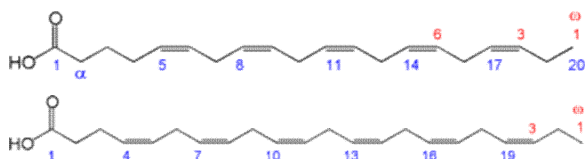


Introduction: Omega-3 (or n-3) fatty acids are a family of fatty acids with a double bond between the third and fourth carbon from the methyl end. There are 3 nutritionally important omega 3 fatty acids: alpha-linolenic acid (**ALA**, 18 carbon polyunsaturated), eicosapentaenoic acid (**EPA**, 20 carbon polyunsaturated), and docosahexaenoic acid (**DHA**, 22 carbon polyunsaturated). ALA is found in plant foods; flax seed oil is an especially rich source. EPA and DHA are rarely found in plant foods, and only in very small amounts. Fish oils, especially fish from cold northern ocean waters, are the best dietary sources of EPA and DHA. Humans are not able to make the double bond at the omega-3 position in fatty acids, so it is essential to obtain them from the diet. Some EPA and DHA can be made in the body from ALA by elongating it to make 20 and 22 carbon fatty acids, but this is not an efficient process and can not be depended on to produce adequate amounts. Most estimates are that somewhere around 5% of dietary ALA can be converted to EPA and DHA. Since ALA is not present in large amounts in most foods, very little DHA and EPA can be made from ALA.

Dosage: Daily Omega-3 Fish Oil has twice as much EPA and DHA per capsule as most fish oil supplements, a dose of 3 capsules per day (ideally taken with meals) provides a very good maintenance dose for most people. For therapeutic use, doses of 6-8 capsules may be safely used by most people.

Active Ingredients: The active ingredients in Daily Omega-3 Fish Oil are EPA (360 mg/capsule) and DHA (240 mg/capsule). There is also some ALA and other fatty acids present, but they are not considered active ingredients. This dose is twice as high as most capsules currently sold in the USA which contain 180 mg EPA and and 120 mg DHA per capsule.



EPA—20 Carbon Omega-3 fatty acid

DHA— 22 Carbon Omega-3 fatty acid

Inactive Ingredients: Inactive ingredients (excipients) present in Daily Omega-3 Fish Oil are used to keep the active ingredients in an easy-to-use and accurately measured dosage form and to preserve the fatty acids.

Bovin Gelatin Softgel Capsules: Bovine gelatin, glycerin, purified water

Vitamin E as Mixed Tocopherols: Used to protect the fatty acids from oxidation.

Description: Daily Omega-3 Fish Oil contains 1200 mg of fish oil concentrate (from sardines, anchovies culpea, sprat, and salmon). EPA and DHA make up 50% of the total fatty acids. The size 24 softgel capsule has a yellow color. It is packaged in bottles of 60 and 120 capsules in white HDPE bottles with inner freshness seals and outer tamper-evident bands. Each bottle has a lot number and expiration date printed on the bottom.

Precautions: Persons with allergies to fish should be cautious about using this product. The molecular distillation process removes most of the protein contaminants, making it less allergenic, but this may be inadequate to protect against serious allergies. Anyone who is using blood thinners or have blood clotting disorders should also use caution; at high doses, omega-3 fish oils can act as blood thinners and may not be safe when combined with other blood thinning agents. If easy bruising or nose bleeds become more common when using omega-3 fish oils, such symptoms should be regarded as indicative that the dose should be reduced or its use discontinued.

Omega-3 Fatty Acids and Health

Essential fatty acids all have double bonds at either the 3 (omega-3) or 6 (omega-6) positions. Omega-6 fatty acids, or n-6 fatty acids, are the most prevalent essential fatty acids in the modern diet. According to the University of Maryland Medical Center (<http://www.umm.edu/altmed/articles/omega-6-000317.htm>) the ideal ratio of omega-6 to omega-3 fatty acids is 2-4:1, but the ratios found in a typical American diet range from 14-25:1. This imbalance has been proposed to increase the incidence of chronic diseases such as heart disease, cancer, asthma, arthritis and depression. The “Mediterranean Diet” is known to be a much healthier diet than most American diets and includes whole grains, fresh fruits and vegetables and more omega-3 fatty acid.

Omega-3 Mechanisms of Action

Eicosanoid Production:

By far, the shifting from pro-inflammatory to anti-inflammatory eicosanoid production is the best characterized mechanism of the beneficial actions of omega-3 fatty acids. Eicosanoids are highly bioactive lipids that are involved in a number of cell signaling pathways—many involved in the inflammatory process. These eicosanoids are usually made from either long chain omega-6 fatty acids or long-chain omega-3 fatty acids. The omega-6 fatty acids give rise to the 2 series of eicosanoids such as prostaglandin E-2 (PGE-2). Aspirin works by inhibiting the biosynthesis of PGE-2. On the other hand, the omega-3 fatty acids compete with omega-6 fatty acids, and inhibit the production of the 2 series of eicosanoids by being converted to the 3 series of eicosanoids by the same enzymes. The omega-3 fatty acid derived 3 series are known to be anti-inflammatory. This is why having the correct balance of omega-6 and omega-3 fatty acids is very important. Whereas, inflammation is an important immune defense mechanism, it can also be very damaging in excess.

Membrane Fluidity:

The long chain omega-3 fatty acids are highly unsaturated and increase membrane fluidity when incorporated into cell membranes. This can greatly affect the activity of membrane associated transporters and signaling proteins. The implications of the increased membrane fluidity are not fully understood, but this may be a mechanism of some of the observed benefits of omega-3 fatty acids.

Brain Development:

The brain contains large amounts of fatty acids and the composition of the brain fatty acids appear to be important for embryonic brain development (Bertrand et al. (2006) *Journal of Nutrition* 136: 1570-1575). In omega-3 deficiency the actual size of several types of brain cells appears to be smaller. The evidence supporting the need for omega-3 fatty acids in early brain development is quite strong and they are being added to many infant formulas. It appears, however, that the availability of omega-3 fatty acids is essential prior to birth and adequate omega-3 status of the mother may be critical to optimal brain development. The requirements for omega-3 fatty acids for brain function later in life are not as well studied, but certainly can not be disregarded.

Health Benefits of Omega-3 Fatty Acids

Anti-inflammatory Effects:

Most of the known benefits of omega-3 fatty acids in adults are linked to the anti-inflammatory properties described above. Consuming omega-3 fatty acids may well be the most important dietary modification for arthritis.

Rheumatoid Arthritis:

Rheumatoid arthritis is a chronic auto-immune inflammatory joint disease that causes substantial morbidity and can be debilitating. Inflammation is a major factor determining the severity of the disease and it is exacerbated by high levels of omega-6 fatty acids—the substrates for inflammatory eicosanoids such as the 2 series prostaglandins. Galarraga et al (*Rheumatology* (2008) 47:665-669) demonstrated that using omega-3 fatty acids enabled

patients to use less non-steroidal anti-inflammatory drugs (NSAIDs) to manage pain. Because there are serious side effects associated with over use of NSAIDs, this is an important observation and clearly indicates that consuming more of the long-chain omega-3 fatty acids found in fish oil is beneficial to persons suffering from rheumatoid arthritis.

Brain Function:

The effects of omega-3s on embryonic brain development are well characterized as mentioned above; less clear are the effects on brain function in children and adults. Several studies have shown that increasing the intake of omega-3 fatty acids improves behavioral problems in children. In an Australian randomized double-blind placebo controlled study, the Conners ADHD Index scores for ADHD improved in children supplemented with oil containing omega-3 fatty acids (3000 mg/d) for 15 weeks (Simm and Bryan (2007) *Journal of Developmental and Behavioral Pediatrics* 28: 82-91). There is also a small but growing body of evidence that omega-3 fatty acids can help alleviate depression in adults.

Cardiovascular Disease:

The interest in omega-3 fatty acids began as a result of observations that Eskimo's have a much lower incidence of cardiovascular disease despite high consumption of fat and cholesterol. A 1999 study (*Lancet* 354: 447-455) of 11,324 patients with recent myocardial infarctions found that treatment with just 1 gram per day of EPA reduced the occurrence of death (by 20%), cardiovascular death (by 30%) and sudden cardiovascular death (by 45%). Other studies have suggested that increasing omega-3 status lowers triglycerides, decreases blood platelet aggregation, interferes with the development of atherosclerosis, and improves other risk factors for cardiovascular disease.

Why Use Daily Omega-3 Fish Oil

Less Heavy Metals:

Mercury and other heavy metals are sometimes concentrated in ocean fish. It is known, however, that the metals bind to proteins and are therefore mostly removed from the oil. This is even more true for molecularly distilled fish oils because small bits of flesh and proteins remain in conventional fish oil. Daily Molecularly distilled fish oil has extremely low levels of heavy metals, much less than is seen in even the best quality fish.

Less Omega-6 Fatty Acids:

The goal of omega-3 supplementation is to increase the ratio of omega-3 to omega-6 fatty acids: not just to increase the omega-3 fatty acids. Therefore the higher concentrations of omega-3 fatty acids improves the ratio much more effectively than with conventional omega-3 supplements.

Less Odor:

One objection many people have to fish oil supplementation is the unpleasant odor. Molecular distillation remove most of the odor.

Fewer Capsules:

Daily Omega-3 Fish Oil capsules are double the strength of most omega-3 supplements and only half the number of capsules are needed to obtain the same dose of omega-3.