FATS IN THE FIRE

Eighty or so years ago, barely out of their teens, my mom and pop separately left tiny villages in Russia for the chance of a better life here. Their reverence for formal education seeped into my pores as I was growing up, but so did their homely, down-to-earth values. Like my parents, I am awed by much in science, yet a part of me—the peasant part?—knows that any miracles science conjures up Mother Nature can eclipse hands down.

When it comes to triumphs that improve her handiwork, for instance by the food industry, my alarm bells clang. A case in point is "hydrogenation"—the hardening of oils to give them desired texture and eternal life. The process, emerging in the early 1900s, uses high pressure and metal catalysts to force hydrogen atoms onto—i.e., to saturate—the carbons of unsaturated fatty acids molecules. In this way, liquid oils become solid fats, e.g., Crisco and Sny.

A big medical push for polyunsaturates in the national diet came about because of the scary, unprecedented rise by the 1950s of atherosclerotic heart disease. Experts focused on high blood cholesterol as the root cause. Excessive intake of saturated fats was known to raise a person's cholesterol level, while polyunsaturates tended to reduce it. Soon, saturated fats, animal fats, and cholesterol became dirty words. Butter was out; in were vegetable oils, also margarines "high in polyunsaturates."

The Birth of Trans Fats

To give the right plasticity and feel to the new margarines, a fancy technology arose: partial hydrogenation. The food oil chemists figured out how to harden selectively the most fluid components of the oils—the Omega-3 fatty acids—and some of the Omega-6. These then were transformed into trans-fatty acids (TFAs)—a distinctly new machine-made species, different from small amounts of naturally occurring trans-fatty acids in dairy and meat fats.

In baking and frying, liquid oils don't yield the crisp, flaky texture provided by solid animal fats, typically butter, lard, and tallow. When animal fats became medical no-no's, purveyors of packaged and fast-food increased their dependence not just on Crisco-type vegetable fats but also on traditional semi-solid tropical fats (palm, palm kernel, and coconut oils), because they provided good taste and texture and didn't need to be hydrogenated.

The Plot (& Oil) Thickens!

In the late 1980s a fierce publicity campaign was launched to remove "dangerous, saturated, artery-clogging tropical fats," and to replace them with "polyunsaturated, heart-healthy" oils. Okay, folks, here's an aside on "nasty" tropical fats (palm, palm kernel, and coconut oils, typically from Malaysia) and why we shouldn't fall for health crusades carrying hidden agendas. This one was largely fueled by the rival American Soybean Assoc., for transparently economic—not health—motives, and taken up passionately by do-gooders in the nutrition community.

The food industry fell in line, but quickly saw how polyunsaturated oils couldn't cut the mustard and had to be "partially" hardened, leading to the current huge rise of TFAs in commercial foods. A great pioneer TFA scientist, Mary G. Enig, Ph.D., wrote in Townsend Letter for Doctors, Dec. 1993: "These plastic, man-made fats are usually much firmer than the natural baking fats like lard and palm oil and the baker can pack more of this fat into a product without producing a greasy feel...Oils such as soybean and canola that are used by restaurants for deep frying do not need to be as solid as fats for baking, but they need to be stabilized by partial hydrogenation. The result is what is called liquid shortening."

Here's how the switch from a tallow based formula to "liquid shortening" affects consumers, as one example, in approximately 15,000 McDonald's fast food restaurants; TFA content of french fries rose from 5% of fat to 43%.

Thus, with tropical fats vilified and pushed out of the picture, in the '90s we're seeing a stupendous surge of TFAs in supermarket staples: e.g., in breads, cakes, crackers, cookies, pasta crusts, pretzels, and snack chips, as well as in most foods in fast food chains.

Damage Report

For at least 45 years, earnest researchers have brought up troubling questions about TFAs. As I wrote in PLAs '84 & '86, TFAs are accepted readily by our tissues, pushing out the true polyunsaturates—the Omega-3 and Omega-6 essential fatty acids, but unable to perform their critical functions. While almost the whole thrust of research is on how TFAs disturb cholesterol levels, studies keep cropping up on other sinister aspects, such as disruption of energy metabolism in heart muscle, altered properties of membranes needed to resist cancer, and higher cancer rates in animals.

The more TFAs we eat, the more get deposited in our bodies. The more TFAs a pregnant woman eats, the more the fetus gets in its tissues, where they cause loss of long-chain Omega-3's vitally needed in eyes and brain. TFAs interfere with growth, so babies are smaller at birth, too.

And if none of the above grabs you, the really big news is that TFAs make people fatter! Among 540 women with the same calorie intake and level of exercise, those who often consumed TFAs weighed almost 5 pounds more than infrequent consumers!

Damage Control

All of this to let you know that the food oil industry, now facing a major campaign to get TFAs out of the food supply, are doing what powerful interests do best: setting up panels of "objective" scientists to cast doubt on the mounting studies that are puncturing the TFA bubble. A report by the International Life Sciences Institute (ILSI) in the September American J of Clinical Nutrition leaves no doubt as to where the vested interests lie—and 'tain't where our own as consumers are, believe me!

Happily, the ILSI report's half-truths, omissions, and obfuscating statistics take a beating, in the same issue of AJCN, from three stalwarts. Netherlands researcher Martijn Katan, whose 1990 work with R. P. Mensink blew the lid worldwide, showing margarine to be a threat to the heart, points out that not only do TFAs raise blood levels...
of "bad" LDL cholesterol and lower "good" HDL cholesterol. Why TFA's raise lipoprotein(a) levels—an ominous cardiovascular sign that the apologists either ignored or dismissed. [See FLs 60 & 65 for Pauling & Rath's theory on why lipoprotein(a) rises when vitamin C levels fall.]

Walter C. Willett and Alberto Ascherio, Harvard scientists who blew the whistle on TFA's in major works, give the ILSI hell, too. Dr. Willett's team studied health and diet records of over 85,000 women for 8 years starting in 1980, discovering that trans fatty acid intake was positively associated with both heart disease and breast cancer. A separate study of men linked high TFA intake to prostate cancer.

They conclude in their crisp rebuttal: "Because these artificial isomers have no nutritional benefits and are virtually certainly harmful compared with their natural precursors, the only real public health question is the magnitude of harm... The ILSI report, by calling only for further research, supports an imprudent public policy." I say Amen to that!

**A New Look at Tropical Oils**

"Saturated" should never have become synonymous with "bad." After all, the body routinely needs and makes saturated fats (from sugars, fats, and carbohydrates), to cushion our skin, organs and bones and to combine with unsaturated fats to form all cellular membranes. Palm kernel and coconut oils are very high in lauric acid, a saturated fat with strong antiviral and antibacterial activity. (This is logical in warm climates, no?) Incidentally, all mother's milk is rich in lauric acid, too.) These effects are so promising that Dr. Mary Enig proposes using palm kernel and coconut oils to help build up immunity in AIDS patients.

Natural palm, palm kernel, and coconut oils are semi-solid, composed of saturated, monounsaturated, and polyunsaturated fats, but no TFA's. The oil palm is unique in producing two sources of oil from its fruit—palm oil from the flesh, and palm kernel oil from the seed. Coconut palm provides oil from, of course, coconuts. All were easy to produce before modern technology, having been consumed for at least 5,000 years in the tropics and subtropics. All are high in easy to digest medium-chain fatty acids that tend to be burned as fuel by the body rather than stored as fat. Palm oil is rich in natural antioxidants that not only keep the oil itself from turning rancid (oxidizing), but offer the same protection to blood cholesterol. (Much emphasis currently is on oxidized cholesterol in the blood as the trigger for heart disease, not normal, unoxidized cholesterol that's seen more and more as an innocent scapegoat.) Tropical oils don't impair our biosynthesis of long-chain Omega-3's, as TFA's do. Despite the campaign by American Soybean Assoc. flaks to portray them as villainous, these oils never have been associated with heart disease.

How many TFA's does it take to screw up our inner works? Nobody knows for sure, but one study found that a "high" TFA intake of 16 grams a day substantially raised risk for heart disease. Current estimates, however, find daily TFA intake in the U.S. to average 10 to 30 grams. Since total fat averages about 80 to 130 grams, clearly TFA's form a sizeable percentage in the daily diet of millions.

Well, what did you expect? The food oil industry here is dead set against it. A news release from the combined auspices of the Institute of Food Technologists, American Institute of Nutrition, and American Society for Clinical Nutrition (publishers of AJCN, incidentally) declares "the scientific evidence on trans fatty acids is insufficient to justify any further changes in food labeling regulations." In a letter to FDA commissioner Dr. David Kessler, the societies' "shared concern is that the public's fears about the putative health risks associated with eating foods containing trans fatty acids or partially hydrogenated vegetable oils will lead people to avoid such foods entirely [!] and choose inappropriate alternatives instead."

Surely, they jest! Do they mean, 'inappropriate alternatives' like unhydrogenated oils? Or foods prepared with natural tropical oils, used safely for millenniums? What a travesty we get when conscience-impaired corporations and shortsighted science are joined at the hip! I feel sorry for those so committed to economic agendas, they don't dare undo the harm they've done by fooling Mother Nature.

**THE WILD BUNCH**

They drive their parents crazy--teachers and classmates, too--because they don't sit still, won't pay attention, and can't stick with an activity long enough to master it. Usually they're boys, and their rising numbers are alarming enough to warrant a modern medical label: "attention-deficit hyperactivity disorder" (ADHD), now the most common childhood behavioral disorder.

Researchers at Indiana's Purdue University lined up 51 of the little buggers, average age 9 years, to compare their diet, health histories, and fatty acids in their blood with those of same-age non-ADHD kids. Nobody's sure what causes ADHD but suspected factors include lead toxicity, neurotransmitter imbalances, and food sensitivities. The researchers decided to check the boys' blood levels of essential fatty acids because their biological effects mediate "a wide variety of functions in every cell in the body" (Laura J. Stevens, et al., pp 761-8, October AJCN).

1 I make my own Better Butter: a half-pound molded butter (one cupful), blended with 3/4 cup of any favorite oil or mixture of oils, placed in a covered container and refrigerated. Lately, I've been adding 2 tablespoons of coconut oil because of the nice studies I'm seeing.
The wild kids turned out to have a lot more ear infections, asthma, stomach aches, and headaches, and fewer had been breastfed, than the non-ADHD boys. Computer analyses of 3-day diet lists supplied by parents seemed to show all were getting reasonable amounts of nutrients, but in analysis of blood levels of fatty acids, the ADHD boys came up much lower in the two most important polyunsaturated fats (PUFA) in the brain---Omega-6 arachidonic acid (ARA), and Omega-3 DHA.

About 21 of the ADHD group had symptoms of essential fatty acid deficiency: excessive thirst; frequent urination; dry hair; and dry skin. These 21 youngsters also had the lowest ARA and DHA plasma levels. (Without enough Omega-3 and Omega-6 PUFA to form strong cellular membranes, cells become "leaky" and water chronically is lost from the body.)

The researchers explain how insufficient PUFA can affect behavior. First, with fewer PUFA there is reduced biosynthesis of eicosanoids (i.e., prostaglandins, leukotrienes, etc.) which act as modulators or modulators of nerve transmission in the central nervous system. Second, because 22:6n-3 [DHA] is the predominant PUFA in the polar lipids of the cerebral cortex and retina, especially in cell membranes that are the most fluid and metabolically active, decreased concentrations of this fatty acid might negatively affect the function of the retina and cerebral cortex in several ways...

They describe how caged monkeys fed a low Omega-3 diet have more "bouts of total locomotion" than well-fed ones. Omega-3-deprived monkeys also have "decreased visual acuity" and drink water all day long.

No wonder these little boys are fidgeting around like caged animals!

No calculation of Omega-3 or Omega-6 fats in the children's diets was available to the researchers, who suspect low Omega-3 intakes cannot be ruled out. I have a hunch about these fidgety youngsters. When Donald O. Rudin, M.D., did his pilot study on the Omega-3's, he found an unsuspected across-the-board deficiency in his 44 subjects. His book, The Omega-3 Phenomenon, tells of patient after patient becoming calmer and experiencing increased well-being, as their "dry" Omega-3 reservoirs filled up.

He had them remove all trans and hydrogenated fats from their diet as well. The average American diet is awash in these obnoxious fats. We've learned that TFAs interfere with biosynthesis of DHA and ARA in everyone, including infants. There's a very good chance these fifty-one ADHD children---and hundreds of thousands more---are absorbing TFAs every day of their lives, beginning when they still were in the womb. Boys, from infancy on, require more PUFA than girls. Maybe those who develop ADHD have stronger-than-average requirements in their brain for the very PUFA they're being robbed of. And maybe it's pure coincidence that their numbers have increased as the TFA content of foods keeps rising!

If you're rearing one of these hard-to-handle kiddos and you've eliminated any foods or chemicals they may be allergic to but they're still climbing the walls, the next step might be to get 'em off TFAs and fill 'em up with flaxseed oil, flaxseed meal, seafood, and some Omega-6 GLA from evening primrose oil. Like chicken soup, it can't hurt!

CATARACT & LIPOIC ACID

On the subject of eyesight, a brand new study by U.C. Berkeley's Dr. Lester Packer2, who was my prof when I was an undergrad in the late 70's, had me scouring my textbooks. "Alpha-lipoic acid" had a remarkably protective effect against cataract formation, induced in newborn rats by BSO, a nasty drug. Alpha-lipoic acid?? Sure enough, it turns out to be an obscure, essential co-factor for enzymes responsible for converting glucose and fatty acids into chemical energy in our bodies. That makes it a vitamin, but not necessarily for mammals, which presumably can biosynthesize it.

Nevertheless, the study found that supplementation with alpha-lipoic acid protected 60% of BSO-treated animals from cataract formation. That's impressive.

Lipoic acid, a sulfur-containing fatty acid, is also known as thiotic acid. Besides its energy-making role, it seems to be a newer member of the "antioxidant network"—those sterling nutrients that sponge up destructive free radicals in our tissues. Apparently, it works synergistically with the others, our old friends vitamin E, vitamin C, and glutathione. These happen to be key elements in protecting the lens of the eye against oxidative damage from light, etc.

In the experiments alpha-lipoic acid restored lens concentrations of glutathione, vitamin C, and vitamin E to normal after the destructive BSO treatment. It also restored the major antioxidant enzymes in the lens, including glutathione peroxidase.

Dr. Packer's group suggests "that alpha-lipoic acid can prevent the formation of cataract by overall enhancement of the lens oxidative defenses.....This protective effect...on cataractogenesis could be of major therapeutic value."

That qualifies for mighty good news, in my book. I checked vitamin suppliers and, sure enough, some of the leaders are carrying it (as alpha lipoic or thiotic acid). It occurs to me that this 'almost-vitamin' could be like other "non-essential" but crucial molecules, which our bodies are supposed to be able to make---only, some of us aren't doing such a hot job! Choline, taurine, and carnitine fall into this category—with plenty evidence of benefits from long-term supplementation. Perhaps as we get older, biosynthesis falters, or in some individuals wasn't so great at any age. In any event, I think I'll add lipoic acid to my ludicrously rich supplement intake—all for the sake of research, naturally!

DYSLEXICS & w-3 DHA

A letter in the August 5th The Lancet from B. Jacqueline Sturdy, University of Surrey, U.K., tells how a daily dose of 480 mg DHA for one month significantly improved dark adaptation (scotopic, or night vision) of all five adult dyslexics in research trials. In four of five controls "DHA had no effect on dark adaptation, although in one (a strict vegetarian) adaptation clearly improved."

Prof. Sturdy writes: "DHA is a key fatty acid in both retina and brain and is usually present in large quantities in these tissues. In these studies I show the benefit of DHA supplementation for one aspect of retinal function. I have found that DHA supplements given to dyslexics can also be associated with improvements in reading ability and behaviour [my emphasis, C.F.]. These reports are anecdotal and subjective but more formal controlled studies are in preparation."

Interesting, that the nondyslexic vegetation's night vision improved. Strict vegetarians generally have low DHA levels because to get it they have to convert the parent Omega-3, alpha-linolenic acid (from foods like Canola oil, walnuts, flaxseeds, etc.), into DHA by a series of enzyme-controlled steps that may not happen readily.

How practical is an intake of 480 milligrams DHA? Very! A 100 gram portion (3/12 oz) of either trout, salmon, shark, tuna, bass, halibut, herring, or mackerel will do it with milligrams to spare. Squid, clams, oysters, and shrimp have quite a bit of DHA, although less than the above fatty fish. All fish and shellfish have some DHA—the fatter species have more. And for those who cannot eat seafood, a vegetarian (from algae) DHA supplement should be available in the near future!

The friendly hormone!

Good news on the natural progesterone front. A new study compared the effects of gels containing either (a) progesterone, (b) estradiol (an estrogen), (c) or both, or (d) placebo, applied topically to the breast in 40 premenopausal women, for 10 to 13 days preceding breast surgery for a presumably benign lump. The purpose was to see the effect physiological amounts of the hormones applied transdermally would have on proliferation of breast epithelial tissue.

Epithelial hyperplasia (excessive breast cell proliferation) is one of the major risk factors for breast cancer. In the women's normal breast tissue, taken from the non-lump area during surgery, estradiol caused cell proliferation to increase significantly compared with placebo, while progesterone actually decreased it below placebo levels. Where the gel contained both hormones, progesterone prevented estradiol's tendency to accelerate breast cell proliferation. (Incidentally, applying the gels topically caused estradiol and progesterone to show up in significant amounts in breast cells.)

The results suggest that transdermal progesterone administered monthly may reduce the risk of breast cancer.

Most of these effects are documented, some are anecdotal. They're impressive enough for Dr. Krebs to have designated nitrilosides as vitamins, i.e., substances required in small amounts for health, which have to be obtained from food. This hypothesis has earned him guffaws and sneers from mainstream scientists, most of whom continue to classify nitrilosides solely as toxic substances.

Illustrations by Clay Geerdes and other artists as noted.

The Felix Letter, P.O. Box 7094, Berkeley, CA 94707, has been published independently by Clara Felix since 1981 and supported solely by subscriptions. Descriptive list of back issues & sample, $1. Year's subscription (6 issues) $12; two-year (12 issues) $22.

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