

SYSTEMA LYMPHATICUM

The lymphatic system is a part of the circulatory system and, related with the defense of body as a part of immun system. It is alternative filtering arrangement of the blood and works like a strainer of body and blood cells.

The system comprising a network of lymphatic vessels that carry a clear fluid (**lymph**) directionally towards the heart.

- The functions of the lymphatic system;
- Transport clean fluids back to the blood
- Remove debris from cells
- Transport fats from digestive system

***Lymph**

***Vessels**

***Nodes**

Coto

FORMING OF THE LYMPH

The blood supplies nutrients and important metabolites to the cells of a tissue and collects back the waste products they produce. This exchange is not direct. There is an intermediary tissue fluid (interstitial fluid) between capillaries and cells. Water and solutes pass between the blood - interstitial fluid - cell via diffusion.

FORMING OF THE LYMPH

Interstitial fluid forms at the arterial (coming from the heart) end of capillaries because of the higher pressure of blood compared to veins, and most of it returns to its venous ends and venules; the rest (up to 10%) enters the lymph capillaries as lymph. Thus, lymph when formed is a watery clear liquid with the same composition as the interstitial fluid. However, as it flows through the lymph nodes it comes in contact with blood, and tends to accumulate more cells (particularly, lymphocytes) and proteins

THE LYMPH

Lymph is the fluid that circulates throughout the lymphatic system. The lymph derived from the interstitial fluid is collected through lymph capillaries. Its composition continually changes as the blood and the surrounding cells continually exchange substances with the interstitial fluid. It is generally similar to blood plasma except that it doesn't contain red blood cells.

LYMPHATIC CIRCULATION and LYMPH VESSELS

The lymphatic system is not closed system and has no central pump like a heart. Lymph transport, therefore, is slow and sporadic. Lymph movement occurs due to peristalsis (rhythmic contraction) of smooth muscles of the lymph vessel walls, valves, and compression during contraction of adjacent skeletal muscle and arterial pulsation.

THE LYMPHATIC VESSELS

The Lymph that enters the lymph vessels from the interstitial spaces usually does not flow backwards along the vessels because of the presence of valves. It is then transported through larger lymphatic vessels (afferent vessels) to lymph nodes, where it is cleaned by lymphocytes. After the nodes, the lymph exist through efferent lymphathic vessels and is collected large lymph ducts. Finally, it is emptied to venous system near the heart.

LYMPH NODES

The lymph node is an ovoid or kidney-shaped organ of the lymphatic system, and of the adaptive immune system, that is widely present throughout the body. They are linked by the lymphatic vessels.

LYMPH NODES

The primary function of lymph nodes is the filtering of lymph to identify and fight infection. lymph nodes contain lymphocytes, a type of white blood cell, which includes B cells, T cells and NK cells in order to filtering for foreign particles and cancer cells.

The Lymph nodes also have clinical significance. They become inflamed or enlarged in various diseases which may range from trivial throat infections, to life-threatening cancers. When swollen, inflamed or enlarged, lymph nodes can be hard, firm or tender.

Palpable Lymph Nodes

- The lymph nodes are detectable by touch (palpable); this is a sign of various infections and diseases.
- **Nodi lymphatici (lymphonodi)**
 - * Lymphocentrum parotideum
 - * Lymphocentrum mandibulare
 - * Lymphocentrum retropharyngeum
 - * Lymphocentrum cervicale superficiale
 - * Lymphonodi axillaris
 - * Lymphocentrum subiliaci
 - * Lymphocentrum popliteum

Lymphathic Vessels

- ❑ **Vasa lymphatica - lymph vessels are thin walled, valved structures that carry lymph. As part of the lymphatic system, lymph vessels are complementary to the cardiovascular system.**
- ❑ **Lymph vessels carry the lymph, that are drained with absorption of interstitial fluid from the tissues, to a lymph node from the lymph capillaries.**

Lymphathic Ducts

- A lymph duct is a great lymphatic vessel that empties lymph into one of the veins and thus return it to general circulation. There are two lymph ducts in the body:
 - * Ductus lymphaticus dexter (right lymphatic duct)
 - * Ductus thoracicus (thoracic duct)

Cisterna chyli

Lymphathic Ducts

□ **Ductus lymphaticus dexter:** It collects lymph from the right forelimb, right side of thorax and right halves of head and neck. It enters directly and empties the lymph to the subclavian vein

□ **Ductus thoracicus:** All other sections of the body are drained by the thoracic duct.

It begins as a cranial continuation of the chyle of cistern. It passes to the thoracic cavity through diaphragma via hiatus aorticus. It enters the cranial vena cava.