TENDER HEART HIGH SCHOOL, SEC-33B, CHD.

CLASS - 10 DATE - 29.07.2024

SUBJECT - BIOLOGY TEACHER - Nidhi Rana

CHAPTER - 7 Chemical Coordination in Plants

All living beings respond to external stimuli (changes in the environment) Plants don't show fast responses to the immediate environment but they do respond to light, gravity and seasonal changes. They need to coordinate growth of cells in their body parts They bring about all these movements by producing certain chemicals in their bodies called hormones. These chemical messengers are called hormones They are produced in one area of the plant and are transported through out the body of the plant. Finally they have their effects at a location far away from their site of production Mainly these hormones affect the growth of the plant, sometimes stimulating and sometimes inhibiting the growth Thus we can say that the meristems i.e. the growing areas in a plant (where the cell division occurs) are sensitive to hormones The hormones help to stretch the cellulose wall of plant's meristematic cells to facilitate division.
Term Hormone was first used by William Bayliss and Ernest Starling in 1902 Phyto hormone means Plant hormones. Let us discuss a few plant hormones-

1 AUXINS - Term coined by F.W. Went in 1928 from Greek word auxein which means 'to grow' It is the first growth hormone discovered in plants and is quite effective in low concentrations In higher plants these are present in meristematic regions like root-shoot tip, lateral meristems etc.

IAA - Indole 3 acetic acid is the main natural auxin found in plant.

Functions -

1) Auxins promote growth of stem root and fruit by cell elongation
2) Auxins delay leaf senescence (i.e. ageing or falling of leaves
3) Auxins promote growth of apical buds (at the tip/apex) and inhibit the growth of lateral buds Growth of lateral bud (present in the axil of leaf) occurs only after the removal of apical bud (present at the tip of the shoot)

Apical dominance - is the phenomenon of suppression of growth of lateral buds by apical buds.

4) Auxins induce rooting in the cutting of some plants like rose etc.
5) Auxins induce Parthenocarpy in parthenocarpic fruits. Parthenocarpy is the development of fruits without fertilization Eg in apples, tomatoes, banana etc.

2. GIBBERELLINS

Gibberellins are of different forms like GA_1 GA_2 GA_3 and so on Gibberellic Acid GA_3 is most studied form. These are also found in meristematic regions like root-shoot apex etc.

Functions -

1) They promote growth of internodes (region between two nodes) by cell elongation.
2) They break seed dormancy and initiate germination
3) They promote fruit growth and induce parthenocarpy
4) They delay senescence (ageing)

5) They are used by horticulture and food industries to increase the length of grapes, elongate apples and improve their shape (as they enhance longitudinal growth of internodes)
6) They are used in brewing industry to speed up the malting process.

3. CYTOKININS

Cytokinins are discovered by Skoog and Miller These have specific effect on cell division. They are produced in root tips and transported through xylem cells. They are found in germinating seeds developing fruits and embryo etc.

Functions -

1) They stimulate plant growth by cell division (not by cell elongation) They promote cell division (even in non meristematic regions.
2) In seeds they cause expansion of cotyledons
3) They break seed dormancy and promote germination
4) They promote chlorophyll synthesis in chloroplast and delay leaf senescence
5) They inhibit apical dominance.

4. ETHYLENE

Ethylene is the only hormone that is gas at room temperature. They are produced in fruits and helps to ripen them Thus the site of production and action are same (ie fruits) Ethylene is majorly produced in meristematic tissues

Functions -

1) It causes reduction in stem elongation
2) It accelerates the senescence.
3) It helps in ripening of fruits
4) It initiates germination in peanut seeds

5. It causes sprouting of potato tuber.
6. It helps in promoting root growth and root hair formation
7. It helps in inducing flowering in mango.

5. ABSCISIC ACID

Abscisic Acid is growth retarding hormone. It is found in chloroplasts of leaves. Fruits and seeds contain highest amount of ABA

Functions

1) It acts as a general plant growth inhibitor by slowing down plant metabolism
2) It inhibits seed germination and development. It induces seed dormancy and helps to withstand unfavourable conditions
3) It accelerates senescence (ageing) and abscission (falling) of leaves, flowers, buds and fruits
4) It stimulates closure of stomata & thus helps the plants in increasing their tolerance to various kinds of stresses. Thus it is also called the stress hormone.

NOTE FOR STUDENTS

After reading the notes please go through the topic as given in your text book carefully

HOME ASSIGNMENT

1) Students are required to learn and write the Table 7.1 showing 'plant hormones, their site of synthesis and functions' in notebook.
2) Answer the 'Review questions'
Q No D Structured / Application / Skill Type
Q No 1 and 2 in the notebook.