

Heart Health

What is Heart Disease?

Heart disease is a general term used to describe the varying conditions and diseases related to the heart and cardiovascular system. These diseases range in specificity, addressing heart rhythm problems (arrhythmias), valve disorders, congenital (birth) heart defects and diseases of the blood vessels. Heart disease is the number one killer of both men and women in the United States and the world.¹

The phrase “heart disease” is often used interchangeably with “cardiovascular disease.” While the term technically refers to any disease that affects the cardiovascular system, it is usually used to refer to those related to atherosclerosis (arterial disease). These conditions have similar causes, mechanisms, and treatments.

Atherosclerosis, also called coronary artery disease or coronary heart disease, plays a significant role as the precursor in the development of cardiovascular disease. This condition refers to the hardening of arterial walls and the buildup of plaque. Damage to the arterial wall, caused by such risk factors as smoking or high blood pressure, triggers the body’s innate immune response: inflammation. Circulating immune complexes, including C-reactive proteins and macrophages, as well as fibrin, travel to the affected site to try and repair the artery, forming clumps. Overtime, plaques can develop on these clumps, consisting of cholesterol, fatty deposits and other cellular waste traveling in the blood. These plaques harden the arteries and narrow the passageway by which blood reaches other organs and tissues.²

Recent evidence from clinical and population studies now suggests that inflammation is an important factor in the severity of atherosclerosis and the likeliness of developing other cardiovascular diseases. Blood flow to vital organs is limited as the vessels narrow. Plaques can then become imbedded in the artery wall, signaling for counter-acting immune responses (i.e. inflammation). When these responses are unable to break up the plaque, the buildup can burst and send clotting particles circulating in the blood. Blood clots can lead to much more serious complications and even be fatal.^{3,4}

Heart Disease Causes and Risk Factors

Cardiovascular disease, as brought on by atherosclerosis, is associated with a number of factors which put someone at risk. These include:

- Age: as we get older, arteries become weaker and more susceptible to damage, promoting clotting
- Gender: men are at greater risk than women; risk in women increases after menopause
- Smoking: nicotine constricts blood vessels, and carbon monoxide damages their inner lining
- Poor diet: high fat, cholesterol and sodium in the diet can be plaque-forming and affect blood pressure
- Physical inactivity
- Excessive alcohol or caffeine intake
- High stress
- Poor hygiene
- High C-reactive protein levels
- High blood pressure
- High blood cholesterol levels: low density lipoproteins (LDLs) accumulate in the form of plaque
- Diabetes
- Obesity

- Family history of heart disease

Heart Disease Symptoms

Atherosclerosis is slowly progressive. The blood vessels are gradually narrowed, blocked or stiffened, making it so the heart, brain or other organs do not receive enough blood to function. Cardiovascular disease is not usually diagnosed until atherosclerosis is so severe that it creates serious problems like heart attack, stroke, heart failure or cardiac arrest. Important symptoms to pay attention to and inform your doctor of are:

- Chest pain (angina)
- Shortness of breath
- Pain, weakness, numbness or coldness in your extremities

Heart Disease Complications and Prognosis

Early detection of cardiovascular disease typically results in a better outcome, but everyone recovers differently. While lifestyle changes may help some, medications and surgical procedures may be necessary for others. Worsening disease states can cause ischemic problems that lead to life-threatening complications, including:

- Heart attack: blood clot blocks blood flow through the coronary artery
- Heart failure: the heart cannot pump enough blood to meet body's needs
- Stroke: arteries to the brain are narrowed or blocked and too little blood reaches the brain
- Aneurysm: bulge of the wall of an artery anywhere in the body
- Peripheral artery disease: atherosclerosis of arteries in the extremities
- Sudden cardiac arrest

Heart Disease Treatment

Cardiovascular disease can be brought on by a number of contributing factors, thus a number of medications may be prescribed to help treat symptoms and prevent disease progression. The types of treatment vary from person to person and depend on severity of the disease. Certain laboratory goals are usually established in order to monitor progress. These typically include:

- Blood LDL cholesterol ≤ 100 mg/dL
- Glycosylated hemoglobin (HbA1c) $\leq 7\%$
- Blood pressure $\leq 120/80$ mmHg

The first and most important part of treatment for anyone with cardiovascular disease is changes in lifestyle to promote a healthy heart. This includes eating a heart healthy diet low in saturated fat, cholesterol and sodium, exercising at least 30 minutes most days of the week, quitting smoking and limiting alcohol consumption.

A number of medications are prescribed to help control heart disease including:

- ACE inhibitors to lower blood pressure
- Aspirin for blood thinning
- Beta-blockers to lower heart rate, blood pressure and oxygen used by the heart
- Calcium channel blockers to relax arteries and lower blood pressure
- Diuretics to lower blood pressure and treat congestive heart failure

- Nitrates to stop chest pain and improve blood supply to the heart
- Statins to lower cholesterol
- Warfarin for blood thinning

If medications aren't enough, surgery may be recommended to clear blockages. These include angioplasty and stent placement, coronary artery bypass surgery and minimally invasive heart surgery.

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Heart Health and Systemic Enzymes

Treatment options with serious side effects have led to an increasing use of systemic enzyme therapy as a safe alternative to alleviate symptoms and improve quality of life. Certain proteolytic (protein digesting) enzymes have been identified to have extremely beneficial actions when applied to inflammation and fibrin deposition related to this condition. Systemic enzymes, typically taken orally and on an empty stomach, enter directly into the blood stream. Enzymes then circulate throughout the body, acting upon complexes in the blood as well as in tissues and organs.

Heart Disease and Inflammation

Systemic enzymes have successfully demonstrated the ability to reduce signs of inflammation throughout the body.

One study compared blood laboratory values before and after supplementation of Exclzyme (a blend containing the proteolytic enzymes serrapeptase, bromelain, lipase, amylase and other proteases) in patients with inflammation related to rheumatic disease or trauma. Results showed a significant decrease in erythrocyte sedimentation rate (ESR), a long-term predictor of cardiovascular disease. ESR is a measurement comparable to C-reactive protein (CRP) levels in predicting risk of a cardiac event. However, ESR does not change as rapidly as does CRP, and CRP is not affected by other factors, as is ESR.^{1,2}

Serrapeptase, an enzyme extracted from silk worms, and nattokinase, an enzyme extracted from the Japanese fermented soybean food Nattō, have been evaluated in numerous studies for their effectiveness in inflammation reduction and show favorable results.

Inflammatory marker reduction has been documented with the supplementation of serrapeptase. The efficacy of serrapeptase was evaluated in a multi-centre, double-blind, placebo-controlled study of 193 subjects suffering from acute or chronic ear, nose or throat disorders. After 3-4 days of treatment, significant symptom regression was observed in serrapeptase-treated patients. Statistical comparison confirmed the greater efficacy of serrapeptase against all of the symptoms examined. It was concluded that serrapeptase has anti-inflammatory, anti-edemic and fibrinolytic activity, and acts rapidly on localized inflammation.³

Bromelain, a proteolytic enzyme extracted from pineapple, has also been found to be effective in reducing inflammation by blocking chemical signals called cytokines, which promote and increase inflammation.^{4,5} Research has also shown that bromelain disrupts the migration of neutrophils to an inflamed area, where they would otherwise propagate the process. One study measured a 50-85 percent decrease in the migration of neutrophils after bromelain treatment.⁶

Heart Disease and Blood Pressure

Research with nattokinase demonstrates it may help avoid or reduce the likelihood of deep vein thrombosis, cardiac infarction, pulmonary emboli and stroke. It appears to accomplish this via its fibrinolytic, anti-inflammatory and modulating effect on blood pressure. Studies on hypertension demonstrate an average drop of 10.9 percent in Systolic Blood Pressure and a 9.7 percent drop in Diastolic Blood Pressure.^{7,8,9}

A study with rat femoral artery investigating the effect of dietary supplementation with natto extracts on the thickening of the inner most membrane (intimal) of arteries was conducted. It was shown that dietary natto extract supplementation suppressed intimal thickening (0.06 +/- 0.01; P < 0.05) compared with the control group. These findings suggest that natto extracts, because of their thrombolytic activity, suppress intimal thickening after vascular injury as a result of the inhibition of thrombi formation.^{10,11}

Heart Disease and Blood Clots (Thrombosis)

Blood clots (thrombi) form when strands of fibrin accumulate in the circulatory system. These clots can cause blockage of blood flow. If blood flow is blocked, the oxygen supply to the tissue is cut off and it eventually dies. In the heart, this can result in myocardial infarction (heart attack). In the brain, it can result in strokes or mini-strokes. Deep vein thrombosis can result in pulmonary emboli. All these events can be life-threatening. An *in vitro* study, not only demonstrated the powerful fibrinolytic activity of nattokinase, but also significantly reduced the aggregation of red blood cells and lowered whole blood viscosity. The net results are vascular conditions that are less likely to produce blood clots. The authors suggest that nattokinase possesses very real potential as a therapeutic agent in cardiovascular health.¹²

The process of forming a clot is complex and involves several enzymes. However, the body mainly produces one central enzyme for dissolving a clot, plasmin. It happens that the properties of nattokinase are very similar to plasmin. Nattokinase is particularly effective because it enhances the body's natural ability to fight blood clots in several different ways. It dissolves fibrin directly and appears to enhance the body's natural production of both plasmin and other clot-dissolving enzymes like urokinase. An *in vivo* study was undertaken to demonstrate the thrombolytic activity of nattokinase, plasmin and elastase on an induced clot in the common carotid artery of laboratory rats. The results indicate the thrombolytic activity of nattokinase is stronger than that of plasmin or elastase *in vivo* in this model.¹³

Heart Disease and Blood Cleansing

Blood viscosity is an important consideration when assessing blood pressure concerns which arise during disease progression. Studies suggest enzymes such as nattokinase can help reduce red blood cell aggregation and improve flow rates.¹⁴ Serrapeptase has demonstrated the ability to cleanse the blood by removing excess fibrin from circulation, thus reducing blood stickiness and the threat of blood clot formation. Additionally, toxic substances and remnant large food particles can be further degraded in the blood and prepared for filtration through the liver and expulsion.¹

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