

Up-regulation of OsBIHD1, a rice gene encoding BELL homeo-domain transcriptional factor, in disease resistance responses

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Abstract: In the present study, we cloned and identified a full-length cDNA of a rice gene, OsBIHD1, encoding a homeodomain type transcriptional factor. OsBIHD1 is predicted to encode a 642 amino acid protein and the deduced protein sequence of OsBIHD1 contains all conserved domains, a homeodomain, a BELL domain, a SKY box, and a VSLTLGL box, which are characteristics of the BELL type homeodomain proteins. The recombinant OsBIHD1 protein expressed in *Escherichia coli* bound to the TGTC motif that is the characteristic cis-element DNA sequence of the homeodomain transcriptional factors. Subcellular localization analysis revealed that the OsBIHD1 protein localized in the nucleus of the plant cells. The OsBIHD1 gene was mapped to chromosome 3 of the rice genome and is a single-copy gene with four exons and three introns. Northern blot analysis showed that expression of OsBIHD1 was activated upon treatment with benzothiadiazole (BTH), which is capable of inducing disease resistance. Expression of OsBIHD1 was also up-regulated rapidly during the first 6 h after inoculation with *Magnaporthe grisea* in BTH-treated rice seedlings and during the incompatible interaction between *M. grisea* and a resistant genotype. These results suggest that OsBIHD1 is a BELL type of homeodomain transcription factor present in the nucleus, whose induction is associated with resistance response in rice.

Author Keywords: benzothiadiazole (BTH); rice (*Oryza sativa* L.); homeodomain; disease resistance response; OsBIHD1; *magnaporthe grisea*

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