

Increased thermogenesis in fat cells during active period of circadian rhythm limits weight gain in mice

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A team of researchers at Northwestern University, working with a pair of colleagues from the University of Texas, has found that an increase in thermogenesis in fat cells during active periods of the daily circadian rhythm can limit weight gain in mice. Their paper is published in the journal *Science*; Damien Lagarde and Lawrence Kazak with the Rosalind and Morris Goodman Cancer Institute at McGill University have published a Perspective piece in the same journal issue outlining the work by the team on this new effort.

Prior research has shown that overeating during the inactive phase of the circadian rhythm in mice and humans can lead to higher levels of [weight gain](#). Likewise, adhering to time-restricted feeding (TRF) can lead to less weight gain. But until now, why this happens has not been fully understood.

To learn more about the effects of a high-fat diet on mice over phases of the circadian rhythm, the researchers fed two groups of mice a high-fat diet. One group was fed during their active phase (when it was dark out) and the other was fed during their inactive phase (when it was light out.) They then took a close look at what was occurring in the fat cells of both groups.

The researchers found that the [mice](#) fed during their inactive phase gained more weight, as expected. But they also learned more about the factors behind such a weight gain. One of the biggest was thermogenesis, the process by which heat is generated in the body. They found that an increase in thermogenesis in fat cells during the active phase of the

circadian [rhythm](#) (due to a boost in creatine in [fat cells](#)) was at least partly responsible for restricting weight gain.

They also found that a zinc finger protein can block the genes responsible for producing the chemicals that regulate thermogenesis by controlling production of adenosine triphosphate. They conclude that their work has helped to explain why TRF can play such an important role in weight management.

More information: Chelsea Hepler et al, Time-restricted feeding mitigates obesity through adipocyte thermogenesis, *Science* (2022). [DOI: 10.1126/science.abl8007](https://doi.org/10.1126/science.abl8007)

Damien Lagarde et al, The timing of eating controls energy use, *Science* (2022). [DOI: 10.1126/science.ade6720](https://doi.org/10.1126/science.ade6720)

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