DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
College Park, MD 20740

2102 '03 APR 18 P1:59

APR - 7 2003

Arun Chainani, M.D.
AuMed, Inc.
P. O. Box 245
Valley Cottage, New York 10920

Dear Dr. Chainani:

This is in response to your submission to the Food and Drug Administration (FDA), received by FDA on October 28, 2002. Your submission is intended to be the notification required by 21 U.S.C. 343(r)(6) (section 403(r)(6) of the Federal Food, Drug, and Cosmetic Act (the Act)) and 21 CFR 101.93(a).

21 CFR 101.93(a)(3) requires that the notice submitted pursuant to 21 U.S.C. 343(r)(6) and this section be signed by a responsible individual who can certify the accuracy of the information presented and contained in the notice, and that the individual certify that the information contained in the notice is complete and accurate, and that the notifying firm has substantiation that the statement is truthful and not misleading. Your submission does not meet this requirement in that the notice does not contain the signature of a responsible individual nor does it certify that the firm is in compliance with the requirements of the Act and the regulation. Therefore, your firm has not complied with the notification requirement in 21 U.S.C. 343(r)(6) and must submit notifications in accordance with the requirements in 21 CFR 101.93(a).

Nonetheless, in resubmitting your notification, you should be aware that the labeling of four of the products that are the subject of your submission bear claims that do not appear to be claims subject to 21 U.S.C. 343(r)(6). You submitted reference booklets that you distribute in conjunction with the marketing of the products **Youthmed**, **Glucomed**, **Hartmed**, and **Ostemed**. Each booklet contains numerous references to the use of these products and/or their ingredients in the treatment, prevention, cure, or mitigation of diseases.

21 U.S.C. 343(r)(6) makes clear that a statement included in labeling under the authority of that section may not claim to diagnose, mitigate, treat, cure, or prevent a specific disease or class of diseases. The statements that you are making for these products suggest that they are intended to treat, prevent, or mitigate diseases. These claims do not

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meet the requirements of 21 U.S.C. 343(r)(6). These claims suggest that these products are intended for use as drugs within the meaning of 21 U.S.C. 321(g)(1)(B), and that they are subject to regulation under the drug provisions of the Act. If you intend to make claims of this nature, you should contact FDA's Center for Drug Evaluation and Research (CDER), Off ice of Compliance, HFD-310, 7520 Standish Place, Rockville, Maryland 20855.

Please contact us if we may be of further assistance.

Sincerely yours,

Susan J. Walker, M.D.
Acting Director
Division of Dietary Supplement Programs
Office of Nutritional Products, Labeling
and Dietary Supplements
Center for Food Safety
and Applied Nutrition

Copies:
FDA, Center for Drug Evaluation and Research, Office of Compliance, HFD-300
FDA, Office of the Associate Commissioner for Regulatory Affairs, Office of Enforcement, HFC-200
FDA, New York District Office, Office of Compliance, HFR-NE140

AuMed

The Gold Standard in Health Care

Dr. Elizabeth Yetley
Office of Special Nutritionals (HFS-450)
Food and Drug Administration
200 C Street, S.W.
Washington, D.C. 20204

Re: Fulfillment of Reporting Obligation Under 21 U.S.C.# 343(r) and 21 CFR # 101.93

Dear Dr. Yetley:

AuMed Inc, in accordance with 21 U.S.C. # 343(r) and 21 CFR # 101.93, hereby submits an original and two copies of its notification with the statements presented below. Please note, these statements/references noted in the Scientific References are aimed at health care professionals as part of an integrated care marketing promotion; these statements are not included on any labels (all labels enclosed) but included in the sub-set of brochures for health care professionals (as part of nutritional support for conventional standards of care). AuMed Inc retains scientific documentation/texts supporting the statements and makes its Scientific References available to health care professionals. (Representative scientific references for health care professionals enclosed with this letter).

In accordance with 21 USC # 343(r)(6) and 21 CFR # 101.93(c), each of the statements of nutritional support are cross-referenced on the very same page next to which the following statement will appear "These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease." In addition, AuMed also notes that all AuMed products are recommended in conjunction with a healthy lifestyle that includes a balanced diet and exercise.

Also note, AuMed nutritional supplements are only made available via health care professionals as part of an integrated health care approach (as part of nutritional support for conventional standards of care).

Respectfully submitted,

Arun Chainani, M.D.

AuMed Toll Free Tel: (877) AuMed Inc = (877) 286-3346
AuMed Mailing Address: AuMed Inc, P.O. Box 245, Valley Cottage, NY 10920

AuMed

The Gold Standard in Health Care

PRODUCT/BRAND DESCRIPTIONS:

COREMED:

COREMED is a multivitamin that is designed to provide balanced vitamin and mineral profiles. It can help optimize healthy lifestyles and may provide broad-spectrum anti-oxidant protection with its optimal dose and ratio of nutrients and its superior chelated mineral salt forms. COREMED multivitamin is an effective adjuvant that complements other AuMed professional brands.

HARTMED:

HARTMED is a health supplement aimed at providing cardiovascular care. This comprehensive scientific formulation provides credible natural vegetarian ingredients and standardized extracts in small easy to swallow vegetarian capsules. COREMED multivitamin also complements HARTMED as an effective adjuvant.

OSTEMED:

OSTEMED is a health supplement formulated for joint care. This comprehensive scientific formulation provides credible natural ingredients and standardized extracts in small easy to swallow capsules. COREMED multivitamin (and adequate calcium intake) also complements OSTEMED as an effective adjuvant.

GLUCOMED:

GLUCOMED is a health supplement aimed at optimal glucose and weight balance. This comprehensive scientific formulation provides credible natural vegetarian ingredients and standardized extracts in small easy to swallow vegetarian capsules. COREMED multivitamin also complements GLUCOMED as an effective adjuvant.

YOUTHMED:

YOUTHMED is a health supplement aimed at supporting a healthy aging process –youthful skin, vision, and memory- so that you may look young, feel young, and stay young. This comprehensive scientific formulation provides credible natural vegetarian ingredients and standardized extracts in small easy to swallow vegetarian capsules. COREMED multivitamin also complements YOUTHMED as an effective adjuvant.

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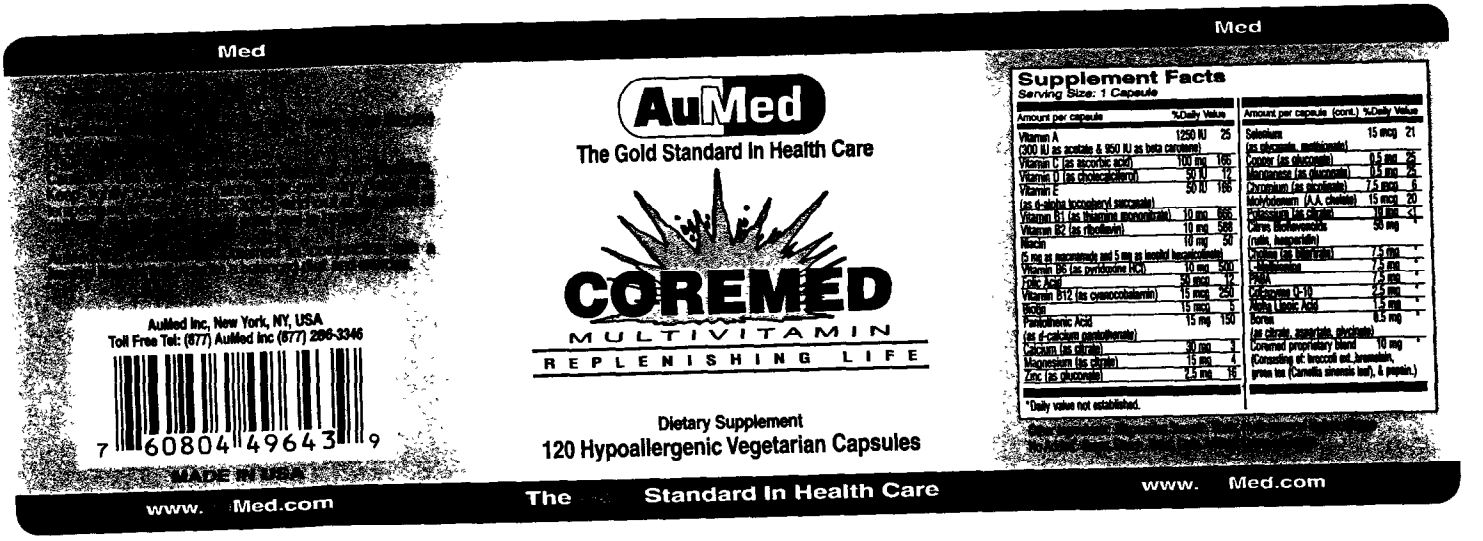

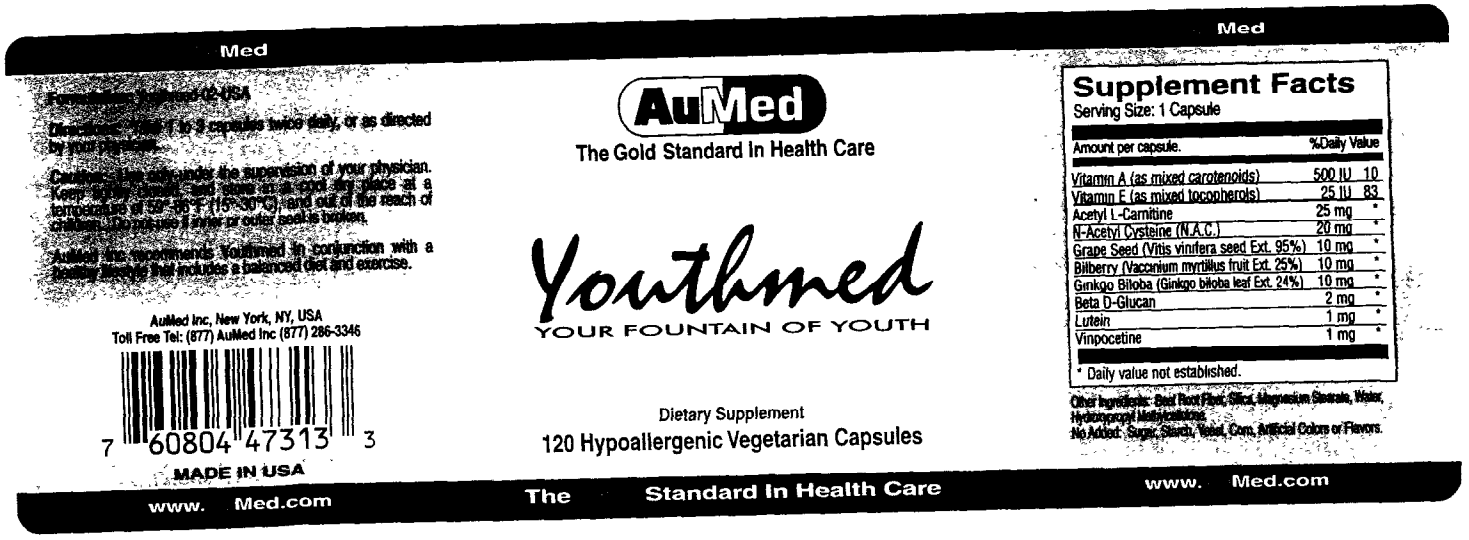

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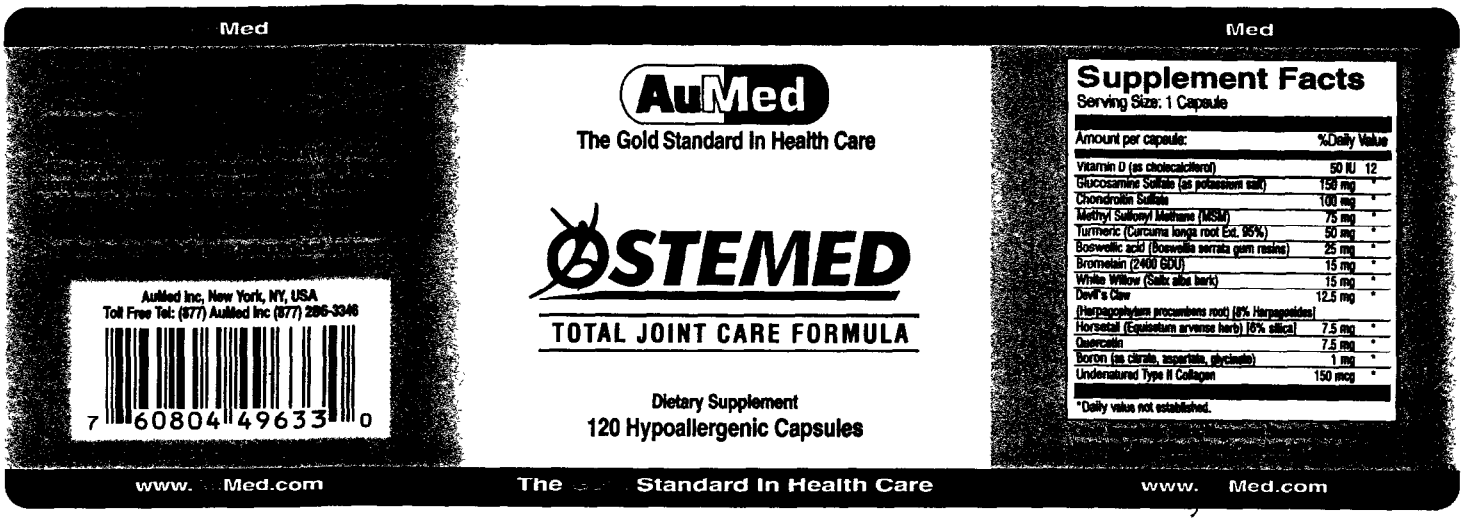
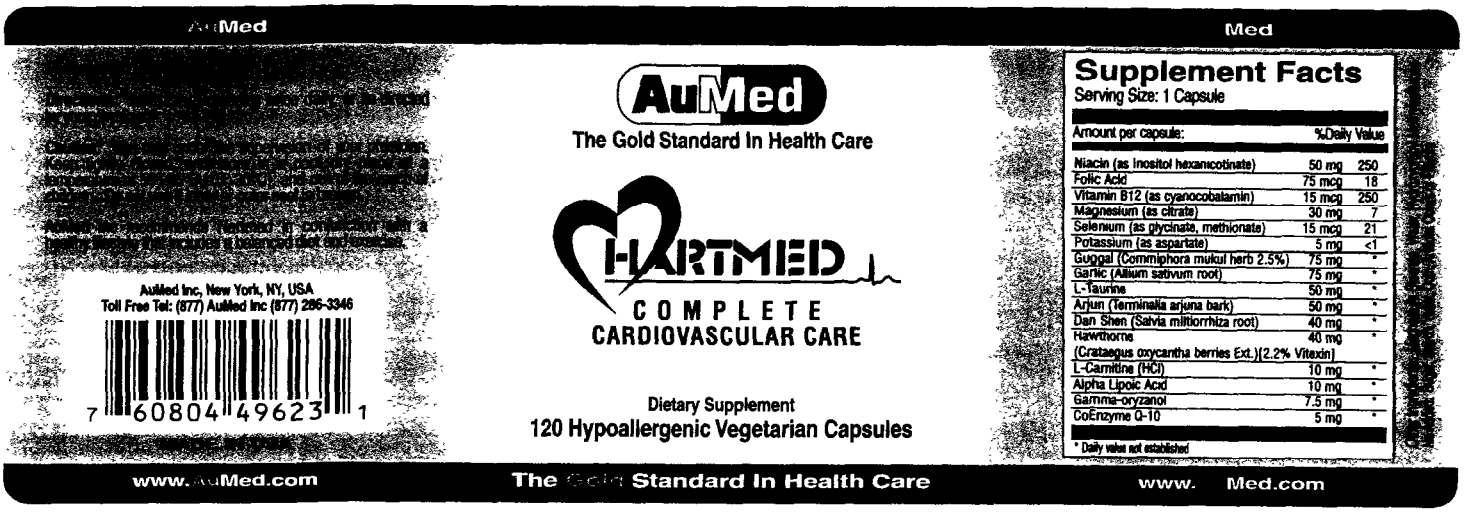
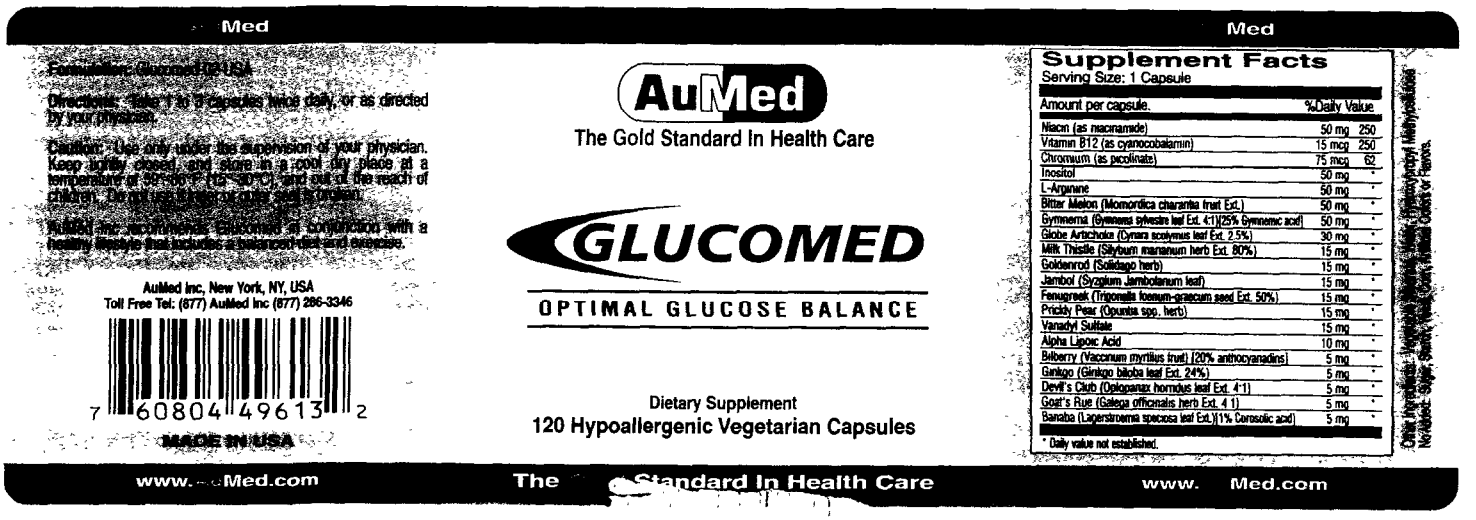






OSTEMED

TOTAL JOINT CARE FORMULA

Scientific Reference

AuMed

The Standard In Health Care

AuMed Inc.
New York • San Francisco • Washington DC

Toll Free Tel : (877) AuMed Inc = (877) 286-3346 Email : info@AuMed.com
Toll Free Fax : (866) Fax AuMed = (866) 329-2863 Web site : www. AuMed.com

Scientific Reference

INGREDIENTS

Each hypoallergenic capsule contains:	
Vitamin D (as cholecalciferol)	50 IU
Glucosamine Sulfate (as potassium salt)	150 mg
Chondroitin Sulfate	100 mg
Methyl Sulfonyl Methane (MSM)	75 mg
Turmeric (*Curcuma longa* root Ext. 95%)	50 mg
Boswellic acid (*Boswellia serrata* gum resins)	25 mg
Bromelain (2400 GDU)	15 mg
White Willow (*Salix alba* bark)	15 mg
Devil's Claw (*Harpagophytum procumbens* root) [8% Harpagosides]	12.5 mg
Horsetail (*Equisetum arvense* herb) [6% silica]	7.5 mg
Quercetin	7.5 mg
Boron (as citrate, aspartate, glycinate)	1 mg
Undenatured Type II Collagen	150 mcg

Other Ingredients: Silica, Magnesium Stearate, Gelatin, Water.
No Added: Sugar, Starch, Yeast, Corn, Artificial Colors or Flavors.

OVERVIEW:

Arthritis is one of the most common medical problems in the world and the number one cause of disability in America.

Osteoarthritis or degenerative joint disease, a common type of arthritis, is characterized by the breakdown of cartilage in joints. Cartilage acts as a cushion for joints. Cartilage breakdown causes bones to rub against each other, causing pain and loss of movement.

Most commonly affecting middle-aged and older people, OA can range from very mild to very severe. It affects hands and weight-bearing joints such as the knees, hips, feet and back. Osteoarthritis affects an estimated 20.7 million Americans (commonly seen after the age of 45 yrs). Research has revealed that women are more commonly affected than men. OA is responsible for more than 7 million physician visits per year.

There are several risk factors of OA. Although *age* is a risk factor, research has shown that OA is not an inevitable part of aging. *Obesity* may lead to osteoarthritis of the knees. In addition, *joint injuries* due to sports, work-related activity or accidents may increase the risk of developing OA. *Genetics* can also play a role in the development of OA, particularly in the hands. In the process of cartilage breakdown, there may be some inflammation, with the release of enzymes that can cause additional cartilage damage.

Osteoporosis, which means porous bones, causes bones to become weak and brittle — so brittle that even mild stress can cause a fracture. Low levels of calcium, phosphorous and other minerals in bones contribute to weakness. Osteoporosis is a significant public health threat for 28 million Americans, 80% of whom are women. In the U.S. today, 10 million individuals already have osteoporosis and 18 million more have low bone mass, placing them at increased risk for this disease. More than 2 million American men suffer from osteoporosis, and millions more are at risk. Each year, 80,000 men suffer from a hip fracture and one-third of these men die within a year.

There are many risk factors for Osteoporosis. *Gender* – women are more susceptible to osteoporosis due to the changes involved in menopause. *Age* - the risk of osteoporosis increases with age; bones become less dense and weaken with age. *Family history* - Susceptibility to fracture may also be linked to a genetic predisposition; a family history of fractures may be associated with reduced bone mass. *Ethnicity* - Caucasian and Asian women are at highest risk; African-American and Latino women have a lower but significant risk. Some of the risk factors that can be addressed by health care providers include: *Hormonal factors:* amenorrhea, low estrogen level (menopause), and low testosterone level in men. *Diet* – a diet low in calcium and vitamin D. *Lifestyle* - An inactive lifestyle or extended bed rest. *Smoking* and *Alcohol consumption.*

Ostemed is a health supplement scientifically designed for total joint care; it includes natural ingredients with anti-inflammatory as well as analgesic properties. **Ostemed** is effectively complemented by **Coremed** (multivitamin). **AuMed Inc** recommends **Ostemed** and **Coremed** in conjunction with a healthy lifestyle that includes a balanced diet and exercise.

DESCRIPTION:

VITAMIN D

Vitamin D3 is also known as cholecalciferol and calcitriol. Vitamin D is a principal regulator of calcium homeostasis in the body. It is particularly important in skeletal development and bone mineralization. Vitamin D deficiency is characterized by inadequate mineralization or demineralization of the skeleton. Inadequate mineralization of the skeleton is the cause of rickets in children while demineralization of the skeleton results in osteomalcia in adults. Further Vitamin D deficiency in adults can lead to osteoporosis which results from a compensatory increase in production of parathyroid hormone resulting in resorption of bone.
Few foods provide natural sources of Vitamin D. Foods that contain Vitamin D include fatty fish, fish liver oils and eggs from hens that have been fed Vitamin D. Nearly all the Vitamin D intake from foods comes from fortified milk products and other foods such as breakfast cereals that have been fortified with Vitamin D. Vitamin D is a fat-soluble vitamin and therefore its absorption is adversely affected in those with malabsorption disorders.

GLUCOSAMINE SULFATE

Glucosamine is an amino monosaccharide found in chitin, glycoproteins and glucosaminoglycans such as hyaluronic acid and heparan sulfate. At neutral as well as physiologic pH, the amino group in glucosamine is protonated resulting in a positive charge. Salt forms of glucosamine contain negative anions to neutralize this charge. In the case of glucosamine sulfate the anion is sulfate. Glucosamine sulfate is water-soluble. Most of the studies done to date, for osteoarthritis, are primarily done on the sulfate salt of glucosamine. Glucosamine sulfate is water-soluble.

CHONDROITIN SULFATE

Chondroitin sulfate belongs to a family of heteropolysaccharides called glycosaminoglycans or GAGS. GAGS, in the form of proteoglycans, form the ground substance in the extra cellular matrix of connective tissue. Chondroitin sulfate is found in human cartilage, bone, cornea, skin and arterial wall (Chondroitin sulfate A or galactosaminoglucuronoglycan sulfate).
Chondroitin sulfate B also known as dermatan sulfate is abundant in skin and is also found in heart valves, tendons and arterial walls. Chondroitin sulfate C is primarily found in fish and shark cartilage and also in humans.
The source of chondroitin sulfate found in nutritional supplements includes shark cartilage, whale septum cartilage, and bovine trachea. Supplements usually have isomeric mixtures of Chondroitin sulfate A and Chondroitin sulfate C.

MSM (METHYLSULFONYLMETHANE)

Methylsulfonylmethane, commonly known as MSM, is a sulfur-containing compound. It is commonly found in a variety of fruits and vegetables with trace amounts present in animals. MSM is a metabolite of Dimethylsulfoxide or DMSO. MSM is water-soluble and has been used for pain relief in a variety of conditions. In its purified chemical form it is an odorless, tasteless, white, water-soluble, crystalline solid.

CURCUMA LONGA EXTRACT

Common name: Turmeric
Family: Zingaberaceae

Curcuma longa is a perennial herb found in India, China and Indonesia. It has a thick rhizome with oblong leaves. Turmeric is a spice that comes from the root *Curcuma longa* that is bright yellow in color and often used as a food coloring. Curcuminoids are polyphenolic pigments found in the spice turmeric. The major curcuminoids are Curcumin, demethxycurcumin and bisdemethoxycurcumin. Curcumin and other curcuminoids have been found to have antioxidant and anti-inflammatory activities.

BOSWELLIA SERRATA

Common name: Olibanum, Salai guggal
Family: Burseraceae

Boswellia serrata is a close relative of the Biblical incense frankincense and has been used historically in Ayurvedic medicine for a variety of ailments. Boswellia extract is derived from the gum resin, known as salai guggul, of the stem bark of the

plant. Scientists are now focusing their study on its ability to manage arthritis and inflammation.

BROMELAIN

Bromelain is the collective term for sulfhydryl proteolytic enzymes derived from ripe and unripe fruit as well as the stem and leaves of the pineapple plant. Bromelain is mainly comprised of cysteine proteases, including carboxypeptidases with smaller amounts of acids including phosphatase, perioxidase, amylase and cellulase. There is research suggesting that it may have wound healing and anti-inflammatory effects.

SALIX ALBA

Common name: White willow
Family: Salicaceae

Salix alba primarily consists of the barks of the young (2 to 3 year old branches harvested during early spring) *Salix alba*, *Salix purpurea*, *Salix fragilis* and other salix species. The plant is indigenous to central and southern Europe. It is a safe natural source of aspirin-like chemicals.

HARPAGOPHYTUM PROCUMBENS

Common name: Devil's claw
Family: Pedaliaceae

Harpagophytum procumbens is native to South Africa and Namibia. It grows in the Savannas and the Kalahari. The parts used for their medicinal properties are the dried tubular secondary roots and the thick lateral tubers. These roots are yellowish-grey in color and bitter to taste.

EQUISETUM ARVENSE

Common name: Horsetail
Family: Equisetaceae

Equisetum arvense consists of the fresh dried, green sterile stem of the plant, harvested in the summer. The herb collected from the wild is air dried before use. The plant grows throughout Europe and Asia. Some of the countries that it extends to is Turkey and South Asian countries.

QUERCETIN

Quercetin belongs to a group of polyphenolic substances known as flavonoids. Quercetin is a member of the class of flavonoids known as flavonols. It is widely distributed in the plant kingdom in rinds and barks. Especially rich sources of quercetin include onions, red wine, green tea and St. John's wort. Quercetin is insoluble in water. Quercetin is also known as meletin and sophretin.

BORON

Boron, the fifth chemical element, is a dietary trace mineral found primarily in plant foods. It is essential for human beings. Recent research supports the use of boron for the promotion of bone and joint health.

UNDENATURED TYPE II COLLAGEN

Type II collagen is the most abundant collagen found in hyaline cartilage (synovial joints, sternum, respiratory tract) comprising 80 to 90% of the total collagen content. Undenatured Type II collagen is sometimes abbreviated as UCII. Autoimmune response to type II collagen is thought to be a significant factor in the pathogenesis of rheumatoid arthritis. A few studies suggest that oral type II collagen may be beneficial to some with rheumatoid arthritis, acting by the process known as oral tolerance.

ACTIONS AND PHARMACOLOGY

VITAMIN D

It may have anti-osteoporotic activities. Osteoporosis results from an imbalance between bone resorption and bone formation. Decreased vitamin D levels result in decreased production of the active form of vitamin D, 1,25-dihydroxyvitamin D, which enhances the efficiency of calcium absorption. Chronic vitamin D deficiency results in decreased calcium absorption and secondary hyperparathyroidism. Increased bone resorption may be a consequence of vitamin D deficiency resulting from secondary hyperparathyroidism. Therefore vitamin D supplementation might be expected to protect against osteoporosis and fractures in those with occult vitamin D deficiency. Vitamin D may also be efficient in the treatment of corticosteroid-induced osteoporosis by virtue of stimulation of calcium absorption from the small intestine and its inhibition of the secretion and production of parathyroid hormone.

GLUCOSAMINE SULFATE

Glucosamine may have anti-inflammatory properties. It may play a role in the promotion and maintenance of the structure and function of cartilage in the joints of the body. Glucosamine is a simple molecule composed of glucose and an amine. The main action of glucosamine is to stimulate the production of glycosaminoglycans.(1,2) Glucosamine also promotes the incorporation of sulfur into cartilage. It appears that with age people lose the ability to manufacture a sufficient quantity of glucosamine resulting in the inability of the cartilage to absorb shock due to deterioration. This can result in osteoarthritis.

(1) – KarzelK, Domenjoz R. Effect of hexosamine derivatives and uronic acid derivatives on glycosamineglycan metabolism of fibroblast cultures. Pharmcology 1971; 5: 337-345

(2) Vidal y plana RR etal. Articular cartilage pharmacology. I. In vitro studies on glucosamine and non steroidal anti-inflammatory drugs. Pharmacol Res comm. 1978; 10 557-569

CHONDROITIN SULFATE

Possible actions include promotion and maintenance of the structure and function of cartilage (referred to as chondroprotection) , pain relief of osteoarthritic joints and anti-inflammatory activity. Chondroitin sulfate and hyaluronic acid are vital for the structure and function of articular cartilage and fundamental components of aggregan found in articular cartilage. Aggregan confers upon articular cartilage shock-absorbing properties. It does this by providing cartilage with a swelling pressure that is restrained by the tensile force of collagen fibers. This balance confers upon articular cartilage the deformable resilience vital to its function. Hyaluronic acid which is also found in synovial fluid has lubricating properties for the joint. In the progression of degenerative joint disease or osteoarthritis, aggregan synthesis is decreased leading to loss of cartilage resiliency resulting in pain and other symptoms that accompany osteoarthritis. Clinical benefit from chondrotin sulphate is likely due to the absorption of sulphur or smaller GAG molecules broken down by the digestive tract.(1)

(1) – Vaz AL. Double blind clinical evaluation of the relative efficacy Ibuprofen and glucosamine sulfate in the management of osteoarthritis of the knee in out patients. Curr Med Res Opin 1982; 8: 145-149

MSM (METHYLSULFONYLMETHANE)

MSM is used for pain and inflammation. It may reduce muscle spasm around arthritic joints and decrease the formation of scar tissue. It may also improve blood flow throughout the body, including painful joints, and may slow down the degeneration of cartilage. MSM delivers biologically active sulfur to the body. MSM protects cells from the damage caused by allergic reactions. It has been shown to soften scar tissue and repair damaged tissue.

CURCUMA LONGA EXTRACT

Curcumin, the yellow pigment of *Curcuma longa,* exerts excellent anti-inflammatory activities.(1,2) The possible anti-inflammatory activity of curcuminoids may be accounted for by several mechanisms, including inhibition of COX

(cyclooxygenase) and LOX (lipooxygenase), reduction of the release of ROS (reactive oxygen species) by stimulated neutrophils, inhibition of AP-1 and NF-KappaB and inhibition of the activation of the pro-inflammatory cytokines TNF (tumor necrosis factor) -alpha and IL (interleukin)-I beta.(2) Curcuma longa exhibits an inhibitory effect on Phospholipase D activity.(3) It also has an inhibitory effect on platelet-activating factor and arachidonic acid mediated platelet aggregation through inhibition of thromboxane formation and Calcium signaling.(4)

(1) – Srimal R, Dhawan B. Pharmacology of diferuloyl methane (curcumin), a non steroidal anti-inflammatory agent. J Pharm Pharmac 1973; 25: 447-452

(2) – Srivastava R. Inhibition of neutrophil response by Curcumin. Agents Actions 1989; 28: 298-303

(3) - Yamamoto et al. Inhibitory effect of curcumin on mammalian Phospholipase D activity. FEBS letters 417 (1997)196-198.

(4) – Bhuktiar Shah et al. Inhibitory effect of curcumin a food spice from turmeric, on platelet-activating factor and arachidonic acid mediated platelet aggregation through inhibition of thromboxane formation and calcium signaling. Biochem Pharmacol 58, 1167-1172, 1999.

BOSWELLIA SERRATA

Boswellic acid, the active ingredient in *Boswellia serrata* demonstrates anti-arthritic effects. The mechanisms of action for *Boswellia serrata* include inhibition of inflammatory mediators, glycosaminoglycans synthesis, and improved blood supply to joint tissues.(1,2)

(1) - Singh GB, Atal CK. Pharmacology of an extract of salai guggal ex- *Boswellia serrata*, a new non steroidal anti – inflammatory agent. Agents action 1986; 18: 407-412

(2) – Reddy CK, Chandrakasan G, Dhar SC. Studies on the metabolism of glycosaminoglycans under the influence of new herbal anti-inflammatory agents. Biochemical Pharmacol 1989;20: 3527-3534

BROMELAIN

Bromelain has been reported to exert a wide variety of beneficial effects including reducing inflammation in rheumatoid arthritis(1) The anti inflammatory action of Bromelain may be due to the activation of plasmin production from plasminogen and reduction of kinin, via inhibition of the conversion of kininogen to kinin. The other possible way that Bromelain produces the anti inflammatory action could be due to proteolytic degradation of circulating immune complexes and inhibition of signaling by extracellular regulated kinase (ERK)-2 and p21 *ras*. Another important action of Bromelain could be by the inhibition of proinflammatory compounds. Most of Bromelains anti swelling activity could be due to activating compounds which break down fibrin which is responsible for forming a matrix that walls off the area of inflammation, resulting in the blockage of blood vessels and inadequate tissue drainage and edema.(2)

(1) - Cohen A, Goldmen J. Bromelain therapy in rheumatoid arthritis. Penn Med J 1964; 67: 27-30

(2) - Pizzaorno Jr. JE, Murray MT, Textbook of Natural Medicine 2nd Edition 1999; Vol 2: 1531

SALIX ALBA

White Willow or *Salix alba* is a safe and natural source of aspirin like chemicals, which helps to explain its role in the traditional treatment of rheumatism and arthritis. It is useful in any condition where there is pain and inflammation. The active ingredients present in *Salix alba* are Glycosides and esters yielding salicylic acid (1.5-12%), tannins and flavonoids.

HARPAGOPHYTUM PROCUMBENS

Devil's Claw has been found to be effective in the treatment of arthritis. Its action is due to the presence of many glycosides including harpagosides harpagide, and procumbide. Other active constituents include acetoside (verbascoside), isoacetoside and traces of Harpagoquinones. Numerous studies have been done to compare the analgesic and anti-inflammatory effect of *Harpagophytum procumbens* with that of Phenyl butazone.(1)

(1) – Brady LR, Tyler VE, Robbers JE. Pharmacognosy. 8th edn. Philadelphia, PA: Lea & Febiger. 1981: p 480

EQUISETUM ARVENSE

Horsetail contains many active ingredients like flavonoids, caffeic acid, esters (including chlorogenic acid and dicoffeoyl-meso-tartaric acid), silicic acid and Pyridine alkaloids (including

nicotine traces) which are responsible for the activity of Horsetail.

QUERCETIN

Quercetin has demonstrated significant anti-inflammatory activity due its inhibition of several of the initial processes of inflammation via interaction with calcium channels and calmodulin. It also inhibits mast cell and basophil degranulation, neutrophil and monocyte lysosomal secretion, prostaglandin formation, lipid peroxidation and the resultant cascade of effects leading to inflammation.(1,2,3) Other *in vitro* studies suggest that quercetin inhibits tyrosine kinase and nitric oxide synthase and that it modulates the activity of the inflammatory mediator, NF-kappaB.

(1) – Ferrandiz ML, Alcaraz MJ. Anti–inflammatory activity and inhibition of arachidonic acid metabolism by flavonoids. Agents Action 1991;32:283-287

(2) – Middleton E, Drzewieki G. Flavonoids inhibition of human basophil histamine release stimulated by various agents Biochem Pharmacol 1984;33:3333-3338

(3) – Amella M, Bronner C, Briancon F etal. Inhibition of mast cell histamine release by flavonoids and Bioflavonoids. Plants Medica 1985;16-20

BORON

Boron may have estrogen-mimetic and anti-osteoporotic activity. A considerable body of evidence has shown that both compositional and functional properties of bone are affected by boron status.(1) It has been suggested that boron may act in an unspecified manner to protect hormones from rapid inactivation.(2) Currently, two hypotheses have been advanced for the biochemical function of boron in animals including humans. The first is that boron plays a role in cell-membrane functions that influence responses to hormone action, trans-membrane signaling and trans-membrane movement of regulatory ions. Boron has been shown in animal models to influence the transport of extracellular calcium and the release of intracellular calcium in platelets activated by thrombin. Histologic findings suggest that supplemental boron enhances maturation of the growth plate.(3). It is understood that boron deficiency may be a contributing factor in some cases of arthritis.(4)

(1) - McCoy H, Kenney MA, Montgomery C etal. Relation of boron to the composition and mechanical properties of bone. Environ Health Prospects 1994; 102: 49-53

(2) - Nielson Fh, Hunt CD , Mullen Lm etal. Effect of dietary boron on mineral, estrogen, and testosterone metabolism in postmenopausal women. FASEB J 1987; 1: 394- 397

(3) – Nielson FH. Studies on the relationship between boron and magnesium which possibly affects the formation and maintenance of bones. Mag trace Elem 1990; 9: 61-69

(4) - Newnham RE. Agricultural practices affect arthritis. Nutr Health 1991;7:89-100

UNDENATURED COLLAGEN TYPE II

Collagen type II may have anti – rheumatoid arthritis activity. The mechanism of action may be through oral tolerance. Oral tolerance refers to the observation that if a protein is orally administered, subsequent immunization with the protein leads to a state of systemic hyporesponsiveness to it. Autoantibodies to type II collagen are thought to play a role in the pathogenesis of rheumatoid arthritis. Therefore, feeding antigenic type II collagen may be predicted to lead to the induction of immune tolerance to type II collagen, especially in the context of elevated autoantibodies to this substance.

INDICATION AND USAGE

VITAMIN D

Vitamin D is useful in reducing bone loss and fracture incidence in the elderly.

GLUCOSAMINE SULFATE

Glucosamine may be indicated for the treatment and prevention of osteoarthritis, either by itself or in combination with chondroitin sulfate.

CHONDROITIN SULFATE

Low molecular weight oral chondroitin sulfate may be indicated for the treatment and prevention of osteoarthritis either by itself or in combination with glucosamine supplement.

MSM (METHYLSULFONYLMETHANE)

Claims for MSM include pain relief, particularly in arthritis. It is anti-inflammatory and analgesic.

CURCUMA LONGA EXTRACT

The curcuminoids may have anti-inflammatory (including anti-arthritic) effects. They may also help speed wound healing. Curcumin has historically been used to treat a wide variety of ailments.

BOSWELLIA SERRATA

Boswellia has been used in the traditional treatment of Osteoarthritis. Several research studies substantiate its role. It has also been shown to possess digestive activity, anti-inflammatory activity, and inhibition of platelet aggregation. Diseases and conditions it has shown to be effective in include athletic injuries and arthritis. It has been used for pancreatic insufficiency, mal-digestion, respiratory tract diseases, dysmenorrhea, edema, and surgical trauma.

BROMELAIN

There is some evidence that bromelain is useful in the several conditions including arthritis and athletic injury. It has also been used for angina, pancreatic insufficiency, bronchitis, cellulitus, edema, and sinusitis.

SALIX ALBA

Salia Alba or white willow bark has been approved by commission E for rheumatism and for pain associated problems. It has also been used for fever, headaches and inflammation with pain.

HARPAGOPHYTUM PROCUMBENS

Harpagophytum procumbens has been approved by the Commission E for rheumatism, and for dyspeptic complaints and loss of appetite. It has also been used for skin injuries and metabolic and urinary tract disorders.

EQUISETUM ARVENSE

Horsetail has been approved by the commission E for its use in urinary tract infections, kidney and bladder stones, wounds and burns. It is also used in inflammatory conditions.

QUERCETIN

Apart from being useful in inflammatory conditions, quercetin may be useful in allergies chronic prostatitis and in some cancers. It also plays an important role in immunity and diabetic complications.

BORON

Boron maybe indicated for the promotion of bone and joint health particularly in women. There is less evidence to support claims that boron enhances cognition and ameliorates the symptoms of arthritis.

UNDENATURED TYPE II COLLAGEN

Undenatured Type II collagen may offer some benefit for patients suffering from rheumatoid arthritis.

RESEARCH SUMMARY

VITAMIN D

Several studies have found an association between Vitamin D and osteoporosis. One study using Vitamin D alone found that supplementation reduced the annual rate of hip fractures from 1.3 to 0.5 %, nearly a 60 % reduction.(1)

In another study 348 women age 70 and older received Vitamin D or placebo for 2 years. In the vitamin D3 group the results were far more impressive than compared to the placebo group.(2)

In some studies where calcium was combined with Vitamin D there were much better results. In one study 3270 women living in nursing homes were given supplemental calcium and vitamin D3. The hip fracture rate taking the combination improved by 43% when compared to the placebo group.(3) In another study, the effects of dietary supplementation with calcium and Vitamin D on bone mineral density and the incidence of hip fractures in 176 men and 213 women aged 65 years or older were evaluated. The participants received either a combination of Calcium plus Vitamin D3 or placebo. The average changes in the bone mineral density in the calcium-Vitamin D3 group were + 0.5% for the hip,+2.12 % for the spine and +.06% for the whole body. In contrast the placebo group had all negative readings.(4).

(1) - Dawson- Hughes B, Harris SS, Krall EA et al. Rates of Bone loss in post menopausal women randomly assigned to one of two dosages of the Vitamin D. Am. J. clin Nutr 1995 ; 61: 1140-1145.

(2) - Ooms ME, Roos JC, Bezemer PD etal. Prevention of bone loss by Vitamin D Supplementation in elderly women: a randomized double blind study. J Clin Endocrinol Metabol 1995 ; 80: 1052 – 1058

(3) - Chapuy MC, Arlot ME, Delmas PD et al. Effect of Calcium and Cholecalciferol treatment for three years on hip fractures in elderly women. Br Med Jr 1994; 308:1081-1082

(4) - Dawson- Hughes B, Harris SS, Krall EA et al. Effect of calcium and vitamin D supplementation on bone density on men and women 65 years of age or older. New Engl J med 1997; 337: 701 -702

GLUCOSAMINE SULFATE

In addition to supporting the health of joints and tissues, glucosamine also functions as an anti-inflammatory. Studies that have looked at glucosamine's anti-inflammatory properties have suggested that it may be beneficial for two common types of arthritis, gonarthritis and osteoarthritis. (1,2,3,4,5)

Benefits may, in some cases, even rival those offered by ibuprofen - without the potentially harmful side effects associated with the drug. Another study indicates that the combination of glucosamine, chondroitin sulfate and manganese ascorbate was more effective at slowing the progression of cartilage breakdown than any of these agents alone.(6)

Glucosamine has also been used for kidney stones and the pain associated with temporomandibular joint dysfunction (TMJ). (7,8)

(1) - Franci B, Campagna S, Battisti E, et al. The Efficacy and Safety of Glucosamine Sulfate in the Treatment of Gonarthritis. Clin Ter. Mar1996;147(3):99-105.

(2) - Vaz AL. Double-blind Clinical Evaluation of the Relative Efficacy of Ibuprofen and Glucosamine Sulphate in the Management of Osteoarthrosis of the Knee in Out-patients. Curr Med Res Opin. 1982;8(3):145-49.

(3) - Muller-Fassbender H, et al. Glucosamine Sulfate Compared to Ibuprofen in Osteoarthritis of the Knee. Osteoarthritis and Cartilage. 1994;2(1):61-69.

(4) - Qui GX, et al. Efficacy and Safety of Glucosamine Sulfate Versus Ibuprofen in Patients with Knee Osteoarthritis. Arzneimittelforschung. May1998;48(5):469-74.

(5) - Reginster JY, Deroisy R, Rovati LC, et al. Long-term effects of glucosamine sulphate on osteoarthritis progression: a randomised, placebo-controlled clinical trial. Lancet. Jan2001;357(9252):251-6.

(6) - Lippiello L, Woodward J, Karpman R, Hammad TA. In vivo chondroprotection and metabolic synergy of glucosamine and chondroitin sulfate. Clin Orthop. Dec2000;(381):229-40.

(7) - Baggio B, et al. Effects of the Oral Administration of Glycosaminoglycans on Cellular Abnormalities Associated with Idiopathic Calcium Oxalate Nephrolithiasis. Eur J Clin Pharmacol. 1991;40(3):237-40.

(8) - Shankland WE 2nd. The Effects of Glucosamine and Chondroitin Sulfate on Osteoarthritis of the TMJ: A Preliminary Report of 50 Patients. Cranio. Oct1998;16(4):230-35.

CHONDROITIN SULFATE

Chondroitin has been used to treat osteoarthritis. Studies suggest that chondroitin can enhance joint health and lower pain associated with the condition.(1) Chondroitin may inhibit enzymes that cause inflammation and damage the joints.(2) The benefits of chondroitin supplementation may carry over to the treatment of joint-related sports injuries(3)

(1) - Deal CL, et al. Nutraceuticals as Therapeutic Agents in Osteoarthritis. The Role of Glucosamine, Chondroitin Sulfate, and Collagen Hydrolysate. Rheum Dis Clin North Am. May1999;25(2):379-95.

(2) - Kelly GS. The Role of Glucosamine Sulfate and Chondroitin Sulfates in the Treatment of Degenerative Joint Disease Altern Med Rev. Feb1998;3(1):27-39.

(3) - Uebelhart D, et al. Protective Effect of Exogenous Chondroitin 4,6-sulfate in the Acute Degradation of Articular Cartilage in the Rabbit. Osteoarthritis Cartilage. May1998;6(SupplA):6-13

MSM (METHYLSULFONYLMETHANE)

Research suggests that MSM may have a variety of benefits for people with all types of arthritis. Benefits can include the reduction, or even elimination of pain in some cases. For osteoarthritis, one study suggests that MSM may inhibit the formation of scar tissue around joints and slow down degeneration of cartilage.(1)

(1) - Jacob, S W. and Herschler, R. MSM: A double blind study of its use in degenerative arthritis. Ann NY Acad Sci, Vol. 411, pxii 1983.

CURCUMA LONGA EXTRACT

The anti-inflammatory properties of the curcuminoids have been demonstrated in a number of in vitro studies. Curcumin has demonstrated some beneficial effects in human studies that are comparable to prescription drugs. In one double blind clinical trial in patients with rheumatoid arthritis, Curcumin was compared with Phenylbutazone. There was significant improvement in both groups but the noteworthy point is that the side effects associated with Curcumin were far less than the phenylbutazone group.(1)
In another study, which used a new human model for evaluating NSAIDS, the postoperative inflammation model, Curcumin was again shown to exert comparable anti-inflammatory action to Phenylbutazone.(2)

(1) – Deodhar SD, Sethi R, Srimal RC. Preliminary studies on antirheumatic activity of Curcumin (diferuloyl methane). Ind J med res 1980; 71: 632-634

(2) – Satoskar RR, Shah SJ, Shenoy SG. Evaluation of anti-inflammatory property of curcumin (diferuloyl methane) in patients with post operative inflammation. Int J Clin Pharmacol ther toxicol 1986;24: 651-654.

BOSWELLIA SERRATA

Studies suggest that boswellia relieves pain and swelling without the harmful side effects commonly associated with ibuprofen and similar drugs.(1,2) Boswellia has shown promising results for both osteoarthritis and rheumatoid arthritis.(3)

(1) - Reddi F, et al. Modulation of Extracellular Matrix Metabolism in Rabbit Articular Chondrocytes and Human Rheumatoid Synovial Cells by the Non-steroidal Anti-inflammatory Drug Etodolac. II: Glycosaminoglycan Synthesis. Agents Actions. Nov1990;31(3-4):358-67.

(2) - Boswellia serrata. Altern Med Rev. Aug1998;3(4):306-07.

(3) - Kulkani RR, Patki PS, Jog VP et al. Treatment of osteoarthritis with a herbomineral formulation. A double-blind, placebo-controlled, cross-over study. J Ethnopharmacol 1991;33: 91-95.

BROMELAIN

Bromelain's anti-inflammatory properties may be of benefit to arthritis sufferers.(1, 2) Studies suggest that bromelain supplementation may reduce pain associated with arthritis.(3)

(1) - Taussig SJ, Batkin S. Bromelain, the enzyme complex of pineapple (Ananas comosus) and its clinical application. An update. J Ethnopharmacol. 1988;27:191-203.

(2) - Rovenska E, et al. Enzyme and combination therapy with cyclosporin A in the rat developing adjuvant arthritis. Int J Tissue React. 1999;21(4):105-11.

(3) - Klein G, et al. Reducing pain by oral enzyme therapy in rheumatic diseases. Wien Med Wochenschr. 1999;149(21-22):577-80.

SALIX ALBA

The glycoside salicin, found in salix alba has been shown to have anti-inflammatory and pain-relieving actions. (1) The analgesic actions of willow are

typically slow-acting but last longer than standard aspirin products. One study has found that white willow bark improved functioning via pain relief in people with osteoarthritis.(2)

(1) Bradley PR, ed. *British Herbal Compendium,* vol 1. Bournemouth, Dorset, UK: British Herbal Medicine Association, 1992, 224–6.

(2) Mills SY, Jacoby RK, Chacksfield M, Willoughby M. Effect of a proprietary herbal medicine on the relief of chronic arthritic pain: A double-blind study. *Br J Rheum* 1996;35:874–8.

HARPAGOPHYTUM PROCUMBENS

Researchers have suggested that the key components of devil's claw may have significant anti-inflammatory function.(1,2,3) One study even suggested that devil's claw has effects similar to conventional anti-inflammatory medications.(4) Because of these benefits, devil's claw has been used to treat osteoarthritis and rheumatoid arthritis. However, research indicates that this herb is better suited for the treatment of chronic, rather than acute, symptoms.(5)

A trial involving 122 patients with arthritis of the hip and/or the knee were given either devil's claw or diacerhein. Diacerhein is a member of a drug class used for osteoarthritis in Europe and is not available in the United States. Pain levels, joint function and mobility as well as the use of additional medications for pain and inflammation were evaluated. At the end of the 4 month trial the authors concluded that devil's claw and diacerhein were both effective in treating osteoarthritis of the hip or knee.(6)

(1) - Erdos A, et al. Contribution to the Pharmacology and Toxicology of Different Extracts as Well as the Harpagosid from Harpagophytum procumbens DC. Planta Medica. 1978;34:97.

(2) - Chrubasik S, et al. Effectiveness of Harpagophytum Extract WS 1531 in the Treatment of Exacerbation of Low Back Pain: A Randomized, Placebo-controlled, Double-blind Study. Eur J Anaesthesiol. Feb1999; 16(2)·118-29.

(3) - Lanhers MC, et al. Anti-inflammatory and Analgesic Effects of an Aqueous Extract of Harpagophytum procumbens. Planta Medica. 1992;58(2):117-23.

(4) - Eichler O, et al. Antiphlogistic, Analgesic and Spasmolytic Effect of Harpagoside, a Glycoside from the Root of Harpagophytum procumbens DC. Arzneim-Forsch/Drug Res. Jan1970;20(1):107-09.

(5) - Newall CA, et al. Herbal Medicines: A Guide for Health Care Professionals. London: The Pharmaceutical Press;1996:98-100.

(6) - Leblan D, Chantre P, Fournie B. Harpagophytum procumbens in the Teatment of Knee and Hip Osteoarthritis. Four-month Results of a Prospective, Multicenter, Double-blind Trial Versus Diacerhein. Joint Bone Spine. 2000;67(5):462-7.

QUERCETIN

Researchers believe that quercetin may inhibit a number of substances that are responsible for producing symptoms of allergy and inflammation.(1,2)

(1) - Bronner C, Landry Y. Kinetics of the Inhibitory Effect of Flavonoids on Histamine Secretion from Mast Cells. Agents Actions. 1985;16:147-51.

(2) - Loggia Della, et al. Anti-inflammatory Activity of Benzopyrones that are Inhibitors of Cyclo- and Lipo-oxygenase. Pharmacol Res Commun. 1988;20 S91-S94.

BORON

Recent studies have suggested that boron may play a role in preventing bone-related diseases such as osteoarthritis, rheumatoid arthritis and osteoporosis. In the case of osteo- and rheumatoid arthritis, scientists have found that boron may help improve patient symptoms.(1,2) Other studies have shown that there is an inverse relationship between the intake of boron and the incidence of arthritis.(3) Studies on postmenopausal women have reported that boron supplementation can reduce the loss of calcium through excretion in the urine.(4) This, scientists say, could help lessen the risk of osteoporosis. Boron has been studied for its beneficial effects on a host of other body functions. Researchers have been looking into the role it may play in the body's metabolism of magnesium.(5) Also, boron may help convert vitamin D to its more active form, thus facilitating calcium absorption.

(1) - Travers RL, et al Boron and Arthritis: The Results of a Double-blind Study. J Nutr Med. 1990;1:127-32.

(2) - Newnham RE. Arthritis or Skeletal Fluorosis and Boron. Int Clin Nutr Rev. 1991;11(2):68-70.

(3) - Newnham RE. Essentiality of boron for healthy bones and joints. Environ Health Perspect. Nov1994;102(Suppl 7).83-5.

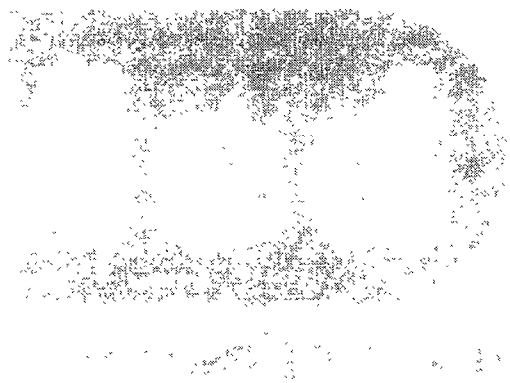
(4) - Nielsen FH, et al. Effect of Dietary Boron on Mineral, Estrogen, and Testosterone Metabolism in Postmenopausal Women. Fed Am Soc Exp Biol. 1987;1(15):394-97.

(5) - Volpe SL, et al. The Relationship Between Boron and Magnesium Status and Bone Mineral Density in the Human: A Review. Magnes Res. Sept1993;6(3):291-96.

UNDENATURED TYPE II COLLAGEN

Researchers at Harvard Medical School found that six of ten rheumatoid arthritis patients taking undenatured type II collagen for three months showed substantial improvement, while one patient recovered completely. In addition, there were no side effects noted.(1) In a 90-day, double-blind, placebo-controlled, follow-up study on patients with severe rheumatoid arthritis, Harvard scientists found that 28 patients taking undenatured type II collagen showed significant improvement compared to the placebo group, while four patients recovered completely.

A multi center, randomized, controlled trial of oral type II collagen tested the substance in four different daily doses versus placebo in 273 rheumatoid arthritis patients. Various criteria were used to evaluate the results. The daily dose levels were 20 micrograms, 100 micrograms, 500 micrograms and 2500 micrograms. Results were encouraging at the lower dose level.



(1) – Trentham DE, Dynesius-Trentham RA, Orav EJ, Combitchi-D, Lorenzo C, Sewell KL, Hafler DA, Weiner HL, Effects of Oral Administration of Type II Collagen on Rheumatoid Arthritis, *Science*, 261:1727-1730, 1993

(2) - Barnett ML, Kremer JM, St Clair EW, et al. Treatment of rheumatoid arthritis with oral type II collagen. Results of a multicenter, double blind, placebo – controlled trial. Arthritis Rheum . 1998; 41: 290 - 297

CONTRAINDICATIONS

VITAMIN D

Vitamin D is contraindicated in those with hypercalcemia and in those with evidence of vitamin D toxicity. It has been suggested that long term over-consumption of Vitamin D in fortified foods contributes to atherosclerosis and heart disease, possibly as a result of magnesium absorption.(1)

(1) – Seelig M.S. Magnesium deficiency with phosphate and Vitamin Dexcess: role in pediatric cardiovascular nutrition. Cardio Med 1978;3: 637- 650

GLUCOSAMINE SULFATE

There are no known toxicities associated with this dietary supplement when used in accordance with proper dosing guidelines. In a sodium restricted diet, the use of the potassium salt or glucosamine hydrochloride is recommended.

CHONDROITIN SULFATE

There are no known contraindications for Chondroitin Sulfate when used in accordance with proper dosing guidelines.

MSM (METHYLSULFONYLMETHANE)

There are no known contraindications for MSM when used in accordance with proper dosing guidelines.

CURCUMA LONGA EXTRACT

Curcuminoids are considered safe when used in accordance with proper dosing guidelines. Curcuminoids should be avoided by those hypersensitive to any component of a curcuminoid-containing supplements. Curcuminoids stimulates bile production in some. The volatile oil of turmeric is thought to be responsible for the bile-stimulating activity of turmeric but this has not been established. Therefore, curcuminoids are contraindicated in those with bile-duct obstructions and those with gallstones.(1) Curcumin can stimulate gall bladder contractions.(2)

(1) -Snow JM. Curcuma longa L. (Zingiberaceae). Protocol Journal of Botanical Medicine 1995;1(2):43-46.

(2) – Raysid A, Lelo A. The effect of curcumin and placebo on human gall-bladder function: An ultrasound study. Ailment Pharmacol Ther. 1999;13;245-249.

BOSWELLIA SERRATA

There are no known contraindications for *Boswellia serrata* when used in accordance with proper dosing guidelines.

BROMELAIN

Bromelain is contraindicated in those hypersensitive to any component of a bromelain containing product. Some individuals experience an allergic reaction when taking this dietary supplement. A respiratory allergy may occur in sensitive individuals, especially in those who are allergic to bee stings.(1) Large doses of Bromelain (greater than 2 g) have been given with no side effects.(2)

(1) - Gailhofer G, et al. Asthma caused by bromelain: an occupational allergy. Clin Allergy. Sep1988;18(5):445-50.

(2) - Gutfreund A, Taussig S, Morris A. Effect of oral Bromelain on blood pressure and heart rate of hypersensitive patients. Hawai Med J 1978; 37: 143-146.

SALIX ALBA

Willow bark is contraindicated in patients that have hypersensitivity to Salicylates.

HARPAGOPHYTUM PROCUMBENS

Toxicity is extremely low and is not seen in recommended doses of this dietary supplement.(1) Devils claw should be avoided by patients suffering from stomach or duodenal ulcers because Devils claw stimulates gastric juice secretion.

(1) - PDR for Herbal Medicines, 2nd ed. Montvale, NJ: Medical Economics Company; 2000:248.

EQUISETUM ARVENSE

Horsetail is considered safe when used in accordance with proper dosing guidelines.(1) Horsetail is contraindicated in patients who have edema due to impaired heart and kidney function.

(1) - Bradley PR, ed. British Herbal Compendium, vol. 1. Bournemouth:British Herbal Medicine Association. 1992;92-93.

QUERCETIN

There are no known contraindications for quercetin when used in accordance with proper dosing guidelines.

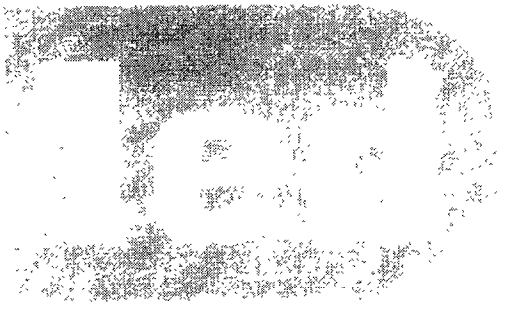
BORON

No serious health or medical problems associated with the use of boron have been reported in areas of the world where the daily diet supplementation has been estimated at around 41 mg a day.(1)

(1) - Naghii MR, Samman S. The role of boron in nutrition and metabolism. Prog Food Nutr Sci. Oct1993;17(4):331-49.

UNDENATURED TYPE II COLLAGEN

Undenatured Type II collagen is contraindicated in those who are hypersensitive to any component of a collagen II containing product.



PRECAUTIONS

PREGNANT WOMEN SHOULD EXERCISE CAUTION IN USE OF HEALTH SUPPLEMENTS AND DO SO ONLY UNDER THE SUPERVISION OF A PHYSICIAN.

VITAMIN D

Pregnant women and nursing mothers should avoid vitamin D supplemental intakes greater than U.S. RDA amounts of the vitamin unless higher amounts are prescribed by their physician. The U.S. RDA for vitamin D is 400 IU or 10 micrograms daily. Supplemental vitamin D should be used cautiously in those on digoxin or any cardiac glycosides. Hypercalcemia in those on digoxin may precipitate cardiac arrhythmias. Supplemental doses of vitamin D greater than upper limit intake levels (UL) should only be used if medically prescribed and should be avoided by those on digoxin or other cardiac glycosides. The UL for adults is 2,000 IU or 50 micrograms daily. Concomitant use of thiazides and pharmacologic doses of vitamin D may cause hypercalcemia in some.

GLUCOSAMINE SULFATE

Patients with type 2 diabetes and those who are overweight and have problems with glucose tolerance should have their blood sugars carefully monitored if they use glucosamine supplements. Glucosamine may increase insulin resistance and decrease the rate of glucose uptake in skeletal muscle. Because of insufficient safety data, children, pregnant women and nursing mothers should avoid using glucosamine.

CHONDROITIN SULFATE

Due to insufficient safety data, children, pregnant women and nursing mothers should avoid using chondroitin sulfate. There is a theoretical possibility that chondroitin sulfate may have antithrombotic activity. Therefore, patients taking warfarin and those with hemophilia should exercise caution in the use of chondroitin.

MSM (METHYLSULFONYLMETHANE)

None reported.

CURCUMA LONGA EXTRACT

Pregnant women and nursing mothers should avoid curcuminoid supplementation. Those with gastroesophogeal reflux disease(GERD) and those with a history of peptic ulcer disease should exercise caution in the use of curcuminoid supplements. Curcuminoids may have antithrombotic activity in some. Therefore, those on warfarin or anti-platelet drugs should exercise caution in their use. Cancer patients should only use curcuminoid supplements under medical supervision. Curcuminoid supplements should be taken with food and may cause gastric irritation and ulceration if taken at high doses on an empty stomach.

BOSWELLIA SERRATA

None reported.

BROMELAIN

Use of Bromelain as part of a treatment regimen should be medically supervised. Those on anticoagulants or antithrombotic agents should exercise caution. Bromelain has blood-thinning activity in some.

SALIX ALBA

Salicylates should be avoided in pregnancy and lactation.

HARPAGOPHYTUM PROCUMBENS

This dietary supplement should not be used in pregnant women or nursing mothers without medical supervision.(1)

(1) - Newall CA, et al. Herbal Medicines: A Guide for Health Care Professionals. London: The Pharmaceutical Press;1996:98-100.

EQUISETUM ARVENSE

None reported.

QUERCETIN

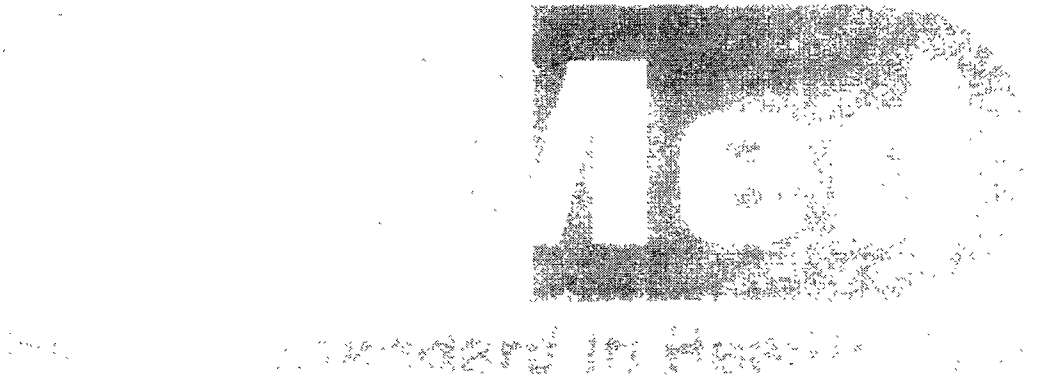
Because of lack of long-term safety data, quercetin should be avoided by pregnant women and nursing mothers.

BORON

None reported.

UNDENATURED TYPE II COLLAGEN

Because of lack of long term safety studies, nutritional supplements containing collagen II should be avoided by pregnant women and nursing mothers.



ADVERSE REACTIONS

VITAMIN D

Dosage of vitamin D up to 60 micrograms (2,400 IU)/day in healthy individuals rarely causes adverse reactions. Chronic dosage of 95 micrograms (3,800 IU)/day or greater in healthy individuals may cause hypercalcemia.(1) Early symptoms of hypercalcemia include nausea and vomiting, weakness, headache, somnolence, dry mouth, constipation, metallic taste, muscle pain and bone pain. Late symptoms and signs of hypercalcemia include polyuria, polydipsia, anorexia, weight loss, nocturia, conjunctivitis, pancreatitis, photophobia, rhinorrhea, pruritis, hyperthermia, decreased libido, elevated BUN, albuminuria, hypercholesterolemia, elevated ALT(SGPT) and AST(SGOT), ectopic calcification, nephrocalcinosis, hypertension and cardiac arrhythmias.

(1) - Selby PL, Davies M, Marks JS. Vitamin D intoxication causes hypercalcaemia by increased bone resorption which responds to pamidronate. Clin Endocrinol (Oxf). Nov 1995;43(5):531-6.

GLUCOSAMINE SULFATE

Side effects that have been reported are mainly mild gastrointestinal complaints such as heartburn, epigastric distress and diarrhea. No allergic reactions have been reported including sulfa-allergic reactions to glucosamine sulfate.

CHONDROITIN SULFATE

Side effects that have been reported are mainly mild gastrointestinal complaints such as heartburn, epigastric distress, nausea and diarrhea. No allergic reactions have been reported including sulfa-allergic reactions.

MSM (METHYLSULFONYLMETHANE)

Occasional side effects reported with large doses of this dietary supplement include mild gastrointestinal discomfort, occasional headaches and more frequent bowel movements. It may be necessary to reduce the dose of this dietary supplement if any of these reactions occur and become serious or do not disappear.

CURCUMA LONGA EXTRACT

This dietary supplement is considered safe when used in accordance with proper dosing guidelines. Adverse reactions to *Curcuma longa* include damage to the gastrointestinal system and it may be ulcerogenic at very high doses.(1) There is one report of transient giddiness following curcuminoid ingestion. Curcuminoids may cause gastritis and peptic ulcer disease if taken without food.(2)

(1) – Ammon HPT, Wahl MA. Pharmacology of Curcuma Longa. Planta Medica 1991; 57: 1-7

(2) - PDR for Herbal Medicines, 2nd ed. Montvale, NJ: Medical Economics Company; 2000:776.

BOSWELLIA SERRATA

This dietary supplement is considered safe when used in accordance with proper dosing guidelines. (1)

(1) - PDR for Herbal Medicines, 2nd ed. Montvale, NJ: Medical Economics Company; 2000:319.

BROMELAIN

Unconfirmed gastrointestinal symptoms such as nausea, vomiting, diarrhea and cramping have been reported with the use of bromelain. There are also occasional reports of metrorrhagia and menorrhagia. (1) Bromelain may cause an increase in blood pressure of hypertensive patients.(2)

(1) – Physicians Desk Reference. Ananase (Rorer). Medical Economics Company. 1982: p.1645

(2) - Gutfreund AE, et al. Effect of oral bromelain on blood pressure and heart rate of hypertensive patients. Hawaii Med J. May1978;37 (5):143-6.

SALIX ALBA

No health hazards are known in conjunction with the proper administration of designated doses. Stomach complaints could occur due to the tannin content.

HARPAGOPHYTUM PROCUMBENS

Health risks or side effects following the proper administration of designated therapeutic dosages

are not recorded. Devils claw has a sensitizing effect.

EQUISETUM ARVENSE

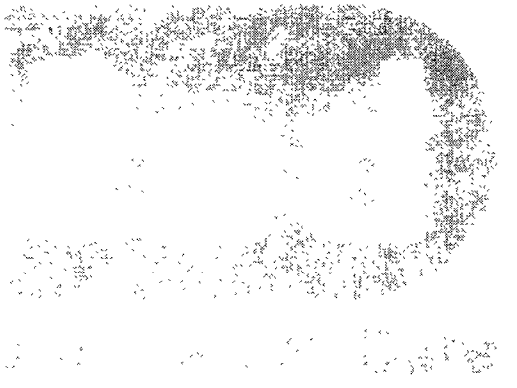
To date, the medical literature has not reported any adverse effects specifically related to the use of this dietary supplement.

QUERCETIN

Adverse reactions reported with oral quercetin supplementation include gastrointestinal symptoms such as nausea and rare reports of headache and mild tingling of the extremities. Oral quercetin is generally well-tolerated.

BORON

This dietary supplement is considered safe when used in accordance with proper dosing guidelines. (1) Symptoms of chronic intoxication can include gastrointestinal disturbances. (2)



(1) - Panel on Micronutrients, Subcommittees on Upper Reference Levels of Nutrients and of Interpretation and Use of Dietary Reference Intakes, and the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc; Washington, DC: National Academy Press; 2001:404-12.

(2) – Neilsen FH. Ultratrace minerals: Boron. In: Shils ME, Young VR, eds. Modern nutrition in health and disease. Philadelphia: lea&Febiger. 1988: p281-283

UNDEANTURED TYPE II COLLAGEN

Collagen II supplements are generally well tolerated. There is one report of transient flushing in a patient with juvenile rheumatoid arthritis (1)

(1) – Barnett ML, Combitchi D, Trentham DE. A pilot trial of oral type II collagen in the treatment of juvenile rheumatoid arthritis. Arthritis Rheum. 1996;39:623-628

INTERACTIONS

VITAMIN D

Anticonvulsants:

Anticonvulsant drug therapy can interfere with Vitamin D activity, leading to bone loss (osteomalacia).(1)

One study of 450 people living in Florida who took anticonvulsants found minimal evidence of anticonvulsant-induced bone disease, suggesting that regular exposure to sunlight may be protective(2)

Corticosteroids:

Steroidal anti-inflammatory drugs reduce the body's ability to activate vitamin D, increasing the risk of bone loss.(3,4) Doctors can determine the levels of activated Vitamin D to check if the disease exists. Patients taking corticosteriods for more than 2 weeks should be under medical supervision.

Conjugated Estrogens:

Two months of conjugated estrogen therapy in women with surgically induced menopause increased blood levels of Vitamin D and decreased urinary calcium loss.(5)

Colestipol and other Bile Acid Sequestrants:

Colestipol and other bile acid sequestrants may prevent absorption of folic acid and vitamin D.(6,7)

Cimetidine:

Cimetidine may reduce vitamin D activation by the liver.(8) Forms of Vitamin D that do not require liver activation are available.

Heparin:

Heparin may interfere with activation of Vitamin D in the body. (9)

Neomycin:

Neomycin can decrease absorption or increase elimination of many nutrients, including Vitamin D.(10,11)

Thiazide Diuretics:

The reduction in urinary loss resulting from treatment with thiazide diuretics is due primarily to changes in kidney function and may also be due, in part, to changes in Vitamin D metabolism.(12)

Warfarin:

The Journal of the American Medical Association suggested that Vitamin D increases the activity of anticoagulants; such therapy should be monitored by the physician.(13)

Verapamil:

Vitamin D may interfere with the effectiveness of Verapamil.(14)

(1) – D'Erasmo E, Ragno A, Raejntroph N, Pisanti D. Drug induced osteomalacia. Receni Prog Med 1998;89:529-33.

(2) – Williams C, Netzloff M, Folkerts L, et al. Vitamin D metabolism and anticonvulsant therapy: effect of sunshine on incidence of osteomalacia. Southern Med J 1984,77:834

(3) – Murphy JV, Marquardt KM, ShugAL. Valproic acid associated abnormalities of Carnitine metabolism. Lancet 1985;1:820-21

(4) - Hendel J et al. The effects of Carbamazepine and valproate on folate metabolism. Acta Neurol Scand 1984;69:226-31

(5) – Lobo RA, Roy S, Shope D, et al. Estrogen and progestin effects on the Urinary calcium and calciotropic hormones in surgically induced postmenopausal women. Horm Metab Res 1985; 17: 370-73.

(6) – Werbach MR. Foundations of Nutritional Medicine. Tarzana, CA: Third line Press, 1997, 224 [review]

(7) - Threlkeld DS, ed. Cardiovascular Drugs, Antihyperlipidemic Agents, Bile Acid Sequestrants. In facts and comparisons Drug Information. St Louis, MO: Facts and Comparisons, Feb 1999, 171L

(8) - Anonymous. Cimetidine inhibits the hepatic hydroxylation of Vitamin D. Nutr Rev 1985;43:184-85{review].

(9) - Aarskog D, Aksens L Markestad TK, et al. Heparin induced inhibition of 1,25 dihydrooxyvitamin D formation. Am J Obstet Gynecol 1984 148:1141-42.

(10) - Threlkeld DS, ed Miscel Products, Smoking Deterrents, Lobeline. In facts and comparisons, St. Louis, MO: Facts and Comparisons, mar 1993, 736i.

(11) - Davison GC, Rosen RC. Lobeline and reduction of cigrette smoking. Psychol Rep 1972: 31:443-56.

(12) - Riis B, Christiansen C. Actions of thiazide on Vitamin D metabolism: A controlled therapeutic trial in normal women early in the postmenopause. Metabolism 1985;34: 421-24

(13) - Schrogie JJ. Coagulopathy and fat soluble drugs. JAMA 1975;232:19 {Letter}

(14) - Threlkeld DS, ed. Diuretics and Cardiovasculars, Calcium Channel Blocking agents. In facts and comparisons Drug Information. St Louis, MO: Facts and Comparisons, Nov 1992, 150-150b.

GLUCOSAMINE SULFATE

Glucosamine may increase insulin resistance and consequently affect glucose tolerance. Diabetics who use glucosamine supplements will need to monitor their blood glucose and may need to adjust their doses of medications they take to control blood glucose. This needs to be done under medical supervision.

CHONDROITIN SULFATE

There are no known drug, nutrient, food or herb interactions. However, chitosan may form complexes with chondroitin sulfate decreasing its absorption. Therefore chondroitin sulfate should not be used concomitantly with chitosan

MSM (METHYLSULFONYLMETHANE)

Anticoagulant Medications

It has been reported that MSM might affects the blood's clotting ability and may alter the effects of these medications and possibly the dose needed for treatment.

CURCUMA LONGA EXTRACT

Anticoagulant Medications and Antiplatelet medications:

Laboratory studies have reported that turmeric affects the blood's clotting ability and may alter the effects of these medications and possibly the dose needed for treatment.(1,2)

Chemotherapeutic agents:

Curcumin has been found to enhance the anti-tumor effects of ciplatin against fibrosarcoma. It has also been found to decrease the clastogenic effect of cisplatin. Also in animal studies, curcumin was found to decrease nephrotoxicity due to doxorubicin and to decrease chromosomal aberrations due to bleomycin.

Piperine:

Piperine may enhance absorption of Curcuminoids.

(1) - Srivastava KC, et al. Curcumin, A Major Component of Food Spice Turmeric (Curcuma longa) Inhibits Aggregation and Alters Eicosanoid Metabolism In Human Blood Platelets. Prostaglandins Leukot Essent Fatty Acids. Apr1995;52(4):223-27.

(2) - Srivastava V, et al. Effect of Curcumin on Platelet Aggregation and Vascular Prostacyclin Synthesis. Arzneim Forsch/Drug Res. 1986;36:715-17.

BOSWELLIA SERRATA

None reported.

BROMELAIN

Anticoagulant Medications:

Studies have reported that Bromelain affects the blood's clotting ability and may alter the effects of these medications and possibly the dose needed for treatment.(1) Bromelain may enhance the anti-coagulant activity of drugs such as warfarin.

Antiplatelet medications:

Studies have reported that Bromelain affects the blood's clotting ability and may alter the effects of these medications and possibly the dose needed for treatment.(2)

Antibiotics:

Human studies have reported that bromelain may increase the amount of antibiotic in the blood and urine.(3,4,5,6,7)

Chemotherapeutic Medications:

A human study reported that bromelain increased the action of a chemotherapeutic agent, possibly altering the dose needed for treatment.(8,9)

(1) - Metzig C, et al. Bromelain proteases reduce human platelet aggregation in vitro, adhesion to bovine endothelial cells and thrombus formation in rat vessels in vivo. In Vivo. Jan1999;13(1):7-12.

(2) - Metzig C, et al. Bromelain proteases reduce human platelet aggregation in vitro, adhesion to bovine endothelial cells and thrombus formation in rat vessels in vivo. In Vivo. Jan1999;13(1):7-12.

(3) - Tinozzi S, Venegoni A. Effect of bromelain on serum and tissue levels of Amoxycillin. Drugs Exptl Clin Res. 1978;4:39-44.

(4) - Renzinni G, Varengo M. The absorption of tetracycline in combination with bromelain by oral application. Arzneim-Forsch. 1972;22:410-412.

(5) - Luerti M, Vignali ML. Influence of bromelain on penetration of antibiotics in uterus, salpinx and ovary. Drugs Exp Clin Res. 1978;4:45-48.

(6) - Bradbrook ID, et al. The effect of bromelain on the absorption of orally administered tetracycline. Br J Clin Pharmacol. Dec1978;6(6):552-4.

(7) - Lucchi R, et al. Chronic infections of the lower respiratory tract. Antibiotic therapy. Results of a double-blind study: tetracycline-HCl as a monosubstance versus tetracycline and bromeline. ZFA (Stuttgart). Apr1980;56(11):807-12.

(8) - Taussig SJ, Batkin S. Bromelain, the enzyme complex of pineapple (Ananas comosus) and its clinical application. An update. J Ethnopharmacol. 1988;27:191-203.

(9) - Neurauer RA. A plant protease for potentiation of and possible replacement of antibiotics. Exp Med Surg. 1961;19:143-60.

SALIX ALBA

Bismuth Salicylate and Ticlopidine

Salicylates are poorly absorbed and are unlikely to build up to levels sufficient to cause negative interaction similar to aspirin.(1) No reports have been published with the negative interactions between salicylate-containing plants and aspirin or aspirin containing drugs.(2) Therefore, concerns about combining salicylate-containing herbs remains theoretical, and the risk of causing problems appears to be low.

(1) – Janssen PL, Katan MB, Van Staveren WA, etal. Acetylsalicylate and salicylates in foods. Cancer Lett 1997 114(1-2): 163-64.

(2) – McGuffin M, Hobbs C, Upton R, Goldberg A, eds. (1997) American Herbal Products Association's Botanical Safety Handbook. Boca Raton, Fl: CRC Press, 1997, 154-55

HARPAGOPHYTUM PROCUMBENS

Anticoagulant Medications:

Devil's Claw is reported to cause purpura i.e. bleeding under the skin, in a person treated with Warfarin. (1)

Antiarrhythmic Medications:

Laboratory studies report that devil's claw may act like some of these medications, which may alter the effects of these medications and possibly the dose needed for treatment.(2)

(1) – Shaw D, Leon C, Kolev S, Murry V. Traditional remedies and food supplements: a 5 year toxicological study(1991-1995). Drug Safety 1997;17:342-356.

(2) - Costa De Pasquale R, Busa G, Circosta C, lauk L, Ragusa S, Ficarra P, Occhiuto F. A drug used in traditional medicine: Harpagophytum procumbens DC. III. Effects on hyperkinetic ventricular arrhythmias by reperfusion. J Ethnopharmacol. May 1985;13(2):193-9.

EQUISETUM ARVENSE

Thiazide Diuretics, Loop Diuretics, Triamterine and Spironolactones:

Horsetail may potentiate the effect of these drugs and lead to possible cardiovascular side effects.(1)

(1) – Brinker F. Herb Contraindications and Drug Interactions. Sandy, OR: Eclectic Institute, 1997, 102-3.

QUERCETIN

Estradiol:

Studies have shown that Quercetin significantly increases estradiol levels.(1,2,3)

Quinolone antibiotics:

Quercetin binds, *in vitro,* to the DNA gyrase site in bacteria. Therefore, theoretically, it can serve as a competitive inhibitor to the quinolone antibiotics which also bind to this site.

Cisplatin:
Because of the theoretical risk of genotoxicity in normal tissues in those using cisplatin along with quercetin, those taking cisplatin should avoid using quercetin supplements.

Bromelain and *Papain* are reported to increase absorption of quercetin.

(1) - Schubert W, Cullberg G, Edgar B, Hedner T. Inhibition of 17 beta-estradiol metabolism by grapefruit juice in ovarietomized women. Maruritas 1994;20: 155-63

(2) – Weber A, Jager R, Borner A etal. Can grapefruit juice influence ethinylestradiol bioavailability? Contraception 1996;53: 41-47

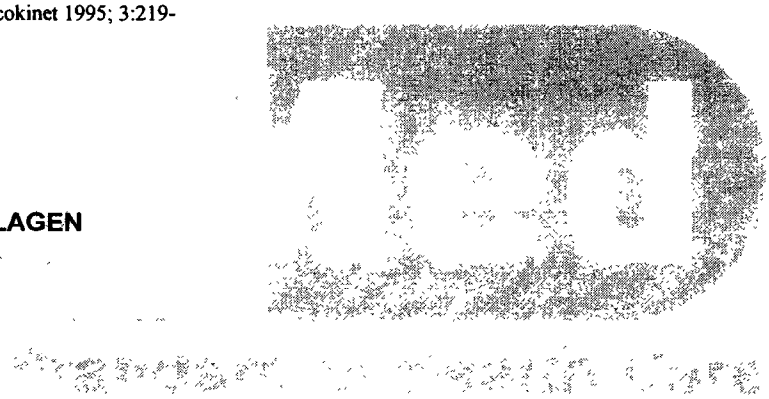
(3) – Schubert W, Eriksson U, Edgar B etal. Flavonoids in grapefruit juice inhibit the invitro hepatic metabolism of 17 beta – estradiol. Eur J Drug Metab Pharmacokinet 1995; 3:219-24

BORON

None reported.

UNDENATURED TYPE II COLLAGEN

None reported.



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Scientific Reference

INGREDIENTS

Each vegetarian capsule contains:	
Niacin (as Inositol Hexanicotinate)	50 mg
Folic Acid	75mcg
Vitamin B12 (as cyanocobalamin)	15mcg
Magnesium (as citrate)	30 mg
Selenium (as glycinate, methionate)	15mcg
Potassium (as aspartate)	5 mg
Guggal (Commiphora mukul herb 2.5%)	75 mg
Garlic (Allium sativum root)	75 mg
L-Taurine	50 mg
Arjun (Terminalia arjuna bark)	50 mg
Dan Shen (Salvia miltiorrhiza root)	40 mg
Hawthorne (Crataegus oxycantha berries Ext.) [2.2% Vitexin]	40 mg
L- Carnitine (HCl)	10 mg
Alpha Lipoic Acid	10mg
Gamma-oryzanol	7.5mg
CoEnzyme Q-10	5 mg

Other Ingredients: Magnesium Stearate, Water, Hydroxypropyl Methylcellulose.
No Added: Sugar, Starch, Yeast, Corn, Artificial Colors or Flavors.

OVERVIEW:

The heart is the hardest working muscle in the human body. At an average rate of 80 times a minute, the heart beats about 115,000 times in one day or 42 million times in a year. During an average lifetime, the human heart will beat more than 3 billion times -- pumping an amount of blood that equals about 1 million barrels.

The cardiovascular system is made up of the heart and blood vessels. Cardiovascular diseases (CVD), as defined by the American Heart Association (AHA), include:

- coronary heart disease (coronary artery disease, ischemic heart disease)
- stroke (brain attack)
- high blood pressure (hypertension)
- rheumatic heart disease

Over sixty million Americans have one or more forms of cardiovascular disease (CVD). More than 2,600 deaths occur each day from cardiovascular disease -- 1 death every 33 seconds

Each year heart disease is at the top of the list of the country's most serious health problems. In fact, statistics show that cardiovascular disease is America's leading health problem, and also a leading cause of death. Each year, cardiovascular diseases top the list of the country's most serious health problems. Coronary heart disease is the number one killer and stroke is the number three killer. Stroke is also the number one cause of serious, long-term disability.

Yet, studies show that nearly everyone can become heart healthy by:

- following a proper diet.
- following an appropriate exercise program.
- following a routine health care plan.

Most important to toppling cardiovascular diseases as the number one cause of disability and death, is early detection and early treatment.

Heart disease is an equal opportunity killer affecting both sexes, every race, and all age groups. While it is true that men generally begin suffering from heart disease at a younger age than women, more than half the women alive today are at risk for cardiovascular disease. One in three men can expect to develop cardiovascular disease before the age of 60. For women of the same age, the odds are one in ten.

Due to the high prevalence of CVD and its potential complications, any predisposition or risk factors should be addressed as part of a comprehensive health care regimen that includes appropriate diet, nutrition, and exercise.

Hartmed is a health supplement scientifically designed for complete cardiac care. **Hartmed** is effectively complemented by **Coremed** (multivitamin). **AuMed Inc** recommends **Hartmed** and **Coremed** in conjunction with a healthy lifestyle that includes a balanced diet and exercise.

DESCRIPTION:

NIACIN (as Inositol Hexanicotinate)

Inositol Hexanicotinate (also known as Inositol Hexaniacinate) is the delivery form of Nicotinic acid that has been used worldwide; the flushing reaction that is usually seen with Nicotinic acid is significantly reduced with Inositol Hexanicotinate. Each molecule of Inositol Hexanicotinate contains six molecules of Nicotinic acid esterified to one molecule of myo-inositol. By weight, approximately 80% of inositol nicotinate is nicotinic acid and 20% is myo-inositol. Niacin is a water-soluble vitamin that can be produced in the body. Niacin is necessary for the production of two important coenzymes that are involved in more than 200 chemical reactions in the body. It is also important for metabolism of carbohydrates, fatty acids and amino acids, as well as energy production on the cellular level.

FOLIC ACID

Folic Acid is the nutritionally essential precursor of a large family of compounds collectively referred to as folates. It is a pteridine derivative linked through a methylene bridge to a molecule of para-amino-benzoyl-glutamic acid. Folate coenzymes are widely distributed in the body and are involved in a diverse set of metabolic processes. It also plays an important role in pregnancy.

VITAMIN B12

Cobalamin is the common name of vitamin B12; it contains the heavy metal cobalt, which gives this water-soluble vitamin its red color. Vitamin B12 is essential for growth and plays a role in metabolism in the cells of the gastrointestinal tract, bone marrow and nervous tissue. Vitamin B12 is produced by bacteria in the digestive tract of animals.

MAGNESIUM

Magnesium is an essential mineral in human nutrition with a wide range of biological functions. Magnesium is involved in over 300 metabolic reactions. It is necessary for major biological processes including the production of cellular energy and the synthesis of nucleic acids and proteins. Magnesium plays important roles for the stability of cells, the maintenance of membrane integrity, muscle contraction, nerve conduction and the regulation of vascular tone. Magnesium and Calcium are intimately related in the roles they play: In some reactions they compliment each other and in some they oppose each other. Magnesium has been called "nature's physiological calcium channel blocker" since it appears to regulate the intracellular flow of calcium ions. Foods rich in magnesium include unpolished grains, nuts and green vegetables.

SELENIUM

Selenium is an essential trace mineral in the human body. This nutrient is an important part of antioxidant enzymes that protect cells against the effects of free radicals that are produced during normal oxygen metabolism. The body has developed defenses such as antioxidants to control levels of free radicals as they can damage cells and may contribute to the development of some chronic diseases. Selenium is one of a group of antioxidants that may help limit the oxidation of LDL cholesterol and thereby help to prevent coronary artery disease. Plant foods are the major dietary sources of selenium in most countries throughout the world. Selenium also can be found in some meats and seafood.

POTASSIUM

Potassium is an essential macro mineral present in human food and it performs many important biological and physiological functions. It is responsible for transmission of nerve impulses, the contraction of cardiac, skeletal and smooth muscle, production of energy and the maintenance of tonicity. Potassium plays an important role not only in hypertension but may also be protective against stroke and cardiovascular disease. Good sources of Potassium include fruits and vegetables.

COMMIPHORA MUKUL

Common Name: Guggal
Family: Burseraceae

Commiphora mukul tree is a small thorny plant distributed throughout India. Guggul and gum guggulu are the names given to a yellowish resin produced by the stem of the plant. This resin has

been used historically and is also the source of modern extracts of guggul. Guggul is used for a wide variety of conditions; traditional uses include cardiac support, rheumatism, and obesity. Standardized guggul extracts are also used for supporting healthy serum cholesterol and triglyceride levels.

ALLIUM SATIVUM

Common Name: Garlic
Family: Liliaceae

Allium sativum is a perennial plant that is cultivated worldwide. The garlic bulb is composed of individual cloves enclosed in a white skin. It is the bulb, either fresh or dehydrated, that is used as a spice or medicinal herb. Garlic contains volatile oils composed of sulfur-containing compounds: allicin, diallyl disulfide, diallyl trisulfide, and others. Allicin is mainly responsible for garlic's pungent odor. Garlic has been used traditionally for a wide variety of conditions.

TAURINE

Taurine is an amino acid that is produced in the body. However, infants and some adults cannot make enough Taurine, making it an essential nutrient in these cases. It is an end product of L-Cysteine metabolism and it is the main amino acid found within the cell membrane. Taurine is present in the retina, brain, myocardium, skeletal and smooth muscles. Taurine has a sulfonic acid group, it is a beta amino acid, and it does not have a chiral center.

TERMINALIA ARJUNA

Common Name: Arjune
Family: Combretaceae

It is a large tree, 20-25m in height, with a buttressed trunk, smooth grey bark, and drooping branches; its leaves are sub opposite, hard, oblong or elliptic, 10-20 cm long, and the flowers are yellowish white. The fruits are 2.5-5 cm long, obvoid-oblong, with 5-7 equal, hard, leathery, thick, narrow wings with their striations curving upwards. It is commonly found on the banks of rivers, streams and dry water courses in the sub-Himalayan tract, Central and South India and West Bengal. Arjune is also planted for shade or ornament in avenues and parks. Arjuna is a heart tonic that has been used to support cardiovascular functions since ancient times when it was discovered to have cardio-protective benefits

SALVIA MILTIORRHIZA

Common Name: Dan Shen
Family: Lamiaceae

Salvia miltiorrhiza is also known as Red Rooted Sage. The plant is an herbaceous perennial growing upright to a height of up to 80 cm. It is commonly found in China and Japan. The medicinal parts are the dried rhizome and root. The plant is dug up in spring or autumn, cleaned cut and dried for use.

CRATAEGUS OXYCANTHA

Common Name : Hawthorne
Family: Rosaceae

Crataegus Oxycantha is a spiny tree or shrub that is a native to Europe. It may reach a height of 30 feet, but is often grown as a hedge plant. The fruits and blossoms or various mixtures of various different species, are used medicinally.

L- CARNITINE

L-Carnitine is an amino acid derivative; it bears many resemblances to amino acids and is often grouped under this heading. L-Carnitine is used by the body to transport long chain fatty acids to the mitochondria. Deficiencies in L-Carnitine are manifested as low energy levels and muscular weakness; they can also appear as mental confusion or cloudiness, angina (heart pain) and weight gain. L-Carnitine can be synthesized in the body provided the requisite vitamins and minerals are also present. These vitamins and minerals include B1, B6, C, and iron. The amino acids lysine and methionine are also needed for L-Carnitine synthesis. L-Carnitine is also present in meats and other animal foods.

ALPHA LIPOIC ACID

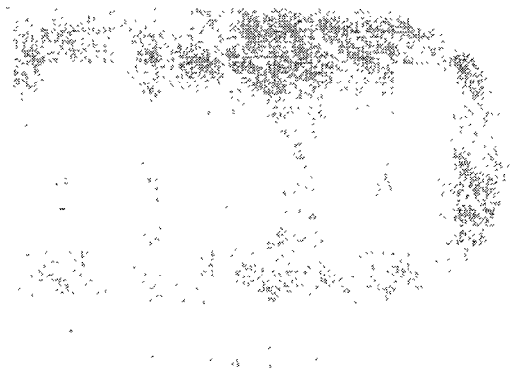
Alpha Lipoic acid, also called lipoic acid or thioctic acid is a sulfur-containing substance that is readily converted to and from its reduced form, dihydrolipoic acid. It acts as a coenzyme in reactions that occur in the Krebs cycle; specifically

it is involved in the decarboxylation of pyruvate and some other alpha-keto acids. It has shown great promise as an antioxidant. Alpha Lipoic acid is synthesized in the mitochondria; octanoic acid and L–Cysteine are precursors in its synthesis.

GAMMA-ORYZANOL

Gamma oryzanol is a mixture of substances derived from rice bran oil, including sterols and ferulic acid. It has been used for several conditions, including mild anxiety and high cholesterol. Rice bran oil is the principal source of gamma oryzanol, but it is also found in the bran of wheat and other grains, as well as in various fruits, vegetables, and herbs.

COENZYME Q10



CoQ10 belongs to a family of substances called ubiquinones. Ubiquinones are lipophilic, water – insoluble substances. Ubiquinones are involved in the electron transport and energy production in mitochondria. Coenzyme Q10's benefits are due to the following two attributes: First, Co-Q10 is an important fat-soluble antioxidant that is uniquely able to protect the cell's energy producing machinery, i.e. mitochondria, from free radical damage. Second, coenzyme Q10 is necessary for the production of energy in all cells of the body. Even though coenzyme Q10 occurs in the cells of all plants and animals, dietary sources may not provide adequate levels of this nutrient. Since oral administration of CoQ10 can increase tissue levels of the nutrient, it may be possible to correct CoQ10 deficiency and its associated metabolic consequences by supplementation.

ACTIONS AND PHARMACOLOGY

NIACIN (as Inositol Hexanicotinate)

Inositol Hexanicotinate has been used to lower cholesterol levels and also improve blood flow in patients with intermittent claudication. It has shown better results than niacin and is well tolerated.(1,2,3). Infact, niacin is recommended by the National Cholesterol Education Program as the first "drug" to use.(4) Unlike many cholesterol reducing drugs which have reduced the life expectancy along with lowering cholesterol levels, niacin has been found to lower cholesterol levels and extend life. Niacin was the only substance to demonstrate a decreased mortality in the Coronary Drug Project.(5)

1. Welch AL, Ede M. inositol hexanicotinate for improved nicotinic acid therapy. Int Record Med 1961;174:9-15

2 Ei- Enein AMA, Hafez YS, Salem H Abdel M. The role of nicotinic acid and inositol Hexanicotinate as anticholesterolemic and antilipemic agents. Nutr Rep Intl 1983;28: 899-911

3. Sunderland GT, Belch JJf, Sturrock RD et al. A double blind randomized placebo controlled trial of hexopal in primary Raynaud's disease. Clin Rheumatol 1988;7:46-49

4. The Expert Panel.. Report of the National Cholesterol Education Program Expert Panel on detection, evaluation, and treatment of high cholesterol in adults Arch Intern Med 1988;148:136-169

5 The Coronary Drug Project Group. Clofibrate and niacin in coronary heart disease. JAMA 1975;231:360-381

FOLIC ACID

Folic acid may reduce the risk factors associated with atherosclerosis. The primary mechanism of action for folic acid in atherosclerosis is that it is required for the conversion of homocysteine to methionine.(1) A deficiency of folic acid is associated with higher levels of homocysteine, which can be a risk factor for atherosclerosis.

1. Vermeulen EGJ, et al. "Effect of homocysteine-lowering treatment with folic acid plus vitamin B6 on progression of subclinical atherosclerosis: a randomized, placebo-controlled trial." Lancet. February12,2000;355:517-522.

VITAMIN B12

Vitamin B12 is essential for the metabolism of nerve tissue and necessary for the health of the entire nervous system. It stimulates growth and increases appetite in children. Cobalamin, along with iron, folic acid, copper, protein, and vitamins C and B6, is needed for the formation of normal red blood cells. Vitamin B12 is the "energy" vitamin, as it often increases energy level, whether obtained from eating the B12 foods or from supplemental use. There may be several reasons for this: Cobalamin stimulates the utilization of proteins, fats, and carbohydrates; it also helps iron function in humans and is important for the synthesis of DNA and RNA, as well as for production of choline, another B vitamin, and methionine, an amino acid.

Vitamin B12 is found to have beneficial effects on the homocysteine levels. Homocysteine is found to be a significant component in the pathogenesis, prevention and treatment of heart disease. Research has revealed that increased levels of homocysteine in the blood has significantly increased the risk of coronary artery disease, (1,2,3,4) myocardial infarction (5,6) and peripheral occlusive disease.(7,8,9,10)

1. Hopkins P, Wu L, Wu J et al. Higher plasma homocysteine and increased susceptibility to adverse effects of low folate in early familial coronary artery disease. Arterioscler thromb Vasc Biol 1995; 15:1314-1320

2. Loehrer F, Angst C, Haefeli W et al. Low whole- blood S-adenosylmethionine and correlation between 5 methltetrahydrofolate and homocysteine in coronary artery disease. Arterioscler thromb Vasc Biol 1996;16.727-733

3. Boushey C, Beresford S, Omenn G, Motulsky A. A quantitative assessment of plasma homocysteine as a risk factor for vascular disease. Probable benefits of increasing folic acid intakes. JAMA 1995;274.1049-1057

4. Robinson K, Mayer E, Miller D et al. Hyperhomocysteinemia and low pyridoxal phosphate. Common and independent reversible risk factors for coronary artery disease. Circulation 1995;92:2825-2830

5. Landgren F, Israelsson B, lindgren A et al. Plasma homocysteine in acute myocardial infarction. Homocysteine – lowering effect of folic acid. J Int Med 1995;237:381-388

6. Chasan – Taber L, Selhub J, Rosenberg I et al. A prospective study of folate and Vitamin B6 and the risk of myocardial infarction in US physicians. J Am Coll nutr 1996;15:136 – 143

7. Selhub J, Jacques P, Bostom A et al. Association between plasma homocysteine concentrations and extracranial carotid – artery stenosis. N Engl J med 1995;332:286-291

8. Van den Berg M, Boers G Franken D et al. Hyperhomocysteinaemia endothelial dysfunction in young patients with peripheral arterial occlusive disease. Eur J clin Invest 1995;25:176-181

9. Van den Berg M, Stehouwer C, Bierdrager E, Rauwerda J Plasma homocysteine and severity of atherosclerosisin young patients with lower – limb atherosclerotic disease. Arterioscler Thromb Vasc Biol 1996;16:165-171

10. Franken D, Boers G Blom H etal. Treatment of mild hyperhomocysteinaemia in vascular disease patients. ArterioscIerThromb Vasc Biol 1994;14:465-470

MAGNESIUM

Magnesium may be important for the proper functioning of the cardiovascular system. The role of magnesium in a wide range of Cardiovascular diseases is now commonly accepted and includes angina, arrhythmias, congestive heart failure, acute myocardial infarction and high blood pressure. Magnesium has been used in some of these indications for over 50 years.(1,2,3)

The beneficial effects of magnesium in an acute MI may be because magnesium dilates the coronary arteries resulting in improved delivery of oxygen to the heart. It also reduces peripheral vascular resisitance, resulting in reduced demand on the heart. Magnesium inhibits platelets from aggregating and forming blood clots and may also reduce the size of the infarct. Moreover magnesium improves energy production of the heart.(4)

Magnesium deficiency may play a major role in angina. Deficiency in magnesium has been shown to produce a spasm of the coronary artery and that is possibly the cause of non-occlusive heart attacks. (5) Thereby it is suggested that magnesium should become the treatment of choice for angina due to coronary artery spasm. (6,7,8) Magnesium has been found to be useful in management of arrythmias and in angina due to atherosclerosis.

1. Mclean RM. Magnesium and its therapeutic uses. A review. Am. J. Med 1994;96: 63-76

2. Altura BM. Basic biochemistry and physiology of magnesium. A brief review. Magnes Trace Elem 1991;10:167-171

3. Purvis JR, Movahed A. Magnesium disorders and cardiovascular disease. Clin Cardiol 1992;15: 556-568

4. Pizzorno Jr. JE, Murray MT, Textbook of Natural Medicine 2nd Edition 1999;Vol 2: 1121-1122

5. Turlapaty PDMV, Altura BM. Magnesium deficiency produces spasms of coronary arteries. Relationship to etiology of sudden death ischemic heart disease. Sci 1980;208:199-200

6. Altura BM. Ischemic heart disease and magnesium. Magnesium 1988;7: 57-67

7. Mclean RM. Magnesium and its therapeutic uses. A review. Am J Med 1994;96:63-76

8. Purvis JR, Movahed A. Magnesium disorders and cardiovascular disease. Clin Cardiol. 1992;15:556-568

SELENIUM

Selenium has antioxidant activity. This antioxidant activity is mainly accounted for by the formation and function of selenium-dependant glutathione peroxidases.(1) This antioxidant activity is believed to be responsible for selenium's reported ability to protect against heart attacks and strokes while supporting overall cardiovascular health. The cardiovascular health is maintained by selenium because Glutathione peroxidase may protect low density lipoproteins (LDL) from oxidation. Oxidized LDL is thought to be a crucial etiological factor in atherogenesis. Selenium may decrease platelet aggregation.

1. Numan It, Hassan Mq, Stohs SJ. Protective effects of antioxidants against Endrine induced lipid peroxidation, glutathione depletion, and lethality in rats. Arch Env Cont Tox 1990; 19: 302-306

POTASSIUM

Potassium is important for the proper functioning of the cardiovascular system. The role of Potassium in a wide range of Cardiovascular diseases is now accepted. Potassium has been used for cardiovascular indications for over 50 years.(1,2,3)

Potassium is an essential element in maintaining fluid balance in the cells, transmission of nerve impulses, skeletal muscle contractility, and normal blood pressure. Many studies have shown that a diet low in potassium and high in sodium may play a role in the development of cancer and cardiovascular disease.(4,5).

1. Mclean RM. Magnesium and its therapeutic uses. A review. Am. J. Med 1994;96: 63-76

2. Altura BM. Basic biochemistry and physiology of magnesium. A brief review. Magnes Trace Elem 1991;10:167-171

3. Purvis JR, Movahed A. Magnesium disorders and cardiovascular disease. Clin Cardiol 1992;15: 556-568

4. Jansson B. Dietary, total body, and intracellular potassium - to – sodium ratios and their influence on cancer. Cancer Detect Prevent 1991;14: 563-565

5. Khaw KT, Barrett- Connor E. Dietary Potassium and stroke associated mortality N. England J Med 1987;316: 235-240

COMMIPHORA MUKUL

Commiphora mukul may have lipid lowering activity. The crude and purified alcohol form (1,2,3,4,5) its petroleum ether extracts (6) and gugulipid (7) all exert lipid lowering activity. Each of the forms lower elevated cholesterol and triglyceride levels. The effect on the cholesterol is due to the lowering of VLDL and LDL while simultaneously elevating HDL cholesterol, thus offering protection to the heart from atherosclerosis.

1. Satyavati GV, Dwarakanath C, Tripathi SN. Experimental studies of the hypocholesterolemic effect of Commiphora Mukul. Ind. J. Med. Res. 1969;57:1950-1962

2. Khana DS, Agarwal OP, Gupta Sk, Arora RB. A biochemical approach to anti-atherosclerotic action of Commiphora – Mukul. An indigenous drug in Indian domestic pigs. Ind J Med Res 1969;57: 900-906

3. Nityand S, Kapoor NK. Hypocholesterolemic effect of Commiphora Mukul resin. Ind J Exp Biol 1971;9:376-377

4. Kuppurajan K, Rajagopalan SS, Koteswara RT, Sitaraman R. Effect of guggul onserum lipids in obese hypercholesterolemic and hyperlipidemic cases. J Assoc Phys India 1978;26:367-371

5. Baldwa VS, Bhasin V, Ranka PC, Mathur Km. Effects of Commiphora mukul (Guggal) in experimentally induced hyperlipidemia and atherosclerosis JAPI 1981;29:13-17

6. Malhotra Sc, Ahuja MMS Comparative hypolipidaemic effectiveness of gum guggulu (commiphora mukul) fraction "A" ethyl- p-cholorophenoxyisobutyrateand ciba 13437-su. Ind J med Res 1971;10:1621-1632

7. Agarwal RC, Singh SP, Saran RK etal. Clinical trial of guggulipid: a new hypolipidemia. Ind J med Res 1986;84:626-634

ALLIUM SATIVUM

Garlic appears to be a protective factor against heart disease and strokes via its ability to impact the process of atherosclerosis. Garlic may offer significant protection against heart disease and stroke as it has the ability to lower blood cholesterol in healthy individuals.(1,2,3,4,5) Garlic effects the cholesterol levels in a combination of ways like lowering the LDL and raising the HDL, and thereby improving the HDL to LDL ratio, which is a primary objective in preventing heart disease and stroke.(4,5)

Garlic has been found to produce hypotensive effects in animals and humans with hypertension.(6,7,8) The trials reveled that garlic preparations lowered the systolic and diastolic blood pressure over a 1-3 month period, which thereby reduced the risk of stroke by 30-40% and risk of heart attack by 20-25%.

Garlic preparations standardized for alliin content as well as garlic oil have demonstrated significant inhibition of platelet aggregation.(9) Garlic preparations standardized for alliin content as well as garlic oil, has shown to significantly increase serum fibrinolytic activity in humans.(10,11)

1. Ali M, Thomsom M. Consumption of a garlic clove a day could be beneficial in reventing thrombosis. Prostagl Leukotr Essen Fatty Acids 1995; 53: 211-212

2. Lau BH, Adetumbi Ma, Sanchez A. *Allium sativum* (garlic) and atherosclerosis . A review . Nutri Res 1983; 3 : 119-128

3. Kendler BS. Garlic (*Allium sativum*) and onion (*Allium cepa*) A review of their relationship to cardiovascular disease. Prev Med 1987 ;16: 670-685

4. Ernst E. Cardiovascular effects of garlic (*Allium sativum*). A review. Pharmatherapeutica 1987; 5 : 83-89

5 Kleijnen J, Knipschild P, ter riet G etal. Garlic, onions and cardiovascular risk factors. A review of the eveidence from human experiments with emphasis on commercially available preparations. Br J Clin Pharmacol 1989;28:535-544

6. Silagy CA, Neil AW A meta- analysis of the effect of garlic on blood pressure. J Hyperten 1994;12: 463-468

7. Petkov V. Plants with Hypotensive, antiatheromatous and coronary dilating action. Am J Clin Med 1979;7:197-236

8. Foushee DB, Ruffin J, Banerjee U. Garlic as a natural agent for the treatment of hypertension. A preliminary report. Cytobios 1982;34:145-162

9. Kiesewetter H, Jung P, Pindur G etal. Effect of garlic on thrombocyte aggregation, microcirculation, and other risk factors. Int J clin Pharmacol Ther toxicol 1991;29:151- 155

10. Chutani SK, Bordia A. The effect of fried versus raw garlic on fibrinolytic activity in man. Atherosclerosis 1981;38:417-21

11. Legnani C, Frascaro M, Guazzaloca G et al. Effects of dried garlic preparation on fibrinolysis and platelet aggregation in healthy subjects. Arzneim Forsch 1993; 43:119- 121

TAURINE

Taurine has antioxidant activity. It has putative hypocholesterolemic, hypotensive, antiatherogenic and detoxifying activities. Taurine reduces cholesterol levels in animals due to stimulation of bile acid synthesis and enhancement of cholesterol 7 alpha-hydroxylase activity. The antiatherogenic activity is also related to the hypocholesteromic activity. Taurine is found to have hypotensive activity in hypertensive patients. Taurine helps regulate the contraction and pumping action of the heart muscle. It is also the most abundant amino acid in the heart. Studies suggest that taurine may support cardiovascular health and function while lessening symptoms of congestive heart failure.(1,2) Taurine may lower blood pressure when given as part of a carefully designed regimen (under the supervision of a physician).(3)

1. Azuma J, et al. Therapeutic Effect of Taurine in Congestive Heart Failure: A Double-blind Crossover Trial. Clin Cardiol. May1985;8(5):276-82.

2. Azuma J, et al. Therapy of Congestive Heart Failure with Orally Administered Taurine. Clin Ther. 1983; 5(4):398-408.

3. Fujita T, et al. Effects of Increased Adrenomedullary Activity and Taurine in Young Patients with Borderline Hypertension. Circulation. Mar1987;75(3):525-32.

TERMINALIA ARJUNA

Arjuna improves cardiac muscle function and pumping activity. It is thought that the saponin glycosides might be responsible for inotropic effects of Terminalia, while the flavonoids and OPCs provide free radical antioxidant activity and vascular strengthening. Terminalia also contains tannins like gallotannins and ellagitannins and steroids like sterols including beta-sitosterol.(1,2) A dose-dependent decrease in heart rate and blood pressure was noted in animal studies.(3)

1. Bone K. Clinical Applications of Ayurvedic and Chinese Herbs. Warwick, Queensland, Australia. Phytotherapy Press; 1996:131-133.

2. Kapoor LD. Handbook of Ayurvedic Medicinal Plants. Boca Raton, FL. CRC Press; 1990:319-320.

3. Singh N, Kapur KK, Singh SP, et al. Mechanism of cardiovascular action of Terminalia arjuna. Planta Med 1982;45:102-104

SALVIA MILTIORRHIZA

Salvia Miltiorrhiza acts by activating the kallikrein-kinin system in the kidneys to promote production and secretion of prostaglandin E2, induce dilation of the renal vascular system, and increase renal blood flow and glomerular filtration rate.(1) It dilates the coronary arteries and inhibits platelet aggregation.(2) It is found that Dan Shen may increase coronary blood flow without affecting heart rate.(3) Dan Shen acts as a free radical scavenger.(4)

1. Yu GR. "Clinical and experimental study on the effect of Salvia miltiorrhiza on microcirculation and 2,3 diphosphoglyceric acid in patients with coronary heart disease." Chung Hsi I Chieh Ho Tsa Chih. Oct.1988;8(10):596-8.

2. Luo HW, et al. "Platelet aggregation inhibitors from Salvia miltiorrhiza Bunge." Yao Hsueh Hsueh Pao. Nov.1988;23(11):830-4.

3. Mashour NH, et al. "Herbal medicine for the treatment of cardiovascular disease: clinical considerations." Arch Intern Med. November9,1998;158:2225-2234.

4. Ming-Shi S. "Increase of vitamin E content in LDL and reduction of atherosclerosis in cholesterol-fed rabbits by a water-soluble antioxidant-rich fraction of Salvia miltiorrhiza." Arterioscler Thromb Vasc Biol. 1998;18:481-486.

CRATAEGUS OXYCANTHA

Crataegus oxycantha prevents the deposition of cholesterol in the arterial walls and improves cardiac function and thereby is effective in reducing blood pressure, angina and serum cholesterol levels.(1,2,3) Hawthorne has been used as an antihypertensive and improves cardiotonic activity. Hawthorne improves the blood supply to the heart by dilating the coronary vessels.(1,2,4,5,6,7). This effect appears to be due to the relaxation of vascular smooth muscle.(4.5) Various flavonoid components in Crataegus have been shown to inhibit vasoconstriction by a variety of substances, including hypophysin, histamine, and acetylcholine.(1,8,9) Hawthorne improves the metabolic processes in the heart which results in an increase in the force of contraction of the heart muscle and elimination of some types of rhythm disturbances.(1,2,10,11,12). This action is due to

increased blood and oxygen supply to the myocardium and also as a result of flavonoid–enzyme interactions.(1,5,7) Hawthorne is known to inhibit angiotensin-converting enzyme(ACE).(13)

1. Petkov V. Plants with hypotensive, antiatheromatous and coronarodilating action. Am J Chin Med 1979;7:197-236

2. Ammon HPT, Handel M. Craategus, toxicology and pharmacology. Planta Medica 1981;43:101-120,318-322

3. Wegrowski J, Robert AM, Moczar M. The effect of procyanidolic oligomers on the composition of normal and hypercholesterolemic rabbit aortas. Biochem Pharm1984;33:3491-3497.

4. Mavers VWH, Hensel H. Changes in local myocardial blood flow following oral administeration to a Crategus extract to non anesthtized dogs. Arzniem Forsch 1974;24:783- 785.

5. Roddewig VC, Hensel H. Reaction of local myocardial blood flow in non-anesthetized dogs and anesthetized cats to oral and parentyral applications of a crategus fraction (oligomere procyanidins). Arzniem Forsch 1977; 27: 1407-1410.

6. Rewerski VW, Piechocki T, Tyalski M, Lewak S. Some pharmacological properties of oligomeric procyanidin isolated from hawthorne . Arzniem Forsch 1967; 17: 490-491.

7. Hammerl H, Kranzl C, Pichler O, Studlar M Klinixch experimentlle toffwechseluntersuchungen mit einem crategus-extrakt. Arzniem Forsch 1971; 21: 261-263

8. Gabor M. Pharmacologic effects of Flavonids on blood vessels Angiologica 1972;9:355-374

9. Havsteen B. Flavnoids, a class of natural products of high pharmacological potency. Biochem Pharm 1983;32:1141-1148

10. Vogel VG. Predictability of the activity of drug combinations- yes or no? Arzniem Forsch 1975;25:1356-1365

11. O'Conolly VM, Jansen W, Bernhoft G, Bartsch G. Treatment of cardiac performance (NYHA stages 1 to 2) in advance age with standardized crataegus extract. Fortschr Med 1986;104:805-808.

12. Petkov E, Nikolov N, Uzunov P. Inhibitory effects of some flavonoids and flavonoids mixtures on cyclic AMP phosphodiesterase activity of rat heart. Planta Medica 1981,43:183-186.

13. Uchida S, Ikari N, Ohta H et al. Inhibitory effects of condensed tannins on angiotensin converting enzyme. Jap. J Pharmacol. 1987;43:242-245

L- CARNITINE

Normal heart function is dependent on adequate concentrations of Carnitine.(1) Carnitine may be useful in angina as it improves the oxygen utilization and energy metabolism by the myocardium thereby helping to prevent the production of toxic fatty acid metabolites.(1) These compounds are extremely damaging to the heart as they contribute to impaired contraction of the heart muscle and irregular beats which can lead to the eventual death of the heart tissue.(2) In addition to angina, all of these effects may make carnitine beneficial in the recovery from a heart attack, arrythmias, and congestive heart failure.(2) Carnitine also exerts beneficial effects on blood lipids by lowering triglycerides and total cholesterol levels while raising HDL cholesterol.(3,4).

1. Opie LH. Role of Carnitine in fatty acid metabolism of normal and ischemic myocardium. Am heart J 1979;97:373-378

2. Goa KL, Brogden RN. L- Carnitine – A preliminary review of its pharmacokinetics, and its therapeutic use in ischemic cardiac disease and primary and secondary Carnitine deficiencies in relationship to its role in fatty acid metabolism. Drugs 1987;34: 1-24

3. Pola P. Statistical evaluation of longterm L- Carnitine therapy in hyperlipoproteinemias. Drugs Exp Clin Res 1983;9:925-934

4. Pola P. Carnitine in the therapy of dyslipidemic patients. Curr ther Res 1980;27:208-215

ALPHA LIPOIC ACID

Alpha Lipoic Acid provides antioxidant protection throughout the body.(1,2) The antioxidant protection that ALA provides is because ALA and its reduced metabolite dihydrolipoic acid (DHLA), form a redox couple and thereby scavenge a wide range of reactive oxygen species.(2) Both can scavenge the hydroxyl radicals, the nitric oxide radicals, peroxynitrite, hydrogen peroxide and hypochlorite. Alpha lipoic acid can scavenge singlet oxygen and Dhla can scavenge superoxide and peroxyl reactive oxygen species.(1,2)

1. Kagan VE, Shvedova A, Serbinova E, et al. Dihydrolipoic acid--a universal antioxidant both in the membrane and in the aqueous phase. Reduction of peroxyl, ascorbyl and chromanoxyl radicals. Biochem Pharmacol. Oct1992;44(8):1637-49.

2. Monograph:Alpha-Lipoic Acid. Altern Med Rev. Aug1998;3(4):308-11.

GAMMA-ORYZANOL

Gamma oryzanol is a naturally occurring mixture of plant chemicals called sterols and ferulic acid

esters. Ferulic acid esters have been shown to have cholesterol lowering action systematically.(1) In addition, studies have shown that gamma oryzanol is a natural antioxidant and can lower cholesterol levels in the blood.(1) It has been used in humans to lower the risk of heart disease.(2)

1. Bombardelli E. Methods, composition and compounds for the treatment of prostate adenoma. EP Appl 8330491.3, June10 1985.

2. Scavariello, E.M.and Arellano, D B. Gamma-oryzanol: an important component in rice bran oil. Arch. Latinoam Nutr. 1998, 48 (1): 7-12.

COENZYME Q10

Coenzyme Q10 or CoQ10 may have cardioprotective, cytoprotective and neuroprotective activities.(1) The actual mechanism of action of CoQ10 is still unclear, but a lot is known about its biochemistry. CoQ10 is really an essential cofactor in the mitochondrial electron transport chain that thereby is vital for the production of ATP.

CoQ10 has antioxidant activity in the mitochondria and cellular membranes, protecting against lipid peroxidation of the membrane. It also inhibits the oxidation of LDL cholesterol.(1) LDL Cholesterol oxidation is believed to play a significant role in the pathogenesis of atherosclerosis. CoQ10 is biosynthesized in the body and with age its levels decrease. This may be due to decreased synthesis and/or increased lipid peroxidation.

Since oral administration of CoQ10 can increase tissue levels of the nutrient, it is theoretically possible to correct CoQ10 deficiency and its associated metabolic consequences by supplementation.(1)

1. Kitamura N, Yamaguchi A Otaki M et al. Myocardial tissue level of Coenzyme Q10 in patients with cardiac failure. In Folkers K, Yamamura Y, eds. Biomedical and clinical aspects of Coenzyme Q Vol 4 Amsterdam: Elsevier. 1984 : p243-252

INDICATION AND USAGE:

NIACIN (as Inositol Hexanicotinate)

Inositol nicotinate or Inositol Hexanicotinate has indications which are similar to those of nicotinic acid and niacin. It has been observed that Inositol Hexanicotinate could be useful in hyperlipidemia , Raynaud's disease, intermittent claudication and other peripheral vascular diseases.(1) It may also be useful in reducing the risk of atherosclerosis.(1)

1. Guyton JR. "Effect of niacin on atherosclerotic cardiovascular disease." Am J Cardiol. December17,1998;82(12A):18U-23U.

FOLIC ACID

Folic acid is indicated for the prevention of some birth defects and offers significant protection against cardiovascular disease and some forms of cancer.(1) There is preliminary evidence that folic acid might be helpful in reducing some of the symptoms associated with psychiatric disorders. It has been hypothesized that folic acid supplementation might help prevent Alzheimers disease.(1) Folic acid also reduces homocysteine levels and can be supportive against arteriosclerosis.(2,3)

1. Kopjas TL. "Effect of folic acid on collateral circulation in diffuse chronic arteriosclerosis." J Am Geriatr Soc. 1966;14:1187-1192.

2. Kopjas TL. "Treatment of chronic diffuse peripheral arteriosclerotic vascular disease with folic acid and vitamin B and C." J Am Geriatr Soc. 1965;13:935-937.

3. Vermeulen EGJ, et al. "Effect of homocysteine-lowering treatment with folic acid plus vitamin B6 on progression of subclinical atherosclerosis: a randomized, placebo-controlled trial." Lancet February12,2000;355:517-522.

VITAMIN B12

Vitamin B 12 has been indicated in patients with Vitamin B12 deficiency. It is also indicated in those with various heart diseases. It has been shown to be useful in reducing homocysteine levels and risk of atherosclerosis.(1,2)

1. Peterson JC and Spence JD. "Vitamins and progression of atherosclerosis in hyper-homocysteinemia." Lancet. January24,1998;351;263.

2. "Preventing the emergency: vitamins and coronary heart disease." Emerg Med. December,1998;30(12):35-37.

MAGNESIUM

Magnesium deficiency is associated with the pathogenesis of numerous disorders including ischemic heart disease, congestive heart failure, sudden cardiac death, cardiac arrhythmias, diabetes mellitus, preeclampsia/eclampsia and hypertension.(1) Supplemental magnesium can be helpful in these conditions.

1. Purvis JR, Movahed A. "Magnesium disorders and cardiovascular diseases." Clin Cardiol. August,1992;15:556-568.

SELENIUM

Low dietary intake of selenium is often associated with increased risk of cardiovascular diseases such as cardiomyopathies and ischemic heart disease.(1) Selenium can be beneficial in supporting cardiovascular health and in myocardial infarctions and ischemic heart diseases.(1,2)

1. Suadicani P, et al. "Serum selenium concentration and risk of ischaemic heart disease in a prospective cohort study of 3000 males." Atheroscler. 1992;96:33-42.

2. Kok FJ, et al. "Decreased selenium levels in acute myocardial infarction." JAMA. 1989;261:1161-1164.

POTASSIUM

Potassium may be useful in the management of hypertension. Many studies have revealed that dietary intake of potassium may protect against stroke. There is growing evidence that high potassium intake may have a number of cardioprotective effects.(1) In hypertensive patients, long term supplementation with potassium is useful in lowering blood pressure.(1)

1. Barri YM, Wingo CS. "The effects of potassium depletion and supplementation on blood pressure: A clinical review." Am J Med Sci. July,1997;314(1):37-40.

COMMIPHORA MUKUL

Commiphora mukul has been used in connection with a variety of conditions including high cholesterol and high triglycerides.(1)

1. Baldwa VS, et al. Effects of Commiphora Mukul (Guggul) in Experimentally Induced Hyperlipidemia and Atherosclerosis. J Assoc Physicians India. 1981;29(1):13-17.

ALLIUM SATIVUM

Garlic has been approved by the commission E for atherosclerosis, hypertension and raised levels of cholesterol. Garlic is also used internally as an adjuvant to diuretic measures for elevated lipid levels. The herb is also used for prevention of age related vascular changes and arteriosclerosis. It may also lower blood pressure.(1)

1. Silagy CA, Neil HA. "A meta-analysis on the effect of garlic on blood pressure." J Hypertens. 1994;(12;4):463-68.

TAURINE

Taurine has been found to be useful in a variety of indications like congestive heart failure and hypertension. It is though to improve heart conductivity. Taurine has also demonstrated some antiatherogenic effects in studies.(1)

1. Kohashi N, et al. "Decrease of urinary taurine in essential hypertension." Jap Heart J. 1983;24:91.

TERMINALIA ARJUNA

Terminalia Arjuna has been used for high blood pressure and various other heart associated diseases.(1) It is also used for other disorders like diabetes, anemia asthma, bronchitis, cardiopathy, dysentry, liver cirrhosis, etc.

1. Dwivedi S, Jauhari R. Beneficial effects of Terminalia arjuna in coronary artery disease. Indian Heart J 1997;49:507-510.

SALVIA MILTIORRHIZA

Dan Shen may be helpful with coronary heart disease specifically with respect to improvement in the various hemodynamic parameters.(1) It is supportive in various cardiovascular diseases.(2)

1. Luo HW, et al. "Platelet aggregation inhibitors from Salvia miltiorrhiza Bunge." Yao Hsueh Hsueh Pao. Nov,1988;23(11):830-4.

2. Mashour NH, et al. "Herbal medicine for the treatment of cardiovascular disease: clinical considerations." Arch Intern Med. November9,1998;158:2225-2234.

CRATAEGUS OXYCANTHA

Crataegus Oxycantha has been indicated in a variety of diseases. The primary indication is atherosclerosis, hypertension and congestive heart failure.(1) It is supportive for heart function.(2) In the past it was used as a mild diuretic and as an astringent for relief of the discomfort of sore throats.

1. Massoni G. "On the use of hawthorn extract (Crataegus) in the treatment of certain ischemic myocardial diseases in old age." G Gerontol. Sep,1968;16(9):979-84.

2. Wolkerstorfer H. "Treatment of heart disease with a digoxin-crataegus combination." Munch Med Wochenschr. Feb25,1966;108(8):438-41.

L- CARNITINE

Supplemental L-Carnitine has been used in the management of cardiac ischemia and peripheral arterial disease.(1) It may also more generally be indicated for cardioprotection.(1,2) It lowers triglyceride levels and increases levels of HDL-cholesterol in some.(2) It is used with some benefit in those with primary and secondary Carnitine deficiency syndromes.

1. Orlando G, Rusconi C. "Oral L-carnitine in the treatment of chronic cardiac ischaemia in elderly patients." Clin Trials J. 1986;23:338-344.

2. Pola P, et al." Carnitine in the therapy of dyslipemic patients." Curr Ther Res. 1980;27:208-216.

ALPHA LIPOIC ACID

Alpha Lipoic Acid may help in the prevention of oxidation of LDL cholesterol and may be protective, generally against oxidative stress and specifically against atherosclerosis, and ischemia.(1)

1. Monograph:Alpha-Lipoic Acid. Altern Med Rev. Aug1998;3(4):308-11.

GAMMA-ORYZANOL

Gamma oryzanol may be useful for elevated cholesterol.(1)

1. Nakayama S, Manabe A, Suzuki J, et al. Comparative effects of two forms of gamma- oryzanol in different sterol compositions on hyperlipidemia induced by cholesterol diet in rats. Jpn J Pharmacol. Jun1987;44(2):135-43.

COENZYME Q10

CoQ 10 may be indicated in various cardiovascular diseases and particularly in congestive heart failure.(1) It may be indicated to correct depletions resulting form the use of HMG-CoA reductase inhibitors used to treat elevated cholesterol levels.(1) CoQ10 may also be useful in cardiomyopathies.(2)

1. Morisco C, et al. "Effect of coenzyme Q10 in patients with congestive heart failul long-term multicenter randomized study." Clin Invest. 1993;71:S134-S136.

2 Langsjoen PH, et al. "Long-term efficacy and safety of coenzyme Q10 therapy for idopathic dilated cardiomyopathy." Am J Cardiol. 1990;65:521-523.

RESEARCH SUMMARY:

NIACIN (as Inositol Hexanicotinate)

Nicotinic acid may lower elevated LDL cholesterol levels while simultaneously raising levels of HDL cholesterol.(1) The use of Inositol Hexanicotinate has grown in popularity because it reportedly does not produce the side affects associated with nicotinic acid. Other studies suggest that nicotinic acid may reduce the recurrence rate of heart attacks in people who are at risk.(2)

1. Alderman JD, et al. Effect of a Modified, Well-tolerated Niacin Regimen on Serum Total Cholesterol, High Density Lipoprotein Cholesterol and the Cholesterol to High Density Lipoprotein Ratio. Am J Cardiol. Oct1989;64(12):725-29.

2. Loggia Della, et al. Anti-inflammatory Activity of Benzopyrones that are Inhibitors of Cyclo- and Lipo-oxygenase. Pharmacol Res Commun. 1988;20:S91-S94.

FOLIC ACID

Folic acid can lower homocysteine levels. Because homocysteine is a significant risk factor for atherosclerosis, folic acid may prevent the development and progression of this disease.(1)

1. Swain RA, et al. The Role of Folic Acid in Deficiency States and Prevention of Disease. J Fam Pract. Feb1997;44(2):138-44

VITAMIN B12

One of the most important long-term benefits of vitamin B12 may be its role in preventing elevated levels of homocysteine from building up in the body.(1) Homocysteine is formed during the metabolism of the amino acid methionine. Elevated level of homocysteine is known to be a risk factor for the development of atherosclerosis and other cardiovascular diseases. Vitamin B12 is one of the vitamins that is required to convert homocysteine into a benign compound. Vitamin B12 deficiency has been associated with depression in the elderly, and it may treat certain symptoms of Crohn's disease.(2,3)

1. Siri PW, et al. Vitamins B6, B12, and Folate: Association with Plasma Total Homocysteine and Risk of Coronary Atherosclerosis. J Am Coll Nutr. Oct1998;17(5):435-41.

2. Joosten E, et al. Metabolic Evidence that Deficiencies of Vitamin B12 (cobalamin), Folate, and Vitamin B6 Occur Commonly in Elderly People. Am J Clin Nutr. Oct1993;58(4):468-76.

3. Imes S, et al. Iron, Folate, Vitamin B12, Zinc, and Copper Status in Outpatients with Crohn's Disease: Effect of Diet Counseling. J Am Diet Assoc. Jul1987;87(7):928-30.

MAGNESIUM

Research indicates that magnesium may be of benefit in cardiovascular diseases.(1,2) Magnesium supplementation may increase the survival rate of patients with congestive heart failure and it can help lower blood pressure.(2,3,4)

1. Gaby AR. Magnesium: An Inexpensive, Safe, and Effective Treatment for Cardiovascular Disease. J Advancement Med. 1986;1:179-81.

2. Kh R, et al. Effect of oral magnesium supplementation on blood pressure, platelet aggregation and calcium handling in deoxycorticosterone acetate induced hypertension in rats. J Hypertens. Jul2000;18(7):919-26.

3. Gottlieb SS, et al. Prognostic Importance of the Serum Magnesium Concentration in Patients with Congestive Heart Failure. J Am Coll Cardiol. Oct1990;16(4):827-31.

4. Moore TJ. The Role of Dietary Electrolytes in Hypertension. J Am Coll Nutr. 1989;8(Suppl):68S-80S.

SELENIUM

There is evidence suggesting that oxidative stress from free radicals may promote heart disease.(1) For example, it is the oxidized form of low-density lipoproteins that promotes plaque build-up in coronary arteries.(2) Selenium is one of a group of antioxidants that may help limit the oxidation of LDL cholesterol and thereby may help in coronary artery diseases.(1,3) It has also been found to have a beneficial role in cardiomyopathies.(4)

1. Ozer NK, Boscoboinik D, Azzi A. New roles of low density lipoproteins and vitamin E in the pathogenesis of atherosclerosis. *Biochem Mol Biol Int* 1995;35:117-24.

2. Lapenna D, de Gioia S, Ciofani G, Mezzetti A, Ucchino S, Calafiore AM, Napolitano AM, Di Ilio C, Cuccurulo F. Glutathione-related antioxidant defenses in human atherosclerotic plaques. *Circulation* 1998;97:1930-4.

3. Neve J. Selenium as a risk factor for cardiovascular diseases. *J Cardiovasc Risk* 1996;3: 42-7.

4. Collipp PJ, Chen SY. "Cardiomyopathy and selenium deficiency in a two year old." N Eng J Med. 1981;304:1304-1305.

POTASSIUM

Blood pressure is partially regulated by potassium and studies suggest that potassium may help reduce blood pressure. (1) Targeted clinical applications for potassium include use in preventing cardiac arrhythmias, which are associated with low potassium levels.(2,3) Potassium is also commonly used in patients with congestive heart failure as some medications used to treat the disease can deplete the body of potassium.(4) A review article that examined studies of more than twenty-five hundred hypertensive patients and their reaction to potassium supplementation found that blood pressure was lowered by supplementation of potassium on a regular basis.(5)

1. Patki PS, et al. Efficacy of Potassium and Magnesium in Essential Hypertension: A Double-blind, Placebo Controlled, Crossover Study. BMJ. Sept1990;301(6751):521-23.

2. Motte G. Arrhythmia Caused by Potassium Deficiency. Arch Mal Coeur Vaiss. Apr1984;77(Spec No): 17-22.

3 Maurat JP, et al Cardiovascular pathology and magnesium. Therapie. Nov-Dec 1993;48(6):599-607.

4 Wester PO, et al. Intracellular Electrolytes in Cardiac Failure. Acta Med Scand Suppl. 1986;707:33-36.

5. Whelton PK, et al. "Effects of oral potassium on blood pressure: Meta-analysis of randomized controlled clinical trials." JAMA. May 28,1997;277(20):1624-1632.

COMMIPHORA MUKUL

Studies suggest that guggul can lower LDL levels while increasing HDL levels.(1) Other research points to guggul's ability to reduce artherosclerotic plaques in the blood vessels.(2) In addition to supporting overall circulatory health, guggul may also function as an antioxidant that can prevent the heart from being damaged by free radicals.(3)

1 Singh V, et al. Stimulation of Low Density Lipoprotein Receptor Activity in Liver Membrane of Guggulsterone Treated Rats. Pharmacol Res. 1990;22(1):37-44.

2. Baldwa VS, et al. Effects of Commiphora Mukul (Guggul) in Experimentally Induced Hyperlipidemia and Atherosclerosis. J Assoc Physicians India. 1981;29(1):13-17.

3 Satyavati GV, et al. Guggulipid: A Promising Hypolipidemic Agent from Gum Guggul (Commiphora Wightii). Econ Med Plant Res. 1991;5:48-82.

ALLIUM SATIVUM

Many studies have suggested that garlic may have a useful role in cardiovascular conditions such as heart disease, atherosclerosis and stroke. The benefits are probably associated with garlic's ability to lower total cholesterol, LDL, and triglycerides, and increase HDL cholesterol.(1,2,3) In addition, garlic may support the overall health of the circulatory system, which may play a role in lowering the risk of heart attack and stroke.(4,5,6) Garlic use has been reported to be useful in treating mild high blood pressure in both animal and human studies.(7, 8, 9) There are likely multiple reasons why garlic may lower blood pressure,(10,11,12,13) and many experts feel that further research in this area is justified.(14)

1. Ernst E. Cardioprotection and Garlic. Lancet. 1997;349(9045):131.

2. Steiner M, et al. A Double-blind Crossover Study in Moderately Hypercholesterolemic Men that Compared the Effect of Aged Garlic Extract and Placebo Administration on Blood Lipids. Am J Clin Nutr. 1996;64(6):866-70.

3. Agarwal KC. Therapeutic Actions of Garlic Constituents. Med Res Rev. 1996;16(1):111-24.

4. Kiesewetter H, et al. Effect of Garlic on Platelet Aggregation in Patients with Increased Risk of Juvenile Ischaemic Attack. Eur J Clin Pharmacol. 1993;45(4):333-36.

5. Bordia A. Effect of Garlic on Blood Lipids in Patients with Coronary Heart Disease. Am J Clin Nutr. 1981;34(10):2100-03.

6. Bordia A, et al. Protective Effect of Garlic Oil on the Changes Produced by 3 Weeks of Fatty Diet on Serum Cholesterol, Serum Triglycerides, Fibrinolytic Activity and Platelet Adhesiveness in Man. Indian Heart J. 1982;34(2):86-88.

7. Ide N, et al. Aged Garlic Extract Attenuates Intracellular Oxidative Stress. Phytomedicine. May1999;6(2): 125-31.

8 Cheng W. [Clinical and Experimental Study of Garlic in Preventing and Treating Cardiovascular Diseases]. Zhong Xi Yi Jie He Za Zhi. Oct1990;10(10):635-7, 640.

9. Ali M, Al-Qattan KK, Al-Enezi F, et al. Effect of Allicin from Garlic Powder on Serum Lipids and Blood Pressure in Rats Fed with a High Cholesterol Diet. Prostaglandins Leukot Essent Fatty Acids. Apr2000;62(4):253-9.

10. Pedraza-Chaverri J, Tapia E, Medina-Campos ON, et al. Garlic Prevents Hypertension Induced by Chronic Inhibition of Nitric Oxide Synthesis. Life Sci. 1998;62(6):PL71-7.

11. Dirsch VM, Kiemer AK, Wagner H, et al. Effect of Allicin and Ajoene, Two Compounds of Garlic, on Inducible Nitric Oxide Synthase. Atherosclerosis. Aug1998;139(2):333-9

12. Kaye AD, De Witt BJ, Anwar M, et al. Analysis of Responses of Garlic Derivatives in the Pulmonary Vascular Bed of the Rat. J Appl Physiol. Jul2000;89(1):353-8.

13. Ali M, Thomson M, Alnageeb MA, et al. Antithrombotic Activity of Garlic: Its Inhibition of the Synthesis of Thromboxane-B2 During Infusion of Arachidonic Acid and Collagen in Rabbits. Prostaglandins Leukot Essent Fatty Acids. Oct1990;41(2):95-9.

14. Silagy CA, Neil HA. A Meta-analysis of the Effect of Garlic on Blood Pressure. J Hypertens. Apr1994;12(4):463-8.

TAURINE

Studies suggest that taurine may support cardiac health and function while lessening symptoms of congestive heart failure.(1,2) Taurine may help lower blood pressure when used as part of a regimen (under the supervision of a physician).(3)

1. Azuma J, et al. Therapeutic Effect of Taurine in Congestive Heart Failure: A Double-blind Crossover Trial. Clin Cardiol. May1985;8(5):276-82.

2. Azuma J, et al. Therapy of Congestive Heart Failure with Orally Administered Taurine. Clin Ther. 1983; 5(4):398-408.

3. Fujita T, et al. Effects of Increased Adrenomedullary Activity and Taurine in Young Patients with Borderline Hypertension. Circulation Mar1987;75(3):525-32.

TERMINALIA ARJUNA

An open study of Terminalia use in stable and unstable angina demonstrated a 50-percent reduction of angina in the stable angina group after three months. A significant reduction was also found in systolic blood pressure in these patients.(1)

A double-blind, placebo-controlled, two-phase trial of Terminalia extract treatment in twelve patients with severe refractory heart failure (NYHA Class IV) was conducted. Improvements were noted in the ensuing two to three months, and were maintained through the balance of the study. After four months' treatment, nine patients had improved to NYHA Class II and three improved to Class III.(2)

A study was conducted on 10 post-myocardial-infarction patients and two ischemic cardiomyopathy patients, along with conventional treatment. Significant reductions in angina, left ventricular ejection fraction, and left ventricular mass were noted in the Terminalia group, whereas the control group taking only conventional drugs had decreased angina only. The two patients with cardiomyopathy improved from NYHA Class III to Class I during the study.(3) Terminalia might reduce blood lipids as well.(4,5)

1. Dwivedi S. Agarwal MP. Antianginal and cardioprotective effects of Terminalia arjuna, an indigenous drug, in coronary artery disease. JAPI 1994;42:287-289.

2. Bharani A, Ganguly A, Bhargave KD. Salutary effect of Terminalia arjuna in patients with severe refractory heart failure. Int J Cardiol 1995;49:191-199.

3. Dwivedi S, Jauhari R. Beneficial effects of Terminalia arjuna in coronary artery disease. Indian Heart J 1997;49:507-510.

4. Ram A, Lauria P, Gupta R, et al. Hypocholesterolaemic effects of Terminalia arjuna tree bark. J Ethnopharmacol 1997;55:165-169.

5. Khanna AK, Ramesh C, Kapoor NK. Terminalia arjuna: an Ayurvedic cardiotonic regulates lipid metabolism in hyperlipidaemic rats. Phytotherapy Res 1996;10:663-665.

SALVIA MILTIORRHIZA

Some of the literature supporting Dan Shen and its use in cardiovascular diseases are referenced below. These studies show promise for its use in myocardial protection and as a health supplement for myocardial ischemia.

1. Mashour NH, et al. "Herbal medicine for the treatment of cardiovascular disease: clinical considerations." Arch Intern Med. November 9,1998;158:2225-2234.

2. Cheng YY, et al. "Effect of Salvia miltiorrhiza on the cardial ischemia in rats induced by ligation." Chung Kuo Chung Hsi I Chieh Ho Tsa Chih. Jul,1992;12(7):424-6.

3. Zhu P. "Experimental study on myocardial protection with verapamil and salvia miltiorrhiza Bunge cardioplegia." Chung Hua Wai Ko Tsa Chih. Jan,1990;28(1):9-12.

4. Zhou W, Ruigrok TJ. "Protective effect of danshen during myocardial ischemia and reperfusion: an isolated rat heart study." Am J Chin Med. 1990;18(1-2):19-24

5. Cheng YY, et al. "Protective action of Salvia miltiorrhiza aqueous extract on chemically induced acute myocardial ischemia in rats." Chung Hsi I Chieh Ho Tsa Chih. Oct,1990;10(10):609-11.

6. Shi YD. "Anti-coagulation effect in vitro of danshan and its three chemical extracts." Chung Yao Tung Pao. July,1986;11(7):48-50.

CRATAEGUS OXYCANTHA

Researchers think that hawthorne may be able to regulate both low and high blood pressure. One of its key components, bioflavonoids, are thought to dilate the blood vessels.(1) Its function as a mild diuretic may contribute to its blood pressure-lowering effects.(1)

Hawthorn has also been evaluated in people with NYHA class II heart failure. In a study of 132 individuals, standardized hawthorn extract compared favorably to captopril, a member of a class of prescription medications known as ACE-inhibitors.(2)

Other key components of hawthorn are believed to support heart and circulatory system health including heartbeat, blood flow, control of atherosclerotic plaque and more.(3,4,5,6)

1. Wagner H, et al. Cardioactive Drugs IV. Cardiotonic Amines from Crataegus oxyacantha. Planta Medica. 1982;45:99-101.

2 Tauchert M, Ploch M, Huebner WD. Effectiveness of Hawthorn Extract LI132 Compared with the ACE Inhibitor Captopril: Multicenter double-blind study with 132 NYHA Stage II. Muench Med Wochenschr. 1994,136(supp):S27-S33.

3. Taskov M. On the Coronary and Cardiotonic Action of Crataemon. Acta Physiol Pharmacol Bulg. 1977; 3(4): 53-57.

4. Petkov E, et al. Inhibitory Effect of Some Flavonoids and Flavonoid Mixtures on Cyclic AMP Phosphodiesterase Activity of Rat Heart. Planta Medica. 1981;43:183-86.

5. Uchida S, et al Inhibitory Effects of Condensed Tannins on Angiotensin Converting Enzyme. Jap J Pharmacol. 1987;43(2):242-46

6 Wegrowski J, Robert AM, Moczar M. The Effect of Procyanidolic Oligomers on the Composition of Normal and Hypercholesterolemic Rabbit Aortas. Biochem Pharm. 1984;33:3491-97.

ALPHA LIPOIC ACID

ALA provides antioxidant protection throughout the body.(1,2) ALA may have protective properties against the normal aging process of the heart.(3)

1. Kagan VE, Shvedova A, Serbinova E, et al. Dihydrolipoic acid--a universal antioxidant both in the membrane and in the aqueous phase Reduction of peroxyl, ascorbyl and chromanoxyl radicals. Biochem Pharmacol. Oct1992;44(8):1637-49.

2. Monograph:Alpha-Lipoic Acid. Altern Med Rev. Aug1998;3(4):308-11.

3. Suh JH, Shigeno ET, Morrow JD, et al. Oxidative stress in the aging rat heart is reversed by dietary supplementation with (R)-(alpha)-lipoic acid. FASEB J. Mar2001;15(3):700-6.

GAMMA ORYZANOL

Studies in animals and humans have shown that gamma oryzanol may help lower elevated cholesterol levels.(1,2) This benefit is apparently the result of a combination of effects including reduced cholesterol absorption, increased conversion of cholesterol to bile acids, and an increased excretion of those bile acids.(3,4)

1. Scavariello EM, Arellano DB. Gamma-oryzanol: an important component in rice bran oil. Arch Latinoam Nutr. Mar1998;48(1):7-12.

2. Nakayama S, Manabe A, Suzuki J, et al. Comparative effects of two forms of gamma- oryzanol in different sterol compositions on hyperlipidemia induced by cholesterol diet in rats. Jpn J Pharmacol. Jun1987;44(2):135-43.

3. Seetharamaiah GS, Chandrasekhara N. Effect of oryzanol on cholesterol absorption & biliary & fecal bile acids in rats. Indian J Med Res. Dec1990;92:471-5.

4. Sakamoto K, Tabata T, Shirasaki K. Effects of gamma-oryzanol and cycloartenol ferulic acid ester on cholesterol diet induced hyperlipidemia in rats. Jpn J Pharmacol. Dec1987;45(4):559-65.

COENZYME Q10

Studies on Co-Q10 often focus on the Cardiovascular system.(1-7) Studies have suggested that Co-Q10 can reduce the frequency of angina episodes and strengthen the heart muscle and increase quality of life and survivability in those with congestive heart failure.(3, 4, 5, 6) Coenzyme Q10 has also been shown to decrease blood pressure in patients with high blood pressure.(7)

1. Oda T. Effect of Coenzyme Q10 on Stress-induced Cardiac Dysfunction in Paediatric Patients with Mitral Valve Prolapse: A Study by Stress Echocardiography. Drugs Exp Clin Res. 1985;11(8):557-76.

2. Mortensen SA, Leth A, Agner E, Rohde M. Dose-related decrease of serum coenzyme Q10 during treatment with HMG-CoA reductase inhibitors Mol Aspects Med. 1997;18

Suppl:S137-44.

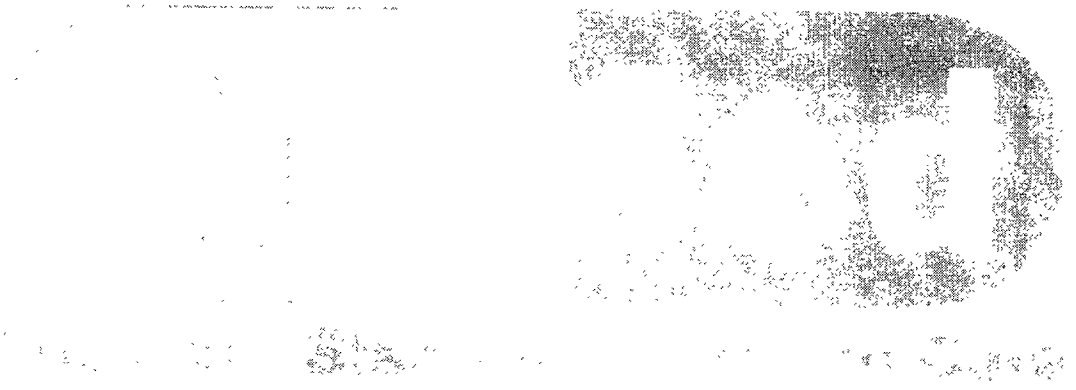
3. Kamikawa T, et al. Effects of Coenzyme Q10 on Exercise Tolerance in Chronic Stable Angina Pectoris. Am J Cardiol. Aug1985;56(4):247-51.

4. Sinatra ST. Coenzyme Q10: A Vital Therapeutic Nutrient for the Heart with Special Application in Congestive Heart Failure. Conn Med. Nov1997;61(11):707-11.

5. Langsjoen PH, et al. A Six-year Clinical Study of Therapy of Cardiomyopathy with Coenzyme Q10. Int J Tissue React. 1990;12(3):169-71.

6. Tran MT, Mitchell TM, Kennedy DT, Giles JT. Role of coenzyme Q10 in chronic heart failure, angina, and hypertension. Pharmacotherapy. Jul2001;21(7):797-806.

7. Langsjoen P, et al. Treatment of Essential Hypertension with Coenzyme Q10. Mol Aspects Med. 1994;15(Suppl):S265-72.



CONTRAINDICATIONS:

NIACIN (as Inositol Hexanicotinate)

Inositol Hexanicotinate is contraindicated in those hypersensitive to any component of inositol nicotinate containing product. It is also contraindicated in those with hepatic dysfunction, unexplained elevation of serum aminotransferases (transaminases) active peptic ulcer disease and arterial bleeding.

FOLIC ACID

This dietary supplement is considered safe when used in accordance with proper dosing guidelines. Please note - large doses of this dietary supplement can mask vitamin B_{12} deficiency. (1)

1. Stabler SP, et al. Vitamin B-12 deficiency in the elderly: current dilemmas. American Journal of Clinical Nutrition. 1997;Vol 66, 741-749.

VITAMIN B12

Vitamin B12 is contraindicated in those hypersensitive to any component of a vitamin B12 containing product.

MAGNESIUM

Magnesium is contraindicated in individuals with renal failure. It is also contraindicated in those with high – grade atrioventricular (AV) blocks unless those with high grade blocks have artificial pacemakers.

Magnesium is contraindicated in those individuals who are hypersensitive to any component of a magnesium containing supplement.

SELENIUM

Selenium is contraindicated in patients who are hypersensitive to any component of a selenium containing preparation.

Large doses of this dietary supplement can cause toxicity. Symptoms include loss of hair and nails, skin lesions, nervous system abnormalities, digestive dysfunction and a garlicky breath odor.(1) At the occurrence of these symptoms the physician must be contacted to lower the doses.

1. Holness DL, Taraschuk IG, Nethercott JR. Health status of copper refinery workers with specific reference to selenium exposure. Arch Environ Health. Sep 1989;44(5):291-7.

POTASSIUM

Potassium supplements are contraindicated in patients with hyperkalemia. Potassium supplements are also contraindicated in those with hypersensitivity to any component of a potassium – containing supplement.

COMMIPHORA MUKUL

This dietary supplement is considered safe when used in accordance with proper dosing guidelines. Those with hyperthyroidism are advised to consult a physician before taking this dietary supplement

ALLIUM SATIVUM

This dietary supplement is considered safe when used in accordance with proper dosing guidelines.(1) However, mega doses of this dietary supplement used over a long period of time are not recommended.(2)

1. Nakagawa S, et al. Acute Toxicity Test of Garlic Extract. J Toxicol Sci. 1984;9:155-69.

2. Rakel: Conn's Current Therapy 2001, 53rd ed. W B Saunders Company; 2001"1267.

TAURINE

Taurine is considered safe when used in accordance with proper dosing guidelines.

TERMINALIA ARJUNA

Terminalia arjuna is generally considered safe without any contraindications.

SALVIA MILTIORRHIZA

Dan Shen is considered safe when used in accordance with proper dosing guidelines.

CRATAEGUS OXYCANTHA

This dietary supplement is considered safe when used in accordance with proper dosing guidelines.(1)

1. Ammon HPT, et al. Crataegus, Toxicology and Pharmacology. Part I: Toxicity. Planta Medica. 1981;43(2):105-20.

L- CARNITINE

L- Carnitine is considered safe when used in accordance with proper dosing guidelines. However, the use of D-carnitine is not recommended; it competes with L-carnitine and can decrease the L-carnitine in the heart and skeletal muscles, which can result in muscle pain, decreased exercise tolerance, and loss of muscle function.

ALPHA LIPOIC ACID

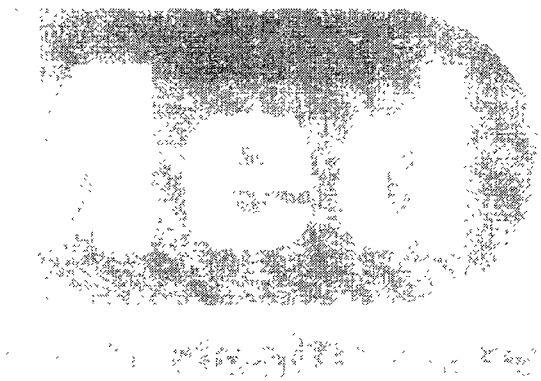
Alpha Lipoic acid is considered safe when used in accordance with proper dosing guidelines.

GAMMA-ORYZANOL

This dietary supplement is considered safe when used in accordance with proper dosing guidelines

COENZYME Q10

CoQ10 is considered safe and no contraindications are noted. However, if a patient has cardiovascular or heart disease the doctor must be consulted before taking this dietary supplement. Coenzyme Q10 strengthens the heart which can affect the dose and activity of other cardiac medications.(1)



1. Langsjoen H, Langsjoen P, Langsjoen P, et al. Usefulness of coenzyme Q10 in clinical cardiology: a long-term study. Mol Aspects Med. 1994;15(Suppl):s165-75.

PRECAUTIONS

PREGNANT WOMEN SHOULD EXERCISE CAUTION IN USE OF HEALTH SUPPLEMENTS AND DO SO ONLY UNDER THE SUPERVISION OF A PHYSICIAN.

NIACIN (as Inositol Hexanicotinate)

Pregnant women and lactating mothers should avoid the use of inositol nicotinate.
A physician should monitor the use of Inositol nicotinate in disorders like Raynauds disease, intermittent claudication, diabetes, gout, renal dysfunction, myocardial disease and unstable angina.
High doses of Inositol Nicotinate may adversely affect glucose tolerance.

FOLIC ACID

Large doses of this dietary supplement can mask vitamin B_{12} deficiency. (1)

1. Stabler SP, et al. Vitamin B-12 deficiency in the elderly: current dilemmas. American Journal of Clinical Nutrition. 1997;Vol 66, 741-749.

VITAMIN B12

Consumption of vitamin B12 to treat B12 deficiency must be medically supervised. B12 should not be used by those with Leber's optic atrophy. Pregnant women and nursing mothers should only use doses higher than 12 micrograms daily if recommended by their physician. Doses higher than 10 micrograms may cause a hematological response in those with anemia.

MAGNESIUM

Pregnant women and nursing mothers should avoid the use of magnesium in doses greater than 350 milligrams daily (in supplementary form) unless higher doses are prescribed by physicians.

Those with myasthenia gravis should avoid the use of magnesium supplements. Magnesium supplements may exacerbate weakness and trigger a myasthenic crisis.

SELENIUM

None reported.

POTASSIUM

The use of Potassium supplements in those with potassium deficiency requires medical supervision. Pregnant women and nursing mothers should avoid potassium supplements unless they are prescribed by their physician.

COMMIPHORA MUKUL

None reported.

ALLIUM SATIVUM

None reported.

TAURINE

None reported.

TERMINALIA ARJUNA

None reported.

SALVIA MILTIORRHIZA

None reported.

CRATAEGUS OXYCANTHA

This dietary supplement should not be used in pregnant women or while breast-feeding without first consulting a physician.(1)

1. Ammon HPT, et al. Crataegus, Toxicology and Pharmacology. Part I: Toxicity. Planta Medica. 1981;43(2):105-20.

L- CARNITINE

None reported.

ALPHA LIPOIC ACID

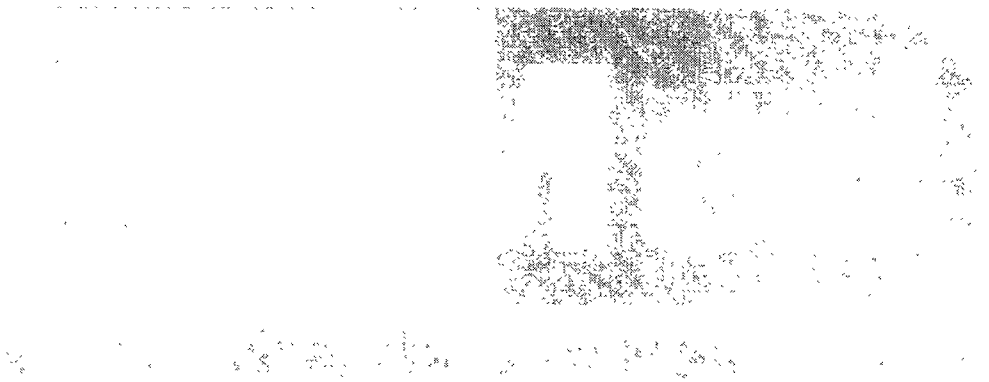
None reported.

GAMMA-ORYZANOL

None reported.

COENZYME Q10

None reported.



ADVERSE REACTIONS

NIACIN (as Inositol Hexanicotinate)

Higher doses of nicotinic acid may clause flushing, pruritis, dizziness, palpitation, impaired glucose tolerance, elevated uric acid levels and liver dysfunctions. Inositol nicotinate appears to be the well tolerated delivery form of nicotinic acid.

FOLIC ACID

Uncommon side effects may include bright-yellow urine, diarrhea, fever, shortness of breath due to anemia, and skin rash.

VITAMIN B12

Vitamin B12 is well tolerated but people who experienced hypersensitivity reactions due to use of parental B12 may experience similar reactions from use of higher doses of oral B12.

MAGNESIUM

The most common adverse reaction from the use of magnesium supplements is diarrhea. Other gastrointestinal symptoms that may occur with the use of magnesium supplements are nausea and abdominal cramping. If magnesium is taken with food it is observed that the abdominal side effects are far less. Less than 350 mg of magnesium is generally well tolerated.

SELENIUM

Intakes of selenium less than 900 mcg daily (for adults) are unlikely to cause adverse reactions. Prolonged intakes of selenium at doses of 1000 mcg or greater can be associated with selenosis or chronic selenium toxicity. Associated symptoms include hair and nail brittleness, skin rash, garlic–like breath odor, fatigue, irritability, nausea and vomiting.

POTASSIUM

The most common adverse reactions of potassium supplements are gastrointestinal and include nausea, vomiting, abdominal discomfort, flatulence and diarrhea. Taking potassium supplements with meals may reduce these adverse reactions. Rashes are occasionally reported. The most serious adverse reaction is hyperkalemia; Hyperkalemia is rare in those with normal renal function.

COMMIPHORA MUKUL

Modern extracts are purified, and few side effects (e.g., mild abdominal discomfort) have been reported with long-term use. Guggul should be used with caution by persons with liver disease and in cases of inflammatory bowel disease and diarrhea

ALLIUM SATIVUM

Adverse effects like headache, myalgia, fatigue and vertigo have been seen with high therapeutic doses of garlic.(1)
Frequent contact with garlic may result in allergic reactions such as dermatitis and asthma.(2) Abdominal discomfort, nausea, vomiting, diarrhea and a feeling of fullness have occurred with higher dose garlic therapy. (3)

1. Holzgartner H, Schmidt U, Kuhn U, Comparison of the efficacy and tolerance of a garlic preparation vs bezafibrate. Arzneimittelforschung 1992 Dec; 42 (12): 1473-7.

2. Asero R, Mistrello G, Roncarolo D et al., A case of garlic allergy. J Allergy Clin Immunol 1998 Mar; 101 (3): 427-8

3. Berthold HK, Sudhop T, von Bergmann K, Effect of garlic oil preparation on serum lipoproteins and cholesterol metabolism: a randomized controlled trial. JAMA 1998 Jun 17; 279(23): 1900-2

TAURINE

Health risks or side effects following the proper administration of designated therapeutic dosages are not recorded.

TERMINALIA ARJUNA

To date, the medical literature has not reported any adverse effects specifically related to the use of this dietary supplement in children.

SALVIA MILTIORRHIZA

Individuals taking blood coagulants should use this herb in consultation with the physician only.

CRATAEGUS OXYCANTHA

Can be safely consumed when used in appropriate doses.(1)

1. McGuffin, M., Hobbs, C., Upton, R., Goldberg, A., American Herbal Products Association - Botanical Safety Handbook, CRC Press, 1997.

L- CARNITINE

Studies show that this dietary supplement has the ability to decrease the activity of thyroid hormone.(1)
Mild gastrointestinal symptoms have been reported in those taking oral L- Carnitine, including transient nausea and vomiting, abdominal cramps and diarrhea.

1. Benvenga S, Ruggeri RM, Russo A, Lapa D, Campenni A, Trimarchi F. Usefulness of L-carnitine, a naturally occurring peripheral antagonist of thyroid hormone action, in iatrogenic hyperthyroidism: a randomized, double-blind, placebo-controlled clinical trial. J Clin Endocrinol Metab. Aug2001;86(8):3579-94.

ALPHA LIPOIC ACID

Patients with diabetes or hypoglycemia should use this dietary supplement with caution due to its ability to lower blood sugar levels.(1,2) Occasional side effects reported with the use of this dietary supplement include skin rash.

1. Evans JL, Goldfine ID. Alpha-lipoic acid: a multifunctional antioxidant that improves insulin sensitivity in patients with type 2 diabetes. Diabetes Technol Ther. 2000;2(3):401-13.

2. Konrad D. The antihyperglycemic drug alpha-lipoic acid stimulates glucose uptake via both GLUT4 translocation and GLUT4 activation: potential role of p38 mitogen-activated protein kinase in GLUT4 activation. Diabetes. Jun 2000;50(6): 1464-71

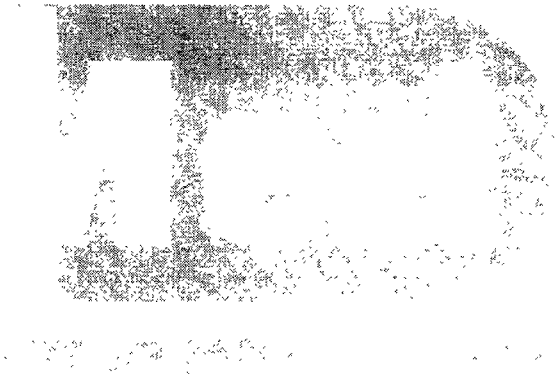
GAMMA-ORYZANOL

There are no associated side effects or adverse reactions reported with gamma oryzanol. Some research suggests that gamma oryzanol taken in moderately high amounts (up to 600 mg per day) for several months can cause dry mouth, sleepiness, hot flushes, irritability, or light headedness in some individuals. (1)

1. Takemoto T, Miyoshi H, Nagashima H. Clinical trial of Hi-Z fine granules (gamma-oryzanol) on gastrointestinal symptoms at 375 hospitals (Japan). *Shinyaku To Rinsho* 1977;26

COENZYME Q10

Mild gastrointestinal symptoms such as nausea, diarrhea and epigastric distress have been reported particularly with higher doses (200 mgs or more).



INTERACTIONS

NIACIN (as Inositol Hexanicotinate)

Tricyclic Antidepressants

Combination of 6 gms per day of L – Tryptophan and 1500 mg per day niacinamide with imipramine has shown to be more effective than imipramine alone for people with bipolar disorders.(1)

Atorvastatin

High doses of Niacin taken with atorvastatin itself may cause muscle disorders (myopathy) that can become serious (rhabdomyolysis).(2,3) However such problems appear to be uncommon.(4,5). Moreover, niacin has been successfully combined with statin drugs to reduce cholesterol more effectively.(6,7)

Oral Contraceptives

A review of literature suggests that women who use oral contraceptives may experience decreased niacin levels.(9,10)

Fluvastatin

Fluvastatin and niacin used together have been shown to be more effective than either drug alone.(8) However high doses of Niacin taken with fluvastatin may cause muscle disorders (myopathy) that can become serious (rhabdomyolysis).(2,3) However such problems appear to be uncommon.(4,5) Although no interactions have been reported with Fluvastatin and niacin, concomitant use should be monitored.

Isoniazid

Isoniazid may interfere with the activity of other nutrients, including niacin.(9,10) People should consider using a daily multivitamin/ mineral supplement during isoniazid therapy.

Lovastatin

High doses of Niacin taken with lorvastatin itself may cause muscle disorders (myopathy) that can become serious (rhabdomyolysis).(2) However, most research reports that lorvastatin and niacin have complimantary, supportive actions.(11) Taking niacin with lorvastatin has been shown to have complementary, supportive actions with almost none of the side effects seen when higher amounts of lovastatin or niacin are taken alone.(12)

(1) – Chouinard G, Young SN, Annable L, Sourkes TL. Tryptophan – nicotinamide, imipramine and their combination in depression. Acta Psychiatr Scand 1979;59:395 –414.

(2) – Garnett WR. Interactions with hydroxymethylglutaryl – coenzyme A reductase inhibitors. Am J Health Syst Pharm 1995;52:1639 – 45.

(3) – Yee HS, Fong NT. Atorvastatin in the treatment of primary hypercholesterolimia and mixed dyslipidemias. Ann Pharmacother 1998;32:1030-43

(4) – Jacobson TA, Amorosa LF. Combination therapy with Fluvastatin and niacin in hypercholesterolimia: a preliminary report on safety. AM J cardiol 1994;73:25D-29D

(5) – Jokubaitis LA. Fluvastatin in combination with other lipid – lowering agents Br J Pract Supple 1996 ;77A: 28-32

(6) – Davignon J, Roederer G, Montigny M, et al. Comparative efficacy and safety of pravastatin, nicotinic acid and the two combined in patients with hypercholesterolemia. AM J cardiol 1994;73:339-45

(7) – JacobsonTA, Jokubaitis LA, Amorosa LF. Fluvastatin and niacin in hypercholesterolemia: a preliminary report on gender differences in efficacy. AM J Med 1994;96 (suppl 6A): 64 S-68 S.

(8) – Jacobson TA, Chin MM, Fromell GJ, etal. Fluvastatin with and without niacin for hypercholesterolemia. Am J cardiol 1994 ;74: 149-54

(9) – Werbach MR. Foundations of Nutritional Medicine. Tarzana, CA: Third line Press, 1997, 231-32 [review]

(10) - Holt GA. Food and Drug Interactions. Chicago, Precept Press, 1998, 146-47

(11) - Malloy MJ, Kane JP, Kunitake ST, Tun P. Complimentarity of colestipol, niacin and lorvastatin in the treatment of severe familial hypercholesterolemia. Ann Intern Med 1987;107:616-23.

(12) - Gardner SF, Schneider EF, Granberry MG, Carter IR. Combination therapy with low dose lovastatin and niacin is as cefective as higher dose lovastatin. Pharmacotherapy 1996;16:419-23

FOLIC ACID

Aluminum/Magnesium Containing Antacids

These medications decrease the amount of acid in the stomach, thus decreasing the amount of folic acid absorbed in the body.(1)

Bile acid Sequestrants

These medications decrease the absorption of folic acid. (2)

H-2 Receptor Antagonists (cimetidine, famotidine, nizatidine, ranitidine)

These medications decrease the amount of acid in the stomach, thus decreasing the amount of folic acid absorbed into the body.(3)

Potassium-Sparing Diuretics (triamterene, HCTZ/triamterene)

An animal study noted that triamterene inhibits the absorption of folic acid in the intestines.(4,5)

Alcohol

Long term use of alcohol may cause low blood and tissue levels of folic acid.(4)

Anticonvulsants

Anticonvulsants are reported to decrease levels of folic acid in the body. Supplementation of the affected nutrient may be recommended under physician supervision.(6,7,8,9,10)

Salicylates (aspirin)

These medications may increase the amount of folic acid eliminated in the urine, thus decreasing the amount of folic acid in the blood.(11)

Corticosteroid Medications (prednisone)

Corticosteroids have been reported to decrease the amount of folic acid in the blood.(12)

NSAIDs (diclofenac, etodolac, fenoprofen, ibuprofen, ketoprofen, ketorolac, meclofenamate, mefenamic acid, nabumetone, naproxen, piroxicam, sulindac, tolmetin, indomethacin)

Many of these medications affect the use of folic acid in the body.(13)

Oral Contraceptives

Studies report that oral contraceptives interrupt the breakdown of folic acid and may decrease the amount of folic acid in the body.(14,15)

Metformin

Metformin may decrease the amount of folic acid in the body.(16)

Methotrexate

Studies have shown that methotrexate can decrease the amount of folic acid in the body.(17,18)

Trimethoprim-Containing Antibiotics

Trimethoprim slightly interrupts the breakdown of folic acid in the body.(19)

Sulfasalazine

This medication may affect the use of folic acid in the body.(13)

Salicylates

Some studies have suggested that this medication may interrupt the use of folic acid in the body.(13)

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(9) - Hendel J, et al. The Effects of Carbamazepine and Valproate on Folate Metabolism in Man. Acta Neurol Scand. Apr1984;69(4):226-31.

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(15) - Shojania AM. Oral Contraceptives: Effect of Folate and Vitamin B12 Metabolism. Can Med Assoc J. Feb1982;126(3):244-7.

(16) - Carlsen, SM, et al. Metformin Increases Total Serum Homocysteine Levels in Non-diabetic Male Patients with Coronary Heart Disease. Scand J Clin Lab Invest. Oct1997;57(6):521-27.

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(18) - Leeb BF, Witzmann G, Ogris E, et al. Folic Acid and Cyanocobalamin Levels in Serum and Erythrocytes During Low-dose Methotrexate Therapy of Rheumatoid Arthritis and Psoriatic Arthritis Patients Clin Exp Rheumatol. Jul-Aug1995;13(4):459-63.

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VITAMIN B12

Antibiotics :

Use of antibiotics may alter the intestinal microflora. Certain inhabitants of the microflora may decrease possible contribution of B12 to the body's requirement for the vitamin. This is often experienced by vegetarians.

Cholestyramine

It may decrease the enterohepatic reabsorption of B12.

Colchicine

It may cause decreased absorption of B12.

Colestipol

It may decrease the enterohepatic reabsorption of B12.

H2 blockers (cimetidine, famotidine, nizatidine, ranitidine

Chronic use of these drugs may result in decreased absorption of vitamin B12. However, they are unlikely to affect absorption of supplemental B12.

Metformin

It may cause decreased absorption of B12 but this effect may be reversed with oral calcium supplementation.

Nitrous oxide

Inhalation of nitrous oxide can produce functional B12 deficiency.

Para-aminosaliculic acid

Chronic use of the anti-tuberculosis drug may decrease absorption of B12.

Potassium chloride

It may decrease absorption of dietary B12.

Proton pump inhibitors (lansoprazole, omeprazole, pantoprazole, rabeprazole

Chronic use of these drugs may result in decreased absorption of vitamin B12. However, they are unlikely to affect absorption of supplemental B12.

Calcium

Calcium supplementation may reverse the possible metformin-induced decrease of B12 absorption.

Folate

Folic acid may work synergistically with B12 in lowering homocysteine levels.

Vitamin B6

It may work synergistically with B12 and folate in lowering homocysteine levels.

Vitamin C

Low serum B12 levels reported in those receiving large doses of vitamin C were artifacts of the effect of ascorbate on the radioisotope assay for B12. There are no known interactions between vitamin C and B12.

MAGNESIUM

Penacillamine

This medication has been reported to bind with magnesium, which may decrease the absorption of both the drug and iron. Supplementation with the affected nutrients and adjustment in the drug dosage may be recommended.(1)

Tetracycline antibiotics

These antibiotics have been reported to bind with magnesium, which may decrease the absorption of both the drug and magnesium. Supplementation with the affected nutrient and adjustment in the drug dosage may be recommended.(2)

Aminoglycosides (gentamicin, neomycin)

These medications are reported to cause increased elimination of magnesium in the urine. Supplementation with the affected nutrient may be beneficial.(3,4)

Amphotericin B

This medication is reported to cause increased elimination of magnesium in the urine.(5)

Cholestyramine

These medications are reported to cause increased elimination of magnesium in the urine.(6)

Corticosteroid Medication

Long term use of these medications has shown a decrease in magnesium blood levels.(7)

Hormone Replacement Therapy (HRT)

Hormone replacement therapy has been reported to decrease magnesium levels in the body.(8,9)

Foscarnet

This medication is reported to cause increased elimination of magnesium in the urine.(10)

Digoxin

This medication is reported to cause increased elimination of magnesium in the urine.(11)

Loop Diuretics

These medications are reported to cause increased elimination of magnesium in the urine.(12)

Oral Contraceptives

These medications may cause a loss of magnesium resulting in decreased magnesium levels in the blood.(13)

Pentamidine

Pentamidine is capable of decreasing the amount of magnesium in the body.14)

Thiazide Diuretics (chlorothiazide, hydrochlorothiazide, bandroflumethiazide, benzthiazide, indapamide, hydroflumethiazide, trichlormethiazide, polythiazide, quinethazone, metolazone, chlorthalidone)

These medications are reported to cause increased elimination of magnesium in the urine.(15)

Calcium

Magnesium absorption from the digestive tract may be decreased by large doses of calcium.(16)

Phosphate

Magnesium absorption from the digestive tract may be decreased by large doses of phosphate.(17)

(1) - Seelig MS. Auto-immune Complications of D-Penicillamine - A Possible Result of Zinc and Magnesium Depletion and of Pyridoxine Inactivation. J Am Coll Nutr. 1982;1(2):207-14.

(2) - Berthon G, et al. Metal Ion-tetracycline Interactions in Biological Fluids. 2. Potentiometric Study of Magnesium Complexes with Tetracycline, Oxytetracycline, Doxycycline, and Minocycline, and Discussion of Their Possible Influence on the Bioavailability of These Antibiotics in Blood Plasma. J Inorg Biochem. Aug1983;19(1):1-18.

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(6) - Watkins DW, et al. Alterations in Calcium, Magnesium, Iron, and Zinc Metabolism by Dietary Cholestyramine. Dig Dis Sci. May1985;30(5):477-82.

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(9) - Seelig MS. Increased Need for Magnesium With the Use of Combined Oestrogen and Calcium for Osteoporosis Treatment Magnes Res. Sep1990;3(3):197-215.

(10)- Gearhart MO, Sorg TB. Foscarnet-induced Severe Hypomagnesemia and Other Electrolyte Disorders. Ann Pharmacother Mar1993;27(3):285-89.

(11) - Kupfer S, Kosovsky JD. Effects of Cardiac Glycosides on Renal Tubular Transport of Calcium, Magnesium, Inorganic Phosphate and Glucose in the Dog. J Clin Invest. 1965,44:1132-43.

(12) - Al-Ghamdi SM, et al. Magnesium Deficiency: Pathophysiologic and Clinical Overview. Am J Kidney Dis. Nov1994;24(5):737-52.

(13) - Blum M, et al. Oral Contraceptive Lowers Serum Magnesium. Harefuah. Nov1991;121(10):363-64.

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(17) - Spencer H, et al. Magnesium-phosphorus Interactions in Man. Trace substances in Environmental Health-XIII. Edited by Hemphill DD. Columbia: Univ. Missouri;1979.

SELENIUM

Corticosteroid Medications

It was reported that high-doses of prednisolone in patients with rheumatoid arthritis may have decreased levels of selenium in their blood.(1)

Oral Contraceptives

A study reported that women taking oral contraceptives had decreased selenium levels in their blood compared to women not on oral contraceptive therapy.(2)

Valproic Acid

An animal study suggested that valproic acid may result in decreased selenium levels.(3)

(1) – Peretz A, et al. Selenium Status in Relation to Clinical Variables and Corticosteroid Treatment in Rheumatoid Arthritis. J Rheumatol. Dec1987;14(6):1104-07.

(2) - Heese HD, et al. Reference Concentrations of Serum Selenium and Manganese in Healthy Nulliparas. S Afr Med J. Feb1988;73(3):163-65.

(3) - Hurd RW, et al. Selenium, Zinc, and Copper Changes with Valproic Acid: Possible Relation to Drug Side Effects. Neurology. Oct1984;34(10):1393-95.

L- CARNITINE

Valproic Acid

Studies have reported that valproic acid use can deplete L-carnitine in humans.(1,2)

Zidovudine

A study reported that zidovudine use can deplete L-carnitine in humans.(3)

(1) - Van Wouwe JP. Carnitine Deficiency During Valproic Acid Treatment. Int J Vitam Nutr Res. 1995;65(3): 211-14.

(2) - Ohtani Y, et al. Carnitine Deficiency and Hyperammonemia Associated with Valproic Acid Therapy. J Pediatr. Nov1982;101(5):782-85

(3) - Dalakas MC, et al. Zidovudine-induced Mitochondrial Myopathy is Associated with Muscle Carnitine Deficiency and Lipid Storage. Ann Neurol. Apr1994;35(4):482-87.

POTASSIUM

Albuterol

This medication may decrease potassium levels in the blood.(1)

Aminoglycosides (gentamicin)
These medications are reported to cause increased elimination of potassium in the urine.(2)

Amphotericin B

This medication may decrease potassium levels in the blood.(3)

Salicylates

These medications can cause damage to the lining of the stomach and the intestines. This may result in a loss of potassium and other nutrients.(4)

Bisacodyl

The laxative effect of this medication may decrease the amount of potassium in the body.(5)

Colchicine

This medication can cause damage to the lining of the stomach and the intestines. This may result in a loss of potassium and other nutrients.(6)

Corticosteroid Medications

These medications are reported to cause increased elimination of potassium in the urine.(7)

Foscarnet

These medications are reported to cause increased elimination of potassium in the urine.(8)

L-dopa

In patients with Parkinson's disease, these medications are reported to cause increased elimination of potassium in the urine.(9)

Loop Diuretics (furosemide, bumetanide, ethacrynic acid, torsemide)

These medications commonly decrease potassium levels in the body in some, but not all patients.(10)

Calcium Channel Blocking Agents (nifedipine, verapamil)

Some of the side effects from these medications are due to decreased potassium levels in the body. Overdoses of these medications may be life threatening.(11, 12)

Penicillin Antibiotics

High doses of these medications have been reported to decrease potassium levels in the body.(13)

Ritodrine

This medication may decrease the amount of potassium in the blood.(14)

Sodium Bicarbonate

Excessive use or overdoses of sodium bicarbonate may result in dangerously low levels of potassium in the body. Supplementation with the affected nutrient may be recommended.(15)

Terbutaline

This medication may decrease the amount of potassium in the blood.(16)

Thiazide Diuretics (chlorothiazide, hydrochlorothiazide, bandroflumethiazide, benzthiazide, indapamide, hydroflumethiazide, trichlormethiazide, polythiazide, quinethazone, metolazone, chlorthalidone)

These medications may decrease the amount of potassium in the body.(17)

Magnesium

Large doses of magnesium may cause diarrhea, which may lead to decreased potassium levels in the body.(18)

Ascorbic Acid (Vitamin C)

Large doses of vitamin C may cause diarrhea, which may lead to decreased potassium levels in the body.

(1) - Montoliu J, et al. Potassium-lowering Effect of Albuterol for Hyperkalemia in Renal Failure. Arch Intern Med. Apr1987;147(4):713-17

(2) - Kes P, Reiner Z. Symptomatic Hypomagnesemia Associated with Gentamicin Therapy. Magnes Trace Elem. 1990;9(1):54-60

(3) - Physicians' Desk Reference. 53rd edition. Montvale, NJ: Medical Economics Company, Inc;1999:1038.

(4) - Nain CK, et al. Acetylsalicylic Acid-induced Biochemical Changes in Gastric Juice: A Failure of Adaptation? Indian J Gastroenterol. Jan1998;17(1):4-5.

(5) - Ritsema GH, et al. Potassium Supplements Prevent Serious Hypokalaemia in Colon Cleansing. Clin Radiol. Dec1994;49(12):874-76.

(6) - Race TF, et al. Intestinal Malabsorption Induced by Oral Colchicine. Comparison with Neomycin and Cathartic Agents. Am J Med Sci. Jan1970;259(1):32-41.

(7) - Shenfield GM, et al. Potassium Supplements in Patients Treated with Corticosteroids. Br J Dis Chest. Jul1975;69:171-76

(8) - Malin A, et al. Foscarnet-induced Hypokalaemia. J Infect. Nov1992;25(3):329-30

(9) - Granerus AK, Jagenburg R, Svanborg A. Kaliuretic Effect of L-dopa Treatment in Parkinsonian Patients. Acta Med Scand 1977;201(4):291-97.

(10)- Lindeman RD. Hypokalemia: Causes, Consequences and Correction. Am J Med Sci. Aug1976;272(1): 5-17.

(11)- Tishler M, Armon S. Nifedipine-induced Hypokalemia. Drug Intell Clin Pharm. May1986;20(5):370-71.

(12) - Minella RA, et al. Fatal Verapamil Toxicity and Hypokalemia. Am Heart J. Jun1991;121(6 Pt 1):1810-12.

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(15)- Fitzgibbons LJ, Snoey ER. Severe Metabolic Alkalosis Due to Baking Soda Ingestion: Case Reports of Two Patients With Unsuspected Antacid Overdose. J Emerg Med. Jan-Feb1999;17(1):57-61.

(16) - Braden GL, et al. Ritodrine- and Terbutaline-induced Hypokalemia in Preterm Labor: Mechanisms and Consequences. Kidney Int. Jun1997;51(6):1867-75.

(17) - Petri M, et al. The Metabolic Effects of Thiazide Therapy in the Elderly: A Population Study. Age Ageing. May1986;15(3):151-55.

(18) - Chhabra A, Patwari AK, Aneja S, et al. Neuromuscular Manifestations of Diarrhea Related Hypokalemia. Indian Pediatr. Apr1995;32(4):409-15.

COMMIPHORA MUKUL

Anticoagulant Medications

Studies have reported that Guggul affects the blood's clotting ability and may alter the effects and possibly the dose of these medications.(1)

Antiplatelet Medications

Studies have reported that Guggul affects the blood's clotting ability and may alter the effects and possibly the dose of these medications.(1)

Thyroid Medications

Studies have reported that guggul stimulates the thyroid. This may change the effects and possibly the dose of these medications.(2,3)

Diltiazem

A study has demonstrated decreased absorption of this medication when taken with guggul. The effect of the medication may be decreased.(4)

Hypocholesterolemic Agents

Studies have reported that guggul lowers both cholesterol and triglyceride levels. This may change the effect and possibly the dose of these medications.(1,5,6)

Propranolol

A study has demonstrated decreased absorption of this medication when taken with guggul. The effect of the medication may be decreased.(4)

(1) - Satyavati GV, et al. Guggulipid: A Promising Hypolipidemic Agent from Gum Guggul (Commiphora Wightii). Econ Med Plant Res. 1991;5:48-82.

(2) - Tripathi YB, et al. Thyroid Stimulatory Action of (Z)-Guggulsterone: Mechanism of Action. Planta Med. 1988;54(4):271-77.

(3) - Panda S, Kar A. Gugulu (Commiphora mukul) induces triiodothyronine production: possible involvement of lipid peroxidation. Life Sci. 1999;65(12):PL137-41.

(4) - Dalvi SS, et al. Effects of Gugulipid on Bioavailability of Diltiazem and Propranolol. J Assoc Physicians India. 1994;42(6):454-55.

(5) - Satyavati GV, et al. Experimental Studies on the Hypocholesterolemic Effect of Commiphora Mukul. Indian J Med Res. 1969;57(10):1950-62.

(6) - Nityanand S, et al. Clinical Trials with Gugulipid. A New Hypolipidaemic Agent. J Assoc Physicians India. 1989;37(5):323-28.

ALLIUM SATIVUM

Antihypertensive Medications

Studies have reported that garlic may lower blood pressure which may alter the effects of these medications and possibly the dose needed for treatment.(1)

Hypolipidemic Medications

Studies have reported that garlic may lower cholesterol levels which may alter the effects of these medications and possibly the dose needed for treatment.(2,3)

Anticoagulant Medications

Studies have reported that garlic affects the blood's clotting ability and may alter the effects of these medications and possibly the dose needed for treatment.(4,5)

Antiplatelet Medications

Studies have reported that garlic affects the blood's clotting ability and may alter the effects of these medications and possibly the dose needed for treatment.(5,6)

Saquinavir

A study in healthy human volunteers has indicated that garlic supplements can decrease the blood levels of saquinavir, which may change the effects of this medication and possibly the dose needed for treatment. A healthcare professional should be notified of concomitant use. (7)

(1) - Fogarty M. Garlic's Potential Role in Reducing Heart Disease. Br J Clin Pract. 1993;47(2):64-65.

(2) - Steiner M, et al. A Double-blind Crossover Study in Moderately Hypercholesterolemic Men that Compared the Effect of Aged Garlic Extract and Placebo Administration on Blood Lipids. Am J Clin Nutr. 1996;64(6):866-70.

(3) - Koscielny J, et al. The Antiatherosclerotic Effect of Allium sativum. Atherosclerosis. May1999;144(1): 237-49.

(4) - Kiesewetter H, et al. Effect of Garlic on Platelet Aggregation in Patients with Increased Risk of Juvenile Ischaemic Attack. Eur J Clin Pharmacol. 1993;45(4):333-36.

(5) - Rose KD, Croissant PD, Parliament CF, Levin MB. Spontaneous spinal epidural hematoma with associated platelet dysfunction from excessive garlic ingestion: a case report. Neurosurgery. May 1990;26(5):880-2.

(6) - Kiesewetter H, et al. Effect of Garlic on Platelet Aggregation in Patients with Increased Risk of Juvenile Ischaemic Attack. Eur J Clin Pharmacol. 1993;45(4):333-36.

(7) - Piscitelli SC, Burstein AH, Welden N, Gallicano KD, Falloon J.The Effect of Garlic Supplements on the Pharmacokinetics of Saquinavir. Clinical Infectious Diseases. 15 Jan 2002,34. Published online 5 Dec 2001.

TAURINE

Chemotherapy

Apparently unrelated to vomiting, Taurine has been shown to be depleted in people taking chemotherapy.(1) It remains unclear how important this effect is or if people taking chemotherapy should take Taurine supplements.

(1) – Desai TK, Maliakkal J, Kinzie JL, et al. Taurine deficiency after intensive chemotherapy and or radiation Am J Clin Nutr 1992;55:708 –11

TERMINALIA ARJUNA

None reported.

SALVIA MILTIORRHIZA

None reported.

CRATAEGUS OXYCANTHA

Antiarrhythmic Medications, ACE Inhibitors, Antihypertensive Agents, Cardiac Glycosides:

Studies report that hawthorn may alter the effects of these medications and possibly the dose needed for treatment.(1-4)

(1) - Wagner H, et al. Cardioactive Drugs IV. Cardiotonic Amines from Crataegus oxyacantha. Planta Medica. 1982;45:99-101.

(2) - Uchida S, et al. Inhibitory Effects of Condensed Tannins on Angiotensin Converting Enzyme. Jap J Pharmacol. 1987;43(2):242-46.

(3) - Taskov M. On the Coronary and Cardiotonic Action of Crataemon. Acta Physiol Pharmacol Bulg. 1977; 3(4): 53-57.

(4) - Petkov V. Plants and Hypotensive, Antiatheromatous and Coronarodilatating Action. Am J Chinese Med. 1979;7:197-236.

L- CARNITINE

None reported.

ALPHA LIPOIC ACID

None reported.

GAMMA-ORYZANOL

None reported.

COENZYME Q10

Anticoagulant Medications:

There have been several case reports where coenzyme-Q10 interrupted the effectiveness of warfarin in people who had been taking a stable dose. Concomitant use should be under medical supervision.(1,2)

Orlistat

When taken at the same time, it is likely that orlistat will greatly decrease the absorption of this nutrient from the digestive tract. This nutrient should be taken at least 2 hours apart from orlistat.(3)

Beta Blockers

Many of these medications can decrease the formation of coenzyme-Q10 in the body.(4)

Biguanides (phenformin, metformin)

Phenformin has been reported to decrease the formation of coenyzme-Q10 in the body.(5)

Clonidine

Studies have reported that clonidine may reduce the formation of coenzyme-Q10 in the body.(6)

Gemfibrozil

A study reported that men being treated with gemfibrozil for elevated cholesterol had a significant decrease in coenzyme-Q10 levels in the blood.(7)

Haloperidol

A study reported that this medication decreases the formation of coenzyme-Q10 in the body.(8)

HMG-CoA reductase inhibitors

These medications have been reported to inhibit the production of coenzyme-Q10, which may cause a decline in coenzyme-Q10 levels in the blood.(9)

Hydralazine

Hydralazine decreases the formation of coenzyme-Q10 in the body.(10)

Methyldopa

This medication has been reported to slightly decrease the formation of coenzyme-Q10 in the body.(10)

Phenothiazines

These medications have been reported to block several steps in the formation of coenzyme-Q10 in the body.(8)

Sulfonylureas

Some of these medications have been reported to possibly decrease coenzyme-Q10 levels in the body. However, tolbutamide, glipizide and chlorpropamide did not have this effect.(5)

Thiazide Diuretics

These medications are reported decrease formation of coenzyme-Q10 in the body.(6)

Tricyclic Antidepressants

These medications have been reported to decrease the formation of coenzyme-Q10 in the body.(8)

(1) - Heck AM, DeWitt BA, Lukes AL. Potential Interactions Between Alternative Therapies and Warfarin. Am J Health Syst Pharm. Jul2000;57(13):1221-7.

(2) - Landbo C, Almdal TP. Interaction Between Warfarin and Coenzyme Q10. Ugeskr Laeger. May1998;160(22):3226-7

(3) - Xenical (orlistat), Product Prescribing Information. Roche Laboratories, Inc. Nutley, New Jersey. Sep2000.

(4) - Kishi T, et al. Bioenergetics in Clinical Medicine XV. Inhibition of Coenzyme Q10-enzymes by Clincically used Adrenergic Blockers of Beta-receptors. Res Commun Chem Pathol Pharmacol. May1977;17(1):157-64.

(5) - Kishi T, et al. Bioenergetics in Clinical Medicine XI. Studies on Coenzyme Q and Diabetes Mellitus. J Med. 1976;7(3-4):307-21..

(6) - Kishi H, et al. Bioenergetics in Clinical Medicine. III. Inhibition of Coenzyme Q10-enzymes by Clinically used Anti-hypertensive Drugs. Res Commun Chem Pathol Pharmacol. Nov1975;12(3):533-40.

(7) - Aberg F, et al. Gemfibrozil-induced Decrease in Serum Ubiquinone and Alpha- and Gamma-tocopherol Levels in Men with Combined Hyperlipidaemia. Eur J Clin Invest. Mar1998;28(3):235-42..

(8) - Kishi T, et al. Inhibition of Myocardial Respiration by Psychotherapeutic Drugs and Prevention by Coenzyme Q10. In: Yamamura Y, Folkers K, Ito Y, eds. Biomedical and Clinical Aspects of Coenzyme Q10. Vol. 2. Amsterdam: Elsevier/North-Holland Biomedical Press;1980:139-54..

(9) - Ghirlanda G, et al. Evidence of Plasma CoQ10-lowering Effect by HMG-CoA Reductase Inhibitors. A Double-blind, Placebo-controlled Study. J Clin Pharmacol. Mar1993;33(3):226-29.

(10) - Kishi T, et al. Bioenergetics in Clinical Medicine XV. Inhibition of Coenzyme Q10-enzymes by Clincically used Adrenergic Blockers of Beta-receptors. Res Commun Chem Pathol Pharmacol. May1977;17(1):157-64.

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Scientific Reference

INGREDIENTS

Each vegetarian capsule contains:	
Niacin (as niacinamide)	50 mg
Vitamin B12 (as cyanocobalamin)	15 mcg
Chromium (as picolinate)	75 mcg
[redacted] INOSITOL	50 mg
L-Arginine	50 mg
Bitter Melon (Momordica charantia fruit Ext.)	50 mg
Gymnema (Gymnema sylvestre leaf Ext. 4:1) [25%Gymnemic acid]	50 mg
Globe Artichoke (Cynara scolymus leaf Ext. 2.5%)	30 mg
Milk Thistle (Silybum marianum herb Ext. 80%)	15 mg
Goldenrod (Solidago herb)	15 mg
Jambol (Syzygium jambolanum leaf)	15 mg
Fenugreek (Trigonella foenum-graecum seed Ext. 50%)	15 mg
Prickly Pear (Opuntia spp. herb)	15 mg
Vanadyl Sulfate	15 mg
Alpha Lipoic acid	10 mg
Bilberry (Vaccinium myrtillus fruit) [20% anthocyanadins]	5 mg
Ginkgo (Ginkgo biloba leaf Ext. 4:1)	5 mg
Devil's Club (Oplopanax horridus leaf Ext. 4:1)	5 mg
Goat's Rue (Galega officinalis herb Ext. 4:1)	5 mg
Banaba (Lagerstroemia speciosa leaf Ext.) [1% Corosolic acid]	5 mg

Other Ingredients: Magnesium Stearate, Water, Hydroxypropyl Methylcellulose.
No Added: Sugar, Starch, Yeast, Corn, Artificial Colors or Flavors.

OVERVIEW

High levels of blood glucose resulting from defects in insulin secretion, insulin action or both characterize diabetes mellitus. It is a chronic disorder of carbohydrate, fat and protein metabolism characterized by fasting elevations of blood glucose and an increased risk of heart disease, stroke, kidney disease and loss of nerve function. Diabetes can be associated with serious complications and premature death. However, people with diabetes can take measures to reduce the likelihood of such occurrences.

15.7 million patients suffer from diabetes in the US. This is 5.9 percent of the population. Last year there were approximately 800,000 patients newly diagnosed with diabetes. The prevalence of diabetes is rising. It is currently the seventh leading cause of death in the U.S.

Demographic data reveals that diabetes is associated with age. 18.4% of all people above the age of 65 have diabetes. 8.2% of all people above the age of 20 and 0.16% of all people below the age of 20 have diabetes. 7.5 million of the total diabetic population are men and 8.1 million are women. DM is linked to the Western lifestyle.

There are three types of diabetes: Type 1 is also known as insulin dependant diabetes mellitus (IDDM) or juvenile onset diabetes. Type I diabetes may account for 5-10 percent of all diagnosed cases of diabetes. Type 2 diabetes, also called as non insulin dependent diabetes (NIDDM) or adult diabetes accounts for nearly 90-95 % of all diagnosed cases of diabetes. The third type of diabetes is Gestational Diabetes. This develops in 2-5 % of all pregnancies but disappears when the pregnancy is over. Another type of Diabetes that is gaining increasing research and validity is known as Syndrome X or insulin resistance diabetes. These patients tend to be overweight and have had NIDDM for years with poor glucose control. They have increased serum levels of insulin but it is not being utilized properly. There are also patients with impaired glucose tolerance who have blood glucose and GTT levels that are high but not high enough to be classified as diabetes.

Diabetes is associated with a variety of complications. Heart disease is the leading cause of diabetes related deaths. Blindness is also common among diabetics. Kidney disease is another associated complication along with nervous system diseases, amputation and dental disease. It has been observed that complications of pregnancy do occur with pre existing diabetes. Other complications that could arise out of diabetes are diabetic ketoacidosis and hyperosmolar nonketotic coma. The classic triad of symptoms for diabetes is polyuria, polydipsia and polyphagia.

Due to the high prevalence of this condition and its potential complications, any predisposition or risk factors for the condition should be addressed as part of a comprehensive health care regimen that includes appropriate diet, nutrition, and exercise.

Glucomed is scientifically formulated with natural ingredients for optimal glucose and weight balance. **Glucomed** is effectively complemented by **Coremed** (multivitamin). **AuMed Inc** recommends **Glucomed** and **Coremed** in conjunction with a healthy lifestyle that includes a balanced diet and exercise.

DESCRIPTION

NIACINAMIDE

Niacinamide, also known as nicotinamide, is one of the principal forms of vitamin B3. Niacinamide is involved in various biological processes including production of energy, synthesis of fatty acids, cholesterol and steroids, signal transduction and the maintenance of the integrity of the genome. Pharmacological doses of niacinamide may have significant value in diabetes mellitus. This form of niacin does not have the unpleasant side effect of flushing.

VITAMIN B12

Vitamin B12 most commonly refers to one of the cobalamin forms called cyanocobalamin that is used for fortification of foods and in nutritional supplements. Vitamin B12 has a striking dark red color and works in coordination with folate in the synthesis of the building blocks for DNA and RNA synthesis. It is also important for maintaining the integrity of the nervous system and for synthesis of molecules involved in fatty acid biosynthesis and production of energy. Gastrointestinal effects like intermittent diarrhea and constipation, and abdominal pain are a result of B12 deficiency. Weight loss and anorexia are some symptoms of B12 deficiency.

CHROMIUM PICOLINATE

Chromium is an essential trace mineral in human nutrition since it plays an important role in carbohydrate metabolism. Glucose intolerance, weight loss and peripheral neuropathy are some of the problems associated with chromium deficiency. Brewer's yeast, whole grains, cereals, spices, mushrooms, brown sugar, coffee, tea, beer, wine and meat products are good sources of chromium. Chromium levels can be depleted by refined sugars, white flour and lack of exercise.(1)

(1) - Mertz W. Chromium in human nutrition: a review. J Nutr 1993;123: 626-633.

[redacted] INOSITOL

Inositol consists of nine distinct isomers that resemble six member ring simple sugars. It is also considered a sugar alcohol. Inositol is an essential nutrient. In fact, this sugar-like substance is one of the water-soluble B vitamins. In humans, it is found in the liver, kidney, skeletal system and heart muscle. It is also present in the leaves and seeds of many plants. The richest plant sources of inositol are seeds such as beans, grains and nuts. The richest animal sources are organ meats. Inositol is also produced by intestinal bacteria. D-chiro-inositol can be obtained from the diet in the form of pinitol, a methyl inositol found in legumes.

L-ARGININE

L-arginine is a semi-essential or conditionally essential amino acid. L-arginine is necessary for young children and for those with certain rare genetic disorders in which synthesis of the amino acid is impaired. Plant and animal proteins provide dietary L-arginine. Small amounts are found in vegetable juices and fermented foods such as miso and yogurt.

MOMORDICA CHARANTIA

Common Name: Bitter Melon
Family: Cucurbitaceae

While bitter melon or karela fruit has long been used in South America and the Orient as a food source, it also serves many medicinal purposes. Scientists are focusing on exploring beneficial properties of the fruit in diabetes and conditions related to diabetes, as well as certain cancers and autoimmune conditions. The medicinal part of the plant is the fruit.

GYMNEMA SYLVESTRE

Common Name: Gymnema
Family: Asclepediaceae

Gymnema is a rain forest vine found in Central and Southern India and has a long tradition in the treatment and management of type 2 diabetes. The Indian name is Gurmar, which means, "sugar destroyer." Its use has been documented in Ayurvedic medical texts for over 2000 years in the treatment of "sweet" urine. The medicinal part of the plant is the leaf.

CYNARA SCOLYMUS

Common Name: Globe Artichoke

Family: Compositae

This large thistle-like plant is native to the regions of southern Europe, North Africa, and the Canary Islands. The leaves of the plant are used medicinally; the roots and the immature flower heads may also contain beneficial compounds. The artichoke is one of the world's oldest medicinal plants. The ancient Egyptians placed great value on the plant - it is clearly seen in their drawings. The ancient Greeks and Romans also used this plant as a digestive aid. In sixteenth-century Europe, the artichoke was favored as a food by royalty.

SILYBUM MARIANUM

Common Name: Milk Thistle
Family: Compositae

Milk thistle is commonly found growing wild in a variety of settings. The seeds of the dried flower are used medicinally. Medical use of milk thistle can be traced back more than 2,000 years. Nicholas Culpeper, the well-known seventeenth-century pharmacist cited its use.

SOLIDAGO ODORA

Common Name: Goldenrod
Family: Astereae

This plant is mainly found in Europe, Asia and North America. This plant has a perennial, woody, branched, and creeping root. It also has a slender, round yellowish-green stem that is smooth or slightly pubescent. Solidago is often reclined and 2 or 3 feet in height. This plant is common to the United States, growing in dry, fertile woodlands and sunny bills, and flowering from July to October. The medicinal parts include the dried aerial parts collected during the flowering season, fresh inflorescences and the flowering twigs.

SYZYGIUM JAMBOLANUM

Common name: Jambol
Family: Myrtaceae

Jambol is a common tree found all over India. The fruit is sweet, appetizing and soothing. The medicinal parts include the leaves, bark and seeds

TRIGONELLA FOENUM-GRAECUM

Common name: Fenugreek
Family: Fabaceae

Fenugreek is a herb that has been used since ancient times. This species is common all over the Mediterranean region as far as China and India and southward as far as Ethiopia. It is cultivated mainly in France, Turkey, northern Africa, India and China.

OPUNTIA SPP.

Common Name: Prickly Pear, Nopal
Family: Cactaceae

Nopal is native to Mexico and the southwestern regions of the United States. It is also found in Italy, Spain and South Africa. Nopal is widely eaten as a food. It is considered a source of health-supporting nutrients.

VANADYL SULFATE

Vanadium is found not only in the form of minerals but also in the human body. Vanadium-containing compounds have traditionally been used for diabetes care with higher therapeutic-to-toxicity ratios. Black pepper, mushrooms, shellfish, parsley, and dill seed are some foods which are rich in vanadium

ALPHA LIPOIC ACID

Alpha-lipoic acid is also known as thiotic acid. It is a disulphide compound that is a cofactor in vital energy producing reactions in the body and is also a potent biological anti-oxidant. Alpha-lipoic acid is found widely in plant and animal sources. It is approved in Germany for polyneuropathies often associated with diabetes and alcoholism

VACCINIUM MYRTILLUS

Common Name: Bilberry
Family: Ericaceae

This plant is mainly found in central and northern Europe, Asia and North America and the medicinal parts include the dried leaves and the fruit.

GINKGO BILOBA

Common Name: Ginkgo or Maidenhair Tree
Family: Ginkgoaceae

Ginkgo is among the oldest living plant species on earth and has been used extensively as a medicinal agent worldwide for centuries. Today, it is the most frequently prescribed medicinal herb in Europe. Ginkgo has been the subject of hundreds of scientific studies that have reported positive effects in a wide range of health areas. It has been popularized for its use in the support of circulation and mental function.

OPLOPANAX HORRIDUS

Common Name: Devil's Club
Family: Araliaceae

Devil's club is distributed from south-central Alaska south along the Pacific Coast. Some authorities extend its distribution to eastern Asia. Devil's club is a native, erect to slightly spreading, deciduous shrub varying from 3.3 to 10 feet in height.

GALEGA OFFICINALIS

Common Name: Goat's Rue
Family: Fabaceae

Galega officinalis is a perennial herb found in Europe and Asia. Medicinal parts include dried leaves collected at the beginning of the flowering season as well as the tips of flowering branches.

LAGERSTROEMIA SPECIOSA

Common Name: Banaba

Banaba is a tree which is found in the Philippines, Thailand, Indonesia, Malaysia and Taiwan. In some countries, including some of the southern parts of the US where banaba is known as "Queen's Crape Myrtle," the trees are planted along roadsides and in parking lots for shade.

ACTIONS AND PHARMACOLOGY

NIACINAMIDE

Pathogenesis of IDDM (insulin-dependant diabetes mellitus) involves auto-immune destruction of beta-cells accompanied by appearance of beta-cell specific antibodies many years before the onset of the disease. These anti-bodies release some cytokines which play a role in early beta-cell damage. Niacinamide was shown to decrease the production of these cytokines in cultures of whole blood from prediabetic and diabetic subjects and also in healthy controls. Inhibition of cytokine production by niacinamide could play an important role in modulation of the immune response leading to IDDM. Niacinamide has been demonstrated to affect glucose tolerance. Effects of niacinamide may also be due to an increase in the pool size of NAD+, a principal metabolite of niacinamide, in beta-cells.

1. Picoit F, Reimers JI, Anderson HU. Nicotinamide- biological actions and therapeutic potential in diabetes prevention. Diabetologia 1993; 36: 574-576.

2. Cleary JP. Vitamin B3 in the treatment of diabetes mellitus: case reports and review of literature. J Nutr Med 1990; 1: 217-25.

3. Pozzilli P, Andreani D. The potential role of nicotinamide in the secondary prevention of IDDM. Diabetes Metabol Rev 1993;9:219-30.

VITAMIN B12

Vitamin B12 is beneficial for the metabolism and health of the nervous system. It stimulates growth and increases appetite in children. Cobalamin, along with iron, folic acid, copper, protein, and vitamins C and B6, is needed for the formation of normal red blood cells. Vitamin B12 is sometimes termed the "energy" vitamin, whether obtained from eating vitamin B12 foods or from supplemental use. Cobalamin stimulates the utilization of proteins, fats, and carbohydrates. It also helps iron function in humans and is important for the synthesis of DNA and RNA, as well as for production of choline, another B vitamin, and methionine, an amino acid.

CHROMIUM PICOLINATE

Chromium picolinate is often used for balancing blood sugar levels. It is thought to facilitate the uptake and utilization of glucose and improve glucose tolerance. Without chromium, insulin's action is blocked and glucose levels are elevated.(1)

1. Mooradian AD, Failla M, Hoogwerf B. Selected vitamin and mineral in diabetes. Diabetes Care 1994; 17: 464-479.

[redacted] INOSITOL

D-Chiro Inositol is believed to work as a second messenger for insulin with a hypoglycemic effect. Diabetics may have a deficiency of inositol in neurons and supplementation with chiro-inositol is thought to help with this deficiency. (1)
Diabetic subjects excrete 5 to 40 times as much D-chiro-inositol in the urine as normal subjects and the rate of excretion depends on the degree of diabetic control. Plasma D-chiro-inositol levels are influenced by insulin treatment and can be a strong predictor of hypertriglyceridemia, the most common lipid abnormality in diabetic patients.
"D-Chiro-inositol has been shown to increase the action of insulin in patients with PCOS, thereby improving ovulatory function and decreasing serum androgen concentrations, blood pressure, and plasma triglyceride concentrations." (2)

1. Leslie RDG. Elliot RB. Early environmental events as a cause of IDDM. Diabetes 1994;43:843-50.

2. Nestler, J.E. et al. ovulatory and Metabolic Effects of d-Chiro Inositol in the Polycystic Ovary Syndrome. The New England Journal of Medicine. April 29, 1999;340:1314-1320.

L-ARGININE

Arginine has some anti-inflammatory, immunomodulatory, anticarcinogenic and wound healing actions. Arginine may also enhance pancreatic function and secretion of insulin.

MOMORDICA CHARANTIA

Bitter Melon has many mechanisms of action. It is thought to act as an antibiotic, anti-viral, antitumor, insulinomimetic, hypotensive, and hypoglycemic agent. Its chemical constituents include alkaloids, alpha and beta momorcharin, charantin, citrulline, elasterol, flavochrome, gaba, lanosterol, lutein,

lycopene, momordicin, momordicosides, oxalate, oxalic acid, zeaxanthin and polypeptides.
Momordica contains charantin which is considered to be a hypoglycemic agent. It also contains an insulin-like peptide, polypeptide-P which can lower blood sugar levels.(1)

1. Welihinda J, Arvidson G, Gylfe E et al. The insulin-releasing activity of the tropical plant *Momordica charantia*. Acta Biol Med Germ 1982;41:1229-40.

GYMNEMA SYLVESTRE

Gymnema sylvestre is an ayurvedic tonic.(1) Gymnema supplementation may hold promise for diabetes.(2,3) In some studies Gymnema was noted to increase the activity of enzymes responsible for glucose uptake and utilization.(4) It is also considered to be a "sugar blocker"; it blocks the taste of sweetness.

1. Kapoor LD. Handbook of Ayurvedic Medicinal Plants. Boca Raton, FL:CRC Press, Inc; 1990:200-201.

2 Prakash AO, Mather S, Mather R. Effect of feeding Gymnema sylvestre leaves on blood glucose in beryllium nitrate treated rats. J Ethnopharmacol 1986;18:143-146.

3. Shanmugasundaram ER, Gopinath KL. Shanmugasundaram KR, Rojendran VM. Possible regeneration of the islets of Langerhans in streptozotocin-diabetic rats given Gymnema sylvestre leaf extracts. J Ethnopharmacol 1990;30:265-279.

4 Shanmugasundaram KR, Panneerselvam C, Samudram P, Shanmugasundaram ER. Enzyme changes and glucose utilisation in diabetic rabbits: the effect of Gymnema sylvestre, R.Br J Ethnopharmacol 1983;7:205-234.

CYNARA SCOLYMUS

Compounds of the artichoke leaf include caffeic acid derivatives, flavonoids and sesquiterpene lactones and compounds of artichoke root include caffeic acid derivatives. Cynara is believed to decrease blood glucose levels. The main active principles are sesquiterpenes, hydroxy cinnamic acid and flavonoids. The compounds are thought to have a lipid reducing effect and may also reduce cholesterol levels.

SILYBUM MARIANUM

Various compounds of this herb include flavonoids, steroids, polyenes, organic acids and those of the milk thistle seed include silymarin, flavonoids, and fatty oil. It is thought to limit glutathione depletion, is anti-inflammatory, and prevents free radical damage. It is an inhibitor of cyclic AMP phosphodiesterase.(1) Silybum has been shown to inhibit glucose-stimulated insulin release in-vitro, while not affecting blood glucose concentration in-vivo. Studies have demonstrated that diabetic patients with cirrhosis require insulin treatment because of insulin resistance (2). Supplementation with silymarin may reduce the lipoperoxidation of cell membranes and insulin resistance, decreasing endogenous insulin overproduction and the need for exogenous insulin administration.

1. Kock HP, Bachner J, Loffler E. Silymarin. Potent inhibitor of cyclic AMP phosphodiesterase. Meth Find Exptl Clin Pharm 1985;7:409-413.

2. Cellular and Molecular Life Sciences, 1997, Vol 53, Iss 11-12, pp 917-920

SOLIDAGO ODORA

Various compounds of the herb include triterpene saponins, volatile oil, polysaccharides, diterpenes, carotinoids, flavonoids, phenol glucosides, caffeic acid derivatives, phenol carboxylic acids, and polyenes. Goldenrod is a diuretic and may also be a useful health supplement for diabetic nephropathies.

SYZYGIUM JAMBOLANUM

Compounds of Jambolan seed include fatty oil, tannins and those of Jambolan bark include tannins, steroids, triterpenes and flavonoids. Jambolan seed has anti-inflammatory actions and Jambolan bark has astringent effects because of it tannin content

TRIGONELLA FOENUM-GRAECUM

Fenugreek has various constituents including mucilages, proteins, proteinase inhibitors, steroid saponins, steroid saponin-peptide esters, sterols, flavonoids, trigonelline, and volatile oils.

OPUNTIA SPP.

Nopal provides several nutrients. Nopal is a natural source for ascorbic acid, vitamin C, bioflavonoids and 17 essential amino acids. As a fibrous plant, Nopal contains pectin, mucilage and gums that are helpful to the digestive system. Its high fiber content curbs the appetite and fat build up is diminished while fat break down and excretion is

increased. Nopal also provides vegetable proteins for the body.

Nopal's 17 amino acids provide the body with energy. Nopal is thought to increase sensitivity to insulin, which stimulates the movement of glucose from the blood into body cells where it is used as energy. It may also slow the digestion of carbohydrates, which in turn may slow insulin production. Nopal's amino acids, fiber and B3 may help reduce total cholesterol, triglyceride and LDL cholesterol levels by metabolizing fat and fatty acids and eliminating excess bile acids.

1. Frati, Alberto et al. Effects of nopal (*Opuntia streptacantha*) on serum lipids, glycemia and body weight. Archiv. Invest. Med. (Mex), 1983;14:117.

2. Meckes, Lozyoa. Opuntia streptacantha: A coadjutor in the treatment of diabetes mellitus. Am J Chin Med; Vol 14, ISS 3-4, 1986;116-8.

VANADYL SULFATE

Vanadium inhibits protein-phosphotyrosine phosphatase and activates nonreceptor protein-tyrosine kinases which may help improve glucose homeostasis.

ALPHA LIPOIC ACID

Alpha-lipoic acid's role in oxidation of pyruvate and alpha-ketoglutarate in the mitochondria, which enhances energy production and possibly its antioxidant activity, may account for its possible benefit in diabetic polyneuropathy. Alpha lipoic acid levels are depleted in those suffering from diabetic neuropathies. It may also enhance glucose uptake by peripheral nerves.

VACCINIUM MYRTILLUS

Compounds of bilberry leaf include catechin tannins, flavonoids, iridoide monoterpenes, caffeic acid derivatives, phenolic acids, quinolizidine alkaloids and those of bilberry fruit include fruit acids, tannins, anthocyanoides, flavonoids, iridoids, pectin and caffeic acid derivatives. Bilberry leaf is thought to have anti-viral and lipid-lowering properties. It may also have an effect on blood sugar due to its chromium content. Bilberry fruit's action on wound healing is due to catechin tannin content. It is thought that anthocyanides may slow down the synthesis of polymeric collagen. It has also been concluded that Bilberry provides protection for the retina.

GINKGO BILOBA

With the help of flavonoids, Ginkgo biloba may help decrease lipid peroxidation, exerting ischemic protective and antioxidant effects. Lipid peroxidation causes tissue and vascular damage and also neuronal loss leading to dementia. This herb may help in decreaseing progression of dementia and ischemia since it reduces neutrophil infiltration and increases blood flow. Cerebral hypoxia tolerance is also increased due to the anti-oxidant and membrane-stabilizing activity. Due to direct action on alpha-adrenoceptors, spasmolytic properties are exhibited by the herb.

Ginkgo biloba may have a role in reducing platelet hypersensitivity, a condition often found in diabetics, and in increasing pancreatic insulin production. NIH has recently funded studies to further explore ginkgo's use in diabetes and insulin production.

OPLOPANAX HORRIDUS

Oplopanax is an adaptogen. It has stimulant properties and is considered a CNS sedative. It controls homeostasis by acting on the endocrine system. It has been shown to increase plasma levels of ACTH and corticosterone and decrease blood glucose levels.

GALEGA OFFICINALIS

Galega contains various compounds including guanidine derivatives, quinazoline alkaloids, lectins, and flavonoids. The herb contains galegine that may contribute to lowering blood sugar levels in humans and have an inhibiting effect on glucose transport in human epithelial cells.

LAGERSTROEMIA SPECIOSA

The active ingredient in Banaba is corosolic acid. It is thought to have glucose-transport stimulating activity. Corosolic acid also has antioxidant activity and prevents lipid peroxidation. It may promote the excretion of glucagons by alpha cells in the Islets of Langerhans.

INDICATION AND USAGE:

NIACINAMIDE

Niacinamide, as a health supplement, has been shown to have a beneficial role in glucose balance. (1)

1. Urberg M, Zemel MB. Evidence for synergism between chromium and nicotinic acid in the control of glucose tolerance in elderly humans. Metabolism. 1987;36:896-99.

VITAMIN B12

The elderly, those who have had gastric surgery, those who are chronically ill, people with low B12 status as well as some vegetarians may be deficient in vitamin B12. Numbness, pins and needle sensations and other symptoms typical of diabetic neuropathy also characterize Vitamin B12 deficiency. Vitamin B12 has been found to have a beneficial role as a supplement in diabetic neuropathy. (1)

1. Davidson S. The use of vitamin B12 in the treatment of diabetic neuropathy. J Flor Med Assoc 1954;15:717-20.

CHROMIUM PICOLINATE

Chromium is believed to improve glucose tolerance. It also helps in building muscle and promoting weight loss.

[redacted] INOSITOL

[redacted] Inositol has been used as a health supplement for glucose balance.

L-ARGININE

L-Arginine may be cardioprotective. It may also be helpful in accelerating wound healing, which is often impaired in diabetes. It may enhance insulin secretion and thus can be a useful health supplement for glucose balance.

MOMORDICA CHARANTIA

Bitter Melon has been used as a health supplement for glucose balance and for joint support.

GYMNEMA SYLVESTRE

Gymnema may increase insulin production, possibly by repairing or regenerating pancreas cells, the site of insulin production. It may also suppress the craving for sweets.

CYNARA SCOLYMUS

Globe Artichoke has been used in traditional medicine for gallstones and liver diseases including those related to diabetes, kidney disease, arteriosclerosis, high cholesterol, alcoholism, dyspepsia, chronic albuminuria, and anemia.

SILYBUM MARIANUM

Silybum may reduce the lipoperoxidation of cell membranes and insulin resistance, decreasing endogenous insulin overproduction and the need for exogenous insulin administration.

SOLIDAGO ODORA

Golderod has historically been used for glucose balance. The flowers are said to be aperient, tonic, astringent, and diuretic, and have been found beneficial in gravel, urinary obstructions, ulceration of the bladder, and in the early stage of dropsy. Solidago has been traditionally used for symptoms such as polyuria as well as complications of diabetic nephropathies.

SYZYGIUM JAMBOLANUM

Various uses of Jambolan seeds have included pancreatic and gastric support, and as a diuretic.

TRIGONELLA FOENUM-GRAECUM

Some indications for fenugreek approved by the Commission E are loss of appetite and inflammation of the skin. For neurasthenia, gout and diabetes it can be combined with insulin. It may hold promise in reducing fasting and postprandial blood levels of glucose, glucagons, somatostatin, insulin, total cholesterol, and triglycerides. (1)

1. Ribes G, Sauvaire Y, Baccou JC et al. Effects of fenugreek seeds on endocrine pancreatic secretions in dogs. Ann Nutr Metab 1984;28:37-43.

OPUNTIA SPP.

Opuntia has been used to support carbohydrate metabolism to help maintain sugar balance. It has also been used for weight loss.

VANADYL SULFATE

Vanadium may help reduce fasting glucose levels and improve insulin sensitivity. (1)

1. Cohen N et al. Oral vanadyl sulfate improves hepatic and peripheral insulin sensitivity in patients with non-insulin-dependent diabetes mellitus. L Clin Invest 1995; 95: 2501-2509.

ALPHA LIPOIC ACID

Alpha Lipoic Acid has beneficial effects with respect to glucose metabolic homeostasis in both nervous and ocular tissues.(1,2)

1. Kishi Y, Schmelzer JD, et al. Alpha-lipoic acid; effect on glucose uptake, sorbitol pathway and energy metabolism in diabetic neuropathy. Diabetes 1999;48:2045-2051.

2. Obrosova I, Cao X, et al. Diabetes induced changes in lens antioxidant status, glucose utilization and energy metabolism. Diabetologia 1998;41:1442-1452.

VACCINIUM MYRTILLUS

There is some clinical support for the use of Bilberry; external uses include applications for wound healing. It is used internally to promote visual acuity, circulation and reduce the risk of retinopathy and neuropathy formation.(1,2)

1. Scharrer A and Ober M. Anthocyanosides in the treatment of retinopathies. Klin Mopatsbl Augenheilkd beih. 178:386-389, 1981.

2. Lietti A and Forni G. Studies on vaccinium myrtillus anthocyanosides. I. Vasoprotective and anti-inflammatory activity. Arzneim-Forsch Drug res. 26:829-32, 1976.

GINKGO BILOBA

Ginkgo biloba is a plant extract often associated with cognition, e.g., memory performance, concentration, and alertness. A period of 4 to 6 weeks is needed before a pronounced effect can be expected.(1) Ginkgo extract stimulates prostaglandin synthesis and inhibits lipid peroxidation in the cell membrane. Ginkgo also possesses superoxide dismutase activity.(2) Ginkgo is thought to act as a "blood thinner" and to improve circulation. Ginkgo biloba may increase pancreatic insulin production as well.

1. Soholm, B. (1998). Clinical improvement of memory and other cognitive functions by Ginkgo biloba: review of relevant literature. Adv. Ther. 15(1):54-65.

2. Pincemail, J., Dupuis, M., Nasr, C., Hans, P., Haag-Berrurier, M., Anton, R. and Delby, C. (1989). Superoxide Anion Scavenging Effect and Superoxide Dismutase Activity of Ginkgo biloba Extract. Experientia. 45(8); 708-712.

OPLOPANAX HORRIDUS

Oplopanax is thought to promote normal blood sugar balance.

GALEGA OFFICINALIS

Galega has historically been used as a diuretic, galactagogue, and for glucose balance.

LAGERSTROEMIA SPECIOSA

Banaba may be effective in reducing blood glucose levels and is also used to promote weight loss.

RESEARCH SUMMARY:

NIACINAMIDE

In vitro experiments showed that niacinamide may reduce beta cell impairment, death caused by macrophages and exposure to various cytokines involved in autoimmune diseases. Niacinamide shows some ability to extend the remission phase when administered to subjects newly diagnosed with diabetes. It may cause resolution of diabetes in those newly diagnosed with the disease. (1) . In one 5-year intervention study, it was concluded that niacinamide supplementation reduced the expected incidence of IDDM by 50% over a 5-year period. There is one recent single-blind, placebo-controlled study indicating that niacinamide improves insulin secretion and metabolic control in lean type 2 diabetic patients with secondary failure to sulfonylureas.

1. Schroeder SA, Krupp MA, Tierney LM, McPhee SJ. Current medical diagnosis and treatment. Los Altos, CA: Lange Med. 1983.

2. Elam, Marshall et al. Effect of Niacin on Lipid and Lipoprotein Levels and Glycemic Control in Patients with Diabetes and Peripheral Arterial Disease. JAMA, Sep 13, 2000:284;10:1263-70.

VITAMIN B12

A double blind study was conducted on the clinical and neurophysiological effects of Vitamin B12 on 50 patients with diabetic neuropathy. Individuals receiving Vitamin B12 reported subjective improvement in somatic and autonomic symptoms (parasthesias, burning sensations, numbness, loss of sensation, and muscle cramps), and regression of signs of diabetic neuropathy (reflexes, vibration sense, lower motor neuron weakness, and sensitivity to pain). Vitamin B12 was well tolerated by the patients and no side-effects were encountered.(1) Vitamin B12, taken orally or intravenously, can reduce nerve damage caused by diabetes.(2)

1. Yamane K, Usui T, Yamamoto T, et al. Clinical efficacy of intravenous plus oral mecobalamin in patients with peripheral neuropathy using vibration perception thresholds as an indicator of improvement Curr Ther Res 1995;56:656–70 [review].

2. Yaqub BA, Siddique A, Sulimani R. Effects of methylcobalamin on diabetic neuropathy. Clin Neurol Neurosurg 1992;94:105-111.

CHROMIUM PICOLINATE

Chromium supplementation reversed diabetic symptoms in patients with chromium deficiency. Chromium supplementation has been shown to improve fasting glucose, postprandial glucose, glycosylated hemoglobin, insulin and cholesterol levels.(1) Plasma chromium levels are about 40% lower in diabetic subjects when compared with healthy individuals.

1. Anderson R et al. Beneficial effect of chromium for people with Type II diabetes. Diabetes 1996; 45: 124A/454.

[redacted] INOSITOL

Inositol's hypoglycemic effect was first discovered in 1987.(1)
Women with polycystic ovary syndrome have insulin resistance and hyperinsulinemia, possibly because of a deficiency of a D-chiro-inositol-containing phosphoglycan that mediates the action of insulin. A study concluded that d-chiro-inositol may help the action of insulin in patients with polycystic ovary syndrome, and may thereby improve ovulatory function and decrease serum androgen concentrations, blood pressure, and plasma triglyceride concentrations.(2)

1. Narayanan C, "Pinitol-A New Anti-Diabetic Compound from the Leaves of Bougainvillea," Current Science 56:3, (1987):139-141.

2. Nestler, J.E. et al. ovulatory and Metabolic Effects of d-Chiro Inositol in the Polycystic Ovary Syndrome. The New England Journal of Medicine. April 29, 1999;340:1314-1320.

L-ARGININE

Arginine's primary function involves the metabolism of protein and nitrogen, as well as the production of a number of important compounds. It also plays a role in maintaining health of the circulatory system. Arginine may also accelerate wound healing.(1) L-arginine was noted to reduce lipid peroxidation in patients with diabetes mellitus.(2)

A 2001 study suggests that treatment with L-Arginine over a long period can improve insulin

sensitivity in patients with type 2 diabetes. The authors of the study point out that L-Arginine, which increases nitric oxide (NO) levels, is known to stimulate insulin secretion. Patients who received L-Arginine had a significant (34%) increase in glucose disposal and significant improvement in hepatic insulin sensitivity, as endogenous glucose production decreased significantly.(3)

1. Barbul A, et al. Arginine Enhances Wound Healing and Lymphocyte Immune Responses in Humans. Surgery. Aug1990;108(2):331-36.

2. Baligan M, Giardina A, Giovannini G, et al. L-arginine and immunity. Study of pediatric subjects. Minerva Pediatr. Nov1997;49(11):537-42

3. Hurson M, et al. Metabolic Effects of Arginine in a Healthy Elderly Population. J Parenter Enteral Nutr. May-Jun1995;19(3):227-30.

MOMORDICA CHARANTIA

Two proteins, alpha- and beta-momorcharin, in the seeds of the bitter melon, appear to modulate the activity of both T and B lymphocytes and significantly suppress macrophage activity, but are non-cytotoxic. (1)

Clinical studies suggest juice of bitter melon fruit may improve glucose tolerance in Type II diabetics.(2)

1. Lee-Huang, S. et al.; "Anti-HIV & anti-tumor activities of recombinant MAP30 from bitter melon"; Gene; 161: 151-56; 1995.

2. Srivastava, Venkatakrishna-bhatt H, et al. Antidiabetic and adaptogenic properties of Momordica Charantia extract: An experimental and clinical evaluation.

GYMNEMA SYLVESTRE

Extracts of leaves have been shown to reduce the dose of conventional medication and insulin in Type II diabetics.(1) It also suppresses sweet taste and reduces sugar cravings in humans (2) and can increase insulin levels in blood.(3)

1. Baskaran K., Kizar Ahamath B., Radha Shanmugasundaram K. & others. Antidiabetic effect of a leaf extract from Gymnema sylvestre in non- insulin-dependent diabetes mellitus patients. J Ethnopharmacol, 30:295-300, 1990.

2. Brala P.M., Hagen R.L. Effects of sweetness perception and caloric value of a preload on short term intake. Physiol Behav, 30:1-9, 1983.

3. Shanmugasundaram E.R., Rajeswari G., Baskaran K. & others. Use of Gymnema sylvestre leaf extract in the control of blood glucose in insulin-dependent diabetes mellitus

CYNARA SCOLYMUS

Dietary supplementation with globe artichoke was found to decrease blood glucose levels in non-insulin dependent diabetes (NIDDM).(1)

A European study suggests that artichoke is efficacious in altering lipid values. After using a standardized artichoke extract for six weeks, total cholesterol and triglyceride values decreased significantly by an average of 11.5% and 12.5%, respectively. HDL-cholesterol levels did not rise significantly.(2)

1. Yamachita K, Kawai K, Itakura M. Effect of fructooligosaccharides on blood glucose and serum lipids in diabetic subjects. Nutr Res. 1984; 4:961-966.

2. Fintelmann V. Antidyspeptic and lipid-lowering effect of artichoke leaf extract. *Zeitschrift fur Allgemeinmed* 1996;72(Suppl 2):3-19.

SILYBUM MARIANUM

The protective effect of silymarin against liver damage has been demonstrated in a number of experimental and clinical studies. Silymarin may help prevent the depletion of glutathione.(1)

In human studies, silymarin has been shown to have positive effects in treating liver diseases of various kinds and inflammation of the bile duct.(2) Studies have demonstrated that diabetic patients with cirrhosis require insulin treatment because of insulin resistance.

1. Canini, F., Bartolucci, A., Cristallini, E., et al., "Use of silymarin in the treatment of alcoholic hepatic stenosis", Clin. Ther., 1985, 114, pp 307-14

2. Salmi, H.A., and Sarna, S., "Effect of silymarin on chemical, functional, and morphological alteration of the liver. A double-blind controlled study" Scand.J.Gastroenterol., 1982, 17, pp 417-21.

SOLIDAGO ODORA

Studies have found that Solidago may have anti-inflammatory, spasmolytic and diuretic properties.(1) It has been used for diabetic complications such as nephropathies.(2)

1. Leuschner J. Anti-inflammatory, spasmolytic and diuretic effects of a commercially available Solidago gigantea Herb. extract. Arzneimittelforschung 1995 Feb;45(2):165-8.

2 Chodora A, Dabrowska K, Senczuk M, Wasik-Olejnik A, Skrzypczak L, et al. Diuretic effect of the glycoside from a plant of the Solidago L. genus. Acta Pol Pharm. 1985;42(2): 199-204.

SYZYGIUM JAMBOLANUM

Jambol has hypoglycemic properties and may be useful for renal support.

1 Silva-Netto CR, Lopes RA, Pozetti GL. Effects of extract of dried leaves of Jambolao (syzygium Jambolanum) on renal excretion of water, sodium and potassium in rats. Rev Fac Odontol Ribeiro Preto 1986 Jul-Dec;23 (2):213-5.

TRIGONELLA FOENUM-GRAECUM

In a randomized study of fifteen people with IDDM, fenugreek was reported to reduce blood sugar, urinary sugar excretion, serum cholesterol and triglycerides with no change in insulin levels compared with 10 days of placebo.(1) In a study of sixty people with NIDDM diabetes, fenugreek was reported to reduce blood glucose levels.(2) Fenugreek seed given twice daily to insulin dependent diabetics resulted in reduction in fasting blood sugar levels. It also improved glucose tolerance test results, and showed a reduction in cholesterol and triglyceride levels. In non-insulin dependent diabetics, it reduced post prandial glucose levels on the glucose tolerance test.(3)

1 Sharma RD, Raghuram TC, Sudhakar Rao N. Effect of fenugreek seeds on blood glucose and serum lipids in type 1 diabetes. *Eur J Clin Nutr* 1990;44:301-6.

2 Sharma RD, Sakar A, Hazra DK, et al. Use of fenugreek seed powder in the management of non-insulin dependant diabetes mellitus. *Nutr Res* 1996;16:1131-39.

3. Z Mada, R. Abel, S. Samish and J. Arad, "Glucose-Lowering Effect of Fenugreek in Non-Insulin Dependent diabetics," European Journal of Clinical Nutrition 42 (1988):51-54

OPUNTIA SPP.

There have been numerous studies on Opuntia and its use in diabetes. One study found that daily intake of Opuntia for 10 days improved glucose control in a small group of adults with non-insulin-dependent diabetes mellitus.(1) This same study found that the glucose tolerance test is lower with previous ingestion of Opuntia stems. The effect on glucose tolerance is dose related.(2) In patients with NIDDM, the ingestion of nopal in fasting conditions is followed by a decrease of serum glucose and serum insulin levels.(3)

Opuntia stems administered to diabetic, obese, and healthy volunteers caused a diminution on serum levels of triglycerides, glucose, total cholesterol and LDL-cholesterol, while HDL-cholesterol did not change and the "atherogenic index" improved (4).

1. Frati, A.C., B. E. Gordillo, P. Altamirano, C.R. Ariza, R. Cortez-Franco, and A. Chavez-Negrete. 1990. Acute hyypoglycemic effect of Opuntia streptacantha Lemaire in NIDDM. Diabetes Care 13:455-456.

2. Frati, A.C., L.M.D. Valle Martinez, C.R. Ariza, S. Islas, and A. Chavez-Negrete. 1989. Hypoglycemic effect of different doses of nopal (Opuntia streptacantha Lemaire) in patients with type II diabetes mellitus. 1989 Archiv. Invest. Med. (Mex) 20:197-201.

3. Frati, A.C., B.E. Gordillo, P.A. Hamirano, and C.R. Ariza. 1988. Hypoglycemic effect of Opuntia streptacantha Lemaire in NIDDM. Diabetes Care 11:63-66.

4. Frati, A.C., J. A. Fernandez, H. de la Riva, R. Ariza, and M.D. C. Torres. 1983. Effects of nopal (Opuntia sp) on serum lipids, glycemia, and body weight. Arch. Invest. Med. (Mex) 14:117-125.

VANADYL SULFATE

Vanadium can have major effects of insulin itself on insulin-sensitive tissues. Vanadium may reduce blood glucose levels in those who are insulin-deficient and improve glucose homeostasis. Vanadium can decrease plasma insulin concentration and blood pressure; clinical trials have shown benefits in both type 1 and type 2 diabetic patients. Type 2 diabetic patients treated with vanadyl sulfate daily for 4 weeks had significant reductions in fasting plasma glucose and beneficial effects on insulin sensitivity persisted for up to 4 weeks after vanadium treatment ended.(1)

1. Halberstam M et al. Oral vanadyl sulfate improves insulin sensitivity in NIDDM but not in obese nondiabetic subjects. Diabetes 1996;45:659-666.

ALPHA LIPOIC ACID

In Germany, Alpha Lipoic acid is commonly used for diabetic neuropathy. Lipoic acid has shown antioxidant properties so as to reduce endoneural blood flow and oxygen tension (which are risk factors of neuropathy). In addition to this, there are favorable lipoic acid effects that appear to be independent of its anti-oxidant properties including increased glucose uptake, promotion of new neurite growth and chelation of transition metals that are thought to play a role in diabetic neuropathy.(1) In one study, subjects received intravenous lipoic acid daily and after 21 days significant pain reduction in most of them was achieved.(2) In a larger, multi-center, double-blind, randomized, placebo-controlled study of 328 patients with type 2 diabetes, significant improvements were recorded in several clinical measures of diabetic polyneuropathy, including pain, numbness, paresthesia and burning sensation. (3) Lipoic acid may help slow the development of atherosclerosis for which diabetics are at great risk.

1. Barbiroli B, et al., Journal of Neurology, 1995;242:472-7.

2. Schonheit K, et al., Biochimica et Biophysica Acta, 1995;1271;335-42; and Cao X and Phillis JW, Free Radical Research, 1995;23:365-70

3. Suzuki YJ, et al., Biochemical & Biophysical Research Communications, 1992;189:1709-15

VACCINIUM MYRTILLUS

Oral administration of Vaccinium has reduced hyperglycemia.(1) Vaccinium has the ability to inhibit sorbitol accumulation and improve collagen integrity and capillary permeability.(2) In laboratory experiments, the administration of Anthocyanosides, as found in vaccinium, has shown promise in inhibiting the development of diabetic cataracts.(3)

1. Allen FM. Blueberry leaf extract. Physiologic and clinical properties in relation to carbohydrate metabolism. JAMA 1937; 89: 1577-1581.

2. Passariello N, Bisesti V, Sgambato S. Influence of Anthocyanosides on the microcirculation and lipid picture in diabetic and dyslipidemic subjects. Gazz Med Ital 1979; 138: 563-566

3. Varma SD, Mizuno A, Kinoshita JH. Diabetic cataracts and flavonoids. I. Acta Opthalmol 1980; 58: 748-759.

GINKGO BILOBA

A recent meta-analysis of controlled clinical trials concluded that ginkgo leaf extract is significantly more effective than placebo in the treatment of the circulatory disorder known as intermittent claudication.(1) Ginkgo biloba may reduce platelet hyperactivity and accelerate pancreatic beta cell function.(2)

1. Pittler MH, Ernst E. *Ginkgo biloba* extract for the treatment of intermittent claudication: A meta-analysis of randomized trials. *The American Journal of Medicine* 2000; 108: 276-281.

2. Kudolo GB. The Effect of 3-month Ingestion of Ginkgo biloba extract (EGb 761) on pancreatic b -cell function in response to glucose loading in individuals with non-insulin dependent diabetes mellitus. Journal of Clinical Pharmacology 41:600-611. 2001.

OPLOPANAX HORRIDUS

Oplopanax may be useful as an oral hypoglycemic agent.(1). It also possesses antibacterial activity.(2) One study showed a hypoglycemic effect in obese, insulin-resistant patients with simultaneously lowered levels of LDL and triglycerides.(3)

1 Kolterman OG. The use of oral hypoglycemic agents in the management of type II diabetes. In: Sussman KE, Draznin B, James WE, eds. *Clinical Guide to Diabetes Mellitus.* New York: Alan R. Liss, Inc.;1987:33-45.

2. Kobaisy M, Abramowski Z, Lermer L, Saxena G, Hancock RE, Towers GH, Doxsee D, strokes RW. Antimycobacterial polyynes of Devil's Club (Oplopanax horridus), a North American native medicinal plant. J Nat Prod 1997 Nov;60(11):1210-3

3 Frati M et al. Effects of Nopal (*Opuntia streptacatha*) on serum lipids, glycemia and body weight. Archiv Invest Med. (Mex), 1983; 14:117.

GALEGA OFFICINALIS

Goat's Rue is one of many herbal remedies with the action of reducing blood sugar levels. Goat's rue is thought to have hypoglycemic activity via enhancing glucose utilization. It was researched in the early 1920's as a possible therapy which led to the development of antidiabetic biguanide drugs; however, these drugs also had numerous side effects which the whole plant did not produce.

LAGERSTROEMIA SPECIOSA

In a placebo controlled study, corosolic acid was found effective in reducing blood glucose levels. There were no adverse effects recorded.(1)

1. Ikeda, Y. The Clinical Study on the Water Extract of Leaves of Lagerstremia speciosa L. for Mild Cases of Diabetes Mellitus. Jan 1998-September 1998. Jikeikai University, Tokyo.

CONTRAINDICATIONS:

NIACINAMIDE

Niacinamide is contraindicated for those hypersensitive to any component of a niacinamide-containing preparation. High dose of niacinamide (doses greater than 500 milligrams/day) is contraindicated for those with liver disease and in those with active peptic ulcer disease.

VITAMIN B12

Vitamin B12 is contraindicated for those hypersensitive to any component of a B12-containing product.

CHROMIUM PICOLINATE

It is contraindicated for those hypersensitive to any component of a chromium-containing supplement.

[redacted] INOSITOL

None reported

L-ARGININE

Supplemental L-arginine is contraindicated in those with the rare genetic disorder argininemia. It is also contraindicated for those hypersensitive to any component of an argenine containing preparation

MOMORDICA CHARANTIA

Bitter melon is contraindicated in pregnancy.

GYMNEMA SYLVESTRE

No contraindications have been reported

CYNARA SCOLYMUS

Due to its stimulating effect on the biliary tract, cynara should not be used if there is a bile duct blockage. Colic can occur if the patient suffers from gallstones.

SILYBUM MARIANUM

No contraindications have been reported.

SOLIDAGO ODORA

In cases of edema resulting from reduced cardiac and/or kidney function, irrigation is contraindicated.

SYZYGIUM JAMBOLANUM

None known.

TRIGONELLA FOENUM-GRAECUM

It should not be used during pregnancy.

OPUNTIA SPP.

No contraindications have been reported.

VANADYL SULFATE

No contraindications have been reported.

ALPHA LIPOIC ACID

No contraindications have been reported.

VACCINIUM MYRTILLUS

No contraindications have been reported.

GINKGO BILOBA

Patients suffering from systematic arterial hypertension or amyloid senile plaques have a higher risk factor for intracranial hemorrhage and hence should avoid use of Ginkgo biloba due to a recent case report of subarachnoid hemorrhage associated with the herb.(1) To date, however, at least four reports of spontaneous bleeding in association with use of Ginkgo biloba have been published.(2)

1. Foster S. Herbal medicine: an introduction for pharmacists. NARD J 1996;10:127-44.

2. Rosenblatt M, Mindel J. Spontaneous hyphema associated with ingestion of Ginkgo biloba extract [Letter]. N Engl J Med 1997;336:1108.

OPLOPANAX HORRIDUS

Oplopanax is contraindicated for patients with acute illnesses such as colds, flu or allergic attacks. It should also be avoided in children, during pregnancy, and by patients suffering from hypertension, bronchitis or excessive menstrual bleeding.

GALEGA OFFICINALIS

None reported

LAGERSTROEMIA SPECIOSA

None reported.

PRECAUTIONS

PREGNANT WOMEN SHOULD EXERCISE CAUTION IN USE OF HEALTH SUPPLEMENTS AND DO SO ONLY UNDER THE SUPERVISION OF A PHYSICIAN.

NIACINAMIDE

Pregnant women and nursing mothers should avoid supplemental doses of niacinamide greater than the U.S. RDA (20milligrams/day), unless higher doses are prescribed by their physician. Those with history of peptic ulcer disease, gastritis, liver disease, gallbladder disease, diabetes and gout should exercise caution in use of high-dose niacinamide.

VITAMIN B12

Consumption of vitamin B12 to treat B12 deficiency should be medically supervised. B12 should not be used by those with Leber's optic atrophy. Pregnant women and nursing mothers should only use doses higher than 12 micrograms daily if recommended by their physician. Doses higher than 10 micrograms may cause a hematological response in those with anemia.

CHROMIUM PICOLINATE

Pregnant women and nursing mothers should avoid doses of chromium above the upper limit of the estimated safe and adequate daily dietary intake (ESADDI) which is 50 to 200 micrograms daily. People with a history of hyperglycemia or type 2 diabetes mellitus should use chromium supplements under medical supervision.

[redacted] INOSITOL

None reported

L-ARGININE

Because of absence of long-term safety studies and because of the possibility of growth hormone stimulation, pregnant women and nursing mothers should avoid L-arginine supplementation. Those with renal or hepatic failure should exercise caution in the use of supplemental L-arginine. There are a few reports of supplemental L-arginine with recurrence of oral herpetic lesions.

MOMORDICA CHARANTIA

No known precautions.

GYMNEMA SYLVESTRE

No known precautions.

CYNARA SCOLYMUS

The safety of this plant's use during pregnancy or lactation has not been established.

SILYBUM MARIANUM

No known precautions.

SOLIDAGO ODORA

No known precautions.

SYZYGIUM JAMBOLANUM

No known precautions.

TRIGONELLA FOENUM-GRAECUM

No known precautions

OPUNTIA SPP.

No known precautions.

VANADYL SULFATE

Those with diabetes, hyperglycemia and hypoglycemia should use supplemental vanadium under medical supervision.

ALPHA LIPOIC ACID

Lipoic acid should be avoided by pregnant women and nursing mothers. Those with diabetes and problems with glucose intolerance are cautioned that supplemental alpha-lipoic acid may lower blood glucose levels and hence blood glucose should be monitored and anti-diabetic drug dose be adjusted accordingly to avoid possible hypoglycemia.

VACCINIUM MYRTILLUS

No known precautions.

GINKGO BILOBA

No known precautions.

OPLOPANAX HORRIDUS

No known precautions.

GALEGA OFFICINALIS

None reported

LAGERSTROEMIA SPECIOSA

None Reported

ADVERSE REACTIONS

NIACINAMIDE

There are rare reports of elevations in liver enzymes and liver damage, including jaundice and parenchymal liver injury. These reports were in those using very high doses of nicotinamide (10 grams or greater daily). Adverse reactions in those using high-dose niacinamide include nausea, vomiting, diarrhea, headache and dizziness.

VITAMIN B12

High dose of oral B12 is well tolerated but people who experienced hypersensitivity reactions due to use of parental B12 may experience similar reactions from use of oral B12.

CHROMIUM PICOLINATE

Use of high dose chromium picolinate can cause rhabdomyolysis, acute generalized exanthematous pustulosis, interstitial nephritis, anemia, thrombocytopenia, hemolysis, liver dysfunction, renal failure and weight loss.

[redacted] INOSITOL

In humans, 4.15 mg/kg/day of inositol was given orally to non-insulin dependent diabetic subjects with no adverse effects noted.(1)

1. United States Patent. Ostlund et al. Patent Number 5,550,166. August 27, 1996.

L-ARGININE

15 to 30 grams daily, of oral supplementation with L-arginine can result in the adverse reactions of nausea, abdominal cramps and diarrhea. Some may experience these adverse effects at lower doses.

MOMORDICA CHARANTIA

No known toxicity or adverse reactions have been reported.

GYMNEMA SYLVESTRE

No adverse reactions have been reported.

CYNARA SCOLYMUS

The plant possesses a medium potential for sensitization through skin contact. Allergic reactions can occur if there is frequent contact with artichokes.

SILYBUM MARIANUM

No known health hazards or side effects are known.

SOLIDAGO ODORA

Sensitization is possible by use of this drug. Patients with chronic renal diseases should use it only under physician supervision.

SYZYGIUM JAMBOLANUM

None reported

TRIGONELLA FOENUM-GRAECUM

Sensitization is possible through repeated external administration.

OPUNTIA SPP.

Undesirable side effects of Opuntia intake include abdominal fullness.

VANADYL SULFATE

In one study some who subjects given 13.5 milligrams of vanadium daily for 2 weeks followed by 22.5 milligrams daily for 5 months, developed gastrointestinal symptoms like nausea, vomiting, diarrhea, cramps and others developed a greenish color of the tongue. In another study, some subjects receiving daily doses of 4.5 to 18 milligrams of vanadium for 6 to 10 weeks developed green tongues, diarrhea and cramps at higher doses.

ALPHA LIPOIC ACID

Lipoic acid in doses up to 600 milligrams daily has been well tolerated.

VACCINIUM MYRTILLUS

Due to its high tannin content, digestive discomfort may occur.