

Why lack of sleep is bad for your heart

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In recent years, numerous studies have shown that people who don't get enough sleep are at greater risk of stroke and heart attack.

A new University of Colorado Boulder study, published in the journal *Experimental Physiology*, helps explain why.

It found that people who sleep fewer than 7 hours per night have lower [blood levels](#) of three physiological regulators, or microRNAs, which influence gene expression and play a key role in maintaining [vascular health](#).

The findings could potentially lead to new, non-invasive tests for sleep deprived patients concerned about their [health](#), the authors said.

"This study proposes a new potential mechanism through which sleep influences heart health and overall physiology," said senior author Christopher DeSouza, a professor of Integrative Physiology.

Despite recommendations by the American Heart Association that people get 7 to 9 [hours of sleep](#) each night, about 40 percent of adults in the United States fall short. Overall, the average American's

[sleep duration](#) has plummeted from 9 hours nightly to 6.8 hours nightly over the past century.

In another recent study, DeSouza's group found that adult men who sleep 6 hours per night have dysfunctional endothelial cells—the cells that line blood vessels—and their arteries don't dilate and constrict as well as those who get sufficient sleep.

But the underlying factors leading to this dysfunction aren't well known.

MicroRNAs are small molecules that suppress gene expression of certain proteins in cells. The exact function of circulating microRNAs in the cardiovascular system, and their impact on cardiovascular health is receiving a lot of scientific attention, and drugs are currently in development for a variety of diseases, including cancer, to correct impaired microRNA signatures.

"They are like cellular brakes, so if beneficial microRNAs are lacking that can have a big impact on the health of the cell," said DeSouza.

For the new study, which is the first to explore the impact of insufficient sleep on circulating microRNA signatures, DeSouza and his team took [blood samples](#) from 24 healthy men and women, age 44 to 62, who had filled out questionnaires about their sleep habits. Half slept 7 to 8.5 hours nightly; Half slept 5 to 6.8 hours nightly.

They measured expression of nine microRNAs previously associated with inflammation, immune function or vascular health.

They found that people with insufficient sleep had 40 to 60 percent lower circulating levels of miR-125A, miR-126, and miR-146a, (previously shown to suppress inflammatory proteins) than those who slept enough.

"Why 7 or 8 hours seems to be the magic number is unclear," said DeSouza. "However, it is plausible that people need at least 7 hours of sleep per night

to maintain levels of important physiological regulators, such as microRNAs."

Research is now underway in DeSouza's lab to determine whether restoring healthy sleep habits can restore healthy levels of microRNAs.

Ultimately, he said, it's possible that microRNAs in blood could be used as a marker of cardiovascular disease in people with insufficient sleep, enabling doctors to glean important information via a [blood](#) test rather than current, more invasive tests.

For now, DeSouza says, the takeaway message for those burning the midnight oil is this:

"Don't underestimate the importance of a good night's sleep."

More information: Jamie G. Hijmans et al, Insufficient sleep is associated with a pro-atherogenic circulating microRNA signature, *Experimental Physiology* (2019). [DOI: 10.1113/EP087469](#)

Provided by University of Colorado at Boulder

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