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Molecular signaling in rice immunity

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We have been studying molecular signaling in rice immunity by studying the small GTPase OsRac1 and its interacting proteins by using a variety of methods. We have identified a number of OsRac1-interacting proteins and studied their functions and interactions with other proteins. We found that OsRac1 interacts with two types of receptors; membrane-bound receptor-like kinases and NB-LRR type receptors. OsRac1 forms a protein network with several chaperones and co-chaperones, SGT1, RAR1, Hsp90, Hsp70, and Hop/Sti1. The OsRac1 network includes enzymes such as NADPH oxidase and CCR which are important for immune responses. We revealed a pathway for chitin-induced immunity in rice. Based on genetic, protein-protein interaction, and biochemical studies we propose that OsRac1 is a "hub" of rice innate immunity where PTI and ETI pathways merge. We also propose that these proteins form complex termed 'defensome'. Based on the recent biochemical analysis we found PTI and ETI receptors form separate defensomes but contain the same chaperones in each defensome. Our results suggest that the defensome complex is a key regulatory system for rice immunity.