LifeExtension℠ Print This

Life Extension Mix™ Caps
490 capsules
Item Catalog Number: 834

Public service campaign are encouraging people to eat more fruits and vegetables to maintain a healthy lifestyle. Despite years of media publicity, 85 percent of Americans are not even eating the minimum recommendation of five servings of fruits and vegetables per day. Those who do report eating some produce often fail to consume the yellow and purple colored plants that are critical components of such a program.

Life Extension Mix™ contains 93 unique vegetable, fruit, and herbal extracts along with high-potency amino acids, vitamins, minerals, and special antioxidants. The Life Extension Mix formula is fortified with botanical extracts that help maintain healthy cells via physiological processes separate from traditional antioxidants. Consumption of these types of plants is being recommended based on research emanating from the world's most prestigious medical centers.

The newest ingredients in the Life Extension formula are two standardized blueberry extracts that provide the most active constituents found in this health-promoting fruit. Blueberry anthocyanins are considered nature's most potent antioxidants and have demonstrated properties that extend well beyond suppressing free radicals. Pterostilbene, another blueberry constituent, helps maintain healthy lipid and glucose levels in those already within normal range.* Even more exciting is that through their unique biological effects; pterostilbene and anthocyanins may help support DNA structure.* The new Life Extension Mix provides blueberry extracts standardized with both anthocyanins and pterostilbene.

Standardized green tea extract
The Life Extension Foundation introduced green tea extract as a supplement in 1993, based on epidemiological studies showing that those who consumed green tea had much lower incidences of common health problems. Over the past 12 years, an enormous amount of positive studies about the health benefits of green tea have been published.

Scientists have looked at the active polyphenol constituents of green tea and have found that they possess remarkable biological activity at t the cellular level. Researchers have also identified multiple mechanisms by which green tea extract helps maintain healthy DNA, protect healthy LDL oxidation, neuronal peroxidation, and a host of other adverse structural and functional age-related changes.*1-7

The new Life Extension Mix provides 325 mg of a decaffeinated green tea extract that is standardized to contain 302 mg of the polyphenols that scientists attribute to green tea's health benefits. The amount of polyphenols (including EGCG) in Life Extension Mix is equivalent to drinking about 3-6 cups of green tea per day.

Vegetable extracts

Luteolin is a flavonoid found in parsley, artichoke, basil, celery and other foods. When measured against 27 other flavonoids, luteolin provided the best DNA protection. One favorable mechanism of luteolin is its ability to inhibit oxidative damage to cellular DNA. Another unique benefit is luteolin's ability to suppress excess levels of dangerous inflammatory cytokines such as interleukin-6 and interleukin 1B.8 Life Extension Mix contains a standardized dose of 8 mg luteolin.

Broccoli is touted as one of the most important vegetables to help maintain healthy DNA. Broccoli contains several active constituents, with sulphoraphane being the most significant because of its unique detoxification and DNA protecting effects. The new Life Extension Mix provides a concentrated broccoli mixture that provides standardized extracts of sulphoraphane and glucosinolates, two compounds attributed to broccoli's multiple protective benefits. Broccoli is also a natural source of gene protecting chlorophyll.*9-13

D-glucarate is a botanical extract found in grapefruit, apples, oranges, broccoli and Brussels sprouts. D-glucarate effectively supports a detoxification process that helps to remove DNA toxins from the body.14,15 The daily dose of Life Extension Mix provides 200 mg D-glucarate.

Lutein, an extract found in spinach and collard greens, has been shown to help maintain critical pigments in the eye macula, while the carotenoid alpha-carotene has demonstrated antioxidant activity far grater than beta-carotene. Lycopene from tomatoes has shown potent effects in helping to maintain healthy DNA structure and protect against LDL oxidation. Life Extension Mix™ contains 60 times more lutein and 10 times more lycopene compared to Centrum(R). Most multivitamin supplements provide no vegetable extracts whatsoever.

Fruit extracts

Life Extension Mix is also fortified with fruit extracts such as bilberry, grape seed, grape skin, and citrus bioflavonoids to provide healthy circulation throughout the body and maintain healthy DNA.*

Ellagic acid is a detoxifying agent found in raspberries, strawberries, and other fruit. Ellagic acid has demonstrated DNA-protecting properties, including the ability to bind to toxins and neutralize them. Studies have also shown that ellagic acid may protect against chromosome damage and reduce the effects of chemically induced hepatic structural degeneration. Life Extension mix contains a raspberry and pomegranate fruit extract to deliver 50 mg of ellagic acid in each daily dose.

The media has publicized the multiple benefits of fruits such as blackberry, cranberry, elderberry, cherry, plums and persimmon. Life Extension Mix has a customized blend of these and other fruits that studies indicate provide multiple favorable effects in the body.

Olive oil consumption is one of the important factors behind the health benefits of the "Mediterranean Diet."16,17 Researchers have discovered that there are up to 300 times more polyphenol compounds in olive water compared to oil oil.18,19 Olive polyphenols have been the subject of numerous studies pointing toward their benefits in many different areas, including helping to protect against LDL oxidation, suppressing free radicals, and stabilizing cell membranes.20-22

Life Extension Mix contains a potent olive juice extract standardized to contain 7 percent of the best-documented polyphenol called hydroxytyrosol.23 The amount of hydroxytyrosol in Life Extension Mix is equivalent to drinking one ounce of virgin olive oil per day.24-25

Sesame lignans enhance the effects of vitamin E

Sesame and its lignans have a broad range of applications in human health. This includes increasing human tissue levels of vitamin E by facilitating carrier proteins in the liver to deliver nutrients to cells throughout the body.26,27

Sesame lignans increase the anti-inflammatory index of fish oils and help maintain healthy cholesterol/LDL levels in those already within normal range.*28-31 Life Extension Mix contains 10 mg sesame lignan extract to provide the direct benefits of the lignans and augment the effects of vitamin E and other nutrients in the body such as gamma-tocopherol and gamma-linolenic acid (GLA).

Maintaining healthy blood glucose levels

Chromium, along with magnesium and biotin, are nutrients required to maintain healthy blood sugar levels in those already within normal range. Life Extension Mix provides 500 mcg chromium, a better absorbed form of magnesium, and high potency of biotin. A review of studies showing the benefits of chromium supplementation reveals that doses exceeding 200 milligrams per day are required for optimal effects.32,33

High potency vitamin D3

Doctors used to be concerned that too much vitamin D could be toxic. Over the past few years, however, an increasing body of evidence indicates that it takes much higher doses of vitamin D (perhaps over 10,000 IU/day) to inflict toxicity on a healthy person. The concern expressed by researchers today is that fear of vitamin D toxicity is keeping many people from supplementing with enough vitamin D, which is critical for maintaining bone density. In response to studies showing that even those who take standard vitamin D supplements are not obtaining adequate amounts, Life Extension Mix provides 800 IU vitamin D3 per daily dose.

Life Extension Mix saves time and money by combining the most popular nutrient supplements in one product, eliminating the need to take separate bottles of B-complex, vitamins C and E, mineral supplements and much more that would be required to achieve the same effects. Life Extension Mix supplies the most powerful antioxidants, including water and fat soluble vitamin C, the ideal form of alpha vitamin E, and plant extracts that help protect against cellular DNA damage. Other ingredients in Life Extension Mix enhance beneficial DNA methylation patterns, and help maintain glycemic control and healthy levels of LDL in those already within normal range.*

Life Extension Mix is the cornerstone of a comprehensive supplement program because it provides so many well-studied nutrients. If you are on a budget, Life Extension Mix provides the best cost per milligram value. With the addition of two standardized blueberry extracts, Life Extension Mix has become an even greater value.

References

Supplement Facts

Serving Size 14 capsules (per day)	
Servings Per Container 35	
Amount Per Serving	
Vitamin A (as 20% Betatene® *D. salin*a natural beta-carotene with mixed carotenoids1, and 80% acetate)	5000 IU
Vitamin C (as ascorbic acid, calcium ascorbate, ascorbyl palmitate, magnesium ascorbate, niacinamide ascorbate, and acerola juice powder)	2000 mg
Vitamin D3 (as cholecalciferol)	800 IU
Vitamin E (as D-alpha tocopheryl succinate)	400 IU
Thiamine (vitamin B1) (as thiamine HCl)	125 mg
Riboflavin (vitamin B2) (with 2 mg riboflavin 5’ phosphate coenzyme)	50 mg
Niacin (vitamin B3) (as 53% niacinamide, 38% niacin, 9% niacinamide ascorbate)	190 mg
Vitamin B6 (as pyridoxine HCI with 2.5 mg pyridoxal 5’ phosphate coenzyme)	100 mg
Folic acid	800 mcg
Vitamin B12 (as 42% cyanocobalamin, 42% hydroxylcobalamin, 16% ion exchange resin)	600 mcg
Biotin	3000 mcg
Pantothenic acid (as D-calcium pantothenate with 5 mg pantethine)	600 mg
Calcium (as calcium ascorbate, D-calcium pantothenate, Calcium D-Glucarate2)	218 mg
Iodine (as potassium iodide)	75 mcg
Magnesium (as magnesium oxide, citrate, glycinate, taurinate, arginate, ascorbate)	325 mg
Zinc [as methionate (OptiZinc®3), zinc succinate]	35 mg
Selenium (as 50% se-methylselenocysteine, 25% L-selenomethionine (yeast free) (SelenoPure®4), and 25% sodium selenate)	200 mcg
Copper (as copper bisglycinate chelate)	1 mg
Manganese (as manganese gluconate)	1 mg
Chromium (as ChromeMate®5 chromium polynicotinate)	500 mcg
Molybdenum (as sodium molybdate)	125 mcg
Potassium (as potassium chloride)	37.4 mg
N-acetyl-L-cysteine (NAC)	600 mg
Taurine	500 mg

Choline (as choline bitartrate)	120 mg
Inositol	250 mg
Phosphatidylcholine (from soy)	150 mg
Bromelain (from pineapple)	15 mg
(2400 gelatin digestive units per gram)	
para-aminobenzoic acid (PABA)	200 mg
Trimethylglycine (TMG) (as betaine anhydrous)	100 mg
(from sugar beets)	
VitaBlue®9 Wild Blueberry (*Vaccinium angustifolium*)	150 mg
130:1 Extract (fruit) [standardized to 14% Total	
Phenolics (21 mg), 4.9% Total Anthocyanins	
(7.35 mg), 660 ppm Pterostilbene (0.1 mg)]	
Bilberry extract (*Vaccinium myrtillus*) (berry)	30 mg
[standardized for 25% anthocyanidins (7.5 mg)]	
Citrus bioflavonoid complex	1300 mg
[50% total bioflavonoids (650 mg)]	
Typical profile: (to equal 50% total bioflavonoids)	
Flavanone (Hesperidin) 35% (455 mg)	
Flavonones (Naringin, Naringenin 7-B-Rutinoside and others) 14% (182 mg)	
Flavonols, Flavones and related phenolic compounds 1% (13 mg)	
Ascorbyl palmitate (fat soluble vitamin C)	250 mg
Ginger root extract (*Zingiber officinale*) (root)	200 mg
[standardized for 5% gingerols (10 mg)]	
Leucoselect®6 grape seed extract (*Vitis vinifera*) (seeds)	25 mg
[standardized for 95% proanthocyanidins (23.75 mg)]	
BioVin®7 full spectrum grape extract (*Vitis vinifera* L.)	25 mg
(whole grapes) [standardized to 95% proanthocyanidins	
(23.75 mg), 75% total polyphenols as gallic acid	
monohydrate (18.75 mg), 200 ppm trans-resveratrol]	
Milk thistle extract (*Silybum marianus*) (seeds)	100 mg
[standardized for 85% silymarin (85 mg)]	
Dilaurylthiodipropionate	25 mg
Thiodiproprionic acid	25 mg
Acerola juice powder extract 1:4 (*Malpighia punicifolia* L.)	300 mg
(fruit)	
Alpha-carotene	100 IU
Broccoli concentrate complex (A proprietary blend of	525 mg
broccoli sprout concentrates and Calcium D-Glucarate2)	
(providing 1.5 mg sulforaphane and 5 mg glucosinolates)	
Calcium D-Glucarate2	200 mg
Boron (as boron citrate/aspartate/glycinate complex)	3 mg

Lutein (purified concentrate from marigold flowers) (*Tagetes erecta*) (providing 465 mcg zeaxanthin)	15 mg
Lycopene (from natural tomato extract) (Lyc-O-Mato®8)	3 mg
Luteolin [from perilla leaf extract (*Perilla frutescens*)]	8 mg
Raspberry leaf (*Rubus idaeus*) and pomegranate fruit (*Punica granatum* L.) extract [standardized for 32% ellagic acid (50 mg)]	156.5 mg
Green tea (*Camellia sinensis*) decaffeinated extract, powdered (leaf) [standardized to 93% polyphenols (302.25 mg), 34% Epigallocatechin gallate (EGCG) (110.5 mg)]	325 mg
Olive juice extract (fresh fruit) [standardized to 10% polyphenols (1.25 mg), 7% hydroxytyrosol (0.88 mg)]	12.5 mg
HiActives 100% fruit/berry complex (A proprietary blend of concentrated blackberry, blueberry, cranberry, elderberry, persimmon, plum, and cherry powders)	200 mg
Sesame seed (Sesamum indicum) lignan extract [standardized for 60% sesamin (6 mg)]	10 mg

Other ingredients: gelatin, rice flour, magnesium stearate, dicalcium phosphate.

Contains milk and soybeans. Contains corn, rice, and sesame. This product contains NO egg, fish, peanuts, crustacean shellfish, tree nuts, wheat, yeast, or gluten. Contains NO artificial sweeteners, flavors, or colors.

1 - Betatene® is a registered trademark of Cognis Nutrition and Health.
2 - The use of Calcium D-Glucarate is licensed from Applied Food Sciences, LLC under U.S. Patent No. 4,845,123.
3 - OptiZinc® is a registered trademark of InterHealth Nutritionals, Inc.
4 - SelenoPure® is a registered trademark of Nutrition 21.
5 - ChromeMate®, a patented, biologically active oxygen-coordinated niacin-bound chromium complex, is a registered trademark of InterHealth Nutritionals Inc., U.S. Patents No. 4,923,855; 4,954,492; 5,194,615.
6 - Leucoselect® is a registered trademark of Indena U.S.A.
7 - BioVin® is a registered trademark of Cyvex Nutrition.
8 - Lyc-O-Mato® is a registered trademark of LycoRed Natural Products Limited.
9 - VitaBlue® is a registered trademark of VDF Futureceuticals, Inc.

Dosage and Use

- Take fourteen capsules per day in divided doses with meals, or as recommended by a healthcare practitioner.

Caution

The niacin in this product may cause flushing (a feeling of warmth and reddening of the skin). This effect is temporary and harmless.

Warnings

- Keep out of reach of children.
- Do not exceed recommended dose.
- Do not purchase if outer seal is broken or damaged.
- If you have a bad reaction to product discontinue use immediately.
- When using nutritional supplements, please inform your physician if you are undergoing treatment for a medical condition or if you are pregnant or lactating.

Related Keywords

Multi Vitamin, Vitamins, Mix

LifeExtension℠ Print This

LE Magazine Special Edition, Winter 2005/2006

NEW LIFE EXTENSION MIX with Standardized Blueberry Extract





Public service campaigns are encouraging people to eat more fruits and vegetables to maintain a healthy lifestyle. Despite years of media publicity, 85% of Americans are not even eating the minimum recommendation of five servings of fruits and vegetables per day. Those who do report eating some produce often fail to consume the yellow and purple colored plants that are critical components of such a program.

Life Extension Mix™ contains 93 unique vegetable, fruit, and herbal extracts along with high-potency amino acids, vitamins, minerals, and special antioxidants. The Life Extension Mix formula is fortified with botanical extracts that help maintain healthy cells via physiological processes separate from traditional antioxidants. Consumption of these types of plants is being recommended based on research emanating from the world's most prestigious medical centers.

The newest ingredients in the Life Extension Mix formula are two standardized blueberry extracts that provide the most active constituents found in this health-promoting fruit.

Blueberry anthocyanins are considered nature's most potent antioxidants and have demonstrated properties that extend well beyond suppressing free radicals.

Pterostilbene, another blueberry constituent, helps maintain healthy lipid and glucose levels.* Even more exciting is that through their unique biological effects; pterostilbene and anthocyanins may help support DNA structure.*

The new Life Extension Mix provides blueberry extracts standardized with both anthocyanins and pterostilbene.

Standardized Green Tea Extract

The Life Extension Foundation introduced green tea extract as a supplement in 1993, based on epidemiological studies showing that

those who consumed green tea had much lower incidences of common health problems. Over the past 12 years, an enormous amount of positive studies about the health benefits of green tea have been published.



Scientists have looked at the active “polyphenol” constituents of green tea and have found that they possess remarkable biological activity at the cellular level. Researchers have also identified multiple mechanisms by which green tea extract helps maintain healthy DNA, protect against LDL oxidation, neuronal peroxidation, and a host of other adverse structural and functional age-related changes.*[1-7]

The new Life Extension Mix provides 325 mg of a decaffeinated green tea extract that is standardized to contain 302 mg of the polyphenols that scientists have attribute to green tea’s health benefits.

The amount of polyphenols (including EGCG) in Life Extension Mix is equivalent to drinking about 3-6 cups of green tea per day.



Vegetable Extracts

Luteolin is a flavonoid found in parsley, artichoke, basil, celery, and other foods. When measured against 27 other flavonoids, luteolin had the best DNA protection.

One favorable mechanism of luteolin is its ability to inhibit oxidative damage to cellular DNA. Another unique benefit is luteolin’s ability to suppress excess levels of dangerous inflammatory cytokines such as interleukin-6 and interleukin 1b.[8] Life Extension Mix contains a standardized dose of 8 mg of luteolin.

Broccoli is touted as one of the most important vegetables to help maintain healthy DNA. Broccoli contains several active constituents, with sulphoraphane being the most significant because of its unique detoxification and DNA protecting effects. The new Life Extension Mix provides a concentrated broccoli mixture that provides standardized extracts of sulphoraphane and gluco-sinolates, two compounds attributed to broccoli’s multiple protective benefits. Broccoli is also a natural source of gene protecting chlorophyll.*[9-13]

D-glucarate is a botanical extract found in grapefruit, apples, oranges, broccoli, and brussels sprouts.

D-glucarate effectively supports a detoxification process that helps to remove DNA toxins from the body.[14,15] The daily dose of Life Extension Mix provides 200 mg of D-glucarate.

Lutein, an extract found in spinach and collard greens, has been shown to help maintain critical pigments in the eye macula, while the carotenoid alpha carotene has demonstrated antioxidant

activity far greater than beta-carotene. Lycopene from tomatoes has shown potent effects in helping to maintain healthy DNA structure and protect against LDL oxidation. Life Extension Mix™ contains 60 times more lutein and 10 times more lycopene compared to Centrum®. Most multivitamin supplements provide no vegetable extracts whatsoever.

Fruit Extracts

Life Extension Mix is also fortified with fruit extracts such as bilberry, grape seed, grape skin, and citrus bioflavonoids to provide healthy circulation throughout the body and maintain healthy DNA.*

Ellagic acid is a detoxifying agent found in raspberries, strawberries, and other fruit. Ellagic acid has demonstrated DNA-protecting properties, including the ability to bind to toxins and neutralize them. Studies have also shown that ellagic acid may protect against chromosome damage and reduce the effects of chemically induced hepatic structural degeneration. Life Extension Mix contains a raspberry and pomegranate fruit extract to deliver 50 mg of ellagic acid in each daily dose.



The media has publicized the multiple benefits of fruits such as blackberry, cranberry, elderberry, cherry, plums, and persimmon. Life Extension Mix has a customized blend of these and other fruits that studies indicate provide multiple favorable effects in the body.

Olive oil consumption is one of the important factors behind the health benefits of the “Mediterranean Diet.”[16,17] Researchers have discovered that there are up to 300 times more polyphenol compounds in olive water compared to olive oil.[18,19] Olive polyphenols have been the subject of numerous studies pointing toward their benefits in many different areas, including helping to protect against LDL oxidation, suppressing free radicals, and stabilizing cell membranes.[20-22] Life Extension Mix contains a potent olive juice extract standardized to contain 7% of the best-documented polyphenol called hydroxytyrosol.[23] The amount of hydroxytyrosol in the daily dose of Life Extension Mix is equivalent to drinking one ounce of virgin olive oil a day.[24,25]

Sesame Lignans Enhance the Effects of Vitamin E

Sesame and its lignans have a broad range of applications in human health. This includes increasing human tissue levels of vitamin E by facilitating carrier proteins in the liver to deliver nutrients to cells throughout the body.[26,27]

Sesame lignans increase the anti-inflammatory index of fish oils and help maintain healthy cholesterol/LDL levels in humans.*[28-31]

Life Extension Mix contains 10 mg of sesame lignan extract to provide the direct benefits of the

lignans and augment the effects of vitamin E and other nutrients in the body such as gamma tocopherol and gamma linolenic acid (GLA).

Maintaining Healthy Blood Glucose Levels

Chromium, along with magnesium and biotin, are nutrients required to maintain optimal blood sugar levels. Life Extension Mix provides 500 mcg of chromium, a better absorbable form of magnesium, and a super high potency of biotin. A review of studies showing benefits of chromium supplementation reveals that doses exceeding 200 mcg a day is required for optimal effects.[32,33]

High Potency Vitamin D3

Doctors used to be concerned that too much vitamin D could be toxic. Over the past few years, however, an increasing body of evidence indicates that it takes much higher doses of vitamin D (perhaps over 10,000 IU/day) to inflict toxicity on a healthy person. The concern expressed by researchers today is that fear of vitamin D toxicity is keeping many people from supplementing with enough vitamin D, which is critical for maintaining bone density. In response to studies showing that even those who take standard vitamin D supplements are not obtaining adequate amounts, Life Extension Mix provides 800 IU of vitamin D3 per daily dose.

The Most Complete Multi-Nutrient Formula



Life Extension Mix saves time and money by combining the most popular nutrient supplements into one product, eliminating the need to take separate bottles of B-complex, vitamins C and E, mineral supplements, and much more that would be required to achieve the same effects.

Life Extension Mix supplies the most powerful antioxidants, including water and fat soluble vitamin C, the ideal form of alpha vitamin E, and plant extracts that help protect against cellular DNA damage. Other ingredients in Life Extension Mix enhance beneficial DNA methylation patterns, help maintain glycemic control, and healthy levels of LDL.*

Life Extension Mix is the cornerstone of a comprehensive supplement program because it provides so many well-studied nutrients. If you are on a budget, the Life Extension Mix provides the best “cost-per-milligram” value.

With the addition of two standardized blueberry extracts, the Life Extension Mix has become an even greater value.

Life Extension mandates that the ingredients in the Life Extension Mix come only from pharmaceutical grade suppliers. These premium companies charge more for their vitamins and trace

elements, but the purity of these substances greatly exceeds that of the lower cost generic versions that are so prevalent in the vitamin industry. Turn to the next page for a complete description of the new Life Extension Mix™ formula.

References

1. Fassina G, Vene R, Morini M et al. Mechanisms of inhibition of tumor angiogenesis and vascular tumor growth by epigallcatechin-3-gallate. Clin Cancer Res. 2004; 10(14):4865-73

2. Yang CS, Chung JY, Li C et al. Mechanisms of inhibition of carcinogenesis by tea. Biofactors 2000;13:(1-4):73-9.

3. Fujiki H. Two stages of cancer prevention with green tea. J. Cancer Res. Clin Oncol 1999 Nov;125 (11):589-97.

4. Xu JZ, Yeung SY, Chang Q et al. Comparison of antioxidant activity and bioavailability of tea epicatechins with their epimers. Br J Nutr. 2004 Jun;91(6):873-81.

5. Miyazawa T. Absorption, metabolism and antioxidative effects of tea catechins in humans. Biofactors 2000;13(1-4):55-9.

6. Xie D, Liu G, Zhu G et al. [-]-Epigallocatechin-3-gallate protects cultured spiral ganglion cells from H202-induced oxidizing damage. Acta Otolaryngol. 2004 May;124(4): 464-70.

7. Beliveau R, Gingras D. Green tea prevention and treatment of cancer by nutriceuticals. Lancet 2004 Sep 18;364(9439):1021-2.

8. Kotanidou A. Luteolin reduces lipopolysaccharide-induced lethal toxicity and expression of proinflammatory molecules in mice. Am J Respir Crit Care Med. 2003 Mar 15; 165(6):818-23.

9. Zhang Y, Callaway EC. High cellular accumulation of sulphoraphane, a dietary anticarcinogen, is followed by rapid transporter-mediated export as a glutathione conjugate. Biochem J. 2002 May 15;364(Pt 1):301-7.

10. Faulkner K, Mithen R, et al. Selective increase of the potential anticarcinogen 4-methylsulphinylbutyl glucosinolate in broccoli. Carcinogenesis. 1998 Apr;19 (4):605-9.

11. Vang O, Frandsen H, et al. Biochemical effects of dietary intakes of different broccoli samples. I. Differential modulation of cytochrome P-450 activities in rat liver, kidney, and colon. Metabolism. 2001 Oct;50 (10):1123-9.

12. Vang O, Mortensen J, et al. Biochemical effects of dietary intake of different broccoli samples. II. Multivariate analysis of contributions of specific glucosinolates in modulating cytochrome P-450 and antioxidant defense enzyme activities. Metabolism. 2001 Oct;50(10):1130-5.

13. Smith, TK, Mithen, R, Johnson, IT. Effects of brassica vegetable juice on the induction of

apoptosis of aberrant crypt foci in rat colonic mucosal crypts in vivo. Carcino genesis 2003 Mar: 24 (3):491-5.

14. Hanausek, M, Walaszek, Z, Slaga, TJ. Detoxifying cancer causing agents to prevent cancer. Integr Cancer Ther. 2003 Jun;2(2): 139-44.

15. Walaszek, Z, Szemraj, J, Narag, M, et al. Metabolism, uptake, and excretion of a D-glucaric acid salt and potential use in cancer prevention. Cancer Detect Prev. 1997;21(2):178-90.

16. Visioli, F, Galli, C. Biological properties of olive oil phytochemicals. Cri Rev Food Sci Nutr. 2002; 42(3):209-21.

17. Valavanidis, A, Nisiotou, C, Papageoriou, Y, et al. Comparison of the radical scavenging potential of polar and lipidic fractions of olive oil and other vegetable oils under normal conditions and after thermal treatment. J Agric Food Chem. 2004 Apr 21;52(8):2358-65.

18. Ranalli A, Lucera L, Contento S. Antioxidizing potency of phenol compounds in olive mill wastewater. J Agric Food Chem. 2003 Dec 17;51(26):7636-41.

19. Water-soluble Olive Polyphenols. Technical file, Inosud S.A. Groupe La Gardonnenque, updated 31/01/2003.

20. Valavanidis A, Nisiotou C, Papageoriou Y et al. Comparison of the radical scavenging potential of polar and lipidic fractions of olive oil and other vegetable oils under normal conditions and after thermal treatment. J Agric Food Chem. 2004 Apr 21;52(8):2358-65.

21. Carluccio MA, Siculella L, Ancora MA et al. Olive oil and red wine antioxidant polyphenols inhibit endothelial activation: antiatherogenic properties of Mediterranean diet phytochemicals. Arterioscler Thromb Vasc Biol. 2003 Apr 1;23(4):622-9.

22. Paiva-Martins F, Gordon MH, Gameiro P. Activity and location of olive oil phenolic antioxidants in liposomes. Chem Phys Lipids 2003 Jun; 124(1):23-36.

23. Visioli, F, Galli, C. Biological properties of olive oil phytochemicals. Cri Rev Food Sci Nutr. 2002; 42(3):209-21.

24. Haban P, Klvanova J, Zidekova E et al. Dietary supplementation with olive oil leads to improved lipoprotein spectrum and lower n-6 PUFAs in elderly subjects. Med Sci Monit. 2004 Apr;10(4):PI49-54.

25. Vissers MN, Zock PL, Katan MB. Bioavailability and antioxidant effects of olive oil phenols in humans – a review. Eur J Clin Nutr. 2004 Jun;58(6):955-65.

26. Parker RS, Sontag TJ. Cytochrome P-450 omega-hydroxylase pathway of tocopherol catabolism. Novel mechanism of regulation of vitamin E status. J Biol Chem. 2002 Jul 12;277(28):25290-6.

27. Meier R, Tomizaki T, Schulze-Briese C et al. The molecular basis of vitamin E retention: structure of human alpha-tocopherol transfer protein. J Mol Biol 2003 Aug 15;331(3:725-34.

28. Ikeda S, Kagaya M, Kobayashi K et al. Dietary sesame lignans decrease lipid peroxidation in rats fed docosahexaenoic acid. J Nutr Sci. Vitaminol [Tokyo). 2003 Aug;49(4):270-6.

29. Kang MH, Naito M, Sakai K et al. Mode of action of sesame lignans in protecting low-density lipoprotein against oxidative damage in vitro. Life Sci. 2000;66(2): 161-71.

30. Kang MH, Naito M, Tsujihara N et al. Sesamolin inhibits lipid peroxidation in rat liver and kidney. J Nutr. 1998 Jun;128(6):1018-22.

31. Christen S, Woodall AA, Shigenaga MK et al. Gamma-tocopherol traps mutagenic electrophiles such as NO(X) complements alpha-tocopherol: physiological implications. Proc Natl Acad Sci. USA 1997 Apr;94(7): 3217-22.

32. Crawford V, Scheckenbach R, Preuss HG. Effects of niacin-bound chromium supplementation on body composition of overweight African-American women. Diabetes Obes Metab. 1999 Nov;1(6):331-7.

33. Grant KE, Chandler RM, Castle AL et al. Chromium and exercise training: Effect on obese women. Med Science Sports Exer. 1997;29: 992-8.

LE Magazine January 2005

REPORT

What's Missing from Multi-Vitamin Supplements?

By Elizabeth Wagner, ND



Promoting a long, healthy life requires preventing diseases associated with poor lifestyle choices and normal aging. Collectively, cardiovascular disease, cancer, and diabetes account for approximately two thirds of all deaths in the US and about $700 billion in direct and indirect economic costs.[1]

Scientists are discovering that vitamins, minerals, amino acids, and plant phytochemicals have powerful impacts on many of the biochemical pathways that go awry in disease processes such as diabetes, cancer, and heart disease. Nutrients and phytochemicals work by many mechanisms to reduce inflammation, inhibit free radicals, prevent glycation reactions, help remove toxins from the body, increase natural antioxidant status, interfere with the proliferation of undesirable cell lines, optimize glucose metabolism, support healthy methylation reactions, and boost the circulatory system.

By arresting disease processes at the molecular and cellular levels, these therapeutic nutrients help arm us against the scourges of disease and aging, and thus build the foundation for a future of optimal health. In this article, we discuss some of the agents that have been identified by leading researchers as among the most promising in fighting illness and promoting health.

DIETARY CAROTENOIDS PREVENT PROSTATE CANCER

Chinese researchers investigated the effects of dietary intake of lycopene and other carotenoids on the prevention of prostate cancer in men.[6,7] Information on food consumption, including fruits and vegetables, was gathered using an interview and questionnaire. The researchers found that prostate cancer risk declined with increasing consumption of lycopene, alpha carotene,

Scientists at Harvard Medical School have advised all adults to take a multi-vitamin supplement to help prevent suboptimal levels of nutrients that may contribute to the onset of diseases such as cancer, heart disease, and osteoporosis.[2] For example, suboptimal levels of folic acid and vitamins B6 and B12 are a risk factor for cardiovascular disease and cancer of the colon and breast.[2] Deficient levels of calcium and vitamin D can contribute to osteoporosis and the loss of bone mass.[3] While multi-vitamins can help to prevent certain illnesses, research indicates that abundant intake of fruits and vegetables can prevent some of the major

beta-carotene, beta-cryptoxanthin, lutein, and zeaxanthin. Consumption of tomatoes, pumpkin, spinach, watermelon, and citrus fruits was also associated with a reduced risk of prostate cancer. The dose-response relationships were also significant in this study, suggesting that increasing one's intake of lycopene and other carotenoid-rich vegetables and fruits may offer protection from prostate cancer.

diseases of aging.[4] Studies at the UCLA Center for Human Nutrition in Los Angeles, CA, have reported that higher intake of fruits and vegetables is associated with a reduced incidence of many common forms of cancer.[4]



The World Cancer Research Fund published an extensive review of the effects of vegetable and fruit consumption on cancer risk.[5] After reviewing hundreds of studies, this not-for-profit group determined conclusively that vegetables and fruits protect against cancer. The panel noted that consumption of at least five servings a day of vegetables and fruits was associated with an approximately 50% reduced risk for cancer compared to the risk associated with consuming only one or two servings.[5] The panel also noted that the cancer-preventive effects of fruits and vegetables were dose dependent, with in-creased intake conferring greater protection.[5]

Compelling evidence likewise suggests that a diet rich in fruits and vegetables can lower the risk of heart disease, the leading cause of mortality and morbidity in the US and worldwide. People who consume more fruits and vegetables often have a lower prevalence of important risk factors for cardiovascular disease, including hypertension, obesity, and type II diabetes.[6] Regular and frequent consumption of fruits and vegetables has also been shown to lower the risk of coronary heart disease, stroke, atherosclerosis, and hypertension.[5,7]

A large study conducted in Finland examined the effects of dietary fruit, berry, and vegetable intake on cardiovascular mortality and all-cause mortality in men.8 More than 2,000 Finnish men participated in the study, with a mean follow-up time of 12.8 years. Men with the highest consumption of fruits, berries, and vegetables had a 41% lower risk of death from cardiovascular disease and a 44% lower risk of all-cause death than men who consumed the least amount of fruits, berries, and vegetables.[8] The study authors concluded, "…diets that are rich in plant-derived foods can promote longevity."[8]

FRUITS, VEGETABLES, AND BREAST CANCER RISK

While intake of fruits and vegetables has been correlated with a decreased risk of numerous cancers, how such intake influences breast cancer risk is less clear.

Researchers at the University of North Carolina investigated how fruit and vegetable intake relates to breast cancer, using a large, population-based, case-controlled study.[69] Intake of fruits, vegetables, and vitamin supplements was assessed in nearly 3,000 participants. Postmenopausal women who consumed the most vegetables experienced a 37% decreased risk of breast cancer compared to women with the lowest vegetable intake. Intake of carotenoids such as alpha carotene, beta-carotene, lutein, and (especially) lycopene was also associated with a decreased risk of breast cancer in postmenopausal women. By contrast, premenopausal women did not show a reduced breast cancer risk related to fruit and vegetable intake. The study authors concluded that fruit and vegetable consumption is associated with a decreased risk of breast cancer in postmenopausal women.

Fruits and vegetables not only contain beneficial vitamins, minerals, and enzymes, but also provide a wealth of phytonutrients. These plant-based compounds likely are responsible for some of the protective effects of fruits and vegetables. Phytonutrients are versatile and powerful agents that help to modulate disease risk through a variety of mechanisms. For example, the glucosinolates in broccoli have been associated with a reduced risk of cancer, particularly of the lung and gastrointestinal tract.[9] These compounds appear to offer protection by stimulating the liver's Phase II enzymes, which are powerful detoxifiers of chemical carcinogens.[10] By contrast, the polyphenols present in olive extract promote health through a different mechanism. In humans, olive polyphenols have been shown to increase the resistance of low-density lipoprotein (LDL) to oxidation.[11] Oxidized LDL is a significant risk factor for the development of heart disease and atherosclerosis.

Pomegranate Promotes Heart Health

The pomegranate is a widely cultivated tropical fruit that is native to Asia. Valued throughout history as a symbol of health and fertility, pomegranates contain many seeds enclosed in juicy red pulp and covered in a tough red rind. Pomegranate appears to be one of the most powerful sources of antioxidants among dietary plants, demonstrating a number of actions that can help prevent disease and aging.[12] Ellagic acid, a polyphenol compound found in pomegranate, has been associated with antioxidant, anti-cancer, and anti-atherogenic biological properties.[13] Pomegranate polyphenols have been found to protect LDL against cell-mediated oxidation.[14] In mice, polyphenol-rich pomegranate juice significantly inhibited the development of atherosclerotic lesions.[14]

In a study of pomegranate juice supplementation, atherosclerotic patients with carotid artery stenosis who consumed pomegranate juice for one year saw a significant reduction in their carotid intima-media thickness, a marker for coronary artery disease.[15] They also experienced a



significant reduction in their serum LDL basal oxidative state, an increase in their serum total antioxidant status, and a reduction in their systolic blood pressure.[15] The study investigators suggested that pomegranate poly-phenols may have been responsible for these effects.

Diabetics often experience elevated lipid levels and a correspondingly higher risk of heart disease. Pomegranate juice supplementation has been reported to improve lipid profiles in diabetics.[16] Diabetic men and women with hyperlipidemia consumed 40 grams of concentrated pomegranate juice daily for eight weeks. At the study's end, the participants demonstrated significant reductions in total cholesterol and LDL.[16] This important finding suggests that pome-granate juice may help to lessen the increased risk of heart disease associated with diabetes.

FRUITS AND VEGETABLES FOR HEALTHY BLOOD PRESSURE

High blood pressure often is a silent yet dangerous condition that increases the risk of heart disease and stroke. Diet has been reported to influence arterial blood pressure.

Researchers in Athens, Greece, investigated the effects of the Mediterranean diet—rich in fruits, vegetables, and olive oil—on blood pressure in adults.[68] Over 20,000 subjects who had never been diagnosed with hypertension participated in the study. Adherence to the Mediterranean diet was significantly associated with lower levels of systolic and diastolic blood pressure. By contrast, intake of cereals, meat and meat products, and ethanol was associated with higher levels of arterial blood pressure. A diet rich in fruits, vegetables, and olive oil has been demonstrated to promote healthy blood pressure levels.

LE Magazine January 2005

REPORT

What's Missing from Multi-Vitamin Supplements?

By Elizabeth Wagner, ND

Sesame Reduces Inflammation, Boosts Antioxidants

Sesamin, one of the lignans found in sesame seeds, has been reported to possess antioxidant effects and to scavenge reactive oxygen species.[17] It apparently acts as an anti-inflammatory as well, reducing inflammation by increasing levels of dihomo-gamma linolenic acid, a precursor of anti-inflammatory prostaglandin E1. Sesame also decreases production of pro-inflammatory prostaglandin E2 and leukotriene B4 by inhibiting delta-5 desaturase enzyme activity.[18] Studies in rats demonstrate that sesamin can lower serum lipids,[19] while other animal studies suggest that sesamin may prevent hypertension.[20]



The tocopherols, the family of nutrients that includes vitamin E, are believed to play an important role in preventing some major diseases associated with aging, including heart disease and cancer. In humans, consumption of a moderate amount of sesame seeds has been found to significantly increase blood levels of gamma tocopherol,[21] which appears to be an especially beneficial member of the vitamin E family. Animal studies likewise have demonstrated that intake of sesame seeds and sesame lignans, particularly sesamin, increases blood levels of gamma tocopherol.[22] Sesame and its lignans appear to offer numerous benefits, including promoting healthy vitamin E levels, reducing inflammation, and promoting healthy blood lipids and blood pressure.

Health Benefits of Olive Extract

Health-conscious adults have long prized olive oil. As the principal source of fat in the Mediter-ranean diet, olive oil has been associated with a lower incidence of coronary heart disease and certain cancers. Extra-virgin olive oil contains abundant phenolic compounds such as hydroxytyrosol that are responsible for its strong flavor and high stability.[23] Accu-mulating evidence indicates that the phenolic compounds in olives are powerful antioxidants (both in vitro and in vivo) and exert other potent biological actions that may be partly responsible for the health-promoting effects of the Mediterranean diet.[23]

One byproduct of the processing of olive oil is a water extract of olive that contains phenolic compounds that are strong scavengers of free radicals.[24] The most potent of these appears to be hydroxytyrosol, which has also demonstrated antibacterial activity.[24]

EATING LETTUCE IMPROVES CHOLESTEROL LEVELS

Although epidemiological studies have indicated that fruits and vegetables offer protection from numerous degenerative disorders such as cardiovascular disease, the exact mechanisms of their actions remain to be elucidated.

French researchers investigated the effects of lettuce ingestion on lipid metabolism and antioxidant status in rats.[70] Rats that were fed a diet of 20% lettuce for three weeks demonstrated a decreased ratio of low-density lipoprotein to high-density lipoprotein and a 41% decrease in liver cholesterol levels. Additionally, absorption of dietary cholesterol decreased by 37%, and excretion of total steroids, including cholesterol, increased by 44%. Lettuce intake significantly increased plasma levels of vitamin C and vitamin E, both of which contribute to plasma antioxidant capacity. The researchers concluded that lettuce consumption has a beneficial effect on cholesterol metabolism, improves antioxidant status, and should help protect against cardiovascular disease.

In-vitro studies have demonstrated that olive polyphenols increase LDL's resistance to oxidation.[25] In a recent study examining whether this effect occurs in humans, subjects consumed virgin olive oil containing differing concentrations of phenolic compounds over the course of three weeks.[10] Consumption of olive oil resulted in a decrease of in-vivo oxidized LDL, an increase in ex-vivo resistance of LDL to oxidation, and an increase in high-density lipoprotein (HDL).[10] These effects were more pronounced in those who consumed olive oil with higher concentrations of polyphenols, suggesting that the polyphenols were responsible for the beneficial effects of preventing LDL oxidation and boosting HDL.[10]

A high intake of antioxidants is protective against the oxidative stress that is involved in the onset of several degenerative diseases. Animal studies suggest that olive polyphenols may protect against oxidative stress by sparing the consumption of vitamin E, a critical antioxidant, during normal physiological processes.[26] Another study in animals found that hydroxytyrosol offered protection from the oxidative stress associated with inhaling sidestream smoke.[27]

Because dietary sources of olive oil may not provide enough of the potent polyphenols needed to obtain maximal antioxidant benefits,[28] a potent supplemental dose rich in hydroxytyrosol is recommended.

Green Tea: Cancer Preventive and Cardioprotective

Tea consumption has been associated with reduced risk for numerous diseases, including cancer, coronary heart disease, stroke, and osteoporosis.[29] Green tea is known for its antioxidant effects. Its main constituent is a polyphenol called epigallocatechin-3 gallate, or EGCG. Polyphenols may be responsible for green tea's cancer-preventive effects. In-vitro studies show that green tea polyphenols potently induce apoptotic cell death and cell cycle arrest in tumor cells, but not in their normal cell counterparts.[30] Various animal studies have shown that green tea inhibits tumor incidence and multiplicity in different organ sites such as the skin, lungs, liver, stomach, mammary glands, and colon.[30] EGCG has been demonstrated to inhibit cyclooxy-genase-2 (COX-2) in human prostate carcinoma cells.[31] Over-expression of COX-2 has been implicated in many pathological conditions, including cancer.[31]

Green tea extract helps protect the cardiovascular system. EGCG has been found to reduce LDL oxidation,[32] which has been implicated in the formation of atherosclerotic plaques in the cardiovascular system. Green tea consumption has been associated with a lower incidence of coronary artery disease.[33] A recent study demonstrated that regular consumption of green tea reduces the risk of developing hypertension,[34] which accelerates atherogenesis and is associated with an increased risk of stroke.

Epidemiological studies suggest that green tea may play a role in preventing type II diabetes, while human studies have shown that green tea promotes healthy glucose metabolism.[35] In diabetic mice, green tea lowered blood glucose levels,[35] suggesting its promise in promoting healthy blood sugar levels.

Oxidative stress is known to play a pivotal role in the development of neurodegenerative diseases. Researchers are examining wheth-er green tea, with its potent poly-phenols, may protect the nervous system and alter brain aging. Ongoing epidemiological studies are investigating whether green tea may help to prevent progressive neurodegenerative disorders such as Parkinson's disease and Alzheimer's disease.[36]

DIET AFFECTS COLORECTAL CANCER RISK

Colorectal cancer is the second leading cause of cancer death in men and women combined. Investigators in the United Kingdom examined the effects of vegetable, fruit, and meat intake in relation to colorectal cancer and genes that modify cancer risk.[71] Fruit and vegetable consumption was found to be protective against colorectal cancer, while overall meat and red meat consumption were found to increase cancer risk.

Many genes have been identified that encode for the enzymes involved in the metabolism of dietary carcinogens or anticarcinogens. The UK researchers found that one of these genes, GSTT1, appears to be related to the protective effect of vegetables. People with deficient or intermediate GSTT1 phenotypes experienced a protective effect of vegetable consumption against colorectal cancer, while other participants did not. The study demonstrated that both dietary and genetic factors are involved in modulating colorectal cancer risk.

Broccoli: Broad-Spectrum Cancer Protection

Broccoli is a rich source of disease-preventive compounds. D-glucarate from broccoli has been shown to be an effective phytonutrient against cancer, offering cancer protection by supporting healthy mechanisms of detoxification. Specifically, D-glucarate inhibits beta-glucuronidase, an enzyme found in certain gut bacteria.

One important mechanism by which the body eliminates toxic chemicals and hormones is by attaching glucuronic acid to them in the liver. Through the process of glucuronidation, the body removes carcinogenic substances such as nitrosamines, polycylic aromatic hydrocarbons,

KEEP AN EYE ON FRUITS AND VEGETABLES

Age-related macular degeneration is the leading cause of vision loss in the elderly. Researchers at Harvard Medical School examined the effects of dietary fruits and vegetables on age-related maculopathy in a study involving over 100,000 participants.[73] People who consumed three or more daily servings of fruit experienced a 44% lower risk of developing neovascular age-related maculopathy, though vegetable intake was not correlated with a decreased risk of maculopathy in this study.

sex steroid hormones, and heterocylic amines. Beta-glucuronidase breaks the bond between these harmful metabolites and glucuronic acid, allowing toxins to be reabsorbed by the body. Elevated beta-glucuronidase activity has been correlated with increased risk for cancers, particularly hormone-dependent cancers such as breast, prostate, and colon cancers.[37] By inhibiting beta-glucuronidase, D-glucarate supports the body's excretion of toxins and hormones.



High intake of cruciferous vegetables has been associated with a reduced risk of cancer, particularly of the lung and gastrointestinal tract.[8] This protective effect has been linked to the presence of glucosinolates,[8] which are metabolized to compounds that have been shown to be powerful inducers of the liver's Phase II detoxification enzymes.[9] These liver enzymes are known to protect against chemical carcinogenes.[9] Induction of Phase II enzymes also promotes the scavenging of free radicals and may relieve oxidative stress, thereby ameliorating hypertension and atherosclerotic changes.[38]

Numerous studies show that broccoli may contain more cancer-preventive nutrients than any other plant. In addition to containing D-glucarate, broccoli is rich in sulforaphane, a compound that has been found to block the formation of tumors initiated by chemical carcinogens and to induce cancer cell death.[39] Sulforaphane and other broccoli compounds have been shown to prevent cancer by supporting the liver's Phase II detoxifying enzyme systems.[40] Broccoli sprouts contain 30-50 times more of these protective chemicals than are found in mature broccoli plants.[41]

FRUITS AND VEGETABLES CUT OBESITY RISK

Excess weight and obesity are increasingly prevalent health problems, contributing to 280,000 premature deaths each year in the US. Overweight and obese individuals experience an increased risk of developing diabetes and heart disease.

In a recent study, Northwestern University researchers examined the effects of fruit and vegetable consumption on obesity and weight gain in women.[74] More than 74,000 women who were free of cardiovascular disease, cancer, and diabetes at the study's onset were followed for 12 years. Dietary information was collected using a food frequency questionnaire. After 12 years, the women who consumed the largest amounts of fruits and vegetables were found to have a 24% lower risk of becoming obese compared to those who had the lowest fruit and vegetable intake. The study authors concluded that increasing intake of fruits and vegetables may reduce the long-term risk of obesity and weight gain in middle-aged women.

LE Magazine January 2005

REPORT

What's Missing from Multi-Vitamin Supplements?

By Elizabeth Wagner, ND

The Role of Flavonoids and Carotenoids

Luteolin, a flavonoid found in parsley, artichoke, basil, celery, and other foods, has been found to actively scavenge free radicals.[42] Perilla leaf, one of the richest sources of luteolin, is known to inhibit inflammation, allergic response, and the production of tumor necrosis factor-alpha.[43] In studies involving human cancer cell lines, luteolin greatly sensitized apoptotic cell death induced by tumor necrosis factor-alpha, suggesting a role for luteolin as an anti-cancer agent.[44] Luteolin has also been demonstrated to be a potent inhibitor of thyroid cancer cell lines in vitro.[45]

Carotenoids are brightly colored pigments found in fruits and vegetables. Lutein, an antioxidant in the carotenoid family, is found in the macula, the central area of the eye's retina. It may act as a filter to protect the macula from damaging forms of light. Lutein is associated with protection from age-related macular degeneration, the leading cause of blindness in older adults.[46]

Lycopene, another carotenoid, is a potent antioxidant found in its highest concentrations in tomato products. Lycopene has been found to offer protection from prostate cancer, the second leading cause of cancer death in men,[47] as well as from other cancers such as breast cancer.[48] High intake of lycopene has been associated with a reduced risk for heart disease,[49] and also helps prevent LDL oxidation.[50]

GOOD HEALTH COMES IN MANY COLORS

The various colors of fruits and vegetables help to promote optimal health, according to the federal Centers for Disease Control and Prevention (CDC).[72]

By choosing a variety of colors, people are more likely to consume the recommended five to nine daily servings of fruits and vegetables. Red foods such as tomato, pink grapefruit, and watermelon contain the powerful antioxidant lycopene, which has demonstrated benefits for fighting heart disease and cancer. Green foods such as spinach, kale, and collards contain the carotenoids lutein and zeaxanthin, which help protect eye health. The

Fruits Rich in Antioxidants

Rich in vitamins, fiber, and phytochemicals, fruits are an excellent source of antioxidants[12] and may provide protection from cancer by inhibiting angiogenesis.[51] Current research suggests that some of the most beneficial health-promoting fruits are blueberries, bilberries, blackberries, cranberries, elderberries, cherries, plums, persimmons, and grapes.

Blueberries have been found to possess powerful antioxidant effects, as measured by

cruciferous vegetables contain several phytochemicals that help prevent cancer. Orange and yellow foods provide vitamin C, beta-carotene, and folate, helping to protect immune and heart health. Blue and purple foods offer proanthocyanadins, powerful antioxidants that protect eye health and help defend the body from carcinogens. White vegetables such as onions, garlic, and leeks contain compounds such as allicin, known to help lower cholesterol and blood pressure. The CDC recommends that when it comes to fruits and vegetables, people should seek not only abundant quantity but also the full spectrum of colors.



their capacity to absorb oxygen radicals.[51] In one animal study, supplementation with blueberry extract prevented memory loss associated with brain aging.[52] Bilberry is a close relative of the American blueberry. Its ripe berries are a rich source of flavonoids that improve microcapillary circulation, decrease capillary permeability and fragility, and inhibit platelet aggregation.[53] Bilberry consumption has been associated with a lower risk of cardiovascular disease and with improved visual function.[54] Bilberry has also been reported to lower blood glucose levels and to prevent diabetic retinopathy.[53]

Blackberry extract has been used as a traditional herbal treatment for diabetes.[55] In animal models, blackberry extract has demonstrated protective effects against inflammation[56] and endotoxins.[57] Cranberry has long been known for its efficacy in preventing urinary tract infections.[58] Recent research indicates that cranberry may also inhibit the proliferation of certain human tumor cell lines.[59] Elderberry extract has been used for centuries to treat colds, flu, sinusitis, and viral infections. Contemporary research confirms its efficacy in supporting a healthy immune system, and suggests possible applications for its use in supporting immune health in people who have cancer or the human immunodeficiency virus (HIV).[60]

Cherry fruit has been used as a folk remedy for gout for many years. Human research indicates that cherries lower plasma levels of urate, a metabolic marker that is elevated in gout.[61] Cherry consumption has also been found to lower plasma levels of C-reactive protein, a marker of inflammation.[61] Plums are a potent source of antioxidant activity, with one serving providing antioxidant protection equivalent to 144-889 mg of vitamin C.[62] Persimmon fruit has demonstrated antioxidant and cholesterol-lowering effects in animal studies,[63] and components of its extract have shown cytotoxic activity against human carcinoma cells.[64] A rich source of dietary fiber, phenolic compounds, minerals, and trace elements, persimmon has been proposed as a valuable component of an

FLAVONOIDS FOUND TO PREVENT DEMENTIA

Plants such as fruits, vegetables, and green tea are rich sources of powerful antioxidants called flavonoids. Because oxidative stress is thought to play a role in dementia, French scientists investigated whether dietary intake of flavonoids could offer a protective effect.[75]

A group of 1,367 subjects over the age of 65 was followed for five years. A questionnaire was used to evaluate their intake of flavonoids. Those who consumed the most flavonoids experienced a 51% lower relative risk of developing dementia than those who

anti-atherosclerotic diet.[65]

consumed the least amount. Since fruits, vegetables, and green tea are rich in flavonoids, these foods may be helpful in preventing dementia.

Grape seed extract possesses powerful antioxidant effects that protect the body from premature aging and disease.[66] Grape seed contains proanthocyanidins, beneficial polyphenol substances whose effects include promoting youthful skin, supporting joint flexibility, and improving vision.[66] The proanthocyanidins in grape seed extract may improve blood circulation by strengthening capillaries, arteries, and veins.[66]

Choosing a Multi-Nutrient Formula

While the market is flooded with multi-nutrient formulas, few stand up to a careful analysis of purity and potency. Many formulas contain only the US government's recommended dietary allowance (RDA) of vitamins. While the RDA may be sufficient to prevent diseases such as scurvy, extensive studies have demonstrated that promoting optimal health requires nutrients in amounts that far exceed the RDA. Additionally, many of today's multi-vitamin supplements use components that are inferior in quality compared to the pharmaceutical-grade nutrients used in premium products.

Research also shows that the body more readily uses certain forms of vitamins and minerals than others. Many vitamin combinations on the market today use the cheapest available forms of vitamins and minerals. These are difficult for the body to absorb and use, and thus provide only marginal nutritional support. When choosing a multi-vitamin product, it is advisable to seek not only high potencies of nutrients, but also formulations designed for optimal absorption and use by the body.

Vitamins and minerals play crucial roles in optimizing health and preventing disease, through mechanisms as diverse as maintaining normal homocysteine levels and reducing the occurrence of damaging glycation reactions.

FRUITS, VEGETABLES, AND CANCER PREVENTION

To determine the relationship between vegetable and fruit intake and cancer risk, scientists at the World Cancer Research Fund in London, England, reviewed over 200 human epidemiological studies and 22 animal studies.[76] They found evidence for a protective effect of greater fruit and vegetable consumption against cancers of the stomach, esophagus, lung, oral cavity and pharynx, endometrium, pancreas, and colon.

The types of foods that most often appeared to be protective against cancer were raw vegetables, including those in the allium family (onions, garlic, chives, leeks, and shallots), carrots, green vegetables, cruciferous vegetables, and tomatoes. The scientists noted that numerous substances in fruits and vegetables may confer cancer protection, including dithiolethiones, isothiocyanates, indole-3-carbinol, allium compounds, isoflavones, protease inhibitors, saponins, phytosterols, vitamin C, D-limonene, lutein, folic acid, beta-carotene, lycopene, selenium, vitamin E, flavonoids, and dietary fiber. The researchers also noted other possible health effects of increased fruit and vegetable consumption, including benefits against

cardiovascular disease, diabetes, stroke, obesity, diverticulosis, and cataracts.

References

1. Eyre H, Kahn R, Robertson RM, et al. Preventing cancer, cardiovascular disease, and diabetes: a common agenda for the American Cancer Society, the American Diabetes Association, and the American Heart Association. Stroke. 2004 Aug;35(8):1999-2010.

2. Fletcher RH, Fairfield KM. Vitamins for chronic disease prevention in adults: clinical applications. JAMA. 2002 Jun;287(23):3127-9.

3. Daniele ND, Carbonelli MG, Candeloro N, Iacopino L, De Lorenzo A, Andreoli A. Effect of supplementation of calcium and Vitamin D on bone mineral density and bone mineral content in peri- and post- menopause women; A double-blind, ran- domized, controlled trial. Pharmacol Res. 2004 Dec;50(6):637-41.

4. Heber D. Vegetables, fruits and phytoestrogens in the prevention of diseases. J Postgrad Med. 2004 Apr-Jun;50(2):145-9.

5. Available at: http://dccps.nci.nih.gov/ 5ad_2_evi.html. Accessed October 29, 2004.

6. Bazzano LA, Serdula MK, Liu S. Dietary intake of fruits and vegetables and risk of cardiovascular disease. Curr Atheroscler Rep. 2003 Nov;5(6):492-9.

7. Srinath Reddy K, Katan MB. Diet, nutrition and the prevention of hypertension and cardiovascular diseases. Public Health Nutr. 2004 Feb;7(1A):167-86.

8. Rissanen TH, Voutilainen S, Virtanen JK, et al. Low intake of fruits, berries and vegetables is associated with excess mortality in men: the Kuopio Ischaemic Heart Disease Risk Factor (KIHD) Study. J Nutr. 2003 Jan;133(1):199-204.

9. Lund E. Non-nutritive bioactive constituents of plants: dietary sources and health benefits of glucosinolates. Int J Vitam Nutr Res. 2003 Mar;73(2):135-43.

10. Munday R, Munday CM. Induction of phase II detoxification enzymes in rats by plant-derived isothiocyanates: comparison of allylisothiocyanate with sulforaphane and related compounds. J Agric Food Chem. 2004 Apr;52(7):1867-71.

11. Marrugat J, Covas MI, Firo M, et al. Effects of differing phenolic content in dietary olive oils on lipids and LDL oxidation—a random ized controlled trial. Eur J Nutr. 2004 Jun;43(3):140-7.

12. Blomhoff R. [Antioxidants and oxidative stress]. Tidsskr Nor Laegeforen. 2004 Jun;124(12):1643-5.

13. Seeram NP, Lee R, Heber D. Bioavailability of ellagic acid in human plasma after consumption of

ellagitannins from pomegranate (Punica granatum L.) juice. Clin Chim Acta. 2004 Oct;348(1-2):63-8.

14. Aviram M, Dornfeld L, Kaplan M, et al. Pomegranate juice flavonoids inhibit low-density lipoprotein oxidation and cardiovascular diseases: studies in atherosclerotic mice and in humans. Drugs Exp Clin Res. 2002;28(2-3):49-62.

15. Aviram M, Rosenblat M, Gaitini D, et al. Pomegranate juice consumption for 3 years by patients with carotid artery stenosis reduces common carotid intima-media thickness, blood pressure and LDL oxidation. Clin Nutr. 2004 Jun;23(3):423-33.

16. Esmaillzadeh A, Tahbaz F, Gaieni I, Alavi- Majd H, Azadbakht L. Concentrated pomegranate juice improves lipid profiles in diabetic patients with hyperlipidemia. J Med Food. 2004 Fall;7(3):305-8.

17. Hou RC, Wu CC, Yang CH, Jeng KC. Protective effects of sesamin and sesamolin on murine BV-2 microglia cell line under hypoxia. Neurosci Lett. 2004 Aug;367(1):10-3.

18. Utsunomiya T, Shimada M, Rikimaru T, et al. Antioxidant and anti-inflammatory effects of a diet supplemented with sesamin on hepatic ischemia-reperfusion injury in rats. Hepatogastroenterology. 2003 Sep- Oct;50(53):1609-13.

19. Ashakumary L, Rouyer I, Takahashi Y, et al. Sesamin, a sesame lignan, is a potent inducer of hepatic fatty acid oxidation in the rat. Metabolism. 1999 Oct;48(10):1303-13.

20. Nakano D, Itoh C, Takaoka M, Kiso Y, Tanaka T, Matsumura Y. Antihypertensive effect of sesamin. IV. Inhibition of vascular superoxide production by sesamin. Biol Pharm Bull. 2002 Sep;25 (9):1247-9.

21. Cooney RV, Custer LJ, Okinaka L, Franke AA. Effects of dietary sesame seeds on plas- ma tocopherol levels. Nutr Cancer. 2001;39(1):66-71.

22. Yamashita K, Ikeda S, Obayashi M. Comparative effects of flaxseed and sesame seed on vitamin E and cholesterol levels in rats. Lipids. 2003 Dec;38(12):1249-55.

23. Visioli F, Galli C, Plasmati E, et al. Olive phenol hydroxytyrosol prevents passive smoking-induced oxidative stress. Circulation. 2000 Oct; 102(18):2169-71.

24. Tuck KL, Hayball PJ. Major phenolic compounds in olive oil: metabolism and health effects. J Nutr Biochem. 2002 Nov;13(11):636-44.

25. Leenen R, Roodenburg AJ, Vissers MN, et al. Supplementation of plasma with olive oil phenols and extracts: influence on LDL oxi- dation. J Agric Food Chem. 2002 Feb;50(5):1290-7.

26. Wiseman SA, Tijburg LB, van de Put FH. Olive oil phenolics protect LDL and spare vitamin E in

the hamster. Lipids. 2002 Nov;37(11):1053-7.

27. Visioli F, Galli C. Antiatherogenic components of olive oil. Curr Atheroscler Rep. 2001 Jan;3(1):64-7.

28. Vissers MN, Zock PL, Katan MB. Bioavailability and antioxidant effects of olive oil phenols in humans: a review. Eur J Clin Nutr. 2004 Jun;58(6):955-65.

29. Siddiqui IA, Afaq F, Adhami VM, Ahmad N, Mukhtar H. Antioxidants of the beverage tea in the promotion of human health. Antiox Redox Signal. 2004 Jun;6(3):571-82.

30. Chen D, Daniel KG, Kuhn, et al. Green tea and polyphenols in cancer prevention. Front Biosci. 2004 Sep;9:2618-31.

31. Hussain T, Gupta S, Adhami VM, Mukhtar H. Green tea constituent epigallocatechin- 3-gallate selectively inhibits COX-2 without affecting COX-1 expression in human prostate carcinoma cells. Int J Cancer. 2004 Sep 28 [Epub ahead of print].

32. Katsube T, Tabata H, Ohta Y, et al. Screening for antioxidant activity in edible plant products: comparison of low-density lipoprotein oxidation assay, DPPH radical scavenging assay, and Folin-Ciocalteu assay. J Agric Food Chem. 2004 Apr;52(8):2391-6.

33. Sano J, Inami S, Seimiya K, et al. Effects of green tea intake on the development of coronary artery disease. Circ J. 2004 Jul;68(7):665-70.

34. Yang YC, Lu FH, Wu JS, Wu CH, Chang CJ. The protective effect of habitual tea consumption on hypertension. Arch Intern Med. 2004 Jul;164(14):1534-40.

35. Tsuneki H, Ishizuka M, Terasawa M, Wu JB, Sasaoka T, Kimura I. Effect of green tea on blood glucose levels and serum proteomic patterns in diabetic (db/db) mice and on glucose metabolism in healthy humans. BMC Pharmacol. 2004 Aug; 4(1):18.

36. Weinreb O, Mandel S, Amit T, Youdim MB. Neurological mechanisms of green tea polyphenols in Alzheimer’s and Parkinson’s diseases. J Nutr Biochem. 2004 Sep;15(9):506-16.

37. Walaszek, Szemraj J, Narog M, et al. Metabolism, uptake, and excretion of a D- glucaric acid salt and its potential use in cancer prevention. Cancer Detect Prev. 1997;21(2):178-90.

38. Wu L, Ashraf MH, Facci M, et al. Dietary approach to attenuate oxidative stress, hypertension, and inflammation in the cardiovascular system. Proc Natl Acad Sci USA. 2004 May;101(18):7094-9.

39. Gamet-Payrastre L, Li P, Lumeau S, et al. Sulforaphane, a naturally occurring isiothio-cyanate, induces cell cyle arrest and apopto- sis in HT 29 human colon cancer cells. Cancer Res. 2000 Mar;60 (5):1426-33.

40. Kensler TW, Curphey TJ, Maxiuntenko Y, Roebuck BD. Chemoprevention by organosulfur inducers of phase 2 enzymes: dithiolethiones and dithiins. Drug Metabol Drug Interact. 2000;17(1-4):3-22.

41. Fahey JW, Zhang Y, Talalay P. Broccoli sprouts: an exceptionally rich source of inducers of enzymes that protect against chemical carcinogens. Proc Natl Acad Sci USA. 1997 Sep;94 (19):10367-72.

42. Kosar M, Dorman HJ, Can Baser KH, Hiltunen R. Screening of free radical scavenging compounds in water extracts of Mentha samples using a postcolumn derivatization method. J Agric Food Chem. 2004 Aug;52(16):5004-10.

43. Ueda H, Yamazaki C, Yamazaki M. Luteolin as an anti-inflammatory and anti-allergic constituent of Perilla frutescens. Biol Pharm Bull. 2002 Sep;25(9):1197-202.

44. Shi RX, Ong CN, Shen HM. Luteolin sensitizes necrosis factor-alpha-induced apoptosis in human tumor cells. Oncogene. 2004 Aug 30 [Epub ahead of print].

45. Yin F, Giuliano AE, Van Herle AJ. Growth inhibitory effects of flavonoids in human thyroid cancer cell lines. Thyroid. 1999 Apr;9(4):369-76.

46. Seddon JM, Ajani UA, Sperduto RD, et al. Dietary carotenoids, vitamins A, C, and E, and advanced age-related macular degener- ation. Eye Disease Case-Control Study Group. JAMA. 1994 Nov;272(18):1413-20.

47. Giovannucci E. A review of epidemiological studies of tomatoes, lycopene, and prostate cancer. Exp Biol Med (Maywood). 2002 Nov;227(10):852-9.

48. Dorgan JF, Sowell A, Swanson CA, et al. Relationship of serum carotenoids, retinol, alpha-tocopherol, and selenium with breast cancer risk: results from a prospective study in Columbia, Missouri (United States). Cancer Causes Control. 1998 Jan;9(1):89-97.

49. Kohlmeier L, Kark JD, Gomez-Garcia E, et al. Lycopene and mycocardial infarction risk in the EURAMIC Study. Am J Epidemiol. 50. Visioli F, Riso P, Grande S, Galli C, Porrini M. Protective activity of tomato products on in vivo markers of lipid oxidation. Eur J Nutr. 2003 Aug;42(4):201-6.

51. Roy S, Khanna S, Alessio HM, et al. Anti-angiogenic property of edible berries. Free Rad Res. 2002 Sep;36(9):1023-31.

52. Goyarzu P, Malin DH, Lau FC, et al. Blueberry supplemented diet: effects on object recognition memory and nuclear fac- tor-kappa B in aged rats. Nutr Neurosci. 2004 Apr;7(2):75-83.

53. [No authors listed]. Monograph. Vaccinium myrtillus (bilberry). Altern Med Rev. 2001 Oct;6(5):500-

4.

54. Hou DX. Potential mechanisms of cancer chemoprevention by anthocyanins. Curr Mol Med. 2003 Mar;3(2):149-59.

55. Swantson-Flatt SK, Day C, Bailey CJ, Flatt PR. Traditional plant treatments for diabetes. Studies in normal and streptozocin diabetic mice. Diabetologia. 1990 Aug;33(8):462-4.

56. Rossi A, Settaino I, Dugo P, et al. Protective effects of anthocyanins from blackberry in a rat model of acute lung inflammation. Free Radic Res. 2003 Aug;37(8):891-900.

57. Sauebin L, Rossi A, Serraino I, et al. Effect of anthocyanins contained in a blackberry extract on the circulatory failure and multiple organ dysfunction caused by endotoxin in the rat. Planta Med. 2004 Aug;70(8):745-52.

58. Jepson RG, Mihaljevic L, Craig J. Cranberries for preventing urinary tract infections. Cochrane Database Syst Rev. 2004(2):CD001321.

59. Ferguson PJ, Kurowska E, Freeman DJ, Chambers AF, Koropatnick DJ. A flavonoid fraction from cranberry extract inhibits proliferation of human tumor cell lines. J Nutr. 2004 Jun;134(6):1529-35.

60. Barak V, Birkenfeld S, Halperin T, Kalickman I. The effect of herbal remedies on the production of human inflammatory and anti-inflammatory cytokines. Isr Med Assoc J. 2002 Nov;4(11Suppl):919-22.

61. Jacob RA, Spinozzi GM, Simon VA, et al. Consumption of cherries lowers plasma urate in healthy women. J Nutr. 2003 Jun;133(6):1826-9.

62. Chin OK, Kim DO, Moon HY, Kang HG, Lee CY. Contributions of individual polyphenolics to total antioxidant capacity of plums. J Agric Food Chem. 2003 Dec;51(25):7240-5.

63. Gorinstein S, Bartnikowska E, Kulasek G, Zemser M, Trakhtenberg S. Dietary persimmon improves lipid metabolism in rats fed diets containing cholesterol. J Nutr. 1998 Nov;128(11):2023-7.

64. Kawase M, Motohashi N, Stoh K, et al. Biological activity of persimmon (Diospyros kaki) peel extracts. Phytother Res. 2003 May;17(5):495-500.

65. Gorinstein S, Zachwieja Z, Folta M, et al. Comparative contents of dietary fiber, total phenolics, and minerals in persimmons and apples. J Agric Food Chem. 2001 Feb;49(2):952-7.

66. Shi J, Yu J, Pohorly JE, Kakuda Y. Polyphenolics in grape seeds—biochemistry and functionality. J Med Food. 2003 Winter;6(4):291-9.

67. Binns CW, LJ LJ, Lee AH. The relationship between dietary carotenoids and prostate cancer risk

in Southeast Chinese men. Asia Pac J Clin Nutr. 2004;13(Suppl):S117.

68. Psaltopoulou T, Naska A, Orfanos P, Trichopoulos D, Mountokalakis T, Trichopoulou A. Olive oil, the Mediterranean diet, and arterial blood pres- sure: the Greek European Prospective Investigation into Cancer and Nutrition (EPIC) study. Am J Clin Nutr. 2004 Oct;80(4):1012-8.

69. Gaudet MM, Britton JA, Kabat GC, et al. Fruits, vegetables, and micronutrients in relation to breast cancer modified by menopause and hormone receptor status. Cancer Epidemiol Biomarkers Prev. 2004 Sept;13(9):1485-94.

70. Nicolle C, Cardinault N, Gueux E, et al. Health effect of vegetable-based diet: lettuce consumption improves cholesterol metabolism and antioxidant status in rats. Clin Nutr. 2004 Aug;23 (4):605-14.

71. Turner F, Smith G, Sachse C, et al. Vegetable, fruit and meat consumption and potential risk modifying genes in relation to colorectal cancer. Int J Cancer. 2004 Nov 1;112(2):259-64.

72. Available at http://www.cdc.gov/nccdphp/ dnpa/5aday/campaign/color/index.htm. Accessed November 1, 2004.

73. Cho E, Seddon JM, Rosner B, Willett WC, Hankinson SE. Prospective study of intakes of fruits, vegetables, vitamins, and carotenoids and risk of age-related macu- lopathy. Arch Opthalmol. 2004 Jun;122(6):883-92.

74. He K, Hu FB, Colditz GA, Manson JE, Willett WC, Liu S. Changes in intake of fruit and vegetables in relation to risk of obesity and weight gain among middle-aged women. Int J Obes Relat Metab Disord. 2004 Oct 05 [Epub ahead of print].

75. Commenges D, Scotet V, Renaud S, Jacqmin-Gadda H, Barberger-Gateau P, Dartigues JF. Intake of flavonoids and risk for dementia. Eur J Epidemiol. 2000 Apr;16(4):357-63.

76. Steinmetz KA, Potter JD. Vegetables, fruit, and cancer prevention: a review. J Am Diet Assoc. 1996 Oct;96(10):1027-39.