

The FELIX Letter

A COMMENTARY ON NUTRITION

No. 69

1993

THE EXPERTS PLAY CATCH-UP

Back in 1982 in *Felix Letter* #3, I conjectured that the modest, steady downturn beginning in 1968 in numbers of heart attacks--they had skyrocketed between 1920 and 1960--could be ascribed in part to a strange new phenomenon: the popping of daily supplements, including vitamins A, C and E, by millions of Americans. Heart-protecting nutrients had been milled out of cereals and flours by high-tech 20th century food processing. I wrote: "Replacing lost values with little supplements in bottles is an absurd way to go, but it's a stopgap and may be saving lives."

As expected, the medical experts saw no connection. Too much cholesterol and animal fats in the diet were gumming up our arteries, that was *it*. Well, they've turned a corner. Nowadays, they're focusing on a new suspect--oxidized cholesterol in blood. Normally, much of the cholesterol our body makes, plus whatever we absorb from food, is ferried thru the blood by carriers, the low density lipoproteins, or LDLs. (Despite its bad press, cholesterol is important to us.) LDL-cholesterol that gets oxidized apparently sets off a chain of events leading to plaque-filled arteries.

Well, fan my brow if our old friends, vitamins E and C, don't turn up as big-time quenchers of free radicals in the blood, protecting LDL cholesterol specifically from such oxidation! [Sato, K., et al., *Arch. Biochem. Biophys* 279: 402, 1990; Princen, H.M.G., et al., *Arterioscler. Thromb.* 212:554, 1992; and Jialal, I. & Grundy, S.M., *J. Lipid Res.* 33:899, 1992.]

The authorities are in raptures about this 'novel' way to nip heart attacks in the bud. For decades, we've tried to tell them, but they were too busy getting their patients to use margarine to listen. **

MORE CATCH-UP BY THE EXPERTS

Readers sent me clippings and congratulatory notes from all over the U.S. last October, when a report from the Agriculture Dept. made headlines with the bad news that *trans* fatty acids in margarine and other hydrogenated

products may be *causing* rather than preventing cardiovascular disasters. The new study confirmed an earlier one in 1990 by Dutch researchers.

It was vindication for 'our' side. We had long taken to heart the warnings of dedicated scientists like Mary E. Enig and F. A. Kummerow, who began alerting the medical community years ago to the not so funny effects on health of machine-made "funny fats." *Trans* fatty acids are abundant in commercial foods prepared with margarine, solid shortening, or partially hydrogenated oils. Drs. Enig and Kummerow said *trans* fats resemble essential fatty acids (EFAs) enough to insinuate themselves into cell membranes. Once there, *trans* fats bolx up the works because they can't perform the job of real EFAs (FL#19, #31, #55).

I learned what this actually signified in terms of health when I read Donald O. Rudin, M.D.'s biomedical manuscript in 1984, the one we later adapted in popular style as *The Omega-3 Phenomenon*. He had arrived at the stunning conclusion that the little-known Omega-3 (w3) fats were major directors of cell functions--local 'hormones,' if you will, which worked in concert with the other essential fatty acids, the much-touted w6, to coordinate activities in tissues and organs, including the brain. The improvements in chronic physical and mental ailments in his

patients came about not simply because he was having them take the missing w3 oils daily, but because he removed margarine and other sources of *trans* fatty acids from their diets. He knew *trans* fats would sabotage the good effects.

But medical leaders and obedient dietitians went on promoting low w3, high w6, high *trans* fat margarine for the heart, as they'd done for 25 years. No upstart researchers, by golly, were going to rain on their crusade!

Here's an aside on advertiser influence in the so-called healthy heart campaign. Dr. Rudin and the original would-be publishers of our book came to a cataclysmic parting of the ways *when they suddenly insisted we take out all negative references to margarine in the by-then almost completed manuscript*. A furious Dr. Rudin said it was impossible, since this had been the premise of his 44-patient study as well as intrinsic to his whole theory! We noted sadly the firm had just recently begun running first-time ads in their magazines, full-page in color, for Fleishmann's margarine, Nabisco crackers, and other *trans* fatty delights. (The book eventually was published by Rawson of MacMillan.)

The earlier study by Dutch scientists in 1990 in *The New England Journal of Medicine* created shockwaves in the medical world--mainly because a prestigious journal finally had acknowledged *trans* fats might be harming us. In FL#55 I hailed the news, but have since become aware that little has changed. The processed food world still churns out *trans* fat-filled cakes, crackers, cookies, candies, cheeses, breads, rolls, fries, chips, etc. as fast as consumers can wolf them down. Dietitians' handouts still recommend margarine.

Maybe they'll bend a little, now that sobering new backup evidence comes from a Harvard Medical School team led by Dr. Rebecca Troisi [December 1992 *Am. J. Clin. Nutrition*]. *Trans* fats caused disturbing blood lipid changes in over 700 male subjects, namely an increase in 'bad' cholesterol (LDL) and a decrease in 'good' cholesterol (HDL). Their intake of



these fats was *less* than what the average American consumes. Even so, the magnitude of the changes corresponded to a 27% increase in risk of heart attacks. Heart disease is our chief slayer. The food industry has thousands of competent scientists and technologists—I know, I went to school with some of them. Most of them even have a conscience! All in all, there are multiple incentives for the industry to come up with *trans* fat-free products that sell well.

Meanwhile, until *trans* fat-less products make their debut in the marketplace [don't hold your breath!], canny folks, i.e., FL readers, will continue to avoid margarine, shortening, "partially or lightly hydrogenated" oils, and assorted stuff made with any of the above. Hark, your arteries are cheering! * *



FOR THAT TRANSFATTY TASTE
THAT STAYS WITH YOU!

FLAXSEED: IS IT SAFE?

New subscriber E.N. in El Sobrante, California, writes: "My son started taking flaxseed and then someone at work brought a book to him saying flaxseed is poisonous. Is it or isn't it? According to #68 Felix Letter, you just received a bag of flaxseed."

Dear E.N. and readers: If flaxseed is poisonous, I must have gone belly-up a while back and the newsletters are all being ghostwritten! Fortunately for its devotees, flaxseed is edible, although like many worthwhile foodstuffs it has its share of natural toxins. Here's the scoop on its safety, etc., based on current data.

(a) First of all, flaxseed has a laxative effect. Some people swear by it, saying they have one or two extra bowel movements a day with no uncomfortable urgency, but others can't handle it. The Irritable Bowel brigade, including myself, tempers the effect by taking flaxmeal with psyllium powder (e.g., Metamucil). I always advise starting with one teaspoon of flaxmeal—ground flaxseed is better absorbed—and gradually build up over weeks to a few tablespoons.

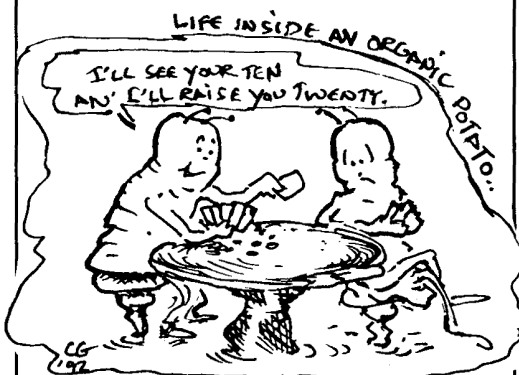
(b) Some of the w3 and w6 fatty acids in the flaxseed we eat become part of our cells. Tissues high in polyunsaturates are vulnerable to peroxidation. Our body's defense is to use its store of antioxidant vitamins such as A and E to fight off free-radical damage. Medical researchers in Toronto found that consumption by subjects for four weeks of 50 grams a day of flaxseed meal baked in muffins didn't deplete their blood levels of vitamins A and E, a good sign.

There was an upward trend in metabolites associated with peroxidation of fats, by the end of the fourth week, though not very significant. (Willy nilly, I say routine supplements of antioxidants C, E, and beta-carotene can do only good if we're on a generous w3 diet, which all of us should be.)

Note: 50 grams is A LOT of flaxseed meal—8 level or about 5 heaping tablespoons a day. I wouldn't wish that amount on anyone! Of course, the researchers were testing uppermost limits of safety.

(c) Flaxseed contains anti-B6 factors, which have produced undesirable effects in some farm animals when flaxseed meal is given as a big part of regular feed. Amounts up to 12% of feed by weight, however, seem to be mainly beneficial. As for humans, I don't see a problem for anyone taking a modest 1-3 tablespoons but the Fortified Flax makers add a little B-6 to their formula to be on the safe side.

(d) Cyanogenic glycosides (also called nitrilosides) are cyanide bearing molecules found in a great many foods favored by man and beast. Examples are blackberries, huckleberries, raspberries, millet, buckwheat, clover, common fodder grasses, cassava, yams, mung bean sprouts, alfalfa sprouts, lentils, apple and apricot seeds, and flaxseed. We know pure cyanide is a poison, but in minute amounts from foods like these it's detoxified in the body to thiocyanate, a normal constituent of blood, saliva, and urine. Subjects getting the walloping 50 grams of flaxmeal daily showed only a modest increase in thiocyanate excretion. No signs of toxicity.



Here the story becomes intriguing. Remember Ernst T. Krebs, Jr., who said Laetrile is a nitriloside and, as such, is a natural cancer fighter? Societies and individuals habitually consuming large amounts, he claimed, stayed cancer-free and healthy. Laetrile became the center of stormy, bitter controversy that peaked a dozen years ago. Although some studies looked promising, there was much hoopla in the press about its dangers and a few defiant doctors got thrown in the slammer. Laetrile still is banned in many states. Last spring, at a conference on alternative medicine, I heard Ernesto Contreras, Jr., M.D., medical director of a modern cancer facility just across the border in Tijuana, Mexico, tell the audience matter-of-factly that Laetrile is not effective in many of their cases, but in certain types of cancer they find it works very well. Hospital Ernesto Contreras, named after his physician father who still is practicing, has employed conventional and alternative therapies for over 25 years.

Research Off the Beaten Track

In 1978, not long after I graduated from UC Berkeley, I helped organize a seminar called "Non-orthodox Topics in Nutrition" with classmates who had gone on to graduate school in nutrition and/or public health. (I was a trouble-maker even then.) We got a lot of flak from some of the faculty who learned one of our invited speakers—horrors!—was Ernst T. Krebs, Jr. After I heard his lecture and chased down a bunch of references, I was left with the conviction that, whether or not Laetrile worked as a treatment for cancer, there might be a reason nature had been so generous in making cyanogenic glycosides available to all living creatures—often in plants that were compellingly rich in flavor. (And nutrients. Think of plump blackberries gleaming in the sun, loaded with vitamins C, E, and nitrilosides!) Could the fact that nitrilosides were missing from the processed stuff most Americans ate on a daily basis have a bearing on the cancer epidemic in the U.S.?

A little more digging provided me with comforting data on thiocyanate. An older name for thiocyanate was *sulfocyanate*, since the linkage to sulfur detoxifies cyanide. As long as the diet contains enough sulfur amino acids (e.g., cysteine) in protein, ingestion of nitriloside-rich foods simply leads to more thiocyanate formation.

Guess what thio- or sulfocyanate does? In medical journals of the early 1930s and 1940s I ran across dozens of papers showing *sulfocyanate* lowered high blood pressure. People with higher thiocyanate

levels in blood were less apt to suffer from hypertension than those with low thiocyanate levels. Potassium or sodium thiocyanate actually was prescribed as anti-hypertensive medication until after World War II, when patentable drugs for the disorder multiplied like rabbits.

Other early medical reports said thiocyanate was a strong *bactericide* [this was before the penicillin era] and a useful remedy for dysentery. It also reduced the frequency and severity of migraine headaches.

Starting in the 1970s, there began to be research reports that thiocyanate inhibited sickling of red blood cells in sickle cell disease. On a diet high in nitrilosides, persons who inherited the disease appeared to bypass the deadly anemia and disabling sickling crises that usually characterized the ailment. (Implications of this for people of African descent are enormous because so many have inherited the disease. I'll report on further research in future issues.)

Toxicology textbooks say too much thiocyanate can be a problem because it can depress thyroid function. Plants in the cabbage family contain ready-formed thiocyanate, and huge intakes have been associated with goiter.

Toxicity from high intakes of nitriloside-rich foods *without adequate intake of proteins containing sulfur amino acids* has been reported in communities in the Third World where, for example, cassava, a starchy food high in nitrilosides, is a staple of the diet, but protein sources are unaffordable.

On the whole, though, people with reasonably balanced intakes of traditional foods containing nitrilosides and thiocyanate don't suffer toxicity. There *must* be a reason these foods are so widespread in nature and so often preferred by animals and birds. I remember my Toxicology professor at UC Berkeley startling me when he warned us that apple seeds contained "poisonous cyanogenic glycosides." I had *always* eaten the seeds since I was a little squirt. I seemed to crave them as much as the apples, yet here I was, still alive and making trouble!



Of course scientists are right to caution people about toxic components of edible foods. But maybe they could step back for a longer view. They might observe that mankind can't always get what it needs to nourish itself wholly by means of readily absorbable, comfortably benign plant nutrients. It's possible we require additional elements, but the plant may be guarding these with a shield of poisonous armor! Maybe that's why we evolved unique metabolic pathways enabling us to crack the shield.

When the body transforms cyanogenic glycosides into thiocyanate, is it simply getting rid of a toxic nuisance, or is it creating something it needs?

Now excuse me, while I stir a tablespoon of flaxmeal and a teaspoon of psyllium powder into a half cup of pineapple juice and swill it down. * *



WHAT'S SO SPECIAL ABOUT w3's ANYWAY?

I never thought the day would come when I couldn't keep up with research on my favorite fatty acids.—a deluge is coming at me from all sides and I'm plumb tickled! Here are a scattering of highlights dealing mostly with w3 ALA from plant sources.

• Rats, mice, chickens, and pigs convert ALA quite efficiently to EPA and DHA, the ultrapolyunsaturated w3's found in fish. The question is, can people do the same? Reports from the Flax Institute confirm our systems *can and do* convert ALA to EPA and to small amounts of DHA. Vegetarians can rest easy. (The exception to that is during pregnancy and lactation, when the fetus' and infant's requirements may not be met by the limited amounts of EPA and especially DHA the mother can make from ALA., especially for the brain.)

• Flaxseed oil lowers elevated blood fats (triglycerides) nearly as well as fish oil does. Another plus for the heart by either oil: less tendency of blood platelets to clump together abnormally.

• Encouraging longterm studies are in progress on anti-cancer effects of lignan, a fiber found abundantly in flaxseed.

• Unlike flax oil which turns rancid quickly unless refrigerated, stability of whole and ground flaxseed is excellent. Even when stored at room temperature for 44 weeks, both show very low peroxide values (a measure of oxidative rancidity), and no change in fatty acids. Similar results are seen after heating for one hour at very high temperatures.

• Flaxseed and canola seed comprising up to 16% of diet of laying hens resulted in good egg quality and large increases of ALA, EPA, and DHA in the eggs.

• Broiler chickens fed a 15% flaxseed diet were smaller and leaner than control fed chickens, but their fat had almost 500% more ALA, 180% more EPA, and 90% more DHA. Canola seed at 25% of diet increased w3 levels substantially in the chickens with no decrease in their size.

• In Germany, over sixty-six thousand tons of flaxseed are baked into breads and buns each year.

• China has used flaxseed oil as a food oil for perhaps 5000 years. People in northwest and north China today are the country's biggest flax producers and flax oil consumers.

• Archeologists working at a site south of Jerusalem discovered remains of linen fabric dating back 8,500 years. At that time, villagers along the Jordan Valley were cultivating flax. A few thousand years later, Egyptian societies made linen thread from flax and pressed its seeds for lamp fuel and food oil. * *

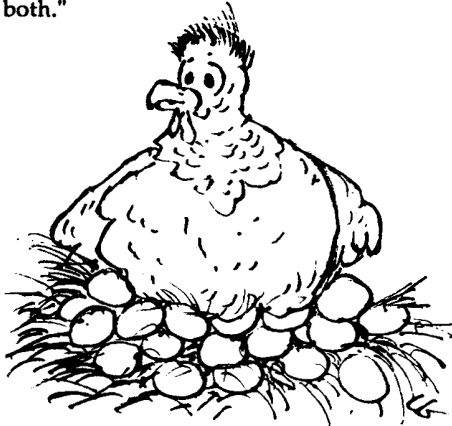


INFANT FEEDING: A NEW LOOK

Artemis Simopoulos, M.D., thanked me for restoring her female identity in FL#68, reminding me Artemis was the name of a Greek goddess. (I get an F in Mythology!) She also sent a research paper she did with Dr. Norman Salem, Jr. on how to make egg yolks a super source of the fatty acids infants need for their development (*Am. J. Clin. Nutr.*, 1992;55:411). At the Ampelistra farm in Greece, "the chickens roam freely and feed on various types of fresh green grass leaves and wild plants including purslane, which is plentiful, and their diet is supplemented with fresh and dried figs, barley flour, and small amounts of corn. The chickens also eat insects of all kinds and sometimes eat worms when the weather is very dry."

The Greek egg yolks contain at least 900% more w3 than U.S. supermarket egg yolks. The authors point out wild purslane is much richer in w3 than cultivated spinach; animals in the wild have far more w3 in their carcasses than do domesticated animals; wild fish have more w3 than hatchery-raised fish. "Industrialization and agricultural practices have systematically reduced the amount of w3 fatty acids in the plants, eggs, fish, and meat that we eat."

"Most important, however, have been the studies indicating that infant formula is devoid of long-chain polyunsaturated acids, including both the w6 and w3 families, whereas human milk contains both."



I was never the same after I learned in 1983 that w3 and w6 fats were equally prominent in the brain[FL#15]. The data had existed, clear as crystal, since the 1960s, but the handful of scientists who knew and cared were ignored. From then on, I hammered away at the unspeakable fact that (a) pregnant and nursing mothers in the U.S. were not being advised to include w3 sources in their diet; and (b) infant formulas contained none at all; which meant babies were not getting what they needed to grow a healthy brain and strong eyes.

Nothing happened for a long, long time. The designers of infant formula, taking their cues from the pediatricians and dietitians, sat on their hands.

At last, the weight of hundreds of research papers on w3's is pushing the door open a crack. Dr. Simopoulos' momentous review article in 1991, "w3 Fatty Acids in Health and Disease" (*Am. J. Clin. Nutr.*, 54:438-463, 211 references), may change the focus of infant feeding. It pinpointed the need for w3's in the developing fetus. The distorted ratio of very high w6 to very low w3 fats in mother's diets "can be considered unbalanced relative to human breast milk and that these diets are damaging to the PUFA [polyunsaturated fatty acid] composition of the developing central nervous system in humans."

Further, "Omega-3 fatty acids are essential for normal growth and development throughout the life cycle and they must be included in the diet of pregnant women, premature infants, full-term infants, children, young adults, and elderly adults."

So, back to Simopoulos & Salem's paper on egg yolks! In Greece, China, and the Middle East they are used as supplemental foods for very young babies. Why not here, they ask, as a source of long-chain w3 and w6 fats missing from infant formula, or in addition to breast milk? The Greek eggs were compared with (a) "fishmeal eggs" from hens fed soybeans and fishmeal as fat sources; and (b) "flax eggs" from hens fed flaxseed, soy meal, alfalfa, and corn.

All had infinitely more w3's, and a far lower w6/w3 ratio, than the supermarket eggs. The Greek eggs, however, had the most w3 and w6 long-chain PUFAs, those valuable for the developing brain. One Greek egg yolk would supply the equivalent amount of w3 PUFAs a one-month old infant would get from a day's breast milk, about 250 mg. With "appropriate manipulation of chicken feed, the fish-meal and flax eggs could be made to resemble the Greek eggs." Forget about the supermarket eggs, though. You'd have to feed the baby more than eight yolks to get those w3s!

FLASH! I just received the January 1993 *J. Am. Dietetic Assoc.*, in which Joyce A. Nettleton makes a scholarly case (95 references) for w3 fatty acids being essential in the diet of pregnant and lactating women to assure healthy babies. Emphasis is on seafoods, "especially fatty fish." If consumption of seafood is impossible, poultry where fish meal has been added to the feed becomes another fair source of EPA and DHA.

Effects on the fetal or infant brain deprived of DHA are difficult to evaluate, but in infant rhesus monkeys too little DHA produces irreversible defects in the retina of the eyes. One group of researchers found that scores on an "intelligence" test for preterm infants correlated with DHA content of their red blood cells!

DHA in breast milk increases with increased dietary intake of DHA, usually from seafood. Preterm and very young infants given formula containing ALA, but not EPA or DHA, lose DHA steadily from their blood and tissues, while those who are breastfed gain DHA.

While breast milk has polyunsaturated long-chain fats needed for the baby's eyes and brain (w3 EPA and DHA, plus w6 arachidonic acid), Nettleton says *not a single infant formula in the U.S. contains them*. She writes in the dry, patient language of scientists who lay out sterling research evidence, over and over again, to little avail. In her shoes, I think I'd want to crack a few heads together!

At this rate of progress by the pachyderms promoting pediatric policy, a baby today will be in high school when his improved formula arrives. What's to stop parents from going back to the centuries old, tried and true practice of putting a few drops of cod liver oil on the kiddo's tongue, or 5 to 10 drops in the day's formula? The pediatrician's mom probably did the same for him, and look how well he turned out! ***



Illustrations by Clay Geerdes and other artists as noted.

The Felix Letter, P.O.B. 7094, Berkeley, CA 94707, is published independently by Clara Felix and supported solely by subscription. Descriptive list of issues & sample, \$1. Subscription \$11 (6 issues). Canada & Mexico \$12, U.S. funds only.

©1993. All rights reserved.