

How Nutrients and Dairy Support the Immune System

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Wintertime always draws attention to the topic of immunity. But the truth is, our immune systems are working year-round. A strong immune system is maintained and supported by proper nutrition. In fact, several nutrients are essential to a healthy, functioning immune system.

An intimate relationship exists between nutrition, immunity, and infection. When one element of this relationship changes, such as having a nutrient deficiency, it affects the other two. For example, a nutrient deficiency can negatively affect the immune system and lead to a greater risk of infection. (Maggini et al., 2018) Nothing illustrates this more than the condition of scurvy, once feared by sailors, as it killed millions of them in the mid-19th century. Scurvy was a devastating disease whose root cause was a vitamin C deficiency, which came from a lack of fruit and vegetables leading to poor wound healing, and in the worst cases, death from infection.

The Role of Micronutrients In Immunity

A healthy immune system relies on various nutrients, including protein, vitamins A, D, C, E, vitamin B6 (pyridoxine) and B12 (cobalamin), folate, iron, selenium, copper, and zinc. Each nutrient plays a role in the way the immune system responds to foreign substances in the body. A deficiency in any of these nutrients can have a negative impact on the immune response and its function. Likewise, repleting a nutrient deficiency can improve resistance to infection and support a fast recovery. (Gombart et al., 2020)

The immune system is complex, and nutrients play many roles, individually

and sometimes overlapping. Nutrients help create immune cells, keep our barriers to disease (like skin) healthy, and make antibodies so we can fight inflammation, for example.

Nutrients Have Different and Overlapping Roles In Immunity

Some nutrients keep the skin, hair, and the mucus membranes within our digestive and respiratory tracts healthy, so they can deter infectious invaders from gaining entry to our body. Vitamins A, D, C, E, B6, B12 and folate, as well as iron and zinc actively keep the integrity of these barriers intact.

Other nutrients help create and manage the immune cells in our body, such as vitamins A, D, C, E, B6, B12 and folate, and zinc, iron, copper, selenium, and magnesium.

Still other nutrients have antimicrobial effects, such as restricting the growth of bacteria or destroying microorganisms that do gain entry to the body. Vitamins A, D, and C, zinc, iron, copper, and selenium are star players in this category.

Inflammation, or the body's response to bacteria or other invaders, is also nutrient dependent. Vitamins A, D, C, E, B6, zinc, copper, iron, selenium, and magnesium are the specific nutrients involved in this process.

Many nutrients help us make antibodies, such as vitamins A, D, C, E, B6, B12, folate, zinc, selenium, and magnesium. All told, nutrients are critical to a healthy immune system and our overall health.

A Special Look at Vitamin D

Vitamin D helps to build strong, dense bones. We can get vitamin D

from food, although the sources are limited and center around fortified foods like dairy milk, and other foods like fatty fish and mushrooms. We can get Vitamin D from sun exposure also, but the use of sunscreen limits how much is converted to the active form of vitamin D in our skin.

Vitamin D also plays a role in our functioning immune system, regulating the immune activity in the body by acting as an anti-inflammatory substance, and boosting the production of immune cells. (Charoenngam & Holick, 2020) Studies have shown a link between low vitamin D status and increases in immune-based conditions such as psoriasis, arthritis, and type 1 diabetes.

Vitamin D deficiency is associated with autoimmune disease and infections. Studies suggest we should maintain a vitamin D level of at least 30 ng/mL to support our body's needs and our immune function. (Charoenngam & Holick, 2020) However, the optimal amount of vitamin D is unknown, as studies suggest there are variable requirements between individuals.

Where Can Immune Supporting Nutrients Be Found In Food?

Eating a variety of foods can support your immune system. Here are some food sources for each immune-supporting nutrient:

Vitamin A

Milk and other dairy products; red, orange, and dark green vegetables; and eggs.

Vitamin D

Milk; fortified breakfast cereals;

some brands of orange juice and yogurt; fatty fish like salmon; mushrooms.

Vitamin C

Citrus fruits, red bell peppers, tomatoes, and strawberries, as well as some fortified foods.

Vitamin E

Vegetable oils (sunflower and safflower oils); nuts (almonds) and sunflower seeds; green vegetables like spinach; fortified foods such as breakfast cereal.

Pyridoxine (Vitamin B6)

Poultry, fish; potatoes and other starchy vegetables; fruit (not citrus types)

Cobalamin (Vitamin B12)

Fish, meat, poultry, eggs, milk, and other dairy products; some breakfast cereals, nutritional yeast, and other fortified foods.

Folate

Naturally present in many foods, it is also fortified in our food supply in the form of folic acid. Folate is naturally

present in vegetables, especially asparagus, brussels sprouts, and dark green leafy vegetables; oranges and orange juice; nuts, beans, and peas. Folic acid is added to the following foods: bread, flour, pasta, rice, and breakfast cereals.

Iron

Lean meat, seafood, and poultry; iron-fortified breakfast cereals and breads; white beans, lentils, spinach, and peas; nuts and some dried fruit, like raisins.

Zinc

Milk and other dairy foods; red meat, poultry, seafood; fortified breakfast cereals; beans; nuts and whole grains.

Copper

Shellfish; nuts; seeds; chocolate; wheat bran cereals and other whole grain products; potatoes; mushrooms; avocados; chickpeas and tofu.

Selenium

Seafood, meat, poultry, eggs, dairy products; breads; cereals; and other grain products.



How Dairy Supports the Immune System

Dairy products have been implicated as contributing to increased inflammation, mostly due to their saturated fat content. However, studies show the nutritional composition of dairy, often referred to as the 'dairy matrix,' appears to suppress the inflammatory response. (Hirahatake et al., 2020)

Furthermore, a recent systematic review found no negative effects - and potentially beneficial effects - of dairy products and dairy protein on inflammation. (Nieman et al., 2021) These results may be due, in part, to the presence of immune-supporting nutrients found in dairy, such as vitamins A, D, and B12; zinc and selenium.

KEY TAKEAWAYS

- A strong immune system is maintained and supported by proper nutrition.
- Nutrition, immunity, and infection are interrelated within the human body.
- A healthy immune system relies on various nutrients to function properly.
- Nutrients help our bodies fight infections, create and manage immune cells, restrict the growth of bacteria, and help make antibodies.
- Vitamin D from foods or exposure to the sun's rays helps build strong bones and fight inflammation. A deficiency in Vitamin D is associated with autoimmune disease and infections.
- Studies show the nutritional composition of dairy products appears to beneficially suppress the body's inflammatory responses.

References

Charoenngam, N., & Holick, M. F. (2020). Immunologic Effects of Vitamin D on Human Health and Disease. *Nutrients*, 12(7), 2097. <https://doi.org/10.3390/nu12072097>

Gombart, A. F., Pierre, A., & Maggini, S. (2020). A Review of Micronutrients and the Immune System—Working in Harmony to Reduce the Risk of Infection. *Nutrients*, 12(1), 236. <https://doi.org/10.3390/nu12010236>

Hirahatake, K. M., Bruno, R. S., Bolling, B. W., Blesso, C., Alexander, L. M., & Adams, S. H. (2020). Dairy Foods and Dairy Fats: New Perspectives on Pathways Implicated in Cardiometabolic Health. *Advances in Nutrition*, 11(2), 266–279. <https://doi.org/10.1093/advances/nmz105>

Maggini, S., Pierre, A., & Calder, P. C. (2018). Immune Function and Micronutrient Requirements Change over the Life Course. *Nutrients*, 10(10), 1531. <https://doi.org/10.3390/nu10101531>

Nieman, K. M., Anderson, B. D., & Cifelli, C. J. (2021). The Effects of Dairy Product and Dairy Protein Intake on Inflammation: A Systematic Review of the Literature. *Journal of the American College of Nutrition*, 40(6), 571–582. <https://doi.org/10.1080/07315724.2020.1800532>



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