

# CHAPTER 10

## FORM AND FUNCTIONS IN PLANTS

### 1. Auxin

- produced in apical meristems of shoots and tips of coleoptiles
- Indole acetic acid and other related compounds are collectively called as auxin
- Auxin travels by diffusion towards base of plant, where it controls the lengthening of the shoot and coleoptile
- promote cell elongation
- differentiation of vascular tissue.
- initiates cell division in vascular cambium
- maintain apical dominance
- The same quantity of auxin that promotes growth in stem inhibits growth in the main root system

### 2. Gibberellins

- first isolated from a parasitic fungus that causes abnormal growth in rice seedlings.
- restore normal growth in dwarf plants
- cause bolting in plants with a rosette form of growth
- cause seed germination in grasses.
- In barley seed, the embryo releases gibberellins that cause the aleurone layer of the endosperm to produce several enzymes, including alpha-amylase which breaks down starch stored in endosperm, releasing sugar.

- Gibberellins can ~~cause~~ <sup>break</sup> seed dormancy
- promotes flowering
- help in growing seedless grapes (parthenocarpy)
- improves storage life of banana

### 3. CYTOKININS:

- promote cell division and bud formation in plant tissue culture
- chemically related to certain components of nucleic acids.
- In tobacco pith cultures:
  - Auxin → promotes root formation
  - Cytokinins → promotes bud formation
- promote growth of lateral buds
- prevent senescence (aging) in leaves by stimulating protein synthesis

### 1. ABSCISIC ACID (ABA)

- promote bud dormancy and seed dormancy
- named 'abscisic acid' due to its abscission character and acidic nature
- called stress hormone
- During stress conditions, ABA causes stomata to close and facilitates influx of water into the roots.

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## 5. ETHYLENE

- gaseous hormone
- inhibits root growth and development of axillary buds (lateral buds)
- stimulates fruit ripening
- induce senescence
- Mechanism of leaf abscission involve decrease auxin and increased ethylene production

\* Apical Meristem Gives Rise to:

1. Protoderm → gives rise to epidermis
2. Ground Meristem → gives rise to shoot cortex
3. Procambium → gives rise to primary vascular tissues

\* Lateral Meristem:

1. Vascular cambium → produce secondary vascular tissues
2. Cork cambium → produce cork cells

\* The endosperm of gymnosperm is haploid

\* The endosperm of angiosperm is triploid

\* Most bacteria are haploid bec they have only one chromosome

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