Fruit fly spit leads to test for sleepiness
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Medical errors

A new study found that medical residents who worked five or more 30-hour shifts in a month were more than eight times more likely to make a medical mistake that harmed a patient. They were four times more likely to make a mistake that resulted in a patient's death, according to the study by researchers at Brigham and Women's Hospital in Boston.

The study appears today in the journal Public Library of Science Medicine.

Every day, 80,000 people fall asleep at the wheel.

Medical residents who are sleep-deprived make 464 percent more serious diagnostic mistakes than those who aren't.

And lack of sleep caused the largest oil spill in U.S. history. The Exxon Valdez ran aground while a sleep-deprived third mate had the helm because the captain was drunk below deck.

"How do you know whether someone's safe to drive or not?" asks James K. Walsh, director of the Sleep Medicine and Research Center affiliated with St. John's Mercy Medical Center and St. Luke's Hospital. "It would sure be nice if we had some objective measure."

It could be in your spit.

A team of researchers at Washington University, led by Paul J. Shaw, has found an indicator of sleepiness in the saliva of fruit flies and humans.

The indicator — a protein called amylase — and other markers could someday be used to detect people impaired by lack of sleep, much the way Breathalyzers identify drunken drivers.

The researchers report their findings this week in the online edition of the Proceedings of the National Academy of Sciences.

Shaw's lab uses the fruit fly, Drosophila melanogaster, to study sleep. Earlier this year, the scientists showed that fruit flies sleep much the way people do, and that getting enough sleep is important for learning.

Too tired to drive: should authorities be able to test us?

The researchers wanted to know what genes regulate sleep, so they deprived fruit flies of their daily naps and looked for genes that became more and more active as the flies got sleepier. One gene that kept popping up in the experiments is a protein called amylase. Amylase is an enzyme found in saliva that helps break down carbohydrates.

The researchers became convinced that the protein must be involved in controlling sleep, Shaw said. But when they tested flies that don't carry the amylase gene, the researchers found that the flies slept normally. That means the gene doesn't regulate sleep.

"We were depressed for a couple of days, but then it occurred to me, 'gawd, it's still useful,'" Shaw said.
He realized the protein might be an indicator of sleep deprivation.

Postdoctoral researcher Laurent Seugnet and other colleagues in Shaw's lab teamed up with researchers at the Washington University Sleep Medicine Center to see whether amylase also would increase in sleep-deprived people.

Nine volunteers, including Seugnet and other members of the laboratory, reported to the sleep center two weekends in a row. One weekend, half the volunteers got a good night's sleep while the other half were kept up for 28 hours. The next weekend the roles were reversed. The volunteers chewed on cotton plugs until they were saturated with saliva, and the samples were analyzed for amylase activity.

The sleep-deprived human volunteers showed an increase in amylase just as the flies had. And the amylase wasn't fooled when the volunteers or flies used caffeine to stay awake, Seugnet said.

People differ naturally in the level of amylase in their saliva, Seugnet said. That could complicate a test based on amylase alone, but the researchers have discovered several other promising biomarkers of sleepiness that may give a more reliable test, he said.

Shaw envisions a day when patients may go to their doctors saying they're not feeling well and walk away with an objective diagnosis of whether the problem may stem from lack of sleep.

"This would be a pioneering breakthrough if it is shown to be valid," said Dr. Charles A. Czeisler, chief of the Division of Sleep Medicine at Brigham and Women's Hospital and Harvard Medical School.

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BY THE NUMBERS:

- 90 percent of police officers in North America have stopped a driver because they thought the person was drunk, but turned out to be drowsy. -- 2004 AAA Foundation for Traffic Safety Internet survey

- One in five drivers surveyed by the Traffic Injury Research Foundation admits they have nodded off behind the wheel at least once in the past year.

- 60 percent of adult drivers told the National Sleep Foundation they drove drowsy this year. About 37 percent say they've dozed at the wheel, with 13 percent of them admitting to nodding off while driving at least once a month. And 4 percent said they'd had an accident or nearly had an accident because they fell asleep or were too tired to drive.

- Up to 100,000 automobile accidents reported to police each year involve drowsiness or fatigue as the primary cause, according to the National Highway Traffic Safety Administration. Those crashes lead to an estimated 1,550 deaths and 71,000 injuries. (Those figures are probably gross underestimates as there is no test for sleepiness police can administer. Missouri and five other states don't even have a code for drowsiness on their crash report forms.)

- An Australian study showed that being awake for 18 hours impaired a person's ability to drive as much as a blood alcohol concentration (BAC) of 0.05, and being awake for 24 hours was equivalent to blood alcohol levels of 0.1. A person with a BAC of 0.08 is considered legally drunk.

- People who sleep six to seven hours per night are twice as likely to be involved in auto accident as people who get at least eight hours of sleep. People who sleep less than five hours per night are four to five times more likely to be in a car crash than people who sleep for eight hours.

- Young people are more likely to drive drowsy.
71 percent of 18 to 29 year-olds drove while sleepy while 52 percent of 30 to 64 year-olds and only 19 percent of people over age 65 did. Older drivers are also more likely to pull over and nap if they start feeling drowsy.

• Men are more likely to drive drowsy and almost twice as likely to fall asleep at the wheel than women are. 56 percent of men and 45 percent of women drove while sleepy and 22 percent of men and 12 percent of women nodded off.

• 59 percent of adults who have children at home drove drowsy, while 45 percent of adults without children did.

Source: www.DrowsyDriving.org