PB-15

Soybean Calmodulin-binding Transcription Activator Acts as Negative Regulator of Drought Stress Response

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[Introduction]

The calmodulin-binding transcription activators (CAMTAs) mediate transcriptional regulation of development, growth, and responses to various environmental stresses in plants.

[Materials and Methods]

To investigate transcriptional expression of *GmCAMTAs*, total RNA was extracted and purified from soybean (*Glycine max*) plants using the trizol solution, according to the manufacturer's instructions. The qRT-PCR analysis was performed using a SYBR kit, and the relative gene expression levels were automatically calculated using the CFX384 real-time PCR detection system. The expression of *TUBULIN2* was used as the endogenous control. To test drought sensitivity, three-week-old plants grown in soil with sufficient water were not watered for 11 or 13 days. After re-watering, the recovery of the drought-treated plants was monitored. The drought experiments were repeated three times, using at least 12 plants from each line.

[Results and Discussion]

We identified and investigated roles of the 15 *CAMTA* homologous genes from soybean (*Glycine max*). The transcription of *GmCAMTA* genes exhibited distinct circadian regulation patterns under long-day conditions. The expression of *GmCAMTAs* were deferentially regulated in various organs and in response to various abiotic stresses, including drought, ABA, and NaCl. To investigate the biological functions of *GmCAMTAs*, we isolated *GmCAMTA2*, *8*, and *11* cDNAs from soybean and overexpressed in *Arabidopsis*, respectively. Then, the phenotypes of these *Arabidopsis* transgenic plants were investigated under various abiotic stress conditions. Among them, *35S::GmCAMTA2*-OX, *8*-OX, *12*-OX plants showed hypersensitivity to drought stress. These results suggested that *GmCAMTA2* functions as a negative regulator in drought stress responses of soybean.

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