

The Lymphatic System

- A. The **lymphatic** system is another vascular system in your body.
- B. It is separate from your cardiovascular system because it has its own **veins** and **capillaries**.
- C. It ultimately connects back with the cardiovascular system because the **fluid** from the **lymphatic** system eventually gets sent back into the **bloodstream**.

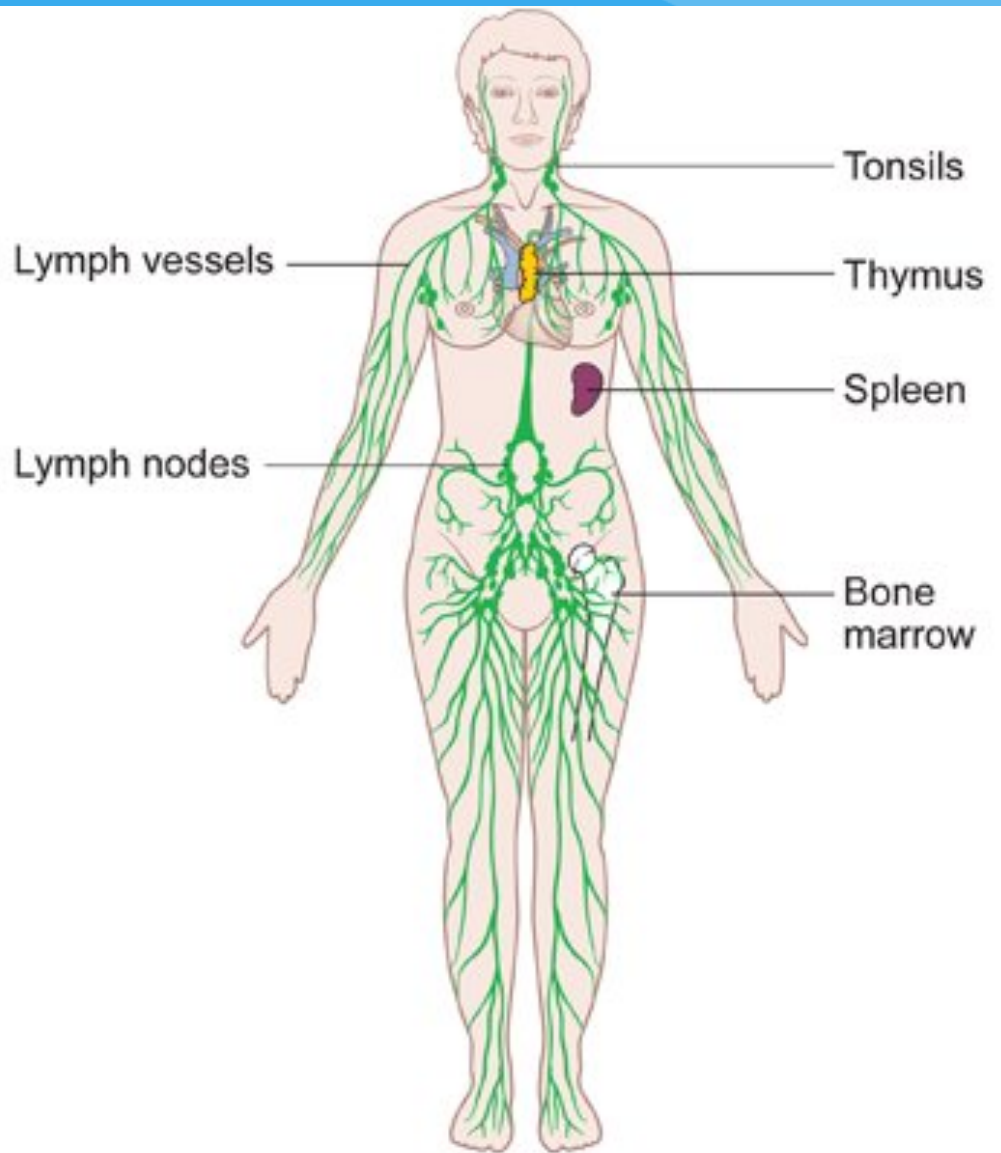


Diagram of the lymphatic system
Copyright © CancerHelp UK

- D. Lymphatic system takes up excess **tissue fluid** (fluid that surrounds cells and tissues) from the tissues and moves into the larger **lymphatic vessels** and through the **lymph nodes** and eventually enters the **blood** through the veins in the **neck** region.
- E. Lymph has **no pump** of its own so its flow depends on pressure from the blood system and the massaging effect of the **muscles**.
- F. It is a **one**-way system that starts in the tissues and empties into the cardiovascular system.

II. Lymph

- A. Once fluid enters the lymph vessels it is called **LYMPH**.
- B. Lymph resembles **plasma**, but is more diluted (about 5% of proteins and 1% of salts)
- C. Formed from bits of blood and other body liquids, called **interstitial fluid**, that collect in the spaces between cells.

- D. Some of the interstitial fluid goes back into the body through the capillary membrane, but most enters the **lymphatic capillaries** to become **lymph**.
- E. Along with this interstitial fluid, the lymph also picks up any particles (**cell** debris, **fat** globules, etc) that are too big to be absorbed through the capillary membrane.
- F. Lymph contains **LYMPHOCYTES** which are a type of **white** blood cell.

III. Main Functions of the Lymphatic System

A. Transport of excess tissue fluid back to cardiovascular system

B. Absorption of **fat** from the intestine and transport to blood

C. Fighting infection

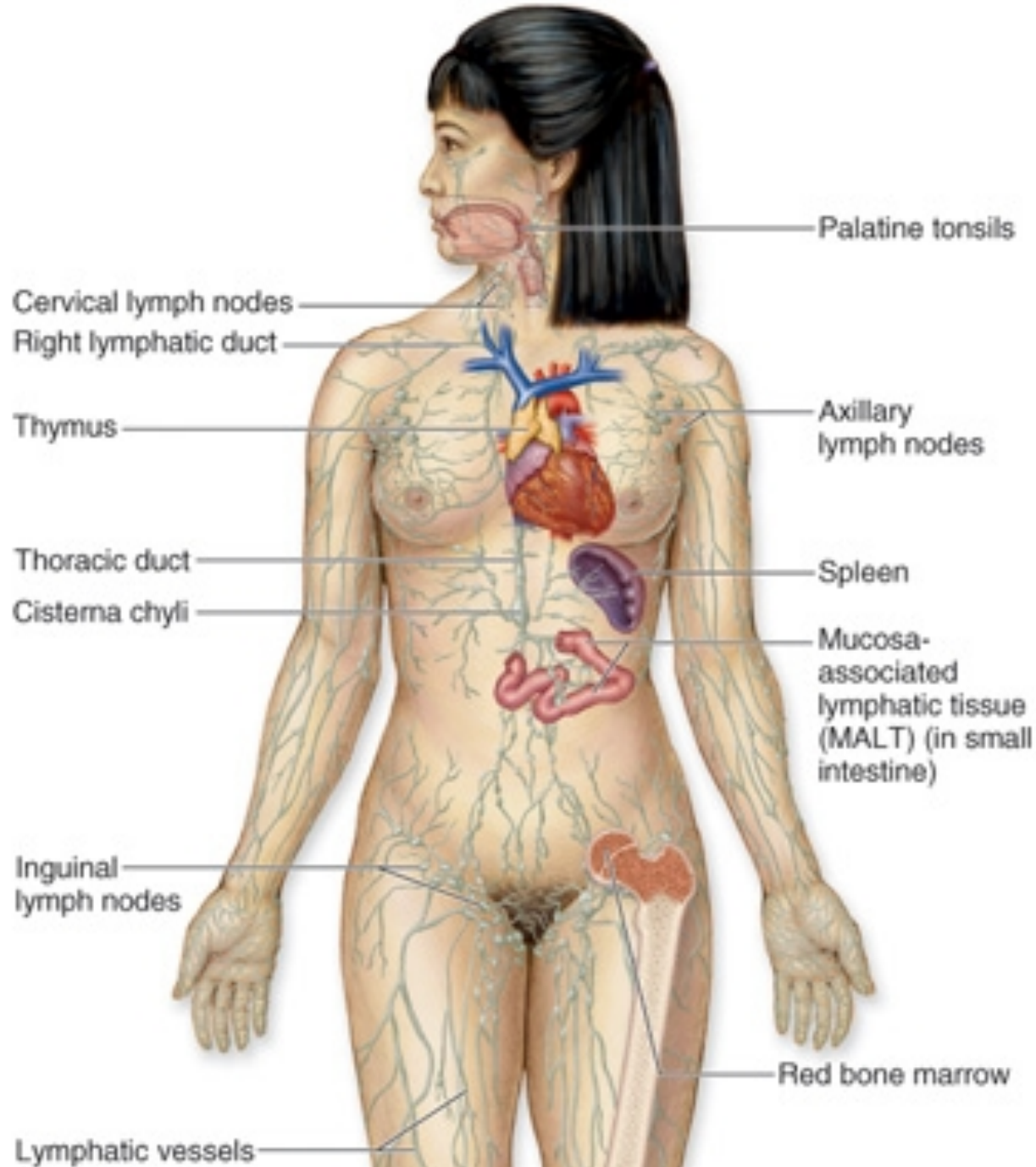
1. **Cleansing lymph**

2. **Produce lymphocytes** (a type of white blood cell)

3. Some lymphocytes produce **antibodies**

V. Components of the Lymphatic System

- A. No lymph “**arteries**” since there is no “**pump**” in this system
- B. Lymph **capillaries** take up cell fluids
- C. Lymph capillaries drain into lymph **veins** which have **valves** for one-way flow
- D. Lymph veins join to two main trunks
 1. **RIGHT LYMPHATIC DUCT**
 - a. Drains the upper **right** portion of the body and empties into the **right** subclavian vein
 2. **THORACIC DUCT**
 - a. Drains the **rest** of the body and drains into the **left** subclavian vein



V. Other Parts of the Lymphatic System

A. Lacteal

1. Blind ends of lymph vessels in **villi** of the small intestine.
2. Products of **fat** digestion enter here.

B. Lymph Nodes

1. Small **oval** or **round** structures that occur along strategic places on lymph vessels.
2. They **produce** and **store lymphocytes**
3. These fight infection by producing **antibodies** which attach to and “**flag**” or deactivate foreign proteins
4. **Filter** lymph of damaged cells, bacteria and spreading cancer cells as well as debris.

C. Spleen

1. Located behind the **stomach**.
2. Contains white blood cells and **stores** blood.

D. Thymus Gland

1. Located in the upper thoracic cavity.
2. Functions in **production** and **maturation** of some **lymphocytes**.
3. Decreases in **size** with age.

