

## Fish Oil

**Fish oil**, made from the tissue of oily fish-such as salmon, tuna, mackerel, herring, lake trout and sardines-has many health benefits. Fish oil contains important **Omega-3 fatty acids**, most notably eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). These Omega-3 fatty acids are believed to have health benefits ranging from reducing the risk of heart attack and coronary heart disease to combating depression, bipolar disorder and schizophrenia.

## Fish Oil Benefits

### Heart Problems

The intake of the recommended amount of DHA and EPA has been shown to have many **heart healthy benefits**. Consumption of dietary fish or fish oil supplements can **lower triglycerides-a certain type of blood fat-and increase "good" cholesterol**, while slightly thinning the blood. All of these factors help reduce the risk of heart attack. Fish oil also helps to prevent dangerous abnormal heart rhythms that can cause sudden cardiac death, and strokes in people with known cardiovascular disease. In addition to the numerous benefits already mentioned for the heart, fish oil can also slow the hardening of arteries and slightly lower blood pressure-two more important factors of heart health.

### Inflammation

Omega-3 fatty acids are not only good for the heart; they also help to reduce inflammation. This is perhaps one of the most valuable benefits of the Omega-3 fatty acids found in fish oil, as inflammation is associated with many serious diseases. **Heart disease, cancer, autoimmune diseases, psoriasis, and Alzheimer's**, for example, are characterized by increased levels of pro-inflammatory markers. Omega-3 fatty acids from fish oil reduce inflammation by preventing production of pro-inflammatory signaling molecules. This may help to prevent serious illness associated with inflammation.

### Arthritis

The ability of fish oil to reduce inflammation is not only good for preventing serious illnesses, such as heart disease and cancer. Fish oil is also effective in reducing the symptoms and pain of **arthritis**. **Morning stiffness and joint tenderness** was shown to decrease with regular intake of fish oil supplements. Fish oil does not act as a painkiller, and it takes regular use before a difference is noticed. However, fish oil is a viable, natural way to reduce the pain and symptoms associated with arthritis if one is dedicated to the long term outcome rather than focused on immediate cessation of symptoms.

### Anti-aging

As if the benefits of fish oil on heart health and arthritis were not enough, it is believed that fish oil also helps with **anti-aging** as well. Omega-3 fatty acids slow the rate at which protective caps on the end of chromosomes shorten, thus **increasing the lifespan of cells**. The caps, or telomeres, are made from copied strands of DNA and prevent the chromosomes from becoming damaged. When a cell divides, its telomere gets shorter until it can get no shorter and the DNA becomes damaged. When the DNA is damaged the cell no longer divides. Omega-3 fatty acids found in fish oil slows the deterioration of the telomeres, resulting in longer life of cells.

**Age-related macular degeneration - better sight** Prolonging the life of cells is not the only anti-aging benefit of fish oil. Fish oil has also been shown to significantly reduce the risk of developing age-related macular degeneration. A major component of the eye's retina is DHA, accounting for 60% of the fatty acids in the retina. **Macular degeneration** is a common cause of **blindness** in the elderly and has no effective treatment. Omega-3 fatty acids help support healthy circulation and blood vessel strength, as well as naturally lowering cholesterol levels-all of which are causes of macular degeneration. Due to the benefits of fish oil, it may prove to be the first effective treatment against macular degeneration.

### **Fish oil benefits to pregnant women and the unborn children**

The benefits of **Omega-3 fatty acids** found in fish oil are not only for the aging or those facing serious medical issues. Fish oil has also been shown to be beneficial to pregnant women and the unborn child. It is recommended that a **pregnant woman have 900 mg of fish oil per day**, which is equivalent to a serving of **salmon per day**. The benefits to the unborn child are numerous and include: a **healthier brain** with increased intelligence; **good nervous system development**; **better eyesight** from retina formation; **fewer behavioral problems** after birth; and **better sleeping patterns** as a new born. The mother also receives benefits from her consumption of fish oil. These benefits include: a lower chance of developing preeclampsia; a decreased chance of preterm labor; and a greatly **reduced incidence of breast cancer**. With benefits such as those, all pregnant women should adhere to the recommended daily dosage of fish oil and thus increase her odds of delivering a happy and healthy child. The reason fish oil is so beneficial to the unborn child is because **70% of a newborn's brain, retina and nervous system are made up of the Omega-3 fatty acids, DHA and EPA**. Therefore, increasing the amount of these fatty acids present in the mother's diet, and therefore being given to her unborn child, aides in the child's development of the brain, retina and nervous system.

### **Benefits of fish oil to mental health**

Not only is fish oil beneficial to physical health, fish oil is also beneficial to **mental health**. **Alzheimer's** is a debilitating disease causing memory loss, dementia, personality change, and eventually death. People with Alzheimer's have a reduced amount of a protein called LR11, which prevents toxic "plaques-deposits" of a protein that are toxic to neurons in the brain. The Omega-3 fatty acid, DHA, increases the production of the protein LR11, thus decreasing the amount of toxic "plaques" and helping to prevent the occurrence of Alzheimer's.

### **Fish oil and depression, bipolar disorder, and schizophrenia**

Fish oil does not only help prevent Alzheimer's. It also helps to prevent mental illnesses such as depression, bipolar disorder, and schizophrenia. Omega-3 fatty acids help maintain the proper functioning of dopamine and serotonin signaling systems in the brain. Both dopamine and serotonin levels, and the signaling system of those hormones, are believed to contribute to the occurrence of depression, bipolar disorder and schizophrenia. Therefore, Omega-3 fatty acids may help to regulate those hormones and lessen the symptoms of these severe mental illnesses. Combined with typical drug therapy, fish oil high in Omega-3 fatty acids has been shown to help regulate the moods of those suffering from these three illnesses.

### **Fish oil Omega-3 fatty acids and our bodies**

Omega-3 fatty acids found in fish oil are extremely important to the overall health of our minds and bodies. For that reason, it is important to understand how our bodies obtain these important fatty acids. The **human body cannot make Omega-3 fatty acids**, and therefore is **dependent on outside sources** for the essential fatty acids. In all circumstances where these fatty acids are believed to be medically beneficial, we must get it through either food (i.e. eating the recommended 2 servings of fish per week) or through a **fish oil supplement**.

### **Fish oil supplements, quality and how fish oil is manufactured**

If a fish oil supplement is used to obtain the essential Omega-3 fatty acids, it is important to know how to determine the **quality of the fish oil**. However, in order to determine the quality, one must first understand exactly **how fish oil is manufactured**. First, the **oily fish** enters a processing plant and is cut into pieces. These pieces are then **cooked** with steam. The cooked fish is then **pressed** to separate the fat free solid from the liquid, which consists of oil and water. The fat free solid is processed into fish meal, which is commonly used in animal feed, while the liquid is further processed to **separate the water from the oil**. The separated water has solids in it and is added back into the fish meal to be used in animal feed, while the separated oil is further **processed to remove impurities**. Finally, **anti-oxidants** are added to the fish oil and the finished oil is placed in steel storage containers. Thus, fish oil is created.

With an understanding of the manufacturing process, one can more easily determine the **quality of the fish oil**, as the quality depends on the type of fish used and the purity standards followed when refining the oil. **Salmon, tuna, sardines and anchovies are the richest sources of Omega-3 fatty acids**, therefore making fish oil made from these fish the most desirable. In order to assess the purity standards followed during the refining of the fish oil, contacting the company that manufactures the fish oil is the best option. When contacting the company, a request for documentation of product verification by a third party laboratory should be requested. A company that is responsible, has done their homework, and has received good marks from third party verification should be happy to provide this information.

Another indication of quality is the **ratio of EPA and DHA per capsule**. Many manufacturers include the milligrams of fish oil on their labels. However, less than one third of that number is actually the essential Omega-3 fatty acids. In order to determine the quality of the fish oil and Omega-3s then, the amounts of EPA and DHA per serving must be added. For example, a fish oil capsule that is 1,000 mg fish oil may contain 200 mg of EPA and 150 mg of DHA, meaning the capsule provides 350 mg of Omega-3 fatty acids.

Here are a few simple rules to follow in order to choose the highest quality fish oil supplement:

- The fish oil must contain Omega-3 fatty acids, not just "fish oil." Remember, it is from the Omega-3 fatty acids that we receive health benefits.

- The supplement should list the total amount of EPA and DHA on the label. You want to get a supplement where the total of the EPA and DHA adds up to the total amount of oils in the product. If there is only 350 mg of Omega-3 fatty acids but the capsule is 1,000 mg, what kind of oil makes up the

missing 650 mg? The closer to the overall capsule size, the better.

- The oil should be pressed only from the flesh of the fish. Some supplements are pressed from heads, tails, or internal organs. You wouldn't eat these parts on a fish if you were obtaining your Omega-3 fatty acids via the food source. Thus, you shouldn't want a supplement made out of the inedible parts of the fish either.

- The fish used for the oil should be health screened and disease free. This means the manufacturer needs to know where their fish is coming from and must assess the fish before including them in their processing plant.

- The fish oil should not have been molecularly distilled. **Molecularly distilling** oxidizes and alters the natural form of the oil. Sometimes the oil is molecularly distilled **to remove toxins**. However, the fish should not have been contaminated in the first place and so should not have required molecular distillation. If the fish in the supplement required molecular distillation, you have to ask how polluted the fish oil was before the distillation and decide if you really want to put that low quality of fish oil in your body.

In addition to label checking to ensure quality, product contamination affects the quality level of fish oil supplements, and is a common concern. A particular concern is the **presence of polychlorinated biphenyls (PCBs), dioxins and heavy metals** such as **mercury**. It is common knowledge that fish contains mercury and mercury in high levels is detrimental to health. However, recent studies failed to find detectable levels of mercury in products of fish oil that were analyzed. Additionally, significant levels of PCBs and dioxins were not found either. It is believed that mercury was not found in detectable levels because most mercury in fish is concentrated in the meat, rather than the oil. Another reason for the undetectable levels of mercury is the distillation process that the fish oil supplements undergo. This process removes contaminants, such as heavy metals and other toxins. Therefore, while product contamination is a legitimate concern, it is not one that needs to be considered too deeply.

Another important factor regarding the quality, and safety, of fish oil is whether or not the fish oil is rancid. This is a legitimate concern and one that is increasingly worrisome. Tests in 2009 showed that an alarming number of sampled fish oil capsules contained "oxidative byproducts," which indicate that the fish oil is degrading and becoming rancid. While fish oil that is not rancid promotes heart health and numerous other health benefits, **rancid fish oil has the opposite effect, actually promoting heart disease and other chronic illnesses**. The reason rancid fish oil is such a concern is because fish oil begins to oxidize as soon as it is extracted from the fish. The oil then begins to go rancid within days, though the majority of labeled fish oil supplements indicates that the capsules are good for three to four years. Further, because the oil is enclosed in capsules, consumers are not able to tell whether or not the fish oil is rancid. Fortunately, there is a solution to the issue of rancid fish oil. **Fortifying fish oil with anti-oxidants, especially vitamin E, prevents oxidation**. It is imperative then that manufacturers use the most effective form of vitamin E-gamma and delta-rather than the less effective (and less expensive) alpha tocopherol.

Knowing that it is highly possible for fish oil capsules purchased to go rancid very quickly, it is imperative that you ascertain the quality and safety of the fish oil that you purchase. There are some easy and effective ways to do this. Testing your fish oil capsules is an effective measure of whether or not they rancid. Bite into the capsule. It should taste fresh and slightly fishy. If it tastes bad or has an extremely fishy taste, it is rancid. Throw the entire bottle away and do not buy that brand again. To increase your odds of receiving capsules that are not rancid, check the label closely and choose a brand that uses d-gamma and d-delta forms of tocopherols (vitamin E). These help to prevent oxidation and rancidity, so brands using these more expensive forms of vitamin E are more likely to be good when you bite into that capsule to check. Do not buy the cheapest brand of fish oil. It might sound more appealing to pay a few dollars less, but it isn't worth it in the long run. If the brand is significantly less than other brands, chances are it uses the lesser quality vitamin E and does not adequately prevent against oxidation and rancidity.

To emphasize how important this is we will state this again - it is imperative never to take fish oil supplements that are rancid. The purpose of the fish oil is to better your general health and help prevent serious illness. Consuming rancid fish oil will do just the opposite.

### **Fish oil side effects**

The quality of the fish oil consumed is extremely important, and now it shouldn't be quite so confusing or difficult to ensure that the highest quality is obtained. Even if the highest quality fish oil supplement is ensured, however, there are still **possible side effects** to consuming these supplements that one should be aware of. Generally, **doses of 3 mg or fewer of fish oil supplements per day produce little to no side effects**. However, fish oil does have a slight **blood thinning effect**-an effect that helps to explain why it is so beneficial for heart health, and an effect that is not necessarily bad in and of itself. This blood thinning effect can **increase the risks of bleeding, easy bruising and nose bleeds** though. This is especially important to consider if you are taking other blood thinning herbs or medication, because concurrent use of blood thinning medications or herbs may increase the risks of bleeding. The fact that fish oil causes blood thinning and thus increases the risk of bleeding, the **use of fish oil supplements** should be **stopped prior to surgery** and it is extremely important that you **tell your doctor** if you are taking fish oil supplements so your doctor can advise you as to the proper procedure that should be taken in preparation for surgery.

### **Fish oil dosage**

**High dosages of fish oil supplements** increase the risk of side effects, such as bleeding, easy bruising and nose bleeds, whereas low dosages generally have little to no associated side effects. The **amount of fish oil** one should take depends heavily on the **reasoning behind their consumption of fish oil**. **Dosage should always be discussed with your medical doctor**, and should be discussed **especially if taking fish oil for a specific medical condition**. However, here are some general guidelines for specific fish oil dosages:

- Aging 1,000 mg twice a day
- Angina 2,000 mg fish oils 3 times a day
- Arrhythmia 1,000 mg 3 times a day
- Asthma 1,000 mg 3 times a day

- Cancer 3 capsules twice a day
- Crohn's Disease 2,000 mg twice a day
- Diabetes 2,000 mg 3 times a day
- Eczema 1,000 mg 3 times a day
- Gout 1,000 mg 3 times a day
- Heart Disease Prevention 1,000 mg 3 times a day
- High Blood Pressure 1,000 mg 3 times a day
- Lupus 2,000 mg 3 times a day
- Psoriasis 2,000 mg 3 times a day
- Raynaud's disease 1,000 mg 4 times a day
- Rheumatoid Arthritis 1000 mg (2 capsules) containing 600 mg EPA/DHA, twice a day
- Skin Health 1,000 mg a day with food
- Stroke 1,000 mg 3 times a day

The FDA does not have a specific recommended dosage for fish oil. However, the FDA does recommend that an **average healthy person (above the age of 5) should not take more than 3,000 mg of fish oil per day**. The list above exceeds that recommendation in some cases, and is why the advice of a medical doctor should be followed before determining the proper dosage of fish oil when used for specific medical conditions.

The World Health Organization recommends starting dosages of fish oil at 300 - 500 mg per day, as it is a good idea to start slowly in order to see how your body feels and to ensure there are no adverse **side effects or allergies**. While starting out slow is a good idea, it is important to note that most of the research praising the benefit of Omega-3 fatty acids is done using dosages of 1,000 mg and up. For example, the American Heart Association recommends a daily dosage of 2,000 - 4,000 mg for high triglycerides, and a daily dosage of 1,000 mg for coronary artery disease. Additionally, some people believe extremely high dosages are effective in treating major issues like **depression** (4,000 mg), and **lupus** and **arthritis** (6,000 mg). If fish oil is being taken for a specific medical condition that suggests a higher dosage than the recommended 3,000 mg per day, it is important to **start out slow and work up to the higher dosage**. When discussing fish oil dosage with your doctor be sure to bring up starting up slow and seek medical advice on the best way to slowly increase dosage until the desired amount is reached.

### **Fish oil dosage and medical advice**

Varying opinions and recommendations regarding the proper dosage of fish oil makes it essential that medical advice is sought before determining and beginning any dosage, but particularly any dosage above the FDA's recommendation of 3,000 mg daily. Additionally, due to the blood thinning effect of fish oil supplements, anyone with a chronic blood disorder should consult a medical doctor before taking ANY dosage of fish oil

### **Eating fish as a source of Omega-3 fatty acids**

For general health it is recommended that **two 3-ounce servings of fish are eaten per week**. However, it is important to note that it is difficult to get an adequate dose of fish oil, high in Omega-3 fatty acids, from food alone. Therefore, supplements such as capsules and chewable tablets are necessary. It sometimes occurs that someone is unable to take the capsules or chewable tablets for various reasons.

### **Side effects of fish oil supplements**

These supplements are known to cause belching with an undesirable **fish flavor**, as well as sometimes causing an **upset stomach, nausea** and **diarrhea**. If these side effects are frequent and cause individual distress, **liquid fish oil** may be the best alternative.

### **Liquid fish oil**

Liquid preparations are more expensive, in general, than capsules and tablets. However, the liquid versions are usually flavored and therefore do not carry the undesirable side effect of "fishy" belches and may be easier to swallow. Liquid fish oil preparations can give the same amounts of Omega-3 fatty acids, and are therefore worth the cost if the capsules and tablets are for any reason intolerable. However, due to the price difference, if tablets or capsules are tolerable they are the more cost effective supplement. Liquid preparations of fish oil may still result in side effects of diarrhea and nausea, as well as adding calories to your daily diet.

If neither capsule or tablets or liquid fish oil works for any number of reasons, there are alternatives rich in Omega-3 fatty acids that do not include fish oil at all.

### **Fish oil alternatives**

#### **Krill oil**

One alternative is krill oil. **Krill** are shrimp-like crustaceans that feed on phytoplankton, and that **contain Omega-3 fatty acids** as well as an antioxidant called **astaxanthin**. Astaxanthin is a **powerful antioxidant** that protects the eyes, brain and central nervous system from free radical damage. **Krill oil** is often used as a substitute for fish oil, because it does not cause fishy belches or aftertastes like fish oil often does. In addition to the lack of those side effects, krill oil also contains more astaxanthin than fish oil. Krill oil is not an appropriate alternative for anyone allergic to seafood or for people with blood disorders. Side effects include loose stools, diarrhea, and indigestion.

Other alternatives for fish oil are alternatives that may be best for vegetarians or for people who simply cannot stand seafood of any variety for any reason.

#### **Algae, nuts and seeds**

One vegetarian alternative is to consume **algae** such as **spirulina** in combination with nuts or seeds. The **spirulina assists the body in converting Omega-3 fats from the nuts or seeds, giving the same effect as fish oil**. **Spirulina** as the algae and flax seed oil is the most frequent combination, and this is a common **vegetarian alternative to fish oil**. **Flax seed oil also has other health benefits** in addition to acting as a replacement for fish oil when combined with algae such as spirulina. Another combination similar to spirulina and flax seed oil is an edible weed known as purslane.

### **Purslane**

Purslane is rich in Omega-3 fatty acids, and has more Omega-3 than other **dark leafy greens** such as kale, chard and spinach. **Walnuts** are an excellent choice for the nut option, as well, and in combination with the dark leafy greens mentioned above would make a great salad. This combination of algae or dark leafy greens and nuts is also a popular alternative due to the sustainability of **using algae and plants as a supplement**.

### **Black Current Oil**

Another popular vegetarian alternative to fish oil is Black Current Oil. **Omega-3 fatty acids ALA and Stearidonic Acid**, present in Black Current Oil, are said to **improve cardiovascular health** and help **maintain hormones** that can lead to some types of **depression**. However, the FDA has not confirmed the claims regarding Black Current Oil.

Finally, there are **vegetarian fish oil replacement supplements** available in some nutritional and drug stores.

### **Seven Seas Vegetarian Omega-3**

One such replacement is Seven Seas Vegetarian Omega-3. While these alternatives are not as easy to find as the traditional fish oil supplements, they are available with enough investigation and are readily available at various online health retailers.

As with any health regimen, **proper nutrition** and **exercise** are important factors in the well being of our bodies. Adding Omega-3 fatty acids through traditional diet of fish, fish oil supplements, or vegetarian alternatives, will further benefit overall health and harvest the **fish oil benefits**. With the guidance of your medical doctor, fish oil can be used to combat specific ailments and may help to ensure the long-term health of both body and mind.

Disclaimer: The statements and information upon this website have not necessarily been evaluated by the Food and Drug Administration. The products featured are not intended to diagnose, treat, cure or prevent any disease. Consumers should always consult their own medical practitioner(s) with any medical or health concerns before starting any new diet, product or supplement.