Cholesterol and Heart Disease

PHYSICIANS COMMITTEE FOR RESPONSIBLE MEDICINE

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Every day, nearly 2,600 Americans die of some type of cardiovascular disease, an average of one death every 34 seconds, and 7.1 million Americans have had a heart attack during their lifetimes.[1] Those who survive often go on to have another heart attack later on. But this need not happen. Eating habits and other lifestyle factors play a large role in the risk of heart disease. Moreover, heart disease can usually be prevented and even reversed.

Atherosclerosis

Atherosclerosis is the all-too-common form of heart disease. Plaques of cholesterol and other substances, very much like small tumors, form in the artery walls and eventually, the passageway for blood becomes clogged. Less blood flow means less oxygen for the heart muscle. Chest pain (angina) occurs, usually following exercise or excitement. When the blood supply is completely cut off, a part of the heart muscle dies—this is known as a heart attack.

What Is Atherosclerosis?

Atherosclerosis is not caused by old age. When battlefield casualties were examined during the Korean and Vietnam wars, American soldiers had significant atherosclerosis at only 18 or 20 years of age. Their Asian counterparts, raised on a diet consisting mainly of rice and vegetables, had much healthier arteries.

Older people are more likely to have heart problems than younger people because they have had more time to indulge in unhealthy habits, not because they have a hereditary tendency towards heart disease. Usually, the problem is not due to genetics, but to eating and smoking habits. Your doctor can tell you if you are one of only about 5 percent of the population with a true genetic tendency towards heart disease.

Many studies have shown the connection between cholesterol and heart problems. Beginning in 1948, under the direction of William Castelli, M.D., the population of Framingham, Massachusetts, has been monitored to see what influences the rate of heart disease.[21] Castelli's study has shown that there is a cholesterol level below which, essentially, coronary artery disease does not occur. Framingham data show that only patients with cholesterol levels of less than 150 milligrams per deciliter (mg/dl) achieve the lowest coronary artery disease risk. In the first 50 years of the Framingham study, only five subjects with cholesterol levels of less than 150 mg/dl developed coronary artery disease. Rural residents in the developing areas of Asia, Africa, and Latin America typically have total-cholesterol levels of about 125-140, and they do not develop coronary artery disease.[2]

CHOLESTEROL

What Is Cholesterol?

Cholesterol is not the same as fat. If you had a bit of cholesterol on the end of your finger, it would look like wax. The liver manufactures cholesterol and sends it out to be used in the manufacture of hormones and cell membranes, and in other parts of the body. Cholesterol levels are measured in milligrams (mg) of cholesterol per deciliter (dl) of blood serum. Based on the results of the Framingham Heart Study and other research, the ideal level appears to be below 150 mg/dl. At that point, coronary artery disease is very unlikely.

Unfortunately, nearly 107 million Americans have cholesterol levels over 200,[1] with the average level for coronary artery disease victims being 225.[3] Surprisingly, the federal government's recommended maximum cholesterol level is still as high as 200.

Different Types of Cholesterol

When cholesterol is transported in the bloodstream, it is packed into low-density lipoproteins (LDL), sometimes called the "bad cholesterol." Although LDL is necessary in limited quantities (LDL delivers cholesterol to various parts of the body), a high LDL cholesterol level can dramatically increase your risk of a heart attack.

When cholesterol is released from dead cells, it is picked up for disposal in another kind of package, called high-density lipoproteins (HDL), the "good cholesterol." When doctors measure cholesterol levels, they first look at total cholesterol as a good, quick guide to a person's risk. For a more exact guide, they divide the total level by the HDL level. The lower your total cholesterol level, and the higher your HDL as a proportion of this, the lower your risk of a heart attack.

The ratio of total cholesterol to HDL should, ideally, be less than 4 to 1. Unfortunately, the average American male's ratio is much higher than that, at 5.0 to 1. Vegetarians, on the other hand, average only about 2.8 to 1.3

Smoking and obesity appear to lower HDL, but HDL can be raised somewhat by vigorous exercise and foods which are rich in vitamin C.[4]

HOW TO LOWER YOUR CHOLESTEROL

Decrease Cholesterol Intake

Since our bodies make plenty of cholesterol for our needs, we do not need to add any in our diet. Cholesterol is found in all foods that come from animals: red meat, poultry, fish, eggs, milk, cheese, yogurt, and every other meat and dairy product. Choosing lean cuts of meat is not enough; the cholesterol is mainly in the lean portion. Many people are surprised to learn that chicken contains as much cholesterol as beef. Every four-ounce serving of beef or chicken contains 100 milligrams of cholesterol. Also, most shellfish are very high in cholesterol. All animal products should be avoided for this reason. No foods from plants contain cholesterol.

Every 100 mg of cholesterol in your daily diet adds roughly 5 points to your cholesterol level, although this varies from person to person. In practical terms, 100 mg of cholesterol is contained in four ounces of beef or chicken, half an egg, or three cups of milk. Beef and chicken have the same amount of cholesterol, 25 mg per ounce.[6]

People can reduce their cholesterol levels dramatically by changing the foods they eat. Every time you reduce your cholesterol level by 1 percent, you reduce your risk of heart disease by 2 percent.[5] For example, a reduction from 300 mg/dl to 200 mg/dl (i.e., a one-third reduction) will yield a two-thirds reduction in the risk of a heart attack. For some people, the benefits are even greater. Decrease Fat Intake, Especially Saturated Fats

Keeping total fat intake low is an important way to lower cholesterol and reduce the risk of other chronic diseases. Animal products, especially meat, ice cream, and cheese, as well as fried food, margarine, vegetable oil, mayonnaise, and many desserts are all loaded with fat. Unfortunately, the food industry often presents the fat content of certain products in a misleading way. Reporting the fat content by weight allows the water content to throw off the measurements and make these products look more healthful than they actually are. The most important piece of information to look for is the percentage of calories from fat.

In the leanest cuts of beef, about 30 percent of the calories come from fat. Skinless chicken is nearly as high, at 23 percent. Even without the skin, chicken is never truly a low-fat food. Most cheeses contain 60 to 80 percent of calories from fat, and premium ice creams often contain 45 to 65 percent of calories from fat. Butter, margarine, and oils of all types are typically 95 to 100 percent of calories from fat. Grains, beans, vegetables, and fruits, however, have comfortably less than 10 percent of their calories coming from fat.

Animal products also contain saturated fat, which causes the liver to produce more cholesterol. Unsaturated fats do not have this effect. Saturated fats are easy to spot because they are solid at room temperature, whereas unsaturated fats are liquid. Beef, chicken, and most other animal products contain substantial amounts of saturated fat. This is another good reason for avoiding such products.

A few vegetable oils are also high in saturated fats. These are known as tropical oils: palm oil, palm kernel oil, and coconut oil. Hydrogenated oils are also high in saturated fat.

While liquid vegetable oils are much better than animal fats and tropical oils, all fats and oils are natural mixtures of saturated and unsaturated fats. Therefore, none of them will do your coronary arteries any good, and should be kept to a minimum.

The following chart shows the percentages of saturated fat in different kinds of fat:

Animal Fats		**Vegetable Oils**	
Beef Tallow	50%	Canola Oil	12%
Chicken Fat	30%	Corn Oil	13%
Pork Fat (lard)	39%	Cottonseed Oil	26%
		Olive Oil	13%
		Peanut Oil	17%
Tropical Oils		Safflower Oil	9%
Coconut Oil	87%	Sesame Oil	14%
Palm Oil	49%	Soybean Oil	15%
Palm Kernel Oil	82%	Sunflower Oil	10%

While the saturated part of oil is what increases your cholesterol level, the unsaturated parts have health problems of their own. These include a tendency to increase free-radical production, impair the immune system, and increase body weight.

Go Vegan

As suggested above, basing one's diet on plant foods—grains, beans, vegetables, and fruits—is the best way to keep saturated fat intake low and to avoid cholesterol completely. A vegan diet is free of all animal products and yields the lowest risk of heart disease. One study showed that people who adopt a vegetarian diet reduce their saturated fat intake by 26 percent and achieve a significant drop in cholesterol levels in just six weeks.[7] Besides the very low levels of fat eaten in a typical vegetarian diet, vegetable protein also helps decrease risk for heart disease. Studies have shown that replacing animal protein with soy protein reduces blood cholesterol levels even when the total amount of fat and saturated fat in the diet remain the same.[8]

Fiber: The Added Advantage of a Vegetarian Diet

Soluble fiber helps to slow the absorption of some food components such as cholesterol. It also acts to reduce the

amount of cholesterol the liver makes. Oats, barley, beans,[9] and some fruits and vegetables are all good sources of soluble fiber. There is no fiber in any animal product.

Maintain Your Ideal Weight

Losing weight helps to increase HDL levels (the "good cholesterol"). Carrying excess weight can affect one's risk for heart disease. People who are thick around the middle ("apple-shaped") are at a higher risk than those who carry excess weight around the hips and buttocks ("pear-shaped").[10] "Apple-shaped" people should lose weight through a low-fat diet and aerobic exercise.

Blood Pressure

Blood pressure is also a risk factor for heart disease and can lead to strokes and other serious health problems as well. Luckily, this is another area where we can take control by watching the foods we eat.

Salt has an effect on blood pressure and should be kept to a minimum. But this is only the beginning. Numerous studies have shown that vegetarians have lower blood pressure than non-vegetarians. A low-fat, high-fiber vegetarian diet, even without lowering salt intake, can lower blood pressure by as much as 10 percent. The biological explanation for this has never been clear. Vegetarian diets are lower in fat and sodium, but there is a blood pressure-lowering effect beyond those two factors. An additional benefit is reduced iron storage in vegetarians. Studies have shown a strong link between iron and heart disease, and also between iron and hypertension.[11]

Other Factors

Other factors can have as much effect on the heart as diet. A healthful meal followed by a cigarette is not much use. People who smoke have a much higher risk of heart disease than non-smokers do. Moderation is not good enough—it is essential to quit.

Physical activity is also important. Regular light exercise, such as a daily half-hour walk, can cut death rates dramatically.

Here are some popular activities and the number of calories they burn per hour for a 150-pound adult:

Activity	Calories Burned Per Hour
Bicycling	400
Canoeing	180
Cooking	180
Dancing, ballroom	240
Gardening	480
Golf	345
Jumping Rope	570
Ping-Pong	285
Playing Piano	165
Racquetball	615
Swimming	525
Tennis doubles	270
Tennis singles	435
Volleyball	330
Walking brisk	360

Finally, stress takes a toll on the heart. Daily life is full of events that cause our hearts to beat a bit faster and drive up our blood pressure.[12] Reducing stress means keeping your challenges within a range you can manage. Getting adequate rest and learning techniques for stress reduction, meditation, or yoga can be very helpful.

That being said, taking control of the other factors cannot undo the effects of a bad diet. The only way to a healthy heart is an all-encompassing healthy lifestyle which incorporates a varied, low-fat, vegetarian diet, daily physical activity, and stress reduction.

And Now the Good News: Reversing Heart Disease

On July 21, 1990, *The Lancet* published the findings of Dean Ornish, M.D., who demonstrated that heart disease can actually be reversed without medicines.[13] Until then, most doctors were not even attempting to reverse heart disease, even though it was, as it is now, the most common cause of death. Most believed that the plaques of cholesterol and other substances that clog the arteries to the heart would not go away. The traditional way to remove them was to wait until they became severe enough to warrant a bypass or angioplasty.

At the University of California in San Francisco, Dr. Ornish tested the theory that a more potent diet, along with other lifestyle changes, might actually reverse heart disease. He selected patients who had plaques that were clearly visible on angiograms and split the patients into two groups. Half were referred to a control group in which they received the standard care that doctors prescribe for heart patients. The other half began a vegetarian diet in which less than 10 percent of calories were contributed by fat. They were also asked to begin a program of modest exercise and learned to manage stress through a variety of simple techniques. Of course, smoking was not permitted.

Dr. Ornish's patients started to feel better almost immediately, and continued to improve over the course of the year. They had previously been struggling with the crushing chest pain of heart disease, but "most of them became essentially pain-free," Dr. Ornish said, "even though they were doing more activities, going back to work, and doing things that they hadn't been able to do, in some cases, for years."

Not only did their cholesterol levels drop dramatically, but, after a year, 82 percent of the patients who followed Dr. Ornish's program showed measurable reversal of their coronary artery blockages. The plaques were starting to dissolve with no medications, no surgery, and no side effects.

The control group, following the more traditional medical routine, did not do so well. For most patients, chest pain did not go away, but continued to get worse, and their plaques continued to grow, cutting off blood flow to the heart a bit more with every passing day.

The work of Dr. Ornish and others has made previous recommendations obsolete.

Many doctors still recommend "chicken and fish" diets, even though a number of studies have shown that, in general, heart patients who make such moderate dietary changes tend to get worse over time. Those who adopt a low-fat, vegetarian diet, get daily physical activity, avoid tobacco, and manage stress, stand the best chance of reversing heart disease.

We now have the most powerful tools yet for gaining control over the health of our hearts.

Suggested Reading

For more information on lowering cholesterol, and other benefits of a low-fat vegetarian diet, PCRM recommends:

- *Foods That Fight Pain* by Neal Barnard, MD.
- *Eat Right, Live Longer* by Neal Barnard, M.D.
- *Food for Life* by Neal Barnard, MD.
- *Dr. Dean Ornish's Program for Reversing Heart Disease* by Dean Ornish, MD.
- *The McDougall Plan* by John McDougall, MD.

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