

# Damaged hearts pump better when fueled with fats

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Contrary to what we've been told, eliminating or severely limiting fats from the diet may not be beneficial to cardiac function in patients suffering from heart failure, a study at Case Western Reserve University School of Medicine reports.

Results from biological model studies conducted by assistant professor of physiology and biophysics Margaret Chandler, PhD, and other researchers, demonstrate that a high-fat diet improved overall mechanical function, in other words, the heart's ability to pump, and was accompanied by cardiac [insulin resistance](#).

"Does that mean I can go out and eat my Big Mac after I have a [heart](#) attack," Dr. Chandler says "No, but treatments that act to provide sufficient energy to the heart and allow the heart to utilize or to maintain its normal metabolic profile may actually be advantageous."

The research, published in *American Journal of Physiology-Heart and Circulatory Physiology*, suggests that for a damaged heart, a [balanced diet](#) that includes mono- and polyunsaturated fats, and which replaces simple sugars (sucrose and [fructose](#)) with complex carbohydrates, may be beneficial.

In a healthy person, the heart uses both fats and carbohydrates to obtain the energy it needs to continue pumping blood 24/7. Ideally, fats are utilized because they yield more energy. However, if a person develops heart failure (or suffers from ischemia – a lack of blood supply), the

heart seems to prefer using glucose for fuel, because glucose requires less oxygen to produce energy.

While heart disease remains the leading cause of death in the United States, more people are surviving heart attacks than ever before. Survivors though pay a price for this improved survival, living with a damaged heart that usually progresses to heart failure. And unfortunately, medications and procedures have yet to "cure" heart failure, or halt the deterioration of heart function.

Upon initiation of these dietary intervention studies, researchers previously thought a high-fat diet fed to animal models that have suffered a heart attack, would overload their tissues with fat, which in turn would have a toxic effect on their hearts. Surprisingly, the heart's pump function improved on the high-fat diet.

Through further testing, the researchers found that animal models suffering from heart failure and receiving a low fat diet were able to produce insulin and take up glucose from the blood, just as healthy hearts do.

However, the biological models with [heart failure](#) that were fed high-fat diets showed signs of insulin resistance, exhibited by a decreased amount of glucose taken up by the heart, as might be expected in a diabetic patient.

One of the main implications of these findings is that contrary to previously held beliefs, a state of insulin-resistance might actually be beneficial to a failing heart.

The hypothesis, according to Dr. Chandler, is that because the heart is being provided with excess amounts of fats, it is forced to utilize its preferred energy source. After suffering an injury that leads to failure,

the heart cannot do this on its own, so the researchers have to manipulate its metabolism to use the energy source that maximizes or maintain its function as near to "normal" as possible.

"We want to provide an environment for the heart which allows it to be as effective and efficient a pump as possible, regardless of the damage it has undergone," Dr. Chandler says.

Provided by Case Western Reserve University

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