

Meristematic Tissue

Meristematic tissue comes from the Greek word 'meristos' which means divisible. A meristematic tissue is a group of cells that are in a state of continuous division.

Characteristics of Meristematic Tissue:

- (Greek word; meristos- means “divisible”)
- Meristematic tissue is a group of cells that has power of continuous division.
- Cells are immature and young
- Meristematic tissue is commonly called as meristems.
- **Shape of cell:** each cell is oval, rounded, polygonal or rectangular
- **Size:** small
- **Intercellular space:** Absent
- **Cell wall:** thin walled made up of cellulose
- **Nucleus:** single large and prominent
- **Reserved food:** cell do not store food
- **Cell division:** high capacity and continuous
- **Metabolic activity:** very high
- Cells are rich in cytoplasm with minute vacuoles
- Cell is diploid and shows mitotic cell division
- Cell is devoid of reserve food materials, ER and plastids.

Classification of Meristematic Tissue:

Meristematic tissues maybe classified on the basis of

1. Mode of origin and development
2. Position in the plant body

1. Based on Mode of Origin and Development:

It is of 3 types.

i) Pro-Meristem/Primordial Meristem:

- **Origin:** embryonic origin
- These cells represent primary stages of meristematic cells.
- It is earliest and youngest meristematic tissue
- It is present in growing root and shoot tip.

- It gives rise to primary meristem,
- They are present at the region of new growth area in the plant body.
- They give rise to primary meristem
- Ex- It occupies the area at the tips of roots and shoots.

ii) Primary Meristem:

- Origin: from Promeristem
- Cells are always active and dividing
- Give rise to active primary permanent tissues.
- Present below promeristem in the shoot and root tip, and also in intercalary position
- Also present at the apex of leaves and in intercalary parts
- It gives rise to secondary meristem, and primary permanent tissue.

iii) Secondary Meristem:

- **Origin:** from primary meristem
- It is developed later on life
- It gives rise to secondary permanent tissue

2. Based on Position in The Plant Body:

On the basis of position meristematic tissues can be divided into 3 types.

i) Apical Meristem:

Position: present at apical parts of plant such as root tip and shoot tip

It helps in increase in height of plants.

Apical meristem has two distinct zones:

Promeristem zone:

contains group of dividing cells (apical initials)

Meristematic zone: contains protoderms (epidermis), procambium (primary vascular tissue) and ground meristem (cortex and pith).

Function: Responsible for increase in length.

ii) Intercalary Meristem:

Position: present in intercalary position in the leaves and internode

It is a part of apical meristem

It also adds to height of plants

Commonly present in monocots, grass and pines

It is present in between the permanent tissues.

It is also present at the base of internodes. Ex- Grass, wheat ; Base of leaf- Pinus;
Base of node- mint

iii) Lateral Meristem:

Position: present on lateral side of stem and root

It helps in increases the diameter or thickness of plants.

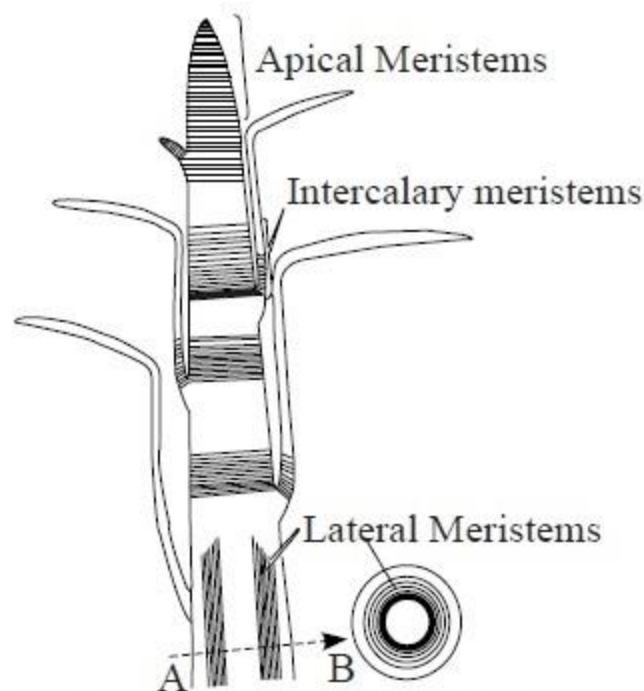
Example: vascular cambium (primary meristem) and cork cambium (secondary meristem)

Present along the lateral sides of stems and root

Divides only in radial division

Ex: Interstellar cambium ring formed by intrafascicular cambium.

Function: Responsible for increasing girth of the stem and root.



3. Based on Plane of Division

i) **Mass meristem:** Divides in all planes and form a mass of cells. Ex.: endosperm

ii) **Rib Meristem:** Divides in a single plane and form a row of cells. Ex.: cortex, pith

iii) **Plate meristem:** It divides in two planes and forms a plate of cells. Ex.: epidermis, epiblemma

4. Based on function (Heberlandt view)

i) Protoderm : It develops epidermal tissue system

ii) Ground meristem: It develops cortex and pith

iii) Procambium: It makes primary vascular bundles

Functions of Meristematic Tissue

- Meristems are actively dividing tissues of the plant
- They are responsible for primary (elongation) and secondary (thickness) growth of the plant
- All new organs and their growth occur by the division of meristematic tissue
- Secondary tissues such as, wood, cork are also formed due to activity of meristematic tissue

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