Seafood During Pregnancy

A groundswell of independent science shows that babies benefit when moms eat plenty of fish during pregnancy. Landmark research, in fact, goes a step further to suggest the typical low-seafood American diet likely hinders optimal brain development among babies.

During the last trimester of pregnancy, a fetus's brain and nervous system rapidly develops, requiring about 65 mg/day of a type of omega-3 fat called docosahexaenoic acid (DHA).[i] DHA is essential, meaning the body does not make it and it must come from the diet. Therefore, a fetus is completely dependant on what its mother eats for the omega-3 DHA its growing brain and nervous system need. To cover the requirements of both mother and child, the International Society for the Study of Fatty Acids and Lipids recommends that pregnant and lactating women should aim to achieve an average dietary intake of at least 200 mg DHA per day.[ii]

The only naturally-rich source of omega-3 DHA is marine foods like fish. Oily fish like salmon, tuna, trout, and sardines are particularly high in omega-3s. A three-ounce serving of canned albacore tuna, for example, contains 535 mg DHA.[iii] Omega-3 needs can generally be met by eating seafood at least twice per week.

Recent data from the U.S. Food and Drug Administration (FDA) show that American women eat well below the amount of fish needed to for optimum health. Pregnant women eat 1.89 ounces per week; post-partum women eat 2.17 ounces per week; and non-pregnant women eat 2.97 ounces per week. The percentage of women who consume any of the four higher-mercury fish (shark, swordfish, king mackerel, and tilefish) advised against by FDA is also very small.[iv]

Because babies of moms who eat the most fish during pregnancy have better brain and eye development than those of moms who limit or avoid fish, the typical low-seafood American diet likely introduces a developmental hindrance. As published in *The Lancet* in reference to fish during pregnancy, "advice to limit seafood consumption could actually be detrimental."[v]

In addition to essential fatty acids, seafood contains many other nutrients important for moms, babies, and the general population. Fish, depending on the species, is rich in B vitamins, vitamin D, iron, and selenium – all packed in with around 20 grams per serving of lean protein.

Eating a seafood-rich diet is associated with health benefits throughout life. Over a dozen major health organizations, including the Alzheimer's Association, American Diabetes Association, American Heart Association, and American Optometric Association recommend eating fish.[vi]

Included in just about all seafood are traces of mercury, a naturally-occurring compound, as result of ocean volcanic activity and thermal events. Although relatively small amounts of mercury have been contributed by man, data shows that over time the amount of mercury in the oceans has remained virtually unchanged.[vii] The concern for mercury exposure began with exceptional cases related to industrial spills in Minimata, Japan and mercury-coated grain consumption in Iraq. Researchers then analyzed a population in the Faroe Islands that consumed large quantities of pilot whale meat, a mammal that contains

significant amounts of mercury and other contaminants. To learn about the effects of mercury in fish, researchers have conducted many studies over the last 20 years in the Seychelles Islands, where people eat more than eight times the amount of seafood of the average American.[viii] These studies reveal no pattern of adverse effects from prenatal mercury exposure from eating fish.

More reflective of a Western pregnancy diet, the following independent studies highlight the consistent finding that eating fish as a whole food, traces of mercury and all, during pregnancy confers a net benefit by optimizing brain and nervous system development:

Associations of maternal fish intake during pregnancy and breastfeeding duration with attainment of developmental milestones in early childhood: a study from the Danish National Birth Cohort

Authors: Emily Oken, et al.
Harvard Medical School
Journal: *American Journal of Clinical Nutrition*, September 2008
Summary: Researchers followed over 25,000 Danish mother/child pairs to determine the overall effect of maternal fish intake during pregnancy on child development. Mothers were interviewed about how much fish they ate, and then about their children's developmental milestones like crawling and putting words together. Compared with women who ate the least fish, women with the highest fish intake (2 ounces per day on average) had children 25% more likely to have higher developmental scores at 6 months and almost 30% more likely to have higher scores at 18 months.

Essential n-3 Fatty Acids in Pregnant Women and Early Visual Acuity Maturation in Term Infants

Authors: Sheila M. Innis, et al.
Child and Family Research Institute, Canada
Journal: *American Journal of Clinical Nutrition*, March 2008
Summary: Researchers studied 135 women and their babies in a double blind prospective study to determine whether DHA omega-3 status is so low among some pregnant women to pose a risk to their babies' development. The researchers found that the women who eat lots of meat and little fish are deficient in omega-3 fatty acids, and their babies do not do as well on eye tests as babies from mothers who are not deficient.

Maternal Seafood Consumption in Pregnancy and Neurodevelopmental Outcomes in Childhood

Authors: Joseph R. Hibbeln, et al.
U.S. National Institutes of Health
Journal: *The Lancet*, February 2007
Summary: Researchers followed nearly 12,000 mother/child pairs enrolled in the Avon Longitudinal Study of Parents and Children (ALSPAC) to assess the impact of factors such as diet and lifestyle on health and growth during pregnancy. Mothers who eat the most seafood during pregnancy -- more than 12 ounces per week -- have children with the highest developmental outcomes. Researchers conclude advice to limit seafood consumption could be detrimental to optimal fetal development.

The latest science of seafood and pregnancy has been misunderstood for many years because of confusion over government advice, as well as low awareness among physicians and their patients about the risks a fish and omega-3 deficient diet can introduce. Women seeking information on nutrition want and need to know the straightforward facts on what is safe and healthful to eat during pregnancy, including commercial seafood. The school of thought on fish and the importance of incorporating it in to a pregnancy diet has changed. For more information, go to www.schoolofthoughtonfish.org.

i Makrides, Maria. "Outcomes for Mothers and Their Babies: Do n-3 Long-Chain Polyunsaturated Fatty Acids and Seafoods Make a Difference?" The Journal of the American Dietetic Association 108 (2008): 1622-26.

ii Koletzo, Berthold. "Dietary fat intakes for pregnant and lactating women." British Journal of Nutrition 98 (2007): 873-77.

iii U.S. Department of Agriculture, Agricultural Research Service, USDA Nutrient Data Laboratory. 2008. USDA National Nutrient Database for Standard Reference, Release 21.

iv Choiniere, Conrad, et al. "Fish Consumption by Women of Childbearing Age, Pregnant Women and Mothers of Infants." Poster presented as part of the International Association for Food Protection 2008 95th Annual Meeting, Columbus, Ohio, 3-6 August 2008.

v Hibbeln, Joseph R., et al. "Maternal seafood consumption in pregnancy and neurodevelopment outcomes in childhood (ALSPAC study): an observational cohort study." The Lancet 369 (2007): 578-585.

vi Appendix A

vii Barber, R.T., Vijayakumar, A., Cross, F.A. "Mercury Concentrations in Recent and Ninety-Year-Old Benthopelagic Fish." Science 178 (1972): 636-639.

Gibbs, R.H., Jarosewich, E., Windom, H.L. "Heavy Metal Concentrations in Museum Fish Specimens: Effects of Preservatives and Time." Science 184 (1974): 475-477.

Kraepiel, A.M.L., Keller, K., Chin, H.B., Malcolm, E.G., Morel, F.M.M. "Sources and Variations of Mercury in Tuna." Environmental Science and Technology 37 (2003): 551-8.

Miller, G.E., Grant, P.M., Kishore, R., Steinkruger, F.J., Roland, F.S., Guinn, V.P. "Mercury Concentrations in Museum Specimens of Tuna and Swordfish." Science 175 (2003): 1121-2.

viii Myers, Gary J. "Nutrient and Methyl Mercury Exposure from Consuming Fish." The Journal of Nutrition 137 (2007): 2805-08.

Appendix A

Organization	Document	Seafood Recommendation
Alzheimer's Association	Adopt a Brain-Healthy Diet	Increase your intake of protective foods. Current research suggests that certain foods may reduce the risk of heart disease and stroke, and appear to protect brain cells. Cold water fish contain beneficial omega-3 fatty acids: halibut, mackerel, salmon, trout and tuna.
American Diabetes Association	Managing Preexisting Diabetes for Pregnancy: Summary of evidence and consensus recommendations for care	Due to the risks of CVD or hypertriglyceridemia, diabetic women are encouraged to eat at least two meals of oily ocean fish per week to increase n-3 fatty acids (eicosapentenoic and docosahexanoic acids), but pregnant women should avoid eating fish potentially high in methylmercury (e.g., swordfish, king mackerel, shark, or tilefish).
American Dietetic Association	Nutrition Fact Sheet: DHA, A Good Fat	DHA is important for proper brain and eye development, especially during pregnancy and infancy. Beginning in the last trimester of pregnancy and continuing through the first 2 years of life and beyond, DHA levels in the brain rapidly increase. Several studies have shown that infants with higher blood levels of DHA score better on tests measuring their brain (or cognitive) and visual function. Women can meet the recommended intake of DHA by consuming two servings of fish, especially fatty fish, per week.
American Heart Association	Fish and Omega-3 Fatty Acids	We recommend eating fish (particularly fatty fish) at least two times a week. Fish is a good source of protein and doesn't have the high saturated fat that fatty meat products do.
American Optometric Association	Nutrients for Eye Health	Consume 500 mg/day DHA/EPA essential fatty acids from sources including flax or fleshy fish like tuna or salmon, or fish oil supplements. Daily intake of these nutrients through foods and/or supplements has been linked to healthy eyes and may reduce risk of some chronic eye conditions.

Arthritis Foundation	Eating Fish May Reduce Inflammation from Arthritis Today	Adding about two 3-ounce servings of seafood to your menu each week is a good way to increase your levels of omega-3s and help decrease the body's inflammatory reaction. The highest levels of omega-3 can be found in cold-water, fatty fish such as salmon, trout, mackerel, tuna, sardines and herring. Not only can omega-3s significantly reduce joint pain and shorten the duration of morning stiffness, but studies, such as those reported in the American Journal of Clinical Nutrition, show that increased levels of omega-3 fatty acids also have enabled people taking nonsteroidal anti-inflammatory drugs (NSAIDs) to reduce their dosage or discontinue use.
International Society for the Study of Fatty Acids and Lipids	Consensus Statement: Dietary fat intakes for pregnant and lactating women	The adopted conclusions include: dietary fat intake in pregnancy and lactation (energy%) should be as recommended for the general population; pregnant and lactating women should aim to achieve an average dietary intake of at least 200 mg DHA/d; intakes of up to 1 g/d DHA or 2·7 g/d n-3 long-chain PUFA have been used in randomized clinical trials without significant adverse effects; women of childbearing age should aim to consume one to two portions of sea fish per week, including oily fish; intake of the DHA precursor, a-linolenic acid, is far less effective with regard to DHA deposition in fetal brain than preformed DHA; intake of fish or other sources of long-chain n-3 fatty acids results in a slightly longer pregnancy duration; dietary inadequacies should be screened for during pregnancy and individual counseling be offered if needed.
Food and Agricultural Organization of the United Nations	Fisheries and food security	Fish oils in fatty fish are the richest source of a type of fat that is vital to normal brain development in unborn babies and infants. Without adequate amounts of these fatty acids, normal brain development does not take place. Closely spaced pregnancies, often seen in developing countries, can lead to the depletion of the mother's supply of essential fatty acids, leaving younger siblings deprived of this vital nutrient at a crucial stage in their growth. This makes fatty fish such as tuna, mackerel and sardines - all of which are commonly available in developing countries - a particularly good choice for the diet of pregnant and lactating women.

International Society for the Study of Fatty Acids and Lipids	Recommendations for Intake of Polyunsaturated Fatty Acids in Healthy Adults	For cardiovascular health, a minimum intake of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) combined, of: 500 mg/d.
National Healthy Mothers, Healthy Babies Coalition	Seafood Nutrition Fact Sheet	Pregnant, breastfeeding and postpartum women are recommended by the Maternal Nutrition Group to consume a minimum of 12 ounces of seafood per week (salmon, tuna, mackerel, sardines), and six ounces of the recommended fish per week can come from albacore tuna.
National Heart, Lunch, and Blood Institute of the National Institutes of Health	Heart Healthy Diet: Daily Food Guide Food Groups	To lower your blood cholesterol level, choose only the leanest meats, poultry, fish and shellfish. Most fish is lower in saturated fat and cholesterol than meat or poultry.
U.S. Department of Agriculture	U.S. Dietary Guidelines for Americans 2005 and MyPyramid	Fish, nuts, and seeds contain healthy oils, so choose these foods frequently instead of meat or poultry. Evidence suggests that consuming approximately two servings of fish per week (approximately 8 ounces total) may reduce the risk of mortality from coronary heart disease.