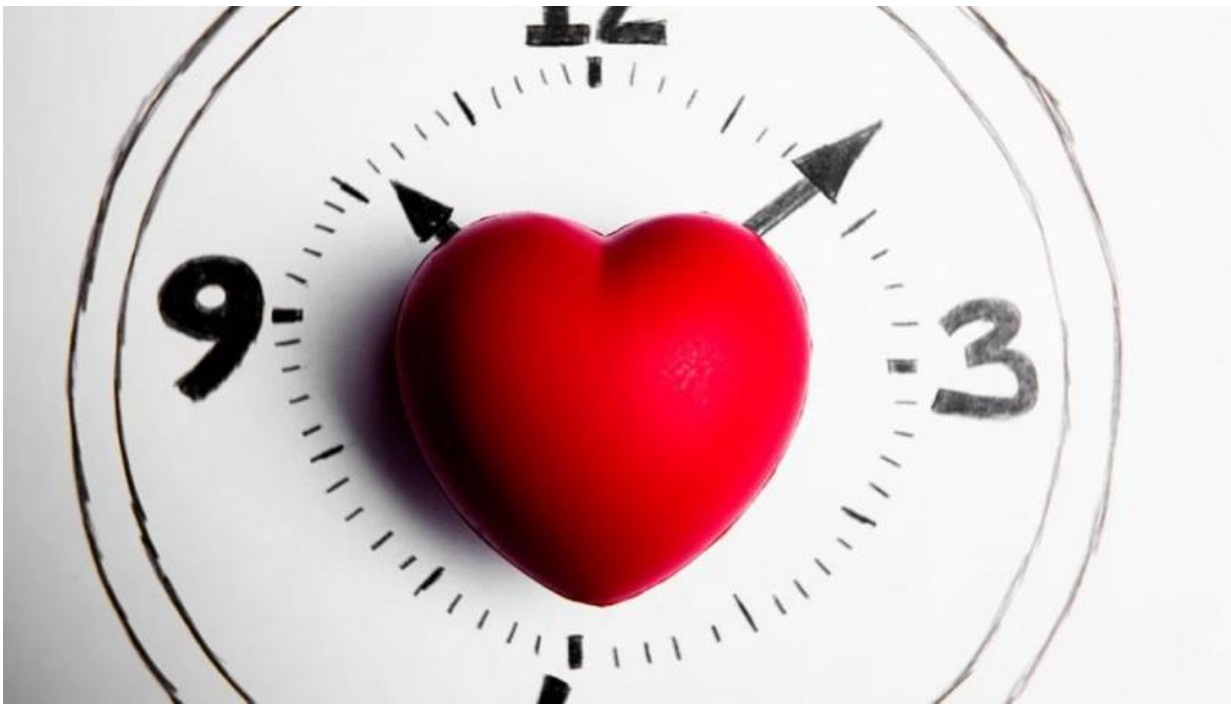


Study shows saturated fats 'jet lag' body clocks, triggering metabolic disorders

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A heart-shape over a clock face. Credit: Texas A&M Health Science Center

It makes sense that people who are trying to slim down would avoid fats. But as anyone who has unsuccessfully tried this approach to dieting knows, it's not quite that simple.

New research from the Texas A&M Health Science Center and Texas A&M AgriLife parses out why saturated fats are "bad"—and suggests

that it may all be in the timing.

Circadian clocks, which exist in cells throughout the body, regulate the local timing of important cellular processes necessary for normal functioning and help keep inflammatory responses in check.

"When you disrupt that timing, the 24-hour organization, there are consequences, and this is a contributing factor in many human health disorders, especially metabolic disease," said David Earnest, Ph.D., professor at the Texas A&M College of Medicine's Department of Neuroscience and Experimental Therapeutics.

In the short term, inflammation is considered to be protective response to injury or invading bacteria, but the chronic, low-grade inflammation caused by high fat diets contributes to obesity and type 2 diabetes and other inflammation-related disorders like cardiovascular disease, stroke and rheumatoid arthritis.

Now, Earnest and his team have shown that consumption of saturated fats at certain times may "jet lag" internal clocks, as well as the resulting inflammation.

Earnest's previous work suggested that a high-fat diet alters how our body clocks keep time, particularly in immune cells that mediate inflammation. Earlier findings show that a high fat diet slows down the clocks in immune cells such that they no longer "tell" accurate time. Now, he and his team, including Robert S. Chapkin, Ph.D., Texas A&M Distinguished Professor and deputy director of the Center for Translational Environmental Health Research, have shown that one type of fat in particular—specifically a saturated fatty acid called palmitate, is the big culprit in compromising the accuracy of our body clocks.

Essentially, what palmitate does is "jet lag" cells in your body so that

some are reset to different "time zones." Humans can manage all right when their entire bodies move into a different time zone, but inflammation seems to result when some cells are shifted but others are not. Earnest compares this phenomenon to the confusion that would develop if the wall clock in your office was set to 2 p.m., the one on your computer indicated 4 p.m., and your wristwatch was showing 2:30 p.m., all while the clock on your cell phone reflected the accurate time of 1 p.m. CST. However, you might not know which one is correct, just as your body is confused when its various types of cells are reflecting different "clocks."

Unfortunately, palmitate (also called palmitic acid) is one of the most commonly consumed long chain saturated fats in the Western diet.

"Chronic inflammation is determined by what saturated fats you have in your diet and when you eat them," Earnest said. The reported findings predict the best time to eat a high-[fat](#) meal is early in the morning and probably the worst time is late at night. So, it's not just what you eat, but also when you eat it.

Earnest's new research, which was [recently published](#) in the journal *EBioMedicine*, also shows that specific polyunsaturated "good" fats and other anti-inflammatory drugs had protective effects at times when saturated fats cause maximal inflammation and the resetting of body clocks.

"Not all fats are bad for you," Earnest said. "We wanted to look specifically comparing palmitate with DHA, which is a common polyunsaturated omega 3." Consistent with established findings that DHA is anti-inflammatory, the results indicated that disrupting the inflammatory response with this omega 3 also blocked the resetting of body clocks to the wrong time. Thus, Earnest believes that chronotherapeutic strategies using omega 3 fatty acids or other anti-

inflammatory treatments may be effective in preventing these local time changes in our [body clocks](#) caused by saturated fats.

"Our findings suggest that we may be able to control the inflammatory response locally in specific tissues, maximizing the inflammation with timed palmitate treatment to help the [body](#) respond to infection or injury," Earnest said. "We could then deliver appropriate treatments at specific times to block the chronic phase and potentially manage inflammation-related diseases."

Provided by Texas A&M University

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