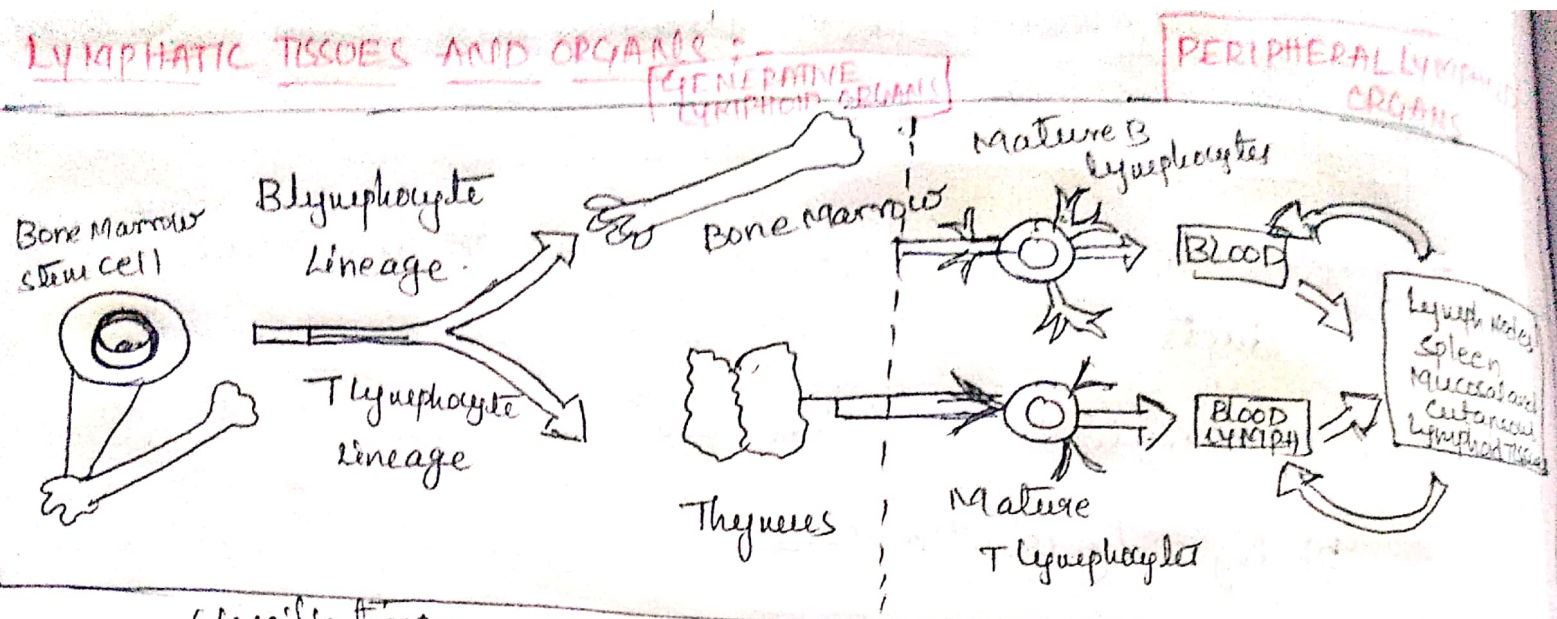




Classification:-

(1) Primary lymphatic organs :-

- The primary lymphatic organs are;
 - ✓ Red Bone Marrow
 - ✓ Thymus gland
- They are 1° lymphatic organs bcz they produce B & T cells.
- The B-lymphocyte cells & T-lymphocyte cells are important cells for immune response.
- The Hemopoietic stem cells in Red bone Marrow produces B-cells and pre T-cells.
- The pre T-cells then migrate to the Thymus gland & become Mature T-cells.

THYMUS GLAND:-

Location: Bilobed lymphatic organ & located in the mediastinum posterior to the sternum and b/w the lungs.

ANATOMY:

- Thymus gland is large in infants & it reaches its maximum size at 10-12 yrs with 40gms of wt.
- It consists two lobes and each lobe are covered by the connective tissue layer known as capsule.
- The extended part of the capsule layer inside the lobes is known as Trabeculae. which divides the lobes into lobules.
- The lobule.
 - outer dark region [Cortex]
 - Inner light region [Medulla]

- Cortex is composed of tightly packed lymphocytes, Epithelial cells & Macrophages.

↓
The migrated pre T cells from the Red Bone Marrow get mature here.

- Medulla consist Epithelial cells & more widely scattered (dotted, spotted) lymphocytes.

- Here, the E.C. secret the thymic hormone which gives their help in to the Maturation of pre T-cells but the Exact function are not known.

(2) Secondary Lymphatic organs:-

- Lymph nodes
- Spleen

- These organs are covered by the capsule layer.
- The lymphatic Nodules are not categorized as Secondary lymphatic organs bcz it is not surrounded by the capsule layer & it is cluster of lymphocyte which guards the

all Mucous Membrane (GIT, Respiratory Passage, UT & Reproductive Tracts) against the harmful pathogens.

Lymph Nodes :-

Location: Along the length of lymphatic vessels.

ANATOMY:

- oval / bean shaped and 1 to 25mm in length
- Each node is covered by a capsule of dense CT.
- Same as thyroid gland the extended capsular part is known as Trabeculae.
- It consists cortex & Medulla region.
- Outer cortex consists follicles & inner part consist packed lymphocytes resemble as lymphatic Node.
- outer region of Follicle contains T-cells, Macrophages & Follicular dendritic cells.
- In the center areas of the Follicles contain B-cells which secrete Antibody.
- The Inner region is known as Medulla it consist Macrophages & plasma cells.

Flow of lymph in Nodes :-

- In the nodes, lymph get enter by Afferent lymphatic vessels and out by the Efferent lymphatic vessels.
- Afferent lymphatic vessels consist valve at the opening part & the valve is open in such a direction that once lymph enter into A.L.V. is not to go back from.
- Efferent L.V. also have a valve at the end in same manner of A.L.V.
- Function:- Filtration of lymph by lymph nodes.

- It filters the foreign substances which are harmful for us bcz the Macrophages, T-lymphocytes, B-lymphocytes of Nodes destroy them.

SPLEEN:-

LOCATION:-

- It is located in the upper left Abdominal cavity, just beneath the diaphragm & posterior to the stomach.

ANATOMY:-

- It is similar to lymph node in shape & structure but it is much larger about 12 cm in long.

- largest lymphatic organ in the body.

- Surrounded by a connective tissue capsule, which extends inward to divide the organ into lobules.

- consists of 2 types of tissue (B)
 - white pulp (lymphocytes) around Arteries
 - Red pulp



Consists of venous sinuses filled w blood & cords of lymphatic cells such as lymphocytes, Macrophages.

- Blood enters the spleen through the splenic Artery, moves through the tissue sinuses where it is filtered, then leaves through the splenic vein.

- It does not filter the lymph bcz it has no afferent Artery.

FUNCTION:-

- lymphocytes in the spleen react to pathogens in the blood & attempt to destroy them.



Macrophages engulf the debris, damaged cells, & other large particles.

- spleen along with the liver, removes old and damaged erythrocytes from the circulating blood. Like other lymphatic tissue, it produces lymphocytes, especially in response to invading pathogens.

- The sinuses in the spleen are a reservoir of blood.

- In emergencies, such as haemorrhage, smooth muscle in the vessel walls & in the capsule of the spleen contracts. This squeezes the blood out of the spleen into the general circulation.

Functions of Lymph:-

(1) Fluid & Protein Balance:-

- When the blood circulates throughout the body, lot of fluid filtered by the capillaries gets trapped in the tissues of the body.

- This trapped fluid, also called as interstitial fluid, comprises about 10% (1-2 lt) of body total fluid. The loss of this fluid is substantial as it is rich in several vital proteins that are required by the body.

- The lymphatic system prevents this loss by collecting this fluid in the lymphatic vessels & return it to the circulatory system.

(2) Transportation of Nutrients:-

- This system works in collaboration with the circulatory system to transport various essential nutrients in the body.

- It carries lipids & lipid soluble vitamins (A, D, E & K) absorbed by the GI tract to the blood.

- It delivers oxygen, hormones & other essential nutrients through the blood to body cells.

(3) Digestion → prevents obesity which results due to accumulation of bad fat in the body.

- The lymphatic vessels that are located in the gastrointestinal lining help in the absorption of fats from the food that we eat.

- It is required for proper assimilation of fats in the body. Failure of this part of this system may result in serious malnutrition.

(4) Excretion:-

- It removes dead ~~body~~^{body} cells, Excess fluid, waste, debris, etc, from the body, thereby assisting in Excretion of waste materials from the body.
- It also removes phagocytes pathogens, toxins and cancer cells from the body cells as well as intercellular spaces.

Protections: :- It consists B & T-cells

- These cells provide us protection Against the Harmful pathogens like bacteria, toxins, Virus etc.
- When pathogens enter into the cells they get activated & fight Against it.