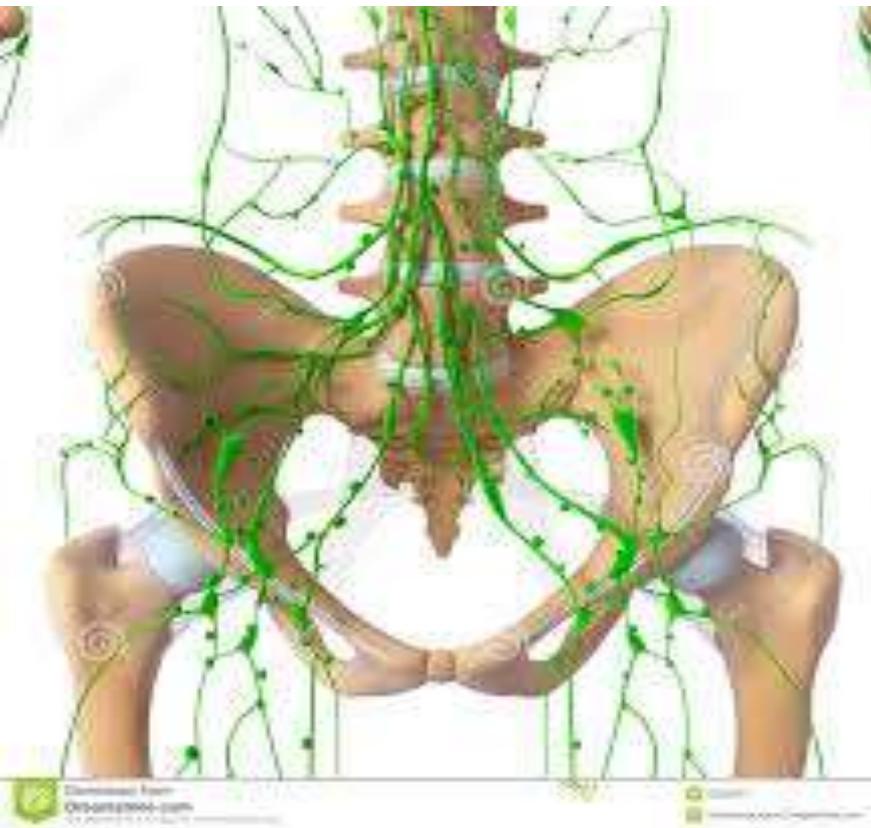


# Lymphatic system



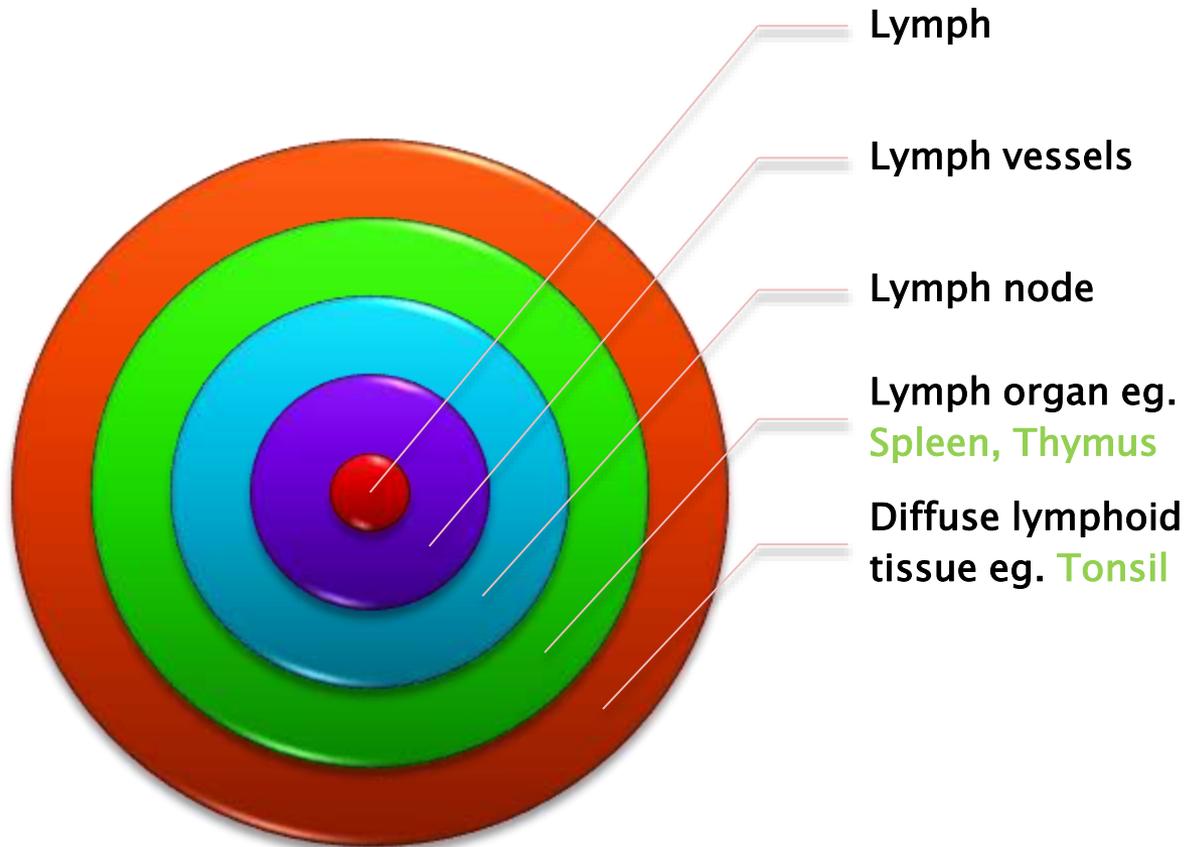
By –  
Mr. ASHOK BISHNOI  
Lecturer, JINR

# Introduction:–

- ▶ All body tissues are bathed in tissue fluid, consisting of the diffusible constituent of blood & waste material from cell. Some tissue fluid returns to capillaries at their venous end the remainder diffuses through the more permeable wall of the lymph capillaries, forming lymph.

- ▶ Cardiovascular & lymphatic system both are supply fluid flow in to the body. but bothe are deferent type of fluid..
  - ▶ Lymphatic system does not having closed circuit & central pump like heart.
- 

# It consist of.....



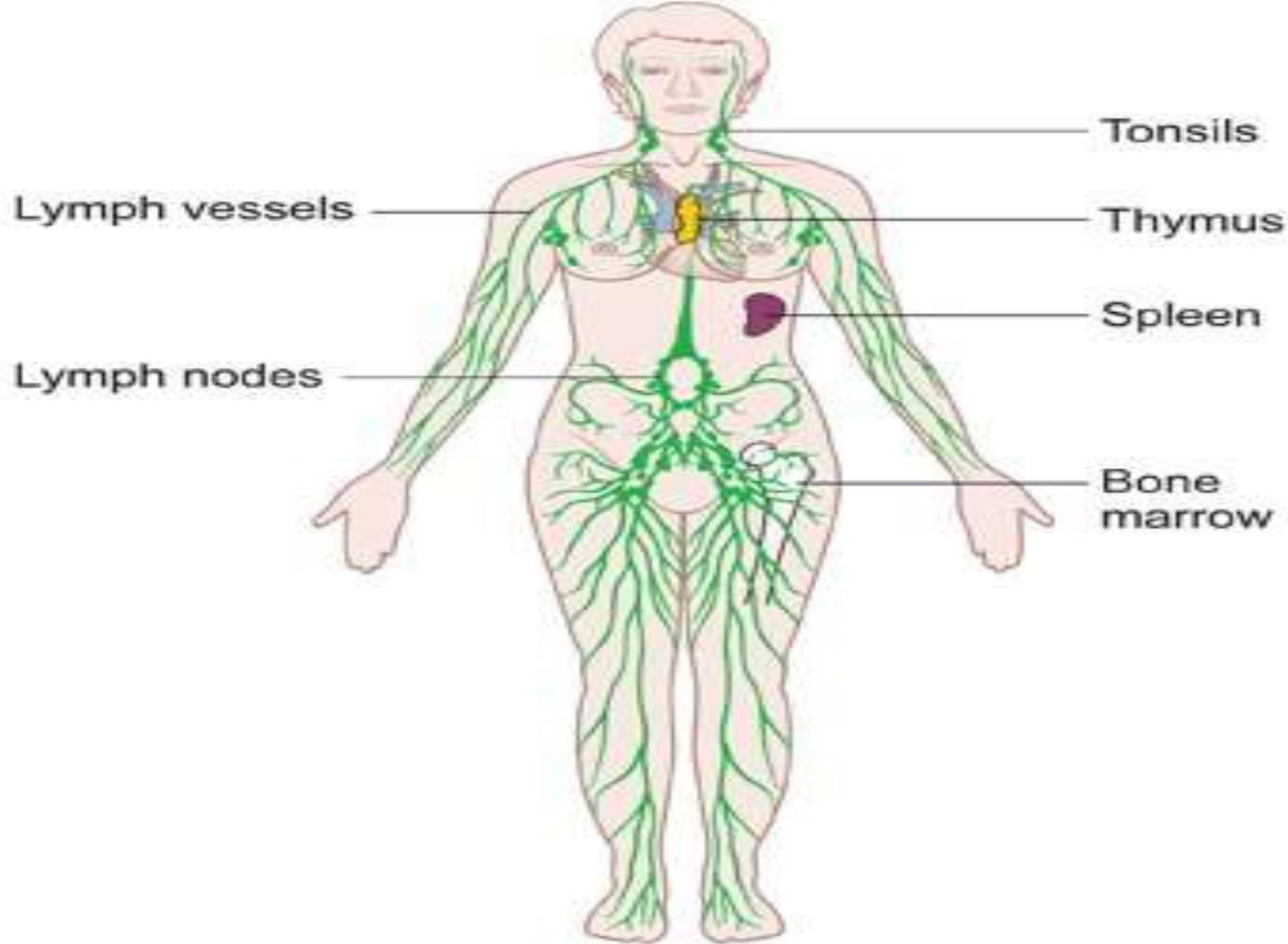


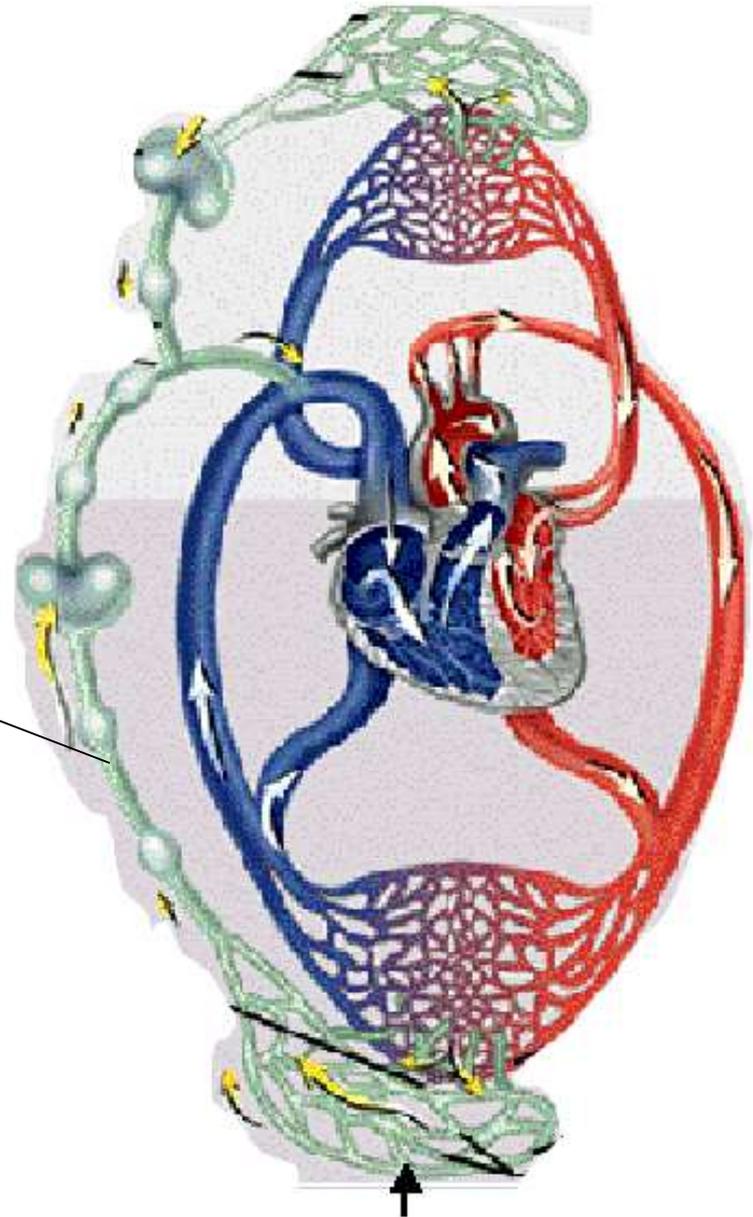
Diagram of the lymphatic system  
Copyright © CancerHelp UK

# Function of L.S.:–

- Return tissue fluid to the bloodstream.
- It absorbs and transports fat and fat soluble vitamins from the intestine..
- Kill the micro-organism.

travel along with blood vessels.

1) *lymphatic vessels*



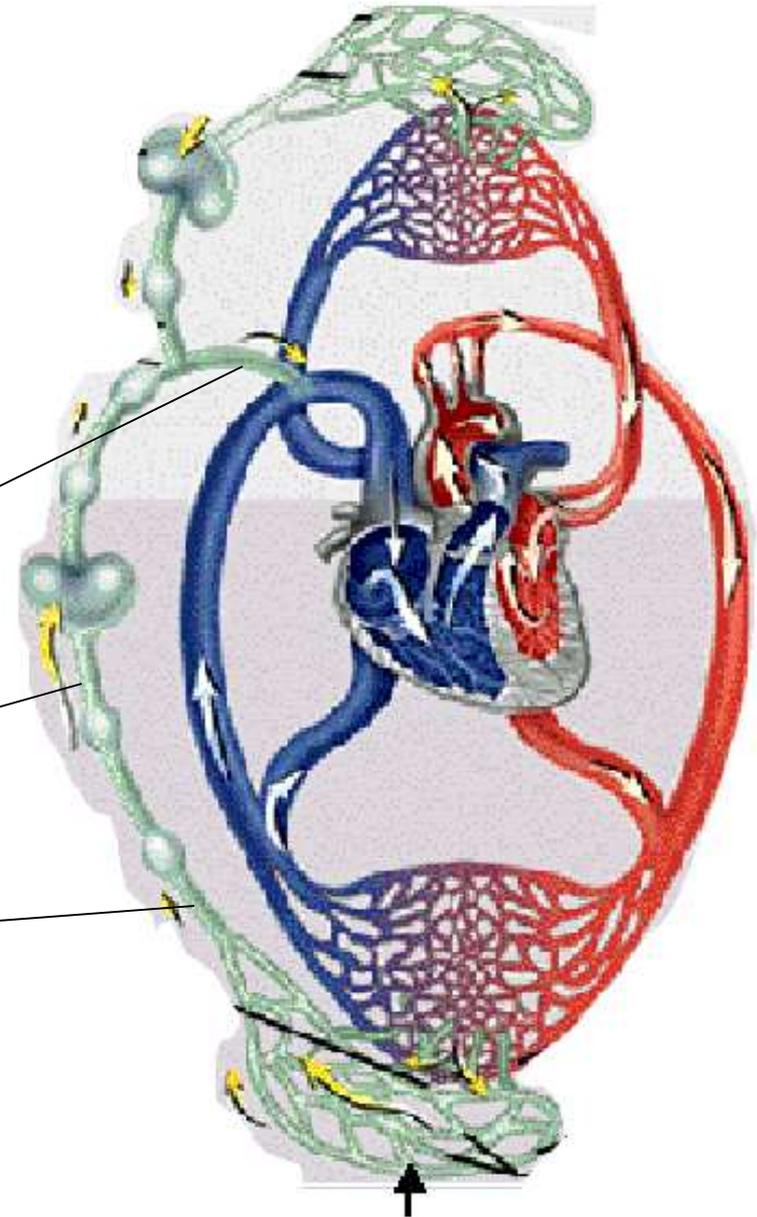
**Lymphatic vessels start with lymphatic capillaries**

lymphatic ducts

lymphatic trunks

lymphatic collecting vessels

lymphatic capillary



# Lymph:–

- ▶ **Meaning:**–After blood travels through capillary beds and is moved to the venous system, some of its fluid is left behind in the tissues it called lymph.
- ▶ Lymph is a clear, colorless liquid with a composition similar to blood plasma.
- ▶ It is nothing but the clear, watery blood plasma leaked out through the capillary walls to flow around the cells.
- ▶ It contains oxygen, proteins, glucose and white blood cells.

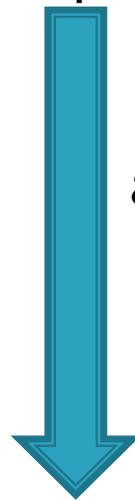
- ▶ All the cells bathed in this fluid receive their nutrients and oxygen from it.
  - ▶ Tubular vessels transport lymph back to the blood, ultimately replacing the volume lost during the formation of the interstitial fluid.
  - ▶ Lymph movement occurs despite low pressure due to peristalsis, valves, and compression during contraction of adjacent skeletal muscle and arterial pulsation
- 

# The origin on lymph :-

the cardiovascular system pumps blood through its system but it cannot return all the fluid from the body cells.



The lymph system picks up 60% of the fluid dropped off at the cellular level,



at this point we are talking about interstitial fluid, the IF picks up plasma and becomes tissue fluid

The tissue fluid is then picked up by lymph capillaries,



the tissue fluid is called *lymph*

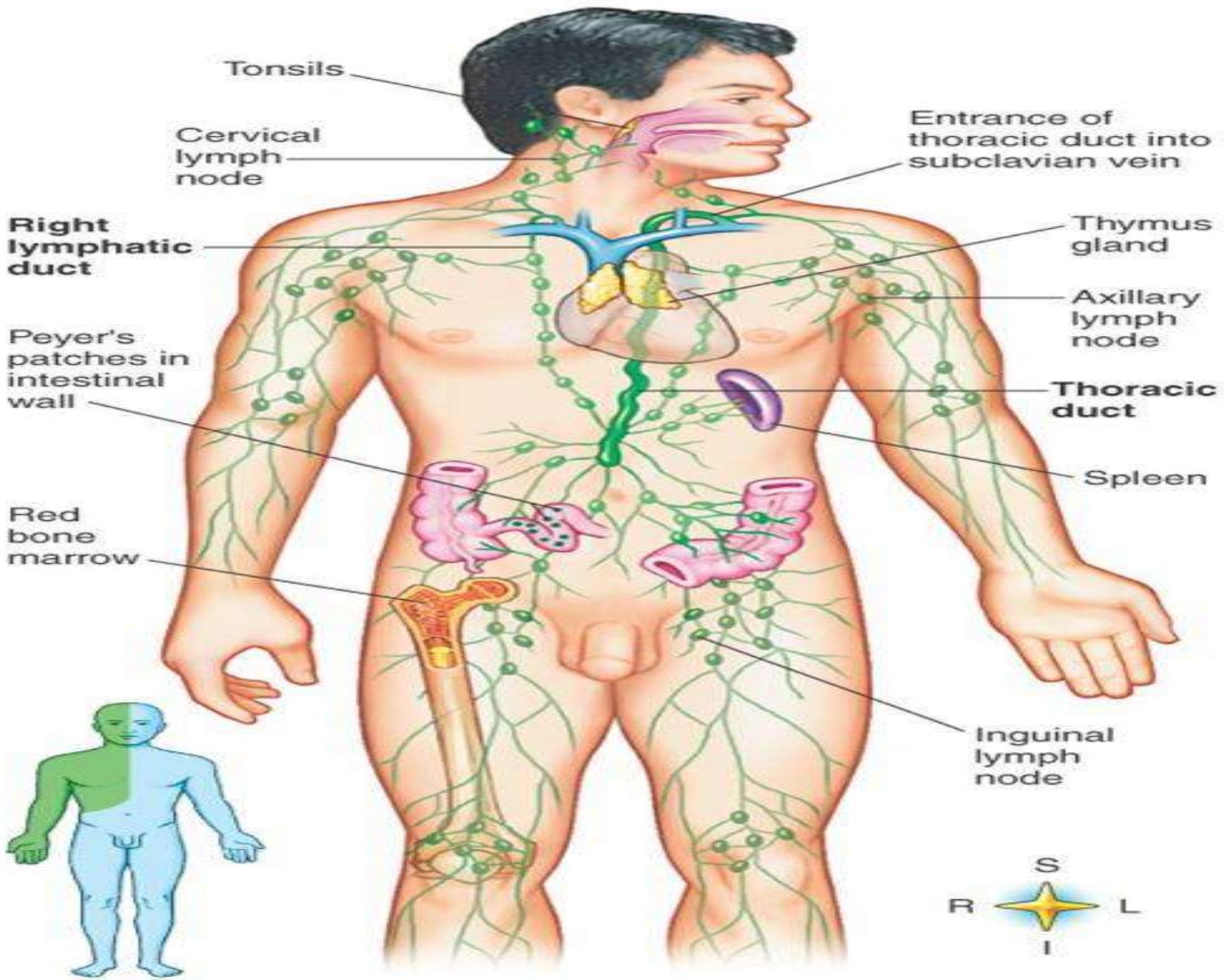
- ▶ **Lymph is an alkaline (pH > 7.0)**

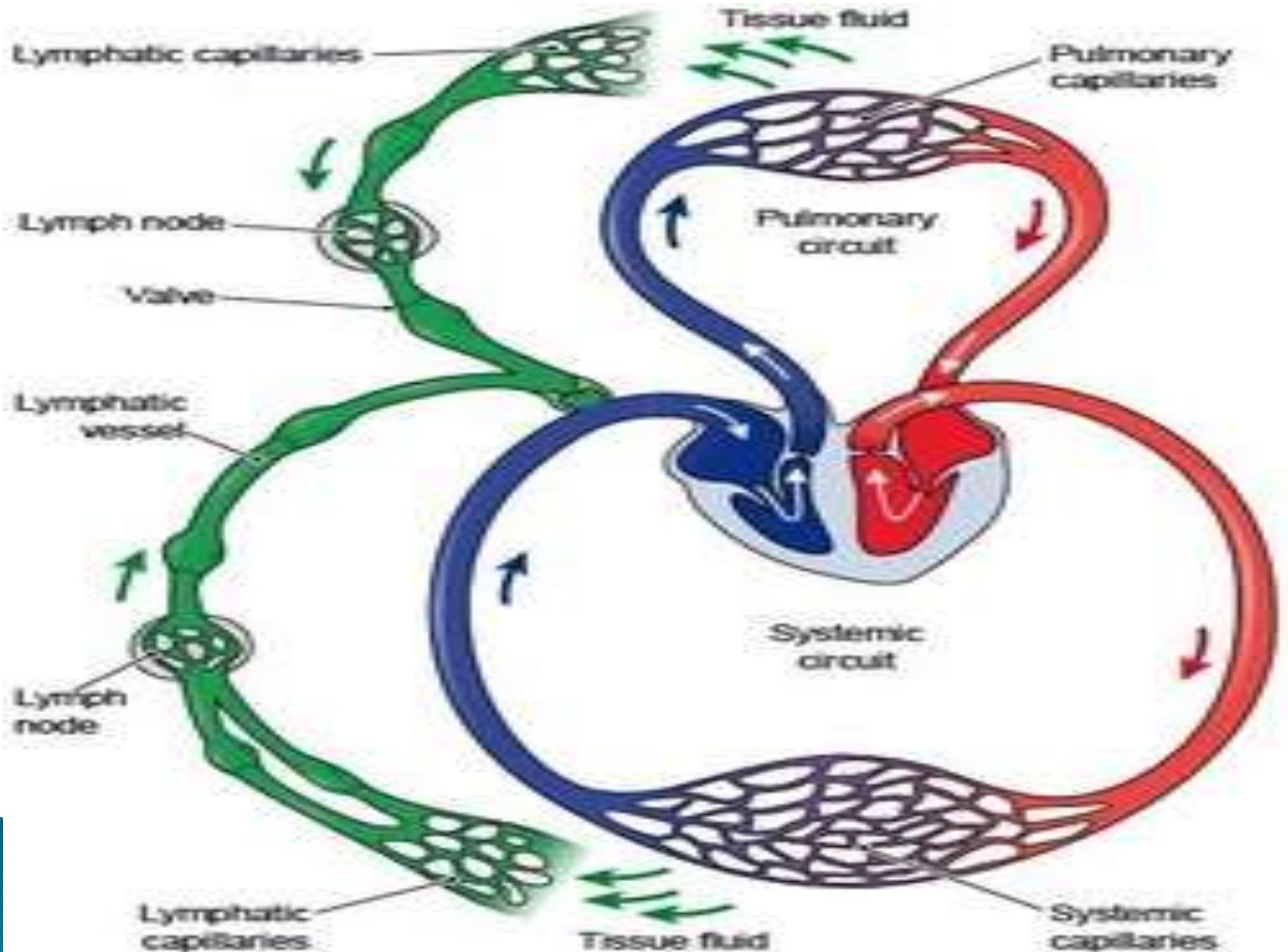
# *Function of lymph:-*

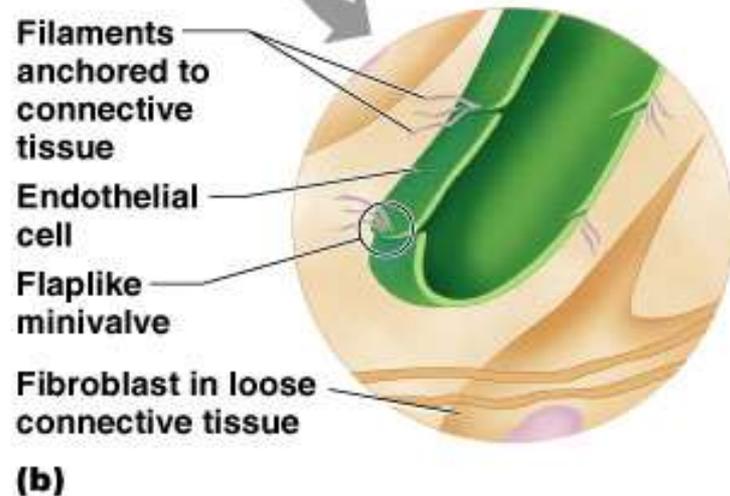
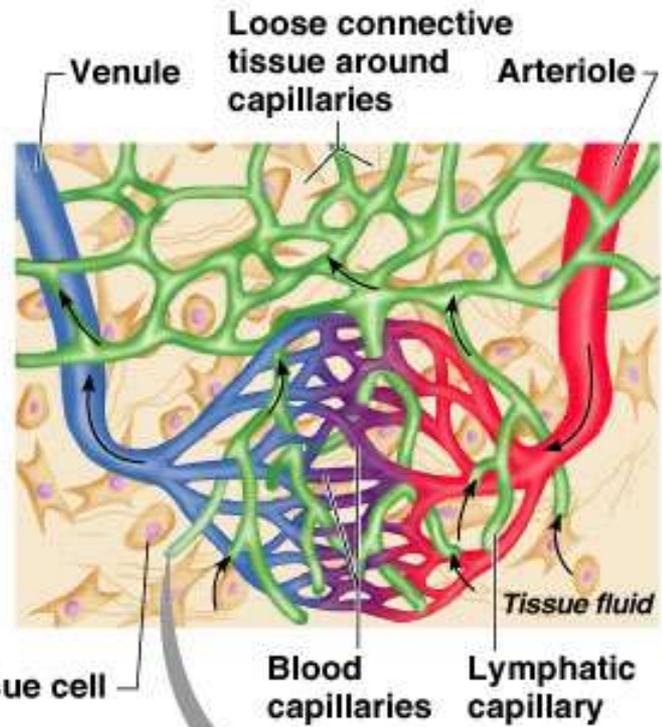
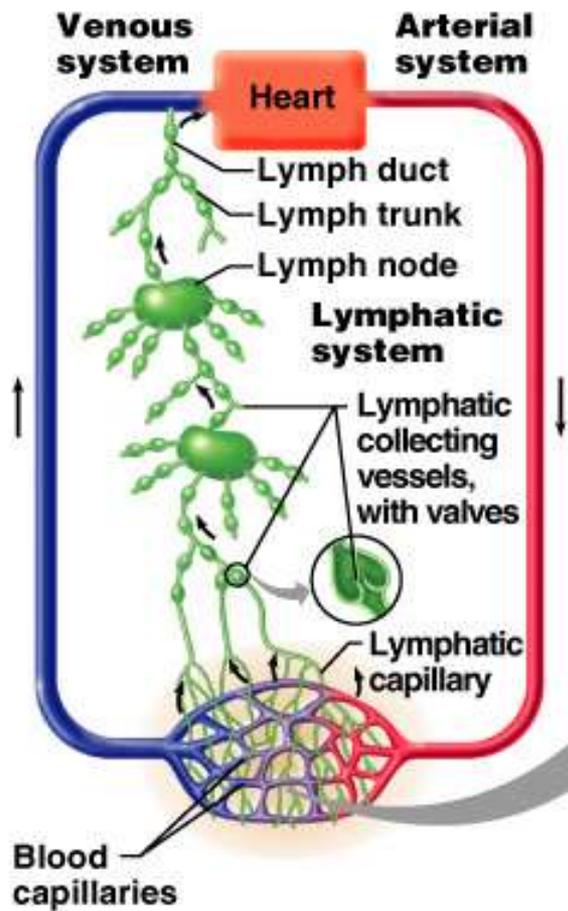
- ▶ Lymph acts as a "middle man" which transports oxygen, food materials, hormones, etc., to the body cells
- ▶ And brings carbon dioxide and other metabolic wastes, from the body cells to blood and then finally pours the same into the venous system.
- ▶ Body cells are kept moist by the lymph.
- ▶ It destroys the invading microorganisms and foreign particles in the lymph nodes

# Lymph vessels:–

- ▶ Return to the blood of any fluids that have escaped from the circulation.
- ▶ Lymphatic vessels are intimately connected with blood vessels so that they can perform this function.
- ▶ **Distribution of lymphatic vessels**
  - Lymphatic vessels travel alongside blood vessels
  - Lymphatic vessels are **absent from bones, teeth, bone marrow, and the central nervous system**







# Circulation of lymph:-

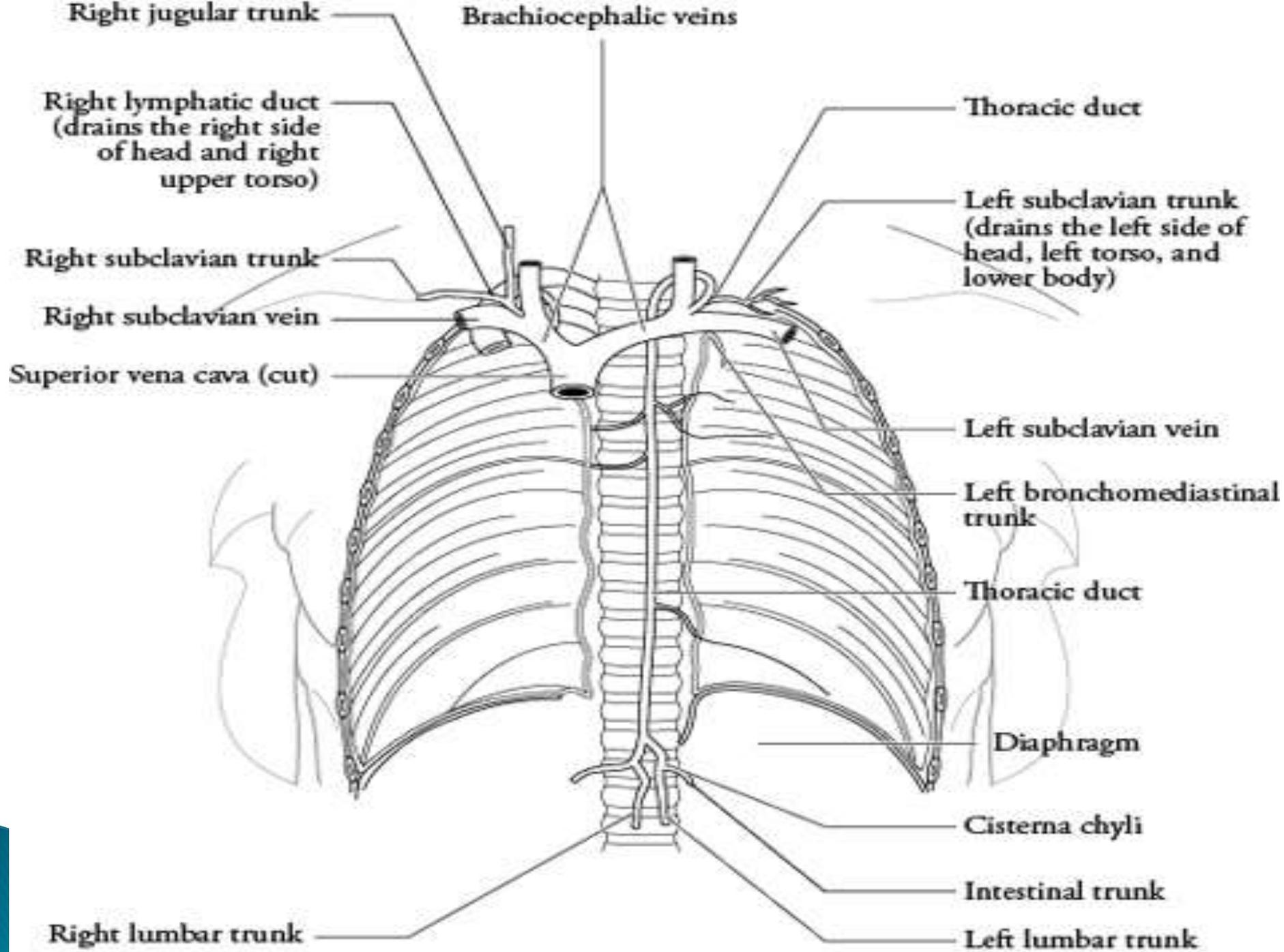
Lymphatic trunks from the union of collecting vessels.

The **nine** major trunks, draining lymph from regions for which they are named, are the **1.lumbar,2. jugular, 3.subclavian, 4.bronchomediastinal trunks**, each of which occurs in pairs (left and right, for each side of the body), and **a (5)single intestinal trunk**.

Lymphatic ducts are the largest lymphatic vessels.

These two ducts drain lymph into veins in the neck (the right and left subclavian veins at their junctures with the internal jugular veins). Valves in the lymphatic ducts at their junctions with the veins prevent the entrance of blood into the lymphatic vessels.

- **The left thoracic duct** collects lymph from the left side of the body and regions of the right side of the body below the thorax. It ultimately drains lymph into the left subclavian vein. It begins at the cisterna chili, an enlarged region of the lymphatic vessel that forms following the union of the intestinal trunk and right and left lumbar trunks.
- **The right thoracic duct** collects lymph from the upper right side of the body (right arm and right regions of thorax, neck, and head), a much smaller area than that serviced by the thoracic duct. It ultimately drains lymph into the right subclavian vein.



**Lymphatic capillary**



**Lymphatic vessel**



**Lymph node**



**Lymphatic vessel**



**Lymphatic trunk**



**Collecting duct**

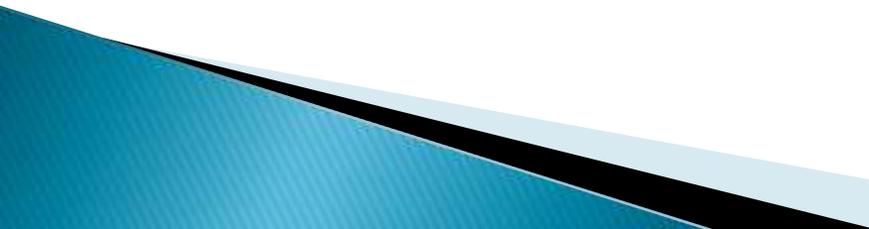


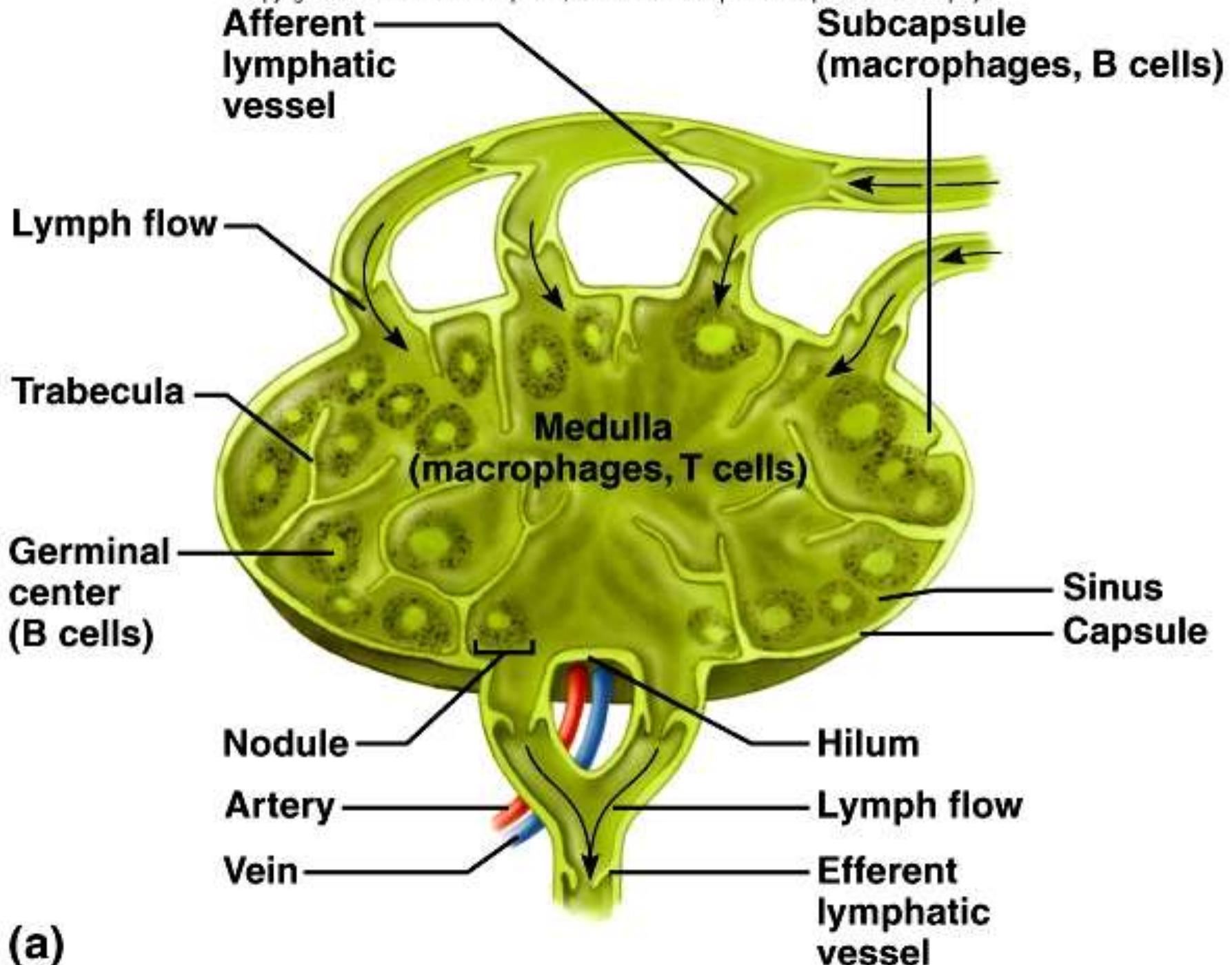
**Subclavian vein**

# Lymph nodes:–

- ▶ They are widely distributed throughout the body along the lymphatic pathways.
- ▶ Lymph nodes are not present in the central nervous system.
- ▶ Composed of lymphoid tissue.

# Structure of lymph nodes

- ▶ Small bean-shaped structures
  - ▶ Usually less than 2.5 cm (1 inch) in length.
  - ▶ Three superficial regions where lymph nodes tend to cluster
    1. Inguinal nodes in the groin
    2. Axillary nodes in the armpit
    3. Cervical nodes in the neck
- 

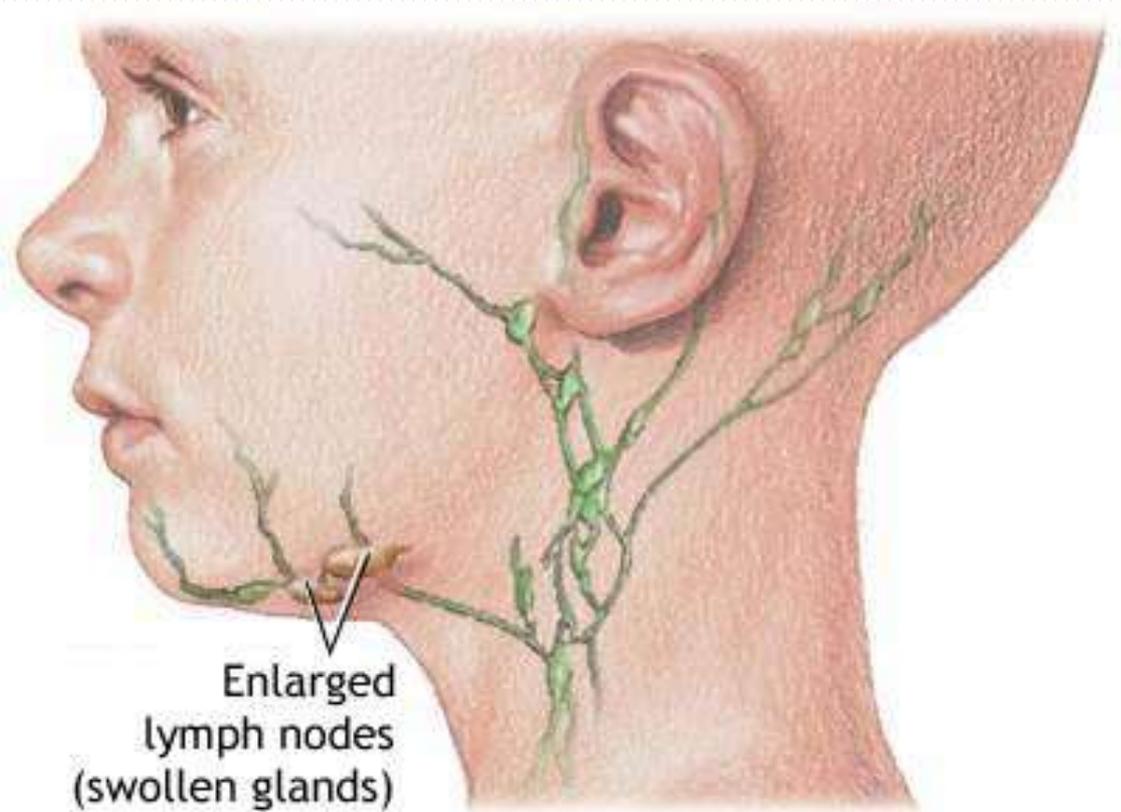


(a)

# Function of Lymph nodes

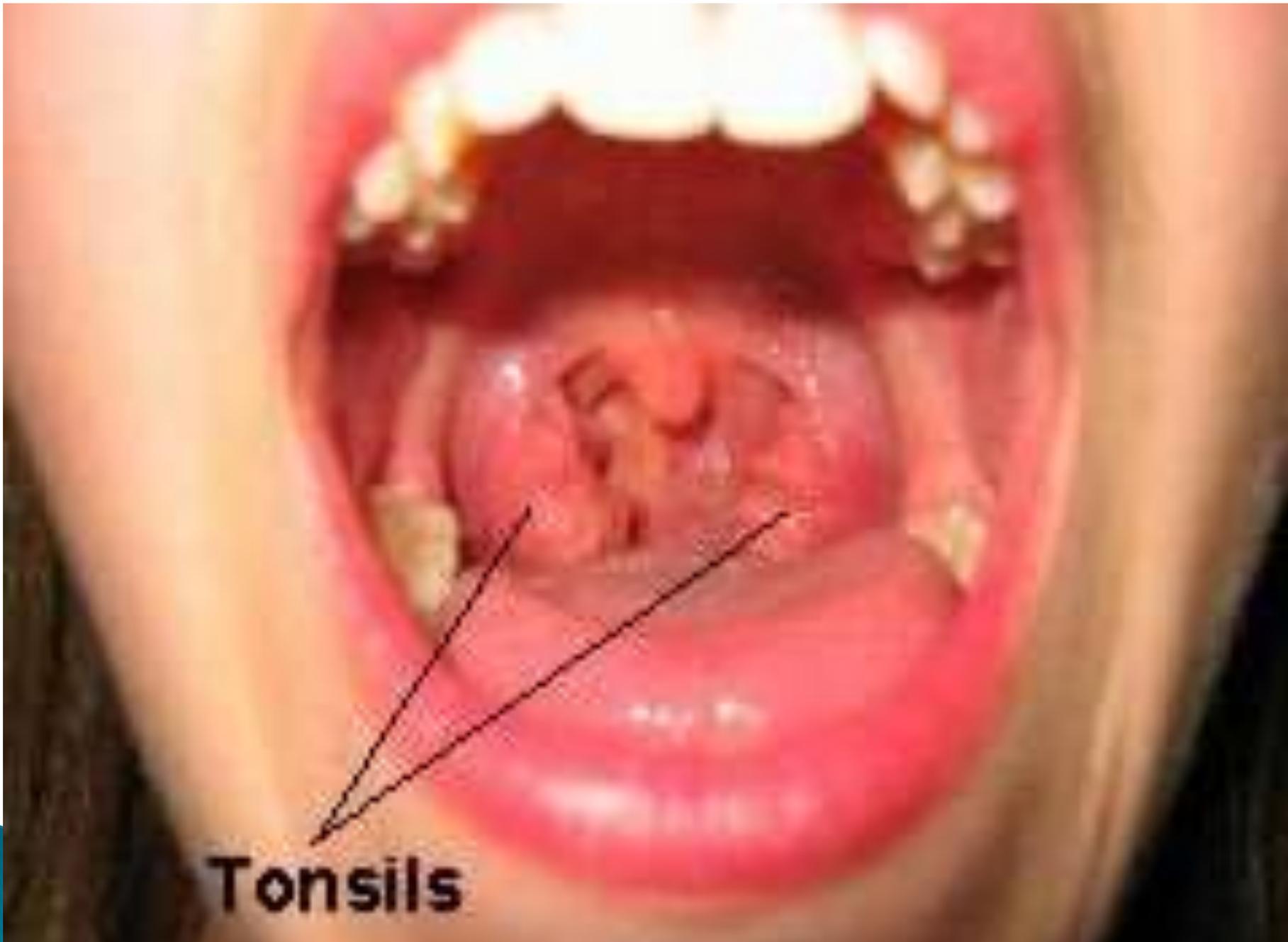
- ▶ Filter the lymph before it is returned to the blood.
  - ▶ Preventing foreign particles from entering the bloodstream
  - ▶ They also produce lymphocytes
- 

# Swollen Lymph Glands



# Tonsils:-

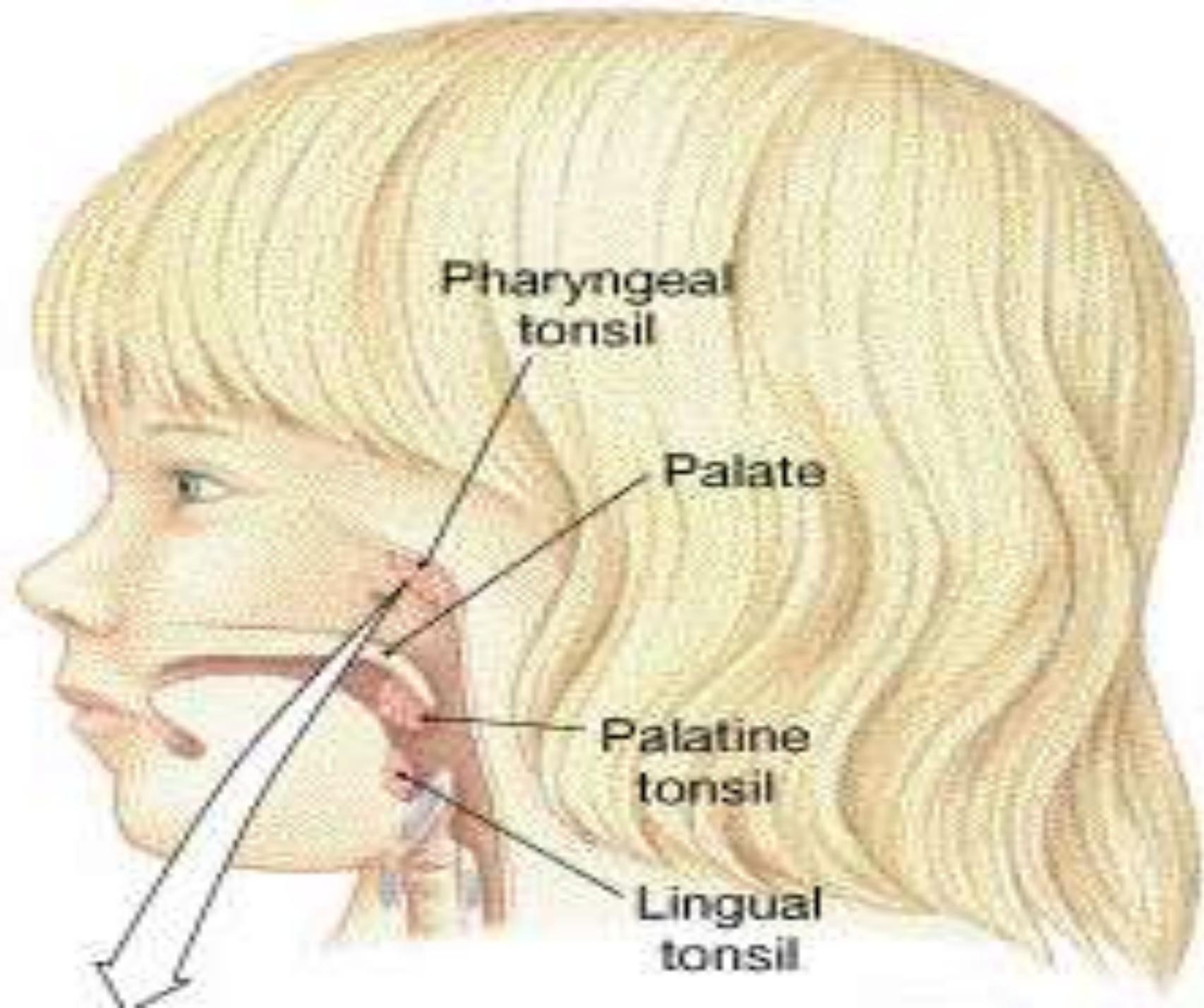
- Cluster of lymphatic tissue just under the mucous membranes that line the nose, mouth, and pharynx (throat) called tonsils.
- There are three groups of tonsils.
  1. Pharyngeal tonsils
  2. Palatine tonsils
  3. Lingual tonsils



**Tonsils**

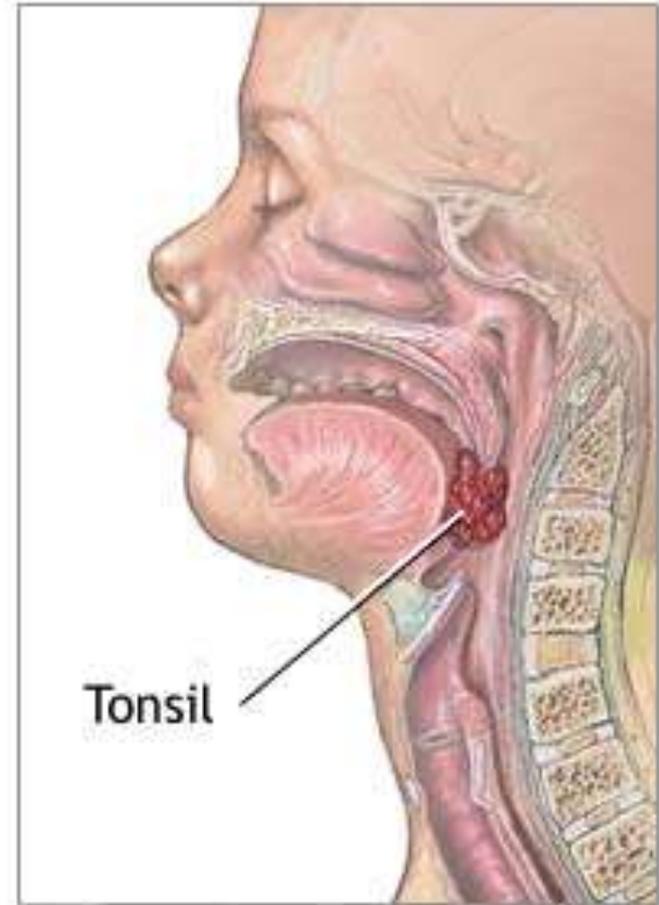
## *Function:-*

- ▶ Provide protection against harmful substances and pathogens that may enter the body through the nose or mouth.
  - ▶ **Blood supply by:-**Tonsillar branch of facial artery
  - ▶ **Nerve supply by:-**glossopharyngeal nerve
- 



# Enlarge Tonsil

Greatly enlarged  
tonsil causing  
obstructive  
sleep apnea



Lymph node:-

