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When "Fatty" is Good: Omega-3 Oils and Fatty Acids

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by Wyn Snow, Managing Editor

In the rush to cut calories, reduce cholesterol intake, and avoid saturated fats, many Americans have embraced low-fat diets and low-fat foods. But some fats are necessary and "essential" for health. These fats show great promise for fighting the onslaught of heart disease and diabetes, possibly even cancer. What are these "good" fats—and how do we get enough of them?

There are two varieties of "essential" fatty acids. They are called essential because, like vitamins, the body needs them and cannot make them. Thus, we need to be sure we get enough from our diets or from supplementation.

Omega-6 fatty acids are found in many vegetable oils. With the dietary switch from cholesterol-laden animal fats to vegetable oils, Americans now get plenty of omega-6 fatty acids in their diet.

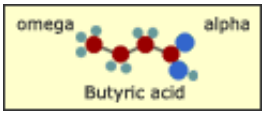
Omega-3 fatty acids are found predominantly in cold-water fish and a few vegetable oils (flaxseed, walnut and canola). Other food sources of omega-3s include whole grains, legumes, nuts, and green leafy vegetables.

Why are Omega-3s so vital to health?

While fats in general have multiple uses in the body, their most significant roles involve the brain, cell membranes, and a host of hormone-like substances that act like thermostats in the body: either raising or lowering a variety of metabolic functions in order to maintain health.

The brain is made of fat, especially the omega-3 fatty acid DHA, so obtaining sufficient omega-3 is crucial for cognitive functioning and mood.

All the cell membranes in the body are made of cholesterol and fat. Part of the membrane must be sturdy so the cell can maintain its shape. For this purpose, the body uses cholesterol and saturated fatty acids that are straight and can be stacked tightly together.



The rest of the membrane must be flexible and porous, so that nutrients can enter the cell and waste products can leave. To accomplish this, the body uses unsaturated fats because they are bent. (Read more on Structure of Fatty Acids.)

Why trans-fats are bad for health

Trans-fats are destructive to health because the body misreads them. Trans-fats have the same chemical signature as omega-3s and omega-6s, so the body uses them for the same purposes. But they are structurally straight rather than bent, so the part of the cell membrane that needs to be porous becomes tight and rigid instead. This causes a variety of health problems—including insulin resistance, which can lead to type 2 diabetes.

Consumption of trans-fats also raises the risk of heart disease by increasing LDL and lowering HDL cholesterol. (A useful mnemonic: the levels one wants to see on test results match the letters: low LDL and high HDL.)

Role of Omega-3s in metabolic processes

In addition to their value for cell membranes, omega-3 fatty acids play an important role in regulating the body's metabolic processes. Eicosanoids are hormone-like compounds that act like thermostats throughout the body, either raising or lowering a wide range of bodily activities.

Eicosanoids have only been discovered recently because their action is localized rather than originating from a specific gland, such as the pancreas or adrenals. Eicosanoids are composed entirely of omega-3 and -6 fatty acids.

Eicosanoids typically come in pairs: one to increase and the other to decrease whatever bodily function the pair is regulating. When omega-3s are lacking in the diet, the body produces less of one of the pairs, with the result that these internal thermostats don't work correctly. The body spirals uncontrollably in a single direction.

Many of today's chronic diseases are related to the impact of an imbalance in the omega-6 and omega-3-based eicosanoids. Having higher levels of omega-6s tends to increase the risk of many inflammatory and auto-immune diseases—such as rheumatoid arthritis, lupus, psoriasis, ulcerative colitis, osteoporosis, gum disease, asthma, and Alzheimer's disease—or make these problems harder to treat.

Health benefits of Omega-3s

Omega-3 fatty acids are vital for our health in a variety of ways.

Reduce risk of heart disease—Omega-3s are blood thinners and help to keep arteries elastic and flexible. They reduce high blood pressure, and keep triglycerides down.

Reduce risk of unwanted blood clots—Omega-6 based thromboxane aids in clotting, which stops blood loss from injuries. Omega-3s keep thromboxane in check, thus preventing unwanted blood clots that can cause strokes, heart attacks, deep-vein thrombosis and embolisms in lungs.

Lower blood pressure—Thromboxane also constricts arteries, leading to raised blood pressure. Omega-3s again keep thromboxane in check.

Reduce inflammatory diseases—Omega-3s are natural anti-inflammatory agents, so they act to prevent or reduce symptoms of arthritis, migraine headaches, menstrual cramps, and asthma.

Vision—Omega-3s are valuable both for the retina and blood supply through the tiny capillaries in the eyes.

Brain and mood—Omega-3s are an important constituent of the brain, especially DHA. In cultures that eat a lot of fish, the rate of depression is lower than in populations that don't, such as the US. Even though depression has many causes, making sure the brain has enough nutrients to function well is an obvious "no brainer."

Cancer—Omega-3s reduce the risk of cancer. They strengthen the immune system, which is the body's primary defense against the appearance of new cancerous cells. Omega-3s also make it harder for a tumor to metastasize to other areas of the body.

Reduce risk of osteoporosis—Bones are living tissue, constantly being broken down and rebuilt. Eicosanoids help to regulate the balance between osteoclasts, which break down bone, and osteoblasts, which rebuild it. Research indicates that healthy omega-3 levels contribute to rebuilding bone rather than losing it.

Other health conditions that can be aided by a healthy intake of omega-3s are dry

skin (one of the first signs of an omega-3 deficiency), allergies, menopause symptoms, vulnerability to glaucoma and macular degeneration, chronic inflammatory bowel diseases, and ADHD.

How much Omega-3s do we need?

Nutrition experts disagree both on how much we need, and the optimal ratio between omega-6 and omega-3 fatty acids. Some recommend consuming equal quantities (a 1:1 ratio), while others recommend no more than 10 omega-6s to each omega-3. The diet of our Paleolithic ancestors probably ranged from equal quantities to a 5:1 ratio between omega-6 and omega-3 fatty acids. In Japan, the traditional soy-and-seafood-based diet shows a ratio of 2.8 to 1. However, the current American diet contains roughly ten to twenty times as much omega-6 as omega-3 fatty acids.

According to Paul Thomas, RD and editor of The Dietary Supplement newsletter, "Most Americans eat diets that provide less than 100 mg/day of EPA and DHA. The national Food and Nutrition Board has established an 'adequate intake' level of 110 mg for adult women and 160 mg for adult men. Other nutrition experts advise a more generous intake of 500-1,000 mg/day from food if possible but from supplements if needed. People with heart disease, various mental illnesses, and rheumatoid arthritis may benefit from higher amounts but should discuss the matter with their healthcare providers first."

The Council for Responsible Nutrition, a supplement industry trade organization, points out that the American Heart Association recommends consuming two fish dinners a week—which is roughly 3 to 4 times more than the Food and Nutrition Board has characterized as "adequate". The World Health Organization and various countries around the world recommend daily intakes averaging 300-500 mg/day of EPA plus DHA. Dr. Artemis Simopoulos, an expert on omega-3s, recommends getting an average of 1,000 mg/day.

Getting more Omega-3s

Adding more omega-3 fatty acids to one's diet is easy to do—if one likes fish. While salmon is the best source at 1700 mg per 3-ounce serving, even cod supplies 100 mg. (See sidebar: **Amount of Omega-3s in Fish**.)

However, some people dislike fish or are allergic, and others should either avoid fish or limit their consumption because of the danger of ingesting mercury—particularly pregnant women and nursing mothers. Mercury is especially toxic to the brain and nervous system of babies and young children.

Flaxseed is the best source of omega-3s in the vegetable kingdom. One rounded tablespoon of milled flaxseed (or one teaspoon of flaxseed oil) supplies 2000 mg of the omega-3 alpha-linolenic acid (ALA), the essential fatty acid that humans cannot make. Flaxseed also contains valuable cancer-fighting lignans (although the oil does not).

Other food sources of omega-3 fatty acids include walnuts, Brazil nuts, butternuts, chia seeds, hickory nuts, macadamia nuts, roasted or cooked soybeans, soybean sprouts, beans of various types, peanuts, olives, spirulina, spinach, purslane, oat germ, wheat germ, lamb, pork, Roquefort and cheddar cheese. Of these, purslane and walnuts are the best sources.

Nutritionist Paul Thomas recommends, "When supplementing with EPA and DHA, choose fish-oil products concentrated in these omega-3 fatty acids. Strict vegetarians will need to buy an algae-derived DHA supplement. At moderate levels of supplementation, EPA and DHA appear to be free of side effects, though they may cause fishy-tasting belches."

Fish-oil supplements and flaxseed oil are both very vulnerable to becoming rancid, and should be kept in the refrigerator. Flaxseed oil should have a "mellow" nutty taste. When it is rancid, it tastes bitter.

Conclusion

Many factors are blamed for today's epidemic of heart disease, diabetes, and cancer. Until recently, medical professionals paid little or no attention to omega-3

fatty acids—yet their consumption by Inuit peoples has protected them from the usual effects of high-fat diets, and many Americans consume less than the rather minimal "adequate intake" level recommended by the national Food and Nutrition Board.

The growing incidence of obesity has led Americans to focus on cutting as much fat as possible from their diets—including the heart-healthy omega-3s. At the same time, the shift to vegetable oils has created a huge deficit of the omega-3 eicosanoids that function as thermostats to stop inflammatory processes in the body. The rampant use of trans-fats (in margarines, partially hydrogenated shortening, and deep-fat frying of fast-foods with vegetable oils) has clogged our cell membranes with unhealthy fats, making them more prone to insulin resistance and the risk of type 2 diabetes.

Can these epidemics of obesity, heart disease, diabetes and cancer be reversed by restoring omega-3 fatty acids to our diets in healthy quantities? Where diet is concerned, there is no such thing as a single "magic bullet" to banish disease (aside from specific deficiency diseases such as rickets and scurvy). But where variety and moderation are the keys to health, we have nothing to lose and everything to gain by obtaining an abundant supply of omega-3 fatty acids.

Additional Reading

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Recommended Brands

Omega3 Fish Oil
Spectrum Essentials, Petaluma CA (www.spectrumorganics.com).

Lignan Rich Flax Oil
Barlean's Organic Oils, Ferndale WA (www.barleans.com/index.html).

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