

LE Magazine May 1999

REPORT

How Vitamin C Prevents Heart Attacks

In the early 1990s, several large population studies showed a reduction in cardiovascular disease in those who consumed vitamin C. The media reported on some of these findings and this favorable publicity helped push a bill through Congress that prevented the FDA from banning high-potency vitamin C and other supplements.

The most significant report emanated from UCLA in 1992, where it was announced that men who took 800 mg a day of vitamin C lived six years longer than those who consumed the FDA's recommended daily allowance of 60 mg a day. The study, which evaluated 11,348 participants over a ten year period of time, showed that high vitamin C intake extended average life span and reduced mortality from cardiovascular disease by 42%. This study was published in the journal *Epidemiology* (1992; 3:3, pp 194-202).



The results of the UCLA report were partially confirmed four years later in a nine year study involving 11,178 participants that was published in *The American Journal of Clinical Nutrition* (August 1996). This study showed that people who took vitamin C and E supplements experienced a 42% reduction in overall mortality.

In response to these reports, scientists set out to determine the specific mechanism by which vitamin C protects against cardiovascular disease. Drs. Linus Pauling, Mathias Rath and others offered persuasive evidence that atherosclerosis is a natural protective mechanism against the arterial deteriorating effects induced by a vitamin C deficiency. Pauling and others showed that the body forms atherosclerotic plaque in order to protect the arterial wall against the acute disintegration that would normally occur in a vitamin C deficient state. Pauling's rationale for the epidemic of atherosclerosis was that people were not consuming enough vitamin C.

Skeptical scientists, however, believed there were other reasons why vitamin C produced such a profound reduction in cardiovascular disease. In 1998, several well controlled studies showed that vitamin C enables the arterial system to expand and contract with youthful elasticity. Since most forms of heart disease are caused by constricted arteries that feed the heart muscle, it is crucial to maintain arterial dilation function-exactly what vitamin C has been shown to do.

Blocked coronary arteries can cause angina (chest pain and shortness of breath) in response to strenuous activity, cold temperatures and emotional states. Cardiologists often prescribe nitroglycerine and longer-acting nitrate drugs to dilate the coronary arteries and relieve angina pain. Nitrate drugs not only improve coronary blood flow, but they also lower the oxygen demand of the heart by reducing peripheral vascular resistance.

Unfortunately, nitrate drugs also produce negative effects. The main limiting factor to the nitrate drugs is tolerance, i.e. the vascular system stops responding to the dilating effects of the drugs and angina is no longer controlled. Nitrate drugs may also cause a progressive weakening of the heart muscle cell's ability to produce energy. When vitamin C is administered to coronary artery disease patients, the vasodilating effects of the nitrate drugs may be significantly prolonged and the energy producing capacity of the cells maintained.

A double-blind study published in the *Journal of the American College of Cardiology* (1998; Vol 31, Iss 6, pp-1323-1329) compared the effects of nitrate drugs in people receiving vitamin C to a placebo group not receiving vitamin C. The doctors administered nitrate drugs to both healthy people and patients with coronary artery disease and then measured vasodilation response and cellular levels of cyclic guanine monophosphate (cGMP), an energy substrate that is depleted by nitrate drugs. At day zero, all participants were measured to establish a baseline. After three days of vitamin C administration (2 grams/three times daily), there was no change in either group. After six days of vitamin C therapy an impressive 42% improvement in vasodilation response was observed and a 60% improvement in cellular cGMP levels was measured in coronary artery disease patients receiving vitamin C compared to placebo. A similar improvement occurred in the healthy subjects taking vitamin C compared to the placebo group. The doctors

concluded the study by stating "These results indicate that combination therapy with vitamin C is potentially useful for preventing the development of nitrate tolerance."

Another study published in the *Journal of Clinical Investigation* (1998; July 1) looked at the effects of nitrate drug therapy on human patients. Tolerance development was monitored by changes in arterial pressure, pulse pressure, heart rate and activity of isolated patients. All patients experienced the deleterious effects of nitrate tolerance. However, when vitamin C was co-administered with the nitrate drugs, the effects of nitrate tolerance were virtually eliminated. The most significant improvement was a 310% improvement in the arterial conductivity test. The nitrate drugs induced a dangerous upregulated activity of platelets, but this too was reversed with vitamin C supplementation. The doctors who conducted this study indicated that vitamin C may be of benefit during long-term, non-intermittent administration of nitrate drugs in humans.

An especially damaging effect of nitrate drugs is that they cause a decrease in the intracellular (inside the cells) production of cGMP. This energy substrate is required to maintain cellular energy levels. Vitamin C has been shown to protect against nitrate-induced depletion of cGMP. In a study published in the May 22 1998 issue of *FEBS Letters* (Netherlands), kidney cells exposed to five hours of pre-treatment with a nitrate drug showed a substantial depletion of intracellular cGMP. When vitamin C was present during pre-treatment with nitrate drugs, cGMP levels were 3.1-fold higher.

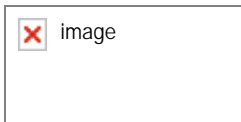
Chronic heart failure is associated with reduced dilating capacity of the endothelial lining of the arterial system. Scientists tested heart failure patients by high-resolution ultrasound and Doppler to measure radial artery diameter and blood flow. Vitamin C restored arterial dilation response and blood flow velocity in patients with heart failure. The scientists determined that the mechanism of action was that vitamin C increased the availability of nitric oxide, an important precursor to cGMP. This study was published in the February 1998 issue of the journal *Circulation*.

Also in 1998, another aspect of vitamin C's effect on coronary artery disease was discovered. A study published in the *Journal of the American College of Cardiology* (1998; 41:5,980-6) showed that low plasma ascorbic acid levels independently predict the presence of an unstable coronary syndrome in heart disease patients. According to the doctors, the study's results showed that the beneficial effects of vitamin C in treating coronary artery disease may result, in part, from an influence on arterial wall lesion activity rather than a reduction in the overall extent of fixed disease.

The published research findings suggest that vitamin C may reduce mortality in coronary artery disease patients, increase life span and possibly eliminate the effects of nitrate tolerance in those taking nitrate drugs. While not recognized in the medical establishment as a therapy for coronary artery disease, there now exists an accumulated wealth of evidence that vitamin C has beneficial effects in the treatment of heart-related illnesses.

-by William Faloon

Based on these recent findings, those with coronary artery disease, especially those who take nitroglycerin or longer-acting nitrate drugs (or a nitroglycerin patch), should consider supplementing with at least six grams a day of vitamin C, along with other antioxidants. This recommendation is strictly the opinion of The Life Extension Foundation based on the peer-reviewed published literature. Neither the FDA or the American Medical Association has recognized the role of vitamin C as a therapy for coronary artery disease.



[Back to the Magazine Forum](#)

All Contents Copyright © 1995-2009 Life Extension Foundation All rights reserved.

LifeExtension®

These statements have not been evaluated by the FDA. These products are not intended to diagnose, treat, cure or prevent any disease. The information provided on this site is for informational purposes only and is not intended as a substitute for advice from your physician or other health care professional or any information contained on or in any product label or packaging. You should not use the information on this site for diagnosis or treatment of any health problem or for prescription of any medication or other treatment. You should consult with a healthcare professional before starting any diet, exercise or supplementation program, before taking any medication, or if you have or suspect you might have a health problem. You should not stop taking any medication without first consulting your physician.