



The Immune / Lymphatic System

The Immune System

The immune system is part of our general body defences against disease. It functions by recognizing viruses and bacteria and converting that information into hormones that activate the immune process.

This response can be both specific, where the body responds only to certain agents and no others as well as non-specific, where the body works to defend itself any harmful agent that enters the body.

Immunity is the ability of an individual to resist or overcome the effects of a particular disease or other harmful agent. Immunity, however, is a selective process, with one being immune to one disease and not necessarily another. Immunity can be either inborn, which is due to inherited factors, or acquired. Acquired immunity develops during one's lifetime as they encounter various harmful agents and successfully fight them off. Acquired immunity is easily seen in the case that we only get the chicken pox once as a child, even though we may be exposed to them on a number of occasions.



The immune system has been broken down into a number of different "lines of defences", starting simply with mechanical barriers and then becoming more and more complex, they include:

- Mechanical barriers - are the first line of defence against harmful agents. Mechanical barriers include the skin, mucus membranes that line passageways that enter the body.
- Chemical Barriers - tears, perspiration and saliva work to wash away harmful invaders while digestive juices and enzymes destroy bacteria and other toxins from ingested substances.
- Phagocytosis - is the ability of certain white blood cells to take in and destroy waste and foreign materials.
- Natural Killer Cells - are able to distinguish cells with an abnormal cellular membrane such as tumour cells or cells infected with a virus and kill them on contact.
- Inflammation - is the body's effort to get rid of anything that irritates it. If the inflammation is due to pathogens, the inflammation is referred to as an infection.
- Fever - boosts the immune system by stimulating phagocytes, increasing metabolism and decreasing the ability of certain organisms to multiply.

The Lymph System

All body tissues live in a liquid environment, both in the cells and surrounding them. During cellular metabolism, waste products, including carbon dioxide and other substances are routed back through the blood stream to be eliminated. In addition to the elimination provided for by the

circulatory system, a second pathway for the removal of tissue fluids from the body is achieved through the lymph system.

The function of the lymph system is to remove excess tissue fluids that do not return through the circulatory system. In addition, the lymph system is responsible for absorbing protein from this fluid and returning it to the blood.

Like the circulatory system, the lymphatic system is made up of a series of capillaries and lymphatic vessels. Unlike the circulatory system, the lymph system does not have a heart to propel lymph (tissue fluids that have entered the lymphatic system) through the system. The movement of lymph is based upon either the volume of fluid within the lymph vessel or by mechanical means, i.e. through movement of the skeletal muscles, where the muscles compress the lymphatic vessels and drive the lymph forward.

Throughout the lymph system, can be found a series of lymph nodes, whose function it is to filter the lymph, trapping and destroying bacteria and other foreign particles. Lymph nodes can be found throughout the body, but tend to be grouped together. Major groupings of lymph nodes can be found in the neck (cervical nodes), in the armpits (auxiliary nodes), near the trachea and bronchial tubes (tracheo-bronchial nodes), in and around the intestines (mesenteric nodes) and in the groin area (Inguinal nodes).

Thymus

The thymus gland is the site in which T-lymphocytes develop and mature before birth and is most active prior to puberty. The thymus secretes the hormone thymosin, which promotes the growth of lymphocytes and lymphoid tissue throughout the body.

Tonsils

The tonsils, once thought of as a useless organ, are actually masses of lymphoid tissue that are designed to filter tissue fluids.

Spleen

The spleen is an organ that contains lymphoid tissue and is designed to filter blood. It is located in the upper left quadrant of the abdominal cavity and is protected by the ribs. One function of the spleen is to filter out old red blood cells. The spleen also harbours phagocytes, which engulf bacteria and other foreign particles. The spleen also serves as a reservoir of blood in cases of emergency.

Vermiform Appendix

Although the function of the vermiform appendix is unknown, the appendix is rich in lymph tissues. The appendix is located at the end of the cecum, which is part of the large intestine.