cells of the arteries, which makes them constrict,” Nedergaard told us. “Therefore, the slow oscillation in norepinephrine concentration drives a slow fluctuation in the diameter of the arteries and in the blood volume in the brain.”

”This dynamic change in blood volume works like a pump to transport cerebrospinal fluid along the arteries towards the brain and through the brain tissue. Thus, norepinephrine coordinates the synchronized constriction and dilation of the blood vessels which drives the glymphatic system,” she detailed.

Sleep aids may disrupt brain’s glymphatic system

Researchers also examined if sleep aids might replicate the natural oscillations needed for glymphatic function. They focused their research on the sedative zolpidem.

They discovered that zolpidem appeared to halt norepinephrine oscillations, interrupting the glymphatic system’s waste removal in the brain during sleep.

“Sleep aids may provide a short-cut to sleep, but our study shows that the sleep you get with sleep medication may lack the beneficial effects of natural, restorative sleep,” Hauglund said. “Our findings underscore that sleep aids should only be used for short periods of time and as a last resort.”

Nedergaard explained that:

“Sleep is crucial as it gives the brain time to perform homeostatic housekeeping tasks such as waste removal. On the contrary, sleep aids block the neuromodulators that drive the waste removal system and prevent the brain [from] properly preparing for a new day.”

Should sleep-aid users be concerned?

MNT also spoke with Clifford Segil, DO, a neurologist at Providence Saint John’s Health Center in Santa Monica, CA, about this study.

According to Segil, who was not involved in the recent research, “it is extremely unlikely the benefits of increased sleep which occurs when patients use a sleep aid like zolpidem are outweighed by any claimed potential adverse effect of this medication decreasing REM sleep, which then in turn decreases brain neurotransmitter levels, [which] then in turn decreases brain protein levels,”

“There are too many ‘in turn’ claims to cause me any concern [that] there is any clinical significance to the research,” he told us. “Clinical neurologists like me are not concerned [that] using zolpidem appropriately in elderly patients who can’t sleep will cause dementia.”

Furthermore, he pointed out: “In the year 2025, there remains no accepted response on why we sleep. Different researchers make different claims and sometimes these are the same and sometimes they are different. We know healthy sleep makes us healthy and poor sleep makes us unhealthy.”

“For clinical neurologists like me, it is challenging to agree that a sleeping medication will cause dementia, and I would reassure my patients the benefits of a good night sleep outweigh any claimed potential risk these can cause memory loss as you age or dementia,” Segil added.

The interaction between brain health, quality sleep, and overall health

Finally, MNT spoke with Peter G. Polos, MD, PhD, FCCP, FAASM, an assistant professor of sleep medicine at the Hackensack Meridian Neuroscience Institute at JFK University Medical Center in New Jersey, about this research.

Polos, who was not involved in the study, commented that he found the results intriguing.

“There is no doubt that the interaction between the glymphatic system and various transmitters and waste products in the brain can work in synchrony,” he said.

“This study suggests that alterations in this tight balance have potential cellular and perhaps clinical consequences. While fascinating, we must remind ourselves that this is an animal study and, as is often the case, extrapolation of animal data to humans must be done cautiously. Nonetheless, it does give clinicians a phenomenon that is deserving of some discussion.”

– Peter G. Polos, MD, PhD, FCCP, FAASM

“If more work were to be done in this area, we certainly would like to see if studies could assess the impact of sleep aids on human glymphatic flow,” Polos continued. “This of course would require noninvasive techniques and perhaps some advanced imaging. Such information, even if in small numbers, would be of benefit.”

“The interaction between the brain, quality sleep, and overall health cannot be understated,” he added. “The rhythmic nature of sleep and the regular cycling of sleep stages have been well studied, We have learned much about the effects of alterations in the brain and their impact on sleep, We do have much more to learn and so we, as sleep physicians, fully support continued research in the relationship between the brain, sleep, and overall health.”

Brain health, sleep, diet: 3 health resolutions for 2025

Taking care of oneself requires a multi-faceted approach: brain, heart, and metabolic health. What research in 2024 has shown us is that improving our health in these areas comes down to three main factors: sleep, diet, and exercise. But how does one start taking action with this intention? And how can we break down such lifestyle changes into manageable steps? In this podcast episode, Medical News Today shares three actionable resolutions that can help improve your health in the new year.

As humans, we are all capable of growth and change. And perhaps, one of the most influential times of the year for transformation and setting the stage for change is New Year's.

When it comes to making resolutions for health or any other area of life, we may set unrealistic or very large goals that set us up for failure from the start. The key, according to experts, is to start small and be as specific as possible—whether that be via setting a time frame or measurable results.

In our August 2023 podcast episode, we had touched on how human behavior inherently resists change unless the optimal conditions are present. One such factor was whether it would be beneficial.

Medical News Today has covered many important pieces of research this year that showed how certain habits and practices could improve overall health.

The top areas of research in this regard were brain and heart health, nutrition, exercise, and sleep.

So, what did the most significant studies from 2024 find?

Based on research earlier this year, researchers found that experiencing disrupted sleep in ages 30–40 may lead to memory problems later in life. They also linked a lack of quality sleep to accelerated brain aging.

On the topic of exercise, scientists found that any form of exercise could help rejuvenate the brain, and a particular type of activity could even prolong life span. Another study also found increased heart failure and death risk from being sedentary for a certain number of hours a day.

To ensure a healthy and balanced diet, the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) of the United Nations (UN) also published a new report this year, listing the food groups people should consume more and others to avoid for optimal health. It also touched on how many carbs and what types of fats to include in one's diet.

In our final podcast episode of 2024, we discussed all this and more. We also included tips on getting better sleep at night, following a healthful diet, and incorporating more exercise into one's daily life.

Please listen to our podcast episode in full below or on your preferred streaming platform.

3 ways to slow down type 2 diabetes-related brain aging

Type 2 diabetes can affect multiple organ systems in the body—the heart, eyes, kidneys, and even the brain. Researchers have also discovered evidence of diabetes leading to faster brain aging, which could increase the risk of Alzheimer's. But is there a way to prevent this, and how so? In this podcast, we discuss lifestyle interventions that could help slow diabetes-related cognitive decline.

An estimated 422 million people worldwide had diabetes in 2014 and a majority of these cases — over 95% — are type 2 diabetes. Global projections show that by 2045, 783 million people are expected to be diagnosed with diabetes.

Type 2 diabetes is a chronic health condition that can affect multiple organs in the body, leading to many serious complications over time, most notably causing vision loss, pain and loss of feeling (through nerve damage), heart disease, and infections. The brain can also be negatively affected by diabetes.

Research has found that type 2 diabetes can lead to cognitive decline, memory loss, and an increased risk of dementia and Alzheimer's disease through a multitude of mechanisms.

The silver lining here is that type 2 diabetes can be prevented or delayed with some lifestyle changes.

But how exactly does type 2 diabetes contribute to accelerated brain aging? And how can we offset brain aging accelerated by diabetes?

In this episode, we examine findings from two recent studies that offer insights into possible ways to slow diabetes-induced brain aging.

For this episode, Medical News Today editors and co-hosts Yasemin Nicola Sakay and Maria Cohut spoke to Thomas (Tom) Barber, MD, associate professor at the University of Warwick in the United Kingdom and honorary consultant endocrinologist to answer these questions and more. Barber has also been featured in two previous In Conversation podcast episodes: 100 years of insulin and Can diet and exercise reverse prediabetes?

Listen to our podcast episode in full below or on your preferred streaming platform.

News Source:

<https://www.medicalnewstoday.com/articles/in-conversation-investigating-the-power-of-music-for-dementia>