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# Internal body clock controls fat metabolism, study shows

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UC Irvine researchers have discovered that circadian rhythms – the internal body clock – regulate fat metabolism. This helps explain why people burn fat more efficiently at certain times of day and could lead to new pharmaceuticals for obesity, diabetes and energy-related illnesses.

The study was headed by Paolo Sassone-Corsi, Donald Bren Professor and chair of pharmacology. A leading expert on circadian rhythms, he discovered many of the key molecular switches governing these biological processes. He and his colleagues found that one of these, a protein called PER2, directly controls PPAR-gamma, a protein essential for lipid metabolism. Since circadian proteins are activated by 24-hour, light-dark patterns, PER2 turns on and off PPAR-gamma's metabolic capabilities at regular intervals.

"What surprised us most, though, is that PER2 targets one specific amino acid on the surface of the PPAR-gamma molecule," Sassone-Corsi said. "This kind of specificity is very rare in cell biology, which makes it exciting, because it presents us with a singular target for drug development."

Daniele Piomelli, Louise Turner Arnold Chair in Neurosciences at UCI, and Todd Leff, associate professor of pathology at Wayne State University in Detroit, collaborated on the study, which appears this month in *Cell Metabolism*.

Twenty-four-hour circadian rhythms regulate fundamental biological and

physiological processes in almost all organisms. They anticipate environmental changes and adapt certain bodily functions to the appropriate time of day. Disruption of these cycles can profoundly influence human health and has been linked to obesity, diabetes, insomnia, depression, heart disease and cancer.

Last year, Sassone-Corsi helped discover that proteins involved with circadian rhythms and metabolism are intrinsically linked and dependent upon each other to ensure that cells operate properly and remain healthy.

Provided by University of California - Irvine