Edward-Elmhurst HEALTH | Healthy Driven

# CHOLESTEROL

**What is cholesterol?**
Cholesterol is one of many types of fats (lipids) that circulate throughout the blood stream. Cholesterol is used in the body to maintain cell walls and to manufacture hormones. It plays a role in neurological development.

We receive cholesterol in two ways. The first is in the food we eat. Cholesterol is found only in animal products like meats, cheeses, eggs, and milk. Foods with saturated fats and trans fatty acids cause the body to make more cholesterol. The second source is our liver. Our livers make cholesterol from the fats we eat. Genes inherited from our parents frequently determine how easily this happens, or how much cholesterol our livers make.

Studies have shown that high levels of cholesterol have been linked to the formation of plaque in the artery walls (atherosclerosis). This plaque can block arteries leading to heart attack or stroke.

Total Cholesterol is the sum of the HDL (high-density lipids or "good cholesterol"), the LDL (low-density lipids or "bad cholesterol"), and the VLDL (very low-density lipids).

**Low-Density Lipids** (LDL) are the fat molecules that migrate into the walls of the arteries to create plaque. They are also called "bad cholesterol." LDL can often be lowered through low-fat and healthy eating habits.

**High-Density Lipids** (HDL) are the fat molecules that collect the LDL molecules and take them back to the liver for disposal. They may also be referred to as healthy or "good cholesterol." HDL can be improved or increased through exercise and smoking cessation (when that applies). Estrogen also tends to increase HDL. HDL cannot be too high. A low HDL level indicates a greater risk for heart disease.

**Very Low-Density Lipids** (VLDL) may contribute to plaque formation but their role is not currently well understood.

**Triglycerides** are the molecules that travel with the VLDL in the blood stream. High triglycerides may contribute to plaque formation indirectly. Triglycerides are lowered by maintaining an ideal weight and by exercising. High triglycerides can occur if you eat more calories each day than you use in physical activity, if you consume too much alcohol, if you eat too many sweets, carbohydrates or fats, or if your genetic make-up programs your body to make too many triglycerides.

Low fat eating and exercise as recommended by your physician and the American Heart Association can help lower your cholesterol. (Please consult your physician before starting an exercise program.)

**What are the Harmful Effects of High Cholesterol?**
Plaque Formation - Arteries carry blood from the heart to all the cells in the body. The LDL fat molecules migrate into the walls of arteries, creating a fatty plaque. This plaque sits within the wall of the artery. When LDL numbers are higher than recommended, this process occurs more readily. Plaque can affect all arteries in the body. This plaque tends to increase and can cause a narrowing that restricts blood flow. Many times even small plaques rupture and a clot will form on the inside of the artery. Depending on the size of the clot, it may block blood flow, causing the death of some tissue. Obstruction of the arteries of the heart leads to a heart attack. Obstruction of the arteries that feed the brain leads to a stroke. When it happens in one of your extremities, you can have loss of limb.

**Am I at Risk?**
If your mother or sister had a heart attack or peripheral vascular (PV) disease at age 65 or younger, or if your father or brother had a heart attack or PV disease at age 55 or younger, you should be screened for high cholesterol. If high cholesterol or heart disease is a problem for your parents, grandparents, or siblings, you are also at greater risk for having high cholesterol. The American Heart Association even recommends screening children if they have a family history of high cholesterol.

**How do I know if I have High Cholesterol?**
There are usually no symptoms that would let you know you have high cholesterol. A blood test (lipid profile) is the best way to see if you have high cholesterol.

**Lipid Profile:** A blood test after a 12 hour fast. Includes:

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| **Total Cholesterol:** | Desirable = less than 200mg/dl<br>Borderline High = 200-239mg/dl<br>High = greater than 240mg/dl | |
| **HDL Cholesterol:** | Low = less than 40mg/dl<br>High = greater than 60mg/dl | A major risk factor for heart disease<br>Protects against heart disease |
| **Triglycerides:** | Normal = less than 150mg/dl<br>Borderline High = 150-199mg/cl<br>High = 200-499mg/dl<br>Very High = greater than 500mg/dl | |

**LDL Cholesterol:** Your LDL goal depends on how many other risk factors you have. Risk Factors include: increasing age (women over 55; men over 45), family history of heart disease, smoking, high LDL cholesterol, low HDL, high blood pressure, diabetes, obesity, and physical inactivity. *If your HDL cholesterol is over 60mg/dl, subtract one risk factor.*

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| 70 – 100 mg/dl | The goal for Coronary Heart Disease or Diabetes |
| Less than 100mg/dl | Best for all |
| 100-129mg/dl | The goal if you have 2 or more risk factors |
| 130-159mg/dl | The goal if you have 1 or no risk factors |
| 160-189mg/dl | High |
| >190mg/dl | Very High |

**How Can I Improve My Cholesterol?**
Limit dietary cholesterol to less than 300 mg per day (200 mg per day if diagnosed with high cholesterol).

Follow a Low Fat Eating Plan

- Eat chicken, fish, and turkey more often than red meats or pork.
- Choose skimmed milk products when eating dairy, including cheeses.
- Limit the amount of animal fat to 7-10% of your total caloric intake for the day.
- Limit the amount of plant fats to 20% of your total caloric intake for the day.
- Limit the amount of trans fatty acid intake each day.
- Use stanols/sterols such as *Take Control* or *Benecol* spreads instead of butter or margarine if you have high LDL cholesterol

| Saturated Fats (Avoid) | Polyunsaturated Fats (Recommended) | Monounsaturated Fats (Best Choice) |
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| Butter<br>Beef fat<br>Lard<br>Poultry Fat<br>Coconut Oil<br>Palm Kernel Oil<br>Milk Fat<br>Cheese Fat<br>Organ Meats | Vegetable Oils:<br>• Safflower Oil<br>• Sunflower Seed Oil<br>• Soybean Oil<br>• Corn Oil<br>• Grapeseed Oil<br><br>Omega-3:<br>• White Fish<br>• Salmon<br>• Tuna<br>• Flax Seed<br>• Chia Seed | Canola Oil<br>Olive Oil<br>Avocado<br>Almonds/Walnuts<br>Pumpkin Seeds<br>Sunflower Seeds<br>Peanut Oil<br>Avocado Oil |

Select Foods High in Fiber

- Include 20-35 grams of fiber in your diet daily.
- Choose whole grain products when eating starches (i.e., brown rice, whole grain pastas or bread).
- Choose Cereals with Oat Bran, All Bran, 40% Bran Flakes, Shredded Wheat or oatmeal.
- Sprinkle Wheat Germ on foods
- Add more beans and legumes
- Increase  Fruits and Vegetables

**What to Look for on Labels when Increasing Fiber** (100% whole grain or first ingredient whole grain)

Increasing your intake of fiber will help decrease absorption of LDL cholesterol, increase nutrients, slow absorption, and decrease insulin requirements.

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| Whole Wheat | Cracked Wheat |
| Whole Barley | Graham Flour |
| Whole Oats | Whole Cornmeal |

**What Are Other Ways I Can Improve My Cholesterol?**

If you smoke, QUIT! Smoking decreases the HDL Cholesterol.

Add physical activity to your day. Exercise lowers triglycerides and raises the protective HDL levels. The American Heart Association recommends aerobic exercise for at least 30 minutes per day, most days of the week. An exercise session should include 5 minutes of warm-up and end with 5 minutes of cool-down. Resistance training is recommended on two or more days per week. Including flexibility training and an increase in daily lifestyle activities can round out the regimen. Significant improvement has even been demonstrated with multiple short bouts of exercise (10 minutes, 3-4 times per day). Always check with your doctor before starting an exercise program.

What Medicines Lower Cholesterol?

| Type of Medication | Name | Action | Possible Side Effects |
|---|---|---|---|
| Statins | Lipitor (Atorvastatin)<br>Zocor (Simvastatin)<br>Crestor (Rosuvastatin)<br>Pravochol (Pravastatin)<br>Lescol XL (Fluvastatin)<br>Mevacor, Altoprev (Lovastatin) | Slow down production of cholesterol and increase liver's ability to remove LDL cholesterol from the blood.<br><br>Decrease total cholesterol, LDL cholesterol, and triglycerides and modestly increases HDL. | Side effects are uncommon but can include gastrointestinal upset or constipation. Should muscle soreness, pain, weakness or brown urine occur, contact your doctor right away.<br>-Increased liver enzymes - monitor |
| Cholesterol Absorption Inhibitor | Zetia | Works in the small intestine to reduce the amount of cholesterol your body absorbs. Decreases total cholesterol and LDL. Often used in combination with other medications. | Rare side effects. Report stomach pain and unusual tired feelings to your doctor. |
| Niacins | Niacin<br>Niaspan (extended release)<br>Slo-Niacin (sustained release) | Reduces the production of LDL and triglycerides in the liver. Decreases total cholesterol, LDL cholesterol, and triglyceride level, while raising HDL cholesterol level. | Common side effect is flushing or hot flashes. Can be decreased by taking during or after meals or by taking aspirin as recommended by your doctor. Side effects may include decreased blood pressure, nausea, indigestion, itching, or rash. This may not be indicated for patients with gout, peptic ulcer, liver disease, or diabetes. |

| Type of Medication | Name | Action | Possible Side Effects |
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| PCSK9 Inhibitor | Praluent (Alirocumab)<br><br>Repatha (Evolocumab) | This drug belongs to a potent new class of self-injectable LDL lowering drugs. PCSK9 is a protein cells produce that binds to the LDL receptor on the liver. This medication targets the PCSK9 protein and blocks it so that more of the receptors on the liver are available to get rid of LDL cholesterol in the blood. It is used for those who have a history of familial hypercholesterolemia. | Because this is a newer drug, all the side-effects are not yet known. Reported at this time in clinical trials for Alirocumab is possible itching, swelling, pain or bruising at the injection site.<br>Cold/flu symptoms, back pain and skin reaction at shot site have been reported side effects to Evolocumab. |
| Fibric Acid Derivatives | Tricor (Fenofibrate)<br>Antora (Fenofibrate)<br>Lopid (Gemfibrizol)<br>Trilipix | Decreases the production of triglycerides in the liver and stimulates the breakdown of triglyceride-rich particles. Lowers triglycerides and may increase HDL cholesterol. | May include gall stones, GI disturbances, diarrhea, and muscle aches.<br>Talk with your doctor when taking with statins or anticoagulant medicine such as Coumadin. |
| Bile Acid Binding | Cholestyramine (Questron Lo Cholest, Prevalite)<br>Cholestipal or Colestid | Binds bile acids (made largely of cholesterol) for excretion in the stool. As the liver makes more bile, it uses cholesterol from the blood. | Constipation, bloating, gas, or fullness. Take other medications at least 2 hour before or 4-6 hours after taking. |
| Combination Medications | Advicor (Lovastatin + Niacin)<br>Vytorin (Zocor + Zetia)<br>Simcor (Erniacin + Simvastatin)<br>Caduet (Amlodipine + Atorvastatin) | Action same as above medications | Same as individual medication. |
| Omega-3 Acids | Omacor | Used with diet to decrease high triglyceride levels. | Belching, infection, flu symptoms, GI upset, or rash. |

*To learn more about cholesterol, Call the Nurse Heartline at 630-527-2825.*
*Read about cholesterol on the following websites: www.americanheart.org*
*www.nhlbi.nih.gov/index.htm*

*Source:* ATP III Adult Treatment Pane 2004, American Heart Association Update 2004
American Heart Association, Prevention & Treatment of High Cholesterol August 2018