

Omega-3 Fat EPA Significantly Lowers Heart Disease Risk

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✓ Fact Checked

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STORY AT-A-GLANCE

- › Omega-3 fats are essential fats your body needs for proper cell division and function of cell receptors, digestion, muscle activity, blood clotting, visual acuity, cognition, heart health and much more
- › A proprietary prescription formulation of fish oil called Vascepa – a highly-processed form of the omega-3 fat EPA – lowered cardiovascular health risks by 25% compared to placebo
- › Participants in the Vascepa trial received 4 grams of EPA per day – which is two to four times more EPA than typically given – for five years
- › A pair of parallel studies published in 2008 – both lasting four years – found fish oil supplements worked better than placebo and the cholesterol-lowering drug Crestor in patients with chronic heart failure
- › While a general recommendation is to take 3 to 4 grams of marine-based omega-3 per day, the only way to identify your ideal dose is to measure your omega-3 index with a blood test. For optimal health, aim for an omega-3 index of 8% or higher

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Omega-3 fats are essential polyunsaturated fats (PUFAs) your body needs for proper cell division and function of cell receptors, digestion, muscle activity, blood clotting, visual acuity, cognition, heart health and much more.

Most omega-3s are considered "essential fats" as your body cannot make them. You have to get them from your diet. Omega-3 fats are found in both marine animals and plants, but each of these sources provides different types of omega-3, and they are not interchangeable.

It's really important to be aware of these differences, especially if you're taking omega-3 to protect or improve your heart or neurological health. For these benefits, you need marine-based omega-3. So, before I get into the evidence behind omega-3 fats for heart health, which is the primary focus of this article, let's quickly review the basics.

Omega-3 Basics

Both plant- and animal-based omega-3 have their first double-bond in the third position – hence the name "omega-3." However, the length of the carbon chain of each omega-3 fat makes a significant difference when it comes to bioavailability and biological effect.^{1,2,3}

- **Marine animal-based omega-3** – Found in fatty fish, fish oil and krill oil, marine animal-based omega-3s primarily contain docosahexaenoic acid (DHA), a long-chained PUFA consisting of 22 carbons, and eicosapentaenoic acid (EPA), which has 20 carbons.
- **Plant-based omega-3** – Found in flaxseed, flaxseed oil, chia seeds, walnuts and leafy greens, for example, plant-based omega-3s contain alpha-linolenic acid (ALA), a shorter-chained PUFA consisting of 18 carbons. Plant-based omega-3s are completely devoid of DHA and EPA, which is why they cannot be used to obtain EPA and DHA-related health benefits.

While ALA is a precursor to EPA and DHA, the enzyme required for this conversion does not work very well in most people, hence the conversion rate is exceptionally small. Typically, less than 0.5 to 1% of the ALA is converted to EPA.⁴

DHA is especially important for optimal health, as it is a component of every cell in your body. This is particularly true for your brain, about 90% of which is made up of DHA. All

other omega-3 fats are found only in trace amounts in your brain, including ALA, regardless of how much ALA you consume.⁵

There are actually specific transporters for long-chained omega-3s in your blood-brain barrier, the placenta (in pregnant women), and likely also in your liver, which transport these molecules in a very precise way into the cell membranes where they belong. No such transporters exist for the short-chained omega-3s.

EPA Lowers Heart Disease Risk

Aside from protecting and benefiting your brain, marine-based omega-3 is also really important for heart health. More recently, a study^{6,7,8} involving a proprietary prescription formulation of fish oil called Vascepa – a highly-processed form of EPA – found the drug lowered cardiovascular health risks by 25% compared to placebo containing mineral oil.

This included heart attacks, strokes, bypass surgery and chest pain requiring hospitalization. The drug trial was called REDUCE-IT and was done for five years. Perhaps the most unusual aspect of this trial is that they used a far higher dosage than is typically used in these types of studies.

Here, participants received 4 grams of EPA per day, which is two to four times more EPA than typically given. Also notable: A 25% reduction in cardiovascular risk is typically what you see with the use of statins, and this significant reduction is believed to be a byproduct of EPA's ability to lower triglycerides.

While the full study will not be available for review until it is presented at the American Heart Association's annual meeting November 10, 2018, the preliminary information looks promising, and supports what James DiNicolantonio and I predicted in our book "[Superfuel](#)," which is being published November 13.

While this study is very strong support for the use of marine-based omega-3 fats, please understand that Vascepa is a highly processed and very expensive form of omega-3 that

costs around \$2,500 a year. You can purchase loads of krill, which I believe is superior because of its absorption and astaxanthin, for that price. As reported by Forbes:⁹

"Vascepa is already approved by the Food and Drug Administration to cut triglycerides in patients in whom levels have risen above 500 milligrams per deciliter [mg/dL], triple normal.

But there had been skepticism regarding whether it would provide a benefit in heart disease, because other fish oil pills had used much lower doses and because it has proved difficult for any drug significantly to reduce the risk of heart attacks and strokes when given on top of cholesterol-lowering medicines, which are already very effective.

But the results from the 8,179-patient study ... seem to leave little doubt that the effect of the drug was substantial in people who had high triglycerides (median triglyceride levels in the study were 219 mg/dL, 50 percent more than normal) and had either had previous cardiovascular problems, such as a heart attack or stroke, or had diabetes and another risk factor for heart disease."

Higher Doses of Omega-3 Required for Optimal Health

For all its potential benefits, it's worth noting that Vascepa costs over \$200 per month. Natural EPA sources such as krill oil and clean fish such as anchovies and sardines are far less expensive. The key to achieving these results, though, is to approach the 4 grams per day dose.

As discussed in "Superfuel," 3 to 4 grams of EPA and DHA appears to be ideal. (Meanwhile, you only need 1 to 2 grams of whole food-based omega-6 linoleic acid per day, ideally from plant seeds and tree nuts, not vegetable oils.)

Taking 3 to 4 grams of omega-3 (EPA and DHA in the form of fatty fish, triglyceride fish oil or krill oil) per day will saturate your cells and cell membranes with DHA, making them very fluid. As a result of improved cell function, your basal metabolic rate

increases by as much as 15%, and your fat burning capacity during rest and exercise increases by 20 and 30% respectively.

As an example, research shows replacing 6 grams of visible fat in your diet (such as steak) with 6 grams of high-quality fish oil can help you lose 2 pounds of fat and gain half a pound of muscle in just three weeks.

Again, the reason for this is because omega-3 fat, particularly DHA, makes the cell membrane really fluid, allowing amino acids, glucose, sodium and potassium to easily flow in and out of the cell. Omega-3s also help synthesize protein, so muscle protein synthesis dramatically increases when you consume 3 to 4 grams of animal-based omega-3 per day.

Fish Oil Is Better Than Drugs for Preventing Heart Failure

The Varicepa trial is not the first to find omega-3 benefits your heart. For example, a pair of parallel studies^{10,11} published in 2008 – both lasting four years – found fish oil supplements worked better than placebo and the cholesterol-lowering drug Crestor in patients with chronic heart failure.

Chronic heart failure is a condition that occurs when the heart becomes enlarged and cannot pump blood efficiently around the body. Omega-3 fats have long been proven to protect and boost heart health in a number of ways. Here is just a sampling of omega-3's heart benefits:^{12,13}

Antiarrhythmic – Counteracts and prevents cardiac arrhythmia

Antithrombotic – Prevent thrombosis (a blood clot within a blood vessel)

Antiatherosclerotic – Prevents fatty deposits and fibrosis of the inner layer of your arteries from forming

Anti-inflammatory – Counteracts inflammation

Improves endothelial function – A major factor in promoting the growth of new blood vessels

Has beneficial effects on the heart's electrical system, preventing potentially life-threatening heart rhythm disorders

Lowers blood pressure

Lowers triglyceride concentrations

DHA and EPA Lower Risk of Heart-Related Death

Other research published in 2016 found eating fatty fish and other omega-3 rich foods (including certain plant-based sources) may lower your risk of a fatal heart attack by about 10%.¹⁴

This effect held true even after accounting for confounding factors like age, sex, ethnicity, diabetes and use of aspirin or cholesterol-lowering drugs. While there are benefits from the fish fats you just need to be ultracareful to have clean fish that aren't loaded with fat soluble toxins that will outweigh the fats' benefits.

Other studies have found even more significant effects. In one, heart attack survivors who took 1 gram of marine-based omega-3 per day for three years had a 50% reduced chance of sudden cardiac death.¹⁵ That's quite significant considering this is about one-quarter of the ideal dose.

Another placebo controlled study¹⁶ published in 2016 found that when taken after a heart attack, high doses of omega-3 can also significantly improve your odds of survival.^{17,18,19} Here, 360 heart attack patients were divided into two groups. The treatment group took 4 grams of the prescription omega-3 fish oil called Lovaza. The placebo group received corn oil.

After six months, the treatment group showed a 5.6% reduction in scarring of undamaged heart muscle. Their hearts were also better able to pump blood compared to the controls. Despite a positive result, it's worth noting that corn oil is a terrible placebo. Placebos are supposed to be completely inert, like water.

Corn oil is actually a harmful industrially processed GMO-contaminated omega-6 fat that clearly adversely affects your heart. So, using a corn oil placebo could make the drug appear more potent than it really is.

Other Health Benefits of Marine-Based Omega-3

Aside from the benefits already discussed, omega-3s are also important for:

Healthy, strong bones	Mood regulation
Reducing your risk of Parkinson's disease	Reducing your risk of death from ALL causes
Protecting your tissues and organs from inflammation	Brain and eye development in babies, and preventing premature delivery
Reducing your risk of Alzheimer's disease	Delaying progression to psychosis among patients at high risk for schizophrenia
Protecting against osteoarthritis and rheumatoid arthritis (RA) ^{20,21,22}	Protecting against metabolic syndrome, ²³ including obesity, fatty liver, ²⁴ and type 2 diabetes (by reducing inflammation and blood sugar)
Improving in premenstrual syndrome (PMS) and dysmenorrhea ²⁵	Lowering your risk for neurological/cognitive dysfunction, including: memory loss, brain aging,

learning disorders and ADHD,²⁶ autism and dyslexia²⁷

Reducing your risk of Crohn's disease

Reducing your risk of colon cancer.²⁸

Colon cancer patients who consumed a minimum of 0.3 grams of omega-3 from fish each day also reduced their risk of dying over the next decade by 41%²⁹

Reducing your risk of kidney disease³⁰

Reducing your risk of autoimmune disorders, such as lupus and nephropathy

Your Blood Level, Not the Dosage, Is Key for Optimization

Despite many studies showing the importance of marine-based omega-3 for heart health, some have come to conflicting conclusions. For example, a Cochrane Collaboration review³¹ concluded omega-3 supplementation has little to no discernible benefit for heart health or longevity.

There are a number of reasons for these perplexing results. Perhaps most importantly, many nutritional studies fail to assess the correct parameters. The importance of looking at achieved blood levels of a nutrient rather than dosage has been made abundantly clear by GrassrootsHealth vitamin D researchers.

When studies look at dosage, no apparent **benefits of vitamin D supplementation** are found. However, when you look at people's blood level – the concentration of the nutrient in the body – truly dramatic effects are detected.

The problem is that people metabolize the nutrient at different rates, and while one may need a very small dose to achieve a certain blood level, another may need several times that dose. As a result, assessing health effects based on supplement dosage can be unreliable.

For this reason, I recommend getting your omega-3 level tested on an annual basis. As with vitamin D, blood testing is the best way to customize your dosage to ensure sufficiency, because requirements for omega-3 will vary depending on your lifestyle; your intake of fatty fish, for example, and your level of physical activity.

So, while a general recommendation is to take 3 to 4 grams of omega-3 per day, the only way to really know whether this is too much or too little is via a blood test. For optimal health, you'll want an omega-3 index of 8% or higher.

Buyer Beware: Most Commercial Fish Oils Are Synthetic

Another reason some fish oil studies reach negative results may be related to the use of inferior products. As noted by Naomi Whittel, former CEO of Twinlab, the [processing of fish oil](#) is deeply problematic, rendering the final product into something far from the natural oils you get from the whole fish.

Whittel estimates about 98% of the omega-3 products on the market are inferior (and perhaps even toxic) due to the way the fish are caught and processed – a summary of which is provided in the graphic below.



Several factors come into play that affect the efficacy of fish oil. One is the form of the long-chained omega-3 fats. In fish, about 98% of the DHA and EPA are in the form of triglycerides, which are the most bioavailable. In most commercial fish oil supplements, however, the DHA and EPA are delivered in the form of ethyl esters.³²

Triglycerides Versus Ethyl Esters

A triglyceride consists of a three-carbon molecule that forms a "backbone" for the fatty acids to latch onto. Each carbon molecule is linked to a fatty acid so, in total, a triglyceride is composed of three carbons bonded to three fatty acids.

Ethyl ester fish oil is most prevalent simply because it's far less expensive to produce than the triglyceride form. Ethyl esters are also easier to work with during processing, as they have a higher boiling point. This becomes important during the molecular distillation phase (see above), during which the oils are heated and purified of harmful environmental pollutants.

The molecular distillation phase also concentrates the EPA and DHA. You can tell the concentration of these two fats in any given supplement by looking at the label. In fish, the oil consists of about 20 to 30% EPA and DHA, whereas purified fish oil concentrate typically contains between 60 and 85% EPA and DHA.

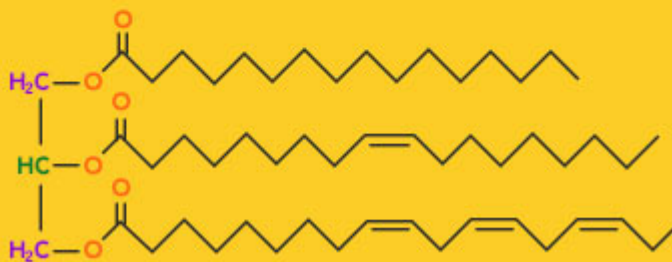
Ethyl esters are essentially a synthetic substrate, created through the micro distillation process of crude fish oil, in which ethanol and/or industrial alcohol is added. This mix is heat distilled in a vacuum chamber, resulting in a concentrated omega-3 ethyl ester condensate.

It is also important to note that this purifying molecular distillation process removes vital resolvins and protectins present in the raw material that are important in reducing inflammation, and inflammation is a hallmark of both neurological and cardiovascular diseases and dysfunction.

Fatty Acid Ethyl Ester (Synthetic Fish Oil)



Triglyceride Form Fish Oil (Natural Fish Oil)



Ethyl Esters Are Poorly Absorbed, May Do More Harm Than Good

Ethyl esters – found in most fish oils – are the least bioavailable form of omega-3. Studies³³ suggest a mere 20% of the EPA and DHA in ethyl ester form are absorbed by your body. When taken with other dietary fat, absorption increased threefold to 60%.

Meanwhile, EPA and DHA in their natural triglyceride form were found to have a 69% absorption rate from the start, and when taken with additional dietary fat, absorption increased to 90%. As a result, taking a triglyceride fish oil results in a 50% greater rise in omega-3 blood plasma levels than ethyl ester fish oil.

Another major drawback of ethyl ester fish oils is their rapid oxidation rate. Ethyl ester DHA is far more reactive than triglyceride DHA, oxidizing 33% more rapidly, and consuming rancid omega-3 is not going to do your health any good.

While manufacturers could convert them back into triglyceride form (by detaching the ethyl alcohol molecule and reattaching a glycerol molecule in a process known as re-esterification), this process is a costly one. So, in summary, it's important to realize that

the vast majority of clinical evidence showing health benefits of omega-3 relates to actual fish consumption, and virtually all of the omega-3s in fish are in triglyceride form.

Hence, to achieve reliable results, you really need to either eat omega-3-rich fish, or make sure the supplement you're taking contains DHA and EPA in their triglyceride form. For a more in-depth understanding of these differences, see the paper, "A Comparison of Synthetic Ethyl Ester Form Fish Oil vs. Natural Triglyceride Form,"³⁴ by Dr. Douglas MacKay.

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