

Title: Underground azelaic acid-conferred resistance to *Pseudomonas syringae* in *Arabidopsis*

Running title: Underground AZA-immunity against pathogens

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SUMMARY

Local interactions between individual plant organs and diverse microorganisms can lead to whole plant immunity via the mobilization of defense signals. One such signal is the plastid lipid-derived oxylipin azelaic acid (AZA). Arabidopsis lacking AZI1 or EARLI1, related lipid transfer family proteins, exhibit reduced AZA transport among leaves and cannot mount systemic immunity. AZA has been detected in roots as well as leaves. Therefore, the present study addresses the effects on plants of AZA application to roots. AZA, but not the structurally related suberic acid, inhibits root growth when directly in contact with roots. Treatment of roots with AZA also induces resistance to *Pseudomonas syringae* in aerial tissues. These effects of AZA on root growth and disease resistance depend at least partially on AZI1 and EARLI1. AZI1 in roots localizes to plastids, similar to its known location in leaves. Interestingly, kinases previously shown to modify AZI1 *in vitro*, MPK3/6, are also needed for AZA-induced root growth inhibition and above ground immunity. Finally, [²H]-AZA applied to the roots does not move to aerial tissues. Thus, AZA application to roots triggers systemic immunity through an AZI1/EARLI1/MPK3/MPK6-dependent pathway and AZA's effects may involve an additional mobile signal(s).