



## Red Wine and Your Heart

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**D**rinking red wine has been portrayed by the media as a means of combating heart disease. Do these claims have any real medical basis? The main health benefit of moderate alcohol use appears to be related to its effect on the development of atherosclerosis or the accumulation of fatty plaques in the blood vessels, particularly the coronary arteries that supply the heart. These deposits decrease blood flow to the heart and may promote the formation of vessel-blocking clots, which can result in anginal chest pain or even a life-threatening heart attack. In this article, we examine the scientific literature behind these claims, both epidemiological (studies focused on disease within whole populations) and biological (studies focused on how the molecular components of red wine affect atherosclerosis).

### Epidemiology

The moderate consumption of alcoholic beverages, defined as 1 to 2 drinks per day, has been suggested to increase overall survival rates in a number of different population groups. One standard drink is generally considered to be 1.5 oz of liquor, 5 oz of wine, or 12 oz of beer. The patient groups that appear to benefit most from light to moderate drinking, middle-aged men and women, are also

those who are at increased risk for developing cardiovascular disease. Thus, the reduction in total mortality that is associated with moderate alcohol consumption, generally a 30% reduction in risk, is believed to be the result of a reduction in the risk of developing atherosclerotic disease.

When the data from 51 epidemiological studies were combined, they showed that the risk of coronary heart disease decreased by approximately 20% when 0 to 2 alcoholic drinks were consumed per day. Apparently healthy adults, patients with a history of heart attack, and patients with diabetes all appeared to benefit. Results from the large Health Professionals Follow-Up Study, a study in which 38,077 male health professionals who were free of cardiovascular disease were observed for 12 years, suggested that drinking 1 to 2 drinks per day, 3 to 4 days per week decreased the risk of having a heart attack by as much as 32%. The formation of an occluding blood clot in an artery that supplies part of the brain can lead to stroke. Light to moderate alcohol consumption was found to be associated with an approximately 20% reduction in the risk for ischemic stroke and may even be beneficial in preventing subsequent strokes.

### Is Red Wine Better?

Alcohol intake from any type of alcoholic beverage appears to be benefi-

cial, but some studies suggest that red wine confers additional health benefits. The regular drinking of red wine has been suggested as the explanation for the “French paradox,” the relatively low incidence of coronary atherosclerosis in France as compared with other Western countries, despite the generally high intake of saturated fat in the French diet. Support for a more pronounced cardioprotective effect for red wine as compared with other alcoholic beverages first emerged from the Copenhagen City Heart Study, in which 13,285 men and women were observed for 12 years. The results from this study suggested that patients who drank wine had half the risk of dying from coronary heart disease or stroke as those who never drank wine. Those who drank beer and spirits did not experience this advantage. The additional benefit of red wine is supported further by an analysis of 13 studies involving 209,418 participants. This analysis showed a 32% risk reduction of atherosclerotic disease with red wine intake, which was greater than the 22% risk reduction for beer consumption. Other studies and reviews have failed to show a beneficial effect for red wine, however, and hence it could be concluded that other lifestyle factors such as diet, exercise, socioeconomic status, or pat-

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tern of alcohol consumption may have played a role in giving wine drinkers an advantage in lowered rates of atherosclerosis.

The chemical composition of red wine may contribute to its apparent benefit. A series of scientific studies suggests that the polyphenolic compounds in red wine, such as flavonoids and resveratrol, may play an active role in limiting the start and progression of atherosclerosis.

### **Effect of Red Wine on the Process of Atherosclerosis**

In addition to ethanol, the polyphenolic compounds in red wine may play an active role in limiting the initiation and progression of atherosclerosis. Atherosclerosis starts when blood vessels begin to lose their natural ability to relax, or vasodilate. Traditional cardiovascular risk factors, such as smoking, high blood pressure, high cholesterol, and diabetes, promote this detrimental process. Both the alcohol and polyphenolic compounds found in red wine appear to favorably maintain healthy blood vessels (vasculature) by promoting the formation of nitric oxide (NO), the key chemical relaxing factor that plays a pivotal role in the regulation of vascular tone. NO protects against vascular injury, inhibits the adhesion of inflammatory cells to the vessel wall, and limits the activation of platelets, the cell particles responsible for blood clotting.

One of the most important alterations caused by regular alcohol consumption is an increase in levels of high-density lipoprotein (HDL) cholesterol, or the “good cholesterol.” One to 2 drinks per day of any alcohol type have been shown to increase HDL cholesterol by about 12%. This extra HDL cholesterol can then serve to remove some of the “bad cholesterol,” low-density lipoprotein (LDL) cholesterol, from the circulation and lessen the amount of material available for fatty plaque formation. Plaque formation may be further hindered by the phenolic substances in red wine that possess antioxidant properties. Studies

in rabbits, hamsters, and mice suggest that the antioxidant properties of wine limit early atherosclerotic plaque formation and progression. Furthermore, red wine has been shown to reduce the expression of several important proteins that promote atherosclerosis. For a discussion of the process of atherosclerosis and what individual proteins do, see the first reference listed in the “Additional Reading” section at the end of this article.

The final stage in atherosclerosis occurs when the plaque ruptures, possibly resulting in either a heart attack or stroke. Both the alcohol and polyphenolic compounds in red wine appear to have anticlotting, or antithrombotic, action. When the plaque ruptures, a surface that favors clotting is exposed. Overall, light to moderate consumers of alcohol have lower levels of proteins that promote clot formation, such as fibrinogen, von Willebrand factor, and factor VII. The efficiency of platelet clumping also is decreased.

### **Will a Glass of Red Wine Each Day Keep Atherosclerosis at Bay?**

Despite considerable data from epidemiological studies and strong suggestions from experimental research, the evidence is still insufficient to encourage patients who do not drink to start consuming red wine as part of a strategy to protect against atherosclerosis. Too much alcohol consumption has been shown repeatedly to contribute to cardiovascular disorders such as alcoholic cardiomyopathy (which develops when the heart muscle becomes too weak to pump blood effectively), high blood pressure, and certain electrical disturbances of the heartbeat. Excessive alcohol use can lead to liver cirrhosis, cancers, pancreatitis, neurological disorders, motor vehicle accidents, and addiction. Individuals with a personal or family history of alcohol abuse or liver disease should avoid drinking alcohol. Nevertheless, many medical societies view light use of ethanol as potentially beneficial to the cardiovascular system, although no

formal recommendations for light alcohol consumption have been made. The American Heart Association recommends that alcohol use be an item of discussion between physician and patient. Heavy drinkers should reduce their consumption, and alcoholics should seek help to overcome their addiction. There is no justification for nondrinkers to start consuming wine as a preventive measure, considering that several other well-proven therapies exist for cardiovascular risk reduction, such as exercise, smoking cessation, blood pressure control, and cholesterol lowering, that do not have wine’s undesirable effects. For those patients who are established moderate drinkers, abstinence should not be enforced. Increasing alcohol consumption for the purposes of cardioprotection, however, is not justified. Hence, individuals should seek the advice of a physician to make a recommendation about alcohol consumption, with or without the clinical manifestations of atherosclerosis. The potential risks and benefits of alcohol should be assessed on a case-by-case basis. Thus, patients are not advised to drink wine for their health, but rather to drink—moderately—to their health.

### **Additional Reading**

For further information, please consult the following sources:

- Szmitko PE, Wang CH, Weisel RD, de Almeida JR, Anderson TJ, Verma S. New markers of inflammation and endothelial cell activation: Part I. *Circulation*. 2003;108:1917–1923. Available at: <http://circ.ahajournals.org/cgi/content/full/108/16/1917>. Accessed December 7, 2004.
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