Dicer-like proteins influence Arabidopsis root microbiota

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Abstract

Plants host a variety of soil microbes on their roots. This root microbiome can affect plants in different ways, including the production of hormones to spur plant growth. In turn, plants also alter the root microbiome, which has been shown to be affected by plant genotype. But it's been unclear whether the root microbiome is influenced by plant epigenetic factors, which regulate the readouts of genetic information. In the model organism *Arabidopsis thaliana*, new DNA methylation, an important epigenetic mark, occurs through the RNA-directed DNA methylation (RdDM) pathway. So researchers decided to look for changes in the root microbiota among mutant *Arabidopsis* plants defective in the canonical RdDM pathway. In the *dcl234* triple mutant, which has defects in three Dicer-like proteins that produce small RNAs, the team found an altered microbiome composition. Mutations in other examined parts of the RdDM pathway, however, did not result in changes to the microbiome. This suggests that the Dicer-like proteins affect the root microbiome, but in an RdDM-independent manner. Subsequent analysis found that the *dcl234* mutant had altered gene expression in key plant-microbe interaction pathways. Taken together these results underscore the complexity of plant regulation of the root microbiota.