Genetic analysis of root-hair development in Arabidopsis

Summary / Zusammenfassung
An EMS-mutagenized Arabidopsis population (ecotype C24) was screen for root hair mutant phenotypes with similarity to the previously isolated lrx1 mutant, which is characterized by short, distorted, and frequently collapsed root hairs (Baumberger et al., 2001; Genes & Dev. 15, 1128 -39). Nine der (deformed root hairs) mutants were isolated and der1 revealed to encode ACTIN2, a major actin of Arabidopsis. der1 is affected in the site-selection of root hair emergence and in the tip-growth process, corroborating previously obtained evidence on the function of the actin cytoskeleton during root hair formation (Ringli et al., 2002; Plant Physiol. 129, 1464-1472). Microscopic characterization and double mutant analysis of the der2-9 mutants revealed that they are affected at different stages of root hair development. Furthermore, exogenous application of the phytohormones auxin and ethylene, both known to be involved in root hair formation, revealed that some der mutants do respond to these phytohormones whereas others are irresponsible. Our results demonstrate that the function of auxin and ethylene is not limited to cell differentiation and root hair elongation but that the two hormones are effective throughout the whole root hair developmental process. der (deformed root hairs) mutants were isolated from an EMS-mutagenized Arabidopsis population. The der1 mutant was cloned and revealed to encode ACTIN2, a major actin of Arabidopsis. der1 is affected in the site-selection of root hair emergence and in the tip-growth process, corroborating previously obtained evidence on the function of the actin cytoskeleton during root hair formation (Ringli et al., 2002; Plant Physiol. 129, 1464-1472). Microscopic characterization and double mutant analysis of the der2-9 mutants revealed that they are affected at different stages of root hair development. Furthermore, exogenous application of the phytohormones auxin and ethylene, both known to be involved in root hair formation, revealed that some der mutants do respond to these phytohormones whereas others are irresponsible. This effect is now investigated in more detail. Weitere Informationen unter http://www.uzh.ch/botinst/Molec_Website/bkeller_home.html

Publications / Publikationen


Keywords / Suchbegriffe
root-hair development, Arabidopsis, der mutants, Actin2

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