

Immune System



Facts

Our body's immune system is ever vigilant in its task of keeping us healthy by finding and destroying pathogens and disease-producing microorganisms. It also acts in neutralizing toxins and in eliminating damaged cells. Damaged and mutated cells are the

cause of many diseases as well as premature aging. In this issue, we cover the basic workings of the immune system; the roles of other organs in supporting healthy immune function; and the nutrients required to keep all these systems working efficiently and effectively in providing an immune response.

BASIC IMMUNOLOGY

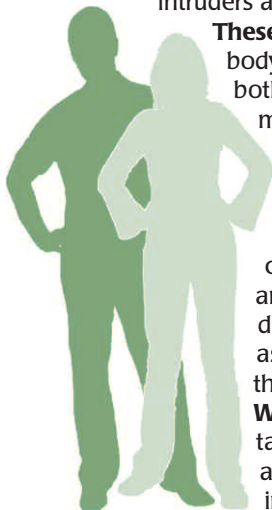
In keeping the body pathogen-free, the immune system uses natural avenues of waste disposal including the skin, mucous membranes, hair, saliva and urine. Should bacteria enter the body, specific cells such as **lymphocytes** and **macrophages** are alerted to fight the invader and prevent its spread.

Lymphocytes are white blood cells that carry out the immune response. There are two major groups, **T cells** and **B cells**. Both develop in the bone marrow's stem cells. B cells complete their development in the marrow, while T cells migrate to the thymus where they mature in a few days. The bone marrow and thymus are primary organs of the lymphatic system, an integral part of the body's immune function and response.

At maturity, these cells acquire immunocompetence, the ability to carry out immune response if properly stimulated. As they circulate throughout the body, B and T cells destroy or neutralize intruders and other abnormal cells.

These lymphocytes are the basis of the body's two closely allied immune responses, both triggered by antigens. In the cell-mediated response, T cells directly attack the foreign matter, usually intracellular pathogens, viruses or transplanted tissue. In the antibody-mediated response, B cells transform into plasma cells that manufacture and deploy antibodies. Antibodies bind together and deactivate extracellular pathogens, such as bacteria and antigens dissolved into the body's fluids.¹

While each type of response tends to target specific invaders, pathogens such as bacteria can evoke both types of immune responses.²



Macrophages are cells that ingest microbes, cell debris and other foreign matter. Activated and mobilized by T cells, macrophages go to the infection site where they engulf invading microorganisms. They play a major role in acquired cell-mediated immunity. Macrophages can also process and present antigens to lymphocytes for neutralization.³

IMMUNE SYSTEM MEMORY

Certain T cells, termed memory cells, seem programmed to remember former attacks by specific pathogens. They converge to launch a second response to recurring pathogens, reacting more quickly and stronger than the T cells of the primary response – even decades later! This second response is usually so fast that the pathogens are destroyed before any outward signs of disease occur.⁴ Additionally, the immune system can distinguish between harmful matter and beneficial elements such as nutrients, which are helpful to the body.

THYMUS - "POWER SEAT" OF IMMUNE FUNCTION

The immune system's fight against foreign invaders relies on the lymphatic system. Along with the thymus gland and bone marrow, the lymphatic system includes a vast and complex network of capillaries, narrow vessels, valves, ducts and nodes. In addition to invader-fighting cells, the system produces lymph, a fluid that passes throughout the network to lymphatic tissues, containing numerous lymphocytes through which pathogens and other invading matter is filtered for destruction or deactivation.⁵

The thymus is considered the "power seat" of the immune system. T cells mature there, and only thymus-dependent antigens can induce the body's cell-mediated immune system response. Optimum functioning of the gland is critical.⁶

THE ROLE OF ADRENALS & LIVER IN IMMUNE RESPONSE

The adrenal glands, which along with the thyroid gland are the body's main energy producers and regulators, take a hit during periods of prolonged or intense physical or mental stress. And when the adrenals are taxed, the immune system can become somewhat compromised, as well. It becomes less effective. This is one reason shingles, herpes simplex (both facial fever blisters and venereal forms), allergies and other immune-linked conditions flare up when a person is under stress.

Another aspect of immune support involves the liver, a multi-purpose workhorse organ that serves as the body's main site of detoxification. The liver not only controls the concentrations of various substances, it also detoxifies certain end products of digestion and stores in fat cells toxins that can't be nullified and eliminated.

It also stores some nutrients and synthesizes others, such as vitamin A formed from beta-carotene, essential for immune health as well as other body functions.



ESSENTIAL NUTRIENTS FOR GOOD IMMUNE FUNCTION

Choline – Essential for liver function as a constituent of lecithin, a group of phosphorus-rich fats found in the liver, which are essential for transforming fats in the body.

Folic Acid – Necessary for growth of all types of cells in the body, including white blood cells. Also takes part in the process of cell division and the healthy growth of glands, including the thymus. A water-soluble B vitamin that is important in both the production and synthesis of nucleic acids (RNA and DNA). Because the daily folate requirement is hinged to the daily metabolic and cell turnover rates, its need is increased by anything that increases the rate of either, such as physical stress.⁷

L-cysteine – Essential for the proper utilization of vitamin B-6. Serves as part of the body's heavy metal detoxification system.⁸

Pantothenic Acid – Serves as a part of coenzyme A, which is essential for the production of energy; for the production of antibodies; and the healthy maintenance of both the central nervous system and the adrenal glands. Plays a role in the synthesis of such vital compounds as sterols and steroid hormones and porphyrins.⁹

Vitamin A & beta carotene – Fat-soluble nutrient important to the immune system and in the formation of mucous membranes, part of the body's outer protection against foreign toxins. The membranes release mucus in the linings of the mouth and nose; digestive tube; and breathing passages. Mucus is composed of water, cast-off tissue cells, mucin and white blood cells, or leukocytes. Leukocytes play a role in activating B cells and T cells in the immune-response process. The liver utilizes beta carotene, an antioxidant, to produce vitamin A, which is stored in the liver and used as needed. Due to its non-toxic nature, beta carotene is the preferred source for vitamin A.

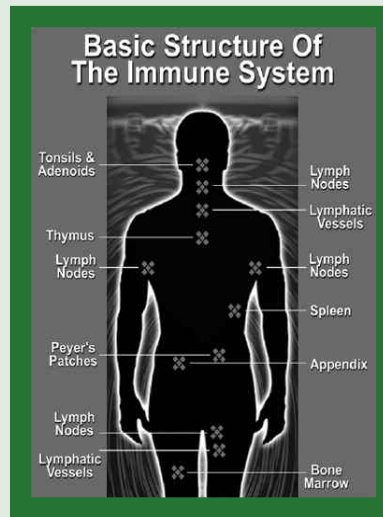
B-Complex vitamins – Play a role in nourishment of the immune system: B-1 participates in carbohydrate metabolism within the liver. Essential in the transformation of tryptophan to niacin; B-2 aids in formation of red blood cells and antibodies; and B-6 is necessary for production of antibodies and skin health.

Vitamin C – Essential for the immune system. Also required in large amounts for adrenal function, specifically in the production of the hormones epinephrine and norepinephrine.¹⁰

Vitamin E – Protects fat-soluble vitamins and red blood cells. Essential for the skin, and for hair and mucous membranes, which protect the body's openings.¹¹

Vitamin K – Plays an important role in liver function, as a cofactor in the liver's synthesis of prothrombin and other coagulation factors.¹²

Zinc – A component of zinc metalloenzymes, necessary for cell growth and proper functioning of the immune system. Aids in protein metabolism, essential for antibody formation and normal immune function. Necessary for healing processes.



Helpful Herbs

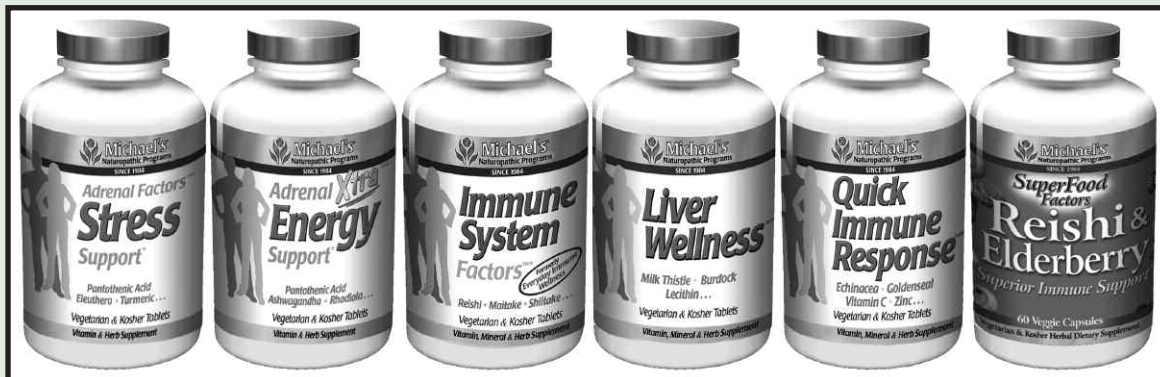
Echinacea – Contains small amounts of ascorbic acid, betaine, beta carotene, magnesium, niacin, selenium, zinc, polysaccharides, and flavonoids, each important to the immune system.¹³

Reishi – has been used for over two millennia for its many health benefits, all without reported side effects. Reishi is a potent adaptogen, helping people to deal with the physiological effects of stress. Polysaccharides in reishi modulate immune function.

Elderberry – also has a long history for its support of the immune system. Flavonoids including anthocyanins give elderberry its potent antioxidant capacity. Antioxidants protect cells from free radical damage that can result from infection. Quercetin, another flavonoid, gives elderberry its anti-inflammatory properties. Elderberry raises cytokine production, a part of immune system response.

Garlic – Traditionally used for the last 5,000 years in both topical and ingestible preparations for many different health applications. Louis Pasteur documented some of garlic's properties in an 1858 study. More recent studies have focused on garlic's potential for supporting the cardiovascular system.¹⁴

Goldenseal – One of the best-selling herbs in the North American natural food market for more than 25 years, goldenseal has been used as an immune-supporting herb.¹⁵



NUTRITIONAL SUPPORT FOR TOTAL IMMUNE FUNCTION

Because of the interdependent relationship between immune function and the lymphatic system, the adrenals and the liver – which collectively comprise a complex interplay of cell types and chemical functions – it's easy to see why good nutritional support is crucial to a strong immune response.

In fact, some experts predict that studies of the effects of nutrition on the immune response will spawn a new sub-discipline within the medical arena.

PRODUCTS FOR IMMUNE SUPPORT

MICHAEL'S® IMMUNE SYSTEM FACTORS™

Supports the immune system's normal operating mode, using a blend of nutrients, including the B-complex vitamins to nourish and balance the immune system. Also contains several medicinal mushrooms used for centuries for their health benefits.

MICHAEL'S® QUICK IMMUNE RESPONSE™

A blend of vitamins A and C, zinc and pantothenic acid complemented with the herbs garlic, goldenseal and echinacea. Formulated to bolster the body's immediate immune response to foreign matter, as soon as it is detected by the body. Created to support one's immediate need for strong immune support.

"Health is like money, we never have a true idea of its value until we lose it."

MICHAEL'S® ADRENAL FACTORS™ STRESS SUPPORT

Contains vitamins C and B-12 along with folic acid and pantothenic acid, complemented by the herbs eleuthero root and licorice root, known for their energizing properties.

MICHAEL'S® ADRENAL XTRA™ ENERGY SUPPORT

Formulated to enhance the body's endurance and speed its return to normal energy levels. Derives its name and potency from the addition of three times the amount of energy-enhancing pantothenic acid found in Adrenal Factors and also from *Rhodiola rosea*, used for centuries to combat fatigue, support physical strength and enhance mental stamina.

MICHAEL'S® LIVER WELLNESS™

Supports proper liver function, detoxification and metabolism of cholesterol in the liver, the primary site for detoxification of toxins in the body. A balanced blend of nutrients, including lipotropic factors such as choline, inositol and methionine complemented with herbs, including milk thistle and dandelion root.

ABOUT MICHAEL'S PRODUCTS

Seasoned health food shoppers know a combination of nutrients is more effective than taking single nutrients. Combinations increase assimilation and reduce the amount of binders and fillers. That's why MICHAEL'S® created the FACTORS OF LIFE® basic nutritional support programs, which provide synergistically complete nutrition.

To ensure freshness, a date of manufacture and a "best if used by" statement is clearly printed on each MICHAEL'S® product. Michael personally guarantees purity and specified content. Each product is hypoallergenic with no artificial colors or flavors. The formulas contain organically grown herbs (when available) to ensure the highest quality.

Additionally, there is no dairy, wheat, gluten, sodium or added sugar in any of our supplements. These high-potency, all-natural products are manufactured with food-grade fillers, binders and enteric coatings. Most are suitable for vegetarians and those who follow a kosher diet.

Every product is double safety-sealed with an outer shrink-wrap and inner-bottle freshness seal. As is normal with all-natural products, some color and texture variations may occur but this does not affect product purity, potency or assimilation.

"If you have health, you probably will be happy, and if you have health and happiness, you have all the wealth you need."

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⁴Tortora, 709-710.

⁵Tortora, 683.

⁶Tortora, 698-96.

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¹²Paige, 557.

¹³Duke, James A., Ph.D. (1992) Phytochemical Constituents of GRAS Herbs and Other Economic Plants. CRC Press: Boca Raton, 237-239.

¹⁴American Botanical Council (1996) American Botanical Council Botanical Series Garlic #311. American Botanical Council: Austin, 3-5.

¹⁵American Botanical Council (1996) American Botanical Council Botanical Series Goldenseal # 309. American Botanical Council: Austin, 5-6.



Michael's®
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HEALTHCARE SOLUTIONS SINCE 1984

MICHAEL'S® Immune Support Formulas

ADRENAL FACTORS™ STRESS SUPPORT

Supplement Facts

Serving Size: Three (3) Tablets

Amount Per Serving	% Daily Value	
Vitamin C (as Calcium Ascorbate)	750 mg	1000%
Folic Acid (as Folicin)	600 mcg	150%
Vitamin B-12 (as Cobalamin)	900 mcg	15,000%
Pantothenic Acid (as Calcium Pantothenate)	450 mg	4500%

Proprietary Blend 1.8 g (1800 mg)*
 Eleuthero Root (Eleutherococcus senticosus), Ashwagandha Root (Withania somnifera), Turmeric Root (Curcuma longa), Juniper Berry (Juniperus communis) & Licorice Root (Glycyrrhiza glabra)

*Daily Value not established.

OTHER INGREDIENTS: Dicalcium Phosphate, Microcrystalline Cellulose, Stearic Acid, Vegetable Magnesium Stearate, Modified Cellulose Gum & Silicon Dioxide.

ADRENAL XTRA™ ENERGY SUPPORT

Supplement Facts

Serving Size: Three (3) Tablets

Amount Per Serving	% Daily Value	
Vitamin C (as Calcium Ascorbate)	500 mg	667%
Folic Acid (as Folicin)	600 mcg	150%
Vitamin B-12 (as Cobalamin)	500 mcg	8333%
Pantothenic Acid (as Calcium Pantothenate)	1500 mg	15,000%

Proprietary Blend 650 mg*
 Ashwagandha Root (Withania somnifera), Rhodiola Rosea Root Extract (3% rosavins), Rhodiola Rosea Root & Licorice Root (Glycyrrhiza glabra)

*Daily Value not established.

OTHER INGREDIENTS: Microcrystalline Cellulose, Dicalcium Phosphate, Modified Cellulose Gum, Silicon Dioxide, Stearic Acid, Vegetable Magnesium Stearate & Hydroxypropylmethyl Cellulose.

IMMUNE SYSTEM FACTORS™

Supplement Facts

Serving Size: Three (3) Tablets

Amount Per Serving	% Daily Value	
Vitamin A (as Beta Carotene)	15,000 IU	300%
Vitamin C (as Magnesium Ascorbate)	200 mg	333%
Vitamin E (as d-alpha Tocopheryl Succinate)	50 IU	167%
Vitamin K2 (as Menaquinone)(from Soy)	45 mcg	56%
Thiamin (as Thiamin Hydrochloride)	25 mg	1667%
Riboflavin	25 mg	1471%
Vitamin B-6 (as Pyridoxine Hydrochloride)	25 mg	1250%
Folic Acid (as Folate)	450 mcg	113%
Pantothenic Acid (as d-Calcium Pantothenate)	100 mg	1000%
Magnesium (as Magnesium Ascorbate)	20 mg	7%
Zinc (as Zinc Citrate)	15 mg	100%
Selenium (as L-Selenomethionine)	150 mcg	210%

Proprietary Blend 525 mg*
 Reishi Mushroom (Ganoderma lucidum), Maitake Mushroom (Grifola frondosa), Shiitake Mushroom (Lentinus edodes), N-Acetyl Cysteine, Citrus Bioflavonoids, Astragalus Root (Astragalus membranaceus), Arabinogalactan (from Western Larch)(Larix occidentalis)

*Daily Value not established.

OTHER INGREDIENTS: Microcrystalline Cellulose, Dicalcium Phosphate, Stearic Acid, Vegetable Magnesium Stearate, Modified Cellulose Gum & Silicon Dioxide.
 ** OptiZinc is a Trademark of Inter-Health Nutraceuticals Inc.

❖ This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

LIVER WELLNESS™

Supplement Facts

Serving Size: Three (3) Tablets

Amount Per Serving	% Daily Value	
Vitamin A (as Beta Carotene)	1500 IU	30%
Vitamin E (as d-alpha Tocopheryl Succinate)	150 IU	500%
Vitamin K (as Phyloquinone)	45 mcg	100%
Thiamin (as Thiamin Hydrochloride)	30 mg	2000%
Niacin (as Nicotinic Acid)	30 mg	150%
Vitamin B-12 (as Cyanocobalamin)	300 mcg	5000%
Pantothenic Acid (as d-Calcium Pantothenate)	30 mg	300%

Proprietary Blend 2.84 g (2840 mg)*
 Lecithin (from Soy), Dandelion Root (Taraxacum officinale), Choline (as Choline Bitartrate), Inositol, Milk Thistle Extract (Silybum marianum), Burdock Root (Arctium lappa), Methionine (as L-Methionine Hydrochloride), Threonine (as L-Threonine), Butternut Root Bark (Juglans cinerea) & Yellow Dock Root (Rumex crispus)

*Daily Value not established.

OTHER INGREDIENTS: Dicalcium Phosphate, Maltodextrin, Microcrystalline Cellulose, Stearic Acid & Vegetable Magnesium Stearate.

QUICK IMMUNE RESPONSE™

Supplement Facts

Serving Size: Three (3) Tablets

Amount Per Serving	% Daily Value	
Vitamin A (as Beta Carotene)	30,000 IU	600%
Vitamin C (as Calcium Ascorbate)	750 mg	1250%
Pantothenic Acid (as d-Calcium Pantothenate)	45 mg	450%
Zinc (as Zinc Monomethionine**)	21 mg	140%

Proprietary Blend 1.8 g (1800 mg)*
 Echinacea Root (Echinacea angustifolia), Garlic Clove (Powder Concentrate)(Allium sativum) & Golden Seal Root (Hydrastis canadensis)

*Daily Value not established.

OTHER INGREDIENTS: Dicalcium Phosphate, Microcrystalline Cellulose, Stearic Acid, Modified Cellulose Gum, Vegetable Magnesium Stearate and Silicon Dioxide.

** OptiZinc is a Trademark of Inter-Health Nutraceuticals Inc.

CAUTION: Not to be taken by pregnant or lactating women. Keep out of reach of children.

REISHI & ELDERBERRY

Supplement Facts

Serving Size: One (1) Veggie Capsule

Amount Per Serving	% Daily Value	
Reishi Mushroom Extract 4:1 (Fruiting Body) (Ganoderma lucidum) (Providing 100 mg Polysaccharides)	400 mg	*
Elderberry Extract 4:1 (Fruit) (Sambucus nigra)	400 mg	*

*Daily Value not established.

OTHER INGREDIENTS: Modified Cellulose Gum, Microcrystalline Cellulose, Silica, Vegetable Magnesium Stearate, Hydroxypropylmethyl Cellulose & Purified Water.

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