

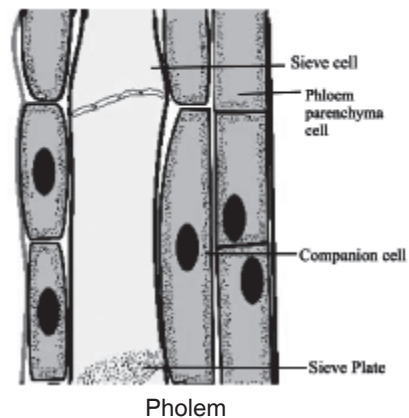
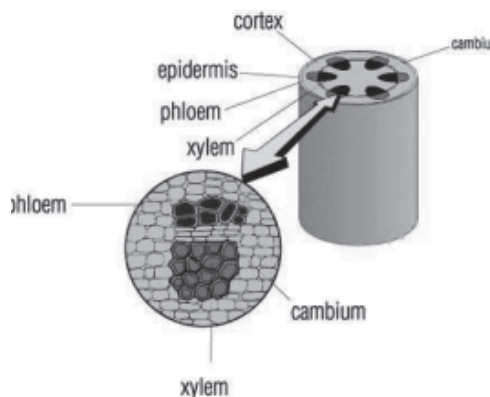
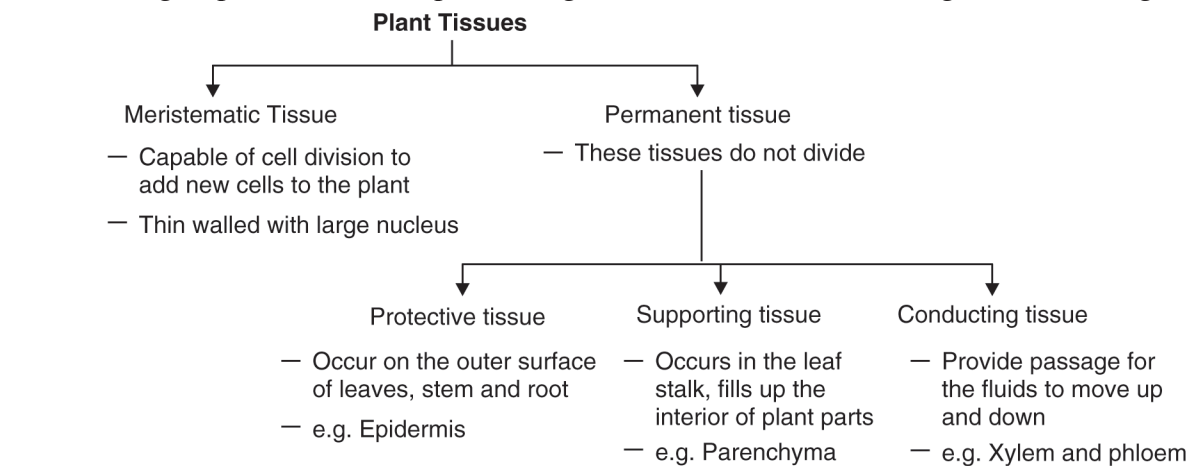
# 21. Building Blocks of Life-Cells and Tissues

- Cell is the structural and functional unit of life.
- A typical cell includes a cell membrane, cytoplasm and genetic material either within the nucleus or in the cytoplasm.
- The cytoplasm contains cell organelles such as mitochondria, endoplasmic reticulum lysosomes, vacuoles, ribosomes, golgi bodies.
- Cell wall and chloroplasts are present only in plant cells while centrosome is present in animal cells.
- Each organelle performs a specific function in the cell.

Prokaryotic cell	Eukaryotic cell
(i) Well organised nucleus absent and genetic material lies in the cytoplasm.	1. Genetic material enclosed within a nuclear membrane forming the nucleus.
(ii) Membrane bound organelles absent.	2. Organelles like Mitochondria chloroplasts, E.R. etc are present.
(iii) Examples: Bacteria, blue green algae.	3. Examples: Cells of fungi, plants, animals.

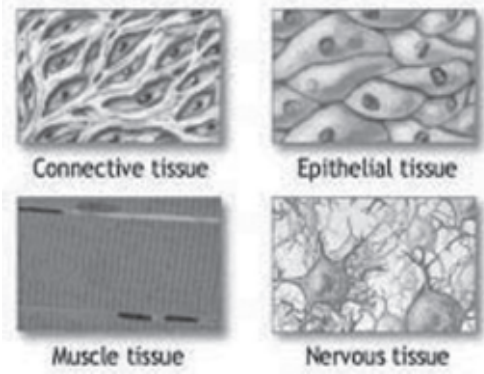
## Build Your Understanding

- **Tissue:** a group of similar cells performing the same function and having a common origin.



## Animal Tissues

- |  |   |   |   |
|--|---|---|---|
| <p><b>Epithelial tissue</b></p> <ul style="list-style-type: none"> <li>– Have thin, irregular surface</li> <li>– Present on the outermost part of skin</li> <li>– Function; Provide protection to the underlying parts, secretion, absorption</li> </ul> | <p><b>Muscular tissue</b></p> <ul style="list-style-type: none"> <li>– Consist of long narrow fibres</li> <li>– Capable of contraction</li> <li>– Bring about movement of body parts</li> <li>– Are of three types: striated, unstriated and cardiac</li> </ul> | <p><b>Connective tissue</b></p> <ul style="list-style-type: none"> <li>– has matrix, cells and fibres</li> <li>– binds/connects different parts; form supportive frame work</li> <li>– Example: Bones, blood, adipose tissue</li> </ul> | <p><b>Nervous tissue</b></p> <ul style="list-style-type: none"> <li>– Consist of neurons</li> <li>– receive and transmit nerve impulse</li> </ul> |
|--|---|---|---|



*Four types of Animal Tissue*

### Stem cells

Stem cells are undifferentiated cells in our body which can divide by mitosis and differentiate into specialised cell types and also produce more stem cells. Stem cell therapy is useful in treating blood cancer, in testing new drugs and providing cells for gene therapy.

### Cell Division

- New cells are formed by cell division
- Cell division replaces worn out cells, repairs injuries, helps in growth and in reproduction.
- There are two types of cell divisions: **mitosis** and **meiosis**. Prior to all divisions the chromosomes duplicate or replicate themselves and then enter cell division.
- During mitosis, the two chromatids of the duplicated chromosome separate. Each chromatid is now a chromosome. One each of these two chromosomes moves into the two daughter cells.
- Meiosis involves two successive divisions:

**In meiosis I**, the chromosomes of the same (matching/homologous) pair move to two daughter cells. Thus two cells with half the number of chromosomes are formed at the end of phase I. This is reduction division. However, each chromosome still has the duplicated copies with them.

**In meiosis II**, like mitosis the duplicated copies that is the chromatids of each chromosome separate and move to two new daughter cells. Thus, four haploid cells are formed.

These daughter cells ultimately give rise to reproductive cells such as pollen grain, ovule, sperm and ovum.

### ✓ Maximise Your Marks

- To revise the structure and functions of different parts of a cell, **draw large enough diagrams** of one plant cell and an animal cell. Label their parts and write the functions against each part.

● **Cell organelles:**

S. No.	Name of the cell part/organelle	Key feature	Function
1	Cell membrane	Thin delicate membrane enclosing the cell	Selectively permeable
2	Cytoplasm	Homogenous, colloidal semifluid in which cell organelles are present	Helps in manufacture and exchange of materials between different cell organelles
3	Nucleus	Small rounded structure bounded by nuclear membrane and containing chromatin material and nucleolus (or nucleoli)	Coordinates the cellular activities and contains the DNA
4	Endoplasmic Reticulum (E.R.)	Irregular network of double membranes in the cytoplasm. Ribosome may be present on E.R.	Helps in synthesis and transport of proteins and fats within the cell
5	Ribosome	Granules in the cytoplasm or on E.R.	Site for protein synthesis
6	Mitochondria	Sausage or rod shaped double membranous structures in the cytoplasm	Carry out cellular respiration
7	Golgi bodies/golgi complex	Stacks of flattened sacs and small vesicles called dictyosomes in plants	Help in secretion and storage of substances like enzymes, hormones
8	Plastids	Of three types, leucoplast, chromoplast and chloroplast. Chloroplast contains chlorophyll pigment and carotenoids	Chloroplast helps in photosynthesis
9	Cell wall	Outer, rigid, protective covering of plant cells; made of cellulose	Provides shape and rigidity; protects the inner parts
10	Centrosome	Consists of two small granules called centrioles, lying anterior to the nucleus	Helps in spindle formation during cell division



**Stretch Yourself**

- What would happen if meiosis did not occur in the reproductive organs?
- Why do multicellular organisms develop tissues performing different functions?

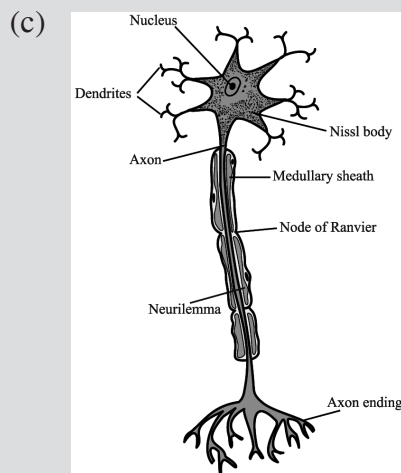
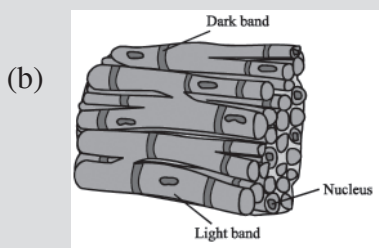
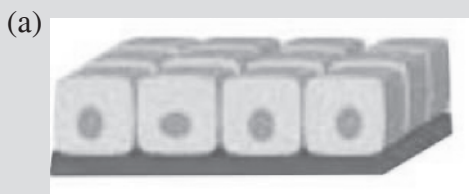
**Ans:** In multicellular organisms, there are many tissues for division of labour so that different tissues perform different functions. All the tissues work in coordination and the organism functions more efficiently.

## ? Test Yourself

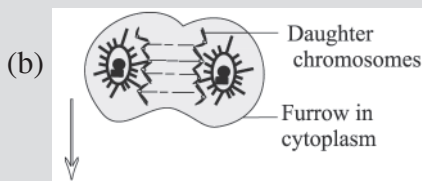
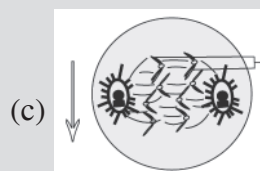
1. Complete the table

Plant or Animal Cell	Name of Organelle	Function
(i) Animal Cell	_____	_____
(ii) _____	Chloroplast	_____
(iii) Plant Cell	_____	_____
(iv) _____	_____	Controller of the cell

2. Identify the animal tissues shown below and state how our body would be affected in the absence of each of these tissues



3. Identify the stage of cell division in each of the diagrams shown below and mention one characteristic feature of each stage.



4. Draw a typical plant and an animal cell and label only the parts that are not common between the two.