Chapter 20: The Lymphatic System

I. Lymphatic vessels: return interstitial fluid to the circulatory system

A. Distribution and structure of lymphatic vessels
   1. Lymphatic capillaries: blind ended tubes in the interstitium

   a. Structured like blood capillaries except:
      1) Endothelial cells: not joined by tight junctions
      2) Cells overlap: forming “mini-valves”
      3) C.T. filaments: anchor cells to the surrounding tissues
b. Materials freely enter: proteins, cell debris, microorganisms, etc.

c. Diagram: blood and lymph capillary interactions

2. Lymphatic collecting vessels: the next larger size
   a. Same tunics as veins
   b. Valves like veins: but more of them

3. Lymphatic trunks: formed by the union of the largest collecting vessels

4. Ducts (only 2): the largest of the lymphatic vessels
   a. Both join jugular at subclavian vein junction
   b. Right lymphatic duct: drains right arm and right side of head
   c. Thoracic duct (left lymphatic duct): drains the rest of the body

5. Lymph transport (unlike blood transport) is pump-less

6. Movement of lymph is by
   a. Contraction of lymph vessel walls
   b. The same factors as in venous return
      1) Muscular pump
      2) Ventilation (respiratory pump)
II. Lymph nodes: hundreds distributed throughout the body

A. Structure

(a) Longitudinal view of the internal structure of a lymph node and associated lymphatics

(b) Photomicrograph of part of a lymph node (72x)
1. **Capsule**: dense fibrous connective tissue, loosely attached
2. **Reticular fibers**: hold the stroma (functional tissue) together in all except the thymus
3. **Cortex**: the outer region
   a. Diagram of a follicle
   b. **B lymphocytes**: predominate in the germinal centers
   c. **T lymphocytes**: found in the rest of the cortex
4. **Medulla**: the inner core

**B. Circulation in lymph nodes**
1. **Afferent vessels**: (more numerous than efferent)
2. **Efferent vessels**: drainage is slow due to fewer efferents

**III. Other lymphoid organs**: defined as organs with many lymphocytes held together by reticular fibers

**A. Spleen**: the largest lymphoid organ, located just under the diaphragm, served by the splenic artery and vein
1. **Functions**
   a. **Filter debris**: such as dead cells, pathogens out of the blood
   b. Lymphocyte proliferation
   c. Immune surveillance and response
   d. Stores salvaged iron
2. **Anatomical areas**
   a. **Red pulp**: venous sinuses containing blood and macrophages
b. **White pulp:** follicle-like structures containing lymphocytes

B. **Thymus:** lies deep to the sternum

1. **Secretes hormones:** that controls and mature lymphocytes into T cells
2. **Active when young:** atrophies into puberty and later

C. **Tonsils:** form a ring of lymphatic tissue around the pharynx
1. Palatine tonsils: *on each side at the posterior end of the oral cavity*

2. Lingual: *at the base of the tongue*

3. Pharyngeal (adenoids): *on the posterior wall of the nasopharynx*

D. **Peyer's patches:** *clusters of nodules similar to tonsils*