
Lymphatic system

Summary

- The lymphatic system is our body's 'sewerage system'.
 - It maintains fluid levels in our body tissues by removing all fluids that leak out of our blood vessels.
 - The lymphatic system is important for the optimal functioning of our general and specific immune responses.
 - The lymph nodes monitor the lymph flowing into them and produce cells and antibodies which protect our body from infection and disease.
 - The spleen and thymus are lymphatic organs that monitor the blood and detect and respond to pathogens and malignant cells.
 - The lymphatic system plays an important role in the absorption of fats from the intestine.
 - When the lymphatic system is not formed well or has been damaged by surgery, radiotherapy or tissue damage, a swelling of a part of the body may occur (most commonly the legs or arms). When this swelling lasts more than about three months it is called lymphoedema.
 - When it's not functioning well the lymphatic system may have a role in obesity, Crohn's disease and other disorders.
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The lymphatic system is a network of delicate tubes throughout the body. It drains fluid (called lymph) that has leaked from the blood vessels into the tissues and empties it back into the bloodstream via the lymph nodes.

The main roles of the lymphatic system include:

- managing the fluid levels in the body
- reacting to bacteria
- dealing with cancer cells
- dealing with cell products that otherwise would result in disease or disorders
- absorbing some of the fats in our diet from the intestine.

The lymph nodes and other lymphatic structures like the spleen and thymus hold special white blood cells called lymphocytes. These can rapidly multiply and release antibodies in response to bacteria, viruses, and a range of other stimuli from dead or dying cells and abnormally behaving cells such as cancer cells.

The lymphatic system and fluid balance

The blood in our blood vessels is under constant pressure. We need that to push nutrients (food the cells need), fluids and some cells into the body's tissues to supply those tissues with food, oxygen and defence.

All of the fluids and its contents that leak out into the tissues (as well as waste products formed in the tissues, and bacteria that enter them through our skin) are removed from them by the lymphatic system.

When the lymphatic system does not drain fluids from the tissues properly, the tissues swell, appearing puffy and uncomfortable. If the swelling only lasts for a short period it is called oedema. If it lasts longer (more than about three months) it is called lymphoedema.

Lymphatic vessels

The lymphatic vessels are found everywhere in our body. Generally, more active areas have more of them.

The smaller lymphatic vessels, which take up the fluids, are called lymph capillaries. The larger lymphatic vessels have muscles in their walls which helps them gently and slowly pulsate. These larger lymphatic vessels also have valves that stop the lymph flowing back the wrong way.

Lymph vessels take the lymph back to the lymph nodes (there are about 700 of these in total), which are found in

our arm pit and groin as well as many other areas of the body such as the mouth, throat and intestines.

The fluid that arrives in the lymph nodes is checked and filtered. Most of it continues on to where the lymphatic system from most of our body (the left arm, tummy, chest, and legs) empties out at the left shoulder area. Lymph from the right arm and face and part of the right chest empties into the blood at the right shoulder area.

Spleen

The spleen is located in the abdominal (tummy) area on the left side, just under the diaphragm. It is the largest of our lymphatic organs.

The spleen does many things as it filters and monitors our blood. It contains a range of cells, including macrophages – the body's garbage trucks. It also produces and stores many cells, including a range of white blood cells, all of which are important for our body's defence.

As well as removing microbes, the spleen also destroys old or damaged red blood cells. It can also help in increasing blood volume quickly if a person loses a lot of blood.

Thymus

The thymus is inside the ribcage, just behind the breastbone. It filters and monitors our blood content. It produces cells called T-lymphocytes which circulate around the body. These cells are important for cell mediated response to an immune challenge, such as may occur when we have an infection.

Other lymphoid tissue

Much of our digestive and respiratory system is lined with lymphatic tissue. It's needed there because those systems are exposed to the external environment. This lymphatic tissue plays a very important role in the defence of our body.

The most important sites of this lymphoid tissue are in the throat (called the tonsils), in the intestine area (called Peyer's patches) and in the appendix.

Lymph nodes

Lymph nodes are filters. They are found at various points around the body, including the throat, armpits, chest, abdomen and groin. Generally they are in chains or groups All are imbedded in fatty tissue and lie close to veins and arteries.

Lymph nodes have a wide range of functions but are generally associated with body defence. Bacteria (or their products) picked up from the tissues by cells called macrophages, or those that flow into the lymph, are forced to percolate through the lymph nodes. There, white blood cells called lymphocytes can attack and kill the bacteria. Viruses and cancer cells are also trapped and destroyed in the lymph nodes.

More lymphocytes are produced when you have an infection. That is why your lymph nodes tend to swell when you have an infection.

Common problems involving the lymphatic system

Common problems involving the lymphatic system can be separated into those related to:

- infection
- disease
- destruction or damage to the lymphatic system or its nodes.

Those related to infection include:

- **glandular fever** – symptoms include tender lymph nodes
- **tonsillitis** – infection of the tonsils in the throat
- **Crohn's disease** – inflammatory bowel disorder.

Those related to disease include:

- **Hodgkin's disease** – a type of cancer of the lymphatic system.

Those related to malformation or destruction or damage to the lymphatic system or its nodes include:

- **primary lymphoedema** – when the lymphatic system has not formed properly. May present as a limb or part body swelling at birth, or may develop at puberty or later in life
- **secondary lymphoedema** – When the lymphatic system is damaged by surgery or radiotherapy associated with the treatment of cancer, when the soft tissues are damaged by trauma, or when the lymphatic system has some other cause of structural or functional impairment.

Where to get help

- Your GP

This page has been produced in consultation with and approved by:

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