

Targeting pathway may reduce cocaine's cardiovascular harms

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Scientists have discovered a potential new pathway to treat the harmful effect of cocaine on the cardiovascular system, according to new research in the American Heart Association's journal *Hypertension*.

Researchers found that excess levels of [reactive oxygen species](#) (ROS), molecules known to be found in the aortas of hypertensive animals and humans, are also involved in cocaine-related cardiovascular disease. Reactive oxygen species is a type of unstable molecule that contains oxygen and that easily reacts with other molecules in a cell. A buildup of reactive oxygen species in cells may cause damage to DNA, RNA and proteins and may cause cell death.

The team determined that cocaine activates the molecule microRNA (miR)-30c-5p, increasing ROS levels in the cardiovascular system. But, blocking activation of miR-30c-5p dramatically reduced cocaine-induced cardiovascular impacts.

"The biggest surprise to us was that the modulation of a single miRNA-mRNA pathway could have such a profound effect on [cardiovascular function](#)," says Chunming Dong, M.D., study senior author and professor of medicine at University of Miami School of Medicine. "This also suggests that targeting this one pathway may have significant therapeutic benefit, which is an exciting possibility."

In the study, mice injected with cocaine had high blood pressure, stiff blood vessels and excess levels of ROS—all indications of

cardiovascular disease. Cocaine exposure also increased levels of the miR-30c-5p molecule in the mice. When the researchers treated the mice to block the increase in miR-30c-5p, the mice did not show [high blood pressure](#), stiffer blood vessels or elevated ROS levels when given cocaine.

This study is the first to identify the role of miR-30c-5p in [cocaine](#)-related cardiovascular disease, Dong says. While the results are promising, the study has limitations as it was conducted in mice, Dong notes. The team plans to test the findings to see if they are observed in patients to determine the viability of this targeted pathway.

More information: Wei Zhu et al, Cocaine Exposure Increases Blood Pressure and Aortic Stiffness via the miR-30c-5p–Malic Enzyme 1–Reactive Oxygen Species Pathway, *Hypertension* (2018). [DOI: 10.1161/HYPERTENSIONAHA.117.10213](#)

Provided by American Heart Association

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