

# The FELIX Letter

A COMMENTARY ON NUTRITION

NO. 12

Recently, I attended a weekend nutrition conference\* in San Francisco's elegant old Sheraton-Palace hotel, together with dieticians, physicians, and nutrition professionals from all over the U.S. (My comely seat neighbor was a young public health nutritionist from Hawaii.) The topics chosen by the sponsoring medical/educational institutes reflected major concerns, and I thought the insights expressed by a number of the speakers well worth sharing with *Felix Letter* readers.

## MATTER OVER MIND

An agreeable development in psychiatry is the newer therapeutic approach using nutrients to improve mental function and mood. At the conference, Dr. Marshall Joseph, a resident in psychiatry at the Langley Porter Psychiatric Institute, University of California, San Francisco, described the encouraging results with one group of nutrients — dietary precursors to specific neurotransmitters that the body makes. It's now known that taking these nutrients orally will increase both the amounts and the synaptic transmission (communication from nerve to nerve) of the following neurotransmitters:

**Tryptophan** (amino acid) — increases *serotonin*.

**Tyrosine** (amino acid) — increases *norepinephrine*.

**Choline** (vitaminlike food factor) — increases *acetylcholine*.

Dr. Joseph noted that the amino acid, *tyrosine*, is helping in *depressions where decreased norepinephrine activity may be involved*. A different kind of depression (the heterogeneity of depressions contributes greatly to difficulty in treating them) can be helped by *tryptophan*, which raises *serotonin* levels and activity. The therapeutic dosages are 2 to 4

grams a day, and in some studies as much as 16 grams. (Healthfood stores sell half-gram capsules.) Dr. Joseph believes tryptophan works well as an addition to the commonly prescribed tricyclic antidepressants.

In *insomnia* (with or without depression), up to two grams of tryptophan at night will decrease the time it takes to fall asleep, he said, and unlike drugs, will restore a natural quality to sleep.

Alzheimer's disease, a severe mental deterioration thought to be incurable, is characterized by loss of "cholinergic" neurons — nerves that use *acetylcholine* to transmit their message. Dr. Joseph said that *cognitive functions improved* in Alzheimer patients after a number of weeks of *choline* therapy, administered by Dr. Ken Davis of Stanford University.

I've been impressed by other research as well, where progress has been seen in hopelessly senile Alzheimer patients given either choline chloride or phosphatidyl choline. Both will increase acetylcholine activity, but

choline chloride causes an unpleasant fishy body odor. Phosphatidyl choline is a natural compound from lecithin (derived from soybeans), has no side effects, is showing promise in other neurological disorders (Parkinson's disease and tardive dyskinesia), and may well prove to be an all-round boon in heart problems as well! Our body makes its own, but inadequate synthesis (one possible cause: poor nutrition) may be responsible for a whole patchwork of disorders. ■

## NUTRITION & IMMUNITY

Diane Wara, M.D., associate professor of Pediatrics at U.C. San Francisco, is an attractive, crisp-spoken young woman who specializes in pediatric immunology. Although it's been known for some time that lack of a single nutrient can affect the immune system, her awareness of this came about in a poignant way. About five years ago, she was involved in a case of four children from southern Oregon with "primary immunodeficiency disease." Without immune factors or antibodies to protect them, three of the children died from overwhelming infections. In working with the single remaining child, an inherited defect that caused a deficiency of the B-vitamin, biotin, was discovered. All enzymatic activities that depended on this single vitamin were absent, and this alone was enough to inactivate her entire immune system!

Miraculously, they found *they could completely reverse her immunodeficiency by giving her large amounts of biotin*, Dr. Wara related. "This was my first experience with the disastrous effects of a single deficiency."

The relationship of nutrition to immunity has great implication in countries where enormous numbers of children suffer from protein-calorie malnutrition. Medical studies show that although these children produce *antibodies*, which partially protect them from bacterial infections, their



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resistance to viruses, fungi, protozoa and other parasites is very poor, and they have a terrible mortality from infections that are ordinarily not deadly in well-nourished children.

### ***T-Cells Vs. Disease***

It is their "cell-mediated immunity," rather than antibody production, which is affected by malnutrition. The T-cells (produced in the thymus gland) which defend us against viruses, fungi, parasites — and also *cancer* — are greatly reduced in activity and number in poorly nourished persons. By no means are children in developing countries alone affected. "It is interesting that malnutrition does not have to be that significant to induce abnormal cellular immunity," Dr. Wara told the conference. In children who are renourished, there can be rapid renormalizing of all immune system functions in as little as 3 weeks.

### ***Replacing Thymus Hormones***

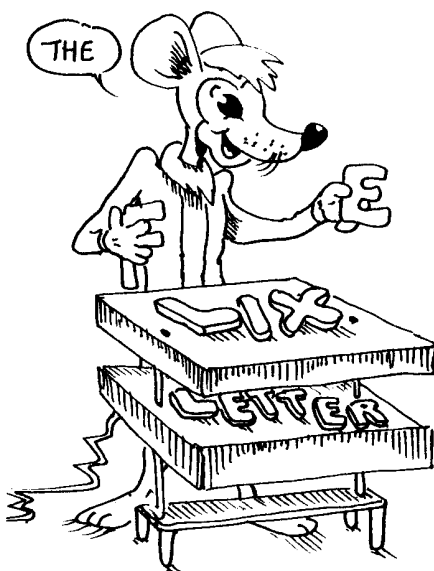
**T**hymus gland hormones begin to decline in everyone at puberty, and by age 50 are no longer detectable. T-cells and T-lymphocytes remain in circulation, however, and cell-mediated immunity continues. A significant area of research in which Dr. Wara is involved is the use of thymic hormones (from calves) to stimulate T-cell function in children with primary (inborn) immunodeficiency disease, and in adults with cancer. "We know as people get older, their T-lymphocytes decrease in number. We also know they have increasing problems with malignancies, with auto-immune diseases . . . I know that, in a test-tube, I can take cells of an aging individual, mix them with thymic factors, and drive them to behave as if they were a young child's cells! . . . The basic problem is that we still don't know *why*, we don't understand the biochemical cause . . . That's where we're stuck right now and where most of the work is going on."

Replenishing natural substances when our body fails in producing enough, falls within the logical premises of "orthomolecular medicine." Thymus hormone replacement is an area of research with promise in fighting cancer and the auto-immune diseases like rheumatoid arthritis, and may even hold out hope for slowing down aging. I'm glad someone's doing it. ■

## **DIET AND THE HEART**

**T**he concept of dietary fats and cholesterol as major contributors to coronary heart disease (CHD) has been rooted firmly in medical psyche and practice for at least 25 years. Stephen B. Hulley, M.D., M.P.H., who studies and teaches the epidemiology of heart disease at the University of California, San Francisco, asked the big question: How strong is the evidence that a fat-controlled diet is beneficial? He outlined the three parts of the fat-cholesterol-arterial disease hypothesis that largely guides current medical management of CHD:

- 1) Dietary animal fats strongly contribute to higher serum cholesterol levels.
- 2) Higher serum cholesterol levels are a major factor in the development of coronary artery disease, i.e., thickening of the walls of the coronary arteries of the heart with cholesterol and other "plaque" materials.
- 3) The narrowed, plaque-thickened coronary arteries are prone to blood clots which, by diminishing or cutting off circulation to portions of the heart, can damage it severely — i.e., coronary heart disease.



The epidemiological evidence for precept 1 is comparatively easy to demonstrate in human studies, Dr. Hulley said: diets high in animal fat can raise serum cholesterol levels in normal persons, and diets low in animal fat can lower them. Uncertainty centers mainly on the second precept. Unlike simple procedures used to establish the first, direct evidence that plaque will automatically build up in arteries of persons with high serum cholesterol can be arrived at only through invasive medical techniques such as arteriograms and biopsies — clearly out of the question when dealing with large population studies.

### ***Do Low Fat Diets Work?***

**B**ecause of the difficulty of obtaining conclusive evidence of a direct link between high serum cholesterol and coronary artery disease, researchers have attempted to confirm it indirectly: by experimenting with low saturated-fat, low cholesterol diets in large numbers of people, hoping to observe a reduction in CHD mortality. Dr. Hulley personally thinks there is value in such diets and believes there is moderate evidence in support of the theory that a high saturated-fat diet leads to coronary artery disease and a higher rate of heart attacks. He notes, however: "In crucial experiments using a modified diet [reducing animal fats and dietary cholesterol] to see the effect on CHD rates — *all* the studies have been inconclusive, including the largest one."

Robert I. Levy, M.D., in the lead editorial "Cholesterol and Disease — What Are the Facts?" in the December 3, 1982 *Journal of the American Medical Association*, makes essentially the same point:

*Where there is doubt and true controversy in the cholesterol-CHD relationship, it takes place when we ask whether [serum] cholesterol lowering will decrease CHD risk! Here, although we have much presumptive epidemiologic data and strongly suggestive animal studies, we still have no definitive clinical trial evidence in man.*

While Dr. Levy expects that "large multiyear, multicenter clinical trials under way" will adequately test this hypothesis, Dr. Hulley is no longer optimistic, stating:

*It's not likely that we will be able to prove it with clinical trials, as these get progressively larger and more expensive. There is no existing diet-only large-scale study in progress, because it was calculated that the sample size would have to be 50,000 to 100,000 persons [!], which is entirely unfeasible both in size and expense.*

**D**r. Hulley pointed out that in the major experiments — the Framingham, Mass. and similar ones in the U.S. and Europe, in which ordinary groups of people in communities were followed over long periods of time — persons with very high serum cholesterol tended to have more heart attacks. But several studies also show that those with very low cholesterol had more deaths from cancer and stroke. Statistically speaking, groups with 190 to 220 milligrams of cholesterol per 100 milliliters of serum had the lowest death rates from all causes. ("Normal" laboratory values are usually noted as 150 to 280 mg/100 ml.)

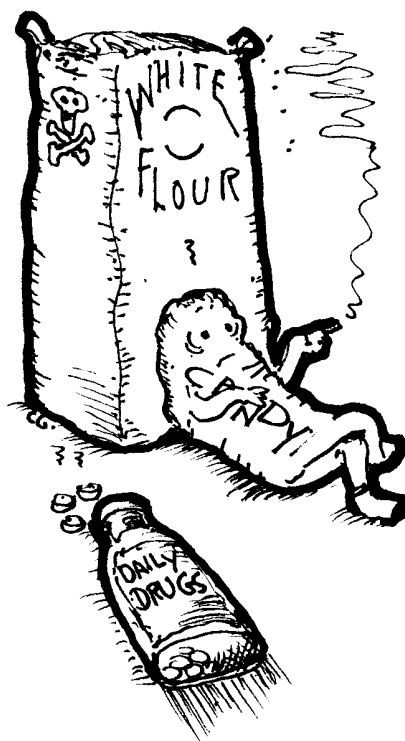
In light of the unconvincing findings of the major long-term trials, Hulley now believes it's questionable whether benefit will be derived from placing persons on rigidly fat-controlled diets if their cholesterol levels are under 240 mg/100 ml; and if cholesterol levels are very low, Hulley believes such a program might even be harmful, since it's not known whether the low levels seen in cancer or stroke are a symptom of, or a contributing factor to, the illness.

### ***Cholesterol: Villain or Hero?***

**I**'ve observed the fat-cholesterol-heart disease theory with a measure of skepticism over the past 25 years, beginning when I was an ingenuous housewife-mother/Adelle Davis convert, without a phrase of medical jargonese to call my own. Now, as a late bloomer with a 1977 degree from U.C. Berkeley's nutrition department and a heady brew of rich biochemicalese to draw from, I am more fully confirmed in my suspicion that organized medicine has been betting on a lame horse and a blindfolded rider in the race against CHD.

Making a villain out of cholesterol stopped making sense to me after I learned what our bodies did with it.

The ovaries and testes use it to make the sex hormones. It's the molecule from which the adrenal cortex makes perhaps 50 different steroid hormones, including all the cortisones, aldosterone, and a number of male and female sex hormones as well. (The adrenal cortex produces androgens and estrogens in addition to those produced by the testis and ovary.) In humans and animals, sunlight converts cholesterol in skin to vitamin D, which is fundamental to calcium metabolism. The largest daily use of cholesterol is in the synthesis by our liver of bile acids, for the emulsification and digestion of fats from food. Like animals, birds, and fish, we go to a lot of trouble to *make our own cholesterol* in liver, brain, intestines, etc., using about 17 metabolic steps and almost as many enzymes, plus nutrients like niacin, pantothenic acid, phosphorus, and magnesium. When we eat foods containing cholesterol, our liver makes less.



Biochemistry is a science that makes me feel humble and at the same time, confident. I am humbled by its grand complexities, and by the patience and genius of generations of its researchers who continue to investigate cellular organization at the molecular level. But as they progressively lift the curtain on its mysteries, I am further reinforced in my *confidence*. For we are beautifully designed! we are artfully put together — unquestionably to enable us to live long, healthy lives! — and we shouldn't settle for less.



**C**holesterol-filled plaques that narrow our arteries dangerously ARE a disease manifestation. It takes a simplistic and cloistered point of view, however, to ascribe this disease to dietary fat and cholesterol. The result has been a channeling of efforts for 20 years into backing 'a lame horse and a blindfolded jockey,' i.e., the big push to lower cholesterol levels as a root cause of CHD by (a) reducing intake of dietary fats and cholesterol; and (b) developing drugs that inhibit the synthesis of cholesterol, or that bind with it and excrete it from the body.

The results from most of the long-term studies using these therapeutic strategies are in now, and they are disappointing to doctors like Levy and Hulley who subscribed to the concepts. While still considering low-fat diets to be prudent for persons with high serum cholesterol, Hulley confesses now to skepticism about the value of much of current medical intervention in CHD.

### ***Another View of CHD***

**A** new and more encompassing theory on the etiology of CHD, with a better-developed nutritional logic, states that plaque forms not from cholesterol but because highly reactive substances (e.g., free radicals) — some derived from normal metabolic processes and others from toxic environmental products — produce damaging lesions in poorly protected arteries, or in arteries suffering the punishing effect of chronic high blood pressure. A tumor-like proliferation of cells inside the artery wall results, producing and accumulating its own cholesterol and fatty plaque materials. After it gets large enough to push out to the artery surface lining the blood channel, it can attract calcium and cholesterol from the blood, further increasing its mass and narrowing the channel.

Or, as Dr. T.L. Cleave of the London Royal College of Physicians, writes: "Now, many consider that in coronary disease any pathological changes involving cholesterol are an associated, not a causative, event, similar to the deposition of cholesterol crystals in inflammations of the middle ear."

Two major factors can predispose to heart attacks and strokes: "sticky" blood, that is, blood with abnormal readiness of platelets to form clots; and, secondly, spasms of the arteries. Trouble arises when a clot lodges in a coronary or cerebral artery already narrowed by plaque, then further constricted by spasm.

**T**he nutrition connection, while more profound than the saturated fat-CHD hypothesis, is simple enough: *modern life has increased the level of*

*environmental assaults that can harm our arteries and, at the same time, has stripped food of elements which normally protect our arteries and heart against such hazards.* While this has long been the contention of natural-food advocates, confirmation in the form of scientific data has been slow in gathering, in part because of diversion of effort and funds to cholesterol investigations. Now, there is a growing body of "hard" evidence linking deficiencies of specific nutrients to breakdowns in cardiovascular health.

Putting it another way — protective nutrients in our diet can do the following (bearing in mind always that a full spectrum of essential vitamins and minerals, including the ones below, are needed for the optimum health and function of all human tissues):

CARDIOVASCULAR FUNCTION	ASSOCIATED NUTRIENTS
<ul style="list-style-type: none"> <li>Strengthen arteries and make them resistant to attack by free radicals and other damaging substances.</li> </ul>	Vitamin E, ascorbic acid, vitamin A, lecithin, chromium, selenium, vitamin B <sub>6</sub> , methionine, zinc, glutathione, folic acid.
<ul style="list-style-type: none"> <li>Keep blood platelets free-flowing, forming clots only to prevent loss of blood from a cut vessel.</li> </ul>	Vitamin E, cis-linoleic acid, Gamma-linolenic acid, fish oils, vitamin B <sub>6</sub> , zinc, magnesium, niacin.
<ul style="list-style-type: none"> <li>Decrease arterial spasms, except as a normal defense against blood loss from a cut artery.</li> </ul>	Magnesium, calcium, and all the nutrients noted above for normal platelet function. These are needed for synthesis of the hormone-like prostaglandins which reduce arterial spasms and normalize platelets.
<ul style="list-style-type: none"> <li>Normalize blood pressure.</li> </ul>	Higher potassium/lower sodium intake. Selenium, vitamin E, calcium, magnesium, lecithin, garlic. Foods providing thiocyanates, such as members of the broccoli and cabbage family. All the nutrients noted above for decreasing arterial spasms, as prostaglandins synthesized from these nutrients are thought to also normalize blood pressure.
<ul style="list-style-type: none"> <li>Increase the body's synthesis of lecithin (phosphatidyl choline), which attaches to, and helps to ferry, cholesterol safely through the blood in the protective high-density lipoproteins (HDL's).</li> </ul>	Choline, niacin, magnesium, cis-linoleic acid, phosphorus, inositol, pantothenic acid — all needed to make lecithin; dietary lecithin from soybeans, containing phosphatidyl choline.



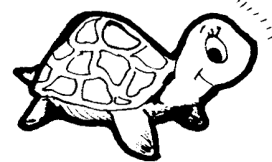
## Nature In Her Wisdom

**T**he foods that provide these protective nutrients are the ones we stopped eating in any decent quantity about 20 years before the epidemic of three related ailments began: coronary heart disease, diabetes, and obesity. The good, fiber-rich complex carbohydrates — whole grains, beans, yams, potatoes, vegetables, and fruits — were largely replaced by white flour, sugar, soda pop, ice cream, and beer. These do *not* protect hearts and arteries.

The optimism I feel generally about health comes from a great respect for the peerless architecture of our cellular machinery, and from the seasoned observation that, given the elements it needs for correct functioning, it serves us long and well.

**T**o me, this means eating a diet of foods as nature made them, with very little alteration. I use food supplements, too, believing them to be one of the compensatory products of technology that may help to protect against the not-so-benign ones like dioxin, PCB, and smog. I comfort myself by choosing to believe they also may provide a measure of protection against my not-so-rare moments of dietary waywardness!

**T**he turnaround we are witnessing in deaths from CHD (they have been decreasing now since 1963) could very well be happening because more people each year — their numbers must be in the millions by now — are doing what I did 25 years ago when I read my first Adelle Davis book: they are changing over to nutrients that nature had ALWAYS provided to protect our hearts. ■



*Illustrations are by Clay Geerdes.*

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