

Terms

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| Histology | (microscopic anatomy) —the study of tissues and how they are arranged into organs |
| Tissue | a group of similar cells and cell products that arise from the same region of the embryo and work together to perform a specific structural or physiological role in an organ -First tissues appear when these cells start to organize themselves into layers; First two, and then three strata |
| Organ | structure with discrete boundaries that is composed of two or more tissue types |

Three primary germ layers

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|--------------------------|---|
| Ectoderm (outer) | Gives rise to epidermis and nervous system |
| Endoderm (inner) | Gives rise to mucous membrane lining digestive and respiratory tracts, digestive glands, among other things |
| Mesoderm (middle) | becomes gelatinous tissue called mesenchyme - Wispy collagen fibers and fibroblasts in gel matrix, Gives rise to muscle, bone, blood |

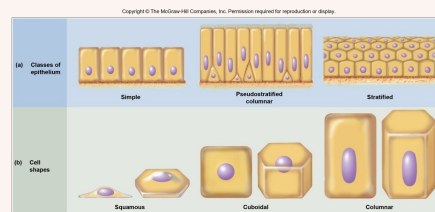
Connective Tissue: Overview

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|------------------------------|---|
| Connective tissue— | a type of tissue in which cells usually occupy less space than the extracellular material |
| Binding of organs— | tendons and ligaments |
| Support— | bones and cartilage |
| Physical protection — | cranium, ribs, sternum |
| Immune protection — | white blood cells attack foreign invaders |
| Movement | bones provide lever system |
| Storage— | fat, calcium, phosphorus |
| Heat production — | metabolism of brown fat in infants |
| Transport — | blood |

Four Broad Categories of Tissues

1. Epithelial Tissue
2. Connective Tissue
3. Nervous Tissue
4. Muscular Tissue

Epithelial Tissue



Epithelial Tissue

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| Covers body surface and lines body cavities |
| • Basement membrane —layer between an epithelium and the underlying connective tissue |
| • Collagen |
| • Anchors the epithelium to the connective tissue below it |
| • Basal surface —surface of an epithelial cell that faces the basement membrane |
| • Apical surface —surface of an epithelial cell that faces away from the basement membrane |

Cells Found in Connective Tissue

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| Macrophages- | phagocytize foreign material and activate immune system when they sense foreign matter (antigen) -Arise from white blood cells called monocytes |
| Leukocytes, | or white blood cells |
| - Neutrophils | wander about attacking bacteria |
| - Lymphocytes | react against bacteria, toxins, and other foreign material |
| Plasma cells | synthesize disease-fighting antibodies -Arise from lymphocytes |
| Mast cells | are found alongside blood vessels -Secrete heparin to inhibit clotting -Secrete histamine to dilate blood vessels |

2 Types of Fibrous Connective Tissue

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| Loose connective tissue | - Much gel-like ground substance between cells • 2 Types: Areolar & Reticular |
|--------------------------------|--|



By **jkellar**
cheatography.com/jkellar/

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2 Types of Fibrous Connective Tissue (cont)

Dense connective tissue

- Fibers fill spaces between cells
- Types vary in fiber orientation
 - **Dense regular** connective tissue
 - **Dense irregular** connective tissue

2 Main Types Epithelial Tissue

Simple epithelium

- Contains one layer of cells
- Named by shape of cells
- All cells touch the basement membrane

Stratified epithelium

- Contains more than one layer
- Named by shape of apical cells
- Some cells** rest on top of others
- does not** touch basement membrane
- Deepest layers undergo continuous **mitosis**
- Their daughter cells push toward the surface and become flatter as they migrate farther upward
- Finally die and flake off—**exfoliation** or **desquamation**

Four types of simple epithelia

- Three named for their cell shapes
 - **Simple squamous** (thin, scaly cells)
 - **Simple cuboidal** (square or round cells)
 - **Simple columnar** (tall, narrow cells)
- (4)– Pseudostratified columnar
 - Not all cells reach the free surface
 - Shorter cells are covered over by taller ones
- Looks stratified
 - Every cell reaches the basement membrane
- Goblet Cells** wineglass-shaped mucus-secreting cells in simple columnar and pseudostratified epithelia=

Two Kinds of Stratified Squamous Epithelia

Keratinized found on skin surface, abrasion resistant Multiple cell layers with cells becoming flat and scaly toward surface keratin is a tough protein

- Epidermis; palms and soles heavily keratinized
- Resists abrasion; retards water loss through skin; resists penetration by pathogenic organisms

Two Kinds of Stratified Squamous Epithelia (cont)

Nonkeratinized lacks surface layer of dead cells

