Chapter 4, Tissues, Part 2

- **Histology** = The study of tissues
- **Tissue** = A collection of cells that perform related functions, and are similar in structure

- **The Four Primary Tissue Types:**
  - Epithelial
  - Connective
  - Muscular
  - Nervous
Connective Tissue:

Supports, protects, binds tissues

Structural characteristics:

- Specialized cells, few in number
- Extracellular matrix
  - fibers (collagen)
  - Ground substance (fluid-like)

• The Four Primary Tissue Types
  - Epithelial
  - Connective
  - Muscular
  - Nervous
Functions of

- Structural framework for body
- Transport of fluids and dissolved materials
- Support and protection for organs
- Energy storage (fat)
- Defense

• The Four Primary Tissue Types
  - Epithelial
  - Connective
  - Muscular
  - Nervous
Classification of Connective Tissue

- Loose (areolar)
- Adipose
- Reticular
- Irregular
- Regular
- Elastic
- Hyaline
- Elastic
- Fibrocartilage
- Compact
- Spongy

This is similar to Table 4.2
Connective Tissue Proper

- Loose (areolar)
- Adipose
- Reticular
Loose Connective Tissue

- viscous EC matrix, fibers not aligned
  1. loose (areolar) C.T.
  2. adipose
  3. reticular
1. Areolar (AKA loose)

- Most widespread
  - Beneath most epithelia
  - Think dermis!!!
- Types of Fibers:
  - Collagen
  - Elastic
  - Reticular
1. Areolar (AKA loose)

- Ground Substance
  - Similar to plasma
  - Leaked from capillaries
  - AKA ECF, interstitial fluid
- Defense:
  - Macrophages
  - Plasma Cells
  - Mast Cells
  - Other WBC
2. Fat

- AKA adipose
  - Cells are swollen with fat
- Prominent in hypodermis
- Intercellular matrix is obscured
- Storage of energy
3. Reticular

- Resembles areolar CT, but
  - Reticular fibers only
- “reticulum” = network
- Bone marrow, spleen

A special stain demonstrates the reticular fibers
Dense Connective Tissue

- Irregular
- Regular
- Elastic
1. Dense Irregular C.T.

- Collagen fibers in many directions
- Resist multi-directional tension
- Joint capsules
2. Dense Regular C.T.

- Very parallel fibers of collagen
- Tendons: Connect muscle to bones
3. Elastic C.T.

- Elastic fibers > collagen
- Walls of large arteries
Supporting C.T.

- Cartilage
  - Hyaline
  - Elastic
    - Ear, larynx
  - Fibrocartilage
    - Intervertebral discs
- Bone (Chapter 6)
  - Mineral matrix

Check Chapt 6, p 125
Hyaline Cartilage

- I.C. Matrix appears homogeneous
- Chondroblasts and chondrocytes in lacunae
- Articular cartilage
- Tracheal rings
Elastic cartilage

- More elastic fibers
- Ear

Fibrocartilage

- IV disk
- Symphysis pubis
- Meniscus
Bone (chap 6)

- The E.C. matrix is mineral, not fibrous
Fluid C.T.

- Blood (Ch 17)
- Lymph (Ch 20)
Membranes = Combination of Epithelia & C.T. (p 88)

**Mucous membranes,**
- Lining of cavities that communicate with exterior

**Serous membranes,**
- Lining of sealed, internal cavities

**Cutaneous membranes,**
- Skin

**Synovial membranes,**
- Joints

Know special names of serous membranes depending on location

Also know difference between “parietal” and “visceral”
Mucous vs. Serous Membrane

AKA mucosa
Cutaneous (skin) & Synovial Membranes
**Muscle Tissue**  Three types:

- **Skeletal**
- **Cardiac**
- **Smooth (not striated)**

*The Four Primary Tissue Types*
- Epithelial
- Connective
- Muscular
- Nervous
Skeletal Muscle (chap 10)

- Voluntary
- Heavily striated
- Multinucleate
  - periphery of the cell
Cardiac Muscle (chap 19)

• Heart (Only)
• Involuntary
• Striated, but poorly
• Intercalated disks
• Heavily branched
• Single central nucleus
Smooth Muscle (chap 23)

- Involuntary
- Esp. digestive system
- No striations
- Very slow
- Single central nucleus
Nervous Tissue (ch 12)

• Neurons
  • Transmit electrical impulses
• Neuroglia
  • Supportive cells of the nervous system

• The Four Primary Tissue Types
  Epithelial
  Connective
  Muscular
  Nervous
Classic Motor Neuron

Diagram showing the components of a classic motor neuron:
- **Mitochondrion**
- **Dendrites**
- **Axon**
- **Nucleus**
- **Microfibrils and microtubules**
- **Soma**
- **Synaptic terminals**
Neuroglia

- Support
- Immune
- Transmission
- Nutrition
- Protection

All the other nuclei are neuroglia!