

From the  
**Editors**

## FAQ about DHA

### The Skinny on the Popular Omega-3 Fatty Acid



In 1994, expert panels from the Food and Agriculture Organization of the World Health Organization and the Child Health Foundation recommended that the omega-3 fatty acid docosahexaenoic acid (DHA) be added to infant formula, after research found that the substance was concentrated in the brains and retinas of breastfed infants. The FDA allowed the use of DHA in infant formula in 2001, and today most popular formulas are DHA-fortified. Gerber Products Company has just launched a new line of DHA-fortified cereals and purees for the weaning diets of infants and toddlers, helping to fill the gap typical diets often leave behind.

Scientists continue to gather evidence connecting DHA to cognitive development, visual health, cardiovascular health and possibly even postpartum depression. As the evidence builds, the U.S. government and other health agencies may soon have a consensus of science in order to make more definitive recommendations.

Meanwhile, healthcare practitioners need information to help guide parents regarding the use of DHA-rich foods or supplements for pregnant women and young children. In addition to the research articles presented in this issue, we've put together a quick overview to help update you on all the news behind this fascinating omega-3.

#### **What is DHA?**

DHA (docosahexaenoic acid) is a long-chain, polyunsaturated omega-3 fatty acid. Chemically, DHA is a carboxylic acid with a 22-carbon chain and six double bonds; the first double bond is located at the third carbon from the omega end. It is found in large concentrations in the retina, brain, adrenals, and testes. With its 22 carbon atoms and 6 double bonds, DHA is the most *unsaturated* fatty acid available in the diet.



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### What does it do in the human body?

DHA is important in the body for many functions. About half of the brain and eyes are made up of fat, much of which is DHA. The omega-3 plays an important role in brain and central nervous system development and function, psychomotor development (such as eye-hand coordination), visual development and function, cardiovascular health, and nerve signal transmission. Recent research is focusing on the important role of DHA in mental and visual development and function during pregnancy and breastfeeding, and in infant and toddler nutrition.

### Where does it come from?

DHA is predominantly produced by marine algae and is abundant in fish because they feed on algae. The best sources of DHA are seafood, especially cold-water fish such as salmon, sardines, cod, mackerel, halibut, herring, trout and albacore tuna. Fish oils such as cod liver oil are also good sources. Eggs and organ meats have a small amount of DHA. ALA (alpha-linolenic acid)—the precursor to DHA—is available through walnuts, flax and canola oil, although the body must convert the nutrients in these sources to DHA. For many Americans who eat high quantities of foods containing omega-6 fatty acids (such as beef and eggs), this process can sometimes be inefficient. “Ten to 20 percent of the population does not convert flaxseed to EPA [eicosapentaenoic acid] and DHA,” says Paul Ratté, ND, a naturopathic practitioner at Northwestern Health Sciences University’s Woodwinds Natural Care Center in Woodbury, Minnesota. “This could be due to a non-active delta-6 desaturase enzyme (which is the main converter).”<sup>1</sup> The fact that both omega-3 and omega-6 fatty acids utilize the same enzymes and thus have to compete in order to produce their final product can also affect conversion.

The best way to optimize DHA intake from fish is to steam it. Other good options include baking, broiling, and grilling. Frying is possibly the worst option, as excessive heat destroys DHA.

### How do we get it?

DHA is either present in the diet or it is derived from dietary sources of ALA. Getting it from direct dietary sources (like seafood) is best. Flax seed oil provides ALA, which needs to be converted by the body into EPA and DHA. For many North Americans whose diets are high in fat, conversion can be less than optimal. Dietary saturated fats, monounsaturated fats, trans-fatty acids, and cholesterol slow conversion in proportion to dietary levels. (Vegetarians, who typically don’t consume as much saturated fat, may have more success when consuming non-animal sources of omega-3 fatty acids.) Deficiencies in vitamins B3, B6 and C, as well as magnesium and zinc, may also slow conversion until they are adequately supplied.

### How much do we need?

While the government has not yet established a recommendation for DHA intake in the U.S., most experts recommend two 4-ounce servings of omega-3-rich fish per week. For optimal heart health, the American Heart Association recommends two servings a week, or for those with existing cardiovascular disease, at least 1,000 milligrams of fish oil each day.<sup>2</sup> A workshop sponsored by the National Institutes of Health (NIH) and the International Society for the Study of Fatty Acids and Lipids (ISSFAL) recommended an intake of 300 mg/day of DHA for preg-



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For optimal health, the diet should contain the proper balance of omega-3 fatty acids to omega-6 fatty acids. The typical western diet is rich in foods providing plenty of the latter, but little of the former.

and must receive this vital nutrient from the mother through the placenta during pregnancy and in breast milk after birth.

It is now known that women in the U.S. have a lower intake of fish than women in other developing countries. Encouraging informed consumption of DHA-rich seafood or supplements can be helpful for pregnant and lactating mothers as well as young children.

### How is DHA important to developing infants?

The most rapid brain growth occurs during the first year of life, with the infant's brain tripling in size by the first birthday. During this stage of rapid central nervous system growth, the brain uses sixty percent of the total energy consumed by the infant. Fats are a major component of the brain cell membrane and the myelin sheath around each nerve. Getting enough fat, and the right kinds, can greatly affect brain development and performance.

DHA is a normal component of breast milk. Infants fed breast milk reportedly have more optimal intellectual and visual development, for many years past birth, than infants raised on formula. (See article "Time to Go Fishing," page 2.)

### How is DHA important to young children?

During early childhood years (ages 2–6), the brain and eyes experience significant growth. In fact, between birth and 5 years of age, the human brain increases approximately 3.5-fold in mass and DHA content increases from 1 gram to approximately 4.5 grams. Due to the major growth during this time and because DHA represents up to 97% of the omega-3 fatty acids in the brain and up to 93% of the omega-3 fatty acids in the retina, the brain and eyes have significant requirements for preformed DHA.

Once a child is no longer breast-feeding or consuming formula, his DHA levels often plummet. Food sources of the nutrient (fatty fish and organ meat) are typically

not popular with young children. While the body can convert DHA from its precursor fatty acids, this process can be inefficient and varies from person to person. It is therefore important for children (and adults) to obtain adequate amounts of DHA directly from their diets.

### How is DHA important to adults?

DHA is important for ongoing brain, eye and cardiovascular health. Throughout our lifecycle, the body continues to turnover DHA—therefore it's necessary to replenish the stores. It is very important to the brain,



DHA is important for optimal infant visual and mental development both in utero and throughout infancy. Encouraging informed consumption of DHA-rich seafood or supplements can be helpful for pregnant and lactating mothers as well as young children.

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retina, testes, and adrenal glands for facilitating optimal functioning. Inadequate DHA in the brain is thought to be an important contributing factor in many of its functional problems, including depression.

Keeping a proper balance in the body between omega-3 fatty acids and omega-6 fatty acids can help maintain overall health. Preliminary studies also show

DHA's potential in reducing the risk of certain neurological diseases. Perhaps most important for adults is the connection with cardiovascular health—DHA is a key component of the cardiovascular system, and may prove important in normalizing certain blood lipids. The American Heart Association recommends at least two servings of DHA-rich seafood per week, or for those with existing cardiovascular disease, at least 1,000 milligrams of fish oil supplements per day, under the supervision of their physician.

### **What about vegetarian mothers?**

Getting enough DHA can be a challenge for vegetarians, as they typically don't eat seafood, the number one source of the ingredient. However, this is easily remedied by paying attention to the balance of fats in the diet, and consuming foods like soybeans, canola oil, flaxseed and walnuts. Adequate intake of ALA for adults set by the Institute of Medicine is 1.6 g/d for men and 1.1 g/d for women.<sup>8</sup>

### **Can Americans get enough DHA from their diets?**

The DHA content of breast milk varies with the mother's diet, and diets vary by country and culture. American women reportedly have lower DHA levels in their breast milk than other countries around the world. According to dietary surveys, pregnant and nursing women in the U.S. consume ~50 mg of DHA a day,<sup>7</sup> under 20% of the intake recommended by an NIH/ISSFAL-sponsored workshop in 2000.<sup>8</sup>

In addition, children don't commonly consume fish, walnuts, or flax seeds. Even health-minded mothers can have a difficult time getting toddlers to eat these foods, and thus children tend not to get enough omega-3 fats in their diets. Once a child is off breast milk, providing an alternative source of DHA may help optimize proper development. As an example, the Holistic Pediatric Association recommends a dosage of about 100 mg for children ages 1–2 years, and 250 mg for children 3–12 years.<sup>9</sup>



### **DHA is Important for:**

- Brain development
- Visual development
- Cardiovascular health
- Nerve signal transmission
- Psychomotor development
- Maintaining optimal function for adrenal glands and testes
- Maintaining optimal mood
- Possibly reducing the risk of some neurological diseases



Getting enough fat, and the right kinds, can greatly affect brain development and performance. Yet once a child is no longer breast-feeding or consuming formula, his DHA levels often plummet. It is therefore important for children (and adults) to obtain adequate amounts of DHA directly from their diets.



### Is there a connection between DHA and post-partum depression?

As mentioned in Dr. Makrides' article (page 2), some studies have drawn a connection between low levels of DHA and post-partum depression. Some experts believe this may be due to a depletion of DHA from neuron membranes, the mother's DHA having gone to the fetus for its neural development.

### Can I get too much DHA?

The body is very efficient at absorbing dietary fat. As stated in Dr. Makrides' article (page 2), the FDA has approved the use of algal and fish oil sources of DHA in infant formula, some foods, and supplements. However, omega-3 fatty acids in high doses (3 grams or more) can cause flatulence and diarrhea in some people. High doses can also act as a blood thinner, so those on blood-thinning medications may want to check with healthcare providers before supplementing.

### Conclusion

Research behind DHA continues to show that this particular omega-3 fatty acid may have many health benefits in the body, for adults and children alike. Exciting new studies examining its effectiveness in cognitive development, visual acuity, Attention Deficit

Disorder, Alzheimer's disease and in cardiovascular health promise to illuminate even more its necessity in our daily diets. •

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