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表观遗传修饰调控非生物胁迫应答提高植物抗逆性的研究进展

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摘要 植物生长过程中不断受到各种逆境胁迫, 而表观遗传修饰在植物的环境适应性进化方面起关键作用。近期研究表明, 低温、高盐等刺激可引起全基因组DNA甲基化水平提高和位点特异性的低甲基化, 阻遏有害基因突变, 并促进胁迫应答基因表达; 组蛋白乙酰转移酶(如GCN5)与去乙酰化酶(如HDA6和HDA19)基因突变均增加植株对ABA刺激和盐胁迫的敏感性; 并且组蛋白乙酰化与甲基化可共同调控胁迫应答基因表达; 含可变H2A.Z的核小体与DNA结合的紧密程度调控拟南芥温敏应答, 染色质重塑蛋白SWI/SNF复合物参与干旱、高温及高盐等胁迫应答。文章从DNA甲基化、组蛋白翻译后修饰等方面着重阐述表观遗传学调控植物胁迫应答的最新研究进展。

关键词: 表观遗传修饰 胁迫应答 植物

Abstract: Plants are constantly challenged by various stresses at all phases of development, and epigenetic modifications play a crucial role in the adaptive evolution to the changing environment. Recent studies have shown that genomic hypermethylation and locus-specific DNA demethylation induced by cold, salinity and other stimuli would inhibit the dele-terious gene mutations and increase the expression of stress responsive genes. The mutants of histone acetyltransferase (GCN5) and histone deacetylase (HDA6 and HDA19) genes displayed hypersensitivity to ABA and salinity stresses. Histone acetylation and methylation exert a cumulative or synergistic effect on the expression of stress-responsive genes. The inter-actions between H2A.Z-containing nucleosomes and DNAs mediate the thermosensory responses in Arabidopsis. Further-more, there are reports that drought, high temperature and salinity stress responses can be modulate by chromatin remodel-ing complexes SWI/SNF. In this review, we summarized previously published researches on the epigenetic regulation of plant stress response.

Keywords: epigenetic modification, stress response, plant

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