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Isolation And Molecular Characterization of OsRLK Genes In Rice

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Objectives

Plant receptor kinases are involved in the regulation of a wide range of processes such as development, disease resistance, perception and self-incompatability. We isolated and characterized a cDNA and BAC clone containing receptor- like protein kinase genes in rice. This study was performed to characterize the receptor-like protein kinase genes present in rice.

Materials and Methods

Materials : rice cDNA and BAC libraries
Sequencing : ABI 377
Sequence analysis : Phred/Phrap, DNAstar, Fgenesh software, BLASTX
Expression analysis : RT-PCR, Northern nybridization

Results and Discussion

Resistance gene analog cDNA clone OsRLK8 was isolated by screening Ilpoombyeo cDNA library using Q30 DNA fragment(128bp), which was isolated by mRNA differential display method, as a probe. This full-lenth cDNA was composed of 2092 nucleotides and 1854bp open reading frame. Translation of this open reading frame would produce a protein of 617 amino acids with a molecular mass of 68693Da. A search of current database with the predicted OsRLG8 protein sequence showed identity(56%) to Lr10, which is wheat leaf rust resistance gene, through the whole region of amino acid sequences. We also isolated a BAC clone(OSJNBa0010G19, GenBank Accession number AC091086) containing clustered OsRLK genes. Shot gun sequencing showed that the full length sequence of the BAC clone covers 167,020bp of telomeric region of short arm of rice chromosome 1. In total, 25 genes were identified. 17 genes were known to be receptor-like protein kinase(RLK) genes. The BAC clone also contained five polyprotein and three hypothetical protein coding genes. Database search and RT-PCR results showed that ten OsRLK genes were expressed at the transcription level. The expression of the OsRLK genes were upregulated or down regulated during salt and other stresses. The total sequence of the 167kb region revealed that an overall gene density of this BAC clone is one gene per 6.7kb. The physiological function of the OsRLK genes will be analyzed in the near future.

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