



THE LYMPHATIC SYSTEM

Your lymphatic system is a group of organs, vessels, and tissues that protect you from infection and maintain a healthy balance of fluids throughout your body. Lymphatic system organs include your bone marrow, thymus, and lymph nodes. Swollen lymph nodes are a sign of common infections, like strep throat, but can also be a sign of more serious diseases like cancer.

Your lymphatic system has many functions. Its key roles include:

- **Collecting excess fluid from your body's tissues and returning it to your bloodstream.** This supports healthy fluid levels in your body. Your lymphatic system also filters out waste products and abnormal cells from this fluid.
- **Helping your body absorb fats.** Most nutrients can travel through tiny openings (pores) in the walls of your capillaries, and your body can then absorb and use them. But certain fats and other molecules are too large to travel in this way. Your lymphatic system collects fluid from your intestines, processes those fluids that contain these molecules and transports them back to your bloodstream.
- **Protecting your body against invaders.** Your lymphatic system is part of your immune system. It produces and releases lymphocytes (a type of white blood cell) and other immune cells. These cells look for and destroy invaders — such as bacteria, viruses, parasites, and fungi — that may enter your body.

How does the lymphatic system work?

Every day, approximately 20 liters of plasma (the liquid part of your blood) flow out of tiny pores in the thin walls of your capillaries. Imagine water seeping out of a sponge. Where does this liquid go? It delivers oxygen and nutrients to the tissues surrounding each capillary. The tissues hungrily soak up all the nutrients while leaving behind waste (like a kid who finishes their food but leaves behind a pile of sticky napkins).

Plasma doesn't mind cleaning up the mess — it picks up the waste and then returns to your bloodstream the same way it came, by flowing back through the pores in your capillary walls. Each day, about 17 liters of plasma return to your bloodstream in this way. Since 20 liters initially flowed out of your capillary walls, that means 3 liters are still roaming around in your body's tissues.

That's where your lymphatic system steps in. Tiny lymphatic capillaries pick up this remaining fluid from your tissues. The fluid changed its name during its journey: now instead of plasma, it's called lymph. Your lymphatic capillaries move the lymph into larger tubes called lymphatic vessels.

These vessels keep the lymph moving until it ultimately reaches one of two major ducts in your upper chest. These are called your right lymphatic duct and thoracic duct, and they're a bit like highway on-ramps. They merge into large veins called your subclavian veins and empty the lymph into them. From there, your lymph reenters your bloodstream and can flow through your body again.

The lymphatic system does not have a pump system like the central nervous system (brain) or cardiovascular system (Heart). So, to move the lymph around movement (exercise) and massage facilitate this motion.



THE LYMPHATIC SYSTEM

ANATOMY

Many different organs and structures make up your lymphatic system. These parts all work together to help keep you healthy.

What are the lymphatic system organs?

The organs of the lymphatic system are your:

- **Bone marrow.** This is the soft, spongy tissue in the center of certain bones, like your hip bone, backbones, and breastbone. Your bone marrow has the vital job of making white blood cells, red blood cells and platelets.
- **Thymus.** This organ is located in your upper chest beneath your breastbone, and it's most active before puberty. It's where T-cells (a type of white blood cell) fully mature. T-cells help your body fight off invaders. It shrinks as we get older.
- **Lymph nodes.** Lymph nodes are bean-shaped glands that monitor and cleanse lymph as it filters through them. They clear out damaged cells and cancer cells. Your lymph nodes also store lymphocytes and other immune system cells that attack and destroy harmful substances like bacteria. You have roughly 600 lymph nodes scattered throughout your body. Some are closely connected in groups called chains. You may be able to feel some lymph nodes through your skin, in areas like your armpits, groin or neck. Others are deeper inside your body.
- **Spleen.** This is the largest lymphatic organ which is located on your left side under your ribs and above your stomach. Your spleen filters your blood and removes cells that are old or not working properly. It also keeps red blood cells and platelets available in case your body needs them.
- **Mucosa-associated lymphoid tissue (MALT).** This mucus membrane exists throughout your body in many important locations. For example, it lines your tonsils, airways, small intestine, and appendix. MALT looks for and destroys germs that could harm you.

What are the other parts of the lymphatic system?

Your lymphatic system is a big team.

Other key players include your:

- **Lymph.** Lymph, also called lymphatic fluid, is a collection of the extra fluid that drains from cells and tissues in your body and isn't reabsorbed into your capillaries. Lymph contains many different substances, including proteins, minerals, fats, damaged cells, cancer cells and germs. Lymph also transports infection-fighting white blood cells (lymphocytes).
- **Lymphatic vessels.** Lymphatic vessels are tubes that form a complex network throughout your body. The smallest tubes are lymphatic capillaries, which ultimately connect to larger tubes that lead to two main ducts in your upper chest. The pulsing of nearby arteries and squeezing of nearby muscles help fluid move through your lymphatic vessels. These vessels contain one-way valves that keep lymph moving the right way.
- **Collecting ducts.** Two main ducts in your upper chest empty lymph into your subclavian veins. These are your right lymphatic duct and thoracic duct. These ducts are like highway on-ramps or merging points where lymph rejoins your bloodstream.
- **Tonsils and adenoids.** These structures trap pathogens from the food you eat and the air you take in. They're part of your body's first line of defense against invaders. Your tonsils are in the back of your throat. Your adenoids are just behind your nasal cavity but are only active during childhood.