CHEMOPREVENTIVE PROPERTIES OF... PHYTOCHEMICALS

Featuring

ELLAGIC INSURANCE FORMULA

By

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CHALLENGE TO THE READER

As you read the information in this book I invite you to consider the following:

- **Why is there such little support in the medical community for antioxidants when the evidence is almost overwhelming that nutritional antioxidants can prevent cancer?**

- **Why are there active campaigns in the US and some European countries to restrict cancer preventive doses of nutritional supplements to a "prescription-only" status?**

- **Why do a majority of doctors, including oncologists, seem completely unaware of the enormous role of nutrition in cancer prevention, which has been ongoing for several decades, and which has been performed by some of the most prestigious medical, pharmacological, and oncology research groups around the world?**

INTRODUCTION

There is a small, but growing contingent of concerned physicians, who recognize conventional medical and surgical strategies are not winning the war against cancer. This war is more than numbers, it's personal. Cancer is a predatory cell

growth that overwhelms other functions in the body until the host ultimately dies from organ failure such as renal shutdown, infection such as pneumonia because of a weakened immune system, or from malnutrition as the parasitic cancer slowly kills the host. The cancer victim literally starves to death as cancer elevates cellular metabolism and increases caloric expenditures while simultaneously lowering appetite and food intake. Out of control cancer cells spew out toxic waste by-products that create weakness, apathy, pain, depression, and the emaciated death-like appearance of the terminal cancer patient.

The cancer establishment is a glaring example of a critical weakness in western medical strategies that treat symptoms, not the underlying causes of disease. This overwhelming emphasis on pharmaceutical drugs, radiation, and surgery has led the World Health Organization to openly criticize American medicine as often harmful, expensive, and unnecessary. It is the opinion of much of the rest of the world that the only way to provide long-lasting relief in any degenerative disease, like cancer, arthritis and heart disease, is to reverse the basic cause of the disease by stimulating the patient's own healing abilities. The "war on cancer" is an internal microscopic war that can only be won by stimulating the patient's own abilities to fight cancer while changing the abnormal conditions that allow cancer to grow. All other therapies produce disappointing results.

Scientists no longer debate whether there is a relationship between diet and disease. Foods sustain and foods heal. But foods can also kill. Much of the increase in modern risk for serious disease as well as debilitating illness is attributed to poor dietary habits.

So what is the difference? Why do some remain healthy and others become ill? What biochemical differences in foods determine vitality and longevity for the individual?

"Nutraceutical" is a term used to define nutrients that have proven drug-like effects on the body. But unlike most licensed pharmaceutical drugs, therapeutic nutrients from plants rarely have adverse side effects and often have multiple potential health benefits that are not limited to a single target organ like the magic bullet, symptom-driven treatment protocols of most prescription drugs that often had adverse effects on the organism.

In this booklet I will explore some of the scientific evidence in support of natural food components as cancer preventive substances. In recent years, many foods including, but certainly not limited to, raspberries, blackberries, grapes, tomatoes, cauliflower, broccoli, strawberries, various grains, barks, and roots as well as many other fruits, vegetables, and herbal remedies have been identified as containing phytochemicals with powerful effects not only beneficial for health maintenance but also useful in the treatment of disease.

Dieticians and medical scientists have long stressed the importance of the consumption of fruits and vegetables by humans for general health and

well-being, and now the specific phytochemicals responsible for their benefits are being isolated, studied, and concentrated in extract form. Some of these phytochemicals have been shown to prevent various types of cancers and in some cases, to reduce cancer even after symptoms have been detected. Ellagic acid, oligomeric proanthocyanidins (OPC), and Green tea catechins stand at the forefront among those phytochemicals that have been studied extensively and have demonstrated multiple potential health benefits, including positive results toward cancer prevention.

WHY ELLAGIC INSURANCE FORMULA?

Ellagic Insurance Formula is based on ground-breaking research suggesting that extracts of certain plant phytochemicals have therapeutic healing effects in the body that are often greater than the physiological benefits experienced from eating the whole plant or the average daily amount of fruits and vegetables consumed in The Great American Diet.

This unique nutraceutical supplement combines therapeutic levels of three polyphenols from plants: ellagitannins (Ellagic acid) from raspberries; oligomeric proanthocyanidins (OPC) from whole grape extract; and catechins from Green tea together with the antioxidant vitamins A, C, E and the mineral Selenium to create a potent antioxidant formula. The scientific laboratory evidence and clinical medical research supporting the protective effects of these nutrients in multiple areas of health concern are reviewed in this booklet, including their potent actions against the two most feared killers of our time, cardiovascular disease and cancer.

The traditional emphasis in cancer treatment has been to destroy cancer cells by surgery, radiotherapy and cytotoxic chemotherapy. This aggressive medical and surgical approach has done little to reduce the overall mortality rate from cancer and even less to prevent cancer. If all cancerous cells are not destroyed or removed, the cancer tends to recur. A need for more effective treatment and/or a cure for cancer has turned scientists toward an emphasis on more biologically relevant strategies of preventing and dealing with cancers.

A key area of new cancer research involves understanding the molecular basis for the initiation and promotion of cancer. Scientists are discovering the relationship of normal genes to cancer oncogenes, in which mutations promote malignancy as well as their role as suppressor or regulatory genes, in which mutations enable cancerous cells to divide uncontrollably. As researchers understand more about the natural processes of cell death and cell suicide, referred to as apoptosis, they believe they will eventually be able to prevent mutations from occurring in genes that allow this uncontrolled growth to occur.

This new focus on cancer biology at the molecular level is providing evidence that nutritional factors, particularly antioxidants, interact with cancer oncogenes and suppressor genes. Vitamins A, C and E are strong regulatory factors of

cancer cell differentiation, regression, membrane biogenesis, DNA, RNA, protein and collagen synthesis and the transformation of precancerous into cancer cells. As suspected, but largely ignored by conventional cancer physicians, these vitamins exert cytotoxic and cytostatic effects and may even cause cancer cells to revert back to normal. This interaction of antioxidant vitamins with oncogenes and growth factors is of considerable importance to cancer cell biology, and may be instrumental in eventual cancer prevention and treatment. Exciting new research also indicates that potent phytochemical antioxidants are chemopreventive, including Ellagic acids, oligomeric proanthocyanidins (OPC), and Green tea catechins, all phenolic flavonoids found in Ellagic Insurance Formula

FREE RADICALS AND CANCER

No discussion of causes of cancer would be complete without a discussion of how free radicals cause aging and disease. Understanding how free radicals damage cells will also help you to understand why potent antioxidants such as those found in Ellagic Insurance Formula can have such dramatic effects on health in general as well as specific diseases.

The "Free Radical Theory of Aging," first proposed by Dr. Denham Harman, postulates that aging results from an accumulation of damage caused by reactions in the body initiated by highly reactive molecules known as free radicals. The changes induced by free radicals are believed to be a major cause of aging, disease development, and death. Free radicals may be produced endogenously (within the body) through normal metabolic processes, or exogenously (outside the body) from sources such as environmental toxins.

The body's defense mechanisms against free radicals are called antioxidants, meaning "against oxidation". If antioxidant protection is inadequate, free radicals can cause progressive cell damage by reacting with vital structures in the body, such as DNA, which can cause mutations (alterations) in the sequence of genetic coding and cell production. The accumulation of abnormal cellular damage or changes over time is then thought to contribute to accelerated aging and the development of degenerative diseases.

With respect to cancer, the free radical theory of aging is attractive because it integrates all the theories which pertain to metabolism and energy expenditure with the theories dealing with molecular changes (mutations) at the DNA level. Thus, it is easy to see how increasing the metabolic rate would generate an explosion of free radicals or reactive oxygen species (ROS). The reactive oxygen species would, in turn, react with DNA to cause mutations which could lead to the development of disease especially cancer. Free radicals are not all bad. White blood cells destroy parasites, bacteria and viruses by using free radical oxidants such as nitric oxide, superoxide and hydrogen peroxide. The downside of this beneficial effect of free radicals is that chronic illness results in prolonged phagocytic activity and increased exposure of body tissues to these oxidants.

Exogenous sources of free radicals include such environmental toxins as food, water, air, smog, ozone, chemicals, drugs, pesticides, and cigarettes. Cigarette smoke is one of our most dangerous sources of oxidants. That is why "passive smoke" from just breathing the air in a smoking environment is considered almost as harmful as smoking itself.

Children of heavy smokers, for example, have much higher rates of upper respiratory infection than children of non- smokers. Radiation and trace metals, notably lead, mercury, iron and copper, are also major sources of free radical generation.

The free radical theory may also explain the relationship between nutrition and cancer. Free radicals just love fat! Diets high in fats and sugars are also low in natural sources of antioxidants. Our modern diets accelerate aging because processed foods generate more free radicals than whole foods while simultaneously containing fewer antioxidant protectors to compensate for the increased free radicals generated when metabolizing junk food. One reason individuals in modern countries may have more cancer is because they eat processed foods that don't contain enough antioxidants and don't eat enough natural plant foods that contain protective flavonoids and phytochemical antioxidants.

Exogenous sources of carcinogenic chemicals are of particular concern because of sheer numbers. Of the 5 million registered chemicals in the world, humans contact with 70,000, of which at least 20,000 are known cancer-causing agents.

Americans spray 1.2 billion pounds of pesticides on food crops every year, dumping 90 billion pounds of toxic waste into 55,000 toxic waste sites, feeding 9 million pounds of antibiotics to farm animals to help them gain weight faster, and covering our landscape with electromagnetic radiation.

It is literally impossible to avoid contact with these reactive free radical molecules. Our body's defense system is unable to compensate for the overwhelming increase in environmental toxins our modern lifestyles have created. Free radicals damage tissue structures and impair cellular functions which manifest as aging and chronic degenerative diseases like arthritis, cardiovascular disease, diabetes, Alzheimer's disease, and cancer.

Free radicals are involved in both the process of aging and the development of cancer (Cross). They attack many cellular targets including membranes, proteins and nucleic acids and cause structural damage to the cellular DNA. These structural changes manifest as point mutations and chromosomal alterations in cancer-related genes (Cerutti). That may be why the elderly, in particular, are predisposed to the development of cancer.

Fortunately, scientific evidence increasingly shows that antioxidants, including antioxidant supplements like Vitamins C, A, and E, and minerals like Selenium, and phytochemicals with antioxidant properties, can prevent much of this

oxidative damage to DNA and thus reduce the ability of the oxidants to induce cancer (Ames).

The relationship between oxidative damage and disease is not limited to cancer. Cardiovascular disease, neurodegenerative disease, inflammatory disease, and trauma all involve free radical damage. Diabetes is another multi-system disease accelerated by free radical damage. Elevated blood sugar causes oxidation of glucose and proteins, a process called glycosylation that is implicated in diabetic complications such as neuropathy. It is therefore not surprising that antioxidant supplements, including vitamins, minerals, and phytochemicals have been found to be beneficial in diabetes and other chronic disease.

PROVEN HEALTH BENEFITS OF BIOFLAVONOIDS

Ellagic acid, OPC, and Green tea catechins belong to related chemical families, flavonoids and flavanols, often lumped together as "bioflavonoids" because they share many potent physiological and biochemical actions in the human body.

Flavonoids and flavanols do share a common structure of two benzene rings on either side of a 3-carbon ring, but have markedly different functions dependent on the multiple combinations of hydroxyl groups, sugars, oxygens, and methyl groups attached to these structures by which the various classes of bioflavonoids are identified: flavanols; flavanones; flavones; flavan-3-ols; anthocyanins; and isoflavones. Differences in chemical structure determine differences in bioavailability, absorption, distribution, actions and potency.

Bioflavonoids are the subject of intense scientific research in the areas of cancer, heart disease, and other degenerative illness because they are extremely potent antioxidants as well as effective anti-inflammatory, anti-allergic, and anti-infectious agents. Epidemiological research continues to show that greater consumption of bioflavonoids is linked to a lower risk of developing disease. At the same time, it is evident that in many parts of the world, intake of fruits, vegetables, and herbs is far from recommended levels. Less than 10% of Americans, for example, eat the recommended amount of fresh fruits and vegetables daily, only 20 % eat enough vegetables, and only 40% eat enough fruit. Since fruits and vegetables supply most of the flavonoids in our diet, it is clear that our intake of flavonoids is dangerously low, increasing general risk for illness and disease.

Some of the richest sources of flavonoids include the following:

? Flavanones (hesperidin, naringenen): citrus (grapefruit, oranges, lemons).

? Anthocyanins: berries! (bilberries, blueberries, cranberries, raspberries, hawthorn, blackberries, elderberries), red wine, grapes and, beets, red onions, cherries

? Catechins: Green tea, apples, pears, cherries, red wine

? Flavanols: onions, kale, parsley, French beans, endive, apples, grapes

? Ellagic acid: red raspberries, cranberries, pomegranate, strawberries, walnuts

Green tea catechins, grape proanthocyanidins, and raspberry ellagitannins are potent antioxidants, capable of scavenging hydroxyl radicals, superoxide anions, and lipid peroxy radicals. They also have proven antibacterial, anti-inflammatory, antiallergic, antimutagenic, antiviral, antineoplastic, anti- thrombotic, and vasodilatory activity. Comparing these three flavonoid ingredients in Ellagic Insurance Formula: dried Green tea leaves contain approximately 30% flavonoids by weight; grape extract contains about 40% oligomeric proanthocyanidins (OPC); and red raspberries contain approximately 60-100 mg polyphenols per 100 grams, including 1500 micrograms of Ellagic acid per gram.

The role of flavonoid antioxidants cannot be ignored. Oxidative damage is implicated in most disease processes, and epidemiological, clinical, and laboratory research on flavonoids and other antioxidants support their use in the prevention and treatment of a number of acute and chronic degenerative and life-threatening conditions. Flavonoids can modify carcinogenesis by inhibiting enzymes that initiate cancer, by modifying how carcinogens are detoxified, by reducing DNA reactive agents, by suppressing the abnormal proliferation of preneoplastic lesions, and by inhibiting certain properties of the cancer cell.

Flavonoids may also protect against heart disease and cancer by inhibiting inflammatory enzymes and the resultant formation of arachidonic acid metabolites.

There is enough evidence at the present time to suggest that cardiovascular disease and cancer, the two leading causes of mortality in the United States, can be significantly impacted by the ingestion of antioxidants, including flavonoids in the form of foods or in more concentrated form as standardized extracts found in nutritional supplements.

Red raspberries, grapes, and Green tea are just a few of the many thousands of plants that contain flavonoid antioxidants, but at present they represent the most potent of the known flavonoid compounds.

The bottom line is that we have enough epidemiological, clinical, and laboratory research on flavonoids, and on antioxidants in general, to make some conclusions about the use of these antioxidant phytochemicals in the prevention and/or treatment of cardiovascular disease, cancer, inflammatory conditions, asthma, periodontal disease, liver disease, cataracts and macular degeneration, just to name a few. This booklet will review why catechins, procyanidins, ellagitannins, and other phytochemicals are being considered as critical additions to both preventive and treatment protocols.

WHAT IS ELLAGIC ACID?

Ellagic acid is a phenolic compound found in plants in the form of hydrolyzable tannins called ellagitannins. Ellagitannins are esters of glucose with hexahydroxydiphenic acid; when hydrolyzed, they yield Ellagic acid, the dilactone of hexahydroxydiphenic acid. Ellagic acid is a very stable compound and is readily absorbed through the gastrointestinal system in mammals, including humans.

Berries are the most common food sources of Ellagic acid. The relative amount of Ellagic acid in average number of micrograms per gram of dry weight fruit extract is highest in red raspberries at 1500mcg, followed by strawberries at 630 mcg, walnuts at 590 mcg, pecans at 330 mcg, and cranberries at 120 mcg. Torre, et al., performed a quantitative evaluation of red raspberries that was published in the Journal of Food Sciences in 1977:

Nutrient Profile of Red Raspberry:

Alpha Carotene 13-60 ug/100g	Alpha-Tocopherol 0.45 mg/100g,
Anthocyanin 20-60 mg/100g	Ascorbic Acid (Vitamin C) 25 mg
Beta-carotene 6-30 ug/100g	Boron 0.1-1.3 mg/100g
Caffeic-acid 0.3-0.7 mg/100g	Calcium 22mg/100g
Carbohydrate 11.57 g/100g	Catechin 0.83 mg/100g
Chlorogenic acid 0.1 mg/100g	Copper 0.74 mg/100g
Glucose 3.5 mg/100g	Fructose 3.2 mg/100g
Sucrose 2.8 mg/100g	Maltose
Ellagic Acid1.5 mg/100g dry weight	Energy (calories) 44.62 kcal/100g
Calories from fat 0.54 kcal/100g	Epicatechin 3.55 mg/100g
Fat (lipids) 0.55 g/100g	Ferulic Acid <0.9mg/100g
Fiber 6.8g/100g	Flavan-3-ol 3.2-4.9mg/100g
Flavonols (Kaempferol, Quercetin) 7.2-10.2mg/100g	Folic Acid 26 mcg/100g
Hydroxybenzoic acid 3.4-4.4 mg/100g	Hydroxycinnamic acid 2.4 mg/100 g
Iron 0.57 mg/100 g	Kaempferol 3.4 - 3.6 ug/g juice
Magnesium18 mg/100g	Malic acid
Manganese 1.013 g/100g	Niacin 0.9 mg/100g
Pantothenic acid 0.24 mg/100g	Pectin1.45 g/100g
Phenolics mg/g (dry weight) 23.9	Phosphorus 12 mg/100g
Potassium152 mg/100g	Protein 1.31 g/100g
Quercetin 118-121 ug/g juice	Riboflavin 0.90 mg/100g
Salicylic acid 5.14 mg/100g	Sodium (mg) 1.50

Sugar (g) 5.10	Tannin 620 mg/100g
Thiamin 0.30 mg/100g	Vitamin A (IU) 90.00
Vitamin B6 0.57 mg/100g	Zinc 0.46 mg/100 g

Research studies on Ellagic acid have been extensive, especially in vitro studies and studies in laboratory animals. Although yet to prove conclusively in humans that red raspberries will reduce risk of cancer or even cause remission of active disease, this research does represent a substantial body of evidence to support the protective effects of ellagitannins in humans in combination with other chemopreventive nutrients.

Ellagic acid promotes carcinogen detoxification by stimulating the activity of various isoforms of the enzyme glutathione-S- transferase in hepatoma (liver cancer).

Ellagic acid slows the growth of abnormal colon cells in humans, prevents the development of cells infected with the human papilloma virus (HPV) linked to cervical cancer, and triggers apoptosis (natural death) of prostate cancer cells. This apoptotic process may also have beneficial effects on breast, lung, esophageal, and skin cancer (melanoma).

Ellagic acid from raspberries causes apoptosis (normal cell death) of human cervical cancer cells (human papilloma virus), induces G1 inhibition of cancer cell division, and prevents destruction of the P53 gene by cancer cells. P53 is regarded as a safeguard against mutagenic activity (cancer causing changes) in cervical cells (Nixon, Narayanan).

Unpublished research at the Hollings Cancer Center shows that one cup of raspberries per week will stop prostate cancer growth for a period of up to one week. Their studies reveal that Ellagic acid from red raspberries is readily absorbed through the gastrointestinal tract. Ellagic acid retains its potency after heating, freezing and concentration processing. So whether consumed fresh, in juices, fruit spreads, preserves or sorbets, red raspberry has been recommended as a beneficial part of any healthy diet.

Inhibition of carcinogenesis by Ellagic acid has been demonstrated in animals with esophagus, tongue, lung, colon, liver, and skin tumors. Ellagic acid inhibits the initiation of tumors through a number of mechanisms, including inhibition of metabolic activation of carcinogenic compounds (such as polycyclic hydrocarbons, nitroso-containing chemicals or food preservatives, and aflatoxins) into forms that induce cell DNA damage.

Ellagic acid acts as a scavenger to "bind" cancer-causing chemicals, making them inactive. It inhibits the ability of other chemicals to cause mutations in bacteria. In addition, Ellagic acid from red raspberries prevents binding of carcinogens to DNA, and reduces the incidence of cancer in cultured human cells exposed to carcinogens. Ellagic acid has been shown to inhibit chemically induced cancer in the lung, liver, skin and esophagus of rodents, and

TPA-induced tumor promotion in mouse skin (Stoner).

Ellagic acid elicits a dose-dependent bactericidal effect in H. pylori cultures, the bacteria thought primarily responsible for the development of gastric ulcers (Chung).

Ellagic acid is an effective inhibitor of lung and esophageal tumors in mice (Stoner).

Ellagic acid inhibits lipid peroxide and liver hydroxy proline and rectifies liver pathology in laboratory animal hepatotoxcity induced by carbon tetrachloride (Thresiamma).

Cancer can affect DNA by covalent bonding of the carcinogen to the DNA molecule. Ellagic acid inhibits mutagenesis and carcinogenesis by forming adducts with DNA, thus masking binding sites to be occupied by the mutagen or carcinogen (Teel).

Ellagic acid treatment of preweanling mice before an injection of B(a)P diol-epoxide caused a 44-75% inhibition in the number of diol-epoxide-induced lung tumors (Chang).

Ellagic acid inhibits N-nitrosomethylbenzylamine (NMBA) tumorigenesis in the esophagus of F-344 rats. Ellagic acid inhibited the development of both preneoplastic and neoplastic lesions by 25-50% (Daniel and Stoner).

Ellagic acid reduced the number of altered foci and the incidence of hepatocellular neoplasms in rats with liver cancer induced by N-2-fluorenylacetamide (Tanaka).

There is clinical evidence that Ellagic acid may inhibit tumors of the prostate and cervix. Preliminary studies in volunteers indicate Ellagic acid shows up in cervical tissue after oral ingestion of red raspberries. One study will evaluate women with atypical squamous cells of undetermined significance (ASCUS) in which there is neither treatment nor clinical evaluation available. ASCUS represents as much as 10% of all Papanicolaou smears in the US and represents approximately 5 million females. In this population, women infected with human papillomaviruses (HPV) types 16 and/or 18 are at the greatest risk of developing cervical cancer at some stage in their lives. This population represents approximately one million women in the United States alone, and in India is one of the two major cancers affecting women.

Ellagic acids do more than prevent cancer. Berries may also help prevent heart attacks because they contain a natural form of aspirin called salicylates. British researchers analyzed the blood of subjects who were not taking any form of aspirin or drugs containing salicylates. They found salicylic acid and two related compounds present in blood, presumably from dietary sources, including raspberries and blackberries.

Researchers at the National Center for Health Statistics (NCHS) in Hyattsville, Maryland established a connection between reduced risk of heart attack and increased intake of salicylates. They found that during a 10 year period beginning in 1960, when heart attack rates began to decline, non-aspirin salicylate consumption went up due to salicylate in processed foods which used a synthetic version to add flavor and aroma.

Ellagic acid is pharmacologically active and has been found to control hemorrhage in animals and in humans, presumably as a result of its ability to activate Hageman factor. Animal tests suggest that red raspberry may reduce levels of glucose (blood sugar) in animals, and therefore may help in the management of diabetes.

Ellagic acid inhibits lipid peroxidation necrosis of skin flaps, enhancing preservation of grafting procedures (Ashoori).

Ellagic acid has a marked inhibitory effect on acid secretion and the occurrence of stress-induced gastric lesions (Murakami).

Ellagitannins are also believed by herbalists to be effective in treating diarrhea, nausea, vomiting and morning sickness in pregnancy. Herbalists do not, however, recommend you use red raspberry for this purpose at home even though red raspberry leaves are included in several herbal pregnancy formulas sold in the United States for women with a history of miscarriage or difficult pregnancy for the purpose of regulating uterine contractions, morning sickness, hot flashes, diarrhea (use weak tea for infants), and for reducing excessive menstrual flow. The herb is also used as a gargle for sore throats.

Consuming one cup (150 grams) of red raspberries per day prevents the development of prostate cancer cells in unpublished studies. Most extract formulas recommend from 500-2000 mg of ellagitannins per day. The amount of Ellagic acid found in red raspberries is 1500 micrograms per gram of dry weight. If one cup contains 150 grams by dry weight, then each cup of red raspberries would average 225 mg of Ellagic acids as well as up to 90 mg of anthocyanidins and less than 40 mg of other polyphenols including flavanols. As with many herbal remedies, suggested use and precise dose response relationships have not been established for ellagitannins extracted from red raspberries.

OPC

OPC is unique among biological nutrients contained in nutritional supplements in that extensive laboratory and clinical research has been ongoing for more than fifty years to support the structure and function claims made for its multiple potential health benefits. I have summarized some of the most important health benefits of OPC below that are found in greater detail in the more than 100 research articles reviewed in my new book, "OPC: The Real Story About Nature's Most Powerful Antioxidant."

OPC has not been prominently featured in cancer research since it has been found to have overwhelmingly positive effects on cardiovascular and musculoskeletal health. Its potential chemopreventive properties are currently under review because of the renewed interest in flavonoids as chemopreventive agents. Key research includes the following:

Huynh, et al., showed that Pycnogenol® inhibits nitrogen- containing compounds from causing cancer in the gastro- intestinal tract of rats. Nitrogen compounds are known to increase risk in humans for both gut and lung cancers.

Nelson, et al., found that Pycnogenol® protected DNA single and double strands from breaking in the presence of oxygen free radical species. This breakage of genetic material is thought to be a possible factor in carcinogenesis (creation of cancer).

Jang, et al., review the properties of the chemical trans- Resveratrol (or Resveretrol) found recently in red wine and the skin of grapes. Cancer studies at the University of Illinois found Resveratrol prevented cancer from starting in normal cells, stopped already cancerous cells from growing, and caused already cancerous cells to revert back to normal.

Grape skin contained the highest amount of Resveratrol of over 1000 plants studied. The OPC in EIF comes from red grapes grown in the Rhone Valley of France that have a comparatively higher content of Resveratrol.

Please keep in mind Resveratrol was tested in cultured cells from mice with induced cancer; there have been no studies in humans. This does not mean Resveratrol doesn't fight cancer, but as of today, realistically speaking, there is more evidence to support its role in reducing heart disease than cancer. Resveratrol prevents platelet aggregation--another reason or excuse to drink red wine! Epidemiological studies do present strong evidence for a reduced risk of both cancer and heart disease in populations consuming higher than normal amounts of red wine on a daily basis (2-4 glasses per day).

Packer, et al., cite many references that support cancer- protective properties of flavonoids and polyphenols including OPC. Flavonoids in numerous studies inhibit the growth of tumor cells by various mechanisms including antioxidant properties, inhibition of enzymes that facilitate cellular metabolism, and ability to inhibit telomerase, an enzyme essential for promoting rapid growth of tumor cells.

A brief review of the multiple benefits of OPC should convince even the most skeptical scientist of the value of increasing daily intake of bioflavonoids, including OPC.

OPC inhibits damage to blood vessels and inhibits abnormal clotting of blood, both of which are related to heart disease. OPC inhibits excessive metabolizing of nitric oxide, a process linked to inflammation, arthritis, and Alzheimer's disease (Fitzpatrick).

OPC 100 mg given to smokers two hours after smoking inhibited clotting of platelets more effectively and faster than 500 mg of aspirin. A 200 mg dose of OPC was even more effective with effects lasting a week after the OPC was stopped (Watson, Putter). OPC corrects some forms of infertility in males by increasing the number of structurally normal sperm, a more cost effective treatment than expensive fertility drugs (Roseff)!

OPC is one of nature's most powerful antioxidants, inhibiting superoxide and hydroxyl forms of oxygen free radicals more effectively than either Vitamin C or E (Bagchi).

OPC inhibits lipid peroxidation of blood fats more effectively than Vitamin E (Bagchi).

OPC inhibits growth of cancer cells in the laboratory while simultaneously enhancing the growth and viability of normal human gastric mucosal cells (Ye).

OPC inhibits acetaminophen-induced liver death in lab mice (Ray).

OPC improved venous insufficiency in 80% of patients treated for just 10 days with 100 mg of OPC. Itching, heaviness and pain disappeared with rapid reduction of the swelling in lower limbs. Symptom improvement correlated with objective changes in videocapillaroscope examination of blood flow (Constantini).

Resveratrol, a chemical found in the skin of grapes, was shown to protect lipid and protein membranes against copper- induced oxidation (Fremont).

OPC binds to both collagen and elastin fibers in connective tissue to reduce their rate of degradation by inflammatory enzymes (Tixier).

OPC protects the lining of blood vessel walls from free radical damage (Rong).

OPC reduces diabetic retinal bleeding and improves vision within a few weeks on as little as 100 mg per day (Froantin).

OPC reduces peripheral edema in several studies involving over 4,000 patients (Henreit).

OPC increases capillary resistance, resulting in lower systolic blood pressure (Lagrue).

OPC reduces severity and duration of soft tissue injuries in soccer players treated immediately following injury with 400 mg per day tapering over several weeks to 200 mg per day of OPC from grape seed extract (Parienti).

OPC reduces symptoms in gastric ulcers (Saito).

OPC reduces post-surgical swelling and pain and speeds soft tissue recovery when elective facial surgery patients were pre- treated before and after surgery (Baruch).

OPC reduced symptoms of PMS in over 60% of patients treated with 200 mg of OPC for three months and in 80% of patients treated for six months (Amsellem).

OPC is an acronym for "oligomeric proanthocyanidins", a polyphenolic phytochemical extracted from many different plants of which the highest concentrations for supplement use are found in grape seed extract, entire grape extract, and pine bark extract.

OPC is distinct from other plant flavonoids because it is a flavan-3-ol. Flavanols differ from flavonoids in that flavanols are highly water-soluble, absorbable and bioavailable. OPC is quickly and readily distributed throughout the body within minutes to a few hours of oral ingestion. OPC also contains ellagitannins in lesser amounts than red raspberries.

OPC is a potent scavenger of free radicals. It is one of nature's most potent antioxidants. OPC contains multiple electron donor sites (hydroxyl sites) that allow it to bind to unstable molecules called free radicals by donating its hydrogen atoms. OPC also recycles other antioxidants such as Vitamin C and glutathione by removing the free radicals they bind with and freeing them up to interact again with other free radicals.

Examples of free radical scavenging activities of OPC include: traps hydroxyl and superoxide radicals; inhibits or delays onset of lipid peroxidation; chelates free iron molecules and inhibits iron-induced lipid peroxidation; reduces free radical production by inhibiting the enzyme xanthine oxidase; and inhibits degradative enzymes that produce free radicals through soft tissue damage (hyaluronidase, elastase, collagenase, protease).

OPC from grape seed extract contains the most potent antioxidant activity of the various polyphenols studied. In one study rat blood vessel walls were exposed to free radicals and the ability of grape seed extract, pine bark, and bilberry to protect the blood vessel walls from damaged was measured. Grape seed extract provided the best arterial wall defense against the damaging effects of free radicals and on an absolute scale, was 22% stronger than pine bark extract and 15% greater than bilberry extract (Jonadet).

OPC binds to protein tissue such as collagen, producing a wide range of benefits to health and anti-aging. OPC binds to the collagen in blood vessel walls, making capillaries stronger and more elastic, improving circulation, and reducing blood pressure. Since joint capsules, ligaments, and tendons are also made up of collagen, OPC typically improves joint elasticity and range of motion. Since skin is also predominantly collagen, OPC is billed in France as the internal cosmetic, making skin more elastic, softening wrinkles, and giving skin over time a more youthful appearance.

The protein-binding properties of OPC also affect protein receptor sites that control enzymes of inflammation and allergy. OPC blocks the release of histamine, resulting in reduced symptoms in allergies, ulcers, and asthma. OPC

blocks the release of proteases and collagenases, resulting in reduced swelling, inflammation, and pain in arthritis.

OPC reduces pain, inflammation, swelling, and stiffness in joints made symptomatic from arthritis or injury in several documented ways. OPC is a potent anti-inflammatory that inhibits the release of degradative enzymes including collagenases, proteases, and elastases that damage soft tissues including joint cartilage and synovial joint linings. OPC is a potent antioxidant that inhibits free radical damage and inflammatory response following injury. OPC speeds recovery from acute injury by inhibiting or reducing the formation of soft tissue edema secondary to acute inflammation. OPC reduces symptoms of chronic joint stiffness and restores functional mobility by improving elasticity of connective tissues. OPC speeds up healing by increasing circulation to joints.

OPC may be the ultimate anti-aging nutrient. OPC improves the appearance of skin. OPC increases circulation to the brain and enhances cognitive functions such as memory and mood. OPC reduces joint stiffness associated with wear and tear of aging. OPC is a potent antioxidant that slows aging by inhibiting the damaging effects of free radicals.

Diabetics experienced reduced diabetic retinopathy and improved retinal appearance and clinical visual acuity after taking as little as 100 mg of OPC per day for six weeks. OPC may enhance peripheral circulation and reduce symptoms of diabetic neuropathy.

OPC has no known side effects such as mutagenecity, carcinogenecity, cellular toxicity or allergic reactions in over fifty years of clinical and laboratory research. Toxicity studies in animals indicate OPC has an extremely high LD50. This means that humans would have to take literally hundreds of thousands of milligrams daily to be adversely effected. OPC is safe to take during pregnancy and breast feeding, unless combined with other herbal ingredients that may be contraindicated during pregnancy.

OPC works best when taken at saturation levels of at least one milligram per pound of body weight per day. A person weighing 200 pounds would take 100 mg twice daily for a total daily dose of 200 milligrams. Therapeutic levels, 300-600 mg of OPC per day, are frequently prescribed by European physicians for medical conditions they think might respond to OPC. Maintenance levels of 100 mg per day are recommended for healthy, younger individuals taking OPC along with other supplements for nutritional insurance.

RESVERATROL

Resveratrol is a polyphenol found in red wine and the skin of grapes that is a naturally occurring antioxidant. It is one of the chemicals thought responsible for the reduced rate of cardiovascular disease and cancer in populations that consume red wine on a daily basis. Grape skins have been identified as the highest known source of Resveratrol.

Fresh grape skin contains about 50 to 100 micrograms of Resveratrol per gram, while red wine concentrations range from 1.5 to 3 milligrams per liter. A glass of red wine contains about 600-700 mcg of Resveratrol compared to about 70-80 mcg in a handful of peanuts. A high quality grape extract contains greater than 400 ppm of Resveratrol.

Extensive recent scientific research has been done on Resveratrol because of the paradoxical health benefits recorded for red wine. Resveratrol was first isolated from red wine in 1992. Since then it has been found to lower cholesterol, inhibit oxidation of LDL cholesterol, inhibit platelet aggregation, and inhibit the growth of cancer cells in vitro.

Resveratrol not only inhibits the growth of cancer cells, it causes already cancerous cells to revert back to normal, and blocks carcinogens from turning normal cells cancerous. Cancer studies at the University of Illinois looked at the effects of Resveratrol in cancer of mouse mammary glands Resveratrol demonstrated chemopreventive properties by several mechanisms affecting the initiation, promotion, and progression of cancer. In other words, Resveratrol prevented cancer from starting in normal cells, stopped cancerous cells from growing, and even caused cancerous cells to revert back to normal.

GREEN TEA

Green tea has been considered a medicinal remedy in Chinese tradition dating back over 4,000 years. The observed health benefits of this folk remedy now being validated by modern scientific investigation include: lowers total cholesterol, increases HDL cholesterol levels, reduces blood pressure, acts as a "blood thinner" by inhibiting platelet aggregation, reduces risk of heart attack and stroke, reduces risk of cancer, enhances immune cell function, improves digestion, and prevents dental cavities and gingivitis.

Green tea catechins are definitely included in a broad brush approach to the health benefits of flavonoids, which includes potential for the prevention and treatment of cardiovascular disease, cancer, inflammatory conditions, asthma, periodontal disease, liver disease, cataracts, and macular degeneration. Epidemiological studies suggest that populations drinking 8-10 cups of Green tea daily have markedly reduced rates of gastrointestinal cancers as well as lower rates of cancer of the pancreas, breast, and lung. Japan, for example, has a very low incidence of cancer which is thought secondary to their relatively high intake of Green tea.

Laboratory studies supporting the cancer protective effect of Green tea demonstrate that catechins and other polyphenols inhibit free radical precursors to cancer as well as block the effects of other tumor promoters including estrogen, growth factors, and cancer causing chemicals like benzopyrenes and nitrosamines.

The anticancer effect of Green tea polyphenols, specifically catechins, in human

and animal studies has been impressive enough for the National Cancer Institute to include Green tea polyphenols in its "Designer Nutrient Program", a research effort to investigate the cancer preventative and therapeutic benefits of foods and food products.

Extensive international research reveals that Green tea catechins have apoptic activity in human cancer cell lines including prostate, skin, lymphoma, ovarian, colon, adenocarcinoma, liver breast, lung, and stomach cancers.

Green tea consumption is protective for gastrointestinal cancers in large studies. Green tea polyphenols have shown promise in vitro as antineoplastic substances, due to their ability to scavenge oxidative initiators of neoplasia (Yoshikawa, Picard).

Laboratory and epidemiological studies indicate Green tea catechins exert a protective effect against prostate cancer. Green tea drinkers have lower rates of prostate cancer with the lowest rate of prostate cancer in China with the highest consumption of tea (Gupta).

Antimutagenic properties of catechins against tumors found in laboratory animals were reproduced recently when tested against four human tumor cell lines from carcinomas of the breast, colon, lung and melanoma. Epigallocatechin gallate was the most potent catechin against all four tumor lines. It was recommended that in vivo animal trials be conducted prior to consideration of testing Green tea catechins against cancer in humans.

Green tea inhibits cancer in laboratory studies by several mechanisms including enhanced cell-mediated immunity, increased glutathione-S-transferase activity (increases glutathione, a powerful intracellular antioxidant), inhibits tumor growth rate, blocks tumor-induced inhibition of intracellular communication, and scavenges free radicals. Green tea polyphenols specifically block the formation of carcinogenic nitrosamines.

When volunteers were given Green tea in combination with 300 mg of sodium nitrate and 300 mg of proline, the formation of nitrosoproline was strongly inhibited (Stich).

Daily intake of Green tea polyphenols appears to have multiple health benefits summarized below, including reduced risk of cancer and cardiovascular disease:

? Catechins protect against radiation, including increased survival and decreased incidence of radiation-induced tumors.

? Catechins have antimutagenic activity against both spontaneous and chemically-induced mutations.

? Catechins have anti-tumor activity, inducing phase I and II metabolic enzymes that increase the formation and excretion of detoxified metabolites of carcinogens, slowing the rate of cell replication and thus the growth and

development of neoplasms, and preventing spontaneous and chemically-induced cancer development.

? Catechins are powerful antioxidants that inhibit oxidation of LDL-cholesterol, reduce cholesterol levels, and reduce body fat, resulting in a decreased risk of heart disease.

? Catechins have regulatory effects on blood pressure and high blood-pressure induced strokes. Individuals consuming more than five cups a day having a 500% decrease in stroke incidence.

? Catechins have antibacterial activity against foodborne pathogenic bacteria and cavity-inducing bacteria, modifying the intestinal microflora, reducing undesirable bacteria and increasing beneficial bacteria.

? Catechins have an antihyperglycemic action, lowering both blood-glucose and normalizing insulin release.

? Catechins show antiviral effects, inhibiting reproduction of numerous viruses including influenza and human immunodeficiency virus.

Additional research is being published almost weekly on the remarkable healing properties of Green tea catechins. Important studies are summarized briefly below:

Green tea also reduces oxidative stress caused by smoking, including decreased oxidative DNA damage, reduced lipid peroxidation, and reduced urine levels of free radicals. Green tea appears to significantly lower risk of cardiovascular disease, even having a protective effect in smokers. Japanese males, for example, have a relatively low risk of heart disease despite the fact 75% of adults smoke tobacco.

This "Japanese Paradox" is similar to the "French paradox" in that the polyphenols in Green tea have a protective effect against heart disease and cancer just like the polyphenols in red wine protect the French against cardiovascular disease in spite of their high fat diets.

In Japanese males over 40, the protective effects of Green tea against heart disease and cancer increased exponentially in proportion to average daily tea intake comparing risk in men drinking less than three, four to nine, and more than ten cups of tea daily (Imai).

Green tea increases thermogenesis or fat oxidation. Green tea catechins increased 24-hour energy expenditure, decreased respiratory quotient, and increased urinary excretion of nitrogen and catecholamines compared to controls and those taking caffeine alone. Green tea catechins independent of caffeine inhibit catechol O-methyltransferase, an enzyme that degrades norepinephrine, causing a more sustained effect of norepinephrine (adrenalin) on thermogenesis and energy production from burning of fatty acids. This occurred

without a stimulatory increase in heart rate, distinguishing Green tea from sympathomimetic drugs, which can have adverse cardiovascular side effects (Dulloo).

Green tea inhibits viral infections by a mechanism similar to elderberry flavonoids. Catechins bind to the hemagglutinin of the influenza virus and inhibit its absorption to the target cell, thereby inhibiting its ability to infect the target cell (Nakayama).

Green tea correlates inversely with total serum cholesterol in a study of 1300 Japanese males. Cholesterol level was an average of 8 mg/dl lower in males drinking 9 or more cups of Green tea per day compared to those consuming zero to two cups per day (Kono).

Green tea lowers cholesterol by increasing fecal lipid excretion in lab animals and may reduce levels in humans by a similar mechanism of increasing bile acids (Yang).

In summary, studies confirm that flavonoids in Green tea have antibacterial, anti-inflammatory, antiallergic, antimutagenic, antiviral, antineoplastic, antithrombotic, and vasodilatory activity. Catechins from Green tea are potent antioxidants that scavenge hydroxyl radicals, superoxide anions, and lipid peroxyl radicals. In most experimental studies catechins demonstrate superior antioxidant properties than Vitamin C or E.

Green tea catechins have bacteriocidal activity at concentrations of catechins found in a single cup of Green tea.

Green tea catechins inhibit oxidation of LDL cholesterol, lower total serum cholesterol levels, and increase levels of HDL cholesterol.

Green tea also contains components unrelated to the flavonoids. Approximately 3.5% caffeine, 6.5% lignan, 1.5% organic acids, 15% proteins, and 2% theanine, an amino acid that has recently been shown to reduce blood pressure. Standardized Green tea extracts contain on average 60-80% total polyphenols, but may be as high as over 90%.

Green tea contains about 50-100 mg of caffeine, the principal ingredient responsible for the social popularity of Green tea. Caffeine stimulates the central nervous system, respiratory, cardiac, and skeletal muscle systems. Caffeine causes coronary artery dilation, smooth muscle relaxation, and diuresis. Long-term studies on caffeine consumption, interesting, refute acute studies that caffeine is harmful to the cardiovascular system and aggravates hypertension (Robertson). Most Green tea extracts, including the extract in Ellagic Insurance Formula, have been decaffeinated.

Studies suggest that 200-400 mg of Green tea polyphenols approximates the amount of catechins found in 8-10 cups of tea daily. Unfortunately, it is difficult for most individuals to consume the 5-10 cups of Green tea daily that research

has shown to be beneficial. One option is to take catechins concentrated in extracted supplement form as provided in Ellagic Insurance Formula. Approximately 200 mg of Green tea catechins in this formula corresponds to the amount of catechins found in 5-8 cups of Green tea.

VITAMIN C

Hundreds of epidemiological studies have pointed to the importance of dietary and supplemental ascorbate in the prevention of various types of cancer including bladder, breast, cervical, colorectal, esophageal, lung, pancreatic, prostate, salivary gland, stomach, leukemia, and non-Hodgkin's lymphoma (Altern Med Rev 3(3):174-186, 1998).

Vitamin C was first recognized in the 18th century as a cure for scurvy in the form of fresh citrus juices. Albert Szent- Gyorgyi first isolated ascorbic acid in the late 1920's as 3- keto-L-gulofurnlactone. By the 1990's Vitamin C has become the most commonly used single supplement in the US. Its use in cancer therapy started with W.J. McCormick, a Canadian physician, who formulated in 1954 the hypothesis that cancer is a collagen disease secondary to a Vitamin C deficiency. While alternative cancer treatments, such as The Gerson therapy, have been incorporating high doses of Vitamin C for years, the use of Vitamin C supplementation in large doses for the prevention and treatment of cancer was not aggressively advanced to the public until 1971 when Linus Pauling, PhD, and Ewan Cameron, MD., presented studies of their use of high-dose Vitamin C for treatment of patients with advanced cancer. Since 1971, considerable attention has been paid to Vitamin C and cancer, particularly in the area of prevention. But until recently, there has been a paucity of human studies using Vitamin C to treat already existing cancer.

The chemopreventive properties of Vitamin C include:

? Vitamin C is a potent antioxidant that scavenges cancer- causing free radicals, neutralizes carcinogenic chemicals such as nitrosamine and nitrites, and regenerates active Vitamin E in lipid membranes.

? Vitamin C stimulates collagen formation necessary for "walling off" of tumors.

? Vitamin C inhibits hyaluronidase which keeps the ground substance around the tumor intact and prevents metastasis.

? Vitamin C is a potent immunostimulant that enhances lymphocyte function and rapidly mobilizes phagocytes, has potent anti-viral and anti-bacterial properties, increases IgA, IgG and IgM antibody levels, stimulates interferon synthesis, and accelerates and promotes wound healing after cancer surgery.

? Vitamin C regulates inflammation by increasing synthesis of prostaglandin PGE1(anti-inflammatory) and inhibiting prostaglandin PGE2 (inflammatory).

? Vitamin C reduces the toxic effect of chemotherapeutic drugs such as

Adriamycin.

VITAMIN A

Vitamin A is a fat-soluble vitamin that occurs in nature either preformed Vitamin A or as provitamin or precursor Vitamin A. Preformed Vitamin A, such as retinol and retinal in eggs, is ready to be used by the body directly from food sources.

The carotenoids and carotenes are forms of provitamin or precursor Vitamin A. Carotenes (including beta-carotene) are a group of fat-soluble pigments found in orange, dark yellow, and dark green vegetables and fruits. Provitamin A can be converted into Vitamin A once ingested.

Researchers have identified over 600 active carotenoids, of which only 30-50 can be converted into Vitamin A. Beta- carotene is readily converted into Vitamin A and has many functions, including some which are independent of Vitamin A. Retinol, retinal and retinoic acid are fat-soluble Vitamin A derivatives vital to eye and retina function, that protect the mucous membranes of the mouth, nose, throat and lungs from damage, and reduce risk of infection and cancer. Low levels correlate with increased lung, larynx, esophagus, mouth, stomach, colon, prostate and cervix cancers.

Increased dietary intake of carotene-containing foods is associated with a lower incidence of certain lung, digestive tract, and other cancers. A study monitoring 8,000 men over a five-year period found that those with the lowest intake of beta-carotene had the greatest risk of getting lung cancer. Another long-term study of 2,000 men demonstrated that smokers with the lowest intake of beta-carotene were several times more likely to develop lung cancer than smokers with the highest intake of beta-carotene. (Hendler).

Because Vitamin A is a fat-soluble vitamin, it may be toxic at high levels. Deficiency of Vitamin A and carotenoids, however, are a much greater concern than taking these nutrients in excess. Extensive medical and pharmaceutical research have done with Vitamin A and carotene-derived substances, as evidenced by thousands of articles in numerous scholarly journals, and numerous diverse health care by products of that research, ranging from acne medication (Retin A) to anti-cancer compounds.

Food sources of Vitamin A include animal and fish liver, eggs, milk and butter. While you can overdose on fat-soluble Vitamin A supplements, large doses of water-soluble beta carotene, found in carrots, broccoli, spinach, cabbage, orange and yellow fruits, are non-toxic and remain an extremely potent source of exogenous antioxidant activity.

Individuals deficient in Vitamin A are more susceptible to infectious diseases and have higher mortality rates. Vitamin A stores are severely depleted during infection. Infectious conditions associated with Vitamin A deficiency include the measles, pneumonia, chicken pox, AIDS, chronic nephritis, and respiratory

syncytial virus.

Vitamin A and its analogues inhibit cancer in numerous ways. They prevent tumor initiation and proliferation, attack and destroy cancer cells, and may actually reverse precancerous lesions. In addition to their anti-cancer properties, the potent anti-inflammatory and antioxidant properties of Vitamin A and carotenoids reduce some of the more toxic effects of radiotherapy and chemotherapy.

Pregnant women should not use high doses of Vitamin A; instead, use beta-carotene. Since Vitamin A is a fat-soluble vitamin stored in the body, toxicity is possible. Beta carotene or plant sources contain precursor Vitamin A, and cannot convert quickly enough to cause a toxic condition. A nonharmful temporary skin yellowing may occur when large amounts of carotene-rich foods, such as carrots or tomatoes are consumed.

Adults who consume an excess of 50,000 I.U. of Vitamin A per day for several years may develop toxicity. Smaller daily doses may result in toxicity if there are malfunctions in storage and transport of Vitamin A, which occurs in liver cirrhosis, hepatitis, inadequate protein consumption, and in children and adolescents. Symptoms of Vitamin A toxicity include dry, fissured skin, brittle nails, cracks in the corners of the mouth and chapped lips, fatigue, nausea, irritability, gingivitis, alopecia, and anorexia.

VITAMIN E

Vitamin E is a potent antioxidant with proven anti-cancer activity that also has proven protective effects against cardiovascular disease. In its natural food state, Vitamin E is actually a family of seven different tocopherols, but the form used for most supplements and medical studies is the alpha- tocopherol form. Vitamin E was originally isolated from wheat germ oil. Its fat-soluble properties allow Vitamin E to function as a potent antioxidant in both the fat-soluble and the water-soluble parts of the cell membrane. Vitamin E helps maintain cell wall integrity and preserve energy metabolism of the cell by inhibiting lipid peroxidation of cell membranes. Vitamin E is also an immune-enhancer and protects against pollution-derived lung damage.

The anticancer activity of Vitamin E is thought to be via its antioxidant action and immune enhancement properties. Vitamin E works synergistically with other potent cellular antioxidants including Selenium, Vitamin C, zinc and others. For example, Vitamin E enhances the cancer preventive effect of Selenium on chemical-induced breast cancer in rats, acts with zinc as a stabilizer of cell membranes, requires Selenium for adequate absorption from the gastrointestinal tract, is destroyed more readily by free radicals in the presence of copper or iron unless adequate Vitamin C is present, and is required to maintain normal levels of Vitamin A in the liver and plasma.

Vitamin E has been shown to be one of the strongest protectors against the

environmental pollutants, ozone and nitric oxide. Nitrites are major sources of free radical damage to cells. Nitrites form with amines in the gut to form carcinogenic compounds. Nitrites, like many chemicals, are not carcinogenic until they are converted to an active form in the body. In some cases Vitamin E can prevent the conversion of inactive forms of such cancer causing substances to active forms.

Vitamin E also prevents the action of tumor promoting and tumor initiating agents which are present in the environment and diet.

Vitamin E influences the effectiveness of many drugs currently used in cancer treatment. In vitro studies show, for example, that Vitamin E acetate in combination with vincristine, 5-fluorouracil,adriamycin, or chlorozotocin produces a synergistic effect, whereas Vitamin E in combination with bleomycin, l-(2-cholrethyl)-3-cyclohexyl-1- triazeno-imidazole-4-carboxamie (DTIC), mutamycin or cis- diamine) dichloro-platinum II (cis-platinum II) produces an additive effect in inhibiting growth of neuroblastoma cells.

In glioma cell cultures, Vitamin E acetate in combination with vincristine or CCNU produces a synergistic effect, whereas Vitamin E in combination with bleomycin, 5-fluorouracil, adriamycin, DTIC, mutamycin and cis-platinum produces an additive effect on the inhibition of growth.

These studies suggest that the effectiveness of the interaction of Vitamin E with cancer chemotherapeutic drugs depends upon tumor form and type of drug. Vitamin E also enhances the effect of some naturally occurring substances such as prostaglandins and sodium butyrate on neuroblastoma cells in vitro. The relevance of the above results in humans is not known at this time.

Vitamin E appears to protect against radiation damage and to also protect against radiation-induced cancers in vitro. Vitamin E protects cells from the toxicity of certain heavy metals, including mercury-induced brain damage. Vitamin E also protects against lung damage generated by cigarette smoke.

Vitamin E appears to protect against various cancers through several actions: Vitamin E kills tumor cells directly, enhances the effect of tumor therapeutic agents (drug, radiation and heat), reduces the toxic effect of tumor cells, and enhances normal immune functions.

Vitamin E's ability to reduce free radicals may slow aging and reduce risk of cancer risk.

SELENIUM

Selenium is an essential micro-nutrient whose best source is seafood given its gradual disappearance from intensively farmed soils. Selenium is toxic in extremely high doses but regarded as safe at normal supplement levels of 50-200 micrograms/day. A potent antioxidant, Selenium is an important co-factor for the

body's natural antioxidant glutathione peroxidase system. Selenium in partnership with Vitamin E protects against cancer and prevents lipid peroxidation. Selenium is an effective detoxifier of heavy metals and boosts immune function against bacterial and viral infections.

The most important recent study on Selenium came from the University of Arizona where researchers were looking at the relationship of Selenium to specific skin cancers in 1,312 volunteers with an average age of 62 and a history of skin cancer. Each participant received either 200 micrograms of yeast-Selenium daily, or a matching placebo.

After the study had been in progress for 10 years, researchers found that, although incidence of non-melanoma skin cancer had not been influenced by the supplement, new cases of life- threatening cancers were 37 percent lower among those taking Selenium with highly significant reductions in the incidence of colorectal and prostate cancer. The probability was less than 1 in 1,000 that this beneficial effect occurred by chance. Possibly more significant, the study found that the total cancer death rate was 50 percent lower in the treated group, with mortality from lung cancer significantly and substantially reduced.

A second lesson from the study was that larger than previously used doses of Selenium, 200 mcg per day in the form of Selenium yeast, were extremely well-tolerated with no side effects or other evidence of toxicity, contrary to earlier reports and concerns that such high doses of Selenium would be toxic. Most Americans get less than 100 micrograms of Selenium a day without supplementation, as the trace mineral occurs naturally in food, but in reduced amounts secondary to gradual depletion from soils.

SUMMARY

We have a health care crisis in America today because we have ignored the lessons of nature. Technology cannot prevent degenerative disease, nor does it restore health or rejuvenate the human body. One approach that is based on sound science and common sense is nutrition. Feed the body and heal the body. Ellagic Insurance Formula is one of many natural and healthy alternatives that is making a difference in the lives of thousands of health conscious consumers who are committed to optimal vitality and longevity. Explore the references and learn about the substantial health benefits of bioflavonoids.

SELECTED REFERENCES

VITAMINS, NUTRITION AND CANCER

Batieha AM, et al. Serum micronutrients and the subsequent risk of cervical cancer in a population-based nested case-control study. Cancer Epidemiol Biomarkers Prev 2(4):335-9, 1993.

Chen et al. Antioxidant status and cancer mortality in China. Int J Epidemiol

21(4):625-35. 1992.

Cohen JH et al. Fruit and vegetable intakes and prostate cancer risk. J Natl Cancer Inst 92(1):61-8, 2000.

Howe GR et al. Dietary factors and risk of breast cancer: combined analysis of 12 case-control studies. J Natl Cancer Inst 82(7):561-9. 1990.

Knekt P et al. Dietary antioxidants and the risk of lung cancer. Am J Epidemiol 134(5):471-9. 1991.

Steinmetz KA et al. Vegetables, fruit, and cancer prevention: a review. J Am Diet Assoc 96(10):1027-39, 1996.

Yong LC et al. Intake of vitamins E, C and A and risk of lung cancer. The NHANES I Epidemiologic Follow-up Study. Am J Epidemiol 1997;146:231-243.

ANTIOXIDANTS AND FREE RADICALS

Block G. A role for antioxidants in reducing cancer risk. Nutrition Reviews 50: 207-213, 1992.

Cerutti P et al. The role of the cellular antioxidant defense in oxidant carcinogenesis. Environmental Health Perspectives 102 (suppl 10): 123- 130, 1994.

Cross CE et al. Oxygen Radicals and Human Disease. Ann Int Med 107: 526-545, 1987.

Ginter E. The role of antioxidants in the prevention of tumors. Bratisl Lek Listy 96:195-209, 1995.

Harman D. Aging: A theory based on free radical and radiation chemistry. Univ. Calif. Rad. Lab. Report No. 3078, July 14, 1955.

Kähkönen MP et al. Antioxidant activity of plant extracts containing phenolic compounds. J Agri Food Chem 47: 3954-3962, 1999.

Mobarhan S. Micronutrient supplementation trials and the reduction of cancer and cerebrovascular incidence and mortality. Nutrition Reviews 52: 102-105, 1994.

FLAVONOIDS

Block G et al. Fruit, vegetables, and cancer prevention: a review of the epidemiological evidence. Nutr Cancer 18: 1-29, 1992.

Bunker V. Free radicals, antioxidants, and aging. Med Lab Sci 49: 299-312, 1992.

Fotsis T et al. Flavonoids, dietary-derived inhibitors of cell proliferation and in vitro angiogenesis. Cancer Research 57: 2916-2921, 1997.

Hirayama T. A large scale cohort study on cancer risks by diet-with special reference to the risk reducing effects of green-yellow vegetable consumption. Diet, Nutrition and Cancer 41-53, 1996.

Newmark HL. Plant phenolic compounds as inhibitors of mutagenesis and carcinogenesis. In: Huang MT, Ho CT, Lee CY, Editors. Phenolic compounds in food and their effects on health II. Antioxidants and cancer prevention. ACS Symposium Series, American Chemical Society 507: 48- 52, 1992.

Stoner GD et al. Polyphenols as cancer chemopreventative agents. J Cell Biochem Suppl 22:169-180, 1995.

RESVERATROL

Bertelli AA et al. Resveratrol, a natural stilbene in grapes and wine, enhances intraphagocytosis in human promonocytes: a co-factor in anti- inflammatory and anti-cancer chemopreventive activity. Int J Tissue React 21(4):93-104, 1999.

Damianaki A et al. Potent inhibitory action of red wine polyphenols on human breast cancer cells. J Cell Biochem 78(3):429-41, 2000.

Frankel EN et al. Inhibition of human LDL oxidation by resveratrol. Lancet 341: 1103-1104, 1993.

Jang M et al. Cancer chemopreventive activity of resveratrol, a natural product derived from grapes. Science 275:218–20, 1997.

Jang M et al. Cancer chemopreventive activity of resveratrol. Drugs Exp Clin Res 25(2-3):65-77, 1999.

Schneider Y et al. Anti-proliferative effect of resveratrol, a natural component of grapes and wine, on human colonic cancer cells. Cancer lett 158(1): 85-911, 2000.

Soleas G et al. Resveratrol, a red wine constituent, has anticarcinogenic properties. Clin Biochem 33(3):240, 2000.

Tessitore L et al. Resveratrol depresses the growth of colorectal aberrant crypt foci by affecting bax and p21(CIP) expression. Carcinogenesis 21(8):1619-22, 2000.

ELLAGIC ACIDS/RED RASPBERRIES

Ahn D et al. The effects of dietary ellagic acid on rat hepatic and esophageal mucosal cytochromes P450 and phase II enzymes. Carcinogenesis 17:821-828, 1996.

Ayrton AD et al. Antimutagenicity of ellagic acid towards the food mutagen IQ: investigation into possible mechanisms of action. Food Chem Toxicol 30(4):289-95, 1992.

Barch DH et al. Ellagic Acid Induces NAD(P)H:Quinone Reductase Through

Activation of the Antioxidant Regulatory Element of the Rat NAD(P)H:Quinone Reductase Gene. Carcinogenesis 15:2065-2068, 1994.

Bhargava UC et al. The mechanism of blood pressure depression by ellagic acid. Proc Soc Exp Biol Med 132(2):754-6, 1969.

Castonguay A et al. Antitumorigenic and antipromoting activities of ellagic acid, ellagitannins and oligomeric anthocyanin and procyanidin. Int J Oncology 10, 367-373, 1997.

Constantinou A et al. The dietary anticancer agent ellagic acid is a potent inhibitor of DNA topoisomerases in vitro. Nutr Cancer 23(2):121-30, 1995.

Daniel EM et al. The effects of ellagic acid and 13-cis-retinoic acid on N-nitrosobenzylmethylamine-induced esophagal tumorigenesis in rats. Cancer Lett 56:117-124, 1991.

Lesca P. Protective effects of ellagic acid and other plant phenols on benzo(a)pyrene-induced neoplasia in mice. Carcinogenesis 4:1651-1653, 1983.

Muktar H et al. Ellagic acid: A potent naturally occurring inhibitor of benzo[a]pyrene metabolism and its subsequent glucuronidation, sulfation and covalent binding to DNA in cultured BALA/c mouse keratinocytes. Carcinogenesis 5: 1565-1571, 1984. Nixon DW. Alternative and complementary therapies in oncology care. J Clin Oncol 17(11 Suppl):35-7, 1999. Nixon DW. Prostate cancer and nutrition. JSC Med Assoc 96(2): 85-6, 2000. Nixon DW. Preventive medicine in the year 2000. Prev Med 30(1): 1-2, 2000.)

Perchellet JP et al. Antitumor-promoting activities of tannic acid, ellagic acid, and several gallic acid derivatives in mouse skin. Basic Life Sci 59:783-801, 1992.

Rao CV et al. Chemoprevention of colon carcinogenesis by dietary administration of Piroxicam, Difluoromethylornithine, 16beta-Fluoro-5-androsten-17-one, and Ellagic Acid individually and in combination. Cancer Research 51: 4528-4534, 1991.

Rommel A et al. Red raspberry phenolic. Influences of processing, variety and environmental factors. In: Ho C-T, Lee CY, Huan M-T Eds. Phenolic Compounds in Food and Their Effects on Health I. Analysis, Occurrence & Chemistry. Washington DC. American Chemical Society. 259-286, 1992.

Rossi M et al. The crystal and molecular structure of ellagic acid dihydrate: a dietary anti-cancer agent. Carcinogenesis 12:2227-32, 1991.

Singletary K et al. Ellagic acid effects on the carcinogenicity, DNA-binding and metabolism of 7,12-dimethylbenz[a}anthracene (DMBA). In Vivo 3: 173-176, 1989.

Smart RC et al. Effect of ellagic acid and 3-O-decylellagic acid on the formation of benzo[a]pyrene-derived DNA adducts in vivo and on the tumorigenicity of 3-methylcholanthrene in mice. Carcinogenesis 7(10):1669-75, 1986.

Tanaka T et al. Inhibitory effect of ellagic acid on N-2-fluoenylacetamide- induced liver carcinogenesis in male AC1/N rats. Jpn J Cancer Res (Gann) 79:1297-1303, 1988.

Tanaka T et al. Inhibition of 4-nitroquinoline-1-oxide-induced rat tongue carcinogenesis by the naturally occurring plant phenolics caffeic, ellagic, chlorogenic and ferulic acids. Carcinogenesis x14(7):1321-5, 1993.

Teel RW. Ellagic acid binding to DNA as a possible mechanism for its antimutagenic and anticarcinogenic action. Cancer Lett 30(3):329-36, 1986.

OPC

Amsellem M et al. Endotelon in the treatment of venolymphatic problems in premenstrual syndrome. Multicentered study on 165 patients. Tempo Medical 282: Nov 1987.

Bagchi D et al. Oxygen free radical scavenging abilities of vitamins C and E, and a grape seed extract proanthocyanidin extract in vitro. Molecular Pathology and Pharmacology 95: 179-189, 1997.

Baruch J. Effet de 'Endotelon dans les oedemes post-chirurgicaux. Resultats d'une etude en double aveugle contre placebo sur trente-dewx patientes. Ann Chir Plast Estbet 29: 4, 1984.

Chen G et al. Ability of m-chloroperoxybenzoic acid to induce the ornithine decarboxylase marker of skin tumor promotion and inhibition of this response by gallotannins, oligomeric proanthocyanidins, and their monomeric units in mouse epidermis in vivo. Anticancer Res 15(4): 1183- 1189, 1995.

Constantini A et al. Clinical and capillaroscopic evaluation of chronic uncomplicated venous insufficiency with procyanidins extracted from vitis vinifera. Minerva Cardioangiol 47(1-2): 39-46, 1999.

Fitzpatrick DF et al. Endothelium-dependent vascular effects of Pycnogenol. J Cardiovasc Pharmacol 32(4): 509-515, 1998.

Froantin M. Les oligomeres procyanidoliques dans le traitement de la fragilite capillaire et de la retinopathie chez les diabetiques. A propos de 26 cas. Med Int 16(11): 432-434, 1981.

Groult N et al. Study of the effect of procyanidole oligomers on cultured mesenchymatous cells. Size and shape of cells and nuclei. Quantitative morphological study. Path Biol 39(4): 277-282, 1991.

Hagerman AE et al. The specificity of proanthocyanidin-protein interactions. J Biol Chem 256(9): 4494-4497.

Henreit JP. Veno-lymphatic insufficiency. 4,729 patients undergoing hormonal and procyanidole oligomer therapy. Phlebologie 46: 313-325, 1993.

Huynh HT et al. Effects of intragastrically administered Pycnogenol on NNK metabolism in F344 rats. Anticancer Res 19: 2095-2099, 1999.

Huynh HT et al. Effects of pycnogenol on the microsomal metabolism of the tobacco-specific nitrosamine NNK as a function of age. Cancer Lett 132(1-2): 135-139, 1998.

Jonadet M et al. Anthocyanosides extracted from Vitis vinifera, Vaccinium myrtillus and Pinus maritimus. I. Elastase-inhibiting activities in vitro. II. Compared angioprotective activities in vivo. J Pharm Belg 38(1): 41-46, 1983.

Lagrue G et al. A study of the effects of procyanidole oligomers on capillary resistance in hypertension and in certain nephropathies. Sem Hop Paris 57: 1399-1401, 1981.

Liviero L et al. Antimutagenic activity of procyanidins from Vitis vinifera. Fitother 65: 203-209, 1994. Maffei Facino R et al. Free radical scavenging action and anti-enzyme activities of procyanidins from Vitis vinifera. A mechanism for capillary- protective action. Drug Res 44: 592-601, 1994.

Mangiapane H et al. The inhibition of the oxidation of low density lipoprotein by (+)-catechin, a naturally occurring flavonoid. Biochemical Pharmacology 43(3): 445-450, 1992.

Masquelier J et al. Stabilization of collagen by procyanidolic oligomers. Acta Therap. 7: 101-105, 1981.

Meunier MT et al. Free radical scavenger activity of procyanidolic oligomers and anthocyanosides with respect to superoxide anion and lipid peroxidation. Plant Med Phytother 23(4): 267-274, 1989.

Nelson AB et al. Pycnogenol inhibits macrophage oxidative burst, lipoprotein oxidation and hydroxyl radical induced DNA damage. Drug Develop Ind Med 24: 1-6, 1998.

Nuttall SL et al. An evaluation of the antioxidant activity of a standardized grape seed extract, Leucoselect. J Clin Pharm Ther 23(5): 385-389, 1998.

Packer L et al. Antioxidant activity and biological properties of a procyanidin-rich extract from pine (Pinus maritima) bark, pycnogenol. Free Rad Biol Med 27(5-6): 704-724, 1999.

Parienti JJ et al. Post-traumatic edema in athletes: controlled study of Endotelon. Gaz. Med. de France 90(3): 1, 1983.

Plumb GW et al. Antioxidant properties of catechins and proanthocyanidins: effect of polymerisatin, galloylation and glycosylation. Free Radic Res 29(4): 351-358, 1998.

Putter M et al. Inhibition of smoking-induced platelet aggregation by aspirin and

pycnogenol. Thromb Res 15(4): 155-156, 1999.

Rao AV and MT Yatcilla. Bio-absorption and in vivo antioxidant properties of BioVin® polyphenols: A human intervention study. Submitted to J of Medicinal Plants, July 2, 1999.

Ray SD et al. A novel proanthocyanidin IH636 grape seed extract increases in vivo Bcl-X1 expression and prevents acetaminophen-induced programmed and unprogrammed cell death in mouse liver. Arch Biochem Biophys 369(1): 42-58, 1999.

Rong Y et al. Pycnogenol protects vascular endothelial cells from t-butyl hydroperoxide induced oxidant injury. Biotechnol Ther 5(3-4): 117-126, 1994.

Saito M et al. Anti-ulcer activity of grape seed extract and procyanidins. J Agric Food Chem 46: 1460-1464, 1998.

Tixier JM et al. Evidence by in vivo and in vitro studies that binding of pycnogenols to elastin affects its rate of degradation by elastases. Biochem Pharmacol 33(24): 3933-3939, 1984.

Virgili F et al. Procyanidins extracted from Pinus maritima (Pycnogenol): scavengers of free radical species and modulators of nitrogen monoxide metabolism in activated murine RAW 264.7 macrophages. Free Radic Biol Med 24: 1120-1129, 1998.

Ye X et al. The cytotoxic effects of a novel IH 636 grape seed proanthocyanidin extract on cultured human cancer cells. Mol Cell Biochem 196(1-2): 99-108, 1999.

GREEN TEA

Ahmad N et al. Green tea polyphenols and cancer: biologic mechanisms and practical implications. Nutr Rev 57(3): 78-83, 1999.

Brown MD. Green tea (Camellia sinensis) extract and its possible role in the prevention of cancer. Altern Med Rev 4(5): 360-370, 1999.

Bushman JL. Green tea and cancer in humans: a review of the literature. Nutr Cancer 31(3): 151-159, 1998.

Chen et al. Green tea epigallocatechin gallate shows a pronounced growth inhibitory effect on cancerous cells but not on their normal counterparts. Cancer Letters 129: 173-179, 1998.

Dulloo AG et al. Efficacy of a green tea extract rich in catechin polyphenols and caffeine in increasing 24-h expenditure and fat oxidation in humans. Am J Clin Nutr 70: 1040- 1045, 1999.

Gupta S et al. Prostate cancer chemoprevention by green tea. Semin Urol Oncol 17(2): 70-76, 1999.

Imai K et al. Cancer-preventive effects of drinking green tea among a Japanese population. Prev Med 26(6):769-75, 1997.

Ji HT et al. Green tea consumption and the risk of pancreatic and colorectal cancer. Int J Can 7; 255-258, 1997.

Kono S et al. Relation of green tea consumption to serum lipids and lipoproteins in Japanese men. J Epidemiol 6(3):128-33, 1996. Lin JK et al Cancer chemoprevention by tea polyphenols. Proc Natl Sci Counc Repub China B 24(1):1-13, 2000.

Mukhtar H et al. Tea polyphenols: prevention of cancer and optimizing health. Am J Clin Nutr 71(6 Suppl):1698S-702S, 2000.

Nakayama M et al. Inhibition of the infectivity of influenza virus by tea polyphenols. Antiviral Res 21: 289-299, 1993.

Picard D. The biochemistry of green tea polyphenols and their potential application in human skin cancer. Alt Med Rev 1: 31-42, 1996.

Sasazuki S et al. Relation between green tea consumption and the severity of coronary atherosclerosis among Japanese men and women. Ann Epidemiol 10(6):401-8, 2000.

Stich HF. Teas and tea components as inhibitors of carcinogen formation in model systems and man. Prevent Med 21: 377-384, 1992.

Yang CS et al. Tea and tea polyphenols inhibit cell hyperproliferation, lung tumorigenesis, and tumor progression. Exp Lung Res 24(4):629-39, 1998.

Weisburger JH. Mechanisms of action of antioxidants as exemplified in vegetables, tomatoes, and tea. Food Chem Toxicol 37(9-10): 943-948, 1999.

Weisburger JH. Tea and health: the underlying mechanisms. Proc Soc Exp Biol Med 2200(4): 271-275, 1999.

VITAMIN C

Block G. Epidemiologic evidence regarding vitamin C and cancer. Am J Clin Nutr 54(6 S):1310S-1314S, 1991.

Cameron E et al. Ascorbic acid and cancer: a review. Cancer Res 39:663- 681, 1979.

Cameron E et al. Supplemental ascorbate in the supportive treatment of cancer: Reevaluation of prolongation of survival times in terminal human cancer. Proc Natl Acad Sci 75:4538-4542, 1978.

Head KA. Ascorbic acid in the prevention and treatment of cancer. Altern Med Rev 3(3):174-86, 1998.

VITAMIN A

Buring JE et al. beta-carotene and cancer chemoprevention. J Cell Biochem Suppl 22:226-30, 1995.

Dorgan JF et al. Relationships of serum carotenoids, retinol, alpha- tocopherol, and selenium with breast cancer risk: results from a prospective study in Columbia, Missouri. Cancer Causes Control 9(1):89-97, 1998.

Niles RM. Vitamin A and cancer. Nutrition 16(7-8):573-6, 2000.

Norrish AE, et al. Prostate cancer and dietary carotenoids. Am J Epidemiol 151(2):119-23, 2000.

Albanes D et al. Effects of supplemental alpha-tocopherol and beta-carotene on colorectal cancer: results from a controlled trial. Cancer Causes Control 11(3):197-205, 2000.

VITAMIN E

Battisti C et al. Vitamin E serum levels and gastric cancer: results from a cohort of patients in Tuscany, Italy. Cancer Lett 151(1):15-8, 2000.

Bostick RM et al. Reduced risk of colon cancer with high intake of vitamin E: the Iowa women's health study. Cancer Res 53:4230-4237, 1993.

Gunawardena K et al. Vitamin E and other antioxidants inhibit human prostate cancer cells through apoptosis. Prostate 44(4):287-95, 2000.

Horvath PM et al. Synergistic effect of vitamin E and selenium in the chemoprevention of mammary carcinogenesis in rats. Cancer Res 43:5335- 5341, 1983.

Knekt P et al. Serum vitamin E, serum selenium, and the risk of gastrointestinal cancer. Int J Cancer 42:846-850, 1988.

Meydani SN et al. Vitamin E supplementation enhances cell-mediated immunity in healthy elderly subjects. Am J Clin Nutr 52:557-563, 1990.

Wald NJ et al. Serum vitamin E and subsequent risk of cancer. Br J Cancer 56:69-72, 1987.

SELENIUM

Alaejos MS et al. Selenium and cancer: some nutritional aspects. Nutrition 16(5):376-83, 2000.

Backovic D et al. Environmental factors, health-related habits, and serum selenium levels in cancer patients and healthy controls. Biological Trace Element Research 67(2): 55-62, 1999.

Clark LC et al. Effects of selenium supplementation for cancer prevention in patients with carcinoma of the skin. A randomized controlled trial. Nutritional Prevention of Cancer Study Group. JAMA 276(24):1957-63, 1996.

Clark LC et al. Decreased incidence of prostate cancer with selenium supplementation: results of a double-blind cancer prevention trial. Br J Urol 81(5):730-4, 1998.

Clark LC et al. Plasma selenium concentration predicts the prevalence of colorectal adenomatous polyps. Cancer Epidemiol Biomarkers Prev 2(1):41-6, 1993.

Combs GF Jr et al. Reduction of cancer mortality and incidence by selenium supplementation. Med Klin 92 Suppl 3:42-5, 1997.

Ip C. Lessons from basic research in selenium and cancer prevention. J Nutr 128(11):1845-54, 1998.

Rayman MP. The importance of selenium to human health. Lancet 356(9225):233-41, 2000.

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