

A Scientific White Paper

*Research on the Importance of a Phytochemical and Antioxidant Fruits & Vegetable
"Red Berry Drink" for Achieving Increased Energy and Vitality*

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The Standard American Diet (S.A.D.) vs. “Super Foods”

As we have become more aware of the amazing and broad spectrum of health, anti-aging, and disease preventing benefits of foods especially high in this “new” array of such micronutrients, a new name for them has arisen, the “Super Foods”.

The “S.A.D.” fact remains, in spite of all the support from mainstream medicine organizations like the American Heart Association and American Diabetes Association, and governmental health organizations like the National Institutes of Health, the National Institute on Aging, the USDA, and even the U.S. Surgeon General, few of us eat the recommended minimum of five fruits and vegetables daily. Even counting the “pale” plant foods like French fries, green-gassed bananas and iceberg lettuce, few achieve the daily minimum. Only a small percentage of people enjoy the optimal nine servings that emphasize fresh and organic phytochemical-dense deep green and brightly colored fruits and vegetables!

The reasons for this lack are many and varied, and deeply ingrained in our American culture and lifestyle, though it can no longer be accounted to ignorance. What is obviously needed is an educational initiative, *as well as new ways* for people to enjoy the benefits of fruits and vegetables. This paper is an introduction, and for some, a review of the power and importance of many of the readily available “super foods” available to each of us today. Our S.A.D. choices in food must change. Education and the new advances in food technologies are the keys.

Why Fruits and Vegetables?

Most of us have heard that diets high in fruits and vegetables can help us lose weight, reduce our risk of heart disease, cancer, diabetes, high blood pressure, cataracts, macular degeneration, osteoporosis, arthritis and even wrinkles. As a matter of fact, according to the National Cancer Institute, 8 to 10 servings a day can cut our risk of some cancers in half!

In 1998, the University of Naples in Italy studied an elderly population and found that those who lived the longest and were the healthiest ate a lot more fruits and vegetables than those who died before their time. Therefore, it comes as no surprise that the USDA Food Guide Pyramid advocates eating 5 to 9 servings of fruits and vegetables per day for optimum health!

FACTOID:
In 1998, the University of Naples, Italy studied 70 to 100 year-olds and found that those who lived the longest and were the healthiest ate a lot more fruit and vegetables.

Food science has just recently come to realize that there is much more to micronutrient nutrition than just vitamins and minerals. Indeed, there may be well over 1,000 different plant chemicals, known as phytochemicals, that may have metabolic activity in humans! These include classes such as the alkaloids, carotenoids, coumarins, flavonoids, isothiocyanates, polyphenols, and polysaccharides, just to name a few! Some serve as antioxidants fighting free radicals, some assist the liver in detoxification, others modulate the immune system and hormone metabolism.

Further study has shown that the fruits and vegetables that come in rich vibrant colors, like tomatoes, carrots, spinach, broccoli, blueberries and raspberries, are much more potent and beneficial than the pastel colored produce like iceberg lettuce, bananas, celery, corn and potatoes. Furthermore, certain foods may contain greater quantities of antioxidants, fibers, probiotics, and even specific medicinal substances, the latter being especially true of many edible herbs and spices.

ORAC Intake, Health Outcomes and the Common Diseases of Aging

“If these findings are borne out in further research, young and middle-aged people may be able to reduce risk of diseases of aging—including senility—simply by adding high-ORAC foods to their diets,” Floyd P. Horn, administrator, Agricultural Research Service’s Human Nutrition Research Center on Aging at Tufts University in Boston.

ORAC, short for **Oxygen Radical Absorbance Capacity**, is a test tube analysis that measures the total antioxidant power of foods and other chemical substances. **Antioxidant power** is the ability to neutralize oxygen free radicals. *Therefore ORAC testing is a way to measure how many oxygen radicals a specific food can absorb. The more oxygen radicals a food can absorb, the higher its ORAC score.*

Foods that score high in ORAC testing may protect cells and their components from oxidative damage. So suggests the latest studies of animals and human blood at the Agricultural Research Service’s Human Nutrition Research Center on Aging at Tufts University in Boston. (ARS is the chief scientific agency of the U.S. Department of Agriculture.) In other words *the higher a food’s ORAC score, the better it is at helping our bodies fight diseases like cancer and heart disease.*

FACTOID:

“Men and women whose diets are high in fruits and vegetables were shown to have lower rates of angina, arthritis, asthma, bronchitis, cirrhosis, gallstones, heart attack, kidney stones and peptic ulcers.”

Epidemiology, march 1998, Vol. 9, No 2, p 208.

Oxygen radicals are chemicals that are naturally formed inside our bodies by the process of **oxidation**. They are normal byproducts of everyday functions like digestion and physical activity. We are also exposed daily to polluted air, ingest oxidized or partially rancid foods, and oxidizing radiations from the sun and various electrical appliances which all add additional oxygen radicals to our systems.

Free radicals destroy our health in many ways. A good illustration of the harmful effects of oxidation is rusting. When metal rusts it becomes weak and flaky, it starts to degenerate or decay until it no longer performs its functions well. Eventually the metal “fatigues” and “fails”. **THIS EXACT SAME PROCESS HAPPENS IN OUR BODY!** Just like in rusting, the cells, organs, and other parts of our body can be made weak by oxidation. This can lead to diseases like cancer, heart disease, cataracts and macular degeneration, osteoarthritis, chronic obstructive pulmonary disease (COPD), senile dementia and other neurodegenerative diseases, and perhaps even skin aging and wrinkling!

The **Free Radical Theory of Aging** is the thesis that oxidative damage culminates in many of the above maladies of aging is now well accepted in the health community. Therefore, *if our bodies can quench these oxygen radicals before they do damage, then they won’t hurt us.* Chemicals that neutralize oxidation from free radicals are called **antioxidants**. The antioxidant evidence has spurred skyrocketing sales of antioxidant vitamins. *But several large trials have had mixed results on vitamin pills as far as achieving the desired benefits.* This may be because there are hundreds, *maybe even thousands,* of antioxidant **phytonutrients** (plant chemical nutrients) in natural plant foods and herbs that play a major role in health and wellness. Some of these phytonutrients we have identified, many more as yet remain to be identified. *What we do know is that most of these powerfully beneficial plant compounds are not found in vitamin pills.* Therefore, it is not surprising that science has found *those who eat 8-10 servings of fruits and vegetables a day suffer from a much lower incidence of the common chronic degenerative diseases of aging as compared to those who eat only 2 or 3 servings a day.*

By the year 2050, nearly one-third of the U.S. population is expected to be over age 65. If further research supports these early findings, *millions of aging people may be able to guard against many of the worst and most common diseases simply by adding high-ORAC foods to their diets!* This could save much suffering, as well as reduce the staggering cost of treating and caring for the elderly.

Dr. Guohua Cao, a physician and chemist, developed the ORAC test while he was a visiting scientist at the National Institute on Aging in Baltimore, Maryland. According to Dr. Cao, “The ORAC value covers all the antioxidants in foods... You cannot easily measure each antioxidant separately, but you can use the ORAC assay to identify which phytonutrients are the important antioxidants. *It may be that combinations of nutrients found in foods have greater protective effects than each nutrient taken alone.*”

New, natural plant chemicals are being discovered every day. We don't know as yet which ones, in what amounts, best fight cancer and other diseases. But we do know that, as our knowledge is so limited, it is best to get these plant chemicals from plant foods, not just supplements, to fully enjoy the disease-fighting benefits.

One of the things science has proven is that *dark greens and brightly colored plant foods are the ones with the highest ORAC scores* such as spinach, broccoli, blueberries, wild tart cherries, raspberries, elderberries, prunes, tomatoes, carrots and the like.

It is important to understand that the ORAC values of fruits and vegetables cover a broad range. Dr. Cao instructs us that, “you can pick seven with low values and get only about 1,300 ORAC units. Or, you can eat seven with high values and reach 6,000 ORAC units or more. One cup of blueberries alone supplies 3,200 ORAC units.” Generally the minimum recommended “5-a-day” vegetables and fruits program is considered to be supplying about 1750 ORAC units daily.

In the studies, eating plenty of *high-ORAC foods raised the antioxidant power of human blood 10 to 25 percent.* Based on the evidence so far, some experts suggest that *daily intake be increased to approximately 5,000 ORAC units to have a significant impact on plasma and tissue antioxidant capacity.*

FACTOID:

Super rich in the anthocyanin bioflavinoid group of phytonutrients, these elements are found abundantly in berries, and some of the richest sources are grape seed extract. These are powerful antioxidants that are significantly more active than Vitamins C and E. Grape seed extracts inhibit the initiation and promotion of tumors, and cause pre-cancerous cells to return to normal, according to the Journal of Clinical Oncology.

Fruits: Nature's Dessert – What a Delight to Eat!

As a recent *Newsweek* article said “*The day when doctors say—'Take 10 cherries and call me in the morning'—may not be far off.*”

Most known phytonutrients are strongly related to pigment. Just as phytonutrient antioxidant *carotenoids* tend to dominate in the dark green greens and bright red and orange vegetables, the richly red/blue pigmented *flavonoids*, with names like *isoflavones, anthocyanins, flavinols, catechins and phenols*, tend to be dominant in the fruits and herbs.

And the richest source of pigment and antioxidants in the fruit group are generally found in the **blueberries, raspberries, blackberries, strawberries, red currants, elderberries, bilberries, tart dark cherries, and deep purple plums/prunes.** Indeed, these fruits are the most potent source of anti-aging

antioxidants of any commonly eaten foods!

Antioxidants have been shown to increase immune function and decrease the risk of infection and cancer. Antioxidants help by preventing or repairing damage done to the body's cells by free radicals. Simply put, a free radical is a molecule with a free electron. Electrons like to be in pairs. An antioxidant, such as vitamin C, vitamin E or *beta-carotene*, may donate one of its electrons to the free radical. If no antioxidants are present, a free radical takes an electron from vital cell structures, damaging the cell and eventually leading to disease.

Just like Pac-Men, the *flavonoid antioxidants* in berries, cherries and plums "eat up" free radicals in the bloodstream helping prevent the development of cancer. These flavonoids have even been called, "*Mother Nature's all-natural chemotherapy agents*".

Fruit *phytonutrient flavonoids* also play a role in preventing the development of heart disease by discouraging fatty deposits in the arteries. *Flavonoids* even slow wrinkling, protect the eyes from cataracts and macular degeneration, and protect the aging brain. Indeed, they are a main reason why fruits and vegetables have been called "*Natures Anti-Aging Wonders!*"

Is it any wonder then that most scientists believe it is far better to get a daily healthy dose of dozens of different *phytonutrients* from micro-nutrient dense "super foods" than it is to take a mega dose of a few *synthetic* antioxidant vitamins and minerals?

For example, the 17 identified compounds in tart cherries that have antioxidant properties are considered, in total, to be superior to the activity of vitamins E and C. In addition, they contain compounds that help relieve the pain of arthritis, gout and even headaches with daily consumption!

Blueberries are by far the greatest common whole food source of eye/vision and brain/ mind protecting antioxidant *flavonoids*, being full of blue *anthocyanins*.

Cranberries, raspberries and tart cherries are the richest fruit source of *ellagic acid*, a naturally occurring plant *phenolic flavonoid phytonutrient* that is known as a potent anti-carcinogenic compound. Clinical tests conducted at the *Hollings Cancer Institute at the Medical University of South Carolina (MUSC)* show that *ellagic acid* may be the most potent way to prevent cancer! In addition, you should know that all the berries, not just cranberries, help prevent recurrent urinary tract-bladder infections (UTI's).

Protection against Macular Degeneration

Your mother may have told you carrots would keep your eyes bright as a child, but as an adult, it looks like fruit is even more important for keeping your sight. Data reported in a study published in the June 2004 issue of the *Archives of Ophthalmology* (which involved 77,562 women and 40,866 men) indicates that eating 3 or more servings of fruit per day may lower your risk of age-related macular degeneration (ARMD), the primary cause of vision loss in older adults, by 36%, compared to persons who consume less than 1.5 servings of fruit daily.

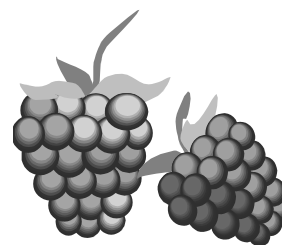
FACTOID:

Studies conducted at the Hollings Cancer Institute found that cranberries, raspberries and tart cherries are the richest fruit source of ellagic acid, a naturally occurring plant phenolic flavonoid phytonutrient. This chemical is a potent anti-carcinogenic and may be the most potent way to prevent cancer!

Raspberry

Fragrantly sweet with a subtly tart overtone and almost melt in your mouth texture, raspberries are wonderfully delicious and are usually in limited supply. Most cultivated varieties of raspberries are grown in California from June through October.

A member of the rose family and a bramble fruit like the blackberry, raspberries are delicately structured with a hollow core. Raspberries are known as “aggregate fruits” since they are a compendium of smaller seed-containing fruits, called drupelets, that are arranged around a hollow central cavity.



Preventing unwanted damage to cell membranes - As an antioxidant food containing *ellagic acid*, raspberry helps prevent unwanted damage to cell membranes and other structures in the body by neutralizing overly reactive oxygen-containing molecules called free radicals. *Ellagic acid* is not the only well-researched phytonutrient component of raspberry, however. Raspberry's flavonoid content is also well documented. Here the key substances are *quercetin*, *kaempferol*, and the cyanidin-based molecules called *cyanidin-3-glucosylrutinoside* and *cyanidin-3-rutinoside*. These flavonoid molecules are also classified as *anthocyanins*, and they belong to the group of substances that give raspberries their rich red color. Raspberries' anthocyanins also give these delectable berries unique antioxidant properties, as well as some antimicrobial ones, including the ability to prevent overgrowth of certain bacteria and fungi in the body (for example, the yeast *Candida albicans*, which is a frequent culprit in vaginal infections and can be a contributing cause in irritable bowel syndrome).

FACTOID:

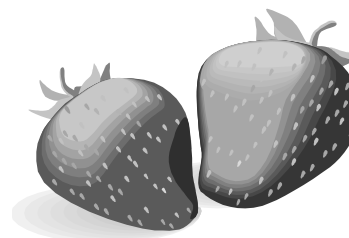
As an antioxidant food containing ellagic acid, raspberry helps prevent unwanted damage to cell membranes and other structures in the body by neutralizing overly reactive oxygen-containing molecules called free radicals.

Traditional nutrients - In addition to their unique phytonutrient content, raspberries are filled with traditional nutrients, primarily in the antioxidant and B vitamin categories. Raspberries emerged from our nutrient ranking system as an excellent source of manganese and vitamin C - two critical antioxidant nutrients that help protect the body's tissue from oxygen-related damage. They also qualified as a good source of riboflavin, folate, niacin, magnesium, potassium and copper. Coupled with this strong B vitamin and mineral content, raspberries qualified as "excellent" in terms of dietary fiber. This combination of nutrients makes raspberries a great fruit choice for having minimal impact on blood sugars.

Strawberry

Strawberries, like other berries, are famous in the phytonutrient world as a rich source of *phenols*. In the strawberry, these phenols are led by the *anthocyanins* (especially *anthocyanin 2*) and by the *ellagitannins*. The *anthocyanins* in strawberry not only provide its flush red color, they also serve as potent antioxidants that have repeatedly been shown to help protect cell structures in the body and to prevent oxygen damage in all of the body's organ systems. Strawberries' unique *phenol* content makes them a heart-protective fruit, an anti-cancer fruit, and an

anti-inflammatory fruit, all rolled into one. The anti-inflammatory properties of strawberry include the ability of *phenols* in this fruit to lessen activity of the enzyme *cyclo-oxygenase*, or COX. Non-steroidal anti-inflammatory drugs like aspirin or ibuprofen block pain by blocking this enzyme, whose overactivity



has been shown to contribute to unwanted inflammation, such as that which is involved in rheumatoid and osteoarthritis, asthma, atherosclerosis, and cancer. Unlike drugs that are COX-inhibitors, however, strawberries do not cause intestinal bleeding.

Significant inhibitor of cancer cell proliferation - A study published in the *Journal of Agriculture and Food Chemistry* analyzed eight strawberry cultivars for their content of protective plant compounds (phenols, flavonoids and anthocyanins) and their antioxidant capacities. Although the various cultivars differed significantly in the amounts of the various beneficial compounds each contained, all cultivars were able to significantly inhibit the proliferation of human liver cancer cells. Interestingly, no relationship was found between a cultivar's antioxidant content and its ability to inhibit cancer cell proliferation, which suggests that this beneficial effect of strawberries is caused by other actions of their many beneficial compounds. (January 2, 2004) Meyers KJ, Watkins CB, Pritts MP, Liu RH. Antioxidant and antiproliferative activities of strawberries. *J Agric Food Chem.* 2003 Nov 5;51(23):6887-92.

In animal studies, researchers have found that strawberries help protect the brain from oxidative stress and may reduce the effects of age-related declines in brain function. Researchers found that feeding aging rats strawberry-rich diets significantly improved both their learning capacity and motor skills. Joseph JA, Shukitt-Hale B, Denisova NA, et al. Reversals of age-related declines in neuronal signal transduction, cognitive, and motor behavioral deficits with blueberry, spinach, or strawberry dietary supplementation. *J Neurosci* 1999 Sep 15;19(18):8114-21.

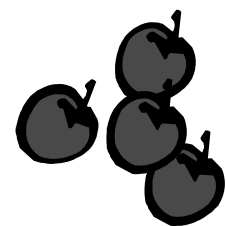
Excellent source of vitamins and fiber - In terms of traditional nutrients, strawberries emerged from our food ranking system as an excellent source of vitamin C, vitamin K and manganese. They also qualified as a very good source of dietary fiber and iodine as well as a good source of potassium, folate, riboflavin, vitamin B5, omega-3 fatty acids, vitamin B6, magnesium, and copper.

FACTOID:
Strawberries' unique phenol content makes them a heart-protective fruit, an anti-cancer fruit, and an anti-inflammatory fruit, all rolled into one.

One July 2004 study indicates that vitamin C-rich foods, such as strawberries, provide humans with protection against inflammatory polyarthritis, a form of rheumatoid arthritis involving two or more joints. The findings, presented in the *Annals of the Rheumatic Diseases* were drawn from a study of more than 20,000 subjects who kept diet diaries and were arthritis-free when the study began, and focused on 73 subjects who developed inflammatory polyarthritis and 146 similar subjects who remained arthritis-free during follow-up between 1993 and 2001. Subjects who consumed the lowest amounts of vitamin C-rich foods were more than three times more likely to develop arthritis than those who consumed the highest amounts. Pattison DJ, Silman AJ, Goodson NJ, Lunt M, Bunn D, Luben R, Welch A, Bingham S, Khaw KT, Day N, Symmons DP. Vitamin C and the risk of developing inflammatory polyarthritis: prospective nested case-control study. *Ann Rheum Dis.* 2004 Jul;63(7):843-7.

Cranberry

Cranberries have long been valued for their ability to help prevent and treat urinary tract infections. Now, recent studies suggest that this native American berry may also promote gastrointestinal and oral health, prevent the formation of kidney stones, lower LDL and raise HDL (good) cholesterol, aid in recovery from stroke, and even help prevent cancer.



Protection against Urinary Tract Infection - Cranberries have been valued for their ability to reduce the risk of urinary tract infections for hundreds of years. In 1994, a placebo-controlled study of 153 elderly women was published in the Journal of the American Medical Association that gave scientific credibility to claims of cranberries effectiveness in preventing urinary tract infection. In this study, the women given cranberry juice had less than half the number of urinary infections as the control group (only 42% as many, to be precise), who received a placebo imitation “cranberry” drink. The daily dose of cranberry juice in this initial study was just 300 milliliters (about one and one-quarter cups). Since then, a number of other studies have also confirmed anecdotal tales of cranberry’s ability to both treat and prevent urinary tract infections. In most of these later studies, subjects drank about 16 ounces (2 cups) of cranberry juice daily. Avorn J, Monane M, Gurwitz JH, Glynn RJ, et al. Reduction of bacteriuria and pyuria after using cranberry juice. *JAMA* 1994;272:590.

How does cranberry juice help prevent urinary tract infections? It acidifies the urine, contains an antibacterial agent called hippuric acid, and also contains other compounds that reduce the ability of E. coli bacteria to adhere to the walls of the urinary tract. Before an infection can start, a pathogen must first latch on to and then penetrate the mucosal surface of the urinary tract walls, but cranberries prevent such adherence, so the E. coli is washed away in the urine and voided. Since E. coli is pathogen responsible for 80-90% of urinary tract infections, the protection afforded by cranberries is quite significant. The most recent studies attempting to explain cranberries’ protective effects on urinary tract health were presented at the Experimental Biology Conference held in April 2002. Amy Howell, research scientist at the Marucci Center for Blueberry Cranberry Research at Rutgers University and Jess Reed, professor of nutrition at the University of Wisconsin-Madison, compared the proanthocyanins (active compounds) in cranberries to those found in grapes, apples, green tea and chocolate. They discovered that “the cranberry’s proanthocyanidins are structurally different than the proanthocyanidins found in the other plant foods tested, which may explain why cranberry has unique bacterial anti-adhesion activity and helps to maintain urinary tract health.” Howell AB. Cranberry proanthocyanidins and the maintenance of urinary tract health. *Crit Rev Food Sci Nutr*. 2002;42(3 Suppl):273-8.

FACTOID:
Before an infection can start, a pathogen must first latch on to and then penetrate the mucosal surface of the urinary tract walls, but cranberries prevent such adherence, so the E. coli is washed away in the urine and voided.

A Pro-biotic Berry for Gastrointestinal and Oral Health?

Not only kidney infections, but the majority of infectious diseases are initiated by the adhesion of pathogenic organisms to the tissues of the host. Cranberries ability to block this adhesion has been demonstrated not only against E. coli, the bacterium most commonly responsible for urinary tract infection, but also for a number of other common pathogens. Sharon N, Ofek I. Fighting infectious diseases with inhibitors of microbial adhesion to host tissues. *Crit Rev Food Sci Nutr*. 2002;42(3 Suppl):267-72.

Delegates at the 2002 American Chemical Society meeting and Experimental Biology Conference were also informed about cranberries’ ability to act as a natural probiotic, supporting the health-promoting bacteria that grow in the human gastro-intestinal tract while killing off the bacteria that promote infections and foodborne illnesses. Reid G. The role of cranberry and probiotics in intestinal and urogenital tract health. *Crit Rev Food Sci Nutr* 2002;42(3 Suppl):293-300.

Prevention of Kidney Stone Formation - Cranberries contain quinic acid, an acidic compound that is unusual in that it is not broken down in the body but is excreted unchanged in the urine. The presence of quinic acid causes the urine to become just slightly acidic—a level of acidity that is, however, sufficient to prevent calcium and phosphate ions from joining to form insoluble stones. In patients who have had recurrent kidney stones, cranberry juice has been shown to reduce the amount of ionized calcium in their

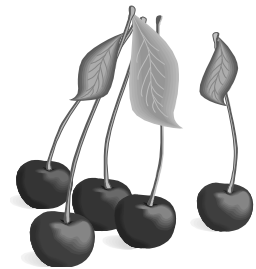
urine by more than 50%—a highly protective effect since in the U.S., 75-85% of kidney stones are composed of calcium salts. McHarg T, Rodgers A, Charlton K. Influence of cranberry juice on the urinary risk factors for calcium oxalate kidney stone formation. *BJU Int.* 2003 Nov;92(7):765-8.

Antioxidant Protection - Studies conducted at the University of Scranton, PA, have revealed cranberries to be phytochemical powerhouses packed with five times the antioxidant content of broccoli. When compared to 19 other common fruits, cranberries were found to contain the highest level of antioxidant phenols. Other studies presented at the 223rd national meeting of the American Chemical Society in April 2002 also showed that cranberries have among the highest levels of phenols of commonly consumed fruits. One study presented at the meetings by biochemist Yuegang Zuo from the University of Massachusetts-Dartmouth looked at 20 different fruit juices and found that cranberry juice had the most phenols and the highest radical scavenging capacity of all of them. *Reed J. Cranberry flavonoids, atherosclerosis and cardiovascular health. Crit Rev Food Sci Nutr* 2002;42(3 Suppl):301-16.

The most recent study to compare levels of phenolic compounds in common fruits, which was conducted at Cornell University and published in the December 2002 issue of the *Journal of Agriculture and Food Chemistry* also confirmed that cranberries had the highest phenolic content of the fruits studied. Cranberries were followed in descending order by apple, red grape, strawberry, pineapple, banana, peach, lemon, orange, pear and grapefruit.

Cherry

Cherries have been a popular food for centuries, and now research has demonstrated an amazing array of health benefits derived from a diet that includes tart cherries. As a recent Newsweek article said **"The day when doctors say—'Take 10 cherries and call me in the morning'— may not be far off."** The discovery of the health benefits of tart cherries is part of a larger awareness of the role that diet plays in our health, and foods that offer specific health benefits are called "functional foods."



According to ongoing research, cherries are a rich source of antioxidants that can help fight cancer and heart disease. In addition, they contain compounds that help relieve the pain of arthritis, gout and even headaches.

The secret is in the pigments that give cherries their rich red hue. They belong to a class of natural dyes called anthocyanins. These compounds are being called "Mother Nature's all-natural chemotherapy agents."

In addition to the antioxidants, cherries are rich in two important flavonoids —isoqueritrin and queritrin. According to leading researchers, queritrin is one of the most potent anticancer agents ever discovered. Consuming it in foods, such as cherries, is like unleashing inside your body an entire army of James Bond-type agents who are adept at neutralizing cancer-causing agents.

Flavonoids in Tart Cherries - As more and more interest develops in research labs around the world to investigate the connection between diet and good health, cherries continue to get high marks in a variety of areas. This report describes some interesting findings from Brunswick Laboratories in Wareham, Massachusetts, about flavonoids in tart cherries.

Anti-inflammatory Properties - Tart cherries contain natural anti-inflammatory compounds, called anthocyanins. Research at Michigan State University indicates that tart cherry compounds are at least 10 times more active than aspirin. The latest research also shows that anthocyanins do a better job of protecting artery walls from plaque build up and heart disease than vitamins C and E.

Anti-oxidants - Tart cherries are an excellent source of antioxidant compounds. Antioxidants are recognized as useful in prevention of cancer, cardiovascular disease and other illnesses. They may also slow the aging process.

FACTOID:

According to ongoing research, cherries are a rich source of antioxidants that can help fight cancer and heart disease. In addition, they contain compounds that help relieve the pain of arthritis, gout and even headaches.

Melatonin

Melatonin has been definitively shown to have significant anti-inflammatory, antioxidant, and anticancer properties, as well as improving natural sleep patterns. Research at the University of Texas by world-renowned melatonin expert Dr. Russel J. Reiter, has demonstrated that tart cherries contain exceptionally high levels of Melatonin, and it is present in the form most readily utilized by the body.

Perillyl Alcohol

Research at the University of Iowa shows that tart cherries contain perillyl alcohol (POH), a natural compound that is extremely powerful in reducing the incidence of all types of cancer. In the study, perillyl alcohol was found to be up to five times more potent than the other known cancer-reducing compounds at inducing tumor regression.

Researchers at Brunswick Laboratories (Wareham, Mass.) verified the natural antioxidants present in Montmorency tart cherries, the leading U.S. tart cherry variety. Lead researcher Dr. Boxin Ou also confirmed the presence of substantial quantities of melatonin. He also identified two important flavonoids — isoqueritrin and queritrin — and documented the presence of ellagic acid in cherries. Ellagic acid is a naturally occurring plant phenolic that is known as a potent anti-carcinogenic/anti-mutagenic compound. Clinical tests conducted at the Hollings Cancer Institute at the Medical University of South Carolina (MUSC) show that ellagic acid may be the most potent way to prevent cancer. It also may inhibit the growth of cancer cells, and arrest the growth of cancer in subjects with a genetic predisposition for the disease. The flavonoids — isqueritrin and queritrin — act as antioxidants as do the anthocyanins. They work to eliminate by-products of oxidative stress and thereby slow the aging process.

The benefits of tart cherries, with their high levels of anthocyanins, perillyl alcohol and melatonin, recently caught the attention of the American Institute for Cancer Research (AICR), based in Washington D. C. Because the natural substances found in cherries have been shown to fight cancer both individually and in concert, the AICR has begun to fund additional research on the ability of cherries to work as anti-carcinogens. The AICR recently funded two research projects both with the intent to identify the cancer-fighting potential of perillyl alcohol and certain anthocyanins.

Blackberry

At 21 mg of vitamin C per 100 grams, fresh blackberries are a very good source of vitamin C. So about a quarter of a supermarket 250 gram punnet delivers an adult about a fifth (20%) of their daily minimal needs; at the same time it delivers nearly 10% of an adults daily folate (B complex, folic acid) needs.



Blackberries were ranked fourth in tests to identify the most antioxidant rich fruits and vegetables. The natural antioxidant 'phenols' in blackberries have been found to have antioxidant properties comparable to fresh grapes and red wines. Interestingly, further studies have shown that blackberries, while having the fourth highest anti-oxidant concentration, are **SECOND** in actual chemical effectiveness in preventing oxidation in cells. Most of this anti-oxidant activity is in the juicy portion

Laboratory tests also suggest some berries may reduce the buildup of LDL (low-density lipoprotein) cholesterol, a contributor to heart disease, stroke and atherosclerosis. And blackberries were tested as having the highest LDL inhibitory effect. Whether frozen berries have the same protective effect has not

been studied - but it would be reasonable to suppose they do. The question of whether frozen berries would give the same effect is as yet unanswered. The phenolic composition of the same berries before and after freezing would have to be tested, as well as testing for the antioxidant activities of frozen berries. But if the antioxidants are still active, it would mean the outstanding power of blackberries' antioxidants are available year round, not just in it's normal brief summer season of fresh fruit.

Kiwi

Kiwi's Phytonutrients Protect DNA - In the world of phytonutrient research, kiwifruit has fascinated researchers for its ability to protect DNA in the nucleus of human cells from oxygen-related damage. Researchers are not yet certain which compounds in kiwi give it this protective antioxidant capacity, but they are sure that this healing property is not limited to those nutrients most commonly associated with kiwi fruit, including its vitamin C or beta-carotene content. Since kiwi contains a variety of flavonoids and carotenoids that have demonstrated antioxidant activity, these phytonutrients in kiwi may be responsible for this DNA protection.

The protective properties of kiwi have been demonstrated in a study with 6- and 7-year-old children in northern and central Italy. The more kiwi or citrus fruit these children consumed, the less likely they were to have respiratory-related health problems including wheezing, shortness of breath, or night coughing. These same antioxidant protective properties may have been involved in providing protection for these children. *Collins BH, Horska A, Hotten PM, et al. Kiwifruit protects against oxidative DNA damage in human cells and in vitro. Nutr Cancer 2001;39(1):148-53.*

Premier Antioxidant Protection - Kiwi fruit emerged from our food ranking system as an excellent source of vitamin C. This nutrient is the primary water-soluble antioxidant in the body, neutralizing free radicals that can cause damage to cells and lead to problems such as inflammation and cancer. In fact, adequate intake of vitamin C has been shown to be helpful in reducing the severity of conditions like osteoarthritis, rheumatoid arthritis, and asthma, and for preventing conditions such as colon cancer, atherosclerosis, and diabetic heart disease. And since vitamin C is necessary for the healthy function of the immune system, it may be useful for preventing recurrent ear infections in people who suffer from them. Owing to the multitude of vitamin C's health benefits, it is not surprising that research has shown that consumption of vegetables and fruits high in this nutrient is associated with a reduced risk of death from all causes including heart disease, stroke and cancer.

FACTOID:
According to research in central Italy, children consuming more kiwi were less likely to have respiratory related health problems like wheezing, shortness of breath or night coughing.

Kiwi fruit is also a good source of two of the most important fat-soluble antioxidants, vitamin E and vitamin A. Vitamin A is provided in the form of beta-carotene. This combination of both fat- and water-soluble antioxidants makes kiwi able to provide free radical protection on all fronts.

Fiber for Blood Sugar Control Plus Cardiovascular and Colon Health - Kiwi fruit qualifies as a very good source of dietary fiber. The fiber in kiwi fruit has also been shown to be useful for a number of conditions. Researchers have found that diets that contain plenty of fiber can reduce high cholesterol levels, which may reduce the risk of heart disease and heart attack. Fiber is also good for binding and removing toxins from the colon, which is helpful for preventing colon cancer. In addition, fiber-rich foods, like kiwifruit, are good for keeping the blood sugar levels of diabetic patients under control. Kiwi

fruit also passed our food ranking test as a good source of the minerals potassium, magnesium, copper and phosphorous.

Elderberry

Elderberries have long been used as food, particularly in the dried form. Elderberry wine, pie, and lemonade are some of the popular ways to prepare this plant as food. The leaves were touted by European herbalists to be pain relieving and to promote healing of injuries when applied as a poultice. *Duke JA. CRC Handbook of Medicinal Herbs. Boca Raton, FL: CRC Press, 1985, 423.*

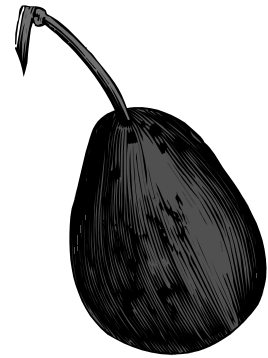
Flavonoids, including quercetin, are believed to account for the therapeutic actions of the elderberry flowers and berries. These flavonoids include anthocyanins that are powerful antioxidants and protect cells against damage according to test tube studies. *Youdim KA, Martin A, Joseph JA. Incorporation of the elderberry anthocyanins by endothelial cells increases protection against oxidative stress. Free Radical Biol Med 2000;29:51-60.*

People receiving an elderberry extract appeared to recover faster than did those receiving a placebo. *Mascolo N, Autore G, Capasso G, et al. Biological screening of Italian medicinal plants for anti-inflammatory activity. Phytother Res 1987;1:28-31.*

Mango

The mango is known as the "apple of the tropics", and is as important there as are apples in the temperate zone. It is common to see mango trees in kitchen gardens, in pastures, or as street trees in the tropics since they are delicious and a good source of vitamins.

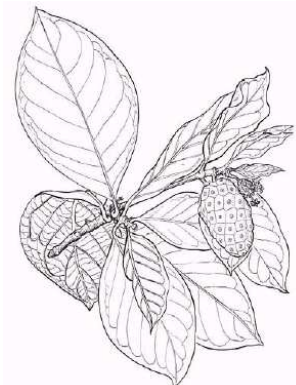
Mangos are one of the finest fresh fruits in the world, but can be dried, pickled, or cooked as well. Mangos are higher in vitamin C than citrus fruits. Green mangos are the tropical equivalent of green apples - tart, crisp, and somewhat dry, often eaten with salt. They are cooked or used in salads in the tropics. About 25% of mangos are processed into juices, chutneys, sauces, or dried. The large seed can be processed into flour, and the fat it contains can be extracted and substituted for cocoa butter.



Noni

Morinda citrifolia, known commercially as noni, grows widely throughout the Pacific and is one of the most significant sources of traditional medicines among Pacific island societies. The tree has attained significant economic importance worldwide in recent years through a variety of health and cosmetic products made from leaves and fruits. These include fruit juices as well as powders made from the fruit or leaves.

Although the fruits of noni are somewhat tasteless and have an unpleasant smell, they are eaten as famine food in Indonesia, Australia, and the Pacific Islands. The young leaves are also eaten as a vegetable and contain 4 to 6 percent protein.



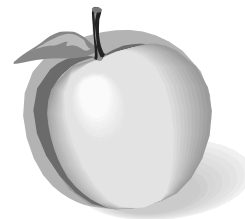
Harvested from both plantations and from the wild, noni is one of the most important botanical remedies and food supplements traded on the international market. It is usually the fruit juice that is sold, fresh or dried. Leaves, bark, and roots are also used for a great many maladies. Pain, arthritis, diabetes, high blood pressure, skin and stomach ulcers, depression, senility, diarrhea, arteriosclerosis, cancer, AIDS, skin parasites, and bad breath are all treated. (*Association of Societies for Growing Australian Plants 2000, Cambie and Ash 1994, Tan 2001*).

A number of physiologically active chemicals, anthraquinones, alkaloids, asperuloside, caproic, caprylic, and ursolic acids, β -sitosterol, and asperuloside may account for some of the effects. (*Cambie and Ash 1994*).

Medicinal uses or purported applications (contemporary, worldwide) Purported treatments for ailments including attention deficit disorder, addictions, allergies, arthritis, asthma, brain problems, burns, cancer, cardiovascular disease, chemical sensitivity, chronic fatigue, diabetes, digestive problems, endometriosis, fibromyalgia, gout, hypertension, immune deficiency, infection, inflammation, jet lag, multiple sclerosis, muscle and joint pain, polio, rheumatism, severed fingers, sinus, and veterinary medicine.

Peach

Peaches contain beta-carotene (vitamin A), vitamin C, vitamin E, fiber and many other nutrients essential to good health. Working together, beta-carotene (vitamin A), vitamin C, vitamin E and hundreds of other more discreet antioxidants strive to protect your body from daily cell damage and many chronic diseases.



Red-pigmented **beta-carotene** is a powerful member of the antioxidant family.

Visible in the vibrant orange color of peaches, beta-carotene is transformed to vitamin A in the body.

(Helpful Hint: Beta-carotene is usually listed as vitamin A on nutrition labels.) **Vitamin A** plays a crucial role in maintaining the skin, internally and externally, as well as in protecting the eyes, building strong teeth and bones and healthy hair. Additionally, research indicates that vitamin A has been linked to reduced rates of cancer and heart disease. Just one serving of peaches contains six percent of the U.S. RDA for vitamin A.

FACTOID:

Visible in the vibrant orange color of peaches, beta-carotene is transformed to vitamin A in the body which plays a crucial role in maintaining the skin, internally and externally, as well as in protecting the eyes, building strong teeth and bones and healthy hair.

Vitamin C boosts the immune system, promotes healing and helps prevent cancer, heart disease and stroke. This aggressive antioxidant is essential to optimum health and peaches can help. One half-cup serving of canned peaches contains eight percent of the U.S. RDA. As part of a vitamin C-rich diet, peaches can help you obtain the maximum benefits of this nutrient.

Research indicates that **vitamin E** is particularly effective in preventing heart disease and breast cancer. While vitamin E is primarily found in vegetable oils, nuts, seeds and wheat germ, peaches contain a significant amount. In a study conducted by Ohio State University, one half-cup serving of canned peaches contributes up to 24% of the U.S. RDA for vitamin E.

Pear

Protection from Free Radicals

Pears qualify as a good source of vitamin C and copper. Both of these nutrients can be thought of as antioxidant nutrients that help protect cells in the body from oxygen-related damage due to free radicals. Vitamin C functions as an antioxidant in all water-soluble areas of the body, and in addition to its antioxidant activity, is critical for good immune function. Vitamin C stimulates white cells to fight infection, directly kills many bacteria and viruses, and regenerates Vitamin E (an antioxidant that protects fat-soluble areas of the body) after it has been inactivated by disarming free radicals.



Copper helps protect the body from free radical damage as a necessary component of *superoxide dismutase* (SOD), a copper-dependent enzyme that eliminates superoxide radicals. Superoxide radicals are a type of free radical generated during normal metabolism, as well as when white blood cells attack invading bacteria and viruses. If not eliminated quickly, superoxide radicals damage cell membranes.

Davis CD. Low dietary copper increases fecal free radical production, fecal water alkaline phosphatase activity and cytotoxicity in healthy men. J Nutr. 2003 Feb; 133(2):522-7.

Treat your tastebuds to a delectable, juicy pear, and you'll be treating your body to 11.1% of the daily value for vitamin C along with 9.5% of the daily value for copper.

FACTOID:

Fiber binds to cancer-causing chemicals in the colon, preventing them from damaging colon cells. This may be one reason why diets high in fiber-rich foods, such as pears, are associated with a reduced risk of colon cancer.

Pears Promote Cardiovascular and Colon Health

Pear's fiber does a lot more than help prevent constipation and ensure regularity. Fiber has been shown in a number of studies to lower high cholesterol levels, good news to people at risk for atherosclerosis or diabetic heart disease. Fiber in the colon binds to bile salts and carries them out of the body. Since bile salts are made from cholesterol, the body must break down more cholesterol to make more bile, a substance which is also necessary for digestion. The end result is a lowering of cholesterol levels.

Fiber also binds to cancer-causing chemicals in the colon, preventing them from damaging colon cells. This may be one reason why diets high in fiber-rich foods, such as pears, are associated with a reduced risk of colon cancer. Additionally, the fact that low dietary intake of copper seems to

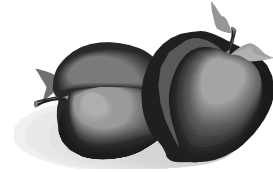
also associated with risk factors for colon cancer (increased fecal free radical production and fecal water alkaline phosphatase activity) serves as yet another reason in support of why this delicious fruit may be very beneficial for colonic health.

A Hypo-Allergenic Fruit

Although not well-documented in scientific research, pears are often recommended by healthcare practitioners as a hypoallergenic fruit that is less likely to produce an adverse response than other fruits. Particularly in the introduction of first fruits to infants, pear is often recommended as a safe way to start.

Plum

There are few fruits that come in such a panorama of colors as the juicy sweet tasting plum. Plums belong to the *Prunus* genus of plants and are relatives of the peach, nectarine and almond. They are all considered “drupes,” fruits that have a hard stone pit surrounding their seeds. When plums are dried, they are known as prunes.



The fresh version (plums) and the dried version (prunes) of the plant scientifically known as *Prunus domestica* have been the subject of repeated health research for their high content of unique phytonutrients called *neochlorogenic* and *chlorogenic acid*. These substances found in plum and prune are classified as *phenols*.

FACTOID:

The plums and the dried version (prunes) have been the subject of repeated health research for their high content of unique phytonutrients called neochlorogenic and chlorogenic acid. These substances found in plum and prune are classified as phenols.

Significant Antioxidant Protection from Phenols

These damage-preventing substances are particularly effective in neutralizing a particularly destructive oxygen radical called *superoxide anion radical*, and they have also been shown to help prevent oxygen-based damage to fats, such as the fats that comprise a substantial portion of our brain cells or *neurons*, the cholesterol and *triglycerides* circulating in our bloodstream, or the fats that make up our cell membranes.

Better Iron Absorption Plus More Antioxidant Protection from Vitamin C

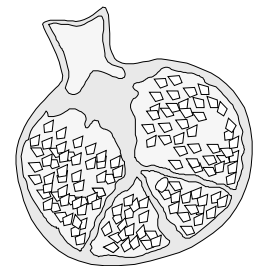
The ability of plum and prune to increase absorption of iron into the body has also been documented in published research. This ability of plum and prune to make iron more available may be related to the vitamin C content of this fruit. Our food ranking system qualified plums as a very good

source of vitamin C. In addition to assisting with absorption of iron, vitamin C is needed in the body to make healthy tissue and is also needed for a strong immune system. *Ballot D, Baynes RD, Bothwell TH, et al. The effects of fruit juices and fruits on the absorption of iron from a rice meal. Br J Nutr 1987 May;57(3):331-43.*

Pomegranate

Pomegranates are a great source of natural antioxidants, which can play a big part in keeping your cardiovascular system pumping efficiently.

Human clinical trials demonstrate that the antioxidant compounds found in pomegranates can help: maintain healthy blood vessels, maintain healthy LDL cholesterol levels, and support normal blood pressure levels.

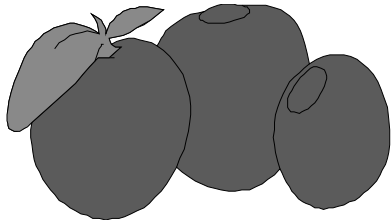


The pomegranate is proven to have higher antioxidant levels than green tea, red wine, cranberries, or blueberries.

Research from around the world supports the claims that pomegranates are good for the cardiovascular system and that they contain rare estrogen compounds that are beneficial for hormonal health in women. Other studies indicate that pomegranates can improve the lipid profile of patients with diabetes.

Pomegranates contain the following active, naturally occurring compounds: fatty acids (punicic acid, linoleic acid), phenolics (ellagic acid, punicalagin, luteolin, kaempferol, quercetin, apigenin, caffeic acid), phytosterols (beta-sitosterol, campesterol, stigmasterol), and gamma-tocopherol.

Blueberry and Bilberry



With flavors that range from mildly sweet to tart and tangy, blueberries are nutritional stars bursting with nutrition and flavor while being very low in calories. Blueberries are the fruits of a shrub that belong to the heath family, which includes the cranberry and bilberry as well as the azalea, mountain laurel and rhododendron. Blueberries grow in clusters and range in size from that of a small pea to a marble. They are deep in color, ranging from blue to maroon to purple-black, and feature a

white-gray waxy "bloom" that covers the surface serving as a protective coat. The skin surrounds a semi-transparent flesh that encases tiny seeds.

Blueberries are literally bursting with nutrients and flavor, yet very low in calories. Recently, researchers at Tufts University analyzed 60 fruits and vegetables for their antioxidant capability. Blueberries came out on top, rating highest in their capacity to destroy free radicals.

An Antioxidant Powerhouse

Packed with antioxidant phytonutrients called *anthocyanidins*, blueberries neutralize free radical damage to the collagen matrix of cells and tissues that can lead to cataracts, glaucoma, varicose veins, hemorrhoids, peptic ulcers, heart disease and cancer. Anthocyanins, the blue-red pigments found in blueberries, improve the integrity of support structures in the veins and entire vascular system. Anthocyanins have been shown to enhance the effects of vitamin C, improve capillary integrity, and stabilize the collagen matrix (the ground substance of all body tissues). They work their protective magic by preventing free-radical damage, inhibiting enzymes from cleaving the collagen matrix, and directly cross-linking with collagen fibers to form a more stable collagen matrix.

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Cardioprotective Action

While wine, particularly red wine, is touted as cardioprotective since it is a good source of antioxidant anthocyanins, a recent study found that blueberries deliver 38% more of these free radical fighters. In this study, published in the August 2003 issue of the *Journal of Agriculture and Food Chemistry*, researchers found that a moderate drink (about 4 ounces) of white wine contained .47 mmol of free radical absorbing antioxidants, red wine provided 2.04 mmol, and a wine made from highbush blueberries delivered 2.42 mmol of these protective plant compounds. (October 1, 2003)

A Visionary Fruit

Extracts of **bilberry** (a variety of blueberry) have been shown in numerous studies to improve nighttime visual acuity and promote quicker adjustment to darkness and faster restoration of visual acuity after exposure to glare. This research was conducted to evaluate claims of bilberry's beneficial effects on night

vision made by British Air Force pilots during World War II who regularly consumed bilberry preserves before their night missions.

The Magic L's – Lycopene and Lutein

Lycopene

Lycopene is an open-chain unsaturated carotenoid that imparts red colour to tomatoes, guava, rosehip, watermelon and pink grapefruit.

Lycopene is a proven antioxidant. Antioxidants neutralize free radicals, which may damage the body's cells.

Research shows that lycopene in tomatoes can be absorbed more efficiently by the body if processed into juice, sauce, paste and ketchup. The chemical form of lycopene found in tomatoes is converted by the temperature changes involved in processing to make it more easily absorbed by the body.

In the body, lycopene is deposited in the liver, lungs, prostate gland, colon and skin. Its concentration in body tissues tends to be higher than all other carotenoids.

Regular high consumption of fruits and vegetables is recommended as part of healthy eating. Epidemiological studies have shown that high intake of lycopene-containing vegetables is inversely associated with the incidence of certain types of cancer. For example, habitual intake of tomato products has been inversely associated with the risk of cancer of the digestive tract among Italians. In one six-year study by Harvard Medical School and Harvard School of Public Health, the diets of more than 47,000 men were studied. Of 46 fruits and vegetables evaluated, only the tomato products (which contain large quantities of lycopene) showed a measurable relationship to reduce prostate cancer risk. As consumption of tomato products increased, levels of lycopene in the blood increased, and the risk for prostate cancer decreased. The study also showed that the heat processing of tomatoes and tomato products increases lycopene's bioavailability.

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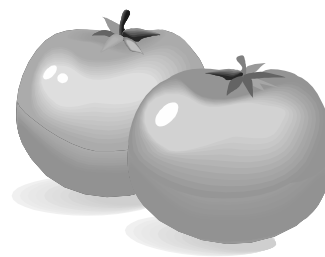
Ongoing preliminary research suggests that lycopene is associated with reduced risk of macular degenerative disease, serum lipid oxidation and cancers of the lung, bladder, cervix and skin.

Studies are underway to investigate other potential benefits of lycopene - including the H.J. Heinz Company sponsored research at the University of Toronto and at the American Health Foundation. These studies will focus on lycopene's possible role in the fight against cancers of the digestive tract, breast and prostate cancer.

*REF.: Stahl, W. and Sies, H. lycopene: a biologically important carotenoid for humans? Arch. Biochem. Biophys. 336: 1-9, 1996
Gerster, H. The potential role of lycopene for human health. J. Amer. Coll. Nutr. 16: 109-126, 1997*

Tomatoes

Tomatoes turn bright red because of the pigment called *lycopene*. *Lycopene* has drawn attention because of its link in lowering the risk of lung and prostate cancer (*Journal National Cancer Institute, December 6, 1995*). Food items most strongly related to decreased risk for ovarian cancer were raw carrots and tomato sauce. According to the *International Journal of Cancer, 2000, Vol 94, Issue 1, pp. 128-134* consumption of fruits, vegetables, food items and supplements high in *carotene, lutein and lycopene* may also reduce the risk of ovarian cancer.



Osteoporosis is a major metabolic bone disease that occurs primarily in women over the age of 50 because of the loss of estrogen during menopause. Oxidative stress as a risk factor for osteoporosis has garnered a lot of interest. Caused by reactive oxygen species (ROS), oxidative stress is involved in the activity and function of osteoblasts and osteoclasts, the two major bone cells involved in the pathogenesis

FACTOID:

According to the International Journal of Cancer, food items most strongly related to decreased risk for ovarian cancer are raw carrots and tomato sauce. Consumption of fruits, vegetables, food items and supplements high in carotene and lycopene reduce the risk of ovarian cancer.

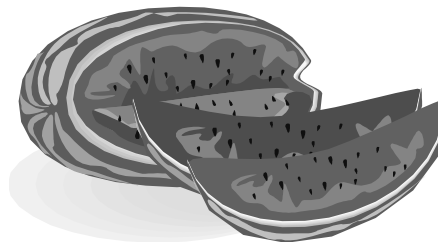
of osteoporosis. However, the cellular and molecular mechanisms involved in this association, the action of ROS, and the role played by dietary antioxidants (eg, lycopene) are not clear and the subject of continued study. Lycopene is a potent antioxidant that is present mainly in tomatoes and tomato products, as well as in small amounts in some fruits and vegetables. Based on epidemiological data, clinical studies, and in vitro cell culture studies, lycopene has been associated with the prevention of major human chronic diseases, including certain types of cancer, cardiovascular disease, hypertension, macular degenerative disease, and male infertility. *LETICIA G. RAO, PH.D., Will Tomatoes Prevent Osteoporosis? Rao AV, Rao LG. Lycopene and human health. Nutraceutical Research, 2004;2(2):127-36.*

Lycopene is a potent antioxidant that is not synthesized in the body. Although 85% of dietary lycopene in North America is obtained from tomatoes and processed tomato products, it can also be obtained from watermelon, pink guavas, and pink grapefruit. *Giovannucci E. Tomatoes, tomato-based products, lycopene, and cancer: review of the epidemiologic literature. J National Cancer Institute 1999;91:317-31.*

There is evidence to suggest an association between oxidative stress induced by reactive oxygen species (ROS) and chronic diseases. Antioxidants, by virtue of their ability to mitigate the damaging effects of ROS, have generated interest in their use as chemopreventive agents for a number of chronic diseases. Lycopene is the most potent natural antioxidant carotenoid occurring naturally in many fruits and vegetables and predominantly in tomatoes and tomato products. There is considerable interest in the role of lycopene in the prevention of human diseases. Initial epidemiological observations suggested an inverse relationship between the intake of tomatoes and lycopene and the incidence of prostate cancer. There is now evidence to suggest a similar relationship between lycopene intake and the prevention of cancers of other sites, and coronary heart disease. Several human intervention studies are now reported in the literature in support of the role of lycopene in chronic diseases. Recent studies are evaluating the effect of lycopene in the management of osteoporosis, hypertension and male infertility among other human diseases. Although the evidence in support of lycopene in disease prevention is mainly based on epidemiological studies, human clinical trials are now being undertaken and reported in the literature. *A.VENKET RAO AND LETICIA G. RAO, TORONTO, ONTARIO Nutritional Genomics and Functional Foods 2003;1:35-44.*

Watermelon

Watermelon is not only great on a hot summer day, this delectable thirst-quencher may also help quench the inflammation that contributes to conditions like asthma, atherosclerosis, diabetes, colon cancer, and arthritis.



Packed with antioxidants - Sweet, juicy watermelon is actually packed with some of the most important antioxidants in nature.

Watermelon is an excellent source of vitamin C and a very good source of vitamin A, notably through its concentration of beta-carotene. Pink watermelon is also a source of the potent carotenoid antioxidant, lycopene. These powerful antioxidants travel through the body neutralizing free radicals. Free radicals are substances in the body that can cause a great deal of damage. They are able to oxidize cholesterol, making it stick to blood vessel walls, where it can lead to heart attack or stroke. They can add to the severity of asthma attacks by causing airways to clamp down and close. They can increase the inflammation that occurs in osteoarthritis and rheumatoid arthritis and cause most of the joint damage that occurs in these conditions, and they can damage cells lining the colon, turning them into cancer cells. Fortunately, vitamin C and beta-carotene are very good at getting rid of these harmful molecules and can therefore prevent the damage they would otherwise cause. As a matter of fact, high intakes of vitamin C and beta-carotene have been shown in a number of scientific studies to reduce the risk of heart disease, reduce the airway spasm that occurs in asthma, reduce the risk of colon cancer, and alleviate some of the symptoms of osteoarthritis and rheumatoid arthritis. A cup of watermelon provides 24.3% of the daily value for vitamin C, and, through its beta-carotene, 11.1% of the DV for vitamin A. Watermelon is rich in the B vitamins necessary for energy production. Our food ranking system also qualified watermelon as a very good source of vitamin

FACTOID:

Watermelon is not only great on a hot summer day, this delectable thirst-quencher may also help quench the inflammation that contributes to conditions like asthma, atherosclerosis, diabetes, colon cancer, and arthritis.

B6 and a good source of vitamin B1, magnesium, and potassium. Part of this high ranking was due to the higher nutrient density of watermelon. Because this food has a higher water content and lower calorie content than many other fruits (a whole cup of watermelon contains only 48 calories), it delivers more nutrients per calorie - an outstanding health benefit!

Concentrated source of lycopene - Watermelon is also a very concentrated source of the carotenoid, **lycopene**. Well known for being abundant in tomatoes and particularly well absorbed from cooked tomato products containing a little fat such as olive oil, lycopene is also present in high amounts in watermelon and mangoes. Lycopene has been extensively studied for its antioxidant and cancer-preventing properties. In contrast to many other food phytonutrients, whose effects have only been studied in

animals, lycopene has been repeatedly studied in humans and found to be protective against a growing list of cancers. These cancers now include prostate cancer, breast cancer, endometrial cancer, lung cancer and colorectal cancers. A study published in the November 2003 issue of the American Journal of Clinical Nutrition found that in patients with colorectal adenomas, a type of polyp that is the precursor for most colorectal cancers, blood levels of lycopene were 35% lower compared to study subjects with no polyps. Blood levels of beta-carotene also tended to be 25.5% lower, although according to researchers, this difference was not significant. In their final (multiple logistic regression) analysis, only low levels of plasma lycopene (less than 70 microgram per liter) and smoking increased the likelihood of colorectal adenomas, but the increase in risk was quite substantial: low levels of lycopene increased risk by 230% and smoking by 302%.(December 31, 2003) The antioxidant function of lycopene – its ability to help protect cells and other structures in the body from oxygen damage – has been linked in human research to prevention of heart disease. Protection of DNA (our genetic material) inside of white blood cells has also

been shown to be an antioxidant role of lycopene. Edwards AJ, Vinyard BT, Wiley ER et al. Consumption of watermelon juice increases plasma concentrations of lycopene and beta-carotene in humans. J Nutr 2003 Apr;133(4):1043-50.

Lutein

Why is lutein important in our diet? Simply put, lutein is an antioxidant that appears to quench or reduce harmful free radicals in various parts of the body. Free radicals can play a role in a variety of chronic diseases. Lutein has been linked to promoting healthy eyes—through reducing the risk of macular degeneration—and healthy skin.

Lutein (pronounced LOO-teen) is a carotenoid, meaning a natural colorant or pigment, found in dark green leafy vegetables such as spinach, plus various fruits and corn. Egg yolks are also sources of lutein.

Lutein also filters the high-energy, blue wavelengths of light from the visible-light spectrum. Blue light, in both indoor lighting and sunlight, is believed to induce oxidative stress and possible free-radical damage in human organs exposed to light, such as the eyes and skin. Blue light is not the same as the commonly known ultraviolet A and ultraviolet B wavelengths of the invisible spectrum.

Most Americans do not get enough lutein in their diets. Research has suggested 6 to 20 mg of lutein per day are needed to realize its health benefits. Lutein is widely available—in doses up to 20 mg or more—in a variety of nutritional supplements, fortified foods and beverages for people wanting to supplement their dietary intake of lutein.

How It Works In The Body - Lutein is an important compound in the human body, but the body does not manufacture lutein. Eating foods containing lutein or consuming dietary supplements that contain lutein is the only way for your body to get lutein. Lutein is present in the eye, blood serum, skin, cervix, brain and breast. Within the eye, lutein is highly concentrated in the macular region of the retina and is dispersed in lower amounts throughout the retina and lens.

Within the skin, lutein appears to be deposited in the epidermis (outer layers) and dermis (inner layers), providing its antioxidant and blue-light absorption functions throughout the depth of the skin.

FACTOID:

Lutein is an important compound in the human body, but the body does not manufacture lutein. Eating foods containing lutein or consuming dietary supplements that contain lutein is the only way for your body to get lutein.

"Lutein (a carotenoid) is especially important to the health of the eye and maintenance of good sight. Lutein is the yellow pigment found in the macula (the center of the retina). It is a crucial protector against macular degeneration and cataracts, because it counteracts damage from ultraviolet and blue light."

Dr. Robert Abel, M.D., ophthalmologist and author of "The Eye Care Revolution," (p. 299, © 1999 Kensington Books)

... "Our data is the first of its kind to suggest that lutein may have the potential to act as a preventative agent against UVB-induced skin cancer... In addition, these data suggest that lutein protects the skin against damage caused by exposure to UVB light, further validating our position that lutein is a critical component to overall skin health."

Salvador Gonzalez, M.D., Ph.D, Wellman Laboratories of Photomedicine, Harvard Medical School.

The Super Green: Spinach

Super Greens are those pigment rich dark green plants that make up most of the very foundation of complex life on earth. By this statement we mean that such green foods make life possible, for they serve at the beginning of the food chain upon which other plants, and the more complex animals, all depend, directly or indirectly. As such these dark green foods contain all the essential building block nutrients or precursors upon which all other life eventually depends.

The dark green **spinach** is super abundant in vitamins, minerals, carotenes and chlorophyll, the great detoxifier. Of particular note are folic acid (vitamin B9), vitamin K, calcium, iron, and potassium, and the antioxidant *phytonutrients lutein and zeaxanthin*.

FACTOID:

The International Journal of Cancer reported that high consumption of green leafy vegetables containing lutein, a cancer protective agent, accounted for the low incidence of lung cancer in Fiji where 80% of the men are smokers!

According to the USDA, folic acid is the most common dietary vitamin deficiency in the U.S., being deficient in 3 out of 4 diets. Indeed, only recently have we become generally aware that folic acid deficiency is the usual cause of the unfortunately not uncommon neural tube birth defects. And many medications, including birth control pills and estrogen, increase the need for folic acid! —*Nutritional Science News, 2001, Vol 6, No 9; p. 338*

Green leafy vegetables are well known as being high in bone building calcium. But did you know that Vitamin K is needed for strong bones, too? The Framingham Health Study showed that those with the highest vitamin K intake had three times less hip fracture from osteoporosis! (*Analyst, 1988:113:393-7*). In Japan vitamin K is approved as a drug to treat osteoporosis! Fewer yet realize that a recent analysis of published research on vitamin K concluded, “A substantial part of the population is mildly deficient in vitamin K, and at the later stages this deficiency may contribute to (not only) increased bone fracture risk, (but) arterial calcification and cardiovascular disease, (too).” —*Hematology Oncology Clinical North America 2000, Vol 14, No 2, pp. 339-53.*

Popeye sang, “I’m strong to the finish ‘cause I eats me spinach”. This was mostly thought related to its rich iron content, which is also true of kale and parsley. Today, with our high sodium, high protein, high processed food diets, we are even more in need of the alkaline ash minerals, especially potassium, found so predominately in the super greens. These minerals act as a buffer to neutralize excess acid. If not present in sufficient quantities, the body “steals” these much mineral needed buffers from our bones, and thus such deficiencies are thought to be a leading cause of osteoporosis. —*American Journal of Clinical Nutrition 2000, Vol 73, pp. 118-122.*

The discovery that there is a whole class of micro-nutrients, called *phytonutrients*, that are not vitamins, minerals or fiber, but had dynamic health enhancing effect, is a big part of the reason the major health agencies recommend a minimum of 5 different fruits and vegetables daily.

One such class of phytochemicals are the antioxidant carotenes, of which the pro vitamin A beta carotene is the most familiar. However, though the dark green “leafies” are a rich sources of beta carotenes, there are numerous nonvitamin A carotenes found in these foods as well. Two of the most researched are *lutein and zeaxanthin*. According to *Health Sense, August 2000, Vol. VI, issue 8*, numerous studies show that maintaining sufficient levels of *lutein and zeaxanthin*, the only carotene antioxidants active in the retina of the eye, can prevent macular degeneration and cataracts, two leading causes of age related blindness, and preserve youthful visual sensitivity!

High consumption of green leafy vegetables containing *lutein and zeaxanthin* were determined to be the protective agents that explained the low incidence of lung cancer in Fiji where 80% of the men smoke! *International Journal of Cancer: 1995, Vol 64 No 63, pp. 18-23*. The February 2000 edition of the *American Journal of Clinical Nutrition* linked *lutein* to a 17% reduction in colon cancer risk.

Non-Green Super Carotenoid: Carrots



There is another carotenoid super food we must mention, namely carrots.

Carrots are well known for their pro-vitamin A *beta-carotene* content, the abundance of which is responsible for their bright orange color. “*There was an evident increase in the risk of breast cancer for decreasing amounts of beta-carotene...the risk of breast cancer approximately doubled among the subjects with blood levels of beta-carotene at the lowest quartile*” (*American Journal of Epidemiology 2001, Vol 12, No 153, pp. 1142-7.*). According to the *International Journal of Cancer*, food items most strongly related to decreased risk for ovarian cancer were raw carrots and tomato sauce. Consumption of fruits, vegetables, food items and supplements high in *carotene and lycopene* were cited for reducing the risk of ovarian cancer.

Carrots are nutritional heroes, they store a goldmine of nutrients. No other vegetable or fruit contains as much carotene as carrots, which the body converts to vitamin A. This is a truly versatile vegetable and an excellent source of vitamins B and C as well as calcium pectate, an extraordinary pectin fibre that has been found to have cholesterol-lowering properties.

The carrot is an herbaceous plant containing about 87% water, rich in mineral salts and vitamins (B,C,D,E).

Carrots are an excellent source of vitamin A, a good source of potassium, and contain vitamin B6, copper, folic acid, and magnesium. The high level of beta-carotene is very important and gives carrots their distinctive orange color.

Carrots also contain, in smaller amounts, essential oils, carbohydrates and nitrogenous composites. They are well-known for their sweetening, antianaemic, healing, diuretic, remineralizing and sedative properties. In order to assimilate the greatest quantity of the nutrients present in carrots, it is important to chew them well - they are the exception to the rule - they are more nutritious cooked than raw.

The power and goodness of carrots Carrots have many important vitamins and minerals. They are rich in antioxidants Beta Carotene, Alpha Carotene, Phytochemicals and Glutathione, Calcium and Potassium, and vitamins A, B1, B2, C, and E, which are also considered antioxidants, protecting as well as nourishing the skin. They contain a form of calcium easily absorbed by the body. Finally they also contain Copper, Iron, Magnesium, Manganese, Phosphorous.and Sulphur - better than a wonder drug!!

FACTOID:

Carrots are an excellent source of vitamin A, a good source of potassium, and contain vitamin B6, copper, folic acid, and magnesium. The high level of beta-carotene is very important and gives carrots their distinctive orange color.

Beets

Beets are notable for their sweetness--they have the highest sugar content of any vegetable, but they are very low in calories. Their sweet flavor comes through whether the beets are fresh or canned (which is the way most beets are sold in the U.S.). Unlike many other processed vegetables, canned beets are perfectly acceptable in both taste and texture; if not pickled, their sweet flavor is largely unaffected by the canning process. Fresh beets, however, have twice the folate (folic acid) and potassium, and have a distinctive flavor and a crisp texture not found in canned beets. Fresh beets also supply a nutritional bonus--their green tops are an excellent source of beta-carotene, calcium, and iron.

Beets aid in reducing blood and organ toxins, especially in the gallbladder and liver. Detoxifying the liver could be helpful for anyone undergoing chemotherapy.

Beets are another high-antioxidant veggie, with an ORAC score of 1840, and a total antioxidant concentration of 1.98. They contain many healthful substances: betaine (aka: trimethylglycine, TMG), betalains, betacyanin, betanin, folate, iron, and fiber. Beet fiber seems to be particularly healthful. Pectin, a soluble fiber in beets, binds toxins, heavy metals, and excess hormones that have been dumped into the gut from the liver. They are passed out instead of being reabsorbed. Betaine helps convert homocysteine into methionine, preventing heart disease.

Beets contain multiple health-promoting substances. Glutamine is the most abundant amino acid in the blood stream (30-35% of amino acid nitrogen in plasma) and fills a number of detoxification-associated biochemical needs in the body. It is a conditionally-essential amino acid, in that the human body produces it endogenously. Deficiencies are prevalent however, primarily because of impaired detoxification mechanisms, cancer, burns, trauma, chronic protein catabolism and excessive exercise.

FACTOID:

Research suggests that glutamine is essential to the health and maintenance of the intestinal tract, a vital organ of detoxification. Interestingly, this supportive nutrient is found in particularly high concentrations in two vegetable sources recognized for their detoxifying properties and folate content: cabbage and beets.

This amino acid is the main metabolic fuel for enterocytes of the small intestine, lymphocytes, macrophages, and fibroblasts and plays a major role in the first line of immune defense in the intestine as well as in the body as a whole. Interestingly, this supportive nutrient is found in particularly high concentrations in two vegetable sources recognized for their detoxifying properties and folate content: cabbage and beets. *Mack, G. 1998. Glutamine synthetase isoenzymes, oligomers and subunits from hairy roots of Beta Vulgaris L. var. lutea. Planta 205(1): 113-20.*

Research suggests that glutamine is essential to the health and maintenance of the intestinal tract, a vital organ of detoxification. In fact, the intestine is the greatest user of glutamine in the body. The intestinal enterocytes absorb glutamine from the lumen of the gut and the bloodstream. The intestinal cell mitochondria then convert glutamine to glutamate, and then to alpha-ketoglutarate, which is used in the Krebs cycle for ATP production. *Hickman, M. A. 1998. Interventional nutrition for gastrointestinal disease. Clin Tech Small Anim Pract 13(4): 211-216.*

Beet root extract prevents lung and skin cancer. [PubMed](#)

Betanin prevents chemical-induced liver, skin and spleen cancer, even at a very low dose. [PubMed](#)

Beet fiber reduced the number of animals with colon cancer by 30% (the poor critters had been dosed with a carcinogen). Beet fiber reduced cholesterol and triglyceride levels, and increased HDL (they had been fed a high-cholesterol diet). Beet fiber increased production of SOD, catalase, glutathione (both

peroxidase and transferase). These are detoxifying enzymes made in the liver. [PubMed](#)

Only red beets boost the cancer-fighting, detoxifying phase II enzymes. A team of researchers led by UW-Madison food scientist Kirk Parkin has shown that beet pigments may boost levels of proteins, called phase II enzymes, that help detoxify potential cancer-causing substances and purge them from the body.

Preventive is the key word, Parkin emphasizes. "Elevating phase II enzyme levels is useful in preventing the initial stages of carcinogenesis, but not in treating the effects of cancer that has been allowed to progress." *Beet Pigments May Help Prevent Cancer - University of Wisconsin-Madison, Dec 10, 2002*

Alexander Ferenczi, MD of Csoma, Hungary fed cancer patients raw beets and beet juice, in the 1950's. Most of the people recovered from their cancers. His claims for the beet were not taken seriously at the time. He was onto something; research shows the beet to be strongly cancer-preventive. *Australian International Clinical Nutrition Review, July 1986*

The Cruciferous Vegetables

When it comes to cancer fighting, the real champs may be the cruciferous vegetables. **Cruciferous vegetables** contain detoxifying phytonutrients with rather unfamiliar names like *isothiocyanate, sulphoraphane and indole -3 carbinol*, or IC-3 for short. These plant micronutrients work by speeding up the production of enzymes, especially in the liver, with which our bodies convert toxic, mutagenic, cancer causing substances into less harmful, even beneficial substances. —*Medical Committee for Aging Research and Education, Year 2001, Issue 2, Abstracts, p.5.*

FACTOID:

According to the Journal of the National Cancer Institute, cruciferous vegetables, such as broccoli, cauliflower, cabbage and brussel sprouts, substantially lower the risk of prostate cancer in men. Numerous studies also suggest a protective role in uterine, cervical and breast cancer in women as well.

The 2000 January 5th issue of the *Journal of the National Cancer Institute* proclaims that the cruciferous vegetables, such as broccoli, cauliflower, cabbage and Brussels Sprouts, substantially lower the risk of prostate cancer in men. Numerous studies also suggest a protective role in uterine, cervical and breast cancer in women as well (*Cancer Chemotherapy and Pharmacology, 1991, No 28, pp. 255-8.*)

Broccoli

Fruits and vegetables are good for overall health, and a newly funded study at the University of Pittsburgh Cancer Institute (UPCI) may show that certain vegetables, such as broccoli, also offer protection against prostate cancer.

"Clearly, what we eat has an effect on the development of diseases such as cancer," said Dr. Singh, also co-leader of UPCI's cancer biochemoprevention program. "However, we know little about the mechanisms by which certain edible plants like broccoli help our bodies fight prostate cancer and other diseases. Our goal with this study is to better understand the function and relationship of substances in broccoli that appear to be linked to inhibiting prostate cancer growth."



ITCs are substances in vegetables that are generated when vegetables are either cut or chewed. Previous nutrition research has demonstrated that ITCs are highly effective in affording protection against cancer in animal models induced by carcinogens including those in tobacco smoke. Epidemiological research also has shown that increased consumption of vegetables that contain ITCs significantly reduces the risk for prostate cancer.

Dr. Singh's laboratory has found that some naturally occurring ITCs are highly effective in suppressing the growth of human prostate cancer cells at concentrations that are achievable through dietary intake of cruciferous vegetables such as watercress and broccoli.

Fabulous Flavonoids: OPC's, Quercetin, and Resveratrol

Oligomeric proanthocyanidins (OPC's) are super rich in the *anthocyanin bioflavonoid* group of phytonutrients. Found abundantly in berries, one of the very richest sources is grape seed extract. These have been shown to be powerful antioxidants that are significantly more active than vitamins C and E, and are thought to protect against carcinogenic changes — *Journal of Clinical Oncology 2000, No 18, pp. 668-83.*

Quercetin is the major representative of the antioxidant *flavinol* group, which group is particularly known for preventing the oxidation of low density lipoproteins (bad cholesterol). *Quercetin* is found in fruits and vegetables, most notably onions and green apple skins. That is the major reason why onions and green apples help prevent hardening of the arteries and the heart attacks and strokes that arteriosclerosis causes (*Biomedical Pharmacotherapy 1997, No 51, pp 305-310*). *Quercetin* has also consistently demonstrated a potent *anti-tumor* effect — *Cancer Chemotherapy and Pharmacology, 1991, No 8, pp. 255-8.*

Resveratrol - Red wines are more protective of heart disease than white wines because of the phytonutrient, *resveratrol*, which gives dark grapes their deep red/blue color. "*Resveratrol (a stilbene found in grape skin extracts) is able to inhibit the initiation and promotion of tumors, and cause pre-cancerous cells to return to normal.*" (*Science, 1997, Vol 275, No 5297, pp. 218-220*). By extracting the *resveratrol* as a phytonutrient supplement, one can get the antioxidant immune enhancing and heart protecting benefits of red wine, dark grapes and grape juice without all the alcohol and sugar.

Fruit and Vegetable Extracts

In order to approximate the health benefits of eating 5 to 9 serving of dark green, red, orange, blue and purple fruit and vegetables daily, food scientists have created fruit and vegetable *extracts* from the most nutrient dense organic varieties. These *extracts* become highly concentrated phytonutrient super food supplements. Findings reported in the 38th annual meeting of the *American Society of Cell Biology* show us that these supplements enhanced "*multiple immune functions...especially for people whose immune functions have been diminished*". Dr O'Neill , Ph.D., of *BYU's Dept. of Microbiology* was quoted as saying, "*Fruit and vegetable extracts may be protective against cancer.*"

FACTOID:

Fruit and vegetable extracts, especially from dense varieties, are highly concentrated phytonutrient super food supplements. Findings reported in the 38th annual meeting of the American Society of Cell Biology indicate that these supplements enhance "multiple immune functions...especially for people whose immune functions have been diminished."

Organic Food More Nutritious?

The *Journal of Alternative and Complementary Medicine* 2001, Vol 7, No 2, pp. 161, reported the results of part of the doctoral dissertation of Virginia Worthington, Ph.D., of *John Hopkins University*, Baltimore. Dr. Worthington found that the composition of conventionally grown American food has declined dramatically in the past 60 years. For example, iron is lower by 32 percent, calcium by 29 percent, magnesium by 21 percent. She also found that **organically grown produce** was higher in most vitamins and minerals and lower in potentially harmful nitrates. Organic foods were 29 percent higher in magnesium, 27 percent higher in vitamin C, and 21 percent higher in iron. Using the USDA recommendation of at least five servings of fruits and vegetables a day, *Dr Worthington concluded that consuming organic produce could make the difference between a deficient and adequate diet!*

The Probiotics: Friendly Microorganisms?

Evidence for **probiotics**, “friendly” microorganisms (like *L. acidophilus*, *L. Casei*, *L.Rhamnosus* and *B.Longum*) is impressive according to Dan Lukaczer, N.D., writing in the *Sept. 2001, Vol.6, No, 9 edition of the Nutritional Science News*. Inflammatory bowel disease, urinary tract infections, diarrhea and even heart disease and colon cancer risk are favorably affected by these *symbiotic* bacteria we host in our alimentary tract. No wonder we call them “friendly”! *Probiotics* are so effective in inhibiting virally induced gastrointestinal infections in children that hospitals, infamous as vectors for drug resistant pathogens, are studying their prophylactic use when admitting children.

FACTOID:

“Inflammatory bowel disease, urinary tract infections, diarrhea and even heart disease and colon cancer risk are favorably effected by these symbiotic bacteria we host in our alimentary tract,” according to Dr. Lukaczar as reported in the Nutritional Science News.

Of note, one of the ways we get “inoculated” with probiotics is through soil organisms on plants. But our highly washed, even irradiated, vegetables may not contain near as many as we might get “eating from the garden”. And our frequent ingestion of chlorinated water, antibiotics, and other medications, along with low fiber, high sugar diets do not favor the growth of symbiotic microorganisms in our intestines.

Fermented plants foods like sauerkraut or tempeh, natto, and milk products like yogurt, are important *probiotic* sources as well. As dairy sensitivity is so common, especially in those with chronic bowel problems, when supplementing *dairy-free probiotics* are to be generally preferred.

“Friendly bacteria can... prevent cancerous tumors; inactivate viruses; produce natural antibodies and vitamins; reduce cholesterol... and even more wonders.” – Dr David Williams, editor of Alternatives For The Health Conscious Individual.

Plant Enzymes, Digestive Dynamos!

Natural **plant enzymes**, like **amylase, lipase, cellulase, lactase, protease, bromelain and papain** (from pineapple and papaya) help us to digest starches, fats, cellulose, milk sugar and proteins, respectively. Raw foods, or foods processed below 108 degrees Fahrenheit, maintain their enzyme activity. Of course, only man cooks his food. In contrast, animals eat a “raw” and therefore a relatively more or less *enzyme rich diet*. The proposed advantages of a diet rich in raw and low temperature processed plant foods, or supplementing these natural plant enzymes, are well stated in the following quote by *I. V. Jimenez-*

Velasquez, Vice-Chair of the Department. Of Medicine, University of Puerto Rico School of Medicine, "As we age, our natural digestive enzymes are depleted, allowing food to ferment (rot) in the digestive tract. Many experts believe that this undigested matter becomes quite toxic, causing many of the health problems associated with aging, such as joint distress, ulcers, bloating and constipation."

Natural Plant Polysaccharides: Soluble and Insoluble Fibers

Three of the "healthiest" *polysaccharide fiber* combinations are found in **oats, brown rice, and apples**. These natural plant foods contain high amounts of beneficial *soluble and insoluble polysaccharides fibers* and a wide variety of vitamins and minerals. *Insoluble fibers* are responsible for increased bulk that reduces the risk of cancer, promotes healthy digestion, reduces the absorption of sugars in diabetic patients and the risks of recurrent urinary stone disease in people with kidney disease.

FACTOID:

Insoluble fibers are the most responsible for lowering cholesterol, and the most effective cholesterol lowering soluble fiber is oat beta-glucan. The FDA has recently approved claims for oat beta-glucan stating that this is the primary component responsible for the total and LDL blood cholesterol lowering effects.

Soluble polysaccharides, known popularly as "*soluble fibers*", are responsible for lowering cholesterol and lipids thus reducing incidence of heart disease. The most effective cholesterol lowering soluble polysaccharide is **oat beta-glucan** (*beta gum*). Indeed, the FDA has given special status for oat beta-glucan approving its cholesterol lowering claims.

Rice bran contains 21% fiber, 21% lipids, 13% amino acids and a variety of vitamins. Most of the fiber in rice bran is insoluble. It is the richest source of *IP-6*, a proven anticancer phytonutrient. It is also a rich source of *tocotrienols*, a vitamin E fraction that has *40 to 60 times the antioxidant activity of regular vitamin E (alpha tocopherol)*.

Apple pectin is a soluble fiber that binds to toxins and excess bile and cholesterol in the gut. Just one of the reasons, "an apple a day keeps the doctor away".

"Soluble fiber from foods such as oat bran, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease." FDA, 2001. In allowing this health claim, FDA concluded that the *beta-glucan soluble fiber* of whole oats is the primary component responsible for the total and LDL blood cholesterol-lowering effects and increased bile acid secretion that helps digesting food.

Herbs, Roots and Spices

Medicinal plants have a long tradition in every culture. Many are safe to be eaten regularly in small amounts with few contraindications, even with concomitant prescription medicines.

Red beet root has long been known as a very nutritious food. Beet root has traditionally been used by herbalists to support kidney and liver functions and to treat coughs and infections. Beet is indigenous to Europe and North Africa. Its scientific name is *Beta vulgaris*. Scientists have demonstrated that beet root avoids the addition of fat to the liver in animals. A *phytochemical alkaloid* known as *betaine*, in high concentration in red beet root, appears to be responsible for this effect. —*PDR for Herbal Medicine, 2000, Medical Economics, p 67.*

Summary

The Standard American Diet (S.A.D.) has given rise to an epidemic of obesity, cardio-vascular disease, premature aging and cancer. The message of five to nine servings of fruits and vegetables daily has gone unheeded. Education and cultural changes must take place.

The “5-A-Day for Better Health” program, sponsored by the National Cancer Institute and the United States Department of Agriculture, has made some progress, but changing the eating habits of a nation comes very slowly. Gourmet juices, salad bars and the “smoothie” craze are steps in the right direction, but new forms of phytonutrient dense foods must become mainstays in our diets.

Ceautamed Worldwide, LLC is dedicated to the development of “functional foods” that can be included in the dietary fabric of the busy, modern world. People will only eat what they like, so our mission is to create good tasting, instant, healthy super foods that help bridge the gap between a S.A.D. and an optimal diet.

For more information, see: www.greensfirst.com and www.5aday.gov on the web.



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