

General Pathology

Cell Types and Cell Constituents

Lec 7

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Introduction

Pathology

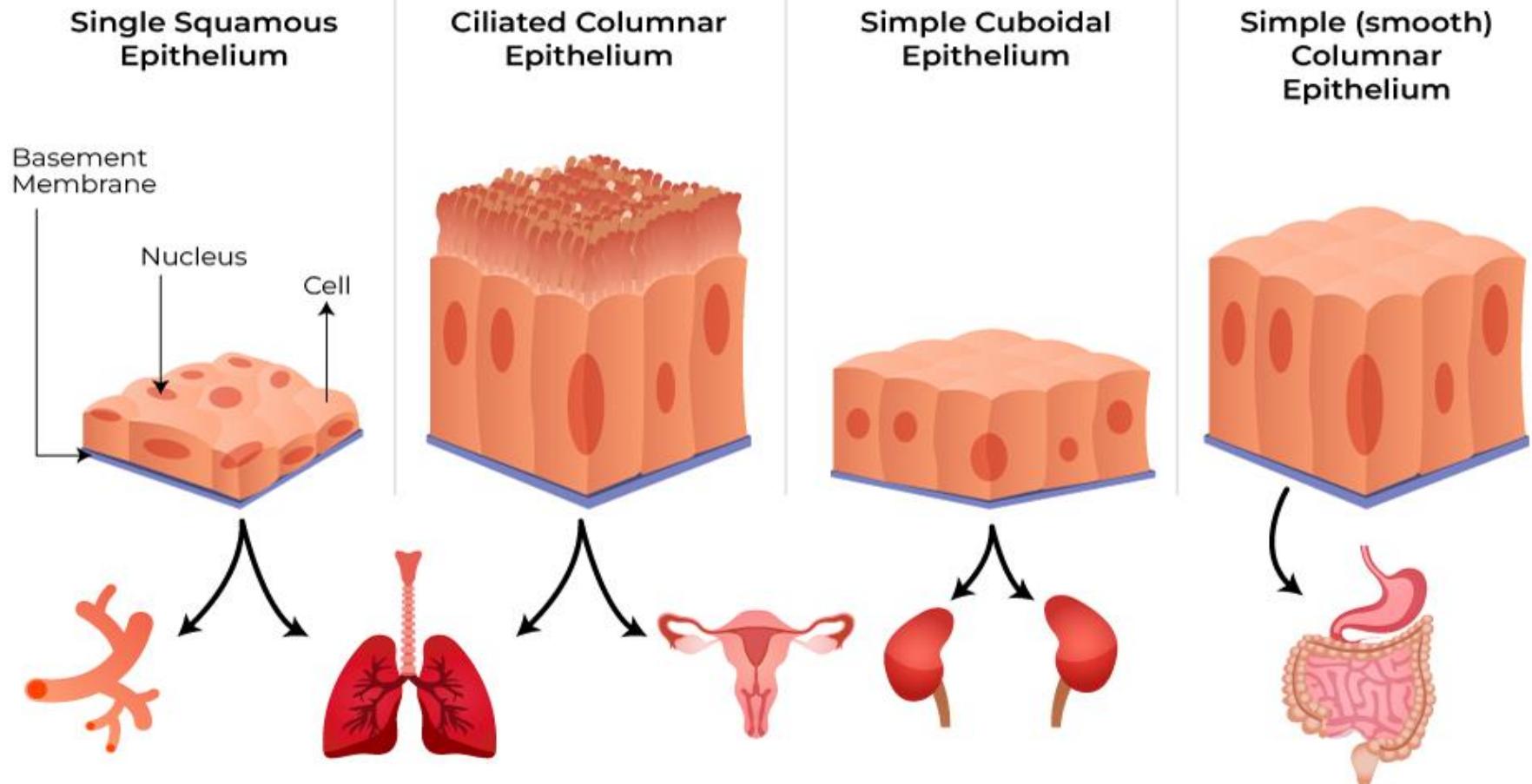
study of disease causes, mechanisms and effects.

Understanding cell structure and function is essential to interpret cellular injury and disease.

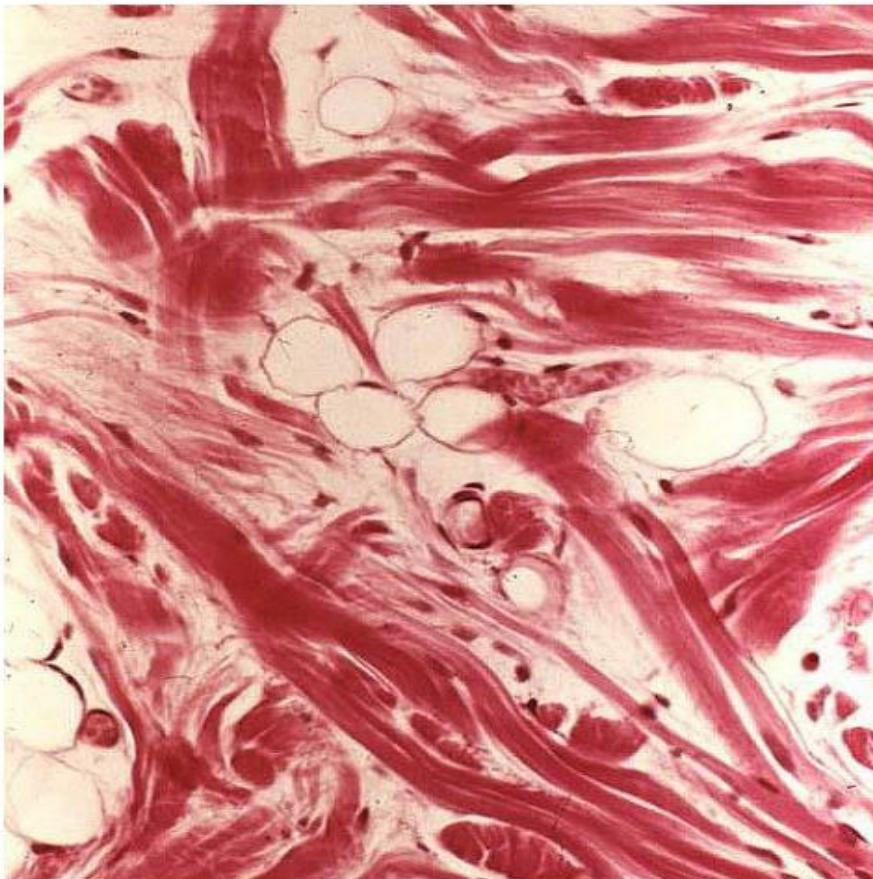
Cell Types

- Epithelial cells – protection, absorption, secretion.
- Connective tissue cells – fibroblasts, adipocytes, chondrocytes, osteocytes.
- Muscle cells – skeletal, cardiac, smooth.
- Nervous tissue – neurons and glial cells.
- Hematopoietic cells – RBCs, platelets, WBCs(neutrophiles, lymphocytes, monocytes, eosinophiles, macrophages, basophiles).

Epithelial Cell

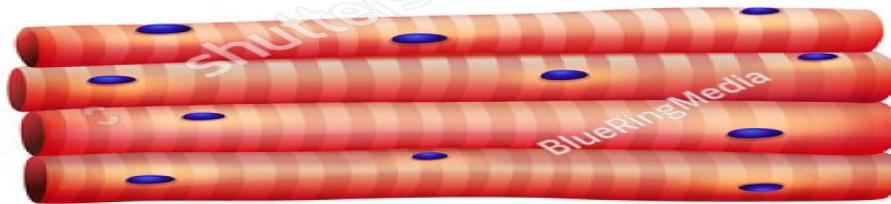


Connective Tissue

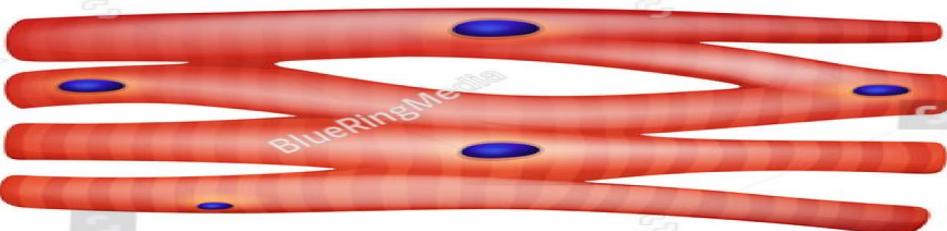
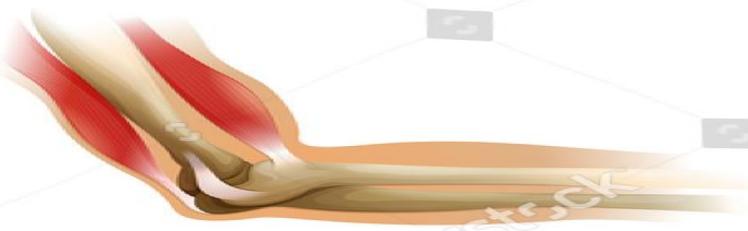


- **Extracellular Matrix**
Fibers – collagen & elastic
“Ground substance”
- **Cells**
Fixed:
Fibroblasts
Adipocytes
“Tissue macrophages”
Free:
Immune cells
(lymphocytes)
Inflammatory cells
(neutrophils & activated macrophages)

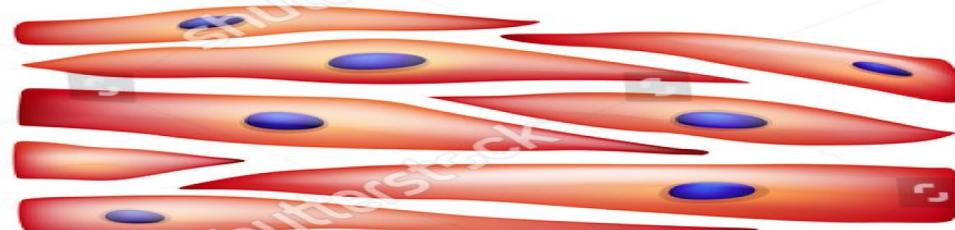
Types of Muscle Cells



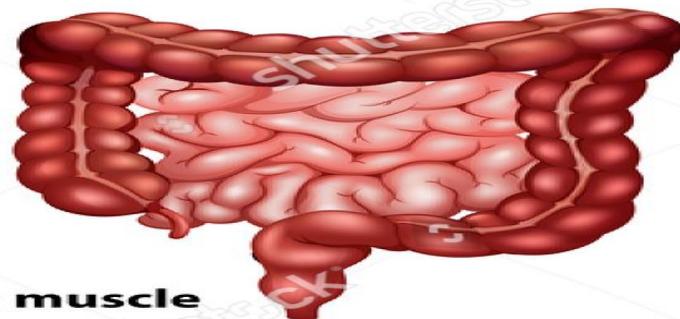
skeletal muscle



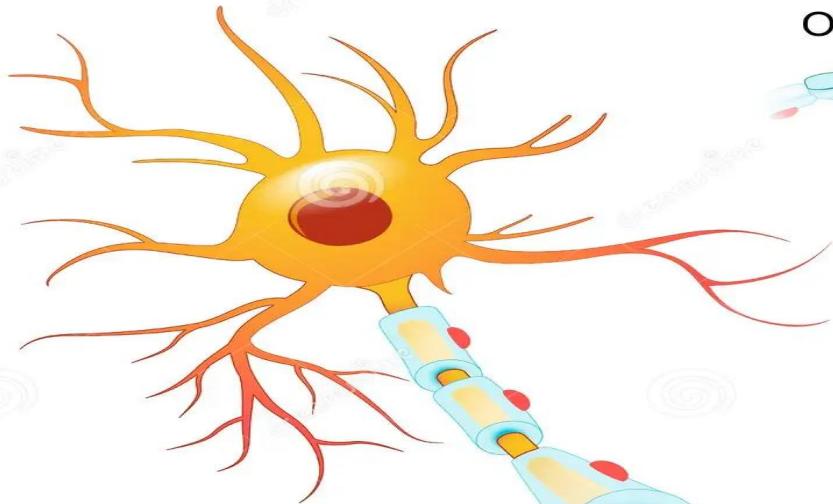
cardiac muscle



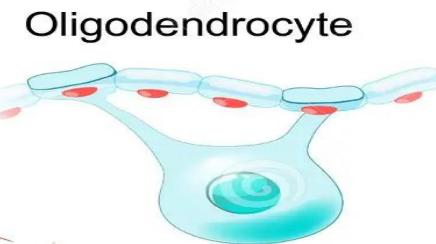
smooth muscle



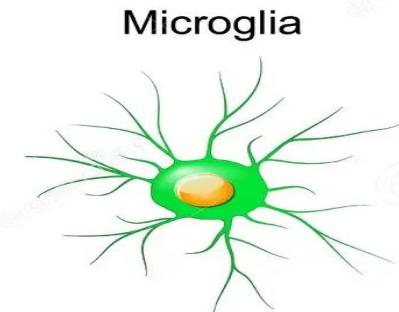
NEURON and GLIAL SELLS



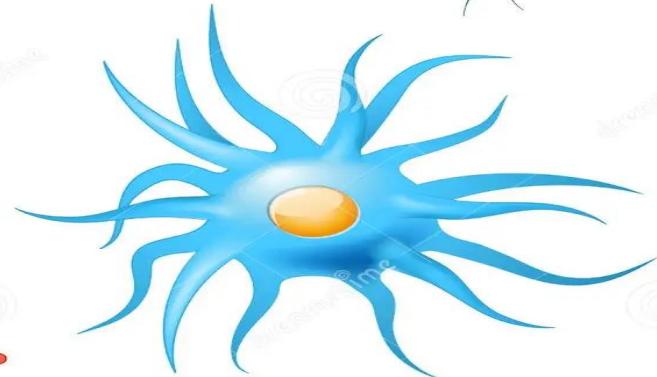
Neuron



Oligodendrocyte



Microglia

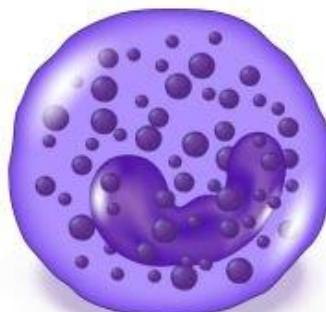


Astrocyte

BLOOD CELLS



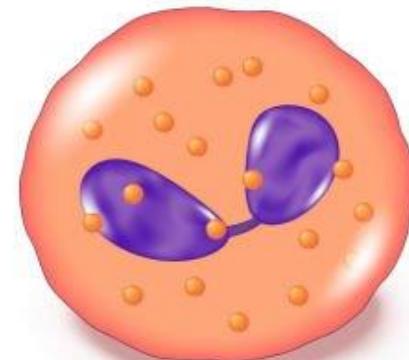
Red blood cell



Basophil



Neutrophil



Eosinophil



Platelets



Macrophage



Monocyte



Lymphocyte

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Cell structure

1. Cell Membrane

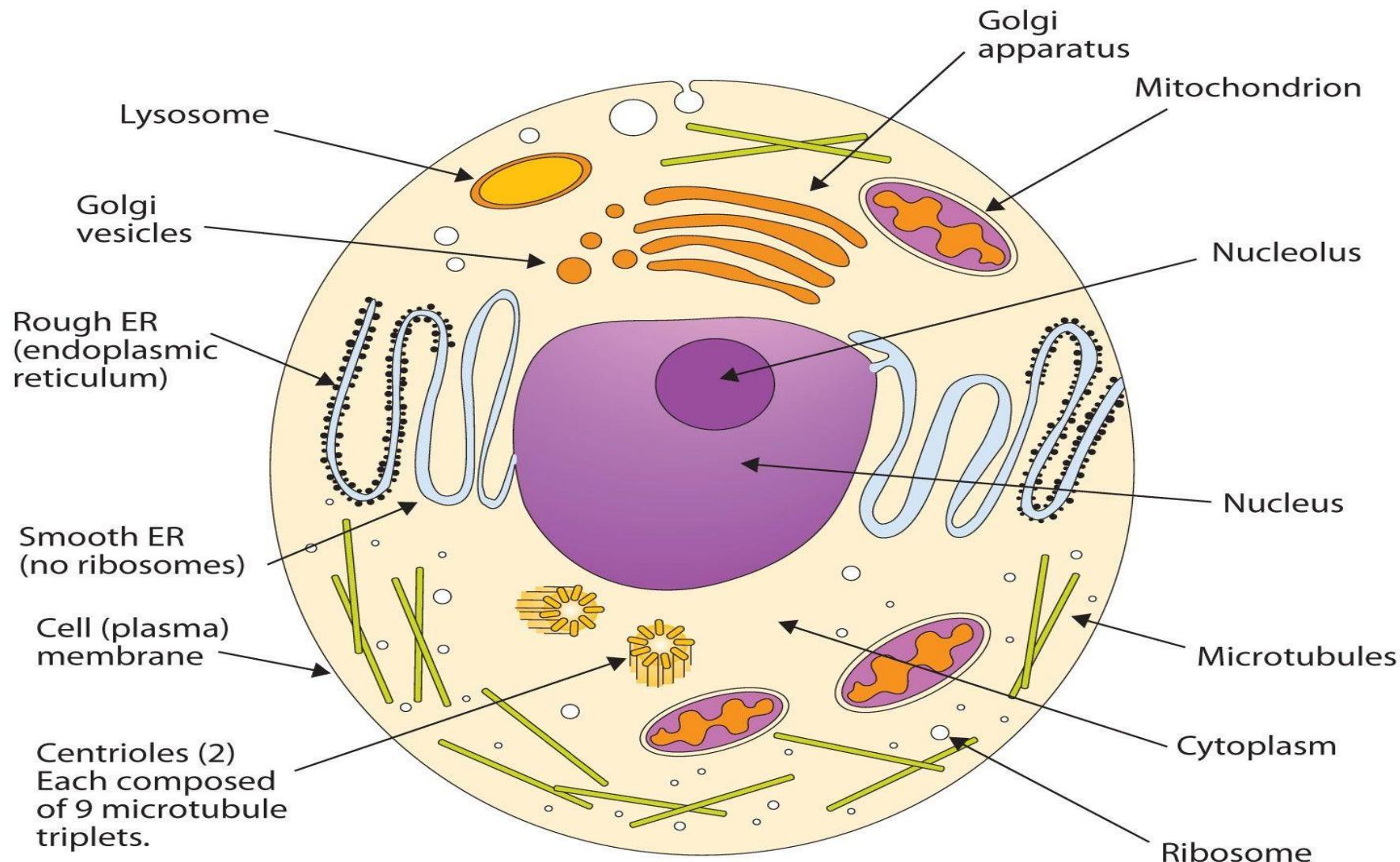
- Phospholipid bilayer.
- Contains receptors, channels and transport proteins.
- Regulates entry/exit of substances.
- Primary site affected in many injuries.

2. Cytoplasmic Organelles

- Mitochondria – ATP production, apoptosis.
- Rough ER – protein synthesis.
- Smooth ER – lipid synthesis, detoxification.
- Golgi apparatus – protein modification and packaging.
- Lysosomes – digestion, autophagy.
- Peroxisomes – fatty acid oxidation.
- Cytoskeleton – structural support and cell movement.

3. Nucleus

- Nuclear membrane, chromatin, nucleolus.
- Controls genetic expression.
- Nuclear changes are key indicators of injury.



Acute Inflammation

- Rapid, early response to injury.
- Key features: redness, heat, swelling, pain, loss of function.
- Dominant cells: neutrophils.
- Outcomes: resolution, abscess, or progression to chronic inflammation.

Chronic Inflammation

- Prolonged inflammation lasting weeks to years.
- Dominant cells: lymphocytes, macrophages, plasma cells.
- Causes: persistent infections, autoimmune diseases, prolonged exposure to toxins.
- Leads to tissue destruction and fibrosis.

Examples of Acute Inflammation

- Acute appendicitis
- Acute pneumonia
- Cellulitis
- Acute bacterial meningitis
- Abscess formation
- Acute cholecystitis

Examples of Chronic Inflammation

- Rheumatoid arthritis
- Chronic gastritis (H. pylori)
- Tuberculosis (granulomatous)
- Crohn's disease
- Atherosclerosis
- Chronic osteomyelitis