

When it comes to sleep research, fruit flies and people make unlikely bedfellows

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You may never hear fruit flies snore, but rest assured that when you're asleep they are too. According to research published in the January 2009 issue of the journal *Genetics*, scientists from the University of Missouri-Kansas City have shown that the circadian rhythms (sleep/wake cycles) of fruit flies and vertebrates are regulated by some of the same "cellular machinery" as that of humans. This study is significant because the sleep-regulating enzyme analyzed in this research is one of only a few possible drug targets for circadian problems that can lead to seasonal affective disorder (SAD), insomnia, and possibly some cancers.

"Modern society functions 24 hours a day and has produced more circadian problems than our ancestors ever faced," said Jeffrey Price, Ph.D., the senior scientist involved in the research. "I hope our work will allow us to better understand and alleviate these problems."

In addition to showing that this drug target has similar circadian functions in flies and humans, the study confirms that fruit flies are attractive and viable animal models for circadian research because their circadian "machinery" is remarkably similar to that in humans and they can be bred easily and rapidly. Moreover, this study provides compelling evidence that from an evolutionary point of view, circadian rhythms have been virtually unchanged since the days when humans and fruit flies shared a common ancestor.

Price and his colleagues made this discovery using a combination of biochemical and genetic approaches. For the biochemical approaches,

normal and mutated versions of the fruit fly's sleep-regulating enzyme (DBT protein kinase) were expressed in insect cells and purified to determine how well each would work. The genetic approaches involved altering fruit flies to have the same sleep-altering gene mutations as vertebrates. The mutant proteins (either the fruit fly or vertebrate protein) were expressed in the fruit fly's circadian neurons and produced very similar effects on the fruit fly's circadian period.

"Every month our journal features articles that illustrate why creatures like fruit flies provide good models for studying human disease, and this article is an especially good example of that," said Mark Johnston, Ph.D., Editor-in-Chief of *Genetics*. "These findings will help guide development of drugs that safely alter the sleep/wake cycle."

According to the Centers for Disease Control and Prevention, more than 25 percent of the U.S. population report not getting enough sleep on occasion, while almost 10 percent experience chronic insomnia. Insufficient sleep is associated with several diseases and conditions, such as diabetes, cardiovascular disease, obesity, and depression. It also is responsible for accidents that cause substantial injury and disability each year.

Journal: A HREF="http://www.genetics.org">www.genetics.org

Source: Federation of American Societies for Experimental Biology

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