

Human Anatomy And Physiology Chapter – 6

Lymphatic System

Lymph and lymphatic system, composition, function and its formation.

Structure and functions of spleen and lymph node.

Lymphatic system

Lymphatic system is a closed system of lymph channels or lymph vessels through which the lymph flows. It arises from the tissue spaces and allows the lymph flow towards the blood.

Lymphatic system works as one way system because lymphatic vessels are more porous and allows the fluid to move into the lymph capillaries and not allows in the opposite direction.

Lymphatic system participate in our immunity system and prevent against any infections or disease because it contains the lymphocytes cell and other antibodies molecules.

Lymph-

Lymph is a clear to white fluid formed from intestinal fluid and flow in the lymphatic system. About 120ml of lymph flows into blood per hour. Out of this, about 100ml/hour flow through thoracic duct and 20ml/hour flow through the right lymphatic duct.

Composition of Lymph-

It is formed by 96% water and 4% solids. Some blood cell are also present in lymph. Solid substances present in the form of--

Organic substances- proteins, lipids, aminoacids, carbohydrates, enzymes, clotting factors

Inorganic substances- Na^+ , Ca^{+2} , Cl^- , HCO_3^-

Cellular compounds- Macrophages, monocytes, plasma cells.

Formation of Lymph-

When the blood passes through blood capillaries in the tissue to venous end of capillaries from the arterial end. Then major part of fluid flow and small amount of fluid passes into lymph capillaries, which have more permeability than blood capillaries.

Factor responsible for lymph formation-

- **Interstitial fluid pressure.**
- **Blood capillaries pressure.**
- **Permeability of lymph capillaries.**
- **Function activities of tissue.**

Functions of lymph-

- Lymph contains the lymphocytes and macrophages and other phagocytosis cell which helps in removing the bacteria, foreign bodies and helps in the immunity.
- Lymph is rich source of protein and minerals so it helps in the redistribution of fluid in the body parts.
- Lymph flow is responsible for the maintenance of structural and functional integrity of tissue. Obstruction to lymph flow affects

various tissue, particularly myocardium, nephrons, and hepatic cells.

Spleen

Introduction - Spleen is highly vascular lymphoid organ present in the body. It is situated in left hypochondriac region that is upper left part of the abdomen, behind the stomach and just below the diaphragm.

The spleen is part of our lymphatic system, which fights against the infection and keeps your body fluids in balance.

Structure of Spleen-

It is the similar structure to lymph node and covered by an outer serous coat and an inner fibromuscular capsule. From the capsule, trabeculae and trabecular network arises.

The parenchyma of spleen is divided into red pulp and white pulp.

Red pulp- Red pulp consists of venous sinus and cord of structures such as blood cells, macrophages and mesenchymal cells.

White pulp- The structure of white pulp is similar to that of lymphoid tissue. It has a central artery, which is surrounded by splenic corpuscles or Malpighian corpuscles. These corpuscles are formed by lymphatic sheath containing lymphocytes and Macrophages.

Functions of Spleen-

- Spleen play an important role in the hematopoietic function in embryo.
- Spleen are also called graveyard of RBCs because it participate in the destruction of RBCs and other old blood cells.

- Spleen stores the large amount of RBCs so it acts as a reservoir function. The RBCs are released from spleen into circulation during the emergency conditions like hypoxia and hemorrhage.
- It plays an important role in the defense mechanism. The macrophages in splenic pulp destroy the microbes and other foreign bodies by phagocytosis.
- It also participates in the excretory process and helps in the ions balance.

Lymph nodes-

- Lymph nodes are small glandular structures located in the course of lymph vessels. The lymph nodes are also called lymph glands or lymphatic nodes.
- Lymph node receives lymph by one or two lymphatic vessels called afferent vessels.
- Lymph nodes are present along the course of lymphatic vessels in axilla, elbow, knee, and groin. Lymph nodes are also present in certain points in abdomen, thorax, and neck, where many lymph vessels join.

Structure Of Lymph Nodes.

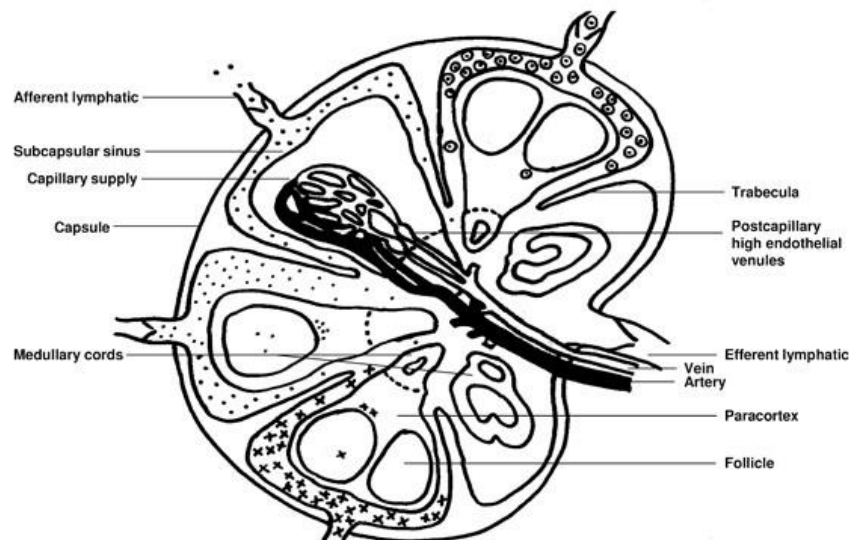
Lymph nodes are generally bean-shaped. Each lymph node constitutes masses of lymphatic tissue, covered by a dense connective tissue capsule. The structures are arranged in three layers namely cortex, paracortex and medulla.

Cortex- Cortex of lymph consists of the lymphoid follicles. During any antigen entry, follicles start proliferation and distribute to different

different area where cause the infection. Cortex also contain some B lymphoid cell and macrophages which also participate against infection.

Paracortex- paracortex is in between the cortex and medulla. Paracortex contain T lymphocytes.

Medulla- Medulla contains B and T lymphocytes and macrophages. Blood vessels of lymph node pass through medulla.



Functions of lymph nodes-

✓ When lymph passes through the lymph nodes, it is filtered that is the water and electrolytes are removed. But, the proteins and lipids are retained in the lymph.

✓ Bacteria and other toxic substances are destroyed by macrophages of lymph nodes are called barriers.

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