

# Tissues

## Chapter 5

### I. Order of Complexity

- A. atom
- B. molecule
- C. macromolecule
- D. organelle
- E. cell
- F. tissue
- G. organ
- H. system
- I. Organism

### II. Introduction:

- A. Tissue – group of cells with a specific function.
- B. There are four main types of tissues.

### III. Epithelial Tissues:

- A. General Characteristics
  - 1. Covers organs and lines surfaces.
  - 2. Usually has one free surface not touching other cells.
- B. Simple Squamous Epithelium
  - 1. single layer of thin, flattened cells.
  - 2. for diffusion, gas exchange, lungs
- C. Simple Cuboidal Epithelium
  - 1. single layer, cube-shaped cells
  - 2. for secretion and absorption in kidneys and glands.
- D. Simple Columnar Epithelium
  - 1. single layer of elongated cells, may be ciliated.
  - 2. lines the uterus, stomach, and intestines where it protects, secretes, and absorbs
- E. Pseudostratified Columnar Epithelium
  - 1. appear layered but aren't
  - 2. may have Cilia, line respiratory tubes.
- F. Stratified Squamous Epithelium
  - 1. layers of flattened cells, designed to protect.
  - 2. skin, lines the mouth, throat
  - 3. sometimes keratinized
- G. Stratified Cuboidal Epithelium
  - 1. two to three layers of cuboidal cells
  - 2. glands.
- H. Stratified Columnar Epithelium
  - 1. several layers
  - 2. in the vas deferens and parts of the pharynx.
- I. Transitional Epithelium
  - 1. changes shape
  - 2. lining of the urinary bladder.
- J. Glandular Epithelium
  - 1. secrete substances

2. Glands that secrete into ducts are exocrine; those that secrete into body fluids are called endocrine.

IV. Connective Tissues:

A. General Characteristics

1. bind, support, protect, store fat.
2. have intercellular material,

B. Connective Tissue Fibers

1. collagen fibers, add strength for holding together.
2. elastin fibers are stretchy and add flexibility.
3. Reticular fibers form supportive networks

C. Classification

1. Loose Connective
2. Adipose
3. Blood
4. Fibrous
5. bone
6. Cartilage

V. Muscle Tissues:

A. contracts

B. Skeletal Muscle Tissue

1. attached to bone
2. voluntary
3. long and cylindrical,
4. striated

C. Smooth Muscle Tissue

1. non-striated
2. spindle-shaped cells.
3. involuntary
4. hollow organs, stomach, intestines

D. Cardiac Muscle Tissue

1. heart
2. branching fibers
3. involuntary
4. striated

VI. Nervous Tissues:

A. brain, spinal cord, nerves.

B. send messages, coordinating and controlling, memory

C. Neurons = nerve cells,

VII. Epithelial Membranes

A. Composed of a layer of epithelial tissue and a layer of connective tissue

B. Covers surfaces and lines cavities

C. Types of Membranes

1. Serous membranes
  - a. line the thorax and abdomen and cover the organs
  - b. secrete fluid that acts as a lubricant.
2. Mucous membranes line the cavities that lead to the outside,
  - a. most secrete mucus.
3. Synovial membranes line the joint cavities.
4. Cutaneous membrane consists of the skin

VIII. Tissue Repair - substituting viable cells for dead

A. Regeneration – new cell is same as old, normal function is restored

- B. Replacement – different tissue replaces, loss of function

## Chapter 6 Integumentary System

### ✦ Skin

- A. Functions
  - temperature regulation, protection, water retention, sensation, and excretion.
- B. **Epidermis**
  - 1. stratified squamous epithelium, lacks blood vessels.
  - 2. Deep layers form new cells by mitosis.
  - 3. Cells are pushed outward as new cells are formed, and become keratinized as they die.
  - 4. Keratin makes barrier
  - 5. Melanocytes produce melanin that protects deeper cells from the sun's UV.
- C. **Dermis**
  - 1. Connective tissue with collagen and elastic fibers.
  - 2. Dermal blood vessels carry nutrients to upper layers of skin and help to regulate temperature.
  - 3. Contains nerve fibers, hair follicles, sebaceous glands, and sweat glands.
  - 4. upper part has dermal papillae which extend up
    - a. contains blood vessels
    - b. are in parallel in hands, etc
      - i. to improve grip
      - ii. make fingerprints
- D. Subcutaneous Layer (Hypodermis)
  - 1. composed of loose connective tissue and adipose tissue.
  - 2. It binds the skin to underlying organs and contains the blood vessels that supply the skin.
  - 3. Contains ½ the bodies fat

### ✦ **Accessory Organs of the Skin**

- A. **Nails**
  - 1. Protective coverings from damage and in defense
  - 2. stratified squamous epithelial cells fill with a hard keratin
  - 3. grow from base continuously
- B. **Hair**
  - 1. develop from cells at the base of the follicle.
  - 2. old cells are pushed out and keratinized, forming the hair shaft.
  - 3. shaft – protrudes above surface
  - 4. root – under surface
  - 5. cortex – hard surrounds center
  - 6. medulla – soft center
  - 7. cuticle – single layer of cells, holds hair in follicle
  - 8. arrector pili muscle attaches to each follicle.

- cause goose bumps when cold or frightened.
- 9. color is determined mainly by melanin
- 10. heat insulator, sweat out of eyes, keep foreign objects out
- C. Sebaceous Glands
  - 1. associated with hair follicles and secrete sebum that waterproofs and moisturizes the hair.
- D. Sweat Glands
  - 1. Sudoriferous glands are either:
    - a. eccrine respond to body temp, H<sub>2</sub>O, little salt
    - b. apocrine respond to body temp, stress, has more organic substances
  - 2. Mammary glands, a modified type of sweat gland, secrete milk.
- E. Secretions produce an unsuitable environment for some microorganisms.

★ **Regulation of Body Temperature**

- A. Heat may be lost through radiation, conduction, or convection.
- B. excessive heat causes dilation of blood vessels.
- C. excessive cooling causes constricting blood vessels.

★ **Vitamin D Production**

- A. UV light makes precursor to Vitamin D

★ **Excretion**

- A. H<sub>2</sub>O, salt, urea, ammonia

★ **Burns**

- A. First Degree – epidermis only, red
- B. Second Degree – epidermis and dermis, red, blisters
- C. Third Degree – epidermis + dermis is completely gone, painless,

★ **Skin Cancer**

- A. usually UV, can be chemicals or radiation
- B. benign – do not invade healthy tissue
- C. malignant – can spread by metastasis
- D. melanoma – cancer of melanocytes
- E. What to look for in moles: Change in color, size, irregular margin, itching, bleeding, oozing, scab, ulceration