PLANT HORMONES Cheat Sheet

by nadjjj_06 via cheatography.com/182191/cs/37899/

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

gibberilins

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 abscision

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 PRODUCTION of:	Meristems of apical buds and roots,
	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
Synthe-sized 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

Abscissic 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).