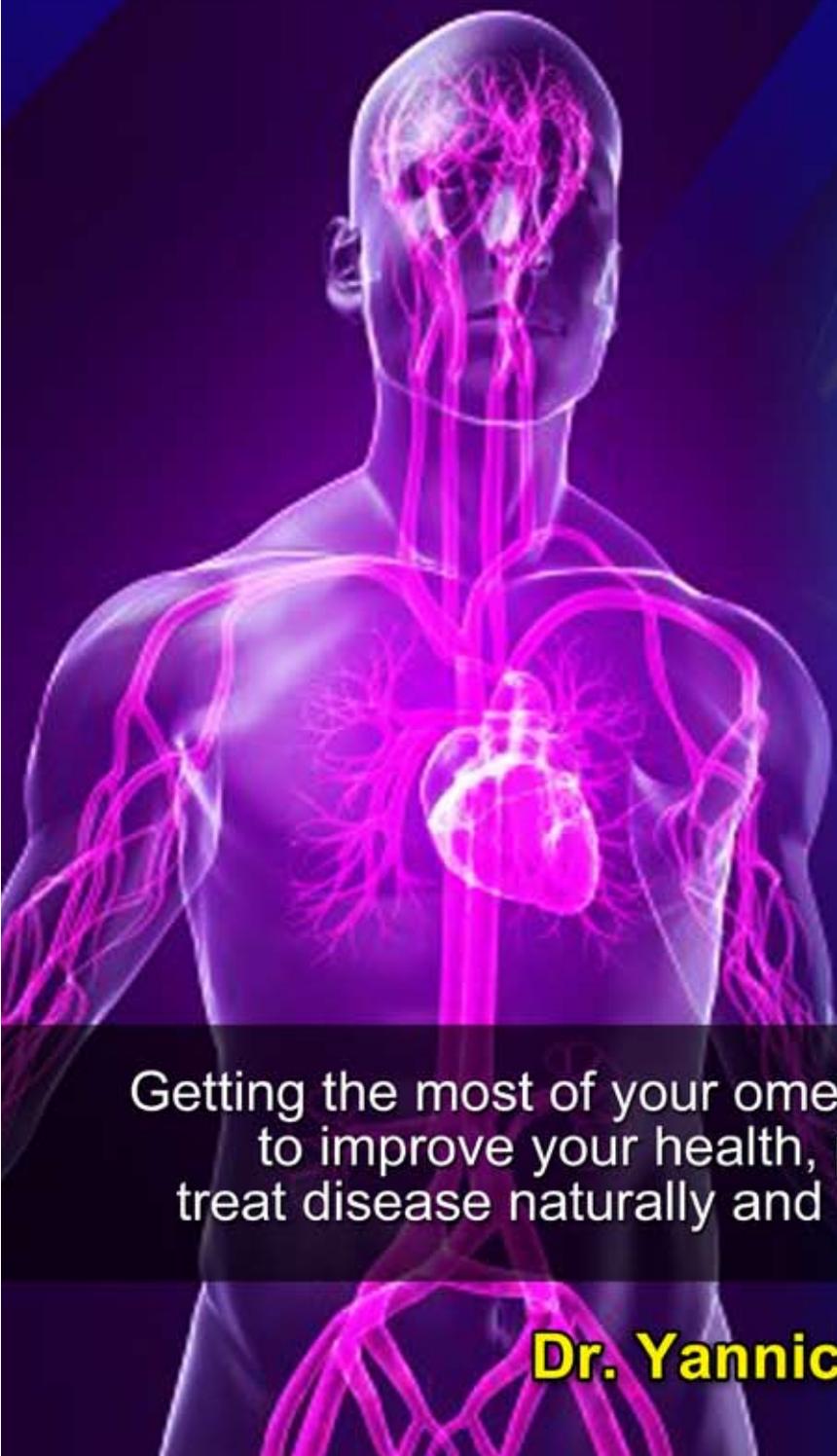


The Healing Power of Omega-3s



Getting the most of your omega 3 fish oil supplements to improve your health, prevent early aging, treat disease naturally and boost your brain power

Dr. Yannick Pauli

Contents

DISCLAIMER.....	2
PART 1 - What are Omega 3s?	
OMEGA-3 FATS OVERVIEW.....	3
THREE TYPES OF OMEGA-3.....	5
OMEGA-3 AND OMEGA-6.....	7
PART 2 - Safety Issues and Side Effects	
SAFETY ISSUE: TOXICITY IN FISH.....	9
POSSIBLE OMEGA-3 SIDE EFFECTS.....	11
POSSIBLE RISKS.....	13
POSSIBLE DRUG INTERACTIONS.....	15
PART 3 - How to choose Omega 3 Supplements?	
TYPES OF OMEGA-3 SUPPLEMENTS.....	17
CHOOSING OMEGA-3 SUPPLEMENTS.....	19
STORING YOUR OMEGA-3 SUPPLEMENTS.....	21
PART 4 - How much to take and for how long	
OMEGA-3 DOSES FOR VARIOUS CONDITIONS.....	22
HOW LONG SHOULD I SUPPLEMENT.....	25
PART 5 - Pregnancy and Breastfeeding	
INFANTS.....	27
MATERNAL HEALTH.....	29
PART 6 - Omega 3 Benefits for Various Conditions	
CARDIOVASCULAR HEALTH.....	31
DEPRESSION.....	33
ADHD AND LEARNING DISODERS.....	35
MACULAR DEGENERATION.....	37
BONE AND JOINT HEALTH.....	39
ALZHEIMER’S DISEASE AND PARKINSONS DISEASE.....	41
OTHER POTENTIAL BENEFITS OF OMEGA-3.....	43
BENEFITS OF AN EPA-ONLY SUPPLEMENT.....	46
PART 7 - Special Considerations	
OMEGA-3 FOR VEGETARIANS.....	48
A COMPREHENSIVE LIST OF OMEGA-3 BENEFIT.....	50
ABOUT DR YANNICK PAULI.....	51
THE SUPPLEMENTS WE USE.....	52
YOUR 10% DISCOUNT COUPON*.....	53

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CHAPTER-1

OMEGA-3 FATS OVERVIEW

Omega-3 essential fatty acids. DHA. EPA. You've probably encountered these buzzwords and their promised health benefits in magazine articles, television commercials, and packaging labels. Omega-3 fats are marketed as the new "miracle cure" that will keep your heart healthy and protect you from all sorts of diseases. While a number of studies provide scientific evidence on the importance of omega-3 fats to the human diet, most people actually know very little about this fat beyond its advertised claims. What exactly are omega-3 essential fatty acids? Where do they come from? How does this particular group of fat provide protection against a range of medical conditions? And how can we make the most out of these healthy fats? These are just some of the questions that this eBook will answer so you can make more informed decisions when you shop for a healthier lifestyle.

The first thing you should know about omega-3 fatty acids is that they are essential, in two different senses of the word: "Essential" because these fats make up part of the brain's physical structure and keep cell membranes supple and flexible. But they are also "essential" in the sense that they are not manufactured by the human body. We can only obtain omega-3 fatty acids through foods naturally rich in omega-3s – deep-sea fatty fish like salmon, tuna, mackerel; sea organisms like krill and algae; nut oils in walnuts; and plants like flax seeds and green leafy vegetables.

The second thing you need to know about omega-3 fatty acids is that they are a polyunsaturated fatty acid (PUFA). Chemically speaking, a polyunsaturated fat has more than one unsaturated carbon, which makes them a liquid substance even when chilled. This also means that they are particularly volatile and vulnerable to environmental elements; the smallest amounts of heat, moisture, air, or light can damage their molecular structure and make them go rancid. In other words, these oils cannot survive being exposed to heat when they are used for cooking. This is why you need to be careful about your sources of omega-3 essential fatty acids. Not only do foods enriched with this fat contain too little omega-3s to fulfill the recommended daily requirement, but these are likely to be altered by the chemical handling and processing they have gone through.

What makes omega-3 fatty acids such an attractive nutrient is that anyone at any age can benefit from its regular consumption. Children who eat omega-3 rich foods tend to be more attentive, focused, and well-behaved. Pregnant women who consume omega-3 fats not only give birth to babies with well-developed brains and eyes; they are also less likely to experience post-partum depression and pregnancy-related hypertension and

CHAPTER-1

diabetes. Men who eat more omega-3 fats have healthier sperm than men who do not. And the elderly can protect themselves from macular degeneration, Parkinson's disease, and osteoporosis with omega-3 fats.

Omega-3 essential fatty acids are by no means a new discovery; in fact, they've been part of the human diet since the first men walked on earth. The only reason why people are so excited about omega-3 fats these days is because the average Western diet is severely deficient in this important nutrient. Young taste buds prefer the grease of a juicy burger to the chewy flesh of fish, and adults find it more convenient to pop a meal in the microwave than cook from scratch. Is there any wonder that there has been a rise in conditions like ADHD and cardiac disease over the last several decades? Only now do we realize how nutritionally lacking the average diet is and how omega-3 essential fatty acids can make a difference to our health.

Important as omega-3 fats may be, do not treat it as a "miracle cure" to every disorder. Like every substance, omega-3 can cause side effects or provide no help to people with certain health problems. It should also be consumed in moderation and obtained from safe, toxic-free sources. This ebook will teach you everything you need to learn about omega-3 essential fatty acids – their health benefits, possible side effects, food sources, and how to choose the best omega-3 supplement for you and your family.

CHAPTER-2

THREE TYPES OF OMEGA-3

It's not enough to take just omega-3 fatty acids for a particular health condition. There are three different types of fatty acids in the omega-3 family tree, all from different sources and with different functions and benefits. When you buy any omega-3 supplement, the first thing you should look for is what type of omega-3 fat it contains.

Alpha linolenic acid

Alpha linolenic acid (ALA) is at the top of the omega-3 family tree because it is the “mother” of omega-3 fatty acids. ALA is found primarily in plant oils like flaxseed oil, and in very small amounts in canola oil, soybean oil, and walnut oils. The important thing you need to know about ALA is that the body converts it into docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), the two omega-3 fatty acids that are used by the body. However, the metabolization of ALA into EPA and DHA is a lengthy and difficult process, especially for people who are deficient in nutrients needed for the conversion. The amount of ALA you consume does not also translate into equal amounts of EPA and DHA. For instance, in order to obtain one gram of EPA from flaxseed oil, you will need to consume 11 grams of flaxseed oil. In other words, ALA is not the most efficient source of omega-3 fatty acids.

Docosahexaenoic acid

Docosahexaenoic acid (DHA) is found in deep sea fatty fish and seaweed. It is known primarily for its role in the growth and development of the brain in infants, and the maintenance of brain function in children and adults. DHA makes up 60% of the brain's physical structure, the eyes' physical structures, as well as the substance in neuron membranes. This is why it is important for pregnant women and children to consume DHA-rich foods; high amounts of DHA in the diet improve learning ability, visual acuity, and cognition during the early years of life. Even adults and the elderly can benefit from DHA's ability to provide a clearer, sharper mind. Deficiencies in this fatty acid are associated with attention deficit hyperactive disorder, fetal alcohol syndrome, aggressive behavior, and cystic fibrosis. In adults, low levels of DHA are associated with the onset of Alzheimer's disease, cognitive decline, and macular degeneration. However, as I will show you later, supplementation with high DHA amount does not provide the many benefits one could have thought, and this is especially true when it comes to brain function. This is a bit counter-intuitive, but science has shown that, although DHA is the most important fat in the brain, its direct supplementation is not ideal. Scientific research is starting to show

CHAPTER-2

that there is a better way: supplementing with EPA. The body then can take EPA and transform it into DHA as it needs.

Eicosapentaenoic acid

Like DHA, eicosapentaenoic acid (EPA) is found in deep sea fatty fish. But where DHA works on the brain and eyes, EPA brings benefits to the circulatory, cardiac, and immune system. EPA is needed to produce a certain group of substances called prostaglandins, which aids in arterial functions like blood clotting. It can also lower triglycerides, blood cholesterol levels, and reduce inflammation in the body. Research shows that people who have high levels of EPA in their diet are less likely to develop Crohn's disease (intestinal inflammation), Rheumatoid arthritis (inflammation of the joints), skin disease, multiple sclerosis, and asthma. In the body, under most conditions, EPA is transformed to DHA.

Most omega-3 supplements contain a combination of DHA and EPA, while some supplements like Vegepa contain ultra-pure EPA only. Although DHA plays an important role in brain development and function, researchers in the medical community recently discovered that EPA actually provides more neurological benefits. After observing the omega-3 supplementation of ADHD and depression patients, it was discovered that those with reduced symptoms are patients who took supplements with high EPA to DHA ratios. It is not known why this ratio is more effective, but some experts hypothesize that DHA tends to inhibit the actions of EPA.

CHAPTER-3

OMEGA-3 AND OMEGA-6

In order to get a greater understanding of essential fatty acids, we need to talk about the omega-6 family. The role of omega 6s are not as clear cut as omega 3s. In fact, this family is a bit of a double edge swords. Some of its members are very beneficial for the body. Others are also needed, but in small quantity. Some of the omega 6 members have anti-inflammatory properties, while others are pro-inflammatory. We need a balance of both, within reason. In our society, we tend to eat too many pro-inflammatory omega-6, essentially through the use of vegetable oils. Also, eating too many omega-6 may lead to a functional deficiency in omega 3. This means that you can have enough omega-3s, but since you also have too many omega-6s, the body cannot use omega-3s properly.

Linolenic acid

Not to be confused with alpha linolenic acid (ALA), linolenic acid (LA) is the mother of omega-6 fatty acids. When consumed, the body converts LA to gamma linolenic acid, but the conversion process is just as difficult and lengthy as the ALA conversion to EPA and DHA. It is more efficient to consume foods that are naturally rich in gamma linolenic acid.

Gamma linolenic acid

Gamma linolenic acid (GLA) is found in plant sources like evening primrose oil. Its functions and benefits are very similar to DHA and EPA. Like DHA, GLA maintains the permeability and flexibility of cell membranes, creating cells that can obtain the needed nutrients for proper functioning. GLA is also used by the body to create prostaglandins. If you remember from the previous chapter, prostaglandins are substances that regulate blood clotting and inflammation. Like EPA, GLA also has anti-inflammatory effects that can soothe arthritis, dysmenorrhea, or psoriasis.

Depending on the body's nutritional status, GLA can be further converted into one of two kinds of omega-6 fats – dihomogamma-linolenic acid (DGLA) and arachidonic acid (AA).

Dihomogamma-linolenic acid and arachidonic acid

DGLA is a substance that works with prostaglandins to reduce inflammation. The body requires healthy levels of certain nutrients like zinc, magnesium, vitamins C, B3, and B6 to convert GLA into DGLA. Otherwise, GLA gets converted into AA. In contrast to DGLA, arachidonic acid (AA) promotes inflammation and hinders the positive effects of GLA. AA can also be found in meat and dairy products.

CHAPTER-3

Omega-3s and Omega-6s

Our bodies need both omega-3 and omega-6 fats at approximately equal amounts, with the ideal ratio of omega-6 to omega-3s at 2:1. However, the average Western diet contains far too many inflammatory omega-6 fats from processed foods, with people consuming ten times more omega-6 fats than omega-3s. This imbalance in fatty acids is believed to cause the sudden proliferation of chronic diseases like coronary heart disease, asthma, and neurodegenerative conditions, which are all rooted in inflammations of the body. Common neurological disorders like chronic depression, attention deficit hyperactive disorder, and dyslexia is also believed to be caused in part by essential fatty acids imbalances..

While the abundance of omega-6 fats in our diet make it unnecessary to supplement with these fats, research shows that taking a combination of EPA and GLA is one of the best ways to relieve pain and joint stiffness caused by arthritis. GLA also has similar benefits to patients with high blood pressure and high LDL cholesterol levels. In other words, not all omega-6 fatty acids will necessarily lead to inflammation. Taken at the right amounts, GLA from evening primrose oil can assist omega-3 fatty acids in preventing inflammation and reducing the severity of many modern maladies.

CHAPTER-4**SAFETY ISSUE: TOXICITY IN FISH**

Omega-3 fatty acids DHA and EPA are naturally found in fatty deep sea fish like salmon, mackerel, and tuna. These fish do not actually produce omega-3 fats; like humans, they obtain these nutrients from eating other fish, which eat algae that covers the ocean floor. Theoretically, eating fish provides more health benefits than eating pork or beef, but chemical pollutants and oil spills are making our fish unsafe to eat. The University of Albany's Institute for Health and Environment recently sampled over 700 farmed and wild salmon species from all over the world, with an alarming discovery: deep sea fish are contaminated with a number of chemicals that can cause cancer and impede the neurological development of babies and children.

Toxins in our fish

The researchers from Albany and other small studies discovered that deep sea fish contain significant levels of PCBs, dioxins, and methyl mercury. Farmed salmon were found to have higher concentrations of these toxins, with the most contaminated samples coming from the Faroe Islands and North Atlantic. The least contaminated farmed salmon were from Washington State and Chile, but they still had higher levels of toxins than wild salmon. Generally, the most toxic are produced in European farms, which are sold across Europe. The salmon with lower contaminant levels can be found in the United States, Chile, or Canada.

Although mercury naturally occurs in our environment, because of industrial pollution and contamination, this toxic metal is now popping up in places where it shouldn't. Through rain and snow, mercury accumulates in lakes, rivers, and oceans, where it undergoes a chemical transformation and becomes methyl mercury, a deadlier compound. Marine life absorbs methyl mercury from the water when they feed on other organisms. Fish higher up in the food chain eat smaller fish throughout their lives, which means they consume the toxins consumed by fish, an amount that accumulates throughout their lifetime. This is what makes farmed salmon more toxic than wild salmon. Wild salmon feed on a variety of marine life like smaller fish, krill, and plankton, which may not carry as many contaminants. On the other hand, farmed salmon are given a high-fat feed made of fish, which have methyl mercury and other toxins in their fatty tissues.

A cause for concern

Children and women, especially those who are pregnant, nursing, or who are trying to conceive, should avoid or limit their consumption of deep sea fatty fish. Even though fish

CHAPTER-4

may only contain trace amounts of toxic heavy metals, regular consumption will cause the toxins to accumulate in your bloodstream. Although the body can naturally detoxify these contaminants, it may take years for the levels to lower significantly. This means that methyl mercury and other toxins might be present in your body even before you get pregnant. A number of studies show that high levels of mercury and other toxins can impede the development of a baby or young child's nervous system, as well as participate to the development of a number of conditions like autism, attention deficit hyperactive disorder, and immune system defects.

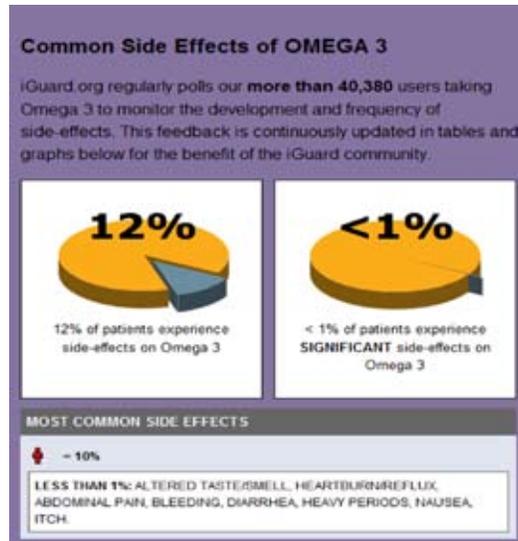
Omega-3 supplements provide an alternative to fish

The problem with eating wild salmon is that they cost almost twice as much as farmed salmon and do not provide a guarantee that they are free from toxins. Although it's safer to eat fish species with lower mercury levels, they do not contain as many omega-3 fatty acids as salmon and other deep sea fish. An alternative to eating fish for omega-3 is to consume high-quality fish oil supplements. These undergo a molecular distillation process that removes contaminants without damaging the fragile structure of omega-3 fats.

CHAPTER-5

POSSIBLE OMEGA-3 SIDE EFFECTS

The health benefits of taking omega-3 fatty acid supplements are widely documented and publicized. Yet this nutrient is by no means a “miracle cure”, nor does it always have positive effects on everyone. According to iGuard.org, who surveyed over 40,000 people taking omega-3 supplements, 12% experienced unpleasant minor reactions while less than 1% experienced significant side effects. Although the benefits of taking omega-3 supplements outweigh its risks, do watch out for the following adverse side effects and contact your physician if your discomfort increases.



Fishy aftertaste

Some people stop taking their omega-3 supplements because they can't stand the fishy aftertaste or the fishy-tasting burps. These side effects are not caused by omega-3s themselves. The fishy aftertaste is actually due to the amount of oxidation that occurred before the fish oil was encapsulated and bottled. If you remember from the previous chapters, omega-3 fatty acids are very vulnerable to the elements. Oxidation occurs when the fish oil comes into contact with the air, which allows oxygen molecules to “burn” the individual cells. This causes the fish oil to spoil and go rancid. Manufacturers of high quality supplements never allow their product to be exposed to air before they are bottled.

CHAPTER-5**Upset stomach**

Gastrointestinal discomfort is among the reported side effects of omega-3 supplements. Although omega-3 fatty acids have been used to treat constipation in the past, regular doses of fish oil do not cause upset stomach, diarrhea, or other gastrointestinal problems. These could either be due to oxidation of the product or contaminants in the product.

Vitamin toxicity

Some fish oil supplements like cod liver oil are made out of the fish's liver, which contains high levels vitamin D and the retinol form of vitamin A. Unless you are suffering from a deficiency of these vitamins, they can be toxic to the body if consumed in high amounts, especially if you are pregnant. Symptoms of vitamin A toxicity include nausea, vomiting, stomach upset, and headaches. However, fish oil supplements that are not derived from the liver contain high amounts of DHA and EPA and will not cause these side effects.

Rashes

Rashes are among the more uncommon side effects of omega-3 supplementation. This is either due to an allergy to the fish species used or an unknown contaminant in the capsule.

Excessive bleeding

Researchers observed that Greenland Eskimos who have high levels of EPA and DHA in their diets have a higher risk of hemorrhagic strokes and long bleeding times. However, it is not known if omega-3 fatty acids are the only factors responsible for these occurrences. Use fish oil supplements with caution if you are at risk for excessive bleeding.

Suppressed immune system

While EPA can benefit those who have inflammatory diseases, this could also suppress the immune system and make it less efficient at destroying pathogens. This gives bacteria a chance to grow and cause infections. Although these findings were only observed in cells outside the body, it's better to take low doses of omega-3, especially if you already have a compromised immune system.

CHAPTER-6**POSSIBLE RISKS**

Omega-3 fatty acids are created by biological organisms, which mean they are safe to consume by most of the population. Swallowing a fish oil capsule is no more different than taking a bite of an apple. However, some individuals experience some undesirable effects because of the way omega-3 interacts with their bodies. The most significant side effects caused by omega-3 supplementation are very rare and only occur in individuals with the following diseases. If you think you are at risk, talk to your physician before taking of omega-3 supplements.

Diabetes

Although omega-3 supplementation can prevent the complications of diabetes, a recent large-scale study shows that fish oils might actually elevate blood glucose levels. This study looked at 152,700 women and 42,504 men over the course of four years and observed that participants who ate fish two to four times a week were 1.17 times more likely to develop type 2 diabetes than those who ate fewer fish. Although other factors may have caused the onset of this condition, it is best to consult with your physician before taking fish oil supplements if you are at risk for developing diabetes.

Epilepsy

Supplementing with gamma linolenic acid (GLA) from evening primrose oil brings a lot of anti-inflammatory benefits, but high doses were found to induce seizures among patients who have undiagnosed temporal lobe epilepsy. For this reason, avoid GLA-rich oils like evening primrose oil if you have a family history of seizures or epilepsy.

Schizophrenia and autism

Patients with schizophrenia or autism may be unable to convert the omega-3 fat alpha-linolenic acid (ALA) into docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), the omega-3 fats used by the body. It is best to consume a supplement that provides DHA and EPA than to depend on an ALA-rich oil.

Bleeding disorders

For individuals suffering from thrombus, blood clots that block the blood flow, omega-3's blood thinning properties can be quite useful. However, talk to your doctor before taking omega-3 supplements if you already take blood thinning medication. Similarly, individuals

CHAPTER-6

with bleeding disorders should be careful when taking omega-3 fatty acids, as this might cause prolonged bleeding, excessive bleeding, or put you at risk for hemorrhagic strokes.

Growth of late stage colon cancer and prostate cancer

DHA and EPA are known to reduce the risk of a number of cancers, including colon cancer. However, some research suggests that consuming ALA can promote the growth of late stage colon cancer and increase the risk of prostate cancer.

Despite the possible risks omega-3 fatty acids might bring to a small margin of the population, the survey from iGuard.org shows that 84% of omega-3 consumers are confident about the benefits it brings. As long as you take omega-3 supplements according to the instructions of your physicians, you need not worry about the more severe side effects of this nutrient.

CHAPTER-7**POSSIBLE DRUG INTERACTIONS**

The unwanted side effects of omega-3 supplementation may also be caused by drug interactions from other medications taken by the patient. A “drug interaction” happens when a different substance affects the activity of a drug – it can either enhance or inhibit the drug’s effect, or produces a whole new unexpected effect. Drug interactions are not limited to drug-drug combinations; it can also occur between drug-herb combinations or drug-nutrient combinations. If you are currently taking the following medications, talk to your physician before taking omega-3 supplements, including those with eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), alpha-linolenic acid (ALA), and gamma-linolenic acid.

Blood thinning medications

Omega-3 fatty acids are a natural blood thinner that allows the blood to pass through the arteries smoothly. It can also lower the risk of strokes, heart attacks, and heart disease. However, omega-3 supplements can increase the effect of blood thinning medications – medications with anti-coagulant or anti-platelet activities. The increased effect may cause prolonged bleeding, heavy menstruation, or hemorrhagic stroke in rare cases. In some cases, this increased effect can be beneficial for the patient. Blood thinning medications include:

- Clopidigrel (Plavix)
- Warfarin (Coumadin)
- Heparin products like dalteparin (Fragmin) or Enoxaparin (Lovenox)
- Non-steroidal inflammatory drugs (NSAIDs) like Ibuprofen (Advil), Meloxicam (Mobic), Indomethacin (Indocin), Ketoprofen (Orudis), Ketorolac (Toradol), Nabumetone (Relafen), Oxaprozin (Daypro). Current research shows that omega-3 fatty acids seem to reduce the risk of ulcers caused by regular intake of NSAIDs.
- Aspirin. Some studies suggest that a combination of aspirin and omega-3 supplements can help patients suffering from heart disease, but they should only be combined under the guidance of your doctor.

CHAPTER-7**Blood glucose lowering medications**

Some studies suggest Omega-3 fatty acids might slightly increase fasting blood glucose levels in some people. Talk to your doctor and take supplements with caution if you take the following medications:

- Glucophage (Metformin)
- Glipizide (Glucotrol and Glucotrol XL)
- Glyburide (Micronase or Diabeta)

Cyclosporine

Cyclosporine is an immunosuppressive drug from soil fungi used to reduce the symptoms of skin disease and to help the body accept transplanted organs. Taking omega-3 supplements with cyclosporine can reduce side effects like kidney damage and high blood pressure caused by this drug in transplant patients.

Topical steroids

Increased EPA intake together with topical steroids and the drug etretinate (Tegison) can reduce the symptoms of psoriasis.

Cholesterol lowering medications

According to the American Heart Association, lowering your omega-6 intake and increasing your omega-3 consumption can improve the effects of cholesterol-lowering medications like lovastatin (mevacor), atorvastatin (Liptor), and simvastatin (Zocor).

Orlistat

Orlistat (Alli, Xenical) is a drug that prevents your body from absorbing fat for more effective weight loss. This action may also interfere with the way your body absorbs omega-3 fatty acids and other important nutrients. To avoid this complication, make sure you take your omega-3 supplement two hours before or after taking Orlistat.

CHAPTER-8

TYPES OF OMEGA-3 SUPPLEMENTS

Just as there are several food sources of omega-3 and omega-6 fatty acids, so are there different types of supplements derived from these food sources. Supplements fall into two general categories – marine sources or plant sources. Marine life is rich in omega-3 fats EPA and DHA, whereas plant sources can provide ALA, GLA, and the omega-3 fat SDA.

Fish oil

Fish oil supplements should be rich in EPA and DHA, assuming that they are made out of oily deep sea fish that contain omega-3 fats. Here is a chart of omega-3-rich fish species with their omega-3 fatty acid content per 100 g. Take note that this table should be treated as a rough guideline; the omega-3 content of fish depends on the season and location. Most fish oil supplements are made of salmon, tuna, herring, or mackerel – the longest-

Fish species	Omega 3 (EPA+DHA) content (g) per 100 g
Tuna	0.28-1.51
Salmon	1.28-2.15
Mackerel	0.4-1.85
Herring	2.01
Rainbow trout	1.15
Sardines	1.15-2
Halibut	0.47-1.18
Cod	0.28

living fish species located high up in the food chain. Unfortunately, these fish also have the highest concentrations of toxins. There will be more on this in the section on choosing omega-3 supplements.

Evening primrose oil (EPO)

Evening primrose oil is the best source of GLA omega-6 essential fatty acids. In its natural unrefined state, EPO contains a high concentration of triterpenes – substances

CHAPTER-8

that support immune function, nourish the skin, hair and nails, and lubricate the joints. Studies show that a combination of GLA and EPA is more effective in reducing arthritis pain than EPA alone.

Flaxseed oil

Flaxseed oil is the best source of ALA, the “mother” of omega-3 fats DHA and EPA. For this reason, vegetarians depend on flaxseed oil for their daily intake of long chain omega-3 fatty acids. ALA is synthesized into EPA and DHA by the body, but the conversion process requires the presence of specific enzymes and can be slow, especially if there is a problem with enzyme activity or a deficiency in certain nutrients. In fact, only 4% of ALA gets converted into DHA and EPA, making vegetarians susceptible to omega-3 fatty acid deficiencies and their associated problems.

Echium oil

Echium oil from the plant echium plantagineum is now heralded as one of the most exciting breakthroughs in nutrition science. This plant is rich in an omega-3 fatty acid called stearidonic acid (SDA), which is naturally converted into EPA by the body. Unlike ALA, SDA is a closer relative to EPA, and can overcome any enzyme problems that interrupt the conversion process from ALA to EPA. This means that you can obtain five times the amount of EPA from SDA than any other vegetarian source of omega-3 fatty acids. Aside from that, echium oil also contains GLA and the omega-9 oleic acid found in olive oil. Studies suggest that the combination of SDA and GLA can increase EPA levels better than SDA alone, making echium oil a powerful food source of omega-3 fats for vegetarians and those allergic to fish oils.

CHAPTER-9**CHOOSING OMEGA-3 SUPPLEMENTS**

Type the term “fish oil brands” on the Google search bar and you’ll be greeted by 2 million search results spread over hundreds of pages. These search results can be confusing and overwhelming, especially if you are new to the world of omega-3 fatty acids. How can you narrow down these options and select only one omega-3 brand?

The most important thing you need to remember about omega-3 supplements is that not all of them were manufactured using the same tools, techniques, or fish sources. The average omega-3 supplement tends to contain generic fish oil – that is, fish oil from various species that was not concentrated or distilled. While they might be more affordable, generic brands may not deliver the benefits you need out of omega-3 fatty acids. Below are some general guidelines on choosing the best quality omega-3 supplements.

Molecular distillation process

Molecular distillation is a refining process used to remove contaminants from omega-3 fatty acids. Unlike other distillation processes, which use heat, molecular distillation occurs in a vacuum, where the oils are carefully extracted at very low temperatures to preserve their purity. This complicated technology can be expensive, and omega-3 supplements that use molecular distillation are bound to cost more than generic brands. However, it is important for omega-3 fatty acids to undergo molecular distillation to remove harmful ocean pollutants, PCBs, and dioxins. Molecular distillation also removes vitamin A, which is naturally found in fish oils and can cause toxicity if consumed in excess amounts.

Fish sources

It’s more cost-effective to obtain fish oil from larger species like salmon, tuna, and halibut, which are located higher up in the food chain. They contain a higher concentration of omega-3 fats and live longer than other fish species. However, large fatty fish species also accumulate a higher number of toxins from the smaller fish they eat. Although the molecular distillation process can remove some of these toxins, it cannot get rid of every single trace without damaging the fragile structure of the fats. Good fish oil brands obtain their omega-3s from short-lived marine life like anchovies; the bottle’s label should indicate the fish species used. Additionally, the manufacturer should also state if the oils were derived from the flesh of the fish. Many omega-3 supplements extract fish oil from the liver, which is part of the excretory system and contains high levels of pollutants.

CHAPTER-9

Enteric coating

Enteric coating is a barrier that protects the omega-3 so they do not dissolve unless they reach the intestines. This provides better absorption and eliminates the fishy aftertaste.

Plant sources

If you're vegetarian or allergic to fish, you can obtain your omega-3 fatty acids from plant-based supplements like evening primrose oil or echium oil. The choices are not as plentiful as fish oil supplements, but keep an eye out for organic virgin products extracted through a cold-pressing process. Generic plant supplements contain refined oils that have been stripped of their natural triterpenes, phytochemicals, and antioxidants during the process. Cold-pressing, on the other hand, preserves the oil's natural state to provide you with as many health benefits as it can give.

CHAPTER-10**STORING YOUR OMEGA-3 SUPPLEMENTS**

Polyunsaturated fats like omega-3 fatty acids are very sensitive to damage from heat, light, and air. When exposed to these elements for a long period of time, omega-3 fatty acids become oxidized, which basically means they turn rancid and go bad. Rancidity not only damages the taste and smell of the oil, but it also diminishes its nutritional value. The worst effect of rancidity, however, is the production of free radicals, which are thought to play a role in the advancement of cancer and a number of degenerative diseases.

A quality omega-3 supplement should have undergone a cold-pressed, molecular distillation process to remove impurities while protecting the fats against oxidation. Despite these measures, omega-3 fats can still go rancid if they are stored improperly. Protect your omega-3 supplements from damage by following these simple measures.

Store in dark bottles

Normally, high-quality fish oil supplements come in dark bottles or opaque bottles to protect the capsules from light damage. Transfer the capsules in dark bottles if they were shipped in clear or translucent containers. Make sure the lid can be tightly closed.

Keep refrigerated

Keeping your omega-3 fats in low temperature areas is important to maintaining their quality and freshness. When not in use, keep the bottle in the refrigerator, even if you live in colder climates. The heat from a cooking stove or a shower may affect the quality of the capsules if they are left on top of the kitchen counter or the bathroom sink.

Check the expiration date

Since omega-3 fatty acid supplements are highly vulnerable to environmental conditions such as heat, light and oxygen, you should always ensure that the supplement you take has not passed the expiration date.

CHAPTER-11

OMEGA-3 DOSES FOR VARIOUS CONDITIONS

It's not enough to know that you have to take a certain amount of fish oil a day; the amount of EPA and DHA in the capsule is what really matters. Before committing to buy a particular brand, check the bottle's label to determine its EPA/DHA content. The average amount of omega-3 fats in fish oil capsules is 180mg (.18 grams) EPA and 120mg (.12 grams) DHA. Five grams of fish oil will yield around 170-560mg EPA and 72-310mg DHA.

There are still a lot of variations in the recommended dosages. For example, the Japanese are known to consume between 700-1200 mg of combined EPA and DHA daily. The American Heart Association recommends 900 mg daily for people with no cardiovascular risks. The Food and Drug Administration has issued a statement that combined consumption of omega 3 fatty acids (in the diet and in supplements) is safe up to 3000 mg per day. Anything above 3000 mg per day should be done under medical supervision.

This section will give you a general idea of how much omega-3 fatty acids you can expect to take for a particular condition, but do not replace this information for medical advice from your physician.

Aging

According to the United States Food and Nutrition Board, the recommended daily intake of DHA plus EPA (combined) is at least 650mg. Researchers are still undecided as to which type of omega-3 fatty acid provides more benefits to the elderly. Some studies show that a higher EPA/DHA ratio is better at preserving cognitive functioning, while others suggest that EPA-only supplements are more effective.

Cardiovascular health

Studies from the American Heart Association (AHA) show that 5 or more servings of fatty fish a week provides significant protection against cardiovascular disease. In their recommendations for managing heart disease, the AHA suggests a daily intake of 900mg EPA/DHA combined, together with 7 servings of fatty fish per week. This dosage agrees with the recommended intake for the maintenance of cardiovascular health among individuals with no heart problems. Those who already have pre-existing heart conditions usually consume more than the 900mg EPA/DHA, as recommended by their doctors. However, supplementation may need to go up to 2000-2000 mg to treat high triglycerides.

CHAPTER-11

Children

For optimum cognitive development and function, studies suggest that children need to take 700-1,400mg EPA/DHA (dosage varies depending on the weight). Omega-3 supplementation has been shown to reduce symptoms of ADHD, autism, and childhood depression.

Depression

Studies in children and adults show that fish oils with EPA and DHA can reduce depression in the short term, but research has yet to confirm its long-term effects. Still, the findings remain optimistic thus far, and a number of psychiatrists and doctors now recommend omega-3 supplements for minor cases of chronic depression and anxiety. The recommended daily dosage is around 600mg EPA/DHA, but need to be tailored to the needs of individuals. One study on bipolar disorder used 9.6 grams per day. Obviously, this would need to be done under close medical supervision.

Eye health

Macular degeneration, one of the leading causes of blindness among adults, can be prevented by taking a combined capsule of EPA/DHA. Research on the subject show that 500-600mg EPA/DHA combined is effective at maintaining eye health, especially among those with low intakes of omega-6 fats linolenic acid and arachidonic acid.

Joint health and arthritis

The published clinical trials on omega-3 and arthritis patients show that symptoms decreased when they consumed 400mg – 600mg EPA/DHA (combined per day). The symptoms returned when omega-3 supplementation ended. In trials on rheumatoid arthritis, dosages were around 3 grams per day. One study even used 18 grams per day. Do not use such high levels unless you have talked to your doctor and are under strict medical supervision.

Pregnancy

The average pregnant woman only consumes 80mg of DHA per day – a far cry from the recommended 300mg DHA and 150mg EPA. Fortunately, this gap can easily be filled by prenatal multivitamins and supplements, which normally contain this recommended amount. The section on pregnancy and breastfeeding will talk more about the benefits of omega-3 supplementation to the baby and mother.

CHAPTER-11

Skin health

Several studies on omega-3 supplementation show consistent reports on the benefit of fish oils for skin health. A combined 2,000mg dosage of EPA and DHA has been found to reduce psoriasis severity, especially if consumed intravenously. Those looking to maintain skin health should consume 900mg of EPA/DHA combined.

CHAPTER-12

HOW LONG SHOULD I SUPPLEMENT

As I have showed you in earlier chapter, the vast majority of people are highly deficient in omega 3 fatty acids because we need to get them from our diet. So, unless you are an Eskimo and eat a traditional Eskimo diet, you are deficient in omega 3 fatty acids. Obviously, the first step would be to increase the amount of omega 3 fatty acid you get from the diet. However, there are two limitations to that. First, we have discussed the potential risk of toxic metal contamination linked to high amounts of fish consumption. The second limitation has to do with the type of omega 3 you can consume. More and more evidence show that EPA and DHA are crucial to your health. Unfortunately, they can only be obtained from fish and other marine life sources. Eating green plants and some seeds will give you some omega 3 through alpha linolenic acid (ALA) – which has beneficial effects of its own – but several studies have shown that ALA supplementation only has a small effect on increasing EPA and DHA in the body. In conclusion, the only way to safely and effectively raise concentration of EPA and DHA in body tissues is to take fish oil supplements.

So how long should you take omega 3 supplements?

I will answer this question from two perspectives:

1. Supplementation for overall health
2. Supplementation to treat a specific disease

Supplementation for overall health

Some new research suggests that there should be an optimal percentage of EPA and DHA in human tissues. This is called the omega 3 index. Preliminary research suggests that it should be about 8%. Most people are around 4%. In one study done by researchers of the University of Minnesota, it was shown that 8 weeks of supplementation with about 2000 mg (2 grams) of combined EPA and DHA rose the omega 3 index from 4.3% to 7.8%. However, once the supplementation stopped, the index decreased to 5.7% after one month. Four month after the end of supplementation, it went back to baseline, and even lower. In another study where individuals were supplemented for 1 full year, researchers found out that participants lost half of EPA concentration within the first 4 weeks after the supplementation stopped.

So from what research show us, 2-4 months of supplementation with 2 grams of

CHAPTER-12

combined EPA and DHA is enough to reach an optimal omega 3 index. However, stopping supplementation result in a decrease in half what was gained after 4 weeks and back to baseline after 3-4 months.

My suggestions are that you either take a supplementation of 1 gram omega 3 (EPA+DHA) on an ongoing basis, or to do rounds of supplementation at 2 grams for 2 months, every other 2 months (2 months ON, 2 month OFF).

Note that if you are trying to help your brain more than anything else, it is wise to take a supplement that has a high EPA to DHA ratio, or no DHA at all. See chapter 22 for the reason why.

Supplementation to treat a specific disease

As you have seen in the previous chapter (and as you will see in the upcoming ones), there is a wide variety in the dosage of omega 3 required to treat various disease. It can vary from one gram to almost ten grams in some studies.

In reality, there is now way we can give specific recommendations as to how long you should take omega 3 supplements if you are trying to treat a specific condition. My suggestion is that you should do so under medical supervision. Definitely seek the assistance of a doctor if you want to take dosages of 3 grams or higher for extended period of times.

Collaborating with your doctor will help you prevent side effects but will also help you determine whether you are successful in your treatment. For example, if you are trying to reduce your blood triglycerides by using omega-3 supplementation, you would need regular blood test to see if you are achieving your objectives. Usually, if your doctor is open and knowledgeable about the use of omega 3s, he or she will help you find the best dosage for the conditions you are trying to treat.

CHAPTER-13

INFANTS

A growing number of studies suggest that many childhood disorders can be prevented if babies receive enough omega-3 fatty acids in the womb and from breast milk. Omega-3 fatty acids, particularly the long-chain DHA, are essential to the development of babies in the womb, especially during the third trimester when the retina and nerve cells start accumulating rapidly. The baby's need for omega-3 fats is at its peak during this time. Infants also need a source of omega-3 fats from breast milk to support the continuing growth of their nervous systems and eyes.

Brain development and function

The importance of omega-3 acid for the brain development of infants is receiving a lot of support from researchers and doctors. After all, around 60% of brain tissue's dry weight is made up of 60% DHA, and the central nervous system is most vulnerable to DHA deficiencies during infancy. Research shows that infants born to mothers who had higher levels of omega-3 fatty acids in their blood during delivery had longer attention spans and higher levels of thinking in early childhood. The literature is also consistent with observations on the positive relationship between high infant omega-3 intake and normal mental development up to two years.

New findings also show that premature babies born in 33 weeks have undeveloped brain structures, which can lead to impaired mental development in childhood. To counter this, researchers from Adelaide gave their mothers 1,000mg DHA a day and fed their breast milk to the babies. Among the 657 premature babies examined, those who had increased DHA intake were able to avoid any developmental delays, as compared to the babies who had lower DHA intake.

Visual acuity

Aside from the brain, developing retinas or eyes also need a healthy supply of DHA. Studies show that infants who receive breast milk (which has around .2% DHA on average) are more likely to have higher DHA levels and better visual acuity than babies who receive milk formula without DHA. DHA supplements were also found to improve the visual function of premature babies.

Why breast milk is better than omega-fortified infant formula

New mothers are often hesitant about breastfeeding their babies and prefer the convenience

CHAPTER-13

of mixing bottles of infant formula. However, a report from the Cornucopia Institute says that not only is breast milk the best source of omega-3 fatty acids for babies; omega-3 fortified infant formulas may even be toxic. Some manufacturers of infant formula do not use organic sources of DHA and EPA. Instead, they fortify the formulas with two man-made oils called ARASCO and DHASCO. These two oils are supposed to contain EPA and DHA, but it turns out that they are extracted from fermented algae and fungus. The extraction process requires a neurotoxic chemical called hexane, which does not contain the nutrient content or chemical structure of DHA. Babies who have taken this milk formula are known to experience non-stop massive diarrhea, which can be very fatal at their age. Despite these findings, the fortified milk formulas have yet to be taken down from supermarket shelves, and the packaging does not contain any warnings about their possible side effects.

Breastfeeding your baby will mean consuming enough omega-3 fatty acids for two people. However, do remember that the toxins found in fish can be easily passed to your child through breast milk. Avoid fatty fish species that have the highest concentrations of ocean pollutants and use a quality fish oil supplement for your omega-3 needs. Researchers have yet to agree on how much omega-3 fats babies need, but experts suggest a daily dose of 200-300mg DHA among nursing mothers.

CHAPTER-14

MATERNAL HEALTH

It pays to take care of your body and stock up on essential nutrients if you are pregnant or trying to conceive. You're probably already aware of why omega-3 fatty acids are important to infant development, but did you know that this fat can protect your health and physiological needs as well? Below are just some of the ways pregnant women can benefit from increased omega-3 intake.

Easier childbirth

Omega-3 fatty acids are taken up by all the cell membranes in the body to keep them flexible and soft. The cells' intake of omega-3 fats affects the functions of the organs, including the cervix. If your cervix is thin and flexible before the birth itself begins, you can expect to have shorter labor and easier childbirth. On the other hand, if there are more omega-6 fats in the body than omega-3, the cervix becomes more rigid and unyielding, resulting in longer labor time and painful childbirth. Midwives observe that first time mothers experience only 4.5 hours of labor when they take omega-3 supplements as compared to the average of 12 hours among mothers who do not supplement.

Protects against preeclampsia

Preeclampsia or pregnancy-induced hypertension affects 5-8% of all pregnant women. This condition occurs during the second trimester and is characterized by high blood pressure, large amounts of protein in urine, and swelling. Research shows that there is a negative relationship between omega-3 fatty acid intake and preeclampsia, meaning that women with the lowest levels of omega-3 are at higher risk for developing this condition. You are more likely to develop preeclampsia if your mother or sister experienced it, but taking omega-3 supplements may prevent this complication from arising.

Prevents postpartum depression

After childbirth, the hormonal imbalance may cause you to feel moody, listless, or depressed. It's normal to feel the "baby blues", but postpartum depression is an entirely different matter. Postpartum depression is a type of clinical depression that impairs your functioning and judgment. It is theorized that the decrease in hormones triggers the onset of postpartum depression, but current research suggests that diminished levels of EPA and DHA may also be the cause. Most of the EPA and DHA in your body are consumed by the baby through the womb or in breast milk and if you have an insufficient enough to begin with, your body will pull out DHA from the brain to give it to the developing

CHAPTER-14

child. Studies also indicate that maternal levels of omega-3 fatty acids drop with each succeeding pregnancy. Supplementing with fish oil capsules or omega-3 rich foods may prevent postpartum depression and allow you to form a healthy bond with the new baby.

While fatty fish is the richest natural source of long chain omega-3s, it is safer for pregnant women to consume fish oil supplements rather than the flesh of fish. Fatty fish species like shark, tuna, mackerel, and swordfish may contain high levels of mercury and other ocean pollutants, which infants and breastfeeding babies are vulnerable to. Mercury is known to stunt mental development and cause a number of childhood disorders like autism or ADHD. A pharmaceutical fish oil supplement, on the other hand, would have already removed these toxins without damaging the fragile structure of the omega-3 fats.

CHAPTER-15**CARDIOVASCULAR HEALTH**

Of all the benefits omega-3 fatty acids can bring to our overall well-being, its positive effects on cardiovascular health are the most widely-publicized and appreciated. The average Western diet is rich in trans-fats, LDL cholesterol, and other fats that precipitate heart disease and inhibit the body's uptake of omega-3 fatty acids. While there are a number of pharmacological treatments for heart problems today, most people tend to forget that a healthy diet and active lifestyle can help them avoid the expense and the difficulties of managing coronary heart disease. In fact, the American Heart Association recommends all individuals to consume fatty, omega-3 rich fish at least twice a week for optimum cardiovascular health.

How exactly can omega-3 fatty acids protect you from heart disease? Researchers have yet to establish its exact mechanisms of action, but what is known is that omega-3 fats can lower the risk factors for cardiovascular disease and cardiac death. Regular omega-3 intake has been observed to lower the levels of bad LDL cholesterol and increase the amounts of good HDL cholesterol. It is also known to prevent arrhythmias because of its stabilizing effect on the myocardium, as well as its ability to decrease the resting heart rate. Researchers have also noted that DHA and EPA can reduce the carbohydrate-induced blood fatty surges after meals, which is an important risk factor of cardiovascular disease. The blood-thinning effect of omega-3 fats can also reduce the risk of cardiovascular blood clotting.

Of course, omega-3 fatty acid supplements should not be used as a replacement for the heart medication prescribed by your doctor. While increased intake of omega-3s may reduce the impact of cardiovascular disease, you can only receive its full benefit if you make healthy lifestyle changes that prevent heart disease.

Don't smoke tobacco

One of the biggest risk factors of heart disease is cigarette smoking and the use of tobacco products. Cigarette smoke contains thousands of chemicals that can damage your heart and blood vessels, making them more vulnerable to atherosclerosis. Nicotine also makes your heart work harder by increasing your blood pressure and heart rate, as well as the carbon monoxide in your blood. Fortunately, quitting smoking is enough to reduce the risk of heart disease within just a year.

CHAPTER-15

Limit your intake of harmful fats

Not all the omega-3 fatty acids in the world can prevent heart disease if you keep consuming foods rich in saturated fats and trans-fats, harmful fats that raise your blood cholesterol levels. Current evidence shows that among the two, trans-fats are worse because it increases your LDL cholesterol levels while lowering your HDL levels. Major sources of these fats include butter, cheese, and beef. Trans-fats can be found in potato chips and other processed foods.

It would also be wise to limit your intake of omega-6 fats arachidonic acid, as these aggravate inflammation and inhibits the body's ability to metabolize DHA and EPA. AA is found in meat and most vegetable oils.

Get physically active

Engaging in regular physical activity can lower your risk of heart disease in several ways. It can help you control your weight and lowers the risk of developing health problems that may strain your heart, such as high cholesterol, diabetes, and high blood pressure. While doctors suggest at least 30 to 60 minutes of physical activity a day, you don't need a gym membership to get that much daily exercise. Remember that walking, riding a bike, or dancing is enough for a good workout.

Additionally, you can use the American Heart Association's guide to omega-3 consumption for your reference.

Population	Recommendation
Patients without documented coronary heart disease (CHD)	Eat a variety of fatty fish at least twice a week. Snack on foods rich in ALA like walnuts.
Patients with documented CHD	Consume 1 g of EPA+DHA per day, or as prescribed by your physician.
Patients with high levels of triglycerides	Consume 2 to 4 grams of EPA+DHA per day, or as prescribed by your physician.

CHAPTER-16**DEPRESSION**

Doctors and psychiatrists explain depression in terms of its biological causes, specifically a deficiency in the neurotransmitter serotonin, which regulates mood, appetite, and sleep. Although major depression can be genetically inherited, the cases of depression increased 20-fold after 1945 despite advances in diagnostic criteria, scientific knowledge, and pharmacological treatments. While there are a number of causes that can trigger this complex condition, current research suggests that omega-3 fatty acids provide a natural means for managing and preventing major depression.

Over the last several decades, the omega-3 consumption of the average Westerner has declined dramatically. The typical Western diet contains a high concentration of omega-6 fats, outnumbering omega-3 fatty acids by as much as 20:1. Given that 60% of the brain's dry weight is made of DHA and that the type of polyunsaturated fatty acids can affect communication between neurons, it makes sense that the skewed ratio of omega-6 and omega-3 fatty acids might have some neurological and psychological consequences. Omega-3 maintains the flexibility of neuronal membranes and fosters efficient communication. When omega-3 fats are not available, the brain uses omega-6 fats, which makes neuronal membranes stiff and distorts neurotransmitter reception. This in turn has a negative impact on behavior and brain function. On the other hand, could increasing the intake of omega-3 reduce the incidence of common psychological problems like ADHD and depression?

Findings from clinical trials seem to say yes. The first pilot study on omega-3 supplementation, depression, and bipolar disorder took place in Harvard University. Thirty patients who were stable but experienced bipolar episodes in the previous year participated in the study; half received 9.6 grams of EPA and DHA a day, the other half took olive oil. The clinical trial was supposed to last for nine months, but the omega-3 group showed significant improvements after four months. Although they had higher mania scores than the control group, the omega-3 group experienced fewer depressive symptoms

One interesting observation made by researchers is that suicide attempts seem to be related to low EPA levels in the blood. In a paper that looked at 100 suicide attempts in China and 100 hospital admissions, those with low EPA levels were eight times more likely to commit suicide than those with the highest amount. The study also noted that total cholesterol levels seem to be synchronized with seasonal depression and suicide. EPA and DHA consumption is at their highest in August to September, and at their lowest in

CHAPTER-16

March to July. Investigators observed that there are more suicides in spring and summer than during autumn and winter.

Researchers also observed the overlap between depression and cardiovascular disease. Many cardiac patients who experience major depression were found to have lower blood levels of DHA. Aside from that, high concentrations of the amino acid homocysteine, a risk factor for cardiovascular disease, may also be caused by the high levels of omega-6 fats in the typical Western diet. Low levels of the omega-3 fat ALA was also linked to depression among Japanese patients suffering from lung cancer.

The effects of omega-3 fatty acids on the central nervous system are far from clear, but what we do know is that DHA and EPA are essential components of neuronal membranes. They are critical to the function of neurons because they act as the receptors and transmitters of neurotransmitters. They keep neuronal membranes fluid by displacing the cholesterol, and act as second messengers when neurotransmitter traffic becomes heavy. Omega-3 fatty acids also inhibit the action of pro-inflammatory immune chemicals called cytokines. Cytokines are known to alter neurotransmitter metabolism and the lower the action of their precursors, or the substances they originate from. Research shows that the levels of cytokines are related to the severity of depressive symptoms, and that the presence of omega-3 fats can reduce their impact.

When supplementing with omega-3 fats for depression, it's just as important to be well-stocked on nutrients that affect omega-3 metabolism. Selenium, zinc, folic acid, and natural antioxidants like vitamin C can improve the body's use of omega-3 fats and have a positive impact on mood. Studies show that a deficiency in selenium and zinc interferes with the body's ability to convert ALA into DHA and EPA.

CHAPTER-17**ADHD AND LEARNING DISORDERS**

The lack of omega-3 fats in the average Western diet has a negative impact on our children as well. Like in depression, there are environmental factors that contribute to childhood disorders like attention deficit hyperactive disorder (ADHD), dyslexia, and autism. A child would rather have a burger and fries over steamed salmon, and it's starting to look like the imbalanced omega-6 to omega-3 ratio might be the culprit behind these modern childhood conditions. Hyperactivity, impulsivity, and inattention are not merely symptoms of ADHD – they suggest an overall problem with brain function. Experts have also observed that children with ADHD tend to have more allergies, headaches, asthma attacks, and dry skin than those without ADHD. Incidentally, these symptoms are the hallmark signs of an omega-3 fatty acid deficiency.

The conventional treatment for childhood ADHD is stimulant medications like Ritalin and Adderall, but these drugs are chemically similar to cocaine and can produce debilitating side effects after long-term use. Not only do stimulant medications carry serious risks, but they also fail to solve the problem at its root. What if the ADHD symptoms are actually caused by a deficiency in certain nutrients, particularly omega-3 fats? Can a child's behavior improve after taking fish oil supplements or making dietary changes?

There are a growing number of published studies where DHA and EPA were given to children with ADHD and other developmental disorders. Although experts have yet to determine a consistent daily dose, benefits were found to be statistically significant. The largest clinical trial to date involved 100 child participants from 12 schools in the United Kingdom. The study observed motor skills and dyspraxia, but also assessed ADHD symptoms and dyslexia. The children were divided into two groups – one group received fish oil supplements, while the control group received a placebo. Each group had children who met the diagnostic criteria of ADHD (32% and 31%, respectively).

After three months taking omega-3 supplements, parents observed a significant reduction in their hyperactive symptoms. Those in the fish oil group also had lower ratings on the Conners' DSM ADHD scale compared to those in the control group. In the dyspraxia trial, those who received supplements had significant improvements in spelling, reading, and behavior, as opposed to the control group where no improvements were made. Eventually, those in the placebo group were given omega-3 fish oil supplements and showed considerable changes in academic achievement and behavior in several months. Those in the fish oil group continued taking the supplements and either maintained their gains or showed further signs of development.

CHAPTER-17

Despite these promising findings, omega-3 fatty acids are no magic bullet that can cure ADHD, autism, and other learning disorders. In fact, there is no such thing as a “cure” for these conditions – they can only be managed through a combination of specialized therapies and lifestyle changes. What omega-3 supplements can do is make it easier to manage the symptoms and aid in the recovery process. If used in the context of a comprehensive, holistic treatment program, omega-3 fatty acids can help your child overcome the setbacks of a learning disability, fulfill his or her potentials, and lead a normal life.

CHAPTER-18**MACULAR DEGENERATION**

Omega-3 fatty acids are just as “essential” to the elderly as they are to children and adults, especially when it comes to preventing health problems that make it difficult to live independently. Macular degeneration, the leading cause of vision loss among people 60 and older, is a condition that causes slow and cumulative damage to the macula. The macula is the oval-shaped center of the retina that enables us to see fine details. Damage to the macula makes people experience blind spots or blurring in the center of their vision; one of the earliest signs of macular degeneration is the need for more light to see things up close. Peripheral vision is usually maintained despite macular degeneration, which means that blindness (the complete inability to see light) does not occur. However, the loss of central vision makes one unable to do every day activities such as driving, reading, or recognizing faces.

There are two basic kinds of macular degeneration. Dry macular degeneration affects 85% of those with the condition and involves the gradual loss of vision, sometimes beginning in one eye. Wet macular degeneration accounts for 90% of vision loss from everyone with the disease, and is characterized a sudden loss of central vision. Most people with wet macular degeneration have had the dry form.

While there is no cure for macular degeneration once it sets in, there are ways to slow down vision loss and prevent the disease from progressing to the wet form. Current research shows that omega-3 fatty acid supplements can slow down macular degeneration in a number of ways. In the first place, long-chain fatty acid DHA forms the building blocks of the nerve cells in the retina. It makes sense for regular intake of DHA and EPA to play a critical role in maintaining integrity of the retina and its components. In a study of an elderly Australian group where over 3,000 participants were examined for their dietary consumption of omega-3 fats, it was found that DHA and EPA from fish reduced the risk of developing macular degeneration by as much as 50%.

However, it isn't enough to simply consume more DHA and EPA. Studies show that high intake of saturated fats and trans-fats also contribute to the onset of macular degeneration because of their inflammatory effects. The same Australian researchers from the mentioned study also discovered that the benefits of omega-3 fats were more pronounced among those who had lower intakes of omega-6 fats like linolenic acid.

If you'd like to take omega-3 fatty acids to prevent macular degeneration, make sure your supplements contain the long-chain fats DHA and EPA. Some studies suggest that

CHAPTER-18

the omega-3 parent ALA may actually contribute to the progression of this condition. At the same time, avoid eating too much processed food, fatty meats, and dairy products. Research shows that a daily serving of a high-fat dairy food (e.g. ice cream), meat food (e.g. hot dogs or burgers), and processed baked goods (e.g. potato chips) increases the progression of macular degeneration by as much as 2.5 times.

CHAPTER-19**BONE AND JOINT HEALTH**

The anti-inflammatory benefits of omega-3 fats have been found to prevent osteoporosis and rheumatoid arthritis, two chronic conditions that cause disability in the elderly.

Osteoporosis

Osteoporosis or brittle bone disease is a condition that is more likely to happen in women than in men, especially those who have given birth to more than two children. Advanced forms of this condition can cause disability, disfigurement, and increase risks of falls leading to fractures. Most women are aware that calcium is needed for bone health, but calcium alone is not enough to maintain the structural integrity of the skeletal system. The body needs other minerals like magnesium to utilize calcium properly; otherwise, the calcium deposits get stored in other tissues and organs, causing conditions like coronary artery disease or kidney disease. Exciting new research in the field of omega-3 fats shows that DHA and EPA can protect the bones and correct the body's tendency to store calcium in the wrong organs.

Researchers from the University of Pretoria, South Africa set up an experimental study where 65 women with a low-calcium diet (average age of 79 years) were randomly assigned to take a combination of omega-3 fat EPA and omega-6 fat GLA, or placebo capsules made of coconut oil. All participants also took one 600mg calcium carbonate supplement per day. Their bone mineral density (BMD) and markers of bone degeneration were measured during the start of the study, and during the sixth, twelfth, and eighteenth month. While the markers of bone degeneration decreased, the groups showed differences in bone mineral density. After eighteen months, patients in the omega group had a 3.1% increase in their spine density. Patients from the placebo group were made to switch to the omega group, and their spine density increased by 2.3%.

The study concluded with the discovery that supplementing your meals with evening primrose oil (the richest source of GLA) can improve your body's ability to absorb calcium and improve the bone's calcium content, while omega-3 fat EPA can increase the blood levels of calcium and correct calcium deficiencies. Prevention is always better than the cure, and these findings are good news for men and women at risk for osteoporosis and other skeletal conditions.

CHAPTER-19

Rheumatoid arthritis

Rheumatoid arthritis is an autoimmune condition where the body's immune system attacks its own joints, causing stiff and swollen joints. Although joint swelling and pain can be treated by aspirin and non-steroidal anti-inflammatory drugs (NSAIDS), studies show that long-term use of these medications can cause serious side effects on the stomach and digestive tract. These findings prompted researchers to find a safer way to reduce the effects of arthritis, and they soon discovered the benefits of omega-3 fats.

Although rheumatoid arthritis can happen to people all over the world, it was observed that the Japanese people (who consume at least 2 fish meals a week) have a 43% reduced risk of developing this condition than North Americans (who consume less than one serving of fish a week). Omega-3 fat EPA has the ability to inhibit the action of pro-inflammatory omega-6 fats, thus decreasing the production substances that contribute to joint swelling. All published studies on omega-3 supplements with DHA and EPA showed significant benefits when they were combined with standard medications. It was also noted that the symptoms returned when fish oil supplementation was stopped. Together with dietary changes and a healthy dose of GLA from evening primrose oil, omega-3 fatty acids provide an opportunity for arthritis patients to gain control over their disease.

CHAPTER-20

ALZHEIMER'S DISEASE AND PARKINSONS DISEASE

It's always good news to know that we're living longer. The bad news is that the longer we live, the higher our chances of developing degenerative disorders of the nervous system like Alzheimer's disease and Parkinson's disease. But there's more good news – mounting research shows that omega-3 fats DHA and EPA can slow down the progression of these conditions, allowing us to live healthier, fuller, and longer lives.

Alzheimer's disease

Alzheimer's disease is the most common type of dementia that results in loss of mental function and memory. It develops in stages, and people suffering from Alzheimer's disease experience gradual loss of judgment, memory, language skills, as well as personality changes and the inability to learn new tasks. During its most advanced stages, people with Alzheimer's lose all mental abilities and memory. These effects happen because Alzheimer's essentially kills the brain cells. In a normal healthy brain, billions of neurons generate and transmit neurotransmitters to other neurons in order to help a person think, feel, and remember. In people suffering from Alzheimer's, neurons start to die off in certain brain regions, slowing down the production of neurotransmitters. This makes the signaling problematic and manifests itself in the symptoms of the condition.

Although there is no cure for Alzheimer's once it sets in, its progression can be delayed by increased intake of omega-3 fatty acids. Dutch researchers looked at the EPA/DHA consumption and the cognitive functioning of elderly men between the ages of 70 – 89. Cognitive function was measured using the Mini-Mental State Exam, where the maximum score is 30 and higher scores indicate better cognitive performance (including attention, language, visual construction, recall, and orientation to time and place). The participants were observed for five years, and those who consumed up to 20g of fish a day had a lower 5-year decline compared to those who ate fewer fish. The lesser progression was also associated with higher daily intakes of DHA/EPA.

Parkinson's disease

Like Alzheimer's disease, Parkinson's disease is a degenerative disorder that causes brain cell death. The difference is that it seems to target nerve cells and dopamine-producing neurons. This slowly kills the production of the neurotransmitter dopamine, which is responsible for movement and impulse control. The hallmark symptoms of Parkinson's

CHAPTER-20

disease are poor motor control, hand tremors, and rigidity in the face. The disease affects both men and women older than 60 and symptoms tend to get worse with time.

A new study from the Université Laval shows that omega-3 fatty acids can prevent the disease and possibly slow down its progress. While this effect was only observed on mice, it seems to have promising human applications. Mice who received a DHA-rich diet seemed immune to a toxic compound called MPTP, which causes the same amount of brain damage as Parkinson's. This compound has been used for over 20 years in Parkinson's research and works faster than the disease itself. A control group of mice who consumed an ordinary diet developed the hallmark symptoms of Parkinson's when they were injected with the toxin, including a 50% drop in dopamine levels.

This study not only demonstrates the brain's natural inclination for omega-3 fats, it also suggests that DHA provides the protective effect against Parkinson's. It was also observed that a brain with more omega-6 fats than omega-3 fats provides a more fertile ground for the disorder.

CHAPTER-21**OTHER POTENTIAL BENEFITS OF OMEGA-3**

Several other studies suggest that omega-3 fatty acids can slow down the development of certain health problems, chronic conditions, and cancers. Although there is a lot of potential for omega-3 to function as an alternative treatment and preventative measure, more scientific studies need to confirm its efficacy.

Weight loss

Research from the University of Navarra, Iceland and the University College Cork suggests that omega-3 can aid in weight loss by curbing appetite. A restrictive diet was imposed on 200 overweight and obese participants, who were divided into two groups: those who received a low-dose omega-3 supplement (260mg/day) and a high-dose omega-3 supplement (1,300mg/day). Two weeks later, those in the high-dose group reported higher satiety.

Eating disorders

Preliminary studies indicate that women who have anorexia nervosa and other eating disorders have lower levels of polyunsaturated fats, including GLA and ALA. To prevent depression and other complications caused by omega-3 deficiencies, some doctors recommend including omega-3 supplements and deep sea fatty fish in treatment programs for eating disorders.

Burns

Animal studies show that omega-3 fats regulate the balance of proteins in the body, which is critical to recovering from burns. Further research is needed to determine to which extent omega-3 fats can reduce inflammation and facilitate healing in human burn victims.

Skin disorders

Photo dermatitis is a rare skin condition that makes a person highly reactive to sunlight. Although sunscreen is still the best solution to protect skin from the damage of UV rays, a small clinical trial on photo dermatitis patients showed increased insensitivity to UV rays after supplementing with omega-3 fats. Another small trial on 40 psoriasis patients showed that those who received EPA along with their medication recovered faster than

CHAPTER-21

those who took medications alone. Many doctors also believe that ALA can reduce acne formation.

Inflammatory bowel disease

When taken with sulfasalazine, a medication that relieves inflammatory bowel disease (IBD), fish oil can reduce ulcerative colitis and Crohn's disease – two common IBD. Animal research also shows that ALA is more effective at reducing the symptoms of IBD than DHA and EPA. Among IBD patients, fish oil was also found to cause side effects that are similar to symptoms like bloating, diarrhea, and flatulence.

Asthma

Early trials show that ALA can improve lung function and reduce inflammation among adults with asthma. A small clinical study that looked at 29 asthmatic children discovered reduced asthma symptoms after ten months of supplementing with EPA/DHA fish oils.

Menstrual pain

A large clinical study of 200 Danish women has shown that those who consume more omega-3 fats have reduced dysmenorrhea or menstrual pain. Additional research is needed to confirm these findings.

Diabetes

As mentioned in the previous chapters, research on omega-3 supplementation among patients show that it actually increases blood sugar levels and the onset of diabetes. However, most studies on this subject are poorly designed. Diabetic patients can benefit from omega-3 fats because it lowers two markers of the disorder – apoproteins and triglycerides. While diabetics can derive this benefit from DHA and EPA, ALA may not provide the same effects because diabetes can make the conversion process less efficient.

Colon cancer

Consuming foods rich in omega-3 fats seem to slow down the progression of colorectal cancer. Eskimo studies show that those who eat large amounts of omega-3 rich fish have a lower rate of developing the condition. Studies on animals also show that omega-6 fats encourage the growth of colon tumors, while daily supplements of EPA and DHA slows down or reverses the cancer's progress. However, studies on rats who have metastatic

CHAPTER-21

colon cancer (colon cancer that spread to other organs like the liver) show that DHA and EPA actually promote the growth of cancer cells.

Breast cancer

Doctors are divided on omega-3's effect on breast cancer, but some studies show that women who eat at least two servings of fatty fish a week are less likely to develop breast cancer or cysts. Additionally, the risk of breast cancer-related death seems to be reduced among women who eat large quantities of seaweed (a plant source of omega-3s) and fish. While further research is required to understand omega-3's effects on breast cancer, some experts speculate that taking vitamin C, vitamin E, and coenzyme Q10 together with omega-3 has value in the prevention and treatment of the disease.

Prostate cancer

Like in breast cancer and colorectal cancer, the ratio of omega-3 to omega-6 fatty acids plays a role in slowing down the progression of prostate cancer. Animal studies show that EPA and DHA prevent the growth of prostate tumors. However, ALA seems to be of little help; a small study on 67 men with prostate cancer discovered that they had elevated ALA levels compared to those without prostate cancer.

Prevention of transplant rejection (heart and kidney)

Omega-3's ability to prevent heart and kidney transplant rejection is still a highly contested subject. Most studies report improved kidney function and lower blood pressure among transplant patients who take fish oil supplements. However, recent trials show little or no benefit in kidney function and no significant change in the rates of graft survival or rejection.

Nephrotic syndrome

Nephrotic syndrome is the result of various disorders that affect the kidney, causing abnormal levels of protein in urine. Some studies suggest that DHA and EPA can improve kidney function, but more research is needed to confirm these conclusions.

Stroke prevention

Several epidemiologic studies looked at the benefits of omega-3 fats on stroke patients with conflicting results. Some studies show improvements, while very large amounts of omega-3s were found to increase the risk of hemorrhagic stroke.

CHAPTER-22**BENEFITS OF AN EPA-ONLY
SUPPLEMENT**

Clinical trials on omega-3 fatty acid supplementation use a combination of EPA and DHA to evaluate its effects on various health problems. Fish have both EPA and DHA stored in their fat, and most omega-3 supplements usually have a varying ratio of both. Although DHA is the omega-3 fat responsible for the structure of the brain and retina, the medical and scientific community believes that EPA provides more benefits than DHA. If you recall from the previous chapters, EPA is responsible for the production of prostaglandins, which reduces inflammation, lowers LDL cholesterol levels, and prevents blood clotting. Current studies show that the most effective supplements are those with a higher EPA to DHA ratio, especially among patients experiencing depressive symptoms and ADHD. Some experts in the field observed that too much DHA might actually inhibit the anti-inflammatory actions of EPA.

More and more manufacturers are taking these findings into consideration and increasing the ratio of EPA to DHA, but some companies like Igennus have decided to remove DHA completely, for various reasons. First of all, the body naturally converts to EPA and DHA when needed, which means there is no need to take DHA in supplement form. DHA also has a higher rate of oxidation than EPA; once it starts to spoil, it contaminates the EPA within the capsule. On the other hand, an EPA-only capsule can deal with arthritis, mood disorders, and cardiac disease more effectively than DHA. The benefits of pure EPA can be enjoyed in the product Vegepa, which contains a healthy mix of EPA and the omega-6 fat GLA from evening primrose oil. Studies show that a combination of EPA and GLA is extremely effective for arthritis.

The EPA in Vegepa is obtained from marine anchovies, which has a lower concentration of ocean pollutants due to its shorter lifespan and its habitat in the clean waters of the South Pacific. The fats from anchovies are molecularly distilled in a vacuum to remove contaminants and to extract the DHA carefully. Everything that is extracted is discarded as a waste product, and the EPA is left undamaged due to the oxygen-free distillation process and the low temperature. Vegepa's GLA content is obtained from evening primrose seeds, which are cold-pressed, unprocessed, and unrefined. This is done to preserve its triterpene content – a hormone-like substance that supports immune functions and enhances the effects of EPA. Each Vegepa capsule contains 280mg ultra-pure EPA, 100mg GLA, and 1mg vitamin E as a natural anti-oxidant and preservative.

CHAPTER-22

While an EPA-only supplement provides more advantages for health problems related to inflammation, it does not mean that DHA is no less important for other conditions. For instance, the importance of DHA to a baby's developing nervous system cannot be over-emphasized. DHA can also provide some benefits to joint and cardiovascular health, but studies show that EPA alone can deal with the symptoms more effectively and efficiently. In other words, the effectiveness of EPA or DHA depends on the health problem, consider your reasons for taking omega-3 supplements before you actually choose which ones to buy. For optimal nervous system functions, heart diseases, and inflammation-related problems, consider a supplement like Vegepa to optimize EPA's role in the body and brain.

CHAPTER-23**OMEGA-3 FOR VEGETARIANS**

There are many advantages to going on a vegetarian diet – you consume far less LDL cholesterol, saturated fats, and total fats than meat eaters do. While green leafy vegetables and nuts contain the parent omega-3 fat ALA, the conversion of this fat into DHA and EPA depends on the enzyme delta-6-desaturase. The normal conversion process is typically slow and does not yield equal amounts of EPA and DHA. In fact, experts estimate that even in the healthiest bodies, less than 8% of ALA is converted to EPA, and only .02-4% of ALA gets converted to DHA. If this enzyme is impaired in any way, you won't be able to get enough DHA and EPA from ALA for normal nervous system functions. Delta-6 desaturase functions can be affected by smoking, viral infections, diabetes, alcohol, stress (through the production of the stress hormone cortisol), and age.

Since it is difficult to include EPA and DHA in all-vegetable meals, vegetarians and vegans may be in danger of omega-3 deficiencies. But there's good news – current research into alternative omega-3 sources discovered that seed of the echium plantagineum plant has an omega-3 fat that can be converted more easily than ALA. This fat is called stearidonic acid (SDA). Unlike ALA, SDA can bypass the delta-6 desaturase enzyme and can be easily metabolized into EPA. SDA is also a closer relative to EPA than ALA, which means the conversion process is shorter and yields five times more EPA than ALA and other vegetarian sources of omega-3 fats. Aside from that, SDA has anti-inflammatory properties, just like EPA. The echium seed is also a fertile source of the omega-6 fat GLA and the omega-9 oleic acid, which is normally found in olive oil and has important cardio-protective properties. Studies show that SDA and GLA combined is more effective at increasing the body's EPA levels than just SDA alone.

One of the most promising studies on the effects of echium oil was done by the Harvard Center of Botanical Lipids. Mice with slightly higher triglyceride levels were given diets supplemented with echium oil, fish oil, and a placebo (palm oil). They found that the echium and fish oils were the most effective at producing the following effects:

- Reducing triglyceride levels in the liver and blood
- Enrich EPA levels in the liver and plasma
- Decreased the expression of the genes that synthesize triglycerides in the liver

As you can see, echium oil is just as effective as EPA in lowering cholesterol levels and

CHAPTER-23

reducing the risk of heart disease, making it an excellent vegetarian alternative to fish oil supplements.

The use of echium seed oil as an omega-3 source is fairly new, and only a few companies have the technology and experience to extract SDA and GLA. Echiomega from Igennus is one of the best sources of pure echium seed oil and the ideal nutritional supplements for vegetarians, vegans, or those allergic to fish. Echiomega contains 213mg SDA, 144mg GLA, and 86mg oleic acid in a gluten-free and dairy-free capsule to help increase your omega-3 consumption while avoiding fish sources.

ADDENDUM: A COMPREHENSIVE LIST OF OMEGA-3 BENEFIT

1.	Acne	19.	Eczema	36.	Osteoporosis
2.	ADHD	19.	Eczema	37.	Panic attack
3.	Alzeihmer	20.	Emphysema	38.	Parkinson
4.	Arrhythmias	21.	Glaucoma	39.	Photo dermatitis
5.	Arthritis	22.	Heart disease	40.	Post-partum depression
6.	Asthma	23.	High blood pressure	41.	Pre-eclampsia
7.	Autism	24.	High cholesterol	42.	Preterm labor
8.	Bipolar disorder	25.	Joint health	43.	Prostate cancer
9.	Blood-thinning	26.	Inflammatory bowel disease	44.	Psoriasis
10.	Brain function	27.	Learning disorders	45.	Rheumatoid arthritis
11.	Breast cancer	28.	Lower cholesterol	46.	Schizophrenia
12.	Burns	29.	Lupus	47.	Skin disorders
13.	Colon cancer	30.	Lyme disease	48.	Stroke prevention
14.	Depression	31.	Macular degeneration	49.	Ulcerative colitis
15.	Diabetes	32.	Menstrual pain	50.	Ulcers
16.	Dyspraxia	33.	Migraines	51.	Visual acuity
17.	Easier childbirth	34.	Multiple sclerosis	52.	Weight loss
18.	Eating disorders	35.	Nephrotic syndrome		

ABOUT DR YANNICK PAULI



Dr. Yannick Pauli is a holistic chiropractor who has advanced training in functional neurology, nutrition and functional medicine. He also has advanced education in chiropractic paediatrics.

He is the Director of the Centre Wellness NeuroFit in Lausanne, Switzerland. Dr. Pauli offers an integrative approach to health and specializes in taking care of individuals suffering from chronic, lifestyle related conditions.

It is in this clinic that he runs Brain Potential, a holistic brain-based stimulation program that integrates various natural therapies to help children suffering from ADHD, dyslexia and other learning disorders, as well as other developmental disorders such as autism.

Dr. Pauli has served as an expert on chiropractic, as well as alternative and complementary medicine at the World Health Organization.

He has also been the recipient of the “Chiropractor of the Year” 2004 by the World Chiropractic Alliance.

Dr. Pauli has published research on the effects of chiropractic on children suffering from dyslexia, as well as the effect of Network Spinal Analysis (a low-force approach to chiropractic) on the ability of adults with ADHD to concentrate.

He is also the founder and current president of the Swiss Chiropractic Pediatric Association.

He has created and runs www.unritalinsolution.com, an information website that serves as the go-to source for everything related to the natural management of ADHD and related disorders.

Dr. Pauli is married with Cecilia and has two children: Noah and Megan.

THE SUPPLEMENTS WE USE

After having reviewed and clinically tested many brands of omega 3 fish oil supplements, it turned out that 2 supplements made by an English company met all the criteria of safety, efficacy and EPA/DHA ratio that I was looking for. Those are the two products I prescribe to my patients.

VEGEPA



I use Vegepa because it has a unique ratio of ultra-pure EPA from marine fish oil and GLA from organic virgin evening primrose oil (EPO). It has some vitamin E to protect the essential fatty acids. The EPO also contains botanical triterpenes. The product is molecularly distilled and is certified gluten-free, dairy-free and yeast-free.

ECHIOMEGA



This one is for vegetarian. It comes from the plant echium plantagineum. It contains stearidonic acid, an omega 3 that readily transforms into EPA. It also contains some GLA.

YOUR 10% DISCOUNT COUPON*

If you are interested in purchasing the products above – or any other products from the company Igennus – use the following discount coupon every time you order to get a 10% discount.

Receive a 10% discount on your purchase of Vegepa
(or any other product from Igennus)
by using the following Promotional Code *:

F4E73LII

Two options to order:

1. Order online at www.vegepa.com and enter the coupon code.
2. Call +44 845 1300 424 (UK) and mention the coupon code.

Print this coupon and keep it in a safe place.
Use it each time you order!

I recommend you order at least three months worth
of fish oil supplements at a time

*Disclaimer:

This is an affiliate offer. In plain English, it means that I receive a commission on your purchase when you use the coupon code provided. The benefit for you is that you get a 10% discount on your purchase. Vegepa is a great product, so I think it is a win-win-win situation for everyone. However, if you have an ethical issue with affiliate offer, you can still order Vegepa without using the coupon code.