Searching for shut eye: Study identifies possible sleep gene

July 29 2008

While scientists and physicians know what happens if you don't get six to eight hours of shut-eye a night, investigators have long been puzzled about what controls the actual need for sleep. Researchers at the University of Pennsylvania School of Medicine might have an answer, at least in fruit flies. In a recent study of fruit flies, they identified a gene that controls sleep.

"We spend -- or should spend -- a third of our lives sleeping," says Amita Sehgal, PhD, Professor of Neuroscience and an Investigator with the Howard Hughes Medical Institute (HHMI). "The idea that so much time is spent in sleep is intriguing. Also, sleep deprivation has serious health consequences and impairs cognitive function."

This study was published in the latest *Science*.

Fruit flies typically sleep 12 hours a day. Sehgal and her team studied 3,500 fruit flies and found mutants that survived on little to no sleep – one to two hours a day or none at all. The sleepless flies had a mutation of a gene that Sehgal and her team have named Sleepless. They believe the Sleepless gene encodes a protein that affects whether potassium ion channels in the brain stay open or closed. When the channels are open, the brain is connected and working – the fly is awake. When closed, the channel shuts down and the fly sleeps. The insomniac fruit flies had less of the Sleepless-produced protein.

The lack of sleep didn't come without consequences. The Sleepless fruit

flies lived about half as long as fruit flies that did not carry the mutation. They also experience impaired coordination and restlessness in their few hours of sleep.

Sleep is regulated by two processes: circadian and homeostatic. Circadian regulation affects the timing of sleep, and the homeostatic mechanism affects the need for sleep. The Sleepless gene affects the homeostatic mechanism.

Sleep isn't just for humans – it's been observed in everything from flies to dogs to people, indicating that it's essential to life. Insufficient and poor-quality sleep is an increasing problem in industrialized nations. In the U.S. alone, about 70 million people suffer from chronic sleep problems, which reduce workplace productivity, affect quality of life and can even be lethal.

"In the long term, we hope that human equivalents of our gene will be isolated and will not only further our understanding of human sleep, but perhaps also serve as drug targets to promote sleep or treat insomnia," says Sehgal.

Source: University of Pennsylvania