

# 15 Superfoods That Boost Immunity

Dr Hafeez Arshad M.Phil Pharmacology

RELUMINS

Why do some people get sick frequently while others can shrug off colds, flu, & other infectious agents? The answer is, of course, the immune system. A healthy immune system keeps us well. Like a symphony, our immunity arranges biochemicals, cells, and different processes to work continuously to shield our bodies against invaders like bacteria, viruses, and toxins. In addition to genetics & lifestyle scientists have identified what we eat as the key factor in how our bodies defenses stay sharp.

Diet plays a significant role in strengthening our body's immune system and helps to fight against the diseases. Many natural foods contain unique ingredients that support and boost immunity. Some also have direct activity against the disease-causing organism. A properly functioning immune system would be well regulated to avoid damaging its own body's cells and tissues.

Research has shown that our immune system benefits from healthy lifestyle measures like avoiding alcohol and smoking, regular exercise, good sleep, and maintaining our weight. As a result of the coronavirus pandemic, people also learned about the benefits of zinc & vitamin C. What follows are the top 15 ingredients that have shown benefits in strengthening the immune system and benefits directly against the disease-causing agents. This list only includes supplements that have a wide safety range, have been shown in clinical studies to have benefits, and are drug free and extracted from natural foods to help optimize our immune system.<sup>1</sup>

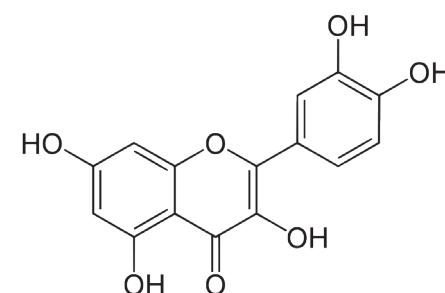


# Lactoferrin

Lactoferrin is a protein present in human milk and cow's milk. Colostrum has approximately seven times more lactoferrin than normal milk. It boosts the immune system by applying changes to the leukocytes of innate immunity, by modifying the synthesis of reactive oxygen species, increasing the number of neutrophils and natural killer cells. It also promotes macrophage phagocytosis, reduces intracellular transport of pathogens, and increases nitric oxide and cytokine production. Lactoferrin promotes the degranulation of neutrophils. It results in the mixing of lactoferrin to the inflammatory cells, including dendritic cells, natural killer cells, macrophages, B lymphocytes, and T lymphocytes. This mixing promotes the ability of lactoferrin to reduce the chronic inflammation and increase innate and adaptive immunity of the body. Lactoferrin also has antiviral activity against different DNA and RNA viruses, including respiratory viruses, by blocking viral entry into the cells.

# Quercetin

Quercetin is a pigment that belongs to the group called flavonoids. It is present in grains, fruits, vegetables, and tea. Its immune-boosting effect is due to the neutralization of free radicals by acting as an antioxidant. Quercetin has inflammatory and immune-modulating functions to prevent different medical conditions, including cancer, degenerative central nervous system problems, and cardiac diseases. It enhances the chronic inflammatory response in people taking keto diets and carrageenan-induced inflammation. These anti-allergic and immune-boosting properties are due to suppression of histamine release and inflammatory cytokines, inhibition of interleukin-4 synthesis, and leukotrienes production. It works as an antiviral agent by reacting with HA protein of virus that inhibits viral entry into cells. It is most potent against the influenza virus.<sup>2</sup>



# Hesperidin

Hesperidin is a plant chemical grouped with bioflavonoids. It is present in citrus fruits. Hesperidin possesses immune, anti-inflammatory, and anti-tumor effects. Anti-inflammatory effects are due to the increase in CD4+ and CD8+ lymphocytes. Hesperidin reduces the amounts of tumor necrotic factor, interleukin-6, and interleukin 1-Beta. It can be used in combination with diosmin (a citrus bioflavonoids) for many inflammatory conditions, including hemorrhoids, venous stasis, lymphedema, and varicose veins. According to studies, in high doses, hesperidin can also damage normal cells by enhancing chronic inflammatory reactions. Regarding antiviral activity, it increases the expression of antiviral genes that activate cellular immunity of both uninfected and infected cells.<sup>3</sup>

# Curcumin

This naturally occurring compound is found in turmeric. Curcumin act as an anti-inflammatory, antiseptic, and immune-boosting agent. It helps in repairing mechanism and preventing the invaders from spreading infection in the body. It helps against the diseases that occur due to low-intensity chronic inflammation, including cancer, metabolic syndrome, heart diseases, Alzheimer's disease, and degenerative syndromes. In some conditions, it can replace the function of anti-inflammatory drugs. The molecular mechanism underlying this function is that it blocks NF- $\kappa$ B, a molecule that trips into the nucleus of cells and turns and increases the expression of genes related to inflammation. NF- $\kappa$ B has a significant role in chronic diseases.

Curcumin naturally cleans the respiratory tract and prevent viruses causing the common cold, flu, and sinusitis. It inhibits the replication process of viral nucleic acid, so decreases the spread of infection among the cells of the body.<sup>4</sup>



## Astragalus

Astragalus is an herb. The root of astragalus is processed to make different forms like capsules, teas, powders, and liquid extracts. Active compounds of root of astragalus ( that are saponins, flavonoids, and polysaccharides) have immune-boosting, antiviral, antioxidant, anti-microbial, and anti-inflammatory properties. The primary mechanism responsible for the immune-boosting property is that it increases the production of white blood cells that prevent illnesses, especially the destruction of cancer cells, prevent HIV and common cold infections, and reduces muscle wasting. It activates macrophages via heparanase enzymes that promote the inflammatory response. The antiviral activity of astragalus is mild and no danger of chronic inflammatory reactions.<sup>5</sup>

## Zinc

Zinc is vital for a healthy immune system. Lower level of zinc is a risk factor of certain disorders and medical illnesses. Zinc is responsible for the proper functioning of approximately one hundred enzymes. It activates and increases the synthesis of T lymphocytes. T cells aid the immune system of the body in two ways that are destroying infected and benign cells or tumors and regulating inflammatory and immune responses.

Deficiency of zinc, especially in newborn children, pregnant mothers, and lactating mothers, can cause severe and life-threatening immune distress. Zinc has a considerable antiviral activity against respiratory viruses. Deficiency of zinc can cause pneumonia in children.<sup>6</sup>

# Selenium

It is an element, a nonmetal with various health benefits to the human body. It boosts the immune system by working as an antioxidant that prevents the cells from oxidative damage. Antioxidants lower the inflammation and reduce the risk of cell and tissue damage. It also increases the leukocytes and other inflammatory cells in the bloodstream that enhance the immune system.

Studies have shown that people who have deficient selenium supplementation are at higher risk of developing respiratory diseases, especially those caused by the Influenza virus. Selenium supplementation also reduces the risk of developing HIV infection, tuberculosis, and hepatitis C. Further, it reduces the DNA damage and destroys cancer cells. It boosts immunity against prostate cancer, lung cancer, colon cancer, and uterine cancer. It increases the level of inflammatory cells in the blood, so excessive or abnormal function may result in a severe chronic inflammatory response.<sup>6</sup>

## Olive leaf extract

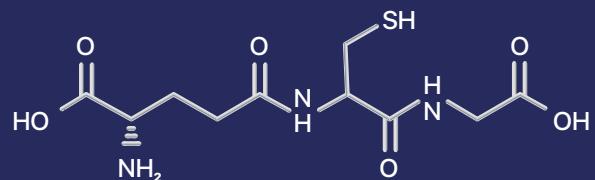
It is the best way to boost up immune system naturally. It enhances the immune system in two ways:

- Increasing phagocytosis that promotes the engulfing and destruction of harmful elements in the body.
- Stops the replication of viruses and bacteria and prevent their spreading from infected cells to the normal cells.

Olive leaf extract is the best way to treat cold, flu, and their associated symptoms, which include sore throat, coughing, sneezing, and pain. It also reduces the inflammatory response to save normal cells. Other functions include neuroprotection, gastroprotection, antioxidant, antibacterial, and anticancer.<sup>8</sup>

# Glutathione

Glutathione is produced inside the human body. It is available from exogenous sources that are spinach, okra, avocados, and asparagus. It balances our innate immunity at the site of infection. It causes leukocytes infiltration, and this kills bacteria and other organisms. It is a thiol-containing antioxidant. It neutralizes free radical reactions. It may increase or decrease inflammatory reactions by regulating white blood cells. Glutathione rebalancing reduces chronic inflammation. It induces an antiviral response by holding back the effects of the Influenza virus. Glutathione has a role in lung diseases. It reduces the transcription factor NF-  $\kappa$ B by reducing the amount of ROS.<sup>7</sup>



## Licorice

This flowering plant belongs to Family Fabaceae. It is an herbaceous legume. Its root extract is helpful for immune support and provides muscle health. It is widely used for herbal immune-boosting. Immune activation through herbal products has always been the safest method. The active ingredient of Licorice, Glycyrrhizin is responsible for immune support. It helps our bodies to maintain a balance of inflammatory reactions. It contains more than 20 triterpenoids. All of these, two triterpenoids, GL and GA have antiviral qualities. These directly target viral replication and virus gene expression.<sup>9</sup>

## Echinacea

It is a group of herbaceous plants belonging to the daisy family. The flowering plant has 10 species. Extracts of Echinacea have great effects on the immune system. Various studies demonstrate that it increases the number of white blood cells in our body. This herbal product has a critical role in preventing the common cold. It boosts immunity by consumption of dry powdered extract (300–500 mg) or liquid tincture extract (2.5ml), three times a day. It has been used in wound healing for a long time. It improves respiratory diseases caused by common bacteria. It helps in the treatment of respiratory viral infections, caused by rhinovirus, influenza virus (A, B), coronavirus, etc. <sup>9</sup>

## Oregano oil

It is one of the elements of folk medicine and extracted from the oregano plant. It has diverse properties and act as an excellent antibacterial, antiviral, and anti-fungal. It helps to get rid of infections. Oregano oil is rich in antioxidants. It reduces free radicals and diminishes inflammatory reactions. According to research, it reduced swelling in the mice's paw by up to 57%. It has a significant antiviral role and great activity against Herpes simplex virus, Rotavirus, and respiratory syncytial virus.<sup>8</sup>

## Bioflavonoids

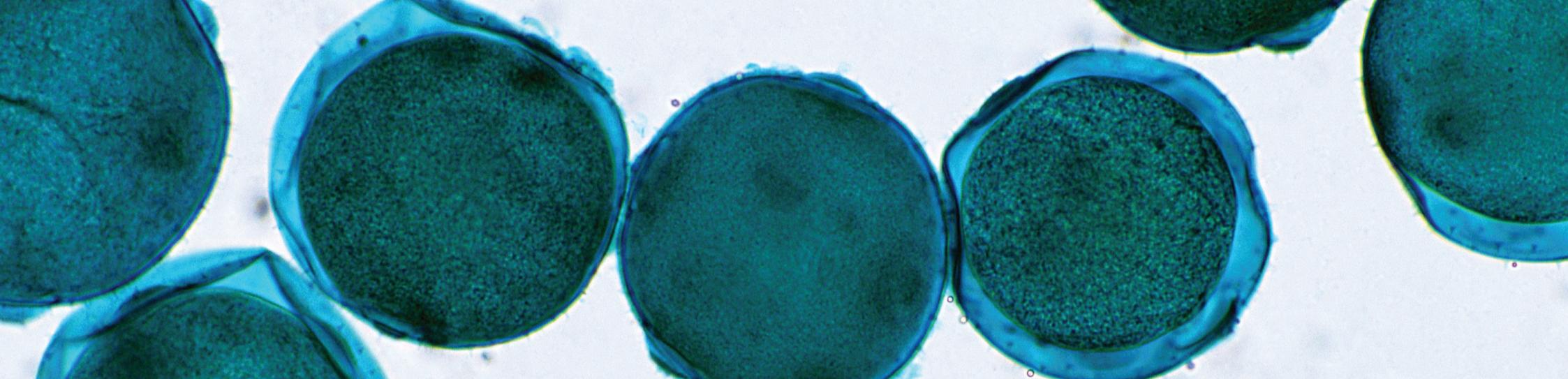
Herbal medicines contain bioflavonoids as active ingredients. These include Ginkgo biloba, Hypericum perforatum, Tanacetum parthenium, Echinacea spp, licorice root, Glycyrrhiza glabra, St. John's wort, and feverfew. These help to increase the benefits of vitamin C.<sup>8</sup>

## Zinc Spray

Immune boosters are the supplements that increase the immunity of our body. Zinc is a vital mineral to the body in several ways. Zinc is a key part of cells that are first-responders against invading bacteria and viruses. Studies have shown that zinc nasal sprays help to decrease the number of upper respiratory infections in children and may reduce the duration of colds in adults.

## Lozenge

The immune defense comprises all the tools of the immune system present in organisms. Zinc lozenges may assist you to beat an infection, but likely won't help you prevent one. It prevents the viruses from multiplying. Zinc lozenge are more effective, which allows the substance to stay in the throat and come in contact with the viruses. But zinc in lozenge form has certain side effects, including nausea and unpleasant taste in mouth.



## References

<sup>1</sup> Actor, J., Hwang, S., & Kruzel, M. (2009). Lactoferrin as a Natural Immune Modulator. *Current Pharmaceutical Design*, 15(17), 1956-1973. doi: 10.2174/138161209788453202

<sup>2</sup> Li, Y., Yao, J., Han, C., Yang, J., Chaudhry, M., & Wang, S. et al. (2016). Quercetin, Inflammation and Immunity. *Nutrients*, 8(3), 167. doi: 10.3390/nu8030167

<sup>3</sup> Lee, Y., Jung, J., & Kim, H. (2011). Hesperidin Partially Restores Impaired Immune and Nutritional Function in Irradiated Mice. *Journal Of Medicinal Food*, 14(5), 475-482. doi: 10.1089/jmf.2010.1269

<sup>4</sup> Gao, X., Kuo, J., Jiang, H., Deeb, D., Liu, Y., & Divine, G. et al. (2004). Immunomodulatory activity of curcumin: suppression of lymphocyte proliferation, development of cell-mediated cytotoxicity, and cytokine production in vitro. *Biochemical Pharmacology*, 68(1), 51-61. doi: 10.1016/j.bcp.2004.03.015

<sup>5</sup> Qin, Q., Niu, J., Wang, Z., Xu, W., Qiao, Z., & Gu, Y. (2012). Astragalus membranaceus Extract Activates Immune Response in Macrophages via Heparanase. *Molecules*, 17(6), 7232-7240. doi: 10.3390/molecules17067232

<sup>6</sup> Maggini, S., Wintergerst, E., Beveridge, S., & Hornig, D. (2007). Selected vitamins and trace elements support immune function by strengthening epithelial barriers and cellular and humoral immune responses. *British Journal Of Nutrition*, 98(S1), S29-S35. doi: 10.1017/s0007114507832971

<sup>7</sup> Ghezzi, P. (2011). Role of glutathione in immunity and inflammation in the lung. *International Journal Of General Medicine*, 105. doi: 10.2147/ijgm.s15618

<sup>8</sup> Khodadadi S. Role of herbal medicine in boosting immune system. *Immunopathol Persa*. 2015;1(1):e01.

<sup>9</sup> Catanzaro, M., Corsini, E., Rosini, M., Racchi, M., & Lanni, C. (2018). Immunomodulators Inspired by Nature: A Review on Curcumin and Echinacea. *Molecules*, 23(11), 2778. doi: