CLASS-11

BODY FLUIDS AND CIRCULATION LYMPH (TISSUE FLUID)

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As the blood passes through the capillaries in tissues, some water along with many small water soluble substances move out into the spaces between the cells of tissue leaving the larger proteins and most of the formed elements (erythrocytes and platelets) in the blood vessels. This fluid released out is called the interstitial fluid or tissue fluid. The mineral distribution of both plasma and tissue fluid are similar. Exchange of nutrients, gases, etc. between the blood and the cells always occurs through the tissue fluid which acts as middle man.

- This fluid is collected and drained back to the major veins by an elaborate network of vessels called the lymphatic system. The fluid present in the lymphatic system is called the lymph.
- Lymph is a colourless fluid (lacks haemoglobin) containing specialised lymphocytes which are responsible for the immune responses of the body. It consists of plasma and leucocytes.
- The lymphatic system comprises of lymphatic capillaries, lymphatic vessels, lymphatic nodes and lymphatic ducts.
- Lymphatic capillaries are the smallest vessels of the lymphatic system. Lymphatic capillaries are microscopic, closed-ended tubes that form vast networks in the intercellular spaces within most organs. Interstitial fluid, proteins, microorganisms and absorbed fat (in the intestine) can easily enter the lymphatic capillaries as the walls of the lymphatic capillaries are composed of endothelial cells with porous junctions.





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- Once the tissue fluid enters the lymphatic capillaries, it is known as lymph. Lymphatic capillaries merge and form larger lymphatic vessels. The walls of larger lymphatic vessels are similar to veins. They have valves to prevent back flow. Eventually, the larger lymphatic vessels empty into one of two principal vessels: the thoracic duct (in the left) or the right lymphatic duct (in the right). Further these ducts drain the lymph into the left and right subclavian veins, respectively. These veins connect with a number of smaller veins and drain into the superior vena cava (major vein) which connects to heart. Thus, tissue fluid, which is formed by filtration of plasma out of blood capillaries is ultimately returned to the major veins or cardiovascular system.
- There are lymph nodes located at regular intervals along the course of lymphatic vessels. Lymph is filtered through the lymph nodes. These are abundant in neck, groin and armpits. Lymph nodes contain phagocytic cells which help to remove pathogens and are sites for lymphocyte proliferation. The tonsils, thymus and spleen are also the lymph nodes. They are called lymphoid organs.



Functions

- **1.** Lymph transports oxygen, nutrients, hormones, etc., to the body cells and brings carbon dioxide and other metabolic wastes, from the body cells and finally pours the same into the venous system.
- **2.** Lymphocytes colonize in lymph nodes. Lymph transports lymphocytes and antibodies from the lymph nodes to the blood.
- **3.** Lymphocytes destroy the invading microorganisms and foreign particles in the lymph nodes.
- **4.** It absorbs fats from the intestine. In the intestinal villi, lymphatic capillaries are present which are called as lacteals. Lacteals ultimately release the absorbed fats into the blood stream.