

Publication

Probing the Arabidopsis flagellin receptor : FLS2-FLS2 association and the contributions of specific domains to signaling function

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FLAGELLIN SENSING2 (FLS2) is a transmembrane receptor kinase that activates antimicrobial defense responses upon binding of bacterial flagellin or the flagellin-derived peptide flg22. We find that some Arabidopsis thaliana FLS2 is present in FLS2-FLS2 complexes before and after plant exposure to flg22. flg22 binding capability is not required for FLS2-FLS2 association. Cys pairs flank the extracellular leucine rich repeat (LRR) domain in FLS2 and many other LRR receptors, and we find that the Cys pair N-terminal to the FLS2 LRR is required for normal processing, stability, and function, possibly due to undescribed endoplasmic reticulum quality control mechanisms. By contrast, disruption of the membrane-proximal Cys pair does not block FLS2 function, instead increasing responsiveness to flg22, as indicated by a stronger oxidative burst. There was no evidence for intermolecular FLS2-FLS2 disulfide bridges. Truncated FLS2 containing only the intracellular domain associates with full-length FLS2 and exerts a dominant-negative effect on wild-type FLS2 function that is dependent on expression level but independent of the protein kinase capacity of the truncated protein. FLS2 is insensitive to disruption of multiple N-glycosylation sites, in contrast with the related receptor EF-Tu RECEPTOR that can be rendered nonfunctional by disruption of single glycosylation sites. These and additional findings more precisely define the molecular mechanisms of FLS2 receptor function.

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