



CHARACTERISTICS OF CELLS

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OUTLINE	
I. CHARACTERISTICS OF CELLS	IV. Number of nucleus
II. Size of cell	A. Anucleated
A. Small-sized cell	B. Mononucleated
B. Medium-sized cell	C. Binucleated
C. Large-sized cell	D. Multinucleated
D. Largest cell (Egg cell)	V. Location of nucleus
III. Shape of cell	A. Central
A. Squamous	B. Peripheral
B. Cuboidal	VI. Arrangement of cell
C. Columnar	A. Singly and Isogenous groups
D. Spherical	B. Concentric arrangement
E. Biconcave	C. Cords, Columns, or rows
F. Elongated (cylindrical)	D. Layer or sheet
1. With blunt ends	E. Bundles or fascicles
2. with branching ends	F. Haphazard
3. with tapered ends	
G. Stellate	
H. Goblet shaped	
I. Irregular-shaped	

LEGENDS

Must know	Lecturer	Book	Presentation	Old Trans
!				

LEARNING OBJECTIVES

At the end of the lecture, the student should be able to:

- ✓ Describe the

CHARACTERISTIC OF CELLS

- Size of cell
- Shape of cell
- Number of nucleus
- Location of nucleus
- Arrangement of cell

CELL SIZE

- Small-sized cell
- Medium-sized cell
- Large-sized cell

MEDIUM SIZED CELL

- Medium sized or Average size
- Acts as the reference value/cell
- Red blood cell (Erythrocytes)
 - 6-8 micrometer (7.5 ave.)



Figure 1. Erythrocyte

SMALL SIZED CELL

- Granule cell
 - Located in the cerebellum
- 4 - 4.5 micrometer

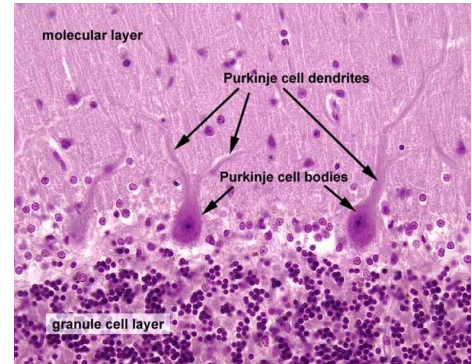


Figure 2. Granule Cells; Purkinje fibers; Molecular layer

LARGE SIZED CELL

- Betz cells or Large-sized pyramidal cells
 - Located in the cerebrum
- 10 micrometer



Figure 3. Betz cells

LARGEST CELL (EGG CELL)

- Largest cell in the body
- Egg cell (ovum)
- Visible to the naked eye
- Some skeletal muscle cells
- 100 micrometer

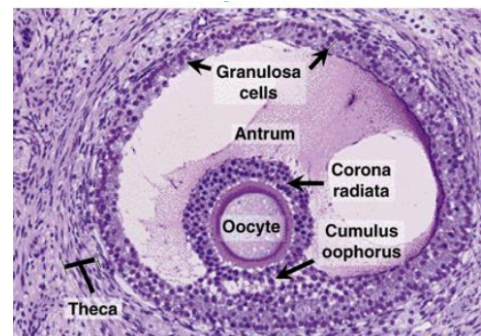


Figure 4. Ovum

CELL SHAPE

- Most variable characteristic
 - Squamous
 - Cuboidal
 - Columnar
 - Spherical
 - Biconcave disc
 - Elongated or Cylindrical:
 - With blunt ends
 - With branching ends
 - With tapered ends
 - Stellate (star shaped)
 - Goblet shaped
 - Polygonal or Polyhedral
 - Irregular

SQUAMOUS

- Flattened
- Example:
 - **Endothelium**
 - Lines the lumen of a blood vessel
 - **Stratum Corneum**
 - Uppermost layer of the epidermis

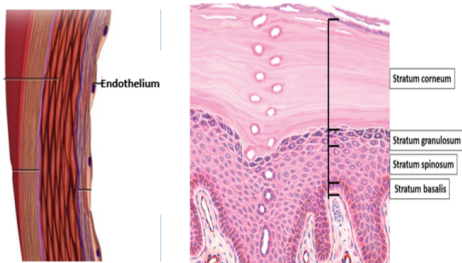


Figure 5. Endothelium and stratum corneum

CUBOIDAL

- Cube-like
- Follicular cells of the thyroid follicle
- Round nucleus
- Height = Width

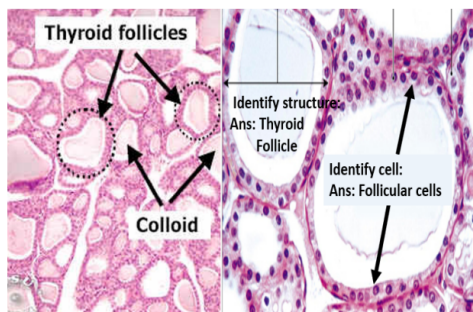


Figure 6. Thyroid gland.

COLUMNAR

- Tall
- Example:
 - Ciliated columnar cells of the trachea (respiratory tract)
 - Enterocytes in the lining epithelium of small intestine

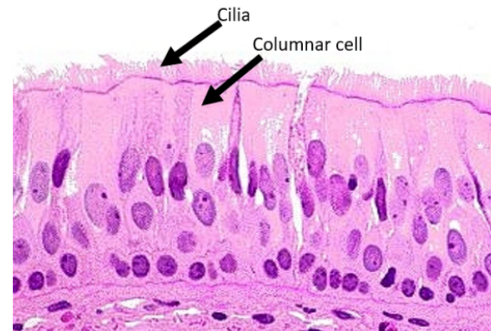


Figure 7. Respiratory tract.

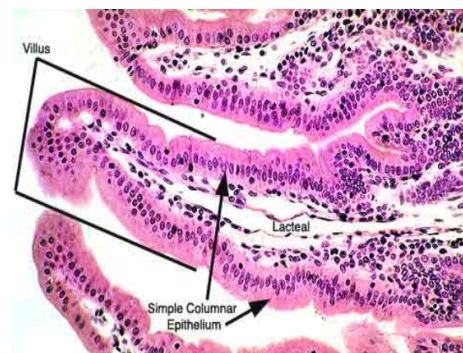


Figure 8. Small intestine; Jejunum.

SPHERICAL

- Round
- Example:
 - Leukocytes (WBC)
 - Egg cell (ovum)

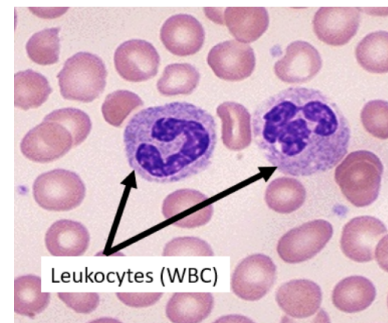


Figure 9. White blood cells.

BICONCAVE DISC

- Discoid
- Erythrocytes (mature RBCs)
 - To enable cells to pass through tiny caliber vessels

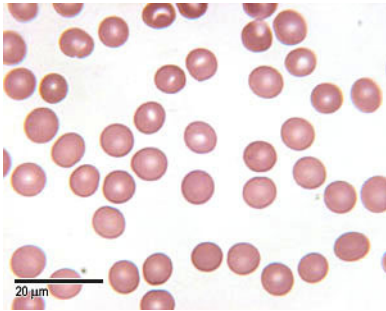


Figure 10. Erythrocytes.

CYLINDRICAL WITH BLUNT ENDS

- Elongated or cylindrical with **blunt ends**
- Example:
 - Skeletal muscle cells (skeletal myocytes)

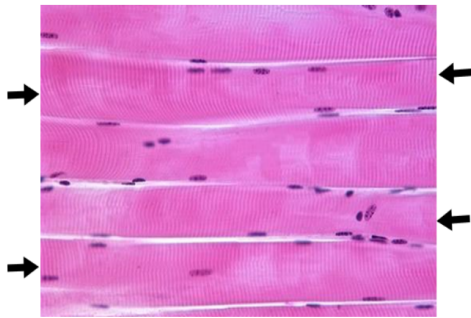


Figure 11. Skeletal myocytes

CYLINDRICAL WITH BRANCHING ENDS

- Elongated or Cylindrical with branching ends
- Example:
 - Heart muscle cells (cardiac myocytes)

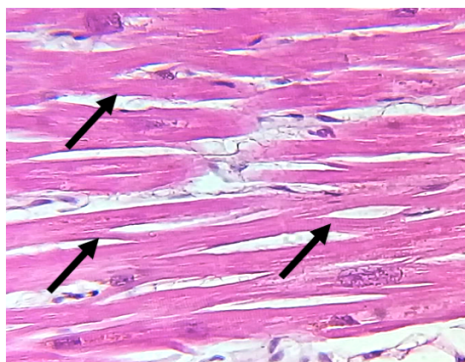


Figure 12. Cardiac myocytes

CYLINDRICAL WITH TAPERED ENDS

- Elongated or Cylindrical with tapered ends
- Example:
 - Smooth muscle cells on the walls of the GIT, Genitourinary tract

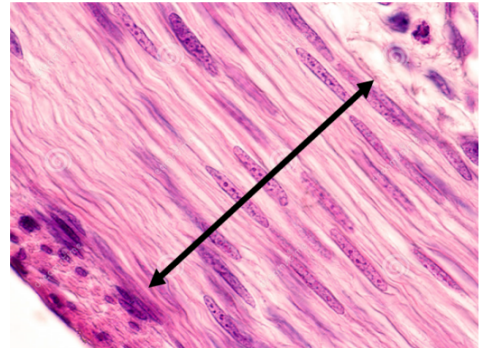


Figure 13. GI track, smooth muscle cells.

STELLATE

- Star shaped
- Example:
 - Neurons (nerve cells)
 - 1 or 2 nuclei
 - 🐟 - Nucleus is situated in the middle which makes a fish-eye appearance

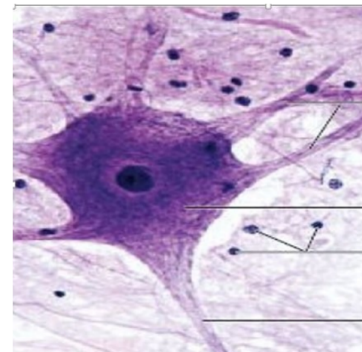


Figure 14. Neuron.

GOBLET SHAPED

- Or Cup shaped
- Example:
 - Goblet cells
 - Secrete mucous
 - Respiratory tract
 - Trap dust particles or foreign bodies
 - Digestive tract
 - Lubricates the surface of small intestine



Figure 15. Small intestine mucosa with goblet cells.

POLYGONAL OR POLYHEDRAL

- Hepatocytes (liver cells)

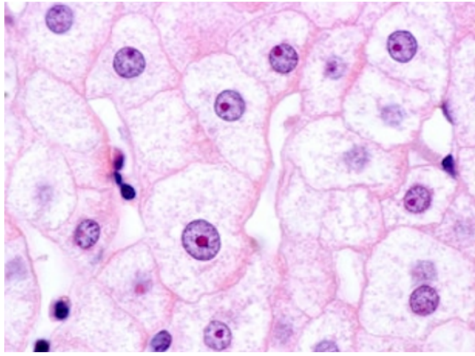


Figure 16. Hepatocytes.

IRREGULAR SHAPED

- Thrombocytes or Platelets
- Are actually fragments of Megakaryocytes

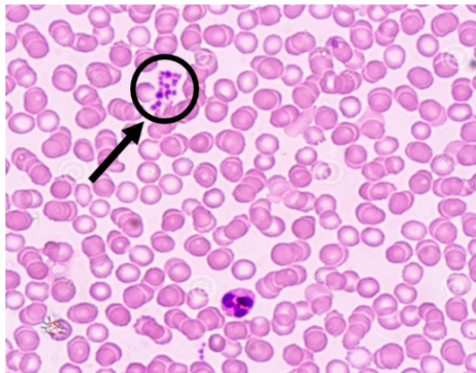


Figure 17. Platelets.

NUMBER OF NUCLEUS

ANUCLEATED

- No nucleus
- Example:
 - Matured RBC (Erythrocyte)
 - This allows RBCs to carry more O₂

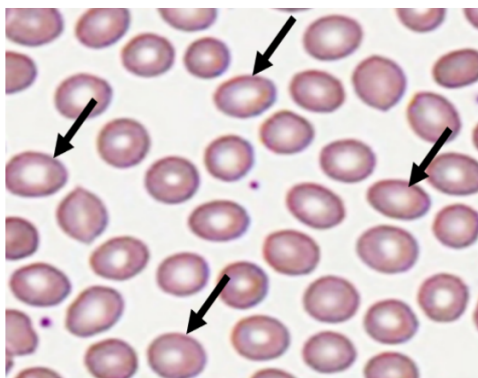


Figure 18. Erythrocytes.

MONONUCLEATED

- 1 Nucleus per cell
- Examples:
 - Cuboidal cells
 - Columnar cells
 - Neurons
 - Hepatocytes (not all are)
 - Smooth muscle cells
 - WBCs (lymphocytes)

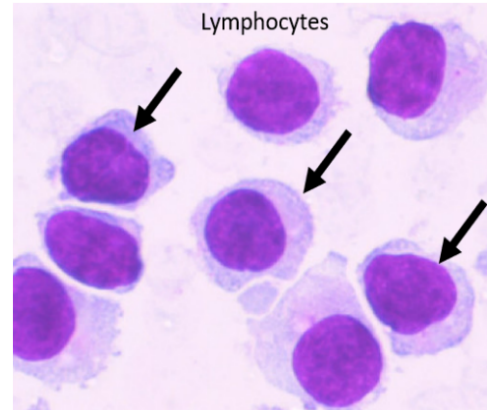


Figure 19. Lymphocytes.

BINUCLEATED

- 2 nuclei per cell
- Examples:
 - Liver cells (hepatocytes)
 - Purkinje fibers (Specialized Heart muscle cells)

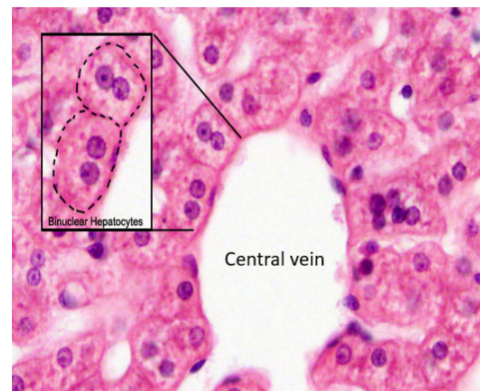


Figure 20. Hepatocytes.

MULTINUCLEATED

- Several nuclei per cell
- Example:
 - Skeletal muscle cells

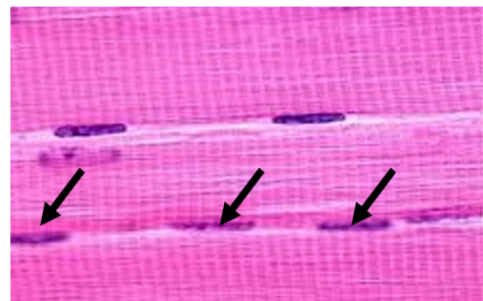


Figure 21. Skeletal muscle cells.

LOCATION OF NUCLEUS

- Central
- 🧑 Peripheral

CENTRAL

- Nuclei is found in the center of the cell
- Smooth muscle cells
- Cardiac muscle cells
- Cuboidal cells

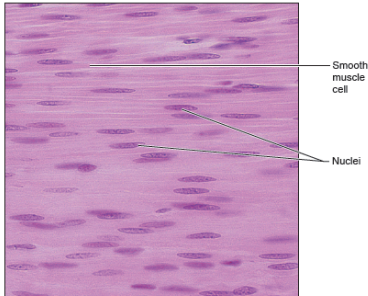


Figure 22. Smooth muscle

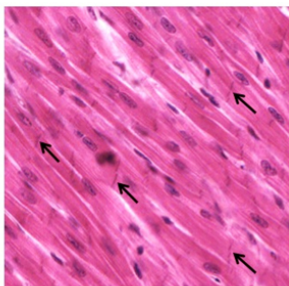


Figure 23. Cardiac muscle cells

🧑 PERIPHERAL

- Nucleus is found in the peripheral of the cell
- E.g Adipose tissue (adipocytes), skeletal muscle cells

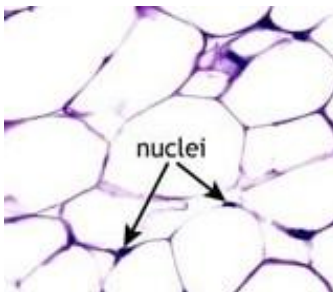


Figure 24. Adipose tissue

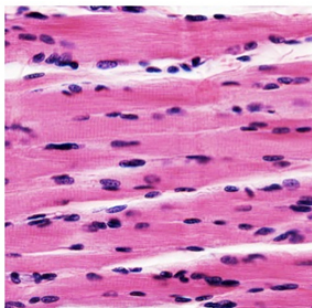


Figure 25. Skeletal muscle cells.

ARRANGEMENT OF CELLS

- Singly and in isogenous group: dyads (2's or pars), triads (3's), tetrads (4's)
- Concentric
- Cords/Rows/Columns
- Layers
- Bundles or fascicles
- Haphazard or in random or no definite pattern

SINGLY AND ISOGENOUS GROUPS

- Cartilage cells (Chondrocytes)

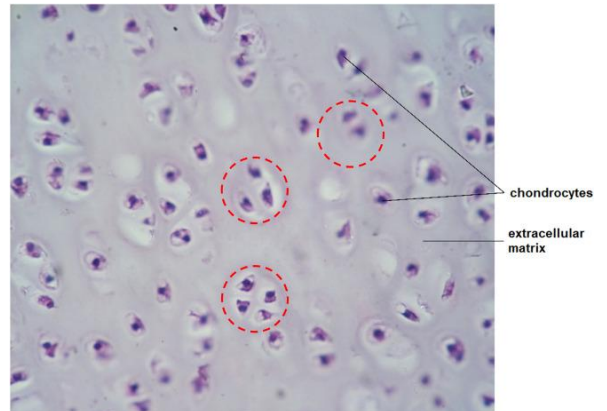


Figure 26. Cartilage cells (Chondrocytes)

CONCENTRIC

- Osteocytes of Compact bone (hard bone)
 - Parenchyma; most mature
- Cells are arranged around a central canal to avail some of its nutritive supply

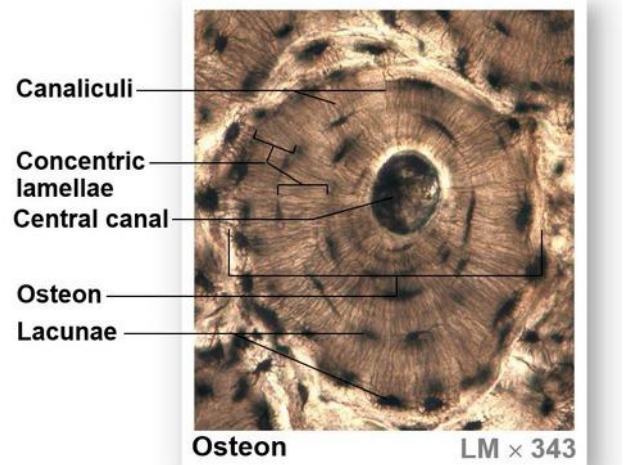


Figure 27. Osteon

CORDS, COLUMNS, OR ROWS

- Liver cells (Hepatocytes)
 - anastomosing
- Sinusoids are the spaces between cells and acting as capillaries

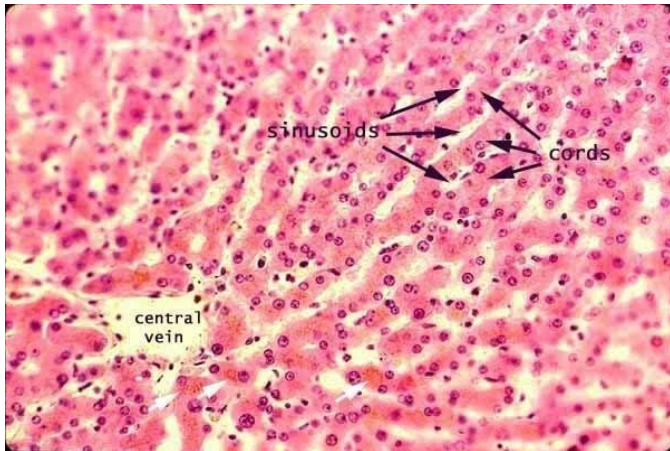


Figure 28. Liver cells

LAYER OR SHEET

- Cells appear one on top of the other layer
- Cells moved up to replace lost cells on the uppermost layer
- E.g. Epidermis of the skin, Stratified epithelium, Smooth muscle cells (tapered)

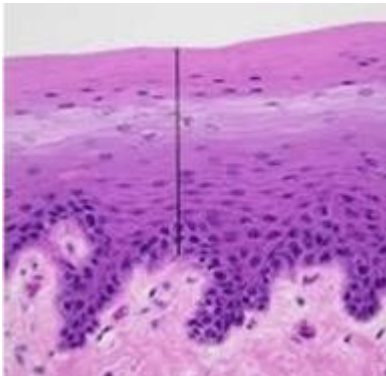


Figure 29. Skin

BUNDLES OR FASCICLES

- Striated muscles
 - Skeletal muscle
 - Cardiac muscle

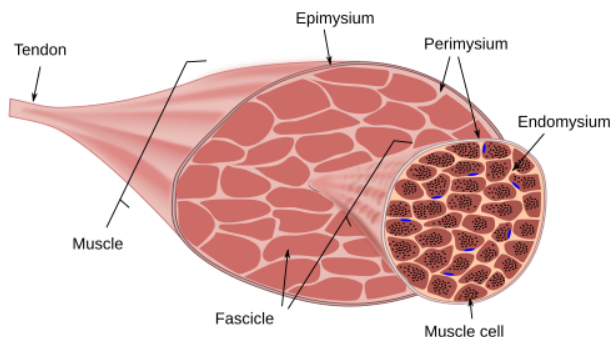


Figure 30. Muscle

HAPHAZARD

- Neurons or nerve cells (Spinal cord)

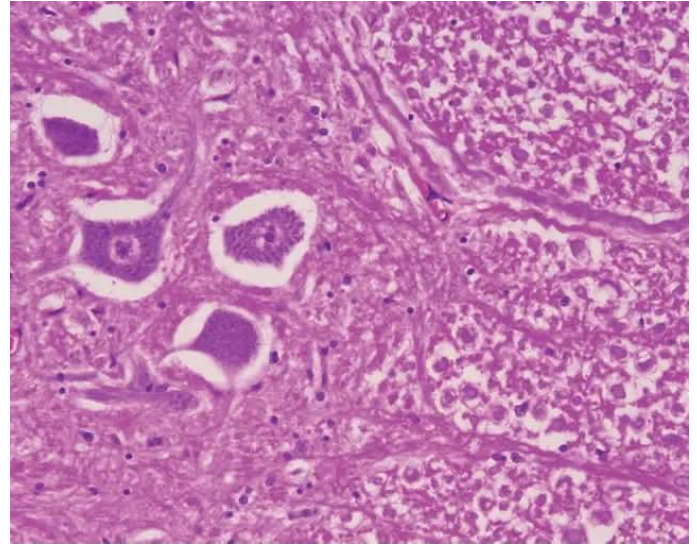


Figure 31. Neuron

REFERENCES

1. Mescher, A. L. (2024). Junqueira's basic histology: Text and atlas (17th ed.) McGraw Hill.
2. Powerpoint: Mangila, (2026). Parenchyma and Stroma
3. Pamana Trans 2029
4. Pamana Trans 2028