

Fish Oil and Omega-3 Fatty Acids

Omega-3 fatty acids are a popular food supplement believed to have positive effects on heart health. This stems mainly from observational studies showing that people consuming large amount of fish have lower rates of heart disease. Therefore, the American Heart Association recommends eating at least two servings of preferably fatty fish a week. Each serving is 3.5 ounce cooked, or about ¾ cup of flaked fish. Omega-3 fatty acids are thought to improve heart health by lowering triglycerides, raising good cholesterol (HDL, or high density lipoprotein), thinning the blood to prevent blood clots from forming and protecting the heart from dangerous heart rhythms.



Omega-3 fatty acids also may slow the progression of plaque buildup and lower blood pressure. Omega-3 fatty acids are highly concentrated in the brain and may be important for cognitive (brain memory and performance) and behavioral function. Scientists believe the omega-3 fatty acid DHA may be protective against Alzheimer's disease and dementia. In Italy, omega-3s are given routinely to heart attack patients. They are also used in other fields of medicine, because omega-3 fish oils are thought to have anti-inflammatory effects.

Sources of Omega-3 Fatty Acids

Omega-3 fatty acids are considered essential fatty acids; this means they are essential to health but cannot be produced by the body. Three different forms of omega-3 fatty acids exist: eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA) and alpha-linolenic acid (ALA). ALA is found in plant sources (flaxseed oil) and food (flaxseeds, walnuts, tofu). EPA and DHA come from seafood, especially fatty fish such as salmon, tuna and halibut. Although fish is a source of omega-3s, fish themselves do not produce them. Rather, they are obtained from the algae (microalgae in particular) and plankton consumed in their diets.

Fish	EPA Content (G/100 G)	DHA Content (G/100 G)	EPA + DHA (G/100 G)
Salmon (Atlantic)	0.690	1.457	2.147
Mackerel	0.504	0.699	1.203
Tuna (fresh)	0.283	0.890	1.173
Trout (rainbow)	0.334	0.820	1.154
Tuna (canned)	0.233	0.629	0.862
Swordfish	0.138	0.681	0.819
Sea bass	0.206	0.556	0.762
Flounder	0.243	0.258	0.501
Halibut	0.091	0.374	0.465

Crab (Alaskan king)	0.295	0.118	0.413
Shrimp	0.171	0.144	0.315
Catfish (farmed)	0.049	0.128	0.177
Cod	0.004	0.154	0.154

Source: United States Department of Agriculture Nutrient Data Laboratory

Important Note: Health food stores carry multiple different types of fish oil. While no specific brand is recommended, and supplements are generally not controlled by the U.S. Food and Drug Administration (FDA), it is probable that the mid-priced, generic brands are just as good as the very expensive brands. Expect to pay \$15-\$30 for a month's supply. The key is to ensure that the product is mercury-free, as pure as possible and contains the right amount of EPA and DHA. The amount of EPA + DHA should add up to close to 1,000mg.

Treatment

Increasing omega-3 fatty acid intake through dietary sources is preferable in healthy people. It has never been shown in rigorous clinical trials that using over-the-counter omega-3 fatty acid supplements has the same benefits. In fact, the best clinical evidence so far shows no benefit of omega-3 fatty acid supplements.

On the other hand, for people with known coronary artery disease, one clinical trial from 1999 showed that 1 gram per day of fish oil supplement improves outcomes. Also in people with heart failure (particularly with reduced heart pump function, ejection fraction [EF] less than 40 percent), the same dose of omega-3 fatty acid supplements may improve outcomes. Based on this, the recommended dose for people with documented heart disease has been at least 1 gram per day of EPA + DHA. Since then, many large, randomized trials have shown no consistent benefit of omega-3 fatty acid supplements in populations at high risk for coronary heart disease. However, treatment with omega-3 fatty acid supplements is still considered reasonable for people with known coronary artery disease and congestive heart failure with reduced ejection fraction. Even a potential modest improvement in outcomes would justify its use, as it is without concerning side effects. This amount of omega-3 fatty acids (1 gram per day) would require considerable fish consumption, to the extent that it is impractical for most. As such, fish oil supplements, either over-the-counter or pharmaceutical grade, are typically used to achieve recommended levels. This is often the case for people with high triglycerides, which may require high levels of omega-3 fatty acid intake. People taking more than 3 grams per day of omega-3 fatty acids from capsules should do so only under a doctor's care. At these doses, omega-3 fatty acid supplements can increase the risk of bleeding in some people.

Population	Recommendation
Patients without documented coronary heart disease (CHD)	Eat a variety of (preferably fatty) fish at least twice a week. Include oils and foods rich in ALA (flaxseed, canola, and soybean oils; flaxseed and walnuts)
Patients with documented CHD Patient with documented heart failure and reduced EF < 40%	Consume about 1g of EPA + DHA per day, preferably from fatty fish. EPA + DHA in capsule form could be considered in consultation with a physician. Consume about 1g of EPA + DHA per day, preferably from fatty fish. EPA +

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Patients who need to lower triglycerides	2 to 4 grams of EPA + DHA per day provided as capsules under a physician's care.

Source: American Heart Association

Side Effects

Omega-3 fatty acids are essentially free of side effects at generally recommended doses (1 to 4 grams per day). Although rare, side effects generally consist of a fishy aftertaste and/or gastrointestinal upset. These side effects can be decreased by freezing the capsules or taking the supplements at night.

Predatory fish, such as sharks, swordfish, tilefish and mackerel, contain higher levels of mercury. Therefore, the benefits and risks of eating fish vary depending on a person's stage of life. Children and pregnant women are advised by the U.S. Food and Drug Administration (FDA) to avoid eating those fish with the potential for the highest level of mercury contamination. For middle-aged and older men and postmenopausal women, the benefits of fish consumption likely outweigh the potential risks when the amount of fish eaten is within the recommendations established by the FDA and Environmental Protection Agency. Fish oil contains only small levels of mercury and is felt to be free of mercury-related toxicities.

Theoretical concerns of increased bleeding have been largely dismissed due to a number of clinical studies. These studies failed to demonstrate any change in bleeding. High doses of omega-3 fatty acids (more than 3 grams per day) have been associated with a slight rise in bad cholesterol (low density lipoprotein, or LDL) and blood sugar.

Goals

In the highest risk people, improving cholesterol levels is critical to achieving clinical success. The goal should be LDL of less than 70; HDL greater than 40-45 and triglycerides under 150 mg/dL. Extensive lifestyle modification is also important. Talk to your doctor today about including fish oil and other beneficial changes into your life to prevent heart disease.

Studies on Omega-3s

Recent data suggest that there may not be as much of a benefit for taking fish oil regularly. A 2008 meta-analysis published in the *Canadian Medical Association Journal* (CMAJ. 2008;178(2):157-64.) showed that fish oil supplementation did not give a preventive benefit to cardiac patients with ventricular arrhythmias.

A more recent 2012 meta-analysis published in the *Journal of the American Medical Association* (JAMA 2012; 308 (10): 1024–33.) found that supplementation did not reduce the chances of death, cardiac death, heart attack or stroke. As such, many providers are no longer recommend fish oil preventively.

Fish oil has demonstrated benefit in the treatment of hypertriglyceridemia, but may also increase LDL (bad cholesterol) in larger doses.

The first large scale randomized controlled trial of omega-3 fatty acids in a usual risk patient population for primary prevention was the VITAL trial reported in the *New England Journal of Medicine* (N Engl J Med 2019;380:23-32.). The results of this trial indicate that supplementation with omega-3 fatty acids at a dose of 1 gram per day was not effective for overall primary prevention of heart disease among healthy middle-aged men and women over five years of follow-up. This is one of the largest trials on this topic.

The GISSI-HF Trial (*Lancet*. 2008; 372(9645):1223-30.) showed that omega-3 fatty acid supplementation is a simple and safe treatment for patients with heart failure and can improve outcomes when used in addition to usual care.

The GISSI-Prevenzione Trial (*Lancet*. 1999; 354(9177):447-55.) showed that omega-3 fatty acid supplementation can improve outcomes in patients with recent heart attack.

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