

Omega-3 fatty acids

Video Details

Overview:

Omega-3 fatty acids are considered essential fatty acids. They are essential to human health but cannot be manufactured by the body. For this reason, omega-3 fatty acids must be obtained from food. Omega-3 fatty acids can be found in fish, such as salmon, tuna, and halibut, other marine life such as algae and krill, certain plants (including purslane), and nut oils. Also known as polyunsaturated fatty acids (PUFAs), omega-3 fatty acids play a crucial role in brain function as well as normal growth and development. The American Heart Association recommends eating fish (particularly fatty fish such as mackerel, lake trout, herring, sardines, albacore tuna, and salmon) at least 2 times a week. It is advised that pregnant women and mothers, nursing mothers, young children, and women who might become pregnant not eat several types of fish, including swordfish, shark, and king mackerel. These individuals should also limit consumption of other fish, including albacore tuna, salmon, and herring. They can take omega-3 fatty acids in quality dietary supplements that are certified mercury-free by a reputable third-party lab.

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There are three major types of omega 3 fatty acids that are ingested in foods and used by the body: alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). Once eaten, the body converts ALA to EPA and DHA, the two types of omega-3 fatty acids more readily used by the body. Extensive research indicates that omega-3 fatty acids reduce inflammation and help prevent risk factors associated with chronic diseases such as heart disease, cancer, and arthritis. These essential fatty acids are highly concentrated in the brain and appear to be particularly important for cognitive (brain memory and performance) and behavioral function. In fact, infants who do not get enough omega-3 fatty acids from their mothers during pregnancy are at risk for developing vision and nerve problems. Symptoms of omega-3 fatty acid deficiency include extreme tiredness (fatigue), poor memory, dry skin, heart problems, mood swings or depression, and poor circulation.

It is important to maintain an appropriate balance of omega-3 and omega-6 (another essential fatty acid) in the diet, as these two substances work together to promote health. Omega-3 fatty acids help reduce inflammation, and most omega-6 fatty acids tend to promote inflammation. An inappropriate balance of these essential fatty acids contributes to the development of disease while a proper balance helps maintain and even improve health. A healthy diet should consist of roughly 2 - 4 times more omega-6 fatty acids than omega-3 fatty acids. The typical American diet tends to contain 14 - 25 times more omega-6 fatty acids than omega-3 fatty acids, and many researchers believe this imbalance is a significant factor in the rising rate of inflammatory disorders in the United States.

In contrast, however, the Mediterranean diet consists of a healthier balance between omega-3 and omega-6 fatty acids, and many studies have shown that people who follow this diet are less likely to develop heart disease. It also contains another fatty acid, omega-9 fatty acids, which have been reported to help lower risks associated with cancer and heart disease. The Mediterranean diet does not include much meat (which is high in omega-6 fatty acids) and emphasizes foods rich in omega-3 fatty acids, including whole grains, fresh fruits and vegetables,

fish, olive oil, garlic, as well as moderate wine consumption.

Uses:

Clinical studies suggest that omega-3 fatty acids may be helpful in treating a variety of health conditions. The evidence is strongest for heart disease and problems that contribute to heart disease, but the range of possible uses for omega-3 fatty acids include:

High cholesterol

Those who follow a Mediterranean-style diet tend to have higher high density lipoprotein (HDL or "good")cholesterol levels. Similar to those who follow a Mediterranean diet, Inuit Eskimos, who consume high amounts of omega-3 fatty acids from fatty fish, also tend to have increased HDL cholesterol and decreased triglycerides (fatty material that circulates in the blood). In addition, fish oil supplements containing eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) have been reported in several large clinical studies to reduce low density lipoprotein (LDL or "bad") cholesterol and triglyceride levels. Finally, walnuts (which are rich in alpha linolenic acid or ALA) have been reported to lower total cholesterol and triglycerides in individuals with high cholesterol levels.

High blood pressure

Several clinical studies suggest that diets or supplements rich in omega-3 fatty acids lower blood pressure significantly in individuals with hypertension. An analysis of 17 clinical studies using fish oil supplements found that supplementation with 3 or more grams of fish oil daily can lead to significant reductions in blood pressure in individuals with untreated hypertension.

Heart disease

One of the best ways to help prevent and treat heart disease is to eat a low-fat diet and to replace foods rich in saturated and trans-fat with those that are rich in monounsaturated and polyunsaturated fats (including omega-3 fatty acids). Clinical evidence suggests that EPA and DHA found in fish oil help reduce risk factors for heart disease including high cholesterol and high blood pressure. There is also strong evidence that these substances can help prevent and treat atherosclerosis by inhibiting the development of plaque and blood clots, each of which tends to clog arteries. Clinical studies of heart attack survivors have found that daily omega-3 fatty acid supplements dramatically reduce the risk of death, subsequent heart attacks, and stroke. Similarly, people who eat an ALA-rich diet are less likely to suffer a fatal heart attack.

Strong evidence from population-based clinical studies suggests that omega-3 fatty acid intake (primarily from fish) helps protect against stroke caused by plaque buildup and blood clots in the arteries that lead to the brain. In fact, eating at least 2 servings of fish per week can reduce the risk of stroke by as much as 50%. However, people who eat more than 3 grams of omega-3 fatty acids per day (equivalent to 3 servings of fish per day) may be at an increased risk for hemorrhagic stroke, a potentially fatal type of stroke in which an artery in the brain leaks or ruptures.

Diabetes

Individuals with diabetes tend to have high triglyceride and low HDL levels. Omega-3 fatty acids from fish oil can help lower triglycerides and apoproteins (markers of diabetes), and raise HDL, so people with diabetes may benefit from eating foods or taking supplements that contain DHA and EPA. ALA (from flaxseed, for example) may not have the same benefit as DHA and EPA because some people with diabetes lack the ability to efficiently convert ALA to a form of omega-3 fatty acids that the body can use readily. There have been slight increases reported in fasting blood sugar levels in patients with type 2 diabetes while taking fish oil supplements.

Weight loss

Many individuals who are overweight suffer from poor blood sugar control, diabetes, and high cholesterol. Clinical studies suggest that overweight people who follow a weight loss program that includes exercise tend to achieve better control over their blood sugar and cholesterol levels when fish rich in omega-3 fatty acids (such as salmon, mackerel, and herring) is a staple in their low-fat diet.

Arthritis

Most clinical studies investigating the use of omega-3 fatty acid supplements for inflammatory

joint conditions have focused almost entirely on rheumatoid arthritis. Several articles reviewing the research in this area conclude that omega-3 fatty acid supplements reduce tenderness in joints, decrease morning stiffness, and allow for a reduction in the amount of medication needed for people with rheumatoid arthritis.

In addition, laboratory studies suggest that diets rich in omega-3 fatty acids (and low in the inflammatory omega-6 fatty acids) may benefit people with other inflammatory disorders, such as osteoarthritis. In fact, several test tube studies of cartilage-containing cells have found that omega-3 fatty acids decrease inflammation and reduce the activity of enzymes that destroy cartilage. Similarly, New Zealand green lipped mussel (*Perna canaliculus*), another potential source of omega-3 fatty acids, has been reported to reduce joint stiffness and pain, increase grip strength, and enhance walking pace in a small group of people with osteoarthritis. In some participants, symptoms worsened before they improved.

An analysis was conducted of 17 randomized, controlled clinical trials assessing the pain relieving effects of omega-3 fatty acid supplementation in patients with rheumatoid arthritis or joint pain caused by inflammatory bowel disease (IBS) and painful menstruation (dysmenorrhea). The results suggest that omega-3 fatty acids are effective treatment, along with conventional therapies such as anti-inflammatory drugs, for joint pain associated with rheumatoid arthritis, inflammatory bowel disease, and dysmenorrhea.

Osteoporosis

Clinical studies suggest that omega-3 fatty acids such as EPA help increase levels of calcium in the body, deposit calcium in the bones, and improve bone strength. In addition, studies also suggest that people who are deficient in certain essential fatty acids (particularly EPA and gamma-linolenic acid [GLA], an omega-6 fatty acid) are more likely to suffer from bone loss than those with normal levels of these fatty acids. In a study of women over 65 with osteoporosis, those given EPA and GLA supplements experienced significantly less bone loss over 3 years than those who were given a placebo. Many of these women also experienced an increase in bone density.

Depression

People who do not get enough omega-3 fatty acids or do not maintain a healthy balance of omega-3 to omega-6 fatty acids in their diet may be at an increased risk for depression. The omega-3 fatty acids are important components of nerve cell membranes. They help nerve cells communicate with each other, which is an essential step in maintaining good mental health. In particular, DHA is involved in a variety of nerve cell processes.

Levels of omega-3 fatty acids were found to be measurably low and the ratio of omega-6 to omega-3 fatty acids were particularly high in a clinical study of patients hospitalized for depression. In a clinical study of individuals with depression, those who ate a healthy diet consisting of fatty fish 2 - 3 times per week for 5 years experienced a significant reduction in feelings of depression and hostility.

Bipolar disorder

In a clinical study of 30 people with bipolar disorder, those who were treated with EPA and DHA (in combination with their usual mood stabilizing medications) for 4 months experienced fewer mood swings and recurrence of either depression or mania than those who received placebo. Another 4-month long clinical study treating individuals with bipolar depression and rapid cycling bipolar disorder did not find evidence of efficacy for the use of in EPA in these patients.

Schizophrenia

Preliminary clinical evidence suggests that people with schizophrenia experience an improvement in symptoms when given omega-3 fatty acids. However, a recent well-designed study concluded that EPA supplements are no better than placebo in improving symptoms of this condition. The conflicting results suggest that more research is needed before conclusions can be drawn about the benefit of omega-3 fatty acids for schizophrenia. Similar to diabetes, individuals with schizophrenia may not be able to convert ALA to EPA or DHA efficiently.

Attention deficit/hyperactivity disorder (ADHD)

Children with attention deficit/hyperactivity disorder (ADHD) may have low levels of certain essential fatty acids (including EPA and DHA) in their bodies. In a clinical study of nearly 100

boys, those with lower levels of omega-3 fatty acids demonstrated more learning and behavioral problems (such as temper tantrums and sleep disturbances) than boys with normal omega-3 fatty acid levels. In animal studies, low levels of omega-3 fatty acids have been shown to lower the concentration of certain brain chemicals (such as dopamine and serotonin) related to attention and motivation. Clinical studies that examine the ability of omega-3 supplements to improve symptoms of ADHD are still needed. At this point in time, eating foods high in omega-3 fatty acids is a reasonable approach for someone with ADHD. A clinical study used omega-3 and omega-6 fatty acid supplementation in 117 children with ADHD. They study found significant improvements in reading, spelling, and behavior in the children over the 3 months of therapy. Another clinical study found that omega-3 fatty acid supplementation helped to decrease physical aggression in school children with ADHD. More studies, including comparisons with drug therapies (such as stimulants), should be performed.

Eating disorders

Clinical studies suggest that men and women with anorexia nervosa have lower than optimal levels of polyunsaturated fatty acids (including ALA and GLA). To prevent the complications associated with essential fatty acid deficiencies, some experts recommend that treatment programs for anorexia nervosa include PUFA-rich foods such as fish and organ meats (which include omega-6 fatty acids).

Burns

Essential fatty acids have been used to reduce inflammation and promote wound healing in burn victims. Animal research indicates that omega-3 fatty acids help promote a healthy balance of proteins in the body -- protein balance is important for recovery after sustaining a burn. Further research is necessary to determine whether omega-3s benefit people in the same way.

Skin disorders

In one clinical study, 13 people with a particular sensitivity to the sun known as photo dermatitis showed significantly less sensitivity to UV rays after taking fish oil supplements. Still, research indicates that topical sunscreens are much better at protecting the skin from damaging effects of the sun than omega-3 fatty acids. In another study of 40 people with psoriasis, those who were treated with medications and EPA supplements did better than those treated with the medications alone. In addition, many clinicians believe that flaxseed (which contains omega-3 fatty acids) is helpful for treating acne.

Inflammatory bowel disease (IBD)

When added to medication, such as sulfasalazine (a standard medication for IBD), omega-3 fatty acids may reduce symptoms of Crohn's disease and ulcerative colitis -- the 2 types of IBD. More studies to investigate this preliminary finding are under way. In animals, it appears that ALA works better at decreasing bowel inflammation than EPA and DHA. Plus, fish oil supplements can cause side effects that are similar to symptoms of IBD (such as flatulence, belching, bloating, and diarrhea).

Asthma

Clinical research suggests that omega-3 fatty acid supplements (in the form of perilla seed oil, which is rich in ALA) may decrease inflammation and improve lung function in adults with asthma. Omega-6 fatty acids have the opposite effect: they tend to increase inflammation and worsen respiratory function. In a small, well-designed clinical study of 29 children with asthma, those who took fish oil supplements rich in EPA and DHA for 10 months had improvement in their symptoms compared to children who took a placebo pill.

Macular Degeneration

A questionnaire administered to more than 3,000 people over the age of 49 found that those who consumed more fish in their diet were less likely to have macular degeneration (a serious age-related eye condition that can progress to blindness) than those who consumed less fish. Similarly, a clinical study comparing 350 people with macular degeneration to 500 without the eye disease found that those with a healthy dietary balance of omega-3 and omega-6 fatty acids and higher intake of fish in their diets were less likely to have this particular eye disorder. Another larger clinical study confirms that EPA and DHA from fish, 4 or more times per week, may reduce the risk of developing macular degeneration. Notably, however, this same study suggests that ALA may actually increase the risk of this eye condition.

Menstrual pain

In a clinical study of nearly 200 Danish women, those with the highest dietary intake of omega-3 fatty acids had the mildest symptoms, such as hot flashes and increased sweating, during menstruation.

Colon cancer

Consuming significant amounts of foods rich in omega-3 fatty acids appears to reduce the risk of colorectal cancer. For example, Eskimos, who tend to follow a high-fat diet but eat significant amounts of fish rich in omega-3 fatty acids, have a low rate of colorectal cancer. Animal studies and laboratory studies have found that omega-3 fatty acids prevent worsening of colon cancer while omega-6 fatty acids promote the growth of colon tumors. Daily consumption of EPA and DHA also appeared to slow or even reverse the progression of colon cancer in people with early stages of the disease.

Clinical studies have reported that low levels of omega-3 fatty acids in the body are a marker for an increased risk of colon cancer.

However, in an animal study of rats with metastatic colon cancer (in other words, cancer that has spread to other parts of the body such as the liver), omega-3 fatty acids actually promoted the growth of cancer cells in the liver. Until more information is available, it is best for people with advanced stages of colorectal cancer to avoid omega-3 fatty acid supplements and diets rich in this substance.

Breast cancer

Although not all experts agree, women who regularly consume foods rich in omega-3 fatty acids over many years may be less likely to develop breast cancer. In addition, the risk of dying from breast cancer may be significantly less for those who eat large quantities of omega-3 from fish and brown kelp seaweed (common in Japan). This is particularly true among women who substitute fish for meat. The balance between omega-3 and omega-6 fatty acids appears to play an important role in the development and growth of breast cancer. Further research is still needed to understand the effect that omega-3 fatty acids may have on the prevention or treatment of breast cancer. For example, researchers speculate that omega-3 fatty acids in combination with other nutrients (namely, vitamin C, vitamin E, beta-carotene, selenium, and coenzyme Q10) may prove to be of particular value for preventing and treating breast cancer.

Prostate cancer

Laboratory and animal studies indicate that omega-3 fatty acids (specifically, DHA and EPA) may inhibit the growth of prostate cancer. Similarly, population based clinical studies of groups of men suggest that a low-fat diet with the addition of omega-3 fatty acids from fish or fish oil help prevent the development of prostate cancer. Like breast cancer, the balance of omega-3 to omega-6 fatty acids appears to be particularly important for reducing the risk of this condition. ALA, however, may not offer the same benefits as EPA and DHA. In fact, one recent clinical study evaluating 67 men with prostate cancer found that they had higher levels of ALA compared to men without prostate cancer. More research in this area is needed.

Other

Although further research is needed, preliminary evidence suggests that omega-3 fatty acids may also prove helpful in protecting against certain infections and treating a variety of conditions, including autism, ulcers, migraine headaches, preterm labor, emphysema, psoriasis, glaucoma, Lyme disease, systemic lupus erythematosus (lupus), irregular heart beats (arrhythmias), multiple sclerosis, and panic attacks. Omega-3 fatty acid supplementation may also help to reduce stress and the effects it has on the body.

Dietary Sources:

Fish, plant, and nut oils are the primary dietary source of omega-3 fatty acids. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are found in cold-water fish such as salmon, mackerel, halibut, sardines, tuna, and herring. ALA is found in flaxseeds, flaxseed oil, canola (rapeseed) oil, soybeans, soybean oil, pumpkin seeds, pumpkin seed oil, purslane, perilla seed oil, walnuts, and walnut oil. Other sources of omega-3 fatty acids include sea life such as krill and algae.

Available Forms:

In addition to the dietary sources described, EPA and DHA can be taken in the form of fish oil capsules. Flaxseed, flaxseed oil, fish and krill oils should be kept refrigerated. Whole flaxseeds must be ground within 24 hours of use, otherwise the ingredients lose their activity. Flaxseeds are also available in ground form in a special mylar package so that the components in the flaxseeds stay active.

Be sure to buy omega-3 fatty acid supplements made by established companies who certify that their products are free of heavy metals such as mercury, lead, and cadmium.

How to Take It:

Dosing for fish oil supplements should be based on the amount of EPA and DHA in the product, not on the total amount of fish oil. Supplements vary in the amounts and ratios of EPA and DHA. A common amount of omega-3 fatty acids in fish oil capsules is 0.18 grams (180 mg) of EPA and 0.12 grams (120 mg) of DHA. Five grams of fish oil contains approximately 0.17 - 0.56 grams (170 -560 mg) of EPA and 0.072 - 0.31 grams (72 - 310 mg) of DHA. Different types of fish contain variable amounts of omega-3 fatty acids, and different types of nuts or oil contain variable amounts of a-linolenic acid. Fish oils contain approximately 9 calories per gram of oil.

Children (18 years and younger)

The precise safe and effective doses of all types of omega-3 fatty acid supplements in children have not been established. Omega-3 fatty acids are used in some infant formulas, although effective doses are not clearly established. Ingestion of fresh fish should be limited in young children due to the presence of potentially harmful environmental contaminants, including mercury. Fish oil capsules should not be used in children except under the direction of a health care provider.

Adults

Individuals taking more than 3 grams daily of omega-3 fatty acids from capsules should do so only under the supervision of a health care provider due to an increase risk of bleeding.

For healthy adults with no history of heart disease: The American Heart Association (AHA) recommends eating fish at least 2 times per week.

For adults with coronary heart disease: The American Heart Association (AHA) recommends an omega-3 fatty acid supplement (as fish oils), 1 gram daily of EPA and DHA. It may take 2 - 3 weeks for benefits of fish oil supplements to be seen.

For adults with high cholesterol levels: The American Heart Association (AHA) recommends an omega-3 fatty acid supplement (as fish oils), 2 - 4 grams daily of EPA and DHA. It may take 2 - 3 weeks for benefits of fish oil supplements to be seen.

Precautions:

Because of the potential for side effects and interactions with medications, dietary supplements should be taken only under the supervision of a knowledgeable health care provider.

Omega-3 fatty acids should be used cautiously by people who bruise easily, have a bleeding disorder, or take blood-thinning medications, including warfarin (Coumadin) or clopidogrel (Plavix), because excessive amounts of omega-3 fatty acids may lead to bleeding. In fact, people who eat more than three grams of omega-3 fatty acids per day (equivalent to 3 servings of fish per day) may be at an increased risk for hemorrhagic stroke, a potentially fatal condition in which an artery in the brain leaks or ruptures.

Fish oil can cause flatulence, bloating, belching, and diarrhea. Time-release preparations may reduce these side effects, however.

People with either diabetes or schizophrenia may lack the ability to convert alpha-linolenic acid (ALA) to eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), the forms more readily used in the body. Therefore, people with these conditions should obtain their omega-3 fatty acids from dietary sources rich in EPA and DHA. Also, individuals with type 2 diabetes may experience increases in fasting blood sugar levels while taking fish oil supplements. If you have type 2 diabetes, only use fish oil supplements under the supervision of a health care provider.

Although studies have found that regular consumption of fish (which includes the omega-3 fatty acids EPA and DHA) may reduce the risk of macular degeneration, a recent study including 2 large groups of men and women found that diets rich in ALA may substantially increase the risk of this disease. More research is needed in this area. Until this information becomes available, it is best for people with macular degeneration to obtain omega-3 fatty acids from sources of EPA and DHA, rather than ALA.

Similar to macular degeneration, fish and fish oil may protect against prostate cancer, but ALA may be associated with increased risk of prostate cancer in men. More research in this area is needed.

Fish (and fish oil supplements) may contain potentially harmful contaminants, such as heavy metals (including mercury), dioxins, and polychlorinated biphenyls (PCBs). For sport-caught fish, the U.S. Environmental Protection Agency (EPA) recommends that intake be limited in pregnant or nursing women to a single 6-ounce meal per week, and in young children to less than 2 ounces per week. For farm-raised, imported, or marine fish, the U.S. Food and Drug Administration recommends that pregnant or nursing women and young children avoid eating types with higher levels of mercury (such as mackerel, shark, swordfish, or tilefish), and less than 12 ounces per week of other fish types. Unrefined fish oil preparations may contain pesticides.

Possible Interactions:

If you are currently being treated with any of the following medications, you should not use omega-3 fatty acid supplements, including eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), and alpha-linolenic acid (ALA), without first talking to your health care provider.

Blood-thinning medications -- Omega-3 fatty acids may increase the effects of blood thinning medications, including aspirin, warfarin (Coumadin), and clopidogrel (Plavix). While the combination of aspirin and omega-3 fatty acids may actually be helpful under certain circumstances (such as in heart disease), they should only be taken together under the guidance and supervision of a health care provider.

Blood sugar lowering medications -- Taking omega-3 fatty acid supplements may increase fasting blood sugar levels. Use with caution if taking blood sugar lowering medications, such as glipizide (Glucotrol and Glucotrol XL), glyburide (Micronase or Diabeta), glucophage (Metformin), or insulin, as omega-3 fatty acid supplements may increase your need for the medication(s).

Cyclosporine -- Taking omega-3 fatty acids during cyclosporine (Sandimmune) therapy may reduce toxic side effects, such as high blood pressure and kidney damage, associated with this medication in transplant patients.

Etretinate and topical steroids -- The addition of omega-3 fatty acids (specifically EPA) to the drug therapy etretinate (Tegison) and topical corticosteroids may improve symptoms of psoriasis.

Cholesterol-lowering medications -- Following certain nutritional guidelines, including increasing the amount of omega-3 fatty acids in your diet and reducing the omega-6 to omega-3 ratio, may allow a group of cholesterol lowering medications known as "statins", including atorvastatin (Liptor), lovastatin (Mevacor), and simvastatin (Zocor) to work more effectively.

Nonsteroidal anti-inflammatory drugs (NSAIDs) -- In an animal study, treatment with omega-3 fatty acids reduced the risk of ulcers from nonsteroidal anti-inflammatory drugs (NSAIDs), including ibuprofen (Motrin or Advil) and naproxen (Alleve or Naprosyn). More research is needed to evaluate whether omega-3 fatty acids would have the same effects in people.

- Reviewed last on: 5/1/2007
- Ernest B. Hawkins, MS, BPharm, RPh, Health Education Resources; and Steven D. Ehrlich, N.M.D., private practice specializing in complementary and alternative medicine, Phoenix, AZ. Review provided by VeriMed Healthcare Network.

Supporting Research

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