

Publication

Tissue-specific FLAGELLIN-SENSING 2 (FLS2) expression in roots restores immune responses in Arabidopsis fls2 mutants

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The flagellin receptor of Arabidopsis, At-FLAGELLIN SENSING 2 (FLS2), has become a model for mechanistic and functional studies on plant immune receptors. Responses to flagellin or its active epitope flagellin 22 (flg22) have been extensively studied in Arabidopsis leaves. However, the perception of microbe-associated molecular patterns (MAMPs) and the immune responses in roots are poorly understood. Here, we show that isolated root tissue is able to induce pattern-triggered immunity (PTI) responses upon flg22 perception, in contrast to elf18 (the active epitope of elongation factor thermo unstable (EF-Tu)). Making use of fls2 mutant plants and tissue-specific promoters, we generated transgenic Arabidopsis lines expressing FLS2 only in certain root tissues. This allowed us to study the spatial requirements for flg22 responses in the root. Remarkably, the intensity of the immune responses did not always correlate with the expression level of the FLS2 receptor, but depended on the expressing tissue, supporting the idea that MAMP perception and sensitivity in different tissues contribute to a proper balance of defense responses according to the expected exposure to elicitors. In summary, we conclude that each investigated root tissue is able to perceive flg22 if FLS2 is present and that tissue identity is a major element of MAMP perception in roots.

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