



# COVID-19 Pandemic: The Role of Nutrition in Strengthening the Immunity

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## Dear Editor,

Coronavirus is one of many viruses that can cause symptoms like pneumonia, lung infection, difficulty in breathing, fever, etc. (1). This virus is a sub-family of the coronavirus family, which occurs as a large ribonucleic acid (RNA) virus that infects the human respiratory tract (2). These viruses are fatal for those with immunocompromise, particularly elderly people. They are known to infect human airways from the luminal side, and progeny viruses are released from the same side. This makes it easier to spread through coughing and sneezing (2).

Immunity is a form of protection against infection or the destructive effect of pathogens produced by special cells (thymus, spleen, lymph nodes, and other specific immune cells) (3-5). The immune system is a general name for the special structures within our body that protect us against harmful substances (4). Normally, human coronavirus doesn't elicit a strong innate immune response in primary target cells of the human respiratory track early during infection. In respiratory epithelium, the innate immune system has a major protective role as the first line of defense against the respiratory pathogen (2). Since still no specific cure or vaccine is developed for coronavirus, enhancing immunity through proper dieting should be the immediately available defense for people, and the key to having a strong immunity is a healthy diet that helps meeting the required essential nutrients (1). The immune diet is nourishment on nutriment, which is beneficial for the immune system. Some of the immune diets include minerals such as zinc, selenium, iron, and vitamins like bit A, D, C, and so on, which are known for their antiviral properties when the safe intake level is not exceeded (1).

Some sources of immune diet include:

**Citrus:** Many researchers have focused on Citrus bioactivities and secondary metabolites. These metabolites are flavonoids, alkaloids, limonoids, coumarins, carotenoids, phenolic acids, and essential oils, which are of great value to human health due to their active characteristic of antioxidant and anti-inflammatory (6);

**Ginger:** Ginger is known to decrease inflammatory illness like sore throat, as it has heat in the form of gingerol and some antioxidants. A study carried out on hens found that ginger extract not only can improve the birds' antioxidant capacity and enhance the immune function but also has the potential to reduce the inflammatory response (7);

**Vegetables:** Veggies like spinach and broccoli help boosting our immunity and increasing infection-fighting ability due to their beta carotene ingredient. Besides, since they contain numerous antioxidants, they can help the antioxidant system to fight reactive oxygen species (ROS), which are harmful to the body. As well, they are capable of directing absorption and neutralization of free radicals (8). However, the is better achieved when it's less or not cooked at all;

**Yogurt:** Yogurt is useful for stimulating the immune system. It's also a great source of vitamin D, which helps to regulate the immune system and boost the body's natural defense (3). It worth noting that it's better to consume yogurts with less sugar/sweeteners and flavors.

**Sunflower and Almond seeds:** These seeds are full of nutrients like phosphorus, magnesium, and vitamins B6 and E. Vitamin E is a potential source of antioxidants that can modulate host immune function. Also, vitamin E is useful for maintaining immunity, especially in aged people. Furthermore, it plays a role in the differentiation of

immature T-cell in the thymus (9).

**Green Tea:** Green tea is flavonoids and rich in epigallocatechin gallate (EGCG), which are good antioxidants that neutralize free radicals that are harmful to the body (8).

**Kiwi and papaya:** These fruits contain a lot of essential nutrients like folate, potassium, and vitamins K and C. Recent scientific study showed that many indexes of the immune response, such as antibody production, lymphocytes proliferation, and some specific subgroups of white blood cells and iron absorption are related to the vitamin C intake (10).

Continuous consumption of one of these foods won't be useful to fight infections or improve immunity, rather a combination of most or all the variety helps to acquire all the necessary vitamins and minerals. Also, the above-listed foods are in addition to the three major classes of foods (i.e. the proteins, carbohydrates, and fats that serve as the source of body fuel).

#### Footnotes

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#### References

1. Boy E. *Coronavirus pandemic highlights need to ensure good nutrition*. 2020, [cited 2020 May 20]. Available from: <https://www.harvestplus.org/knowledge-market/in-the-news/coronavirus-pandemic-highlights-need-ensure-good-nutrition>.
2. Jonsdottir HR, Dijkman R. Coronaviruses and the human airway: A universal system for virus-host interaction studies. *Virology*. 2016;13:24. doi: 10.1186/s12985-016-0479-5. [PubMed: 26852031]. [PubMed Central: PMC4744394].
3. Richter A, Schend J. *15 foods that boost the immune system*. 2020, [cited 2020 May 15]. Available from: <https://www.healthline.com/health/food-nutrition/foods-that-boost-the-immune-system>.
4. Karacabey K. The effect of nutritional elements on the immune system. *Journal of Obesity & Weight Loss Therapy*. 2012;2(9). doi: 10.4172/2165-7904.1000152.
5. Sadanand S, Coico R, Sunshine G. Immunology: A short course. *Yale J Biol Med*. 2009;82(4):232-3. [PubMed Central: PMC2794500].
6. Lv X, Zhao S, Ning Z, Zeng H, Shu Y, Tao O, et al. Citrus fruits as a treasure trove of active natural metabolites that potentially provide benefits for human health. *Chem Cent J*. 2015;9:68. doi: 10.1186/s13065-015-0145-9. [PubMed: 26705419]. [PubMed Central: PMC4690266].
7. An S, Liu G, Guo X, An Y, Wang R. Ginger extract enhances antioxidant ability and immunity of layers. *Anim Nutr*. 2019;5(4):407-9. doi: 10.1016/j.aninu.2019.05.003. [PubMed: 31890918]. [PubMed Central: PMC6920395].
8. Osawa T. Novel natural antioxidant for neutralization in food and biological system. In: Uritani I, Garcia W, Mendoza EM, editors. *Posthervest biochemistry of plant food-material in the tropics*. Japan: Japan scientific society press; 1996. p. 241-51.
9. Lopez-Varela S, Gonzalez-Gross M, Marcos A. Functional foods and the immune system: A review. *Eur J Clin Nutr*. 2002;56 Suppl 3:S29-33. doi: 10.1038/sj.ejcn.1601481. [PubMed: 12142958].
10. Grimble RF. Effect of antioxidative vitamins on immune function with clinical applications. *Int J Vitam Nutr Res*. 1997;67(5):312-20. [PubMed: 9350472].