

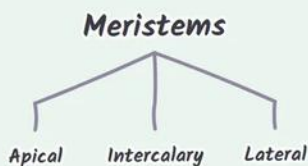
*the internal tissues behind every root, stem and leaf*

## Tissues, permanent vs meristematic \*

- a tissue: similar cells working together for one function
- meristematic tissue: cells that keep dividing, found at specific growing points
- permanent tissue: non-dividing cells with a fixed shape, formed once meristematic cells differentiate

## Meristems, by position

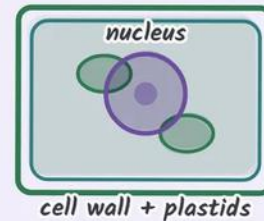
- apical meristem: at the tip of the root and shoot, responsible for growth in length
- intercalary meristem: between permanent tissue, at leaf or internode base, as in grasses
- lateral meristem: vascular and cork cambium along roots and stems, adds girth



*the three meristems, sorted by where they sit in the plant body*

## A generic plant cell

- every plant cell has a cellulose wall around the membrane, nucleus and organelles inside
- plastids are membrane-bound organelles: store starch, or in green tissue, photosynthesise

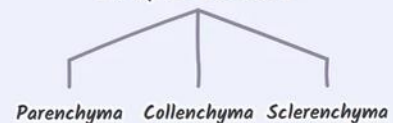


*a squared-off wall around the membrane, plastids inside, the nucleus at the centre: the basic plan behind every plant tissue*

## Simple permanent tissues \*

- parenchyma: thin-walled living cells, large gaps, form the ground tissue filling most of the body
- chlorophyll-bearing parenchyma is called chlorenchyma
- collenchyma: living cells with corner wall thickening (cellulose + pectin), flexible support for growing parts
- sclerenchyma: dead cells, hard lignified wall, rigid strength; long fibres or short irregular sclereids

### Simple tissues



*the three simple tissues, sorted by wall thickness and whether the cell stays alive at maturity*

## Collenchyma vs Sclerenchyma \*

### Collenchyma

- living cells at maturity
- wall thickened unevenly, at the corners, with cellulose and pectin
- flexible support, common in young stems and leaf stalks

### Sclerenchyma

- dead cells at maturity, no living protoplasm
- wall thickened uniformly, with lignin
- rigid support, common in mature stems and seed husks

*living or dead at maturity is the fastest way to tell the two apart*