

# LYMPHATIC SYSTEM

A&P

# LYMPHATIC SYSTEM CONSISTS OF:

- Lymph
- Lymphatic vessels
- Lymph nodes
- Lymphatic ducts
- Lymphatic tissue

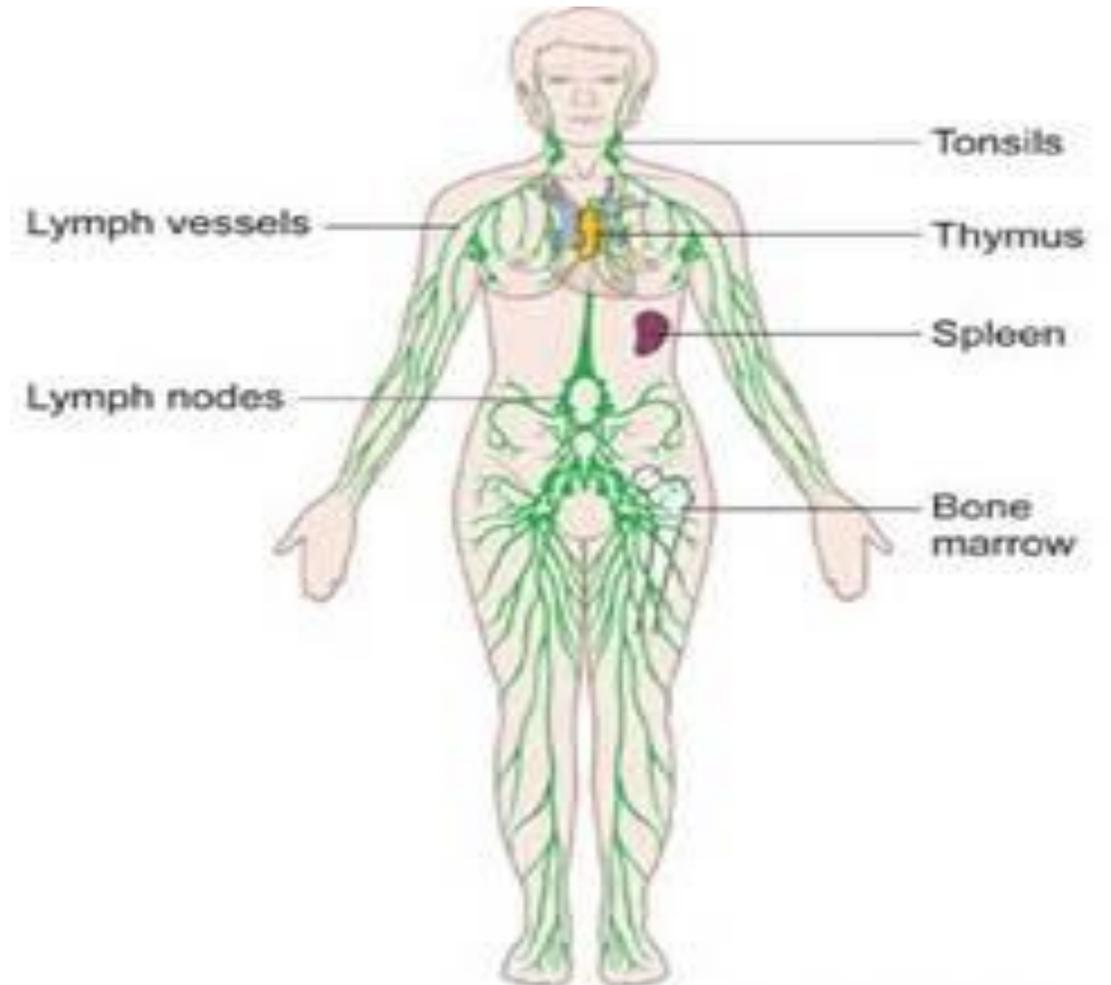
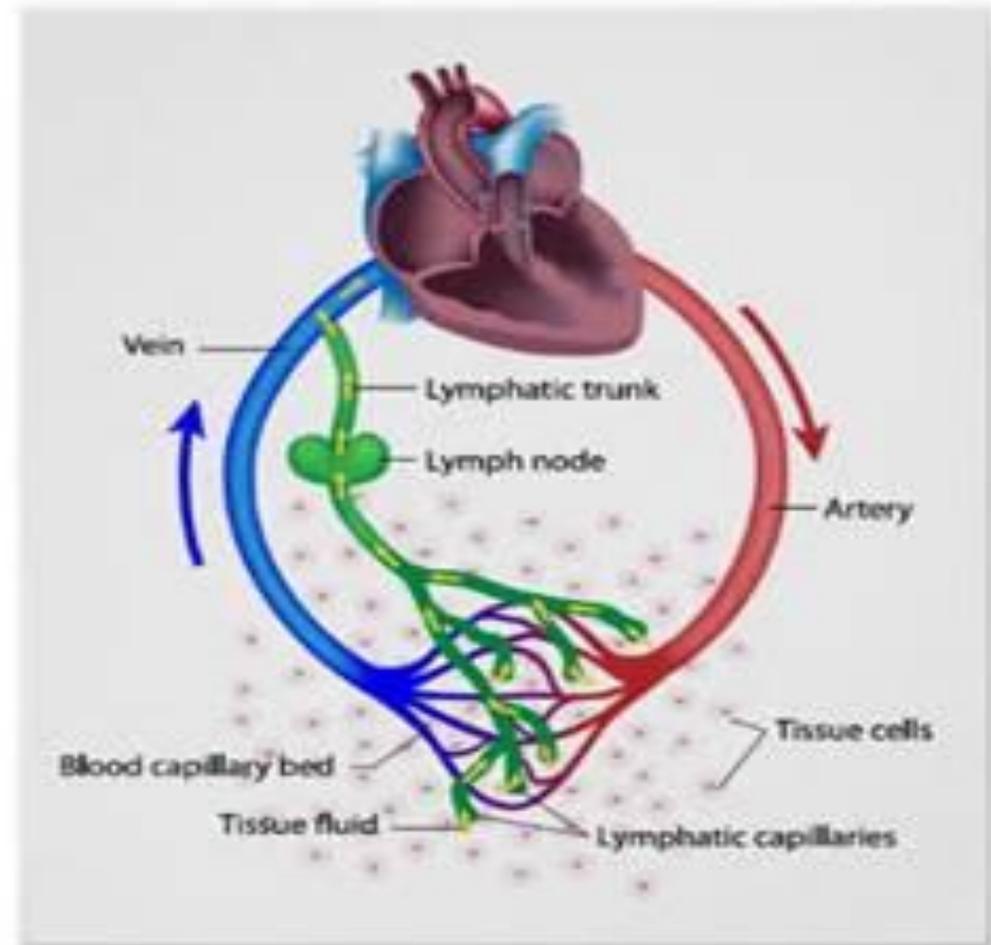


Diagram of the lymphatic system  
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# LYMPHATIC SYSTEM FUNCTIONS:

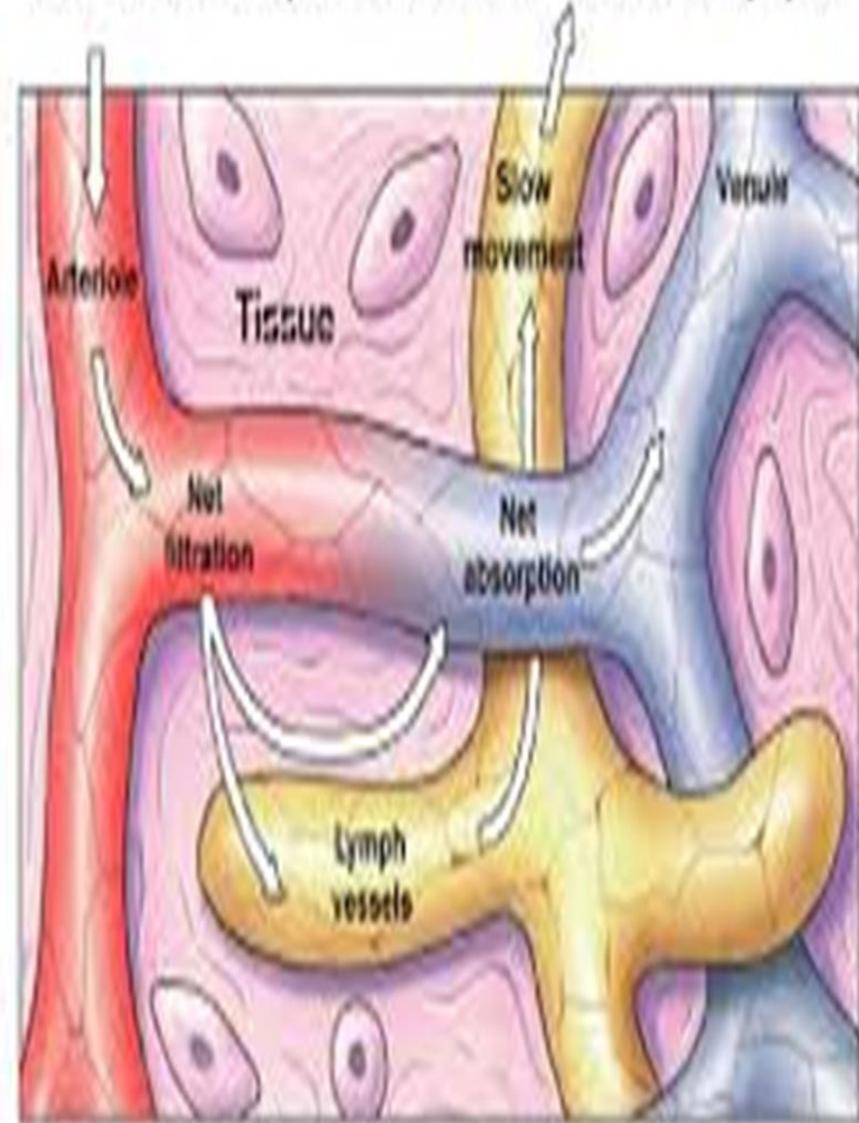
- ❑ Works with the CV system to remove wastes and excess fluids from the tissues
- ❑ Part of the body's defense (immune system) to protect us from pathogens



# LYMPH:

- Thin, watery fluid made of intercellular (interstitial) fluid
- It forms when plasma leaks out of blood vessels into tissue spaces
- Made of water, digested nutrients, salts, hormones, O<sub>2</sub>, CO<sub>2</sub>, lymphocytes, metabolic wastes (urea)
- Once this interstitial fluid enters lymphatic system it is called lymph

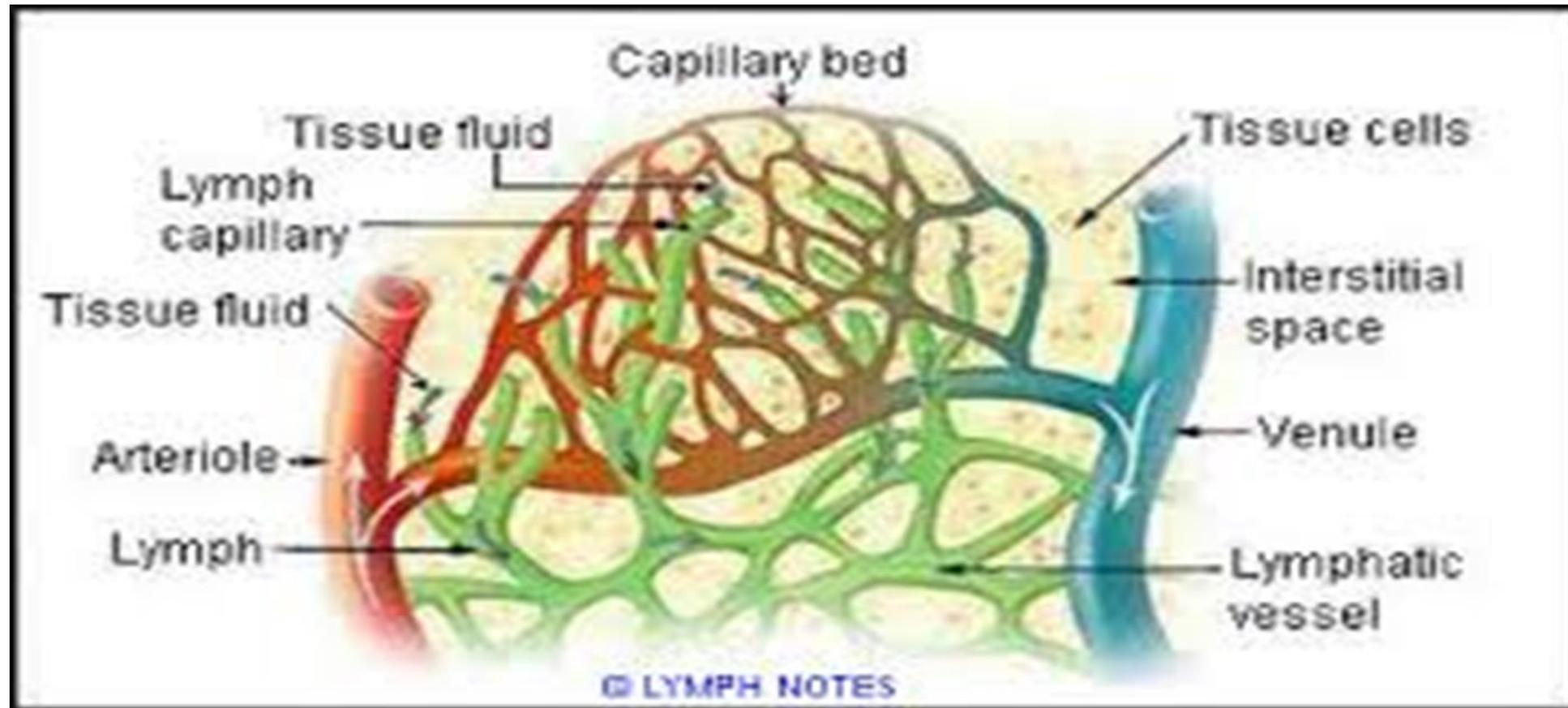
The white arrow represents the fluid that becomes lymph.



The fluid that leaks out of blood vessels washes the tissue and is picked up by lymph vessels and taken to the lymph nodes for further cleansing.

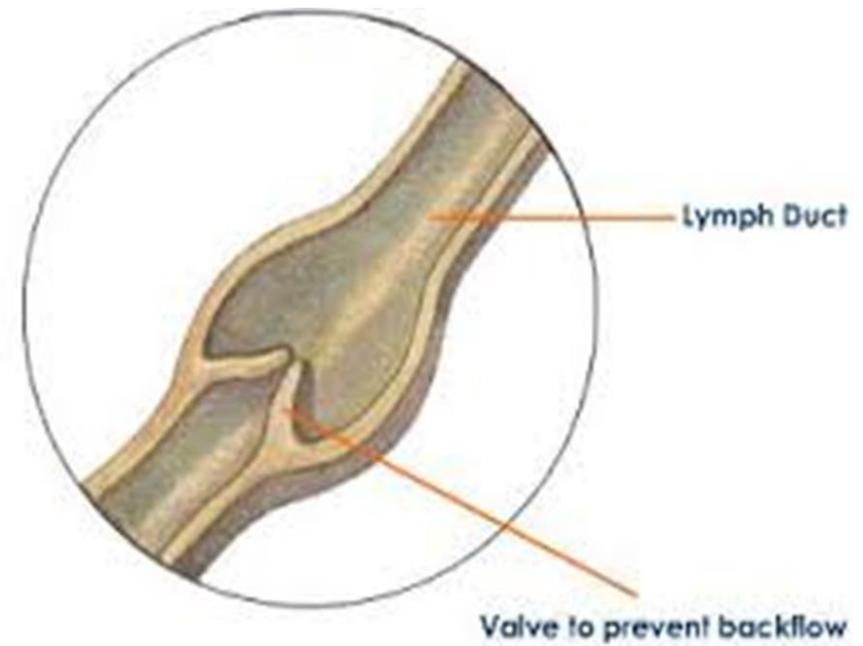
# LYMPHATIC VESSELS:

- Located in almost all body tissues close to blood vessels



# LYMPHATIC VESSELS:

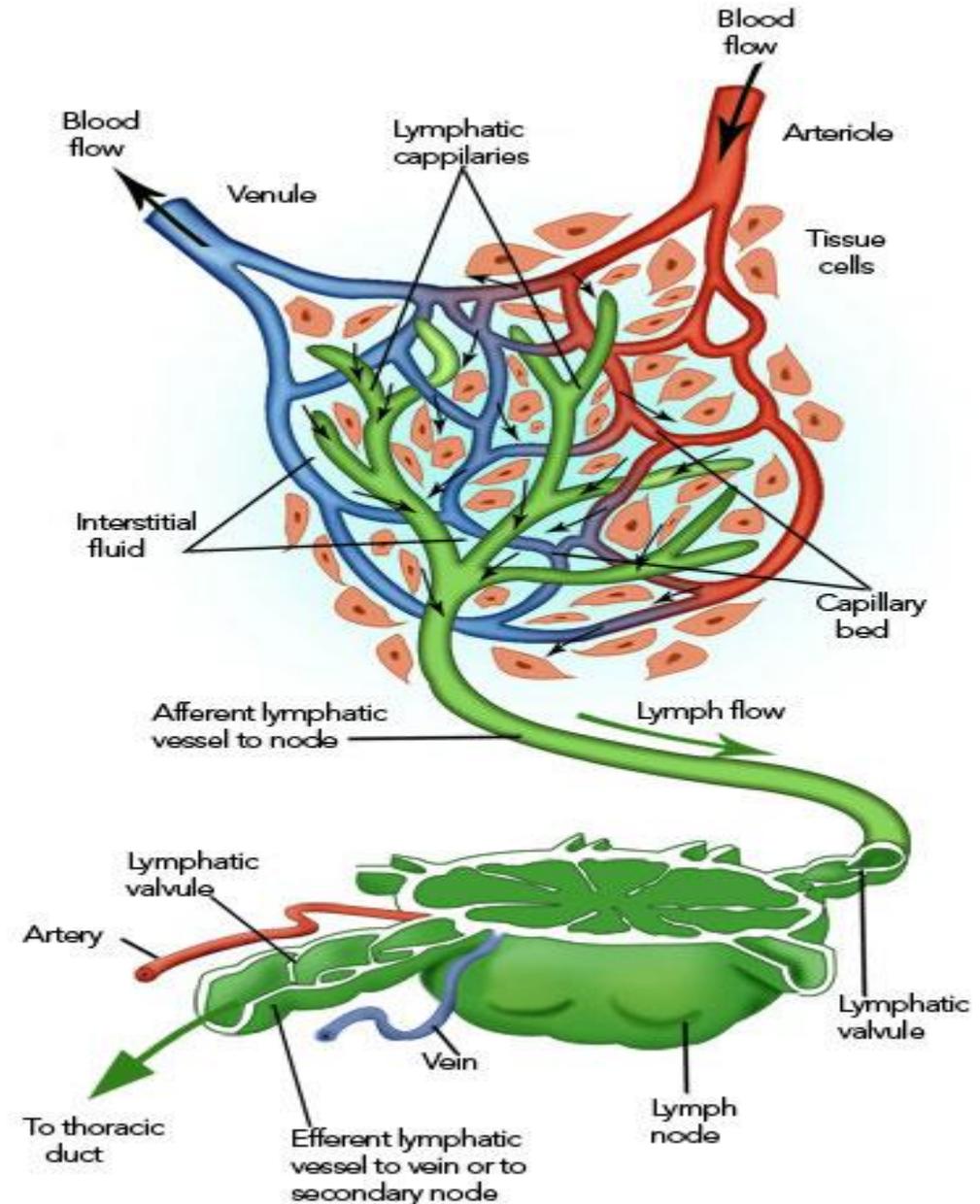
- Contain valves to keep lymph flowing in one direction
- Skeletal muscle contractions against lymph vessels cause lymph to flow through the vessels



# LYMPHATIC VESSELS:

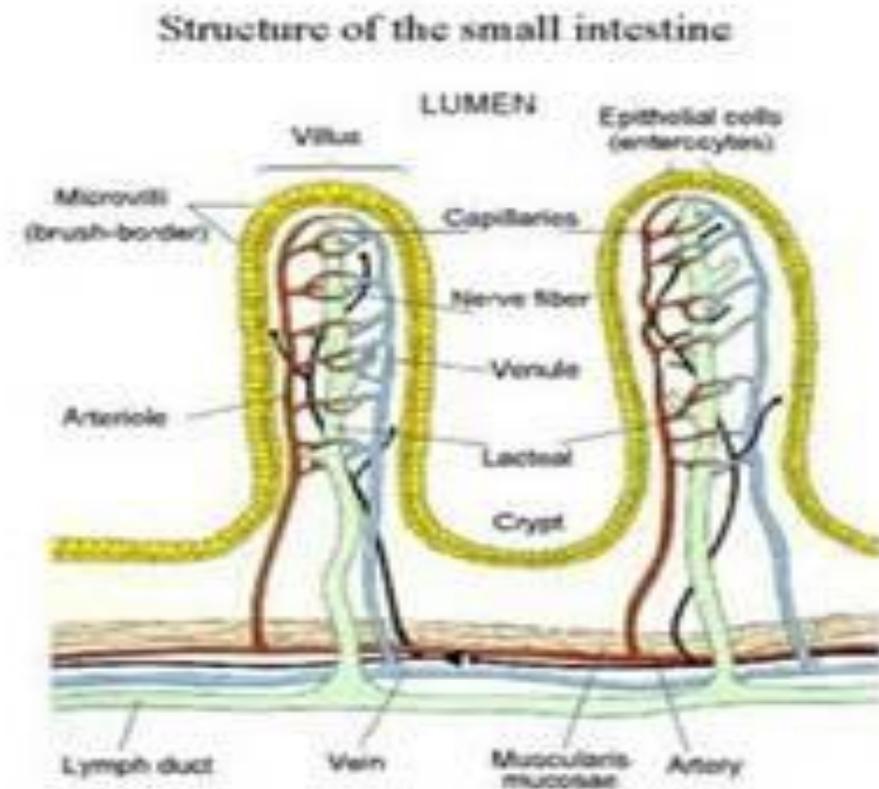
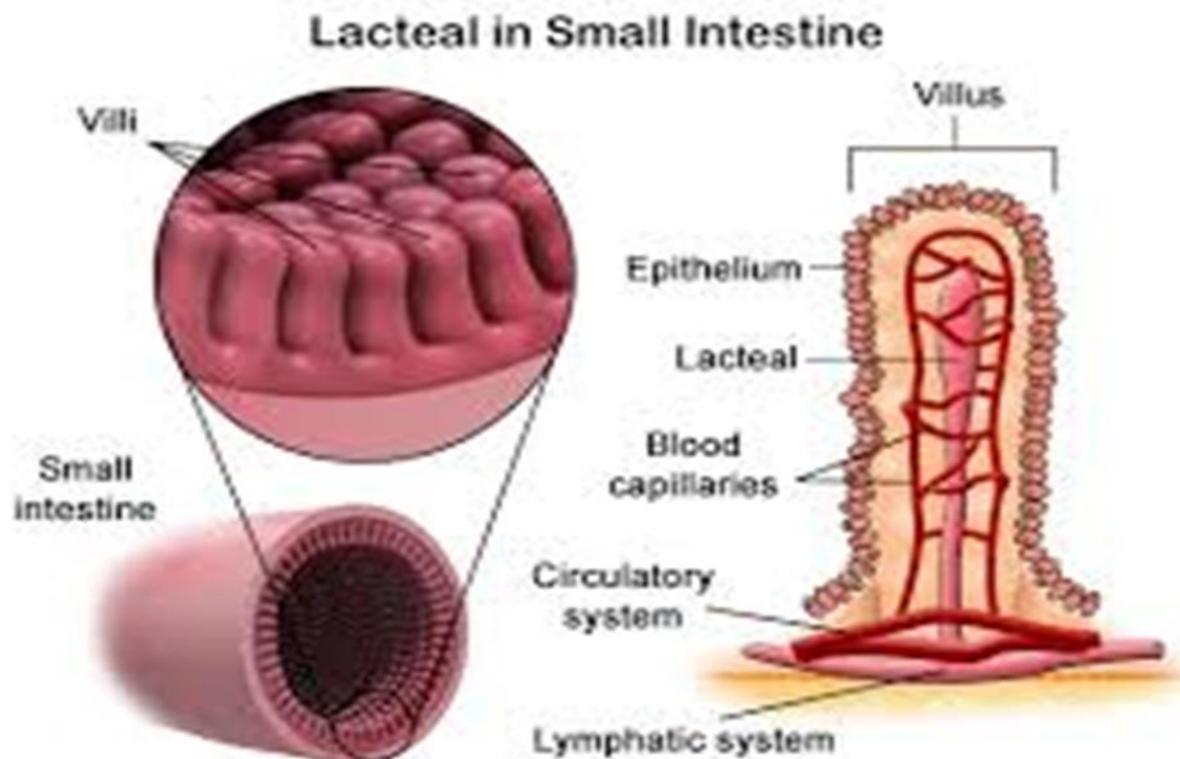
- Lymphatic capillaries = small, open-ended lymph vessels that pick up lymph at tissues
- Lymphatic capillaries join together to form larger lymphatic vessels which pass through lymph nodes

SCHEMATIC ILLUSTRATION: LYMPH FLOW



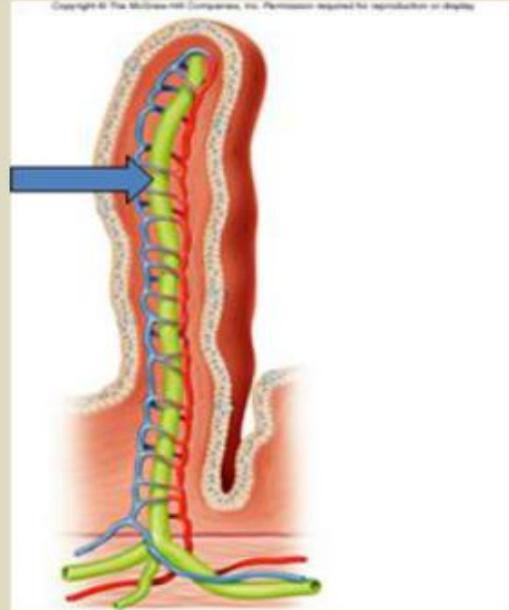
# LYMPHATIC VESSELS:

- **Lacteals** = specialized lymph capillaries in the small intestines that pick up digested lipids (fats)



# LYMPHATIC VESSELS:

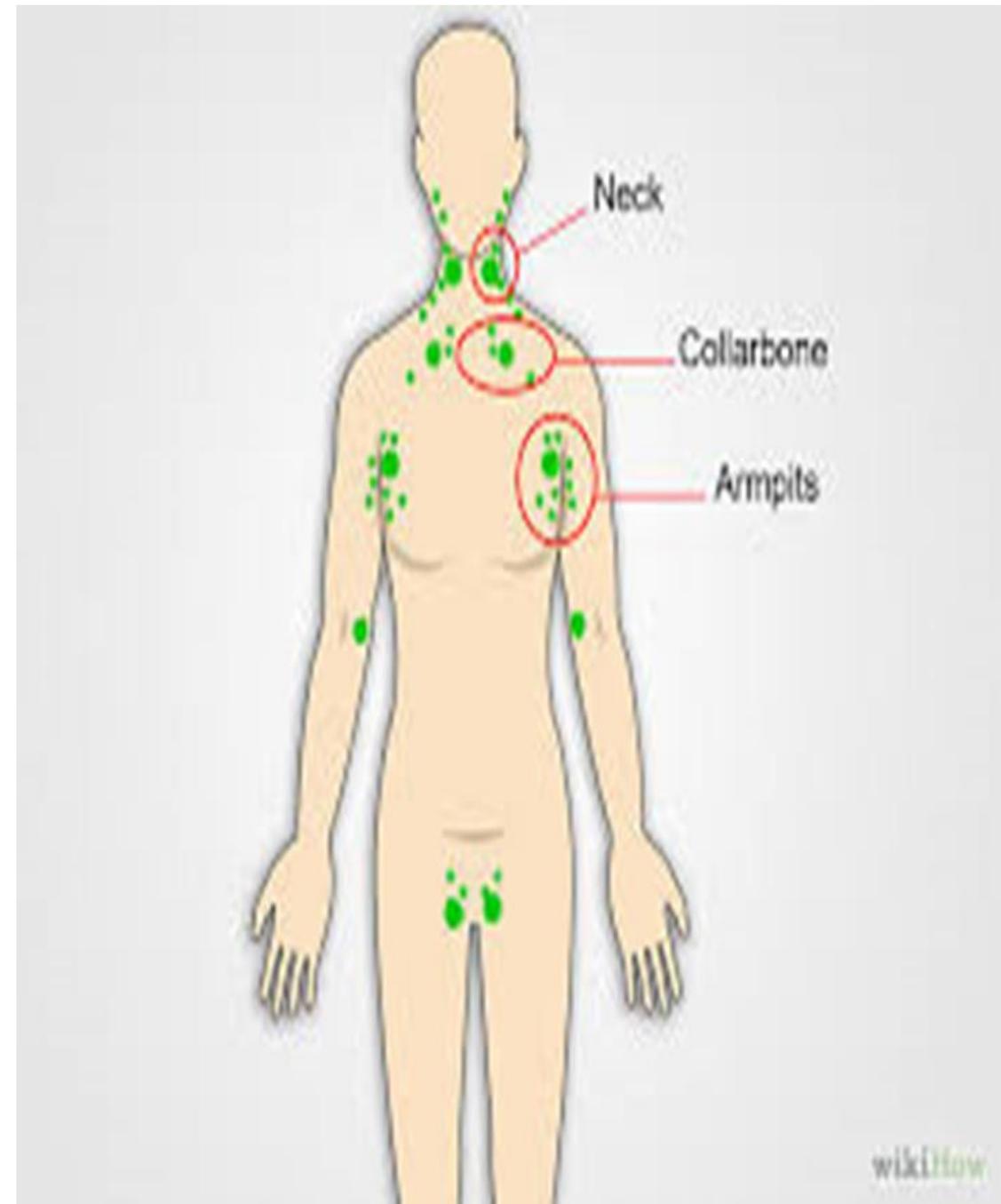
- Chyle = lymph mixed with lipids
- Lacteals transport chyle to the bloodstream through the thoracic duct



Name this lymphatic vessel.

# LYMPH NODES:

- AKA lymph glands
- Located in clusters all over the body
- Small, round, or oval masses
- Size ranges from pinhead to almond
- Filter lymph and remove impurities-  
carbon, cancer cells, pathogens, dead  
blood cells



# LYMPH NODES:

- Produce lymphocytes (type of WBC) and antibodies (fight infection)
- Purified lymph with added lymphocytes and antibodies leaves node by a single lymphatic vessel

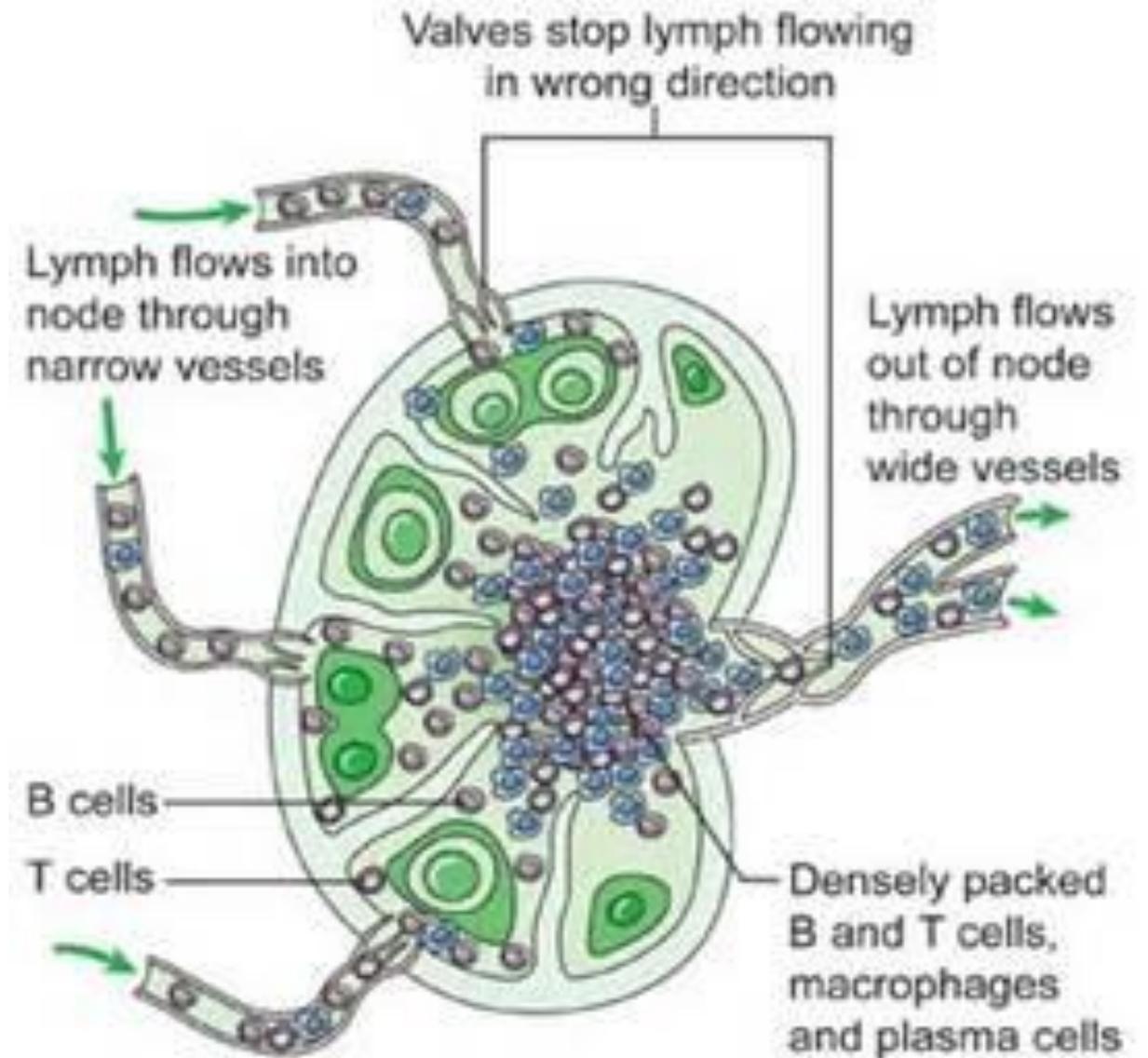
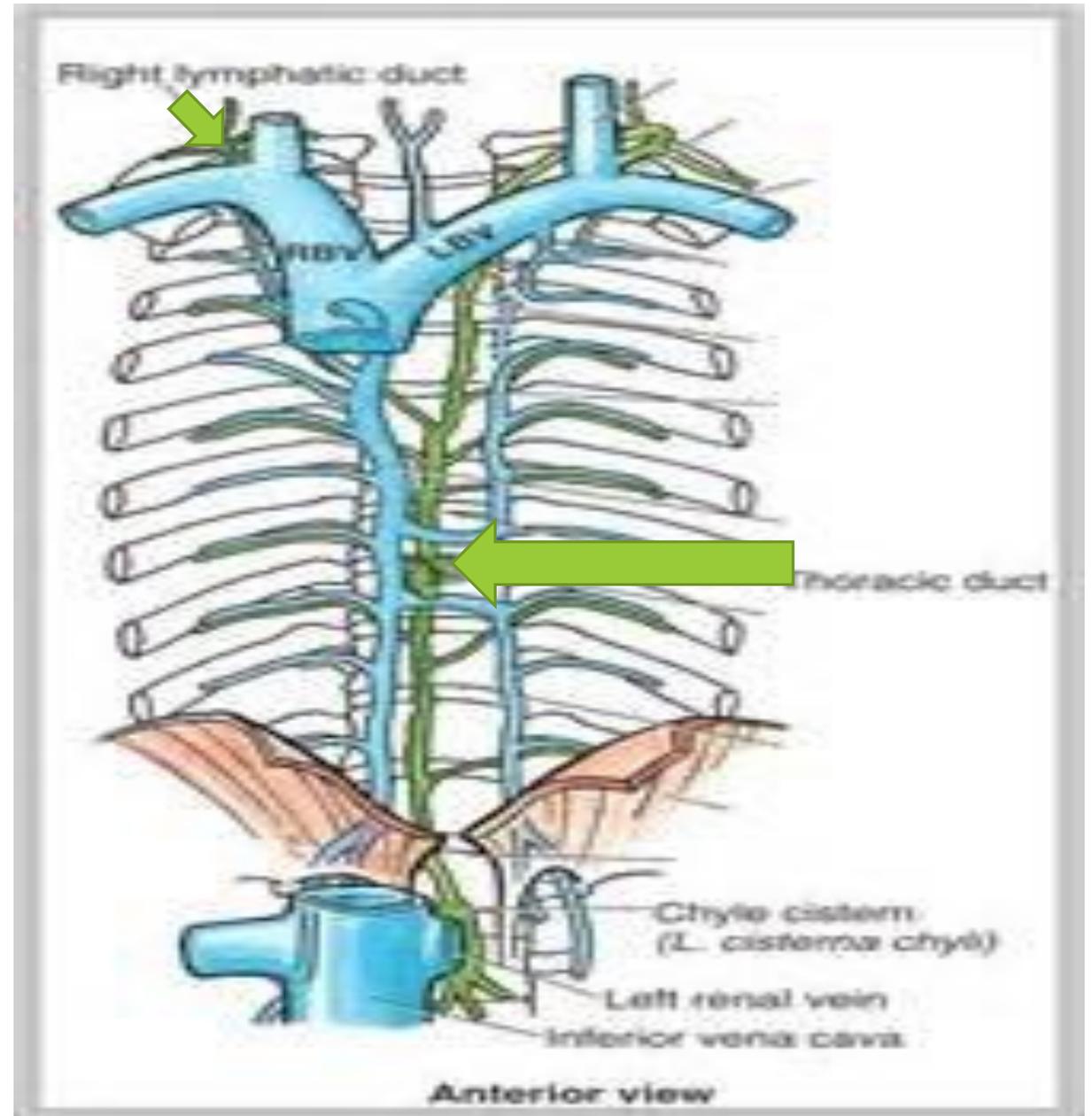


Diagram of a lymph node  
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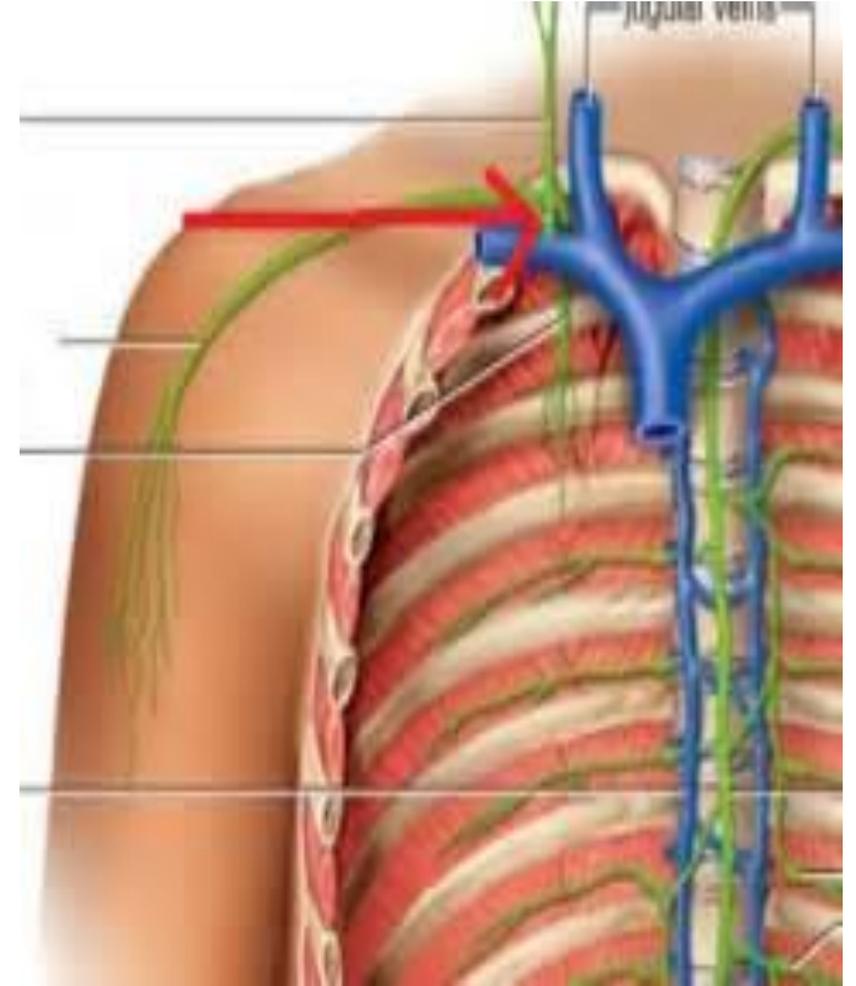
# LYMPHATIC DUCTS:

- As lymphatic vessels leave nodes, they continue to join together to form larger lymph vessels
- These vessels drain into 1 of 2 **lymphatic ducts: right lymphatic duct or thoracic duct**



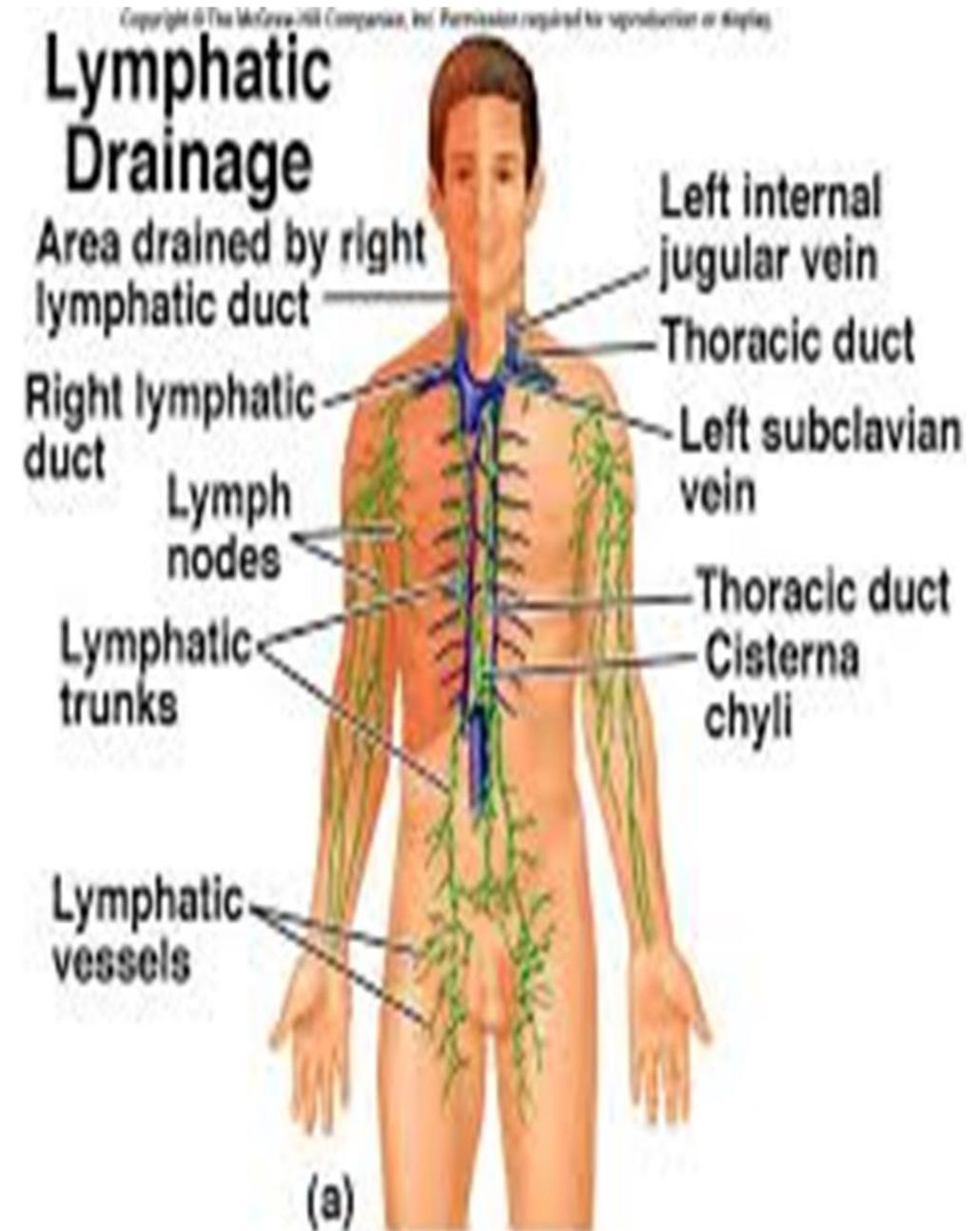
# LYMPHATIC DUCTS:

- **Right lymphatic duct**-short tube, receives all the purified lymph from R side of head & neck, R chest, & R arm
- It empties into the R subclavian vein, returning the purified lymph to the blood



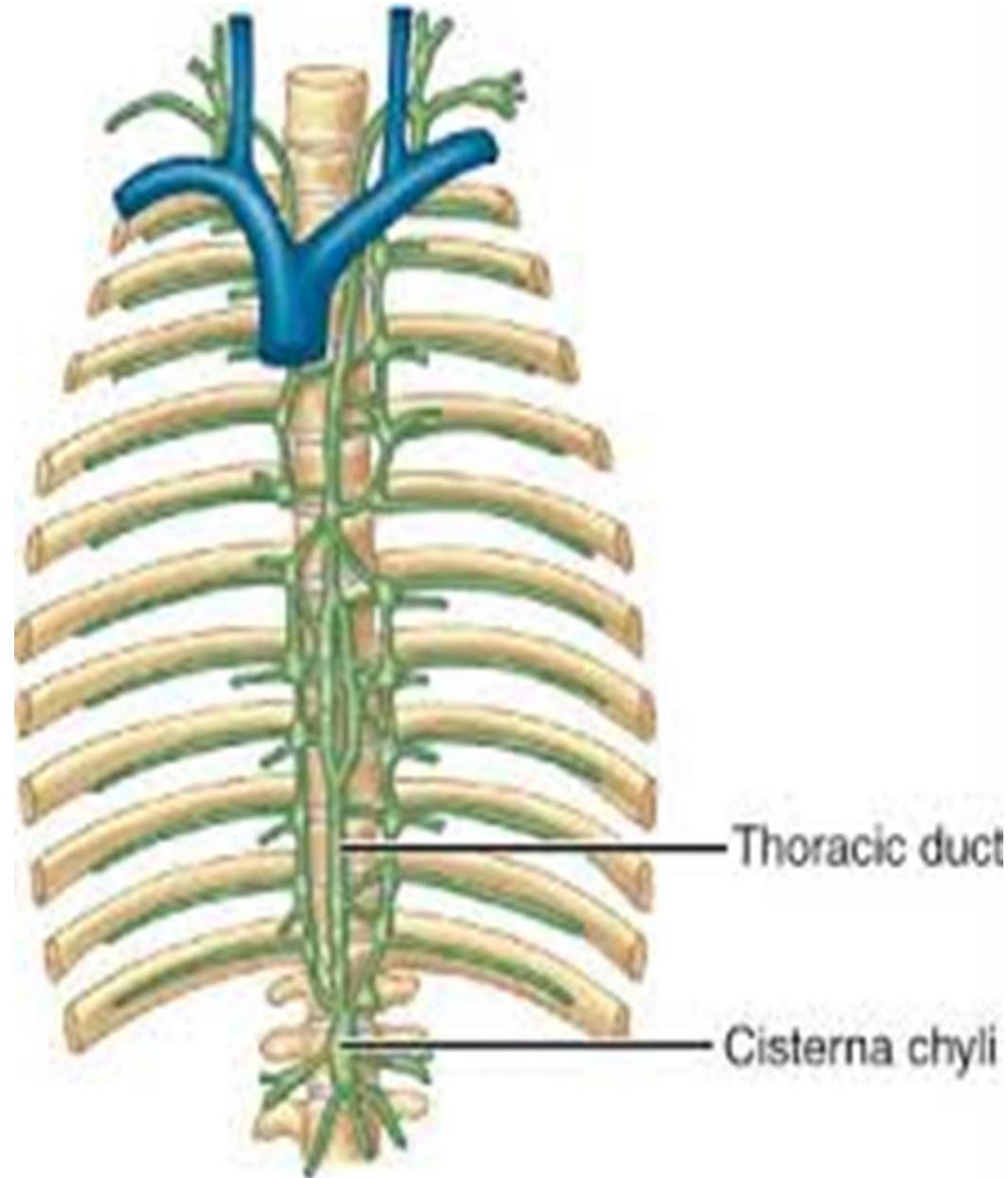
# LYMPHATIC DUCTS:

- **Thoracic Duct**-larger than R lymphatic duct
- Drains lymph from the rest of the body
- It empties into the L subclavian vein

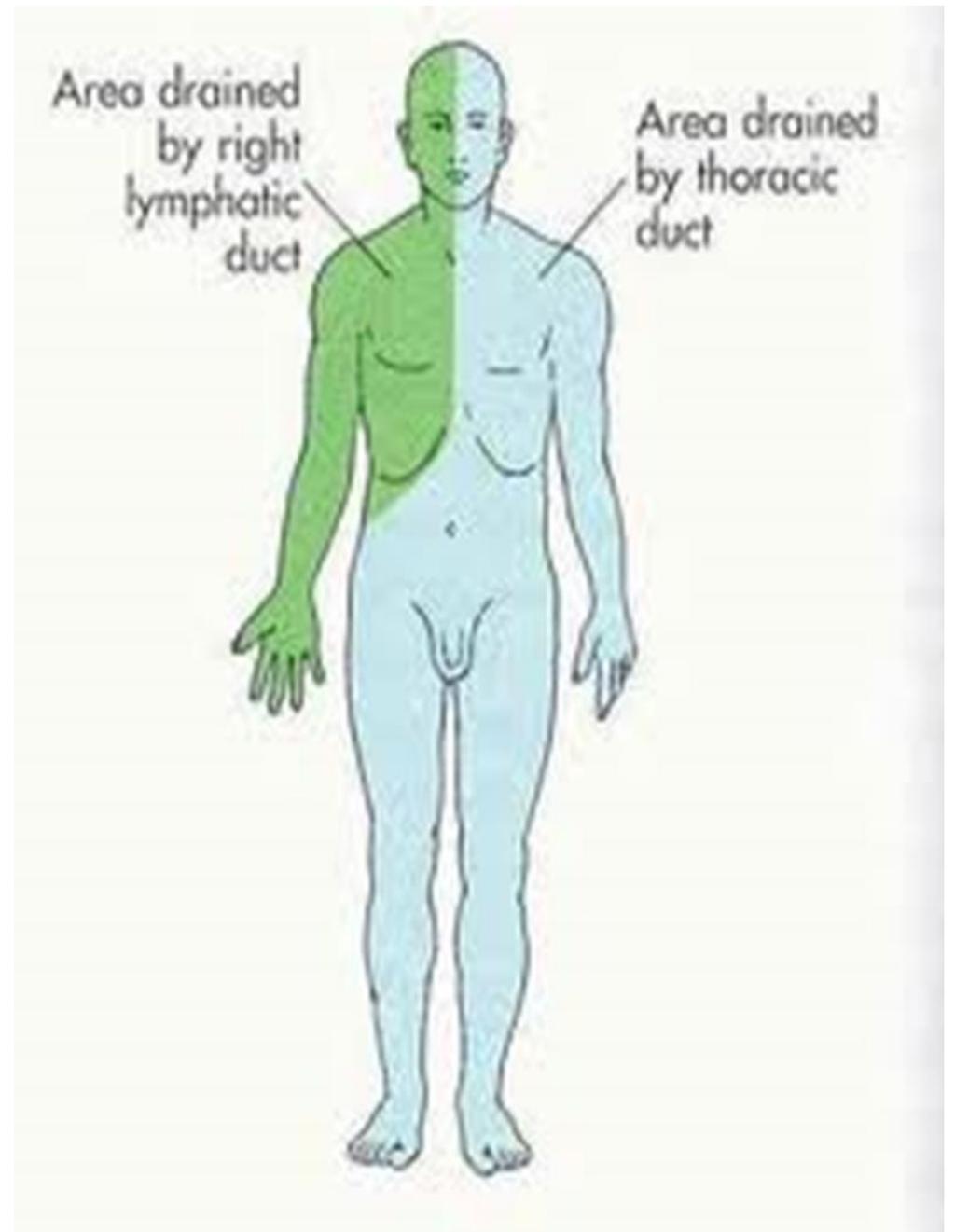
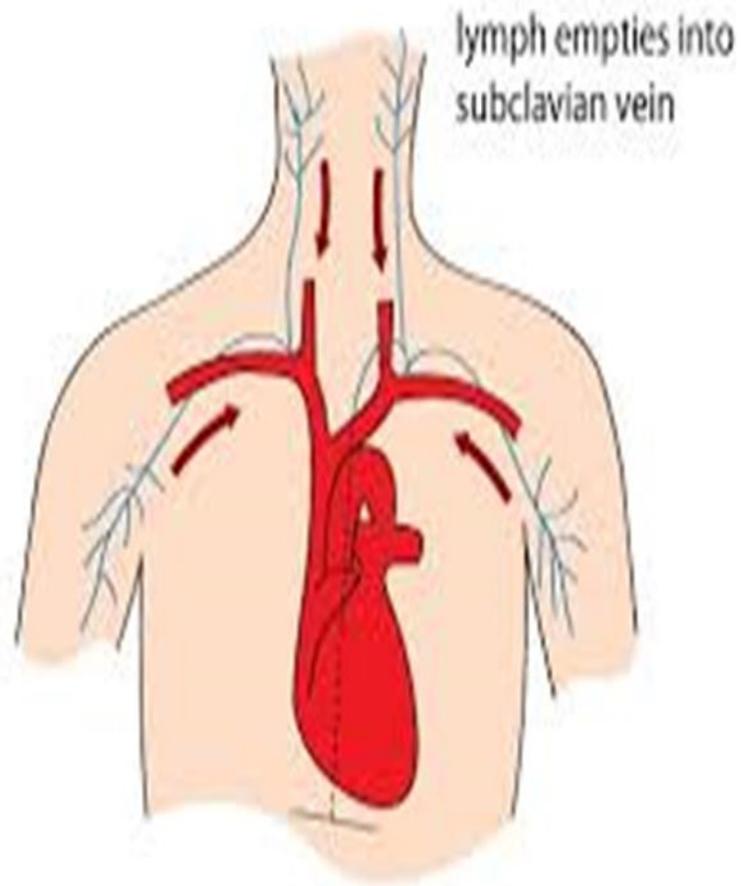


# LYMPHATIC DUCTS:

- **Cisterna chyli**-enlarged pouchlike structure found at the start of the thoracic duct
- It serves as a storage area for purified lymph before this lymph returns to the bloodstream
- It receives chyle from the intestinal lacteals

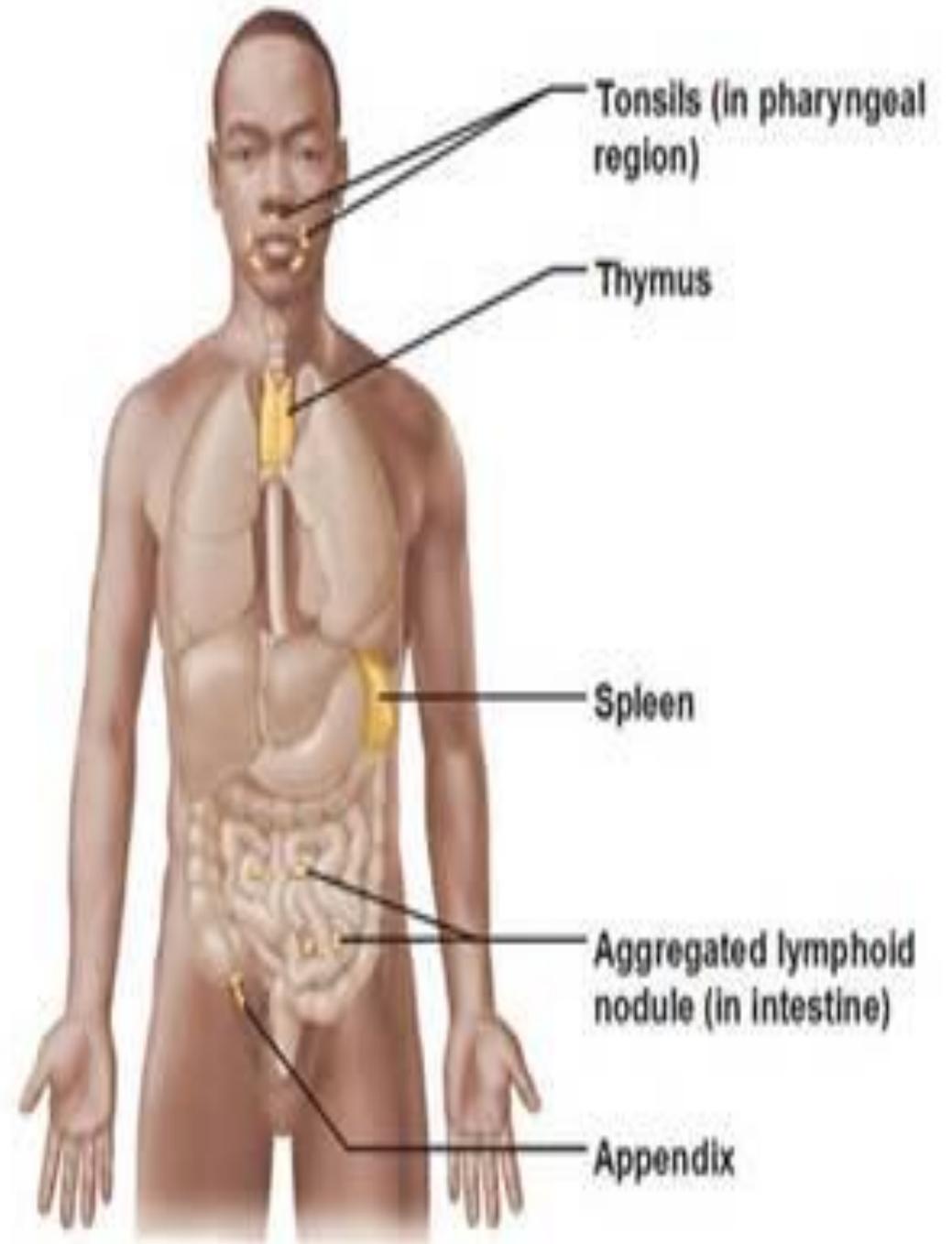


# LYMPHATIC DUCTS:



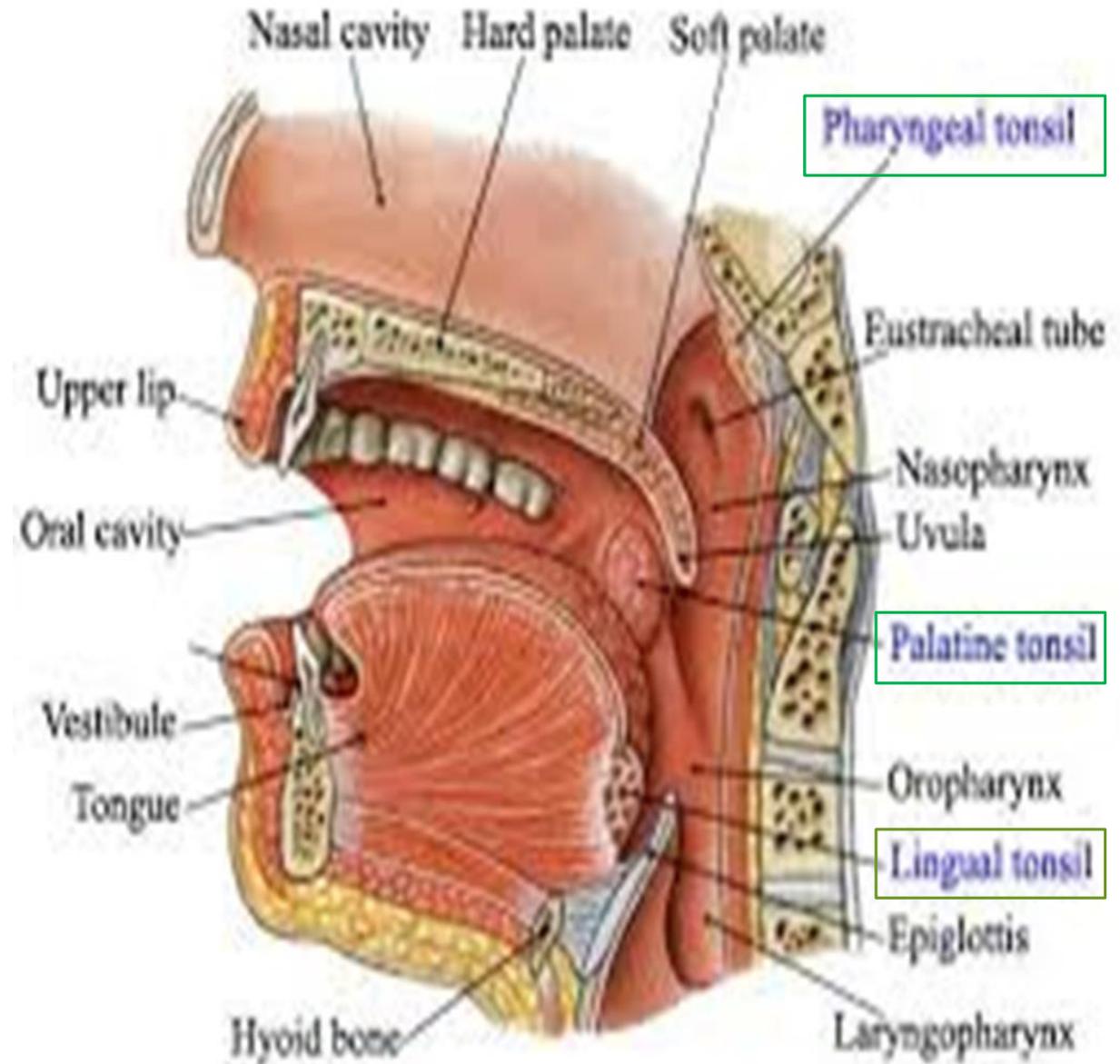
# LYMPHATIC TISSUE:

- *Tonsils*
- *Spleen*
- *Thymus*



# TONSILS:

- Masses of lymphatic tissue that filter interstitial fluid
- 3 pairs of tonsils:
  1. **Palatine tonsils** = located on each side of the soft palate
  2. **Pharyngeal tonsils** = AKA adenoids, located in nasopharynx
  3. **Lingual tonsils** = located on the back of the tongue

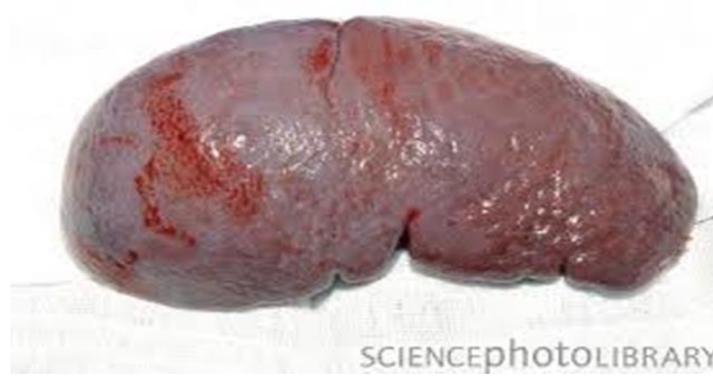


# TONSILS:

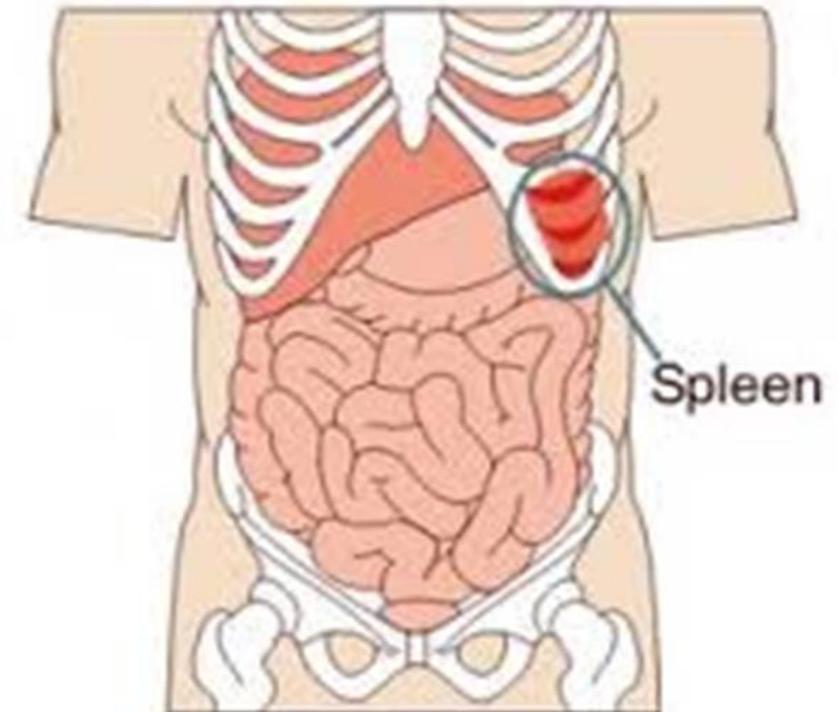
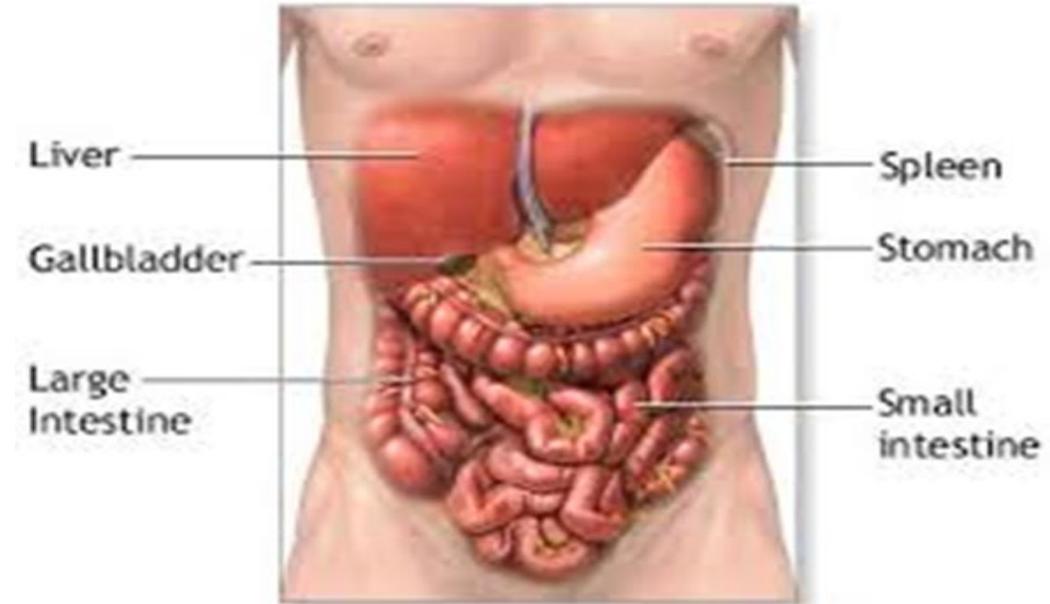
➤ Which tonsils can you see here?



# SPLEEN:

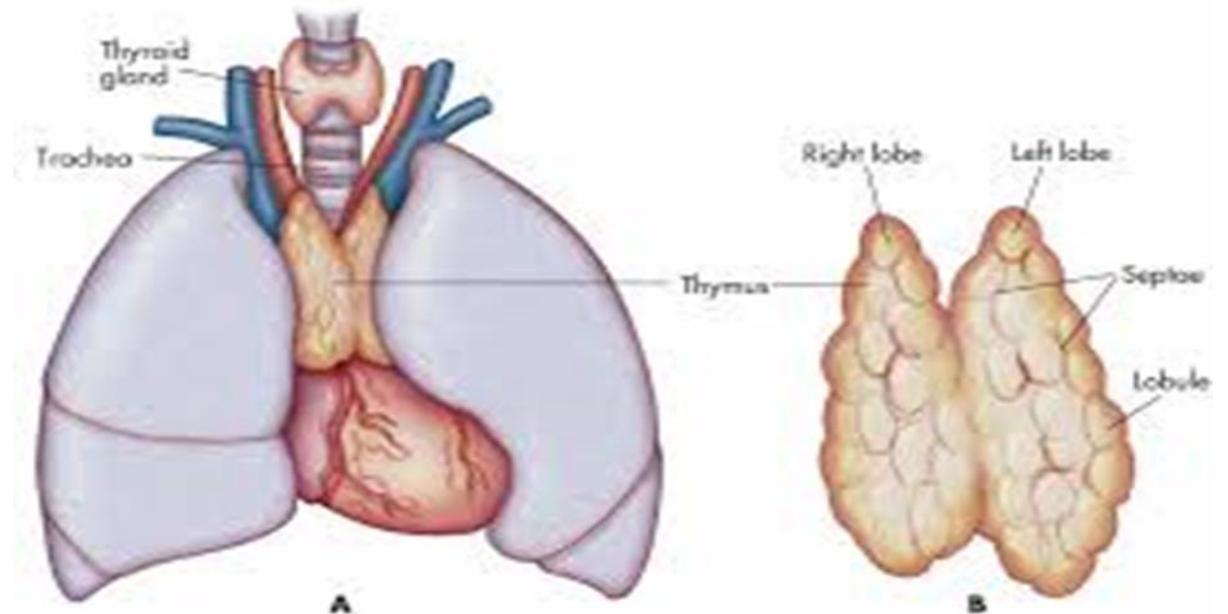
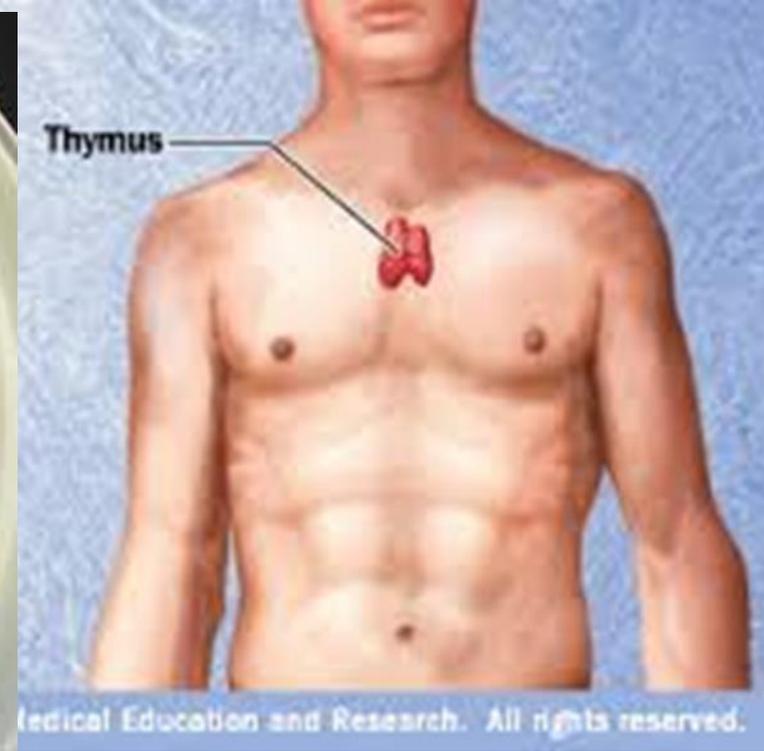


- Organ located beneath the L side of the diaphragm & posterior to the upper part of the stomach
- *Produces* WBCs & antibodies
- *Destroys* thrombocytes & old RBCs
- *Stores* RBCs to release into bloodstream if excessive bleeding occurs
- *Filters* metabolites & wastes from body tissues

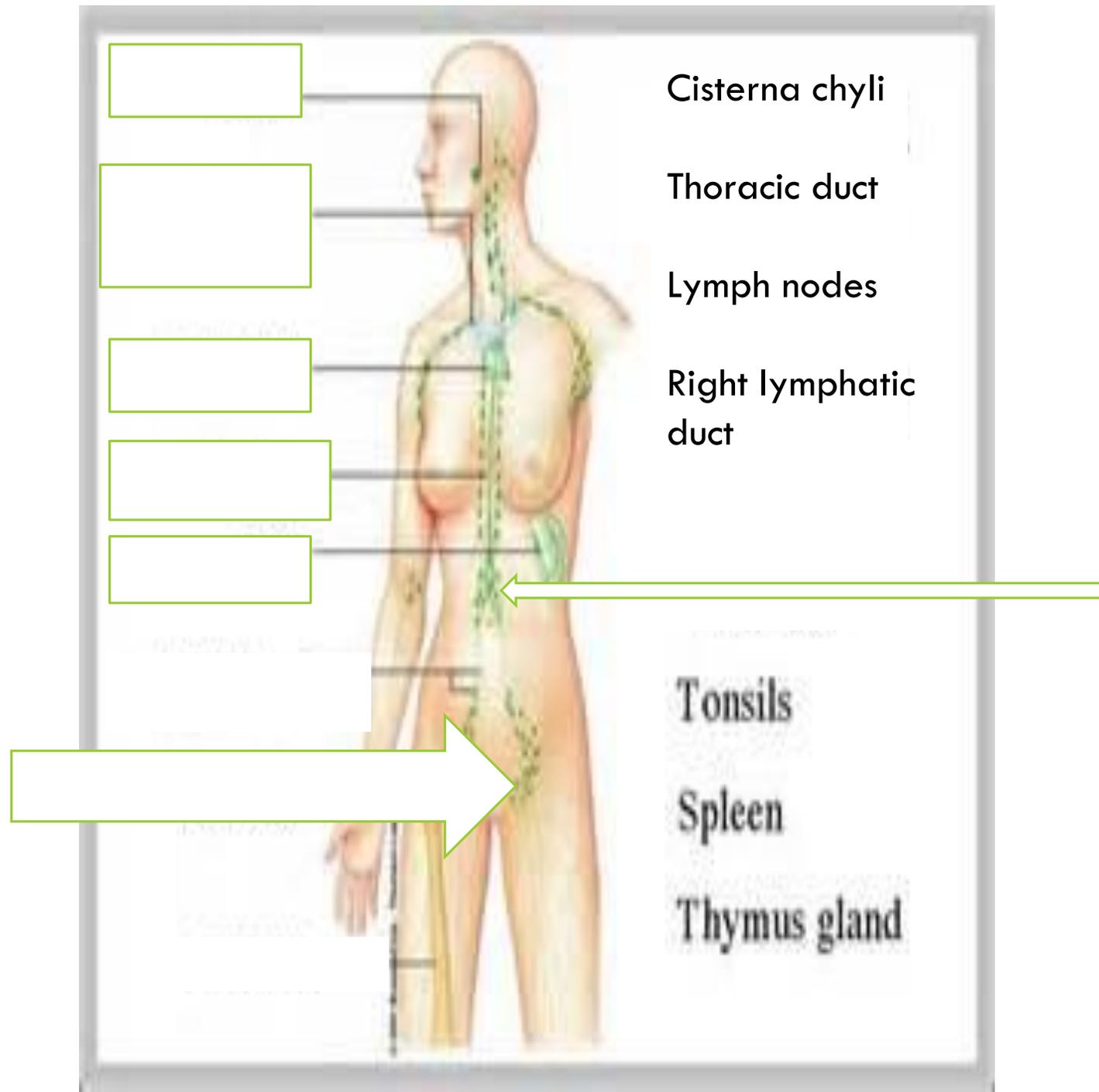


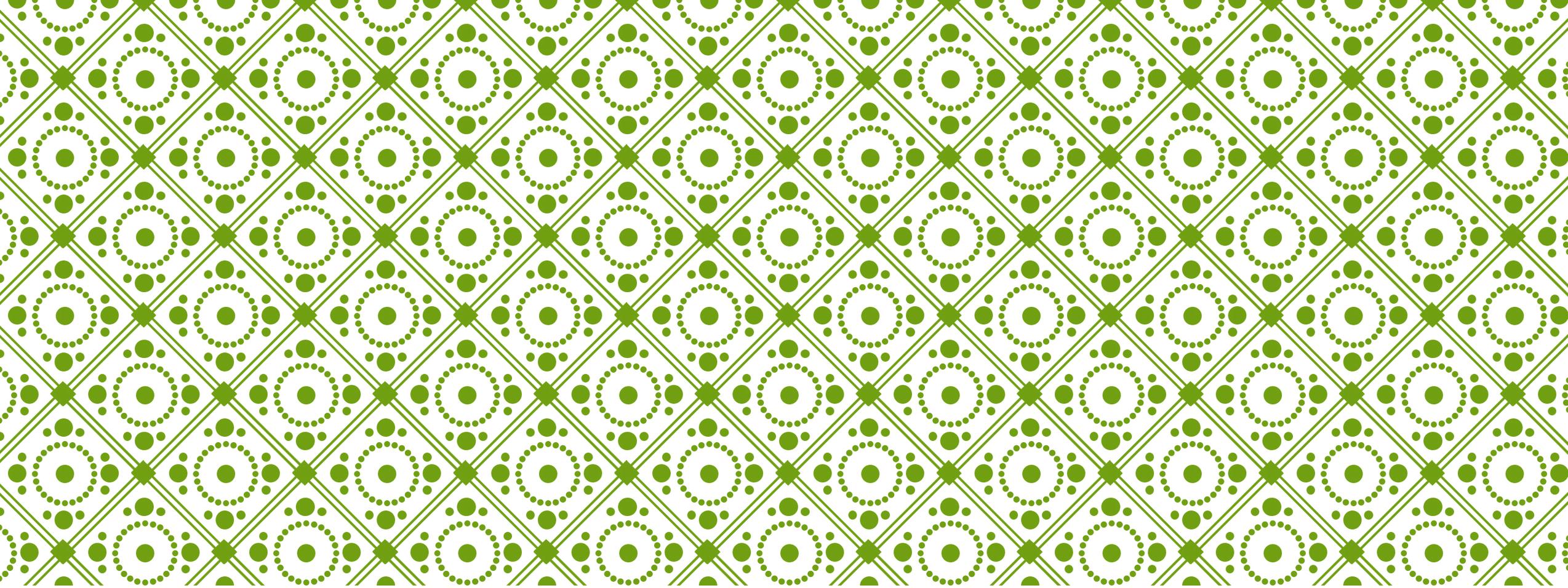
# THYMUS:

- Mass of lymph tissue in the center of the upper chest
- Produces antibodies & lymphocytes to fight infection
- Atrophies (wastes away) after puberty and is replaced by fat & connective tissue
- Its function is taken over by the lymph nodes



**LABEL  
THE  
DIAGRAM  
WITH THE  
WORDS  
FROM THE  
BANK:**





# LYMPHATIC SYSTEM

Diseases/Disorders

# LYMPHATIC SYSTEM

Diseases and abnormal conditions include:

- *Adenitis*
- *Hodgkins' Disease*
- *Lymphangitis*
- *Splenomegaly*
- *Tonsillitis*

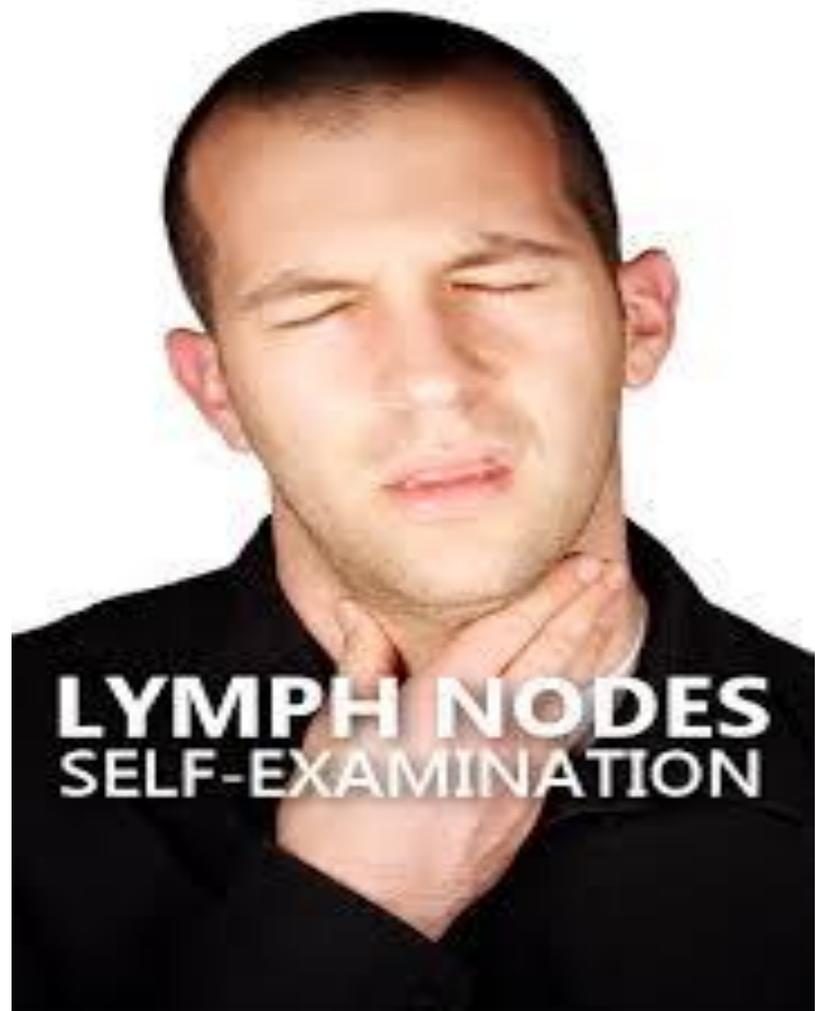
# ADENITIS

- ❖ Inflammation or infection of the lymph nodes
- ❖ Caused by large amount of harmful substances (pathogens, cancer cells) enter the lymph nodes and infect them
- ❖ **S/SX**=fever, swollen & painful nodes which if not treated can form an abscess
- ❖ **Tx**=abx & warm, moist compresses; I&D for abscess
- ❖ I&D 0:47 <https://www.youtube.com/watch?v=f19SFdC3Mp0>



# HODGKIN'S DISEASE

- ❖ Chronic, malignant disease of lymph nodes
- ❖ Most common form of lymphoma (tumor of lymph tissue)
- ❖ **S/Sx**=painless swelling of nodes, fever, night sweats, weight loss, fatigue, pruritus
- ❖ **Tx**=chemotherapy, radiation
  
- ❖ 1:37 <https://www.youtube.com/watch?v=saYsSlSBObw>
- ❖ 5:58 <https://www.youtube.com/watch?v=bKoni1D6IDE>



# LYMPHANGITIS

- ❖ Inflammation of lymphatic vessels
- ❖ Usually results from infxn in extremity
- ❖ **S/Sx**=red streak extending up an UE or LE from the source of infxn; fever, chills, tenderness or pain
- ❖ **Tx**=abx, rest, elevation of affected part; warm, moist compresses
- ❖ 2:07 <https://www.youtube.com/watch?v=R2mrSSwbLfQ>



# SPLENOMEGALY

- ❖ Enlargement of spleen
- ❖ Results from abnormal accumulation of RBCs, mononucleosis, cirrhosis of the liver
- ❖ **S/Sx**=swelling, abd pain, ruptured spleen, increased destruction of RBCs leads to anemia, leukopenia, & thrombocytopenia
- ❖ If spleen ruptures it can lead to intraperitoneal hemorrhage & shock can lead to death
- ❖ **Tx**=for severe cases where cause cannot be treated splenectomy is done
- ❖ 12:21 <https://www.youtube.com/watch?v=txCYSkZlrjE>



# TONSILLITIS

- ❖ Inflammation or infxn of tonsils-usually pharyngeal & palatine tonsils
- ❖ **S/Sx**=throat pain, dysphagia, fever, white or yellow spots of exudate on tonsils, swollen nodes near mandible
- ❖ **Tx**=abx, warm throat irrigations, rest, analgesics; tonsillectomy

# TONSILLITIS

❖ Tonsillectomy=

surgical removal of tonsils

❖ Used for pts with:

- ✓ chronic tonsillitis
- ✓ frequent infections
- ✓ hypertrophy (enlargement) that causes obstruction of the airway

❖ 2:47 <https://www.youtube.com/watch?v=zzXzr-zDLX8>

❖ 1:59 <https://www.youtube.com/watch?v=gzJzg4wz1p8>

