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The role of NOI-domain containing proteins in modulating PAMP- and effector- triggered immunity

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Plants have developed a multi-layered immune system that allows them to effectively fend off most infections. The first layer termed PAMP triggered immunity (PTI), responds to conserved microbial features while the second layer, known as effector triggered immunity (ETI), restricts bacterial ability to suppress PTI through the introduction of effector proteins into the host cell. In the model organism, *Arabidopsis thaliana*, the NOI containing protein RIN4 regulates both branches of the immune system. RIN4 negatively regulates PTI and suppresses the ectopic activation of RPS2 which activating an RPS2 dependent hypersensitive response, upon the introduction of the bacterial effector, AvrRpt2. Suppression of RPS2 activation requires RIN4 to be localized at the membrane via the palmitoylation of terminal cysteine residues while the presence of a conserved motif (VPKFG) in the NOI- domains of RIN4 is required for effector mediated activation of RPS2. In an attempt to find RIN4 like proteins in crop species, we carried out an *in silico* analysis using AtRIN4 as query. Our analysis revealed that apple, barley, potato, tomato, soybean, peach, rice and lettuce genomes contained RIN4 orthologs with high degree of sequence conservation in both NOI domains. Furthermore, the RIN4 cleavage site (VPKFG) within the NOI domains as well as the C-terminal cysteine residues important for suppressing RPS2 were also highly conserved in the orthologous proteins. On the basis of these findings we hypothesize that these crop species might also employ RIN4-like proteins for the regulation of PAMP and Effector triggered immune responses.

Biography

Ahmed Jawaad Afzal is an Associate Professor at the Department of Biology Lahore University of Management Sciences (LUMS). Plants employ multiple layers of immunity to guard against infection: The first layer responds to structures within conserved microbial molecules. The second layer responds to effector proteins, which are pathogen-encoded virulence factors. These two “branches” of the immune system synergize to provide robust host defense that halts most infections. His current work focuses on understanding the role of the multifunctional protein RIN4, which regulates both branches of the plant immune system.

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