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The Science Is Screaming: Don't Make This Trendy Mistake

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STORY AT-A-GLANCE

- 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
- Most people consume far too many omega-6 fats and relatively few omega-3 fats, which promotes the ongoing inflammation underlying most chronic diseases seen today
- Omega-3 fats have been shown to decrease inflammation, reduce your risk for coronary artery disease and others, and reduce your overall risk of dying
- You need both plant- and animal-derived omega-3 fats for optimal health. The best source of animal-based omega-3 fats is krill oil due to its superior potency, stability, bioavailability and sustainability

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The science is loud and clear: The correct balance of fatty acids is essential if you want to be the healthiest you can be. That means that maintaining a healthy ratio of omega-6 to omega-3 is important for optimal health. Ideally, you want to maintain a 4-to-1 ratio, or less.

However, studies show that most people are consuming as much as a 12-to-1 ratio, which can be attributed to the consumption of too much α-linolenic acid (ALA), the

primary sources of which are vegetable oils such as soybean and canola.[1]

It's unfortunate that most people have been fooled by a decades-long fad promoting vegetable oils as the key to good eating and a long life when, in fact, it is a road to ill health and chronic disease. History shows that our lopsided consumption of ALAs began in the early 1900s, when people were discouraged from eating natural animal fats such as butter and lard.[2]

We now know that refined vegetable oils are among the worst foods to consume, and that we need to limit ALA consumption. As a group, when consumed in the wrong ratios, these fats tend to stimulate inflammatory processes in your body, rather than inhibit them. There are actually two problems related to how fats are being consumed in the U.S. today:

1. Most people are consuming far too many omega-6 fats compared to omega-3 fats. As mentioned, the ideal ratio of omega-6 to omega-3 fats is 4-to-1, but this is nearly impossible to achieve if you're regularly eating processed foods or restaurant fare, as these are loaded with omega-6 from industrial vegetable oils.
2. Americans are also consuming far too many polyunsaturated fats (PUFAs). While both omega-3 and omega-6 fats are PUFAs and essential to your health, when omega-6 is consumed in excess, it becomes problematic. In fact, too many PUFAs contribute to chronic inflammation over the long term.

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[3] 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:[4]

1. Providing energy
2. Providing the building blocks for cell membranes and metabolism
3. Acting as raw materials that can be converted to other substances that perform special duties in your body such as hormones

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 basic types of fatty acids, based on how many of their carbon bonds are paired with hydrogen:[5]

- **Saturated fats —** These fats are fully loaded with hydrogen atoms forming straight chains, and typically solid at room temperature (for example, butter and coconut oil).
- **Unsaturated fats —** Unsaturated fats come in two varieties:
    - **Monounsaturated fats —** Missing one pair of hydrogens
    - **Polyunsaturated Fats (PUFAs) —** Missing more than one pair of hydrogens

Unsaturated 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).

- **Trans fats —** Most trans fats are a product of an industrial process called hydrogenation and are not found naturally in foods. It wasn't until the 1990s that research began to show that trans fats are not a healthy food ingredient.

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.[6] Lard is primarily 39.2% saturated fat and 45.1% monounsaturated fat, but contains some polyunsaturated fat as well.[7]

Most vegetable oils are high in PUFAs, 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 atoms:[8]

- **Short-chain fatty acids (SCFAs) —** Two to four carbon atoms
- **Medium-chain fatty acids (MCFAs) —** Six to 10 carbon atoms
- **Long-chain fatty acids (LCFAs) —** Twelve to 26 carbon atoms
- **Very-long-chain fatty acids**[9] **(VLCFAs) —** Twenty-six to 30 carbon atoms

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[10] (55%), canola oil[11] (9%), English walnuts[12] (11.6%), and

soybean oil[13] (7%). 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. Studies suggest less than 1% 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.

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:[14]

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 and other autoimmune diseases such as rheumatoid arthritis	Preventing premature death
Multiple sclerosis	Combating cancer

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:[15]

> *"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[16] even showed that supplementing a mother's DHA during pregnancy and lactation improves her child's IQ at 4 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[17] 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.[18]
- 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.[19]
- Epidemiological evidence suggests that populations consuming marine diets rich in EPA have a low incidence of cancer.[20] Experimental studies, both in vitro and in vivo, further support EPA's anticancer 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.

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. 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 improve heart health by:[21,22]

- Lowering lipid and triglyceride levels in your blood
- Decreasing blood viscosity
- Reducing platelet aggregation, thereby reducing the likelihood of a clot
- Reducing your chances 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	Anti-inflammatory — 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. However, 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 ideal, 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:[23]

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

	hyperactivity, or irritability	

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[24] 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 No. 1 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 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% 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 phosphatidyl choline molecules in order for them be used by your tissues. Because of this, you can only absorb about 15 to 20% 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.

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