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Endogenous hormones and their signaling mechanisms

1. Introduction

Endogenous hormones play crucial roles in regulating plant growth and development. Among these hormones, auxin, cytokinin, abscisic acid, ethylene, and gibberellin are known to be involved in the regulation of flowering, fruit growth, and senescence. These hormones are synthesized in specific organs or tissues and can be transported long distances to other parts of the plant. In this review, we focus on the role of cytokinin in plant growth and development.

2. Cytokinin metabolism

Cytokinin is a class of phytohormones that plays an important role in plant growth and development. Cytokinin is synthesized in the roots and is transported to the shoots, where it promotes cell division and elongation. Cytokinin is metabolized in the shoots by cytokinin oxidase, which converts cytokinin to inactive compounds. The inactive compounds are then transported back to the roots, where they are degraded by cytokinin oxidase.

3. Cytokinin signaling

Cytokinin signaling is mediated by a family of proteins known as cytokinin receptors. These receptors are located in the plasma membrane and bind cytokinin with high affinity. Upon binding cytokinin, the cytokinin receptors undergo a conformational change that triggers a signal transduction pathway. This signal transduction pathway leads to the activation of cytokinin-responsive genes, which are involved in the regulation of plant growth and development.

4. Cytokinin function in plant growth and development

Cytokinin is involved in a wide range of plant processes, including embryogenesis, root development, shoot regeneration, and flowering. Cytokinin also plays a role in the regulation of cellular growth and division, as well as in the regulation of gene expression. Cytokinin is also involved in the regulation of plant defense responses, such as the activation of salicylic acid-dependent gene expression and the induction of the expression of genes involved in the biosynthesis of secondary metabolites.

5. Conclusion

Cytokinin is a key regulator of plant growth and development. Understanding the role of cytokinin in plant biology is crucial for the development of new strategies for improving plant productivity. Further research is needed to elucidate the complex signaling mechanisms involved in cytokinin action and to identify new targets for the development of cytokinin-based therapies.