

EDUCATION FOR LIFE



ASIAN
INTERNATIONAL
SCHOOL

CONTROL AND COORDINATION IN PLANTS

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Things to be coordinated:

Growth of plants

Germination of seeds

Flowering of plants

Ripening of fruits

Shedding of leaves

Movement of plants - Plants can do movement but can't do locomotion (moving from one place to another).

Animals Vs Plants

Animals	Plants
1. Control and coordination is more complicated in animals.	Simpler in plants.
1. Animals have nervous system and endocrine system (system of hormones) for control and coordination.	Plants do not have nervous system. Different hormones are responsible for control and coordination in plants.
1. Animals have specific glands to secrete hormones.	Plants do not have specific glands for secretion of hormones.

SOME IMPORTANT PLANT HORMONES

AUXIN: It controls growth of stem, fruits and roots.

GIBBERELLINS: It controls growth of stem, breaking dormancy of buds and seeds and growth of fruits.

CYTOKININ: It controls growth of plants by cell division, functioning of stomata, breaking dormancy of seeds. These type of hormones present more in seeds and fruits.

ABSCISSIC ACID (ABA): It controls inhibit growth, controls shedding of leaves, functioning of stomata and promote dormancy of seeds.

MOVEMENT IN PLANTS

Movement in plants can be divided into two main types -

1. TROPIC MOVEMENT

2. NASTIC MOVEMENT.

Tropic movement/Tropism is the movement of plants in which direction of movement is guided by the direction of external stimulus causing the movement.

Nastic movement is the movement of plants in which direction of movement is **not** guided by the direction of any stimulus causing the movement.

TROPIC MOVEMENTS

Tropic movements happen as a result of growth of a part of plant in a particular direction. Tropic movements can be of many types.

Phototropism

Geotropism / Gravitropism

Hydrotropism

Chemotropism

Thigmotropism

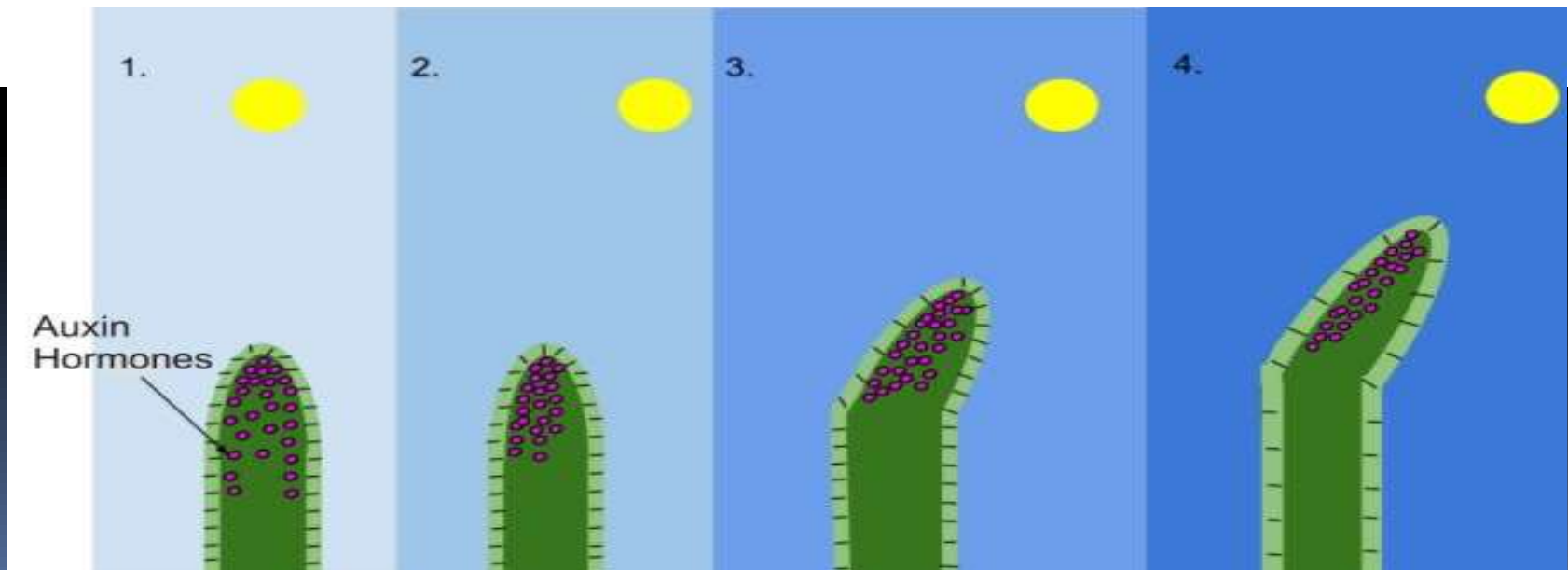
1. PHOTOTROPISM

Phototropism is the growth movement of parts of plants in response to light. Growth towards a source of light is called positive phototropism. Growth away from the source of light is termed negative phototropism. Stems usually show positive phototropic movement, while roots usually show negative phototropic movement.

Mechanism of Phototropism

Auxin hormones cause growth in the part of stem where it is present in more amounts. But it prefers to accumulate more in regions of stem getting less light.

When light comes from top, all sides of stem get same light. Thus auxin is uniformly distributed in stem and stem grows straight. But when light comes only from one side, auxin hormones gather on the other side and causing more growth on that side. This leads to bending of stem towards light.



GEOTROPISM

When stem and root of plant move against and along the direction of gravity, it is called geotropism.

Stems usually show negative geotropic movement to get light and air. Roots usually show positive geotropic movement i.e. towards the direction of the gravity to get water and nutrients from soil.

HYDROTROPISM

Movement of root towards water is called hydrotropism. This shows a positive hydrotropic movement. Growth hormones in root are responsible for bending of root towards the direction of water.

THIGMOTROPISM

It is the growth movement of stem of some plants over a surface influenced by touch. The plant grows in a way so as it can coil around a support.

Such movements are seen in creepers for ex. Money plant.

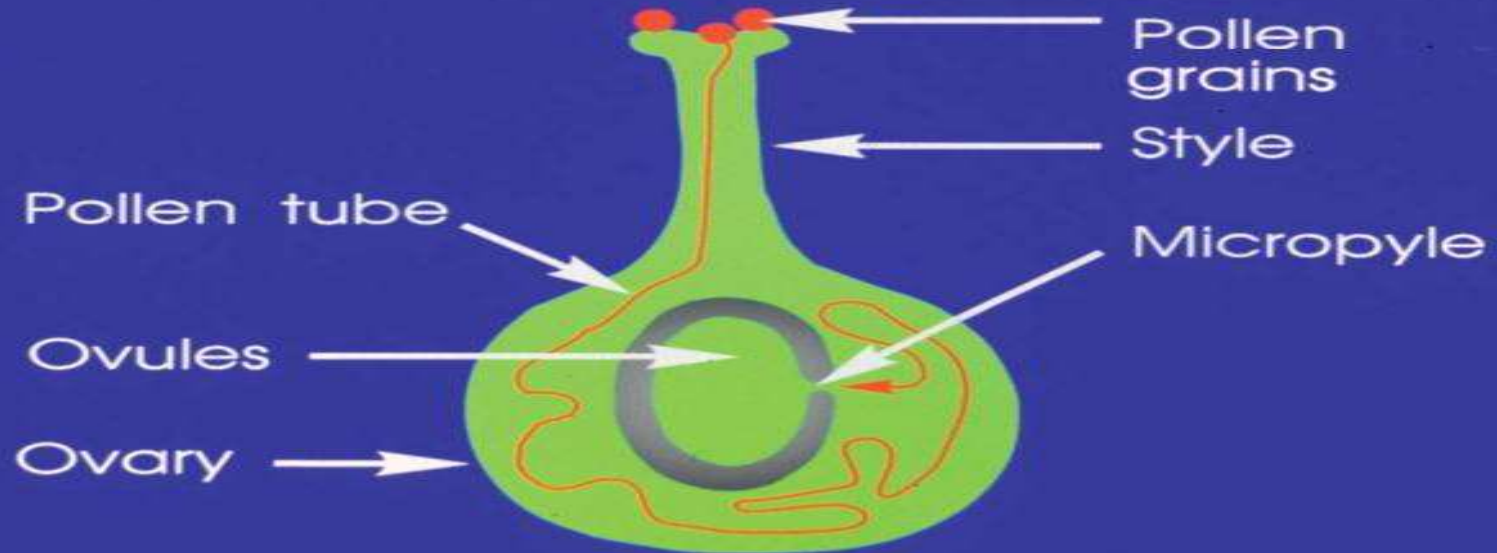
The amount of auxin reduces in the portion of stem touching the stick. More auxin is present on the other side of stem which results in more growth on that side. This leads in the bending of stem around the contact surface.



1.CHEMOTROPISM

Movement of plant or parts of plant in response to a chemical stimulus is called chemotropism. In positive chemotropism, movement is toward the chemical. In negative chemotropism, movement is away from the chemical.

Growth of pollen tube from pollen to ovary under the influence of chemical released by ovary is an example of chemotropism.



NASTIC MOVEMENT (NASTY)

Nastic movements are the movements in which direction of the response is not dependent on the direction of the stimulus.

For example, when we touch the leaves of *Mimosa pudica* / touch-me-not plant, its leaves fold inward and droop. The drooping is independent of the direction from which the leaves are touched. Such movements happen because when we touch the leaf, an electro-chemical signal travels to pulvinus. Pulvinus is a joint at the base of plant leaf which is tightly filled with water. Due to this, it remains firm and holds the leaf upright. When electro-chemical signal reaches to pulvinus, this signal makes pulvinus loose its water and thus firmness. So the leaf folds inward and droops. If it is left for 15-20 minutes, water comes back to pulvinus and leaves become upright again.

*Thank
you!*