TISSUES
(HISTOLOGY)

Introduction: Cells are organized into groups and layers called tissues. The cells of different tissues vary in size, shape, organization, and function, however, within each tissue type, they are quite similar in function.

OBJECTIVE: 1 Identify the body's four basic tissue types and describe their roles..
OBJECTIVE: 2 Discuss the types and functions of epithelial cells.
OBJECTIVE: 3 Describe the relationship between form and function for each type of epithelium.

A. Definition: a _____cells and cell products that _____
_____

B. *Four* Major Types
1. _____
2. _____
3. _____
4. _____

C. EPITHELIAL Tissue (epithelium)
1. **Definition: one of the four primary tissue types; a layer of cells that forms a superficial _____ or an internal _____ of a body cavity or vessel**
2. **Includes: _____**
3. **Characteristics**
   a. _____
   b. **apical surface "exposed" to internal passageway or environment (skin)**
   c. **always _____ to connective tissue by "_____"**
   d. _____
   e. _____ **replacement/regeneration**
4. **Functions**
   a. **physical _____**
   b. _____ **(absorption / excretion)**
   c. **provide for _____**
   d. **produce specialized _____**
5. **Intercellular Connections**
   a. _____ **of protection from _____**
   b. **attachments called _____**
   c. **Types**
      1) _____ **junctions**
      2) _____ **junctions**
      3) **adhering junctions or _____**
6. **Classification Scheme**
   a. _____
   b. _____
   c. _____ **cells**
   d. _____ **cells**
   e. _____ **cells**

7. **Specialized EPITHELIUM**

a. _____ **epithelium** **[Figure 4-4a p. 99]**

1) **Description: single layer, thin,** _____ **cells, nuclei usually broad & thin**
2) **Function** _____ **(reduce friction)**
3) **Location:**
   a) **exchange surfaces of lungs**
   b) **lines inside of blood and lymph vessels**
   c) **covers membranes that line ventral cavities**
   d) **lining inner surface of heart**

b. _____ **epithelium** **[Figure 4-4b p. 99]**

1) **Description: single layer of** _____ **cells, larger cells w/ room for more organelles; spherical nuclei usually centrally located**
2) **Function:** _____
3) **Location:**
   a) **covers ovaries**
   b) **lines ducts of certain glands [salivary, thyroid, pancreas, & liver]**
   c) **lines portions of kidney tubules involved in urine production**

c. _____ **epithelium** **[Figure 4-4c p. 99]**

1) **Description:** _____ **cells in a single layer, nuclei found at same level near basement membrane**
2) **Function:** _____
3) **Location:**
   a) **lines uterus**
   b) **lines organs of digestive tract**
   c) **secretes digestive fluids and absorbs nutrients**
4) **OTHER: absorbing cells have** _____ **, cylindrical processes which** _____**;** _____ **secrete mucus**

d. _____ **epithelium** **[Figure 4-5b p. 100]**

1) **Description:** _____ **or layered but are not, nuclei located at two or more levels**
2) **Location:**
   a) **commonly possess** _____ **which sweep secreted mucus**
   b) **goblet cells scattered throughout**
   c) **lines passages of respiratory and reproductive tracts (capturing particles and moving sex cells)**

e. _____ **epithelium** **[Figure 4-5a p. 100]**

1) **Description:** _____**, relatively thick tissue;** _____ **occurs in outer layers**
2) **Function:** _____**→ mechanical stresses ; water-proofing**
3) **Location:**
   a) **forms outer layer of skin (epidermis)**
   b) **lines mouth, throat, vagina, and anal canal**

f. _____ epithelium Rare!

1) Description: two to three layers of cuboidal cells that _____, cell layering protects more than a single layer
2) Location:
   a) lines larger ducts of mammary glands, sweat glands
   b) lines developing ovarian follicles and seminiferous tubules

g. _____ epithelium Rare!

1) Description: elongated superficial cells with cube-shaped basal layers
2) Location:
   a) lines parts of the pharynx, epiglottis, anus, urethra
   b) found in male vas deferens

h. _____ epithelium [Figure 4-5c p. 100]

1) Description: specialized to change in response to increased tension (when distended>_____; when relaxed > _____
2) Location:
   a) forms inner lining of the _____-
   b) lines the passageways of the urinary system
3) OTHER: provides expandable lining and forms a barrier to prevent contents from diffusing

i. _____ epithelium [Table 4-2 p. 103]

1) Definition: composed of cells specialized to _____
   _____
2) Gland
   a) Definition: group of cells that secrete its products into a duct or on to a body surface
   b) Types
      (1) _____ glands
         (a) Definition: secrete their products _____ opening onto (internal or external) surfaces
         (b) Types
            ^ _____ [Figure 4-6a pg. 102]
            most common
            releases from secretory vesicles by exocytosis
            mucin mixes w/ H_2O→ mucus
            location: salivary gland
            ^ _____ [Figure 4-6b pg.102
            loss of cytoplasm and product
            location: mammary gland
            ^ _____ [Figure 4-6c pg. 102]
            cell lysis
            location: sebaceous glands
      (2) _____ glands
         (a) Definition: secrete their products directly into the _____ fluids
         (b) more specifics in CH 10

c) Secretion Types

(1) _____ : _____, increase concentration of enzymes called serous fluid; common in glands of body cavities

(2) _____ : secrete a _____ mucus which is rich in glycoprotein, mucin; found in inner linings of digestive and respiratory systems

(3) MIXED

A. Plasma Membrane Modifications

Color and label:

1. ○ epithelial cells
2. ○ underlying connective tissue
3. ○ microvilli
   a. microfilaments
4. ○ cilia
   a. microtubules

Color (or trace) and label:

5. ○ membrane
6. ○ glycoprotein
7. ○ tonofilaments
8. ○ connexions

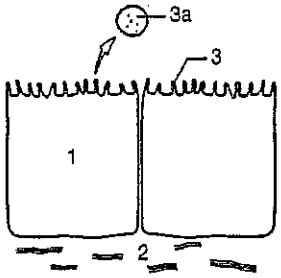

Figure 4.1a. Microvilli.

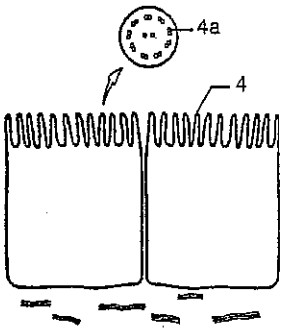

Figure 4.1b. Cilia.

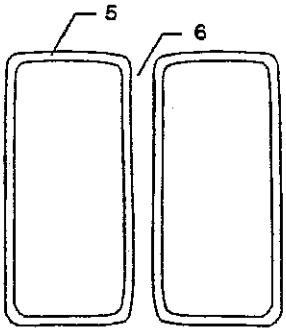

Figure 4.1c. No membrane modification.

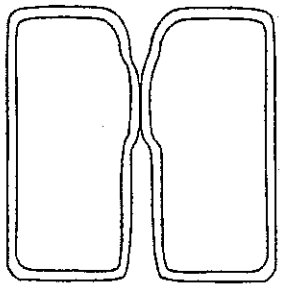

Figure 4.1d. Tight junction.

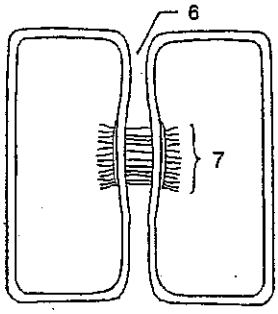

Figure 4.1e. Adhering junction.

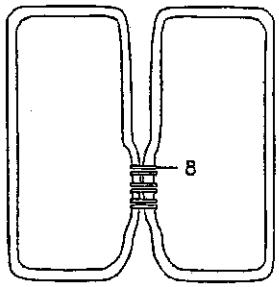

Figure 4.1f. Gap junction.

Exercise 4.1:

_____ 1. Which of the drawings show surface modifications?

_____ a. Are these surface modifications found in epithelial, connective, muscle, or nervous tissue?

_____ b. What surface modification contains microtubules? What is its function?

_____ c. What surface modification contains microfilaments? What is its function?

_____ 2. Which of the drawings show cell junctions?

3. Match each junction type with its description:

_____ a. prevents movement of materials between cells, found between epithelial cells

_____ b. holds cells together, found in skin and cardiac muscle

_____ c. transmits impulse and small ions from cell to cell, found in heart, smooth muscle, some nerve cells

_____ 4. Adhering junctions that exist in a band around cells are called _____, while those that exist as spots are called _____.