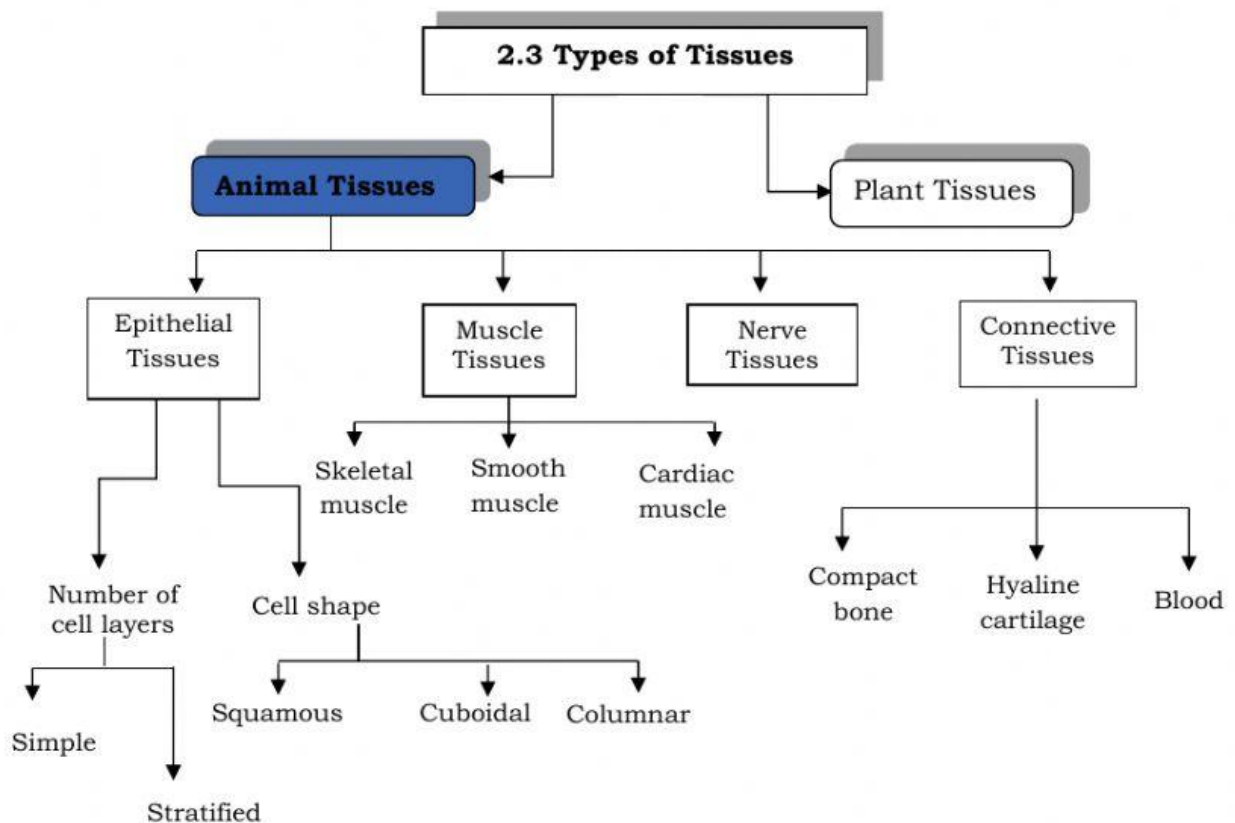


2.3 CELLS ARE GROUPED INTO TISSUES

Learning outcomes

At the end of this lesson, students should be able to:

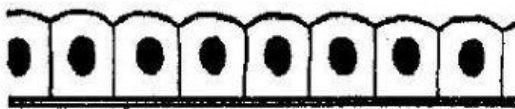
- I. **Describe animal tissues and plant tissues**
- II. **State the types, structure, functions and distributions of the following tissues:**
 - a. **Animal cells & tissues:**
 - Epithelial cells (simple squamous, simple cuboidal, simple columnar),
 - Nerve cell (motor neuron),
 - Muscle cells (smooth muscle),
 - Connective tissues (blood).
 - b. **Plant cells & tissues:**
 - Apical meristem,
 - Ground tissues (parenchyma, collenchyma, sclerenchyma)
 - Vascular tissues (xylem, phloem)



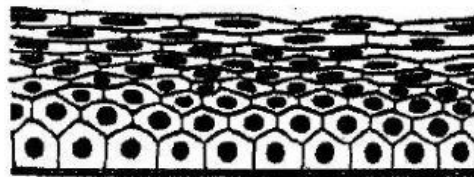
2.3.1 Animal cells and tissues

Epithelial tissues

- Can be differentiated based on;
 - i. number of cell layers
 - ii. cell shape
- Based on number of cell layers, we have simple epithelium tissues and stratified epithelium tissues.



A) Simple epithelium tissues



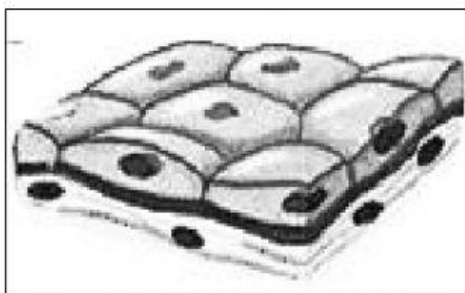
B) Stratified epithelium tissues

- Based on the cell shape, we have;
 - i. _____ epithelium
 - ii. _____ epithelium
 - iii. _____ epithelium

Exercise 2.3 (a): Based on cell shape, identify types of cell below.

A) Simple Epithelium Tissues

i. Simple _____ Epithelium



Shape:

- ✓ Single layer of _____ cells
- ✓ With _____-shaped central nuclei

Function:

- ✓ Facilitate _____ & filtration of substances (due to very thin & permeable structure)

Location:

- Glomerulus & Bowman capsule (in kidney)
- _____
Lining of blood vessel (endothelium)

ii. Simple _____ Epithelium



Shape:

- ✓ Single layer of _____ cells

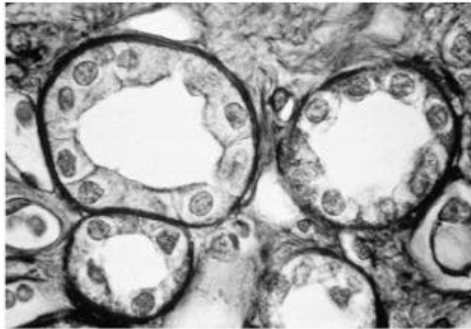
- ✓ With _____-shaped central nuclei

Function:

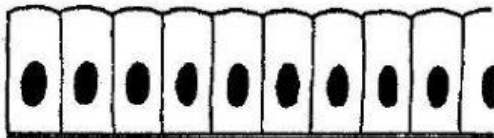
- ✓ Facilitate _____
& _____

Location:

- ✓ Lining of _____ tubules
- ✓ Some glands
 - example: salivary gland



iii. Simple _____ Epithelium



Shape:

- ✓ Single layer of _____ cells

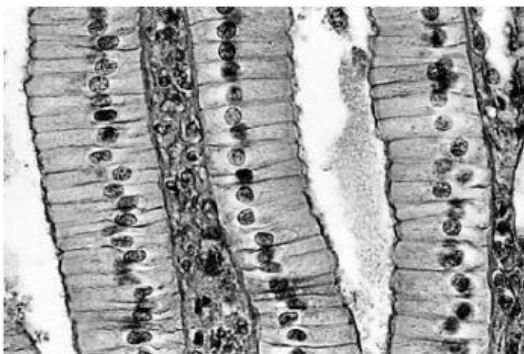
- ✓ With _____-shaped nuclei located near to the base

Function:

- ✓ Facilitate _____ & _____

Location:

- ✓ Lining of _____ tract, gallbladder



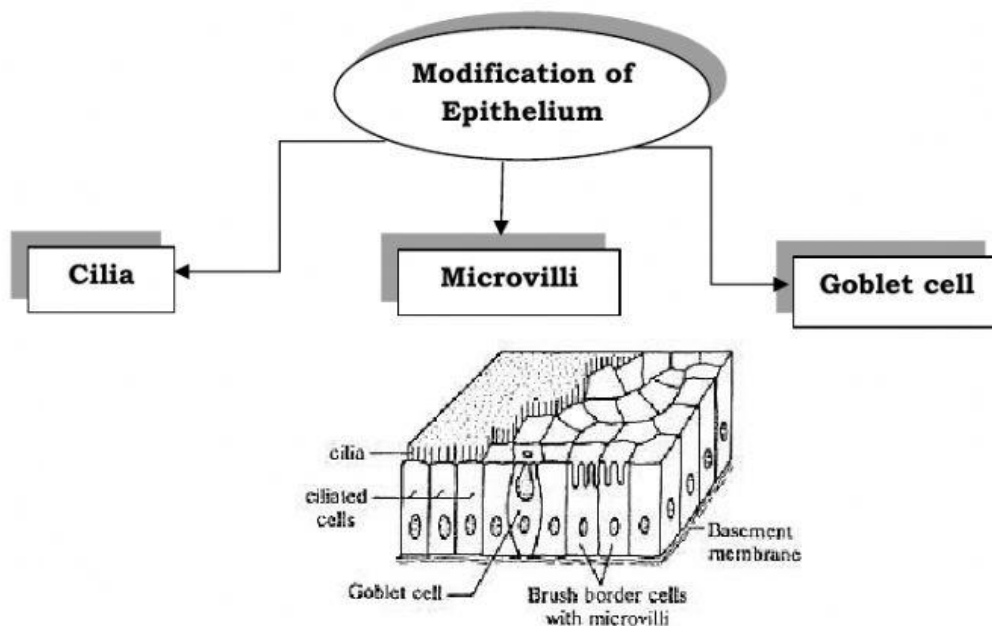
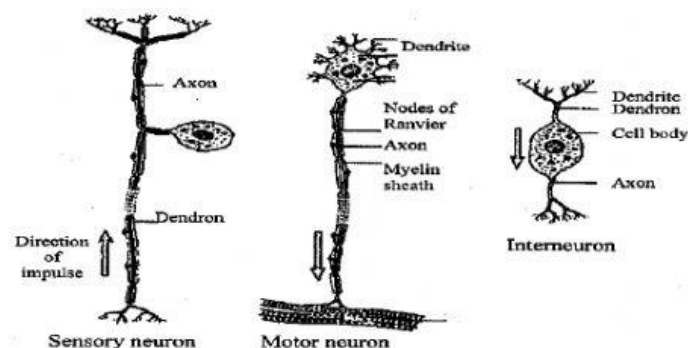


Fig. 4-3 - Simple columnar epithelium

Cilia – small & short hair-like structure. Beating of cilia create motion to move material Example: simple ciliated columnar epithelium Location: lining of bronchi Function: to remove dust trapped in the respiratory tract	Microvilli - small finger-like projections due to the folding of plasma membrane - Increase surface area for absorption Location: lining of digestive tract Function: to increase surface area for absorption of nutrients	Goblet cells - cup-shaped cells Location: Digestive tract Function: secrete mucus to lubricate & trap dust which enter respiratory tract
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Nerve cells (neurons)

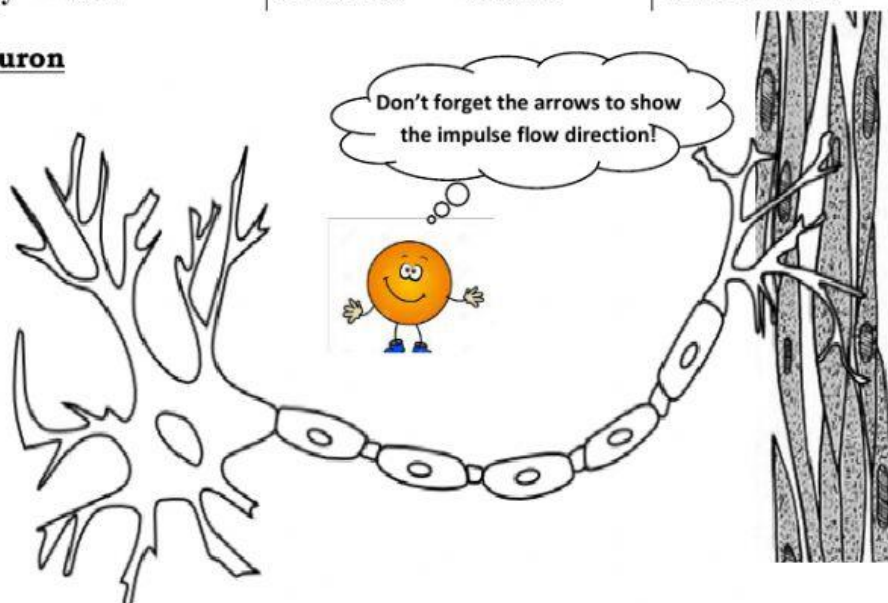


Types of neurons based on function

Exercise 2.3 (b): Label and colour the diagram below as suggested in the table.

Axon - purple	Axon terminals - orange	Myelin sheath - yellow
cell body - blue	Dendrites - brown	Muscle fibers - red

Motor neuron



Exercise 2.3 (c): Match the descriptions in the table below using the terms in the list.

Neuron
Motor neuron
Cell body

Axon
Node of Ranvier
Dendrite

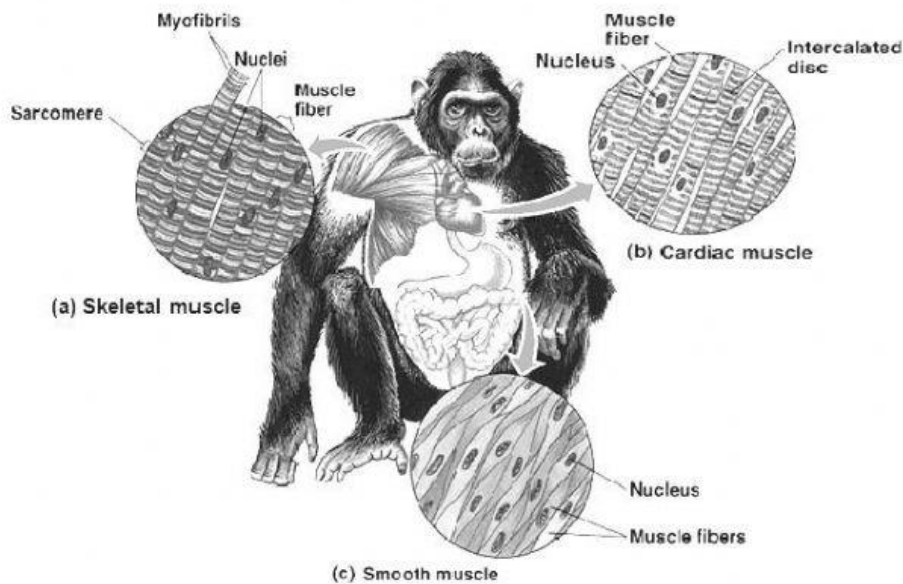
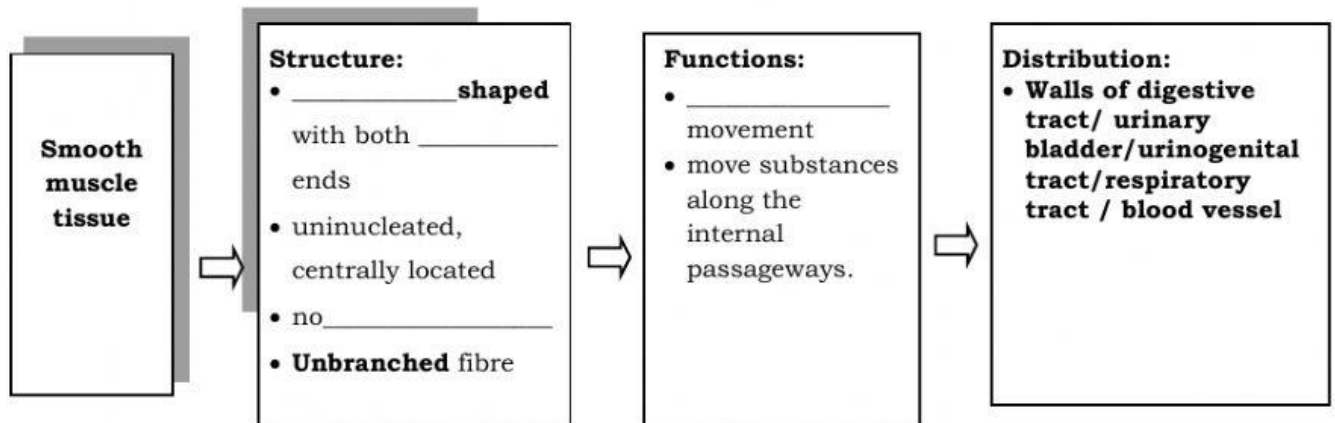
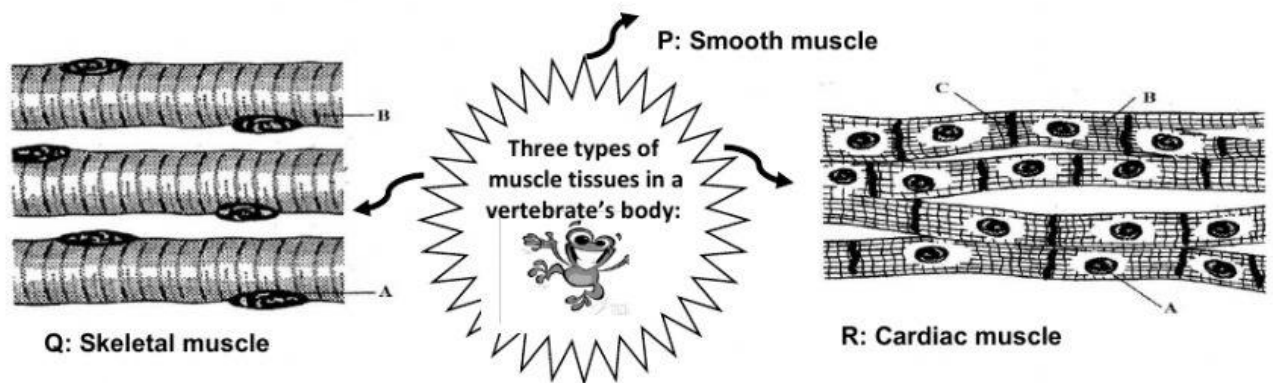
Myelin sheath
Interneuron
Sensory neuron

	Connect one neuron with another neuron
	The long fiber that carries the nerve impulses <u>away</u> from cell body.
	Uncovered part of axon between the Schwann cells
	Electrical insulator that speeds up the impulse transmission
	Carries the nerve impulse to the cell body
	Transmit impulse from central nervous system to effectors
	Transmit impulse from the receptor to central nervous system
	Functional unit of the nervous system
	Contain large nucleus, have organelles (except centriole), numerous mitochondria & extensive rough endoplasmic reticulum (Nissl granules)

Muscle tissues:

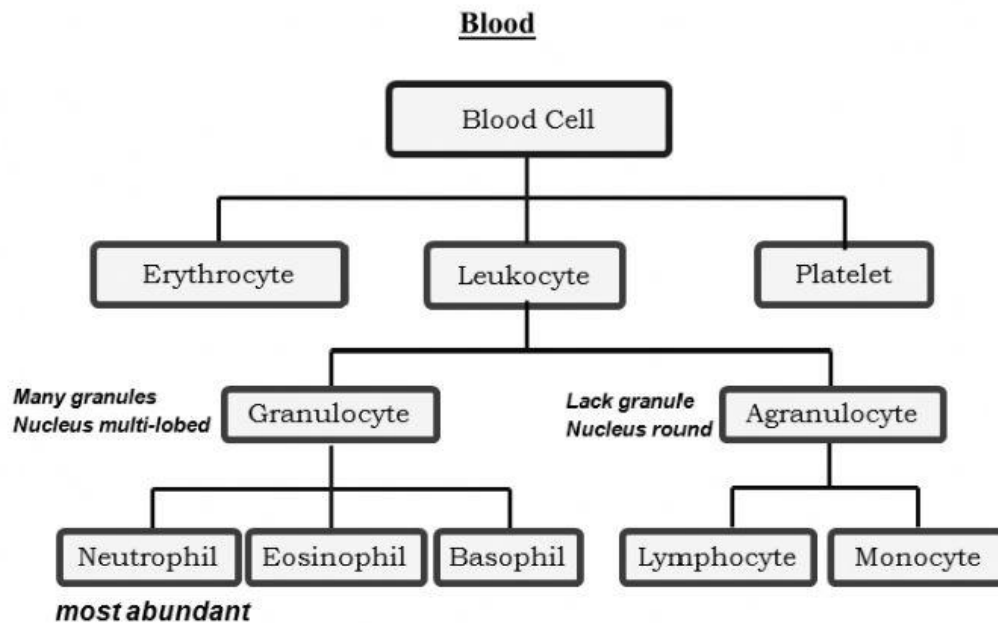
A – Nucleus
B – Striation
C – Intercalated disc
D – cell membrane





Connective tissues:

- There are three (3) connective tissues:
 - i. Compact bone
 - ii. Hyaline cartilage
 - iii. Blood

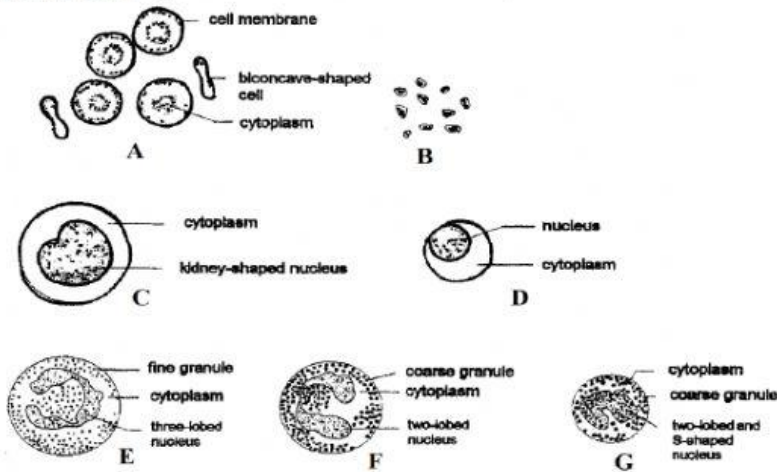


Exercise 2.3 (d): Use the concept map above to fill in the blanks below.

- Has three types of cells: erythrocytes, _____ and _____ (Thrombocytes).
- Erythrocyte has _____ shape with no nucleus.
- Leukocyte is divided into 2 groups: _____ & _____
- _____ has many granules and multi-lobed nucleus.
- 3 types of granulocytes: Neutrophil, _____ and _____
- Agranulocytes: lymphocyte and _____.
- Platelet is a cytoplasmic fragment of large cells, usually irregular shaped and lack of nucleus.
- Blood cells are suspended in fluid matrix called _____, consisting mainly of 90% water, inorganic mineral salts and protein

Exercise 2.3 (e): Identify each of the blood components in the diagram below.

Identify cell A- G



A- _____
B- _____
C- _____
D- _____
E- _____
F- _____
G- _____

Functions:

- Erythrocytes: _____

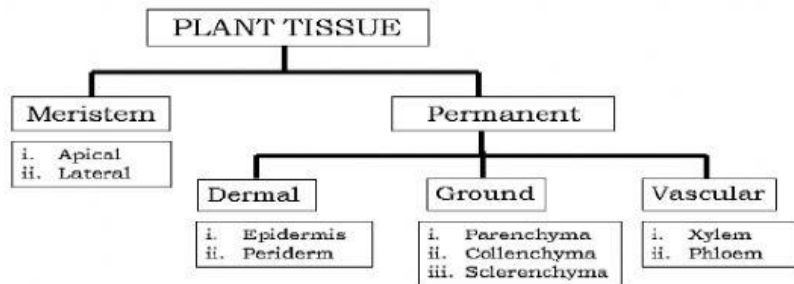
- Leukocyte: _____

- Platelets: _____

I'm a red blood cell! I bring oxygen to your cells!

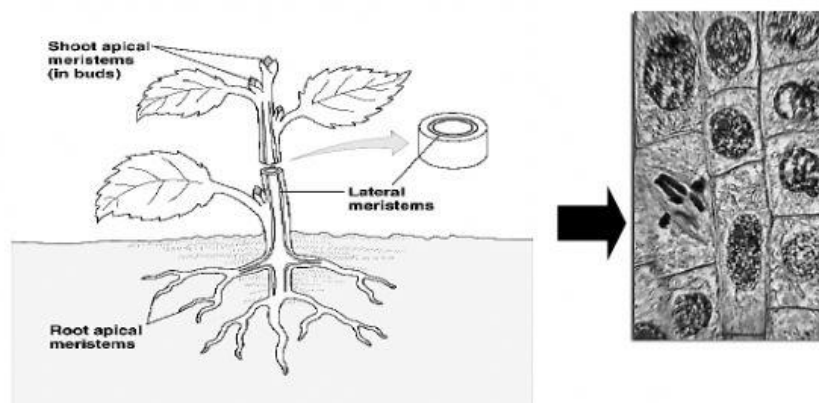


2.3.2 Plant Cells and Tissues



A. Meristem tissue

Types of meristem	Location	Function
Apical	_____ tips & _____ tips	Increase the <u>length</u> of stems & roots (primary growth)
Lateral	Cylinders around the stem & root (cambium)	Increase the <u>diameter</u> of stems & roots (secondary growth)



Structure

- Small young cells
- Isodiametric shape
- Thin primary cell wall
- Large, central nucleus
- Dense cytoplasm
- No or small central vacuoles
- Closely packed with no intercellular air spaces

Functions of meristem cells

- Cells divide by _____ to produce new cells.
- Cells grow, elongate and differentiate to form specialized cells to carry out specific function.

B. Permanent plant tissue (matured and specialized cells)

i. Dermal and Ground Tissues

The diagram shows a plant with three circular cross-sections. The top section shows a single layer of cells labeled 'Dermal tissue'. The middle section shows a cluster of cells labeled 'Ground tissue'. The bottom section shows a cluster of cells labeled 'Vascular tissue'.	i. Dermal tissue Distribution: Outermost layer of cells @ surface of plant body. Structure : Tightly packed → forming a protective layer on the surface Function: Defense against – mechanical damaged, pathogenic disease & water loss ii. Ground tissue Consist of: • _____ cells • _____ cells • _____ cells
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