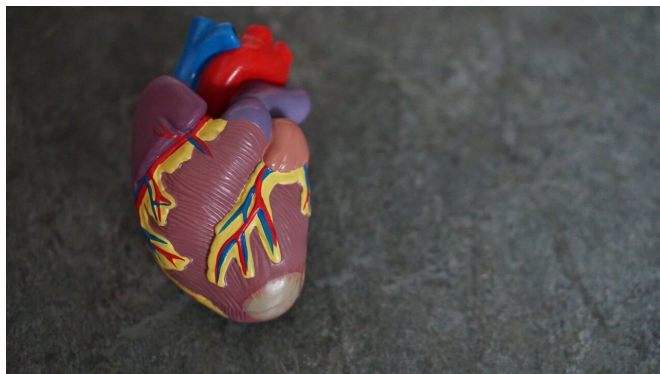


# Give the heart a ketone? It may be beneficial

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There is growing evidence that ketone bodies may be beneficial to heart disease patients regardless of the method of delivery used to increase ketone delivery to the heart. A *Journal of the American College of Cardiology* review paper examines emerging evidence regarding ketone bodies' effects on the heart and the potential for ketone therapy as a cardiovascular intervention in heart disease patients.

In recent years ketone bodies entered the popular lexicon through the "[keto diet](#)," which consists of a very low carbohydrate and [high fat diet](#) that endeavors to force the body into ketosis. This is a metabolic state with increased ketone bodies circulating in the body as a result of less glucose, or sugar, being in the bloodstream to provide fuel, causing the body to shift to metabolize fat as energy. Recent research has shown that a keto diet may contribute to increased risk for [heart disease](#) if the foods consumed do not include [heart healthy fats](#).

The review discusses the therapeutic advantages of increasing circulating ketone levels through multiple mechanisms, including the keto diet. The researchers discuss both the potential merits and concerns related to the keto diet in relation to each mechanism for increasing ketone levels in the

body, providing novel therapeutic avenues to increase ketosis without the concerning impacts of the keto diet.

"We found that data from experimental and [human studies](#) suggest ketone bodies exert protective effects on patients with heart disease. As heart disease remains the leading killer worldwide, determining new ways to offer cardiac protection is vital to this patient population," said B. Daan Westenbrink, MD, Ph.D., a cardiologist and translational scientist at University Medical Center Groningen in the Netherlands and senior author on the paper. "While the keto diet has become increasingly popular, there are concerns about untoward effects on the heart. However, administration of ketones may be an alternative to a keto diet as a means of elevating ketone bodies for their protective effects."

Ketone bodies are produced by the liver, particularly in response to prolonged fasting, insulin deprivation and extreme exercise. Ketones provide additional energy to multiple organs, and under extreme conditions ketone bodies may account for approximately 5-20% of total energy expenditure by the body.

Under normal conditions, a healthy heart consumes little glucose as an energy source. However, in the early stages of structural heart disease there is a switch from fatty acids to glucose utilization. This metabolic reprogramming leads to heart muscle energy starvation, contributing to the development of heart failure. According to the researchers, a failing heart seems to reprogram its metabolism to increased reliance on ketone bodies as a fuel source.

According to the researchers, ketones may also have positive effects on common cardiovascular risk factors, including [blood pressure](#), [body weight](#), [blood glucose](#) or blood sugar, and cholesterol, though research is ongoing. Research has also shown ketone bodies may provide additional cardiovascular benefits impacting endothelial

function, inflammation, cardiac remodeling and mitochondrial function.

These benefits could be achieved through the keto diet, but long term compliance to the diet is low, often due to gastrointestinal distress. There are alternatives to the keto diet or ingesting ketone precursors to achieve ketosis, which include ingesting ketone salts or ketone esters.

"With numerous pathways to achieve ketosis, ketone bodies have potential clinical implications that require further study," Westenbrink said.

"Further exploration of therapeutic approaches to harness the beneficial effects of ketosis are necessary. I believe in the coming years we will have a much better grasp on whether [ketone bodies](#) can be optimized and used in the treatment and prevention of heart disease."

**More information:** *Journal of the American College of Cardiology* (2021). [DOI: 10.1016/j.jacc.2020.12.065](#)

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