

The FELIX Letter

A COMMENTARY ON NUTRITION

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SKINNINESS NO, FITNESS YES!

For too many years to remember, I was a secretary in professional and business offices. [More offices than I care to remember, too. I guess I knew my destiny one day would lie elsewhere!] An invariable topic of fascination among us womenfolk was the latest 800-calorie *guaranteed* weightloss gimmick. Sooner or later, most of us landed in all the following categories: the Grimly Dedicated (those *trying* to knock off 15 pounds via the new starvation kick); the Ever Hopeful (those *contemplating* losing 15 pounds the same way); the Temporarily Defeated (those who had *regained* 15 pounds they'd shed on last year's plan).

Nature was trying to tell us something, but we began to grasp the logic of her message only after new research emerged in nutrition and exercise physiology. *Simply put, low-calorie diets have a rebound effect.* Besides costing dearly in fatigue, irritability, and wrecked love lives, they lay the foundation for *quicker regaining of weight each time on fewer calories.* Clever scientists proved it first with rats, then with people. Repeated cycles of weight loss and gain ("yo-yo-ing") made rats *and* people increasingly efficient at utilizing every last calorie. One yo-yo dieter (human) finally was unable to lose weight on 420 carefully monitored calories!

A few theories on why this happens:

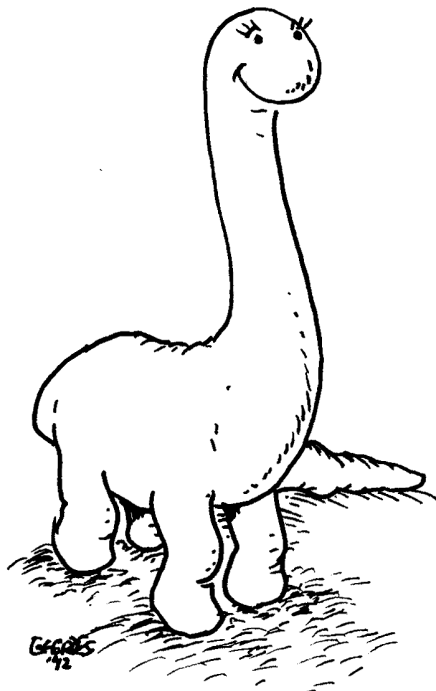
- (a) Inevitably, on low-calorie diets a person will lose muscle tissue *which contains major fat-burning enzymes.* Besides getting weaker, the dieter finds it increasingly tougher to burn off fat.
- (b) Certain enzymes that stimulate the body to *make* fat may increase 25-fold in low-calorie repeat dieters. The body is merely trying to protect itself by putting in stores against what it perceives (rightfully) to be life-threatening starvation. When the diet ends the higher enzyme activity still goes on, causing calories to be quickly deposited as fat.
- (c) We make less *thyroid* hormone on low-calorie diets. That clever body of ours is only trying to conserve calories by

lowering our metabolism, to keep us from starving too quickly.

(d) Low-calorie diets slow down the body's production of "get-up-'n-go" messengers in our nervous system—again, keeping calorie-burning activity down to a crawl.

(e) With each bout of starvation the body's 'memory' sharpens, eventually making it super-smart at utilizing all the above survival tactics!

The irony is that while people in pursuit of skinniness ardently embrace hunger, countless others are forced to cope with it as a commonplace fact of life. To insure survival, their anti-starvation systems *must* go on red alert, their energy output *must* slow down. These built-in devices evolved as our safeguard against periodic scarcity throughout human existence. [Note: As a species we are not nearly as well protected against glut!] *The body has no way of recognizing the difference between voluntary and involuntary starvation.* Identical safeguards go into operation in yo-yo dieters. You can believe your sister-in-law Gladys who tells you she's eating practically nothing on her newest (27th) diet and can't lose an ounce!



I don't believe rail-thin is good and I'm sick of movies, tv, and advertising that enshrine it. The female of the species is being sold a pack of dangerous lies. Tiny nine-year-old girls won't eat nourishing food because they're afraid of getting 'fat.' Young women starve themselves until they lose the hormones that make them fertile and safe from osteoporosis. Older women torture themselves to go for the reed look (see the mature fashion models in *Lear*), whereas the truth is we need the extra padding to make estrogen for us after menopause. Indeed, a woman's adipose tissue becomes the main producer of bone-protecting estrogen after her ovaries quit making it. I accept that if a woman wants to be a fashion model, dancer or actress she will need to be thinner than 95 percent of the female population.

But for the rest of us gals, what's the gain? A few wolf whistles, and early osteoporosis?

Mostly, I'm addressing reasonably healthy women AND men whose chubbiness has gotten a tad out of bounds. You may be active but, like most of us, are not on a regular fitness program. If you think svelteness is next to godliness, you've lost me. If you're looking for a quick fix, look elsewhere. Since 1982, when I published *Felix Letters 5/6* on weight loss, dozens of fads for the melting away of pounds have come...and gone. The following is the bare bones of a *lifetime* program to make more muscle and discourage excess storage of fat. Because muscle weighs more than fat, for a while the regimen may not result in weight loss but it will decrease girth and increase fitness. Here's the approach validated by the newer research:

• Cut way back on fat intake.

Fat in foods turns into body fat easier and faster than protein foods or complex carbohydrates do. Examples of some practical choices that don't sacrifice tastiness:

- (a) Low- or nonfat milk and cottage cheese instead of full-fat. Low- or nonfat yogurt instead of sour cream.
- (b) Low-fat cheese instead of full-fat.
- (c) Leaner cuts of meat instead of fatty ones.

(d) Bagels, Ry Krisp, pretzels, rice cakes, rice crackers, low-fat cookies and muffins instead of croissants or pastries.

(e) Well-seasoned no-butter popcorn instead of corn chips. Check healthfood store for *baked* chips or puffs made of corn or rice; use instead of regular (fried) potato or corn chips. Baked ones contain 25% fewer calories and one-third the fat.

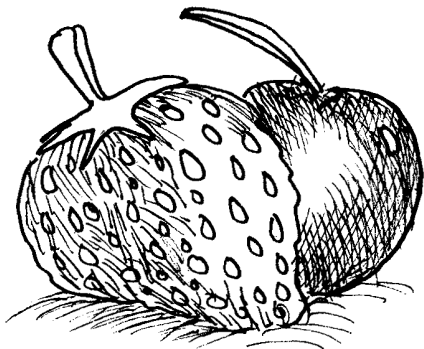
(f) A very light hand with salad dressings, mayonnaise, butter, oil. Mainly bake, roast, steam, saute instead of deepfry.

• Exceptions to low-fat intake:

(1) Fill up on shellfish and fish, including fatty fish, at least 3 times a week. (2) Make sure you're getting one tablespoon canola oil a day, providing about 3 grams Omega-6 and 1-1/2 grams Omega-3 essential (vitaminlike) fats. (3) Take 1 or 2 rounded teaspoons of flaxmeal (ground flaxseed) daily, for valuable anticancer fiber and additional Omega-3. Omega-3's are important for increasing thermogenesis, i.e., ability to burn calories for body heat. (4) Three or four times a week chew slowly a small handful (1 rounded tablespoon) of a mixture of unsalted, unroasted walnuts, almonds, pumpkin seeds, sunflower seeds, chopped brazil nuts, or other favorites. High in vitamin E, magnesium, Omega-6, and satisfaction!

Incidentally, the Omega-3 fats we consume are taken up preferentially into cell membranes rather than stored as padding/fat. They also are oxidized (burnt up) faster than most dietary fats—another reason they don't contribute readily to chubbiness.

• **Don't go hungry.** Remember, this is a lifetime program, not a quickie. Make up for loss of fatty foods by eating more seafood, vegetables, fresh fruits and complex carbohydrates such as cereals, rice, beans, corn, potatoes, pasta. Nosh on low-fat snacks between meals if hungry.



• **Try to drink no more than six ounces of fruit juice or sugary soda pop at a time, and no more than twice a day. Those simple sugars turn into body fat fast. Quench thirst with plenty of water.**

• **Nourish your fat-burning enzymes and hormones by remaining well-nourished in general. It takes a full complement of nutrients to put on muscle and take off fat. A well-rounded program of vitamin and mineral supplements is vital. Below are a few additional nutrients, not drugs, with a reputation for encouraging the body to burn fat:**

• **Spirulina powder**, 1 to 2 tablespoons a day shaken into tomato or V-8 juice.

• **Chromium picolinate**, 200 - 400 micrograms a day. Helps increase lean muscle mass (double-blind study with athletes).

• **Gamma-linolenic acid**, 40 to 100 mg a day.

• **L-Carnitine**, 250 mg a day.

• **Co-enzyme Q10**, 10 to 30 mg a day.

• **Absolute key to making the dietary part of the program effective: 12 minutes of aerobic activity six days a week.**

Aerobic activity is steady, continuous movement that produces a pulse rate 80 percent of maximum. Maximum is considered to be roughly 220 minus one's age. E.g., at 30 years, maximum pulse rate is $220 - 30 = 190$; 80 percent is 152 heartbeats per minute. At 60 years, maximum pulse is $220 - 60 = 160$; 80 percent is 128 beats a minute.

Physiologists learned that the *easiest* yet surprisingly effective way to get muscles to make more mitochondria, the tiny "energy-factories," is by a steady, almost daily twelve minutes of aerobics. Mitochondria also produce *fat-burning enzymes*, so aerobics give us double

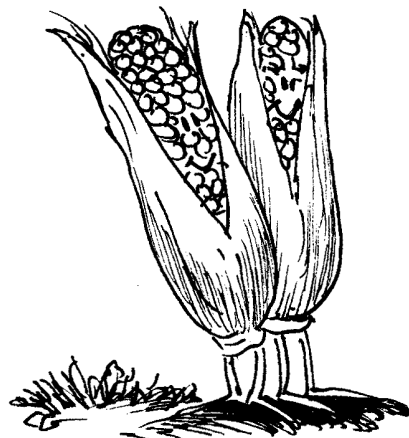
benefits. If you can do 15 or 20 minutes, fine. But the wonderful news for us willpower-impaired folks is that **12 minutes will do it!** More mitochondria in muscle = leaner, stronger muscles = fitness. Many strenuous physical activities and sports demand isolated bursts of activity instead of nonstop steady (aerobic) ones. If you love tennis, gardening, basketball, dancing, etc., do any of them *in addition to* not instead of your daily aerobics.

If an individual has no special health problems besides undue chubbiness, he or she can reach the aerobic heart rate quickly and keep it up for the minimum 12 minutes by participating in aerobic classes, riding a stationery bicycle, jogging in place or on a track, working out on a rowing or Nordic track-style machine, skipping rope, etc. My own favorites are jogging on a mini-trampoline, or tap-dancing with soft-soled shoes to taped music. If walking is your choice, make sure the pace is brisk enough to maintain your pulse rate at 80 percent of maximum. Aerobic swimming builds fitness but not fatloss, so alternate it with earthier aerobics.

This nearly daily aerobic activity works in both known and mysterious ways to gradually decrease fat stores and increase muscle fibers. When we build muscle and lose fat, we automatically burn more calories. The 12-minute aerobics coupled with the low-fat, high-nutrient diet may not produce weight loss for a while, but will cause a change for the better in body composition. Improved fitness stimulates faster burning of calories, which creates more energy, which means a permanently stepped-up ability to keep unwanted fat off.

The key words are gradual and steady. It's not a fad, but a comfortable lifestyle to make us healthier, stronger, trimmer.

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A TOOTHY ANECDOTE

Tooth tissue is much livelier than it appears. Current research indicates our teeth constantly nourish themselves with nutrients from the blood, even to the point of being able to fill in and repair their own tiny cavities! A friend who accumulated multiple fillings because of a crummy diet in his youth has the common problem of 'sensitive' teeth. At times they can ache and throb miserably, even though teeth and fillings are sound. Although he routinely takes supplements containing calcium and magnesium, he's found the quickest way to relieve tooth twinges is with a few extra capsules of calcium and magnesium providing about 500 mg and 300 mg respectively. The throbbing stops in less than half an hour.

He also gets soothing results with a newer supplement, based on the kind used successfully by British medical researchers to treat osteoporosis. It's a product from bovine bone that's rich in *microcrystalline hydroxyapatite* and *chondroitin sulfate*. Besides calcium it contains additional bone-building minerals [good for teeth, too!] such as magnesium, silica, boron, manganese, and zinc, plus vitamin K. □

SALT VS. SODIUM

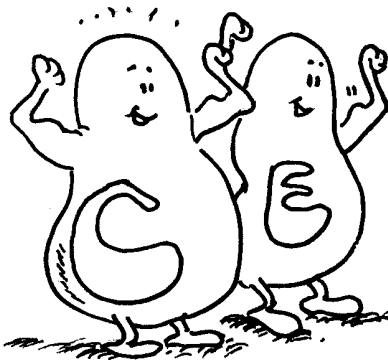
We may no longer be able to casually use the term "low-sodium diet" when we're talking about a low-salt one. "Salt-sensitive" people—those who respond with a steep rise in blood pressure to salty foods—may be reacting specifically to NaCl, that is, sodium linked with chloride, not to sodium as such.

Investigators studying hypertension are finding that animals and people who get high blood pressure from salt do *not* respond with higher pressure to *non-chloride sodium salts* such as sodium ascorbate, sodium bicarbonate, sodium citrate, sodium phosphate, and mono-sodium glutamate!

Possible explanations: (1) Table salt, but not the non-chloride sodium salts, causes expansion of blood plasma volume, which in salt-sensitive persons may trigger high blood pressure. (2) A high NaCl intake, but not the intake of non-chloride sodium salts, provokes our kidneys to excrete *calcium* via the urine. Calcium deficiency is one known cause of high blood pressure! [Note: High sugar intake also leads to high urinary calcium losses.]

As far as I'm concerned, this is good news for hypertension-prone folks. Sodium linked to ascorbate (vitamin C), bicarbonate, or citrate can be useful

nutritional adjuncts, and I for one am happy to learn they don't cause blood pressure to rise. □



ARE WE SEEING A MEDICAL TURNAROUND?

When I was an undergraduate in nutrition at UC Berkeley in the late '70s, Dr. Doris Calloway who was head of the department (now Professor emerita) literally had a sneer on her handsome face when telling the class about the *chutzpah* of Dr. Linus Pauling in extolling the health benefits of large amounts of vitamin C. He was "only a chemist," she said, with no training in nutritional science. She had pointedly omitted informing us in advance of a campus lecture on the subject by the two-time Nobel prize winner, but I was lucky enough to attend.

I hope you're repentant, Dr. Calloway—because the medical hierarchy is undergoing a landmark shift towards a benign view of supplements, **especially beta carotene and vitamins E and, yes, C!** Bold headlines on *TIME*'s cover of April 6th celebrated its featured article, "The Real Power of Vitamins." "*They may be much more important than doctors thought in warding off cancer, heart disease and the ravages of aging,*" went the subhead, "*and, no, you may not be getting enough of these crucial nutrients in your diet.*"

After decades of pouring millions into the fight against "vitamin quackery," the medical establishment may be bowing to the inevitable. (Pinch me, I must be dreaming!) The article scans some of the major studies that are converting hardnosed skeptics into believers. It describes the usefulness of **folic acid supplements** for pregnant women in preventing fetal abnormalities in brain and spine. Also, folic acid may ward off cervical dysplasia, a familiar precancerous condition of the uterine cervix. Women exposed to a common virus that causes cancer of the cervix, it says, are *five times more likely to get cervical dysplasia if they have low blood levels of folic acid.*

The article tells of a new Dutch study of 1500 women showing that **Vitamin K supplements** may help women past menopause to retain calcium in their bones.

The New Stars---Antioxidants!

"Most of the excitement, however," the article continues, "is being generated by a group of vitamins—C, E and beta carotene, the chemical parent of vitamin A—that are known as antioxidants." Free radicals, made by our own cells or by outside pollutants, are "cellular renegades; they wreak havoc by damaging DNA, altering biochemical compounds, corroding cell membranes and killing cells outright." They have much to do with "the development of ailments like cancer, heart or lung disease and cataracts," and they probably speed up aging.

Antioxidant nutrients stem the damage by neutralizing free radicals, says the review. **Vitamin E** may be important to protect the heart and arteries from free radicals; it boosts the immune system in older people; it's protective against cigarette smoke, car exhaust, and other damaging stuff. **Beta carotene** is a safeguard against heart disease and fights cancer, too.

The article paints an optimistic picture: "In that brave new world, people might pop vitamins C and E to deter the development of cataracts....Patients taking high doses of both vitamins appear to reduce the risk of cataracts by at least 50%, according to a Canadian study." **Vitamin C** may be especially efficient "because it concentrates in the eye."

Dear readers, it may be a long month of Sundays before your everyday doctors get serious about using nutrients as first-line therapy! but I see the beginnings of a newfound albeit grudging respect for their potential. Dr. Pauling suffered years of ostracism by the orthodox establishment for his vitamin C work—not unlike the way his livelihood was taken away, and his citizenship impugned, in the 1950's McCarthy era when he fought to stop the testing of nuclear weapons in the atmosphere. In both situations his principles have been vindicated.



A New Role for Vitamin C

He and Dr. Matthias Rath formulated a stunning theory on chronic vitamin C deficiency as the root cause of human cardiovascular disease (*Journal of Orthomolecular Medicine*, Vol. 6, Nos. 3 & 4, 1991, pp 125-146). In the final stages of scurvy, blood vessels disintegrate and victims bleed to death, since in the absence of vitamin C (ascorbate), no collagen can be made for the matrix that holds cells together, giving integrity to tissues. Besides being needed for collagen synthesis, ascorbate is a powerful antioxidant, protecting vessels and blood components from harmful free radicals. In chronic ascorbate deficiency, loss of this protection and skimpy collagen synthesis make vessel walls fragile and permeable. To ward off danger of blood seepage from the impaired blood vessels, a number of emergency repair systems go into action. One of these is Lipoprotein(a), abbreviated Lp(a).

The current work expands on an earlier study of Lp(a) [see *Felix Letter* No. 60]. It is a unique cholesterol-transporter in the blood that, Pauling and Rath suggest, may pinch hit for ascorbate when the vitamin is low in the diet. Under those circumstances, high levels of Lp(a) and a protein known as fibrinogen appear in the blood plasma. Lp(a) binds to fibrinogen, which in turn becomes fibrin. Together, Lp(a) and fibrin lay down filamentous substances to repair and strengthen the inner walls. Not as good as collagen, but better than nothing in an emergency!

But when there is *continued, chronic* ascorbate deficiency, what starts out as a temporary rescue operation turns into a messy buildup of Lp(a) and fibrin inside blood vessel walls. This, say Rath and Pauling, is the basis for thickened walls that narrow arteries. All other vascular damage begins from this starting point.



Besides a sharp rise in Lp(a) and fibrinogen, other factors go into play to prevent blood loss from fragile vessels in unrelenting vitamin C deficiency. Unfortunately, the remedies—constriction of vessels and increased blood coagulation—are among the worst risk factors for cardiovascular disease! Other risk factors, such as abnormally high blood levels of LDL, the cholesterol-carrying lipoprotein, simply add fuel to the fire.



Prevention?

Rath and Pauling say vitamin C is the best prophylaxis. Ascorbate lowers plasma Lp(a) levels, preventing it from being deposited in walls of blood vessels. It decreases LDL-cholesterol and increases the good kind, HDL, that transports fats and cholesterol away from vascular walls. Ascorbate scavenges harmful oxygen free radicals, and regenerates vitamin E so it can fight free radicals, too. Above all, it preserves the integrity of the vascular wall, "preventing the formation of atherosclerotic plaques. Moreover, ascorbate hits all of these targets at the same time. It will be hard for any pharmaceutical product to surpass ascorbate, a substance that has been developed and improved by nature over billions of years."

The two scientists say ascorbate also helps to reduce existing plaque in persons who have cardiovascular disease. They offer a fascinating, complex biochemical theory on why supplements of ascorbate plus the amino acid lysine may help to clean up the arteries by nudging Lp(a) out of vascular walls. In the last article of the series in the same journal issue, Pauling gives the case history of a 71-year-old man who had undergone three separate bypass surgeries for coronary artery disease, was on medication as well as on a well-rounded program of ascorbate and other supplements, but continued to suffer severe angina when working in his yard or taking a daily two mile walk. The angina stopped for good only after he began adding specified amounts of L-lysine to his regimen.

As I was writing this issue, newspapers reported a major statistical study by James Enstrom of UCLA's School of Public Health. In over 11,000 adults, men who consumed the most vitamin C had a 42 percent lower death rate from all causes, most notably heart disease, than those who consumed the lowest amount!

I hope clinicians read the Matthias-Pauling series for its fresh perspective on heart disease and the clues it offers for treatment. The rest of us can thank our lucky stars we believed Dr. Linus Pauling when he told us, so many years ago, that vitamin C was good for what ailed us!

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Illustrations by Clay Geerdes and other artists as noted.

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