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MAP kinase cascade-mediated broad spectrum resistance in rice-blast fungus interactions

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Abstract

Mitogen-activated protein kinase (MAPK) cascade(s) is important for plant defense/stress responses. Though MAPKs have been identified and characterized in rice (*Oryza sativa* L.), a monocot cereal crop research model, the first upstream component of the kinase cascade, namely MAPK kinase kinase (MAPKKK) has not yet been identified. Here we report the functional analysis of a novel rice gene encoding a MAPKKK, *OsEDR1*, designated based on its homology with the Arabidopsis MAPKKK, *AtEDR1*. *OsEDR1*, a single copy gene in the genome of rice. Over-expression of *OsEDR1* cause lesion mimic type cell death response as well as increased resistance to rice blast pathogen, *Magnaporthe grisea* and bacterial blight *Xanthomonas oryzae* pv. *oryzae*. The cell death response was similar to HR response during incompatible interaction. These results suggest a role for *OsEDR1* as a positive regulator in defense signalling pathways and development.