

ARCHIVE NEWS RELEASE

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NIH Scientists Show Nitrite Improves Blood Flow

Bethesda, Maryland — Scientists at the National Institutes of Health have determined that nitrite, a common small ion, or salt, in blood, can improve blood flow by opening blood vessels. This increases oxygen in the blood and makes it a potential new treatment for diseases such as high blood pressure, heart attacks, sickle cell disease, and leg vascular problems.

The study also describes a newly discovered function for the hemoglobin molecule itself, perhaps the most studied protein in human history. The new study demonstrates that when hemoglobin releases its oxygen in regions of the body with low oxygen (such as organs) or high metabolism, it can then convert nitrite to nitric oxide, which is known to dilate blood vessels. The article will be published in the December issue of *Nature Medicine* and was published in advance online November 2.

"The importance of this work is that no one considered this molecule to have any significant function and it is relatively abundant in the blood stream," said Dr. Mark Gladwin, senior investigator in Critical Care Medicine, Department of the NIH Clinical Center and an author of the article. Nitrite levels have been shown to be low in patients with high blood pressure.

Gladwin and coauthor Dr. Richard Cannon, III in the Cardiovascular Branch of the National Heart, Lung, and Blood Institute, NIH, studied eighteen healthy volunteers who were enrolled in a physiological study. They were infused with sodium nitrite to determine whether nitrite affects blood flow. They showed that blood flow increased by 175 percent.

"We saw a huge improvement in blood flow," said Gladwin. "Nitrite helps get more blood to regions of the body with low oxygen, such as kidneys, the heart, the brain and muscles. This has potential as a new therapy that was previously overlooked, said Gladwin. "It's a powder sitting on the shelf and everyone has it." However, he warns that at high concentrations it can be toxic and clinical trials, now in progress at NIH, are required to establish its clinical usefulness in various diseases.

Nitrite is present not only in blood, but in leafy green vegetables and hot dogs. A similar reaction of nitrite and myoglobin in red meat makes nitric oxide bind to myoglobin and explains the red color of meat on grocery store shelves. Further study will be needed to determine if dietary sources of nitrite affect blood flow and blood pressure.

Scientists from the University of Alabama at Birmingham, Wake Forest University, Winston-Salem, North Carolina, and the National Institute of Diabetes and Digestive and Kidney Diseases, NIH, also participated in this study.