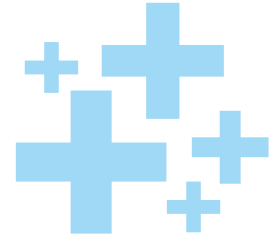


# Nutrition and immunity



Course Title: Infectious Diseases  
Semester: 1st 2223  
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## Introduction<sup>(1)</sup>

In times of illness or during flu season, consumers frequently look for specialized meals or multivitamins that are said to strengthen immunity.

Popular examples are vit C as well as foods like citrus fruits, chicken soup, and tea with honey. Yet, the structure of our immune system is complex and is influenced by several factors that must be in optimum balance, not alone our diet, and certainly not by any one specific ingredient or nutrient.

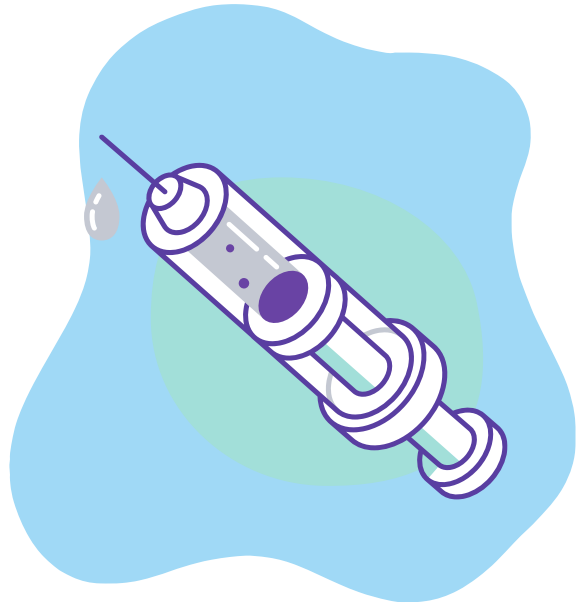


A balanced diet with a variety of vitamins and minerals, along with healthy lifestyle choices like getting adequate sleep, getting regular exercise, and reducing stress, however, effectively prepares our body to resist infection and disease.<sup>(1)</sup>

## Why Do We Need an Immune System?<sup>(1)</sup>

We are frequently exposed to several kinds of various harmful microorganisms on a daily basis.

Our immune system, a system of complex biological processes and pathways, protects us against both these hazardous bacteria and some diseases. It takes immediate action after identifying foreign invaders like bacteria, viruses, and parasites. Both innate and adaptive immunity are present in humans.



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## Innate immunity:<sup>(2)</sup>

Through the creation of barrier-like defenses, innate immunity serves as our first line of protection against pathogens that try to infiltrate our bodies.

These obstacles consist of skin that largely protects against germs. Virulent-trapping mucus pathogens are destroyed by stomach acid. Enzymes that help produce anti-bacterial chemicals from our perspiration and tears immune system cells that fight off any invading foreign cells.



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## Adaptive immunity:<sup>(2)</sup>

A system called adaptive or acquired immunity develops the ability to identify pathogens.

Our body's cells and organs, including the lymph nodes, spleen, thymus, and bone marrow, control it. When a foreign substance enters the body, these cells and organs produce antibodies, which trigger the growth of immune cells (such as various types of white blood cells) that are specific to the dangerous substance and attack and eliminate it.

And When a foreign substance enters again, our immune system adapts by memorizing it so that the antibodies and cells are significantly more effective and swift to annihilate it.



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## The relationship between nutrition and immunity:<sup>(3)</sup>

All cells, including immune cells, require adequate nutrition as part of a balanced diet to remain healthy.

It's possible that some eating habits can better prepare the body for microbial assaults and excessive inflammation, but it's unclear that any particular meals can provide more defense.



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A healthy immune system can be harmed by diets that are deficient in diversity and nutrients, such as those that mostly consist of ultra-processed meals and lack less processed foods.

Additionally, it is thought that a Western diet strong in red meat and refined sugar and low in fruits and vegetables can encourage disruptions in the microbiome of good intestinal microbes, leading to chronic gut inflammation and the corresponding suppression of immunity.<sup>(3)</sup>

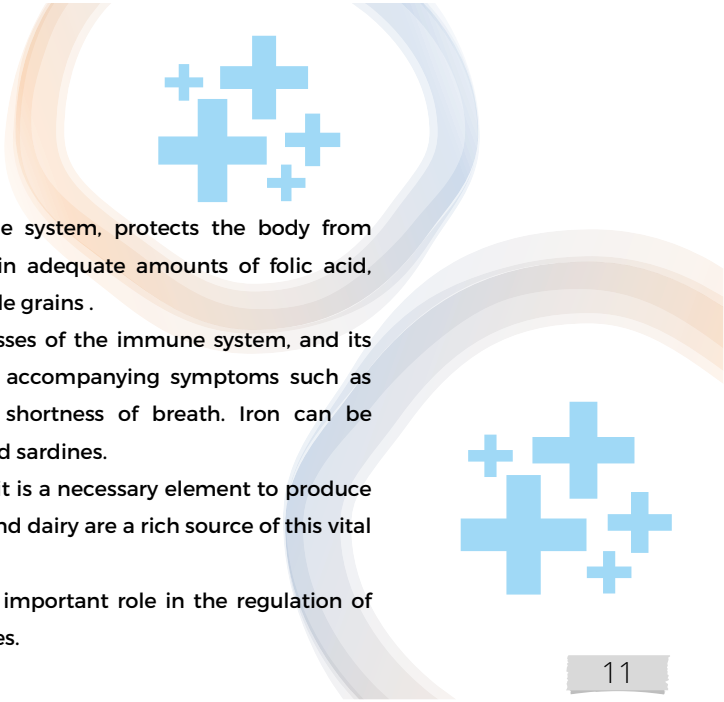


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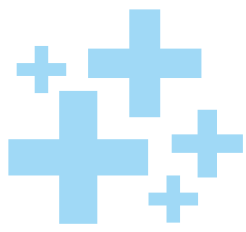
## The effect of nutrients on immunity:<sup>(3)</sup>

1. Vitamin D supports the immune system. It is found in (liver - red meat - oily fish such as salmon - egg yolk).
2. Vitamin A is an antioxidant and supports the immune system (found in tuna, potatoes and carrots).
3. Vitamin E is a powerful antioxidant, as it supports the body in resisting disease and infection. It is found in (plant foods rich in fats such as almonds, peanuts).
4. Vitamin C contributes to preventing infection or shortening the duration of the disease and enhances the body's resistance. Citrus fruits are a major source of it, knowing that there are other sources of it such as spinach and strawberries.

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5. Folic acid strengthens the immune system, protects the body from pressure and anemia, and to obtain adequate amounts of folic acid, should be increased lentils and whole grains .
  6. Iron is a key element in the processes of the immune system, and its deficiency causes anemia and the accompanying symptoms such as headache, general weakness and shortness of breath. Iron can be obtained from red meat, chicken and sardines.
  7. Zinc The importance of zinc is that it is a necessary element to produce immune cells. Oysters, lean meats and dairy are a rich source of this vital element.
  8. Dietary fat and cholesterol play an important role in the regulation of immune and inflammatory responses.

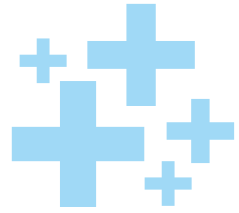
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9. Proteins are an essential part of the diet that helps build and repair body tissues and protects it from disease-causing bacteria and viruses. This is done by the formation of antibodies to distinguish and eliminate them, as the strength of the immune system depends on the protein. A lack of protein in the diet can lead to symptoms of weakness, fatigue, and weakened immunity.
  10. Complex carbohydrates boost immune function and complex carbohydrates that are rich in fiber and nutrients help stabilize blood sugar, which keeps the immune system strong.
  11. Vitamins: It stimulates the body to produce white blood cells and enhance their function, and also helps eliminate pathogens, whether viruses or bacteria.

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# Foods that boost immunity<sup>(4)</sup>



## 1. Citrus fruits

It is often recommended to eat oranges and citrus fruits that contain a high percentage of vitamin C, which is known to increase the number of white blood cells and thus help the body fight infections and diseases. Oranges, grapefruits, clementines and tangerines are delicious foods to strengthen your immune system.

## 2. Broccoli

This veggie is a superfood. It's packed with vitamins A, C and E and packed with fiber and antioxidants too. To get the most out of broccoli, you shouldn't overcook it, just steam it or boil it for a short time, or you can even eat it raw after making sure you wash it well.



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## 3. Garlic

Since ancient civilizations, people have been using garlic for its medicinal properties as an antibacterial. Garlic contains several sulfur compounds including one active ingredient called allicin, which is what gives garlic its pungent smell.

## 4. Ginger

Ginger is a strong-tasting spice with anti-inflammatory properties, and it is a delicious addition to food. You can brew fresh ginger in hot water to make ginger tea. It is great for soothing a sore throat. Ginger is often recommended as a remedy for nausea.



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# Foods That May Weaken Immune System <sup>(5)</sup>



## 1. Added sugar

It has been shown that high blood sugar levels may harm gut barrier function and drive gut bacteria imbalances, which can alter your immune response and make your body more susceptible to infection.

## 2. Salty foods

Salty foods like chips, frozen dinners, and fast food may impair your body's immune response, as high salt diets may trigger tissue inflammation and increase the risk of autoimmune diseases.



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## 3. Fried foods

Fried foods are high in a group of molecules called advanced glycation end products (AGEs). AGEs are formed when sugars react with proteins or fats during high-temperature cooking, such as during frying. If levels become too high in your body, AGEs can contribute to inflammation and cellular damage.



## 4. Processed and charred meats

Like fried foods, processed and charred meats are high in AGEs. Processed meats are also high in saturated fat. Some research suggests that diets high in saturated fats and low in unsaturated fats may contribute to immune system dysfunction.

## 5. Fast food

Diets high in fast food and highly processed foods may drive inflammation, increase gut permeability, and cause bacteria imbalance in the gut, all of which can negatively affect your immune health.



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