

Researchers identify new pathway linking the brain to high blood pressure

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New research by scientists at the Ottawa Heart Institute and the University of Maryland School of Medicine (UM SOM) has uncovered a new pathway by which the brain uses an unusual steroid to control blood pressure. The study, which also suggests new approaches for treating high blood pressure and heart failure, appears today in the journal *PLOS One*.

"This research gives us an entirely new way of understanding how the brain and the [cardiovascular system](#) work together," said Dr. John Hamlyn, professor of physiology at the University of Maryland School of Medicine, one of the principal authors. "It opens a new and exciting way for us to work on innovative treatment approaches that could one day help patients."

For decades, researchers have known that the brain controls the diameter of the peripheral arteries via the [nervous system](#). Electrical impulses from the brain travel to the arteries via a network of nerves known as the sympathetic nervous system. This system is essential for daily life, but is often chronically over active in patients with high blood pressure or [heart failure](#). In fact, many drugs that help with hypertension and heart failure work by decreasing the activity of the sympathetic nervous system.

However, these drugs often have serious side effects, such as fatigue, dizziness, depression and erectile dysfunction. "These drawbacks have led to the search for novel ways to inhibit sympathetic nerve action while

causing fewer problems for patients," says Dr. Frans Leenen, Director of Hypertension at the Ottawa Heart Institute, and a principal author of the study.

Working with an animal model of hypertension, Dr. Leenen in collaboration with Dr. Hamlyn and Dr. Mordecai Blaustein, professor of physiology and medicine at the UM SOM, found a new link between the brain and increased [blood pressure](#), namely, a little-known steroid called ouabain (pronounced WAH-bane). This new study is the first to identify a particular pathway by which the [brain](#) regulates the diameter of the arteries via ouabain in the bloodstream, and causes an increase in contractile proteins in the arteries. This new humoral "chronic" pathway acts together with the more "acute" [sympathetic nervous system](#) pathway to control the function of arteries and thereby contributes to e.g. [high blood pressure](#).

"Now that we understand the role of ouabain, we can begin working on how to modify this new pathway to help people with cardiovascular problems," said Dr. Blaustein. "The potential for this is big." Dr. Blaustein, who has been doing research on the substance since 1977, said medications that block ouabain's effects might improve the lives of people with hypertension and heart failure.

Provided by Ottawa Heart Institute

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