

甘露醇对拟南芥基因组DNA甲基化的影响

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Methylation-sensitive Amplified Polymorphism Analysis of DNA Methylation in *Arabidopsis* Under Mannitol Treatment

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摘要

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摘要 以拟南芥(*Arabidopsis thaliana*)为材料, 研究不同浓度甘露醇处理下拟南芥幼苗生长发育及其基因组DNA的甲基化水平和变化模式。结果表明, 用50、100、150和200 mmol · L⁻¹甘露醇处理拟南芥种子会对拟南芥幼苗的形态特征和生长态势产生影响; 甲基化敏感扩增多态性(methylation-sensitive amplification polymorphism, MSAP)分析表明, 经50、100、150和200 mmol · L⁻¹甘露醇处理后, 基因组DNA甲基化比率分别为17.75%、21.15%、15.49%和46.10%。甘露醇处理使拟南芥发生基于DNA甲基化水平和模式改变的表现遗传变异。与对照相比, 在50、100、150和200 mmol · L⁻¹甘露醇处理下拟南芥幼苗基因组DNA的甲基化和去甲基化比率分别为5.78%、15.48%、10.71%、33.73%及10.98%、5.36%、8.33%、7.69%。由此推测, 5-甲基胞嘧啶百分含量随着甘露醇胁迫的增强而发生不同程度的变化。

关键词: 拟南芥 DNA甲基化 甘露醇 MSAP

Abstract: We aimed to assess the effect of mannitol treatment on plant growth, as well as genomic DNA methylation levels and patterns in *Arabidopsis thaliana* by methylation-sensitive amplified polymorphism (MSAP) analysis. Mannitol at 50, 100, 150 and 200 mmol · L⁻¹ promoted the root length of *Arabidopsis* seedlings. MSAP analysis revealed that levels of 5-methyldeoxycytidine (5-mdC) in mannitol-treated seedlings were also altered significantly, from 17.75%, 21.15%, 15.49% to 46.10% in plants treated with 50, 100, 150 and 200 mmol · L⁻¹ mannitol, respectively. Thus, mannitol caused epigenetic changes in all samples based on different levels and patterns of DNA methylation. As the controls, methylation and demethylation of DNA in the seeds treated with mannitol was 5.78%, 15.48%, 10.71%, 33.73% and 10.98%, 5.36%, 8.33%, 7.69%, respectively. Mannitol causes a dose-dependent and transient change in global 5-mdC levels in *Arabidopsis* seedlings.

Keywords: *Arabidopsis* DNA methylation mannitol methylation-sensitive amplified polymorphism

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