

Ch5: Body Tissues and Membranes

Tissue = groups of cells that are similar in structure and function

Types

- Epithelial – covering
- Connective – support
- Muscle – movement
- Nervous – control

Epithelial Tissue

- ⊙ Function = lining, covering, and glandular tissue of the body
- ⊙ Special Characteristics:
 - Fits closely together
 - Apical surface = one free end that is exposed to body's exterior
 - Lower surface rests on basement membrane (connective)
 - No blood supply of their own and depend on diffusion
 - Regeneration

Classification of Epithelial Tissue

- ⊙ Simple = one layer, absorption, secretion, filtration
- ⊙ Types
 - **Simple Squamous** – (serous membrane) forms where filtration and rapid diffusion takes place
 - Ex: air sacs in lungs or lining of ventral body cavity
 - **Simple Cuboidal** – found in glands and their ducts
 - Ex: salivary gland and pancreas
 - **Simple Columnar** – (mucous membranes) goblet cells secrete mucus
 - Ex: lining of digestive tract (intestines)
 - **Pseudostratified Columnar** – give false impression of layers
 - Ex: lining of respiratory tract - ciliated
- ⊙ Stratified = more than one layer, more durable, protection
- ⊙ Types:
 - **Stratified Squamous** – found in mouth, esophagus, and skin
 - Found in places that require some protection against objects (clothes/food)
 - Stratified Cuboidal and Columnar – fairly rare
 - found in ducts of large glands
 - **Transitional** – lines bladder, ureters, and urethra
 - changes shape when stretched
- ⊙ Glandular Epithelial Tissue – consists of one or more cells that make and secrete a product
- ⊙ Types:
 - Endocrine glands – secrete hormones (thyroid, adrenals, pituitary)
 - Exocrine glands – have ducts to outside (sweat, oil glands)

Epithelial Membranes

- ⊙ Membranes line body cavities and hold organs together
 - Cutaneous
 - Function: protect underlying tissues from drying out
 - Location: skin
 - Structure: dry membrane
 - Mucous
 - Function: lubricate lining of certain body systems
 - Location: systems open to outside; digestive and respiratory
 - Structure: wet membrane
 - Serous
 - Function: to prevent friction
 - Location: lines inner body cavities (pleural, pericardial, and peritoneum)
 - Structure: has an inner (visceral) layer and an outer (parietal) layer

Connective Tissue

- ⊙ Function = protecting, supporting, and binding together other body tissues
- ⊙ Common Characteristics
 - Variations in blood supply
 - Most are well vascularized, but tendons and ligaments are not
 - Cartilage is avascular – heals very slowly or not at all
 - Extracellular matrix – contains different types of cells surrounded by nonliving substances
 - Connective tissue makes it – different thicknesses
 - Allows tissue to bear weight or withstand stretching
 - Varies from hard (bone) to soft (fat)
 - Types of fibers made by connective tissue
 - Collagen – white
 - Elastic – yellow
 - Reticular – fine collagen

Classification of Connective Tissue

- ⊙ Bone (osseous) – bone cells sitting in lacunae and surrounded by very hard matrix
 - Protects and supports other body organs
- ⊙ Cartilage – softer and more flexible than bone
 - Hyaline – collagen fibers in rubbery matrix and glassy appearance
 - Larynx, attaches ribs to breastbone, covers ends of bones at joints, makes up fetus skeleton
 - Elastic – found where structures need elasticity
 - External ear, vertebral discs
- ⊙ Loose Connective Tissue – soft, more cells, and fewer fibers
 - Areolar – holds internal organs together
 - Provides a reservoir of water and salts for surrounding tissues
 - Edema – when body region gets inflamed and areolar tissue soaks up excess fluid
 - Adipose (fat) – stored oil that insulates and cushions body parts
 - Reticular – form stroma
 - internal supporting framework for lymphoid organs (spleen and lymph nodes)

- ⊙ Dense Connective Tissue – contain collagen and fibroblasts (fiber-forming cells)
 - Tendons = connects muscle to bone
 - Ligaments = connects bone to bone
- ⊙ Blood – only fluid tissue
 - Blood cells surrounded by nonliving fluid matrix called plasma
 - Transport vehicle of cardiovascular system

Connective Membranes

- Synovial
 - Function: lubricate and protect joints
 - Location: joints of body

Muscle Tissue

- ⊙ Function = aids in the internal and external movement of the body
- ⊙ Types: Skeletal, cardiac, and smooth
- ⊙ Characteristics: striations, control, location, and number of nuclei

Classification of Muscle Tissue

- ⊙ Skeletal
 - Location: Attached to skeleton; moves body
 - Control: Voluntary
 - Striated – has visible stripes in cell
 - Multinucleated – formed because cells fuse during development to form one long cell
 - ⊙ Long and cylindrical
- ⊙ Cardiac
 - Location: only in heart
 - Striated
 - one nucleus
 - ⊙ Fits tightly together at junctions called intercalated disks
 - ⊙ Gap junctions that allow ions to pass freely from cell to cell to cause rapid conduction of electrical impulses
 - Control: Involuntary
- ⊙ Smooth
 - No striations
 - Control: Involuntary
 - One nucleus
 - ⊙ Spindle-shaped
 - Location: walls of hollow organs (stomach, bladder, uterus, blood vessels)
 - ⊙ Creates peristalsis = wavelike motion of the slow contraction

Nervous Tissue

- ⊙ Neurons = nerve cells that receive and conduct electrochemical impulses from one part of the body to another
- ⊙ Characteristics
 - Irritability and conductivity
- ⊙ Structure
 - Cytoplasm in long extensions (axon) with supporting cells around them for support and nutrients