

HUMAN ANATOMY AND PHYSIOLOGY 1(BP101T)

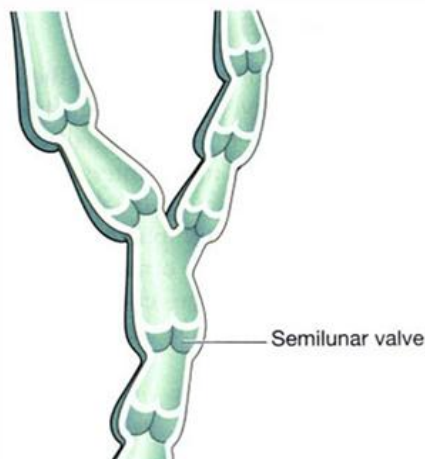
UNIT: 3 LYMPHATIC SYSTEM

CLASS: 9

TOPIC: LYMPHATIC VESSELS

LYMPHATIC CAPILLARIES, LYMPHATIC VENULES OR LYMPHATIC VESSELS:

- a. Lymph capillaries: These originate as blind-end tubes in the interstitial spaces. They have single layer of endothelial cells, but their walls are more permeable to all interstitial fluid constituents, including proteins and cell debris. The tiny capillaries join up to form larger lymph vessels. These are absent in CNS (central nervous system), bones, most superficial layer of the skin.
- b. Lymphatic venules or Lymphatic vessels: the walls of the lymph vessels are having same thickness as veins contains three layers as outer fibrous layer, middle smooth and elastic tissue layer, inner lining of endothelium. Lymph vessels have numerous cup-shaped valves which ensure that lymph flows in one way only (unidirectional flow), i.e. towards the thorax. Lymph vessels have numerous cup-shaped valves which ensure that lymph flows in one way only, i.e. towards the thorax.

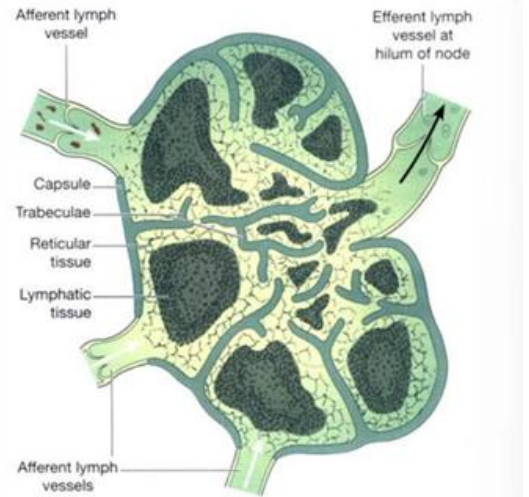


3. Lymphatic duct: Lymph vessels become larger as they join together, eventually forming two large ducts, the thoracic duct and right lymphatic duct, that empty lymph into the subclavian veins. a. Thoracic duct: This duct begins at the cisterna chyli, which is a dilated lymph channel situated in front of the bodies of the first two lumbar vertebrae. The duct is about 40 cm long and opens into the left subclavian vein in the root of the neck. It drains lymph from both legs, the pelvic and abdominal cavities, the left half of the thorax, head and neck and the left arm. b. Right lymphatic duct: This is a dilated lymph vessel about 1 cm long. It lies in the root of the neck and opens into the right subclavian vein. It drains lymph from the right half of the thorax, head and neck and the right arm.

4. Lymph nodes: Lymph nodes are oval or bean-shaped organs that lie, often in groups, along the length of lymph vessels. The lymph drains through a number of nodes, usually 8 to 10, before returning to the venous circulation. These nodes vary considerably in size: some are as small as a pin head and the largest are about the size of an almond. Structure of lymph nodes Lymph nodes: have an outer capsule of fibrous tissue which dips down into the node substance forming partitions, or trabeculae. The main substance of the node consists of reticular and lymphatic tissue containing many lymphocytes and macrophages. As many as four or five afferent lymph vessels may enter a lymph node while only one efferent vessel carries lymph away from the node. Each node has a concave surface called the hilum where an artery enters and a vein and the efferent lymph vessel leave.

- The large numbers of lymph nodes situated in strategic positions throughout the body are arranged in deep and superficial groups.
- Lymph from the head and neck passes through deep and superficial cervical nodes.

Lymph from the upper limbs passes through nodes situated in the elbow region then through the deep and superficial axillary nodes. Lymph from organs and tissues in the thoracic cavity drains through groups of nodes that are situated close to the mediastinum, large airways, oesophagus and chest wall. Most of the lymph from the breast passes through the axillary nodes.



Lymph from the pelvic and abdominal cavities passes through many lymph nodes before entering the cisterna chyli.

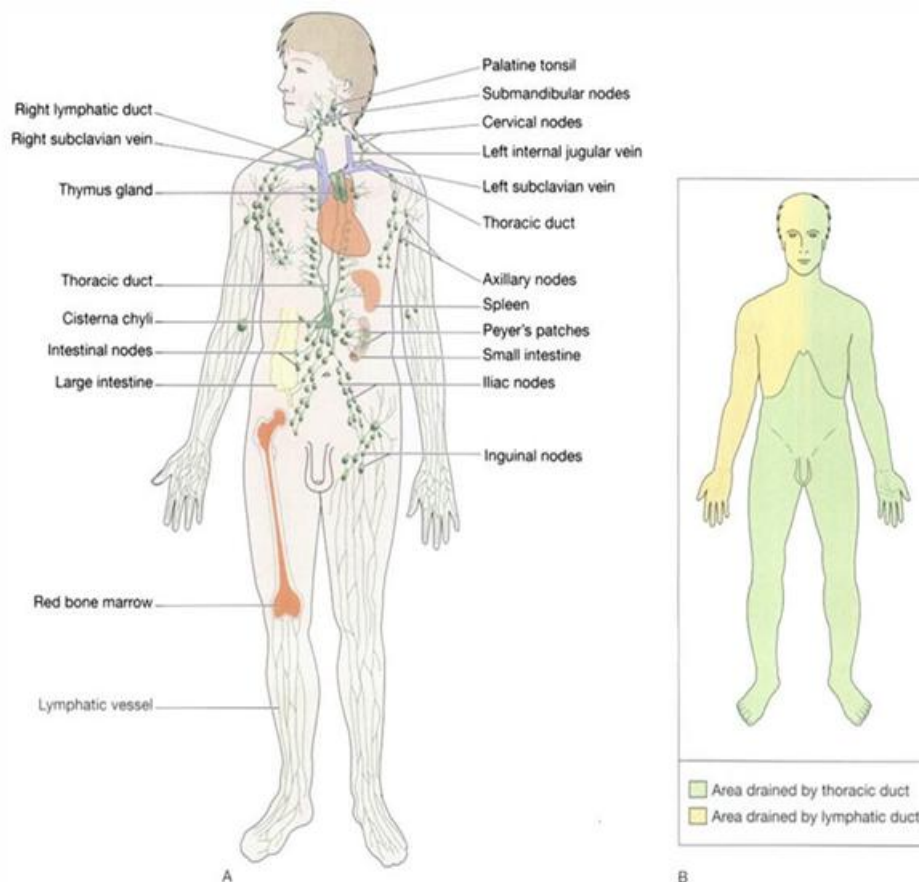


Figure 6.1 A. The lymphatic system. B. Lymph drainage. Green area drained by the thoracic duct; gold area drained by the right lymphatic duct.

The abdominal and pelvic nodes are situated mainly in association with the blood vessels supplying the organs and close to the main arteries, i.e. the aorta and the

external and internal iliac arteries. The lymph from the lower limbs drains through deep and superficial nodes including groups of nodes behind the knee and in the groin (inguinal nodes).

FUNCTIONS OF LYMPH NODES: Filtering and phagocytosis: Lymph is filtered by the reticular and lymphoid tissue as it passes through lymph nodes. Particulate matter may include microbes, dead and live phagocytes containing ingested microbes, cells from malignant tumours, worn out and damaged tissue cells and inhaled particles. In some cases where phagocytosis of microbes is incomplete they may stimulate inflammation and enlargement of the node (lymphadenopathy). Proliferation of lymphocytes: Activated T- and B-lymphocytes multiply in lymph nodes. Antibodies produced by sensitised B-lymphocytes enter lymph and blood draining the node.