Natural Methods for Reversing Atherosclerosis

Even when cardiologists aggressively manage their patients' cholesterol and blood pressure levels, millions of Americans continue to suffer heart attacks and strokes. The reason is that many cardiologists fail to address the key underlying cause of coronary artery disease—that of endothelial dysfunction.

Endothelial dysfunction is the major cause of atherosclerosis—the blockage of arteries that increases the risk of heart attack, stroke, and congestive heart failure. Fortunately, it is never too late to start counteracting this circulatory breakdown, which is often a part of the aging process.

A wealth of research now points to several nutritional agents such as cocoa polyphenols, pomegranate, and bioavailable superoxide dismutase (SOD) that have been shown to dramatically improve arterial blood flow, helping promote youthful endothelial function and protect against the processes known to damage aging arteries.
The Importance of Endothelial Health

Very few doctors discuss the importance of endothelial health with their cardiac patients. The endothelium comprises the thin layer of cells that line the interior surfaces of the entire circulatory system including the heart, blood vessels, the lymphatic system, and even the smallest capillaries. Essential to good health, the endothelium maintains uninterrupted circulation by allowing blood to flow smoothly to every part of the body and by participating in blood pressure control. One of its most important functions is the release of nitric oxide, which signals the surrounding smooth muscles of the arteries to relax and dilate, which increases healthy blood flow throughout the body.

But harmful oxidative stress, such as that which occurs in hypertension, hypercholesterolemia, diabetes, cigarette smoking, and the aging process itself inactivates nitric oxide, thereby contributing to endothelial dysfunction.

Damage occurs when the endothelium’s structural integrity is compromised and is no longer able to protect the artery walls against the infiltration of cholesterol, triglycerides, and low-density lipoprotein (LDL). Thus, endothelial dysfunction is one of the first steps in the creation of atherosclerosis—the buildup of arterial plaque that elevates the risk for heart attack, stroke, and congestive heart failure.

Unfortunately, as we age, our body continually loses optimal endothelial function. A research study published in the journal Gerontology that examined healthy people showed that endothelial function declines with increasing age. Even worse, some research has shown that the development of endothelial dysfunction can begin as early as the teenage years. Cardiovascular researchers believe the endothelium has an “enormous yet largely untapped diagnostic and therapeutic potential,” which is why a better understanding of endothelial dysfunction may help to prevent or delay deadly cardiovascular events. As scientists continue to unravel the numerous causes of heart disease and atherosclerosis, the importance of preserving endothelial health is gaining appreciation.

Fortunately, researchers have identified several innovative nutritional ingredients that appear to enhance endothelial health. Among them are cocoa, pomegranate, and a bioavailable formulation of superoxide dismutase (SOD) called GliSODin. In studies published in peer-reviewed journals, these substances have been shown to have properties that protect against endothelial dysfunction, while helping reverse clinical markers of arterial plaque.

Cocoa: A Natural Antioxidant that Preserves Cardiovascular Health

Centuries before European confectioners processed the beans of the Theobroma cacao plant to make a confection we call “chocolate,” cocoa was used in Mexico and parts of Latin America in its powdered form for...
medicinal purposes. Recent studies in medical journals have found that cocoa may actually be cardioprotective, and a new study showed it may even be able to reverse the effects of endothelial dysfunction by improving the dilation of blood vessels.8

Cocoa has a high concentration of polyphenol compounds, specifically a class of natural compounds called flavonoids. Scientists have identified several cocoa flavanols, including epicatechin and catechin, which can benefit circulatory health. Cocoa flavanols improve endothelial function by enhancing nitric oxide bioactivity,9 increasing blood flow, reducing the tendency of blood clot formation,10 reducing moderately high blood pressure,11 and helping LDL resist oxidation, which may prevent the buildup of atherosclerotic plaque in artery walls.12

A study published in the Journal of the American College of Cardiology8 found that giving flavanol-rich cocoa to diabetic patients improved their vascular function. In an editorial accompanying the research report, another team of scientists noted that the study provides “sizable evidence that cocoa flavanols have a positive effect on the health of the arteries.”13

Scientists at the Department of Nutrition, University of California-Davis also found that cocoa had a beneficial effect on cardiovascular health. Their 2006 study in the Journal of Cardiovascular Pharmacology found that “consuming flavanol-rich cocoa and cocoa-based products can improve endothelial function in both compromised and otherwise normal, healthy individuals.” Six weeks of cocoa consumption increased brachial artery hyperemic blood flow by up to 76% compared with baseline values. Additionally, cocoa consumption decreased levels of a blood marker associated with the progressive formation of atherosclerotic plaque.14

WHAT YOU NEED TO KNOW

Natural Methods for Reversing Atherosclerosis

• Many cardiologists fail to address one of the key underlying causes of atherosclerosis—endothelial dysfunction.

• Endothelial dysfunction occurs when the structure and function of the cells lining blood vessels become impaired, diminishing healthy blood flow and leading to the buildup of atherosclerotic plaque.

• Hypertension, smoking, and the aging process itself increase the risk for endothelial dysfunction, which in turn increases the risk for heart attack, stroke, and heart failure.

• Cocoa polyphenols improve endothelial function, enhance blood flow, improve LDL's resistance to oxidation, and modulate blood pressure. Sugar-free cocoa appears to offer superior benefits to preparations that include sugar.

• Pomegranate helps enhance cardiovascular health by supporting nitric oxide activity, reversing atherosclerotic plaque buildup, and improving blood pressure.

• Diminished levels of the antioxidant enzyme SOD have been linked with cardiovascular disease. A bioavailable formulation called GliSODIn® helps boost the body's levels of SOD while reversing the buildup of atherosclerotic plaque.
rotic lesions, signaling protection against the accumulation of dangerous plaque.\textsuperscript{14}

Important research from the \textit{Archives of Biochemistry and Biophysics} demonstrated a possible biochemical mechanism through which cocoa may help preserve vascular health. Using a double-blind, crossover study design, scientists found that adults who consumed cocoa demonstrated decreased arginase enzymatic activity. Inhibition of arginase is reported to improve endothelial-dependent vasodilation by making more arginine available. Thus this study suggests that cocoa may help promote healthy blood vessel dilation and optimal circulation.\textsuperscript{15}

A recent clinical trial examined the effects of dark chocolate including liquid cocoa on endothelial function and blood pressure in overweight adults. Consumption of dark chocolate or liquid cocoa improved endothelial function and decreased blood pressure. Sugar-free cocoa produced greater improvements in endothelial function, compared with regular cocoa containing sugar. This led the study authors to conclude that sugar may decrease cocoa's benefits for endothelial health and blood pressure, and that sugar-free cocoa preparations may offer superior benefits.\textsuperscript{16}

These findings offer powerful support for cocoa's role in maintaining optimal endothelial health.

\textbf{Pomegranate: An Ancient Fruit that Can Reverse Atherosclerosis}

An exotic fruit whose taste and beautiful ruby-colored seeds have been revered since ancient times, the pomegranate (\textit{Punica granatum}) has recently become universally prized for its cardiovascular health benefits.

Studies have found that pomegranate has powerful antioxidant properties that appear to protect the heart and blood vessels.\textsuperscript{17} Pomegranate juice may have anti-atherosclerotic properties, slowing the progression of arterial plaques.\textsuperscript{18} Most promising may be the results from studies showing that pomegranate juice improves stress-induced ischemia in patients who already had cardiovascular disease and atherosclerosis.\textsuperscript{19} Pomegranate even shows benefits in reducing systolic blood pressure.\textsuperscript{18} Punicalagins, tannins, and anthocyanins are the major components in pomegranate that are responsible for its antioxidant and cardiovascular health benefits.

One of pomegranate's key mechanisms for supporting cardiovascular health is its ability to modulate nitric oxide activity. In endothelial cells, pomegranate enhances the bioactivity of nitric oxide synthase, an enzyme that generates nitric oxide.\textsuperscript{17} Pomegranate's antioxidant effects also help protect nitric oxide against oxidative destruction, thus ensuring its availability for essential vessel-protective functions.\textsuperscript{20,21}

In a small, controlled study published in the journal \textit{Clinical Nutrition}, 10 patients with atherosclerosis and carotid artery stenosis (narrowing of the main arteries in the neck that supply blood to the brain) were able to reverse the effects of carotid atherosclerosis by supplementing their diet with pomegranate juice each day for one year. Carotid artery atherosclerosis (measured as carotid intima-media thickness) decreased by a remarkable 30\% in those who consumed pomegranate juice daily, while it increased by 9\% in patients who did not consume pomegranate juice. In those who consumed pomegranate, total antioxidant status was increased by 130\%, while blood serum levels of LDL basal oxidative state and LDL susceptibility to oxidation were both significantly reduced, by 90\% and 59\%, respectively. Systolic blood pressure was reduced by 21\% after one year of pomegranate juice consumption, but was not further reduced after two additional years of pomegranate juice consumption. The researchers suggested the improvement in the patients' cardiovascular health "could be related to the potent antioxidant characteristics of pomegranate juice polyphenols."\textsuperscript{18}

A study reported in the prestigious \textit{American Journal of Cardiology} also demonstrated the benefits of pomegranate juice in people with atherosclerosis. In a randomized, placebo-controlled, double-blind study, 45 patients with stable coronary heart disease who suffered from stress-induced ischemia (reduced blood supply to the heart muscle caused by atherosclerosis of the coronary arteries) were randomly assigned to drink pomegranate juice (eight ounces daily) or a placebo each day. Participants underwent several cardiac diagnostic tests at the beginning and at the end of the trial. After three months, the measurable extent of stress-induced ischemia decreased in the pomegranate group, but increased in the control group. This benefit was observed without changes in
cardiac medications, blood sugar, hemoglobin A1c, or weight. The researchers concluded that daily consumption of pomegranate juice may improve stress-induced myocardial ischemia in patients with coronary heart disease.19

These studies demonstrate that pomegranate offers important cardiovascular health benefits for patients who already suffer from atherosclerosis and endothelial dysfunction, and suggest that pomegranate may similarly help preserve cardiovascular well-being in healthy people.

**SOD: The Body’s Own Antioxidant**

One of the most important enzymes in the body, superoxide dismutase (SOD) was identified by scientists only 40 years ago.22 SOD is the major antioxidant enzyme that provides the body’s first enzymatic step in the defense system against oxidative stress. As a natural antioxidant and anti-inflammatory agent, SOD maintains cellular health by activating cellular repair. Most importantly, SOD plays a pivotal role in protecting tissues from damage by oxidant stress by removing or neutralizing the superoxide radical that has been implicated in many disease states including inflammatory diseases, cardiovascular and neurodegenerative diseases, and cancer.23

A study published in the journal *Circulation* in 2002 found that in patients with chronic heart failure, endothelial-bound SOD activity was substantially reduced. Diminished SOD levels were closely linked with increased vascular oxidative stress, which contributes to endothelial dysfunction in chronic heart failure.24

SOD also has important anti-aging qualities. Mice lacking a form of SOD die from oxidative stress within days of birth25 and those bred without a second type of SOD are highly susceptible to age-related problems like cataracts.26 Unfortunately, SOD levels decline as we age—reducing our defense against free radicals just at the time when the body’s free radical activity is increased.27

Therefore it makes sense for scientists to look for a way to increase SOD levels in the body to be able to benefit from this important antioxidant.28 Food scientists found that a certain species of melon naturally contained high levels of SOD. Supplementing with this melon extract, however, failed to boost SOD levels in the body because acids and enzymes in the digestive system broke down the SOD before it could be assimilated into the body. After much trial and error, scientists combined SOD with gliadin protein from wheat extract to create an orally effective delivery system called GliSODin® that is capable of increasing the body’s levels of protective SOD. This new bioavailable form of SOD passes through the stomach intact, then continues to the intestines, where it is absorbed into the bloodstream.

A clinical study confirms GliSODin®’s ability to provide antioxidant protection to the body. For 28 days, scientists supplemented animals with either standardized melon SOD or with standardized melon SOD extract combined with gliadin (GliSODin®). The two groups were evaluated for various biomarkers of oxidative stress. Animals supplemented with GliSODin® showed a significant elevation in circulating antioxidant enzyme activity, correlated with an increased resistance of red blood cells to oxidative stress-induced hemolysis (rupture). In contrast, animals supplemented with melon SOD alone showed no change in their level of antioxidant protection.29

Another study powerfully demonstrated GliSODin®’s protective effects on the cardiovascular system. A group of doctors at a preventive medicine society in Paris administered GliSODin® to adults aged 30-60 years old at risk for cardiovascular disease based on genetic factors, blood chemistry, blood pressure, body mass index (BMI), and a history of cigarette smoking. Remarkably, the physicians found that two years of supplementation with GliSODin® actually reversed the buildup of atherosclerotic plaque in the carotid arteries, as determined by ultrasound measurements of carotid intima-media thickness. Additionally, GliSODin® supplementation increased antioxidant capacity in the subjects.28
NATURAL METHODS FOR REVERSING ATHEROSCLEROSIS

Together, these findings suggest that GliSODin® may offer a practical strategy for maintaining youthful levels of protective SOD as we age, which may help prevent and even reverse endothelial dysfunction and atherosclerosis.

Conclusion
Preserving optimal endothelial function is essential to maintaining smooth flow of blood through the arteries and preventing the accumulation of atherosclerotic plaque that can contribute to heart attack, stroke, and other cardiovascular diseases. Powerful, natural antioxidant sources like cocoa and pomegranate have been shown to enhance cardiovascular health. In some studies, pomegranate and cocoa have been shown to limit or reverse atherosclerosis, lower high blood pressure, and improve endothelial function in people with the most serious arterial problems, including heart disease and diabetes. Scientists continue to research superoxide dismutase, the body’s own powerful antioxidant. Now that it is bioavailable as GliSODin® to supplement the body’s naturally declining levels, there is another powerful anti-aging strategy to maintain healthy endothelial function and help prevent or reverse atherosclerosis.

If you have any questions on the scientific content of this article, please call a Life Extension Health Advisor at 1-800-226-2370.

References