EPA
(EICOSAPENTAENOIC ACID)

REDUCING INFLAMMATION – NOURISHING THE BRAIN – PREVENING HEART DISEASE AND STROKE – TREATING DEPRESSION – BUILDING CELL MEMBRANES – HEALTHY BABIES and MOMS – LOWERING BLOOD PRESSURE

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Udo Erasmus
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Nordic Naturals Algae Omega Vegetarian EPA and DHA
Opti3 Omega-3 with EPA and DHA

FROM FISH

Carlson's Fish Oil with EPA and DHA
Nutra Sea Fish Oil
Green Pastures Blue Ice Royal: Butter Oil and Fermented Cod Liver Oil Blend

Conventional: **no word on omega-3 EPA….**

Terms:

THE SCIENCE IS PRACTICALLY SCREAMING. . . DON'T MAKE THIS TRENDY FAT MISTAKE

Source: ***Dr. Joe Mercola*** ***http://articles.mercola.com/sites/articles/archive/2011/11/11/everything-you-need-to-know-about-fatty-acids.aspx***

The science is loud and clear: the correct balance of fatty acids is essential if you want to be the healthiest you can be.

There are actually two problems related to how these fats are being consumed by most Westerners today:

1. Most people are consuming *far too many omega-6 fats compared to omega-3 fats*.
   The ideal ratio of omega-3 to omega-6 fats is 1:1, but the typical Western diet is between 1:20 and 1:50.

2. The typical Westerner is consuming far too many polyunsaturated fats (PUFAs) altogether, which is a problem in and of itself.

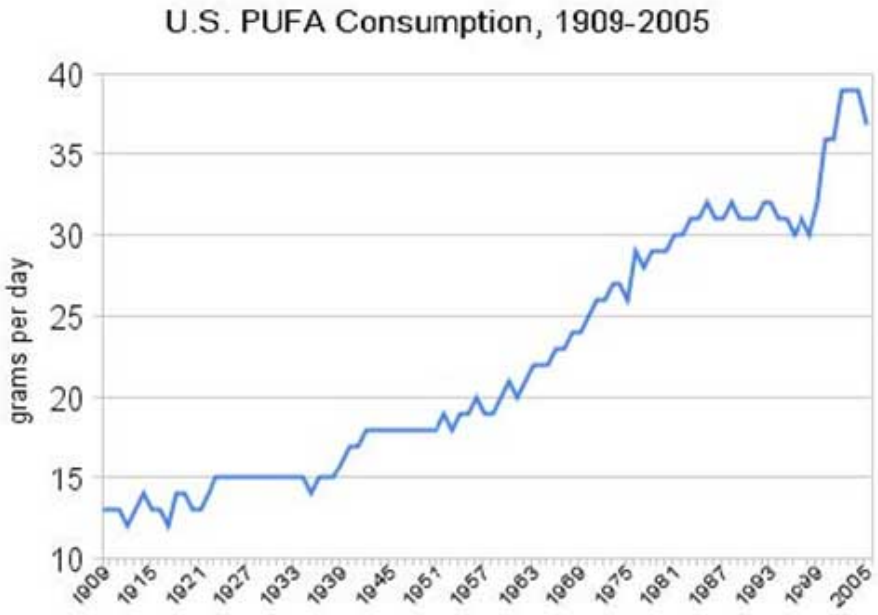
So, most consume the wrong amount—AND the wrong ratio of these highly benefical fats.

Both omega-3 and omega-6 fats are PUFAs and they're both essential to your health, but when omega-6 is consumed *in excess*, it become problematic.

As a group, when consumed in the wrong ratios, they tend to stimulate inflammatory processes in your body, rather than inhibit them.

You need some inflammation to protect yourself from infections and trauma, and PUFAs help you mount these defenses.

However, too many PUFAs contribute to chronic inflammation, which causes all sorts of problems over the long-term. Inflammation is at the source of just about every chronic disease we see today. Consumption of polyunsaturated fat in the U.S. has gone from about 13 grams per day to nearly 40 grams per day over the past century (see figure below).



Increase in American PUFA Consumption
From Stephan Guyenet's Whole Health Source Blog

By far, the type of omega fats that most Westerners get too much of is the omega-6 variety, due to its prevalence in processed foods—and this is what's driving up the line on the graph. It is easy to get confused when reading about the different types of fats—there are saturated fats and unsaturated fats, omega-3s and omega-6s, PUFAs, long-chain and short-chain fats, and the list goes on.

In order to help clear up the confusion, this article aims to provide you with a "primer" on fatty acids to increase your understanding of the fundamental differences between the types of fats and how your body uses them. So let's start by taking a look at the overall category called "fats"—what they're made of and what they do for you. And then we'll take a closer look at PUFAs and omega-3s.

Fats for Dummies

Fats are one member of a group of water-insoluble substances called "lipids." Lipids are important to you because they are the primary components of your cell membranes. Other members of the lipid group include sterols, phospholipids, triglycerides, and waxes.

Fats both in foods and in your body, are simply storage units composed of fatty acids. A fat is distinguished by the specific combination of fatty acids making it up. Fatty acids have three basic purposes in your body:

1. Providing energy
2. Providing the building blocks for cell membranes

3. Acting as raw materials that can be converted to other substances that perform special duties in your body such as hormones.

Fatty Acid Saturation and Chain Length

The properties of fats and fatty acids depend on their degree of hydrogen saturation and the length of their molecules, or "chain length." Chemically, a fatty acid is a chain of carbon atoms with pairs of hydrogen atoms attached, with an "acid group" attached to one end of the molecule.

There are four types of fatty acids, based on how many of their carbon bondsare paired with hydrogen:

1. **Saturated Fats**: Fully loaded with hydrogen atoms forming straight chains, and are typically solid at room temperature (for example, butter and coconut oil)
2. Unsaturated Fats: These fats have lost at least one of their pairs of hydrogen atoms from their carbon chain, resulting in molecules that kink or bend at each double bond. The more hydrogen pairs that are missing, the more bent the molecules. The more bent the molecules, the more space they occupy, thereby making the fat a liquid at room temperature (oil). Unsaturated fats come in two varieties:

    a. **Monounsaturated Fats:** Missing one pair of hydrogens
    b. **Polyunsaturated Fats (PUFAs):** Missing more than one pair of hydrogens

Vegetable oils and animal fats are typically composed of a mixture of these different fatty acid types. For example, olive oil is mostly monounsaturated fat with a small amount of polyunsaturated fat. Lard is primarily equal parts saturated fat and monounsaturated fat, but contains some polyunsaturated fat as well. Most vegetable oils high in PUFA, whereas most animal fats are high in saturated and monounsaturated fats (except for palm, coconut, and olive oils). Saturated and monounsaturated fats are more easily used by your body than polyunsaturated fats.

Fats vary in the length of their carbon chains, leading to another classification scheme based on their number of carbon pairs:

- **Short-chain fatty acids (SCFAs):** Less than eight carbons
- **Medium-chain fatty acids (MCFAs):** Eight to 14 carbons
- **Long-chain fatty acids (LCFAs):** 16 or more carbons
- **Very-long-chain fatty acids (VLCFAs):** More than 22 carbons

A fatty acid's chain length and saturation control its melting point. As chain length increases, melting point increases. Likewise, fats that are solid at room temperature (butter, coconut oil) have longer chain lengths than fats that are liquid at room temperature (fish oil, olive oil). With chain lengths being equal, unsaturated fats have lower melting points than saturated fats.

The Chemical Instability of Polyunsaturated Fats (PUFAs)

Because your tissues are made up mostly of saturated and monounsaturated fats, your body requires more of them than polyunsaturated fats (which is true of all mammals). The main dietary PUFAs are

omega-3 and omega-6 fats. Although your body does need these, it needs them *in relatively small quantities*.

One of the problems with PUFAs is that they are very chemically unstable, and highly susceptible to being altered and denatured by what's around them. Think about what happens to the oils in your pantry—they are susceptible to going rancid as a result of oxidation. In your body, PUFAs undergo a similar process when exposed to the toxic byproducts of proteins and sugars—*especially fructose*.

This is why most fish oil supplements have such a short shelf life, and many are already oxidized before they hit the bottle. Consuming oxidized fats can do your body more harm than good.

When you eat too many PUFAs, they are increasingly incorporated into your cell membranes. **Because these fats are unstable, your cells become fragile and prone to oxidation**, which leads to all sorts of health problems, such as atherosclerosis. Now let's take a look at the most common PUFAs in your diet—the omega fats.

The Omega Fats

The end of the fatty acid chain, opposite the acid end, is the "omega end." The location of the first double bond from the omega end dictates whether a fatty acid is an omega-3, omega-6, omega-9 (oleic acid), or another member of the "omega family." Both omega-3s and omega-6s come in both short-and long-chain varieties.

Omega-3 Fats

- **Plant Based**: The shorter-chain form of omega-3 is **alpha-linolenic acid (ALA),** the only omega-3 found in plants (except for some algae). Foods rich in ALA include flaxseed oil (53 percent), canola oil (11 percent), English walnuts (9 percent), and soybean oil (7 percent). ALA is considered essential because your body can't make it, so you need it in your diet—or its long-chain derivatives.
- **Animal Based**: The longer-chain forms of omega-3 are found mostly in animals and they are **eicosapentaenoic and docosahexaenoic acids (EPA and DHA)** and are highly unsaturated, mainly found in fish, shellfish and krill. DHA is the primary structural component of your brain and retina, and EPA is its precursor. Your body can make some EPA and DHA from short-chain ALA, *but does so inefficiently*. Recent studies suggest less than one percent of ALA is converted, if you are consuming the typical Western diet. DHA is found in cod liver oil, fatty fish, and in smaller concentrations in the organs and fats of land animals.

Omega-6 Fats

- **Shorter-chain**: The shorter-chain form of omega-6 is **linoleic acid (LA),** which is the most prevalent PUFA in the Western diet, is abundant in corn oil, sunflower oil, soybean oil and canola oil.
- **Longer-chain:** The longer-chain form of omega-6 is **arachidonic acid (AA),** which is an important constituent of cell membranes and a material your body uses to make substances that combat infection, regulate inflammation, promote blood clotting, and allow your cells to communicate. AA is found in liver, egg yolks, animal meats and seafood.

Fats: Understanding the Essentials

"Essential fatty acids" (EFAs) is a term referring to the PUFAs your body needs but cannot produce (or convert from other fats), so they must be obtained from your diet.

Traditionally, only two fats were considered "essential"—ALA (an omega-3 fat) and LA (an omega-6 fat). **However, we now know it's the long-chain derivatives—arachidonic acid, DHA, and EPA—that your body needs the most.** Although you have the enzymes to convert LA into these longer-chain fats (ALA, DHA and EPA), the conversion isn't efficient enough for optimal brain growth and development. This has led to a recent rethinking of what fats to consider "essential" and recommendations for adding more long-chain fats to your diet, to better meet these biological demands.

Healthier, stronger bones	Protecting your tissues and organs from inflammation
Improved mood regulation	Brain and eye development in babies
Reduced risk of Parkinson's disease	Reduced risk of Alzheimer's disease
Reduced risk of death from ALL causes	Relief from Dry Eye Syndrome
Prevention of vascular complications from type 2 diabetes	Peripheral artery disease
Gallstones	Preventing postpartum depression
Reducing symptoms of lupus erythematosus and other autoimmune diseases	Preventing premature birth
Multiple sclerosis	Combating cancer

DHA and EPA: The "Anti-Inflammatory Fats"

Scientific studies have uncovered a number of important health benefits from omega-3 fats, and it's looking more like it's DHA and EPA that are responsible for those benefits, rather than ALA. Science suggests that omega-3s offer the following benefits to your health:

In fact, if you go to the omega-3 fat page on GreenMedInfo.com, you will see a list of scientific studies supporting the benefits of omega-3s for 254 different diseases, which is powerful proof of their broad-reaching scope. One reason omega-3s are so good for you is their anti-inflammatory properties, especially the omega-3s from animal sources. In the case of DHA, your tissues use this fatty acid it to synthesize compounds called "resolvins," which help to reduce inflammation.

According to the Weston A. Price Foundation:

"Sufficient DHA allows the immune system to mount a robust inflammatory response against invading pathogens or damaged tissues and to bring the response quickly to an end once the task has been accomplished.

Researchers are increasingly discovering that most degenerative diseases involve an element of chronic, low-level inflammation, and the inability to "turn off" important inflammatory processes once they are no longer needed could be part of the problem. DHA deficiency may therefore be at the root of widespread declines in cognitive function, increases in mental disorders and epidemic levels of degenerative disease."

A study in the journal *Pediatrics* even showed that supplementing a mother's DHA during pregnancy and lactation improves her child's IQ at four years of age. EPA, which accumulates in fish, is a precursor to DHA.

Just like DHA, EPA also helps to control inflammation, but this time by interfering with arachidonic acid metabolism. Arachidonic acid is the precursor to PGE2 (a prostaglandin), which is a major initiator of inflammation. You can see how DHA and EPA would work together to naturally reduce inflammation and improve inflammatory conditions like rheumatoid arthritis and asthma.

In rheumatoid arthritis, EPA/DHA supplementation has been shown to reduce joint stiffness and soreness and improve flexibility. And for asthma, a study involving fish oil supplementation for asthmatic children (along with improved diet) resulted in better airway function and reduced need for asthma medications, without side effects. The most profound benefits of EPA may lie in its implications for people at high risk for coronary artery disease. But science has shown that EPA/DHA supplementation can benefit people with other conditions as well, such as:

- **EPA/DHA supplementation has helped people with ulcerative colitis.**
- **Several studies have shown that people with schizophrenia often have low levels of the particular EFAs necessary for normal nerve cell membrane metabolism. Early results from a few trials suggest EPA can have a positive effect on the mental status of schizophrenics.**
- **Epidemiological evidence suggests that populations consuming marine diets rich in EPA have a low incidence of cancer. Experimental studies, both in vitro and in vivo, further support EPA's anti-cancer activity.**

EPA and Your Heart

Even though the medical establishment for decades has advised you to consume vegetable oils (omega-6 PUFAs) to prevent heart disease, **human trials have conclusively demonstrated that vegetable oils DO NOT decrease atherosclerosis or decrease your risk of dying from cardiovascular disease.**

But the news gets even worse. Studies have revealed that vegetable oils actually increase your risk of cancer after a period of about five years, and may increase your risk of heart disease as well.

There is a widespread medical myth that atherosclerotic plaque is caused by too much LDL and cholesterol in your blood. Yet, this is not what the research shows! **Instead, science tells us that the mechanism driving atherosclerosis is actually the oxidation of PUFAs in your LDL membrane.** You may recall that excess PUFAs lead to fragile cell membranes that can easily be damaged by oxidation.

Furthermore, high LDL appears to be a sign of cholesterol sulfate deficiency—it's your body's way of trying to maintain the correct balance by taking damaged LDL and turning it into plaque, within which the blood platelets produce the cholesterol sulfate your heart and brain needs for optimal function. What this also means is that when you artificially lower your cholesterol with a statin drug, which effectively reduces that plaque but doesn't address the root problem, your body is not able to compensate any longer, and as a result of lack of cholesterol sulfate you may end up with heart failure. For more details on this, please review my interview with Dr. Stephanie Seneff.

So that I can be perfectly clear about this, I'll repeat it again:

Atherosclerosis is NOT caused by the amount of cholesterol carried by your LDL, but by oxidative damage to weak cell membranes, resulting from a diet too high in PUFAs and too low in saturated fats.

It is no wonder, then, that trials attempting to prevent heart disease with diets rich in polyunsaturated vegetable oils have failed so miserably! Even the US FDA, which denies most nutritional claims, acknowledges the following cardiovascular benefits of dietary animal-based omega-3 fats:

And the opposite can be said of diets rich in EPA, which have been scientifically shown to:

- Lower lipid and triglyceride levels in your blood
- Decrease blood viscosity
- Reduce platelet aggregation, thereby reducing the likelihood of a clot
- Reduce your changes of heart attack

Antiarrhythmic: counteracting or preventing cardiac arrhythmia	Antithrombotic: tending to prevent thrombosis (a blood clot within a blood vessel)
Antiatherosclerotic: preventing fatty deposits and fibrosis of the inner layer of your arteries from forming	Antiinflammatory: counteracting inflammation (heat, pain, swelling, etc.)
Improving endothelial function: a major factor in promoting the growth of new blood vessels	Antihypertensive: Lowering blood pressure
Lowering triglyceride concentrations	

Marine oils are an excellent source of EPA-and DHA-rich omega-3 fats.

Many cultures around the world that subsist on traditional diets have very low to nonexistent cardiovascular disease. Many of these cultures have a high intake of marine oils (e.g., the Inuit)—but

some do not. **But, what ALL of these groups do have in common is the near absence of refined foods.**

If you are eating standard American fare, simply taking an omega-3 supplement may not be enough because it needs to be implemented as part of a TOTAL nutrition plan, which should include eliminating refined/processed food and excess sugar and grains, and a return to whole foods, with an emphasis on fresh organic vegetables and meats. Basically, it's a return to what our ancestors ate. So, how do you know if you're getting enough omega-3 fats?

Signs and Symptoms of Fatty Acid Deficiency

To get your omega-3 to omega-6 ratio closer to the ideal 1:1, simply cut back on all vegetable oils (this includes processed foods, which are loaded with vegetable oils), and begin consuming sources of high-quality omega-3 fats daily. My favorite omega-3 supplement is krill oil, which I'll discuss in a moment.

Common signs and symptoms that your omega-3 to omega-6 ratio may be out of balance include:

Dry, flaky skin, alligator skin, or "chicken skin" on backs of arms	**Lowered immunity, frequent infections**	**Fatigue**
Dandruff or dry hair	**Dry eyes**	**Allergies**
Brittle or soft nails	**Poor wound healing**	**Poor attention span, hyperactivity, or irritability**
Cracked skin on heals or fingertips	**Frequent urination or excessive thirst**	**Problems learning**

Certain clusters of symptoms may indicate other fatty acid deficiencies. For example, if you have a deficiency in arachidonic acid, the following symptoms are typical:

- Dry, itchy, scaly skin
- Dandruff and/or hair loss
- Reproductive difficulties
- Gastrointestinal disturbances
- Food intolerances

Deficiencies in either arachidonic acid or DHA can result in poor growth, poor immune function, and inflammation. DHA deficiency has been linked to ADHD, depression and Alzheimer's disease, which is understandable as DHA is so critical to your neurological function. If your deficiency is in DHA, you are more likely to experience these symptoms:

- Numbness or tingling
- Weakness or pain
- Psychological disturbances
- Poor cognition

- Poor visual acuity

Plant-Based Versus Animal-based Omega-3 Fats

There are many who argue you can get all of the omega-3 fats you need from plant sources, but I disagree. Plant-based omega-3 sources include flax, hemp, and chia seeds, which are all high in ALA. Your body can convert ALA into EPA and DHA—but only in small quantities, as I discussed earlier. While you certainly should consume these plant-based fats, you cannot rely on them exclusively to meet all your body's omega-3 fat requirements.

Your body needs all three omega-3 fats (ALA, EPA and DHA), and for this, you need both plant AND animal sources. **You should avoid taking DHA-only products, for the same reason.**

For optimal health, then, it boils down to the need for balance among these various essential fats, and you can achieve this balance by eating a diet that incorporates a wide variety of whole foods from both plant and animal sources, and a good omega-3 supplement.

My Number One Choice for Omega-3 Supplementation

In a perfect world, you'd get all of the animal-based omega-3s you needed from eating fish and seafood. But the sad reality is that industrial pollution has contaminated most of the world's fish and seafood with a variety of dangerous toxins like mercury and PCBs. **The one exception is krill oil, my favorite omega-3 fat supplement. Krill does not generally have this contamination.**

I take krill oil every day because I believe it's the best omega-3 source for the following four reasons:

1. **Highest Bioavailability:** The omega-3 in krill oil is bound in a phospholipid structure, making it far more bioavailable than fish oil. In fact, nearly 100 percent of the DHA and EPA in krill oil are immediately available to your body. The omega-3 fats in fish oil, on the other hand, are in triglyceride molecules that have to be broken down in your gut into their base fats, EPA and DHA. Once these fats are absorbed into your bloodstream, your liver then has to attach them to phoshphatidyl choline molecules in order for them be used by your tissues.

   Because of this, you can only absorb about 15 to 20 percent of the fish oil you take, while the rest is eliminated in your intestine. (This is what causes many people to not tolerate fish oil very well, "burping up" the fish oil taste)

2. **Highest Stability:** Unlike ordinary fish oil, krill oil naturally contains the powerful antioxidant astaxanthin, which prevents the perishable DHA and EPA from oxidizing and going rancid.

3. **Highest Sustainability:** Krill is the largest biomass in the world, and krill harvesting is one of the best regulated on the planet, with strict catch regulations that are reviewed regularly to ensure sustainability.

4. **Lowest Dose:** Krill oil works at a much lower dose than fish oil. Because krill oil is so potent and used so efficiently by your body, you may only need one 500 mg capsule per day.

THE IMPORTANCE OF EPA FATTY ACID

Source:
http://www.fitday.com/fitness-articles/nutrition/fats/the-importance-of-epa-fatty-acid.html

EPA stands for Eicosapentaenoic acid, and it is one of many Omega-3 fatty acids needed by the human body. The body can't make **EPA fatty acid**, and must get it from food or supplement sources. There are many benefits to consuming a healthy amount of EPA.

How to Eat EPA

Although EPA is available in some vegetarian foods, such as nuts, beans and dark, green leafy vegetables, they are present in small amounts. **The best food source of EPA is fatty fish, such as mackerel, anchovies, sardines, salmon, tuna and hoki.** Getting adequate EPA nutrition from fish sources can be tricky, as it is important to eat fish from a clean source. Fatty fish carry residues of the pollution they swim in. If you intend to get the bulk of your Omega-3 fatty acid nutrition from fish, make sure you know the source of your food. You may also want to consider providing your body with needed Omega-3 fatty acids through supplements or fish oil capsules.

EPA and Depression

Recent studies have produced evidence that the fatty acid pure ethyl EPA reduces the symptoms of depression. **In one study, blood samples taken from people around the world showed a corollary between depression and low levels of EPA.** Other studies divided sufferers of depression into two blind groups, one receiving EPA supplements and the other receiving placebos. The majority of the recipients of the EPA reported an ease of their depression symptoms not reported among the placebo group. It is concluded that EPA plays an intrinsic role in nerve stimulation responses inside the brain.

Reducing Heart Disease

Studies have shown that those who are prone to heart attacks are less likely to have them while taking EPA. **One large study shows that people with high cholesterol who took EPA supplements were 20% less likely to suffer cardiac episodes than those who did not.** Cardiac episodes include heart failure, angina, and all types of heart attacks. It is believed that EPA works to keep plaque from rupturing, which prevents cardiac arrest.

EPA for a Better Pregnancy

EPA fatty acids are an important part of pre-natal development. They contribute countless benefits to the developing fetus's health. They are instrumental in retinal development, and are particularly beneficial in areas of brain development. Prenatal EPA has been linked to encouraging a fully developed nervous system, increased intelligence and better behavior in a child. However, many doctors do not recommend mothers eat the amount of fatty fish

necessary to reap the benefits of EPA. Fish can be dangerous during pregnancy due to the possibility of high metal content. Instead, it is recommended expectant mothers consult their doctors about taking a pre-natal supplement containing a suitable level of EPA.

The full benefits of EPA are still being studied, but the majority of the medical community agrees that it is an important part of human nutrition. Consult your doctor about increasing your consumption of EPA, as part of your health maintenance regime.

WHAT ARE THE REAL DIFFERENCES BETWEEN EPA AND DHA?

Source: http://www.psychologytoday.com/blog/in-the-zone/201204/what-are-the-real-differences-between-epa-and-dha

It is rapidly becoming acknowledged that omega-3 fatty acids are good for the brain. However, there are two eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Are they equivalent, different, or something in-between?

The first casualty of marketing is usually the truth. The reality is that the two key omega-3 fatty acids (EPA and DHA) do a lot of different things, and as a result the benefits of EPA and DHA are often very different. That's why you need them both. But as to why, let me go into more detail.

Benefits of EPA

The ultimate goal of using omega-3 fatty acids is the reduction of cellular inflammation.

Since eicosanoids derived from arachidonic acid (AA), an omega-6 fatty acid, are the primary mediators of cellular inflammation, EPA becomes the most important of the omega-3 fatty acids to reduce cellular inflammation for a number of reasons. First, EPA is an inhibitor of the enzyme delta-5-desaturase (D5D) that produces AA (1). The more EPA you have in the diet, the less AA you produce. This essentially chokes off the supply of AA necessary for the production of pro-inflammatory eicosanoids (prostaglandins, thromboxanes, leukotrienes, etc.). DHA is not an inhibitor of this enzyme because it can't fit into the active catalytic site of the enzyme due to its larger spatial size. As an additional insurance policy, EPA also competes with AA for the enzyme phospholipase A2 necessary to release AA from the membrane phospholipids (where it is stored). Inhibition of this enzyme is the mechanism of action used by corticosteroids. If you have adequate levels of EPA to compete with AA (i.e. a low AA/EPA ratio), you can realize many of the benefits of corticosteroids but without their side effects. That's because if you don't release AA from the cell membrane then you can't make inflammatory eicosanoids. Because of its increased spatial dimensions, DHA is not a good competitor of phospholipase A2 relative to EPA. On the other hand, EPA and AA are very similar spatially so they are in constant competition for the phospholipase A2 enzyme just as both fatty acids are in constant competition for the delta-5 desaturase enzyme. This is why measuring the AA/EPA ratio is such a powerful predictor of the state of cellular inflammation in your body.

The various enzymes (COX and LOX) that make inflammatory eicosanoids can accommodate both AA and EPA, but again due to the greater spatial size of DHA, these enzymes will have difficulty in converting DHA into eicosanoids. This makes DHA a poor substrate for these key inflammatory

enzymes. Thus DHA again has little effect on cellular inflammation whereas EPA can have a powerful impact.

Finally, it is often assumed since there are not high levels of EPA in the brain, that it is not important for neurological function. Actually it is key for reducing neuro-inflammation by competing against AA for access to the same enzymes needed to produce inflammatory eicosanoids. However, once EPA enters into the brain it is rapidly oxidized (2,3). This is not the case with DHA (4). The only way to control cellular inflammation in the brain is to maintain high levels of EPA in the blood. This is why all the work on depression, ADHD, brain trauma, etc. have demonstrated EPA to be superior to DHA (5).

Benefits of DHA

At this point, you might think that DHA is useless. Actually just the opposite, because DHA can do a lot of different things that EPA can't do..

First difference is in the area of omega-6 fatty acid metabolism. Whereas EPA is the inhibitor of the enzyme (D5D) that directly produces AA, DHA is an inhibitor of another key enzyme delta-6-desaturase (D6D) that produces the first metabolite from linoleic acid known as gamma linolenic acid or GLA (6). However, this is not exactly an advantage. Even though reduction of GLA will eventually decrease AA production, it also has the more immediate effect of reducing the production of the next metabolite known as dihomo gamma linolenic acid or DGLA. This can be a disaster as a great number of powerful anti-inflammatory eicosanoids are derived from DGLA. This is why if you use high-dose DHA it is essential to add back trace amounts of GLA to maintain sufficient levels of DGLA to continue to produce anti-inflammatory eicosanoids.

In my opinion, the key benefit of DHA lies in its unique spatial characteristics. As mentioned earlier, the extra double bond (six in DHA vs. five in EPA) and increased carbon length (22 carbons in DHA vs. 20 in EPA) means that DHA takes up takes up a lot more space than does EPA in the membrane. Although this increase in spatial volume makes DHA a poor substrate for phospholipase A2 as well as the COX and LOX enzymes, it does a great job of making membranes (especially those in the brain) a lot more fluid as the DHA sweeps out a much greater volume in the membrane than does EPA. This increase in membrane fluidity is critical for synaptic vesicles and the retina of the eye as it allows receptors to rotate more effectively thus increasing the transmission of signals from the surface of the membrane to the interior of the nerve cells. This is why DHA is a critical component of these highly fluid portions of the nerves (7). On the other hand, the myelin membrane is essentially an insulator so that relatively little DHA is found in that part of the membrane.

This constant sweeping motion of DHA also causes the breakup of lipid rafts in membranes (8). Disruption of these islands of relatively solid lipids makes it more difficult for cancer cells to continue to survive and more difficult for inflammatory cytokines to initiate the signaling responses to turn on inflammatory genes (9). In addition, the greater spatial characteristics of DHA increase the size of LDL particles to a greater extent compared to EPA. As a result, DHA helps reduce the entry of these enlarged LDL particles into the muscle cells that line the artery thus reducing the likelihood of developing atherosclerotic lesions (10). Thus the increased spatial territory swept out by DHA is good news for making certain areas of membranes more fluid or lipoprotein particles larger, even though it reduces the benefits of DHA in competing with AA for key enzymes important in the development of cellular inflammation.

Common Effects for Both EPA and DHA

Not surprising, there are some areas in which both EPA and DHA appear to be equally beneficial. As an example, both are equally effective in reducing triglyceride levels (10). This is probably due to the relatively equivalent activation of the gene transcription factor (PPAR alpha) that causes the enhanced synthesis of the enzymes that oxidize fats in lipoprotein particles. There is also apparently equal activation of the anti-inflammatory gene transcription factor PPAR-gamma (11). Both seem to be equally effective in making powerful anti-inflammatory eicosanoids known as resolvins (12). Finally, although both have no effect on total cholesterol levels, DHA can increase the size of LDL particle to a greater extent than can EPA (10).

Summary

EPA and DHA do different things, so you need them both, especially for the brain. If your goal is reducing cellular inflammation, then you probably need more EPA than DHA. How much more? Probably twice the levels, nonetheless you always cover your bets with omega-3 fatty acids by using both EPA and DHA at the same time.

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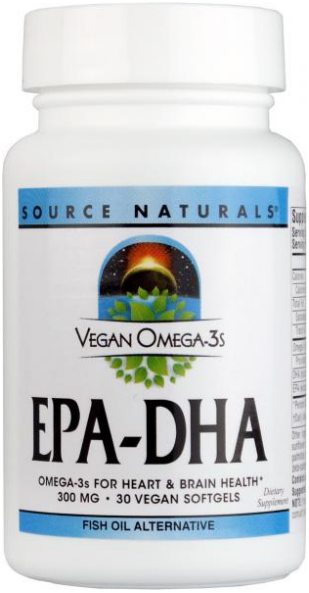
SOURCES: VEGAN/VEGETARIAN



Source Naturals Vegan EPA-DHA

Nordic Naturals Algae Omega Vegetarian EPA and DHA

Opti3 Omega-3 with EPA and DH

SOURCES: FROM FISH

Carlson's Fish Oil with EPA and DHA

Nutra Sea Fish Oil

Green Pastures Blue Ice Royal: Butter Oil and Fermented Cod Liver Oil Blend