Chapter 3

Nutrition

A healthy diet teamed up with regular exercise and no smoking can eliminate 80 percent of heart disease and 70 percent of some cancers.

—Walter C. Willett, M.D.
Chairman, Dept. of Nutrition, Harvard School of Public Health

THE ROLE OF NUTRITION IN WELLNESS

From detoxification we move forward into nutrition, the second of the four pillars of wellness. Exercise and mind-body health, which we'll discuss in the next two chapters, are the other primary factors that can directly enhance your health and longevity.

The quality and quantity of scientific information on diet and health has grown enormously over the last two decades. Most doctors have had little or no training in nutrition in medical school, and only recently have medical students been exposed to evidence of the vital role that nutrition plays in our health. Other than the oxygen you inhale, the only other source of healthy input for your body comes from what you eat and drink.

When we talk about nutrition, we are including *macronutrients* (protein, carbohydrates, and fats) and *micronutrients* (vitamins and minerals). Both types of nutrients—and water, of course—are essential for life and health. Let's begin by taking a brief look at each of these elements of nutrition.

Macronutrients

Protein

The word protein comes from the Greek *proteios,* meaning primary. Our bodies are composed chiefly of protein; specifically twenty-two amino acids that are required to build all the proteins necessary for humans. Of these, fourteen can be produced by the body (nonessential) while eight (essential) must be obtained from food. A food source in which all eight essential amino acids are present is called a complete protein and includes cheese, eggs, fish, meat, (organic) milk,

nuts, poultry, soybeans, and yogurt. In this chapter, you'll learn why protein is the most neglected nutrient and why it should compose up to 30 percent of the calories you ingest each day.

Carbohydrates

Carbohydrates are the most common source of energy in the diet. However, not all carbohydrates are created equally. There is a significant difference between *unrefined* (healthy) carbohydrates, such as fruits, vegetables, and whole grains, and *refined* (unhealthy) carbohydrates, such as bleached flour, white rice, and sugar. Refined carbohydrates generally rank on the high end of the glycemic index (*see* Appendix C), which signals rapid spikes in blood sugar and insulin levels, followed by an equally precipitous decline, and leading to rebound cravings for even more carbs.

A significant number of people have, or develop, an exaggerated insulin response to refined carbohydrates. Many researchers believe this vicious cycle is responsible for much of today's epidemic of obesity and cardiovascular disease in the United States. Whenever possible, select foods with a lower glycemic index to avert the refined carbohydrate trap and preserve the health of your insulin receptors. In this chapter, we'll show you how to team up healthy unrefined carbohydrates with fat and protein to blunt your appetite, manage your weight, and enhance health.

Fats

Fats contain twice the energy of proteins and carbohydrates per unit weight and are essential for proper nutrition. Fatty acids are the building blocks of fat and come in three types: saturated, monounsaturated, and polyunsaturated.

The problem with fat is not that we eat it at all, but that we eat too much of the wrong kind. Where we get into trouble with fats is through the process known as hydrogenation. Partially hydrogenated fats start life as polyunsaturated oils, which are then hardened into solid fats, such as margarine and shortening, when hydrogen is bubbled into them. The end result is stable fats with a long shelf life, which is why these are the fats you see on the labels of most packaged baked goods, cookies, crackers, french fries, frozen convenience foods, microwave popcorn, pancake mixes, salad dressings, and so on. In fact, these so-called killer fats are believed to be in 75 percent of all foods consumed by Americans today. Such fats, which create an unhealthy ratio between omega-6 and omega-3 fatty acids, the two main types of polyunsaturated fats, are now thought to trigger inflammatory processes and cause free-radical damage to cell membranes. Later in this chapter, we'll show you how to strive for a 2:1 to 4:1 ratio of omega-6 to omega-3 fats in your diet.

Your overall fat intake should not exceed approximately 30 percent of the total calories you ingest, and saturated fat should make up less than 10 percent of this total. To make this happen, it is important to increase your awareness of poly- and monounsaturated fats, which are found in avocados, flaxseed, nuts, olive oil, and salmon. Table 3.1 shows you which fats are considered healthy.

Largely due to the misguided belief of the past two decades that *all* fats are bad for us, most of our bodies are now starving for omega-3 fatty acids, a type of polyunsaturated fat that increases healthy cholesterol and decreases triglycerides. Americans consume only about 120 milligrams of omega-3 fats per day, in contrast to the average Japanese who consumes a whopping 600 milligrams daily, primarily from fish, tofu, and seaweed. It's no coincidence that the Japanese who follow a traditional Japanese diet have far lower rates of arthritis, cancer, and heart disease than we Americans do.

TABLE 3.1. Healthy Fats

Monounsaturated	Polyunsaturated
Avocado oil	Black currant oil
Nut oils (almonds)	Borage oil
Olive oil	Flaxseed oil
	Pumpkin-seed oil
	Walnut oil

Healthy omega-3 fatty acids can be challenging to work into your diet because there are few natural sources. These include dark green leafy vegetables, flaxseed, hemp, tofu, and pumpkin-seed and walnut oils. Certain fish are also rich in omega-3 fatty acids, but the Cadillac of all omega-3 oils is found in coldwater fish, especially wild salmon. That's because these fish convert the main omega-3 building block, alpha-linolenic acid, into two highly beneficial end products for your health: eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Fish has all the protein of beef and less that half the fat (*see* Table 3.2 on page 48).

Remember to choose healthy fish and not unhealthy fish. What do we mean by this? Although heavy metal toxicity can come from dental mercury amalgams, as we discussed earlier, a greater source of mercury comes from the fish we eat. The chain of events works something like this. The burning of coal in the world creates an industrialized waste that ascends into the atmosphere. Mercury residues are formed there, and when it rains, the mercury falls back to the earth and into our streams, lakes, rivers, and oceans. Much of this organic mercury is then taken up by algae, which is, in turn, eaten by small fish. Bigger fish eat the small fish, with the result that the highest mercury concentrations are found in the largest fish, such as shark, swordfish, tilefish, and tuna, to mention a few. Even grouper and large Pacific halibut contain high levels of mercury, as do all freshwater fish, also a major problem.

So, not all fish are healthy. In a Finnish study, cardiologists showed that men

TABLE 3.2. Levels of Omega-3 Fatty Acids in Fish

Type of Fish	Omega-3 grams per 4-oz serving	Type of Fish	Omega-3 grams per 4-oz serving
Sardines	5.5	Pollack	0.6
Chinook (king) salmon	3.6	Crab	0.5
White (albacore) tuna	2.6	Ocean perch	0.5
Sockeye salmon	2.3	Shrimp	0.5
Mackerel	1.8–2.6	Halibut	0.4
Herring	1.2–2.7	Scallop	0.4
Rainbow trout	1.0	Cod	0.3
Squid	1.0	Flounder	0.3
Striped bass	0.9	Lobster	0.3
Whiting	0.9	Sole	0.3
Mussel	0.8	Clam	0.2
Channel catfish	0.7	Haddock	0.2
King crab	0.6	Northern pike	0.2

who ate freshwater fish had higher levels of toxic metals in their bodies than those who didn't, with subsequent higher coronary artery disease. The study also revealed that heavy-metal contamination was much worse in freshwater fish than in the saltwater varieties. The same is true in this country. Farmed freshwater fish not only contain higher quantities of heavy metal residues, such as mercury, but also contain insecticides and pesticides as well. We recommend using great caution when eating any farm-raised fish because it can also contain toxins from chemical residues, such as dioxin and petrochemicals.

Small migratory fish, such as Atlantic halibut, cod, and wild salmon from the Aleutian Islands in Alaska, are the healthiest fish around. For shellfish, the best choice is scallops. Remember, fish does contain healthy omega-3 essential fatty acids that will protect your body from oxidative stress (free radicals), but you must choose wisely.

Micronutrients

Vitamins

Vitamins are essential for the proper regulation of metabolism as they control the way in which ingested foods are assimilated and distributed throughout the body. Most vitamins must be obtained from the diet or from supplements. For example,

while most animals make some of their own vitamin C, humans must get vitamin C from the diet, as we are unable to synthesize it. Eating a variety of raw fruits and vegetables is your best bet, since boiling vegetables destroys most vitamins and the rest of them are dissolved in the water, which is usually tossed away. The next best option is lightly steaming or low-fat stir-frying vegetables to preserve vitamin content. Table 3.3 below lists our recommended minimal daily doses for many of the essential vitamins and the foods in which they are found.

TABLE 3.3. Vitamins—Benefits, Sources, and Recommended Doses

Vitamins	Benefits	Sources	Recommended Daily Dose
Vitamin A and beta-carotene	Growth, especially skin, hair, nails, teeth; healthy condition of mucous linings and membranes; maintenance of glandular activity; resistance to infection	Carrots; fish-liver oils; liver; parsley, spinach, and other green vegetables; sweet potatoes	5,000 IU
Vitamin B_1 (thiamine)	Appetite; growth; digestion and assimilation; muscle tone; nervous system; normal red-blood count; protein, carbohydrate, and fat metabolism; vitality	Beans; brewer's yeast; grains; nuts; soybeans; wheat germ	1.5 mg
Vitamin B_2 (riboflavin)	Breakdown of fatty acids; cell respiration; control of infection; healthy eyes; nerve tissues	Beans; brewer's yeast; dried milk; fruits, grains; green vegetables; liver; wheat germ	2 mg
Vitamin B_6 (pyridoxine)	Enzyme and brain; enzyme system; nervous system and brain; protection from infection; protein and fat metabolism	Avocados; bananas; bran; Brewer's yeast; green leafy vegetables; pecans; wheat germ	2 mg
Vitamin B_{12} (cobalamin)	Enzymatic process; prevention of anemia; production and regeneration of blood cells	Brewer's yeast; dark green leafy vegetables; nuts	300 mcg
Vitamin C	Appetite; defense against bacterial toxins; glandular activity; growth, especially teeth; protection of vascular system; tissue respiration	Brussels sprouts; citrus fruits; green vegetables	200 mg
Vitamin D	Bones, teeth, tissue; regulation of blood calcium	Sunshine; butter and dairy products; egg yolk; salmon; tuna	800 IU
Vitamin E	Circulation; keeps red blood cells from being destroyed; sexual glands and reproductive skin	Eggs; milk; corn, peanut, sun-flower-seed oils; wheat-germ oils; green vegetables; wheat germ; whole grains	200 IU
Folic acid	Healing; prevention of infection; protein metabolism; red blood cells; RNA and DNA	Cheese; eggs; liver; orange juice; oysters; sunflower seeds	800 mcg

Reference: Zone Café

Minerals

Minerals such as sodium (table salt) and potassium are needed in relatively large amounts; others, like copper and chromium (trace minerals), are necessary in much smaller amounts (*see* Table 3.4 below).

Sodium is an important mineral found mainly in body fluids. One teaspoon of salt provides 2 grams of sodium. The average person consumes between 3 and 7 grams daily, mostly from salt already present in food. About 30 percent of those with high blood pressure are salt-sensitive and should eat a diet low in salt (less than 2.3 grams per day). It is important to read the labels and learn how much sodium, and what other ingredients, have been added to packaged foods.

TABLE 3.4. Sodium Content of Foods

Low-Sodium Foods	mg per 100 grams	Moderate-Sodium Foods	mg per 100 grams	High-Sodium Foods	mg per 100 grams
Apples	1	Milk	50	Salmon, canned	521
Asparagus	1	Light meat chicken	70	Graham crackers	686
Grapefruit	1	Dark meat chicken	90	Cornflakes	914
Pineapple	1	Eggs	118	Potato chips	1,000
Egg noodles	5	Celery	125	Cured ham	1,310
Shredded wheat	10	Tomato juice, canned	200	Processed cheese	1,450
Raisins	12	Cottage cheese	404	Sauerkraut	1,750
Sweet potato	16			Bacon	1,957
Broccoli	19			Olives, green	2,018

Commonly needed minerals are listed in Table 3.5 on page 51, with their benefits for the body, their dietary sources, and the recommended doses.

Water

The human body is close to 90 percent water, and its total body weight is 70 percent water. We rely on water for digestion, cooling, waste elimination, and to help circulate nutrients to every cell in the body. The exact amount of water required will depend on the type of food you eat, the air temperature, humidity, the amount of exercise you do, and your individual metabolic rate. We recommend a minimum of 6–8 glasses of water per day.

TABLE 3.5. Minerals—Benefits, Sources, and Recommended Doses

Minerals	Benefits	Sources	Recommended Daily Dose
Calcium	Acid/alkaline balance; bones and teeth; coagulation of blood; enzyme stimulation; heart and nerves; skin tone; vitamin metabolism	Cheese; green vegetables; milk products; oranges	1,500 mg for women; 500 mg for men
Chromium	Helps protein and fat metabolism; important for control of blood sugar	Meats; whole grains; wine and beer	120 mcg
Copper	Conversion of iron into hemoglobin; red blood cells	Broccoli; garlic; leeks; parsley; radishes	2.0 mg
Iodine	Circulation; oxidation of fats and proteins; prevention of goiter; size and activity of thyroid gland	All sea plants; iodized or sea salt; seafood; spinach	150 mcg
Iron	Blood cells; hemoglobin; liver; oxygen transmission; tissue respiration	Beans; blackstrap molasses; bran; dried apricots; eggs; grains; liver meats; nuts	18 mg (for children and premenopausal women)
Magnesium	Heart rhythm; lung tissues; nervous system; stimulation of enzymes; structure of bones; relaxation	Almonds; bran; cabbage; lettuce; spinach; tomato; wheat germ	400 mg
Manganese	Nervous system; red blood cells; tissue respiration	Vegetable foods which contain iron	1–2 mg
Potassium	Cell activity; counteracts constipation; elasticity of muscle tissues; purification of blood in kidneys	Cabbage; celery; kale, lettuce; tomatoes	1–2 g
Selenium	Antioxidant that decreases risk of free-radical damage to blood vessel walls	Tortilla chips; Brazil nuts; tuna	100 mcg
Zinc	Circulation; healing; normal growth; preventing high blood pressure; sexual development; tissue respiration	Brewer's yeast; eggs; liver; oatmeal, oysters; pumpkin and sunflower seeds; wheat germ	15 mg

Burkitt, M.D., a British researcher working in Africa, is credited with recognizing the important role of fiber in health. His 1974 paper, "Dietary Fiber and Disease," was published in the *Journal of the American Medical Society* and is considered a classic.

BESTSELLER DIETS—DO ANY OF THEM REALLY WORK?

We have all been exposed to the latest advances in nutrition, whether it was a new fad supplement or a vogue diet, and you've probably figured out by now that much of the media hype has heretofore been based on thin evidence. In the last decade, however, we have seen a convergence in thinking from the world's leading nutritional scientists, with additional information supplied by research from paleontologists and anthropologists, and some of the newer bestseller diets are now backed by their evidence-based research.

Back in 1992, the USDA Food Pyramid—advising us to eat two or more servings from each of four food groups: meat and fish, vegetables and fruits, milk and dairy products, and breads and cereals—was built on very shaky scientific research. We stand to learn much from our ancestors who lived before the development of agriculture and animal husbandry (over 10,000 years ago) and derived all their nutrients from just the first two food groups. They apparently consumed cereal grains rarely, if at all, had no dairy products, and obviously no refined, processed foods. Fortunately, since its inception, the Food Pyramid has undergone significant testing and revision by the Harvard School of Public Health (*American Journal of Clinical Nutrition,* December 2002) and is now similar to the OmegaRx Zone Food Pyramid, by Dr. Barry Sears.

The updated pyramid moves us a step closer to making the general public more aware of how a preventive diet can be effective against cancer, heart disease, and a range of other chronic diseases. (*See* Figure 3.1 on page 53.) We offer the following general guidelines for cultivating a healthy diet and lifestyle.

- Eat fewer bad fats and more good fats.
- Eat fewer refined-grain carbohydrates and more whole-grain, low-glycemic carbohydrates (avoid bread whenever possible).
- Choose healthier sources of protein (for example, sea salmon, free-range organic meat, or poultry).
- Eat plenty of organic vegetables and fruits.
- Drink plenty of pure, filtered water.
- Take nutraceuticals for insurance.
- Use alcohol in moderation.

In this trial of people who had previously been diagnosed with a heart attack, those following the Mediterranean-style diet suffered 73 percent fewer heart attacks and 70 percent fewer deaths than those on the Heart Association diet. Indeed, the Mediterranean style of eating makes great heart sense.

Pan-Asian Modified Mediterranean (PAMM) Diet

Dr. Stephen Sinatra has coined the term *PAMM diet,* which combines the healthiest foods found in China, Japan, and Thailand with fresh fish, fruits, olive oil, and vegetable selections from the Mediterranean diet. To this he adds flaxseed; groats; mushrooms; low-glycemic grains, such as spelt; and soy. Dr. Sinatra's top picks, Asian-style, include:

- Broccoli with sesame seeds;
- Green salad with ginger;
- Green tea;
- Omelet with scallions;
- Seaweed and cucumber maki rolls;
- Shiitake mushrooms;
- Tofu (Szechuan style).

On the PAMM diet, Dr. Sinatra recommends that about 25 to 30 percent of your calories come from protein; 30 to 35 percent from healthy fats; and 40 to 45 percent from slow-burning, low-glycemic carbohydrates, including fresh fruits and vegetables and such legumes as chickpeas and lentils. Dr. Sinatra also recommends not using any white flour (bread, bagels, crackers, etc.). He is a strong believer in a gluten-free approach to optimum health. His PAMM diet is very similar to both Dr. Sears's Zone diet and Dr. Arthur Agatston's South Beach diet; all three embrace moderate protein, healthy fat, and low-glycemic carbohydrate consumption to keep insulin production at ideal levels within the body.

The recent emergence of the South Beach diet as an effective means of weight loss and lifestyle adaptation further strengthens our position that excess insulin leads to weight and fat gain, and that moderation is the key to healthy eating. The South Beach diet diverges from the Zone and PAMM diets in that it consists of different phases for weight loss and maintenance. The first phase of the diet emphasizes the ingestion of very low-glycemic carbohydrates, such as lettuce, coupled with lean proteins and some healthy fat. In the second or third stages, as part of a weight-maintenance plan, the dieters can gradually add moderate amounts of carbohydrates, such as bread and alcohol.

FOOD IS POWERFUL MEDICINE—A DIETARY FEAST FROM A TO Z

Once food (protein, carbohydrates, and fats) is broken down into its basic components (amino acids, glucose, and fatty acids) and sent to the bloodstream, it has a more powerful impact on your body and your health than any drug your doctor could ever prescribe.

As we have pointed out, Americans are still much more likely to die of lifestyle-related diseases, such as cancer, diabetes, heart disease, and strokes, than people who live in Third World countries; the reason is largely due to what we put on our plates. Numerous studies reveal that people who live in less affluent countries, with diets rich in unprocessed whole grains and plenty of fresh fruits and vegetables, have much lower rates of cancer and heart disease than those in the wealthier, more advanced nations because, as we have learned, these foods generally have a protective effect against our so-called diseases of civilization.

Scientists are increasingly finding health-enhancing chemicals in fruits, vegetables, herbs, and such common spices as garlic and turmeric. These protective compounds are called *phytonutrients,* and many of them are powerful antioxidants. Here is an A-to-Z sampling of some of the best and tastiest out there—a bounty of health for you, ready for the plucking.

Apples

Key ingredients pectin and quercetin act to:

- Lower cholesterol;
- Protect against cancer;
- Protect against heart disease.

Berries

Key ingredients anthocyanin, ellagic acid, and pectin act to:

- Benefit vision;
- Protect against cancer;
- Lower cholesterol.

Carrots

Key ingredients alpha-carotene, beta-carotene, calcium, and pectate act to:

- Protect against cancer;
- Protect against heart disease;
- Protect against stroke.

Dark-green leafy vegetables (such as spinach and kale)

Key ingredients folic acid, lutein, and alpha-lipoic acid act to:

- Prevent macular degeneration;
- Help protect against heart attack;
- Protect against cancer.

Echinacea

Key ingredients of complex polysaccharides act as:

- Immune stimulants;
- Anti-inflammatories;
- Antiviral/antibacterial agents.

Fruits, citrus (grapefruits, oranges, lemons, limes, tangerines)

Key ingredients d-limonene, flavonoids, lycopene, and vitamin C act to:

- Decrease cholesterol;
- Protect against cancer;
- Protect against cardiovascular disease.

Garlic

Key ingredients ajoene, selenium, and sulphur compounds act as natural antibiotics and antifungals, and also act to:

- Prevent blood clots and heart disease;
- Protect against cancer.

Hawthorn berries (tea)

Key ingredients flavonoids and procyanidins act as anti-inflammatories and also act to:

- Lower blood pressure;
- Protect against heart disease.

Ipecacuanha root

Key ingredient emetia acts as an anti-inflammatory and acts to:

- Ease indigestion;
- Protect against cancer.

Juices from tropical fruits (guavas, kiwi fruit, mangoes, pineapples)

Key ingredients fiber, lycopene, many antioxidants, and vitamins E and C act to:

- Protect against cancer;
- Protect against heart disease;
- Stimulate immune system.

Kava kava

Key ingredient kavalactones acts to:

- Help insomnia;
- Induce relaxation;
- Reduce anxiety.

Legumes (dried beans, lentils, peas)

Key ingredients fiber and folate act to:

- Help control diabetes;
- Lower cholesterol;
- Protect against cardiovascular disease.

Melons (cantaloupes, honeydew, watermelon)

Key ingredients beta-carotene, lycopene, potassium, and vitamin C act to:

- Help lower high blood pressure;
- Protect against cancer;
- Protect against cardiovascular disease.

Nuts and seeds

Key ingredients arginine, B vitamins, fiber, magnesium, selenium, vitamin C, and zinc act to:

- Balance eicosanoid hormones;

- Help with weight loss;
- Increase HDL levels;
- Protect against heart disease.

Onions

Key ingredients quercetin and selenium act to:

- Protect against cardiovascular disease;
- Protect against stomach cancer;
- Reduce risk of stroke.

Polyphenol teas (*Camellia sinensis*) (black tea, green tea, oolong)

Key ingredients catechins and polyphenols act to:

- Lower risk of heart disease;
- Prevent oxidation of LDL cholesterol;
- Protect against cancer.

Quinine (Peruvian bark)

Key ingredients alkaloids and chinchora act as:

- Antimalarials;
- Membrane stabilizers;
- Nighttime muscle-cramp relievers.

Red grapes and wine

Key ingredients phenolics, quercetin, and resveratrol act to:

- Prevent oxidation of LDL cholesterol;
- Protect against heart disease and blindness;
- Regulate blood flow and circulation.

Soy products and tofu

Key ingredients genistein, isoflavones, and phytoestrogens act to:

- Lower blood cholesterol and triglycerides;
- Prevent oxidation of LDL cholesterol and clogging of arteries;
- Protect against cancers (breast, prostate).

Tomatoes (cooked with oil)
Key ingredients chlorogenic acid, lycopene, and p-coumaric acid act to:

- Decrease risk of esophageal cancer;
- Protect against cancer (prostate, cervix);
- Protect against heart disease.

Unusual spices (curry powder, turmeric)
Key ingredients curcuminoids and phenolic compounds act to:

- Benefit digestion and liver function;
- Lower cholesterol and reduce inflammation;
- Protect against cystic fibrosis.

Vegetables, cruciferous (broccoli, Brussels sprouts, cabbage)
Key ingredients fiber, indoles, and sulforaphane act to:

- Lower cholesterol;
- Protect against cancer;
- Protect against macular degeneration.

Walnuts
Key ingredients polyunsaturated fats and some omega-3s (EFAs) act to:

- Prevent heart disease;
- Reduce cholesterol;
- Reduce stroke risk.

Xiao yao wan (bupleurum) (dry root, often taken as a tea [Sho-saiko-to formula])
Key ingredient *Paeonia* acts to:

- Reduce bleeding;
- Reduce menstrual cramps and pelvic pain;
- Reduce PMS symptoms.

Yellow and orange vegetables (red and yellow peppers)
Key ingredients carotenoids and flavonoids act to:

- Protect against cancer;
- Protect against heart disease;
- Stimulate immune function.

ZEAXANTHIN-CONTAINING VEGETABLES (beet, collard, mustard, Swiss chard, watercress)

Key ingredient zeaxanthin acts to:

- Help vision;
- Lower cholesterol;
- Prevent cancer (especially cancer of the cervix).

craze, but you can avoid this mistake with a spa-medicine program, using the OmegaZone Dietary Program.

Myths and Facts about Weight Loss

Myth #1: Eating fat makes you fat.

Fact: Eating fat does not make you fat. It is your body's response to excess carbohydrate in your diet that makes you fat.

Myth #2: It's easy to lose weight by simply restricting calories.

Fact: Losing weight does not necessarily follow eating less.

Myth #3: Diets based on limited choice and caloric restriction work best.

Fact: People get tired of feeling deprived and hungry and these diets usually fail.

Myth #4: Weight loss is all about willpower.

Fact: Weight loss has nothing to do with willpower. You need information, the right information, not willpower.

Myth #5: It is not what you eat, but how much you eat.

Fact: Changing *what* you eat is more important than *how much* you eat. It is important to *decrease* carbohydrate intake and eat the right ratio of protein to carbohydrate at each meal.

Myth #6: All people are created equal; it's simply a question of calories in and calories out.

Fact: Not all people are created equal. Some of us are slow burners. Some of us have an exaggerated insulin response when we eat a carbohydrate load, some of us don't. A weight-loss program must be individualized for your particular needs.

Myth #7: A person's metabolism is not all that important when it comes to losing weight.

Fact: Your metabolism is important and a measurement of your BMR (basal metabolic rate) will show you how important it is. Some of us need hormonal, nutraceutical, detoxification, or pharmacological agents to normalize our body's metabolic rate, and some of us don't.

Myth #8: Counting calories and knowing all the food tables and portion sizes is critical.

Fact: Spa-medicine dietary programs can help you navigate toward your ideal weight with remarkably little effort.

Chapter 7

Reduce Inflammation

Instead of different treatments for heart disease, Alzheimer's, and colon cancer, there might be a single inflammation-reducing remedy that would prevent all three.

—*Time* (Cover Story) February 23, 2004

INFLAMMATION

Most of us have some idea what inflammation is. If a wound gets hot, turns red, hurts, and swells, we recognize that inflammation is at work. In this instance, inflammation is a beneficial process, serving to immobilize the area of injury as the rest of the immune system mobilizes to heal.

Regardless of the source of assault on our bodies, inflammation is the first-alert mechanism that calls into action the cells responsible for surveillance and protection, heralding them to go to work and limit the damage. These cells attack and destroy the invaders, then clean up the damaged cells, repairing and clearing as they go, until a healthy state is restored. As such, inflammation is your body's first line of defense against injury or infection.

SILENT INFLAMMATION

Unlike the above example, researchers now recognize another kind of inflammation: silent inflammation, or SI. This type of internal inflammation has an insidious nature and is the culprit behind the many chronic diseases that are primarily caused by poor lifestyle habits and environmental pollutants. The chronic and continuous low-level demand that silent inflammation places on the body's defense systems results in an immune-system breakdown. In SI there is no regulated progression of a healthy inflammatory response, no planned sequence from the first alarm to the formation of the last new cell. Many of these reactions become intermingled and hamper one another.

The body tissues themselves may lose their ability to recognize cells that are

"self" from those that are not, and the body may mistakenly identify its own cells as foreign invaders. This internal programming error then continues to trigger and retrigger immune responses, setting the stage for autoimmune diseases, such as lupus, multiple sclerosis, and scleroderma. The result is chaos, and what is even more disturbing is that this process may be happening year after year without our even being aware of it.

We now know that inflammation plays a central role in the chronic illness that remains our number-one killer: coronary artery disease. In fact, elevated markers of silent inflammation, such as homocysteine, CRP, and Lp(a), have been found to be more predictive of heart disease than such traditional risk factors as elevated cholesterol levels (50 percent of those hospitalized for heart disease have normal cholesterol levels).

A landmark study showed that people with high levels of C-reactive protein (CRP), one of the cardinal markers of inflammation, were over four times more likely to have heart attacks than those with low CRP levels. Researchers then began to link C-reactive protein, along with other markers of inflammation, to a wide range of chronic diseases, including Alzheimer's disease, arthritis, Parkinson's disease, and even cancer. Chronic silent inflammation is now accepted as a warning that something is drastically out of balance in a person's overall health.

Although chronic inflammation can cause a variety of disorders, many of us (and unfortunately this includes many physicians) do not know the warning signs of this kind of inflammation or the best ways to treat it. This knowledge is critical because, if a person has one inflammatory condition, the odds that he or she will develop another condition increase dramatically. Researchers have discovered, for example, that a woman with rheumatoid arthritis has a 100 percent increased risk of experiencing a myocardial infarction. And other recent research has demonstrated that higher CRP levels are also associated with age-related macular degeneration, so the same individual can have more than one condition caused by SI. For all these reasons, slowing down this chronic inflammation syndrome is vital to successful age management, so it is crucial that everyone becomes aware of it, understands its causes, and takes measures to stop it.

CAUSES OF INFLAMMATION

There are many factors that trigger inflammation. They are found in both our internal and external environments and include excessive levels of the hormone insulin, emotional stress, environmental toxins (heavy metals), free-radical damage, nanobacteria and other bacterial infections, obesity, overconsumption of hydrogenated oils, periodontal disease, radiation exposure, smoking, spirochetes, such as the *Borrelia* that causes Lyme disease, viral infections, such as cytomegalovirus (CMV), and some pharmacological drugs. Let's take a closer look at a few of these examples.

- Always supplement your diet with fish oil and other nutraceuticals.
- Use monounsaturated oils (such as olive oil) whenever possible on vegetables and salads.
- Choose low-glycemic carbohydrates whenever possible.

In addition to excess insulin, heart disease and aging are accelerated by increased blood sugar, elevated cortisol levels, and free radicals. And all these contributing factors can be modified by the Zone diet, which works to establish hormonal equilibrium in the body.

The essential fatty acids, omega-6 and omega-3, are also key dietary components. As mentioned in Chapter 3, when these two types of essential fatty acids are metabolized they produce eicosanoid hormones, which can have dramatically different physiological reactions. Eicosanoids have been labeled either good or bad, depending on how they affect the body. Good eicosanoids, produced from omega-3 fatty acids, are anti-inflammatory by nature, while bad eicosanoids cause inflammation. The metabolism of essential fatty acids is ultimately controlled by one particular enzyme in the body, delta-5-desaturase, which produces arachidonic acid (AA), a long-chain omega-6 fatty acid that is the precursor of the proinflammatory (bad) eicosanoids. (*See* Figure 7.1 below.)

Two dietary constituents profoundly affect the activity of the enzyme delta-5-desaturase—the levels of long-chain omega-3-fatty acids, eicosapentaenoic acid (EPA), and the levels of insulin. The AA/EPA balance, as measured in the blood, represents the balance of bad and good eicosanoids throughout the body (an ideal AA/EPA ratio is 1.5).

If you eat an imbalance of (too many) carbohydrates, refined sugars, and proteins, you will provoke a greater insulin response. Too much insulin in the body exacerbates AA production, which causes sticky platelets (platelet aggregation) and sets the stage for chronic, silent inflammation while promoting blood clotting at the same time. But high levels of EPA (as found in wild salmon, for example) will counteract the negative effects of AA production and keep inflammation at bay.

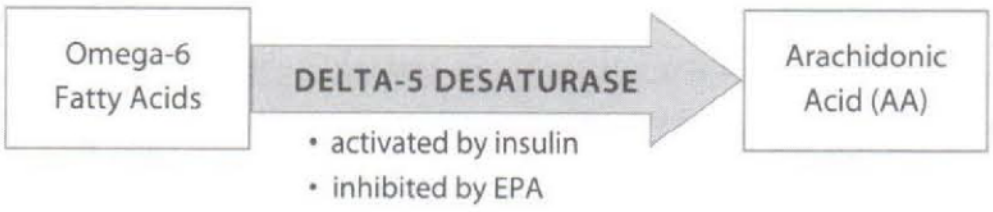


Figure 7.1. The Role of Delta-5 Desaturase in AA Synthesis

Periodontal Disease

There is a significant relationship between periodontal (gum) disease and chronic inflammation. Multiple microbes, including bacteria, spirochetes, and viruses, can grow in and around the teeth and periodontal sections of the mouth and cause a decline in the immune system, making the area susceptible to chronic low-grade inflammation and subsequent increases in CRP levels. In one study of fifty people referred for angiography and assessed for periodontal disease, there was a significant relationship between the extent of coronary atherosclerosis and periodontal disease.

Cardiologists are especially aware of the link between gum disease, halitosis, oral hygiene, missing teeth, and a strong probability of subsequent cardiovascular disease. Practicing good oral hygiene and taking antioxidants, such as coenzyme Q_{10}, essential fatty acids, and magnesium, can help support gum health, thereby reducing chronic inflammation.

Homocysteine

A higher level of homocysteine is not only a risk factor for cardiovascular disease, it has also been implicated in Alzheimer's disease, cancer, low birth weight, neural tube defects, and osteoporosis. Homocysteine is directly toxic to blood vessels in the brain and heart. Elevated levels wreak oxidative stress, cause DNA damage to the nerves, endothelial dysfunction, and even a weakening of the mitochondrial membrane.

High levels of homocysteine have been shown to double the incidence of Alzheimer's disease. In one study of 1,092 people who were initially dementia-free, over an eight-year follow-up, 111 developed dementia and 83 developed

full-blown Alzheimer's disease. Those with high homocysteine levels had double the Alzheimer's risk of those with lower homocysteine levels, and as the homocysteine levels went up, so did the risk levels.

One of the most important factors in lowering homocysteine is the use of the B vitamins, including B_6, B_{12}, betaine hydrochloride (trimethylglycine), calcium folinate, folic acid, and pyridoxal phosphate. Beets, broccoli, garlic, and SAMe are also effective in reversing toxic homocysteine back into harmless methionine. A large percentage of people, however, particularly those of European and French Canadian decent, cannot adequately metabolize synthetic folic acid. For these people, homocysteine levels will persist despite the use of B vitamin components.

What are acceptable levels of homocysteine? A homocysteine level less than 7 is ideal. Levels over 10 are unacceptable, especially in those with presenile dementia or arteriosclerotic cardiovascular disease. And high homocysteine levels are especially treacherous in the company of elevated lipoprotein(a) (Lp[a]) because together they can induce clots.

Lipoprotein(a)

Lipoprotein(a) is a cholesterol particle that is highly inflammatory and thrombotic. In a ten-year follow-up of myocardial infarctions in 5,200 participants, those with the highest Lp(a) levels had a 70 percent increase in myocardial infarctions. For the cardiologist, Lp(a) is a difficult risk factor to neutralize because the statin drugs are known to increase Lp(a), so it is important for physicians to track Lp(a) levels whenever they are treating high cholesterol with any statin drugs.

We have found that the toxic effects of Lp(a) can often be neutralized by using targeted nutraceuticals. The liver-supporting nutrients are especially helpful, along with coenzyme Q_{10}, Policosanol, and the omega-3 essential fatty acids, such as fish oils, in combination with niacin.

Fibrinogen

High fibrinogen is a phenomenon increasingly observed in postmenopausal women and smokers, and levels greater than 360 milligrams have been associated with coronary calcification. This coagulation protein has been successfully neutralized with bromelain, fish oils, garlic, and natural Cox-2 inhibitors, such as ginger and green teas, as well as enzymes (to be discussed later in this chapter).

Ferritin

Serum ferritin (high levels of stored iron) is also associated with increased risk for myocardial infarctions. The high levels of iron that can oxidize LDL cholesterol may reflect iron overload or hereditary high iron levels. If you have this condition, it is important to cut iron consumption to a minimum and use high-dose vitamin C with caution, as megadoses greater than 500 milligrams daily may lead you to absorb too much iron from your diet.

TABLE 7.1. Mesua RX Smart Zone for Optimum Health

The smart zone is what Dr.Suarez considers a safe zone in terms of preventing cardiac problems, and below are the tests for it that you should include in your blood workups. Each test is followed by Dr.Suarez suggested optimum health ranges, which are consistent with better-than-normal lab results. The recommendations on the right are ways you can improve your scores if they're not in the healthy range. To use this table, make a note of any lab results that are outside the smart-zone levels in your tests, then choose treatment from the list of recommendations on the right.

Blood Tests	Mesua RX Zone Levels	Recommendations to Maintain Optimum Health
Albumin	4.2–5.0 G/dL	If less than 4.2, immune-system support is needed; reduce allergies; promote personal hygiene.
CoQ_{10}	1.0–1.8 ug/ml	30–60 mg Q-Gel daily (see note below for therapeutic levels).
C-reactive protein	<.80 mg/dL	Statin drugs (10–20 mg Pravachol or 20–40 mg Zocor); exercise; baby aspirin; 2 grams omega-3 fish oils; 400 IU vitamin E daily.
Fasting blood sugar	<100 mg/dL	Weight loss; exercise; restrict carbohydrates, especially high-glycemic carbohydrates, such as sugars; use lower glycemic carbohydrates, such as broccoli, chick peas, or lentils, that lower insulin levels; 100–300 mg alpha-lipoic acid; 60–90 mg Q-Gel; 200 IU vitamin E.
Fasting insulin	<12 microunits/L	Same recommendations as fasting blood sugar.
Ferritin	Females: 40–80ng/mL Males: 20–50ng/mL	If greater than than 100 ng/mL, check for hemochromatosis (check iron and iron-binding capacity). If total iron, total iron-binding capacity, and ferritin are all elevated, assess for genetic hemochromatosis (excess iron). If positive for hemochromatosis, you may need to donate blood 1–3 times a year. Check drinking water for high iron content. Do not take more than 500 mg vitamin C a day.
Fibrinogen	180–350 mg/dL	If greater than 350, take 500–1,000 mg of garlic daily; 1–2 grams Norwegian fish oil; 500–1,000 mg bromelain once a day; 6–9 Wobenzyme* tablets daily in divided doses; drink ginger and/or green tea.
Folate	>10 ng/mL	800 mcg folic acid daily.
Hemoglobin A1C	<6% of total HGB	Reduce weight; exercise; 100–300 mg alpha-lipoic acid daily; consider metformin if lifestyle changes do not improve percentages.
HDL	Females: 40–120 mg/dL Males: 35–120 mg/dL	Assess for insulin resistance if HDL is low; reduce weight, exercise; use less high-glycemic carbohydrates; 500–1,000 mg niacin or 750–1,500 mg niaspan; 1,000 mg pantethine; 1000–1,500 mg guggulipid; 500–1,000 mg L-carnitine.
Homocysteine	<10 umol/L	800 mcg folic acid; 40 mg B_6; 200 mcg B_{12}; 250–1,000 mcg trimethylglycine; eat more beets and broccoli.
LDL	60–150 mg/dL	*See* Total cholesterol. If LDL is greater than 130 in presence of documented coronary artery disease, statin therapy is indicated (10–20 mg Pravachol or 20–40 mg Zocor daily).

Blood Tests	Mesua RX Zone Levels	Recommendations to Maintain Optimum Health
LP(a)	<30 ng/dL	250 mg niacin 3–4 times a day (may cause flushing) or 750–1,500 mg niaspan daily (niaspan is a long-acting niacin for which a prescription is needed); 500–1,000 mg Vitamin C; 1–2 grams Norwegian fish oil; avoid all trans fatty acids; females: consider natural estrogen; males: avoid soy; and consider testosterone.
Total cholesterol	125–225 ml/dL	Lose weight; exercise; increase fiber; flax**; oatmeal; oats; soy products; 200 mcg chromium; 30–60 mg Q-Gel; 50–100 mg tocotrienol formula; 400–800 mg garlic, 500–1,500 mg plant sterols (phytosterols) daily; probiotics.
DHEA (female)	Age 30–39: 60–400 mcg/dL 40–49: 70–350 mcg/dL 50–59: 40–180 mcg/dL > 60: 20–150 mcg/dL	For men under age fifty, low levels of DHEA are definitely a risk factor for heart disease and may suggest vital exhuastion. Women with low DHEA levels are also at risk. Women can take 10–20 mg.
DHEA (male)	Age 31–50: 60–450 mcg/dL 51–60: 80–400 mcg/dL 61–83: 200–280 mcg/dL	Men can take 20–25 mg as a soluble wafer. Your doctor can use a compounding pharmacy to formulate.
Triglycerides	50–180 ml/dL	Weight reduction; exercise; restrict carbohydrates; at least 2 grams fish oil daily.
Optional tests for newer inflammatory markers: Interleukin-6 Oxidized LDL Tissue necrosis Factor alpha		If interleukin-6, tissue necrosis factor alpha, and oxidized LDL are elevated, a more complicated inflammatory process is indicated, especially if fibrinogen and CRP levels are significantly increased. If such is the case, then treatments to target inflammation reduction must be initiated. Recommended statin therapy in combination with 2 g Norwegian fish oil; 6–9 Wobenzyme tablets daily in divided doses on empty stomach. Also strongly recommendeded is an exercise program. Make sure your healthcare professional follows up with subsequent inflammatory assessments to track your progress.
		Unless otherwise specified, the above are recommended daily doses.

NOTE: These suggested therapeutic CoQ_{10} levels are for the following medical conditions:

2.0–2.5 ug/mL	If you have high blood pressure, mitral valve prolapse (MVP), arrhythmia, diabetes, or periodontal disease.
2.5–3.5 ug/mL	If you have mild to moderate congestive heart failure, angina, or chronic fatigue syndrome.
>3.5 ug/mL	If you have severe congestive heart failure.

tion in our bodies as we age. As the toxic load increases, so does the incidence of chronic disease (*see* Figure 7.2 below).

We believe that regular detoxification should become part of a healthy lifestyle. Although you should always avoid obvious toxins whenever possible, it is extremely difficult to avoid many toxins that are present everywhere in the environment today. That is why each of us should incorporate certain daily detoxification strategies to help flush out the toxins that are circulating in the blood or are lodged in soft tissues and vital organs.

Remember, these strategies should include diets, such as the OmegaZone diet, bathing, infrared saunas, massages, and liver and colon cleansing on a regular basis. Also, a detoxifying nutraceutical formula can provide additional protection from the various toxins. A detox formula should include liver-supporting nutrients, such as artichokes, L-carnitine, and milk thistle. Alpha-lipoic acid and other sulphur-containing nutraceuticals will help chelate heavy metals, and indole-3-carbinol will help rid the body of xenoestrogens.

2. Diet and Weight Loss

Over 65 percent of the American population is now overweight. Researchers speculate that tobacco will soon be replaced by obesity as the major risk factor today. Recent research suggests that fat cells have become the home for inflammatory cytokines. In fact, accumulated fat around the waist acts just like an extra endocrine gland, probably one of the major reasons that obese people tend to get more cancer, type-2 diabetes, and heart disease, as well as other inflammatory disorders.

The obesity and diabetes epidemics are linked to metabolic syndrome (an

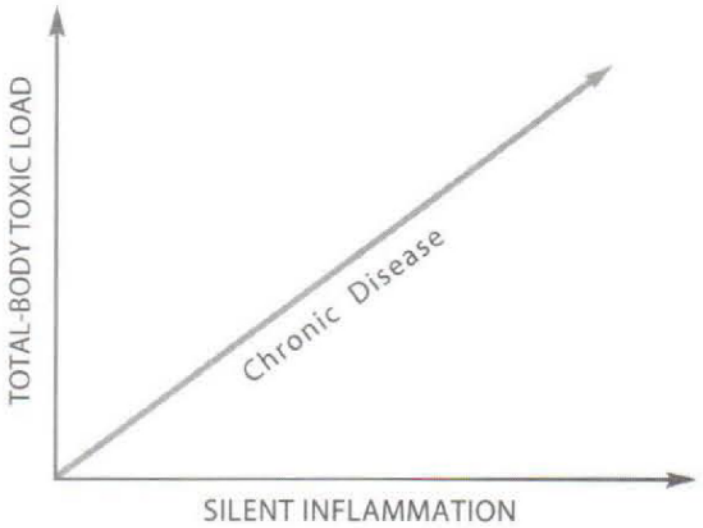


Figure 7.2. Silent Inflammation and Chronic Disease

3. Nutraceuticals

Nutraceuticals are components of foods or dietary supplements that support healing. They include antioxidants, coenzyme Q_{10}, enzymes, fish oils, garlic, green tea, L-carnitine, minerals, and vitamins. At the microscopic level, many of these nutraceuticals can penetrate into the cells and help eradicate free-radical damage, while decreasing inflammation at the same time.

Carotenoid and flavonoid nutraceuticals can have a positive impact on the body. For example, antioxidant flavonoids, especially quercetin, were studied in the European Zutphen Elderly Study. As reported in the *Lancet*, researchers looked at mortality in older men and found that a higher death rate was associated with a lower flavonoid intake. The flavonoids consumed by the male subjects came primarily from black tea, green apples, and onions. Their results confirmed that all-cause mortality was reduced in those men consuming greater than 30 milligrams of flavonoids per day.

The cardiovascular benefits of similar oligomeric proanthocyanidins (OPCs,

which add the bright colors to many fruits and vegetables, belong in the flavonoid class of nutrients) have also been noteworthy. OPCs inhibit free radicals, the oxidation of LDL, and sticky blood platelets (platelet aggregation). They improve the elasticity and integrity of blood vessels, and have a role in lowering blood pressure. In animal research, OPCs have also demonstrated a cholesterol lowering effect.

The French Paradox is a term that describes the discrepancy between the traditional high-fat French diet and their comparatively low incidence of heart disease. It has been suggested that their consumption of red wine is what offsets their high-fat diet. Researchers postulate that red wine has high concentrations of OPCs quercetin and resveratrol, as well as other flavonoids, and it is these grape skins that are responsible for this victory over heart disease.

Magnesium

Magnesium is a mineral with favorable cardiovascular benefits. It acts like a calcium channel blocker to prevent spasms in the walls of blood vessels. Magnesium has a profoundly positive influence on blood vessels and makes blood platelets less sticky. In fact, a magnesium deficiency has been observed in those with insulin resistance and diabetes. Taking 400–800 milligrams of magnesium is recommended for anyone with Raynaud's disease or for anyone who wants to block coronary artery spasms or lower blood pressure.

In one study, magnesium decreased many symptoms associated with mitral valve prolapse, including anxiety, chest pain, palpitations, shortness of breath, and weakness. (Coenzyme Q_{10} also has known cardiac benefits and was instrumental in helping to improve the quality of life for the people in this study.)

Coenzyme Q_{10}

Coenzyme Q_{10} has a crucial role in cellular energy production and is critical in the proper functioning of the mitochondria, which it contributes to by recycling ATP (adenosine triphosphate) as well as being a cofactor in its production. People with cardiomyopathy, hypertensive cardiovascular disease, mitral valve prolapse, and especially those with statin-induced diastolic dysfunction have shown improvement when they took coenzyme Q_{10}.

Coenzyme Q_{10} can also help treat angina, arrhythmias, congestive heart failure, and toxin-induced cardiotoxicity. And pretreatment with coenzyme Q_{10} for weeks before an elective coronary artery bypass graft (CABG) has been shown to help with speedier postoperative recuperation.

Since its discovery in 1972, there have been multiple controlled trials on the use of coenzyme Q_{10}, with more than forty showing some benefit and only four

showing none. One yearlong, double-blind study of 641 recipients showed a 20 percent reduction in hospitalizations for the coenzyme Q_{10} group compared to those taking the placebo, and the coenzyme Q_{10} group had a better quality of life, as well as lower medical bills.

Another topic of special emphasis in relation to coenzyme Q_{10} is statins. The number of these drugs prescribed every year is astounding and may have a link to the increased number of cases of cardiomyopathies. Statin drugs can cause profound deficiencies in coenzyme Q_{10} so it should be supplemented by anyone receiving a statin drug, such as 3-hydroxy-3 methylglutaryl coenzyme A-reductase inhibitors. Coenzyme Q_{10} treatment has been helpful in counteracting diffuse muscular pain, a noted side effect of statin therapy.

The body's own production of coenzyme Q_{10} drops off with aging, and while its side effects—abdominal discomfort, excess energy or anxiety, and nausea—are rare, it is contraindicated for healthy pregnant or lactating women because the unborn and newborn produce sufficient quantities of the compound on their own.

such as angina and myocardial infarction, and that it takes considerable time to recover and regenerate ATP compounds. Supplementing with D-ribose helps to replenish the severely depleted ATP levels.

Taking D-ribose (15 grams daily) can protect cardiac cells from ischemic episodes and, for anyone with angina, it can increase the amount of time you can exercise before the onset of angina symptoms. The combined antioxidant, membrane-stabilizing, and metabolic activities of coenzyme Q_{10}, L-carnitine, and D-ribose will play a significant role in myocardial ischemia.

As new research unfolds, these nutraceuticals provide an exciting platform in cardiovascular disease to improve the quality of life for people with heart problems. Metabolic cardiologists will upgrade the level of care for their patients as they gain further insight into this new great emerging field in cardiovascular medicine.

4. Enzymes

Within a single cell there are roughly 100,000 genes, the majority of which have enzymes, the workhorses of the living cell, in them. All enzymes are proteins, and all are composed of long chains of amino acids. Also recognized as the life force of the body, enzymes are involved in nearly every one of its metabolic processes. As we age, or develop a disease, our bodies have fewer and fewer enzyme stores at their disposal (a sixty-year-old has 50 percent fewer enzymes than a thirty-year-old, for example).

Enzymes function as catalysts and make things work faster. They have the ability to initiate, accelerate, and terminate biochemical reactions in the body. Enzymes increase the activity of the cells that are important to a healthy immune system, and they are integral in maintaining balance in the body. Provided there are sufficient enzymes, cases of acute inflammation can heal in a few days. With chronic silent inflammation, however, the continued shortage of enzymes leads to an eventual breakdown of the reactions needed to remove diseased tissue from the body and return it to normal health. Enzymes are important biological response modifiers and play a vital role in controlling inflammation and promoting health.

Cancer and Enzyme Therapy

It is well known that people with cancer also have excess blood coagulation or toxic blood. Wobenzym therapy, used exclusively by Olympic athletes over the years to reduce inflammation in tendons, muscles, and joints, will often help normalize the blood of cancer patients, in addition to improving blood flow and preventing fibrosis (the formation of abnormal tissue).

5. Omega-3 Fatty Acids

Leading medical institutions worldwide have confirmed that daily supplementation with high-grade fish oil, rich in omega-3 essential fatty acids, is your most powerful weapon for controlling inflammation.

There is overwhelming evidence in the cardiovascular literature that omega-3 essential fatty acids are appropriate in the treatment and prevention of cardiovascular disease, and the *Lancet* recently published another, very important, study of 11,000 Italian participants with myocardial infarction. Over a three-year period, the group given fish oil had a 45 percent lower incidence of sudden cardiac death and a 20 percent reduction in all causes of death. Those receiving fish oil also had reduced blood pressure, suppressed platelet activity, lowered triglyceride levels, and a marked lessening of cardiac arrhythmias. Perhaps the most noteworthy benefit of fish oil is its favorable impact on heart rate variability (HRV). Omega-3 essential fatty acids also reduce plaque rupture by literally getting inside plaque to stabilize it and render it less vulnerable to rupture. Eating healthy fish or taking fish-oil supplements is an absolute must, especially for those most at risk for cardiovascular disease. In fact, just two fish meals per month will reduce an individual's risk of sudden cardiac death by 50 percent.

Unfortunately, because most fish have become contaminated with toxins, such as dioxins, mercury, and PCBs, consuming fatty coldwater fish as your primary source of omega-3s is now being questioned. There is, however, a solution to this dilemma—the **Mesua RX** brand of fish oils formulated by **Dr.Suarez** lab. These pharmaceutical-grade fish oils have been concentrated and purified to the highest standards possible. They are toxin-free and can be ingested without any fear of toxins or contaminants found in the fish we eat, or in the standard omega-3 supplements. For these reasons, we can heartily recommend them. **Mesua RX** fish oil supplements are available through the website **www.mesua.com** .

The certification process for **Mesua RX** measures the levels of contaminants in parts per billion. **Mesua RX** is found to be at least 100 times purer than the typical health-food-grade fish oils. It sets the standard for fish-oil purity and goes beyond the same quality control standards established for the oils that were used in recent clinical trials.

If you make no other changes in your diet to enhance insulin control and reduce inflammatory mediators, consider supplementing with **Mesua RX** to help maintain brain, cardiovascular, and immune function.

6. Control of Chronic Infections without Antibiotics

Current research from the National Institutes of Health (NIH) and elsewhere shows that while chronic infections are really never eradicated, they can be controlled as long as a person remains on an antimicrobial program. The disadvantages of living on antibiotics, however, do not make this an attractive or plausible way to live.

Research has shown that some people who have taken tetracycline for acne for years have less atherosclerosis. This makes sense when we recognize that many people have chronic infections, such as CMV and nanobacteria, that contribute to the silent inflammation and the elevated CRP levels we see. It is our opinion that if we boost the body's natural immunity with select nutraceuticals, and we practice good oral hygiene, we can thwart many of these chronic infections. And, unlike antibiotics, these formulas can be taken for an entire lifetime without any substantial risk.

We have already discussed how infections cause Lyme disease, and how useful Wobenzym and other enzymes are in the treatment of these chronic infections. After studies done in Florida at Hemex Laboratories (www.hemex.com), researchers are now convinced that the presence of any form of infection is associated with inflammation and severely toxic blood. Therefore, to help get adequate

Chapter 8

Nutraceuticals

"The Mesua RX products giving you the fountain of health and youth from the inside out"

Nutraceuticals can be broadly defined as components of foods or dietary supplements that have a medicinal or therapeutic effect. In general, nutraceuticals are taken in amounts higher than what can be obtained from a regular diet.

—ARTHUR ROBERTS, M.D.

Our bodies require oxygen for metabolism. Without oxygen we cannot produce energy, but a downside of this energy production is its generation of free radicals and inflammation, so one of the main keys to achieving good health is to maintain the right balance of free radicals and antioxidants.

Nutraceuticals are components of foods or dietary supplements that support healing. They include antioxidants, amino acids, enzymes, fish oils, herbs, minerals, and vitamins. Many of these nutrients and antioxidants can penetrate into cells and prevent free-radical damage while simultaneously decreasing inflammation in the body.

TEN PRINCIPLES OF CELLULAR HEALTH AND NUTRACEUTICALS

The following principles are modified from Dr. Matthias Rath's original ideas detailed in *The Heart*.

1. Health and disease are determined by the vitality of the 60 trillion cells that make up our bodies and the various organs comprising them.
2. Nearly all diseases develop within organs at the cellular level. Inflammation is a major cause of most chronic disease.
3. Essential nutrients are needed for the thousands of biochemical reactions in each cell and to minimize the effects of inflammation.
4. The primary cause of cellular malfunction is a deficiency of vitamins, minerals, hormones, and other nutrients required for cell fuel.

5. Stress and aging (both mental and physical) will change the demand for nutrients required by the various cells of organs.
6. Nutrients are also required in different amounts, as determined by an individual's genetic predisposition.
7. Cardiovascular and neurological complications are the most prevalent of all ailments because those cells consume vitamins and other essential nutrients at a higher rate than the cells of other organs.
8. Medi-spas, which integrate the best of both conventional and alternative treatments while focusing on the individuality of each client, are the ideal sites to optimize cellular health.
9. Dietary supplementation with enzymes, hormones, vitamins, and other nutrients is a key process in the prevention and treatment of cardiovascular conditions and other chronic diseases associated with aging.
10. Core nutraceuticals, containing antioxidants, enzymes, minerals, omega-3 fatty acids, and vitamins, should be consumed daily by all individuals. In addition, target nutraceuticals aimed at specific problems should also be taken to help support cell function while correcting cell malfunction in any diseased organs.

THE EMERGENCE OF NUTRACEUTICALS

In the United States, the profit motive often dictates the direction of scientific research. Unlike drugs, nutraceuticals are most often derived from natural products that in most instances cannot be patented. This greatly reduces the financial incentive for a drug company to proceed with years of research and marketing. Most nutraceutical research today is carried out abroad, led by Germany, where about 70 percent of physicians prescribe from about 600 different botanical medicines. Today drugs are a multibillion dollar industry; however, the pendulum is beginning to swing the other way.

The rediscovery of botanical medicine and the emergence of nutraceuticals are helping to redefine health care in the United States and other countries. More and more consumers have noticed their benefits are largely free of the side effects associated with many types of drugs.

Over the past twenty-five years, in our own practices in cardiology, internal medicine, and plastic surgery, we have seen countless patients benefit from taking nutraceuticals. For a majority of nonacute health conditions, we prescribe nutraceuticals and lifestyle changes as first-line therapies, looking to drugs only if these approaches are not effective.

We would like to introduce you first to new research on antioxidants and then cite the brain as a specific example of how targeted nutraceuticals can improve your health and longevity.

I. ANTIOXIDANTS LEAD THE WAY TO A NEW UNDERSTANDING

We now stand at the threshold of a new understanding of how antioxidants can affect the quality and length of human life, thanks largely to such people as Professor Lester Packer, Ph.D., author of *The Antioxidant Miracle*. He and others have made startling new discoveries on how antioxidants can prevent and treat many chronic and degenerative diseases, including arthritis, cancer, cataracts, and heart disease.

Dr. Packer's conclusions concerning the antioxidant effects that increase longevity include:

- Improving concentration and reversing age-related memory loss;
- Protecting against prostate and other cancers;
- Rejuvenating an aging immune system;
- Relieving arthritis and other inflammatory conditions;
- Reversing age spots and protecting against skin cancer;
- Supporting cardiovascular function;
- Turning off *bad* genes.

Antioxidant supplements are readily available, and you are probably taking them, but you may not be taking them correctly. Recently, scientists discovered a dynamic interplay among certain key antioxidants, a relationship Dr. Packer calls *the antioxidant network* because they work in concert to greatly enhance one another's power. What makes network antioxidants special is that they can extend their antioxidant power by recycling or regenerating one another after they have quenched dangerous free radicals. As Dr. Packer states, "The primary job of the antioxidant network is to prevent antioxidants from being lost through oxidation. As one network antioxidant saves the other, the cycle continues, ensuring the body will maintain the right antioxidant balance."

Although there are hundreds of antioxidants, Dr. Packer has identified these five as foundation network antioxidants:

1. Alpha-lipoic acid
2. Coenzyme Q_{10}
3. Glutathione
4. Vitamin C
5. Vitamin E

It is interesting to note that all these foundation antioxidants support the inner mitrochondrial membrane. Whenever we protect the mitochondria (the cell's engine), we stabilize the integrity of the cell and probably extend its life. **Dr. Suarez** feels that one of the major causes of congestive heart failure in older people is mitochondrial dysfunction of heart cells leading to impaired contraction in the heart. As an antidote to this, he has been recommending coenzyme Q_{10} to his patients for more than twenty years.

Oxidation—A Paradox of Life and Death

As stated previously, the body requires oxygen for metabolism, to produce energy and sustain life. Unfortunately, free radicals, those molecular snipers that roam the body in search of electrons that will neutralize their charge, are byproducts of oxidative processes and cause cellular damage. An essential means of cultivating good health involves balancing antioxidants and free radicals, and this is what your body's antioxidant defense system does.

Dr. Bruce Ames, a well-known antioxidant scientist, estimates that each human cell gets about 10,000 oxidative *hits* daily to its DNA. If you multiply this by the trillions of cells in the body, you can see how it can add up to a big problem. Free radicals not quickly reined in can cause a great deal of trouble and this is why supplements with antioxidants are indispensable for longevity. When your antioxidant defenses are overwhelmed by a firestorm of free radicals, the condition known as oxidative stress exists. In order to sustain optimum health, you must have enough antioxidants available to handle the free-radical oxidative stress that occurs to a greater or lesser degree every second of your life.

To better understand the process of oxidation, think about the leftovers you wrap up after a meal. One of the reasons wrapping helps is that it keeps oxygen from attacking the leftovers. Although food chemists had long recognized that certain vitamins were good food preservatives and began to call them antioxidants, it did not initially occur to anyone that the same process occurring to the leftover food was occurring in our own bodies.

As we age, the levels of antioxidants fall and the network antioxidants (*see* Table 8.1 on page 151) become overwhelmed by the gradually increasing toxic load on the body. Interestingly, humans and elephants have the highest concentration of antioxidants and the longest life spans, while rats and other rodents have the lowest levels and the shortest life spans.

The Antioxidant Network

The following is a summary of the beneficial effects of the five network antioxidants from *The Antioxidant Miracle,* by Dr. Packer, modified with our comments and suggestions.

TABLE 8.1. Network Antioxidants

FAT-SOLUBLE ANTIOXIDANTS *(Protect fatty part of cell membranes)*	WATER-SOLUBLE ANTIOXIDANTS *(Protect watery part of cell membranes)*
Vitamin E	Vitamin C
Coenzyme Q_{10}	Glutathione
Alpha-lipoic acid*	Alpha-lipoic acid*

*Alpha-lipoic acid is unique and can function in both zones, regenerating fat- and water-soluble antioxidants.

Source: The Antioxidant Miracle

1. Alpha-Lipoic Acid

- Protects against three common age-associated diseases: cataracts, heart disease, and strokes.
- Strengthens memory and prevents brain aging.
- Helps to reduce blood sugar.
- Boosts the entire antioxidant network by helping to recycle oxidized vitamins C and E and coenzyme Q_{10}.
- Can prevent and relieve the complications of diabetes.
- Turns off *bad* genes that accelerate aging, cancer, and polyneuropathy (inflammation of all the nerves of the body).
- Can reverse mushroom poisoning of the liver.
- Has been useful in treating liver disease, such as hepatitis C.
- Reduces advanced glycolation end products (AGES) and helps skin.
- Strengthens the immune system.
- Prevents replication of HIV in cultured human cells.
- Protects against radiation poisoning.

A Note for Smokers

Smoking probably shortens your life by about eight years. Obviously, the best advice is to quit. It might be possible to reduce the diseases associated with cigarette smoke by bolstering network antioxidants, especially lipoic acid. Gamma tocopherol (vitamin E) also appears to be protective for smokers, and since smoking causes a drastic reduction in vitamin C, it should be supplemented as well. We don't, however, recommend beta-carotene in doses greater than 10,000 units for smokers, as high doses of it may enhance lung cancer in them.

RDA: Not established

Recommended amount: 50–100 milligrams

Sources: Synthesized by body but levels fall off with age. Present in small amounts in animal products, especially red meat.

2. Vitamin E

- Reverses the age-related slump in immune function.
- Protects your brain from aging.
- Protects your lungs from automobile emissions.
- Reduces risk of gastrointestinal cancer in both men and women.
- Reduces your risk of strokes and heart disease.
- Protects your skin from UV rays and ozone.
- Relieves arthritis and other inflammatory diseases.
- Reduces risk of prostate cancer in men.
- Reduces risk of breast cancer in women.
- Helps save your vision by preventing cataracts.

RDA: 30 IU daily

Recommended amount: 100–200 IU mixed tocopherols and tocotrienols

Sources: Barley, extra virgin olive oil, leafy vegetables, nuts, rice bran oil, wheat germ.

A Note for Living Better Longer

In studies on human cells, scientists have evidence that vitamin E can prevent aging at the cellular level, where aging begins. Long before we see the more visible signs of gray hair and wrinkles, subtle changes are occurring in our cells. One of the telltale signs of aging is the accumulation of the pigment lipofuscin, especially in the brain and heart. Vitamin E has been shown to prevent cells from accumulating this aging substance in cultured human cells.

3. Vitamin C

- Protects you from heart disease.
- Reduces risk of cancer.
- Protects sperm from free-radical damage.
- Regenerates used-up vitamin E.

- Boosts the immune system.
- Reduces the length and severity of colds.
- Keeps skin young and supple, particularly the fat-soluble form of ascorbyl palmitate.
- Vitamins C and E prevent the oxidation of harmful LDL lipoproteins.
- Protects against cataracts.

RDA: 60 milligrams (100 milligrams for smokers)

Recommended amount: 200–400 milligrams

Sources: Abundant in many fruits and vegetables, including broccoli, cabbage, citrus fruit, cranberries, potatoes, red peppers, and tomatoes.

An Evolutionary Note

Humans (as well as bats and guinea pigs) are one of the few animals that don't produce vitamin C. Some scientists believe that the loss of the necessary enzyme about 45,000 years ago was an evolutionary error. The average foraging gorilla will consume about 5,000 milligrams of vitamin C per day. If a rat were a 170-pound man, it would make about 5,000 milligrams per day, an amount that some believe is closer to an optimal dose for humans. The stress of today's living requires taking more than the woefully inadequate RDA of vitamin C. Smokers, older people, anyone with diabetes, and women on oral contraceptives, all require at least 200 milligrams of vitamin C per day.

4. Coenzyme Q_{10}

- Regenerates vitamin E in the antioxidant network.
- Can prevent and help reverse some heart diseases.
- Can help manage type-2 diabetes.
- Can help improve Parkinson's disease.
- May help prevent Alzheimer's disease.
- May help treat breast cancer.
- Can help treat gum disease.
- Can reduce fatigue.
- Can improve male fertility.

RDA: Not established

Recommended amount: 30–100 milligrams (150–250 milligrams if taking a statin drug)

Sources: Synthesized by the body; also found in seafood and organ meats.

An Historical Note

Coenzyme Q_{10} was discovered by Professor Fred Crane at the University of Wisconsin in 1957. Renowned scientist Karl Folkers, who was the first researcher to identify the structures of vitamin B_6 and B_{12}, isolated coenzyme Q_{10} from beef hearts in 1958 while working at Merck, Sharpe and Dohme. Although recognizing its importance, Merck sold the technology to the Japanese in 1965. Dr. Folkers continued his research at the University of Texas and was the first to suggest that the age-related decline in coenzyme Q_{10} was a contributing factor in many age-related diseases, including heart disease, cancer, and Alzheimer's disease. He reasoned that since high-energy bonds are so important to the function of virtually every cell in the body, it is impossible for any body system to run well if it is not getting adequate fuel. Since coenzyme Q_{10} helps support the formation of adenosine triphosphate (ATP)—the essence of the body's energy—coenzyme Q_{10} will help rescue almost any tissue in need.

The L-Carnitine Connection to Coenzyme Q_{10}

A vital sidekick to coenzyme Q_{10} is L-carnitine, an amino acid found primarily in meat, most often lamb. Because it has a special relationship with coenzyme Q_{10}, we highly recommend this multitalented nutraceutical in doses of 75–150 milligrams per day. Together, coenzyme Q_{10} and L-carnitine act synergistically to burn fats inside the mitochondria, the furnaces of the cells, and this helps the body's energy network function at a highly favorable level, especially in the heart, which derives more than 60 percent of its energy from burning fat.

5. Glutathione

- Important for longevity.
- Recycles vitamin C.
- Can be boosted by lipoic acid.
- Detoxifies drugs and toxins.

- Important for healthy liver function.
- Boosts immunity.
- Helps store and transport amino acids.
- Can help turn off the inflammatory response.
- Forms glutathione peroxidase, the body's most important defense against arteriosclerosis.
- Can be synthesized from the metabolism of N-acetylcysteine (NAC), which is the breakdown product of glutathione. (Oral forms of glutathione are not well absorbed.)

RDA: Not established

Recommended amount: 50 milligrams alpha-lipoic acid daily (as above) and 50 milligrams NAC.

Sources: Abundant in fruits, vegetables, especially avocados, and freshly cooked meats.

A Note on the Master Antioxidant

Glutathione is the cell's primary antioxidant and is found in the watery portion of the cell. Glutathione is produced in the cells from three amino acids—cysteine, glutamic acid, and glycine. Glutathione is the only network antioxidant most experts do *not* recommend supplementing with, due to the fact that it is broken down and no one knows how much glutathione actually passes through the intestinal wall into the cells. Alpha-lipoic acid and NAC will boost glutathione levels in target tissues where it is needed. The B vitamins and such minerals as calcium, magnesium, and selenium also boost antioxidant levels when consumed daily. Adding antioxidants to your wellness and longevity program can help you "To die as young as possible as old as possible," as the Greeks used to say.

The easiest way to take nutraceuticals is in packet form. As part of the Zone Foundation Program, we recommend a multivitamin/mineral combination with added enzymes, omega-3 fatty acids, and an antioxidant cocktail (*see* Table 8.2 on page 156). Although an extra evening dose is a suggested way to take supplements, we understand that people often dislike taking multiple numbers of tablets and capsules. They also want to avoid the extra cost, so a minimum of one packet a day to start is strongly recommended.

TABLE 8.2. Basic Antioxidant Cocktail

Mixed carotenoids	5,000 IU	Vitamin B_{12}	300 mcg
Vitamin E	200 IU mixed tocopherols and tocotrienols	Vitamin B_6	2 mg
		L-carnitine	75 mg
Coenzyme Q_{10}	30 mg	Magnesium	200 mg
Alpha-lipoic acid	50 mg	Calcium	500 mg
Vitamin C	200 mg	Selenium	100 mcg
Folic acid	800 mcg	Zinc	15 mg

II. BRAIN HEALTH

Many express surprise when they meet someone in their seventies, eighties, or beyond, who is sharp as a tack. While the brain is especially susceptible to the damaging effects of free-radical stress, it is also one of the body's most plastic structures—that is, it is able to respond to targeted nutritional supplements as well as mental stimulation for a lifetime. When it comes to your brain, it's a clear case of use it or lose it. In this section, we'll briefly touch upon the most important nutraceuticals for optimal brain health.

Together with heart disease, memory loss is one of the biggest concerns of our aging population. The most beneficial aspects of aging are wisdom and experience, but the downside of aging is that things we used to take for granted now seem to be changing in a manner that often makes us feel old. Sometimes mental acuity, brain processing, and short-term recall of faces, information, names, numbers, and words are not as quick as they used to be, and some of us accept this age-related memory and cognitive decline as inevitable and natural. This is not necessarily so, and it certainly is not necessarily an early symptom of dementia or Alzheimer's disease. It may be due to age-related factors, but it can also be caused by depression, various medications, or such medical conditions as a low thyroid, a deficiency of vitamin B_{12}, or elevated homocysteine levels.

The first thing to do, even if you have not noticed any symptoms of brain-drain, is check your brain-processing functions to determine what your current level of brain capacity is. You can do this online with an easy, simple brain test called BrainCHECK (www.brain.com).

Our brains are unlike any of our other organs because each tiny region has a very specialized function that is not duplicated anywhere else. That means, if we sustain an injury to a very small area of our brain, we can end up with damage that can severely compromise our ability to function. Even with all our high-tech

super computers, the brain is still the most efficient and complicated computer of all. It has yet to be duplicated and it can't be transplanted. Therefore, we must do everything possible to prevent it from becoming damaged.

In order to do that, we must first have a basic understanding of how the brain and nerve cells function. An individual brain cell, or nerve cell, is called a neuron. It has a body in it that receives information from other neurons and, in turn, produces a response that is sent out to other nerve cells or muscles to trigger a body function, such as a thought, movement, vision, smell, taste, tears, and perspiration. Neurons receive information through thousands of little biochemical processes, with the roots (dendrites) attached to the cell body. Information is sent out from the neurons by a long extension of each cell called the axon (only one axon to a neuron), and it is best visualized as a copper wire with insulation, called *myelin,* wrapped around it. Myelin is essential for most nerve cells to conduct electricity normally. The axon then makes contact with another cell, of one type or another, through a junction box called a synapse. It communicates with the next cell down the line by releasing a chemical messenger into the synapse that, in turn, activates that cell. These chemical messengers are called neurotransmitters. One nerve cell can be connected to thousands of other nerve cells through the dendrites (treelike structures in the nerve cells).

The brain has certain basic needs in order to function. First, it needs fuel and that is glucose. The brain cannot survive long without glucose, and glucose deprivation in such conditions as hypoglycemia (low blood sugar) can cause significant brain damage after only a short period of time. Second, it needs to burn the glucose fuel, and for this it needs oxygen, which is carried to it through the cerebral blood vessels—the carotid and vertebral arteries. For our brain to work, our heart must pump blood to it, and to do that, our arteries must be open so the blood can reach the brain. If either of these systems (blood or oxygen) malfunctions, the brain can be permanently damaged in as short a time as five minutes. Third, it needs amino acids, electrolytes, fatty acids, hormones, minerals, and vitamins in order to manufacture neurotransmitters, stabilize electrical connections, maintain metabolic functions and myelin, and strengthen cell walls. Since many of these brain nutrients decline as we age, we need supplementation to replace them.

In order to prevent memory and cognitive loss, it would help to first know what causes it. There are many theories, the most popular of which has to do with oxidative free-radical damage to cells and cell membranes. Oxidation of fatty acids in the walls of nerve cells and damage to the mitochondria (the pow-

erhouse of the cell) tend to cause an accumulation of damaged materials, a loss of dendrites, sick and dying cells, and ultimately cell death. Depending on which regions are damaged, this could manifest as Alzheimer's disease or Parkinson's disease. Other theories involve programmed cell death, or the formation of neurotoxins from ingested materials in food, water, and the atmosphere. And, if not recognized, deficiencies of one or more brain nutrients can also result in memory loss and eventual cell death, plus any accumulation of tiny small infarcts (strokes) will eventually result in decreased memory and ability to think clearly.

Still another school of thought is that memory loss and Alzheimer's disease are due to lifestyle. In his book *Brain Longevity,* Dharma Singh Khalsa, M.D., says that chronic stress causes continued excessive concentrations of cortisol in the body, and this is toxic to brain cells. We agree that reducing your stress and maintaining a balanced and happy spirit are critical to preserve a well-functioning mind, and we believe that, by lowering stress-induced cortisol levels, you can help slow down brain aging, especially Alzheimer's disease.

This prevalent disease has been estimated at 50 percent in individuals eighty-five years or older—the most rapidly growing segment of our population. Whatever the ultimate causes of Alzheimer's disease may be, symptoms of the disease arise when neurons that are damaged or destroyed by free radicals (generated by inflammation) fail to function.

The Importance of Enhancing Brain Function as We Age

The question arises as to when you should start taking compounds to help preserve and heighten cognitive skills. The answer is the earlier the better. Our philosophy is preventive medicine. Once you have been diagnosed with dementia, there is very little, if anything, you can do to effectively slow or reverse the process. So do whatever you can, as early as possible, to enhance, maintain, and retain your brain—without cognitive function, the quality of life descends to a much lower level.

We know there is no fountain of youth, but there are new and emerging compounds that may possibly slow, or even reverse, the memory impairment that can eventually progress to Alzheimer's disease or dementia. Our first priority is to preserve and maintain your self-image and your quality of life for as long as possible. Effective Alzheimer's therapy needs to:

1. Reduce inflammation;
2. Limit the damage of free radicals;
3. Enhance neural function.

1. Reducing Inflammation

Fish oil. Manipulation of dietary fat is a proven method of reducing inflammation. Dietary changes designed to decrease arachidonic acid (by eating less meat and eggs) and increase omega-3 levels have been effective strategies for curtailing inflammatory conditions, including arthritis, multiple sclerosis, and psoriasis. The best source of omega-3s is pharmaceutical grade (purified of toxins) fish oil, the potency of which is determined by its DHA content. Borage seed oil and black currant oil are other sources of activated omega-6 fatty acids, and their potency is determined by the GLA content. Magnesium, vitamin B_3, vitamin B_6, and zinc intensify the anti-inflammatory effects of both essential fatty acids.

Recommended dose: 4 capsules **Mesua RX** daily
1,600 milligrams EPA (eicosapentaenoic acid)
800 milligrams DHA (docosahexaenoic acid)

Polyphenols. These are potent free-radical fighters that can help prevent inflammation. They are present in small amounts in most fruits and vegetables, and are abundant in grape seeds and pine bark (Pycnogenol). Polyphenols are excellent for the health of the brain as they can readily cross the blood-brain barrier to nurture brain tissues and diminish inflammation.

Excellent dietary sources include berries, dark vegetables, green tea, red wine, soybeans, and such herbs as bilberry, ginkgo biloba, and milk thistle.

Recommended dose: 120 milligrams Pycnogenol
120 milligrams grapeseed extract

2. Limiting Free-Radical Activity

Alpha-lipoic acid. Lipoic acid is an extremely powerful antioxidant as it is both fat and water soluble, and may therefore freely enter all parts of the cells. It is rapidly absorbed and readily enters the brain to protect neurons from free-radical damage. Further antioxidant protection is derived from its ability to recycle vitamins C and E and regenerate glutathione, one of the brain's most important anti oxidants. Lipoic acid also acts as a potent metal chelator and decreases inflammation in the brain.

Recommended dose: 50–100 milligrams a day

Ginkgo biloba. This ancient herb can increase blood flow, decrease clumping of blood, decrease free radicals, and increase glucose to reduce bouts of dizziness, depression, and memory loss. In a study published in *The Journal of the American*

Medical Asociation, the authors concluded that ginkgo biloba was safe and appeared to be capable of stabilizing and improving (for six months to a year) the cognitive performance and social functioning of people with dementia.

Recommended dose: 60 milligrams two to four times a day

Note: Do not use aspirin with ginkgo biloba.

N-acetyl-cysteine (NAC). Glutathione production may be complemented with the oral administration of NAC. This precursor of glutathione has the unique ability to reduce nitric oxide and, in turn, lower free-radical activity, thereby creating a less-hostile environment for delicate brain tissue.

Recommended dose: 1,000 milligrams a day

Vitamin D. This vitamin has strong antioxidant capabilities and is highly fat soluble making it an ideal candidate to act as a bodyguard for the brain. In fact, vitamin D has been shown to be more potent against free radicals than fat-soluble vitamin E. In a Japanese study, 80 percent of the test subjects with Alzheimer's disease were deficient in vitamin D.

Recommended dose: 800 IU a day

Vitamin E. This fat-soluble vitamin is important for balancing free radicals. Because the brain is more than 60 percent fat, which makes it highly susceptible to free-radical assault, fat solubility is a critical antioxidant feature for preserving brain integrity. In a landmark study in the *New England Journal of Medicine*, one test group was given vitamin E, while another was prescribed the drug selegiline; those supplemented with vitamin E excelled in all areas measured, including longevity and cognitive function.

Recommended dose: 400–800 IU a day

3. Enhancing Neural Function

Coenzyme Q_{10}. Although a deficiency of coenzyme Q_{10} is usually associated with heart disease, there is growing evidence of the adverse effects that an insufficient supply of coenzyme Q_{10} can have on the brain. Since most of our cellular energy is derived from the mitochondria, the structures in the cells that manufacture and drive this energy are essential for normal brain function. When this energy powerhouse is malfunctioning, it can result in many of the diseases of aging, including diseases of the brain, and this is where coenzyme Q_{10} comes in. It will help to restore the fuel that allows brain mitochondria to function normally.

Recommended dose: In a recent study of patients with Parkinson's disease, 1,200 milligrams of coenzyme Q_{10}, given daily, significantly improved the quality of life. For healthy people, 30–100 milligrams are recommended.

Targeted Nutraceuticals

If you want to prevent or help support weakened organs and systems within the body, we recommend stepping up your program with targeted nutraceuticals. They very effectively support bone tissue, the brain, cholesterol management, the heart, the immune system, the joints, the libido, the liver, the prostate, and vision.

We have been involved with the production and distribution of nutraceuticals for more than twenty years and strongly encourage all our clients to take a multivitamin and mineral formula each day. **Mesua RX physician foundation formula** includes antioxidants, bone support, mitochondrial support, and omega EFAs to help decrease inflammation.

As you've learned, most chronic disease develops at the cellular level and inflammation is perhaps the single-most important causative factor. Detoxifying the body and reducing inflammation with optimum nutraceutical balance is key to helping you reach the Mesua RX fount of health and youth from the inside out.

Appendix E

Calorie Value for Ten Minutes of Activity

Activity	125 pounds	175 pounds	250 pounds
PERSONAL NECESSITIES			
Sleeping	10	14	20
Sitting (watching TV)	10	14	18
Sitting (talking)	15	21	30
Dressing or washing	26	37	53
Standing	12	16	24
LOCOMOTION			
Walking downstairs	56	78	111
Walking upstairs	146	202	288
Walking at 2 mph	29	40	58
Walking at 4 mph	52	72	102
Running at 5.5 mph	90	125	178
Running at 7 mph	118	164	232
Running at 12 mph	164	228	326
Cycling at 5.5 mph	42	58	83
Cycling at 13 mph	89	124	178
HOUSEWORK			
Making beds	32	46	65
Washing floors	38	53	75
Washing windows	35	48	69
Dusting	22	31	44
Preparing a meal	32	46	65
Shoveling snow	65	89	130

Activity	125 pounds	175 pounds	250 pounds
HOUSEWORK (cont.)			
Light gardening	30	42	59
Weeding garden	49	68	98
Mowing grass (power)	34	47	67
Mowing grass (manual)	38	52	74
SEDENTARY OCCUPATION			
Sitting	15	21	30
Light office work	25	34	50
Standing, light activity	20	28	40
Typing (electric)	19	27	39
LIGHT WORK			
Assembly line	20	28	40
Auto repair	35	48	69
Carpentry	32	44	64
Bricklaying	28	40	57
Farming chores	32	44	64
House painting	29	40	58
HEAVY WORK			
Pick and shovel work	56	78	110
Chopping wood	60	84	121
Dragging logs	158	220	315
Drilling coal	79	111	159
RECREATION			
Badminton	43	65	94
Baseball	39	54	78
Basketball	58	82	117
Bowling (nonstop)	56	78	111
Canoeing (4 mph)	90	128	182
Dancing (moderate)	35	48	69
Dancing (vigorous)	48	66	94
Football	69	96	137
Golfing	33	48	68

Activity	125 pounds	175 pounds	250 pounds
RECREATION (cont.)			
Horseback riding	56	78	112
Ping-pong	32	45	64
Racquetball	75	104	144
Skiing (Alpine)	80	112	160
Skiing (cross-country)	98	138	194
Skiing (water)	60	88	130
Squash	75	104	144
Swimming (backstroke)	32	45	64
Swimming (crawl)	40	56	80
Tennis	56	80	115
Volleyball	43	65	94

Calorie values are approximate.

Appendix F

Zone Café

THE CONSCIOUS CHOICE

It is no secret that a worldwide obesity epidemic threatens to handicap our healthcare system, as well as contribute to numerous health complications, including cancer, diabetes, and heart disease. Notably, about half the money used to buy food in the United States is spent at restaurants, predominantly fast-food establishments—in 2001, Americans spent over $110 billion on fast food.

MISSION

Zone Café is positioned to become the number-one quick and casual healthy restaurant chain in America. With a unique menu based on the Zone diet, we serve delicious, high-quality, affordable cuisine, providing a nutritious alternative to traditional fast food.

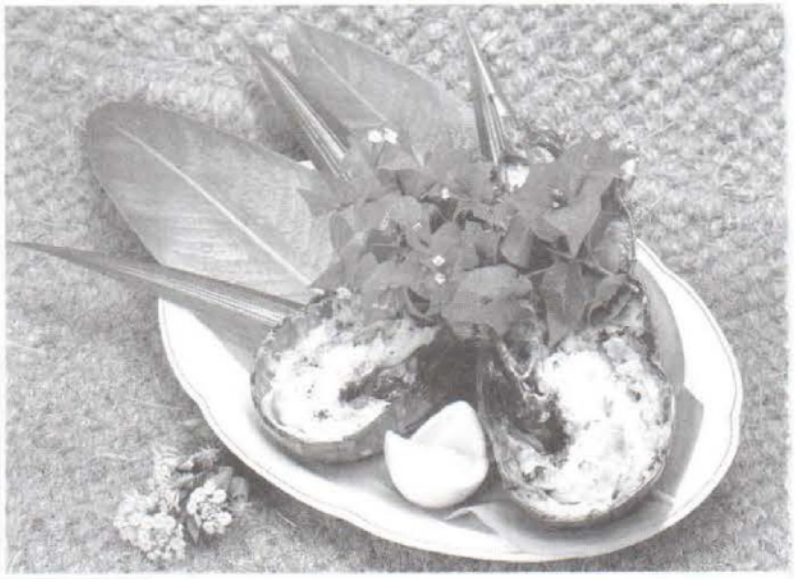
PHILOSOPHY

Hippocrates said, "Let food be your medicine." Centuries later, his timeless wisdom is not only simple to implement, but may also be integral in combating obesity while reversing the aging process. The key to applying this strategy for health management is to consciously choose the most ideal foods to enhance optimal health and well-being.

Perceiving food as preventive medicine is the first step in taking responsibility and caring for the body. With this in mind, we have designed Zone Café cuisine to be not only your healthiest food option, but also the tastiest. In developing these meals, we offer you a trustworthy option crafted by leading scientists and doctors.

MENU

Based on the Zone diet, as created by Dr. Barry Sears, Zone Café meals consist of specific combinations of quality macronutrients (proteins, carbohydrates, and fats). Our chefs prepare creative medleys of lean protein and monounsaturated



Photos courtesy of CuisinArt Resort & Spa.