# The Overexpression of Horsegram MURLK Improves Regulation of Cell Death and Defense Responses to Microbial Pathogens

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**Abstract :** Certain protein kinases have been shown to be crucial for plant cell signaling pathways associated with plant immune responses. Here we identified a horsegram [Macrotyloma uniflorum (Lam.) Verdc.] malectin-like leucine rich receptor-like protein kinase (RLK) gene MuRLK. The functional MuRLK protein preferentially binds to mannose and N-acetyl glucosamine residues. MuRLK exists in the cytoplasm and also localizes to the plasma membrane of plant cells via its N-terminus. Over-expression of MuRLK in Arabidopsis enhances the basal resistance to infection with Pseudomonas syringae pv. tomato, Alternaria brassicicola and Hyaloperonospora arabidopsidis, are associated with elevated ROS bursts, MAPK activation, thus ultimately leading to hypersensitive cell death. Moreover, salicylic acid-dependent and jasmonic acid-dependent defense responses are also enhanced in the MuRLK-overexpressed plants that lead to HR-induced cell death. Together, these results suggest that MuRLK plays a key role in the regulation of plant cell death, early and late defense responses after the recognition of microbial pathogens.

**Keywords :** horsegram, Pseudomonas syringae pv. tomato, MuRLK, ROS burst, cell death, plant defense
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