

Gene variation that lets people get by on fewer zees transferred to create insomniac mice

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A University of Utah sleep expert has joined with researchers at the University of California, San Francisco (UCSF), and Stanford University to identify a genetic variation in humans, which the scientists also developed in mouse models, that allows a rare number of people to require less sleep than others.

Published in the Aug. 13 issue of the journal *Science*, the study describes how a [genetic variation](#) found in people who seem to need only about six hours' sleep—compared to the often recommended 7½ to eight hours—was put into mice to create a colony of "insomniac" rodents. Like humans with the variation, which is called DEC2, mice who received the variant gene appeared to function normally even though they got less sleep than a control group that didn't have the DEC2 variation.

"We're all different in many ways, and sleep is one of them," said Christopher R. Jones, M.D., Ph.D., associate professor of neurology at the U of U School of Medicine, director of the University's Sleep-Wake Center, and a co-author on the study. "There may be some people who can function more productively with less sleep."

The discovery arose after a 68-year-old woman contacted Jones' collaborators to volunteer for sleep research, telling him she had an unusually early morning wake-up time. Both the woman and her

daughter go to bed between 10 and 10:30 p.m. and wake up between 4 and 4:30 in the morning. Yet, their 18-hour day does not affect their energy level or ability to function.

"The mom is very energetic and extremely active," Jones said. "In fact, it makes me feel tired to hear about the activities she does every day."

The woman just returned from a 50-day cruise, dances several nights a week, and plays bridge every day. Intrigued by the woman's ability to operate on less sleep, Jones contacted colleagues at UCSF, who examined the woman's DNA and identified the DEC2 variation. Those researchers, led by the study's first and senior authors, Ying He and Ying-Hui Fu, transferred the "insomnia" gene variation into mice to create a colony for study.

Stanford researcher Nobuhiro Fujiki and colleagues then went about the delicate task of measuring sleep among the insomniac mice. The researchers precisely monitored when the mice were slumbering, and then interrupted their sleep cycle to see how it would affect them. Even with less sleep, the insomniac mice were more active than a group of control mice who didn't have the DEC2 variation. The researchers determined this by monitoring how long both groups of mice spent running in wheels inside their cages, and the insomniac group spent an average 1 ½ more hours turning the wheels than the control group.

This heightened functioning raised the question of whether the insomniac mice slept deeper than the controls. But the Stanford group monitored their sleep and found it was no deeper than that of the control group.

The study begins to shed more light on two related aspects of sleep: the biological clock that lets people sleep in harmony with the cycle of day and night and the body's sleep homeostat—a mechanism in a different

part of the brain that tracks how long people are awake and asleep. Genes such as DEC2 are found in both the homeostat and biological clock. Yet, while some of those genes work in the homeostat, they do not appear to have a function in the [biological clock](#).

For the future, Jones wants to study more family members of the now 77-year-old woman. A genealogist tracked some of her relatives to the Slovakia area of Eastern Europe and Jones wants to study them to see how many might have the DEC2 variation. He also wants to explore questions such as whether people with sleep variations are prone to different moods and temperaments than those without it: Do they have more positive outlooks or are they depressed? Are they more driven, and could that explain why they [sleep](#) less?

"Their relentless drive is not a mood disorder," Jones said. "There is a strong affective and emotional component to the feeling that you always want to do something. They can't imagine doing nothing."

Source: University of Utah Health Sciences ([news](#) : [web](#))

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