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Fats & Cholesterol

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Fats and Cholesterol - The Good, The Bad, and The Healthy Diet

"Eat a low-fat, low-cholesterol diet." Most of us have heard this simple recommendation so often over the past two decades that we can recite it in our sleep. Touted as a way to lose weight and prevent cancer and heart disease, it's no wonder much of the nation - and food producers - hopped on board.

Unfortunately, this simple message is now largely out of date. Detailed research -much of it done at Harvard - shows that the total amount of fat in the diet, whether high or low, isn't really linked with disease. What really matters is the type of fat in the diet.(1) Bad fats increase the risk for certain diseases and good fats lower the risk. The key is to substitute good fats for bad fats.

And cholesterol in food? Although it is still important to limit the amount of cholesterol your eat, especially if you have diabetes, dietary cholesterol isn't nearly the villain it's been portrayed to be. Cholesterol in the bloodstream is what's most important. High blood cholesterol levels greatly increase the risk for heart disease. But the average person makes about 75% of blood cholesterol in his or her liver, while only about 25% is absorbed from food. The biggest influence on blood cholesterol level is the mix of fats in the diet.

DIETARY FATS

What About Margarine vs. Butter?

For years, margarine was pushed as a heart healthy alternative to butter. Butter was known to be filled with cholesterol and saturated fat that were bad for blood cholesterol and increased the risk of heart disease.

Because margarine was made from unsaturated vegetable oils, it was assumed it would be better for the heart.

Unfortunately, research showed that this wasn't necessarily the case. Some forms of margarine - specifically the hard stick margarine - were actually worse for the heart than butter. This was because they contained large amounts of trans

Type of Fat	Main Source	State at Room Temperature	Effect on Cholesterol Levels
Monounsaturated	Olives; olive oil, canola oil, peanut oil; cashews, almonds, peanuts, and most other nuts; avocados	Liquid	Lowers LDL; raises HDL
Polyunsaturated	Corn, soybean, safflower, and cottonseed oils; fish	Liquid	Lowers LDL; raises HDL
Saturated	Whole milk, butter, cheese, and ice cream; red meat; chocolate; coconuts, coconut milk, and coconut oil	Solid	Raises both LDL and HDL
Trans	Most margarines; vegetable shortening; partially hydrogenated vegetable oil; deep-fried chips; many fast foods; most commercial baked goods	Solid or semi-solid	Raises LDL

The Cholesterol--Heart Disease Connection

Cholesterol is a wax-like substance. The liver makes it and links it to carrier proteins called lipoproteins that let it dissolve in blood and be transported to all parts of the body. Why? Cholesterol play essential roles in the formation of cell membranes, some hormones, and vitamin D.

Too much cholesterol in the blood, though, can lead to problems. In the 1960s and 70s, scientists established a link between high blood cholesterol levels and heart disease. Deposits of cholesterol can build up inside arteries. These

fats.

The Nurses' Health Study found that women who ate 4 teaspoons of stick margarine a day had a 50 percent greater risk of heart disease than women who ate margarine only rarely. (4)

So, what should you choose to use? The best option is to use liquid vegetable oils or a soft tub margarine that is labeled trans fat free or non-hydrogenated.

If you choose a soft margarine, be sure that it's also low in saturated fat.

Achieving and Maintaining Optimal Blood Cholesterol Levels

You can lower your blood cholesterol level and your risk of heart disease by exercising regularly; maintaining a healthy body weight; increasing dietary fiber; and minimizing the amount of trans fats,

deposits, called plaque, can narrow an artery enough to slow or block blood flow. This narrowing process, called atherosclerosis, commonly occurs in arteries that nourish the heart (the coronary arteries). When one or more sections of heart muscle fail to get enough blood, and thus the oxygen and nutrients they need, the result may be the chest pain known as angina. In addition, plaque can rupture, causing blood clots that may lead to heart attack, stroke, or sudden death. Fortunately, the buildup of cholesterol can be slowed, stopped, and even reversed.

Cholesterol-carrying lipoproteins play central roles in the development of atherosclerotic plaque and cardiovascular disease. The two main types of lipoproteins basically work in opposite directions.

Low-density lipoproteins (LDL) carry cholesterol from the liver to the rest of the body. When there is too much LDL cholesterol in the blood, it can be deposited on the walls of the coronary arteries. Because of this, LDL cholesterol is often referred to as the "bad" cholesterol.

High-density lipoproteins (HDL) carry cholesterol from the blood back to the liver, which processes the cholesterol for elimination from the body. HDL makes it less likely that excess cholesterol in the blood will be deposited in the coronary arteries, which is why HDL cholesterol is often referred to as the "good" cholesterol.

In general, the higher your LDL and the lower your HDL, the greater your risk for atherosclerosis and heart disease.

For adults age 20 years or over, the latest guidelines from the National Cholesterol Education Program recommend the following optimal levels:

- Total cholesterol less than 200 milligrams per deciliter (mg/dl)
- HDL cholesterol levels greater than 40 mg/dl
- LDL cholesterol levels less than 100 mg/dl

limiting the amount of saturated, and replacing these with unsaturated fat and dietary fiber.

Seeing your doctor regularly is always important. All adults should have their cholesterol levels checked at least every five years. If you have reason to suspect that you're at risk for heart disease because of family history or previously measured high cholesterol levels, then you should have your cholesterol checked more frequently.

If you are unable to lower your cholesterol to safe levels through diet and exercise, then your doctor may prescribe cholesterol-lowering medication.

Dietary Fat, Dietary Cholesterol, and Blood Cholesterol Levels

One of the most important determinants of blood cholesterol level is fat in the diet - not total fat, as mentioned already, but specific types of fat. Some types of fat are clearly good for cholesterol levels and others are clearly bad for them.

Cholesterol in food

While it is well known that high blood cholesterol levels are associated with an increased risk for heart disease, scientific studies have shown that there is only a weak relationship between the amount of cholesterol a person consumes and their blood cholesterol levels or risk for heart disease. For some people with high cholesterol, reducing the amount of cholesterol in the diet has a small but helpful impact on blood cholesterol levels. For others, the amount of cholesterol eaten has little impact on the amount of cholesterol circulating in the blood.

In a study of over 80,000 female nurses, Harvard researchers actually found that increasing cholesterol intake by 200 mg for every 1000 calories in the diet (about an egg a day) did not appreciably increase the risk for heart disease.(2)

Eggs

Long vilified by well-meaning doctors and scientists for their high cholesterol content, eggs are now making a bit of a comeback. Recent research by Harvard investigators has shown that moderate egg consumption--up to one a day--does not increase heart disease risk in healthy individuals.(2) While it's true that egg yolks have a lot of cholesterol--and, therefore may slightly affect blood cholesterol levels--eggs also contain nutrients that may help lower the risk for heart disease, including protein, vitamins B12 and D, riboflavin, and folate.

So, when eaten in moderation, eggs can be part of a healthy diet. People with diabetes, though, should probably limit themselves to no more than two or three eggs a week, as the Nurses' Health Study found that for such individuals, an egg a day might increase the risk for heart disease. Similarly, people who have difficulty controlling their blood cholesterol may also want to be cautious about eating egg yolks and choose foods made with egg whites instead.

Dietary Fats

The Bad Fats

Some fats are bad because they tend to worsen blood cholesterol levels.

Saturated Fats

Saturated fats are mainly animal fats. They are found in meat, seafood, whole-milk dairy products (cheese, milk, and ice cream), poultry skin, and egg yolks. Some plant foods are also high in saturated fats, including coconut and coconut oil, palm oil, and palm kernel oil. Saturated fats raise total blood cholesterol levels more than dietary cholesterol because they tend to boost both good HDL and bad LDL cholesterol. The net effect is negative, meaning it's important to limit saturated fats.

Trans Fats

Trans fatty acids are fats produced by heating liquid vegetable oils in the presence of hydrogen. This process is known as hydrogenation. The more hydrogenated an oil is, the harder it will be at room temperature. For example, a spreadable tub margarine is less hydrogenated and so has fewer trans fats than a stick margarine.

Most of the trans fats in the American diet are found in commercially prepared baked goods, margarines, snack foods, and processed foods. Commercially prepared fried foods, like French fries and onion rings, also contain a good deal of trans fat.

Trans fats are even worse for cholesterol levels than saturated fats because they raise bad LDL and lower good HDL. While you should limit your intake of saturated fats, it is important to eliminate trans fats from partially hydrogenated oils from your diet.

The Good Fats

Some fats are good because they can improve blood cholesterol levels.

Unsaturated Fats--Polyunsaturated and Monounsaturated

Unsaturated fats are found in products derived from plant sources, such as vegetable oils, nuts, and seeds. There are two main categories: polyunsaturated fats (which are found in high concentrations in sunflower, corn, and soybean oils) and monounsaturated fats (which are found in high concentrations in canola, peanut, and olive oils). In studies in which polyunsaturated and monounsaturated fats were eaten in place of carbohydrates, these good fats decreased LDL levels and increased HDL levels.

Percentage of Specific Types of Fat in Common Oils and Fats*

Oils	Saturated	Mono-unsaturated	Poly-unsaturated	Trans
Canola	7	58	29	0
Safflower	9	12	74	0
Sunflower	10	20	66	0
Corn	13	24	60	0
Olive	13	72	8	0
Soybean	16	44	37	0
Peanut	17	49	32	0
Palm	50	37	10	0
Coconut	87	6	2	0
Cooking Fats				
Shortening	22	29	29	18
Lard	39	44	11	1
Butter	60	26	5	5
Margarine/Spreads				
70% Soybean Oil, Stick	18	2	29	23
67% Corn & Soybean Oil Spread, Tub	16	27	44	11
48% Soybean Oil Spread, Tub	17	24	49	8

60% Sunflower, Soybean, and Canola Oil Spread, Tub	18	22	54	5

*Values expressed as percent of total fat; data are from analyses at Harvard School of Public Health Lipid Laboratory and U.S.D.A. publications.

Dietary Fats and Heart Disease--Beyond the "30%" Recommendation

Many health agencies, including the American Dietetic Association, the American Diabetes Association, and the American Heart Association, once recommend limiting fat intake to 30% or less of total daily calories as a means of preventing disease. Today, these recommendations focus on limiting intake of saturated fat, and have relaxed a bit with regard to total fat intake. That's a move in the right direction, because there is no good evidence for any particular "optimal" amount of total fat in a healthy diet.

The relation of fat intake to health is one of the areas that Harvard researchers have examined in detail over the last 20 years in two large studies. The Nurses' Health Study and the Health Professionals Follow-up Study have found no link between the overall percentage of calories from fat and any important health outcome, including cancer, heart disease, and weight gain.

What was important in these studies was the type of fat in the diet.(3) There are clear links between the different types of dietary fats and heart disease. Logically, most of the influence that fat intake has on heart disease is due to its effect on blood cholesterol levels.

Ounce for ounce, trans fats are far worse than saturated fats when it comes to heart disease. The Nurses' Health Study found that replacing only 30 calories (7 grams) of carbohydrates every day with 30 calories (4 grams) of trans fats nearly doubled the risk for heart disease.(4) Saturated fats increased risk as well, but not nearly as much.

For the good fats, there is consistent evidence that high intake of either monounsaturated or polyunsaturated fat lowers the

risk for heart disease. In the Nurses' Health Study, replacing 80 calories of carbohydrates with 80 calories of either polyunsaturated or monounsaturated fats lowered the risk for heart disease by about 30 to 40 percent.(3)

Fish, an important source of the polyunsaturated fat known as omega-3 fatty acid, has received much attention in the past for its potential to lower heart disease risk. And there have been some studies to back this up, although not all have shown consistent benefits. One large trial, however, found that by getting 1 gram per day of omega-3 fatty acids over a 3.5 year period, people who had survived a heart attack could lower their risk of dying from heart disease by 25 percent.(5) The study participants got their omega-3s from a capsule - getting a gram a day from fish would mean eating a serving a day of fatty fish, such as mackerel, salmon, sardines, or swordfish.

Eating fish may help prevent heart disease or deaths from heart disease in several ways. it may replace red meat or other less-healthy sources of protein. And the omega-3 fats in fish appear to protect the heart against the development of erratic and potentially deadly rhythm disturbances. Although more research is needed, adding fish to the diet may help protect you from heart disease, and it doesn't have any known risks. The American Heart Association currently recommends that everyone eat at least two servings of fish a week.(6)

Dietary Fats and Cancer

Heart disease is not the only condition that has been linked with fat intake. Researchers once suspected an association between dietary fat and certain cancers. Here again, the type of fat - and not the total amount - seemed to be most important.

Breast Cancer

By the early 1980s, most nutrition experts believed that dietary fat was a major cause of breast cancer.(7, 8) This thinking was largely based on international comparisons showing higher breast cancer rates in countries with higher per capita fat intake. But such comparisons are very broad in nature. As more detailed studies were performed over the next couple of decades, the apparent link between total fat intake and breast cancer has faded.(9)

Many newer studies - including those by Harvard researchers - of different types of fat have failed to find a link with breast

cancer. However, some European studies have reported suggestive findings of lower breast cancer risk among women with a high intake of monounsaturated fats (mainly in the form of olive oil).(10, 11)

Colon Cancer

As with breast cancer, international comparisons initially suggested an association between total dietary fat intake and colon cancer risk. But later studies contradicted these earlier findings and revealed instead an association that was weak at best. Although fat intake doesn't seem to increase colon cancer risk, high consumption of red meat still does appear to do so.(12)

Prostate Cancer

Although the exact connection between dietary fat and prostate cancer is far from clear, there is some evidence that diets high in animal fat and saturated fat increase prostate cancer risk. However, some studies have also shown no association, while others have implicated unsaturated fats. Clearly much more research is needed to clear up the exact links between dietary fat and prostate cancer.

Other Cancers

Preliminary research has also linked the intake of certain kinds fat with other cancers, though much more research is needed to confirm these results. In the Nurses' Health Study, Harvard researchers found that a high intake of trans fats increased the risk for non-Hodgkin's lymphoma and that a high saturated fat intake increased the risk for endometrial cancer.

Dietary Fat and Obesity

It is a common belief that the more fat you eat, the more body fat you put on, and the more weight you gain. This belief has been bolstered by much of the nutrition advice given to people over the past decade, which has focused on lowering total fat intake while increasing carbohydrate intake. But it isn't completely true, and the advice has been misguided. For example, while Americans have gradually decreased the proportion of calories they get from fat over the last decade, rates of obesity have increased steeply.

Over the short term, following a low-fat diet does lead to

weight loss. But so does following a high-fat, low-carbohydrate diet. Actually, almost any diet that helps you take in fewer calories works over the short term. In other words, low-fat diets appear to offer no apparent advantages over diets with fat levels close to the national average.

Although more research is needed, a prudent recommendation for losing weight or maintain a healthy weight is to be mindful of the amount of food you eat in relation to the amount of calories you burn in a day. Exercising regularly is especially beneficial.

The Bottom Line: Recommendations for Fat Intake

Although the different types of fat have a varied - and admittedly confusing - effect on health and disease, the basic message is simple: chuck out the bad fats and replace them with good fats. Try to limit saturated fats in your diet and eliminate trans fats and replace them with polyunsaturated and monounsaturated fats.

The trickiest of these to attack are the trans fats. That's because they lurk in many different types of foods and aren't always included on the food label. But as awareness about trans fats increases, more "trans-fat" free products are becoming available. Now there's even a trans fat-free Crisco! Labeling of trans fat content has long been up to the food maker's discretion. However, a report on trans fats from the Institute of Medicine concluding that there is no safe level of trans fats in the diet (13) has finally prompted the Food and Drug Administration to require that all Nutrition Facts food labels list trans fats by January 1, 2006. Some foods - mostly those that are trans-fat-free - already list trans fats. Until all foods do, it will take some detective work to determine if a food contains trans fats. Check the ingredient list for "hydrogenated oils." The higher up these are listed, the more trans fats the food contains.

Tips for lowering trans fat intake:

- **Choose liquid vegetable oils or a soft tub margarine that is contains little or no trans fats.**
- **Reduce intake of commercially prepared baked goods, snack foods, and processed foods, including fast foods. To be on the safe side, assume that all such produts contain trans fats unless they are labeled otherwise.**
- **When foods containing hydrogenated or partially**

hydrogenated oils can't be avoided, choose products that list the hydrogenated oils near the end of the ingredient list.

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