

HORMONE

Greek: hormon to excite

Naturally occurring, signalling molecules that exert a profound influence on physiological processes

Produced in tiny amounts by one part of an organism's body and transported to other parts, where it binds to a specific receptor and triggers responses in target cells and tissues.

Phytohormones

Principal means of intercellular communication within plants

Produced within plants, and are effective at extremely low concentrations

Transported to different parts of the plants to perform various physiological functions

Plant hormones control growth, flowering, fruiting, aging, and even death.

Effect of a particular hormone is concentration dependent; hormones may have different effects at different concentrations.

Like animal hormones, plant hormones affect target cells via receptor proteins.

Plants regulate levels of hormones by altering precursors, transport, inactivation, breakdown, or storage.

TYPES OF PHYTOHORMONES

auxin

gibberellins

cytokinins

Ethylene

Abscissic Acid

Brassinosteroids

Strigolactones

AUXIN

AUXIN: THE GROWTH HORMONES

Auxin was the first plant hormone to be discovered.

Greek word auxein means "to increase or to grow."

Enlargement of plant cells.

Indole-3-acetic acid (IAA) is the most widely distributed natural auxin

Promotes production of Shoot apical meristems

AUXIN (cont)

young leaves

root tips

germinating seeds

fruits

PHYSIOLOGICAL EFFECTS OF AUXIN

Auxins promote cell elongation of stems and coleoptiles

Coleoptile is the pointed protective sheath covering the emerging shoot of monocots

Phototropism is mediated by the lateral redistribution of auxin

Gravitropism involves lateral redistribution of auxin

Auxin promotes apical dominance

Auxin promotes the formation of lateral and adventitious roots

Auxin delays the onset of leaf abscission

When the level of auxin declines, a special layer of cells — the abscission layer — forms at the base of the petiole.

Auxin promotes fruit development

Gibberellins

Gibberellins: Regulators of Plant Height

discovered by Ewiti Kurosawa

Causes Internodal elongation known as the 'bakanae' or 'foolish seedling' disease of rice

Isolated from fungus (Gibberella fujikuroi)

Stimulate stem elongation

Promotes Meristems of apical buds and roots,

PRODUCTION

of:

young leaves

developing seeds

PHYSIOLOGICAL EFFECTS OF GIBBERELLINS

Gibberellins Stimulate Stem Growth in Plants.

Gibberellin application results in bolting (stem growth)

"Foolish rice" seedlings, suffer from an overdose of gibberellins normally found in plants in lower concentrations

Gibberellins promote fruit set and parthenocarpy

GA promote early seed development and germination.

Gibberellins mobilize nutrients during seed germination

Cytokinins : Regulators of Cell Division

| | |
|---------------------------------------|--|
| Discovered in the search for? | factors that stimulate plant cells to divide |
| The most common natural cytokinin is? | Zeatin, |
| because it was discovered first in? | (Zea mays) |

PHYSIOLOGICAL EFFECTS OF CYTOKININS

Auxin :Cytokinin regulates root and short initiation in callus tissues

Cytokinin stimulates the Growth Of Axillary Buds

Cytokinins Delay Leaf Senescence

Leaf senescence is delayed in a transgenic tobacco plant containing a cytokinin biosynthesis gene, ipt. The ipt gene is expressed in response to signals that induce senescence.

Ethylene: The Gaseous Hormone

| | |
|---------------------------|---|
| Discovered in the early | 1900s |
| as a ? | fruit ripening |
| Not required for? | normal vegetative growth |
| Synthesized primarily in? | in response to stress and may be produced in large amounts by tissues undergoing senescence or ripening |
| Promotes production of? | Fruit ripening |
| | Senescence |
| | Leaf abscission |
| | Wounds and stress |

PHYSIOLOGICAL EFFECTS OF Ethylene

Ethylene stimulates fruit ripening.

Fruits that ripen in response to ethylene exhibit a characteristic respiratory rise called climacteric before the ripening phase

Ethylene triggers ripening, and ripening triggers more ethylene production-a rare example of positive feedbackmechanism

As apples ripen, they release ethylene. Over- ripened apples release the hormone in high amounts, causing other apples stored nearby to ripen faster and rot sooner.

PHYSIOLOGICAL EFFECTS OF Ethylene (cont)

Ethylene promotes senescence and leaf abscission.

auxin from the leaf prevents abscission

the amount of auxin from the leaf decreases and the ethylene level rises

Synthesis of enzyme that hydrolyze the cell wall polysaccharides, resulting in cell separation and leaf abscission

Ethylene instigates triple response

slowing of stem elongation

thickening of the stem

Curvature that causes the stem to start growing horizontally

Ethylene regulates epinasty

Abscisic Acid

Abscisic Acid: A Seed Maturation and Antistress Signal

Accumulates as a response to stressful environmental conditions, such as dehydration, cold temperatures, or shortened day lengths

PHYSIOLOGICAL EFFECTS OF AA

Abscisic acid induces seed and bud dormancy ABA induces dormancy in seeds by blocking germination and promoting the synthesis of storage proteins

ABA accumulates in dormant buds as an adaptive feature in cold climates

ABA Closes Stomata in Response to Water Stress ABA binding leads to influx of Calcium and the opening of potassium channel

Potassium ions exits the guard cells and water follows. Guard cells become flaccid, closing the stomatal aperture



Strigolactones

Strigolactones are signaling compounds made by plants.

2 Main functions: as endogenous hormones to control plant development

as components of root exudates to promote symbiotic interactions between plants and soil microbes.

Some plants that are parasitic on other plants have established a third function, which is to stimulate germination of their seeds when in close proximity to the roots of a suitable host plant.

Brassinosteroids

Brassinosteroids (BRs) as a class of steroid plant hormones participate in the regulation of numerous developmental processes, including root and shoot growth, vascular differentiation, fertility, flowering, and seed germination.

Brassinosteroids (BR) and gibberellins (GA) promote seed germination of these species and counteract the germination-inhibition by abscisic acid (ABA).

C

By [nadjji_06](#)
cheatography.com/nadjji-06/

Not published yet.
Last updated 25th March, 2023.
Page 3 of 3.

Sponsored by [ApolloPad.com](#)
Everyone has a novel in them. Finish
Yours!
<https://apollopad.com>