

Transfats to ~~trans~~ fats

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NUTRITION NEWS

by Davorka Monti

Let's **NOT** Chew the Fat

Ingested fats serve a diverse array of functions within our bodies, from providing a concentrated source of energy to assisting in the absorption of fat-soluble vitamins (such as Vitamin D) (Lichtenstein et al. 1998). For many years the message has been to **reduce total fat intake**, and in spite of that **message the amount of fat consumed has been steadily increasing**.

In both research and advertising campaigns, the focus has shifted from decreasing the consumption of all fats to decreasing fats that increase the risk of heart disease, some cancers, and chronic diseases. In particular, researchers, nutritionists, and the media have been drawing attention to saturated fats and trans fats. Between the two, trans fats account for about 3% of total calories in the North American diet, and saturated fat contributes 13% (Chicago Dietetics Association 2000; Liebman 2002).

Trans fats in particular have been singled out as the worst fats in our diet because they are the worst offenders in increasing the risk of heart disease (Stender and Dyerberg 2004; Heart and Stroke Foundation of Canada 2005). This does not provide *carte blanche* for the consumption of saturated fats; the evidence against both trans and saturated fats is so strong that individuals should cut down their consumption of both (Liebman 2002). If the health effects of these fats are a concern to the general populous, a closer examination of the health effects on a fetus is certainly warranted.

DIFFERENT TYPES OF FATS

Prior to the widespread availability of trans fats, people used to cook with butter, lard, palm oil, and so on, which are all high in saturated fat. Researchers, however, found that eating a diet high in saturated fats increased a person's "bad" cholesterol and, consequently, the risk for heart disease. To lower the consumption of saturated fat, liquid vegetable oils were hydrogenated (adding hydrogen to vegetable oil) in order to make them solid at room temperature. This hydrogenation gave oils the consistency of butter and created margarine that could be easily spread on toast. In manufacturing terms, trans fats were stable, which increased the shelf-life of foods in comparison to liquid fats (Tsang 2006). Strictly speaking, trans fats do not have to exist, since there are other alternatives, albeit with an associated increase in food manufacturing costs (Liebman 2002). The rapid adoption of trans fats by consumers was largely based on the belief that trans fats were a healthy alternative to saturated fats. In time, however, research would ultimately prove that hydrogenation increases the risk of heart disease even more than saturated fat.

Trans fats are found in two forms — natural and manufactured. They occur naturally as conjugated linoleic acids (CLAs), which are formed by bacteria acting upon fatty acids in the rumen of cows. Approximately 3%-5% of trans fat consumption is from CLAs found in sources such as beef and dairy products. For the purposes of this discussion, the focus will be on the second form of trans fats: manufactured.

Researchers used to hold the belief that in order to lower bad cholesterol levels, people needed to eat foods lower in dietary cholesterol. This has not been proven to be true. In fact, strong evidence exists that both saturated fats and trans fats are more detrimental to our heart and health than dietary cholesterol (American Heart Association 2006).

Polyunsaturated vegetable fats are liquid at room temperature, and when consumed in moderation, they have an increased ability to lower total cholesterol levels. Polyunsaturated fat found in fish oils have gained the most praise from the research community (Liebman 2002). For example, Hu and associates (2002) found that healthy (nonpregnant) women who consumed fish at least five times per week had a 45% lower risk of dying of heart disease.

There are three types of polyunsaturated fatty acids that our bodies cannot produce: omega-9 essential fatty acids, omega-6 fatty acids (as linoleic acid), and omega-3 fatty acids. These fatty acids serve many functions in pregnancy, and are necessary for optimal fetal brain development. The forms of omega-3 fatty acids include: alpha-linolenic acid (LNA), docosahexaenoic acid (DHA) plus eicosapentaenoic acid (EPA) (Sattar et al. 1998). The following table lists essential fatty acids and some common sources:

Essential Polyunsaturated Fatty Acid	Source
Omega-9	* Olive and canola oils
Omega-6	* Vegetable oils, such as: safflower, sunflower, and corn oil, * Eggs, chicken
Omega-3 (LNA)	* Plant sources, such as: canola oil, flaxseed, and walnuts
Omega-3 (DHA + EPA)	* Fish, such as: salmon, herring, and mackerel

Reference: National Academies 2002

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TYPE OF FAT	FOODS FOUND IN	EFFECT ON BLOOD LIPIDS
Saturated Fats	Meat fat, lard, high fat dairy products, ice cream, eggs, seafood, coconut oil, palm and palm kernel oil, cocoa butter	Raise bad (LDL) cholesterol levels
Trans Fats	Stick margarine, shortenings, partially hydrogenated oils used in cakes, cookies, crackers and many fried foods such as French fries	Raise bad (LDL) cholesterol Lower good (HDL) cholesterol
Dietary Cholesterol	Animal foods; dairy products, meat, fish, poultry; Egg yolks and organ meats a rich source	Effect of dietary cholesterol on LDL levels weak, but can be significant in some people
Polyunsaturated Fat	Corn, sunflower, safflower, soybean, corn oils, walnuts, and sunflower seeds	Lower overall cholesterol levels
Monounsaturated Fat	Olive, canola, peanut oils, and avocados	Only lower bad (LDL) cholesterol if you eat them in place of saturated fats

References: Chicago Dietetics Association 2000; American Heart Association 2006

Our bodies do not convert much of the plant sources of omega-3 (LNA) into DHA plus EPA. The omega-3 (DHA + EPA) found in fish has been linked with the strongest heart-healthy evidence (Liebman 2002).

Monounsaturated fats, when compared to polyunsaturated fats, do not lower bad cholesterol. They can lower bad cholesterol if they are consumed in place of saturated fats. Even though some fats have health benefits, moderation should be used when eating all types of fats because fats, gram for gram, contain more than twice the calories of either protein or carbohydrates (American Heart Association 2006).

EFFECT ON FETUS AND PREGNANCY

Trans fats cross the placenta and have been reported in the umbilical cord plasma of newborns at levels similar to those in maternal plasma. Trans fats can be incorporated into both fetal and adult tissue, although the mechanism and the rate of transfer from a woman to the fetus continues to be a contradictory subject (Larque et al. 2001). Studies in test tubes have shown that trans fats affect the proper functioning and conversion of essential fatty acids. This may have substantial implications if researchers are able to conduct human studies, since essential fatty acids are important for fetal growth and neural development (Elias and Innis 2002). Elias and Innis (2002) found that pregnant women consumed more trans fat than they anticipated, since much of it was hidden in bakery products (e.g., Danish pastries, donuts, cookies).

A small study of women with preeclampsia found that the risk of preeclampsia appeared to increase with an increased intake of trans fats in a diet (Williams et al. 1998). Olsen and researchers (1992) found that a daily fish oil supplement containing omega-3 fatty acid prolonged gestation. Elias and Innis (2001) found the opposite (a shorter gestation period) seemed to occur for

infants with higher plasma trans fatty acid levels. Research findings concerning the effect of trans fats on allergic diseases in children and type 2 diabetes in adults indicate that further investigation is required in this area (Stender et al. 2004).

Because trans fats are not essential and provide no known health benefit, there is no defined safe level.

RECOMMENDATIONS FOR CONSUMPTION

The United States Government 2005 Dietary Advisory Committee Report recommended that trans fat intake should be limited to 1% of daily energy intake or less. Because trans fats are not essential and provide no known health benefit, there is no defined safe level; people should eat as little trans fat as possible (National Academies 2002). Even though specific recommendations were not provided for trans fat consumption during pregnancy, the same recommendations would more than likely apply. Pregnant or not, everyone needs to pay attention to the foods they eat and their ingredients. Although some countries are moving to include a breakdown of trans fats on the label of prepackaged foods, many hidden sources exist. These include bakery products and foods in restaurants.

THE BOTTOM LINE

- Choose products with less than 10% daily value of trans and saturated fats (which is approximately 20g per day of both combined).

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- Limit intake of all fats to 30% of calories.
- Avoid products with greater than 10% daily value trans and saturated fats.
- Trans fats should be 1% of energy or less.
- Saturated fat less than 10%.
- Eat fish 2 to 5 times per week.*
- Choose healthier oils such as canola (still within moderation).
- Eat a healthy diet that includes five or more servings of fruits and vegetables.

(Heart and Stroke Foundation of Canada 2005; Dietary Guidelines Advisory Committee Report 2005; Liebman 2002)

* The recommendations for increased fish intake must be tempered with the fact that many fish, especially those higher on the food chain, contain mercury, which can have serious consequences for a fetus. *The U.S. FDA advises all pregnant and nursing women, women who may become pregnant, and young children, not to eat swordfish, shark, king mackerel, and tilefish, and to limit the consumption of fresh, frozen, or canned albacore tuna. Safe fish include: salmon, catfish, flounder, and tilapia.*

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