Lymphatic System

• Returns fluids that leaked from blood vessels back to blood

• Consists of three parts

  1. Network of lymphatic vessels (lymphatics)
  2. Lymph – fluid in vessels
  3. Lymph nodes – cleanse lymph
Lymphoid Organs and Tissues

• Provide structural basis of immune system
• House phagocytic cells and lymphocytes
• Structures include spleen, thymus, tonsils, other lymphoid tissues
Lymphatic System: Functions

- **Lymphatic vessels** (lymphatics)
  - Return interstitial fluid and leaked plasma proteins back to blood
  - ~ 3L / day
  - Once interstitial fluid enters lymphatics, called lymph
Figure 20.2a The lymphatic system.

- **Internal jugular vein**
- **Entrance of right lymphatic duct into vein**
- **Entrance of thoracic duct into vein**
- **Thoracic duct**
- **Cisterna chyli**
- **Collecting lymphatic vessels**
- **Aorta**
- **Regional lymph nodes:**
  - **Cervical nodes**
  - **Axillary nodes**
  - **Inguinal nodes**

*General distribution of collecting lymphatic vessels and regional lymph nodes.*
(a) Structural relationship between a capillary bed of the blood vascular system and lymphatic capillaries.

(b) Lymphatic capillaries are blind-ended tubes in which adjacent endothelial cells overlap each other, forming flaplike minivalves.
(b) Major lymphatic trunks and ducts in relation to veins and surrounding structures. Anterior view of thoracic and abdominal wall.
Lymph Transport

• Lymph propelled by
  • Milking action of skeletal muscle
  • Pressure changes in thorax during breathing
  • Valves to prevent backflow
  • Pulsations of nearby arteries
  • Contractions of smooth muscle in walls of lymphatics
Lymph Nodes

• Principal lymphoid organs of the body
• Embedded in connective tissue, in clusters along lymphatic vessels
• Near the body surface in inguinal, axillary, and cervical regions of the body
Figure 20.2a The lymphatic system.

Drained by the right lymphatic duct
Drained by the thoracic duct

(a) General distribution of collecting lymphatic vessels and regional lymph nodes.
(a) Longitudinal view of the internal structure of a lymph node and associated lymphatics
Figure 20.5 Lymphoid organs.

- **Tonsils** (in pharyngeal region)
- **Thymus** (in thorax; most active during youth)
- **Spleen** (curves around left side of stomach)
- **Peyer’s patches** (aggregated lymphoid nodules in small intestine)
- **Appendix**