



Ways to strengthen the immune system

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The immune system is the body's natural defence system, designed to identify and destroy harmful foreign substances such as bacteria and viruses that enter the body.

The immune system does not reside in a single part of the body, but is made up of a network of cells, molecules, tissues and organs working together to protect the body. Each of these elements play a key role in how the immune system works.

Although there is still much that scientists don't know about the immune system, it has long been established that several factors influence the function of the immune system, including stress, sleep and nutrition.

The first line of defence, therefore, is to choose a healthy lifestyle.

Following general good health guidelines is the first step towards strengthening the immune system. Every part of the body, including the immune system, functions optimally when protected from environmental assaults and strengthened by healthy living strategies such as:

- Not smoking
- Eating a diet high in fruits and vegetables
- Exercising regularly
- Maintaining a healthy weight
- Limiting alcohol intake – if alcohol is consumed, doing so in moderation
- Getting adequate sleep – aiming for seven to nine hours nightly
- Reducing the risk of infection, by washing hands frequently, covering coughs and sneezes with a tissue or flexed elbow and avoiding close contact with people who are sick
- Reducing stress

Diet and the immune system

Good nutrition is fundamental to improving immunity. The World Health Organization (WHO) guidance on diet, especially during the current pandemic, states that 'good nutrition is crucial for health, particularly in times when the immune system might need to fight back' (WHO, 2020).

Dietary deficiencies of protein and specific micronutrients are well known to be potential causes of immune dysfunction. Every stage of the immune response depends on the presence of certain micronutrients, which have synergistic roles based on their complementary modes of action. Providing a diet high in nutritious foods which are rich in vitamins and minerals supports optimal function of the immune system by:

- **Avoiding micronutrient deficiencies** – Micronutrients work collectively to support an optimum immune system. Deficiencies of zinc, selenium, iron, copper, folic acid and vitamins A, B₆, B₁₂, C, D and E have been linked to altered immune responses.
- **Providing anti-oxidant nutrients** – Natural anti-oxidant nutrients may be defined as molecules that prevent cell damage against free radicals.* Anti-oxidant nutrients such as beta-carotene, vitamins E and C, selenium, copper, iron and zinc, slow cell damage caused by free radicals and may play an important immune protective role in infections caused by bacteria, viruses or parasites.

*The body generates hundreds of substances called 'free radicals' when converting food to energy. Other free radicals are extracted from food or breathed in from the air, and some are generated by the sunlight's action on the skin and eyes. These free radicals can damage the body's cellular structures. Anti-oxidants are molecules that interact with and neutralise free radicals.

Can we improve immunity with micronutrient supplements?

Consuming a balanced diet provides all the necessary nutrition required, but where there are challenges in meeting dietary requirements, supplements may be a useful addition in helping to meet nutritional needs.

A significant proportion of the general population in industrialised nations has inadequate intakes of certain micronutrients, and multiple micronutrient deficiencies frequently occur simultaneously in children and adults worldwide. Furthermore, certain situations, such as infection, stress and pollution may decrease nutrient stores within the body.

Although further research is needed, available evidence indicates that supplementation with multiple micronutrients with immune-supporting roles may support immune function and reduce the risk of infection. Micronutrients with the strongest evidence for immune support are vitamins A, C and D and zinc.

It is important that supplementation is used within recommended safety limits, particularly in potentially at-risk groups such as pregnant or postpartum women (for vitamin A) or smokers (in whom high doses of vitamin E, for example, may have an adverse effect on the risk of lung cancer).

Immune system effects of herbal agents

Several products from the plant kingdom have been investigated for their immune-modulating potential.

- *Echinacea* is widely used to prevent or provide early treatment for colds. Some studies show that extracts of *Echinacea* may shorten the duration and severity of colds and other upper respiratory infections when given as soon as symptoms become evident.
- Propolis, a resinous material produced by bees, has several biological properties that may have an impact on immune function. Further large studies are needed to establish the role of propolis in strengthening immune responses.
- Elderberry (*Sambucus nigra*) has been used extensively as a natural remedy against upper respiratory infections. Elderberry extract has been shown to be effective in lessening the duration and severity of flu symptoms.

Gut health, probiotics and immunity

Inside the gut are over 40 trillion live microorganisms (the gut microbiota/microflora or 'flora') that promote normal gastrointestinal function, protect the body from infection, regulate metabolism and maintain the mucosal immune system. In order for the gut to function optimally, the balance of the gut microflora must be maintained.

The gut plays a key role in the body's immune system. The intestine is the largest immune organ of the body, providing a protective interface between the human body and the foreign substances that enter the body from the external environment.

Probiotics are microorganisms that may be beneficial to health when consumed in adequate amounts. Some studies have shown

that certain probiotics may be useful in stimulating the immune response. *Lactobacillus* and the *Bifidobacteria* are the most commonly used probiotics in clinical practice. The yeast, *Saccharomyces boulardii* and *Bacillus* species are also widely used. Probiotics have an impact on the intestinal ecosystem by, for example, regulating gut mucosal immunity and by interacting with the gut microflora or potentially harmful pathogens. However, not all probiotics have the same effects and it is important to use probiotics that have been adequately tested in clinical studies.

In summary

- The first line of defence in strengthening the immune system is to choose a healthy lifestyle.
- A diet high in nutritious foods which are rich in vitamins and minerals supports optimal function of the immune system.
- Where there are challenges in meeting dietary requirements, supplements may be a useful addition in helping to meet nutritional needs.
- Micronutrients with the strongest evidence for immune support are vitamins A, C, D and zinc.
- Several herbal agents are under investigation for their immune-modulating potential against infections.
- Some studies have shown that certain probiotics may be useful in stimulating the immune response.

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