



**TOPIC: THE TOP TEN
BY DR. ELINA CHERNYAK, D.O.**

The philosophy of maintaining good health is reflected in the old saying, "an ounce of prevention is better than a pound of cure". Even the healthiest diets fall short in providing sufficient nutrients for optimum health and to help prevent illness. Combined with added biological stresses from environmental pollutants and the rush of daily modern life where preparing your own pure organic meals is often impractical, we must provide our bodies with additional high-quality nutrients from reliable, trusted sources. Investing in quality nutrition is an investment in your health.

I have discovered that the following 10 nutrients provide a solid foundation of nutritional support for everyone. Along with using this combination myself, I have shared it with my patients for several years with great success. When taken as directed, the side effects are only positive, including an improved sense of mental and physical well being and higher energy levels. Indeed there are situations where additional supplementation is necessary above and beyond this formula to address a particular condition, but using my Top Ten on a regular basis will yield remarkable results.

A note about micronutrient inadequacy:

"Approximately 40 micronutrients are required in the human diet. Deficiency of vitamins folic acid, B6 niacin, C, or E, or iron, or zinc, appears to mimic radiation damage in DNA by causing single- and double-strand breaks, oxidative lesions, or both...Micronutrient deficiency may explain, in good part, why the quarter of the population that eats the fewest fruits and vegetables has approximately double the cancer rate." Ames BN.Toxicology Letters 1998; 102-103:5-18.

THE BEST SUPPLEMENT BRAND: PURE ENCAPSULATIONS

The highest-grade nutritional supplements available today are made by Pure Encapsulations (Pure Caps for short). Pure Caps manufacturing process is immaculate. Sold only through licensed healthcare Professionals, they are absolutely pure, clean supplements that are hypoallergenic and formulated in exact dosages recommended by leading physicians. Most importantly, Pure Caps contain biologically active ingredients that deliver their nutrients completely and effectively on a molecular level. Pure Encapsulations is an environmentally responsible company and major sponsor of Vitamin Angels, a non-profit organization dedicated to providing critical nutrients to impoverished children and families in more than 40 countries.

THE TOP TEN:

- 1. PURE CAPS ULTRANUTRIENT MULTIVITAMIN / MINERAL COMPLEX:**
- 2. VITAMIN D3**
- 3. B COMPLEX**
- 4. ZINC 30**
- 5. R- LIPOIC ACID**
- 6. FISH OIL (EPA/DHA)**
- 7. PROBIOTICS**
- 8. PURE CAPSULATIONS ULTRASYNERGISTIC VITAMIN E:**
- 9. ASTAXANTHIN**
- 10. VITAMIN C**



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1. PURE CAPS ULTRANUTRIENT MULTIVITAMIN / MINERAL COMPLEX:

These daily supplements deliver many of the essential nutrients required by major systems in the human body including the cardiovascular system, immune system, organ function, eyesight, cognitive function, and many more that contribute to basic, vital health.

Notable are the biologically active forms of B2 and B6, which are superior to more common vitamin brands. For example, air pollutants known as Carbonyl radicals block the body's conversion of B6 into its active and useful form, Pyridoxine-5-Phosphate (P5P). By including P5P, the body does not need to convert anything before it can absorb it. Pure Caps includes both active and inactive forms of B6, which although a more expensive process, renders the vitamins more effective. This knowledge points out an example of making informed decisions. We can't assume that just any store-bought vitamin will actually be absorbed and converted to its active form within the body.

One serving also provides 200 mcg of selenium (selenomethionine), a natural antioxidant that delays the oxidation of polyunsaturated fatty acids and preserves the elasticity of tissue. In synergy with vitamin E, selenium promotes healthy growth and fertility, and improves the function of energy certain producing cells. Selenium also provides support for the immune system. In fact, there is published data to show that supplementation with 200 micrograms daily reduced the incidence of some cancers by 50% over a 5 year period!

2. VITAMIN D3

Vitamin D3 is one of the hottest topics in health today. Vitamin D is manufactured by the body when the UVB band of sunlight reacts with fat-soluble molecules in the skin. For various reasons, most people are not getting enough sun exposure to produce ample amounts of Vitamin D. The source of vitamin D in food is limited mostly to fish oils and fortified foods such as milk. Special conditions such as pregnancy, having dark colored skin, and obesity greatly increase the need for vitamin D. In addition, after age 60 our ability to make vitamin D from the sunshine greatly diminishes. For these reasons most people would be wise to supplement with Vitamin D3 (which is better than the cheaper version Vitamin D2). A daily dose of 400 I.U. is a good starting point, but most people will appreciate the greater bone protection and anti-inflammatory benefits of larger doses in the range of 1000 I.U. to 5000 I.U. daily.

Vitamin D deficiency disrupts 36 proteins involved in mammalian brain development. Scientific studies have also found that severe maternal vitamin D deficiency leads to rat pups with increased brain size and enlarged ventricles (chambers in the brain), which are abnormalities very similar to those found in autistic children. --- Am J Psychiatry.1995 Aug;152(8):1145-9.

3. B COMPLEX

The B vitamin levels in most people (especially the elderly) are often found to be too low. Even if you have B vitamins in your diet or the good bacteria in your intestines makes them, it is easy not to have enough Bs to handle all of your metabolic and detoxification needs. In addition, as with the carotenoids and tocopherols, we need to take all the B vitamins together for maximum synergistic benefit.

Here are a few important facts:

- Good levels of thiamine (B1) are important to protect the liver from stress such as alcohol.
- The combination of riboflavin (B2), pyridoxine (B6), folic acid, and methylcobalamin (B12) have been shown to keep the inflammation from too much homocysteine (a normal metabolic byproduct), from damaging arteries and leading to vascular disease and cancer.



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- Biotin is critical for blood sugar regulation.
- Pantothenic acid is helpful under conditions of high stress.
- Niacinamide and inositol hexaniacinate help regulate cholesterol and other lipids in the blood.
- It has been found that certain toxins (such as carbonyl radicals from jet fuel) can block the conversion of pyridoxal phosphate (B6) to pyridoxal-5-phosphate (active B6). This is why adding activated forms of B6 and B2 insure that the critical metabolic functions of these vitamins are carried out in the body.

4. ZINC 30

Zinc supplementation is important for optimum immune function, and is often depleted (especially in the elderly) when there is low stomach acid which is needed for zinc absorption. This also happens when taking acid blocking drugs on a long-term basis. Zinc is a crucial ingredient in immune regulation. In the entire body, the highest concentration of zinc is in the BRAIN. Zinc is required for activation and development of T cells (immune system). Zinc is an important mineral for the proper sensitivity and metabolism of thyroid hormone.

Inadequate zinc intake (found in >10% of the U.S. population) causes oxidation and DNA damage in human cells. Zinc, performs more than 100 different functions in the body and has been identified as a cofactor for various enzymes. DNA-dependent RNA polymerase is the required enzyme for the synthesis of mRNA. mRNA, the message that comes off the genome and is translated into protein, is dependent upon zinc status. If you are zinc-deprived, the clinical manifestation could be protein insufficiency. Your body cannot manufacture enough de novo protein because the mechanism by which the message is transcribed off the DNA is impaired.

The recommended daily intake for zinc is somewhere around 10 to 20 mg, a fairly small amount. It is just a few crystals on the end of a teaspoon. If a person does not get adequate levels of this mineral, however, he or she might exhibit a variety of symptoms associated with protein insufficiency. One such symptom is problems with taste perception. To assess zinc status, we frequently employ the zinc tally or zinc oral tolerance test.

We know zinc status can affect night vision. Vitamin A non-responsive night blindness is associated with zinc insufficiency. Zinc can be involved in a condition in infants called acrodermatitis enteropathica. The condition begins with a rash in the anal region, and it can work its way over the whole body as a consequence of zinc malabsorption syndrome. Zinc deficiency can relate to things like poor wound healing, immunosuppressive disorders in adults, or growth and developmental retardation in children and adolescents. All of these are protein-related conditions connected to insufficient manufacture of specific enzymes or structural proteins in the body.

The Thymus is the headquarters of the immune system. Without it, there will be no immune system. Zinc is the most important mineral to the thymus gland. It is so important that if you have a small or malfunctioning thymus, zinc supplements can reverse and rejuvenate it.

Some of the common reasons for zinc deficiency are vegetarian diets, low red meat consumption, low seafood consumption, dieting, copper toxicity, low stomach acid, digestive disorders, aging. There are more than 300 enzyme systems in the body that require zinc. A deficiency may result in small testes, anorexia, slow wound healing, delayed puberty and skin problems. Supplementation with zinc increases body's ability to digest microbic invaders, dead cells and other debris.



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5. R- LIPOIC ACID

A number of reports indicating that chronic exposure of cells to oxidative stress and the subsequent damage to the cells can be prevented by administration of lipoic acid. This may be very important in conditions of high oxidative stress like neuronal inflammation, cardiovascular inflammation, AIDS, and other viral-induced inflammation, as reported in *Free Radical Biology & Medicine* (1997;22:1241).

Alpha lipoic acid is also a powerful antioxidant, effective in scavenging both water-and lipid-soluble free radicals, picks up some of the free radicals that vitamins C and E miss and is used to treat **diabetic polyneuropathy** by reducing excitotoxicity of glutamate.

Alpha-lipoic acid- 600 to 1800 mg/day can also improve insulin sensitivity in pts with type 2 diabetes. 600 -1200 mg/day may improve microcirculation and diabetic polyneuropathy.---Exp Clin Endocrinol Diabetes, 2000. 108(3): p.168-74.

6. FISH OIL (EPA/DHA)

Fish oil contains essential fatty acids known as Omega 3 EFAs, AND n-3 PUFAs. There are two particular fatty acids in fish that are important: Eicosapentaenoic Acid and Docosahexaenoic Acid, known as EPA and DHA respectively. Essential oils from plants are known as Alpha-linolenic Acid, and can be obtained from the green leaves of plants, in selected seeds, nuts, and legumes (eg, flax, canola, walnuts, and soy). However, there is data that suggests vegetarians don't convert enough of their Alpha-lenolenic acid completely to EPA and DHA and thus can have low levels in their red blood cell membranes.

Eating fish is certainly an acceptable way to get these wonderful oils in your body, especially cold water fish like mackerel, tuna, salmon, and sardines etc. However, due to environmental pollution, total mercury content in fish has become a hazard, particularly in large fish weighing 5 or more pounds. Fortunately, molecularly distilled fish oil is now available that contains no toxins like mercury. The best fish oil on the market today in my opinion is made by [Nordic Naturals](#).

Typically fish oil comes in gelatin capsules or in a liquid form that can be added to salads, bread, etc. I recommend an adult dose of about 600mg of EPA and about 400 mg of DHA per day. This daily supplementation will yield positive results including better cognitive function, improved circulation, eyesight, and athletic performance. However the dose can be much larger when dealing with various conditions of inflammation. For example, inflammatory bowel disease like ulcerative colitis or regional enteritis (Crohn's disease) may require 5,000 mg of EPA and 3,000mg of DHA to show improvement. There are numerous examples of the benefits of these oils in scientific literature:

- DHA is now recommended for pregnant and nursing mothers to help with the development of the baby's brain and eyes (Docosahexaenoic acid accounts for 40% of the membrane phospholipids in the brain). DHA is now being placed in infant formulas worldwide.
- Healthy seniors with normal plasma omega 3 levels show lesser decline in speed-related cognitive tests over a 3-year period.
- Omega 3 consumption has been explored extensively, and studies have reported that diets high in fish or fish oils are associated with a lower incidence of most types dementia.



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- Children at risk for childhood type I diabetes (autoimmune diabetes), those with either a family history of type I diabetes, or antibodies against insulin making cells in their blood, were given fish oils for a period of time and it was found that those with higher levels of EPA and DHA in their red blood cell membranes had a 37% decrease in developing diabetes. -JAMA Sept 26,2007 (Vol298,No.12)
- The large GISSI-Prevenzione clinical trial of 11,323 men and women with myocardial infarction provides convincing evidence of the benefits of fish oil supplementation. Dietary supplementation with omega 3 polyunsaturated fatty acids (1 g/day) significantly lowered the risk of cardiovascular death by 17-30%, and the overall risk of death by 14-20%. - Lancet.1999;354(9177):447-55.
- Fish oil has been shown to exert a mild blood pressure-lowering effect in both normal and mildly hypertensive individuals. As low a dose as 3g of EPA and DHA was shown to be associated with a drop of 5 mm Hg systolic and 3 mm diastolic. - ISSFAL news-letter.1996;3(4):2-5.
- There is considerable evidence that omega 3 fatty acids prevent cardiac arrhythmias, including inhibition of ventricular fibrillation and consequent cardiac arrest. - Lancet.2002;360(9344):1455-61.
- Depletion of omega 3 and omega 6 polyunsaturated fatty acids is seen in schizophrenia patients. Prostaglandins Leukot Essent Fatty Acids.2003;69:393-99.
- EPA has been found to be lower in autistic children. Many autistic children do well on an initial dose of 3 grams fish oil and 1 gram evening primrose oil. - J Clin Psychiatry 2003;64:848-49.
- Omega-3 therapy has been successfully applied to the treatment of patients with rheumatoid arthritis, inflammatory bowel disease, coronary artery disease, peripheral vascular disease, dysmenorrheal (PMS), cystic fibrosis, migraine headaches, schizophrenia, atopic eczema and multiple sclerosis. - Ann Rehum Dis., Ann Intern Med., Arch Int Med., Int J Vitam Nutr Res., Am J Obstet Gynecol., Lancet, Am J Clin Nutr., Am J Psychiatry., J Neurol Neurosurg Psychiatry.

7. PROBIOTICS

Within the normal healthy human digestive system resides a population of about 400 different microbial species. It is estimated that the total weight of these microbes is in the vicinity of six pounds, placing it among the body's largest "organs". The word *probiotic* (derived from the Greek and means "for life"). It appears that Nobel-laureate Eli metchnikov may have been correct in his assertion the live bacterial cultures are "the elixir of life."

The rationale for Probiotics is that the body contains a small ecology of microbes, collectively known as the gut flora. A number of these healthy bacterial types are often thrown out of balance by a wide range of circumstances including the use of some prescription drugs, excess alcohol, stress, disease, or exposure to toxic substances. Overall intestinal health can be compromised by several factors, including malnutrition, antibiotics, bacterial overgrowth, intestinal infections, food allergies, gluten intolerance, over the counter meds like Tylenol and aspirin, immune disorders and various other conditions. These factors that reduce concentration of beneficial organisms are particularly damaging such as frequent antibiotic use that results in overgrowth of yeast and pathologic bacteria. Probiotics may also reduce colon cancer risk by reducing the incidence and



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number of tumors. It is important for all individuals to supplement with high quality probiotics on a daily basis to insure a proper balance of healthy flora within the body.

More notes on Probiotics:

- A study showed an increased recurrence-free period in subjects with bladder cancer. - Urol Int 1992;49:125-9
- Exposure to stress is associated with reduced levels of beneficial bacteria and compromise of the immune system. - Nahrung.1987;31(5-6):443-47.
- Probiotics are extremely safe, even at high doses. - Eur J Nutr.2004;43(S2):118-73.
- Probiotic supplementation has been shown to be beneficial in antibiotic-associated diarrhea, cancer prevention, health promotion and H.pylori prevention. - Int J Infect Dis.1999., J Clin Gastroenterol.2005., Annu Rev Nutr.2002., Annu rev Nutr.2002.
- Trials demonstrated a primary therapy for ulcerative colitis, using doses of 10-75 billion cfu/day.- Gut.2004;53:1617-23.
- Several studies of IBS (irritable bowel) treatment with probiotics have utilized doses of 25-75 billion cfu/day of lactobacillus and bifidobacter, demonstrating decrease in flatus and improvement in quality-of-life symptom scores. - J Clin Gastroenterol.2004;38:S104-S106.
- Post-antibiotic therapies have been recommended at 20-25 billion cfu/day to help normalize flora. Treatment is usually for 3-4 weeks and can begin during antibiotic treatment. - Br Med J.2001;322:1327-29.
- Findings of several recent human trials suggest probiotics may help both gastrointestinal and systemic conditions. - Br J Nutr.2002;87(Suppl 2): S241-S246.
- Probiotics aid in digestion, enhance absorption of nutrients, combat diarrhea, and improve immune system.-Horizon Scientific Press,2004.
- Probiotics have been shown to have an antitumor activity. - Fuller R, Ed.Boston: Chapman and Hall, 1997.
- Supplementing pregnant women and then their infants for 6 months with probiotics resulted in a 50% reduction in asthma, eczema and allergy in children at 2 years of age. - Lancet.2001;357:1076-79.

8. PURE CAPSULATIONS ULTRASyNERGISTIC VITAMIN E:

One of the best sources of Vitamin E, this is a mixture of alpha, beta, gamma, and delta tocopherols. Alpha-Tocopherol is the only form of Vitamin E in vitamin supplements. Gamma-tocopherol is the predominant form of vitamin E in US diet. Studies have shown the mixture promotes free radical scavange activity in blood and tissues. The combination offers solid antioxidant support for fat membranes. Both gamma and alpha tocopherol support prostate function. A clinical trail supports the combination of the four tocopherols; they work better in combination to promote healthy platelet function. It is naturally derived from soy and there is no detectable GMO material in this product. Usual dose is 1-3 grams per day.



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Vitamin E was discovered by Evans and Bishop in 1922 as a vitamin necessary for reproduction in rats. Its function as an antioxidant was first described by Cummings and Mattill in 1931. Since then, its antioxidant function as a free radical scavenger protecting the organism against oxidative damage has been firmly established. Vitamin E occurs in plant sources in eight different analogs. Alpha-Tocopherol is the predominant form of the vitamin found in mammalian plasma and tissues. It is the only form present in vitamin supplements. Another form of vitamin E, gamma-tocopherol, is the principal vitamin E form in the US diet, being about 2.5 times as abundant in food as alpha-tocopherol. Its source is principally vegetable oils, and it is less active as an antioxidant than alpha-tocopherol. ---Wolf G. J Nutr. 2005; 135:363-366.

Vitamin E is the most potent, lipid-soluble antioxidant in blood – Am J Clin Nutr 2007;86:1392-8.

Epidemiologic studies suggest an association between increased antioxidant intake, esp. vitamin E alpha tocopherol, and reduced rates of morbidity and mortality from coronary artery disease.---J Nutr 2005;135(2):348-53.

High-dose alpha tocopherol supplementation in patients with CAD was safe and significantly reduced plasma biomarkers of oxidative stress and inflammation. –Am J Clin Nutr 2007; 86:1392-8.

In patients with coronary artery disease, a dose of alpha tocopherol (1200 IU/day) was shown to have a significant anti-inflammatory effect—J Nutr 2003;107(7): 926-8.

9. ASTAXANTHIN

Derived from Hawaiian Haematococcus pluvialis microalgae, astaxanthin is a stable, effective, fat-soluble anti-oxidant from the carotenoid family. It's a powerful antioxidant and anti-inflammatory, yields great benefits to the immune system, helps eliminate certain skin conditions like acne and is especially helpful to the eyes.

Astaxanthin was found to be an effective anti-tumor agent in a series of studies on mice and rats at the Gifu University School of Medicine in Japan (Mori, et al, 1997). One of these studies found that Astaxanthin significantly reduced both the incidence and the proliferation of chemically induced bladder cancer in mice (Tanaka, et al, 1994). Two other studies showed the same effects in the oral cavity and the colon of rats; Astaxanthin reduced the incidence and the proliferation of cancers when carcinogenic chemicals were introduced (Tanaka, et al, 1995a and Tanaka, et al, 1995b). Lastly, a few different studies have shown Astaxanthin's positive effects on cancer of the liver in rats (Gradelet, et al, 1997, Gradelet, et al, 1998, Yang, et al, 1997 and Kurihara, et al, 2002).

Astaxanthin may also be very effective for autoimmune conditions such as rheumatoid arthritis. While there has not been a large amount of research in this area to date, in one very significant double blind, placebo controlled study, sufferers of rheumatoid arthritis in the treatment group showed marked improvement in pain and quality of life levels as the study progressed over eight weeks (Nir and Spiller, 2002). This is a very important study in that it demonstrates how the benefits of Astaxanthin can make a real difference in the here and now to people with debilitating diseases.

Astaxanthin's outstanding properties as an anti-inflammatory also play a major role in its ability to enhance immune function. Due to the multitude of ways in which Astaxanthin combats inflammation, it is a very special anti-inflammatory indeed. While more human research would be welcome, it is evident from the vast amount of research already completed that Astaxanthin has outstanding immune enhancing effects, and may be an excellent aid in the prevention of cancer, in the reduction of tumors and in the treatment of people with inflammatory and autoimmune conditions.



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Astaxanthin protects liver damage by inhibiting lipid peroxidation and stimulating the cellular antioxidant system.- Methods Find Exp Clin Pharmacol. 2001 Mar;23(2):79-84. Links

Lipid peroxidation has an important role in pathological conditions including atherosclerosis. Astaxanthin is a ten-fold more potent antioxidant than other carotenoids. The main dietary sources of astaxanthin are aquatic animals including salmon, trout, red sea bream, shrimp, lobster and fish eggs. About 450 g of farmed rainbow trout or 800 g of wild salmon contain 4 mg of naturally occurring astaxanthin.-Int.J.Vitam.Nutr.Res.,77(1),2007,3-11.

Due to Natural Astaxanthin's superior antioxidant and anti-inflammatory properties, indications are that it will prove to be superior to all other nutraceuticals for eye and brain health. Scientists believe that something may cause people's internal antioxidant defense system to malfunction or wear out as we age. Our bodies may lose the ability to produce high levels of the antioxidants that are normally produced internally. Also, our bodies are now subjected to unprecedented levels of oxidation caused by environmental factors such as pollution, containments, processed food and the high levels of stress in modern life. All of these lead to an assault on our vital organs as we age, particularly our brains and eyes.

The eye, in particular is now subjected to much higher levels of oxidation than our ancestors' experienced. The depletion of the ozone layer is causing more intense sunlight than ever before, which directly affects the eyes and skin. Excessive exposure to sunlight and to the highly oxygenated environment cause free radicals to be generated in the eye.

Free radicals and singlet oxygen oxidize the polyunsaturated fatty acids in the retina which leads to functional impairment of the retinal cell membranes, causing temporary and permanent damage to the retinal cells. Once the retina is damaged, it cannot be replaced. Antioxidants that can reach the inner eye by crossing the blood-brain and blood-retinal barriers are essential because they protect the eye from these damaging conditions.

Some groundbreaking work was done by Dr. Mark Tso of the University of Illinois on Astaxanthin's benefits on the eyes. Dr. Tso was the first person who proved that Astaxanthin could cross the blood-brain and blood-retinal barriers, and then once in the brain it could reach the retina and the macula by crossing through the blood-retinal barrier.

We see a pattern emerging in which Astaxanthin attacks different problems in a multitude of ways. Perhaps someday researchers will discover that, similar to the case with single pathway anti-inflammatories like Vioxx, which have dangerous side effects, this multiple pathway "shotgun" approach to eye health is also the safest and most natural.

Since Dr. Tso's groundbreaking work, other scientists have found further benefits for the eyes when using Natural Astaxanthin. For example, **eye fatigue** is a serious problem in many of today's occupations. Working for long periods at visual display terminals reportedly induces various visual problems such as **eyestrain, blurring and diplopia** (a disorder of vision in which two images of a single object are seen because of unequal action of the eye muscles – also called **double vision**).

In a double blind study performed in Japan, after four weeks of supplementation with 5 mg of Astaxanthin per day (extracted from Haematococcus algae meal) the authors reported a 46% reduction in the number of eyestrain subjects. They also found higher accommodation amplitude (the adjustment in the lens of the eye that allows it to focus) in subjects who used visual display terminals. The mechanism of action is still not understood, but it's most likely due to Astaxanthin's potent antioxidant properties (Nagaki, et al, 2002).



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Additional studies have validated this work, showing that 6 mg per day of Natural Astaxanthin supplementation for four weeks can reduce eye soreness, dryness, tiredness and blurred vision (Shiratori, et al, 2005 and Nagaki, et al, 2006).

It is now believed that antioxidants may play a crucial role in ameliorating or indeed preventing photobiologic damage (phototoxicity, photoageing and cancers. –Journal of Dermatological Science 30 (2002) 73-84.

Astaxanthin showed a superior protection effect on photoaging in hairless mice. We were convinced that astaxanthin would be a novel and promising antioxidant for cosmetic applications to prevent chronic photoaging.–Carotenoid Science Vol5, April 2002.

Astaxanthin has been shown to protect the skin from ultraviolet light. Astaxanthin differs from other sun-protective carotenoids like beta-carotene and lycopene (from tomatoes) because it is effective at much smaller dosages. For example, it takes dosages of over 50 mg of beta-carotene to protect from sunburn while astaxanthin has been shown to protect at dosages of less than ten times as much.

Whereas all cells age, aging of cells is accelerated by the action of toxins and ultraviolet light in a process called free radical degeneration. Free radicals are highly reactive compounds which damage collagen, cell membranes, and the genetic machinery of the cells. Antioxidants such as vitamin C help protect the water soluble parts of the cell while vitamin E helps protect the cell membranes. Astaxanthin can protect both water soluble and fat soluble parts of the cell. This is because the molecules have both fat soluble and water soluble components. The other unusual capacity of astaxanthin is that it exhibits exceptionally strong antioxidant strength compared to other antioxidants when measured at very low concentrations. Astaxanthin is also anti-inflammatory, helping to quell the negative effects of rough conditions for the skin. Blustery winter weather, chaffing, pollution, and extreme weather can give us a rosy look but can be drying and parching to the skin.

10. VITAMIN C

Popularly known to have benefits to the immune system, Vitamin C is also one of the most important dietary antioxidants and provides nutritional support to all physiological functions. General areas of use Vitamin C are:

- As an antioxidant
- Promotes wound healing
- Prevents colds / Boosts immunity
- Protects against effects of stress
- Asthma
- Atherosclerosis
- Auto-immune disorders
- Cataracts
- Cervical dysplasia
- Crohn's disease
- Cancer
- Candida
- Capillary fragility and easy bruising
- Diabetes
- Eczema
- Gall bladder disease
- Dyspepsia, H Pylori infections and peptic ulcers



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- Gingivitis
- Glaucoma
- Herpes infections
- Essential hypertension
- Allergies and hives
- Macular degeneration
- Osteoarthritis and Rheumatoid arthritis
- Neurologic disorders: Multiple Sclerosis and Parkinsonism
- Infections
- Mitral valve prolapse
- Cardiovascular disease
- Preclampsia
- Wound healing
- Vit C can help restore the antioxidant potential of vitamin E
- Vitamin C also functions as an essential cofactor for the enzymes involved in the synthesis of collagen (structural protein of bones, skin, and cartilage)
- Vit C. is used as a preventive against infections such as influenza and other viruses.
- Support of immune cell function is also a key role performed by vitamin C and an effect which may help fight infections in their early stages.
- Vit C has anti-inflammatory effects that helps protect blood vessels from inflammation.
- Vit C levels are decreased in brain trauma. The greater the trauma the lower the Vit C levels
- Vit C taken intravenously kills cancer cells and may be beneficial in fighting infections by increasing intracellular peroxide
- Low Vit C status is associated with decreased fat oxidation during exercise. (In other words if one wishes to burn fat while exercising it would be wise to maintain optimum Vit C levels)
- Vit C's combined effects of cellular strengthening, collagen synthesis and antioxidant protection are thought to account for the multi-faceted approach by which it helps to maintain health
- vitamin C supplementation (500 mg/d) maintains reduced glutathione concentrations in blood and improves the overall antioxidant protection capacity of blood. Glutathione is an important antioxidant defense mechanism in living cells.---Am J Clin Nutr 1993; 58:103-5.
- Vit C improves ability of body to resist toxic effects of exposure to radioactivity. Guinea pigs that were supplemented with large doses of vitamin C (10 grams) were able to withstand twice the known lethal dosages of radioactivity-Davin-Adair Pub, 1973.
- Data indicates that vitamin C protects against stomach cancer-Cancer Epidemiol Biomarkers Prev.2001;10:1055-62.
- There is inverse association between Vit C and esophageal cancer.-Cancer Epidemiol Biomarkers Prev.2001;10:1055-62.

People who have normal blood clotting, but experience excessive bleeding, may be deficient in vitamin C, according to a new report in *Surgery*. While severe vitamin C depletion (known as scurvy) is rarely seen in the United States, this new report suggests subtle vitamin C deficiency may be more common than previously believed. Findings suggest that vitamin C supplementation may rapidly reverse the effects of vitamin C deficiency, including bleeding. The authors recommend a supplement of 500 to 1,000 mg per day of vitamin C for at least a month following surgery and perhaps longer if dietary intake of vitamin C is not sufficient. Vitamin C is an important nutrient for maintaining the integrity of blood vessel walls and plays a role in the production of collagen, the main protein component of connective tissue. When vitamin C becomes depleted or diminished, collagen does not form properly and becomes unstable and weak, leading to blood vessels that break easily and an increased tendency to bleed.



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Those most at risk of developing vitamin C deficiency include the elderly, smokers, heavy alcohol consumers, chronically ill people, fad dieters, or those who eat a diet low in fruits and vegetables, which are rich sources of vitamin C. The need for vitamin C likely increases during surgery due to increased demand to help heal wounds, fight infection (as vitamin C supports immune function), and possibly assist in metabolizing anesthetics. Blee TH, Cogbill TH, Lambert PJ. Hemorrhage associated with vitamin C deficiency in surgical patients. *Surgery* 2002;131:408-12.

Doctors have long wondered whether high intake of vitamin C increases risk of kidney stones. Dr. Wandzilak, MD, of the University of California Davis, noted in the *Journal of Urology* (April 1994;151:834-7) that increasing large quantities of vitamin C did not cause an increase in kidney stone formation in healthy subjects.

High doses of vitamin C protect against DNA damage in blood cells, eye lenses, and sperm. - Linus Pauling Institute. Large doses of vitamin C improve both quality and length of life for cancer patients. Supportive megavitamin C therapy also reduces hair loss and nausea from chemotherapy, enabling oncologists to give maximum strength treatments. - *International Journal of Vitamin and Nutritional Research Suppl.*

Individual needs for vitamin C vary greatly, especially during illness. A relatively small amount of C is often sufficient for normal health, whereas tens of thousands of milligrams may be absorbed during viral or bacterial illness, particularly if the dosage is frequently divided during the day. When sick, one should take the minimum that gets you well. One can expect very high minimums during illness. Doses should be measured in grams, not milligrams, up to bowel tolerance (saturation). Diarrhea is a marker of vitamin C saturation.