

BIOCHEMISTRY AND PHYSIOLOGY OF PLANT HORMONES

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AUXINS

Auxins is synthesized in relatively large amounts in a few localized centers, but it is transported through all the living tissues of most abundant auxin synthesis in the vegetative seed plant

Other rich sources are enlarging leaves, flowers, fruits, and seeds.

The enzymes for the conversion of tryptophan to IAA occur generally throughout the plant and are especially active in region of intense metabolic activity, such as meristems, expanding leaves, fruits, and root tips

GIBBERELLINS

EFFECTS OF LIGHT ON GA BIOSYNTHESIS

As photoreceptor

In the case of etiolated wheat leaf sections, an increase in GA-like substance occurred shortly after 5 minutes of red light treatment

RNA and protein synthesis, appeared to be implicated in an observed increase in GA-like substances that occurred subsequent to a 30-minute red light treatment of wheat leaves

Kaurene is a key intermediate in GA biosynthesis, and rate of kaurene biosynthesis may be correlated closely with rate of GA biosynthesis, the light-induced increase in kaurene-synthesizing capacity reflects a potential light-induced increase in rate of GA biosynthesis

ROLE OF GAs IN DWARFISM

Dwarf mutant of corn (*Zea mays*) known as the dwarf-5 (*d5*) mutant. *d5* phenotype is due to a single gene mutation, reduction in internode elongation that mature dwarf plants are only about 20% the height of normal plants.

Dwarfism is expressed from the seedling stage to maturity and, in contrast to dwarf types of some other species, is expressed in etiolated as well as light-grown plants. The dwarf-5 mutant is deficient in endogenous GA

Other aspects of GA Metabolism

Hashimoto and Rappaport (1996), found that as the seeds matured the acidic ethylacetate-soluble GA-like substances initially decreased and then almost disappeared, while neutral substances and one of the acidic butanol-soluble substances increased. The neutral GA-like substances were present fairly large amounts in mature dry seeds.

QUANTITATIVE CHANGES IN GA CONTENT DURING DEVELOPMENT

DEVELOPMENT OF SHOOTS

Sensitivity of the seedlings to exogenous GA decreased as development progressed, to the extent that seedlings treated at 9 days of age were only slightly taller than the controls on the thirteenth day of growth

DEVELOPMENT OF FRUITS AND SEEDS

Developing seeds and fruits contain much higher concentration of GA than vegetative organs.

Transport GA

GA transport apparently occurring in the phloem and xylem

Movement of applied GAs occur in the sieve tube sap of plants

Cytokinin

Effect cytokinins on leaf growth and senescence

Riishmond and Lang (1957), kinetin retarded the senescence of detached Leaves of cocklebur (Xanthium)

Mothes (1959), spraying solutions of kinetin directly onto leaves that the effect Of the applied cytokinin was quite localized. Only those areas to which the Chemical was applied remained green

Abscissic Acid

Stomatal Regulation

Spray applications of exogenous ABA at low concentrations could reduce Transpiration, that this was due to closure of the stomates

Bud Dormancy

The inhibitory effect on the growth of buds exerted by leaves maintained Under short day conditions strongly suggests the translocation of inhibitor (ABA) from the leaves to the buds

Seed Dormancy

Exogenous ABA, prevent germination in nondormant seeds of both *Fraxinus americana* and *F. ornus*

Abscission

High levels of ABA occurred in direct correlation with abortion and
Abscission of young fruit

Regulation of Synthesis of Proteins in Barley Aleurone

ABA suppresses the synthesis of certain proteins in barley aleurone
tissue and induces the synthesis of other proteins

Seed maturation

ABA plays an important role in suppression of germination. Exogenous ABA
Can block both visible germination and the appearance of germination-
Specific enzymes in cultured embryo

Ethylene

1. Stimulation of ripening of fleshy fruits
2. Stimulation of leaf abscission
3. Triple response of etiolated legume seedlings- reduced stem elongation, radial swelling of stems, and agravitropism or diagravitropism of stems
4. Inhibition of leaf and terminal bud expansion in etiolated seedlings
5. Tightening of the epicotyl or hypocotyl hook of etiolated dicot seedlings
6. Inhibition of root growth
7. Increase in membrane permeability
8. Stimulation of adventitious root formation
9. Stimulation of flowering in pineapple
10. Inhibition of lateral bud development
11. Causes various types of flowers to fade
12. Interference with polar auxin transport
13. Causes epinasty of leaves
14. Participation in normal root gravitropism

Brassinosteroids

BRs elicit a pronounced stem elongation response in dwarf pea epicotyls

BR treatment significantly increased RNA and DNA polymerase activities,
And the synthesis of RNA, DNA, and protein in *Phaseolus vulgaris* and
P. aureus

THANK YOU