

Gut Bacteria May Reduce Cholesterol and Lower Heart Disease Risk

The findings suggest that the risk of heart disease might be lowered with strategies to alter the levels of specific gut bacteria.

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Different people have different resident microbes in and on their bodies. The trillions of microbes in the human intestines influence not just digestion and gut health, but how organs throughout the body function. Levels of certain microbes in the gut have been associated with the risk of health conditions like diabetes, liver disease, and cancer.

Scientists have thought that certain gut microbes may also play a role in cardiovascular disease (CVD). But which microbes might affect the risk of CVD—and how they might do this—has been unclear. Much remains unknown about how gut microbes process, or metabolize, compounds like cholesterol that affect CVD risk.

In a new study, funded in part by NIH, researchers led by Dr. Ramnik Xavier from the Broad Institute, Massachusetts General Hospital, and Harvard studied bacteria in the stool of more than 1,400 people participating in the Framingham Heart Study, a long-term study of heart health.

The team analyzed the bacterial genomes (the complete sets of genes) in the stool samples. They also studied blood samples and cardiovascular health measurements from the participants to identify microbes and metabolic pathways that are associated with CVD. The results were [published on April 2, 2024, in Cell](#).

The researchers identified several species of bacteria whose levels were associated with blood markers of CVD. Such markers included cholesterol, triglyceride, and blood glucose levels.

Higher levels of one group of bacteria called Oscillibacter were strongly associated with lower levels of cholesterol, both in the stool and the blood. Oscillibacter were also linked with other blood markers of reduced CVD risk, such as lower triglycerides and glucose and higher HDL (high-density lipoprotein).

The reductions in cholesterol by Oscillibacter appeared to be related to genes for enzymes that break down cholesterol in the intestines. This might lead to less cholesterol making its way into the bloodstream.

To confirm that *Oscillibacter* could process cholesterol, the researchers grew several *Oscillibacter* strains from the stool samples and then fed them cholesterol. The bacteria took up the cholesterol and broke it down into smaller molecules that don't raise the risk of CVD.

The team identified enzymes from other bacteria that were also associated with lower cholesterol levels. A detailed knowledge of the microbes and metabolic pathways that affect CVD risk may eventually lead to personalized therapies that manipulate gut bacteria.

"Our research integrates findings from human subjects with experimental validation to ensure we achieve actionable mechanistic insight that will serve as starting points to improve cardiovascular health," Xavier says.

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