

A Closer Look at Cholesterol

There are many factors that impact your risk of heart disease, including your cholesterol levels. Cholesterol is a waxy, fatty substance produced by the liver that is used to create cell membranes, Vitamin D, hormones (e.g., (testosterone, estrogen, progesterone, cortisol) and bile acids. Cholesterol is not the enemy. It only becomes a problem when there is either too much or too much of the wrong kind.

To get to where it is needed throughout the body, cholesterol is packaged into different containers (or particles) for transport through the blood stream. There are different versions of these particles, which are called lipoproteins, and they vary according to the ratio of protein, cholesterol and triglycerides they contain.

Triglycerides

- Fat molecules formed from calories consumed that aren't used right away.
- Get transported throughout the body by lipoproteins and stored in your fat cells.
- Between meals, hormones release triglycerides for energy.
- **Having high triglycerides can increase your body's production of LDL cholesterol and can increase the risk of blood clotting and atherosclerosis.**

Very Low Density Lipoproteins (VLDL)

- Transport triglycerides from the liver to fat tissue and muscle.
- **Can be converted to LDL in the blood stream as more and more triglycerides are "dropped off" for storage or energy production.**

Low Density Lipoproteins (LDL)

- Transport cholesterol around the body so it can build cell membranes, build hormones, etc.
- Can be large and fluffy or small and dense.
- **The amount and size of LDL particles matter. Small dense LDL particles are more dangerous because they can easily burrow into the artery walls and are more likely to become oxidized/damaged.**
- Oxidized LDL is more likely to adhere to arterial walls and cause a microscopic scratch. From that point on, oxidized LDL continues to play a role in virtually all stages of heart disease.

High Density Lipoproteins (HDL)

- Remove excess cholesterol from the blood and transport it back to the liver, reducing the risk of fatty plaque formation and atherosclerosis.
- Normally, HDL acts as an antioxidant and anti-inflammatory.
- **In general, the higher your HDL the better** — to a certain extent.
- However, if inflammation rises too high in your body, then HDL can turn pro-inflammatory.

Lab Tests for Lipids

Lipoproteins are like cars that carry cholesterol and fats around the body, and the cholesterol and fats are like passengers in the car.

- The **lipid panel test** looks for **how many passengers** there are in each car (measures the concentration of cholesterol inside the lipoproteins).
- The **lipid particle test** tells you **how many cars are on the road** (measures the lipoprotein particle number).

Both tests provide important information, but research is showing that the number of cars on the road (particle number) is a better indicator of heart disease (along with the particle size as previously mentioned under LDL). Your health care provider may also order additional tests to get a more comprehensive understanding of your cardiovascular risk factors.

Lipid Panel Test	
Total Cholesterol	
<200	Desirable
200-239	Borderline high
≥240	High
Triglycerides	
<150	Desirable
151-199	Borderline high
200-499	High
≥500	Very high
VLDL	
5-40	desirable
>40	undesirable
LDL Cholesterol	
<100	Desirable
100-129	Near desirable
130-159	Borderline high
160-189	High
≥190	Very high
HDL Cholesterol	
<40	Undesirable
≥60	Desirable

Lipid Particle Test	
LDL-P	
<1000	Optimal
1000-1299	Moderate risk
1300-1599	Borderline high risk
1600-2000	High risk
Small LDL-P	
<527	Optimal
LP-IR Score	
<45	Optimal

Ten Tips to Improve Your Cholesterol Numbers

Many factors can affect your cholesterol quality and quantity. Genetics, age and gender have some impact, however lifestyle plays a very large role in determining your cholesterol numbers.

Nutrition research shows that **refined carbohydrates and excess sugar** have a bigger impact on our cholesterol quantity than we used to think. In 2020, a study published in the Journal of the American College of Cardiology reported, "Although saturated fatty acids increase LDL cholesterol, in most individuals, this is not due to increasing levels of (the dangerous) small, dense LDL particles, but rather larger LDL particles, which are much less strongly related to CVD risk."

To optimize cholesterol levels and to decrease the risk of oxidation of LDL cholesterol, eat fewer packaged and processed foods and more real, whole foods.

- 1. Reduce or eliminate refined carbohydrates and excess sugar** – Sugar, white flour, white rice, other processed grains and foods made from those items (e.g., white bread, pasta, crackers, cereal, pretzels) can increase triglycerides and the dangerous kinds of LDL cholesterol and reduce the beneficial HDL cholesterol. Read ingredients to determine if foods are high in refined carbs or sugar. **Small portions of dark chocolate (70% or greater)** contain powerful cholesterol-benefitting polyphenols, so 1-2 squares may be a good option for satisfying a sweet tooth.
- 2. Fill ¼ of your plate or less with whole intact grains, starchy vegetables or fruit** – Intact grains like steel cut oats, wheat berries, quinoa, millet or brown rice provide more fiber and nutrients than their processed counterparts. Nutrient dense carbohydrates like sweet potatoes, butternut squash and whole fruits are also a great source of nutrients and fiber. **Cholesterol-optimizing standouts: oats, barley, red grapefruit, watermelon, pomegranate seeds (or pomegranate juice limited to a very small portion of ~ 1 ½ ounces).**
- 3. Fill ½ of your plate with non-starchy vegetables** – Loaded with powerful antioxidants (to help prevent excess oxidation), nutrients and fiber, all non-starchy vegetables help improve cholesterol and heart health in many ways. Aim for a colorful variety of non-starchy vegetables daily. **A few potential cholesterol-optimizing standouts: tomatoes, onions, artichoke, dark leafy greens, fennel, cabbage.**
- 4. Eat more fatty fish** – Fish like **salmon** and **sardines** are rich in the omega-3 fatty acids EPA and DHA which are potent anti-inflammatory fats. They can decrease LDL particle number, increase particle size (to the less dangerous large fluffy LDL particles) and decrease triglycerides. **Aim to consume 2-3 servings of fatty fish weekly.** Supplemental EPA and DHA may be beneficial if you don't consume adequate amounts from food, but talk to a Registered Dietitian Nutritionist or other health care provider before choosing a fish oil supplement because quality of fish oil varies dramatically from product to product.
- 5. Include healthy fats at each meal** – Plant-based fats like raw nuts and seeds (especially **walnuts** and **almonds**), **avocados**, **olives** and **extra virgin olive oil** are also helpful in keeping our cholesterol healthy.

- 6. Eliminate industrially processed fats and oils, and moderate intake of saturated fat** – Industrial seed oils extracted from soybeans, corn, rapeseed (source of canola oil), cottonseed and safflower seeds are easily oxidized during processing and are high in omega-6 fatty acids which contributes to a pro-inflammatory omega-6 : omega-3 ratio. Trans fats (also known as partially hydrogenated oils), which lower HDL, increase the dangerous forms of LDL and increase triglycerides, have been banned in many countries including the U.S. As manufacturers have removed trans fat from their products (e.g., cookies, biscuits, pie crusts, crackers, margarine, non-dairy creamers, deep fried foods, fast food) many have replaced them with shelf-stable saturated fats that are still highly processed and should be avoided.

Some saturated fats have certain health benefits but can be easily overdone and can impact total LDL cholesterol levels. When using saturated fat in cooking, stick with small portions of organic virgin coconut oil, grass fed butter or grass-fed ghee.

- 7. Include quality protein at each meal** – Choosing skinless, lean cuts of meat and pasture-raised/grass-fed meats and animal products (like dairy) or plant-based proteins (like tempeh, tofu, lentils and beans) can provide the nutrients your body needs while limiting excessive amounts of saturated fats. **Cholesterol-optimizing standout: soybeans (like edamame and tempeh)**
- 8. Limit alcohol consumption** – Excess alcohol can increase triglyceride levels. Limit alcohol to no more than 1 standard drink per day for women or 2 standard drinks per day for men. If you already have elevated triglycerides, you may need to reduce this further.
- 9. Drink green tea** – Drinking green tea has been shown to be beneficial for reducing triglycerides, cholesterol and LDL cholesterol. The general recommendation is about **3 cups of green tea per day**, which supplies a therapeutic dose of 240-320 mg of polyphenols.
- 10. Eat probiotic-rich foods** – Research suggests that the quality of the bacteria in the gut plays a role in inflammation and cholesterol. Several different lactobacillus, bacillus and bifidobacteria strains have been shown in studies to lower cholesterol levels in the blood. The best way to get a variety of probiotic strains is through fermented foods such as **kefir, yogurt, natto, fermented pickles, fermented sauerkraut, kimchi** and other fermented vegetables.

Diet isn't the only thing that can impact your cholesterol and heart health. Chronic inflammation, poor thyroid function, stress overload, insulin resistance, certain medications and other health issues can impact your cholesterol too. Having regular checkups with your health care provider is important to stay on top of your health.

Address all aspects of your health, including daily movement or exercise, stress management and sleep to help reduce your risk of heart disease.

Meal and Snack Ideas to Support Healthy Cholesterol Levels

Breakfast/Snack

- [Chickpea scramble bowl](#) with a side of [homemade turkey sausage](#)
- [Tofu scramble](#) with ½ grapefruit on the side and green tea
- [Smoothie](#)
- [Steel cut oats](#) with pomegranate seeds
- [Strawberry flax yogurt parfait](#)
- [Kiwi pomegranate salsa](#)
- [Copy cat Rx bars](#)
- [Tuna apple bites](#)
- Bell peppers and carrots w/ [hummus](#)
- Apple w/ almond butter and cinnamon
- Olives with sugar snap peas, cucumbers and/or carrots
- 1-2 squares 70% or above dark chocolate
- Leftovers from dinner

Lunch/Dinner

- [Mushroom miso soup](#)
- [Hearty lentil soup](#) with [arugula salad with garlicky anchovy dressing](#)
- [Split pea soup with cabbage and chicken](#)
- [Vegetarian chili with farro](#) topped with kimchi, with an arugula side salad
- Red lentil pasta with sautéed Swiss chard, mashed avocado, garlic and salt
- [Sheet pan tempeh and broccoli](#)
- [Szechuan tofu and veggies](#)
- [Sardine fish cakes](#) served over Swiss chard
- [Quinoa salmon burger](#) with [carrot beet salad](#)
- [Oven fried salmon sardine cakes](#) with [roasted winter vegetable rainbow salad](#)
- [Sheet pan salmon and green beans](#)
- [Asparagus sweet potato turkey skillet](#)
- [Spinach cranberry turkey burger](#) with [kale chips](#)
- [Italian stuffed tomatoes](#) and [savory kale with anchovies](#)
- [Sheet pan chicken breast with tomatoes and broccoli](#)
- [Stir fry sorghum chicken grain bowl](#)
- [Pumpkin seed pesto spinach, quinoa & grass-fed skirt steak salad](#)

Underlined items link to recipes.