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THE EFFECTS OF MICRORNA408 ON ROOT GRAVITROPIC BENDING IN ARABIDOPSIS

Abstract

MicroRNA (miRNA) is a kind non-coding small RNA composed of 20 to 24 nucleotides that can affect plant root development. This study analyzed the miRNA expression in Arabidopsis root tip cells through Illumina sequencing and real-time PCR before (sample 0) and 15 min after (sample 15) clinostat treatment was administered. After stimulation was performed, the expression levels of seven miRNA genes, including Arabidopsis miR160, miR161, miR394, miR402, miR403, miR408, and miR823, were significantly upregulated. The target genes of these miRNAs participate in a series of biological processes related to auxin responses, environmental stress, and DNA methylation. An overexpression vector of Arabidopsis miR408 was constructed and transferred to Arabidopsis seedlings. The Arabidopsis seedlings were subjected to gravitropic stimulation by rotating these seedlings at 90°. The root tip bending states of the transgenic plants were then observed. In contrast to the root tip bending of the control seedlings, the root tip bending of the miR408 transgenic offspring significantly decreased. This result indicated that miR408 played a role in root responses to gravitropic stimulation.