

Chinese and Western Botanicals Combined for Fu Zheng Therapy: Tonic Herbs for Immune Response & Vitality

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Discussion

ROOTS OF HEALTH

Ancient and modern herbal traditions blend herbs together to create numerous harmonious formulas that work synergistically to enhance the healing response and restore healthy function. Current research focusing on plant medicines reports their inherent ability to work on multiple pathways and modulate cellular and physiological functions. Researchers find that botanicals, many used successfully and safely for thousands of years, contain a wide array of natural compounds that exert a normalizing influence and are especially beneficial in promoting homeostasis and optimal function.¹⁻⁵

Herbal medicine traditions have blended herbs together for these purposes for thousands of years. Because of their efficacy, most of these traditional formulas are used clinically today and many are being researched. Herbs and herbal formulas that exert a normalizing influence to promote homeostasis and optimal function are generally known as tonics and are further classified by their sphere of activity.

Many of the botanicals outlined in this paper stem from the Chinese medical tradition and are Chinese herbs known for their profound tonic actions. A fundamental principle of Chinese medicine recognizes that it is essential to support physiological homeostasis in order to promote and preserve health. The foundational premise is that when the vital energy (Qi) of the body is strong, health can be restored and disease can be resisted.

In Chinese medicine one expression of this principle is known as Fu Zheng, Gu Ben therapy, which can be translated as *reinforce healthy qi and supplement the root* or as *strengthen what is correct and nourish the root*. “What is correct” refers to normal function and healthy vitality (Qi). “Nourish the root” refers to multiple systems that support health but primarily to the Kidney energy which is considered the root of health and longevity in Chinese medicine.

Chinese medicine defines fundamental forces essential

to life and health. These include Qi (vital life force), Blood (blood), Yin (fluids, moisture), and Yang (fire, such as the fire of metabolism). Fu Zheng, Gu Ben therapy involves enhancement of these forces and vital organ functions. Herbal therapy focuses on maintaining these forces in balance to preserve and restore health. Powerful tonic herbs are employed to support and nourish the Kidney system along with herbs specific to metabolic and organ function to promote physiological homeostasis.

As the seat of Yin/Yang, and for other reasons, the Kidneys are considered the root of life that determines life span and supports healthy organ function, metabolism, overall vitality, stamina, and endurance. The Yang aspect of the Kidneys refers to its warming metabolic function and the Yin aspect supports organ function and protects organs and tissues from damage due to heat and dryness. Yin tonics are particularly important for the Lungs, Liver, Spleen, and Kidney health.

According to Chinese medicine theory, the Kidneys are also essential to formation of bone marrow. Spleen and Lung health are essential to metabolism and formation of vital energy (Qi). The Liver regulates the flow of Qi and blood throughout the body, among numerous other functions. The health and function of the organ systems are interrelated in numerous complex ways unique to Chinese medical theory. Deficiency syndrome refers to patterns of imbalance and disharmony which reduces the body’s homeostatic capacity and natural resistance.⁵ Fu Zheng herbs are utilized as foods and medicines to enhance the integrity of these functions throughout all phases of life.¹⁻⁵

Numerous studies confirm the efficacy of Fu Zheng herbs. Most of the traditional Fu Zheng herbs are known today as adaptogens because they enhance non-specific resistance.¹⁻⁵ Many of the herbs also demonstrate immune-modulating influence.⁹ There is substantial research and a solid history of clinical use of Fu Zheng herbs as adjuncts to cancer therapy and as restorative herbs to promote recovery from the

adverse effects of drugs, chemotherapy, and radiation. This is particularly so in China, where these powerful herbs are used routinely in hospitals and clinical settings. Fu Zheng therapy has historically been used in cancer care and prevention as well.^{7,8}

HERBAL COMBINATIONS THAT MODULATE IMMUNE RESPONSE AND ENHANCE ENDOCRINE FUNCTION:

With strong roots in Chinese medicine, the formulation approach detailed below integrates herbs that work on multiple pathways simultaneously to create a synergistic blend.

Formulation Principles According to Chinese Medicine

- **Nourish Blood**
Dong Quai, Lycium, Millettia, Peony, Deer Antler, Rehmannia
- **Nourish Vitality (Qi)**
Astragalus, White Panax Ginseng, Atractylodes, Licorice
- **Enhance organ systems**
 - Spleen:* Astragalus, Atractylodes, Tangerine, White Panax Ginseng
 - Liver:* White Peony, Lycium, Polygonum, Ligustrum, Dong Quai
 - Kidneys:* Cordyceps, White Panax Ginseng, Rehmannia, Licorice, Deer Velvet Antler, Cinnamon, Ligustrum, Polygonum
 - Lungs:* Cordyceps, Astragalus, White Panax Ginseng, Cinnamon, Tangerine

Formulation Principles According to Modern Research

- **Modulate immune function**
Astragalus, White Panax Ginseng, Echinacea, Cat's Claw, Atractylodes, Cordyceps, Licorice, Millettia
- **Anti-inflammatory**
Echinacea, Cat's Claw, Licorice, Long Pepper
- **Enhance endocrine system health**
White Panax Ginseng, Cordyceps, Rehmannia, Ligustrum, Licorice, Polygonum, Deer Velvet Antler, Dong Quai
- **Enhance digestive metabolism**
White Panax Ginseng, Astragalus, Atractylodes, Tangerine
- **Support hematopoiesis**
Dong Quai, Astragalus, Lycium, Millettia, Peony, Deer

Key Targets of Fu Zheng Therapy According to Chinese and Western Medicines¹⁻⁸:

- Alleviate deficiency: supplement Qi, nourish Blood, enrich Yin, Warm Yang
- Harmonize systems according to Chinese medicine principles
- Support the Root – Kidney Essence, Yin/Yang (Qi)
- Tonify organ systems including Spleen, Lungs, Liver, Kidneys
- Strengthen the digestive system - enhance nutrient absorption and metabolism
- Protect bone marrow and hematopoietic function
- Protect the structure and function of internal organs
- Enhance endocrine system function
- Support and modulate immune response
- Facilitate homeostasis and allostasis

Antler, Rehmannia

Traditional Chinese Medicine Herbal Combinations that Modulate and Restore Health

The groupings of herbs below are found in traditional formulas from ancient through modern times.

- *Astragalus and Dong Quai*
A premier restorative formula to nourish both Qi and Blood, which are considered inextricably intertwined in Chinese medicine.
- *Licorice and Peony*
Classical Chinese formula to calm muscle spasm through nourishing the blood.
- *Dong Quai, Peony, Rehmannia*
Three ingredients of the renowned *Four Blood Formula* used to nourish the blood.
- *Atractylodes, Panax Ginseng, Licorice*
Three ingredients of the famed *Four Gentlemen Decoction* which is a primary Qi tonic formula.
- *Deer Antler, Lycium, Ginseng*
Used together to replenish Yin and Essence, tonify Qi, and strengthen Yang. Tonifies the *Sea of Blood (Chong Mai)* and includes Deer Antler specifically to nourish the marrow.

Table 1. Three Herbal Immunostimulants

Herb or Extract	Key Constituents	Pharmacologic Actions	Primary Traditional Medicine Uses
<i>Echinacea purpurea</i> , <i>E. Angustifolia</i> , <i>E. pallida</i>	Polysaccharides, glycoproteins, alkamides, cichoric acid (a derivate of caffeic acid)	Stimulation of cell-mediated immune mechanisms	Used for treatment of upper and lower respiratory infections, pelvic infections
<i>Panax ginseng</i>	Ginsenosides, essential oils, phytosterols	Stimulation of cell-mediated immune mechanisms; effects on cardiovascular and neuroendocrine systems	Used primarily for coping with physical and mental stress; increasingly used as adjunct to cancer therapy
<i>Astragalus membranaceus</i>	Asparagine, calycosin, cycloastragenol, astragalosides, betaine, kumatakenin, glucuronic acid, β -sitosterol, soyasaponin, formononetin astraisoflavan	Stimulation of cell-mediated immune mechanisms; effects on cardiovascular and neuroendocrine systems	Used as an adjunct to cancer therapy and to the treatment of immunodeficiency disorders. Used in treatment of a wide variety of infections

Source: See reference #9

Chinese & Western Botanicals for Fu Zheng Therapy: Tonic Herbs for Immune Response & Vitality



Astragalus (*Astragalus membranaceus*)

Astragalus is a premier tonic herb valued by Chinese medicine practitioners for thousands of years to support vital energy (Qi), enhance health, and support immune function. Traditionally, it is combined with equal parts Dong Quai to nourish and build Blood. Astragalus is famously combined with Atractylodes in a number of time-revered formulas to promote immune resistance, enhance Spleen function, and support Lung health according to Chinese medicine principles.

Astragalus is a key component of traditional and modern formulas used for general weakness, chronic illness, immune support, and to increase overall vitality. It is often combined with other herbs such as Ginseng, Atractylodes, Dong Quai, Licorice, and others.^{10,11} The combination of Astragalus and Ligustrum fruit is shown to stimulate immune response.¹¹

Astragalus contains astragalosides, polysaccharides, isoflavonoids, saponins, and minerals including manganese and zinc. It is particularly rich in potassium and magnesium.¹² The strong immune-enhancing influence of Astragalus is primarily attributed to its polysaccharide fractions.¹¹

Many studies find that Astragalus benefits and modulates immune response.^{9,10,12} Astragalus extract is found to be effective in helping to prevent colds, flus, and pulmonary

tract infections.¹¹ It is found to increase white blood cell counts depleted due to drug therapies. Astragalus demonstrates the ability to increase NK (natural killer) cells and activity, and to induce interleukin-2 (IL-2) and interferon production.^{12,13} Astragalus is also found to be protective against lipid peroxidation and shows the ability to activate macrophages.^{14,15}

Studies find that Astragalus is hematopoietic and can increase blood cell production and maturity from bone marrow.¹¹ It is found to be an effective tonic to alleviate fatigue through addressing multiple systems and is usually combined with other herbs appropriate for the individual.¹⁰⁻¹²



Milletia (*Milletia reticulata*)

Milletia is used in Chinese medicine to tonify Blood and activate blood circulation and is traditionally combined with other Blood tonic herbs. A famous traditional Chinese formula, Dong Quai and Milletia Combination, combines Dong Quai, Milletia, Rehmannia, and Peony with two other herbs to vitalize the blood, generate new blood, and to promote blood circulation. This formula is especially indicated for advanced stages of depletion where there may be injury to the bone marrow along with Qi and Blood deficiency (according to Chinese medicine principles).^{11,16}

Research finds that *Millettia* enhances blood cell production.¹¹ It is utilized in several modern prescriptions for treating thrombocytopenia (a decrease in the number of platelets in the blood, resulting in the potential for increased bleeding and decreased ability for clotting). It is found useful in cases of bone marrow anemia as it increases red blood cell productivity.¹⁷



Cordyceps (*Cordyceps sinensis*)

Known in China as “winter worm summer grass” or the “caterpillar mushroom,” Cordyceps is a parasite fungus that traditionally grows on the larvae of caterpillars and other hosts that provide a growth medium for the mycelia. Today, most Cordyceps is made from cultured mycelia. The CS-4 strain is cultured on organic brown rice, offering superior quality and therapeutic activity, and is the most widely-researched and highly-regarded.

Cordyceps first gained international attention when it was discovered that Chinese Olympic athletes included Cordyceps as part of their daily herbal training formula. Studies confirm that Cordyceps increases endurance, vigor, and athletic training and performance.^{18,19}

Li Chih Shen, a renowned sixteenth century herbalist, praised Cordyceps for its ability to invigorate and tone the entire body. Chinese herbalists revere it as a respiratory tonic. It deeply nourishes the deep reserve (Kidney) energy that supports healthy Lung function, overall vitality and stamina.²⁰

Recognized for its liver- and kidney-protective qualities, studies find Cordyceps to be especially beneficial for those with chronic kidney disease.²¹⁻²⁴ Cordyceps contains polysaccharides that contribute to its immune-modulating influence.²⁰ It demonstrates high antioxidant activity and is found to exert free-radical scavenging ability.²⁵⁻²⁷ Studies find that Cordyceps extract inhibits brain aging, modulates endocrine function, and supports healthy testosterone levels.^{28,29}



Atractylodes (*Atractylodes macrocephala*)

Revered as a powerful tonic herb in Chinese medicine, Atractylodes is used to enhance optimal health and well-being particularly in combination with other herbs. Atractylodes is one of the main ingredients in the famous *Four Gentlemen Decoction*, where it is combined with Ginseng, Poria, and Licorice to tonify Qi and strengthen Spleen function. Atractylodes is often combined with tonic herbs to enhance blood production and is typically formulated with Astragalus (another Qi and Spleen tonic) to enhance immune system function especially during seasonal changes or challenges.

Modern research considers Atractylodes an adaptogenic herb. The polysaccharides atractylenolides and polyacetylenes are considered the main active constituents of Atractylodes that promote both nonspecific and specific immune response along with modulatory influence on the immune system.³ Atractylodes is found to restore immune response, to stimulate immune response including macrophage activity, and to enhance production of interleukin-2 (IL-2).^{3,11,30}

Echinacea (*Echinacea purpurea*)



Echinacea has a long history of medicinal use by both Europeans and Native Americans. The Eclectic Physicians valued it as a blood purifier and also used it to treat infectious diseases.³¹ Widely-known for its ability to enhance immune function, modern research finds that Echinacea stimulates immune response and is immune-modulatory.⁹ Echinacea extracts are found to modulate anti-inflammatory cytokines and exert an influence on macrophages that promotes an anti-inflammatory response. It is found to promote activation of T-cells, NK cells and to enhance production of interferon. Echinacea also supports lymphatic and macrophage functions.

Active components include polysaccharides, caffeic acid compounds, and lipophilic compounds. The phenolic compounds in Echinacea are found to exert potent antioxidant and free-radical scavenging influence.³¹⁻³⁷ Studies find that the phenolic compounds in Echinacea offer both antioxidant and free radical scavenging properties.^{35,36} The immune-enhancing properties of Echinacea are attributed to the caffeic acid derivative, alkylamides, and polysaccharides.³⁷

In 21 studies with over 3500 participants, Echinacea was shown to be beneficial for cold, flu, and upper respiratory tract infections in all but three studies. The German Commission E approves the internal use of *E. purpurea* as supportive therapy for acute and chronic infections of the respiratory tract.^{38,39}

Ligustrum (*Ligustrum lucidum*)



Ligustrum fruit is a potent restorative herb long-revered in Chinese medicine. Widely used in longevity tonics for its profoundly restorative ability, Ligustrum is often combined with Lycium fruit along with other powerful restorative herbs.

Ligustrum is found to be hepato-protective and to exert antioxidant influence.^{40,41} Clinical trials demonstrate that Ligustrum inhibits leukopenia caused by chemo and radiation therapy. It corrects low white blood cell counts and is a mainstay of adjunctive treatment for cancer patients.⁴²

The combination of Astragalus and Ligustrum demonstrates

notable immune-potentiating actions and enhancement of non-specific immune response beyond the individual influence of either herb alone. This combination is found powerful to modulate interleukin-2 (IL-2) levels and to restore generation of lymphokine-activated killer (LAK) cells.^{43,44}

Panax Ginseng (*Panax Ginseng, white*)



This highly-renowned tonic herb has been used as both food and medicine in Asian countries for over 4000 years. The genus name Panax is derived from the Greek words pan, meaning all, and axos meaning medicine or remedy – reflecting the root's reputation as a panacea. Because the root is shaped like a human, it is believed to embody a human's three essences (body, mind, and spirit) and to also contain the essence of the earth. It is highly esteemed in Oriental medicine as a longevity herb that nourishes all the viscera and benefits the mind.

Fresh, unprocessed Ginseng has a cooling, calming, and quiescent effect and is known as White Panax Ginseng. When fresh Ginseng is specially prepared and steamed with herbs, it becomes more warming in nature and is known as Red Panax Ginseng.

Ginseng is high in saponins, the most studied of which are the group of ginsenosides. Panax Ginseng is also high in polysaccharides, peptide glycans, and flavones.⁴⁵ Ginseng is well-known for its ability to enhance vital energy and benefit physical performance and stamina. It also benefits mental cognition and concentration. Ginseng enhances recovery from exertion and muscle fatigue.⁴⁶⁻⁴⁹ It has been used for thousands of years to help resolve serious illness, combat fatigue, and promote longevity.

Ginseng is beneficial for neurasthenia and mild depression. Ginseng exerts modulating activity on the central nervous system. It facilitates the stress response, acts on the hypothalamus, and modulates the activity of the adrenal cortex. It helps normalize glucocorticoid levels to enhance recovery time after stress. Ginseng also modulates healthy blood glucose levels.⁵⁰⁻⁵³

Ginseng is reported to be neuro-protective and to enhance cognitive ability.⁵⁴ Ginsenosides from Ginseng demonstrate antioxidative properties and enhance the antioxidative defense system, including glutathione. Ginseng promotes the activity of the antioxidant enzymes GSH-Px (glutathione peroxidase) and SOD (superoxide dismutase).⁵⁵ At the same time, it helps decrease levels of proinflammatory cytokines,^{54,56} while it modulates and enhances immune system response, NK (natural killer) cell activity, and interferon production.^{9,57}



Cat's Claw (*Uncaria tomentosa*)

Growing in the Amazon highlands, Cat's Claw is a traditional Peruvian medicine used to treat many inflammatory conditions. Decoctions prepared from the bark have been used to treat immunologic and digestive disorders. Modern research demonstrates its potent ability to modulate the immune system and enhance immune response. Cat's Claw is also found to inhibit tumor growth and to exert anti-inflammatory and anti-oxidative influence.⁵⁸⁻⁶⁰ Constituents include alkaloids, glycosides, sterols, triterpenes, phenolic acids, and various flavonoids.⁵⁸

Uncaria's anti-inflammatory properties may result from its ability to inhibit TNF (tumor necrosis factor), a potent inflammatory cytokine, and PGE2 (prostaglandin E2) production.^{61,62} Cat's Claw is found to enhance DNA repair and decrease DNA damage.⁶³ Cat's Claw influences the immune system and is found to increase the ability of the spleen to produce immunological cells.⁶⁴



White Peony (*Paeonia lactiflora*)

Peony roots have been used medicinally for over 3000 years in China and around 500 years in Europe. Peony flowers are cultivated in gardens and featured in Asian art while White Peony root is valued for numerous health benefits. In Chinese medicine, White Peony root is one of the main herbs used to nourish the Blood and the Liver to ensure physiological health.

Peony is found to contain glycosides, of which paeoniflorin is the most studied. It also contains flavonoids, proanthocyanidins, tannins, terpenoids, and complex polysaccharides.⁶⁵⁻⁶⁸ The compound paeoniflorin (PF) is found to suppress multiple inflammatory processes including prostaglandin and leukotriene production, reactive oxygen species, proinflammatory cytokines, and chemokines. It inhibits the formation of new blood vessels and production of matrix metalloproteinases.^{69,70}

PF, considered the active constituent of White Peony root, is a monoterpene glycoside that is neuro-protective. It is found to calm the microglial inflammatory response, to reduce production of proinflammatory factors from activated microglial cells, and to calm inflammation-induced neurotoxicity.^{71,72} Albiflorin, another constituent of White Peony, is found to exert anti-inflammatory benefits similar to PF.⁷³ White Peony is also found to be hepato-protective.⁶⁶



Polygonum (*Polygonum multiflorum*)

Polygonum root, known as He Shou Wu, is a profound revitalizing and longevity tonic in Chinese



medicine that works as a restorative for the deep Kidney (root energy). He Shou Wu means “black-haired Mr. He”, referring to its ability to act as a profound tonic restorative to the extent that it can turn graying hair black again.¹¹ Combined with herbs appropriate for the issue being addressed, Polygonum is a profound adaptogenic herb used as both a Liver and Kidney tonic. Considered a moistening herb, it nourishes the blood and alleviates dryness.

More than 100 compounds have been isolated from Polygonum root including stilbenes, quinones, flavonoids, phospholipids, coumarins, lignans, and others. Polygonum root extract is found to significantly inhibit lipid peroxidation. It is found beneficial for anti-aging and for its lipid-modulating and anti-inflammatory influence.⁷⁴⁻⁷⁶



Rehmannia (*Rehmannia glutinosa*)

Rehmannia root is highly esteemed in Chinese medicine to nourish the Blood and Kidney organ system combined with other appropriate herbs. The traditionally prepared/cooked form of Rehmannia is used to nourish and restore deep, foundational energy (as a Kidney Yin tonic in Chinese medicine), to enhance vitality, and to promote a healthy aging process through all stages of life.

One of the most widely revered Chinese formulas, Si Wu Tang (Four Substances Decoction) combines Rehmannia, Dong Quai, Peony, and one other herb to nourish Blood as an overall health tonic for many conditions. Rehmannia is included in many other formulas to enhance vitality, nourish Blood, and for its restorative influence.^{11,77}

Rehmannia root is found to be rich in saccharides (including polysaccharides and oligosaccharides), flavonoids, and contains over 20 amino acids. Mineral-rich, it contains over 20 microelements including iron, zinc, manganese, and chromium. Catalpol, an iridoid monosaccharide glycoside, is considered to be the main active principle of Rehmannia root.

Modern studies find that Rehmannia exerts influence on multiple systems including blood, endocrine, immune, cardiovascular, and nervous systems. It is shown to exert inhibitory influence on the central nervous system and is thought to alleviate the action of glucocorticoids on the HPA (hypothalamic pituitary adrenal) axis.⁷⁸ Studies show that Rehmannia formulas influence hematopoiesis and benefit heart, liver, kidney, and immune function in animals.^{79,80}



Licorice (*Glycyrrhiza glabra*)

Licorice acts as a synergist to moderate and harmonize the characteristics of other botanicals in a formula. Valued as a Qi tonic, it is considered a special herb in Chinese medicine that carries other herbs

throughout the body. Licorice is known as a demulcent (soothing to the mucus membranes of the body) and is noted for its anti-inflammatory, immune-modulating influence.⁸¹⁻⁸³

Licorice extract is shown to increase immune function including production of interferon and NK (natural killer) cells.⁸⁴ Multiple flavonoids have been isolated from licorice, many of which show broad-spectrum antibacterial effects.⁸⁵⁻⁸⁹ Licorice is hepato-protective,⁹⁰⁻⁹² enhances adrenal function and supports the stress response through multiple pathways.⁹³⁻⁹⁶

Lycium (*Lycium chinense*)



Lycium fruit, popularly known as Goji berries, have been used as a food and traditional medicine in China and Asia for over 2000 years. In Chinese medicine they are known to nourish Blood and to support the Yin aspect of the Liver, Kidneys, and Lungs. They are also known to support healthy eyes. Modern studies find that Lycium berries exert a wide physiological influence and benefit overall well-being. The berries are found to increase non-specific immunity.^{11,97}

Lycium fruit contains an abundance of polysaccharides, a stable vitamin C analog, carotenoids (zeaxanthin and beta-carotene), betaine, B-sitosterol, flavonoids, amino acids, minerals, and vitamins. The content of vitamin C in Lycium fruit is comparable to that of fresh lemons. The seeds are high in carotenoids, primarily zeaxanthin.^{97,98} The polysaccharides exert a wide influence and are found to enhance well-being and immune function. Lycium increases white blood cells, including lymphocytes. It is shown to increase the expression of interleukin-2 and to modulate cytokine production.⁹⁸⁻¹⁰⁰ Lycium fruit decoction is found to increase red and white blood cell production in mice.¹¹

In several studies Lycium berry ingestion was associated with increased antioxidant markers, including SOD (super oxide dismutase), and decreased lipid peroxidation. Significant improvements in well-being were noted including sleep quality, stress levels, mental acuity, weakness, and fatigue.^{97,98} Lycium exerts antioxidative, anti-aging, and antitumor properties, including induction of apoptosis and cell cycle arrest. The fruit is shown to be hepato-protective, neuro-protective, cardio-protective, and protective of retinal ganglion cells. Lycium is found to reduce organ toxicity from irradiation or chemotherapy and to support healthy male reproduction and sexual health.⁹⁷

Dong Quai (*Angelica sinensis*)



One of the most esteemed herbs in the Chinese materia medica, Dong Quai is especially revered as a Blood-nourishing tonic used in many formulas

tailored for individual needs. For millennia it has been used in medicinal decoctions and cooked in soups and stews to replenish the Blood and restore health. In Chinese medicine, nourishing the Blood and enhancing blood flow are important treatment principles to address most health issues including those with pain or muscle spasm. Dong Quai is often used in formulas to promote blood circulation and healing in traumatic injuries and to relieve pain such as dysmenorrhea, headache, numbness, pain of extremities, and back pain.

High in coumarins and flavonoids, Dong Quai also contains volatile oils, vitamin A, carotenoids, vitamins B12, E, and phytosterols (including beta-sitosterol) along with minerals.¹⁰¹ Studies report the anti-inflammatory effects of Dong Quai.¹⁰¹ Dong Quai is known for hematopoietic, antioxidant, immune regulatory properties, and is neuro-protective.¹⁰² A major component of Dong Quai known as ligustilide is shown to exert neuro-protective and anti-inflammatory influence.¹⁰³

Deer Velvet Antler (*Cornu cervi parvum*)



Deer Antler is the only mammalian organ that regenerates itself in an annual rhythm. Each spring, male deer cast off the hard antler from the previous year and the growth of a new antler begins. It starts as a soft, velvet material that regenerates at an amazing pace. Ancient cultures in the Far East were fascinated by this yearly miracle and intuited that deer antler offered rejuvenative qualities to help slow the aging process. Evidence of the medicinal use of Deer Velvet Antler dates back 2000 years. Traditional uses include supplementing Kidney Yang, strengthening bones, supporting bone marrow, and nourishing the blood.^{104,105} A vast array of literature on Deer Antler exists in Asia.

Deer Antler Velvet has an amazing nutrient profile including collagen, amino acids, essential fatty acids, enzymes, vitamins, minerals, and trace minerals. It also contains high concentrations of somatostatin, an important growth hormone.^{106,107} Deer Antler Velvet is shown to enhance athletic performance.¹⁰⁵ It is found to be anti-oxidative and to increase SOD (superoxide dismutase activity). Deer Antler is found to decrease the rate of muscle fatigue, enhance muscular strength, and possesses anti-catabolic activity.^{104,108-111} Deer Antler stimulates hematopoiesis (blood cell production) and increases red and white blood cell production.^{107-109,112}

Tangerine (*Citrus reticulata*)



Tangerine peel is added to many formulations in Chinese medicine to enhance Qi (vital energy) and to support digestion of the herbal formula itself. Found to be anti-inflammatory, it contains hesperidin, limonene, and tangeretin.¹¹ Tangeretin, a flavone, is present in high amounts in citrus fruit peels. Tangeretin is found to be

cytostatic, anti-proliferative, and antioxidative.^{113,114}

Cinnamon (*Cinnamomum cassia*)



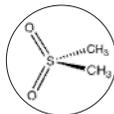
Used worldwide, Cinnamon has been traded as a valuable spice for thousands of years. It is known for its wonderful flavor and warming qualities.

Cinnamon bark is used in Chinese medicine to spark the Kidney energetic system function. As such, it is valued as a powerful Kidney Yang tonic to augment what is known as the Life Gate Fire and is used primarily for those who are weak, sensitive to cold, with cold extremities, and other deficiency symptoms. It dispels cold and warms the metabolism.

Cinnamon is traditionally used to encourage production of Blood and Qi combined with appropriate herbs. Cinnamon bark is traditionally used in small amounts because of its powerful nature and is usually combined with Ginseng, Astragalus, Atractylodes, aged Tangerine Peel, Rehmannia, Dong Quai, Peony, and Licorice, and other herbs for this purpose.¹¹

Cinnamon bark contains volatile oils, flavonoids, procyanidins, and catechins along with resinous compounds.¹¹⁵ It exerts antioxidant, anti-inflammatory, antidiabetic, and antimicrobial activity.¹¹⁵ Modern research finds it enhances cardiovascular health and production of white blood cells in animals.¹¹

MSM (methyl sulfonyl methane)



MSM is a naturally rich source of sulfur, a key nutrient that influences cellular health. MSM is most abundant in cow's milk and is also found in fruits, vegetables, and tea. While it is comprised of sulfur oxygen and methyl groups, it is about one-third sulfur. MSM is found to exert anti-inflammatory and antioxidative influence. It is shown to modulate cytokines and the inflammatory response after exercise. Studies show it plays a role in glutathione (GSH) synthesis and can directly decrease production of ROS (reactive oxidative species).¹¹⁶⁻¹²¹ MSM supplementation is found to lower oxidative stress biomarkers.¹¹⁸

Sulfur compounds, which play a role in many organs and tissues, are found in the hair, skin, and nails. Many amino acids, the building blocks of protein, have sulfur as a component. Found throughout the human brain, it will also cross the blood brain barrier.¹¹⁶ MSM is found to transport compounds across biological membranes and can enhance cellular permeability.¹²²

Black Pepper (*Piper Nigrum*)



Long Pepper, one of the world's oldest culinary and medicinal spices, is the fruit of a flowering vine that is indigenous to the hot and moist parts of India. In ancient times, until around the 14th century, Long



Pepper (*P. longum*) was much more widely known, used, and traded than Black Pepper (*P. nigrum*). Highly prized for its sweet and pungent flavor in the Roman Empire, it traded for three times the cost of Black Pepper.¹²³ It was known to both Hippocrates and to the Greek botanist Theophrastus.

Called Pippali in Ayurvedic medicine, it is one of their most esteemed herbs. It is the primary ingredient in the famous Ayurvedic formula Trikatu (Three Pungents) which contains three warming digestive herbs: Long Pepper, Black Pepper, and Ginger Root. This formula has been used for thousands of years to enhance the digestion and assimilation of nutrients.

With unique properties distinct from those of Black Pepper, Long Pepper is traditionally used to expel unhealthy mucous and congestion from the respiratory tract, sinuses, and digestive system, including the spleen, stomach, and gall bladder. Ayurvedic practitioners use Long Pepper to raise the metabolism, eliminate toxins, and to strengthen the nervous system. It is an important herb to support respiratory and digestive health.^{124,125}

Modern studies find that Long Pepper exerts antioxidant activity, decreases lipid peroxide levels, and modulates glutathione levels. Found to be anti-inflammatory and immunomodulatory, it is being studied for cytotoxic activity.^{123,125-128} Long Pepper contains about 3% to 5% content of the pungent alkaloid piperine.¹²⁹ It is widely known as an agent that enhances the bioavailability of many nutrients.¹²⁹⁻¹³¹

Note: Capitalization of names (Lung, Liver, Blood) denotes use of these terms in accordance with Chinese medicine paradigm and principles. When not capitalized (lung, liver, blood) these refer to the physiological concepts of Western medicine.

For more information on any of the ingredients listed here, including extensive research or individual monographs compiled by Donnie Yance, please email info@naturaedu.com.

References

This specific product has not been tested for any of the potential benefits listed herein. The following references apply to studies and/or research conducted with certain ingredients, or combinations of ingredients used in formulating this product. Such ingredients may not be from the same source or processed in the same way as the ingredients used in this product.

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