Medical Xpress

Hot pepper compound could help hearts

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Credit: AI-generated image (disclaimer)

The food that inspires wariness is on course for inspiring even more wonder from a medical standpoint as scientists today reported the latest evidence that chili peppers are a heart-healthy food with potential to protect against the No. 1 cause of death in the developed world. The report was part of the 243rd National Meeting and Exposition of the American Chemical Society (ACS) being held this week.

The study focused on capsaicin and its fiery-hot relatives, a piquant family of substances termed "capsaicinoids." The stuff that gives cayennes, jalapenos, habaneros and other chili peppers their heat, capsaicin already has an established role in medicine in rub-on-the-skin creams to treat arthritis and certain forms of pain. Past research suggested that spicing food with chilies can lower blood pressure in people with that condition, reduce blood cholesterol and ease the tendency for dangerous blood clots to form.

"Our research has reinforced and expanded knowledge about how these substances in chilies work in improving heart health," said Zhen-Yu Chen, Ph.D., who presented the study. "We now have a clearer and more detailed portrait of their innermost effects on genes and other mechanisms that influence cholesterol and the health of blood vessels. It is among the first research to provide that information."

The team found, for instance, that capsaicin and a close chemical relative boost heart health in two ways. They lower cholesterol levels by reducing accumulation of cholesterol in the body and increasing its breakdown and excretion in the feces. They also block action of a gene that makes arteries contract, restricting the flow of blood to the heart and other organs. The blocking action allows more blood to flow through blood vessels.

"We concluded that capsaicinoids were beneficial in improving a range of factors related to heart and blood vessel health," said Chen, a professor of food and nutritional science at the Chinese University of Hong Kong. "But we certainly do not recommend that people start consuming chilies to an excess. A good diet is a matter of balance. And remember, chilies are no substitute for the prescription medications proven to be beneficial. They may be a nice supplement, however, for people who find the hot flavor pleasant."

Chen and his colleagues turned to hamsters for the study, animals that serve as stand-ins for humans in research that cannot be done in people. They gave the hamsters high-cholesterol diets, divided them into groups, and supplemented each group's food with either no capsaicinoids (the control group) or various amounts of capsaicinoids. The scientists then analyzed the effects.

In addition to reducing total cholesterol levels in the blood, capsaicinoids reduced levels of the so-called "bad" cholesterol (which deposits into blood vessels), but did not affect levels of so-called "good" cholesterol. The team found indications that capsaicinoids may reduce the size of deposits that already have formed in blood vessels, narrowing arteries in ways that can lead to heart attacks or strokes.

Capsaicinoids also blocked the activity of a gene that produces cyclooxygenase-2, a substance that makes the muscles around blood vessels constrict. By blocking it, muscles can relax and widen, allowing more blood to flow.

More information:

Abstract

Capsaicinoids are the active ingredients in chili pepper. The present study was to investigate the effect of dietary capsaicinoids on functionality of blood vessel, metabolism of cholesterol as well as gene expression of transporters, enzymes and receptors involved in cholesterol homeostasis. In brief, male hamsters were divided into five groups and fed diets containing 0%, 0.010%, 0.015%, 0.020% and 0.030% capsaicinoids. It was found that capsaicinoids lowered serum total cholesterol (TC), non-high-density lipoprotein cholesterol (non-HDL-C) and triacylglycerols (TAG) with high-density lipoprotein cholesterol being unchanged. Capsaicinoids decreased the atherosclerotic plaque in the four experimental groups compared with the control hamsters. Results on fecal analysis showed that capsaicinoids not only increased

the excretion of total neutral sterols but also decreased the ratio of serum campesterol : cholesterol, indicating it decreased cholesterol absorption. In addition, capsaicinoids increased the fecal acidic sterol excretion possibly mediated by up-regulation of cholesterol 7α-hydroxylase and down-regulation of liver X receptor alpha. Capsaicinoids could improve the endothelium-dependent relaxations and reduce the endothelium-dependent contractions by inhibiting the gene expression of COX-2 with COX-1 expression being unaltered. It was concluded that capsaicinoids were beneficial in improving lipoprotein profile and aortic function.

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