OBJECTIVES

01 Explain the hormones and their functions.

02 To become familiar with major types of hormones in plants
What is Plant Hormones!

➢ Plant hormones is an intrinsic factors that regulate the growth and development of plants. These are called plant hormones or “Phytohormones”.

➢ In order to plants to respond to the environment, their cells must be able to communicate with other cells.

➢ Plants can redirect their growth in response to several different environmental stimuli: Light, Gravity, and Touch.

➢ Hormones are chemical messengers.
  • produced in one part of an organism
  • stimulates or suppresses activity in another part

➢ In order to plants to respond to the environment, their cells must be able to communicate with other cells.

➢ Plants can redirect their growth in response to several different environmental stimuli: Light, Gravity, and Touch.
Type of phytohormones:

- 5 major “classic” classes of PGRs
  - Auxins (IAA, NAA, 2,4-D, 2,4,5-T)
  - Cytokinins (kinetin)
  - Abscisic acid (ABA)
  - Gibberellins (GAx)
  - Ethylene (C2H4)
Based on their action, plant hormones are categorized into two categories:

- **Plant Growth Promoters.**
  - Auxins
  - Gibberellins
  - Cytokinins

- **Plant Growth Inhibitors.**
  - Abscisic acid
  - Ethylene
❖ Auxin Hormone

<table>
<thead>
<tr>
<th>Role of Hormone</th>
<th>Cell elongation (increase cell size)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site of Production</td>
<td>Shoot Tips</td>
</tr>
<tr>
<td>Effect of Hormone</td>
<td>Growth of plant in response to the environment, production of roots.</td>
</tr>
</tbody>
</table>

Auxin molecules

Cell elongation

Chemical structure of auxin:

\[-\text{OCH}_3\text{CH}_2\text{COOH}\]
Tropism

➢ A plant’s response to environment

- Phototropism - response to light
- Geotropism - response to gravity
- Thigmotropism - response to touch
**Cytokinin Hormone.**

<table>
<thead>
<tr>
<th>Role of Hormone</th>
<th>Effect of Hormone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell division (increase number of cells)</td>
<td>Mitosis of new cells; Stimulates seed germination and new shoot growth</td>
</tr>
<tr>
<td>Site of Production</td>
<td>Root Tips</td>
</tr>
</tbody>
</table>

![Chemical structure of cytokinin hormone](image)

Cytokinins = More Mitosis
More Mitosis = More Cells
More Cells = Plant Growth
Gibberellins Hormone.

<table>
<thead>
<tr>
<th>Role of Hormone</th>
<th>Internode Elongation (height)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site of Production</td>
<td>Root and Shoot Tips</td>
</tr>
<tr>
<td>Effect of Hormone</td>
<td>Controls yearly cycles (flowering/bolting, seeding and dormancy exiting)</td>
</tr>
<tr>
<td></td>
<td>Rapid growth of stems and seeds.</td>
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</tbody>
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![Diagram of plant structure with labeled internode and node](image)
Abscisic Acid Hormone

<table>
<thead>
<tr>
<th>Role of Hormone</th>
<th>Dormancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site of Production</td>
<td>Chloroplasts</td>
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**Effect of Hormone**

Enters dormancy: (leaves drop off trees, seeds fall, the stomata close to reduce water loss during drought stress)
Ethylene Hormone

<table>
<thead>
<tr>
<th>Role of Hormone</th>
<th>Ripening and Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site of Production</td>
<td>Ripening fruits, aging flowers, germinating seeds and wounded tissues</td>
</tr>
<tr>
<td>Effect of Hormone</td>
<td>Stimulates fruits to ripen, flowers to enter senescence (to grow old and die)</td>
</tr>
</tbody>
</table>
References


Thank You