



HEALTH

Cholesterol and Fats

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Quick Facts...

Fats and cholesterol can help keep our bodies healthy or they can promote disease.

There are several types of fat.

Dietary fats and cholesterol can affect blood cholesterol levels.

An elevated blood cholesterol level is a risk factor for heart disease.

Most Americans eat too much fat and cholesterol.

Cholesterol

What is cholesterol? Cholesterol is a waxy, fat-like substance found in all animals including people. It is an essential part of cells in the body and is used to make certain hormones and digest fats. There are two different types of cholesterol. Blood, or serum, cholesterol circulates in the blood. Dietary cholesterol comes from the food we eat.

Is all blood cholesterol the same? The chemical substance is the same. However, it is transported in the blood by different carriers. The relative amounts of cholesterol transported by each carrier can affect the risk of heart disease. The two major blood cholesterol carriers are LDL and HDL (see Table 1).

Where do we get cholesterol? Our bodies can make all of our cholesterol, but most people also get it from foods. Different foods vary in the amount of cholesterol they contain. Only animal products have cholesterol; plants do not. See Table 5.

Table 1: Characteristics of HDL and LDL.

	LDL	HDL
Full Name:	Low Density Lipoprotein.	High Density Lipoprotein.
What it does:	Takes cholesterol from the liver to the rest of the body.	Primarily takes cholesterol from body tissue back to liver.
Effect on risk of heart disease:	Excess amounts increase risk.	High amounts reduce risk.
Nickname:	"Bad" cholesterol.	"Good" cholesterol.

Is it harmful? Cholesterol is necessary for a healthy body. By itself, it is not harmful. However, a high blood level of total cholesterol is a major risk factor for heart disease, along with high levels of LDL cholesterol. The higher the level, the greater the risk. In contrast, high levels of HDL cholesterol are protective.

The National Cholesterol Education Program (NCEP) recommends that everyone age 20 and older obtain what is called a "fasting lipoprotein profile" every five years. This is a blood test done after a 9 to 12 hour fast without food, liquids or pills. It reveals information about the total cholesterol, LDL cholesterol, HDL cholesterol, and triglyceride levels in the blood. Table 2 shows how the results from a fasting lipoprotein profile are classified.

The results of the test, along with other factors, helps determine your overall risk for heart disease. When determining your total risk, consider other risk factors such as age, gender, family history, smoking, hypertension, diabetes, and obesity.

Fats

Is eating fat unhealthy? Eating some fat is necessary. It is an important source of essential fatty acids (linolenic and lionoleic acids) and concentrated

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Here is a sample nutrition label seen on foods:

Spinach Souffle Nutrition Facts

Serving Size ½ cup	
Servings Per Container 3	
Amount Per Serving	
Calories 150	Calories from Fat 90
	% Daily Value*
Total Fat 10g	15%
Saturated Fat 2g	10%
Cholesterol 120mg	38%
Sodium 480mg	19%
Total Carbohydrate 9g	3%
Dietary Fiber 0g	12%
Sugars 4g	
Protein 6g	
Vitamin A 35%	• Vitamin C 2%
Calcium 10%	• Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrates			
Dietary Fiber		25g	30g
Calories per gram:			
Fat 9 • Carbohydrate 4 • Protein 4			

This label tells you that this spinach souffle provides 10 g total fat in a half cup serving. This is 15% of the Daily Value for total fat, based on a 2,000-calorie diet: 10 grams fat / 65 g total fat in a 2,000-calorie diet = 15%. (See fact sheet 9.365, Understanding the Food Label).

Evaluate your diet as a whole. The percent of calories from fat for the entire diet is more important than the percentage of fat from an individual food.

energy — it has more than twice as many calories per ounce as sugar, starch or protein. Fats help carry fat-soluble vitamins A, D, E and K. Fats can also make food taste better, aid in cooking, and help keep the hunger pangs away.

Yet, eating too much fat may lead to obesity, which is unhealthy. It also may increase the risk of heart disease and some forms of cancer.

Are all fats the same? There is not a single type of fat. Rather, the word “fat” is often used to refer to all of the fatty substances found both in food and in the body.

Types of Fat (See Table 3)

Essential Fatty Acids: Types of fat that cannot be made in the body. We must eat foods rich in these as they are the building block for other important fatty acids (e.g., DHA/EPA).

Lipid: Scientific term referring to fat, cholesterol and other fat-like substances. A common quality among lipids is that they do not dissolve in water.

Lipoprotein: A protein-coated transporter that carries fat and/or cholesterol in the bloodstream.

Triglycerides: Scientific name for the main form of fat found in the diet and in the body. Most of the fat in the body is stored as triglycerides.

Saturated Fats: Usually solid at room temperature, saturated fats have all of the hydrogen atoms they can hold (saturated with hydrogen). Saturated fats primarily come from animal products, but are also found in tropical plant oils, such as coconut and palm.

Monounsaturated Fats: Liquid at room temperature, monounsaturated fats are missing one pair of hydrogen atoms. Monounsaturated fats primarily come from plants and include olive oil, canola oil and peanut oil.

Polyunsaturated Fats: Liquid at room temperature, polyunsaturated fats are missing two or more pairs of hydrogen atoms. Many common vegetable oils, such as corn, soybean, safflower and sunflower oil, are high in polyunsaturated fats.

Hydrogenated Fats: Polyunsaturated fats and monounsaturated fats are sometimes processed to make them solid at room temperature and to protect against rancidity. Hydrogen atoms are added through a process called hydrogenation.

Trans Fatty Acids: A type of fat formed during the process of hydrogenation. Trans fatty acids have been shown to increase LDL cholesterol and lower HDL cholesterol, which may increase the risk for heart disease.

Omega-3 Fatty Acids: A type of fatty acid that is highly polyunsaturated. Omega-3 fatty acids are mainly found in higher-fat, cold-water fish, such as salmon, mackerel and herring, as well as omega-3 fortified eggs. Diets high in omega-3 fatty acids may help lower levels of LDL cholesterol and triglycerides.

Fats and Cholesterol

How are fats related to blood cholesterol? Scientific evidence indicates that the amount and type of dietary fat can affect blood cholesterol. Eating less fat, especially saturated fats, has been found to lower blood cholesterol levels. Replacing some saturated fats with polyunsaturated and monounsaturated fats (especially olive and canola oil) also can help lower blood cholesterol. Dietary cholesterol can raise blood cholesterol but generally is not as important as saturated fat and total fat in the diet. Remember, high total blood cholesterol levels and LDL cholesterol levels increase risk of heart disease while lower levels reduce risk. Higher levels of HDL cholesterol help lower the risk for heart disease.

Table 2: Classifications of a Fasting Lipoprotein Profile.

Total Cholesterol	
Desirable	< 200 mg/dL
Borderline high	200 – 239 mg/dL
High	≥ 240 mg/dL
LDL Cholesterol	
Optimal	< 100 mg/dL
Near Optimal/Above Optimal	100 – 129 mg/dL
Borderline High	130 – 159 mg/dL
High	160 – 189 mg/dL
Very High	≥ 190 mg/dL
HDL Cholesterol	
Low	< 40 mg/dL
High ¹	≥ 60 mg/dL
Triglycerides	
Normal	< 150 mg/dL
Borderline High	150 – 199 mg/dL
High	200 – 499 mg/dL
Very High	≥ 500 mg/dL

¹An HDL of 60 mg/dL and above is considered protective against heart disease.

There are several things you can do to reduce the amount of fat and cholesterol you eat.

The following terms describe products that help reduce intake of fat:

- *Low fat: 3 grams or less per serving.*
- *Low saturated fat: 1 gram or less and less than 0.5 grams trans fat per serving.*
- *Low cholesterol: Less than 20 mg cholesterol and 2 grams or less of both saturated fat and trans fat per serving.*
- *Low calorie: 40 calories or less per serving. Synonyms for low include “little,” “few” and “low source of.”*
- *Reduced: At least 25 percent fewer calories, fat, saturated fat, or cholesterol per serving than the original product.*
- *Lean: Less than 10 grams fat, less than 4.5 grams saturated fat and trans fat, and less than 95 mg cholesterol per serving and per 100 grams.*
- *Extra lean: Less than 5 grams fat, less than 2 grams saturated fat and trans fat, and less than 95 mg cholesterol per serving and per 100 grams.*
- *Light: 1/3 fewer calories, 1/2 the fat, or 1/2 the sodium of reference food.*

How much fat and cholesterol is too much?

Frequently, recommendations for fat are given in percentage of calories from fat or fat calories. (Currently, the average American gets about 33 percent of total calories from fat.) Most medical experts think this is too much. The *U.S. Dietary Guidelines* advise a general reduction in fat (especially saturated fat) and cholesterol. Dietary recommendations by the American Heart Association and the National Cholesterol Education Program for fat and cholesterol intakes for both the general public and for people with high LDL cholesterol, heart disease and/or diabetes are presented in Table 4.

Diet therapy may not be enough for some people with high risk. Most people, however, continue diet therapy at least six months before deciding whether to add drug treatment.

Children can eat a diet consistent with adult guidelines to maintain appropriate growth while lowering risk for future cardiovascular disease. Adoption of a healthy diet and lifestyle in youth is recommended because it tracks into adulthood.

In what foods are fats and cholesterol found? In some foods, fats are obvious, such as in noticeably greasy, fried or oily foods. In other foods, they are more invisible. Cholesterol comes from animal products but has no tell-tale signs. It is not found in food products made from plants. A food can be high in fat and cholesterol (fried egg), high in fat but low in cholesterol (peanut butter), low in fat and high in cholesterol (shrimp) or low in both (fruit). Table 5 shows the fat and cholesterol contents of several foods.

What about fish and fish oil supplements? Diets high in fish, especially cold-water fish like salmon, herring, mackerel, and whitefish, have been linked to reduced risk of heart disease. People who eat large amounts of fish tend to have lower blood cholesterol and triglyceride levels. The high amounts of omega-3 fatty acids found in fish are believed to be the reason. The current recommendation is to consume a variety of fish (preferably oily) at least two times per week. The use of fish oil supplements could be considered with consultation with your doctor, especially in individuals with cardiovascular disease and elevated triglycerides.

Reducing Fat and Cholesterol

Read labels and shop carefully. The Nutrition Facts panel on the food label provides the necessary information to help consumers meet the American Heart Association’s and the USDA/Health and Human Services’ Dietary Guidelines. The Nutrition Facts panel lists the Daily Reference Values (DRV) for specific nutrients, including fat, saturated fat and cholesterol. DRVs are set by the Food and Drug Administration and are intended to help consumers evaluate their food choices to determine how their intake of certain nutrients compares to desirable intakes. The DRV for fat is 65 g, for saturated fat 20 g, and for cholesterol 300 mg.

Specific health claims can be made for food products that meet certain requirements. For example, “While many factors affect heart disease, diets low in saturated fat and cholesterol may reduce the risk of this disease.” In order to make a health claim about heart disease and fats, the food must be low in fat, saturated fat and cholesterol. Terms “lean” and “extra lean” can be used to describe the fat content of meat, poultry, seafood and game meats if certain standards are met.

Products that have “percent fat free” claims must accurately reflect the amount of fat present in 100 grams of the food. “Percent fat free” products must

Table 3: Polyunsaturated, monounsaturated and saturated fats.

	Polyunsaturated (fats, oils)	Monounsaturated (fats, oils)	Saturated (fats)
Amounts of hydrogen:	Missing many hydrogen atoms.	Missing some hydrogen atoms.	Filled up with hydrogen.
How they affect our health:	Can lower blood cholesterol, may lower HDL.	Lowers blood cholesterol but not HDL.	Can raise blood cholesterol.
At room temperature:	Polyunsaturated and monounsaturated fats are liquid (so we call them oils).		Saturated fats are usually solid or firm.
Where they come from:	Mostly from plants: safflower oil, corn oil, soybean oil, cottonseed oil, sesame oil	Mostly from plants: olive oil, peanut oil, canola oil	Mostly from animals: fat in meat, butter, lard, cheese, whole milk, cream. Some from plants: coconut oil, palm oil, cocoa butter (in chocolate), hydrogenated vegetable oil.

Table 4: Recommendations for Calories, Fat and Cholesterol Intakes*

Nutrient	People without Heart Disease or High LDL Cholesterol	People with Heart Disease, Diabetes, or High LDL Cholesterol
Total Calories	Balance calorie intake and physical activity to achieve or maintain a healthy body weight.	
Total Fat	Less than 30% of total calories	25 – 35% of total calories ¹
Saturated Fat	Less than 10% of total calories	Less than 7% of total calories
Polyunsaturated Fat	Up to 10% of total calories	Up to 10% of total calories
Monounsaturated Fat	Up to 20% of total calories	Up to 20% of total calories
Cholesterol	Less than 300 mg/day	Less than 200 mg/day

*By the American Heart Association and the National Cholesterol Education Program

¹A higher fat intake is allowed, provided most of it is unsaturated fat, and may be needed to prevent low HDL levels from worsening

meet the low fat or fat free product definitions. For example, if a product contains 2.5 grams of fat per 50 grams, the claim must be “95 percent fat free.”

Learn the heart-healthy facts. It is true that fat and cholesterol often are found in meats, but meats can provide many important nutrients. Many people think chicken and fish are healthier than red meat. However, with careful selection and preparation, red meats can be low in fat and included in a heart-healthy diet. Remember, chicken and fish, which often are low-fat choices, can be prepared so they are higher in fat than lean beef or pork. Dark meat poultry has more fat than white meat. Keeping the skin on chicken or frying it adds more fat. What you buy at the store and how you cook the food makes the difference.

To reduce meat fats:

- Cut off all visible fat.
- Thoroughly drain fat off all cooked meats.
- Cook stew and other meats a day ahead of time. Remove the hardened fat from the top before reheating or making chili, stew or soups.
- Baste with wine, tomato juice or bouillon instead of drippings.
- Broil rather than pan-fry meats, such as hamburger, chops and steak.
- Remove skin from chicken.
- Buy lean or extra lean meats.

Examples of lean meat choices:

Beef — round steak, rump roast, top ground steak and roast, tip steak and roast, lean cubed steak, top loin steak, tenderloin steak, flank, sirloin, ground beef, lean or extra lean.

Pork — leg roast (fresh ham), leg steak, lean pork cutlets, center rib chop and roast, butterfly chop, sirloin roast, tenderloin, tenderloin roast, ground pork, lean or extra lean, lean shoulder cubes, lamb-leg, loin chops.

Change recipes to reduce fats. Many favorite recipes can still be used in a reduced-fat diet.

- Try cutting oil or fat in half. You usually can’t tell the difference.
- Use lean meats in recipes.
- In casseroles, use more vegetables and less meat and be careful with the sauces.

When shopping, buy foods: with less fat:

- Hamburger with deep color or labeled “lean”
- Least fatty grades of meat
- Nonfat, 1%, or 2% milk
- Nonfat dry milk
- Tuna packed in water

instead of those with more fat:

- Hamburger with light pink color or labeled “regular”
- Heavily marbled beef
- Whole milk
- Nondairy coffee creamer
- Tuna packed in oil

Eat more:

- Vegetables
- Fruits
- Lean meats, fish, poultry
- Vegetable protein — peas, lentils, beans, grains, nuts, seeds, soy
- Whole grains in breads, cereals, pasta and white grains
- Fruit for dessert and snacks

Eat less:

- Fried foods
- Fatty and processed meats — lunch meats, bacon, hot dogs, sausage
- Desserts high in fat — ice cream, pastries, pies, cheesecake

- Use low-fat alternatives for sour cream, mayonnaise and whipping cream, such as nonfat yogurt or whipped topping made from skim milk.
- Use two egg whites instead of one yolk.

Watch portion sizes. Moderation is the key. For example, a lean 3-ounce meat portion provides you with the nutrients you need. A piece of meat the size of a deck of cards is about a 3-ounce portion. Don't eliminate — just cut down. Eat high-fat food less often and in small portions.

Increase fiber intake. Research has shown eating foods rich in soluble fiber may decrease LDL cholesterol levels. Foods high in soluble fiber include cereal grains, beans, peas, legumes and many fruits and vegetables. For more information see fact sheet no. 9.333 *Dietary Fiber*.

There are several things you can do to reduce the amount of fat and cholesterol you eat.

Table 5: Spotting hard to see fats and cholesterol in foods.

Category, food (mg/dl)	Serving size	Grams fat per serving	Cholesterol
Dairy			
ice cream	1 cup	14	59
egg, cooked	1	6	213
cheddar cheese	1 oz.	9	30
Meat			
regular ground beef, cooked (70% lean)	1 patty	12	60
hot dogs	1	16	30
chicken leg w/skin	1	20	139
Nuts and seeds			
peanut butter	1 Tbsp.	8	0
Baked goods			
doughnut, glazed (3 1/4" diameter)	1	14	4
brownies (2 3/4" x 7/8")	1 square	9	10
Candy			
chocolate	1 oz.	9	7
Other			
olives, giant size	5	3	0

*Fats do not always come in teaspoons, but all fat must be counted in what you eat each day. For example, the fat in a hot dog cannot be measured with a teaspoon, but it may be a big source of fat, contributing 3 teaspoons per 2 ounces of hot dog.

References: National Heart, Lung and Blood Institute. Executive Summary of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). *Journal of the American Medical Association*, 285(19): 2486-97, 2001.

American Heart Association. Diet and lifestyle recommendations revision 2006: A scientific statement from the American Heart Association nutrition committee. *Circulation*, 114:82-96, 2006. U.S. Department of Agriculture. Agricultural Research Service. Nutrient intakes from food: Mean amounts and percentages of calories from protein, carbohydrate, fat, and alcohol, One day, 2003 - 2004. 2007. Or www.ars.usda.gov/ba/bhnrc/fsrg.

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