

Chapter 5 Tissues

I. Tissues

1. Groups of similar cells that perform a common function. Surrounded by nonliving intercellular matrix – this defines the nature of the tissue
2. 4 Kinds
 - a. epithelial – covers & protects body surfaces, lines body cavities moves substances in & out of blood, forms glands
 - b. connective – supports body and its parts, holds structures together
 - c. muscle – produces movement
 - d. nervous – provides communication between body parts

II. Epithelial Tissue

1. Function
 - a. protection
 - b. sensor functions
 - c. secretion
 - d. absorption
 - e. excretion
2. Generalizations
 - a. has a free surface
 - b. Attaches to the underlying connective tissue by a non-cellular

layer called the basement membrane

- c. no blood vessels – nutrients received through diffusion
- d. tightly packed together
- e. reproduces quickly

3. Shapes

- a. squamous – thin, flat
- b. cuboidal – cubed shaped
- c. columnar, tall, like columns

4. Layers

- a. simple – single layer
- b. stratified - multiple layers
- c. pseudostratified - technically simple; cilia found

5. Derived from multiple germ layers
6. Keratinization
 - a. keratin is a protein
 - b. makes cell tough & hard
 - c. keratin replaces water in cells
 - d. dying cells “move up”
7. Cornified layer
 - a. surface of skin
 - b. hard & thick
 - c. additional thickening = callous, protects bone underneath
8. Glandular Epithelium
 - a. glands – specialized groups of cells that produce & secrete substances into ducts or tissues
 - b. exocrine glands secrete into ducts; ex. sebaceous glands
 - c. endocrine glands do not secrete into ducts; ex. hormones
 - d. 3 types of exocrine glands – determined by method of secretion

- a. merocrine glands – discharge secretions directly through plasma membrane
 - 1. serous – watery fluid
 - 2. mucous
- b. apocrine glands
 - 1. armpit, groin
 - 2. loss of small amount of cytoplasm
- c. holocrine gland – whole cells are lost
 - 1. sebaceous

III. Connective Tissue – most abundant in body

1. Binds tissue together
2. Provides support & protection
3. Serves as framework
4. Fills spaces
5. Stores fat
6. Produces blood cells
7. Protects against infection
8. Helps repair tissue damage
9. 4 types

A. Fibrous

1. Loose

- i. Stretchable
- ii. Large number of fibroblasts
- iii. Macrophages

2. Adipose

- i. Forms protective pads
- ii. Deposit for extra food
- iii. Insulator

3. Reticular Tissue

- i. Three dimensional network
- ii. Framework of spleen, lymph nodes & bone marrow
- iii. Acts as filter

4. Dense Fibrous Tissue

- i. Few fibroblasts

- ii. Regular – arranged in parallel rows; ex. Ligaments
- iii. Irregular, not arranged in parallel rows; ex. Dermis

B. Bone Tissue

1. Most highly specialized tissue

2. Bone salt is 65% of matrix –
gives hardness

i. Calcium
phosphate

ii. Calcium
carbonate

3. support & protection

4. attachment for muscles

5. Haversian System (osteon)

iii. Basic structural
unit of bone

iv. Osteocytes in
small spaces –
lacunae,
arranged in
lamellae

v. Canaliculi
connect lacuna
& osteocyte
with blood
vessels

6. osteoblasts – bone forming
cells

7. osteoclasts – bone destroying
cells

- a. mature bone can re-grow and reshape
- b. membrane bones are formed within membrane; flat bones
- c. endochondrial ossification – replace cartilage with bone; long bones

C. Cartilage – only chondrocytes are present

1. Produce fibers and ground substance of cartilage
2. Formed in lacuna
3. Avascular – nutrients reach it through diffusion; injuries heal slowly
4. Hyaline cartilage – low amount of collagen

- i. Most prevalent
- ii. Respiratory tubes
- iii. Articular cartilage

5. fibrocartilage – strongest

- iv. vertebral discs

- v. rigid matrix
- vi. lots of collagen

6.elastic cartilage

- i. few collagen fibers
- ii. large number of elastic fibers
- iii. high degree of flexibility
- iv. ear, voicebox

D. blood – fluid; no ground substances or fibers

1.components

- i. plasma – liquid portion
- ii.rbc, erythrocyte – most plentiful
- iii.wbc, leukocyte – larger than rbc; protection
- iv.platelet (piece of cell) – thrombocyte, clot blood

2.hematopoietic tissue – red marrow

- i.blood forming tissue

IV. Muscle Tissue

A. Skeletal – voluntary or striated

- 1. Attached to bones
- 2. Many nuclei per cell

B. Smooth – involuntary

- i. Walls of organs

- ii. Needs brain to function
- iii. 1 nuclei per cell

C. Cardiac – involuntary

- 1. Can function independently of brain = autorhythmicity

V Nervous Tissue

A. .Found in brain, spinal cord and neurons

B. Most complex tissue in the body

C. . 3 parts of a neuron

- 1. Dendrite – extension of the cell, multiple
- 2. Body
- 3. Axon – transmits pulse

D. Derived from ectoderm germ layer

VI.Membranes

A.Serous – secrete watery fluid

- 1. lubrication
- 2. in enclosed cavities
- 3. epithelial

B .mucous

1. protects openings of cavities
2. goblet cells make mucous
3. epithelial

C. synovial

1. fluid between joints
2. assist in movement
3. connective

D.cutaneous (skin)

1. epithelial
2. 4 functions
 1. protection
 2. excretion
 3. sensation
 4. secretion