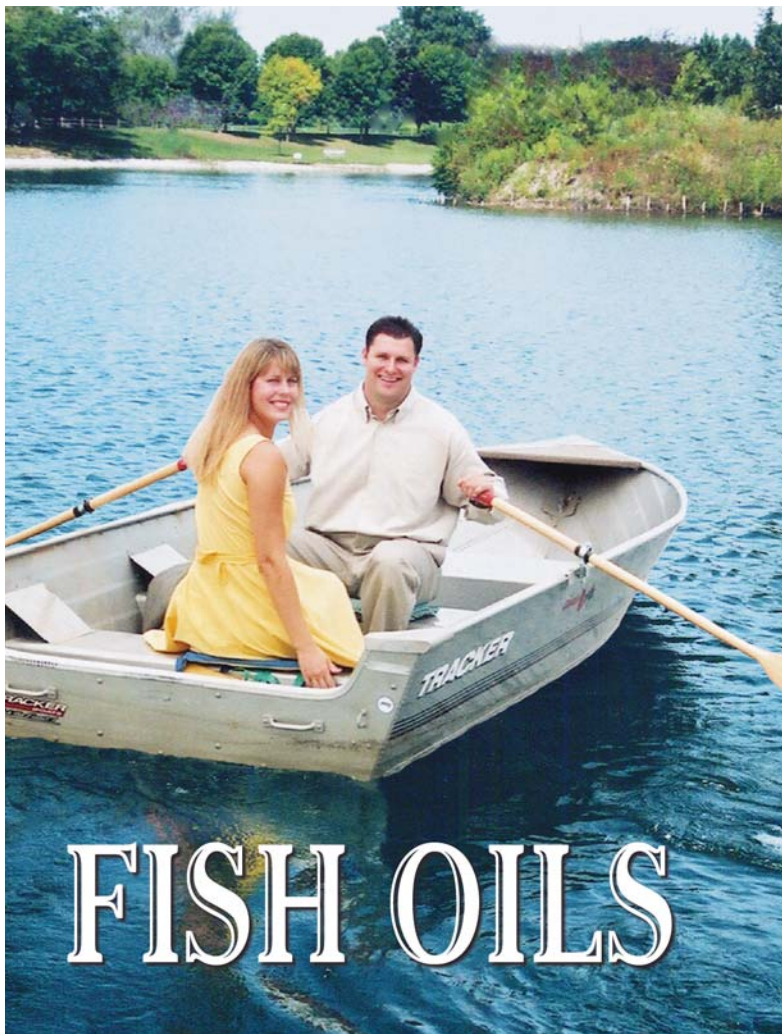


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- Brain & Nerve Function
- Eye & Vision Health
- Immune System Health
- Radiant, Healthy Skin
- Joint Health

More Inside.



By: *John & Susan Carlson*

John and Susan Carlson have been actively researching and working with nutritional supplements since 1965. John is a registered professional engineer while Susan is licensed both as a pharmacist and a nutrition counselor. They are the founders of J.R. Carlson Laboratories, Inc.

HealthGems

News for a Healthy Lifestyle

Fish Oil In The News

This Volume provides additional insights into the healthy benefits of fish oil first presented in Volume 3. For additional information, please request Volume 3: Fish Oil providing EPA & DHA Omega-3 Fatty Acids.

During the past 20 plus years, scientists worldwide have become increasingly interested in the benefits of eating cold water fish because they contain the omega-3 polyunsaturated fatty acids, EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid).

Knowledge of the health benefits of fish oils providing EPA and DHA is growing as more studies are conducted. The original discovery of their ability to lower the risk of coronary heart disease was expanded to their relationships within the eye, brain, joints, skin and nervous system. DHA supplementation has been shown to benefit infant brain development and increase intelligence.

Recent studies are summarized here.

Fish Oil May Be More Effective Than Prescription Medications

Swiss researchers performed a meta-analysis of 97 clinical studies to compare the efficacy of fish oil, statins, fibrates, resins, niacin or diet alone on mortality rates compared to placebo. Significant risk reductions for overall mortality were observed with fish oil (23% risk reduction) and statins (13% risk reduction). For cardiovascular mortality, significant risk reductions were observed with fish oil (32% risk reduction), resins (30% risk reduction) and statins (22% risk reduction). The authors conclude that statins and fish oil offer the most favorable overall benefits by reducing the risk of both cardiac mortality and overall mortality. The greatest risk reduction was observed in the fish oil group.

Studer, Briel, et al. "Effect of Different Antilipidemic Agents and Diets on Mortality", *ARCH Intern Med.*, April 11, 2005; Vol. 165, 725-730.

Turn the page to learn more about How Fish Oil Plus Statins Helps Reduce Major Coronary Events.

HealthGems

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Fish Oil Plus Statin Reduces Major Coronary Events Better Than Statins Alone

The results of a major randomized human clinical trial of 18,645 participants were presented at the November 2005 American Heart Association meeting in Dallas, TX. In the JELIS (Japan Eicosapentaenoic Acid Lipid Intervention Study) trial, the participants were given a statin drug alone or a combination of statin and 1,800 mg per day of EPA from fish oil. After greater than 4.5 years of follow-up, significant reductions in major coronary events (19% reduction) and unstable angina (24% reduction) were observed in the secondary prevention group (prevention of a second coronary event). A similar, but not significant, 18% reduction in major coronary events was observed in the primary prevention group (in participants with no previous coronary events).

Because cholesterol was reduced equivalently in both the active and placebo groups, the researchers hypothesize that fish oil provides its protective benefits through a non-lipid mechanism. It is believed that fish oils may help to stabilize atherosclerotic plaques as well as provide anti-inflammatory and anti-thrombotic benefits.

Yokoyama, M. et al, "JELIS - Japan Eicosapentaenoic acid (EPA) Lipid Intervention Study", *Unpublished data presented at the American Heart Association Scientific Sessions*. Nov. 2005; in Dallas, TX.

Fish Oils Increase Lipoprotein Size

Lipoproteins are the principal means by which lipids are transported through the bloodstream. Lipids are fat and substances like fat that the body uses for energy. Examples of lipids include fatty acids, triglycerides and cholesterol. A study of lipids on lipoprotein size in men found that LDL particle size increased significantly in a group supplemented with DHA, but not in an olive oil group. DHA (docosahexaenoic acid) is one of the longest chain and most unsaturated fatty acids (oils) in the food kingdom; it is twice as unsaturated as vegetable oils. The best source is cold water fish.

Am. J. Clin. Nutr., 2000, 71: 1085-94

Why is this finding significant?
Lipoprotein size has been linked to longevity.

Lipoprotein Size and Longevity

Researchers measured the HDL and LDL particle size of people with exceptional longevity and found a lipoprotein link. High-density lipoproteins (HDL) are also commonly referred to as "good" cholesterol and low-density lipoproteins (LDL) are commonly referred to as "bad" cholesterol.

A group of 213 Ashkenazi Jews (mean age 98.2) and 216 of their offspring (mean age 68.3) were compared to two control groups of matched ages. Individuals with exceptional longevity (and their offspring) were found to have significantly larger HDL and LDL particle sizes in their blood, suggesting that lipoprotein sizes promote healthier aging. Particle size was independent of total LDL and HDL numbers.

JAMA, Oct. 15, 2003; 290:15;2030-2040.

The longevity study indicates a relationship between life span and lipoprotein size. It is known that women generally have larger size particles of HDL and LDL than men, which may explain their higher life expectancies.

Can Fish Consumption Reduce Cardiovascular Death Rate?

The main finding of a Finnish study involving people with cardiovascular disease was that a higher proportion of omega-3 fats in the blood was associated with a 67% reduced risk of death compared to those with a lower proportion of omega-3 fats in the blood. The study involved 285 men and 130 women with cardiovascular disease.



Subjects completed food questionnaires and their blood was tested for omega-3 fats, omega-6 fats, monounsaturated fats and saturated fats. The levels of EPA and DHA in the subject's blood corresponded to the amount of fish they recorded in their food questionnaires.

The researchers also discussed how omega-3 fats work to benefit our health and reduce the risk of coronary artery disease by:

- 1.) lowering triglyceride levels
- 2.) reducing the likelihood of blood cells to adhere to the blood vessel walls and contribute to plaque and clogged blood vessels
- 3.) helping stabilize heartbeat
- 4.) minor blood pressure-lowering effect and
- 5.) their minor influence on reducing platelet aggregation.

Am. J. Clin. Nutr., 2003; 78:65-71.

Heart Healthy Diet Suggestions:

Dr. Fredric Pashkow of Honolulu, Hawaii, reviewed various studies and prepared a suggested diet for all patients to prevent heart disease.

His diet is as follows:

- The optimal diet to prevent heart disease would be lower in calories, saturated fat, refined grains and sugars than the average diet consumed currently in the US.
- It would be higher in fiber, natural vitamins and varieties of species.
- Fish, high in omega-3 fatty acids, would be regularly consumed.
- Polyunsaturated oils, high in linolenic acid, such as canola, would be used for cooking in preference to all others.
- Meals would ideally be accompanied with a glass or two of wine and followed by a long walk.

Preventive Cardiovascular Therapeutics, April 20 - May 3, 2003.

A Dietary Program for CHD Prevention

Two doctors from the Harvard School of Public Health reviewed the data from 147 original studies on diet and coronary heart disease (CHD).

They summarized their results from what they described as "compelling evidence" into 3 dietary strategies:

- ✓ Substitute unsaturated fats (especially polyunsaturated fat) for saturated and hydrogenated fats (trans-fats).
- ✓ Increase dietary intake of omega-3 fatty acids from fish oil or plant sources.
- ✓ Eat a diet high in fruits, vegetables, nuts and whole grains. Avoid refined grains.

JAMA, Nov. 27, 2002; 28;20:2569-78.

Brain Studies

Fish have been referred to as “brain food” for many years without much scientific substantiation. Now, science has established the working connection between fish and brain function.

The fatty acids, EPA and DHA, have been found to play important roles in the activation of receptors for neurotransmitters. Impaired signal translation from cerebrovascular cells can lead to psychological problems.

1. Huntington’s Disease

The favorable results from a small study of PUFA’s on 17 patients have led to a larger international study that is underway.

2. Schizophrenia

Four out of five completed international studies have shown significant beneficial effects of EPA when used as an add-on to anti-psychotic drugs, though one study showed benefits of EPA used solely. Studies are in their infancy, more work needs to be done.

3. Depression

Individuals with depression usually have low blood levels of omega-3 fatty acids, including EPA. Scientists believe EPA offers a new approach to depression with none of the adverse effects of drugs.

The effect of PUFA’s on the brain and diseases of the brain are very limited at present, but the preliminary work done so far is encouraging. Look for new reports from future studies.

Alzheimer’s and Low Blood Levels of Docosahexaenoic Acid (DHA)

A review of 1,188 elderly people with an average age of 75 years showed a two times higher frequency of Alzheimer’s disease in people with lower blood DHA levels. Fish is our major source of DHA.

Lipids, 1999; 34: S245.

Fish Oils Protect Against Alzheimer Disease

A study conducted in Chicago indicates that older people who eat fish may reduce their risk of developing Alzheimer disease. Fish oil is high in DHA, which is an important nutrient for brain and nerve cells. Participants in this study were 65 to 94 years of age and were initially unaffected by Alzheimer disease. Subjects who ate fish at least once a week had 60% less risk of developing Alzheimer disease compared to those who rarely or never ate fish. Patients were followed for an average of 4 years.



Arch. Neurol. Jul. 2003; 60(7):940-6.

DHA Reduces the Tendency for Hostility in Young Adults

A cross-sectional observational study analyzed 3,581 urban black and white young adults between the ages of 18 and 30 for hostility levels based upon their fatty acid intakes. Data obtained from hostility measurements in 1990-1991 and dietary assessments in 1992-1993, both from an ongoing cohort study, were used in this trial. Analysis of this data after adjustment for multiple variables revealed a significant inverse association between fatty fish intake and hostility. No association was observed between total omega-6 fatty acid intake or omega-6/omega-3 ratios and hostility. The researchers concluded that regular consumption of fish rich in omega-3 fatty acids, particularly DHA, is associated with reduced odds for hostility.

E. J. Clin. Nutr., 2004; 50:24-31.

Dry Eye Syndrome (DES)

A study of the dietary intake and ratio of omega-3 to omega-6 fatty acids in the diets of 1,546 women reporting Dry Eye Syndrome (DES) were compared to the ratios of these fatty acids in the diets of women without DES.

The information was taken from 39,876 women who participated in the Women's Health Study.

The source of the omega-3 in the diet was mainly from seafood that contains the long chain EPA and DHA fatty acids. The omega-6 source was mostly linoleic acid from margarine, butter and nuts.

Upon comparison of the dietary intake ratios of the omega-6 to omega-3's, researchers concluded that a higher intake of omega-3 was associated with a decreased risk of incidence of DES, while a higher ratio of omega-6 to omega-3 was associated with an increased DES risk.

Miljanovic, Trivedi, et al; "Relation between dietary n-3 and n-6 fatty acids and clinically diagnosed dry eye syndrome in women" *Am. J. Clin. Nutr.* 2005; 82:887-93.

Fish Found Protective against Macular Degeneration

Researchers studied fat intake and the progression of age-related Macular Degeneration (MD), and found certain fats protective and others detrimental.

- Saturated, mono-unsaturated and trans fats increased the likelihood of progression of MD.
- Animal fat and processed baked goods (high in certain fats) increased the risk of MD.
- Fish and nuts were protective in the advancement of MD.

"Progression of age-related macular degeneration; association with dietary fat, transunsaturated fat, nuts & fish intake", *Arch. Ophthalmol.*, Dec. 2003; 121(12):1728-37.

Fish Oils Improved Visual Function in Patients with High Ocular Pressure

Optometrists and ophthalmologists routinely check their patients for elevations in ocular pressure. Even slight elevations in ocular pressure can put a patient at an increased risk for nerve cell damage in the eye.

A double blind study of 40 patients with ocular hypertension found that daily supplementation with 480 mg of DHA and 680 mg of EPA significantly improved patients' visual function as measured by blue/yellow visual field indices. Blue/yellow visual field indices help eye doctors to identify visual field defects early on, before vision loss is readily apparent to the patient. This observed improvement suggests that fish oils may have a neuroprotective effect in the eye. The researchers conclude that fish oils may be a supportive therapy in the management of glaucoma and ocular hypertension.

Acta. Ophthalmol. Scand., 1999; 54-55.

Fish Diet Reduced Macular Degeneration Risk

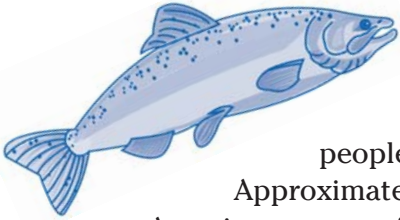
A study of the diets of 4,753 Macular Degeneration (MD) patients (ages 55 to 80) over a 6.5 year period investigated the relationship between diets of omega-3 fatty acids from fish and diets of omega-6 fatty acids found in high levels in red meat.

Patients in the highest quintile group of intake of omega-3 fatty acids (EPA & DHA) had a 40% reduction in risk of developing AMD. Those who consumed foods containing large amounts of DHA had a 47% reduction.

Contrary, the patients with diets high in arachidonic acid (AA) (an omega-6 fatty acid) were found to have a 54% increased risk of developing AMD over the lowest AA intake.

Finn, Robert, "Eating Fish may Stave Off Macular Degeneration", *Family Practice News*, Feb. 2004; 34(3).

Fish Oils Can Help Fight Asthma



Asthma can be an aggravating and frightening chronic medical condition for the people who suffer from it.

Approximately 12 to 15 million Americans are affected by asthma.

Inflammation of the bronchial tubes is thought to be one of the factors that contribute to the long-term damage that asthma causes to the lungs. Therefore, controlling inflammation could be a key to treating asthma.

With this in mind, a recent study sought to examine the affect supplementing with fish oil would have in asthmatic patients with exercise-induced bronchoconstriction (EIB). EIB results in the narrowing of the airways that can occur during or following exercise, resulting in a post exercise decrease in lung function.

The omega-3 fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are n-3 PUFAs naturally occurring in fish oil. EPA and DHA help inhibit proinflammatory responses. Researchers noted that a possible contributing factor to the increased prevalence of asthma in Western countries might be due to the consumption of a proinflammatory diet, which is low in omega-3 fatty acids.

Citing mounting evidence that dietary modifications have been shown to have the potential to reduce the prevalence and incidence of asthma and EIB; researchers hypothesized that fish oil supplementation would: lessen airway inflammation, severity of EIB, medication usage

and improve post exercise pulmonary function in asthmatic subjects. Researchers recruited 16 subjects who had been diagnosed with mild-to-moderate persistent asthma. Subjects were given either soft gel capsules equaling 3.2 grams of EPA and 2.0 grams of DHA or an identical placebo capsule containing olive oil for three weeks. Thereafter, they followed a 2-week washout period and than switched to an alternative diet for the remaining 3 weeks.

Researchers noted that bronchodilator use was significantly reduced during the last 2 weeks of the fish oil diet compared to the normal diet. Researchers felt this study demonstrated “that a diet supplemented with fish oil ameliorates the severity of exercise-induced airway narrowing in subjects with mild-to-moderate persistent asthma” and that it has been shown “for the first time that a diet supplemented with fish oil reduces airway inflammation in asthmatic subjects with EIB”.

The researchers concluded, “this study has shown that fish oil supplementation may represent a potentially beneficial nonpharmacologic intervention in asthmatic patients with EIB. The fish oil diet reduced airway inflammation and the severity of EIB with a concomitant decrease in bronchodilator use.”

Mickleborough, et al “Protective Effect of Fish Oil Supplementation on Exercise-Induced Bronchoconstriction in Asthma”

Chest, January 2006; 129(1): 39-49.

GENERAL HEALTH BENEFITS

Fish Consumption Significantly Reduced Stroke Risk In Men

Researchers reviewed the data collected from 43,671 men who were free from diagnosed cardiovascular disease.

Men who ate fish 1 to 3 times per month had a 30% reduced rate of stroke and 44% reduced rate of Ischemic Stroke. However, a higher frequency of fish intake was not associated with further risk reduction. No significant associations were found between fish intake and risk of hemorrhagic stroke.

JAMA, Dec. 25, 2002; 288:24:3130-6.

Fish Oil Helped Combat Cystic Fibrosis



An Italian study evaluated the effect of fish oil on cystic fibrosis (CF). CF is a genetic disease characterized by a life threatening accumulation of mucus in the lungs. The study monitored 30 CF patients and 20 controls for a period of 8 months. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) were administered to the 30 CF patients at 1.3% of their total caloric intake. Inflammation was significantly reduced in the CF patients and pulmonary testing showed a significant improvement in forced expiratory volume. The researchers concluded that long-term EPA and DHA supplementation has a positive effect on inflammation in CF patients.

J. Parent. Enteral. Nutr., 2003 Jan.-Feb.; 27(1):52-7.

Did you know?

The American Heart Association website recommends people with documented Coronary Heart Disease consume one gram of EPA & DHA daily, either from fatty fish or through supplementation with fish oils.

People who need to lower triglycerides should take 2 to 4 grams of EPA & DHA per day as capsules under their physician's care.

<http://www.americanheart.org/presenter.jhtml?identifier=4632>

Effects of Fish Oil Omega-3's

A randomized, double blind, placebo-controlled study was conducted on 53 subjects for 5 months to evaluate the increase of fish oil omega-3's in the blood.

The subjects taking the fish oil products received either 500 mg or 1,000 mg of EPA & DHA. It is important to note that this is the amount of omega-3's in the fish oil capsules and not the mg's of fish oils.

The results showed a 7.9% increase in blood omega-3's by the 500 mg dose group over the placebo group, and a 9.9% increase in the 1,000 mg EPA & DHA group over the placebo group.

Wm. Harris, PhD., ACC Convention, March 2004 - St. Luke's Mid America Heart Institute

Infant Studies

There is a need for dietary DHA during the last three months of pregnancy and the first months of a baby's life, since DHA is essential for brain and eye retina development. Studies have shown that PUFA's (DHA) are associated with longer gestation, higher birth weight and enhanced infant development, including early language development and visual acuity, the PUFA-DHA being the key need. One study stated that breast milk levels of DHA have declined about 50 percent in North America over the past 15 years.

Another study reports that the availability of PUFA's in early infant development affects blood pressure levels later in life. Scientists accept the fact that breast milk is best for a newborn's health. A study indicated vegetable oil based infant formulas may lead to poorer visual function and learning in comparisons to breast-fed or formulas with DHA fed infants. However, there is an indication that at least some of the adverse effects of DHA deficiency during neurodevelopment may be reversible with a DHA supplemented diet.

Flax Seed Oil Did Not Increase DHA

DHA (Docosahexaenoic Acid) is the super-unsaturated fatty acid that is important to the infant's brain and eyes. It has 6 double bonds.

Flax Seed Oil contains alpha linolenic, the "low-end" omega-3 fatty acid, with only 3 double bonds. Seven women took flax seed oil for 4 weeks supplying 10.7 grams of alpha linolenic daily. Breast milk samples were taken before, during and after and analyzed for their fatty acid composition.

Flax seed oil increased the breast milk, plasma and red blood cell contents of other omega-3's, but it had NO EFFECT on the DHA content.

Am. J. Clin. Nutr., Jan. 2003; 77(1):226-33.

Infants Fed Polyunsaturated Fatty Acid Enriched Formula Develop Better Visual Acuity Throughout First Year Of Life

Researchers conducted a randomized, double-blind, controlled clinical trial to evaluate the effect of the polyunsaturated fatty acids Docosahexaenoic Acid (DHA) and Arachidonic Acid (AA) on nervous system development in 103 term infants. These infants were fed either standard formula or an enriched formula containing 0.36% DHA and 0.72% AA for one year. These enriched formula DHA/AA levels reflect the natural levels found in breast milk of healthy adult women. The effects of these two formulas were compared based upon their influence on nervous system development as measured by visual acuity tests.

Visual acuity was significantly better in the supplemented group than the control group at ages 6, 17, 26 and 52 weeks. Stereoacuity (a measure of visual cortex function) was significantly better in the supplemented group at age 17 weeks, and more than triple by 39 weeks. Physical growth and development was equal in both groups and the two diets were well tolerated.

The differences between study groups were subtle, but statistically significant. The authors note that even subtle differences in visual function may provide an important clue to the nutritional requirements of the central nervous system. Traditional infant formulas may not provide adequate amounts of the polyunsaturated fatty acids DHA and AA, which are needed for optimal nervous system development in infants.

Birch E., et al "Visual Maturation of Term Infants Fed Long-Chain PUFA Supplemented or Control Formula for 12 Months,"
Am. J. Clin. Nutr., 2005; 81:871-9.

Fish Oil (& GLA) Helps ADHD & Awkward Kids

A child who is clumsy and awkward may be prone to injury, ridicule and lower self-esteem. This condition is referred to as Developmental Coordination Disorder and is reported to affect approximately 5% of school-aged children.

Children affected by Developmental Coordination Disorder very often have difficulties learning. In a recent research trial, supplements of fish oils with gamma-linoleic acid were given to children 5 to 12 years of age for 3 to 6 months. Improvements were seen in reading and spelling and Attention-Deficit/Hyperactivity Disorder related (behavior) symptoms for this group of children, after receiving the supplements. However, no improvement of motor skills was observed. Supplements containing these nutritive fats, often lacking in our diet, are a safe option for helping children.

Richardson, J. Alexander and Paul Montgomery, "The Oxford-Durham study: a randomized, controlled trial of dietary supplementation with fatty acids in children with developmental coordination disorder." Pediatrics, 2005; 1115; 1360-1366.

Fish Oil Supplementation May Improve Lipid Risk Factors in Obese Children

At the recent American Heart Association (AHA) 2005 Scientific Sessions, researchers reported some exciting new studies involving fish oil supplementation. One of the studies presented suggested that fish oil supplementation could help improve the lipid profile in children who are overweight and at high risk for heart disease.

49 overweight children (aged 10 to 18 years) with a body mass index higher than the 95th percentile were studied during a 12-week period. The children were randomized to a control group or active treatment group and all received a low-glycemic

load diet rich in fruits, vegetables and protein. They also engaged in a supervised exercise program during a three-month period. The active treatment group received 3 grams daily of a fish oil supplement.

After 12 weeks, the triglyceride levels in the control group did not differ significantly from base line levels. In the fish oil treatment group, triglyceride levels had decreased significantly. Additionally, a change in the ratio of triglyceride/HDL cholesterol suggested an increase in the size of the particles, which lowers the risk of heart disease.

AHA, 2005 Scientific Sessions: Poster B94, Abstract 210. Presented Nov. 13, 2005.

Smarter Babies

DHA is an important omega-3 fatty acid from fish oil, which is needed for the development of infants' brains, nerves and eyes.

A Canadian study was conducted on 83 infants who were enrolled within two weeks of birth and exclusively breast fed for four months by mothers whose diets were supplemented to increase the DHA content of their breast milk.

The infant's visual acuity was tested at 2, 4, 6, 9 and 12 months, and language development at 9 and 14 months.

Researchers found that DHA related favorably to:

- visual acuity
- vocabulary production
- vocabulary
- comprehension

Clin. Nutr., Feb. 2002; 75:2(S).4065.



GENERAL HEALTH BENEFITS

Regular Fish Consumption Reduced the Risk for Prostate Cancer

Researchers analyzed the dietary fat intake of 47,866 men aged 40 to 75 for 14 years. During this period, 2,965 new cases of prostate cancer were reported. Four hundred forty-eight of these cancers had progressed into an advanced stage.

Review of the data showed there was a significant association between the type of fat consumed and the risk for developing prostate cancer. Men consuming the highest quantities of EPA and DHA from fish experienced an 11% reduced risk for developing prostate cancer, with a 26% risk reduction observed for advanced prostate cancer. No association was seen between alpha-linolenic acid (ALA) intake and overall prostate cancer incidence. However, men with prostate cancer consuming larger amounts of (ALA) were twice as likely for their cancer to have progressed into an advanced stage.

Am. J. Clin. Nutr. 2004; 80:204-16.

Fish Reduced Prostate Cancer Risk

A large study conducted by the Harvard Medical School followed 47,882 men over a period of 12 years. It assessed their consumption of fish and marine fatty acids to incidence of prostate cancer.

In evaluating 2,482 cases of prostate cancer among the group, they found that eating fish more than three times a week was associated with a reduced risk of prostate cancer compared to infrequent fish consumption.

Cancer Epid. Bio. Prev., Jan. 2003; 12(1)64-7.

Can Fish Oil Help to Ease Back Pain?

A recent study appearing in the journal of *Surgical Neurology* suggests that omega-3 fatty acids found in fish oils might be beneficial in treating neck and back pain. The study is exciting because the supplements could provide “a safer alternative” to nonsteroidal anti-inflammatory drugs (NSAID’s) for some patients, note the authors.

The study consisted of 250 people with nonsurgical neck or back pain, all of which were taking NSAID’s. For the first two weeks, patients received a daily dose of EPA and DHA of 2.4 grams. Thereafter, participants were to cut the amount in half and reduce their NSAID usage over the next one to two weeks. One month into the study, surveys were sent to study participants. The survey showed:

- half of the patients had stopped taking any NSAIDs for their pain (59%)
- 60% noted an overall improvement in their pain, and their overall pain had improved
- 60% reported less joint pain
- 80% were satisfied with their improvement
- 88% would keep taking fish oil supplements

One of the studies main authors, Joseph Maroon, MD states, “Our study adds to the numerous previously published studies showing the health benefits of omega-3 EFAs, which include blood clot prevention, pain reduction, immune system boosting and healthy blood vessel dilation”.

Maroon, J. et al, “ ω -3 Fatty acids (fish oil) as an anti-inflammatory: an alternative to nonsteroidal anti-inflammatory drugs for discogenic pain”, *Surgical Neurology*, April 2006; Vol. 65, Issue 4: 326-331.

DON'T FRY AWAY BENEFITS

Fish Oil Supplementation During Exercise Helps Reduce % of Body Fat

At the 2006 ISSFAL meeting, exciting new research on the benefits fish oil supplementation provides during exercise was presented. Research was based on 75 male and female overweight or obese participants (aged 25 to 65 years old) who also had two cardiovascular disease risk factors. They took part in a 12 week double blind trial.

Participants were assigned to either daily supplementation with a fish oil supplement providing 2 grams of DHA/EPA with or without exercise. Other participants were assigned to daily supplementation with vegetable oil with or without an exercise regimen. The exercise regimen that half of the subjects were assigned to consisted of three running sessions per week for 45 minutes each at 75% of their age-predicted maximum heart rate.

After measuring body composition, the only group that had a significant reduction in their percentage of body fat was the group that combined fish oil with exercise. Researchers believed this reflected an enhanced fat oxidation during exer-

cise, and also that the fish oil plus exercise group had a lessened surge in heart rate rise with exercise. This was attributed to reduced vascular resistance and improved blood flow in muscles.

Hill, A. Nutritional Physiology Research Centre, University of South Australia and University of Adelaide, Australia www.dhaomega3.org, 2006.

Fish Consumption and Women with Type 2 Diabetes

Researchers at the Harvard School of Public Health evaluated the health and fish consumption of 5,103 female nurses diagnosed with type 2 diabetes. They examined whether the intake of fish and omega-3 fatty acids was associated with a reduced risk for coronary heart disease (CHD) and total mortality over a period of sixteen years.

The women who consumed fish five or more times per week had a 64% reduction of CHD and a 52% reduced rate of total mortality compared to the women who ate fish less than once per month. Overall, a higher consumption of omega-3 fatty acids was associated with a 31% reduced risk of CHD and a 37% reduced risk for total mortality.

Circulation. 2003; 107:1852-7.

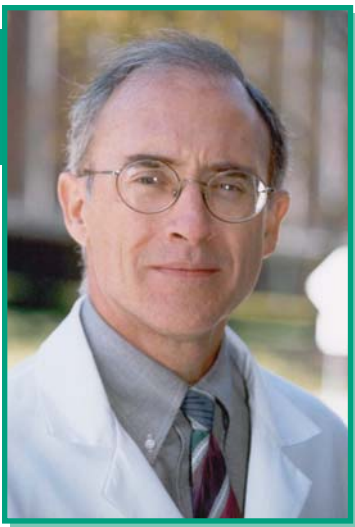
Eat Your Fish But Don't Fry Away Your Health Benefits

Although the health benefits of fish are now becoming widely recognized, not all preparations of fish may be good for your health! One important benefit of regular fish consumption is the reduced occurrence of atrial fibrillation (AF). AF is a type of abnormal heart rhythm. Researchers conducted a cohort study on 4,815 adults who were followed for 12 years to determine whether different methods of fish preparation influenced the anti-arrhythmic properties of fish itself.

The researchers discovered that persons with the highest intakes of baked and/or broiled fish meals per week experienced an average 35% reduction in risk of AF. These results suggest that regular intake of baked or broiled fish may be an easy method of reducing the risk of AF.

On the other hand, consumption of fried fish one or more times per week actually increased the risk of AF by 24%! This is believed to be due to the frying process itself that often results in the production of trans fats. So, eat your fish properly, just don't fry away its benefits!

Mozaffarian, et al., "Fish Intake and Risk of Incident Atrial Fibrillation", *Circulation*, July 27, 2004, pp. 368-73.



Are You Getting Enough Omega-3?

William S. Harris, Ph.D.

**Co-Director, Lipid & Diabetes Research Center,
Mid America Heart Institute of St. Luke's Hospital System**

Readers of HealthGems need not be convinced of the health benefits of omega-3 fatty acids. The value of these “Gifts from the Sea” has been thoroughly reviewed in past issues of the Newsletter. The arena in which their benefits have been most carefully documented is cardiovascular disease. In fact, the American Heart Association has now officially recommended that patients with known heart disease try to get about 1 gram (1,000 mg) of EPA+DHA per day, and that those without heart disease eat two servings of preferably oily fish (e.g., salmon, sardines, mackerel, albacore tuna) per week. The latter would provide about 500 mg of EPA+DHA per day. But benefits of these essential fatty acids may not be limited to heart disease. Data from a wide variety of fields is beginning to point to their importance in psychiatric and neurological conditions, human development and autoimmune diseases. It's also becoming increasingly evident that the typical American diet is deficient in omega-3.

Assessing Omega-3 Adequacy

How can you know that you are getting enough omega-3 fatty acids? The EPA+DHA content of that salmon fillet sitting on your plate is unknown, since levels can vary markedly depending on season of life of the fish, the fish's diet, post-catch processing and cooking methods. In addition, most reputable manufacturers of fish oil supplements list the omega-3 content accurately on the label (according to the *Consumers' Report*, July 2003). This is because of the integrity of the individual companies, not Federal law. And even if you could be certain of your omega-3 intake, each person is metabolically unique, with idiosyncrasies in digestion, absorption, tissue distribution, and cellular metabolism. What's more, there are marked variations in the rate of conversion of α -linolenic acid (the plant-derived omega-3 fatty acids) into EPA and DHA. The bottom line is that you

simply cannot know how much omega-3 you have in your system simply by knowing how much you take in. The only way to really know if you are getting “enough” omega-3 is to have your blood tested, AND to compare your levels with some target, “desirable” value. This test, which in the past had only been used in medical research, is now available to the public as OMX-3™, the Omega-3 Index.

The Omega-3 Index

We developed the OMX-3 test so that individuals could have a way to know if they were getting enough omega-3. The OMX-3 test can be used just like a cholesterol test. We measure cholesterol in order to find out who is at higher vs. lower risk for heart attacks. If the cholesterol is OK, then nothing needs to be done, but if it's too high, then dietary changes are recommended and drugs are often prescribed to bring it down. The same is true for your Omega-3 Index except that nutritional changes alone, not drugs, are all that are needed to “fix” a low score. It is useful to both individuals wanting to know how to reduce their risk for heart disease and to health care providers as they seek to provide the best preventive care for their patients.

What is the Omega-3 Index? It is a measure of the amount of EPA and DHA in red blood cells (RBC's). Why use RBC's? There are several reasons. First, EPA and DHA are in the membrane of the RBC in just the same way that they are in ALL cell membranes, so the RBC provides an easily-accessible window into the body's stores of omega-3. In fact, we have even shown that the RBC omega-3 content is a direct reflection of that of the living human heart, the organ where high omega-3 is absolutely critical. Secondly, the RBC provides a long-term reflection of average omega-3 levels, just like the “hemoglobin A1c,” is used by diabetes doctors to track the long-term stability of blood sugar. Third, the fatty acid composition of RBC's is not acutely influenced by a meal, so the test can be done in fasting or non-fasting blood samples. Thus, the Omega-3 Index is an excellent measure of your body's omega-3 stores.

What is the target Omega-3 Index?

It's one thing to agree that the Omega-3 Index is a good reflection of body omega-3 levels, but it's another thing to say, “Your OMX-3 should be X%.” What is a “healthy” score? We have also addressed this important question. Based on our research, we have proposed that a “healthy” OMX-3 result is 8% or higher and that a score below 4% is worrisome. These values will undoubtedly be refined with further research, but as a starting point, they are an important step forward in preventive medicine.

Alternatives to the Omega-3 Index

Some have recommended the use of a fatty acid ratio be used for risk assessment, typically either the omega-6 to omega-3 ratio, or the arachidonic acid (AA) to EPA ratio. While there is some logic to this suggestion, is there actually any scientific data to support it? We have just completed a careful review of 19 studies published in the medical literature which revealed three important facts:

- 1) that low levels of the fish-derived omega-3 fatty acids (especially DHA) are consistently associated with higher risk for heart disease, and
- 2) that a high level of omega-6 or AA is not. In fact, we found that individuals who had had heart attacks or died from heart disease had significantly lower, not higher, blood levels of AA, and
- 3) neither the ratio of omega-6 to omega-3 or the ratio of AA to EPA were useful markers.

Therefore, the use of these ratios cannot be recommended for estimating risk for heart attacks. A test like OMX-3, however, appears to be excellent way to identify individuals at increased cardiac risk.

How to find out your Omega-3 Index

The OMX-3 test is available from OmegaMetrix. The test can be run on a regular blood sample or on a dried blood spot self-collected at home and sent through the mail. The blood sample is analyzed at the Lipid and Diabetes Research Laboratory of the Mid America Heart Institute of Saint Luke's Hospital in Kansas City. It can be ordered on-line directly from the company or through your health care provider. Go to www.omegametrix.com or call 1-866-677-4900.

Healthy Benefits of Omega-3 Oils Summarized:

EPA supports a healthy cardiovascular system by promoting the formation of healthy body prostaglandins, which regulate cell activity.

DHA supports a healthy mental attitude and good vision, as it is a major building block of tissues in the brain and retina of the eye. It is used as a structural component of the cellular membranes in our brain and is preferentially taken up by the brain in relation to other fatty acids. It also supports several neural transmitters that are vital to normal nerve and brain function.

Cardiovascular Health	Dietary intake of EPA and DHA from fish or supplements help support a healthy, stable heart rhythm and healthy triglyceride levels. They also help modulate platelet adhesion and artery wall elasticity.
Eyes, Brain and Mental Health	DHA is incorporated into the membranes of cells involved in cell-signaling pathways, especially in the brain and retina. Recent studies show that DHA may help maintain healthy cognitive function and mental outlook.
Immune Function and Inflammation	DHA and EPA may help normalize inflammatory and immune processes by modulating the influence of eicosanoids and cytokines. Research shows beneficial effects for various related conditions. For example, fish oils may help promote comfortable joint function. In-vitro studies show that DHA and EPA may help promote healthy cell growth and apoptosis.

FISH OIL SAFETY

Fish Oil Supplements: Safer than Consuming Fish?

Each year, scientists continue to increase their knowledge and understanding of how important regular consumption of omega-3 fatty acids, EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) is to our health. Medical studies are published documenting the positive health benefits of fish consumption.

Among some of the known and well-documented health benefits of consuming omega-3 fatty acids regularly, some studies have shown it helps decrease inflammation in some autoimmune disorders, helps relieve depression and is important to our heart health. Regular consumption of omega-3 fatty acids is so important to our heart health, it prompted the American Heart Association to change its dietary guidelines in response to this need. The American Heart Association has recommended since 2000 that healthy American adults consume at least two servings of fish per week.

However, there is a growing concern regarding levels of mercury and other pollutants such as polychlorinated biphenyls (PCB's), organochlorine (OC) pesticides, and others present in many species of fish. Because of the risk of mercury exposure and its affects, pregnant and breast-feeding women, infants and children are cautioned not to consume large amounts of certain fish species. Recent studies have suggested that levels of mercury and other toxins present in many species of fish may obstruct the protective cardiovascular benefits of eating fish.

With this in mind, a study published in the January 2005 issue of the *Archives of Pathology and Laboratory Medicine* raised an important question: is consumption of fish oil supplements safer than eating fish regularly? To answer the question, the researchers had 5 commercial over-the-counter brands of fish oil supplements analyzed for their mercury content. Their tests

showed that the fish oil supplements had very low amounts of mercury present. They concluded that even large doses of fish oil should not cause mercury toxicity.

In a related study, they then tested the levels of PCB's and organochlorines in the fish oil supplements. They noted the fish oil they tested contains at least 5 times less PCB's than the FDA limits. To put it into context: if a person consumed fish from the Great Lakes at the optimum recommended amount of 400 grams/week, that person would have consumed at least 70 times more PCB's and 120 times more organochloride pesticides than a person who was consuming a dose of 1 1/2 grams of fish oil per day from supplements for one week.

The authors conclude:

“Fish oils provide the advantages of omega-3 fatty acids with minimal toxic risks. Our data suggests that even large amounts of fish oil can be consumed without risk of toxicity. This is particularly important because high doses of fish oil supplements are currently being used to treat hypertriglyceridemia and to augment antidepressive therapy in patients...fish oil supplements may be preferable to fish consumption as a dietary guideline for the general population and as a therapeutic source of omega-3 fatty acids in patients with cardiovascular disease and depression.”

How can you make sure you and your family are receiving all the health benefits of fish without exposure to mercury and other toxins? Select a fish oil product which states on the label:

“The fish oil has been tested by an independent, FDA registered laboratory and found to be free of detectable levels of mercury, cadmium, lead, PCB's and at least 20 other contaminants.”

CHOOSE YOUR FISH

EPA & DHA Content of Fish & Shellfish Summarized

HIGH CONTENT FISH

Grams of EPA & DHA

(1.0 gram or more of EPA & DHA per 100 grams† food serving)

Anchovy	1.5
Herring	1.6 to 1.7
Mackerel (Excluding King)	1.3 to 2.3
Salmon (Excluding Chum)	1.0 to 2.0
Sardine (canned in oil)	1.0
Shad	2.4
Tuna (Bluefin)	1.2
Whitefish (Most species)	1.3



MEDIUM CONTENT FISH & SHELLFISH

Grams of EPA & DHA

(0.6 to 0.9 gram of EPA & DHA per 100 grams† food serving)

Bass	0.6 to 0.8
Bluefish	0.8
Halibut (Greenland)	0.9
Seabass	0.6
Shark	0.8
Trout	0.6 to 1.0
Wolfish	0.6
Oysters	0.4 to 0.7



LOW CONTENT FISH & SHELLFISH

Grams of EPA & DHA

(0.2 to 0.5 gram of EPA & DHA per 100 grams† food serving)

Carp	0.4
Catfish	0.3 to 0.4
Flatfish (Flounder and Sole Species)	0.2
Grouper	0.2
Haddock	0.2
Halibut (Atlantic & Pacific)	0.4
Perch (Ocean)	0.3
Pollock (Atlantic)	0.4
Snapper	0.3
Tuna (Yellowfin, Ahi, Skipjack)	0.2
Walleye Pike	0.3
Whitefish (Smoked)	0.2
Bluecrab	0.3
Lobster (Spiny)	0.4
Shrimp (Mixed Species)	0.5



VERY LOW CONTENT FISH & SHELLFISH

(0.1 gram of EPA & DHA or less per 100 grams† food serving)

Orange Roughy	Trace
Pike (Northern)	0.1
Lobster (Northern)	0.0

† 100 grams of food is equivalent to 3 1/2 ounces or one small serving. Figures are for **Raw Fish**, except where otherwise specified.

TUNA

Canned

Light, drained, canned in oil	0.13
White, drained, canned in oil	0.24
Light, drained, canned in water	0.3
White, drained, canned in water	0.86

SALMON

Raw Canned

Chum	0.6	1.2**
Pink	1.0	1.7*
Sockeye	1.2	1.2**
Coho (Wild & Farmed)	1.0 + 1.2	
Atlantic (Wild & Farmed)	1.4 + 1.9	
Chinook***	2.0	

*solids with bone & liquid

**drained solids with bone

***smoked or smoked Lox: .45 grams

Compiled from USDA food composition websites in 2005
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