STEP 2

Reap the Benefits of Lifelong Supplements

Lifelong Supplement Number 1: High-potency Multivitamin and Mineral

As we learned in Step 1, a healthy diet is the primary source of the vitamins, minerals, and protective nutrients that will help prevent many degenerative conditions. However, to maximize your defenses against cancer, heart disease, and other degenerative diseases, and to slow the aging process, you also need supplements. It's estimated that sixty percent of North Americans take a daily vitamin/mineral supplement. Regular users cite these motivations:

- to enhance energy and well-being;
- to help defend against diseases such as cancer, heart disease, osteoporosis, and dementia;
- to help manage existing health conditions (e.g., arthritis; diabetes);
- to slow the aging process.

Some people still argue that we can derive all the vitamins and minerals we need from food alone. But do your homework on this subject, and you'll find that 80 to 90 percent of people don't reach

their daily recommended allowances—or even come close. Results from the National Health and Nutrition Examination Surveys (both surveys 1 and 2) showed these results, which were a cross-sectional surveys of the American population. Marginal nutrient deficiencies are present in as many as 50 percent of non-users of supplement products. Furthermore, the daily allowance levels set by the government identify only the minimums required to guard against severe diseases (scurvy, pellagra, beriberi). They are not intended as guidelines for the optimal intake levels that help prevent degenerative diseases while maximizing our well-being and longevity.

As part of an overall wellness and anti-aging program, taking a high-potency multivitamin and mineral each day is crucial. Most multiple vitamin products contain all vitamins and minerals from vitamin A to zinc, but often at insufficient doses to provide the advantages you are seeking.

Free Radical Damage

It is widely accepted in the scientific community that free radicals cause cancer, accelerate aging, and contribute to the development and progression of heart disease and stroke, Alzheimer's disease and age-related cognitive decline, cataracts and macular degeneration of the eye, weakening of the immune system, skin cancer, wrinkles, and similar degenerative conditions. In fact, these harmful agents are believed to play a role in more than sixty different health conditions.

A free radical is a molecule with an unpaired electron. Electrons usually orbit the nucleus of an atom in pairs, one spinning clockwise and the other spinning counter-clockwise. A group of atoms makes up a molecule. A molecule with an unpaired electron will use the easiest means available to become whole and stable: it will strip an electron from a neighboring molecule that was otherwise minding its own business. The neighbour is now a free radical and must in turn steal an electron from another nearby molecule. This

chain reaction of free radical formation is known to cause damage to cellular structures, including the cell's membrane, its enzymes, its DNA (its genetic blueprint) and its mitochondria (the energy-producing machinery of the cell). Studies show that free radical damage to the DNA of the cell can lead to cancer. Cigarette smoke, for example, is loaded with free radicals that attack the DNA of lung cells, creating cancerous mutations. It's estimated that cigarette smoke, including second-hand smoke, is responsible for approximately 30 percent of all human cancers.

There are many other sources of free radicals besides cigarette smoke. It may surprise you to learn that some of the oxygen we inhale is transformed into free radicals during the course of normal metabolism. These oxygen radicals likewise cause damage to body cells and tissues. When you cut open an apple and leave it exposed to the air for a few minutes, it turns brown. That is an oxygen free radical attack, and the same kind of reaction occurs in the body. Many researchers have demonstrated that this type of oxidizing over a lifetime is responsible for much of the aging of our tissues. In other words, we don't age, we actually slowly rot—just like the apple. Oxygen is a double-edged sword in that we need it to produce energy—without it we would die within three minutes or so—but at the same time, up to five percent percent of the oxygen in our cells is converted into very aggressive oxygen free radicals. In addition to cigarette smoke and oxygen, there are countless environmental and food-borne free radicals that can enter the body. Here are some harmful yet common examples:

- Alcohol—generates many free radicals and is responsible for approximately three percent percent of all human cancers in North America;
- Heterocyclic amines—found in barbecued, blackened, or Cajun-style meat or fish;

- Polycyclic aromatic hydrocarbons (PAH)—formed when the fat in meat drips onto the barbecue coals. The resulting smoke contains PAH, which infuses the food on the grill. Smoked meat and fish are known to contain high levels of PAH, and regular consumption of these foods is associated with an increased incidence of stomach and esophageal cancers;
- Pesticides such as DDT;
- Nitrosamines—formed when you consume foods like processed meats that contain nitrates and nitrite salts. Once in the intestinal tract, nitrates combine with protein amino acids to form cancer-causing nitrosamines;
- Ultraviolet light from the sun and tanning beds—UV light converts oxygen in skin cells into free radicals by injecting them with an unpaired electron from the photon energy in UV-light waves. These free radicals then go on to cause accelerated skin aging and increase the risk of skin cancer. UV light can also reach deep into the dermal layers and cause cross-linking of collagen fibers, which results in skin wrinkling.
- X-rays—radiation beams fired through the body initiate free radical formation in the our cells in much the same way that UV light initiates free radicals in skin cells;
- Air pollution—contains many free radicals, among them nitrous oxide and polycyclic aromatic hydrocarbons;
- Occupational free radicals—include substances such as carbon tetrachloride, asbestos, vinyl chloride, and heavy metals like mercury, cadmium, and lead.

Your body will come into contact with innumerable free radical insults over its lifetime. Reducing your exposure to free radicals as much as possible is important, but it is also vital to optimize your antioxidant defenses.

Antioxidants to the Rescue

Antioxidants have the ability to intercept, suppress, and neutralize free radicals, converting them into stable, non-harmful substances, and thus prevent or halt free radical damage to your tissues. Antioxidant molecules donate an electron or absorb an electron from a free radical molecule, without being converted into free radicals themselves. Fortunately, the body naturally produces several antioxidant enzymes such as glutathione peroxidase, catalase, and superoxide dismutase to help reduce free radical damage to the body. Without these enzymes to protect us from oxygen free radicals alone, we would all be dead within hours. They enable us to live in the earth's atmosphere of 21 percent oxygen, and to use oxygen to power energy production in our cells. However, these antioxidant enzymes require activation by certain minerals, among them manganese, magnesium, zinc, copper, and selenium. Our bodies also require additional protection from nutritional antioxidants such as vitamin A, vitamin C, vitamin E, beta-carotene, lycopene, lutein and zeaxantin, and bioflavonoids. Studies conducted over the past 25 years have produced evidence that supplementing with these nutritional antioxidants, at levels beyond what food alone can provide, can be significant in preventing degenerative diseases and in slowing the aging process.

Your lifelong wellness and anti-aging plan must include maximizing your defenses against free radical damage by consuming at least five servings of fruit and vegetables per day, and by acquiring the additional protection of a daily antioxidant-enriched, high-potency multivitamin and mineral supplement.

Antioxidants Reduce Cancer Risk

Research studies undertaken in the 1980s, in particular those by researchers in Finland and Switzerland, provided some of the first

conclusive evidence that people who have higher intakes of vitamin C and beta-carotene, and who maintain appreciable blood levels of them through their lives, have a markedly lower risk of cancers than individuals with lower intakes or blood levels of these nutrients. Antioxidants like vitamin C, beta-carotene, vitamin E and others were shown to suppress free radicals that can cause cancerous mutations in cell DNA.

The *American Journal of Clinical Nutrition* reported in 1991 that a high total carotenoid intake (beta-carotene, lycopene, and lutein) had been linked with a significant reduction in the risk of cancers of the lung, stomach, breast, bladder, and colon a year later. A review published in Nutrition and Cancer reported on approximately 90 epidemiological studies that examined the role of vitamin C or vitamin C-rich foods in cancer prevention. According to those findings, the evidence was strong that vitamin C might protect against cancers of the esophagus, oral cavity, stomach, and pancreas and was substantial for cancers of the cervix, rectum, breast, and lung. As for vitamin E, the association between serum vitamin E levels and subsequent cancer risk was examined in at least 12 longitudinal studies. These found, on average, a three percent lower blood vitamin E level among individuals who later developed the disease. Vitamin E appeared to be especially protective against cancers of the stomach, pancreas, colon, and rectum, and, with selenium, of the reproductive organs in women. Since these early reports, much additional research has been undertaken to examine the relationship between antioxidants and cancer prevention even more closely.

Colon Cancer

As mentioned earlier, colon cancer is now the number two cause of cancer death in North America and colonoscopy testing is becoming routine for those over the age of fifty. A number of antioxidants have been identified as important to its repression.

Selenium is a trace mineral that is known to prevent chemically induced colon cancer in animal studies. In one study with rats that were fed a known cancer-causing chemical, the rats whose diets were supplemented with selenium had a tumor yield of only three percent, whereas the rats who received no selenium supplement had a 29 percent tumor yield. Other animal studies have shown that selenium supplements can reduce the incidence of intestinal tumors by fifty percent compared with animals given the cancer-causing agent without them.

Human observation studies are equally impressive. For example, areas in North America with low soil and crop selenium concentrations show higher incidences of colon and rectal cancers. In a study of U.S. veterans, blood levels of selenium were measured in subjects with and without colorectal cancer. Those with blood selenium levels below 128 micrograms per liter were 4.2 times more likely to have one or more cancerous polyps. In a separate clinical trial using selenium to reduce risk of skin cancer, 1312 subjects were given either 200 micrograms of selenium or a placebo daily for almost five years. Those taking the selenium experienced a 58 percent reduction in colon and rectal cancers compared to subjects taking the placebo.

More recently, in a study by Dr. Mark Russo and associates at the University of North Carolina (Chapel Hill), patients who were referred for a colonoscopy assessment were given blood tests as well. The researchers reported that the average blood level of selenium for patients with cancerous lesions was 107 micrograms per liter, compared to 120 micrograms per liter for the cancer-free subjects. An increase of 30 micrograms per liter in blood selenium level was associated with a 50 percent reduction in risk of colon cancer lesions.

The authors concluded that their data supported the protective effect of selenium against colon and rectal cancers after adjustments for factors as smoking, alcohol intake, use of dandruff shampoo (which contains selenium), and diet.

There are several ways that selenium is thought to reduce cancer risk. First, it may increase the levels of the naturally produced antioxidant enzyme glutathione peroxidase, a strong anti-cancer agent within the body. Selenium also decreases the formation of the cancer-permissive hormone known as prostaglandin series-2, which we last saw as a by-product of polyunsaturated fats in high-fat meat and dairy products. Finally, selenium metabolism itself may initiate the programmed death of cancer and precancerous cells.

The average person's intake of selenium from food sources is about 50 micrograms daily, not enough to maximize its anti-cancer defenses, according to the available research. Selenium consumed as a dietary supplement at 100 to 200 micrograms per day has been shown to reduce the incidence of lung, colorectal, and prostate cancer in humans. As reported by Dr. B. Combs and fellow researchers in 1996, selenium blood levels of approximately 120 mcg/ml (1.5 umol/ml) may be optimal for cancer prevention in general. The most recent estimates suggest that women require a minimum of 96 micrograms per day and men require at least 120 micrograms per day to support blood levels at 120 mcg/ml. Toxicity of selenium begins at doses of 1,000 micrograms per day, so 100-200 micrograms of selenium supplement from a multiple vitamin is extremely safe.

Vitamin E has also been shown to reduce the risk of colon cancer in many animal and human studies.

Like selenium, vitamin E inhibits the formation of the dangerous prostaglandin hormone series-2, which encourages the rapid division of tumor cells and helps cancer cells escape surveillance by the body's immune system. By suppressing the formation of prostaglandin series-2, vitamin E discourages tumor cell growth and enables the immune system to more effectively identify and destroy any cancer cells that may emerge.

Early studies dating back to 1982 demonstrated that 400 mg of vitamin E and 400 mg of vitamin C, when taken daily, dramatically reduced the formation of cancer-causing agents in the colons of test subjects.

More recently, the Iowa Women's Health Study demonstrated a very strong protective effect for vitamin E. This large-scale study of 35,000 women between 55 and 66 years of age tracked subjects who had no previous history of cancer. After four years, it produced convincing data that a high intake of vitamin E was associated with a reduced risk of colon cancer. Women in the top 20 percent level of vitamin E intake had a 66 percent lower chance of developing colon cancer than women ingesting vitamin E in the lowest 20 percent intake range. In almost all cases, those with a high intake were taking supplements containing vitamin E.

I recommend that adults ingest 400 I.U. of vitamin E per day from a high-potency multivitamin and mineral to help prevent colon and other cancers. Vitamin E is fat-soluble, so you must take it with a meal that provides some fat in order for it to be absorbed from your intestinal tract into the bloodstream. The same is true for vitamin A, beta-carotene, lycopene, lutein, vitamin D, and vitamin K.

In epidemiological and prospective studies and in intervention trials, vitamin C has been consistently linked to a reduced risk of colon cancer. It acts as an antioxidant in the intestinal tract and at sufficient levels will decrease the concentrations of cancer-causing chemicals in fecal matter. Vitamin C also blocks the formation of cancer-causing nitrosamines through the entire intestinal tract. In one two-and-a-half year study of colon polyps sufferers, it reduced the recurrence of colon polyps by 35 percent, compared to 23 percent in the placebo group.

Prostate Cancer

Prostate cancer is the most common cancer among men in North America. Studies suggest a link between oxygen free radicals and the development of tumors in the prostate, but it is also well known that proper diet and the use of supplements can reduce prostate cancer incidence.

The emerging research suggests that the antioxidant function of supplementary vitamin E, selenium and lycopene hold promise for its prevention. In the Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study, reported in 1998 by Dr. O.P. Heinonen and colleagues, long-term supplementary doses of vitamin E were associated with a 32 percent decrease in the incidence of the disease. Over the eight-year period of the study, death from prostate cancer was 41 percent lower among men receiving the vitamin E supplement.

Examinations of blood levels in patients with prostate cancer have revealed low levels of selenium, with those at the lowest levels exhibiting as much as a 5.8 times higher risk of dying from the disease than those with the highest selenium levels. The correlation was supported by a four-and-a-half year study conducted by Dr. L. Clark and fellow researchers in 1996, in which the administration of selenium supplements was associated with a 63 percent lower incidence of prostate cancer.

The Health Professionals Follow-up Study of some 40,000 men aged 40 to 75 years of age also endorsed antioxidant benefits. The 1995 report linked a significant decrease in the risk of prostate cancer to higher intakes of lycopene, the most effective of the major carotenoids in destroying oxygen free radicals. An intake level of at least six mg per day was associated with a 21 percent reduction in prostate cancer incidence, compared with consuming less than 2.3 mg per day. It is estimated that a minimum four to six mg daily intake of lycopene is required for prostate protection.

Breast Cancer

Several epidemiological and clinical intervention studies have suggested that vitamin E supplementation can inhibit the development of breast cancer. The Nurses' Health Study, which has followed approximately 88,000 U.S. female nurses aged 34 to 59 years of age since 1980, found a 16 percent decreased risk of breast cancer in women within the top 20 percent range of vitamin E intake, compared to those in the lowest 20 percent range. Most women in the high range took vitamin E supplements in some form.

Vitamin E supplementation is also linked to a reduction in the spread and progression of breast cancer in women who already have the disease. According to a recent study by Dr. A. Fleischauer and others, breast cancer survivors taking vitamin E supplements experienced a 25 to 35 percent decrease in recurrence and mortality compared to non-users of vitamin E supplements. A cocktail of various antioxidants was shown to be helpful in a study by Dr. K. Lockwood and colleagues. They conducted an 18-month review of 32 women with breast cancer, all of whom were put on a nutritional protocol consisting of high-dose antioxidants and other nutrients. The women were between 32 and 81 years of age and classified as high-risk because their tumors had spread to the lymph nodes under the arm. The daily nutritional supplement, which was added to the normal surgical and therapeutic treatments for breast cancer, consisted of a combination of vitamin C, 2850 mg; vitamin E, 2500 IU; beta-carotene, 32.5 IU; selenium, 387 mcg; along with secondary vitamins and minerals, essential fatty acids (1.2 gm gamma linolenic acid and 3.5 gm omega-3 fatty acids), and coenzyme Q10 (90 to 390 mg per day). At the end of the study, none of the patients showed signs of further metastases, quality of life was improved (no weight loss, reduced use of painkillers) and six

patients showed apparent partial remission. The results indicated that various antioxidants and other nutrients can work synergistically to help contain and prevent cancer.

Cervical Cancer

Antioxidants such as vitamin E, beta-carotene, and other carotenoids have been shown to protect against cervical cancer in certain studies. In some elevated blood levels of folic acid, beta-carotene, lycopene, and vitamin E were found effective against cervical dysplasia, a precancerous condition of the cervix. In a recent study of 32 women by Dr. P. Kanetsky and fellow researchers, it was found that women with higher intake and blood levels of lycopene were one-third as likely to have cervical dysplasia as those with the lowest one-third of lycopene blood levels. In addition, women who got more vitamin A were one-fourth as likely to develop dysplasia as women with the lowest one-third of vitamin A blood levels.

In another study of patients with mild or moderate cervical dysplasia, 30 subjects were treated with 30 mg (50,000 I.U.) of beta-carotene orally every day. More than 70 percent of patients showed a reversal of their condition after six months. The evidence is persuasive that nutrition and antioxidant supplementation can play a vital role in the prevention of cervical dysplasia and, in some cases, can reverse this condition in its early and moderate stages.

Stomach Cancer

Like colon cancer, stomach cancer is closely linked to nitrosamines, a known group of environmental carcinogens. On average, North Americans consume approximately 74 mg of nitrates per day, thanks to processed meats, alcoholic beverages, and plant foods grown in soils treated with nitrogen fertilizers. Both vitamin C and vitamin E can block the formation of nitrosamines in the stomach and intestinal tract when taken as

supplements with, or shortly after, a meal containing nitrates and protein. Taking 500 mg of vitamin C twice a day has been shown to block as much as 85 to 100 percent of nitrosamine formation under conditions of a high nitrate intake. Vitamin E has demonstrated similar effects: a daily dosage of 400 IU can help prevent the formation of nitrosamines.

Antioxidants Reduce Heart Disease Risk

The substantial body of evidence that vitamin E and vitamin C supplementation can reduce the risk of heart disease and other cardiovascular conditions maybe truly life-saving. Cardiovascular disease accounts for nearly 50 percent of all deaths in North America.

In 1987 Dr. F. Gey and his colleagues published the results of an extensive European study in which researchers collected blood samples from healthy men who lived in areas with high heart disease mortality (southwest Finland, north Karelia), medium mortality (Northern Ireland) and low mortality (Switzerland and southern Italy). The average blood vitamin E levels were found to be significantly higher in regions with low heart disease mortality, compared with those in regions with higher rates. In a subsequent, more detailed study of 16 regions in 10 European countries, the MONICA study is a weird type of an acronym for Multinational MONItoring of trends and determinants in CArdiovascular disease. It began in the early 1980's assessing overall trends in 21 countries for cardiovascular disease risk, over a 10 year period. It followed 10 million men and women age 25-64 during the study period. It is one of the largest cardiovascular disease studies performed to date. Researchers again reported a strong relationship between high blood vitamin E levels and low rates of heart disease mortality. This relationship has been borne out by the research of other investigators who have studied angina patients in the United States, cardiovascular disease mortality in the Netherlands, and heart disease rates in Finland.

In the Nurses' Health Study, women who were free from cardiovascular disease and cancer at the beginning of the study showed a 41 percent reduction in risk of heart disease among those who consumed daily vitamin E supplements (greater than or equal to 100 I.U.) for at least two years, compared with those who did not, after eight years of follow up. This finding held true even after factoring in other heart disease risk factors. In this same study, the risk of ischemic stroke was also reduced by 29 percent in nurses using vitamin E supplementation at or above 100 I.U. per day.

Similar results were seen in men in the Health Professionals Follow-up Study. It enlisted 39,910 men aged 40 to 75 years old in 1986 who were free of cardiovascular disease, diabetes, or high cholesterol at the beginning of the study. Those taking vitamin E supplements showed the greatest reduction in risk of heart disease (a 46 percent reduction) compared with non-supplement users. The protective dosage was found to be 100 to 350 I.U. per day in this study. As with the Nurses' Health Study, vitamin E supplementation below 100 I.U. per day did not provide significant protection against heart disease.

In the mid-nineties Dr. H.N. Hodis and fellow researchers measured the progression of coronary artery narrowing, or atherosclerosis, in 162 nonsmoking men aged 40 to 59.Those men who took vitamin E supplements experienced a significant slowdown in the narrowing of their arteries compared with non-supplement users. The apparent benefit once again affected only those taking more than 100 I.U. of vitamin E daily. In this study subjects who received cholesterol-lowering medication in addition to vitamin E supplements showed actual regression in coronary artery narrowing. The ability to reverse heart disease by this form of combination therapy is a truly remarkable finding.

Other intervention trials using vitamin E supplements have demonstrated their beneficial effects in combating atherosclerosis elsewhere in the body and in the recovery of coronary

angioplasty patients. Overall, studies indicate that daily vitamin E supplementation exceeding 100 IU is associated with a 40 percent reduction in risk for heart attack and other cardiovascular problems related to atherosclerosis.

Vitamin E appears to protect against cardiovascular disease in three ways. First, as an antioxidant it travels in the bloodstream bound to LDL cholesterol. As part of this cholesterol complex, it intercepts free radicals that might otherwise damage cholesterol and its related unsaturated fats. Cholesterol damaged by free radicals is much more likely to adhere to artery walls as plaque. Second, vitamin E regulates the rate at which smooth muscle within the artery wall will grow and proliferate. Like plaque build-up, this process can also contribute to a harmful narrowing of the arteries.

The third protective action of vitamin E is its ability to reduce the stickiness of blood platelets. Platelets are the blood cells that clump together and form clots. They prevent us from bleeding to death every time we nick ourselves with a sharp object or develop a nosebleed. However, several common lifestyle factors (smoking, lack of exercise, and a diet high in unsaturated fats) encourage platelets to be excessively sticky and to form abnormal and potentially fatal clots or mini-plugs inside the arteries. Ideally, platelets should clump together to save your life, not to end it. Vitamin E regulates platelet stickness and discourages the abnormal clumping that could obstruct blood flow.

As demonstrated by a number of prominent researchers, blood levels of vitamin E necessary to materially reduce free radical attack of LDL cholesterol, to inhibit smooth muscle growth in the arteries, and to reduce platelet stickiness are achieved only through supplementation. At least 100 I.U. of vitamin E per day are required to obtain a cardio-protective effect. In my view, a daily dosage of 400 I.U. is ideal for the purpose of prevention and anti-aging.

What about vitamin C and heart disease? In the Monica Study previously mentioned, scientists demonstrated that vitamin C blood

levels above 50 micromoles per litre were associated with more than a 50 percent reduction in heart disease mortality rates. Low blood levels of both vitamin C and vitamin E were stronger predictors of future heart disease mortality than were high blood cholesterol levels, smoking or high blood pressure, which are known cardinal risk factors.

In a 20-year follow-up study of a group of patients in the United Kingdom over 65 years of age, low vitamin C status was strongly associated with increased risk of death from stroke. A Swiss study reported on in 1993 uncovered an identical finding on related research by Dr. D. Harats, published in 1998, showed that subjects ingesting 500 mg per day of vitamin C exhibited decreased free radical damage to cholesterol.

A number of studies have demonstrated that vitamin E protects blood cholesterol from free radical attack. It appears that vitamin C shares this important role as a water-soluble antioxidant circulating in the bloodstream. In fact, high doses of vitamin C (500-1,000 mg daily) have lowered blood cholesterol in high cholesterol patients receiving supplementation. But research in Finland suggested an interesting relationship between vitamins E and C and the risk of heart attack. Dr. R. Salonen found that low vitamin E status (from diet) was associated with increased risk only if vitamin C status was also low. Because vitamin C is required to regenerate vitamin E, this finding could explain the lack of protective effect of vitamin E alone. The two appear to work together to help protect us against heart attack, stroke, and other vascular diseases.

The recommended daily allowance for vitamin C is 60 mg. This nominal amount is insufficient to raise blood levels into a more protective range, discouraging free radical damage to blood cholesterol and helping to lower the total amount of cholesterol in the bloodstream. Alarmingly, 20 to 30 percent of U.S. adults fail to attain 60 mg of vitamin C each day from their diets. Ingesting at least 1000 mg of vitamin C per day, in two 500 mg doses, is the amount I recommend for general prevention and anti-aging.

Antioxidants Reduce Alzheimer's Disease and Dementia Risk

At any given moment, the brain is using at least 10 percent of the body's oxygen, thereby exposing the brain cells to significant levels of oxygen free radicals. Over a lifetime these free radicals can cause enough corrosive damage—much the way oxygen in the air can rust out a car—to interfere with the cells' normal function and ultimately to contribute to cell death. Researchers have shown that many brain and nerve degenerative diseases, including Alzheimer's disease and age-related cognitive decline or senile dementia, are strongly linked to free radical damage. At the same time, evidence is accumulating that individuals who take antioxidant supplements at protective dosages have a much lower risk of developing these conditions as they age.

In the Chicago Health in Aging Project, where 6000 people aged 62 to 102 were followed for three years, the average annual decline in cognitive score was 34 percent less in those with the highest vitamin E intake compared with those in the lowest intake group. A weak association was also established for vitamin C. In 1998 Dr M.C. Morris and his colleagues reported that among a group of 633 individuals 65 years and older, none of the vitamin E or vitamin C supplement users developed Alzheimer's disease during the 4.3 year follow-up study to the Chicago project.

In the Alzheimer's Disease Co-operative Study, Alzheimer's patients with moderately advanced disease were treated with 2,000 I.U. vitamin E a day or with a placebo. The results indicated that vitamin E supplementation was able to slow the functional deterioration of the brain significantly in these patients, delaying the need for nursing home placement and retarding the progression of the disease. Laboratory research results published in 1999 revealed that vitamin E inhibits free radical damage to brain cells induced by the Abeta-amyloid protein, a hallmark feature of Alzheimer's disease.

Meanwhile, other studies have shown that supplementation with vitamin E is effective in slowing the progression of Parkinson's disease and helps to control tardive dyskinesia, a condition involving involuntary repetitive movements of the face and head brought on by certain drugs that affect brain function.

Antioxidants Reduce Eye Disease Risk

The leading cause of blindness in people over the age of 55 in North America is age-related macular degeneration (AMD). Though the underlying causes are not fully understood, the evidence linking free radical damage to the development of AMD is strong and consistent. In daylight, ultraviolet light from the sun travels through the pupil to the back of the eye, where waves in the visible light spectrum stimulate the optic nerve, enabling vision to occur. However, the ultraviolet light at the back of the eye also induces free radical damage, which in turn can lead to macular degeneration. Along with the effects of ultraviolet light, smoking, atherosclerosis, and high blood pressure can contribute to the development of AMD.

Preliminary studies in humans backed up the evidence of earlier animal research that high blood levels of antioxidant vitamins and minerals could reduce the risk of AMD. One investigation revealed that individuals in the top 20 percent blood levels of selenium, vitamin C, and vitamin E had a 70 percent lower risk of developing AMD than did those with blood levels in the lowest 20 percent. In the Physicians' Health Study, male doctors taking vitamin E supplements had a 13 percent reduced risk of AMD.

Dietary intake of lutein and zeaxanthin (mostly dark green vegetables) plus supplementation with these two carotenoids has been shown to increase the amount of macular pigment in the back of the eye. That acts as a shield, protecting the optic nerve from free radical assault. In fact the area around the optic nerve is known as the macula lutea, due to its high concentration of lutein.

One study showed that adults with the highest intake of lutein had a 57 percent reduced risk of developing AMD compared to those with low levels of this carotenoid.

The most convincing evidence that antioxidant supplements provide protection against AMD was published in 2001 by researchers of the Age-Related Eye Disease Study, a multi-center, intervention trial involving 4,757 patients between the ages of 55 and 80 years old. In this study, conducted by the U.S.-based National Eye Institute, patients who were at high risk of developing more advanced stages of AMD reduced their risk by approximately 25 percent when treated with a high-dose combination of vitamin C, vitamin E, beta-carotene, and zinc. According to the NEI, antioxidant supplementation is the first effective treatment ever shown to successfully slow the progression of the disease. Participants in this double-blind, placebo-controlled clinical study, who suffered from varying degrees of AMD, were given one of four treatments. The best results occurred in those taking both antioxidant and zinc supplements in these doses:

- vitamin C – 500 mg;
- vitamin E – 400 IU;
- beta-carotene – 25,000 IU;
- zinc – 80 mg.

Antioxidant supplements have also been shown to prevent cataracts (white, opaque lesions that form on the normally transparent lens of the eye). They occur as a result of damage to the protein structure of the lens. Strong evidence exists that free radical damage from ultraviolet light and radiation exposure contribute to later-life cataract development. The lens of the eye is devoid of the naturally-produced antioxidant enzymes, superoxide dismutase, catalase and glutathione peroxidase, and is completely dependent on nutritional antioxidants such as vitamin E, vitamin C, selenium, and carotenes for its antioxidant defenses.

Cataracts are the leading cause of all blindness and impaired vision in the United States. Forty thousand Americans are blind due to cataracts, and cataract surgery is the most prevalent major surgery among Medicare recipients in the U.S. A Canadian study by J. Robertson and fellow researchers suggested that if all Canadians over 55 years of age took an appropriate supplement of vitamin C and vitamin E every day, cataract incidence would be reduced by at least 50 percent and cut related health care costs in half. A number of intervention trials have demonstrated that 1000 mg of vitamin C per day can halt or slow the development of cataracts in the early stages. Other case-control and prospective studies have likewise linked higher blood levels and/or intake levels of vitamin C and vitamin E with a significant reduction in the risk of cataracts.

Antioxidants Slow Skin Wrinkling and Reduce Skin Cancer Risk

Premature aging of the skin and genetic damage to skin cells most commonly results from free radical damage induced by exposure to ultraviolet light from the sun and from tanning beds. This damage hastens the process of skin aging and wrinkling and creates cell mutations that lead to the development of skin cancers (basal cell carcinoma, squamous cell carcinoma, and melanoma). Avoiding overexposure to sunlight and other known sources of free radicals, wearing protective clothing, and using antioxidant-containing sun block products are all prudent strategies to minimize environmental skin injury.

The use of antioxidant supplements is another defense against free radical damage premature wrinkling and cancerous mutations. A 1998 double-blind, placebo-controlled study of human subjects demonstrated that those taking the vitamin C (2000 mg per day) and vitamin E (1000 I.U.) supplements had significantly

less damage to their skin after UV-light exposure than did the group not given the supplement regime. They also showed considerably less sunburn reaction.

Investigation in this area strongly suggests that daily supplements of vitamins A, C, E, beta-carotene, selenium, and zinc, at levels above those typically consumed from food alone, provides the skin with additional and possibly essential antioxidant defenses to help slow skin aging and lend support to other skin cancer prevention initiatives.

Antioxidants Strengthen Your Immune System

Over the years, the immune system tends to become weaker and less efficient at combating germs that can cause serious infections and at identifying and destroying emerging cancer cells. Yet it is essential to maintain a strong, efficient immune system throughout your lifetime. Antioxidants can help maintain more optimal immune function as we age, and help to strengthen the immune system in individuals who are in an immune-compromised state.

Beta-carotene supplements, along with other carotenoids, have increased immune cell numbers and activity in animal and human tests. Placebo-controlled studies have shown their positive benefits in increasing the count of some white blood cells and enhancing cancer-fighting immune functions in healthy people consuming 25,000 to 100,000 IU per day. In double-blind trials in elderly subjects, 40,000 to 150,000 IU per day increased the effectiveness of immune cells that identify and kill emerging cancer cells. Supplementation at these high levels may be important to individuals who have already encountered cancer or whose immune systems are severely weakened by such diseases as hepatitis or HIV infection.

Vitamin C has been shown to stimulate the immune system by both elevating interferon levels and enhancing the activity of certain immune cells. A combination of vitamin A, vitamin C, and

vitamin E significantly improved immune cell number and activity, compared to a placebo, in a group of hospitalized elderly patients. In another study involving human subjects, daily intake of a 1000 mg vitamin C plus 200 IU vitamin E for four months improved several measures of immune function.

Vitamin E supplementation has improved some aspects of immune-cell activity in the elderly. The effect is more pronounced with 200 IU per day, compared to lower doses (60 IU per day), according to double-blind research, according to studies performed in 1997 by S.N. Meydani, M. Meydani, and J.B. Blumberg as well as a second study by F.G. DeWaart and fellow researchers.

B Vitamins Also Prevent Cancer, Heart Disease and Dementia

In addition to antioxidants, a well-formulated high-potency multivitamin and mineral should include a B-50 complex comprising 50 mg of most of the B vitamins plus 400 mcg of folic acid, 50 mcg of vitamin B12, and 300 mcg of biotin. High B vitamin levels reduce risk of heart disease and certain inflammatory states, improve detoxification processes, and maintain brain and cognitive function. B vitamins are also essential for the synthesis of red blood cells and normal cell replication, and they are known for their anti-stress and anti-fatigue properties.

B Vitamins Reduce Risk of Cervical and Colon Cancer

Folic acid and vitamin B12 are essential to the body's production of the amino acid S-adenosylmethionine, one of the necessary building blocks of DNA. If folic acid and vitamin B12 levels fall, the amount of S-adenosylmethionine will decline, inhibiting the replication of healthy DNA cells from one generation to the next. Genetic errors will become more common and genetic linkages more fragile, prone to breakage or mutation. These alterations to genetic structure allow cancers to take hold in our DNA.

Women who are marginally deficient in folic acid are vulnerable to cervical dysplasia and cervical cancer. Apart from its role in DNA synthesis and repair, folic acid inhibits the ability of the human papillomavirus (HPV) to invade the DNA of surface cervical cells. Women who have experienced multiple sex partners are most likely to contract HPV, as contact with semen is the way cervical cells are typically exposed to the virus.

HPV is strongly associated with cervical cancer, and thus folic acid supplementation is important to help prevent its infection of cervical tissue.

Oral contraceptives are known to increase the rate of cell division of cervical cells, adding to the risk of cervical dysplasia. A number of studies have demonstrated that folic acid supplementation can reverse cervical megaloblastic changes and dysplasia, in patients using oral contraceptives. In one conducted by Dr. C.E. Butterworth and others, patients with mild and moderate degrees of cervical dysplasia showed reversal of their condition over a three-month trial period.

Childbearing women have been advised to ingest at least 400 mcg of folic acid daily to reduce the risk of spinal birth defects in their offspring. This same dosage appears to be effective in reducing the risk of cervical dysplasia as well.

With respect to colon cancer, Dr. E. Giovannucci and fellow researchers assessed the dietary habits of women in the Nurses' Health Study and men in the Health Professionals Follow-up Study for a period of one year. Of their 25,474 subjects, 895 developed polyps of the colon or rectum. A major finding was that high folic acid intake protected subjects against colorectal cancer. Women in the top 20 percent intake level of folic acid demonstrated a 34 percent decreased risk of colorectal cancer compared with those in the bottom 20 percent intake level. Among men, a 37 percent reduction in risk was observed for the highest 20 percent intake of folic acid versus the lowest 20 percent intake group. Users of multiple vitamins exhibited the greatest reduction in risk of colorectal cancer

in this study and much of their protective effect was due to folic acid. Here too, 400 mcg per day is the dosage recommended.

B Vitamins and the Prevention of Heart Disease and Stroke

Just as folic acid and vitamin B12 are required for the production of essential compounds like S-adenosylmethionine in the body, so too are they necessary for the elimination of other naturally-produced agents that are not so desirable. Researchers have identified homocysteine, an amino acid that is formed in the course of normal metabolism, as a having a toxic effect on the cells that line our blood vessels. It increases the tendency of blood platelets to clump in the bloodstream and it stimulates the growth of muscle fibres into the arteries, both of which can impair blood flow. High blood levels of homocysteine signal an increased risk of cardiovascular, cerebrovascular (narrowed arteries in the brain) and peripheral vascular (narrowed arteries in the arms, hands, legs, and feet) disease. Ten percent of all heart attacks in the United States are attributed to elevated blood levels of homocysteine.

An appropriate intake of folic acid and vitamins B6 and B12 has been shown to reduce high homocysteine counts. In a 14-year follow-up of women in the Nurses' Health Study, subjects who took daily doses of folic acid and vitamin B6 above the recommended dietary allowances experienced a 45 percent reduced risk of fatal and non-fatal heart attacks. Findings from the Health Professionals Follow-up Study among male health practitioners likewise demonstrated a correlation between high folic acid intake and a significant reduction in heart disease risk. Many experts now recommend that the daily dietary allowance of folic acid be set at 400 mcg, a level most easily achieved through multivitamin and mineral supplements.

B Vitamins Preserve Memory and Cognitive Function

Deterioration of mental capacity has long been accepted as a condition of the normal aging process. In recent years, however, scientific evidence has demonstrated that certain natural health products and supplements are effective in preventing, reversing, or better managing cognitive impairment in older individuals. The Boston Veterans Affairs Normative Aging Study is one of many studies that have investigated the influence of nutrition on age-related disorders. Its results, published in 1996 in *The American Journal of Clinical Nutrition*, indicated that older individuals with low blood concentrations of vitamin B12, vitamin B6, and folic acid had the poorest scores of brain function as measured by a battery of cognitive tests.

In earlier studies clinical deficiencies of B vitamins have been implicated in a range of brain-related disorders, among them reversible dementia and electrophysiological dysfunction, including convulsions. In healthy older adults blood levels of B vitamins usually considered to be in the normal range were associated with poorer scores on tests of delayed recall, abstract reasoning, and selective attention. There is also good evidence that deficiencies of vitamin B12, folic acid, and vitamin B6 commonly increase with age.

B vitamins are known to be critical to brain chemistry and physiology. Vitamin B6 is a cofactor in the production of dopamine, norepinephrine, serotonin, and other chemical neurotransmitters. Vitamin B12 and folic acid are also required the synthesis of serotonin, adrenaline and norepinephrine. As described earlier, they are necessary for the production of S-adenosylmethionine, which has known anti-depressant properties. Vitamin B12 deficiency can result in de-insulation of nerve fibers, which will produce a constellation of neurological symptoms. Low intakes of B vitamins generally can lead to higher blood levels of homocysteine and

narrowed arteries in the brain can cause serious cognitive dysfunction. In the Normative Aging Study, subjects with high levels of homocysteine performed like patients with mild Alzheimer's disease in tests measuring psychomotor speed.

There is growing support for the premise that optimal vitamin B levels can prevent, slow, or reverse the deterioration of memory and other mental capacities in older individuals. A 1992 double-blind study showed that daily supplementation with 20 mg of vitamin B6 (pyridoxine) improved memory performance in a group of men aged 70 to 79 years. Another study that same year by researchers Dr. D.C. Martin and associates showed that the administration of vitamin B12 to elderly individuals caused a "striking improvement" in various aspects of cognitive function.

B vitamins are crucial to the development and preservation of mental skills throughout our lifetimes. The sad reality is that many midlife and older members of society have poor dietary intake and nutritional status of the various B vitamins.

Bone Support Nutrients From a High-potency Multivitamin and Mineral

In North America, at least one in four women develops osteoporosis by age 50 and one in eight men develop the condition after age 50. In women, complications of osteoporotic fractures cause more deaths each year than breast and ovarian cancers combined. Preventing osteoporosis requires a lifelong strategy that includes an adequate daily intake of calcium, vitamin D, magnesium, copper, and zinc, which together are the essential bone-strengthening nutrients. Studies show that across the population most adolescents and adults fall short of their calcium requirements by 500 mg, on average, that is required to prevent future development of osteoporosis. Intakes of vitamin D, for calcium absorption, and zinc are also below the levels recommended by nutrition experts. Thus, a well-designed multiple vitamin, containing 500 mg of elemental

calcium, 400 IU of vitamin D, 15 mg of zinc, 200 mg of magnesium, and 2 mg of copper, is an important lifelong strategy to help prevent osteoporosis.

The Benefits of a High-potency Multivitamin and Mineral Supplement

The truth is that it is impossible to acquire the optimal doses of every vitamin and mineral from food alone. In order to prevent degenerative diseases, maximize your health and wellbeing, and slow the aging process, it is absolutely necessary to take a high-potency multivitamin and mineral every day. By this I mean a multivitamin and mineral supplement that is antioxidant-enriched, contains a B-50 complex, and offers the proper doses of bone-building nutrients. This formula can not only help defend your body and mind against degenerative conditions, but it will enhance the texture of your skin, hair, and nails; improve sleep quality; strengthen your immune system; and boost your energy level.

Here is the high-potency multivitamin and mineral formulation I developed and recommend to my patients and other health practitioners:

Multivitamin & Mineral Daily Supplement

Water-soluble substances such as vitamin C are generally not stored well by the body, and it is best to replenish blood and tissue levels of water-soluble vitamins and minerals by taking supplements containing these nutrients twice daily, allowing 4-6 hours between intakes. These values represent the total daily levels from supplementation, but should be taken in two divided doses — at two separate meals.

(Continued)

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Beta carotene	**10,000 I.U.**	**Niacin**	**50 mg**
Biotin	300 mcg	Pantothenic Acid	50 mg
Calcium	500 mg	Selenium	100 mcg
Chromium	50 mcg	Vitamin A	2500 I.U.
Citrus Bioflavonoids	50 mg	Vitamin B-1	50 mg
Copper	2 mg	Vitamin B-2	50 mg
Folic Acid	400 mcg	Vitamin B-6	50 mg
Iron	6 mg	Vitamin B-12	50 mcg
Lutein – 5%	6 mg	Vitamin C	1000 mg
Lycopene – %	6 mg	Vitamin D	400 I.U.
Magnesium	200 mg	Vitamin E (all-natural)	400 I.U.
Manganese	5 mg	Zinc	15 mg
Molybdenum	50 mcg		

Lifelong Supplement Number 2: Essential Fatty Acids

Essential fatty acids are the second supplement in your lifelong daily regimen. They play a vital role in the prevention of cancer and heart disease, help reduce and prevent inflammatory conditions such as arthritis, Crohn's disease, ulcerative colitis, eczema, and psoriasis; improve the softness and smoothness of your skin; and provide many other health benefits.

Essential fatty acids are important components of the outer skin or membrane of every cell. The membrane determines which

chemicals and nutrients will be allowed to enter and exit the cell; essential fats influence the health of every cell in the body through their support of the structure and function of the cell membrane. In nerve cell membranes, for example, essential fatty acids facilitate nerve conduction, which enables the brain to think and to transmit impulses to other nerves, muscles, and organs. Within the cell membrane essential fatty acids are continually activated and converted into prostaglandin hormones, a process that allows essential fatty acids to supply their disease prevention and anti-aging effects to a wide range of tissues within the body. Not all prostaglandin hormones are so beneficial, however.

Prostaglandin Series-2 (PG-2) Causes Many Health Problems

There are three main types of prostaglandin hormones (PG): PG-1, PG-2, and PG-3. PG-1 and PG-3 have positive impacts on our health, while PG-2 can lead to highly undesirable effects. It encourages blood vessels to constrict and blood platelets to clot abnormally, thereby increasing the chance of heart attack, ischemic stroke, and high blood pressure. It also encourages inflammation, worsening arthritis and other joint, muscle and tendon conditions, including Crohn's disease and colitis. As described earlier, PG-2 is associated with greater risk of cancer in that it prompts rapid cell division. Finally, it can make the skin dry, rough, and scaly, and aggravate a number of common skin disorders, such as eczema, psoriasis, and possibly roscacea.

PG-2 is formed from an unsaturated fat known as arachidonic acid, found in high-fat meats and high-fat dairy products. As well, the over-consumption of linoleic acid, an unsaturated fat found in corn oil, sunflower seed oil, safflower seed oil, and mixed vegetable oils, promotes the production of arachidonic acid by the body. Higher cell membrane concentrations of arachidonic acid favor the

synthesis of PG-2, contributing to a raft of health ills. Unfortunately, the typical North American diet is a rich source of arachidonic acid and linoleic acid, and most individuals produce too much PG-2.

You can lower your tissue concentrations of arachidoninc acid by choosing chicken, turkey or fish, instead of high-fat meat products, and non-fat or 1 percent milk and yogurt products. Exclude from your diet any cheese that is more than 3 percent milk fat, and use olive oil or canola oil in place of other vegetable oils in salad dressings. It's worth repeating that peanut oil may be used for stir-fries, but no oil can be safely used for deep-frying, which should be avoided. Olive oil and canola oil are good sources of monounsaturated fat, which does not participate in the formation of prostaglandin hormones and is known to help reduce cholesterol and contribute to cardiovascular health in other ways.

Supplement with Healthy Essential Fatty Acids That Make PG-1 and PG-3

The appropriate dietary changes will help prevent the formation of PG-2 but it is equally important to supplement your diet with the essential fatty acids that encourage the production of PG-1 and PG-3. These essential fatty acids promote good health by suppressing inflammation, dilating blood vessels, maintaining normal blood clotting, slowing the rate of cell division, and improving the smoothness and softness of the skin while healing various skin conditions.

The key building block for PG-1 is an unsaturated fat known as gamma-linolenic acid (GLA), which is found in high concentrations in borage oil (22 percent yield, compared to the better-known evening primrose oil, at 9 percent yield). GLA can also be formed in the body from linoleic acid, but individuals who suffer diabetes, eczema, or premenstrual syndrome have a defective enzyme that prevents the conversion of linoleic acid to GLA. The consumption of alcohol, refined sugars, and hydrogenated fats tends to inhibit this

conversion, as does the aging process itself. Consequently virtually everyone has suboptimal cell membrane concentrations of GLA.

The solution is to take a borage oil supplement (22 percent GLA) every day to ensure high production of PG-1 hormones. Studies have shown that supplementation with GLA-containing oils can reduce pain and swelling in arthritis, including rheumatoid arthritis, and improve fibrocystic breast disease, PMS, and skin lesions, such as eczema. Even if you don't experience these conditions, it is still important to boost your synthesis of PG-1 with borage seed oil.

PG-3 is formed from an omega-3 unsaturated fat called eicosapentaenoic acid (EPA), which is found in cold-water marine fish such as salmon, mackerel, anchovies, sardines, and tuna. The body can also convert the omega-3 fat alpha-linolenic acid (ALA) found in flaxseed oil (58 percent yield) into EPA, increasing the production of PG-3. Fish oil contains docosahexaenoic acid (DHA), another oil that the body can convert into EPA and thence, PG-3, if required. DHA enhances immune function and the development and function of the brain, and is essential to good vision.

PG-3 is considered very important for total body wellness, as it reduces risk of heart attacks by dilating blood vessels and discouraging abnormal blood clotting. It slows the rate of cell division and so reduces the risk, especially of breast, prostate, and colon cancer. PG-3 is also known to reduce inflammation, including skin inflammatory responses, a role it shares with PG-1.

Most individuals suffer unknowingly from an essential fatty acid deficiency or imbalance, thanks to modern agricultural and food processing methods and the typical North American diet. Neglecting these deficiencies can contribute to numerous health disorders, from cancer and heart disease to complexion problems, skin disorders, and inflammatory conditions. To ensure optimal essential fatty acid nutritional status, I recommend you take an essential fatty acid supplement that contains omega 3, 6, and 9 fatty acids, derived from equal amounts (400 mg each) of non-genetically

modified flaxseed oil, borage oil, and a high yield fish oil (30 percent EPA/20 percent DHA) every day. For general health maintenance, I suggest two to three 1200 mg capsules daily. This simple practice can result in significant benefits for your health, your appearance, the rate at which your body will age, and your risk of future illness.

Essential Fatty Acid Daily Supplement

Each capsule should contain these ingredients and dosages, and individuals should consume 2-3 capsules per day for general health-promotion and anti-aging purposes. They can be taken all at once if that is most convenient or at intervals through the day. Essential fatty acids are fat-soluble and can be easily stored for later use by the body.

Essential Fatty Acid Source	Distinguishing Features	Amount
Borage Seed Oil	Non-genetically modified seeds	400 mg
Flaxseed Oil	Non-genetically modified seeds	400 mg
Fish Oil	30 percent EPA and 20 percent DHA	400 mg

Vitamins and Minerals as Co-Factors for PG-1 and PG-3 Synthesis

One final note: certain vitamins and minerals are required as co-factors in the enzymatic reactions that allow the cells of your body to convert healthy essential fatty acids into PG-1 and PG-3. For example, the conversion of ALA to EPA requires high levels of vitamin B6, zinc, magnesium, and niacin (vitamin B3). The synthesis

of PG-1 and PG-3 requires the optimal intake of vitamin C, vitamin E, and selenium. Thus, in addition to all the advantages described earlier, the use of a high-potency multivitamin and mineral is also vital to the production of health-promoting prostaglandins.

Lifelong Supplement Number 3: Flaxseed Powder

One of the most versatile natural agents for the promotion of health and wellbeing among both men and women is ground flaxseed. Flaxseeds are an extremely rich source of secoisolariciresinol diglycoside (SLD); in fact, flaxseeds contain 800 times more SLD and related compounds than any other common food. Ingesting the equivalent of two heaping tablespoons, or approximately 45 to 50 gm of ground flaxseed (sometimes marketed as flaxseed powder) per day, helps support the health of the female reproductive organs and the male prostate gland. This level of daily intake will also lower blood cholesterol levels, enhance liver and gallbladder function, improve large bowel health, reverse fibrocystic breast disease, help support bone density by slowing calcium resorption, and improve the texture of the skin.

Flaxseed and Reproductive Organs

After ingestion, the SLD in flaxseeds is converted by large-bowel bacteria into two estrogen-like substances known as enterolactone and enterodiol. These are classified as phytoestrogens, or plant-based estrogens, which means they can bind to estrogen receptors on breast tissue, the endometrium of the uterus, and the cervix, moderating their overstimulation of the body's more potent estrogens. This is important because overstimulation of these tissues by endogenous estrogens (in the form of hormone replacement therapy or the birth control pill) is linked to an increased risk of breast cancer, endometrial cancer, and cancer of the cervix.

A recently published Toronto-based hospital study demonstrated that flaxseed supplementation greatly improved symptoms in women who suffered from fibrocystic breast disease. Other studies have shown that flaxseed supplementation can help normalize estrogen production and reduce the buildup of more cancer-permissive estrogens. Furthermore, it has slowed breast cell division rates, a factor in the prevention of breast cancer development. All indicators suggest that every woman over the age of 16 should capitalize on the contributions of flaxseed to the lifelong health of reproductive tissues.

Flaxseed and Prostate Health

The phytoestrogens derived from flaxseed also help preserve prostate health in various ways. First, enterolactone and enterodiol block the overproduction of estrone hormone within fat cells. With weight gain, fat cells become larger and tend to manufacture more estrone hormone, which encourages prostate cells to synthesize more dihydrotestosterone (DHT). A buildup of DHT in the prostate, in turn, stimulates rapid division of the prostate cells, leading to prostate enlargement, and accelerates the growth of any existing prostate cancer cells. By age 50, approximately 15 to 30 percent of men worldwide already have some cancer cells present within the prostate gland. Keeping DHT levels in check is vital to prevent these cancer cells from spreading throughout the prostate gland and metastasizing to other parts of the body. The ingestion of flaxseed on a daily basis provides bioactive agents that indirectly slow the rate of prostate cell replication, reducing the chances of prostate enlargement and of cancer development. These same phytoestrogens also bind to receptors on the prostate gland, blocking the influence of other hormones which can stimulate rapid prostate cell division. Herbal compounds such as saw palmetto,

pygeum africanum, soy isoflavonoids and beta-sitosterol can halt the buildup of DHT as well and have improved prostate health in a number of well-designed clinical studies. Because prostate cancer is so widespread and prostate enlargement problems affect 80 percent of men who live to old age, I recommend the daily ingestion of 50 gm of ground flaxseed for every adult male.

Flaxseed and Cholesterol

Studies reveal that the same amount of flaxseed required to maintain male and female reproductive tissue health—approximately 40 to 50 gm daily—can also lower blood cholesterol by up to 10 percent in people with high cholesterol levels. More important, it lowers the bad LDL cholesterol by approximately 15 percent and concentrations of lipoprotein (a) by seven percent. Lipoprotein (a) is now recognized as a significant risk factor for heart disease, and flaxseed supplementation is the only known dietary intervention that can lower its levels into a safer range. Flaxseed contains soluble dietary fiber, which has proven cholesterol-lowering effects, plus binds to bile acids, preventing their re-absorption back into the bloodstream and subsequent conversion into cholesterol in the liver.

Flaxseed and Bowel Function

Flaxseed also contains insoluble dietary fiber, which acts as a bulking agent or roughage, encouraging more regular bowel movements. Flaxseed supplementation provides a natural and gentle laxative effect, relieving constipation and promoting the health of the large bowel. By providing both soluble and insoluble dietary fiber, flaxseed is one of the few natural nutrition products that can help to keep cholesterol levels under control and regulate bowel function at the same time.

Flaxseed and Liver and Gallbladder Support

The daily ingestion of ground flaxseed will improve the flow of bile from the liver to the gallbladder, and ultimately into the intestinal tract. This effect reduces the chances of gallstone formation and related gallbladder disease. Essentially, flaxseed supplementation induces a liver flushing effect, preventing the stagnation of bile which can harden into stones if not eliminated in a timely fashion.

Don't Confuse Flaxseed Powder with Flaxseed Oil

Consumers are often confused by the differences between flaxseed powder and flaxseed oil. Flaxseed powder (ground flaxseed) is a rich source of phytoestrogens, as well as cholesterol-cruncher and colon-cleaner fiber, and thus contributes significantly to female and male reproductive health, to the lowering of cholesterol, improved liver and gallbladder function, and regulation of the large bowel.

Flaxseed oil, on the other hand, is an abundant source of the omega-3 fat known as alpha-linolenic acid, which as we know can be converted into the highly beneficial prostaglandin series-3. Omega-3 fats, including alpha-linolenic acid, have demonstrated an ability to slow the cell replication rate of breast, prostate, and colon cells. The evidence suggests that taken together, flaxseed powder and flaxseed oil provide considerable anti-aging and disease prevention properties.

How to Use Flaxseed

You can purchase ground flaxseeds (or flaxseed powder, as it may be labelled), or you can grind whole flaxseeds in a coffee grinder to ensure its freshness. Flaxseeds or powder from organic sources are easily attainable. As suggested, two heaping tablespoons of 40 to 50 gm of ground flaxseed per day provides the health-promoting

advantages described in this section. It can be mixed into a protein shake or fruit juice, sprinkled on cereal or mixed into a bowl of low-fat yogurt. It can also be added as an ingredient in low-fat muffins or take center stage in flaxbread. The important thing is that you consume at least 25 gm per day, and ideally 40 to 50 gm, by whatever delivery system works for you. The best news is that it has a nutty, flavorful taste that is palatable and very enjoyable.

Flaxseed is truly one of nature's gifts. Incorporate it into a proactive, anti-aging, disease prevention lifestyle and use it for a lifetime.

For access to the references to Step 2 and additional education on wellness please visit the author's web site at ***www.meschinohealth.com***