

Abstract

Docosahexaenoic acid (DHA) is an n-3 fatty acid that deep water fatty fish obtain by eating blue-green algae. Omega-3 fats, especially the 22-carbon long DHA, are essential for brain function, while omega-6 fats from meat-based diets increase inflammation. The FDA has approved fish oil for dietary supplementation. Until modern times, people consumed a 1:3 ratio of omega-3 to omega-6, while modern diets provide around 1:20, greatly increasing inflammation while challenging mental function and brain development. My hypothesis is that pregnant women consuming fish oil during pregnancy have measurably healthier children. For my method I searched peer reviewed literature in the American Journal of Clinical Nutrition and the American Society of Nutrition. It has been shown that higher maternal fish intake and greater duration of breastfeeding were associated with higher child developmental scores at 18 months. There is sufficient evidence that every pregnant woman would benefit their fetus by taking 300 mg fish oil five times a week, or getting the equivalent by taking the vegetarian source, blue-green algae, or consuming a fatty fish low in mercury.

Introduction

Docosahexaenoic acid (DHA) is an n-3 fatty acid that deep water fatty fish obtain by eating blue-green algae, that the FDA has approved for dietary supplementation (Functional Foods Fact Sheet). N-3, also called omega-3, refers to a group of unsaturated fatty acids. "Dietary recommendations have been made for n-3 fatty acids, including 18-carbon linolenic acid (ALA), 20-carbon eicosapentaenoic acid (EPA), and 22-carbon docosahexaenoic acid (DHA) to achieve nutrient adequacy" (Gebauer, 2006). ALA is an essential fatty acid because humans cannot make it in their bodies. Humans lack a desaturase enzyme that finishes the fatty acid chain. EPA and DHA are derived from ALA. However, the conversion rate of ALA to longer EPA and DHA is so low that ALA commonly obtained in the diet from flax seed is insufficient to provide enough DHA (Gebauer, 2006). Because *small amounts of DHA can reverse an n-3 fatty acid deficiency*, and since DHA is the most abundant n-3 fatty acid in tissues, DHA is the essential fatty acid (Gebauer, 2006).

DHA is the most abundant fatty acid in the gray matter of the brain (Functional Foods Fact Sheet), and is also important for healthy eye cell development and function.

Methods

To find whether pregnant women consuming DHA, or fish oil, have measurably healthier children, I searched peer-reviewed scholarly articles in the American Journal of Clinical Nutrition and the American Society of Nutrition.

Results

In a double-blind, placebo-controlled, randomized trial, pregnant women consumed a DHA-containing cereal bar (300 mg DHA/92kcal bar) or a placebo cereal bar from gestation week 24 until delivery. The average consumption was five bars per week. Higher maternal fish intake and greater duration of breastfeeding were associated with higher child developmental scores at 18 mo for the highest versus the lowest quintile of fish intake (Judge, 2007).

In a different study, Oken et al studied 25,446 children of mothers participating in the Danish National Birth Cohort, a prospective population-based cohort study including pregnant women enrolled between 1997 and 2002. In a standardized interview, the mothers reported child development in a standardized interview, which they used to generate developmental scores at ages 6 and 18 mo.



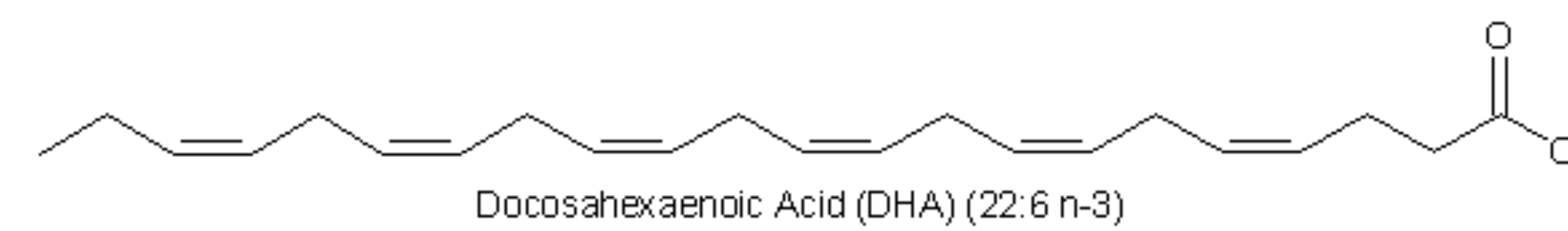
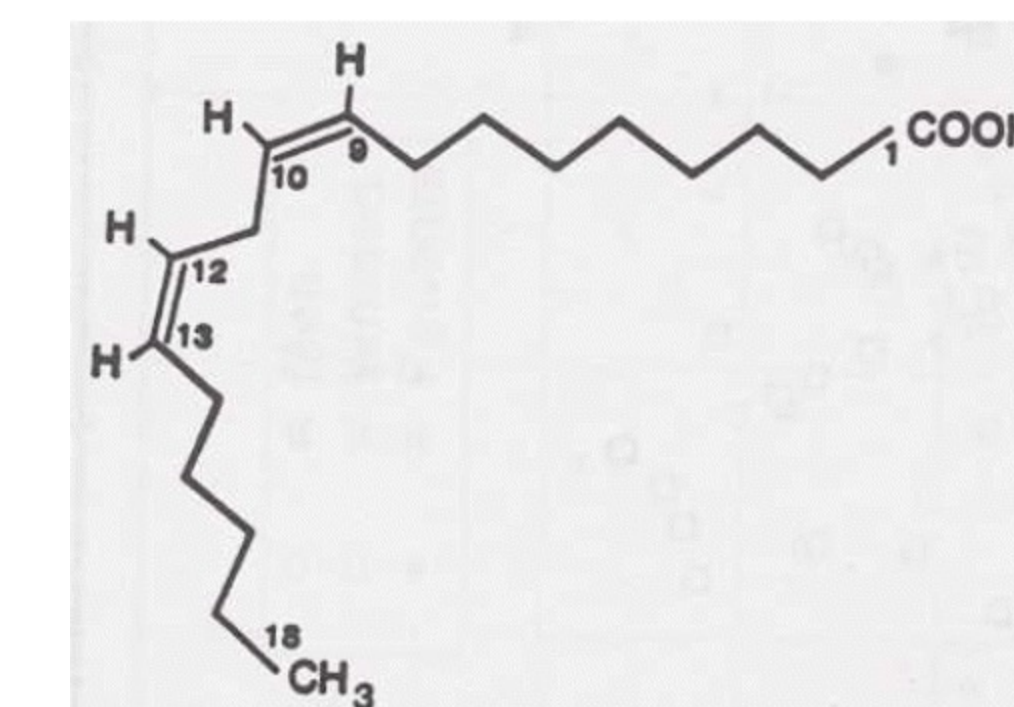
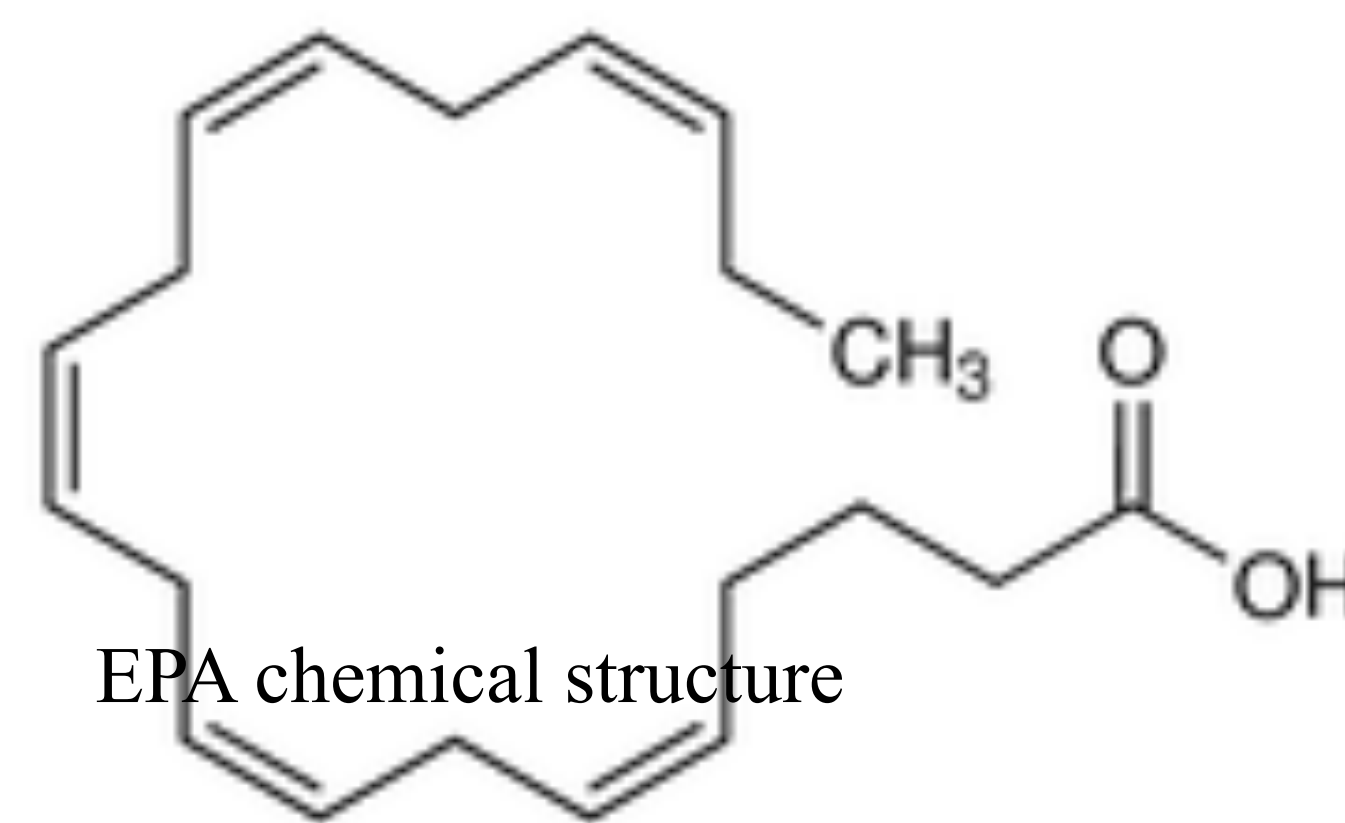
Fish Oil Benefits Fetus

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Table 2. Recommended dietary allowances (RDA).**

Food	Non-pregnant	Pregnant	Increase (%)	Breastfeeding
Energy†	2200 kkal	2500 kkal	+14	2640 kkal
Protein	50 mg	60 mg	+20	65 g
Vit A	800 µg	800 µg	0	1300 µg
Vit D	5 µg	10 µg	+100	10 µg
Vit E	8 µg	10 µg	+25	12 µg
Vit K	-	65 µg	-	65 µg
Vit C	60 mg	70 mg	+17	95 mg
Tiamin	1.1 mg	1.5 mg	+36	1.6 mg
Riboflavin	1.3 mg	1.6 mg	+23	1.8 mg
Niasin	15 mg	17 mg	+13	20 m
Vit B6	1.6 mg	2.2 mg	+37	2.1 mg
Folate	180 µg	1 g		280 µg
Vit B12	2 µg	2 µg	+10	2.6 µg
Calcium	800 mg	1200 mg	+50	1200 mg
Phosphore	800 mg	1200 mg	+50	1200 mg
Mg	280 mg	320 mg	+14	355 mg
Iron	15 mg	30 mg	+100	15 mg
Zinc	12 mg	15 mg	+25	19 mg
Iodine	105 µg	175 µg	+17	200 µg

(**) National Research Council (NRC). Recommended Dietary Allowances, 10th ed. Washington DC: National Academy Press, 1989.



Results (cont'd)

The results showed that higher maternal fish intake was associated with higher child development scores at 18 months for the highest versus the lowest quintile of fish intake. Associations were similar after six months (Oken, 2008).

Among women, high fish intakes resulted in lower prevalence of postpartum depression, though pregnant and lactating women are advised to consume fish low in mercury (Functional Foods Fact Sheet).

Discussion

There are fish oil supplements available at almost all stores selling nutritional supplements such as vitamins. Although it is inappropriate to endorse specific products, I want to provide examples that are available. I take 1 g of oil obtained from anchovy and mackerel per capsule.

For vegetarians, blue-green algae can be purchased online. The main distributor I found was Simplexity Health. They cost about \$0.25 per capsule and the company recommends taking four each day.

The evidence is absolutely clear that women must get fish oil in the diet during pregnancy and breastfeeding.

Important

As shown by an AJCN article by Brooks et al., flaxseed oil, another omega-3 food, affects the estrogen metabolism in the body. "Phytoestrogens, which are abundant in flaxseed and soy, have chemical structures resembling those of endogenous estrogens and have been shown to exert hormonal effects. . . (Brooks, 2004)" Because of this, flaxseed oil should not be on the menu for pregnant women. DHA does not affect the estrogen and is safe, in fact beneficial for pregnant women.

References

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Table taken from: http://www.perinatology.org.tr/journal/issue/20052/fulltext/txt_01.asp

