OsABF1 Represses Gibberellin Biosynthesis to Regulate Plant Height and Seed Germination in Rice (Oryza sativa L.)

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Abstract

Gibberellins (GAs) are diterpenoid phytohormones regulating various aspects of plant growth and development, such as internode elongation and seed germination. Although the GA biosynthesis pathways have been identified, the transcriptional regulatory network of GA home□ostasis still remains elusive. Here, we report the functional characterization of a GA-inducible OsABF1 in GA biosynthesis underpinning plant height and seed germination. Overexpression of OsABF1 produced a typical GA-deficient phenotype with semi-dwarf and retarded seed germination. Meanwhile, the phenotypes could be rescued by exogenous GA3 , suggesting that OsABF1 is a key regulator of GA homeostasis. OsABF1 could directly suppress the transcription of green revolution gene SD1, thus reducing the endogenous GA level in rice. Moreover, OsABF1 interacts with and transcriptionally antagonizes to the polycomb repression complex component OsEMF2b, whose mutant showed as similar but more severe phenotype to OsABF1 overexpression lines. It is suggested that OsABF1 recruits RRC2-mediated H3K27me3 deposition on the SD1 promoter, thus epigenetically silencing SD1 to maintain the GA homeostasis for growth and seed germination. These findings shed new insight into the functions of OsABF1 and regulatory mechanism underlying GA homeostasis in rice.

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