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.

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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 increase blood sugar, elevated cortisol levels, and free radicals.

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.

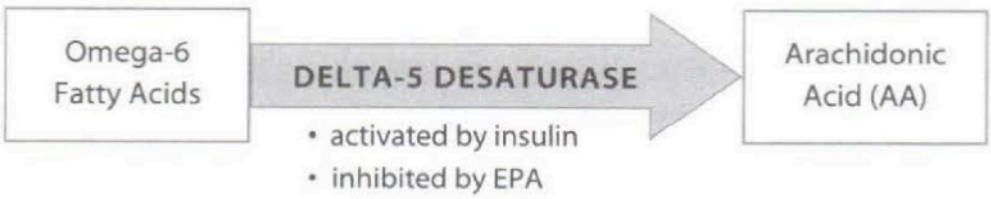

Figure 7.1. The Role of Delta-5 Desaturase in AA Synthesis

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.

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.

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.