Department of Kidney Dialysis Techniques
Histology lec 2: Cell Histology
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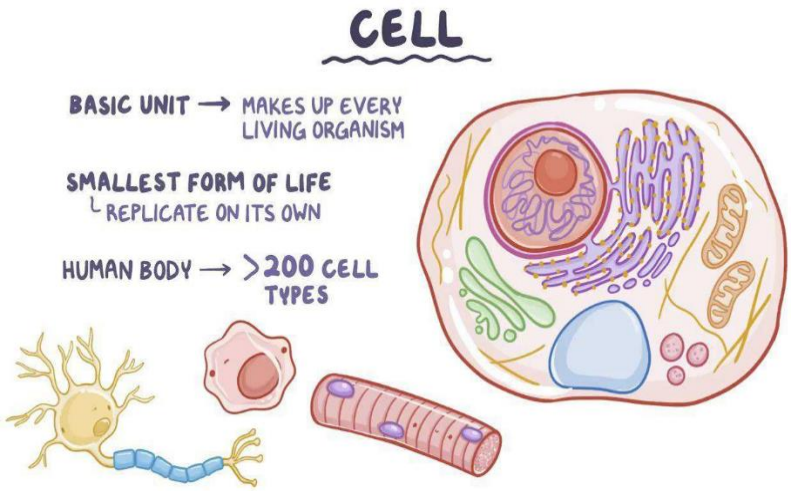
LEARNING OBJECTIVES

By the end of this section, you will be able to understand:

- **Introduction to cell Histology.**
- **Basic Structure of the Cell**
- **Cytoplasmic organelles.**
- **Cell types**
- **Cell Junctions .**

Cell Histology: Structure and Types



Cells are the basic structural and functional units of all living organisms. Understanding cell histology is essential for interpreting normal tissue architecture and pathological changes.

Basic Structure of the Cell

A. Plasma Membrane

• Composed of a phospholipid bilayer with embedded proteins.

• **Functions:**

• Selective permeabilit • Cell communication • Cell adhesion

• **Visible under electron microscopy.**

B. Cytoplasm

• **Consists of:**

• Cytosol • Organelles • Cytoskeleton

• **Site of most metabolic activities.**

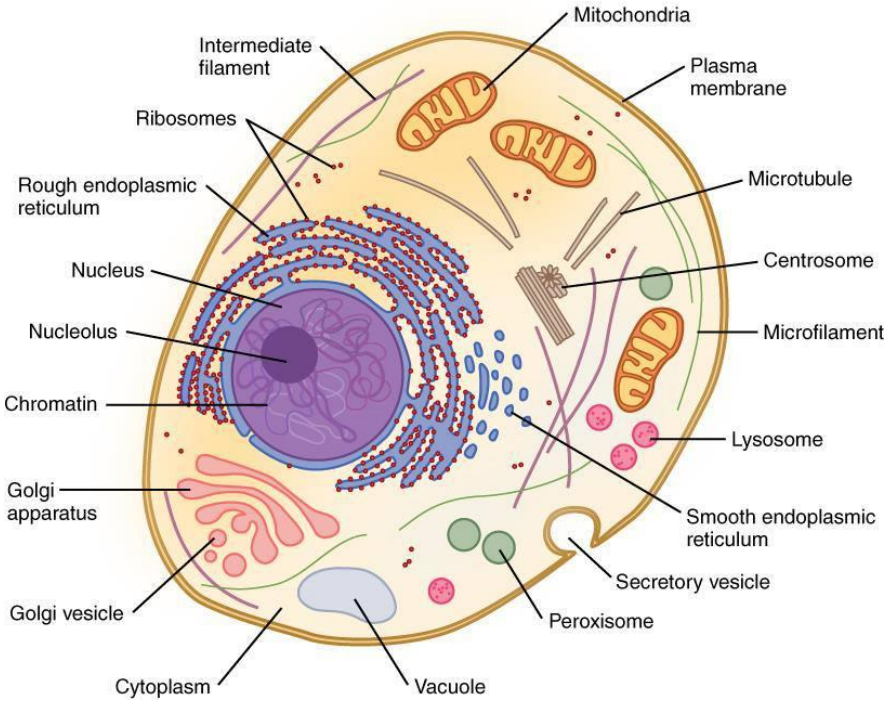
C. Nucleus

- **Surrounded by a double-layered nuclear envelope with nuclear pores.**
- **Contains: Nucleolus**

D. Cytoplasmic Organelles

1. Mitochondria

- Double membrane
- Inner membrane forms cristae
- Function: ATP production
- Abundant in cells with high energy demand (e.g., muscle cells)



2. Endoplasmic Reticulum (ER)

- Rough ER: studded with ribosomes → protein synthesis
- Smooth ER:
- Lipid synthesis, Detoxification, Calcium storage

3. Golgi Apparatus

- Modifies, packages, and transports proteins
- Prominent in secretory cells

4. Ribosomes

- Free or bound to RER
- Site of protein synthesis

5. Lysosomes

- Contain digestive enzymes • Intracellular digestion and autophagy

E. Cytoskeleton

Composed of:

- **Microfilaments (actin)**

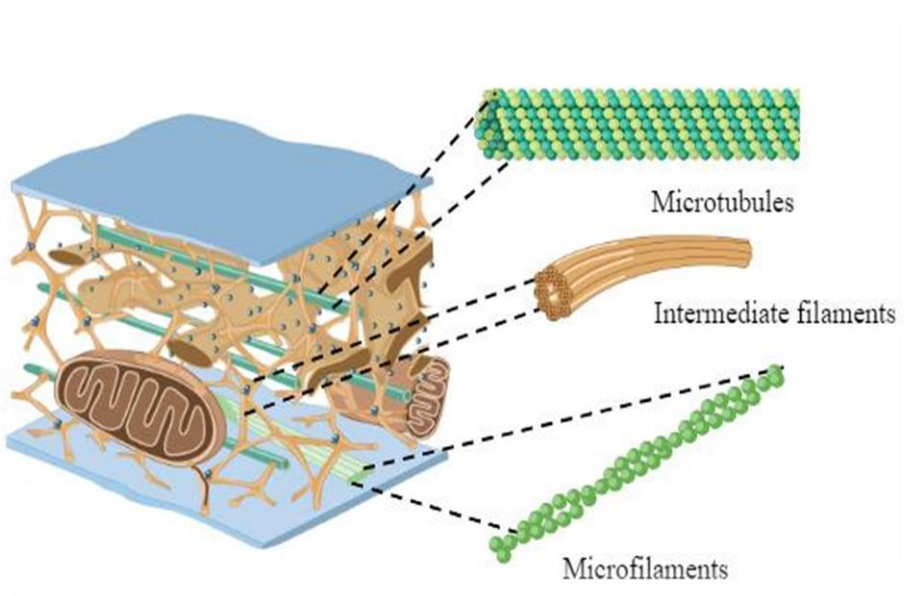
– cell movement

- **Intermediate filaments**

– mechanical strength

- **Microtubules**

– intracellular transport, mitosis



Types of Cells in Histology

A. Epithelial Cells

- Cover surfaces and line cavities
- **Characteristics:**
- Closely packed
- Polarity
- Basement membrane
- **Examples:**
- Squamous cells
- Cuboidal cells
- Columnar cells

B. Connective Tissue Cells

- Provide support and protection
- **Examples:**

- Fibroblasts
- Adipocytes
- Macrophages
- Plasma cells

C. Muscle Cells

- Specialized for contraction
- **Types:**
- Skeletal muscle cells
- Cardiac muscle cells
- Smooth muscle cells

D. Nervous Tissue Cells

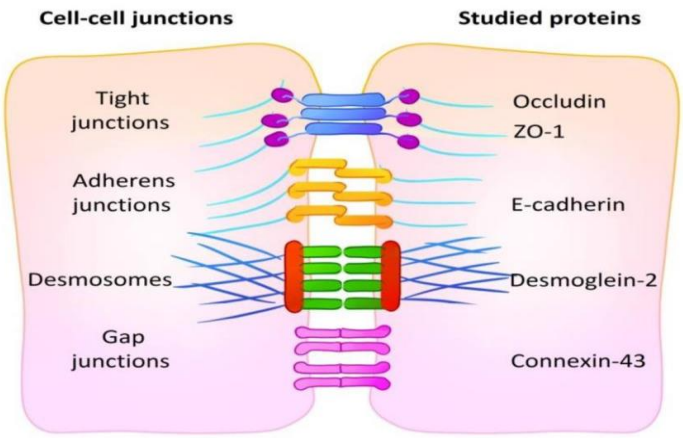
- **Neurons:** transmit electrical signals
- **Neuroglial cells:** support and protect neurons

E. Blood Cells

- Red blood cells (erythrocytes)
- White blood cells (leukocytes)
- Platelets

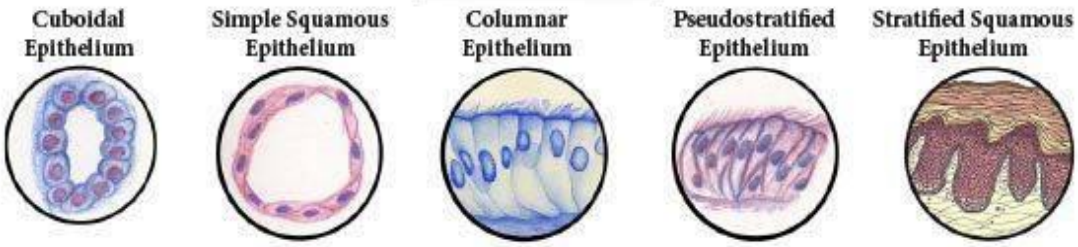
Cell Junctions (Histological Importance)

- **Tight junctions:** prevent leakage
- **Adherens junctions:** mechanical attachment
- **Desmosomes:** strong adhesion
- **Gap junctions:** cell communication

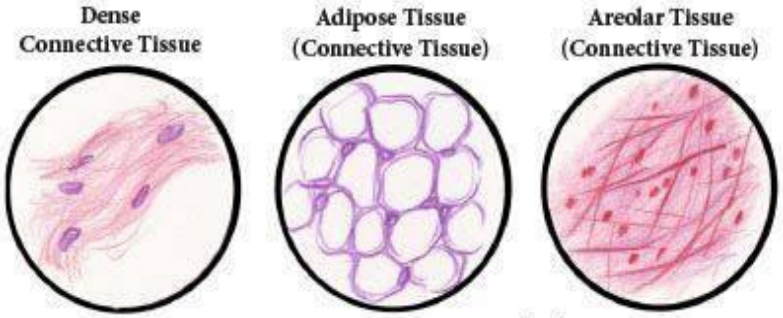


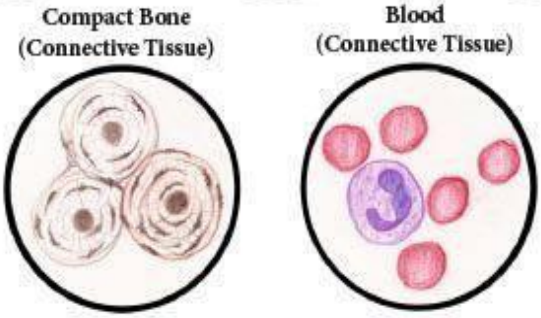
The Four Basic Tissue Types Of The Human Body:
Epithelium, Connective Tissue, Nervous Tissue and Muscle

EPITHELIUM



CONNECTIVE TISSUE





NERVOUS TISSUE

MUSCLE TISSUE