The Track Your Plaque Complete Handbook of

Omega-3 Fatty Acids and Fish Oil

A complete guide to the enormous heart health benefits of omega-3 fatty acids from fish oil

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The Complete Track Your Plaque Handbook of Omega-3 fatty acids

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The information in this book is not intended to diagnose or treat any condition, but simply provide information that should be further discussed with your physician. Only your personal physician who understands your health status and needs can properly and safely diagnose and treat any health condition.

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“In terms of its potential impact on health in the Western world, the "omega-3" story may someday be viewed as one of the most important in the history of modern nutritional science.”

Dr. William Harris
St. Luke’s Mid-America Heart Institute
University of Missouri-Kansas City

Omega-3 fatty acids: Among the health breakthroughs of the century

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 perhaps at a price). Aspirin, niacin (vitamin B3) and anti-hypertensive drugs have also had substantial impacts. And, of course, omega-3 fatty acids.

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 (Omacor®, Solvay Pharmaceuticals) 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.

Fat-phobia gone haywire

The era up until the 1990s was indeed a fat-loaded dietary Dark Age.

Americans indulged in excessive saturated fats: fried chicken, spare ribs, French fries, gravy, bacon, Crisco, butter, etc. As research connected saturated fat with high
cholesterol and risk of heart disease, hypertension, and cancer, the push to reduce saturated fat intake was underway.

Along came personalities like Nathan Pritikin and Dr. Dean Ornish, both of whom emerged as champions of the low-fat nutritional approach. Both advocated a severe restriction in fat intake—all fat—to less than 10% of all calories.

This represented a dramatic improvement in prevailing habits. In 1985, this was a breakthrough. Instead of a pork chop dinner with French fries and gravy on mashed potatoes, they encouraged rices, grains, and vegetables. They discouraged meat of any variety, shortening, frying, cooking oils, even salad oils.

That shift did indeed help many people succeed in losing weight, reduce cholesterol, and even reduce angina symptoms (chest pain) when the starting point was the traditional American fat-laden diet.

But times have changed. Gas is no longer $1.29 a gallon, Jimmy Carter is no longer President, and most Americans don’t count daily triple digit fat-gram intake.

In the 21st century, a low-fat diet is a perversion of health. The original low-fat concept has morphed into over-reliance on breads, breakfast cereals, pasta, crackers, cookies, pretzels, chips and other processed carbohydrates. Food manufacturers have churned out 116,000 new packaged products since 1990, all competing for your appetite. These are the foods that pack 90% of supermarket shelves and now constitute 70–80% of most Americans’ diet—diets of convenience. Yes, diets may have become low-fat. But processed foods have become so popular among Americans that obesity now ranks as one of the largest health problems the country faces, a legacy of the low-fat era.

“All fats are bad!”

Dr. Ornish still carries great name recognition. As a result, his outdated concepts still gain media attention. The June, 2006 issue of Reader's Digest, in their RDHealth column, carried an interview with Dr. Ornish in which he reiterated his fat-phobia. He warned of the “dangers” of omega-3 fatty acids from fish oil. “I've recently learned that omega-3s are a double-edged sword...In some cases, omega-3s could be fatal.”

Clinging to the low-fat concept is like hoping that 8-track tapes will make a comeback. It's not going to happen. We enjoyed the benefits while they lasted, appropriate for the era. But now, they're woefully outdated.

The overwhelming evidence is that omega-3 fatty acids obtained from fish oil provides tremendous benefits with little or no downside. Ignore the doomsday preachings of Dr. Ornish. Don’t allow the struggles to resurrect this now-defunct concept ruin your health.

In the Track Your Plaque program, omega-3 fatty acids from fish oil are a crucial supplement to help you gain control over coronary plaque and stop or reduce your heart
scan score. Few other treatments, prescription or otherwise, pack such a huge panel of benefits into something so inexpensive, safe, and accessible.

**Don’t underestimate the power of fish oil: A case study**

Stacy, a 40-year old physical therapist, was terrified to learn of 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.

We 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 (“familial hypertriglyceridemia”) and modest dietary excesses. But these levels of triglycerides and cholesterol posed 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 the metabolic syndrome: blood sugar was slightly elevated at 114 mg/dl; her blood pressure was 140/88; and she showed a modest excess of abdominal fat, weighing 160 lbs at 5’ 5”.

We advised Stacy to take 2700 mg of omega-3 fatty acids 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 required more than most people, given her unusually high triglycerides.) Within several weeks, she was out of immediate danger: the omega-3s dropped her triglycerides down to 344 mg/dl.

Over the next few months, we 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 around 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-3s can be.

**The enormous cardiovascular power of omega-3 fatty acids**

Unlike many other nutritional supplements, omega-3 fatty acids from fish oil have the advantage of a substantial scientific basis. Thousands of studies have now documented the enormous range of beneficial effects provided.

Among the expanding myriad benefits that omega-3s provide are:

**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 cold water 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 oil 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 ML et al 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 CM et al 1995).

In 1999, the 11,000-participant GISSI-Prevenzione trial brought any remaining naysayers to their knees (GISSI-Prevenzione 1999). Participants taking 1000 mg of the omega-fatty acids, EPA + 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-3s.

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 A et al 2005; Christensen JH et al 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 after bypass surgery (Calo L et al 2005).

**Omega-3s shut down inflammation**

Hidden, imperceptible inflammation is being recognized as 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 the inflammatory process, 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 BA et al 2001; Ciubotaru I et al 2003; Adam O et al 2003). In contrast, the non-steroidal anti-inflammatory drugs (NSAIDs) and COX-2 inhibitors (e.g., Vioxx®), commonly prescribed for arthritis, increase production of inflammatory cytokines and *increase* risk of cardiovascular events (Solomon DH 2005; Hippisley-Cox J et al 2005). Omega-3 fatty acids, unlike arthritis drugs, do not cause ulcers, nor do they impair kidney function. Interestingly, long term of omega-3 fatty acids may allow up to a 50% reduction in NSAID usage in persons requiring long-term treatment (Cleland LG et al 2006).
The mis-guided 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 A 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 more diabetes, cancer, and heart disease driven by inflammation. Omega-3 supplementation provides outsized anti-inflammatory and cardiovascular benefits in people with this condition (Bassuk SS et al 2004; Menuet R et al 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 hirudin, Plavix®, and many 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 K et al 2004). In all practicality, the blood thinning effect is modest and rarely 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 which, in turn, reduces formation of abnormal lipoproteins created from triglycerides, especially “small LDL” (Balk EM et al 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 R et al 2005).
An exciting area of emerging research is that of “post-prandial hyperlipidemias”, the after-eating flood of fat 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 post-prandial particles (chylomicrons, chylomicron remnants, VLDL) that persist in the blood after eating, reducing blood levels a dramatic 50% (Karpe F et al 1994; Westphal S et al 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 SL et al 1997; Abeywardena MY et al 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 removed at surgery 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 F et al 2003).

**Omega-3s: How to get what you need for vascular health**

**Fish oil** is the most concentrated source of omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosapentaenoic acid (DHA), obtained from cold water 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, since much of it is simply burned for calories. Although linolenic acid may provide unique health benefits, fish oil remains by far the most confident source of effective omega-3s.

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

Doses that begin to provide 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 4000 mg of omega-3. Consider a concentrated fish oil preparation if you and your doctor decide a high dose is necessary. If you suffer
fishy belching with your fish oil capsules, try refrigerating the capsules. This almost always completely eliminates this effect. Fish oil is also best taken with meals to minimize the occasional stomach upset. 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 1200 mg of EPA+DHA. This is usually provided by taking 4 x 1000 mg capsules of fish oil, providing 180 mg EPA, 120 mg DHA per capsule (300 mg per capsule), for a total of 1200 mg EPA+DHA.

About a third of people, however, will require greater doses of omega-3s to reduce triglycerides, VLDL, and/or intermediate-density lipoprotein (IDL). Most people will do fine with an increase to 1800 mg EPA+DHA, usually provided by 6 x 1000 mg standard capsules. A very occasional person (about 1 in 100) will require even higher doses.

If you ever decide to change your fish oil preparation, or if you change to a more concentrated form or another form such as liquid fish oil (e.g., Carlson's), paste (e.g., Coromega), or syrup (e.g., Pharmax's Frutol), then you will need to examine the label to determine the dose of EPA+DHA. If, for instance, a teaspoon of liquid fish oil provides 360 mg EPA and 240 mg DHA, that's a total of 600 mg omega-3s per teaspoon. If your EPA+DHA dose is 1200 mg per day, then two teaspoons a day should provide it. Always 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.

Most fish oil will smell slightly fishy. If it smells really fishy, then that batch may be rancid, an occasional occurrence when there was lax preparation or if the bottle sat on the shelf too long. Discard any preparation with too fishy an odor.

**How much is enough?**

1200 mg EPA+DHA is generally obtainable by taking 4 capsules of 1000 mg of fish oil, since the majority of preparations contain 180 mg EPA and 120 mg DHA per capsule.

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

The principal measure to look at is triglycerides. If triglycerides remain above 60 mg/dl, we usually consider increasing fish oil.

Another measure that's very important is intermediate-density lipoprotein, or IDL, also called "remnant lipoproteins" on a Vertical Auto Profile (VAP) panel. Persistence of any IDL or remnant lipoproteins is reason to consider more fish oil. Most commonly, if there is some persistence of either, we increase fish oil to 6000 mg per day of a standard preparation, or 1800 mg/day of EPA+DHA.
The only time we see persistence of IDL or remnant lipoproteins with this higher dose is when triglycerides are really high. If starting triglycerides are, for instance, 500 mg/dl, then even this higher dose may be insufficient. This is when more highly concentrated preparations of fish oil may be necessary, occasionally even the prescription form, Omacor®. (We currently use Omacor® only when high doses of EPA+DHA are required, most because of its outrageous cost. Two capsules per day costs around $120 per month; three capsules per day to provide 1800 mg/day of EPA+DHA costs $180 per month. We use it only when absolutely necessary.)

**What’s better than fish oil?**

Recall that, contrary to conventional thinking like that articulated in the Adult Treatment Panel-III cholesterol treatment guidelines, 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, reduced HDL, lack of healthy large HDL, VLDL. ATP-III advises a level of 150 mg/dl or less. Unfortunately, triglyceride levels this high guarantee appearance of all these undesirable particles and an increasing heart scan score.

What's better than 4000 mg of fish oil for its 1200 mg of EPA and DHA (omega-3 fatty acids)? **More fish oil.** In other words, 4000 mg fish oil providing 1200 mg EPA + DHA is our minimum. A simple increase to 6000 mg to provide 1800 mg EPA + DHA is usually all that is necessary to further reduce triglycerides and put a halt to the cascade of abnormal lipoprotein particles that trigger plaque growth. Occasionally, a somewhat higher dose may be required.

Another important issue: An over-reliance on wheat products (and other highly-processed carbohydrates like corn starch) also increases triglycerides. This includes any flour product like breads (regardless of whether it's white, whole wheat, or whole grain—they all raise triglycerides), pretzels, bagels, breakfast cereals, and pasta. A dramatic reduction in wheat-containing products will reduce triglycerides substantially, help you reduce abdominal fat, reduce blood pressure, raise HDL and reduce small LDL, clear your mind, provide more energy, avoid afternoon "fogginess" . . . Huge benefits. Excess alcohol (beyond two servings per day) can also raise triglycerides. Be sure to address these issues, as well.

**Fish oil and mercury**

Manufacturers of fish oil make claims that this product or that ("super-concentrated", "pharmaceutical grade", "purified", etc.) is purer or less contaminated than competitors' products. The manufacturers of the "drug" Omacor®, or prescription fish oil, have added to the confusion by suggesting that their product is the most pure of all, since it is the most concentrated of any fish oil preparation (900 mg EPA+DHA per capsule). They claim that "OMACOR® is naturally derived through a unique, patented process that creates a highly concentrated, highly purified prescription medicine. By prescribing OMACOR® (omega-3-acid ethyl esters), a prescription omega-3, your doctor is giving
you a concentrated and reliable omega-3. Each OMACOR® 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 to that the independent (and therefore presumably unbiased) analyses provided by Consumer Reports (2003) and Consumer Labs (2004; www.consumerlab.com). How much mercury has been found in fish oil supplements?

None.

This is different from the mercury content of whole fish that you eat. 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, 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 little to do with the method of processing and much 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 according to the best information we have. 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.

Fish oil and pesticides

Like mercury, the quantity of pesticide residues in fish oil has caused some concern.

However, independent analyses have shown that residues of pesticides like dioxin, polychlorinated biphenyls (PCBs) and organochlorines, are negligible. They are certainly lower than that found in eating the fish itself (Melanson SF et al 2005). (This may not hold true, however, for cod liver oil preparations, which some suspect to contain greater levels of pesticide residues (Storelli MM et al 2004)).

Independent analyses conducted by Consumer Reports and Consumer Labs have also both shown no significant pesticide residues in fish oil. Consumer Reports analyzed 16 brands and Consumer Labs 41 brands (2004). (In the Consumer Labs' analysis, two brands failed their testing due to breakdown products of rancidity, however.)

While various manufacturers continue to make extravagant claims of purity, no unbiased testing has yet proven that these claims hold any truth. Likewise, having gone through the FDA approval process also does not necessarily mean that Omacor® poses any advantage beyond higher omega-3 content per capsule.
Alternatives to fish oil capsules

Occasionally, someone will be unable to take fish oil due to the large capsule size, excessive fishy belching, or stomach upset. The easiest solution is usually just to try a different brand, e.g., Sam's Club (Makers' Mark brand) enteric-coated.

However, sometimes liquid fish oil preparations may be preferred. Here's a list of products we've used successfully. All cost more than plain old fish oil capsules, but fish oil is so crucial to your heart scan/coronary plaque control efforts, that it really pays to search out alternatives.

Liquid fish oil—e.g., Carlson's liquid fish oil. Most liquid fish oil comes flavored either lemon or orange.

Coromega—a non-oily preparation, available in some health food stores. Coromega comes in little single-serving foil dispensers. It tastes kind of fruity. It's kind of pricey ($1.40 per day for two packets).

Frutol—A very clever re-formulation 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 tastes pretty good and is not too expensive. Go to www.pharmaxllx.com for more information. There are various distributors around the U.S. best found on the internet.

Omacor®—Prescription fish oil approved by the FDA in 2004 for reduction of high triglycerides. While capsule size is approximately the same as over-the-counter fish oil capsules, the higher concentration of EPA+DHA permit use of fewer capsules. (One capsule Omacor® contains the same amount of omega-3s as three capsules of most fish oil preparations.)

Krill oil—Krill oil is extracted from Antarctic krill, a type of plankton rich in omega-3s. Manufacturer-supported research has introduced some extravagant claims of superiority to conventional fish-sourced fish oil, but time and more scientific and clinical experience will need to bear this out.

Regardless of what preparation you choose, you can determine the dose needed by adding up the EPA+DHA content. For the basic prevention effect, the starting dose for the Track Your Plaque program, you need a total of 1200 mg per day of EPA+DHA. Higher doses, e.g., 1800–2400 mg per day, may be required for correction of high triglycerides or postprandial (after-eating) abnormalities.

More on prescription Omacor®—Who says it’s better?

The British National Health Service (NHS) announced that, in light of the substantial data documenting that omega-3 fatty acid intake from fish reduces likelihood of
cardiovascular events by around 40%, that Brits discharged from hospital following a heart attack should be "prescribed" 1000 mg of *prescription* fish oil per day.

Hardly a revolutionary concept. Part of the timidity of the British NHS in recommending this modest dose (equivalent to three capsules of the most common nutritional supplement fish oil preparations) seems to relate to the potential cost to the government, since apparently much of the cost will be borne by the government-subsidized health system.

But *prescription* fish oil? Why prescription fish oil? Prescription Omacor®, one capsule per day, costs around $120 (U.S.) per month. At Sam's Club, the same quantity of omega-3 fatty acids (in three capsules) will cost around $2.50 per month. That's less than 5% of the cost of the prescription form.

Omacor® is clearly more concentrated. But is the prescription form better—more effective, more purified, less contaminated, etc.? We have seen no independent verification of this. Of course, manufacturers make all sorts of claims. The only independent, unbiased testing we are aware of comes from organizations like Consumer Reports and www.consumerlabs.com. Omacor has not been compared to non-prescription fish oil in any of their analyses. Head-to-head comparison of Omacor to nutritional supplement fish oil is unlikely to come from the manufacturer of Omacor. Drug companies powerfully 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.

Why would the NHS only recommend eating fish and prescription fish oil? It smells awfully fishy to us. As soon as an opportunity for profit is built into a treatment, all of a sudden it gains endorsement. Perhaps lobbying by those parties with potential for profit drove the process.

Nonetheless, despite the filthy politics and under-the-table dealings, some good comes out of the NHS's action: broader recognition of the power of fish oil. Perhaps when a British patient or an American patient gets discharged with a prescription for Omacor®, the patient will take the initiative and go to the health food store instead and save him (or his insurer) $117.50 per month.

Hospitals are now starting to carry prescription fish oil, known as Omacor®, 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 has 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 most hospitals. Whenever we've tried to get fish oil for patients while in hospital, you'd think we were trying to smuggle Osama Bin Laden into the place. The resistance was incredible.

Now that FDA-approved Omacor® is available, costing $120 dollars per month for two capsules, $195 for the three capsule per day dose for after surgery, all of a sudden it becomes available. Why would this irrational state of affairs occur in hospitals?
Several reasons, most of which revolve around the great suspicion physicians have 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.

Of course, no drug sales representative is promoting the nutritional supplement fish oil to physicians nor to hospitals. We now see people adding the extraordinary expense of prescription fish oil to their prescription bills.

In our view, it's unnecessary, irrational, and driven more by politics and greed than actual need. Take a look at the website for Omacor® (www.omacorrx.com). Among the claims:

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

This is a bald lie. Dozens of studies have used nutritional supplement fish oil and shown spectacular triglyceride-reducing effects.

Their 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 OMACOR®."

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 OMACOR 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 both Consumer Reports and Consumer Lab found no mercury, nor PCB's, in nutritional supplement fish oil. But just suggesting a difference without proving it may be enough to scare some people.

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 already bloated health care costs to enrich some drug manufacturer.

For your coronary plaque control program and control and/or reversal of your heart scan score, we start at 4000 mg per day of standard fish oil, providing 1200 mg per day of omega-3 oils. This amount as a nutritional supplement costs only a few dollars a month. And you have the satisfaction of not only taking a powerful step for your health, but also not enriching the overflowing pockets of drug companies.
Some miscellaneous topics on omega-3s and fish oil

Does fish oil raise LDL cholesterol?

Katie had an LDL (conventionally calculated) of 87 mg/dl, HDL of 48 mg/dl.

She added fish oil, 6000 mg per day. Three months later her LDL was 118 mg/dl, HDL 54 mg/dl. In other words, LDL increased by 31 mg. What gives?

Several studies have, indeed, shown that fish oil raises LDL cholesterol, usually by 5-10 mg/dl. Occasionally, it may be as much as 20-30.

Unfortunately, many physicians often assume that it’s the (minor) cholesterol content of fish oil capsules, or some vague, undesirable effect of fish oil. It’s nothing of the kind.

Since we based Katie’s program on (NMR) lipoprotein analysis, not conventional lipids (HDL, calculated LDL, triglycerides, total cholesterol), we knew that Katie also had a severe excess of intermediate-density lipoprotein, or IDL, and very-low-density lipoproteins, VLDL. This signifies that after a meal, dietary fats persist for 12, 24, or more hours. Fish oil is a very effective method to clear IDL and VLDL, though sometimes it also causes a shift of some IDL and VLDL into the LDL class. Thus, the apparent increase in LDL.

Another contributor: Conventional LDL is a calculated value, not measured. The calculation for LDL is thrown off by any reduction in HDL or rise in triglycerides. In Katie’s case, the rise in HDL from 48 to 54 meant that calculated LDL becomes more accurate and rises towards the true measured value. At the start, Katie’s true measured LDL was 122 mg/dl, 35 mg higher than the calculated value. Calculated LDL is therefore approximating measured LDL more accurately as HDL rises.

The most important lesson to learn is that, if LDL rises significantly on fish oil and you haven’t had lipoproteins formally measured, there may have been a substantial postprandial abnormality like IDL that was unrecognized.

Fish oil, vitamin K, and aspirin

"I am now taking 9 mg of vitamin K1 and 1000 mcg of K2. Does taking this supplement with this much K1 have a counteracting effect on the thinning/anticlotting properties of aspirin and fish oil that I also take?"

The answer: Vitamin K should have no effect on the platelet-blocking effects of aspirin or fish oil. The majority of blood clot inhibiting effects of aspirin and fish oil arise from their ability to keep blood platelets from “clumping” (just like the TV commercials for Plavix).

Vitamin K, on the other hand, participates in the liver production of blood clotting factors (like II, VII, IX, and X, among others for you curious ones).
Thus, vitamin K-dependent clotting factors and platelet-blocking are two separate pathways to forming blood clots. Some of us refer to the difference as "red clots" from the vitamin K pathway and "white clots" from the platelet pathway, since they really do have this different physical appearance.

The vitamin K2 conversation, like that about vitamin D, is fascinating for its potential to provide the missing link between the tightly-tied fortunes of bone health and atherosclerosis. Why is someone with a high CT heart scan score far more likely to have osteoporosis? Vitamin D and K2 deficiency may provide the missing link for many people. Don't let worries like these stop you from taking K2 or fish oil.

“My bread contains 900 mg of omega-3!”

Phyllis is the survivor of a large heart attack (an "anterior" myocardial infarction involving the crucial front of the heart) several years ago. Excessive fatigue prompted a stress test, which showed poor blood flow in areas outside the heart attack zone. This prompted a heart catheterization, then a bypass operation one year ago.

FINALLY, Phyllis began to understand that her unhealthy lifestyle played a role in causing her heart disease. But lifestyle alone wasn't to blame. Along with being 70 lbs overweight and overindulging in unhealthy sweets every day, she also had lipoprotein(a), small LDL particles, and high triglycerides. The high triglycerides were also associated with its evil "friends," VLDL and IDL (post-prandial, or after-eating, particles).

When we met her, Phyllis' triglycerides typically ranged from 200–300 mg/dl. Fish oil was the first solution, because of its marvelously effect on reducing triglycerides, as well as VLDL and IDL. Her dose: 6000 mg of a standard 1000 mg capsule (6 capsules) to provide 1800 mg EPA + DHA, the effective omega-3 fatty acids.

But Phyllis wasn't terribly good at following advice. She likes to wander off and follow her own path. She noticed that the healthy bread sold at the grocery store and containing flaxseed boasted "900 mg of omega-3s per slice!". So she ate two slices of the flaxseed-containing bread per day and dropped the fish oil.

Guess what? Triglycerides promptly rebounded to 290 mg/dl, along with oodles of VLDL and IDL.

The “omega-3s” in bread, flaxseed, and other nutritional products do not work like those from fish sources.

A more obvious example occurs in people with a disorder called “familial hypertriglyceridemia,” or the inherited inability to clear triglycerides from the blood. These people have triglycerides of 800 mg/dl, 2000 mg/dl, or higher. Fish oil yields dramatic drops of hundreds, or even thousands of milligrams. Fish oil likely achieves this effect by activating the enzyme, lipoprotein lipase, that is responsible for clearing blood triglycerides. Flaxseed oil and other linolenic acid sources yield . . . nothing.

Don't get the wrong message. Flaxseed is a great food. As the ground seed, it reduces LDL cholesterol, reduces blood sugar, provides fiber for colon health, and may even...
yield anti-cancer benefits. Flaxseed oil is a wonderful oil, rich in monounsaturates, low in saturated fat, and rich in linolenic acid, an oil fraction that may provide heart benefits a la Mediterranean diet.

But linolenic acid from flaxseed is not the same as EPA + DHA from fish oil. This is most graphically proven by the lack of any triglyceride-reducing effects of flaxseed preparations.

Enjoy your flaxseed oil and ground flaxseed, but don't stop your fish oil because of it. Heart disease and coronary plaque are serious business. You need serious tools to combat and control them. Fish oil is serious business for triglycerides and protection of your heart. Flaxseed and flaxseed oil are not.

**Fish oil and marketing**

Craig was absolutely convinced that his fish oil was the best available in the world: purer, uncontaminated by mercury or pesticides—"not like that other crap on the shelves!" When asked how he knew this, he proclaimed, "They said so."

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 an independent source like Consumer Reports, Consumer Lab, or the FDA.

But 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, a fair number of supplement manufacturers get away with 1) producing supplements that fail to contain the stated amounts of ingredients, occasionally containing none of the essential ingredient(s), 2) contain contaminants like lead, and 3) make extravagant and often unfounded claims like "superior", "more effective," and "purer".

Thankfully, analyses (above) like those conducted by Consumer Reports and Consumer Lab are hugely reassuring. The great majority of fish oil preparations on the market are high-quality, free of contamination, and provide the benefits you're seeking. 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 count omega-3 fatty acids as 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 post-prandial, flood of fat that is a potent risk 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.
References:


