

The Role of Essential Fatty Acids (EFAs) In Health and Disease.

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ADHD Defined

Introduction: Today herbs and other dietary supplements fill the shelves in many pharmacies and supermarkets. Organized medicine has been slow to recommend these items because of a paucity of double-blind, placebo-controlled studies. Physicians are also concerned about side effects, and potential interactions when these are given with other prescription drugs.

Recently, supplementation with fish oil, which contains omega-3 polyunsaturated fatty acids, has been publicized as having beneficial effects on overall health, on depression, on memory, to prevent high blood pressure, and other mental disorders, to reduce the risk of diabetes, obesity, premature labor, various inflammatory diseases and cancer.

There are clinical reports that EFAs are of benefit to people, who suffer from Raynaud's phenomeon, Psoriasis, Lupus, Crohn's Disease, Migraine, Gout, Allergies, Multiple Sclerosis, Asthma, Chronic Fatigue Syndrome, Osteoporosis, Kidney Stones, Diabetic Neuropathy, and Gout. They are also reported to be essential for ovulation and to prevent premenstrual disorder. What are Essential Fatty Acids?

EFAs fall into one of two categories: omega 3 or omega 6 fatty acids. The most common are **linoleic acid** (omega-6) **linolenic acid** (omega-3) and the omega-3 fatty acids **eicosapentaenoic acid** (EPA) and **docosahexaenoic acid** (DHA).

According to theory, in prehistoric times, our diets were rich in omega 6 and omega 3 fatty acids in the ratio of 4:1 to 1:1. Today the ratio has changed to be closer to 25:1. As a result of our consumption of vegetable-based oils

containing large amounts of omega-6 and a low intake of cold-water fish, we have developed a deficiency of omega-3's in our modern diet. Because humans cannot synthesize certain essential fatty acids, notably omega-3 fatty acids, these must come from the diet. While newborns may be able to convert linolenic acid to the essential omega 3's, EPA and DHA, adults are unable to make that conversion. Vegetarians, likewise, can have a deficiency of omega 3's because of a lack of fish or meat in their diet. Omega 3 fatty acids are contained in breast milk but not found in infant formula.

The ideal ratio of omega-3 to 6 is 1:1. This helps promote a healthy balance of hormone-like substances called eicosanoids, which include prostaglandins, leukotrienes, and thromboxenes, all of which play important roles in inflammation and in balancing mood.

There are 3 main types of omega-6 fatty acids **linoleic acid**, **arachidonic acid** and **gamma linolenic acid** (GLA). The body normally converts linoleic acid into GLA, but a number of factors may hinder that conversion. Supplementation with other sources is a good idea. The main sources for GLA, are evening primrose oil, borage oil and black currant oil. The intake should be in the range of 3000-4000 mg.

Since our bodies cannot manufacture either omega 3 or omega 6 fatty acids, a great deal of interest has been sparked in the development of new products, such as eggs and chickens which are high in omega-3 fatty acids. The source of these items are chickens fed an algae-based or flax seed diet, not unlike what ocean fish consume. Some companies have plans to market yogurt and other dairy products from cattle fed an algae-rich diet

How do omega-3 fatty acids work in the body and what do they do?

We start off with the interesting fact that over 60% of the dry weight of the brain is composed of lipids whose role in the central nervous system is structural (e.g., neuronal membranes) or functional (e.g., membrane-bound receptors).

Essential fatty acid metabolism can influence many aspects of brain development, including neuronal migration, axonal and dendritic growth, and the creation, remodeling, and pruning of synaptic connections.

All animal cells are enclosed in a cell membrane, which serves as the "skin" for the cell. There are receptors built into the cell membrane

that function as a “lock” into which the neurotransmitter “key” fits, causing the cell to respond in a certain fashion. Antidepressants partially work by affecting the neurotransmitters and/or the receptors.

When the cell membrane is composed of the good, long, springy, fatty acids, such as the omega-3s, the cell membrane is flexible, like a balloon’s skin. The receptors are free to function smoothly. When the cell membrane is composed of short, straight, fatty acids, it is stiff, like a piece of sheet metal. Receptors work less efficiently, and the passage of important substances and electrical impulses through the cell wall may be impaired.

Adequate amounts of omega-3s, obtained from the diet or from fish oil capsules, cause a “general dampening” of post-synaptic signal transduction in the brain. (Reducing the speed of electrical transmission between brain cells.) Dr. Andrew Stoll of Harvard Medical School and author of the Omega 3 Connection added that there are also many other proposed theories on why omega-3s stabilize moods.

What is the data that supports the supplementation of essential fatty acids?

The Inuit Eskimos’ diets contain an enormous amount of fat derived from fish. They seldom suffer heart attacks or rheumatoid arthritis. This is presumably because the whales, seals and fish that they eat are high in Omega-3 fatty acids.

Epidemiological data suggest that populations that consume large amounts of fish, such as the Japanese, appear to have relatively low rates of major depression. In a study of 3403 men and women in Finland, depression was inversely correlated with the amount of fish consumption. There was a 31% increase in the odds of having mild to severe depressive symptoms among infrequent (less than once a week) fish consumers compared with frequent (at least once a week) users.

In addition, rates of depression are high and increasing in parts of the world (e.g., United States and Western Europe) where changes in agriculture and food technology have shifted diets away from omega-3 fatty acids toward the omega-6 fatty acids (from commercial and processed vegetable oils. One theory proposes that impaired fatty acid and phospholipid metabolism underlie both depression and other coexisting medical problems, like heart disease and various types of cancer.

The best clinical trial of omega-3 fatty acids for treatment of affective disorder involved adult outpatients with bipolar disorder. These patients, in addition to their ongoing usual treatment, received either a supplement of omega-3 fatty acids or an olive oil placebo. The source of the omega-3 fatty acids for this placebo-controlled, double-blind trial was menhaden fish body oil concentrate. Nine (64.3%) of the 14 patients treated with omega-3 fatty acids responded to treatment, compared with 3 (18.8%) of the 16 placebo-treated subjects ($P = .02$).

Since that study was completed, the same authors also reported treating another 22 bipolar patients with open-label flaxseed oil, which is also an omega-3 fatty acid source. Eighteen of the 22 bipolar patients treated with the flaxseed oil appeared to benefit, with many patients reporting a distinct mood-elevating effect.

The omega-3 fatty acids include EPA (**eicosapentaenoic acid**) and DHA (**docosahexaenoic acid**, not to be confused with DHEA, an entirely different substance.) Changes in diet in this part of the world, have led to declining intake of EPA and DHA. “There is some evidence, that cardiovascular disease has increased in this century because of a deficiency of omega-3s,” according to Dr. Stoll. Rising rates of major depression “in each decade of this century, with the age of onset going down,” may also be attributable, at least in part, to “this loss of omega-3s,” he speculated.

There is some evidence for essential fatty acids also having health promoting effects on mood, memory, vision, joint and hormonal function and possible positive effects on triglyceride levels in the heart and blood vessels. In a study published in the May 1999 issue of Archives of General Psychiatry, patients with bipolar disorder who took omega-3 fatty acid supplements in addition to their usual treatment, “had a significantly longer period of remission” than patients on usual treatment plus an inactive placebo.

In Dr. Stoll’s double-blind study, 30 bipolar patients were assigned to groups that randomly received either placebo or 9.6 grams per day of omega-3 fatty acids in the form of fish oil capsules. All of the patients had been manic or hypomanic in the preceding 12 months, and about 40 percent had rapid-cycling symptoms. Existing treatments (mostly mood stabilizers such as lithium or Depakote) were continued. Stoll then added to their regimen 7 capsules of EFAs two times per day or 6.2 gms. of EPA and 3.4 gms. of DHA/ day.

Although the trial was originally planned to last nine months, it was stopped

after only four, when it became apparent that patients taking the omega-3s were doing much better on nearly every outcome measure than the patients taking placebo. Differences in rates of relapse were particularly striking. Although Dr. Stoll acknowledged more study is needed (and further studies are already in progress), he believes omega-3 supplementation should be considered for any bipolar patient not responding fully to other treatments.

One extremely depressed, treatment-resistant patient, (January, 2002 Archives of General Psychiatry) responded dramatically to 4 gms. of 95% pure EPA. His symptoms completely abated in 9 months.

Omega-3 EPA ratios and depression

Recently, there were some reports that major depression may be accompanied by alterations in serum total cholesterol, cholesterol ester and omega 3 essential fatty acid levels and by an increased arachidonic acid/eicosapentaenoic (EPA) ratio. The present study aimed to examine fatty acid composition of serum cholesterol esters and phospholipids in 36 major depressed 14 minor depressed and 24 normal subjects. Major depressed subjects had significantly higher arachidonic omega-6 to EPA omega 3 ratio in both serum cholesterol esters and phospholipids and a significantly increased omega 6/omega 3 ratio in cholesterol ester fraction than healthy volunteers and minor depressed subjects.

Major depressed subjects had significantly lower omega 3 in cholesterol esters than normal controls. Major depressed subjects showed significantly lower total omega 3 polyunsaturated fatty acids in cholesterol esters and significantly lower omega 3 in serum cholesterol esters and phospholipids than minor depressed subjects and healthy controls. These findings suggest an abnormal intake or metabolism of essential fatty acids in conjunction with decreased formation of cholesterol esters in major depression.

What Additional Evidence is there for EFAs Effectiveness?

Joseph Hibbeln, M.D., of the National Institute of Health found a strong correlation between fish consumption worldwide and lower annual prevalence of major depression. His findings were published in the British medical journal, Lancet.

Some experts now believe that EFAs are a very important component for mood stabilization. Omega-3 supplementation is safe, said Dr. Stoll, with only a slight theoretical chance of increased bleeding if used in high

doses in conjunction with anticoagulants. But patients with diabetes must consult their physicians before taking the supplements. “These are the only fats that do not cause weight gain,” Dr. Stoll added. “The omega-3 story doesn’t end with bipolar disorder,” he said, citing studies suggesting benefits in schizophrenia, ADD, and major depression.”

Finnish researcher Antti Tanskanen M.D. published in the Archives of General Psychiatry the results of a questionnaire to a random sample of 3000 residents of Kuopio, Finland. Of the 59% that responded those that ate fish two or more times a week “appeared to suffer significantly less from depression and suicidal tendencies than those eating less or no fish.”

In the American Journal of Psychiatry March, 2002, Nemets et. al. report on the addition of Omega 3 (EPA) to Maintenance Medication Treatment for Recurrent Unipolar Depressive Disorder. The conclusion of the study was that a significant effect was found from “week 2 of treatment (with EPA.)” “EPA had an effect on core depressive symptoms such as depressed mood, guilt feelings, and worthlessness as well as insomnia.”

Attention-deficit hyperactivity disorder (ADHD) has also been associated with a deficiency in essential fatty acids. In 1981, Colquhoun and Bunday proposed that hypothesis based on a survey of hyperactive children. These children showed clinical signs consistent with a deficiency of essential fatty acids: excessive thirst, frequent urination, dry skin, and dry hair.

Biochemical studies of blood subsequently provided supporting evidence for the hypothesis. Deficiencies of certain fatty acids in the plasma were found in 44 children with ADHD compared with age- and sex-matched controls. More recently, a randomized, double-blind treatment trial in ADHD children with clinical signs of fatty acid deficiency showed that supplementation changed the blood profile of fatty acids in the blood and was associated with reductions in ADHD symptoms.

What Other Conditions Do EFAs Affect?

The brain is made up of 60 percent fat, and it needs omega-3s to function properly. In the last century, however, Americans have drastically reduced their intake of these oils, as diets changed and were based more on processed foods. This deficit, scientists agree, has contributed to an epidemic of heart disease. Now a spate of cross-national studies has also linked low fish consumption to high rates of major depression, bipolar disorder, postpartum depression,

and suicidal tendencies. “Heart disease and depression often go hand in hand,” says Dr. Joseph Hibbeln, the National Institute of Health psychiatrist, who conducted a number of these surveys. “Now we may know why.”

It is impossible to reduce the cause for different illnesses to a single explanation—especially since omega-3s may function differently in each of these conditions. For major depression, omega-3s appear to work in part by making it easier for the receptors on brain cells to process mood-related signals from neighboring neurons. “Think of the receptor as a doorbell on a house,” says Dr. Lauren Marangell of Baylor College of Medicine.

Omega-3s provide the lubrication that frees up a stuck doorbell and allows it to respond to a messenger’s touch. The same fats may combat bipolar disorder (which involves mania as well as depression) by inhibiting a process called signal transduction, which occurs inside a brain cell after a messenger has “rung the bell.” In a normal brain, the process is orderly. But in a bipolar patient, it’s as if everyone in a house started running in different directions at the sound of the buzzer—and not necessarily answering the door. Omega-3s—like all the major medications used to treat bipolar disorder—help quiet this pandemonium.

If a woman is low in omega-3s to begin with, this depletion may set the stage for postpartum depression. While omega-3s are important for everyone, an adequate supply is especially critical for infants and mothers. Gestating and newborn babies often deplete their mothers of these fats in order to nourish their own brains. If a woman is low on omega-3s to begin with, this depletion may set the stage for postpartum depression.

A fetus takes in large amounts of these fats during the third trimester of gestation, and breast milk maintains a steady supply following birth. Infant formulas, by contrast, deliver very little. (The World Health Organization recommends supplementing formulas with omega-3s, but the U.S. Food and Drug Administration has not yet approved such supplementation. The matter is currently under review.)

No one doubts that omega-3 fatty acids help build and maintain brain tissue. But can the same fats help treat psychiatric disorders? Researchers have not conducted the large clinical trials needed to answer that question, but the early evidence is encouraging

British doctors have also gotten impressive results in trials for depression

and schizophrenia. Other researchers, however, have found negative or neutral results in pilot studies, so it's not yet possible to establish fish oil as an effective therapy.

“The field is still in its infancy,” cautions Hibbeln. “What we have now are provocative hypotheses, not a lot of hard data.” Fortunately, because omega-3s are a normal part of the diet, they have caused virtually no side effects in the trials. “Omega-3s just give back to the body what it requires for proper functioning,” says Stoll.

Preliminary evidence also exists for a potential benefit of omega-3 fatty acids in the treatment of schizophrenia. Peet and colleagues reported that a dietary analysis of 20 patients with schizophrenia yielded significant relationships between the status of dietary omega-3 fatty acids and the severity of both schizophrenia symptoms and tardive dyskinesia.

A higher consumption of omega-3 fatty acids correlated with less severe symptomatology. In addition, a case has been reported in which a patient with schizophrenia was successfully treated with omega-3 fatty acid supplementation alone. There was a dramatic and sustained improvement in both the positive and negative symptoms. A recent review of the topic, however, concluded that while substantial evidence does exist supporting a potential role of omega-3 fatty acids in schizophrenia, treatment data are lacking.

The latest study of omega-3 given to chronic, poorly functioning schizophrenic patients in a carefully controlled double-blind trial, revealed that “EFAs had no greater efficacy than placebo for patients with schizophrenia.” The author, Wayne Fenton MD, Deputy Director for Clinical Affairs at the NIMH Division of Mental Disorders, stated that younger patients or those with less severe symptoms might respond more positively to omega-3 supplementation. The doses, given were 3 gms. daily of the EPA only and did not include any DHA. Whether higher doses or a combination of the two EFAs in a 7:1 ratio might have resulted in a different outcome will have to await another study.

What Does the American Heart Association Say About Boosting Our Omega-3 Intake?

The American Heart Association has recently changed its dietary guidelines to recommend that adults eat at least two servings of fish each week. Oily fish such as anchovies, mackerel, and salmon have the most omega-3s. It was the first time this group departed from a general

guideline to recommend a specific food.

(The FDA, however, recently warned pregnant women against eating certain types of fish with high mercury levels; e.g. shark, swordfish, and king mackerel.)

Flaxseed, flaxseed oil, wheat germ and walnuts are good sources, too, as are dark greens such as spinach and kale. You can also boost your omega-3 levels by switching from corn and soybean oil to canola oil. Some hens are even fed flax and fish meal to boost the levels of omega-3s in their egg yolks. (Look for cartons that mention omega-3 levels.)

The best fish oil formulas, Dr. Stoll said, are made from small fish like anchovies or sardines because they are low on the food chain and do not accumulate toxins. Cod liver oil is not a good alternative, he said, because it contains too much Vitamin A. In addition to fish, wild game, nuts like almonds and walnuts and avocados contain omega-3. Beyond that, says Stoll, your best bet is a supplement. For general health, one to two grams of omega-3s a day should be sufficient. To correct mood problems, two to five grams or more may be required.

For all their promise, omega-3 fatty acids won't replace anti-depressants. Except in mild cases, omega-3s will likely be an adjunct to standard therapy. Stoll calls them "an 'and' rather than an 'or'" "Many factors play a role in modifying depression," says Hibbeln. "People are too complex to be governed by one or two molecules." But look on the bright side. Even if omega-3s don't leave you depression-proof, they'll boost your heart health.

According to a April 2001 New York Times article, research has shown that lack of omega-3 may play a role in a number of modern maladies, including depression, heart arrhythmias, irritable bowel syndrome and rheumatoid arthritis. Cholesterol is composed of saturated, monounsaturated and polyunsaturated molecules. Omega-6 and omega-3, named for their molecular configuration, are polyunsaturates.

In the absence of omega-3s, the body uses saturated fat to make cell membranes. But cell membranes made with that type of fat are less elastic, and the lack of elasticity can affect the heart. Elastic cells help prevent a potentially dangerous arrhythmia by allowing the heart to get back to a complete resting state.

“There’s a strong basis for concluding that there is a beneficial effect on nerve conduction in the heart,” from omega-3s, said Ronald Krauss, chairman of the Nutrition, Physical Activity and Metabolism Council of the heart association. Research also indicates that omega-3s may prevent heart attacks; reduce the body’s inflammatory response, helping prevent athero-sclerosis; and in higher amounts (3-4 gms. per day) reduce blood triglyceride levels. Several studies have reported beneficial effects on patients with coronary artery disease when 850 mgs. to 2.9 gms. per day were given.

A large prevention trial demonstrated that high doses of omega-3 fatty acids reduced average mortality by 20% and the risk of sudden death by 45% in people with pre-existing coronary artery disease. Nearly two-dozen studies have shown that patients with rheumatoid arthritis have less fatigue and joint stiffness and are able to lower their anti-inflammatory drugs, especially if the omega-3 treatment begins early in the progression of the disease.

A study in *The New England Journal of Medicine* showed that more than half of the people with Crohn’s Disease and irritable bowel syndrome remained symptom-free if they took omega-3s with their medication.

In an article published in January in *The Journal of the American Medical Association*, researchers found in a study of 80,000 nurses from 1980 to 1994 that women who ate fish once a week were 22 percent less likely to have strokes than women who ate fish once a month, and eating fish five times a week cut the risk of stroke in half.

Other researchers also stress that many more studies need to be done before any claims can be made about omega-3 and mood disorders. Epidemiological studies and the limited number of double-blind studies are not enough to confirm that a deficiency of omega-3s are related to mental illness, some experts say.

Dr.s Stoll and Lauren Marangell, a professor of psychiatry at Baylor University medical school, conducted a double blind, controlled study of 44 people with bipolar affective disorder, a condition in which the patient swings between manic episodes and deep depression. The results of 10 grams of fish oil a day were so marked in reducing episodes of mania and depression that after four months the control group was also given fish oil. The results were published in *The Archives of General Psychiatry* in 1998. Another large-scale study is under way at the National Institute of Mental Health.

In a 1998 study, Joseph Hibbeln of the National Institute on Alcohol Abuse and Alcoholism found that high levels of DHA, one of the components of omega-3 measured in the person's blood, were predictors of high levels of a marker for serotonin in cerebrospinal fluid. Serotonin is a major neurotransmitter that contributes to a feeling of well-being.

Dr. Hibbeln conducted an epidemiological study of 11 countries and found the incidence of unipolar depression was inversely proportional to the amount of fish consumed. His work was published in *Lancet*.

A study done in 1999 in Finland revealed that the risk of depression and suicidality was lower among lake fish consumers. A study of 265,000 Japanese, who were followed for 17 years, showed a reduced risk of suicide with people who ate fish daily compared with non-daily consumption.

Omega-3 fatty acids may also be helpful in the treatment of dementia. In a prospective, naturalistic study, the dietary habits of 5386 non-demented subjects were assessed at baseline. At follow-up, fish consumption was found to be inversely related to the incidence of dementia. There is also a case report in the literature of a 77-year old patient with Alzheimer's dementia who improved clinically over several months when placed on a regimen of increased fish consumption. Symptom improvement included regaining the ability to dress himself, decreased restless and destructive behavior, improved fine motor skills, and enhanced insight into his condition.

Although it is too soon to recommend supplementation with omega-3 fatty acids for the general public, scientific evidence for a possible dietary deficiency of this essential fatty acid is accumulating. Supplementation with omega-3 fatty acids for individuals with bipolar disorder, particularly those who are not doing well, is worth a try.

One cautionary study reported in the *American Journal of Clinical Nutrition* that dietary supplementation with 9 capsules per day for 12 weeks of eicosapentaenoic acid, (EPA), but not with other long-chain polyunsaturated fatty acids, decreased natural killer cell activity, when given to healthy adults males age 55-75. The researchers found a significant reduction (mean decline: 48%) in Natural Killer cell activity that was fully reversed by 4 wk after supplementation had ceased. (Natural killer cells are essential for protection against invading bacteria and viruses).

Animal studies had previously shown that dietary flaxseed oil [rich in the n-3 polyunsaturated fatty acid alpha-linolenic acid (ALA)], evening primrose oil [rich in the n-6 polyunsaturated fatty acid gamma-linolenic acid (GLA)], and fish oil rich in the long-chain n-3 polyunsaturated fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) can decrease natural killer (NK) cell activity

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From the MSNBC NEWS SERVICES May 31.2001 article: OMEGA-3 fatty acids, plentiful in dark, oily fish, have shown promise in protecting against cancers of the colon, rectum, and ovary. Previous studies have shown fatty fish oils can impede the growth of prostate cancer cells in laboratory dishes and in animals. In another study, prostate cancer was found less frequently in men who had high levels of fatty acids in their blood.

Now, a new study, published this week in *The Lancet* medical journal, Finnish researchers from the Karolinska Institute in Stockholm, Sweden, showed that men who ate no fish during the 30 year period analyzed, were two to three times more likely to get prostate cancer than those who ate fish regularly. Fish high in omega 3 fatty acids are particularly effective, the scientists found. "The message is very simple — eat fish," Professor Alicja Wolk of the institute's Department of Medical Epidemiology said. Dr. Regina G. Ziegler, a nutritional epidemiologist at the National Cancer Institute, was cautious about the Swedish findings. "It's a provocative study," said Ziegler, who was not involved with the research. "But there could be other dietary patterns that go along with eating very little fish that could be at work here. People who seldom or never eat fish tend to substitute their diet with more red meat, Ziegler said, and scientists believe animal fat — butter, cream, beef, pork and processed meats — may encourage prostate cancer. "Is the fish really protective, or is red meat causing the cancer?" Ziegler cautioned.

Also, Swedish men eat a lot of oily fish, so there weren't many in the group who ate very little of it. That means that although the study involved thousands of men, the effect seen was driven by a small number of men with unusual eating habits. With such a small sample, it is difficult to rule out the possibility that it was not the fish itself, but something else about the men who were not big fish eaters, Ziegler said. The survey assessed nearly 6,300 Swedish men between 1967 and 1997. During that period there were 466 diagnoses of prostate cancer of which 340 were fatal.

The link between the fatty fish and a reduced frequency of prostate cancer was even stronger after the results were adjusted to account for the influence of other eating habits, a genetic predisposition to prostate cancer and smoking, drinking and exercise habits, the authors of the study said. "We're only talking

about a moderate intake. This would be about two or maybe three servings a week. That is very manageable,” Wolk said. “What is also important is that the fattier the fish it is, the less you have to eat to get the same benefit.” Sardines have the most omega-3 oil in them, while the concentration in tuna is quite a lot less, Wolk said, adding that it doesn’t matter if the fish is canned.

In a preliminary study at Duke University Medical Center, 3 tbspn. per day of ground flaxseed combined with a low fat diet was found to retard the growth of prostate tumors. After 34 days of treatment the men with prostate tumors had lower cholesterol levels, decreased testosterone levels and an increased death of tumor cells compared to controls. Science News January 2002, reports that omega-3 fatty acids are possibly effective components of therapy for ulcerative colitis and regional ileitis. Experimental induction of colitis in rats was significantly improved by the addition of Omega-3 fatty acids over the control groups that received either Omega-6’s. The full report was published in the January Journal of Nutrition.

How Can I Obtain Adequate Amounts of EFAs in My Diet?

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Fish, especially oily, coldwater fish
Flax seed is questionably converted in the body to the essential fatty acids, EPA and DHA. This has not yet been adequately studied) There are many supplements available for example: Omega-Brite and Nordic Naturals. (Results of testing of several brands of fish and marine oil products can be found on the internet at ConsumerLab.com.) Fish, 3 servings a week of salmon, mackerel, sardines, or scallops will probably suffice. Everyone should eat at least this amount. People with mood disorders or heart disease should supplement with fish oil capsules, which contain DHA and EPA, 1 Gm.= 3 or more capsules per day, eaten with meals. (Eat a piece of citrus fruit if you experience any unpleasant fishy aftertaste.

Flax seed, a possible source of omega-3s. (Also several studies have claimed reduction in tumor size, lower LDL levels (bad cholesterol) and possibly helpful in Lupus and inflammation. Whole flax seeds – cheapest, may be difficult to use. Grind up and add to food. Can be useful for regulating bowel movements and preventing constipation. Flax seed is an excellent source of fiber.

Flax seed-containing breakfast cereals. Flax seed meal – Add 1 Tablespoon per day to food. Must refrigerate. Flax seed oil – Use like salad oil. Add 1 Tablespoon per day to food. Must refrigerate. Flax seed oil capsules – 2-3 three times a day. They do not need refrigeratio

Dietary sources of omega-3s include cod, salmon, haddock, scallops, spinach, multigrain cereal, eggs, walnuts and fish oil capsules. But it is difficult to get

adequate and consistent mood-stabilizing amounts simply by eating fish alone.

However, the omega-3 doses used in Dr. Stoll's study are probably higher than necessary. He advises a dose of 2 to 5 grams per day, best taken with antioxidants (e.g., vitamin E, vitamin C and selenium). Read labels carefully, because the percentage of omega-3s in some brands of fish oil may be as low as 30 percent. Omega-3s in flaxseed oil, Dr. Stoll added, have a shorter chain structure, and it is unclear whether the benefits would be the same. Further research is needed, however, to establish optimal doses of EPA, DHA and alpha linolenic acid

Are there Side Effects from taking EFA Supplements? Some people experience a fishy after-taste; have gas, or an irritated stomach. There is also a possibility that EFAs may affect blood clotting time in persons with bleeding disorders. Omega-3 can affect free-radical formation so supplemental vitamins E and C and the trace mineral, selenium are recommended to help prevent free radical formation. In rare instances the mood disorder, hypomania, has developed. This has occurred primarily with flax seed oil supplementation.

Summary and Conclusions and the Future

The epidemiological studies and research so far indicate that essential fatty acids are necessary for our mental and physical health. Further research may draw other conclusions. But until that is available, it would seem wise to supplement our diets with omega-3 fatty acids, derived from fish oil or if unavailable, ground flaxseed.

David Mischoulon M.D. a psychiatrist at Mass. General Hospital in Boston is planning a double-blind, placebo controlled study this year to determine whether omega-3 fatty acids can truly counter unipolar depression. The experimental subjects will be given omega-3 fatty acids as their sole form of treatment.

Dr. L. James Groll is on the board of directors for ADDReferral, and Stanford University Medical School and was appointed as a Fellow at the Menninger Foundation, where he received psychiatric training. He is the medical director and psychiatric consultant for 1-800-Therapist, and served as the medical director of two psychiatric hospitals.

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