**The lymphatic system**

The lymohatic system communicates with the blood circulatory system

The waste products and water excreted by the cells have two routes by which they return to the circulation :

1- blood capillaries

2- lymph capillaries

The fluid within the lymph capillaries and vessels is known as lymph ,

The composition of lymph like blood plasma but in different concentration ( water , Na , K ….etc )

**Function of the lymph :**

1- filtration ----remove any particles which not normally in serum

2- breaks down material which hasbeen filtered off such as microorganisms , tumour cells ,,,, etc

3- place to multiplication of lymphocytes

**The structure of the lymphatic system**

( lymph capillaries , lymph vessels , thoracic duct , right lymphatic duct , lymph nodes , and others tissues )

**1-lymph capillaries :**

are composed of single layer of endothelial cells and originate in the tissue spaces as blend tubes , these capillaries join with one anther to form lymph vessels

**2- lymph vessels**

\* outer coat consisting of fibrous tissue which acts as a protective covering

\* middle coat of muscular and elastic tissues

\* inner lining composed of single layer of endothelial cells

\* many valves consisting of a double layer of lining membrane and prevent the backward flow of the lymph

**3- lymphatic ducts :**

Are two type which collect lymph from the whole body and return it to the blood

\* the thoracic duct)

Begins at the cysterna chili , which is a sac-like dilatation and situated in front of the bodies of the first and second lumber vertebrae to the right of the abdominal aorta .

It is the largest lymph vessel in the body and contains several valve . extends from the 2nd lumber vertebra to the root of the neck where it opens into the left subclavian vein

This duct drains lymph from the lower limbs , pelvic cavity , left side of chest , head and neck and left arm

\* the right lymphatic duct :

It lies in the root of the neck and open into the right subclavian vein , the duct drains lymph from the right side of the chest , head , neck and the right arm .

**4- lymph nodes :**

All the small and medium sized lymph vessels open into lymph nodes ,

Some of nodes are small as a pin head , and some is large as almond size .

Lymph nodes have surrounding capsule of fibrous tissue which dips down into the node substance forming partitions known as trabeculae , the main substance of the node consists of reticular and lymphatic tissue containing many lymphocytes .

The lymph from the upper limbs passes through nodes situated in the elbow region ( supratrochlear nodes ) then through the deep and superficial axillary nodes ( fig 6:7 )

The main Lymph nodes from thoracic cavity are tracheobronchial and intercostal nodes , and the main lymph nodes from the lower limbs are poplitial nodes and inguinal nodes ( fig 6:8 ),and from neck ( submandibular nodes and cervical nodes) , from head ( occipital nodes )

**5- lymphatic tissue :**

Lymphatic tissue is found in a number of situations in the body in addition to the lymph nodes .

1- the palatine tonsil

2- pharyngeal tonsil

3- the solitary lymphatic follicles in small intestine

4- peyers patches in small intestine

5- the vermiform appendix in first part of large intestine

**The spleen** figure 6: 9

Is formed by lymphatic tissue , it lies in the left hypochondriac region of the abdominal cavity between the fundus of the stomach and the diaphragm , its purplish in colour , 12cm long, 7cm wide , 2.5cm thick , 200grams weight .

Organs in association with the spleen

Superior and posterior ----- diaphragm

Inferior ---------------- left colic flexure of the large intestine

Anterior --------------- fundus of the stomach

Medially ------------ pancreas and left kidney

Laterally ---------- ribs .

**Spleen structure** :

Ovoid in shape and covered anteriorly by peritoneum . and under peritoneum fibroelastic capsule which surrounds the gland .

Fibrous tissue spreads into the organ substance to form trabeculae , the substance of the organ is known as the splenic pulp , the lower medial border of the organ is concave and leaveing the hilum .

The vessels entering and leaving at the hilum are

Splenic artery ,,,,,,,,, splenic vein ,,,,,,,, lymph vessels ,,,, nerves

**Spleen function**

1- phagocytosis ------ RBCs , WBCs ,and Platelets destroyed in the spleen , and the breakdown products such as bilirubin and iron .

2- a reservoir for blood --- it store RBCs which passes into circulation and increase the O2 in emergency states as hypoxia

3- formation the lymphocytes ----

4- formation the antibodies and antitoxins .

**The thymus : figure 6:11**

It lies in the upper part of the mediastinum behind the sternum , and extends upwards into the root of the neck , weight 12gram at birth then 30-40 g after puberty

Organs association with the thymus

Anterior ---- sternum

Posterior ----- aorta and trachea

Laterally ---- lungs

Superior ---- root of the neck

Inferior ---- the heart

Function :

It’s the site of activation of the T-lymphocytes , in child influence on the development of lymphoid tissues