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# L-carnitine

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## L-carnitine and Your Heart

### Levels of this vitamin-like nutrient decline as we age

Manufactured from the amino acids lysine and methionine, L-carnitine helps transport long-chain fatty acids across the mitochondrial membrane of cells, where they're metabolized as fuel. Because it's the only substance that can perform this vital task, we all need plenty of carnitine, which is available in meat and in supplements. While outright deficiency is uncommon in well-nourished populations, vegetarians, older individuals, and those who have kidney and liver disease or who take anticonvulsant medications may need more of this vitamin-like nutrient than their diets provide.

by Carol Ferguson  
**Cardiovascular Health**

The heart gets 60 percent of its fuel from fat, making L-carnitine important for cardiovascular health. By enhancing fatty acid metabolism, L-carnitine prevents the buildup of toxic fat metabolites.

Numerous double-blind, placebo-controlled studies find this substance effective in treating angina, a crushing sensation in the chest caused by inadequate blood flow to the heart muscle. "Having enough carnitine in the tissue to metabolize fatty acids efficiently lets the heart do more with less oxygen," explains cardiologist Stephen T. Sinatra, MD.

Since physical exertion tends to trigger angina, exercise studies are a useful way to explore L-carnitine's effects. Among 200 angina patients 40 to 65 years old, those taking L-carnitine showed better cardiac performance, as well as improved quality of life. Surprisingly, those with the most compromised heart function experienced the greatest improvement with L-carnitine, which also improves



exercise duration and oxygen consumption in research with heart failure patients.

In peripheral vascular disease (painful leg cramping in patients with arteriosclerosis), "no pharmaceutical drug has been observed to convey significant benefit," says cardiologist Seth J. Baum, MD. "What does work quite well, however, is the supplement L-carnitine."

Among obese individuals with insulin resistance, L-carnitine appears to improve vascular function, as reported in investigations of leg blood flow. In a study at Indiana University School of Medicine, researchers found that increasing L-carnitine levels may delay cardiovascular disease progression in obese subjects.

Ongoing European investigations suggest that L-carnitine, administered early in a heart attack, can slow the advancement of heart disease. L-carnitine also showed protective effects in a double-blind study of arrhythmia patients.

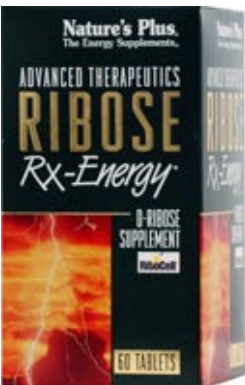
"Perhaps the most outstanding aspect of the use of L-carnitine supplementation in cardiovascular

conditions has been its ability to assist coenzyme Q10 and D-ribose in reducing the mortality from end-stage congestive heart failure," adds Dr. Sinatra. Compared to healthy individuals, heart failure patients have significantly lower carnitine concentrations in their heart muscle. The good news is that recent research suggests that carnitine supplementation can reverse this dangerous trend.

#### Using L-carnitine

Red meat is the richest food source of L-carnitine, and Dr. Baum recommends that omnivores choose organic sources. "I am convinced that the less opportunity man has to impose his artificial imprint [antibiotics and hormones] the better off food is", he adds.

L-carnitine is also a safe supplement; just don't take it with the medication pen-tylenetetrazol. For aging and overall heart protection, Dr. Sinatra recommends 250 to 750 mg of L-carnitine, along with CoQ10, D-ribose, magnesium, and fish oil daily. Angina and arrhythmia patients can take 1,000 to 2,001 mg of L-carnitine daily. For congestive heart failure, Dr. Sinatra suggests 2,000 to 3,300 mg daily depending on that condition's severity.



## Taurine reverses damage done by smoking and protects against heart disease

Smokers may want to increase their intake of fish to reduce their risk of heart disease and stroke. This advice comes as a result of a study finding taurine an amino acid present in fish, able to restore normal blood vessel function in smokers.

Proper vessel function is key to preventing hardening of the arteries. Cigarette smoke produces changes in blood vessels, causing them “to behave like a rigid pipe rather than a flexible tube,” explains Dr. David J. Bouchier-Hayes, principal investigator of the study. Such rigidity prevents the vessels from dilating in response to increased blood flow, resulting in a condition called endothelial dysfunction, an early sign of atherosclerosis and a primary cause of heart attacks and stroke.

The study investigators recruited 15 healthy



smokers and 15 healthy non-smokers. Initially, the smokers' blood vessel diameter was smaller than non-smokers'. After taking 1.5 grams per day of taurine for five days, the smokers' blood vessel diameter increased, equaling that of non-smokers. Study results were published in the *January 7, 2003 issue of Circulation*.

This is not the first study to associate taurine with a decreased risk of heart disease. Researchers at the University of South Alabama found that congestive heart failure responds favorably to taurine therapy [*Amino Acids 2000; 18(4):305-18*]. A large scale study in Japan drawing from 24 populations in 16 countries revealed a strong inverse association between levels of taurine excretion and ischemic heart disease [*Hypertens Res 2001 Jul:24(4):453-7*].

An Australian study discovered taurine to be one of the key properties in fish that protect against cardiovascular disease [*Asia Pac J Clin Nutr 2001;10(2):134-7*].

Individuals seeking to boost their taurine intake can choose from all types of fish, including fatty fish, mild fish, white fish and/or taurine supplements. Other supplements that help to protect against endothelial dysfunction are Vitamin C and folic acid.

