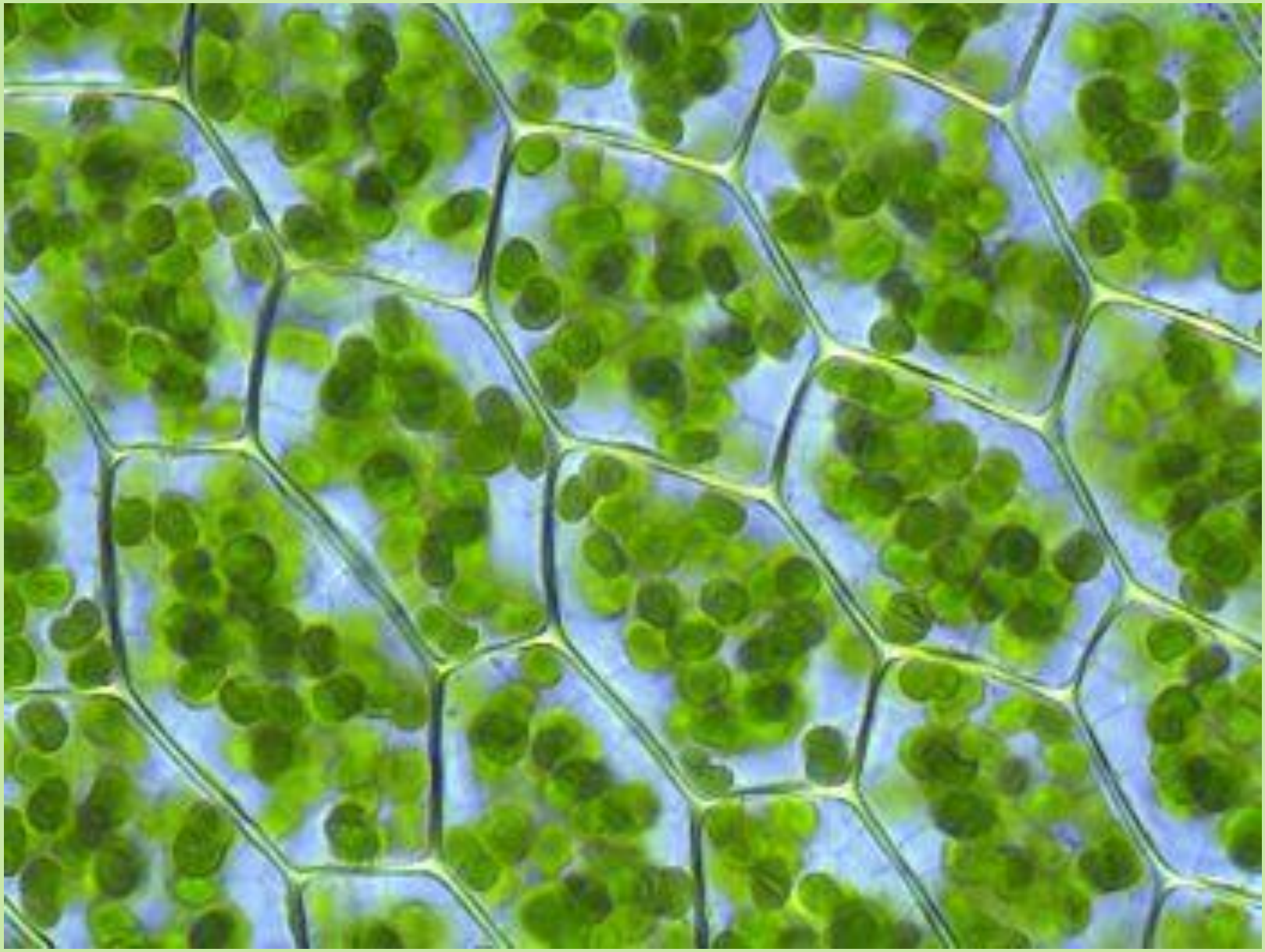
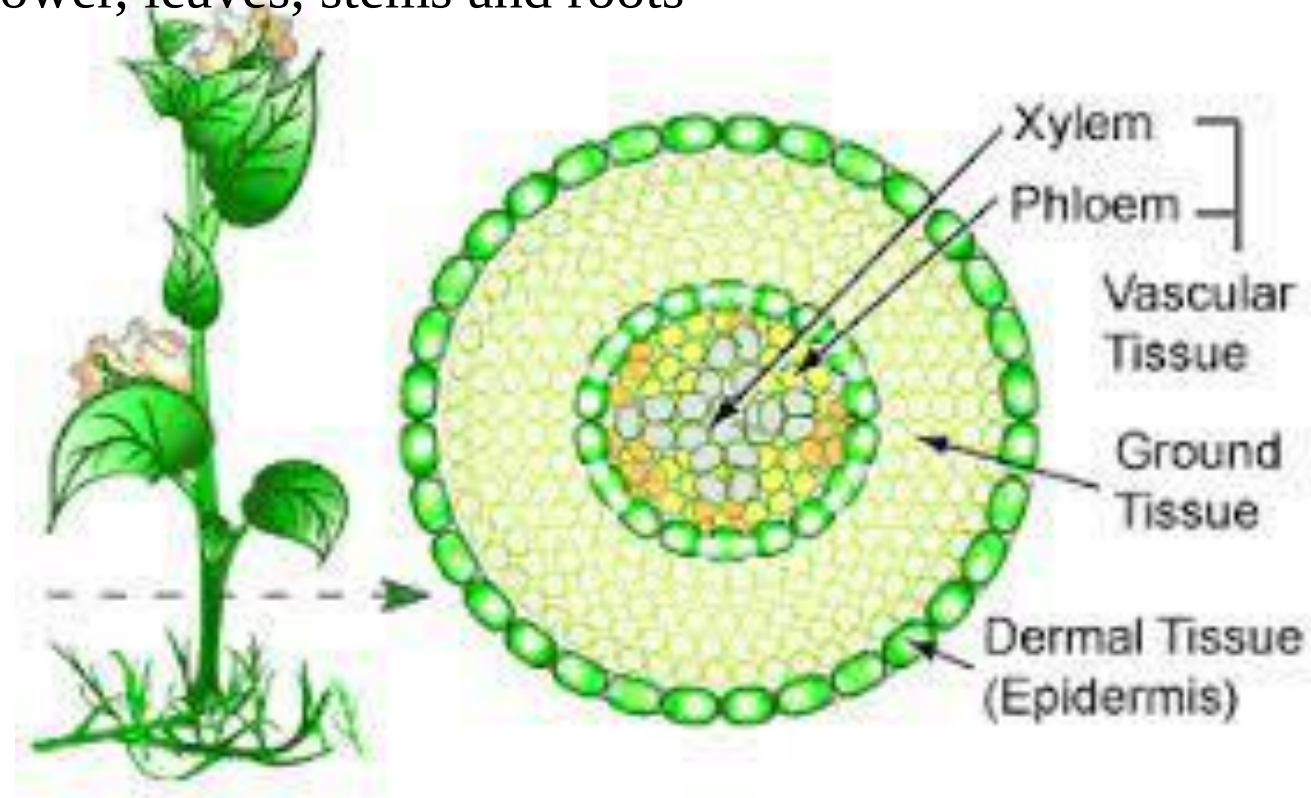
Plant Tissue



Plant tissue :

Plant tissue is a group of cells which are similar in structure and origin and perform a similar function for the plant. Each plant tissue is specialized for a unique purpose and can be combined with other tissues to create organs such as flower, leaves, stems and roots



Plant tissues are of **two** types:

1. Meristematic tissue
2. Permanent tissue

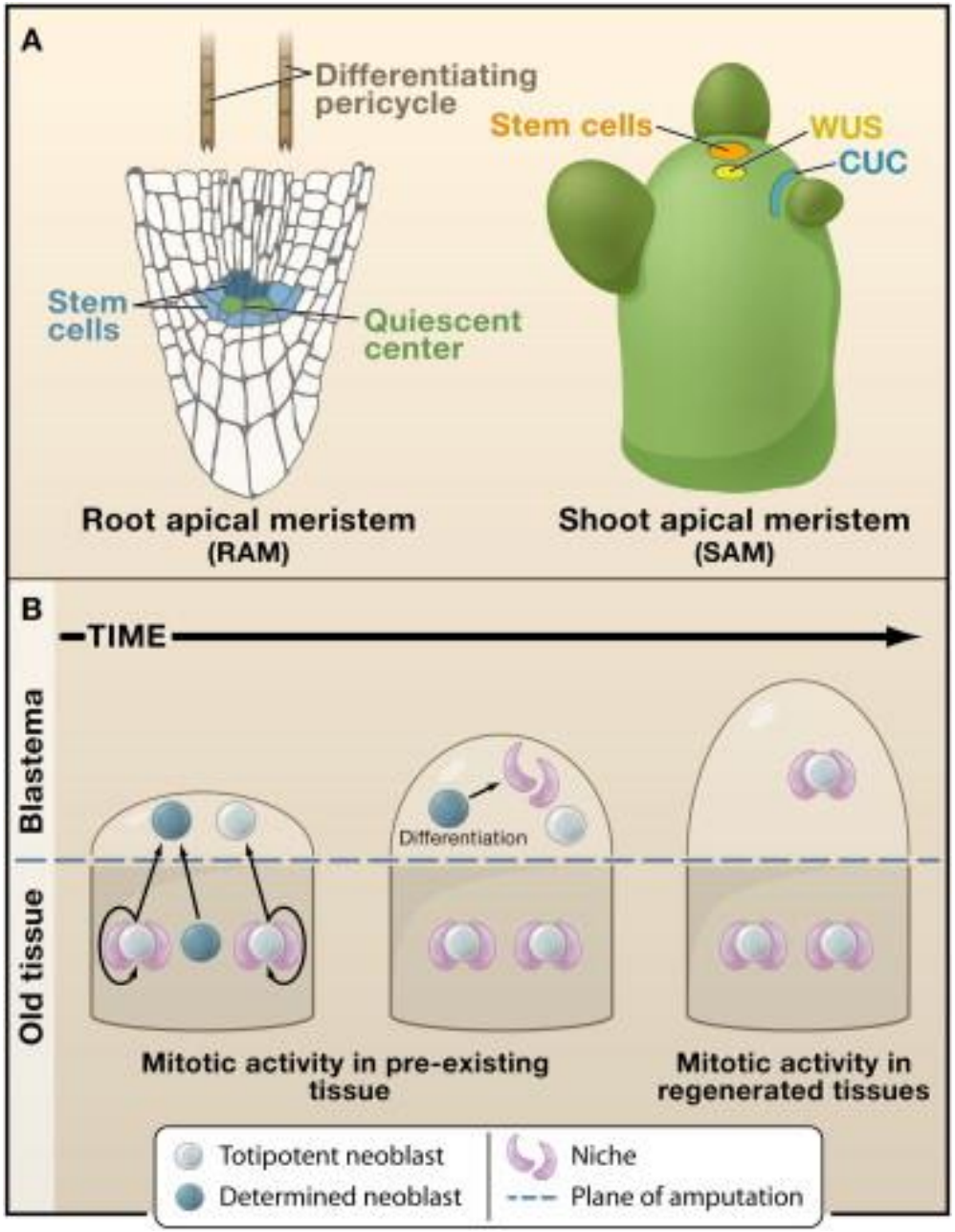
Meristematic Tissue:

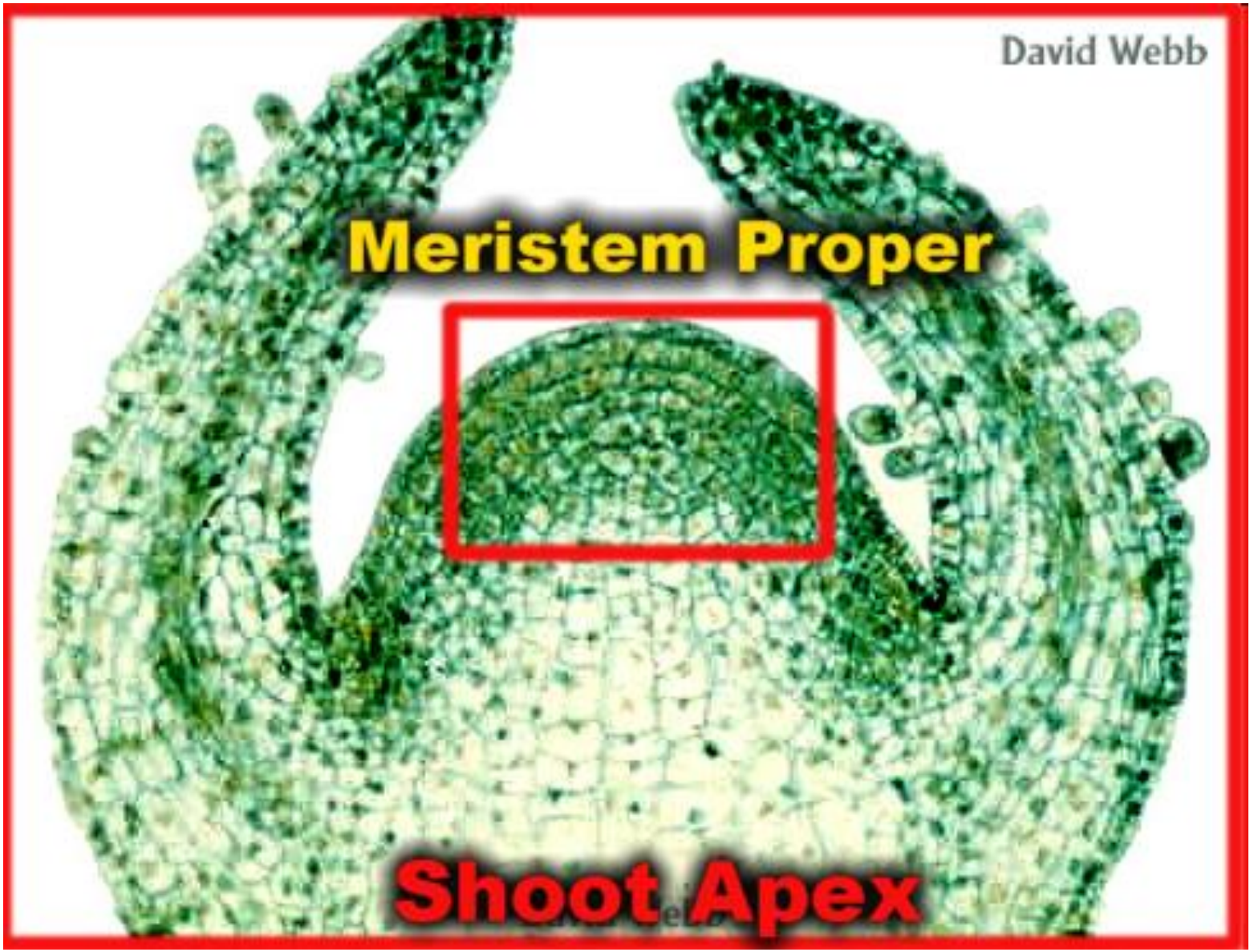
The cells of this tissue have the ability to divide and re-divide to form new cells (mitosis). The newly formed cells are similar to the parent cell but as they grow their characteristics change and they differentiate. These cells, found in growing areas of plants, help in increase of length and width of plants.

Permanent Tissue:

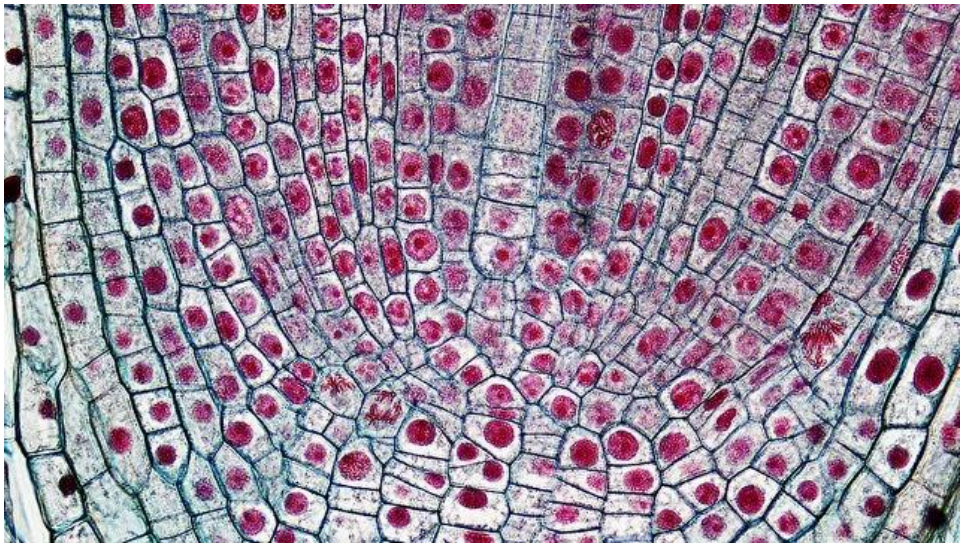
These are matured meristematic tissue. The meristematic cells form permanent tissue once they lose the ability to divide. The process by which cells arise from meristematic tissue and take up a permanent shape, size and function is called differentiation.

Meristematic tissues	Permanent tissues
Continuously dividing cells.	Do not divide continuously
Cells are small and isodiametric.	Variable in shape and size
Cell wall is thin.	Cell wall is thick
Nuclei are large.	Nuclei are small
Vacuoles are absent	Vacuoles are present
Intercellular spaces absent	Intercellular spaces present
Metabolic activities are at high rate.	Low rate
Inorganic inclusion absent	Present
Cells are undifferentiated.	Cells are differentiated
Simple tissue	Simple or complex

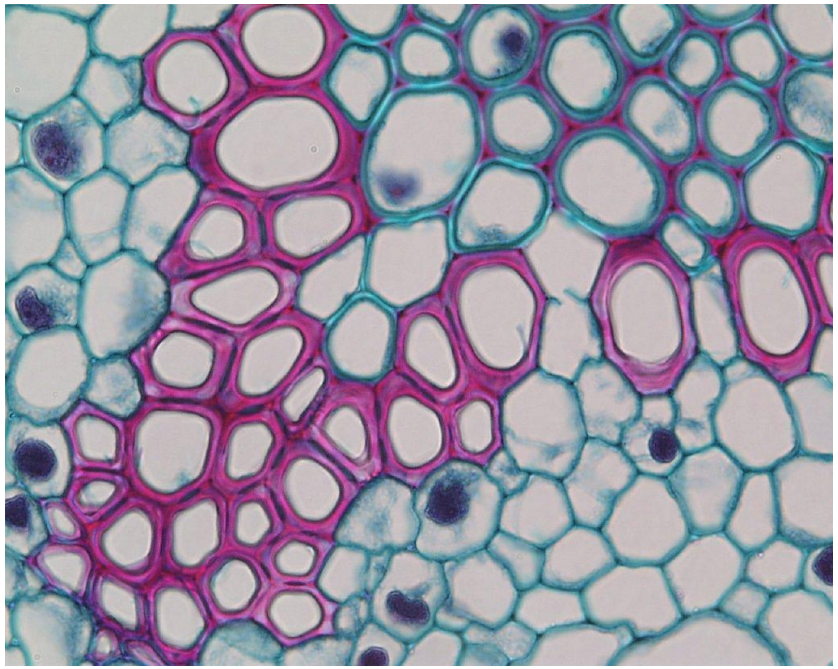

A
Differentiating pericycle
Stem cells
Quiescent center
Root apical meristem (RAM)
Stem cells
WUS
CUC
Shoot apical meristem (SAM)
B
TIME
Blastema
Old tissue
Differentiation
Mitotic activity in pre-existing tissue
Mitotic activity in regenerated tissues
Totipotent neoblast
Determined neoblast
Niche
Plane of amputation


David Webb
Meristem Proper
Shoot Apex

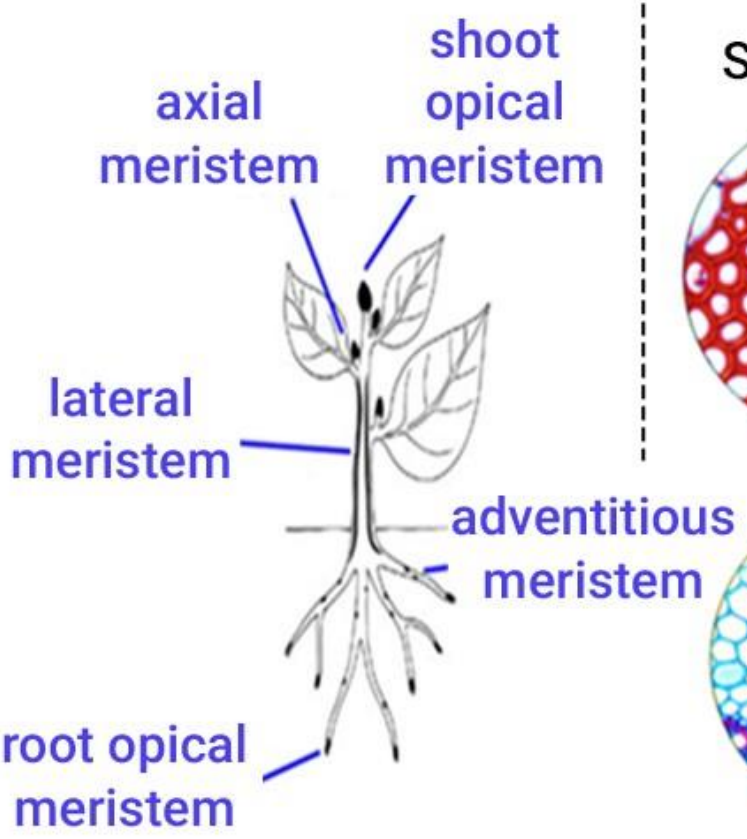
Meristematic Tissue



Permanent Tissue

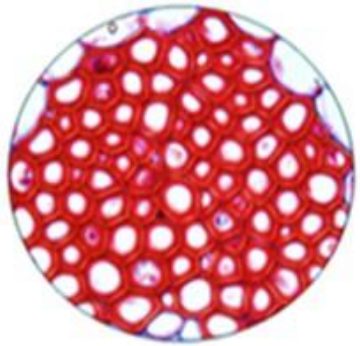


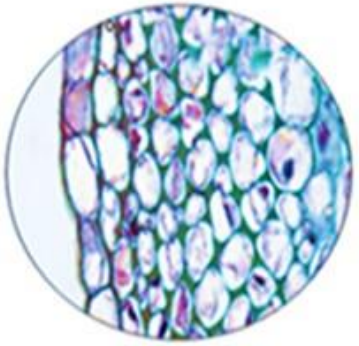
Meristimatic Tissues



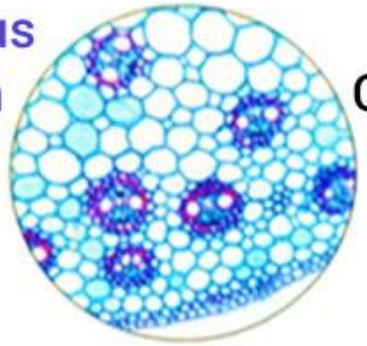
Permanent Tissues

Sclerenchyma Cells

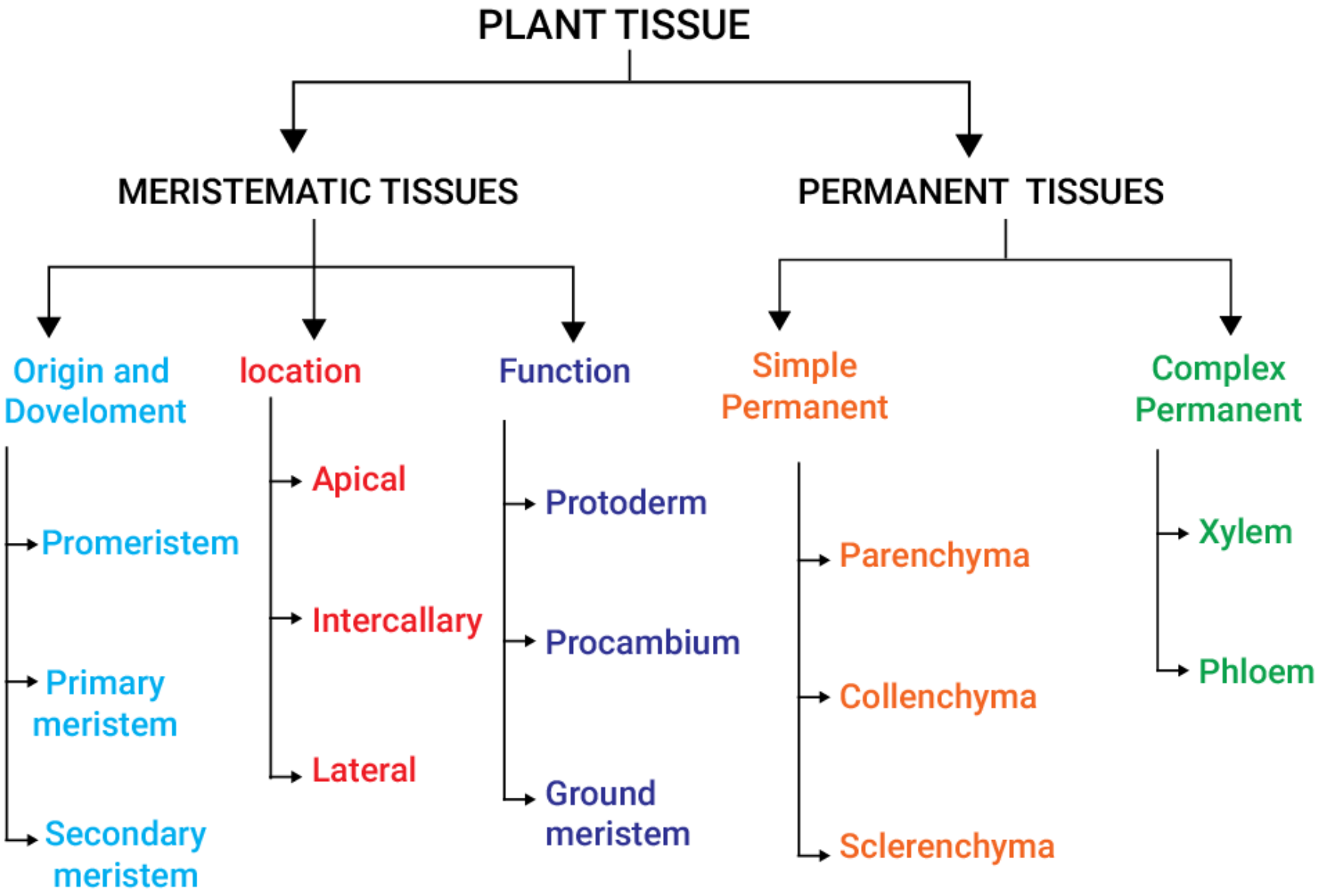




Collenchyma Cells



Parenchyma Cells


PLANT TISSUE
MERISTEMATIC TISSUES
PERMANENT TISSUES
Origin and Dovelopment
location
Function
Simple Permanent
Complex Permanent
Promeristem
Primary meristem
Secondary meristem
Apical
Intercallary
Lateral
Protoderm
Procambium
Ground meristem
Parenchyma
Collenchyma
Sclerenchyma
Xylem
Phloem

Meristem Based on Origin and Development

Promeristem:

It is the region of new growth in plant body, where the foundation of new organs is initiated. Sometimes it is also called primordial meristem.

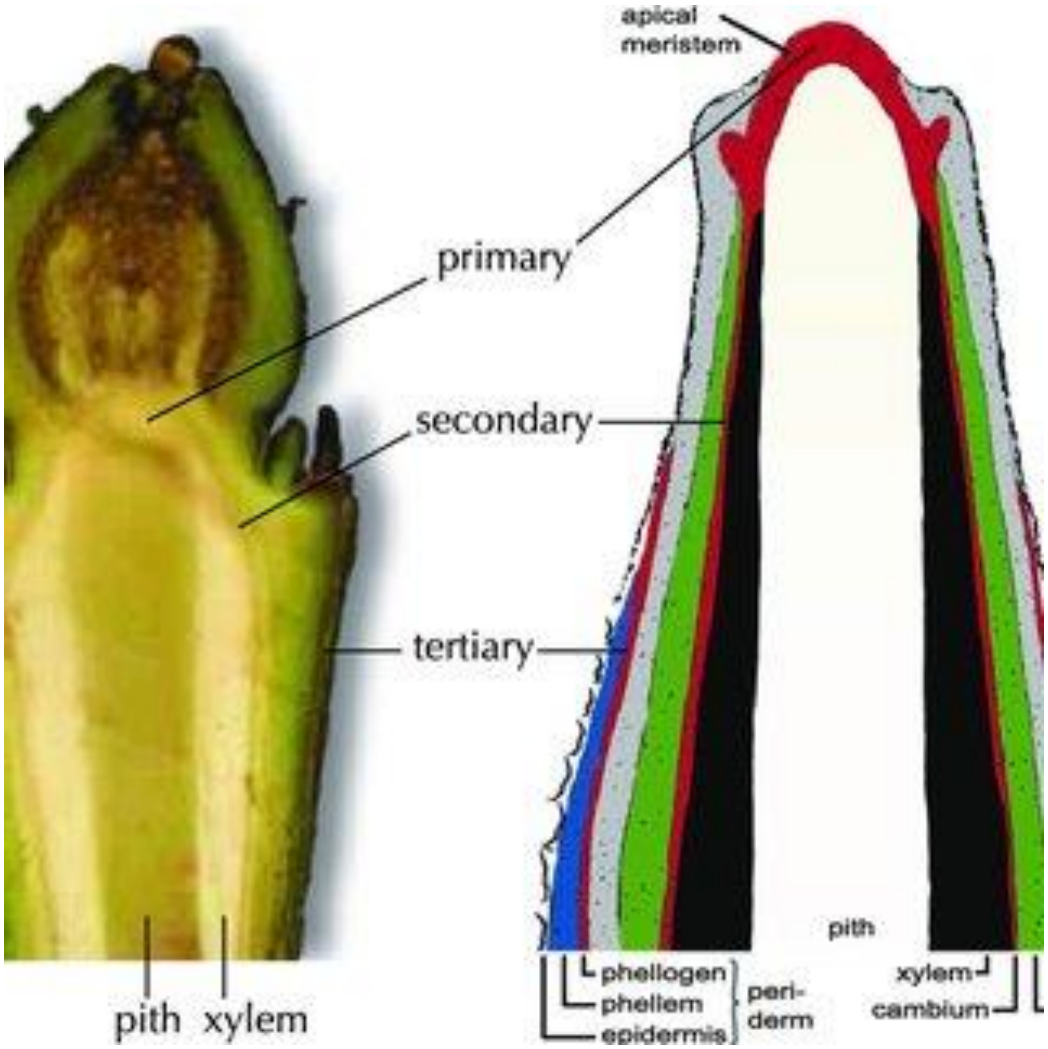
Primary Meristem:

It derives from embryonic stages and differentiated into primary permanent tissue.

Secondary Meristem:

It derives during later stage of development. It produces cork cambium and interfascicular cambium.

Meristem Based on Origin and Development



Meristem Based on Position

Apical Meristem:

Present in the apices of root and shoot. It is responsible for increase in the length of plant.

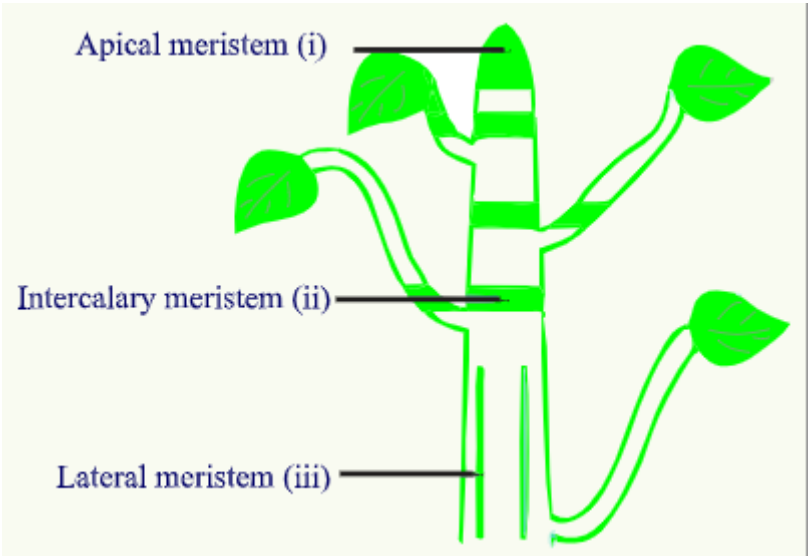
Intercalary Meristem:

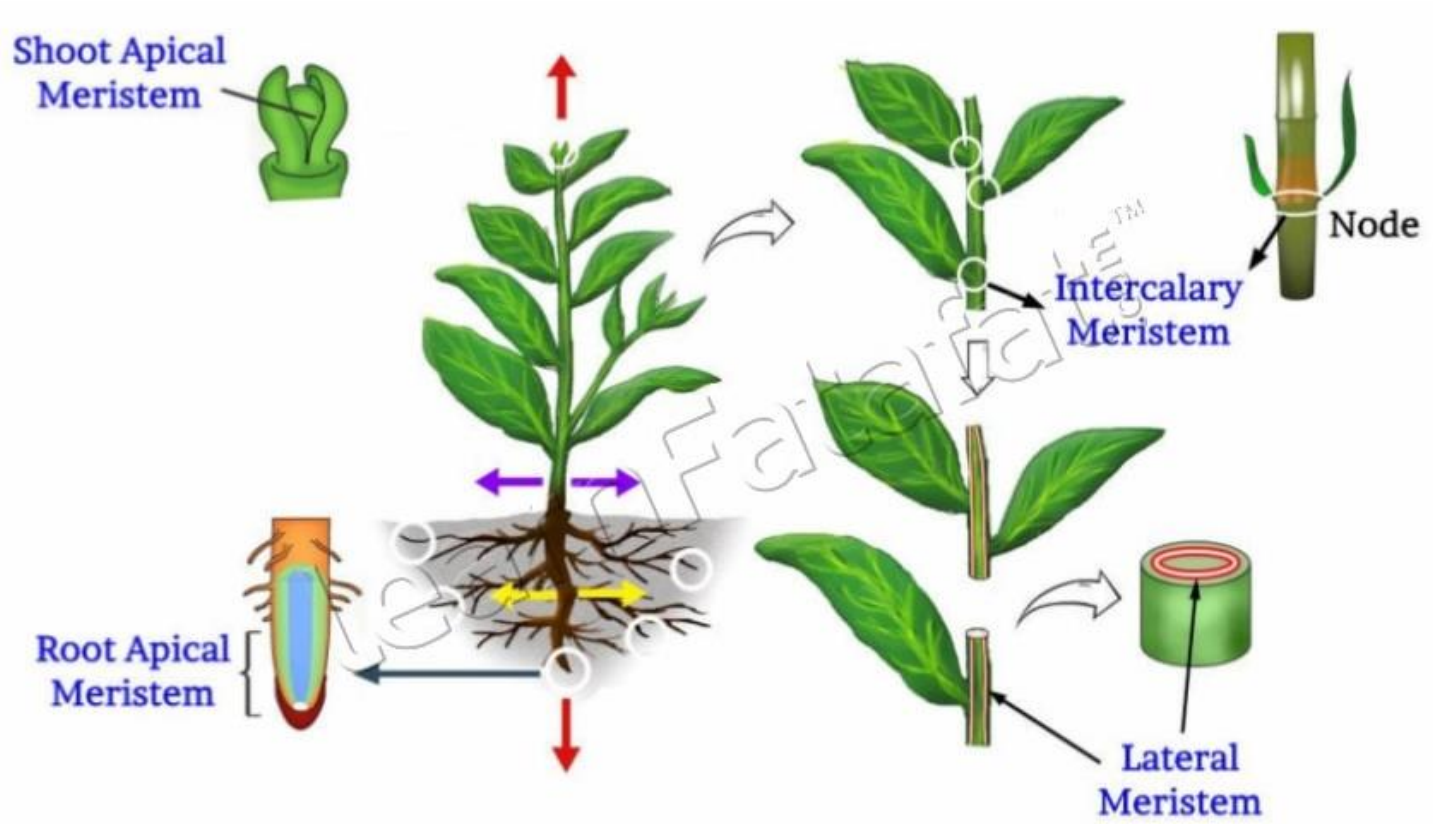
Intercalary meristems are commonly found at the bases of leaves, above or below the nodes. It is responsible for elongation of internode.

Lateral Meristem:

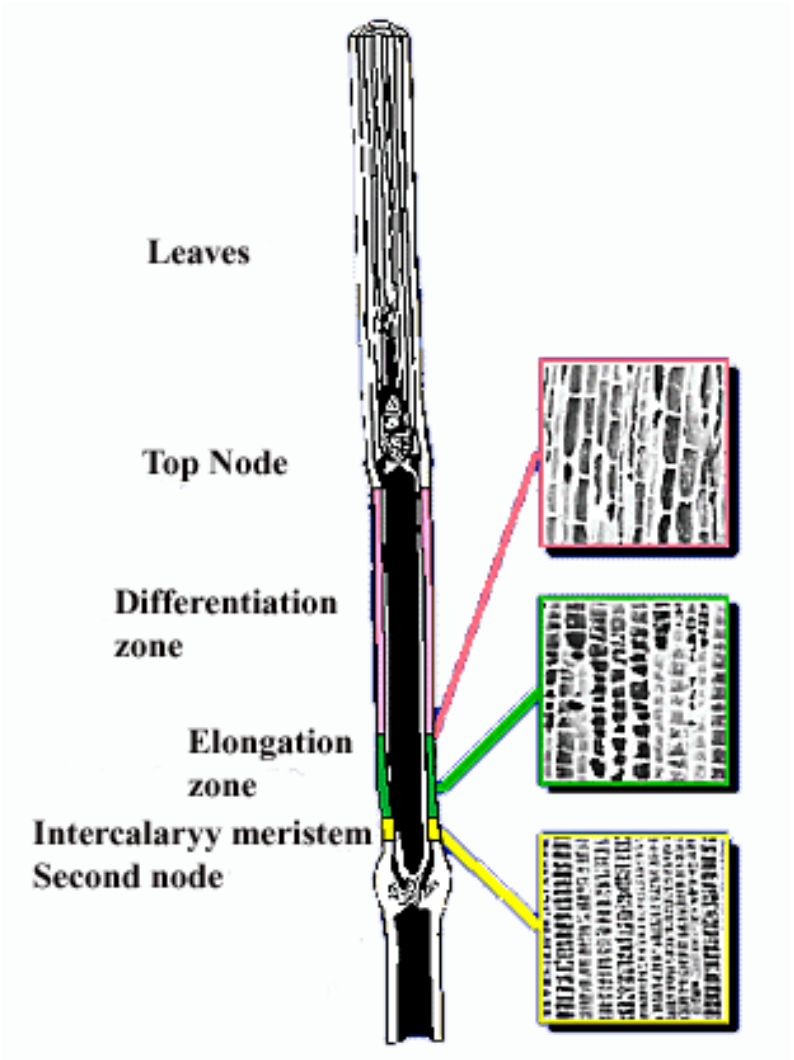
It is found on the longitudinal axis of root and stem. The girth of the stem or root increases due to Lateral Meristem. Only one type of primary lateral meristem is found in plants. It is intra-fascicular cambium.

Meristem Based on Position





- **Intercalary meristem-**
- * occurs between mature tissues sections in the vicinity of the nodes or leaf attachment;
- * common in grasses (occur at bases of nodes);



Meristem Based on Function

Protoderm:

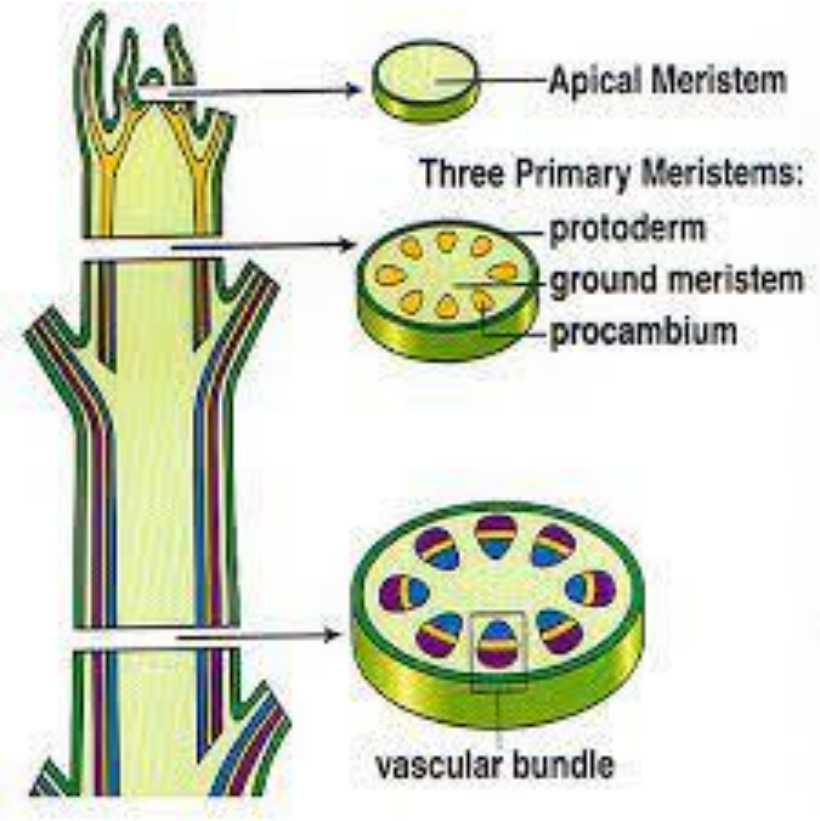
It gives rise to epidermal tissue system and develops epidermis of stem and epiblema of root.

Ground Meristem:

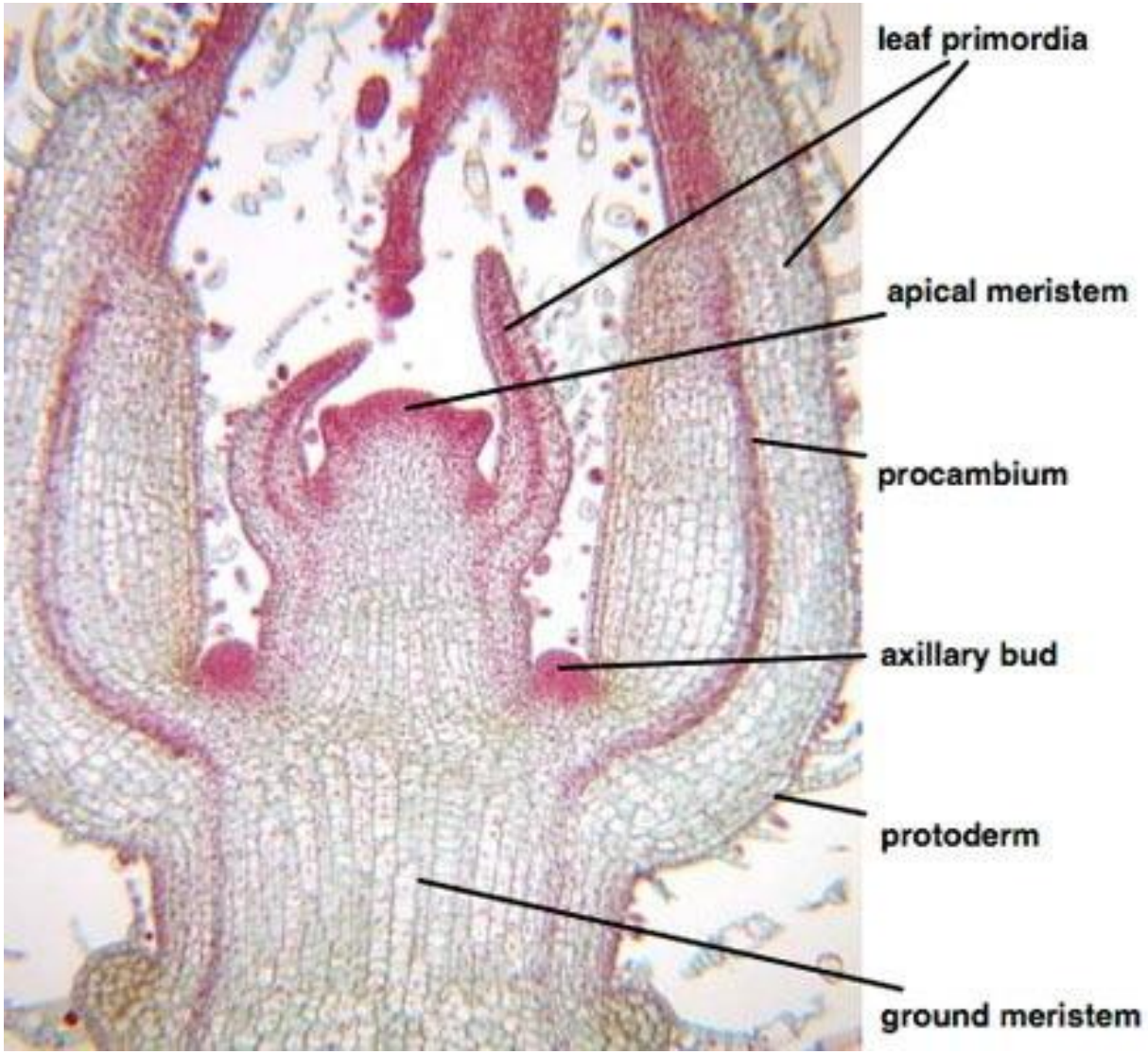
It is gives rise to all tissues except epidermis and vascular strands.

Procambium:

It gives rise to primary vascular tissues. Eg. xylem, phloem.



Meristem Based on Function



Meristem Based on Plane of Division

Mass Meristem:

It divides in all plane. Example: endosperm, young embryo and sporangium.

Rib or File Meristem:

It divides anticlinally in one plane. Example: development of cortex and pith.

Plate Meristem:

It divides anticlinally in two plane. Example: development of epidermis.

Thank You