

RHIZOBACTERIA MODULATE DEVELOPMENT AND PATHOGEN RESISTANCE OF ARABIDOPSIS

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Pseudomonas not only harbors plant and human pathogenic species, but also accommodates beneficial species that promote plant growth. In this study, we investigated the effects of *P. fluorescens* strain SS101 on the development and pathogen resistance of *Arabidopsis thaliana*. In both soil and *in vitro* assays, the rhizobacterial strain *P. fluorescens* SS101 significantly increased root and shoot biomass of Arabidopsis. SS101-treated Arabidopsis seedlings showed enhanced shoot and root development, enhanced greening and a substantial increase in lateral root formation. Microscopic analysis of these seedlings revealed an increased number of root pericycle cells. To identify plant genes involved in the associative interaction between *P. fluorescens* and Arabidopsis, microarray analyses were performed to monitor changes in the root and leaf transcriptomes. The results showed 1179 and 920 differentially expressed genes in roots and leaves, respectively. Over-representation analysis showed that many of these genes are involved in lateral root formation, uni-dimensional cell growth, auxin response, cell wall modification, iron homeostasis and disease resistance. To identify the bacterial genes and traits involved in the interaction with Arabidopsis, 7488 random mutants of strain SS101 were screened for loss or reduced ability to induce lateral root formation or pathogen resistance. Preliminary results showed that nine mutants did not induce lateral root formation and 78 mutants lost or had a reduced ability to induce resistance to the bacterial pathogen *P. syringae*. Identification and functional analyses of these bacterial genes are in progress.