

Sex differences in 'body clock' may benefit women's heart health

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Research suggests that a gene that governs the body's biological (circadian) clock acts differently in males versus females and may protect females from heart disease. The study is the first to analyze circadian blood pressure rhythms in female mice. The research, published ahead of print in the *American Journal of Physiology—Regulatory, Integrative and Comparative Physiology*, was chosen as an *APS select* article for January.

The body's circadian clock—the [biological clock](#) that organizes bodily activities over a 24-hour period— contributes to normal variations in blood pressure and heart function over the course of the day. In most healthy humans, blood pressure dips at night. People who do not experience this temporary drop, called "non-dippers," are more likely to develop heart disease. The circadian clock is made up of four main proteins (encoded by "clock genes") that regulate close to half of all genes in the body, including those important for blood pressure regulation.

Previous research has shown that male mice that are missing one of the four clock genes (PER1) become non-dippers and have a higher risk for heart and kidney disease. A research team studied the circadian response and blood pressure of [female mice](#) that lack PER1 and compared them with a healthy female control group. On both low- and high-salt diets, both groups "retained an apparent circadian rhythm" of blood pressure, the researchers explained. Unlike the male mice in previous research, the females without PER1 showed normal dips in [blood pressure](#) overnight.

These results suggest that the lack of PER1 acts differently in [males](#) and females. The findings are consistent with research showing that premenopausal women are less likely to be non-dippers than men of the same age. "This study represents an important step in understanding sex differences in the regulation of cardiovascular function by the [circadian clock](#)," the researchers

wrote.

More information: Lauren G. Douma et al, Female C57BL/6J mice lacking the circadian clock protein PER1 are protected from nondipping hypertension, *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology* (2018). [DOI: 10.1152/ajpregu.00381.2017](#)

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