

Nutrition and the immune system

The immune system is a complex and efficient defence system against diseases. These diseases are caused by a pathogen (germ) such as a virus, bacteria or parasite. When pathogens manage to enter the body, messages are sent out, warning that the body is being attacked. The immune system then directs the correct attacking cells to the problem area to destroy these pathogens. Antigens are proteins that are found on the surface of the pathogen and are unique to that pathogen.

The immune system is a vast network of specialised organs, cells, and tissues that all work together to destroy these pathogens and keep us healthy. All throughout the body, these disease-fighting cells are stored in the immune system waiting for the signal to go to battle. It relies on white blood cells called leukocytes that are made in the bone marrow. These enter the lymphatic system, a network of vessels that help clear toxins and waste from the body. Once these detect antigens, it signals for the body's immune system to kick in. There are various leukocytes to be able to detect various types of antigens, and are divided into two types; phagocytes and lymphocytes. Phagocytes surround any pathogens in the blood and engulf them, also calling other phagocytes to help. Whereas once a lymphocyte, divided mainly into B and T cells, detects a pathogen it produces antibodies. B cells produce the antibodies and T cells can kill the pathogen themselves, call for more T cells and direct the B cells when to make antibodies as well as when to stop. Antibodies attach to antigens and are designed to only attach to certain antigens. They only recognise, and therefore attack, bad antigens. These antibodies are then stored in the body for the next encounter to be able to respond faster.

Research shows nutrition is an important factor that influences the immune system and has key roles at every stage of the immune response. Individuals with nutrient deficiencies, when the body doesn't absorb or get the necessary amount of nutrients from food, have weakened immune system and they are more prone to disease. Therefore it is important to eat a balanced diet especially rich in immune boosting components such as protein, vitamins, and minerals to enhance the resistance against infections

Some nutrients that have been found to be actively involved in the proper functioning and strengthening of the human immune system include dietary protein, omega-3 fatty acids, vitamin A, vitamin D, vitamin E, vitamin B, vitamin C, iron, zinc, and selenium.

Dietary protein

Protein plays an important role in the formation of antibodies. Particularly in the production and activation of B and T cells.

Healthy sources; lean meats, fish, cheese, yogurt, legumes, lentils, seeds and eggs.

Omega-3 fats

Omega-3 fats are involved in the activation of immune cells and the regulation of the cell membrane (the outer layers) structure and function. They also boost the immune system by enhancing B cells ability to engulf pathogens by increasing their signaling ability.

Healthy sources; Fish and other seafood, especially fatty fish such as salmon, mackerel, tuna, herring and sardines. Also, found in nuts and seeds.

Vitamin A,

Acts as an anti-inflammatory factor in improving immune system function, involved in development of T cells and their different roles.

Healthy sources; liver, cheese, butter and eggs.

Vitamin D,

Vitamin D regulates immune cells function and inhibits inflammatory processes by promoting the T cells that regulate other cells in the immune system.

Healthy sources; Eggs, mushrooms, red meat, fish and other seafood. Can also be synthesised by sunlight exposure on the skin.

Vitamin E,

Found in high concentration in immune cells; enhancing the function of the immune system and reducing the risk of infection. It regulates T cell function.

Healthy sources; plant oils, wheat germ, nuts and seeds.

Vitamin B

Most particularly B1, B6 and B12, help in the production of white blood cells, enhancing the number of T cells.

Healthy sources; whole grains, nuts, seeds, legumes, leafy vegetables such as spinach and kale.

Vitamin C

Improves the response of phagocytes and therefore the ability to kill the pathogens.

Healthy sources; citrus fruits, berries, broccoli, kiwi and peppers

Iron

Iron is a vital mineral for both health and infection control. It is essential for development and growth of the tissue and central components of the immune system.

Healthy sources; liver, red meats, legumes, dark chocolate and nuts.

Zinc

Zinc is essential for the development and activation of T cells

Healthy sources; seafood, beef, lamb, turkey, eggs, nuts, seeds, legumes and yogurt.

Selenium

Improves immunity and reduces inflammation. Also important in the function of leukocytes.

Healthy sources; Brazil nuts, fish and other seafood, eggs, mushrooms and whole grains.