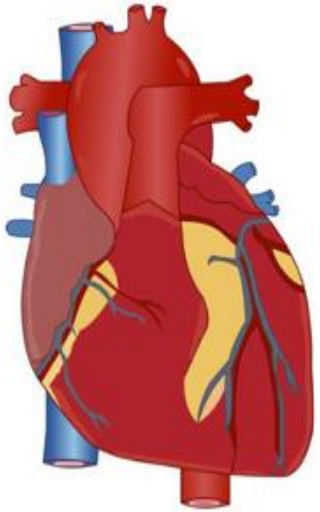
LIFE PROCESSES

Class 10 Biology

TRANSPORTATION

PART 3/4



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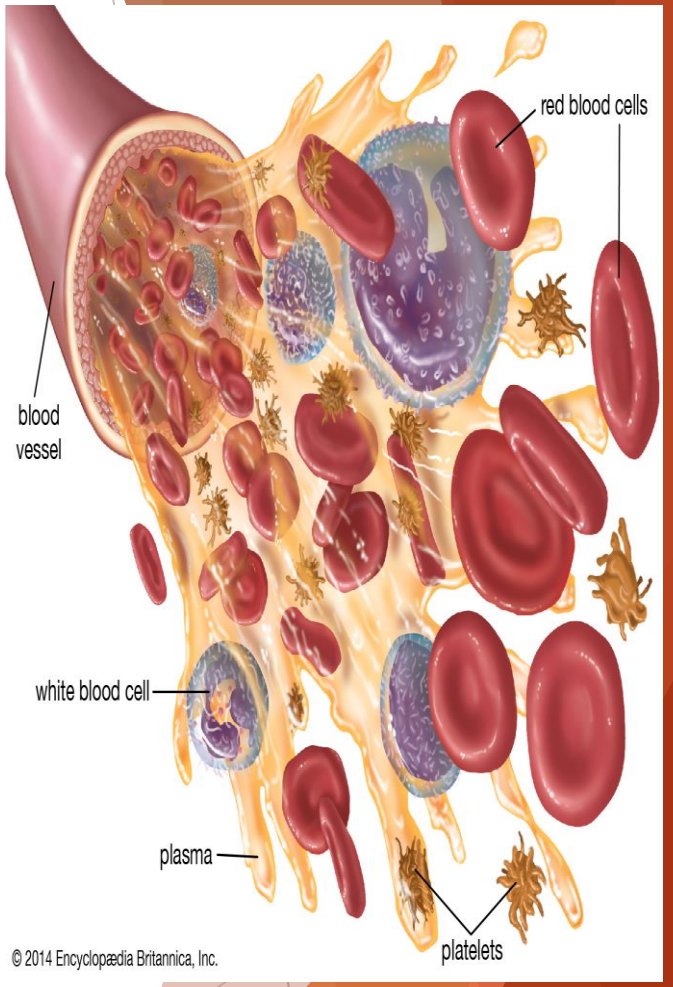
COMPONENTS OF BLOOD AND THEIR FUNCTIONS

White Blood Corpuscles (WBC/ LEUKOCYTES)

- They fight against infection and protect us from diseases.
- They are round or irregular, semi-transparent cells containing a nucleus and are seen under a microscope. They are a larger than RBC but are lesser in number. Some WBCs make 'antibodies' to fight against infection ,so they provide immunity in our body.

Functions

- WBC acts as a defence system in the body.
- Different WBC have specific functions :
- **Neutrophils** attack and engulf the invading bacteria.
- **Lymphocytes** produces antibodies and provide immunity against infection.
- **Basophils** secrete anticoagulants and prevent clotting within the blood vessels.
- **Eosinophils** also assist in defence mechanism of the body and take up anti parasitic and anti bacterial activities.



Blood platelets/ THROMBOCYTES

- They are tiny, circular or oval ,colourless cells formed in the bone marrow. They lack a nucleus.

Functions

- Help in the coagulation of blood (clotting of blood) in a cut or wound, due to which bleeding stops and prevents loss of pressure.

THE BLOOD VESSELS AND THEIR FUNCTIONS

ARTERIES

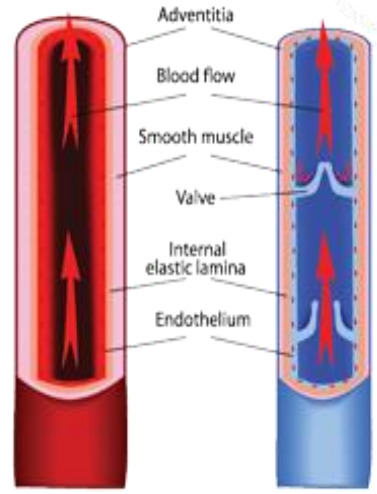
Carry oxygenated blood away from the heart(except pulmonary artery).

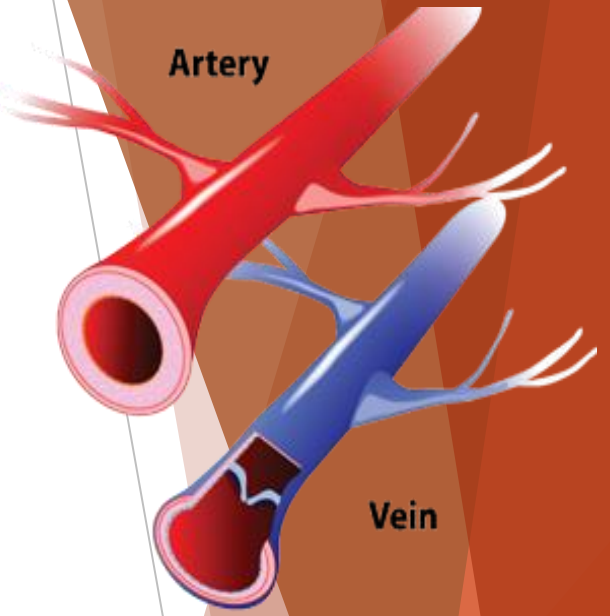
Blood in them is under high pressure.

They have thick, elastic muscular wall.

They have a narrow /small lumen and no valves.

They are deep seated to protect them from damage.



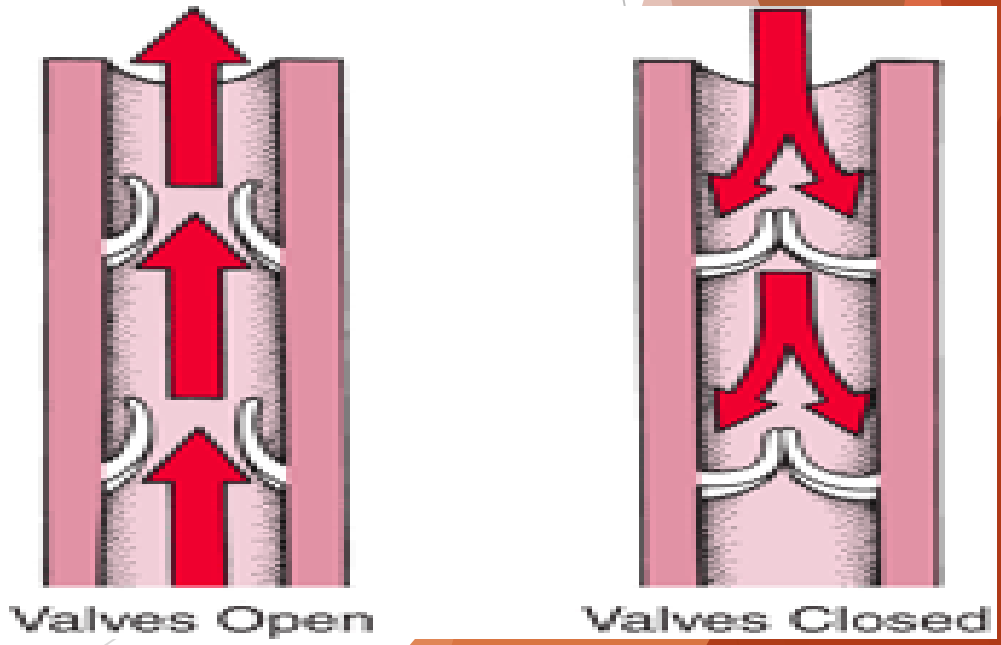


Artery Vein

VEINS

Carry deoxygenated blood back to the heart(except pulmonary vein)

Blood is under low pressure. They have valves to prevent backflow of blood and to send blood in one direction. They are relatively thin walled and have a large lumen. Mostly superficially seated.

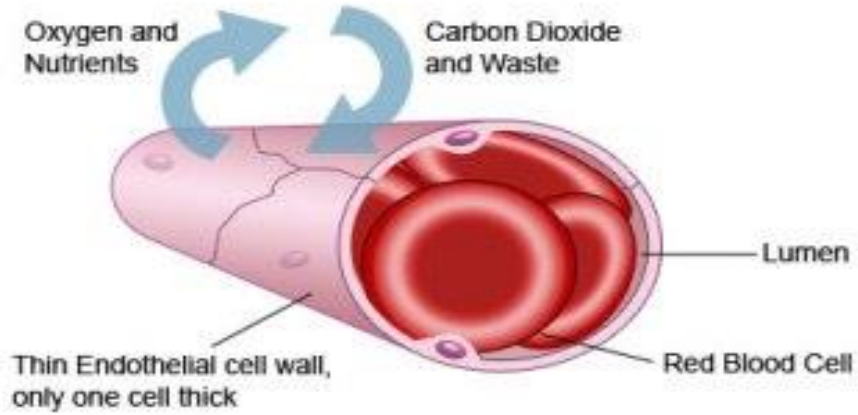


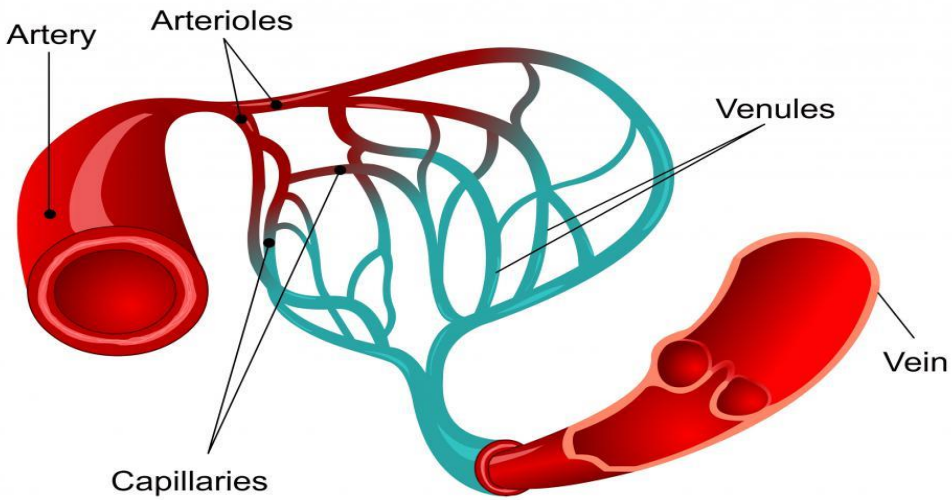
CAPILLARIES

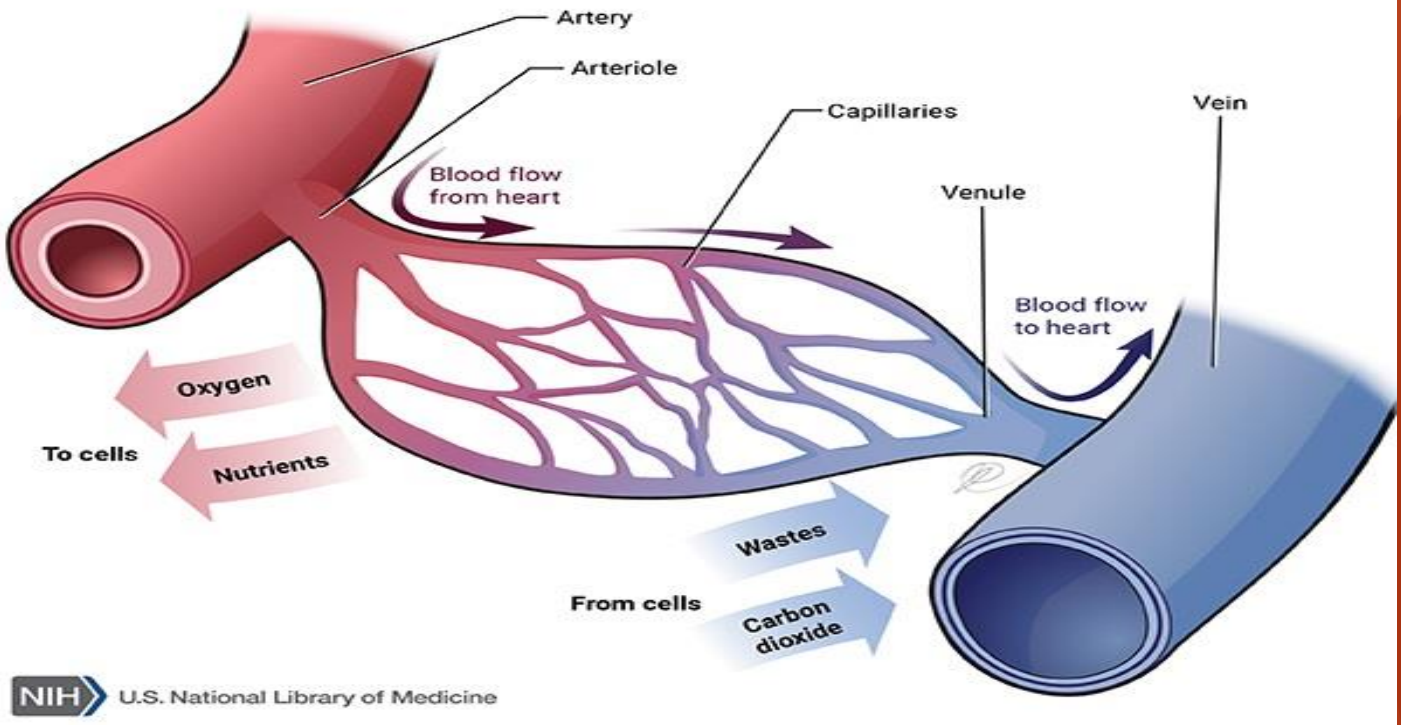
Very thin cell walls (one cell thick) so that substances can diffuse easily .

Carries blood close to every cell in the body, to exchange substances.

Supplies food and oxygen to the tissues and takes away waste, like carbon dioxide.







THE LYMPHATIC SYSTEM

The lymphatic system is another type of fluid transportation system. Its components are:

1. Lymph 2. Lymphatic capillaries 3. lymphatic vessels 4. Lymph nodes

LYMPH

Lymph is extra cellular fluid similar in composition to blood plasma. It is derived from blood plasma as fluids pass through capillary walls at the arterial end. It is devoid of RBC and so is pale yellow.

LYMPHATIC CAPILLARIES

Lymphatic capillaries are tiny, thin-walled micro vessels .The lymph capillaries, begin in the tissue spaces as blind-ended sacs.

They are slightly larger in diameter than blood capillaries, and have closed ends .

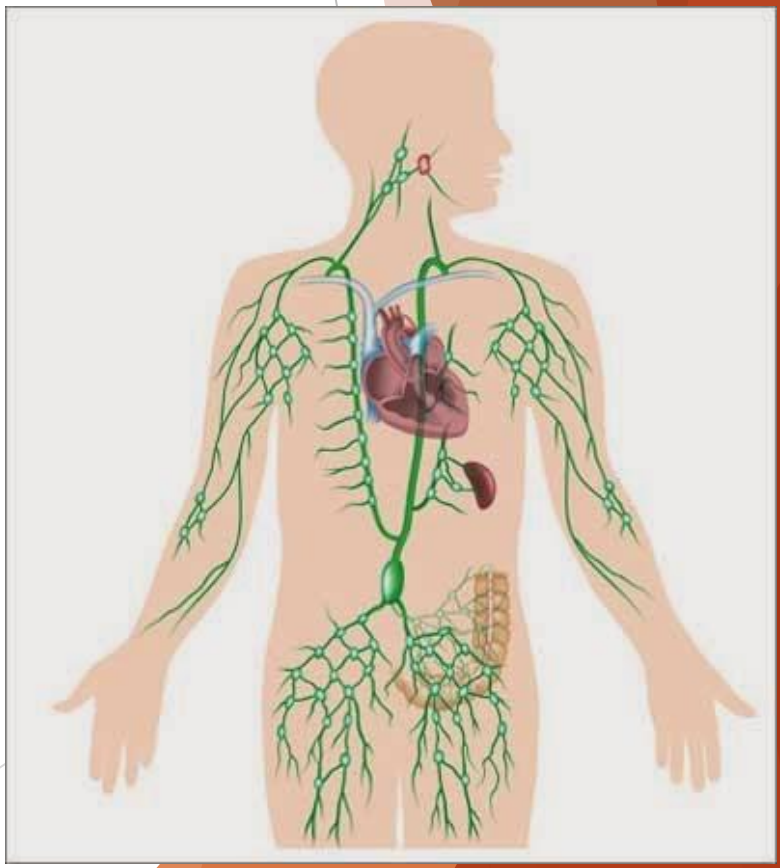
Their unique structure permits lymph to flow into them but not out.

LYMPHATIC VESSELS

They are thin-walled having valves that carry lymph. They collect lymph from tissues throughout the body and unlike blood vessels, **only carry fluid away from the tissues**.

LYMPH NODES

They are collection centers for lymph and as it passes through the nodes, the damaged cells, microbes and foreign particles are filtered out. The lymph nodes produce special WBCs like lymphocytes that engulf and destroy the microbes and thus provide protection. Lymph nodes, tonsils, spleen etc are the different lymph organs and they play a major role in the immune system of our body.



THE LYMPHATIC SYSTEM-Path of Lymph

1) Lymphatic system consists of lymph, lymph capillaries, lymph vessels, lymph nodes.

2) Fluid diffuses through the very thin walls of the capillaries into the tissue spaces. It contains minerals, nutrients and less proteins and nourishes the tissues. This tissue fluid is called lymph.

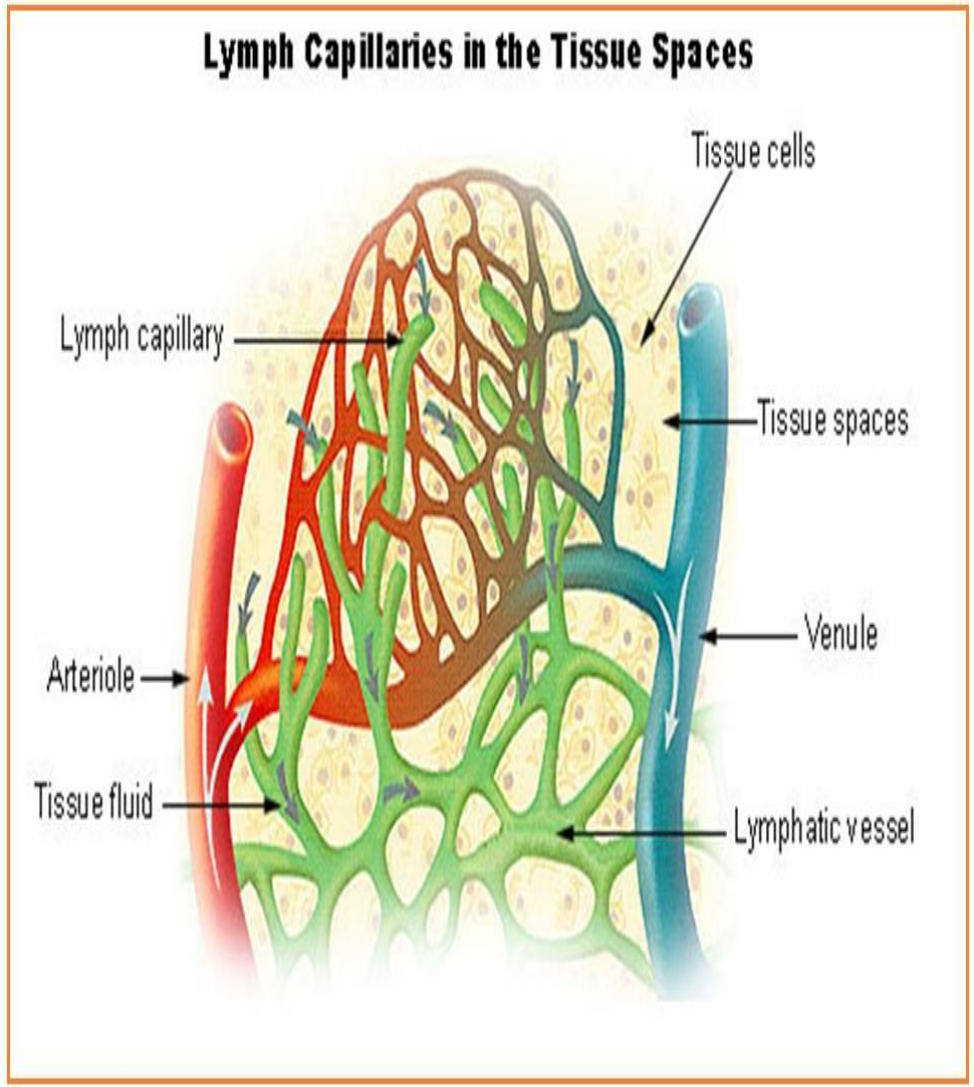
3) The lymphatic system helps to transport this tissue fluid back into the main blood stream.

4) From intercellular spaces, lymph goes into lymphatic capillaries.

5) Lymphatic capillaries join to form large lymph vessels that drain into collecting ducts.

6) These empty the lymph into the two subclavian veins, located below the collar bones. These veins join to form the superior vena cava.

7) Lymph flows only in direction, that is from tissues to heart through veins.



Functions of Lymphatic system:

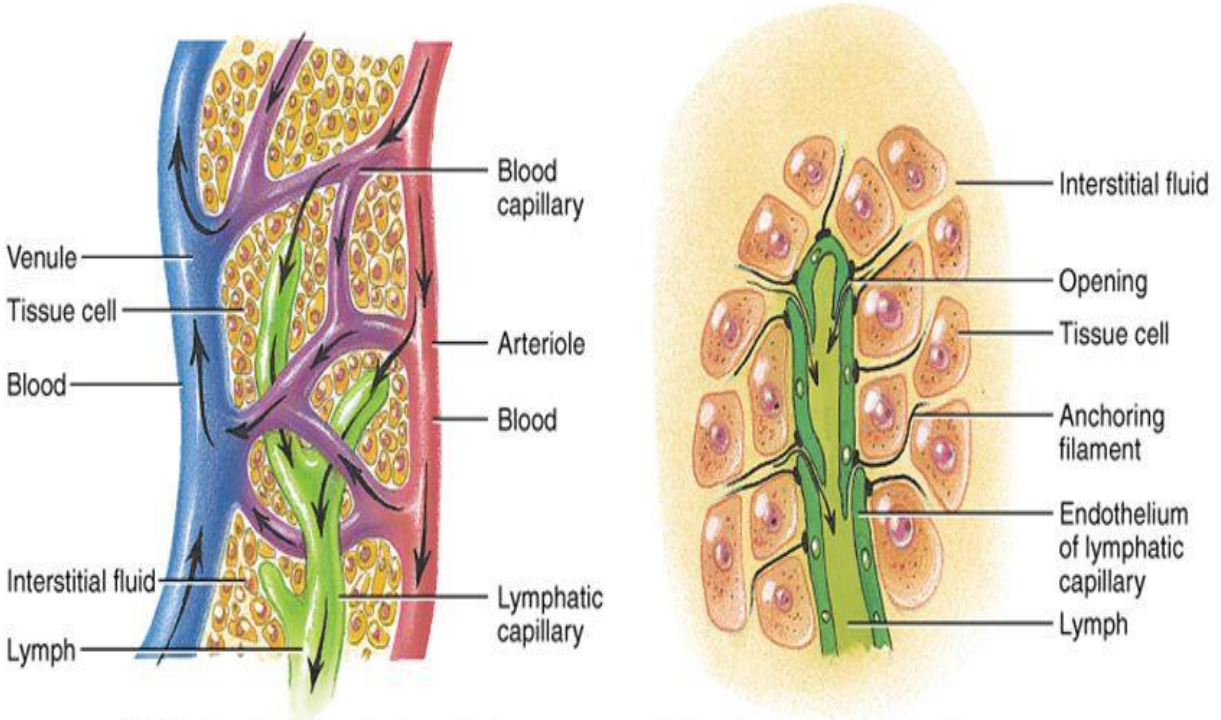
a) Lymph facilitates absorption of fats and fat-soluble nutrients back to the circulatory system.

b) It removes excess fluids from body tissues and maintains the balance of fluid between the blood and tissues.

c) It forms part of the body's immune system and helps defend against bacteria and other microbes, by producing immune cells like lymphocytes and other antibody cells.

Lymph and Circulation

Fluid moves out of circulation into the tissues at the blood capillaries. From the tissues fluid flows into the lymphatic capillary to be filtered at the lymph nodes and then is returned to blood by ducts near the heart.



(a) Relationship of lymphatic capillaries to tissue cells and blood capillaries

(b) Details of a lymphatic capillary

The Lymphatic System

- **Lymphatic vessels** collect tissue fluid from loose connective tissue
  - Carry fluid to great veins in the neck
  - Fluid flows only toward the heart

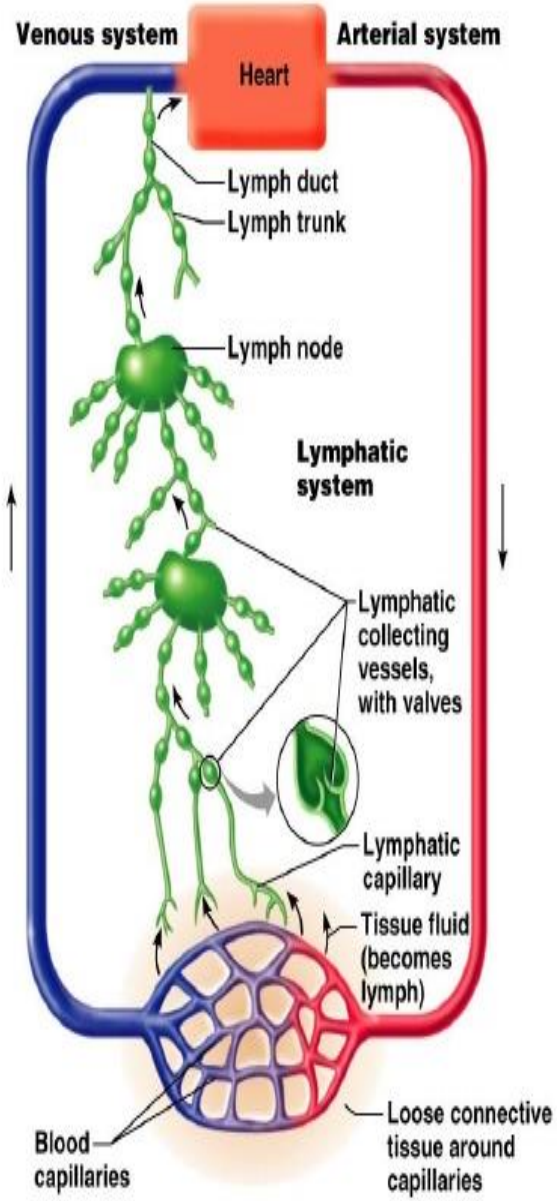
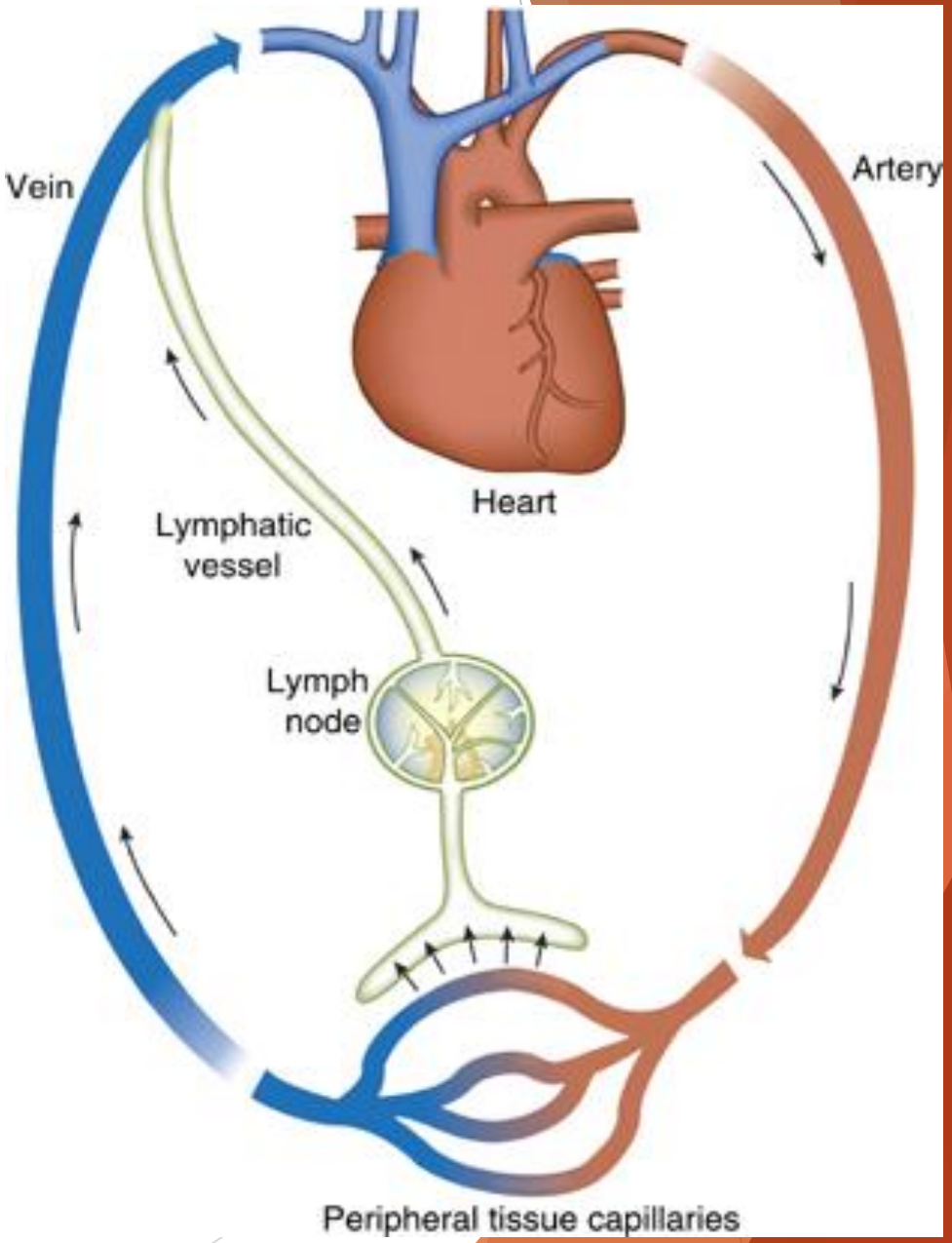


Figure 20.1



Source:
NCERT Science text book.
Google

Continued in Part 4