Chapter 12

Omega-3 fatty acids

Omega-3 fatty acids from fish oil provide a foundation for your plaque-control program through effects on reducing triglycerides, accelerating clearance of postprandial, or after-eating, byproducts, and anti-inflammatory and plaque-stabilizing effects.

Here's how to gain full advantage from omega-3 fatty acids.

What genuine breakthrough discoveries or revelations have there been over the past 50 years that we can honestly say have altered the course of cardiovascular illness? Not just refinements or minor improvements, but big, ground-shaking discoveries that result in substantially reduced death, heart attack, and stroke?

There are heart procedures like bypass surgery, valve surgery, angioplasty and stents, of course. But what treatments outside of major procedures have resulted in dramatic and life-saving treatments? The prescription statin drugs, whether we like it or not, have become a prominent fixture of the landscape and have, indeed, cut the incidence of heart attack and stroke (though at a price). Aspirin, niacin (vitamin B3) and anti-hypertensive drugs have also had substantial impacts. Omega-3 fatty acids figure prominently on this list.

The case for omega-3s has become inarguably powerful. Safe, effective, and inexpensive, omega-3 fatty acids exert mortality-reducing and health-promoting effects that are, in many cases, superior to prescription agents. Yet they remain woefully underutilized. Ironically, the recent appearance of a prescription form of omega-3 fatty acids (Lovaza®) has "legitimized" the use of omega-3 fatty acids among physicians. But you can obtain all the benefits of these healthy fats without a prescription.
Don’t underestimate the power of fish oil: A case study
Stacy, a 40-year old physical therapist, was terrified when she saw her most recent cholesterol panel: Total cholesterol 594 mg/dl and triglycerides 2893 mg/dl. Because these values were so high, the LDL and HDL cholesterol values were unobtainable.

I met Stacy in a panic. In tears, she declared “I don’t understand it. I take good care of myself. I don’t eat fatty foods, I exercise, I don’t do anything wrong!”

She was right: Her frightening distortions were not from anything “bad” she’d done. It was a combination of genetics and modest dietary excesses. But these levels of triglycerides and cholesterol pose risk for liver disease and pancreatic damage (pancreatitis), as well as heightened long-term risk for heart disease and stroke. Stacy also showed some features of insulin resistance or metabolic syndrome: blood sugar elevated at 114 mg/dl; blood pressure 140/88; and excess abdominal fat, weighing 160 lbs at 5’5.”

I advised Stacy to take 3000 mg of omega-3 fatty acids, EPA and DHA, from fish oil every day. She chose a low-cost, low-potency fish oil that required 9 capsules per day. She accomplished this by taking three capsules, three times per day with meals. (Stacy could have chosen a more-concentrated fish oil, allowing her to take fewer capsules to achieve the same dose of omega-3s.)

I also counseled Stacy on reducing her intake of processed carbohydrates like crackers, pretzels, breakfast cereals, and other wheat-containing products; avoiding the food additive high-fructose corn syrup, since it causes triglycerides to skyrocket; and to reduce weight by at least 20 lbs. Stacy accomplished all this. Her most recent panel showed a total cholesterol of 165 mg/dl, triglycerides of 144 mg/dl, HDL 70 mg/dl, and LDL 66 mg/dl.

Though an extreme case, Stacy’s experience showcases just what a powerful tool omega-3 fatty acids can be.

End Sidebar
The cardiovascular power of omega-3 fatty acids

Omega-3 fatty acids from fish oil have the advantage of a substantial scientific basis. Thousands of studies have now documented the broad range of beneficial effects provided by EPA, eicosapentaenoic acid, and DHA, docosahexaenoic acid.

Among the benefits that omega-3s provide:

**Omega-3s stabilize heart rhythms**

At first, the results were puzzling. Clinical trials confirmed that eating fish reduced likelihood of heart attack, but reduced sudden cardiac death *even more*. Thus it was suspected that omega-3 fatty acids of coldwater fish stabilize cell membranes of heart muscle cells and turn-off abnormal heart rhythm activity.

The Diet and Reinfarction Trial (DART) was the pioneering treatment trial revealing this paradox. 2033 men with prior heart attack either ate fish twice per week or did not (fish consumption vs. “placebo”), resulting in a 29% drop in cardiac death among those advised to eat fish. There was no decrease in the number of heart attacks, but only death from heart attack. The investigators reasoned that fish oil suppressed abnormal rhythms generated by damaged heart muscle (Burr 1989). This was further supported by the observational Physicians’ Health Study showing that participants dying from sudden cardiac death had lower blood levels of omega-3 fatty acids than those who did not. Protective levels were obtained by eating two or more servings of fish per week, yielding a 52% reduction in the risk of sudden cardiac death (Albert 1995).

In 1999, the 11,000-participant GISSI-Prevenzione trial brought remaining naysayers to their knees (GISSI-Prevenzione 1999). Participants taking 1000 mg of the omega-fatty acids, EPA and DHA, experienced 30% reduction in cardiovascular death and an astounding 45% reduction in sudden death compared to placebo; protective benefits began as early as three months after initiation of omega-3 supplementation.

The rhythm-suppressing properties of fish oil are so effective that some cardiologists now recommend that patients with implanted defibrillators (for life-threatening heart rhythms) take omega-3s to
reduce rhythm instability and cut back on defibrillator firings (which are painful and frightening) (Leaf 2005; Christensen 2005).

People with the common though troublesome rhythm, atrial fibrillation, have lower levels of omega-3s in their blood. Fish oil has impressively suppressed atrial fibrillation in experimental non-human preparations, as well as in human patients, with one study demonstrating a 54% reduction in atrial fibrillation that is common after bypass surgery (Calo 2005).

**Omega-3s shut down inflammation**

Hidden, imperceptible inflammation is a fundamental process that triggers the chain of events leading to heart attack, stroke, cancer and diabetes.

Omega-3 fatty acids suppress multiple steps in inflammatory pathways, including inflammatory cytokines IL-1, IL-2, tumor necrosis factor, COX-2 and others. Inflammatory joint diseases like rheumatoid arthritis serve as a therapeutic model of omega-3 anti-inflammatory benefits. Omega-3 fatty acids reduce blood markers of inflammation and ease the severity of arthritis (Watkins 2001; Ciubotaru 2003; Adam 2003). In contrast, the non-steroidal anti-inflammatory drugs (NSAIDs) and COX-2 inhibitors (e.g., Celebrex®), commonly prescribed for arthritis, *increase* production of inflammatory cytokines and *increase* risk of cardiovascular events (Solomon 2005; Hippisley-Cox 2005). Omega-3 fatty acids, unlike arthritis drugs, do not cause ulcers, nor do they impair kidney function. Interestingly, long-term supplementation of omega-3 fatty acids may allow up to 50% reduction in NSAID usage in chronic arthritis sufferers (Cleland 2006).

The misguided advice of the 1980s and '90s that polyunsaturated oils were good for us has resulted in an American diet appallingly overloaded with omega-6 fatty acids. Omega-6 fatty acids *increase* inflammation by activating production of arachadonic acid and related inflammatory prostaglandins. Omega-3 fatty acids *compete* with omega-6s, thereby slashing production of inflammatory prostaglandins and increasing *anti*-inflammatory prostanoids and leukotrienes (Leaf 2002).
Omega-3 fatty acids may provide special benefits to people with the metabolic syndrome, the collection of low HDL cholesterol, increased triglycerides, high blood pressure, resistance to insulin, and high C-reactive protein (CRP), that afflicts 47 million U.S. adults. Excess weight is an important trigger for hidden inflammation. Fat cells in the body produce a signaling molecule called interleukin-6, which provokes CRP release from the liver. CRP is a popular method for measuring hidden inflammation, with levels of 3.0 mg/l or greater yielding a tripling of heart attack risk. Overweight and obese people have higher levels of CRP and suffer far diabetes, cancer, and heart disease driven by inflammation. Omega-3 supplementation provides outsized anti-inflammatory and cardiovascular benefits in people with this condition (Bassuk 2004; Menuet 2005).

**Omega-3s help prevent blood clots**
Most heart attacks and many strokes result from the sudden appearance of blood clots that form on the surface of atherosclerotic plaque. That’s why treatments like aspirin that inhibit blood clotting reduce the likelihood of these events. It’s also behind the push for new blood-thinning agents that are pouring into the marketplace, like Plavix® and others. Omega-3s have a similar effect.

Omega-3s reduce blood clotting proteins, fibrinogen and factor V, and inhibit platelet aggregation, all of which reduce the likelihood of clot formation on active, ruptured coronary plaque that would otherwise result in heart attack (Vanschoonbeek 2004). In all practicality, the blood thinning effect is modest and almost never sufficient to result in excess bleeding or bruising.

**Omega-3s correct triglycerides and lipoprotein disorders**
While the world obsesses over cholesterol, an important cause of atherosclerosis is neglected: triglycerides. Triglycerides are a potent driving factor behind heart disease and stroke.

Few treatments provide the dramatic triglyceride-reducing power of omega-3 fatty acids, yet they are woefully underutilized by physicians. Omega-3s block triglyceride production that, in turn,
reduces formation of abnormal lipoproteins created from triglycerides, especially “small LDL” (Balk 2006). Increased triglycerides and small LDL have ballooned in importance as a cause for heart disease as more and more Americans develop the metabolic syndrome, or pre-diabetes. Omega-3s provide substantial correction of the lipoprotein abnormalities triggered by the metabolic syndrome (Menuet 2005).

An exciting area of emerging research is that of “postprandial hyperlipidemias,” the after-eating flood of lipoproteins in the blood that follows every meal. In several studies, this has proven to be a potent cause of atherosclerosis. Omega-3 fatty acids accelerate clearance of postprandial particles like chylomicrons, chylomicron remnants, and VLDL that persist in the blood after eating, reducing blood levels by 50% (Karpe 1994; Westphal 2000).

**Omega-3s stabilize atherosclerotic plaque**
Not only do omega-3s reduce the factors that cause atherosclerotic plaque, but they also directly modify plaque structure and activity.

Omega-3s slow atherosclerotic plaque growth by blocking cellular growth factors and adhesion molecules, inhibition of smooth muscle cell growth and migration of inflammatory monocytes (Connor 1997; Abeywardena 2001). All of this contributes to a slowdown in plaque growth and suppressing abnormal activity that triggers stroke and heart attack.

A cleverly designed British study led to the fascinating observation that omega-3s transform atherosclerotic plaque composition. 150 people with severe carotid plaque scheduled for carotid endarterectomy (surgical removal) were given either fish oil or sunflower oil while waiting for their procedure. (Delays in the British health system permitted this study design.) Plaque was surgically removed several months later and examined. Participants taking fish oil had reduced plaque inflammation and thicker tissue covering the fatty core, markers for stable plaque. Those taking sunflower oil had unstable plaques with greater inflammation and thinner, more fragile overlying tissue. This suggests that omega-3s from fish oil taken for just a few months stabilize carotid plaque, making it less prone to rupture and fragment (Thies 2003).
Omega-3 Index: The higher, the better?
So you take a few fish oil capsules every day and eat fish once or twice a week. What are the blood and tissue levels of omega-3 fatty acids generated by your habits?

A number of variables enter into the equation. For instance, if you take fish oil capsules, what is the concentration of omega-3 fatty acids? How well are the contents absorbed? After absorption, how effectively are omega-3 fatty acids incorporated into cell membranes?

Even if you take fish oil supplements, it is hard to know just how much you’ve increased blood levels. However, it is now possible to measure the amount of omega-3 fatty acids in your bloodstream, a value called the “omega-3 index.” Too little and you might still be at risk for cardiovascular events.

Two large studies have demonstrated that higher omega-3 blood (the level in red blood cells, or RBCs) levels were associated with reduced likelihood of sudden cardiac death. The risk for sudden cardiac death was 10-fold higher for the lowest omega-3 RBC levels compared to the highest (Harris 2008; Siscovick 1995; Albert 2002).

Most Americans have omega-3 RBC levels in the 2.5-4.0% range, associated with greatest risk for sudden cardiac death. People with heart disease can have levels as low as 1%.

The omega-3 index has greater power to discriminate who will have a heart attack or die from sudden cardiac death better than many other common laboratory measures of coronary risk, including LDL cholesterol, HDL cholesterol, triglycerides, total cholesterol to HDL ratio, homocysteine, and c-reactive protein.

Just as hemoglobin A1c offers a 3-month look into blood glucose levels, the omega-3 index reflects your long-term omega-3 intake and absorption. The quantity of RBC omega-3s also closely parallels the quantity of omega-3s in heart tissues.

What is an *ideal* omega-3 index?
Studies relating RBC omega-3 levels and sudden cardiac death suggest that a level of 6.3-7.3% is associated with fewer fatal events, but events are not eliminated at this level. Is there even greater benefit with levels higher than 6.3-7.3%? A recent analysis of females from the Harvard School of Public Health suggests that RBC omega-3 levels as high as 8.99% are still associated with non-fatal heart attack (myocardial infarction), compared to 9.36% in those without heart attacks. This suggests that even higher levels may be necessary to prevent non-fatal events.

Should we target 10%? 12%? Maybe higher? Any higher and we are toeing the level achieved by the Inuits, the “Eskimos” of Greenland, northern Canada and Alaska who have been observed to have low rates of heart disease (before the introduction of Western foods).

Most recently, another study comparing 50 people after heart attack with 50 controls showed that people with heart attack had omega-3 indexes of 9.57% versus 11.81% in controls—even higher. (This study was in a Korean population with higher fish consumption. There was also a powerful contribution to risk from “trans” fat RBC levels.) The investigators concluded: "The area under the receiver operating characteristic curve of fatty acid profiles was larger than that for traditional risk factors, suggesting that fatty acid profiles make a higher contribution to the discrimination of MI cases from controls compared with modified Framingham risk factors."

The data suggest that, while an omega-3 index of 7.3% is associated with reduced risk for sudden cardiac death, a higher level of 10% or greater is associated with less risk for heart attack. Surprisingly, fish consumption and fish oil intake account for only 47% of the variation in omega-3 index.

The appreciation of the importance of omega-3 fatty acids marks one of the greatest health revelations of the last 50 years. We can now measure how much omega-3 we have absorbed and accumulated in our bodies.

I believe the emerging data are becoming increasingly clear: If you desire maximal control over heart health, know your omega-3 index and keep it 10% or higher. Daily total intakes of EPA and DHA of
3000-3600 mg fairly reliably yield such high omega-3 indexes; blood and fingerstick tests for omega-3 index are available to verify.

References:


Siscovick DS, Raghunathan TE, King I et al. Dietary intake and cell membrane levels of long-chain n-3 polyunsaturated fatty acids and the risk of primary cardiac arrest. JAMA 1995 Nov 1;274(17):1363-7.

End Sidebar--------------------------------------------------------------------

Omega-3s: How to get what you need for vascular health
Fish oil is the most concentrated source of omega-3 fatty acids, EPA and DHA, obtained from coldwater fish and phytoplankton.

A secondary, much less concentrated, source is alpha-linolenic acid (ALA) from flaxseed and flaxseed oil, walnuts, and canola oil. Only 10% of ingested linolenic acid, however, is converted into active EPA or DHA. Although linolenic acid may provide unique health benefits of its own, fish oil remains by far the most confident source of effective omega-3s. Linolenic acid sources cannot be used in place of fish oil.

Dosing for fish oil is a perennial point of confusion. However, it's quite simple.

The outsized heart benefits of omega-3s start at 1200 mg omega-3 per day, usually provided by taking 4000 mg of fish oil per day (300 mg EPA+DHA per capsule) and go up to 6000 mg of omega-3. Consider a concentrated fish oil preparation with greater content of
EPA + DHA per capsule if you and your doctor decide that a high
dose is necessary, such as for reduction of lipoprotein(a). If you suffer
fishy belching with your fish oil capsules, try refrigerating the
capsules. This usually minimizes the effect. Also, consider a different
preparation; sometimes, overly-oxidized (rancid) fish oil can cause
belching. Lastly, people who are wheat-free tend to tolerate fish oil far
more easily than wheat-consuming people, likely because wheat is
destructive to the gastrointestinal tract. Fish oil is also best taken with
meals. Doses are also best divided into two (e.g., three capsules
twice a day).

Since the active ingredients in fish oil are DHA and EPA, anything
else in your capsules, such as omega-6, omega-9, or linolenic acid,
should not count towards the sum of EPA + DHA, since they do not
exert the same benefits as the omega-3s.

The basic suggested starting dose for the Track Your Plaque
program is 1800 mg of EPA+DHA per day. This is usually provided
by taking 6 x 1000 mg capsules of fish oil, providing 180 mg EPA,
120 mg DHA per capsule (300 mg per capsule), for a total of 1800
mg EPA+DHA. Fewer capsules are required if more concentrated fish
oil capsules or liquids are used.

The ideal daily intake of EPA + DHA for our Track Your Plaque
purposes, however, is 3000 mg per day. This dose is best
managed by using more concentrated fish oil preparations, e.g., 360
mg EPA, 240 mg DHA per capsule, for a total of 600 mg EPA + DHA
per capsule. This preparation will allow achieving our ideal omega-3
intake by taking five capsules per day.

If you ever decide to change your fish oil preparation, or if you switch
to a more concentrated form or another form such as liquid fish oil
(e.g., Carlson's, Barleans, Pharmax, Nordic Naturals) or fruit-flavored
emulsions (e.g., Coromega®, Pharmax), then you will need to
examine the label to determine the content of EPA + DHA. If, for
instance, a teaspoon of liquid fish oil provides 1050 mg EPA and 750
mg DHA, that's a total of 1800 mg omega-3s per teaspoon. If your
desired EPA + DHA dose is 3000 mg per day, then approximately 1½
teaspoons per day should provide it. Adding up the EPA+DHA
content of whatever preparation you choose will therefore allow you to mix, match, or change your dose whenever you like.

**How much is enough?**

1800 mg EPA+DHA is our basic *Track Your Plaque* starting dose, generally obtainable by taking 6 capsules of 1000 mg of fish oil, since the majority of preparations contain 180 mg EPA and 120 mg DHA per capsule. Anyone with a positive heart scan score (above zero), established coronary disease (e.g., stents, angioplasty, heart attack, or bypass surgery), or starting levels of triglycerides >300 mg/dl should consider the *Track Your Plaque* “ideal” dose of 3000 mg EPA + DHA per day, the dose more likely to generate the most protective blood (RBC) levels of omega-3 fatty acids. More concentrated fish oil capsules or liquids are best used to obtain this higher dose.

But how will you know if even higher doses wouldn't be even better?

The principal measure to look at is triglycerides. If triglycerides remain above 60 mg/dl, then an increase in omega-3 intake from fish can be considered.

If starting triglycerides are, for instance, 500 mg/dl, then even the 3000 mg EPA + DHA dose may be insufficient. Recall that we aim to reduce triglycerides to *60 mg/dl or less*. This is important to suppress the formation of abnormal triglyceride-containing lipoprotein particles, especially small LDL and VLDL. For reduction of high triglycerides, EPA + DHA daily intakes of 3600-6000 mg per day may be necessary. However, this is best undertaken under supervision of your healthcare provider. Obviously, more highly concentrated preparations of fish oil will be necessary.

Incidentally, we *never* use the prescription form of fish oil, Lovaza®. In my view, there is only one reason to take the prescription form of fish oil: to make the drug manufacturer rich. You can match or exceed the effects of prescription fish oil at far lower cost by taking one of the many excellent preparations of fish oil available over-the-counter. Even in patients with very high triglycerides of >1000 mg/dl, I *never* use prescription fish oil, yet obtain excellent results.
Fish oil, mercury and pesticides
Manufacturers of fish oil make claims that this product or that ("super-concentrated," "pharmaceutical grade," "ultra-purified," etc.) is purer or less contaminated than competitors' products. The manufacturers of prescription fish oil, Lovaza®, have added to the confusion by suggesting that their product is the purest of all, since it is more concentrated than some of the lower concentration fish oils available over-the-counter (842 mg EPA+DHA per Lovaza® capsule). They claim that "LOVAZA® is naturally derived through a unique, patented process that creates a highly concentrated, highly purified prescription medicine. By prescribing LOVAZA® (omega-3-acid ethyl esters), a prescription omega-3, your doctor is giving you a concentrated and reliable omega-3. Each LOVAZA® capsule contains 90% omega-3 acids (84% EPA/DHA). Nonprescription omega-3 dietary supplements typically contain only 13%-63% EPA/DHA."

How much truth is there in these concerns?

Let's go to the data published by the USDA, FDA, and several independent studies. Let's add the independent analyses provided by Consumer Reports (2003) and Consumer Labs (continually updated; www.consumerlab.com). How much mercury has been found in fish oil supplements?

Virtually none.

Consumer Labs, for instance, has tested dozens of fish oil preparations for mercury content and found none to contain unsafe levels above 10 parts per billion; most contain near zero. This is different from the mercury content of whole fish that you eat that typically contain many times this amount. Predatory fish that are at the top of the food chain, consume other fish and thereby concentrate organic methyl mercury, the toxic form of mercury, do indeed have higher levels of mercury in their fatty tissues. Thus, predatory shark, swordfish, and King mackerel are higher in mercury than sardines, herring, and salmon. Farm-raised fish also contain higher levels of mercury.
The mercury content of fish oil capsules have less to do with the method of processing and more with the animal source of oil. Fish oil is generally obtained from sardines, salmon, and cod. Fish oil capsules are not prepared from swordfish or shark.

Thus, concerns about mercury from fish oil—regardless of brand—are generally unfounded. Eating whole fish—now that's another story for another time. But we can take fish oil to reduce triglycerides, VLDL, IDL, small LDL, and heart attack risk without worrying about mercury.

Likewise, other contaminants like polychlorinated biphenyls (PCBs), dioxin, and furans have not been found to be present to any substantial level in fish oil. They are certainly found at lower concentrations than that found in eating the fish itself (Melanson 2005). (Cod liver oil, however, is different; some preparations have been found to contain small quantities of PCBs (Storelli 2004). For this and other reasons, including vitamin A content, I do not recommend cod liver oil in the *Track Your Plaque* program.)

The one issue that has, however, proven to be a tripping point for some brands of over-the-counter fish oil has been oxidative breakdown products, i.e., rancidity. Consumer Labs, for instance, has found excessive quantities of oxidative breakdown products in several products. (An annual subscription to their service is low-cost and well worth the few dollars per year.)

Another easy way to test fish oil for oxidative breakdown products: Make sure your fish oil passes the “sniff test.” Most fish oil will smell slightly fishy. The most purified fish oils, such as the Pharmax preparation of liquid fish oil, has no fish smell when first opened. If a fish oil preparation you purchase smells really fishy, then that batch may be oxidized or rancid, an occasional occurrence when there was lax preparation or if the bottle sat on the shelf too long. Discard or return any preparation with too fishy an odor. Also, all liquid forms of fish oil, because they lack a protective coating, should be refrigerated after opening.

While various manufacturers continue to make extravagant claims of purity, no unbiased testing has yet proven that most of these claims
hold any truth. Having gone through the FDA approval process also does not necessarily mean that Lovaza® provides any advantage.

**Fish oil: The choices**
Here’s a list of fish oil products that we have used successfully that have consistently provided high quality at reasonable cost and pass the “sniff test.” They have also not been identified as having any problems by any independent analysis.

Barleans
Carlsons
Coromega
Costco
GNC
Life Extension
Members’ Mark (Sam’s Club)
Nordic Naturals
Nuvite
PharmaNutrients
Pharmax
Pure Encapsulations
Swanson
Trader Joe’s

**Alternatives to fish oil capsules**
Occasionally, someone will be unable to take fish oil due to the large capsule size, fishy belching, or stomach upset.

Here's a list of products we've used with success. Some cost more than the most common low-potency fish oil capsules, but omega-3 fatty acids from fish oil are so crucial to your plaque control efforts that it really pays to search out alternatives.

**Liquid fish oil**—Nordic Naturals, Barleans, and Pharmax produce highly concentrated fish oil liquids with 1800-2100 mg EPA + DHA per teaspoon. Carlson's liquid fish oil is widely available but is less
concentrated and is mildly “fishy” (1300 mg EPA + DHA per teaspoon). Most liquid fish oil comes flavored either lemon or orange. Note that liquid fish oil must be refrigerated after opening.

**Coromega®**—a fruit-flavored emulsion available in some health food stores. Coromega® comes in single-serving foil dispensers.

**Frutol®**—A re-formulated emulsion of fish oil that makes it water-soluble and non-oily. The Pharmax company has put their fish oil into a fruit flavored base that has a pleasant taste and is not too expensive. See the *Track Your Plaque* Marketplace for more information.

**Krill oil**—Krill oil is extracted from Antarctic krill, a type of plankton rich in omega-3s. Krill oil is *not* a replacement for fish oil, despite extravagant claims of superiority to conventional fish-sourced fish oil by the manufacturer. Krill oil may have unique properties of its own, e.g., astaxanthin content, a carotenoid unique to shellfish and other sea animals, but cannot be used to replace fish oil.

Regardless of what preparation you choose, you can determine the dose needed by adding up the EPA+DHA content.

**Sidebar**

*More on prescription Lovaza®: Who says it’s better?*

In my view, prescription fish oil is entirely unnecessary, irrational, and driven more by politics and greed than actual need.

Take a look at the website for Lovaza® (www.Lovazarx.com). Among the claims:

"**LOVAZA® is the only omega-3 that, along with diet, has been proven and approved to dramatically reduce very high triglycerides...**"

This is a clever half-truth. Dozens of studies have used nutritional supplement fish oil and shown triglyceride-reducing and other beneficial effects but, no, they have not been approved by the FDA. Nutritional supplements don’t require approval by the FDA, no more
than vitamin C requires FDA approval to prevent scurvy.

The Lovaza manufacturer’s argument against fish oil supplements:

"Dietary supplements are not FDA-approved for the treatment of any specific disease or medical condition. Get the Facts: nonprescription, dietary supplement omega-3 is not a substitute for prescription LOVAZA®."

Does that make any sense? Should you buy a GM car because only GM makes genuine GM cars? This is the silly logic being offered by these people to justify their ridiculous pricing.

How about: "The unique manufacturing process for LOVAZA helps to eliminate worries about mercury and other pollution from the environment."

Funny...mercury in fish tends to be sequestered in the meat, not the oil. Independent reports by Consumer Reports, Consumer Lab, and others have found no mercury, PCB’s, nor other contaminants in nutritional supplement fish oil. But just suggesting a difference without proving it may be enough to scare some people.

Prescription Lovaza®, one capsule per day, costs around $120 per month. To achieve the Track Your Plaque suggested ideal omega-3 fatty acid intake, you’d have to take at least three capsules of Lovaza® per day, bringing the cost to $360 per month. At a store like Sam’s Club, the same quantity of omega-3 fatty acids will cost around $10.00 per month, or less than 3% of the cost of the prescription form.

Lovaza® is more concentrated than most, but not all, over-the-counter fish oil. In fact, you can purchase fish oil capsules or liquids that are more concentrated than the prescription form in many health food stores. But is the prescription form better—more effective, more purified, less contaminated, etc.? There is no independent verification of this. Lovaza® has not been compared to non-prescription fish oil in any analysis. Head-to-head comparison of Lovaza® to nutritional supplement fish oil is unlikely to come from the manufacturer of Lovaza®. Drug companies resist head-to-head comparisons, fearing
it will not play out in their favor. Let the public remain ignorant and hope that marketing conquers all.

Hospitals are now starting to carry prescription fish oil on their formularies. It's used by some thoracic surgeons after bypass surgery, since fish oil has been shown to reduce the likelihood of atrial fibrillation (a common rhythm after heart surgery).

Why now? The data confirming the benefits of fish oil on atrial fibrillation have been available for several years.

It's now available in hospitals because it's FDA-approved. In other words, when fish oil was just a supplement, it was not available in hospitals. Whenever I've tried to get fish oil for patients while in hospital, you'd think I was trying to smuggle Osama Bin Laden into the place. The resistance was incredible.

Several reasons, most of which revolve around the great suspicion the medical establishment has towards nutritional supplements. In addition, there's the litigation risk: If something has been approved by the FDA, their stamp of endorsement provides some layer of legal protection. And, of course, no drug sales representative is promoting the nutritional supplement fish oil to physicians nor to hospitals.

Just because something is used by a hospital does not make it better. The adoption of fish oil in hospitals is a good thing. Too bad it has to add to an already bloated health care system to enrich some drug manufacturer.

In my experience, fish oil you purchase at the health food store or other retailer provides effective results for a reasonable price, without safety concerns, and will not make the pharmaceutical industry any richer from their clever marketing sleight-of-hand.

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A word about marketing
Craig was absolutely convinced that his fish oil was the best available in the world: purer, uncontaminated by mercury or pesticides—"not
Craig fell for the marketing. While there may be some truth in the manufacturer’s claims, you can’t believe it from the mouth of the manufacturer. True judgments about quality and purity have to come from independent sources like Consumer Reports or Consumer Lab.

The FDA doesn’t regulate the quality and purity of nutritional supplements. On the positive side, this has allowed supplement manufacturers to keep costs down, not having to navigate arcane and complex regulatory restrictions.

On the negative side, some supplement manufacturers get away with 1) producing supplements that fail to contain the stated amounts of ingredients, 2) contain contaminants like lead, and 3) make extravagant and often unfounded claims like "superior," "pharmaceutical grade," and "purer."

Thankfully, analyses like those conducted by Consumer Reports and Consumer Lab are reassuring. The great majority of fish oil preparations on the market are high-quality, free of contamination, and provide the benefits you desire. Just be sure that you purchase your product from a supplier that turns over its inventory with some frequency. A dust-covered bottle from the back of the shelf is probably not a good idea, nor is a bottle that, when opened, emits a powerful odor of rotten fish. Both point towards rancidity.

Conclusion:
If omega-3 fatty acids are not a part of your heart disease and stroke prevention program, then you’re missing a critical ingredient for health. In fact, we can include omega-3 fatty acids among the most significant health discoveries of the 20th century.

Omega-3 fatty acids from fish oil reduce triglycerides more than any prescription agent. New research is showing that omega-3s provide the unique benefit of reducing the after-meal, or postprandial, flood of lipoproteins that are potent triggers for cardiovascular disease. Omega-3 fatty acids provide direct atherosclerotic plaque-stabilizing...
benefits throughout all the arteries of the body and yield reductions in death from cardiovascular disease unmatched by any other treatment, prescription or otherwise. The anti-inflammatory effects of omega-3s complement and, in many regards, surpass that of prescription anti-inflammatory drugs, without the threat of adverse cardiovascular effects.