

I N N A T E

RESPONSE FORMULAS®

V i s m e d i c a t r i x n a t u r a e

Adrenal Response™ Complete Care

100% Whole Food Targeted Response Dietary Supplement

Formula Rationale

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Formula Rationale of Adrenal Response™ Complete Care

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It is our mission to craft efficacious formulations to help harness the innate healing response that is within every patient. In the time-honored traditions of *vis medicatrix naturae* (the healing power of nature), we select only the most nourishing whole foods and botanicals.

Purpose

Stress is a killer. Research shows that the human physiology, under stress, suffers in every aspects of its function. Stress, be it physical, emotional, mental or environmental shortens life. Protecting against the debilitating effects of stress is essential to optimal health.

Adrenal Function

One of many adrenal gland functions is to manage stress and enhance energy. The adrenal glands create hormones that manage and influence energy, inflammation, blood pressure, blood sugar, electrolyte balance and emotions. The adrenals control our most basic instinct, our ‘flight or fight’ response. The adrenals are the most important gland for overall adaptation to stress. Without proper adrenal function life becomes difficult, if not impossible, to manage.

The Adrenal Glands

The adrenal glands are a pair of triangular shaped organs located above the kidneys. Each gland is made up of two main parts:

1. Cortex (outer part) that produces cortisone
2. Medulla (center) that creates and secretes adrenaline.

Adrenal Cortex Functions

1. Production and Secretion of Cortisone
2. Maintain the Sodium-Water Balance
3. Metabolism of Carbohydrates
4. Blood Sugar Regulation
5. Production of Sex Hormones

The Outer Adrenal Cortex

The Outer Adrenal Cortex is divided into three zones. Each zone has its’ own cellular arrangement and secretes different hormones.

The Outer Zone- zona glomerulosa

Cells are arranged in arched loops or round balls The Outer Zone Secretes a group of hormones called mineralocorticoids. Mineralocorticoids are important to electrolyte balance along with the relationship of sodium to potassium and maintaining the proper balance.

Aldosterone is the key adrenal hormone. Aldosterone is responsible for 95% of adrenal activity. Aldosterone causes potassium excretion and sodium reabsorption. Sodium reabsorption leads to elimination of H⁺ ions, which makes blood less acidic. Aldosterone sets up a positively charged field around the kidneys, enabling the kidneys to draw negatively charged chlorine and bicarbonate ions out of the urine into the blood.

Middle Zone- zona fasciculata

Widest of the 3 zones, with cells arranged in long straight cords. This zone secretes Glucocorticoid hormones: Hydrocortisone (cortisol), corticosterone, and cortisone. The Glucocorticoids are a group of hormones responsible for normal metabolism, energy production and stress adaptation. They also have anti-inflammatory actions.

1. They promote healthy metabolism and energy through increasing the rate that amino acids are extracted from cells and transported to the liver. The liver will use these amino acids to create needed enzymes, or if glycogen is low it will use the amino acids to make glucose. Also helps the body to store fat for future energy needs.
2. Stress adaptation is provided through the available glucose, giving energy for 'flight or fright'. The additional glucose gives fuel for handling stress, temperature extremes, fright, high altitude, infection, bleeding, emotional pressures, disease, etc.
3. They can raise blood pressure through increased sensitivity to blood vessel constricting chemicals.
4. Decrease blood vessel dilation and edema associated with inflammation. At the same time they decrease connective tissue dilatation and reduce inflammation.
5. The hypothalamus when stimulated by stress and abnormally low levels of glucocorticoids secretes adrenocorticotropin hormone releasing factor (ACTHRF). This secretion stimulates the pituitary gland to release ACTH, adrenocorticotropin hormone (also called adrenocorticotropin. ACTH travels through the blood to the adrenal cortex and stimulates the secretion of Glucocorticoid.

The Inner Zone- zona reticularis

Contains cells that secrete sex hormones, both male and female, androgens, and gonadocorticoids, in very small amounts. An important reason for supporting the adrenal glands through menopause and climacteric for both men and women.

The Inner Adrenal Medulla

The Adrenal Medullas has hormone producing cells called chromaffin cells. The secretion of hormones by the chromaffin cells is directly controlled by the autonomic nervous system.

The two primary hormones synthesized by the medulla are epinephrine and norepinephrine. Epinephrine makes up about 80% of the total secretions of the gland and is the most active of the two hormones. These two hormones are largely responsible for 'flight or fight response'. Stress causes increased output of these hormones. Increased epinephrine can increase blood pressure and heart rate, and constrict blood vessels. Epinephrine accelerates respiration, decreases digestion, increases efficacy of muscle contractions, increases blood sugar levels and stimulates cellular metabolism.

Essential Factors to Provide Comprehensive Adrenal Support

1. The Adrenals
2. Stress Response
3. Antioxidant Support
4. The Pancreas
5. The Nervous System
6. Membrane Stabilization
7. Oxidative Stress
8. The Urinary System- Kidney Chi

Adrenal Exhaustion - The Challenge

Lifestyle, dietary and environmental factors all affect the adrenal glands. Exhausted adrenals deplete the body's vitality and disrupt the body's balance. Research confirms that adrenal exhaustion has replaced the cold virus as the most common health problem in North America. This physiological phenomenon costs the economy billions of dollars in lost time every year.

Adrenal Response™ Complete Care - The Solution

Adrenal Response™ Complete Care is specifically formulated to strengthen and nourish every aspect of adrenal

function. Adrenal Response™ Complete Care also strengthens' the body's natural stress adaptation response.

Adrenal Response™ Complete Care is designed as both a tonic and a targeted nutritional for specific response. Tonics tone, nourish and enliven the body's systems. Specific response uses nutrient intelligence to deliver a specific and measurable response. This approach to maintaining adrenal health has been proven, through traditional use and scientific validation, to be extremely effective.

Adrenal Response™ Complete Care- the Formula

Our formulator examined every available resource for proven Herbs, Fungi, Foods and Whole Food FoodState® Nutrients that provide adrenal nourishment and optimal adrenal response. The raw materials chosen for this formula have extensive recorded traditional and clinical use.

Adrenal Response™ Complete Care is a meticulously researched adaptogenic tonic that uses clinically proven nutrients, herbs, fungi and whole foods to assist the body's natural stress adaptation response.

Backed by Science and Tradition

Our formulator looks at every aspect of the desired specific response. Research is extensive as demonstrated by the quantity and quality of the references listed in this Rationale. We have the greatest respect for the latest science. Many times that scientific body of work has a short time frame when compared to traditional use. The tradition of thousands of years of recorded and effective specific response carries immense weight in our formulas.

Formula Components

FoodState® Nutrients

Pantothenate (*S. cerevisiae*)

Also called Vitamin B5, Pantothenate is an important component in the manufacture of coenzyme A (CoA) and acyl carrier protein (ACP). These critical body chemicals are vital to the manufacture of adrenal hormones and red blood cells. Pantothenic Acid stimulates the Adrenal Cortex, increases the production of cortisone and other adrenal hormones. Both CoA and ACP play essential roles in fat and carbohydrate utilization, energy production.

Vitamin C (*Citrus sinensis*)

The adrenal glands use Vitamin C in natural stress response functions. Vitamin C plays important roles in the production of hormones, interferon, lymphocytes and other immune response chemicals. Vitamin C plays a role in the production of nerve transmitting substances.

Vitamin C provides antioxidant protection in aqueous mediums of the body, and works with the grandmother of all antioxidants, glutathione, in protecting the body during stress. This antioxidant vitamin is vital to the production and stabilization of collagen. Collagen is the vital protein that creates connective tissue, cartilage, tendons, skin, etc.

Potassium (*S. cerevisiae*)

Potassium is an essential element that functions in the maintenance of electrolyte and osmosis balance. As a component in the production of ATP, Potassium also plays a role in the transmission of nerve impulses, skeletal muscle contractility and in maintaining normal blood pressure. Potassium is beneficial in the prevention and treatment of hypertension and cardiovascular disease. Potassium supports the adrenal glands, muscle, kidney, and nerve functions.

Magnesium (*S. cerevisiae*)

Magnesium occurs abundantly in nature, however, much is lost in the processing and refining of foods. As a result, low magnesium intake is common.

Magnesium supports functions of the adrenal glands.

Magnesium primarily functions in enzyme activation, with participation in more than 300 enzymatic reactions in

the body. An important function is the enzymes responsible for the transcription, translation and replication of nucleic acids (RNA and DNA).

Magnesium plays a critical role in energy production through pathways of carbohydrate, lipid and protein metabolism and in the synthesis of ATP in the mitochondria.

Magnesium is important for bone growth, the metabolism of calcium, and the structure and function of the muscles.

Magnesium is necessary in the sodium potassium pump for the active transport of potassium out of the cells.

Magnesium is crucial to healthy heart function.

Flavonoids - Phenolics

Flavonoids occur in most plant species. Flavonoids work with Vitamin C. Flavonoids go beyond the scope of Vitamin C, stabilizing the integrity of cell membranes, mediating allergic response, assisting in fighting off infections and viruses.

Flavonoids are powerful inhibitors of oxidative damage and are able to quench a wide variety of free radicals, including hydroxyl radicals, superoxide radicals, and lipid peroxide radicals.

Flavonoids possess powerful anti-inflammatory, anti-thrombotic, antiviral, vasodilatory, antimutagenic and antibacterial actions. They have the ability to act as single-electron donors to eliminate free radicals.

Flavonoids fall into the classification of Phenolic compounds. Anthocyanidins, Anthocyanins, Bioflavonoids, and Flavonoids, are some of the active antioxidants that are part of the phenolic family. Phenolic Compounds have been shown to eliminate oxygen, carbon and nitrogen-centered free radicals by donating to them the single electron that they need to be non-reactive in the body. By helping to neutralize the free radicals that would cause damage and aging to the cells of the cardiovascular system, flavonoids work as potent anti-aging factors.

Adrenal Response™ Complete Care includes the flavonoid and polyphenol rich foods Blueberry, Indian Goose Berry (Amla), along with OPC's, and FoodState® Citrus Bioflavonoids.

Whole Herb Extracts

Ashwagandha, Schizandra Berry, Holy Basil, Cultivated American Ginseng, and Astragalus Root represent the premier herbal Adaptogens. Adaptogens are tonics that help increase the body's resistance to stress. Adaptogens support the health of the adrenal glands and their functions. Adaptogens strengthen the body's ability to adjust to our swiftly changing environment and lifestyles. Research indicates that adaptogens maintain homeostasis during stress and in recovering homeostasis after times of stress.

Ashwagandha Root (*Withania somnifera*): Sensoril™

Sensoril™ a patented Ashwagandha Extract is the first stress relief nutraceutical to possess guaranteed optimized concentrations and ratios of key constituents from both root and specially processed leaf. Sensoril™ provides effective results for the reduction and management of stress, tension, and irritability.

Ashwagandha is native to India. Ashwagandha is an Adaptogenic herb that has been revered in the Ayurvedic healing tradition for over 2,500 years. It is used as a vitalizer, tonic, rejuvenative, aphrodisiac, nervine, sedative, astringent and antihepatotoxic.

Ashwagandha is calming and nourishing to the nervous system while enhancing stamina and natural resistance.

Ashwagandha enhances physical performance with decreased stress response. A true support herb, Ashwagandha assists the body in rejuvenation, rebuilding and restoring the nervous system, musculature and general vitality. Ashwagandha is included in this formula for its Adaptogenic support and rejuvenative action on the muscles, bones,

connective tissue and nerves. Ashwagandha enhances mental clarity and is calming to the mind.

Ashwagandha has been used in protocols to treat Chronic Fatigue Syndrome, and is considered by some Herbalists and Naturopathic Physicians as a primary herb for this condition.

Ashwagandhas' Constituents include: Withaferin A, one of the several withanolides (steroidal lactones), amino acids, including proline, valine, alanine, glycine, cystine, cysteine, glutamic acid, aspartic acid, tannins, and flavonoids.

Cultivated Organic American Ginseng Root (*Panax quinquefolius*) 4:1

American Ginseng was discovered about 300 years ago in North America, and quickly became a popular medicinal herb. The vast majority of American Ginseng has been exported to the Orient where it is a highly valued tonic. The word *Panax* is derived from the Greek pan, meaning “all” or cure-all (panacea). Ginseng means ‘spirit in the form of man’. (Ref. 52)

American Ginseng is an adaptogenic and antioxidant tonic that supports innate stress response. Research indicates that American Ginseng effects metabolism of lipids and supports endocrine activity. Adaptogenic, anti-fatigue and performance enhancing properties have been demonstrated and documented in published studies.

American Ginseng has shown radioprotective activity, the ability to help protect from x-rays and toxins.

Traditional use of American Ginseng for its protective anti-aging properties is being supported by scientific research.

Researchers in Canada at the University of Toronto and St. Michael’s Hospital found that American Ginseng has a beneficial affect on glucose metabolism and supports blood sugar imbalances.

American Ginseng, a native tonic, shows promise as an adjuvant therapy.

American Ginseng is an ‘At-Risk’ plant. We only use the cultivated root.

American Ginseng’s Active Constituents include several Saponins called ginsenosides. Quinqueginsin, triterpenes, glycosides, amino acids, glutamic acid and minerals.

Holy Basil Leaf (*Ocimum sanctum*) 10:1

Holy Basil, also known as Tulsi, or Sacred Basil, is used extensively in Ayurvedic healing traditions. Tulsi means matchless in Hindi. Holy Basil is different species than Sweet Basil, or culinary Basil.

Research indicates that Holy Basil has cortisol reducing compounds that support Adrenal function and help return balance or homeostasis.

Research indicates that Holy Basil modulates innate stress response providing anti-stress activity and enhanced endurance, a true adaptogen. Known as an Ayurvedic medicine for the nervous system and the mind. Holy Basil is uplifting, enhancing mental clarity and meditation and so it is considered a sattvic herb.

Research on Ursolic acid, a constituent in Holy Basil, reveals its activity as an antiinflammatory and COX-2 inhibitor.

Holy Basil enhances the activity of glutathione S-transferase, a key enzyme in detoxification.

Herbalists and Naturopaths often use Holy Basil to treat mental cloudiness from use of drugs and marijuana.

Holy Basil's actions include Adaptogen, carminative, antiviral, galactagogue, radioprotective, hypoglycemic, anti-ulcer, antiinflammatory,

Holy Basils' Constituents include Triterpene-Ursolic acid, ascorbic acid, eugenol, and the phenols / flavonoids orientin, vicenin, and saponins.

Schizandra Berry (*Schisandra chinensis*) 4:1

Schizandra has long been revered as a superior tonic in China. Schizandra's support of overall vitality and stress management it may be even more important and relevant to people today than it was thousands of years ago when the Chinese first began using it. As an Adaptogen Schizandra helps build non-specific resistance, supports and restores immune and Adrenal function, and provides effective antioxidant activity.

Research on Schizandra Berry, much of which has been done in the former Soviet Union and China, demonstrates substantial Hepatoprotective activity, supporting the health, protection and rejuvenation of the liver. The liver supportive and protective properties of Schizandra in union with its Adaptogenic action brought it to the forefront when considering botanicals for use in this formula.

Schizandra enhances performance and also supports cardiovascular well being.

Schizandra is a nourishing rejuvenative supporting the kidneys and their function, which is often challenged when under stress.

Chemical sensitivities are common in today's stress filled lifestyles. Schizandra supports those who are sensitive with anti-allergenic and glutathione sparing action.

Schizandra is the berry of 5 tastes, a digestive tonic. This flavorful berry is also useful during chemotherapy and radiation therapy, supporting the liver and immune response.

Schizandra's lignans contribute superior antioxidant and free radical scavenging activity, while providing liver, adrenal and digestive support.

Schizandra Berries provide antioxidant activity which one study found to surpass the antioxidant activity of Vitamin E, Vitamin C and Beta-Carotene.

One of Schizandra's most pronounced properties is as an antihepatotoxic and liver tissue regenerator. Schizandra is protective of the liver against several toxins, supports cytochrome P-450 concentrations and enhances the production of several other detoxifying enzymes.

An important aspect in Schizandra's role in this formula is enhancing the regeneration of glutathione in the liver, an essential piece in the body's innate detoxification.

Schizandra's Constituents include 40 identified Lignans including- dibenzo [a,c] cyclooctadiene, schizandrol A & B, schisandrin A (deoxyschisandrin), schisandrin B, schisantherin A & B, gomisin N, schisantherin A, B & C; volatile oils (monoterpenes & sesquiterpenes); organic acids (citric acid, malic acid, tartaric acid, fumaric acid); Vitamins A, C & E; stigmasterol; resins and the seed also contains essential fatty acids.

Schizandra's Actions include Hepatoprotectant, Adaptogen, antioxidant, digestive tonic, urinary tonic. In traditional Chinese texts Schizandra is recognized for its actions supporting the energies of the liver and kidney.

Astragalus Root (*Astragalus membranaceus*) 4:1

Astragalus is an important adaptogen that supports adrenal function, while it spares adrenal hormones.

Astragalus enhances altitude adjustment, endurance and immune system response.

Astragalus is a revered blood builder that enhances red blood cell formation in the bone marrow. This process enhances oxygen delivery to the cell and increases overall energy.

Astragalus contains the major constituent Polysaccharides (astragalus I, II, III), saponins (astramembrannin I and II) and betaine. The polysaccharides support both specific and non-specific immune response by strengthening adrenal and pituitary gland activity.

Astragalus is supportive to the cardiovascular system, lungs and digestion; this primary Chi tonic is safe for everyone.

Astragalus is often used in adjuvant therapies for those under going allopathic cancer treatments.

The Actions of Astragalus include tonic, antioxidant, blood builder and antihepatotoxic.

Optimized Response Organic & Kosher Mushrooms

Purple Kculli Corn Optimized Biomass

Purple Kculli Corn is an ancient, non-GMO, heirloom strain of Organic Purple Corn. Purple Kculli Corn is abundant with protective phytonutrients and anthocyanins. Purple Kculli Corn has six identified anthocyanins.

Anthocyanins have potent antioxidant and free radical scavenging activity that have been demonstrated in many studies. Anthocyanins aid in the protection of cellular DNA and help keep vitamin E in the systems of the body. Anthocyanins reduce oxidative Stress in the body and provide significant hepatoprotective, or liver protecting effects. Anthocyanins help maintain membrane integrity and proper permeability, reduce oxidative damage to cells, support connective tissue growth and health.

The Anthocyanin most abundant in purple corn is C3G (3-O-B-D-glucoside also known as (cyanidin-3-O-B-glucopyranoside) and it had the highest ORAC value (oxygen radical absorbance capacity) when compared to 13 other anthocyanins. ORAC value is also known as “Anti Aging Points”.

Preliminary research on C3G, suggest it may help reduce body fat and support carbohydrate metabolism.

“Biomass” is the union of the Mycelium and the Growth Medium or substrate. The Mycelium lives through nourishment from the Purple Kculli Corn. The mushroom mycelia digests and absorbs the rich nutrition supplied by the substrate. The substrate becomes part of the mushroom. By organically growing Maitake on Purple Kculli Corn, the substrate delivers the antioxidant properties into the mushroom mycelia. The levels and activity of primary constituents are significantly enhanced through the Organic Purple Kculli Corn substrate.

Research reveals that foods with the highest total phenolic and anthocyanin content also have the highest antioxidant activity. The process of growing the mushroom in Optimized Purple Corn Mycelia Biomass™ creates the Optimized Response delivered by the formula.

Harmonically Grown Organic Purple Kculli Corn Extract is organically grown without the use of petrochemical driven machinery for cultivation of the soil and harvesting the crop. The farm is a fair trade farm with fair wages paid to workers. The farm is sustainable, and stewardship of the land is practiced.

Reishi Antler Mushroom Mycelia Optimized Biomass (*Ganoderma lucidium*)

Recorded use of Reishi mushroom dates back 2,000 years in China and Japan. Reishi is one of the most highly regarded and widely studied of all herbs in Oriental Medicine.

Reishi mushroom is considered a ‘fu zheng’ tonic, “a medicine that improves the ability of the body to maintain homeostasis by strengthening natural resistance and by improving general health.”

Reishi Antler and fruiting body, is considered a Superior Tonic for the cardiovascular system. The mycelia of Reishi contain polysaccharides and about 100 different triterpenes. The triterpenes such as ganoderic acids, have

shown to assist in blood pressure and cholesterol health. Several of Reishi's polysaccharides have cardio-protective properties. Research demonstrates that polysaccharides and triterpenes stimulate natural resistance, creating a heightened response.

Reishi mushroom has demonstrated anti-oxidant, antihepatotoxic (liver protecting), and cholesterol supportive properties in numerous studies.

In China, Reishi is commonly used in treatment of liver dysfunction.

Reishi provides adaptogenic support to Adrenal function and assists with the body's Innate Stress Response. It supports the central nervous system, helps with insomnia, and allergic reactions.

Traditionally it is thought that Reishi increases mental and intellectual capacity and has possible aphrodisiac properties.

Reishi's Actions include Anti-oxidant, adaptogenic, antihepatotoxic (liver protecting), Cardiotonic, cholesterol regulating, anti-allergenic and nutritive

Reishi's PhytoNutrients & other Constituents include many polysaccharides including Beta-D-glucan, and Ganoderans A, B, C, triterpenes such as ganoderic acids.

Cordyceps Optimized Mycelia BioMass (*Cordyceps sinensis*)

Cordyceps Mushroom Mycelia is prized as a potent adaptogenic tonic having properties similar in action to Ginseng. It is revered for endurance, stamina, general vitality and is used for fatigue, debility, exhaustion, and building the body's natural resistance.

In Traditional Chinese Medicine Cordyceps is considered to be balancing to both Yin and Yang energies.

Human clinical studies indicate Cordyceps supports lower LDL cholesterol and plasma triglyceride levels.

Cordyceps supports and enhances functions of the lungs, kidneys, heart, immune system, liver and adrenal glands.

Clinical studies indicate that Cordyceps and mycelia enhance the Chi of the liver, kidneys and lungs.

Cordyceps strengthens and nourishes to the blood.

Studies reveal that Cordyceps polysaccharides stimulate phagocytotic functions, phagocytic and macrophage activity enhancing the body's innate immune response.

Actions: Adaptogenic, kidney supportive, cardiotonic, immune system, liver and Adrenal Glands.

Constituents: Protein bound Polysaccharides: CO-N, SN-C and CO-1; amino acids including: glutamic acid, tyrosine, and L-tryptophan; Uracil, adenine, adenosine; cordycepic acid.

The Purple Kculli Corn Biomass maximizes levels of the actives in Cordyceps including cordycepin.

Additional Foods & Extracts

Wild Blueberry (*Vaccinium angustifolium*) 7:1

Wild Blueberry is a native fruit that contains health supportive phytonutrients notably the phenolic compounds called Proanthocyanins. These natural phytonutrients have demonstrated the ability to regenerate reduced glutathione from oxidized glutathione. Anthocyanidins reduce capillary fragility and permeability and they strengthen the vascular system. Proanthocyanins stabilize collagen and preserve elastin vital to connective tissue, blood vessels, skin and muscles.

In 1997, the scientists at Jean Mayer USDA Human Nutrition Research Center on Aging, at Tufts University, ranked Blueberries number 1 in antioxidant activity compared with 50 commercially available fruits and vegetables. In tests, Blueberry scored a higher ORAC value, otherwise known as “anti-aging points”, than other fruit and vegetables tested.

Current research has disclosed innumerable potential health benefits of Blueberries ranging from cancer prevention, cardiovascular support, protecting from oxidation of LDL’s, anti-aging, vision and urinary tract support, and improvements in cognitive and motor function.

Blueberries possess antioxidant properties that neutralize free radicals and reduce oxidative Stress to cellular membranes.

Blueberries contain potent anti-inflammatory compounds.

Blueberries constituents have a highly protective effect on the brain as we age. Recent studies at Princeton University and the Salk Institute have shown that Blueberry supports the growth of new brain neurons and enhances communication abilities. Furthermore, research at the University of South Florida has uncovered evidence suggesting that blueberries may hinder the onset of Alzheimer’s disease. The National Institute of Aging (NIA) and United States Department of Agriculture (USDA) funded a study that concluded that a diet including Blueberry extract, rich in antioxidant flavonoids, improves memory and aged related motor functions.

Like it’s European cousin Bilberry, Blueberries support vision and the health of the eyes.

Actions: Antioxidant, cardiovascular support, protecting the oxidation of LDL’s, anti-aging, vision support, anti-inflammatory, antiviral, improvements in cognitive and motor function, nutritive, urinary tonic.

Wild Blueberry Phyto-Nutrients and other Constituents: Potassium, Flavonoids especially Anthocyanins, Resveratrol, Carbohydrates, Dietary Fiber, Vitamin A, Vitamin E & Vitamin C, Thiamin, Riboflavin, Niacin, B6 and Folate, B12, Phosphorous, Magnesium, Manganese, Boron and Zinc; (+)-Catechin, 1,8-Cineole, Alpha-Carotene, Alpha-Terpeneol, Beta-Carotene, Beta-Cryptoxanthin, Beta-Sitosterol, Caffeic-Acid, Cyanidin, Ellagic-Acid, Farnesol, Glutamic Acid, Glycine, Isoleucine, Limonene, Lysine, Methionine, Phenol, Quercetin, Rosmarinic Acid, Rutin, Thymol, Serine, Tyrosine, Tryptophan, chlorogenic acid, kaempferol, myricetin, p-coumaric acid, ferulic acid, proanthocyanidins (condensed tannins), fructooligosaccharides,

Indian Gooseberry (*Amla Emblic officinalis*) 5:1

Commonly called Indian Gooseberry, Amla fruit is extensively found all over India. Amla is a highly nutritious food, biological response modifier, and cardiovascular tonic. Considered a rejuvenative or potent rasayanas in Ayurvedic Medicine. “Rasayanas are used to promote health and longevity by increasing defence (defense) against disease, arresting the aging process and revitalizing the body in debilitated conditions.” (Ref. 54).

Alma is rich in protective phenolic compounds including bioflavonoids. Research demonstrates that Amla has antihepatotoxic, adaptogenic and kidney protective activity. The clinical efficacy of the fruits of *E. officinalis* are held in high esteem in Ayurveda.

Amla provides antioxidant activity, blocking free radical processes without pro-oxidant side effects. Amla’s protective actions had been, until recently, attributed to its high Vitamin C content. New research indicates that it is not rich in ascorbic acid, commonly labeled Vitamin C, but rather is rich in other antioxidant, free radical scavenging constituents.

These constituents include: the tannins Emblicanin A and B, ellagic acid, gallic acid.

Amla is used in treatment of anemia, debility and wasting diseases.

Amla is useful in convalescence and as a tonic.

Amla's Constituents include Tannins- Emblicanin A and B, punigluconin, pedunculagin; ellagic acid, gallic acid, phenolic compounds

OPC's: Pine Bark Extraction (Pinus spp.) 85-95% Oligomeric Proanthocyanidins

OPC's are found in many plants especially Grape seeds and Pine Bark.

OPC's, or Oligomeric Proanthocyanidins are a complex molecule technically referred to as flavan-3-ol, or catechin.

OPC's supply many health benefits for the cardiovascular system. OPC's have been shown to reduce the risk of heart attack or stroke through prevention of oxidation of LDL cholesterol by scavenging free radicals. Through this activity, OPC's help prevent and reduce the buildup of oxidized cholesterol plaque on artery walls.

OPC's modify the activity of hormone-like factors to help prevent platelets from sticking together to form dangerous clots. OPC's strengthen the collagen in the blood vessel walls, enhancing their elasticity and creating healthy tissue that resists the destructive adhesion by damaging enzymes.

OPC's reduce vascular fragility helping to stabilize the membranes of the blood vessels.

It helps to reduce elevated blood pressure by inhibiting the activity of enzymes called ACE (angiotensin converting enzyme). OPC's help to relieve venous insufficiency, support improved circulation and support the production of healthy collagen tissue.

Lycopene (from tomato)

Lycopene is a red pigment carotenoid. Tomato products are the most common source in the diet. Lycopene has been indicated as protective of the prostate gland, breast tissue, cardiovascular system, lungs, liver, adrenal glands, reproductive organs, skin, kidneys and colon.

Lycopene is considered the most effective at quenching singlet oxygen free radicals of all common dietary carotenoids.

Research indicates that Lycopene plays a role in mediating cardiovascular health.

Lycopene is not a precursor to Vitamin A.

Amino Acid ~ L-Serine

L-Serine is a nonessential hydroxy-amino acid. It is synthesized from Glycine, with cofactors B6 and Folic acid assisting in the production. Serine is highly reactive in the body and plays a role in the biosynthesis of several other amino acids and body chemicals.

With its glycogenic qualities Serine can be used as an energy source by the body when in a fasting state. Glycogenic means producing glycogen, stored sugar that provides energy for the liver, muscles and other tissues.)

Serine is involved with synthesis of DNA, the formation of choline, phospholipids and neurotransmitters.

Phosphatidylserine (PS) is a component of the membranes of brain cells. An important form of Serine, it plays a key role in several brain and cognitive functions.

Carob *Ceratonia siliqua* St. John's Bread

Carob is a pod, a legume that is sweet and alkaline in nature, with a warming energy. It is calming to the nervous system.

Carob is a rich source of Serine, so it provides important food factors enhancing nutrient delivery.

Carob Contains natural sugars, calcium, pectin, B-Complex vitamins, tannins, potassium.

Sea Vegetables

Laminaria digitata, Kelp (*Ascophyllum nodosum*)

For thousands of years Sea Vegetables have been consumed for their nutrition and healing properties. Sea plants contain ten to twenty times the level of minerals and trace minerals compared to land plants. Laminaria species are also called kelp. Kelp is the largest and longest of sea plants, up to 1,500 feet in length.

The abundant levels of vitamins, minerals, micro and macro elements and phyto-nutrients enable Sea Vegetables to support our blood, lymphatic system, thyroid gland, liver, reproductive organs and lungs. Their soothing mucilaginous properties support the tissues of the lungs and GI tract.

Laminaria has a balancing action on adrenal hormones and thyroid hormones. There is an important interrelationship between adrenal function and the thyroid. Research on Laminaria has shown benefits for the female system and breast health.

Laminaria and other Sea Vegetables have detoxifying properties that help remove radiation and some heavy metals from the body.

Laminaria is supportive to the kidneys.

Laminaria can be useful in weight management programs.

Actions: Antioxidant, radioprotective, nutritive tonic, thyroid and immune stimulating, cytotoxic, anti-lipemic, adaptogenic

Laminaria's Constituents include iodine, polysaccharides, beta-glucans, minerals, beta-carotene, iron, calcium, fluorine, vitamins B6, B3, & B2, amino acids, zinc, vitamin C, vitamin E, silicon, sulfur, unsaturated fatty acids, fiber, fucans (sulfated polysaccharides), chromium, sodium alginate, lignans.

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References

1. Bland, Jeffrey S. *Nutritional Endocrinology, Breakthrough Approaches for Improving Adrenal and Thyroid Function*. The Institute for Functional Medicine Gig Harbor, WA © 2002
2. Bove, Mary, ND. "Adrenal Function, Stress and Botanical Medicine" *Medicines from the Earth Proceedings*. Black Mountain, NC: 2003
3. Hoffmann, David. *Medical Herbalism*. Rochester, VT: Healing Arts Press ©2003
4. Upton, Roy. *American Herbal Pharmacopoeia™ and Therapeutic Compendium*, Ashwagandha Root, *Withania somnifera*. April 2000 www.herbal-ahp.org
5. Upton, Roy. *American Herbal Pharmacopoeia™ and Therapeutic Compendium* Schisandra Berry, *Schisandra chinensis*, Oct. 1999
6. Upton, Roy. *American Herbal Pharmacopoeia™ and Therapeutic Compendium* Reishi Mushroom, *Ganoderma lucidum*, September 2000
7. Upton, Roy. *American Herbal Pharmacopoeia™ and Therapeutic Compendium*, Astragalus Root, *Astragalus membranaceus*, August 1999
8. Hobbs, Christopher, L. Ac. *Medicinal Mushrooms*. Santa Cruz, CA: Botanica Press. © 1986, 1995
9. Halpern, Georges M, MD, Miller, Andrew. *Medicinal Mushrooms Ancient Remedies for Modern Aliments*. NY, NY: M. Evans Company ©2002
10. ARS- Agricultural Research Service web-site, Dr. James Duke's Phytochemical and Ethnobotanical Databases www.ars-grin.gov/cgi-bin/duke/farmacy2.pl
11. Yance, Donald, Jr. "Assessing and Treating Adrenal and Thyroid Deficient Disorders." *Medicines from the Earth Official Proceedings*. Black Mountain, NC: 2002
12. Yance, Donald, Jr. *Herbal Medicine, Healing & Cancer*. Chicago, IL: Keats Publishing © 1999
13. Jones, Kenneth. "The Potential Health Benefits of Purple Corn", *HerbalGram* No.65, pp.46-49
14. Cevallos-Casals BA, Cisneros-Zevallos L. "Stoichiometric and kinetic studies of phenolic antioxidants from Andean purple corn and red fleshed sweet potato." *J of Agriculture Food Chemistry* 2002;82(9):1003-1006
15. Tsuda T, Horio F, Uchida K, Aoki H, et al. "Dietary cyanidin 3-O-B-D-glucoside-rich purple corn color prevents obesity and ameliorates hyperglycemia in mice." *J Nutrition* 2003;133(7):2125-2130
16. Kelly, Gregory S, ND. "Nutritional and Botanical Interventions to Assist with the Adaptation to Stress". *Alternative Medicine Review*; Vol. 4, No.4:249-260(1999)
17. Pitchford, Paul. *Healing with Whole Foods*. Berkley, CA: North Atlantic Books © 1993
18. Pizzorno, Joseph E. N.D., Murray, Michael T. N.D. *Textbook of Natural Medicine*, Vol. I & II. Edinburgh, UK: Churchill Livingston © 1993, 1999
19. McCaleb, Rob, Leigh, Evelyn, Morien, Krista. *Encyclopedia of Popular Herbs*. Herb Research Foundation. Roseville, CA: Prima Health © 2000
20. Mills Simon, Bone Kerry. *Principles and Practice of Phytotherapy*. Edinburgh, UK: Churchill Livingston ©2000
21. Pengelly, Andrew. *The Constituents of Medicinal Plants*. Australia, New Zealand: CABI Publishing © 1996
22. Werbach, Melvyn R, MD, Murray, Michael T, ND. *Botanical Influences on Illness*. Tarzana, CA: Third Line Press © 1994
23. Werbach, Melvyn R. MD. *Nutritional Influences on Illness*. Tarzana, CA: Third Line Press ©1993
24. Yarnell Eric, Abascal Kathy, Hooper Carol G. *Clinical Botanical Medicine*. Larchmont, NY: Mary Ann Liebert, Inc. © 2002
25. Murray, Michael T. *Encyclopedia of Nutritional Supplements*. Rocklin, CA: Prima Publishing © 1996
26. Blumenthal, Mark. *The Complete German Commission E Monographs*. American Botanical Council (ABC). Austin, TX: Integrative Medicine/ ABC © 1998
27. Mishra LC, Singh BB, Dagenais S. "Scientific Basis for the Therapeutic Use of *Withania somnifera* (Ashwagandha): A Review". *Alternative Medicine Review*; Vol. 5, No.4:2000
28. Bomser J, Madhavi D., et al., "In vitro anticancer activity of fruit extracts from *Vaccinium* species." *Planta Medica* 62:212-216 :1996
29. Sundermann, Anne. "Newsbreak: Study: Wild Blueberry may fight aging, cancer". *Herbs For Health*. Nov/Dec 1998, pg.26
30. Lietti A, Cristoni A, Picci M. "Studies on *Vaccinium myrtillus* anthocyanosides, Vasoprotective and antiinflammatory activity." *Research Labs Inverni della Beffa, Milan Italy, Arzeim-Forsch (Drug Res.)* 26, NO. 5 1976
31. Prior Ronald L. "Antioxidant Capacity and Health Benefits of Fruits and Vegetables: Blueberries, the Leader of the Pack", *North American Blueberry Council*, USDA Human Nutrition Research Center on Aging at Tufts University, 1999

32. Joseph JA, Shukitt-Hale B, et al., "Reversals of Age-Related Declines in Neuronal Signal Transduction, Cognitive, and Motor Behavioral Deficits with Blueberry, Spinach, or Strawberry Dietary Supplementation." *The Journal Of Neuroscience* September 15, 1999, 19(18):8114-8121
33. Smith MAL, Marley KA, et al., "Bioactive Properties of Wild Blueberry Fruits". *Journal of Food Science*, Vol. 65, No. 2, 2000
34. Robert M, Godeau G, Moati F, et al., "Action of anthocyanosides of *Vaccinium myrtillus* on the permeability of the blood brain barrier." *J Med* (1977) 8(5):321-32
35. Colantuoni A, Bertuglia S, et al., "Effects of *Vaccinium myrtillus* anthocyanosides on arterial vasomotion." *Arzneimittelforschung* (1991 Sept.) 41(9):905-9
36. Roy, U. et al. "Evaluation of antiStress activity of Indian medicinal plants, *Withania somnifera* and *Ocimum sanctum*, with special reference to Stress induced stomach ulcer."
37. International Seminar- Traditional Medicine, Calcutta, India. Nov. 1992
38. Constantino, Luca, et al., "Composition, superoxide radicals scavenging and antilipoperoxidant activity of some edible fruits." *Fitoterapia*, Vol. LXV, No. 1, 1994, pp. 44-7
39. Hikino H, Yoshinobu K, et al., "Antihepatotoxic Actions of Lignoids from *Schizandra chinensis* Fruits". *Planta Medica* 1984
40. Wagner H, Norr H, Winterhoff H, "Plant Adaptogens". *Phytomedicine* Vol.1/1994, pp. 63-76
41. Vanderhaeghe LA, "Stress, Aging and Cortisol". In The Raw, *Health Products Business*. May 2001
42. Camire ME. "Bilberries and blueberries as functional foods and nutraceuticals." *Functional Foods: Herbs, Botanicals and Teas*. Mazza JG, Ooma BD. Lancaster, PA: Technomic Pub; 2000
43. Mazza, G. *Functional Foods Biochemical & Processing Aspects*. Lancaster, PA: Technomic Publishing © 1998
44. Kilham, Chris. *OPC: The Miracle Antioxidant*. Good Health Guides, Keats Publishing; New Canaan, CT © 1997
45. Frankel EN, et.al. "Inhibition of Oxidation of Human Lo-Density Lipoprotein by Phenolic Substances in Red Wine." *Lancet*; 341.Feb 20, 1993
46. Meunier MT, et al. "Inhibition of Angiotensin in Converting Enzyme by Flavanolic Compounds: In Vitro and In Vivo Studies", *Planta Medica*; May 26, 1986: 12-15
47. O'Brien, Chris. "A Healthy Mouthful: Oligomeric Proanthocyanidins", *SIE* March 2001 pp. 42-45
48. Dubick MA, Omaye ST. "Modification of Atherogenesis and Heart Disease by Grape Wine and Tea Polyphenols". *Handbook of Nutraceuticals and Functional Foods*. Chapter 14, Edited by: Wildman, Robert EC. CRC Press; Boca Raton, FL ©2001
49. Folts JD. "Potential Health Benefits from the Flavonoids in Grape products on Vascular Disease". *Flavonoids in Cell Function*. Buslig, Bela S., Manthey John A, Editors © 2002
50. Pataki T, Istvan B, et al. "Grape seed proanthocyanidins improved cardiac recovery" *Am J Clin Nutr* 2002;75:894-9
51. Foster, Steven. *American Ginseng, Panax quinquefolius*. American Botanical Council, Botanical Series No. 308
52. Vuksan V, Sievenpiper JL, et al. "American Ginseng (*Panax quinquefolius* L.) reduces postprandial glycemia in nondiabetic subjects and subjects with type 2 diabetes mellitus." *Arch Intern Med*. Apr. 10, 2000; 160(7):1009-1013
53. Bhattacharya A, Chatterjee A, et al. "Antioxidant activity of active tannoid principles of *Emblica officinalis* (amla)." *Indian J of Experimental Biology*. Vol. 37, July 1999; pp. 676-680