

# [The protect the body from foreign pathogens](https://assignbuster.com/the-protect-the-body-from-foreign-pathogens/)

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The immunesystem is an intricate and complex defense system that functions to protect thebody from foreign pathogens that seek to invade and cause harm to the body. Although the immune system is able to defend and destroy the majority offoreign invaders, there are some pathogens that are able to evade the immuneresponse and penetrate the defense system. Therefore, in order to compensatefor the immune systems’ flaws, there are alternative measures that can be takento aid the immune response. Additional measures include the use ofsupplementary dietary ingredients which can be utilized to enhance the immuneresponse and serve as an added protection in cases of a weakened immune systemor sneaky invaders. There are various dietary ingredients that containproperties that are useful in boosting the immune response.

Dietary ingredientsare defined as “ a vitamin, a mineral, an herb or other botanical, an aminoacid, a dietary substance for use by man to supplement the diet by increasingthe total daily intake, or a concentrate, metabolite, constituent, extract, orcombinations of these ingredients” (Kalra, 2003). Therefore, dietaryingredients encompass a wide spectrum of supplements that have the capabilityof producing a positive impact on the immune system’s response. Although thereare many dietary ingredients that can be used to produce effects on the immuneresponse, some ingredients that are recognized as having a particular impact onthe immune system include Echinaceaand Ginseng.

Herbs                         The use of herbal therapy or phytomedicine has beena long standing practice that has been thought to have the power to bring abouthealing capabilities (Block & Mead, 2003). This method has gained momentum inmodern medicine as a form of complementary medicine (Block & Mead, 2003). Among some of the herbal agents that are used to stimulate the body’s diseasefighting mechanisms, Echinacea and Ginseng are the most widely used (Block & Mead, 2003). Herbalremedies that bring about effects on the immune system are classified as eitheradaptogens or immunostimulants. Adaptogens are defined as “ substances that arereputed to increase the body’s resistance to physical, chemical, and biologicalstressors” (Block & Mead, 2003). On the other hand, immunostimulants “ areagents that activate the body’s nonspecific defense mechanisms againstinfectious organisms (notably viral and bacterial pathogens) or againstneoplastic cells” (Block & Mead, 2003).  The purpose of immunotherapy is primarily toactivate immunologic cell activity that interact directly with infectiousagents or neoplastic cells (Block & Mead, 2003).

It is believed that herbalimmunostimulants may “ help rectify the moderately compromised cell-mediatedimmune response”, but have only a slight impact on the normal immune response (Block& Mead, 2003). Most herbal agents have been found to enhance innateimmunity, which is the first line of defense that is not intrinsically affectedby prior contact with an antigen. Herbal agents have been found to produceeffects on cell-mediated immunity by producing changes in the “ natural killer(NK) cell number and activity, lymphokine-activated killer (LAK) cell activity, macrophage activity, phagocytic activity, and proliferation of specificT-lymphocytes subsets” (Block & Mead, 2003). It has also been found thatherbal agents also seem to have an effect on acquired immunity (Block , 2003). Herbal agents have been found to produce effects on acquiredimmunity by producing changes in “ mitogenic effects on B lymphocytes (increasedproliferation) and production of specific types of antibodies” (Block , 2003). There is evidence that suggests herbal agents have the ability tomanipulate the natural immune mechanisms to inhibit the progression anddevelopment of some neoplastic and infectious diseases (Block & Mead, 2003).

Herbal supplements can also be used as a complement to cancer treatments becauseof their immune stimulating capabilities. Herbal supplements for cancerpatients may have the potential to protect cancer patients from contractingillnesses such as community-acquired respiratory viruses when their immunesystem is weakened from chemotherapy (Block & Mead, 2003). Therefore, herbalagents are of strong relevance to the overall health and survival ofimmunocompromised patients (Block & Mead, 2003).

Echinacea                        Someof the more widely used herbal immunostimulants lie under the genus, Echinacea (Block & Mead, 2003). The threespecies that are commonly used for medicinal purposes include: Echinacea purpurea, Echinacea angustifolia, and Echinaceapallida (Block & Mead, 2003). The herb is native to North America, where Native Americans were the first to discover its’ healing qualities andthen echinacea was later used by the white colonists (Block & Mead, 2003). Echinacea is commonly known as a “ cold fighter” because of its’ effectiveness against upper respiratory infections (Block , 2003). However, it can also be useful in the treatment of “ infectionswith Candida albicans and Listeria monocytogenes, chronic pelvicinfections, chronic fatigue syndrome, herpes infections, cancer, chronicarthritis, and a variety of skin diseases, wounds, and ulcers” (Block , 2003). Although echinacea hasbeen found to contain useful healing properties, the three species contain avariety of phytochemicals that are difficult to prepare and produce the sameresults consistently (Block & Mead, 2003). This lack of understanding aboutthe chemical mechanisms of echinacea willcontinue to limit the accuracy of treating specific medical conditions (Block& Mead, 2003).

However, it is claimed that echinacea produces effects onthe immune system by enhancing “ phagocytic activity, macrophage activation, andNK cell activity” (Block & Mead, 2003). The echinacea constituents reportedto produce immunologic effects include: polysaccharides, glycoproteins, alkamides, and cichoric acid (Block & Mead, 2003). It was found that E.

purpurea purified polysaccharides” induce macrophage activation and increase phagocytic activity in vitro and invivo in mice” (Block & Mead, 2003). Increased immune function suggests thatthe immune effects “ could be mediated by increased monocyte secretion ofseveral cytokine, including tumor necrosis factor-alpha as well as interleukins1, 6, and 10” (Block & Mead, 2003). In some preclinical trials, E.

angustifolia was found to inhibit” the infiltration of inflammatory leukocytes and reduced edema” (Block , 2003). E. purpurea producedeffects that increased the number of NK cells significantly and stimulated “ theclassical and alternative pathways of complement activation” (Block & Mead, 2003). Treatments with E. angustifoliaproduced an increase in the antibody, immunoglobulin G (IgG) (Block & Mead, 2003). These findings suggest that echinacea’s primary mechanism may be its’ effects on cell-mediated immunity (Block& Mead, 2003). Echinacea usage for cancer patients prior to chemotherapy inone clinical trial resulted in a dramatic increase in leukocyte number twoweeks after chemotherapy was administered (Block & Mead, 2003). However, itwas observed that there was “ no impact on phagocytic activity or lymphocytesubpopulations” (Block & Mead, 2003).

E. purpurea may be best known for its’ popularity in reducing the symptoms ofupper respiratory tract infections (Block & Mead, 2003). E. purpurea fluid extracts are mostcommonly used in the treatment of upper respiratory infections, but itseffectiveness is still inconclusive (Block & Mead, 2003). Even though theclinical trials that have been run to test the effectiveness of Echinacea havebeen modest in quality, it can be concluded that there is evidence thatEchinacea is effective for treating URIs (Block & Mead, 2003).

Some of themany immunomodulatory benefits that have been cited include “ phagocyticleukocyte and NK cell activation, macrophage activation, and changes in numberand activity of T- and B-cell leukocytes” (Block & Mead, 2003).  Ginseng                        Ginsengis another type of herb that is a dominant amongst the wide variety of herbsused in phytomedicine. Ginseng “ is a slow-growing root herb that has been usedmedicinally for more than 3000 years by practitioners of traditional Chinesemedicine” (Block & Mead, 2003). Ginseng is highly regarded and researchedin Asia and is regarded as an adaptogen and an immunostimulant (Block &Mead, 2003). There are three commonly used species that are referred to asginseng, they include: Panax ginseng, Panax quinquefolius, and Eleutherococcus senticosus (Block &Mead, 2003). Panax ginseng is thepredominant and the most well researched ginseng species. The main immunemechanisms of P. ginseng include:” immunostimulation, increased antitumor activity, improved cardiovascularfunction (vasodilation, and reduced platelet aggregation), antioxidant activity(increased oxygen radical scavenging and decreased lipid peroxidation), hypoglycemic activity, and stimulation of the pituitary-adrenocortical system(steroidal effect)” (Block & Mead, 2003).

Ginseng’s main active componentsare “ glycosidal saponins (glycosylated steroids) known as ginsenosides” (Block& Mead, 2003). Ginsenosides can act as protectors of the cell’s outermembranes, much like antioxidants, mainly for immune and nerve cells (Block& Mead, 2003). In laboratory and human studies, antioxidant micronutrientshave been shown to enhance immune function (Block & Mead, 2003). It wasdiscovered that ginseng in vitro, stimulated macrophage activation to initiatethe production of reactive nitrogen intermediates in order to attack and killtumors (Block & Mead, 2003). In athymic rats, it was found that ginsengincreased resistance against Pseudomonasaeruginosa pneumonia which is “ virtually impossible to treat withantibiotics” and caused changes in IgM, lung IL-4, IFN-?, and TNF-? (Block& Mead, 2003). There are also differences between extracts of wild Panax ginseng and cultured Panax ginseng (Block & Mead, 2003).  Research indicates that wild Panax ginseng stimulated lymphocyteproduction in vitro whereas cultured Panaxginseng did not (Block & Mead, 2003).

In other experiments, the fluvaccine was given to participants followed by Ginseng treatment. This method resulted in “ a highly significantreduction” of the frequency of upper respiratory infections (Block & Mead, 2003). In the same experiment, it was also reported that NK activity “ was twice ashigh as the placebo group” (Block & Mead, 2003). Ginseng is also apromising complementary treatment to chemotherapy.

In one experiment, Shenmai(herbal combination containing ginseng), in addition to chemotherapy “ resultedin significantly increased T-cell and NK levels; a trend toward increasedT-helper/T-suppressor ratios was also reported” (Block & Mead, 2003). Conclusion                        Thedietary ingredients Echinacea and Ginseng are some of the most well-known and studieddietary ingredients that serve to boost the immune response. Echinacea has beenreported to contain particularly valuable properties for treating upperrespiratory infections. On the other hand, Ginseng is known as the “ heal all” tonic. Ginseng has been shown to reduce the frequency of respiratoryinfections, has shown promise in acting as a complementary treatment forcancer, and has been reported to increase T-cell and NK levels. All of whichstimulate the immune response and lead to the eradication of the invadingpathogens from the body.