

Compound Shows Promise Against Intractable Heart Failure

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(PhysOrg.com) -- A chemical compound found normally in the blood has shown promise in treating and preventing an intractable form of heart failure in a mouse model of the disease, report researchers at the University of Illinois at Chicago College of Medicine.

The study is published in the February issue of *Circulation*.

More than five and half million Americans have heart failure, according to the American Heart Association, and 670,000 new cases are diagnosed each year.

In heart failure the heart is unable to pump effectively and cannot meet the body's need for blood and oxygen. It is really two diseases, each with about half of all patients, says Dr. Samuel Dudley, professor of medicine and physiology at UIC and chair of the section of cardiology. Systolic heart failure occurs when the heart can no longer contract effectively. In diastolic heart failure, the heart is unable to relax after contraction.

"Although we have a number of treatments for systolic heart failure, there are no approved treatments at all for diastolic heart failure, a deadly disease with a 60 percent mortality rate five years after diagnosis," said Dudley.

Hypertension is the cause in the overwhelming majority of diastolic heart failure cases.

"We know from previous studies that nitric oxide (NO) is necessary for blood vessel relaxation," said Dudley, "and that hypertension can lead to a decrease of NO in blood vessels."

Dudley and his colleagues knew that -- in [blood vessels](#) -- the problem was depletion of a chemical called tetrahydrobiopterin, or BH4, which is needed for the tissues to make NO.

"We decided to try thinking of the heart as a huge blood vessel that might also be unable to make the NO it needed due to long-term [hypertension](#), and see if adding BH4 could make a difference," said Dudley.

They found that by giving mice BH4 they were not only able to prevent diastolic heart failure from developing, but to restore function to the heart after the fact.

"We are very excited about the possibilities of developing therapies for human [heart failure](#) based on BH4," said Dudley. BH4 has already been shown to be safe in FDA trials, in a formulation currently used to treat phenylketonuria, a genetic condition.

Provided by University of Illinois at Chicago

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