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综合评述

抗冻蛋白与植物低温胁迫反应

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摘要

植物抗冻蛋白是从许多抗冻植物中分离的、参与植物抵御冻害反应的一类新型蛋白.这类抗冻蛋白具有多个亲水性缚冰域，能直接作用于冰晶，阻止冰晶在细胞间隙形成和再结晶.一些植物抗冻蛋白与致病相关蛋白有序列同源性，具有抗冻和抗病双重活性.植物抗冻蛋白的表达和积累，既受控于发育及转录因子调节，又受到低温、短日照、脱水及乙烯等因素的影响.异源超表达抗冻蛋白基因能赋予敏感宿主植物抗冻能力.文中论述了有关植物抗冻蛋白特性和鉴定，抗冻机制和表达调控，以及遗传转化等方面的研究进展.

关键词 植物抗冻蛋白 抗冻蛋白的双重功能 抗冻性调控 遗传转化

分类号

Anti-freezing proteins and plant responses to low temperature stress

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Abstract

Anti-freezing proteins (AFPs) are the new type of proteins isolated from overwintering plants,which involve in the plant responses to low temperature stress.AFPs have multiple hydrophilic ice binding domains,which can inhibit the growth and recrystallization of ice in intercellular spaces.Some AFPs are homologous to the pathogenesis-related proteins,and function with two activities,*i.e.*,anti-freezing and disease resistance.The expression and accumulation of AFPs are controlled by developmental regulation and transcriptional factors,and affected by low temperature,short day length,dehydration,and ethylene.The heterologous over-expression of genes encoding AFPs in freezing-sensitive plants can enhance the freezing resistance of host plants.In this paper,the research advances in plant AFPs' characters and their identification,mechanisms of freezing resistance and their regulation,and genetic modification were reviewed.

Key words

Plant anti-freezing protein (AFP) Dual-function of AFPs Regulation of freezing resistance Genetic modification

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