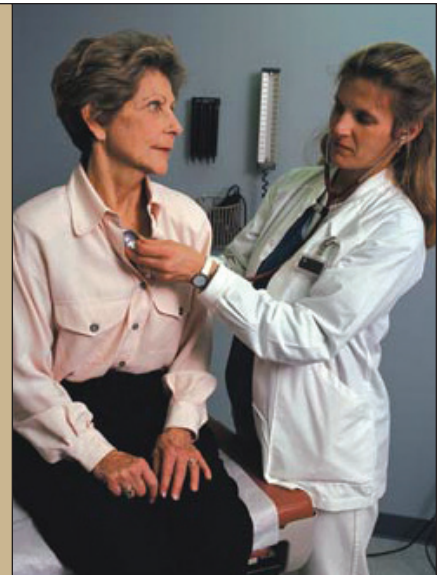


Cardiovascular Disease: New Assessments, New Recommendations

by Jodi Friedlander, M.S. & Edward Bauman, M.Ed., Ph.D.

1. The Japanese eat very little fat and suffer fewer heart attacks than the British or Americans
2. Mexicans eat a lot of fat and suffer fewer heart attacks than the British or Americans.
3. Africans drink very little red wine and suffer fewer heart attacks than the British or Americans.
4. Italians drink large amounts of red wine and suffer fewer heart attacks than the British or Americans.
5. Germans drink a lot of beer and eat lots of sausages and fats and suffer fewer heart attacks than the British or Americans.

CONCLUSION: *Eat and drink what you like.
Speaking English is apparently what kills you.*



Heartbreak

We are a heart-sick society, literally dying of broken hearts. A recent news story (Ohlemacher, 2007) reported that the average lifespan in the United States is declining, both for infants and adults. Despite great wealth and major technological and medical advances, a baby born in 2004 can expect to live an average of only 77.9 years. This places us 42nd in the world in life expectancy, down from eleventh place just two decades ago.

The reason? For the most part, it appears to be none other than diet and lifestyle. Abundant wealth allows us the luxuries of fast and processed food, too much food, and energy-saving devices such as cars, which make physical activity largely unnecessary. Our diets contain junk fats, too much sugar, and too few nutrients. We are eating ourselves to death and dying of malnutrition.

Two-thirds of adults are overweight, one-third are obese, so naturally we are dying of the diseases associated with this condition (along with cigarette smoking): heart disease and cancer, primarily.

While cancer of all types – the big “C” – seems to predominate in media stories and in our fears, it is the stealthy incidence of heart disease that is far more breathtaking. The most recent statistics from the *American Heart Association* (AHA) show that for the year 2004, an estimated 79,400,000 Americans – *one in three* – had one or more forms of *cardiovascular disease* (CVD), including:

- ▶ High blood pressure – 72,000,000
- ▶ Coronary heart disease – 15,800,000
- ▶ Myocardial infarction (acute heart attack) – 7,900,000



Cardiovascular Disease: New Assessments, New Recommendations

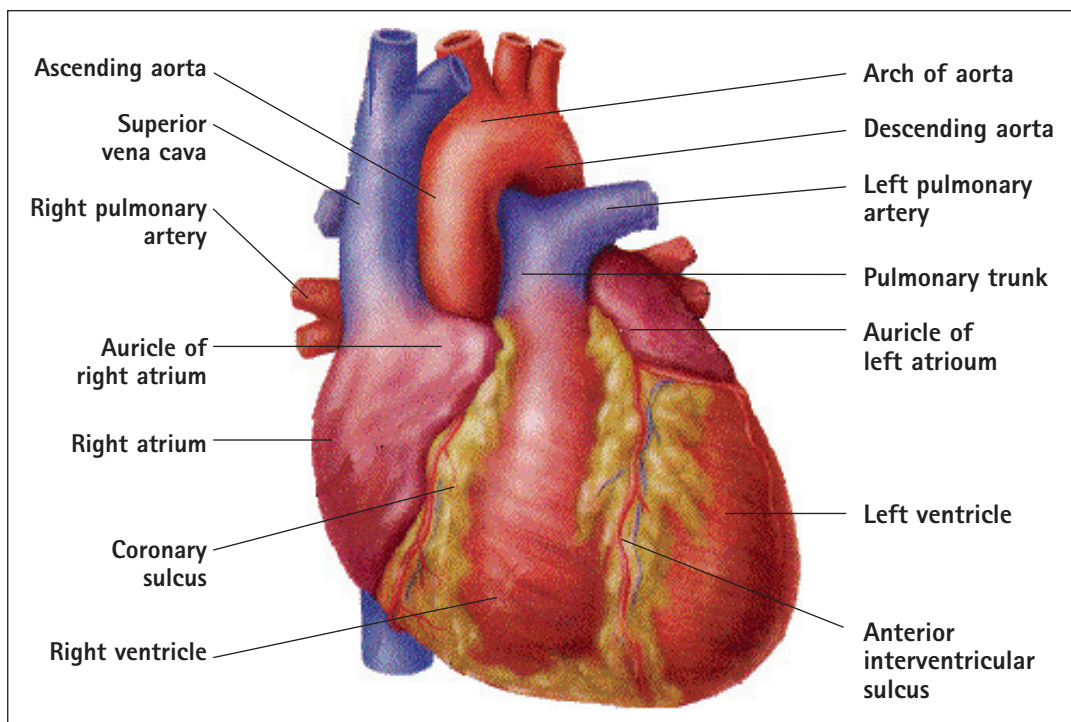
- ▶ Angina pectoris (chest pain or discomfort caused by reduced blood supply to the heart muscle) – 8,900,000
- ▶ Stroke – 5,700,000 (Source for all: AHA, 2007)

Overall, cardiovascular diseases were responsible for 36.3% of all deaths. This amounts to 1 of every 2.8 deaths in 2004, a total of 871,500, far more than for cancer. Of the deaths attributable to CVD, 452,300 were from coronary heart disease, caused by atherosclerosis. And though this figure represents a 33% decline from the period of 1994 to 2004, it is still the single leading cause of death in the U.S. today, with strokes not far behind at number three (AHA, 2007). *More women die from CVD each year than from the next seven leading causes of death combined* (Goodman, 2006). More frightening is the fact that about 325,000 people a year die of heart attacks, either in an emergency room or without being hospitalized (AHA, 2007). Most of these are sudden deaths caused by cardiac arrest. Heart disease is often referred to as the “silent killer” because the first sign of heart trouble is frequently a fatal heart attack. The expense of heart disease is in itself enough to cause some heart attacks. Estimates are that the

direct and indirect costs in 2007 will be \$431.8 billion (AHA, 2007).

The *Eating For Health™* approach to diet, attitude, and lifestyle is perfectly suited for people at risk of or suffering from cardiovascular disease. Given the overstimulating culture we live in, the pace at which most people run, and the uncertainty and fear of economic, ecological, and personal demise, it is no wonder our vascular systems are breaking down. For most people, CVD is driven by poor lifestyle and diet choices, with toxicity and trauma tossed in to expedite the disease process.

The information that follows provides a clinical nutrition perspective on risk assessment, beyond just cholesterol. A wide variety of therapeutic nutrients are discussed that can promote a healthy heart and vascular system. As a bonus, they can minimize dependency on Statin drugs, blood pressure medication, and diuretics that over time have predictable and detrimental side effects. Our intent is to provide reliable, science-based, peer-reviewed reference materials to be shared with cardiologists. The goal is to open their eyes so they will expand their practices by collaborating with nutrition consultants to help their patients live longer and healthier.



Cardiovascular Disease: New Assessments, New Recommendations

Definitions

Cardiovascular disease (CVD): Any disease of the heart or blood vessels (MedicineNet, 2007). It is not a single disease but rather a constellation of conditions that affect the circulatory system, including:

Arteriosclerosis: Hardening of the arteries

Atherosclerosis: A form of arteriosclerosis marked by the buildup of plaque: fats, cholesterol, and other substances that deposit inside the artery walls, narrowing the arteries and restricting blood flow (AHA, 2003). There are soft and hard plaques. Soft plaques are the more dangerous, as they can rupture and obstruct blood vessels. Atherosclerosis can lead to...

Coronary artery disease (CAD), also called coronary heart disease (CHD): Any disease that affects the arteries of the heart, especially if it reduces oxygen and nutrient flow to the heart (Glanze et al., 1992; p. 210). Common effects include *angina pectoris* (chest pain), heart attack, or both (AHA, 2007).

Hypertension: High blood pressure (high BP).

Stroke or cerebrovascular accident (CVA): Blood clot or bleeding in the brain, cutting off oxygen and causing various effects, depending on the location and extent of damage (Glanze et al., 1992; p. 156). *Transient ischemic attack* (TIA) is a milder, shorter form of stroke, involving a brain blood vessel breakdown, generally with symptoms of shorter duration (Glanze et al., 1992; p. 784).

Heart failure (HF) or congestive (or chronic) heart failure (CHF): Inability of the heart to pump sufficient blood to the rest of the body. Results in fluid accumulation in the lungs, ankles, and legs; fatigue; and shortness of breath. When leg arteries are affected, the diagnosis is intermittent claudication, is marked by numbness or pain in the lower extremities, especially when walking. This is a major symptom of *peripheral artery disease* (PAD).

Arrhythmias: *premature atrial contractions* (PACs), *premature ventricular contractions* (PVCs), atrial and ventricular fibrillation, and other sinus pauses.

CVD also includes heart valve disease, orthostatic hypotension, shock, endocarditis, diseases of the aorta and its branches, and congenital heart disease (MedicineNet, 2007). This article focuses on assessments and support for the conditions defined above.

De-fibbing the Myths

Science over the last ten years has made valuable new discoveries regarding CVD and has also validated findings from older research. Though medical misinformation dies hard, it is time to write the epitaph for the long-enduring myth of cholesterol as the cause of heart disease. It is not. Despite multiple studies indicating otherwise, this dogma has been medical gospel since the early 1960s and has spawned a multi-billion dollar drug and diet industry bent on controlling numbers without looking further for underlying causes. This is not to say that high cholesterol, especially elevated levels of *low-density lipoproteins* (LDL), is not a risk factor. It can be, but correlation does not equal causation. Consider these facts:

- ▶ Cholesterol is a vital component of all animals. It helps digest fats, strengthens cell membranes, insulates nerves, and is essential to hormone production. We cannot live without it.
- ▶ There is no such thing as "good" or "bad" cholesterol. Cholesterol is a single substance. Since it is fat soluble, it doesn't travel well in the watery bloodstream, so it is encased in proteins that allow it to be water soluble. Hence, *lipoproteins* consist of fat (lipo) and its carrying agent (protein). These proteins — *high-density lipoproteins* (HDL) and LDL — come in many sizes. It is the LDL, when small, dense, and oxidized, that are problematic. Cholesterol is detrimental only when it becomes oxidized and contributes to the process of inflammation (Sinatra, 2007; p. 37).
- ▶ Even when the diet is devoid of cholesterol-containing foods (animal products), the liver produces adequate supplies, synthesizing it from proteins, carbohydrates, or fats (Barnes and Galton, 1976; p. 168).



Cardiovascular Disease: New Assessments, New Recommendations

- ▶ The ground-breaking work demonstrating the cholesterol-raising abilities of cholesterol-rich diets was performed on rabbits – natural herbivores with no means of handling and excreting any form of cholesterol (Barnes and Galton, 1976; p.170). All cholesterol-feeding studies were also done with a highly processed, denatured form of cholesterol (Barnes and Galton, 1976; p. 171).
- ▶ Cholesterol does not deposit on the walls of healthy arteries unless, as in feeding experiments, damaged cholesterol is ingested. Then, damage to arteries with subsequent cholesterol deposition is seen within days (Barnes and Galton, 1976; p. 171).
- ▶ Cholesterol is a healing substance. It is deposited on artery walls in response to inflammation, rather than simply collecting passively, as was once thought. This response was demonstrated as far back as 1858 (Barnes and Galton, 1976; p. 169-170).
- ▶ Most studies have shown that high cholesterol is not a risk factor for coronary heart disease in the elderly and that, in fact, those with the highest serum cholesterol levels live the longest (Ravnskov, 2004).
- ▶ Some studies have found that high cholesterol is not a risk factor for women (Ravnskov, 2004).
- ▶ Six studies found that total mortality was *inversely* associated with total cholesterol, LDL cholesterol, or both (Ravnskov, 2004).
- ▶ People with very low cholesterol levels (<160) have been found to be more susceptible to infectious diseases, including HIV/AIDS. There is also evidence that high cholesterol levels are protective against infectious diseases. LDL has been shown to neutralize dangerous bacterial toxins and to have a direct beneficial effect on the immune system (Ravnskov, 2004).
- ▶ Cholesterol levels <160 have been linked to depression, suicides, aggression and amnesia (Sinatra, 2007; p. 36).
- ▶ Deaths from CHF have been found to be higher in people with the lowest concentrations of lipids, including total cholesterol, LDL, HDL, and triglycerides (Ravnskov, 2004).
- ▶ Amount of lipids in the blood have not been shown to correlate with the degree of atherosclerosis in the arteries. Increases and declines in cholesterol levels, whether produced naturally or by medical intervention, are not followed by expected dose-response changes in atherosclerotic plaques in individuals (Ravnskov, 2004).
- ▶ Cholesterol levels can be very high and cause no damage to arteries (Sinatra, 2007; p. 31).
- ▶ Only 50% of heart attacks occur in people with high cholesterol.



Cardiovascular Disease: New Assessments, New Recommendations

Hearts on Fire

Most of the current research now points to a single factor as the initiator of many disease processes, including degenerative conditions of the heart and arteries: *inflammation*.

While the complete etiology of this inflammatory process is not within the scope of this paper, the most important point to keep in mind is that atherosclerosis – the build-up of plaque in the arteries and subsequent cardiovascular complications – begins with chronic inflammation somewhere in the body. This inflammation can eventually involve other parts of the body, including the inner wall of the arteries (the endothelium), resulting in *endothelial dysfunction* (ED), which is where heart disease begins. Insulin resistance is thought to be the predominant initiator of this process (Innes et al., 2007).

While not yet completely understood, it also appears that longstanding inflammation occurring in the gums, such as in gingivitis or tooth infections, or in the gut, such as from *H. pylori* or Chlamydia, may play a role in the initiation of the atherosclerotic response (LePine, 2006; Sinatra, 2007; p. 23; Fratellone, 2006). So may *nanobacteria*, hepatitis (especially C); chronic mononucleosis; dysbiosis, such as from food sensitivities and leaky gut; or chronic low-grade infections. According to Todd LePine, M.D. (2006), because our intestines are the body's main interface with the outside world, when the source of inflammation is elusive, it is prudent to check the gut.

Other sources of inflammation that can lead to vascular injury include:

- ▶ Cigarette smoke
- ▶ Ingestion of bad fats (trans, oxidized, etc.) and other poor dietary factors
- ▶ High blood pressure
- ▶ Chronic stress
- ▶ Toxic chemicals and metals, either ingested or in the environment
- ▶ Alcohol abuse

- ▶ Copper deficiencies (Ravnskov, 2004)
- ▶ Deficiencies of Vitamins A and D (Ravnskov, 2004)

Environmental pollutants excepted, the rest of these represent *modifiable lifestyle risk factors*, even in the presence of familial tendencies towards developing CVD.

Determining Risk

Stephen Sinatra, M.D., in *Reverse Heart Disease NOW* (2007; pp. 38–57, unless otherwise noted), identifies the following twelve factors – *The Dirty Dozen* – as major risks for CVD:

1. **INSULIN RESISTANCE (IR)** is profoundly inflammatory and damaging to the arteries. It often results in weight gain, especially around the middle, with what is known as *visceral adipose tissue* (VAT). At a certain percentage of fat accumulation, VAT becomes an endocrine organ, producing an array of inflammatory chemicals (cytokines) that result in chronic inflammation and metabolic and hormonal dysfunction (Houston and Egan, 2005; p. 8). The rising prevalence of CVD worldwide is thought, in large part, to be due to the atherogenic changes in IR, obesity, lipid profiles, and other measures of the insulin resistance syndrome (Innes et al., 2007). Glucose intolerance alone, after all other risk factors have been taken into account, has been found to be a potent, independent risk factor for CVD (Kannel et al., 1990). Additionally, endothelial damage can both induce and exacerbate inflammation and insulin resistance, leading to the conditions associated with CVD (Innes et al., 2007), which include the *Metabolic Syndrome* (MS).

The MS, also known as *Syndrome X* and *Insulin Resistance Syndrome*, is marked primarily by insulin resistance and endothelial dysfunction, resulting in inflammation that can lead to CVD. According to doctors Mark Houston and Brent Egan:

Cardiovascular Disease: New Assessments, New Recommendations

... the MS originates from both insulin resistance and activation of vascular inflammatory mechanisms related to increased oxidative stress, vascular endothelial dysfunction, thrombosis and atheroembolic disease.

(2005, p. 6)

A diagnosis of the MS is made when at least three of the following major factors are present (Houston and Egan, 2005; pp. 8–12):

- ▶ **Insulin Resistance:** (fasting insulin >17 microunits/L); glucose intolerance (marked by hemoglobin A1C (HbA1C) >5.5% of total hemoglobin (HGB); Type 2 diabetes mellitus (DM).
- ▶ **Obesity:** (body fat >29% in men and >37% in women) with much of the fat as central adiposity that collects around the mid-section (VAT). Waist girth >35" for women and >40" for men; waist-to-hip ratios >0.85 in women, >0.90 in men.
- ▶ **Dyslipidemia:** Low HDL (<40 in men, <50 in women), small HDL, and high LDL, with a greater preponderance of small, dense LDL particles; triglyceride levels >150 mg/dl.; elevated lipoprotein (a) [Lp(a)].
- ▶ **Hypertension:** (BP >140/90 or >130/85 in diabetics or those with the MS).
- ▶ **Prothrombosis:** (tendency to form blood clots).
- ▶ **Inflammation**
- ▶ **Microalbuminuria:** Small amounts of *albumin* (a protein) in the urine. Indicative of kidney disease, CVD, the MS.

The MS is also often marked by high levels of uric acid, which inhibit nitric oxide bioavailability (Klotter, 2007). Insulin requires nitric oxide for glucose uptake in cells.

CVD risk compounds as the number of factors increases. As the MS exhausts the pancreatic beta cells and progresses into *non-insulin dependent diabetes* (NIDDM), a new category of CV risk is created (Houston and Egan, 2005; p. 6).

2. TOXIC BLOOD contains substances that represent independent risk factors for CVD, such as:

- ▶ **Homocysteine:** A catalyst for the oxidation of cholesterol and a marker of inflammation.
- ▶ **Lipoprotein (a) [Lp(a)]:** Essential for artery wall repair but can be inflammatory in the presence of a vitamin C deficiency. Increases often seen in unstable diabetics, menopausal women, and in thyroid autoimmunity in both men and menopausal women (Lotz and Salabe, 1997).
- ▶ **C-Reactive Protein (CRP):** An independent marker of inflammation that rises with chronic infection, high blood sugar, overweight, and deficiencies of antioxidants and essential fatty acids. One of the best markers early on for insulin resistance, because it reflects the inflammatory chemicals produced by VAT (Houston, 2005). Rises transiently in the presence of acute infections; persistent CRP denotes risk.
- ▶ **Fibrinogen:** A protein that regulates coagulation of the blood and an independent risk factor for CVD. Also determines stickiness and viscosity of the blood. Blood that clots too quickly can cause a heart attack. Fibrinogen increases in response to smoking, insulin resistance, birth control pills and menopause.
- ▶ **Ferritin:** A measurement of the storage form of iron. Too much iron can oxidize LDL cholesterol – literally rust it.

3. OXIDATIVE STRESS can cause a chain reaction of free-radical damage and has been determined to be a causal factor in almost every disease known to mankind, as well as in the aging process itself. When LDL are attacked by free-radicals, they can become oxidized, resulting in the "bad" LDL known to damage arterial tissues. Free-radical damage can be caused by cigarette smoke, high sugar intake, excessive physical or emotional stress, trans fats, heavy metal toxins, radiation, and the immune system's response to chronic infection.



4. POOR BIOENERGETICS (poor mitochondrial function). Mitochondria are the powerhouses of our cells; they produce the *adenosine triphosphate* (ATP) that fuels cells and therefore our bodies. Because the heart requires abundant energy to work hard 24 hours a day, its cells are packed with mitochondria. Anything that deprives the heart of the oxygen and nutrients it needs to produce this energy, such as occurs from arterial inflammation and occlusions from plaque, will have serious health repercussions.

5. NANOBACTERIA, a hundredth the size of normal bacteria, were discovered in 1988 and are now considered a likely cause of CVD. Nanobacteria envelop themselves in an impenetrable calcium-rich film where they slowly multiply. By burrowing into healthy cells and killing them, they set off a persistent, unsuccessful immune response that generates chronic inflammation. They calcify their environment, contributing to arterial calcification and the destruction of artery walls, joints and kidney tissue. Fetal bovine serum provides the breeding ground for these miniscule bacteria, and it is hypothesized that they enter our bodies via vaccines made from this serum. This may partially account for the levels of atherosclerosis found in young people.

6. TOXIC METALS

- ▶ Lead in body tissues is directly linked to an increased risk for CVD and hypertension. Lead, mercury, and cadmium accumulate and get locked into tissues, poisoning enzyme systems, causing free-radical stress, and pushing out health-supporting minerals, such as magnesium (which relaxes arterial walls).
- ▶ Heart attack patients have been found to have more mercury in their systems than controls. Mercury (found in fish, dental amalgams, and in the air) may directly impair mitochondrial function. It also inactivates selenium, which helps regenerate the powerful free-radical scavenger, glutathione.

7. EMOTIONAL STRESS has long been known to contribute to disease states. In their article in *Alternative Therapies in Health and Medicine*, Innes et al. (2007) defined the destructive, self-perpetuating cascade of inflammatory cytokines that emanates from chronic stress. It begins with messages to the *hypothalamic-pituitary-adrenal* (HPA) axis, which prompt *sympathetic nervous system* (SNS) activation and a stress response, leading eventually to the creation of the core issues of insulin resistance, along with the oxidative stress, inflammation, and endothelial dysfunction that precede CVD. *Cortisol*, our long-term stress hormone, has both direct and insulin-mediated effects on adipose tissue. It can ultimately promote insulin resistance, VAT, dyslipidemia, glucose intolerance, and hypertension (Innes et al., 2007). Chronic anger, depression, and lack of a supportive social network have all been shown to contribute to heart disease.

Also of note, researchers have found that people who were physically or sexually abused during childhood, or rejected by their mothers, are twice as likely to have inflammatory proteins (CRP) in their blood, and that these people tend to exhibit higher levels of heart disease and diabetes (Merali, 2007).

8. GENDER FACTORS (the hormone connection)

- ▶ Estrogen and testosterone are heart protective in women and men, respectively. Low estrogen in women, postmenopausally, and low testosterone in men, associated with aging, are independent risk factors for heart disease.
- ▶ The synthetic progesterone, *Provera*, prescribed in menopause, constricts coronary arteries and raises the risk of heart attack and stroke.
- ▶ Hypothyroidism, most prevalent in women, especially after menopause, can elevate blood pressure (Dernellis and Panaretou, 2002) and cholesterol (Barnes and Galton, 1976; pp.65-178) and increase the rate of heart attacks (Barnes and Galton, 1976; pp. 155-196). Auto-



Cardiovascular Disease: New Assessments, New Recommendations

immune hypothyroid is associated with elevated Lp(a) (Lotz and Salabe, 1997). Treatment with thyroid hormone can lessen all aspects of this atherogenic profile (Martinez et al., 1998).

9. TRANS-FATTY ACIDS are metabolic poison. They harm the delta-6 desaturase enzyme that converts beneficial dietary fats into fats the body can use, thereby contributing to fatty acid deficiencies. They turn off the production of anti-inflammatory prostaglandins and turn on the production of those that inflame. Even if one eats or supplements good fats, eating trans fats nullifies their effect. There are no safe levels of trans-fats.

10. HIGH BLOOD PRESSURE (HBP, hypertension) is an independent risk factor for CVD and can be either the cause or the result of atherosclerosis. It is defined as a *systolic blood pressure* (SBP) of >140mm Hg. and a *diastolic blood pressure* (DBP) >90mm Hg – or 130/80 in people with the MS or diabetes, or those taking hypertensive medication (also Houston and Egan, 2005; p. 10). Fully one-third of hypertensives are unaware of their condition, yet elevated blood pressure is a prime risk factor for heart attacks and strokes, heart failure, brain damage, and kidney disease. Women appear to be more vulnerable to its effects than men.

HBP increases the risk of CVD by damaging the arteries and organs. Healthy arteries expand and contract with each pulse of the heart. Sustained pressure causes arterial walls to thicken and become inelastic and resistant to blood flow. This injures the arterial linings and speeds up plaque formation. The heart's left ventricle enlarges (*left ventricular hypertrophy*) in an attempt to compensate for the increased systemic pressure, and over time this will deteriorate its function, eventually causing heart failure. Anything that adds more pressure to the system – arterial spasms or blood clots – causes the ventricle to work even harder, producing congestive heart failure. In the presence of other risk factors,

HBP is likely to contribute to aneurysm (a dilated, ballooned portion of an artery, occurring at a weak spot), stroke, angina pectoris, and heart attack (*myocardial infarction*) [Segala (LEF), 2003; p. 1004].

Blood pressure tends to rise as we age, with SBP going up 20 or 30 mm Hg from early to late adulthood; there is a smaller concurrent rise in DBP (Whelton, 2004). Levels of each are higher in men in early adulthood and then level out or decline until, in the sixth or seventh decade, the gender discrepancies either disappear or reverse to a small degree. While it is important to keep an eye on both the systolic and diastolic, as each is an independent risk factor for CVD, a high systolic is a far more powerful indicator of risk (Whelton, 2004).

Fully 25% of the U.S. population suffers from hypertension (>50% by the sixth decade of life), which is responsible for most doctor visits and prescriptions filled – to the tune of over \$10 billion a year (Houston, 2005; p. 18) – though among all the risk factors for CVD, BP is the most modifiable through diet and lifestyle adjustments (Whelton, 2004).

11. GENETICS: Genetic testing can be helpful in determining predispositions towards CVD, and also in tailoring specific supplement, pharmaceutical, and lifestyle protocols for those already suffering from the disease.

12. RADIATION from dental or other X-rays, mammograms, CT scans, angiograms, and cancer therapy can cause atherosclerosis. Damage from radiation accumulates and doesn't leave the body. Since radiation is abundant in our environment, it would appear to be prudent to keep medical radiation to a minimum.

Testing (all reference values: Sinatra, 2007; p. 66)

The following represents reasonable tests to request as a nutritional consultant. More invasive and complex testing is more realistically entrusted to a physician.



Cardiovascular Disease: New Assessments, New Recommendations

SERUM TESTS

(To be done in addition to the standard panel of *complete blood cell count* (CBC); electrolytes; chemical profile; and renal function):

- ▶ **VAP (Vertical Auto Profile) Cholesterol:** A far more accurate assessment for cholesterol than the standard lipid panel. Determines total cholesterol, HDL and LDL, but calculates values for subfractions – *very low-density lipoprotein* (VLDL); *intermediate-density lipoprotein* (IDL); small and large HDL; small and large LDL (indicates LDL density pattern). Also tests *triglycerides** (blood fats) and Lp(a). Suggests additional risk factors.

*Atherogenesis occurs in response to food intake, and two recent studies suggest that *non-fasting triglyceride* levels may provide a stronger and more independent assessment of risk than when done fasting (O’Riordan, July 19, 2007).

- ▶ **Highly Sensitive C-Reactive Protein (hs-CRP) or Cardio CRP:** Laboratory reference ranges vary somewhat, but generally levels >1.3 (mg./L) are indicative of an inflammatory condition in the body, either acute or chronic. Higher levels are associated with increased risk of CVD, and along with other risk factors, CRP provides a very good predictor of CVD events [Segala (LEF), 2003; p. 525]. Levels <0.8 mg/L are desirable.
- ▶ **apoB/apoA-I Ratio:** Though apoB levels are frequently checked, the ratio between B and A appears to be possibly the single best lipoprotein-related variable to quantitate coronary risk (Walldius et al., 2004).
- ▶ **Homocysteine:** <9 µmol/L
- ▶ **Vitamin B12:** High homocysteine levels reflect a need for B6, folate, and B12. This helps determine nutrient needs more precisely.
- ▶ **Fibrinogen:** 180–350 mg/dl
- ▶ **Ferritin:** women – <80 µg/L; men – <90 µg/L

- ▶ **Vitamin D3 (25-hydroxyvitamin D):** Deficiency plays a role in heart disease, stroke, and hypertension. Levels around 50 ng/mL are optimal (Vitamin D Council).
- ▶ **Vitamin K:** Necessary for the integrity of the arteries. Deficiencies are associated with arterial calcification (Sinatra, 2007; p. 85).

TESTS FOR INSULIN RESISTANCE:

- ▶ **Fasting Blood Glucose:** <100 mg/dl
- ▶ **Fasting Insulin:** <17 microunits/L
- ▶ **Hemoglobin A1C (HbA1C):** <6% of total *hemoglobin* (HGB)

When risk factors such as homocysteine, Lp(a), cholesterol levels, and hypertension do not respond well, or at all, to nutritional therapy, further testing can be helpful.

- ▶ **Thyroid:** Low thyroid levels can cause cholesterol, BP, homocysteine, and Lp(a) to increase. Testing can be done with serum or saliva. (Saliva testing done through Diagnos-Techs Lab.)
 - **TSH <2** [a 1997 study found that TSH over 2, especially when coupled with thyroid antibodies, was associated with an increased risk of developing hypothyroidism (Weetman, 1997)]. Reference ranges are too wide, and it is generally accepted that anything >3 represents subclinical hypothyroidism and warrants treatment if symptoms exist.
 - **Free T4 and Free T3:** Reference ranges are fine for these
 - **Autoantibodies thyroid peroxidase antibodies (TPOAb) and thyroglobulin antibodies (TgAb):** are necessary to determine autoimmunity even with normal hormone levels.
- ▶ **Estrogen:** As estrogen levels fall with menopause, cholesterol, triglycerides, Lp(a), and inflammatory markers all rise (Bland, 2004; p. 109). Taking supplemental estrogen orally can create inflammation. Estrogen can be tested via serum or saliva.



Cardiovascular Disease: New Assessments, New Recommendations

OTHER TESTS:

- ▶ **AA/EPA Ratio:** measures the ratio of the inflammation-producing Omega-6 fatty acid, *arachidonic acid* (AA), and the anti-inflammatory Omega-3 fatty acid *eicosapentaenoic acid* (EPA). This can measure insulin resistance, as too much insulin provokes AA production (Sinatra, 2007; p. 67). (This blood spot analysis can be ordered through Metametrix.)
- ▶ **Food Sensitivities:** These can be IgE, IgG, IgA, or IgM (Leopold, 2006).
- ▶ **Stool Analysis:** Indicated when digestive tract bacterial infection is suspected. (*Metametrix GI Effects* is a new, highly sensitive test).
- ▶ **Hair Mineral Analysis:** can help determine mineral deficiencies and toxic metal overloads. This can be followed up with a:
 - **Heavy Metals Urine Challenge:** if deemed appropriate.
- ▶ **Urine and Saliva pH:** Chronic inflammation produces an acidic effect in the body. Clients can monitor the effectiveness of their program by keeping track of their acid/alkaline balance.

Feeding the Hungry Heart

World Health Organization statistics show that as much as 80% of heart disease can be prevented by adopting a healthy diet (Low Dog, 2006). A heart-healthy diet is defined as an anti-inflammatory diet, one that can provide the necessary nutrients to control blood glucose and insulin, raise HDL, and lower LDL and BP. It is also alkalinizing and soothing to the intestinal tract. Once symptoms of CVD have developed, making prevention no longer possible, dietary measures are still important to reduce the risk of heart attack and to slow the progression of atherosclerosis. Testing can reveal specific risk factors, and diet and lifestyle can be tailored to successfully target each one. The wisdom of the *Eating For Health™* plan, combined with the supplement recommendations of researchers at the forefront of CVD treatment, constitute the basis of a

truly supportive nutrition and lifestyle program for the prevention and care of cardiovascular disease.

DIETARY BASICS

Eating For Health™, building direction, with emphasis on:

- ▶ **Lean protein:** including vegetable protein, such as tempeh, beans, legumes.
- ▶ **Olive oil:** as the main source of fat (Leopold, 2006) and virgin organic coconut oil for sautéing.
- ▶ **Low-glycemic index vegetables, non-gluten grains, and fresh fruits:** to keep insulin and blood sugar levels stable.
- ▶ **Fiber:** intake of at least 10 gm. daily (LEF, 2006).
- ▶ **Foods high in antioxidants:** including carotenoids, flavonoids, isoflavones, and phyto-anti-inflammatories (Leopold, 2006).

Carotenoid-Rich Foods

- ▶ Apricot
- ▶ Cantaloupe
- ▶ Carrots
- ▶ Kale
- ▶ Lemons
- ▶ Limes
- ▶ Oranges
- ▶ Spinach
- ▶ Sweet potato
- ▶ Tomato
- ▶ Winter squash
- ▶ Yams

Flavonoid-Rich Foods:

- ▶ Berries (dark)
- ▶ Cherries
- ▶ Citrus fruits
- ▶ Greens
- ▶ Green tea
- ▶ Oolong tea (Bauman, 2007)
- ▶ Peppers
- ▶ Red wine
- ▶ Tomatoes

Isoflavone-Rich Foods:

- ▶ Edamame*
- ▶ Miso*
- ▶ Tempeh*
- ▶ Tofu*

* Soy (preferably fermented) may lower LDL and BP and may promote HDL production (Sinatra, 2007; p. 179).



Cardiovascular Disease: New Assessments, New Recommendations

Phyto-Anti-Inflammatories:

- ▶ **Olive oil:** extra virgin olive oil contains compounds that are potent free-radical scavengers and can help block LDL oxidation (Sinatra, 2007; p. 179).
- ▶ **Spices and herbs:** ginger, curcumin (turmeric), rosemary, capsaicin (hot peppers), oregano, boswellia (frankincense),
- ▶ **Sesame oil**
- ▶ **Quercetin:** (apple, green tea, onions, berries, brassica vegetables, buckwheat)
- ▶ **Epigallocatechin:** green tea
- ▶ **Ursolic acid:** present in apples, bilberries, cranberries, elder flower, peppermint, lavender, oregano, thyme, hawthorn, prunes.
- ▶ **Omega-3 Rich Foods:** wild-caught cold water fish, such as salmon; pastured beef; Omega-3 enriched eggs; flax, pumpkin, and chia seeds; walnuts. Eating the equivalent of one fatty fish meal once a week can provide enough Omega-3 fats to reduce the risk by half of developing an initial heart attack, compared to people who have no EPA/DHA intake (Sinatra, 2007; p. 178).
- ▶ **Nuts and seeds for their essential fatty acids, protein, fiber, and phytosterols (compounds that inhibit cholesterol absorption):** The FDA, in 2003, approved the health claim that eating 1.5 ounces of nuts per day may reduce the risk of CHD (Low Dog, 2006).
- ▶ **Garlic:** its active component, allicin, can help raise HDL; lower LDL, homocysteine, and blood pressure; and decrease platelet stickiness (Sinatra, 2007; p. 179).
- ▶ **Arginine-rich foods:** lentils, hazelnuts, walnuts, peanuts.



Booster Foods:

- ▶ **Whole food concentrates:** such as green and red fruit and vegetable powders, can help reduce DNA damage, improve endothelial function and arterial compliance, and reduce BP (Houston, 2005; p. 51).
- ▶ **Chlorella:** may improve endothelial function and improves SNS function, possibly because it provides potassium, calcium and magnesium (Houston, 2005; p. 94).
- ▶ **Flax seed:** is a valuable source of Omega-3 fats. 1–2 tablespoons daily.
- ▶ **Aloe vera:** (Leopold, 2006)

Foods To Restrict:

- ▶ **Inflammatory foods:** such as commercially raised red meat and dairy.
- ▶ **Salt:** Especially for hypertension, though not all are salt sensitive
- ▶ **Saturated fats:** if high, and eliminate intake of trans fats, hydrogenated oils, and other damaged fats.
- ▶ **Most vegetable oils:** they contain too much Omega-6 and are generally damaged fats.
- ▶ **Caffeine:** no more than 100 grams/day, or one 8 ounce cup (Houston, 2005; p. 108).
- ▶ **Alcohol:** no more than 20 grams/day (Houston, 2005; p. 91).
 - Red wine = 10 oz.
 - Beer = 24 oz.
 - Hard liquor = 2 oz.
- ▶ **Soft drinks:** drinking more than one soft drink per day, even when artificially sweetened and containing no sugar, can have adverse metabolic consequences and contribute to the onset of the MS (O’Riordan, July 25, 2007).
- ▶ **Refined carbohydrates:** Reduce or eliminate all especially sugar, refined flour products, and high fructose corn syrup. Fructose consumption,



Cardiovascular Disease: New Assessments, New Recommendations

primarily in the form of high fructose corn syrup, has increased 135% between 1977 and 2001 (Hitt, 2007). A recent short-term study has shown it to promote atherogenesis at a greater rate than glucose in overweight and obese adults (Hitt, 2007).

- ▶ Foods for which sensitivities have been detected.

LIFESTYLE:

- ▶ If you smoke, stop. That's the bottom line. The 4000+ chemicals in cigarette smoke kill like nothing else can. Though high-quality nutrient intake is important, much of the research indicates that its effect is limited among those who smoke.
- ▶ Weight loss, specifically *fat* loss. Needs to be shed slowly – one to two pounds per week. Women should achieve a waist circumference of no more than 35", men no more than 40"; Desirable body fat levels in men are under 16% and in women, under 22% (Houston, 2005; p. 107). Even modest amounts of weight loss can confer significant benefits.
- ▶ Detoxification of heavy metals and other toxins may be crucial.
- ▶ Light to moderate physical activity, such as walking, for thirty minutes a day can reduce risk of heart attack and lower BP and cholesterol (Devries, 2007; p. 129).
- ▶ De-stress activities such as meditation, yoga, biofeedback, massage, leisurely walks.
- ▶ EDTA chelation therapy appears to confer great benefit on some people with clogged arteries.

SUPPLEMENTS:

Basics for heart health and to slow the progression of atherosclerosis and improve endothelial function (from LEF, 2006 and Sinatra, 2007; p. 204–209).

- ▶ **High quality multi-vitamin/mineral with high-potency B vitamins:** Add extra folate (folic acid). Because of variation in individual metabolism of folate, it may be wise to supplement with three types: folic acid, 5-formyl THF, and L-5-MTHF (Bauman, 2007).
- ▶ **Fish Oil:** (flax oil may not be as beneficial). Omega-3 oils may interfere with anticoagulant drugs (Low Dog, 2006).
- ▶ **Magnesium:** can relax muscles and aid sleep. It is important for the relaxation of arterial walls.
- ▶ **CoQ10:** A powerful antioxidant necessary for muscle energy production, it also helps prevent disease and slows down the aging process; reduces mild to moderate HBP; generates energy, strength, and vitality; strengthens the immune system; counteracts the muscle wasting of statin drugs; improves nervous system and brain disorders; and helps protect against gum disease (Sinatra, 2007; p. 137).
- ▶ **Vitamin C:** Can retard the progression of atherosclerosis; reverses endothelial dysfunction; improves recovery after heart attack and after bypass surgery; helps control blood pressure; helps chelate lead out of the body; improves conversion of cholesterol into bile acids; and helps neutralize Lp(a) and vascular wall damage due to homocysteine (Sinatra, 2007; p. 116).

Heart-Healthy Supplementation Basics:

SUPPLEMENT	DAILY DOSAGE
Multi-vitamin/minerals	Take as directed
Extra folate	400–1000 mcg
Fish oil	1 gm with 2:1 EPA/DHA
Magnesium	400–800 mg
CoQ10	60–120 mg (prevention); 180–360 mg (treatment)
Vitamin C	1–3 gm, divided doses



Cardiovascular Disease: New Assessments, New Recommendations

For the cost conscious, the above is the minimum required for an effective program (Sinatra, 2007; p. 209). To this can be added:

- ▶ **PLC (propionyl-L-Carnitine) or L-Carnitine:** Helps deliver fats efficiently to cell mitochondria for energy production, i.e., speeds metabolism; transports waste material out of the mitochondria; necessary for proper heart function (Sinatra, 2007; p. 153).
- ▶ **D-Ribose:** With carnitine, magnesium, and CoQ10, helps produce energy to implement a successful exercise program. D-ribose, a simple sugar, is a building block of *Adenosine Triphosphate* (ATP) and repletes energy in sick hearts. It is present in red meat but not in sufficient amounts to provide therapeutic benefits (Sinatra, 2007; p. 156).
- ▶ **L-Arginine:** Improves endothelial function; provides antioxidant effect; blocks LDL oxidation; blocks platelet clumping and white cell adhesion to vascular walls; decreases angina frequency; improves symptoms of heart failure; improves heart attack outcomes and vascular blockages (Sinatra, 2007; p. 111). Precursor to nitric oxide. Take with antioxidants (LEF, 2006). Not to be used right after a heart attack (Sinatra, 2007; p.112)
- ▶ **Vitamin E (additional):** high gamma/delta tocopherols* (take in A.M.) and high gamma/delta tocotrienols* (take in P.M.)
*Tocopherols and tocotrienols compete with each other and need to be taken separately (Houston, 2005; p. 80).

OR

- ▶ **Vitamin E:** mixed tocopherols and tocotrienols (Sinatra, 2007; p. 205).
- ▶ **Vitamin K:** K2 appears to be more effective than K1 (Sinatra, 2007; p. 132). Helps prevent calcification of arteries.

- ▶ **Selenium:** A good antioxidant; often deficient in the diet; helps neutralize mercury. A necessary nutrient for optimal thyroid function.
- ▶ **Zinc (additional):** Has anti-atherogenic effect (Jenner et al., 2007). Diabetics should use no more than 35 mg (Segala (LEF), 2003; p.521)

Heart Healthy Herbs:

- ▶ **Hawthorn:** standardized extract. Rich in antioxidants. Increases contractility of heart, strengthens its pumping action (Low Dog, 2006). No controlled trials with people have been done.

Further Heart-Healthy Supplementation:

SUPPLEMENT	DAILY DOSAGE
PLC (propionyl-L-Carnitine) OR L-Carnitine	1000-2000 mg 1 or 2 times daily
D-Ribose	<ul style="list-style-type: none"> • 5 gm for prevention, maintenance or for strenuous activity. • 10-15 gm for established but not advanced CVD • 15-30 gm for advanced heart failure, frequent angina and for those awaiting heart transplants.
L-Arginine	2000-3000mg 3 times daily
Vitamin E: High Gamma/Delta tocopherols	400 IU tocopherols, take in A.M.
Vitamin E: Tocotrienols	100 mg tocotrienols, take in P.M.
OR Vitamin E: Mixed tocopherols and tocotrienols	200 mg
Vitamin K (K2 preferred)	150 mcg
Selenium	200 mcg
Zinc	30-60 mg
Hawthorn	160-900 mg

Cardiovascular Disease: New Assessments, New Recommendations

Specific Anti-Inflammatory Nutrients (in addition to the basics, above):

- ▶ **Vitamin D3:** also lowers BP even when not deficient and improves insulin resistance.
- ▶ **Lipoic Acid:** recycles vitamins C and E and glutathione. Works best in combination with E, CoQ10, carnitine, and selenomethionine (LEF, 2006). Choose alpha-lipoic or the more potent R-lipoic.
- ▶ **Garlic:** Reduces inflammation, improves endothelial function, slows progression of plaque, improves exercise capacity (LEF, 2006); inhibits platelet aggregation; blocks thromboxane synthesis (Marz, 1997; p. 253). Do not take garlic supplements if on blood thinners.
- ▶ **Ginkgo biloba:** Has anti-platelet effect, so higher doses not recommended (LEF, 2006)
- ▶ **Quercetin:** a polyphenol bioflavonoid found in red wine. Protects endothelial cells. Stimulates nitric oxide production (LEF, 2006)
- ▶ **Green tea extract:** Also anti-platelet agent and decreases markers of inflammation, as well as protecting LDL (LEF, 2006).
- ▶ **Vitamin B6** (LEF, 2006): Required for keeping homocysteine in check; helps convert tryptophan to niacin; helps convert linoleic acid to anti-inflammatory PGE1 (Marz, 1997; p. 212). Take with other B vitamins to maintain proper balance.

Anti-Inflammatory Supplements

SUPPLEMENT	DAILY DOSAGE
Vitamin D3	1200–2000 mg
Lipoic acid	150–300 mg
Garlic	<i>Capsules:</i> 1000–3000 mg (lower for prevention) <i>Oil:</i> .03–.12ml 3 times daily (Bauman, 2005) 100–150 mg/kg fresh (Marx, 1997; p.253)
Ginkgo biloba	120 mg
Quercetin	500–1000 mg (water soluble)
Green tea extract	725 mg (93% polyphenols)
Vitamin B6	40–500 mg (lower for prevention; higher for treatment)

Anti-Inflammatory Herbs:

- ▶ **Turmeric (*Curcuma longa*):** Potent anti-inflammatory; inhibits formation of about a dozen inflammatory cytokines, including COX-2; used for both acute and chronic inflammation (Sodhi, 2007).
- ▶ **Ashwagandha:** May prevent lipid peroxidation; immunomodulating effects (Sodhi, 2007).
- ▶ **Ginger:** antioxidant, blood thinner, cardiogenic; inhibits inflammatory prostaglandin, thromboxane and leukotriene synthesis; lowers cholesterol (Sodhi, 2007).
- ▶ **Guggul:** More potent than hydrocortisone for chronic inflammation; also lowers cholesterol (Sodhi, 2007).
- ▶ **Rosemary** (Leopold, 2006)

Herbal Anti-Inflammatories:

HERB	DAILY DOSAGE
Turmeric	500–2000 mg standardized extract 2–3 times daily
Ashwagandha	300–500 mg standardized extract, 2–3 times daily
Ginger	3–6 gm raw ginger for inflammation, OR 100–200 mg 3 times daily of standardized extract
Guggul	300–500 mg 3 times daily of standardized extract; take with food
Rosemary	1–2 gm

Nutrition for Specific Conditions

The greatest amount of nutrient research exists for hypertension, dysglycemia, and dyslipidemia (cholesterol and triglyceride reduction), which respond well to nutritional intervention. These sections, therefore, contain the most information. The effect of nutrients on Lp(a) is contradictory, as its levels are affected by genetics more than nutrition. It is this author's experience, also, that high levels respond more favorably to hormone supplementation, either transdermal estrogen or



Cardiovascular Disease: New Assessments, New Recommendations

thyroid, as necessary. The number of nutrients that can effect beneficial changes in all parameters of CVD are too numerous to be included in this paper. What follows are those that have been most researched and found to be most effective.

Please note that while what follows is in addition to basic supplementation, there are some duplications to ensure that important supplements are not left out. When dosages given here vary from the basic recommendations, they are in place of rather than in addition to those mentioned above.

Hypertension

DIET

Foods that directly lower blood pressure (Houston, 2005, p. 106):

- ▶ **Garlic:** 4 cloves/4 grams daily – fresh and wild is best
- ▶ **Mushrooms:** 1/2 cup daily of either Shitake or Maitake
- ▶ **Guava fruit:** 1-2 lbs. daily is effective (as determined by research study)
- ▶ **Pomegranate juice:** 50 ml. daily (1.6 oz.). Consume with a healthy fat and/or protein if diabetic.
- ▶ **Wakame seaweed:** 3.0–3.5 gm daily
- ▶ **Celery:** 4 sticks daily or 8 teaspoons fresh juice, three times a day
- ▶ **Lycopene-containing foods:** tomatoes and cooked tomato products; guava; watermelon; apricots; pink grapefruit (don't eat if taking statins); papaya
- ▶ **Calcium-containing foods:** kelp, parsley, dandelion greens, dulse, tofu, collard greens, salmon with bones, turnip greens, garbanzo beans, almonds, sesame seeds (Minzel, 2006; p. 20).
- ▶ **Magnesium-containing foods:** kelp, buckwheat, dulse, wheat germ, millet, almonds, rye, blackstrap molasses, tofu, nutritional yeast, beet greens (Minzel, 2006; p. 21).

- ▶ **Potassium-containing foods:** dulse, Swiss chard, kelp, garlic, sunflower seeds, millet, wheat germ, banana, raisins, chicken, avocado, potato (with skin) (Minzel, 2006; p. 21).

Booster Foods:

Whey protein, in a hydrolyzed form (Houston, 2005; p. 63) can significantly lower BP. 20–30 gm per day. Whey is a natural *angiotensin converting enzyme* (ACE) inhibitor (Houston (a), 2005).

Foods To Restrict:

Sodium chloride, aka table salt. Half of all hypertensives are salt sensitive. The minimum sodium requirement is 500 mg per day (Houston, 2005; pp. 46, 57).

LIFESTYLE:

Exercise, done correctly, can lower blood pressure significantly, with reductions as great as 10–15 mmHg in systolic, and 5–10 mmHg in diastolic (Houston, 2005; p. 41).

- ▶ **Aerobic Exercise:** 5–7 days/week, at 50–75% of maximum heart rate (220 minus age), for 60 minutes daily is required to lower BP (Houston, 2005; p. 41). Cardio-burst (interval training) may be even more effective, keeping heart rate no lower than 50% of maximum, with at least five short bursts (up to 5 minutes) at up to 85%. It is necessary to burn 4200 calories per week to lower BP (Houston, 2005; p. 41).
- ▶ **Resistance Training:** 3–7 days/week to build lean body mass and reduce fat weight.

Always pay attention to any blood pressure-raising effects medication may be having and avoid if possible.

SUPPLEMENTS (from Houston, 2005; pp. 72–108 unless otherwise noted):

- ▶ **Vitamin C:** Powerful antioxidant and detoxifying agent; where atherosclerotic plaques are most abundant, vitamin C is most deficient; helps degrade cholesterol (Marz, 1997; p. 237). Natural calcium channel blocker (Houston (a), 2005).



Cardiovascular Disease: New Assessments, New Recommendations

- ▶ **Vitamin E:** high gamma/delta tocopherols* (take in A.M.) and high gamma/delta tocotrienols* (take in P.M.). Natural calcium channel blocker (Houston (a), 2005).

**Tocopherols and tocotrienols compete with each other and need to be taken separately.*

- ▶ **Fish Oil:** Use only high quality, purified products. Flax oil may not be as effective due to conversion problems. Has a mild lowering effect (Lerman, 2006). A natural ACE inhibitor (Houston (a), 2005).
- ▶ **Vitamin D3**
- ▶ The minerals **magnesium, calcium** and **potassium** work synergistically to lower BP and work in conjunction, also, with sodium restriction. More of these are necessary if taking diuretics.
 - **Magnesium:** regardless of food intake (Sinatra, 2007; p. 104). Natural calcium channel blocker (Houston (a), 2005).
 - **Calcium:** More effective when obtained from food!
 - **Potassium:** High potassium intake most effective in African Americans and Asians (esp. Chinese and Japanese).
- ▶ **Co-enzyme Q10 (CoQ10):** A potent antioxidant that regenerates vitamins A, C, and, Carotene.
- ▶ **Vitamin B6:** Natural calcium channel blocker (Houston (a), 2005).
- ▶ **R-Lipoic acid:** Natural calcium channel blocker (Houston (a), 2005). Better when taken with:
- ▶ **Biotin:** improves utilization of glucose, good antioxidant, improves insulin sensitivity (Houston (a), 2005).
- ▶ **Zinc:** Natural ACE inhibitor (Houston (a), 2005).
- ▶ **N-Acetyl Cysteine:** Lowers BP, homocysteine, Lp(a), and platelet aggregation. Precursor to glutathione. Natural calcium channel blocker (Houston (a), 2005).
- ▶ **L-Carnitine**
- ▶ **Taurine**

- ▶ **Pycnogenol**
- ▶ **Melatonin:** to lower night-time BP. Can improve sleep and reduce cortisol levels.

Blood Pressure-Lowering Nutrients

SUPPLEMENT	DAILY DOSAGE
Vitamin C	500 mg 2 times daily
Vitamin E: High Gamma/Delta tocopherols	400 IU tocopherols, take in A.M.
Vitamin E: Tocotrienols	100 mg tocotrienols, take in P.M.
Fish oil	4–15 gm, w/at least 3 gm. DHA/EPA. Best results obtained from highest doses.
Vitamin D3	1200–2000 mg
Magnesium	500–1000 mg
Calcium	1000 mg
Potassium	500 mg
CoQ10	200–400 mg
B6	100 mg 2 times daily
R-lipoic	100 mg 2 times daily
Biotin	2–4 mg
Zinc	25 mg
N-acetylcysteine	1000 mg. 2 times daily
L-carnitine	2 gm. 2 times daily
Taurine	2–3 gm 2 times daily
Pycnogenol	200 mg
Melatonin	2.5 mg 1 hr. before bed

Herbs:

- ▶ **Hawthorn standardized extract:** Natural calcium channel blocker and ACE inhibitor (Houston (a), 2005). Dose: 160–900 mg daily



Cardiovascular Disease: New Assessments, New Recommendations

Insulin Resistance

DIET:

- ▶ Emphasize eliminating refined carbohydrates and including plenty of low-glycemic vegetables and fruits.
- ▶ Adequate antioxidant-containing foods (fruits and vegetables) are crucial.
- ▶ 4 tablespoons extra virgin olive oil per day, or 12–16 whole olives (Houston, 2005; p. 298).
- ▶ Intracellular glutathione is an important antioxidant. It can be increased by these foods (Houston, 2005; p. 300):
 - Whey protein
 - Cruciferous vegetables
 - Green tea
 - Onions and garlic can reduce glucose and increase free insulin (Houston, 2005; p. 302).
 - Bitter melon reduces glucose and HbA1C (Houston, 2005; p. 302).
 - Cinnamon, used liberally (up to 6 gm/day) can improve blood sugar and most parameters of CVD (Houston, 2005; p. 306).

Foods To Avoid: (Houston and Egan, 2005; p. 278):

- ▶ Tobacco
- ▶ Alcohol in excess
- ▶ Caffeine (may or may not pose a problem)
- ▶ Thiazide Diuretics
- ▶ Beta Blockers

LIFESTYLE:

- ▶ Weight (fat) loss
- ▶ Exercise
- ▶ Endurance exercise increases insulin sensitivity and decreases fasting insulin; it has an immediate effect and persists 24–48 hours post exercise; improves many aspects of glucose utilization (Houston and Egan, 2005; p. 285).
- ▶ Resistance exercise has a similar effect as endurance (Houston and Egan, 2005; p. 285) and helps build more muscle, which will increase metabolism and glucose utilization.

- ▶ Stress reduction
- ▶ Test for food sensitivities

Supplements to Improve Insulin Sensitivity and Production, and to Improve Glucose Metabolism

(Houston, 2005; pp. 286–307, unless otherwise noted):

SUPPLEMENT	DAILY DOSAGE
Alpha lipoic acid (or R-lipoic acid) best with:	100–1800 mg
Chromium (GTF)	8 mcg/kg/day = 3.6 mg/lb
Vanadate	Dose to 40–80 mcg/L in serum
Magnesium, with:	500 mg 2 times daily
Vitamin B6	50–100 mg
Niacin (inositol hexanicotinate is best)	25 mg/kg. = 11.5 mg/lb
Biotin	8–16 mg
Vitamin E (mixed tocopherols and tocotrienols)	200–400 IU
Vitamin D3 (Houston, 2005; p. 81)	1200–2000 mg
Potassium	500 mg
Zinc	30–50 mg
Fish oil	DHA–600 mg./EPA–900 mg
Selenium	200 mcg
Manganese	5–10 mg
GLA (gamma linolenic acid)	500 mg 2 times daily
CLA (conjugated linoleic acid)	no established dose
L-carnitine	2 gm 2 times daily
Taurine	1.5–3 gm 2 times daily
N-acetylcysteine	1000 mg. 2 times daily
Pycnogenol	100–200 mg

Cardiovascular Disease: New Assessments, New Recommendations

Herbs for Insulin Resistance

HERB	DAILY DOSAGE
EGCG (green tea extract)	500 mg 2 times daily
Gymnema sylvestre	400 mg of extract, divided doses
Ginseng	200–300 mg 2 times daily

Dyslipidemia (high LDL; low HDL; high triglycerides)

NOTE: Raising HDL has been found to confer greater protection against CVD than lowering HDL (Goodman, 2006).

DIET:

Foods especially helpful for lowering cholesterol and triglycerides (Houston and Egan, 2005; p. 341):

- ▶ Nuts
- ▶ Grape products; red wine
- ▶ Olive oil
- ▶ Garlic
- ▶ Barley
- ▶ Green or oolong tea (Bauman, 2007)
- ▶ Berries
- ▶ Citrus juices (diluted)

Pomegranate juice, one glass a day, can reduce both LDL oxidation and carotid arterial thickness (Sinatra, 2007; p. 131). For those with blood sugar dysregulation, be sure to have some protein and/or fat with this.

Booster Foods (Houston and Egan, 2005; p. 341):

- ▶ Flax seed
- ▶ Blue green algae
- ▶ Coriander seeds
- ▶ Green tea



SUPPLEMENTS:

- ▶ **Omega-3 Fatty Acids:** decrease triglyceride levels by 30% or more in those with elevated or normal levels, using standard dosages (Lerman, 2006).
- ▶ **Vitamin E:** high gamma/delta tocopherols* (take in A.M.) and high gamma/delta tocotrienols* [Tocotrienols are very effective at lowering LDL. Take in P.M. because cholesterol production is greatest at night (Houston (a), 2005).] *Tocopherols and tocotrienols compete with each other and need to be taken separately (Houston, 2005; p. 80).
- ▶ **Niacin, in the form of inositol hexanicotinate:** Can raise HDL and lower LDL and Lp(a) by 15–30% (Devries, 2007; p. 89)
- ▶ **Red yeast rice:** Contains natural statins; can lower LDL by 25% (Devries, 2007; p.89). Take with CoQ10.
- ▶ **Stanols and sterols:** Can lower LDL by 10–20% (Devries, 2007; p. 89).
- ▶ **CoQ10:** Production is inhibited with use of statins. Necessary for muscle function, including the heart. A necessary supplement for those taking statins.
- ▶ **Pantothenic acid:** (can lower LDL by 14%) (Houston and Egan, 2005; p. 19).
- ▶ **Garlic:** Studies are conflicting, but it appears to lower cholesterol by + 5% (Low Dog, 2006).
- ▶ **Guggul:** Anti-inflammatory; also lowers cholesterol (Sodhi, 2007).
- ▶ **Ginger:** antioxidant, blood thinner, cardiogenic; inhibits inflammatory prostaglandin, thromboxane, and leukotriene synthesis; lowers cholesterol (Sodhi, 2007).



Cardiovascular Disease: New Assessments, New Recommendations

Supplements for Dyslipidemia

SUPPLEMENT	DAILY DOSAGE
Omega-3 fatty acids (fish oil)	3-4 gm
Vitamin E: high gamma/delta tocopherols* (take in A.M.) and high gamma/delta tocotrienols* (take in P.M.)	400 IU 100 mg
Niacin	500-2000 mg
Red yeast rice	600-1200 mg 2 times daily, with food
Stanols and sterols	2 gm
CoQ10	180-360 mg (Sinatra, 2007; p. 204)
Pantothenic acid	300 mg 3 times daily
Garlic	8-12 mg allicin
Guggul	300-500 mg 3 times daily of standardized extract. Take with food
Ginger	3-6 gm raw; 100-200 mg 3 times daily of standardized extract

- ▶ **CRP:** C-Reactive Protein is lowered by addressing inflammation through the use of the diet and anti-inflammatory herbs and nutrients mentioned above, and by medical treatment for any chronic infections that may be occurring.

Stephen Sinatra, M.D. finds that vitamin C can help keep CRP in check (2007; p. 116). And a 2004 study showed that CoQ10 and vitamin E, together, reduced its levels (Sinatra, 2007; p. 141).

- ▶ **Homocysteine:** The body takes the amino acid methionine, breaks it down into homocysteine, and then recycles some of the homocysteine back into methionine. This methylation process, critical to keeping homocysteine levels low,

depends on adequate dietary B vitamins, in particular B6, folate, and B12. Some people have a genetic variation that does not allow their folic acid to efficiently convert homocysteine back to methionine. For this reason, as mentioned above, supplementing with three different folates – folic acid, 5-formyl THF, and L-5-MTHF – may be beneficial. *Betaine* (trimethylglycine) also aids in this conversion.

Homocysteine-Lowering Supplements (Sinatra, 2007; p. 127):

SUPPLEMENT	DAILY DOSAGE
Folic acid	1000-5000 mcg
Vitamin B6	40 mg
Vitamin B12	200 mcg
If still high after two months, add: N-acetylcysteine	500 mg

Other Recommendations (Houston and Egan, 2005; p. 333; Segala (LEF), 2003; p. 521):

SUPPLEMENT	DAILY DOSAGE
Folate	800-10,000 mcg
Vitamin B12	1000-3000 mcg
Vitamin B6	100-500 mg (Houston and Egan, 2005; p.15, suggest no more than 200 mg. to avoid neuropathy)
Zinc	30 mg
Vitamin B2	10 mg 2 times daily
Betaine (Trimethylglycine)	500-9000 mg
Phosphatidyl Choline	500 mg 2 times daily
Taurine	1000 mg 2 times daily
N-acetylcysteine (NAC)	1000 mg 2 times daily

Cardiovascular Disease: New Assessments, New Recommendations

Arrhythmias

Includes atrial fibrillation, ventricular fibrillation, and premature contractions. These are caused by a variety of factors including, but not limited to, existing heart disease, thyroid disease, drug interactions, and nutrient deficiencies.

SUPPLEMENTS:

- ▶ **Omega-3 Fatty Acids:** prevent cardiac arrhythmias, including inhibition of ventricular fibrillation and consequent cardiac arrest, as shown in animal and in vitro cell studies (Lerman, 2006). These fatty acids also increase heart rate variability, low levels of which are an independent risk factor for CVD (Lerman, 2006). Heart rate variability refers to the way a healthy heart beat will speed up on inhalation and slow during exhalation.
- ▶ **L-Arginine:** Nitric oxide precursor; will open up arteries if given in high enough doses. Improves endothelial function (Houston and Egan, 2005; p. 15).
- ▶ **CoQ10:** Improves endothelial function (Houston and Egan, 2005; p. 15).
- ▶ **Taurine:** Vasodilator and decreases SNS activity (Houston and Egan, 2005; p. 15).
- ▶ **Potassium** (LEF, 2006)
- ▶ **Magnesium:** (LEF, 2006) According to Stephen Sinatra, M.D., all of his patients with heart arrhythmias are deficient in magnesium (2007; p. 102).

NOTE: Eby and Halcomb (nd) have found that 10–20 gm of taurine, combined with 4–6 gm of L-arginine, can eliminate heart arrhythmias and maintain normal cardiac rhythm while treatment continues.

Arrhythmia Supplementation

SUPPLEMENT	DAILY DOSAGE
Omega-3 fatty acids	3–4 gm as preventive dosage; 5.2 gm for improving heart rate variability
L-Arginine	10 gm in supplements or food
CoQ10	180–360 mg
Taurine	2–3 gm 2 times daily
Potassium	amount determined by testing
Magnesium	at least 500 mg elemental

Congestive Heart Failure:

In addition to the following supplements, it is helpful to discover the cause of the heart failure and to nourish and supplement accordingly, i.e., hypertension, dyslipidemia, metabolic syndrome.

SUPPLEMENTS:

There exist different lines of thought regarding CHF supplementation, probably due to different etiologies for the condition. Two protocols appear here.

Dr. Sinatra's CHF Protocol (2007; pp. 140, 158, 161, 111, 154–155):

SUPPLEMENT	DAILY DOSAGE
CoQ10	300–600 mg. depending on severity
L-carnitine	1–3 gm
D-ribose	10–15 gm
L-arginine	6–8 gm

Cardiovascular Disease: New Assessments, New Recommendations

Life Extension Foundation's CHF Protocol (LEF, 2006)

SUPPLEMENT	DAILY DOSAGE
Taurine	2-3 gm
Potassium (if deficiency confirmed by blood test)	Supplement to replenish
Vitamin C	1000 mg
Vitamin E	800 IU
Alpha-lipoic acid	150 mg
Fish oil	700-1400 mg of EPA, 500-1000 mg DHA

HERBS:

- ▶ **Hawthorn (leaf extract):** can prolong the lives of those with CHF (Anonymous, Reuter's Health, 2007). Dose: 160-900 mg.
- ▶ **Lp(a):** As mentioned above, Dr. Stephen Sinatra (2007, p. 40-41) considers Lp(a) to be benign except in the case of a vitamin C deficiency. Genetics plays a large role in determining levels, and there are no drugs to counteract it. Dietary cholesterol reduction and exercise do not affect it, and statin drugs increase its levels. Yet Lp(a) is considered a large risk factor for heart disease.

The Main Course of Supplementation Linus Pauling Protocol (Sinatra, 2007; p. 205):

- ▶ Vitamin C
- ▶ L-Lysine
- ▶ L-Proline

Other Protocols:

- ▶ **L-Carnitine:** Can lower Lp(a) by 8% (Devries, 2007; p. 90).
- ▶ **Niacin, in the form of inositol hexanicotinate:** Can raise HDL and lower LDL and Lp(a) by 15-30% (Devries, 2007; p. 89).

- ▶ **Nattokinase and Lumbrokinase:** Enzymes used to prevent and treat heart disease. They degrade fibrin, thus reducing the tendency to form clots. They eat away at clots and help prevent plaque ruptures (Sinatra, 2007; p. 106-107).
- ▶ **Estrogen** replacement (Fratellone, 2006)
- ▶ **Thyroid hormone** replacement (Martinez et al., 1998)

Lp(a) Supplement Choices

SUPPLEMENT	DAILY DOSAGE
Pauling Protocol:	
• Vitamin C	For every 10pts. Lp(a):1000mg
• L-lysine	2000 mg 2 times daily
• L-proline	1000 mg 2 times daily
L-carnitine	1 gm 2 times daily
Niacin	500-2000 mg
Nattokinase	4000 units; 6000 units for stroke
Lumbrokinase	(Two 20 mg capsules 30 minutes before meals, 3 times daily daily for 4 weeks, then 1 capsule 3 times daily (Sinatra, 2007; p. 204)
Estrogen replacement	As needed
Thyroid hormone replacement	As needed

Fibrinogen (from Segala, (LEF), 2003; p. 522-523):

DIET:

- ▶ Foods and booster foods:
 - Garlic
 - Flax seed
 - Green tea
 - Ginger



Cardiovascular Disease: New Assessments, New Recommendations

Supplements to Decrease Fibrinogen

SUPPLEMENT	DAILY DOSAGE
Beta-carotene and/or	5000 IU
Vitamin A	10,000 IU
CoQ10	100–400 mg (depending on severity)
Nattokinase	4000 units; 6000 units for stroke
Lumbrokinase	two 20 mg capsules 30 minutes before meals, 3 times daily for 4 weeks, then 1 capsule 3 times daily (Sinatra, 2007; p. 204)
Fish oil	3–4 gm
HERBS Curcumin Gingko biloba	900 mg 1–2 times daily 120–240 mg divided doses

CONCLUSION

This is a dizzying, confusing compilation of foods, supplements and lifestyle factors, and it's sad that so many people are finding regimens like this necessary. On top of these nutrient recommendations for prevention and care of CVD, practitioners must also look for drug-induced nutrient deficiencies, as most of the pharmaceuticals used to treat any of these conditions deplete several nutrients. Please keep in mind that it is always better to obtain nutrients from food sources, but by the time someone has CVD, various combinations of supplemental nutrients will perhaps offer the only real solution.

Attempting to correct downstream biochemical imbalances accrued over a lifetime of poor diet and poor lifestyle is not the best way to avoid the heartbreak of heartbreak. Early intervention is the best prevention. But take heart, many of these nutritional protocols are working better than drugs, and without the side effects. And word is getting out.

WORKS CITED

- Anonymous. "Cardiovascular Disease Statistics." *American Heart Association* online. Updated, 8/3/2007. Retrieved from: <http://www.americanheart.org/presenter.jhtml?identifier=4478>
- Anonymous. "Coronary Artery Disease and Atherosclerosis." *Life Extension Foundation (LEF)* online. Updated 3/22/2006. Retrieved from: http://www.lef.org/protocols/heart_circulatory/coronary_artery_disease_atherosclerosis_01.htm
- Anonymous. *Definition of Cardiovascular Disease*. MedicineNet.com. (2007). Retrieved from: <http://www.medterms.com/script/main/art.asp?articlekey=18312>
- Anonymous. "Heart and Stroke Facts," *American Heart Association* online. 2003. Retrieved from: <http://www.americanheart.org/downloadable/heart/1056719919740HSFacts2003text.pdf>
- Anonymous. "Herbal Extract Extends Heart Patients' Lives." *Reuters Health Information*, 3/27/ 2007. Retrieved from: http://metagenics.com/resource_center/login.asp
- Anonymous. "Understanding Vitamin D Cholecalciferol." *Vitamin D Council* online, (ND). Retrieved from: <http://www.vitamindcouncil.com/>
- Barnes, Broda and Galton, Lawrence. *Hypothyroidism: The Unsuspected Illness*, pp. 138-196. New York: Harper and Row, 1976.
- Bauman, Edward, Ph.D. *Heart Smart Nutrition*. Bauman Nutrition, 02/05/2007.
- Bland, Jeffrey S., Ph.D. "Nutrigenomic Modulation of Inflammatory Disorders: Arthralgias, Coronary Heart Disease, PMS and Menopause-Associated Inflammation". Seminar syllabus. *Metagenics*, 2004.
- Dernellis, John M.D.; Panaretou, Maria M.D. "Thyroid Hormone Effect on Hypertension, Aortic Stiffness." *American Heart Journal*. 143(4):718-724, April 2002. Retrieved from: <http://pt.wkhealth.com/pt/re/amhj/abstract.00000406-200204000-00021.htm;jsessionid=G8KMRQp7NYygnxNyQJ8L1xyQFk06MPxDFZ0TnD07yTKLzp4LJT3Q!2112021004!181195629!8091!-1>
- Devries, Stephen R., M.D. *What Your Doctor May Not Tell You About Cholesterol*. New York: Warner Wellness, 2007.
- Drake, Victoria J., Ph.D. "Two Faces of Inflammation." Oregon State University. *The Linus Pauling Institute Research Newsletter*, Spring/Summer, 2007; pp. 6-7.
- Eby, George, M.S. and Halcomb, William W., D. O. *Elimination of Cardiac Arrhythmias Using Oral Taurine with L-Arginine with Case Histories: Hypothesis for Nitric Oxide Stabilization of the Sinus Node*. George Eby Research, (ND). Retrieved from: <http://george-eby-research.com/html/taurine-l-arginine-arrhythmias.html>
- Frattebone, Patrick, M.D. "Integrative Cardiology – Part 1: Alternative Treatments for Heart Disease on Clinical Rounds", *Designs for Health* website, CR_082306, 8/23/2006. Retrieved from: <http://catalog.designs-forhealth.com/s.nl/sc.30/category.1161/f>



Cardiovascular Disease: New Assessments, New Recommendations

- Glanze, Walter D.; Kenneth N. Anderson and Lois E. Anderson, editors. *The Mosby Medical Encyclopedia*. New York: Penguin, 1992.
- Goodman, Dennis, M.D., F.A.C.P., F.A.C.C., F.C.C.P. "Alternative Therapies for Reducing Cardiovascular Disease Risk in Women." *CamExpo West* syllabus, "Women's Health" track. November, 2006.
- Hitt, Emma, Ph.D. "Fructose but Not Glucose Consumption Linked to Atherogenic Lipid Profile." *American Diabetes Association* 67th Scientific Sessions: Abstract 0062-OR, 6/23/2007. Retrieved from Medscape Today, July 5, 2007: <http://www.medscape.com/viewarticle/559344>
- Houston, Mark C., M.D., M.Sc, F.A.C.P., F.A.H.A. and Egan, Brent M., M.D. *The Metabolic Syndrome*. JANA. Vol. 8, No. 2, (2005), pp. 3-83.
- Houston, Mark C., M.D., M.Sc, F.A.C.P, F.A.H.A. "Beyond Metabolic Syndrome: An Integrative Approach to Prevention and Treatment – Hypertension, Lipid Abnormalities, Diabetes and Insulin Resistance." Seminar, jointly sponsored by University of California, Irvine School of Medicine and Medical Conference Management. Irvine, California. (September 16-17, 2005).
- Houston, Mark C., "Beyond Metabolic Syndrome." Interview on Clinical Rounds, *Designs for Health* website, 7/6/2005. Retrieved from: <http://catalog.designsforhealth.com/s.nl?sc=30&category=28&search=beyond%20metabolic%20syndrome>
- Innes, Kim E., M.S.P.H., Ph.D.; Vincent, Heather K., Ph.D. and Taylor, Ann Gill, M.S., Ed.D. "Chronic Stress and Insulin Resistance-Related Indices of Cardiovascular Disease Risk, Part I: Neurophysiological Responses and Pathological Sequelae." *Alternative Therapies in Health and Medicine*. Jul/Aug, 2007. Volume 13, No. 4; pp. 46-52.
- Jenner, Andrew; Ren, Minqin; Rajendran, Reshmi; Ning, Pan; Tan, Benny; Huat, Kwong; Watt, Frank and Halliwell, Barry. "Zinc Supplementation Inhibits Lipid Peroxidation and the Development of Atherosclerosis in Rabbits Fed a High Cholesterol Diet." *Free Radical Biology and Medicine*. Volume 42, No. 4, (2/15/2007), pp. 559-566.
- Kannel, W.B.; D'Agostino, R.B.; Wilson, P.W.; Belanger, A.J. and Gagnon, D.R. "Diabetes, Fibrinogen, and Risk of Cardiovascular Disease: the Framingham Experience." *Am Heart J*. 1990 Sep;120(3):672-6. Retrieved from: http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list_uids=2389702&dopt=AbstractPlus&holding=f1000%2Cf1000m%2Cisrctn
- Klotter, Jule. "Metabolic Syndrome." *Townsend Letter for Doctors and Patients*. May, 2007. Retrieved from: http://findarticles.com/p/articles/mi_m0ISW/is_286/ai_n19170410
- Leopold, David, M.D. "Anti-Inflammatory Diet." *CamExpo West* syllabus, "Food as Medicine" track. November, 2006.
- LePine, Todd, M.D. "Inflammation and its Role in the Disease Process. Clinical Rounds," *Designs for Health* website, CR_051006, 5/10/2006. Retrieved from: <http://catalog.designsforhealth.com/s.nl/sc.30/category.3184/f>
- Lerman, Robert H., M.D., Ph.D. "Essential Fatty Acids." *Alternative Therapies in Health and Medicine*. May/June, 2006. Vol. 12, No. 3; pp. 20-29.
- Lotz, H. and Salabe, GB. "Lipoprotein (a) Increase Associated with Thyroid Autoimmunity." *European Journal of Endocrinology*. Vol. 136, Issue 1: 87-91, 1997. Retrieved from: <http://www.eje-online.org/cgi/content/abstract/136/1/87>
- Low Dog, Tieraona, M.D. "Getting to the Heart of Health." *CamExpo West* syllabus, "Food as Medicine" track. November, 2006.
- Martinez-Triguero, M.L.; Hernandez-Mijares, A.; Nguyen, T.T.; Munoz, M.L.; Pena, H.; Morillas, C.; Lorente, D. Lluch, I. and Molina, E. "Effect of Thyroid Hormone Replacement on Lipoprotein(a), Lipids, and Apolipoproteins in Subjects with Hypothyroidism." *Mayo Clinic* proceedings, 1998, vol. 73, no9, pp. 837-841.
- Marz, Russell B., N.D., M.Ac.O.M. *Medical Nutrition from Marz*, 2nd edition. Portland, OR: Omni-Press, 1997
- Merali, Zeeva. "Why Childhood Abuse Harms Health as Adult." *NewScientist.com* news service. January 15, 2007. Retrieved from: http://www.newscientist.com/article.ns?id=dn10957&feedId=online-news_rss20
- Minzel, David, Ph.D., C.N.C. "Whole Food Therapeutics and Lifestyle Change in the Treatment of Cardiovascular Disease in Men." *Unified Energetics*. Fall, 2006, Volume 2, No. 5; pp. 18-23.
- Ohlemacher, Stephen. "US Slipping in Life Expectancy Ratings." *Associated Press*, in Yahoo News, 8/12/2007. Retrieved from: http://news.yahoo.com/s/ap/20070812/ap_on_he_me/life_expectancy;_ylt=Ar6bG42A_7xyDzZ.y3h4bgDVJRIF
- O'Riordan, Michael. "The Choice of a Metabolic Syndrome Generation: Soft Drink Consumption Associated With Increased Metabolic Risk." *Heartwire* from WebMD. 7/25/2007. Retrieved from: <http://www.medscape.com/viewarticle/560344?src=mp>
- "Nonfasting Triglyceride Levels Associated With an Increased Risk of Cardiovascular Disease." Reported in *JAMA*. 2007;298:299-308, 309-316, 336-338. Retrieved from Heartwire, from WebMD, 7/19/2007. <http://www.medscape.com/viewarticle/560043?src=mp>
- Rosamond, Wayne, Ph.D.; Flegal, Katherine, Ph.D.; Friday, Gary, M.D., M.P.H.; Furie, Karen, M.D.; Go, Alan, M.D.; Greenlund, Kurt, Ph.D.; Haase, Nancy; Ho, Michael, M.D., Ph.D.; Howard, Virginia, M.S.P.H.; Kissela, Bret, M.D., M.P.H.; Kittner, Steven, M.D.; Lloyd-Jones, Donald, M.D.; McDermott, Mary, M.D.; Meigs, James, M.D.; Moy, Claudia, Ph.D.; Nichol, Graham, M.D.; O'Donnell, Christopher J., M.D., M.P.H.; Roger, Veronique, M.D.; Rumsfeld, John, M.D., Ph.D.; Sorlie, Paul, Ph.D.; Steinberger, Julia, M.D., M.S.C.; Thom, Thomas; Wasserthiel-Smoller, Sylvia, Ph.D.; Hong, Yuling, M.D., Ph.D.



Cardiovascular Disease: New Assessments, New Recommendations

"Heart Disease and Stroke Statistics – 2007 Update." *Circulation*. 2007;115:e69-e171, online, 12/18/2006. Retrieved from: <http://circ.ahajournals.org/cgi/content/full/CIRCULATIONAHA.106.179918#TBL1179728>

Segala, Melanie, Editor. *Disease Prevention and Treatment*, Expanded 4th Edition. Life Extension Foundation (LEF). Hollywood, FL: Life Extension Media, 2003.

Sodhi, M.D., N.D. "Chronic Inflammatory Conditions and Ayurvedic Medicine." *Unified Energetics*, Winter, 2007, volume 3; pp. 30-34.

Sinatra, Stephen T., M.D. and Roberts, James C., M.D. *Reverse Heart Disease NOW*. Hoboken, NJ: Wiley, 2007.

Walldius, Goran; Jungner, Ingmar; Aastveit, Are H.; Holme, Ingar; Furberg, Curt D.; Sniderman, Allan D. "The apoB/apoA-I Ratio Is Better Than the Cholesterol Ratios to Estimate the Balance Between Plasma Proatherogenic and Antiatherogenic Lipoproteins and to Predict Coronary Risk." *Clinical Chemistry and Laboratory Medicine*. 42(12):1355-1363, December 2004. Retrieved from LWW online: <http://www.evidence-based-ophthalmology.com/pt/re/ebeye/abstract.00115728-200442120-00002.htm?sessionid=GnmZb4wKbGLLqMY2n4vSxnBdwJ28GqbZbQXyLJGNypdpG8Mpm3d!1267112738!181195629!8091!-1?nav=forward&basedoc=00003017-200407130-00022&article=2&fullimage=false>

Weetman, A. P. "Hypothyroidism: Screening and Subclinical Disease." *British Medical Journal*, 1997;314:1175 (19 April)

Whelton, Paul K., M.D., M.Sc. "Epidemiology and the Prevention of Hypertension." *Journal of Clinical Hypertension* 6(11): 636-642, 2004 in Medscape, 12/13/2004. Retrieved from: http://www.medscape.com/viewarticle/494336_1

BIBLIOGRAPHY

Alsheikh-Ali, Alawi A., M.D.; Maddukuri, Prasad V., M.D.; Han, Hui, M.D. and Karas, Richard H., M.D., Ph.D. "Effect of the Magnitude of Lipid Lowering on Risk of Elevated Liver Enzymes, Rhabdomyolysis, and Cancer: Insights From Large Randomized Statin Trials." *J Am Coll Cardiol*, 2007; 50:409-418 online, 7/31/2007. Retrieved from: <http://content.onlinejacc.org/cgi/content/short/50/5/409>

Anonymous. "Coronary Artery Disease and Atherosclerosis." *Life Extension Foundation* website. (Updated 3/22/2006). Retrieved from: http://www.lef.org/protocols/heart_circulatory/coronary_artery_disease_atherosclerosis_01.htm and http://www.lef.org/protocols/heart_circulatory/coronary_artery_disease_atherosclerosis_02.htm

Fischer, Christina; Katke, Christopher; Shaddle, William and Katke, Michael. *Cardiovascular Health, Part 1: Stress, Free Radicals, and Fundamental Protection. The Nutrition Masters Course, Fifth Edition*. (1988, revised 1999). Advanced Nutrition Publications, Inc.

Fischer, Christina; Katke, Christopher; Shaddle, William and Katke, Michael. "Cardiovascular Health, Part 2: Assessment Tools, Traditional and Nutritional Interventions for Risk Reduction." *The Nutrition Masters*

Course, 5th Edition. (1988, revised 1999). Advanced Nutrition Publications, Inc.

Healy, Bernadine, M.D. "Statins and Cancer Risk: Pay Attention, but Don't Panic." *US News and World Report*. 7/23/07. Retrieved from: <http://health.usnews.com/usnews/health/articles/070723/23healytip.htm>

Kharratian, Datis, D.C., M.S., F.A.A.C.P., D.A.C.B.N., D.I.B.A.K., C.N.S., C.C.N., C.S.C.S., C.C.S.P. "Cardiovascular Disease and Gastrointestinal Dysfunction;" "Insulin and Cardiovascular Disease;" and "Nutritional Support for Abnormal Lipid Metabolism in Functional Blood Chemistry Analysis." Seminar syllabus, 2006.

LaValle, James B., R.Ph., N.M.D., C.C.N. *The COX-2 Connection*. Rochester, VT: Healing Arts, 2001.

RECOMMENDED READING

BOOKS:

Reverse Heart Disease NOW, by Stephen Sinatra, M.D.

What Your Doctor May Not Tell You About Hypertension, by Mark Houston, M.D.

What Your Doctor May Not Tell You About Cholesterol, by Stephen R. Devries, M.D. (Not as comprehensive as the other two, and some of the dietary advice is questionable, but it contains some valuable information.)

Hypothyroidism: The Unsuspected Illness, by Broda O. Barnes, M.D. and Lawrence Galton

WEBSITES:

www.mercola.com

www.westonaprice.org

www.drsinatra.com

www.hypertensioninstitute.com – This is Dr. Houston's site. It contains shorter nutrition and lifestyle protocols developed utilizing products from *Designs for Health*, whose website has almost identical recommendations

BIOGRAPHIES

A once-and-future student of Ed Bauman, M.Ed., Ph.D., Jodi Friedlander, M.S., earned her Master's degree in Holistic Nutrition from Clayton College of Natural Health. She lives in Tehachapi, California with her husband, Scott, and their dog and three cats. She maintains a private nutrition consulting practice, specializing in issues of weight gain, hormone imbalance, and stress disorders. She also writes a monthly nutrition newspaper column, lectures, and teaches private nutrition classes. She keeps her life in balance with gardening, hiking, biking, running, rock climbing, and yoga. She is constantly asked, "Where the heck is Tehachapi?" She can be contacted at: jfriedlander05@yahoo.com

Edward Bauman, M.Ed., Ph.D. is the director of Bauman College: Holistic Nutrition and Culinary Arts, which has three classroom campuses in Northern California and an innovative distance learning program. Ed is committed to bringing the message of *Eating For Health™* to a wider audience to reverse the tendencies toward mindless over-consumption of sickening foods. He can be reached at: edb@baumancollege.org

