

Researchers find new mechanism for circadian rhythm

October 20 2009

Molecules that may hold the key to new ways to fight cancer and other diseases have been found to play an important role in regulating circadian rhythm, says Liheng Shi, a researcher in Texas A&M's Department of Veterinary Integrative Biosciences.

Circadian rhythm is the roughly 24-hour cycle of physiological activities of humans, animals and even bacteria, Shi explains.

He and colleagues have had their research, currently focusing on the circadian rhythm in chickens' eyes, published in the *"Journal of Biological Chemistry."* Chicken eyes have a lot in common with human eyes.

"The prefix 'photo-' in photoreceptors means light, and photoreceptors in animals' eyes receive light signals and then translate them into signals that their brain can understand, and that is how they see," he explains.

Shi notes there are two kinds of photoreceptors - cone photoreceptors and rod photoreceptors, named for the shape they resemble.

Some channels that scientists call L-VGCCs are important to the circadian rhythm in chickens' eyes. These channels are important because they are the pathways through which messages go in and out of photoreceptors, and these messages are crucial to the proper functioning of the [eye](#).

A group of proteins (L-VGCC α 1C) carries the messages in and out. At night, they get more work done than during the day to "prepare chickens' eyes for another day's busy work" and "tell various parts of the eye to adjust to the darkness," explains Shi, who holds a post-doctoral position under the mentorship of Gladys Ko, one of the coauthors of the article.

These proteins are controlled by messengers called mRNA, and they are especially active, raising the question of why, he says.

"There must be an explanation," Shi says, "and we found a possible answer."

The answer lies in a sibling of the messenger named microRNA-26a, a "small guy" in the RNA family.

"During the day, the 'naughty small guy' crawls onto the back of his brother mRNA, so his brother cannot concentrate on his work," the Texas A&M researcher explains. "At night, however, he lets his brother go, so his brother focuses on his work and gets more work done."

He advises not to "look down" on the mRNA. "If they quite their job, the chicken may become blind," Shi adds. "Besides regulating circadian rhythm, the microRNA family also influence [cancer](#) development, cell division, heart disease, and so on."

"What we know about microRNAs is probably only a tip of the iceberg," the Texas A&M postdoc says. "As we get to know more about them, these small guys may be able to help us diagnose and treat many diseases."

Source: Texas A&M University

Citation: Researchers find new mechanism for circadian rhythm (2009, October 20) retrieved 23 June 2024 from <https://phys.org/news/2009-10-mechanism-circadian-rhythm.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.