

缺磷胁迫下番茄侧根形成与miR164及NAC1表达的关系

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Relationship between the development of tomato lateral roots and expression of miR164, NAC1 under P deficiency

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摘要 为了研究番茄幼苗在缺磷胁迫下根系形态发育与生长素、生长素信号转导途径中的转录因子NAC1, 以及调控NAC1 表达的上游miR164之间的关系。试验以5和500 μmol/L磷浓度作为缺磷胁迫和对照, 检测了外源生长素NAA (1-naphthalene acetic acid) 及生长素抑制剂NPA (N-1-naphthylphthalamic acid) 对侧根形成的影响; 同时采用RT-PCR检测了NAC1和miR164在缺磷胁迫下的时序表达。结果表明, 缺磷胁迫下侧根大量形成与生长素及其运输密切相关, 在侧根迅速形成的24 h内, NAC1的表达在缺磷胁迫下增强; 而其上游的miR164表达降低, 从而揭示了缺磷胁迫下侧根形成与miR164调节NAC1表达之间的关系。

关键词: 番茄 侧根 生长素 miRNA NAC1

Abstract: This study investigated the relationship between the development of tomato lateral roots and auxin, NAC1 (transcription factor involved in the auxin signal transduction) and miR164 expression under P deficiency. Effects of exogenous auxin NAA (1-naphthalene acetic acid) and its transport inhibitor NPA (N-1-naphthylphthalamic acid) on the lateral root development were analyzed under P deficiency (5 μmol/L Pi) versus the control (500 μmol/L Pi). The time course of the expression pattern of miR164 and its target gene, NAC1, were analyzed by RT-PCR. The results showed that the development of lateral roots was promoted by NAA and blocked by NPA. During 12 h of lateral root initiation, expression of NAC1 was strongly up-regulated, while miR164 was down-regulated in P-deficient plants. Our data suggest that miR164, together with its target (NAC1), is involved in the mediation of P-deficiency-induced lateral root development.

Keywords: tomato; lateral root auxin miRNA NAC1

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