Lack of Sleep Kills Brain Cells, New Study Shows

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If you're burning the midnight oil, you may be burning out brain cells, too, new research shows. A study published this week in the Journal of Neuroscience found that staying awake too long destroys brain cells in mice, and may do the same in humans.

It's the first study to show (if only in animals) that sleep loss can lead to irreversible brain cell damage.

Researchers from the Center for Sleep and Circadian Neurobiology at the University of Pennsylvania found that prolonging wakefulness damages a particular type of brain cell called locus ceruleus (LC) neurons, which play an important role in keeping us alert and awake.

"We now have evidence that sleep loss can lead to irreversible injury," says lead author Sigrid Veasey, MD, associate professor of Medicine at the University of Pennsylvania's Perelman School of Medicine. "This might be in a simple animal but this suggests to us that we are going to have to look very carefully in humans."

In collaboration with colleagues at Peking University, the researchers looked at the brains of mice subjected to sleep conditions similar to late night or shift work and found

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that disrupted circadian rhythms resulted in degeneration of LC brain cells and ultimately apoptosis, or cell death.

The researchers limited the test mice to four to five hours of sleep over each 24-hour time period. After just three days of sleep deprivation the mice experienced a 25% loss of LCs in a particular section of the brain stem.

The study was done in mice, so further research is required before we'll know if similar cell death occurs in humans. However, the researchers said, they planned to extend the results to humans by conducting autopsies to examine the brain cells of shift workers.

Concern about brain changes from lack of sleep has mounted in recent months with the publication of several other key studies. In January, sleep researchers at the University of Surrey linked sleep loss with disruptions in gene function that could affect metabolism, inflammation, and long term disease risk to body and brain.

And in October a groundbreaking study showed how sleep may "detox" the brain, flushing out waste products linked to Alzheimer's and dementia.

A Nation at Risk for Sleep Deprivation

But Americans don't seem to be listening. Whether its college students in libraries, truck drivers on the interstates, or cubicle- and office-dwellers in high-rises, we feel increasing pressure to prove our dedication – and best the competition – with longer and longer hours.

As a result, the Centers for Disease Control (CDC) recently announced that insufficient sleep is now "epidemic" in America.

According to a CDC survey of almost 75,000 adults, more than a third (35 percent) said they got on average less than seven hours of sleep a night, and 38 percent said they had been tired enough to unintentionally drop off to sleep during the day at least once in the past month.

In addition, a startling 48 percent said they snored, a characteristic frequently associated with poor sleep, while 4.7% admitted to nodding off or falling asleep at the wheel at least once in the past month.

Still, there is good news as well. A positive take-away from the study was the discovery that a protein called SirT3 (full name sirtuin type 3) protects LCs from the damage caused by lack of sleep. This points the way towards the development of future

treatments to boost SirT3 production and thus protect brain cells from damage due to lack of sleep.

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