Periarbuscular membrane signalling promoting arbuscular INTRODUCTION Hector Montero Peter Eastmond, Uta Paszkowski Research, Harpenden, UK Peter Eastmond, Washington, Peter Eastmond, Peter Eastmond, Washington, Peter Eastmond, Peter Eastmond, Peter Eastmond, Washington, Washingt Arbuscular Receptor-Like Kinase 1 (ARK1) was recently shown to be a rice periarbuscular membrane specific signalling component of the arbuscular mycorrhizal symbiosis. Mutation of this protein reduces the fitness of the symbiotic fungus becoming unable to sustain effective spread although arbuscules develop normally. This defect can be recovered if mutant plants are grown alongside wild type plants suggesting that signals or nutrients are not properly delivered to the symbiotic fungus. Lipid dynamics potentially dependent on ARK1 and its close homolog ARK2 are thus being studied using confocal microscopy and analytical approaches. ARK1 and ARK2 lack an extracellular domain in monocots. Another related rice receptor-like kinase, Similar Protein to ARK1 (SPARK1), has an extracellular domain as ARKs do in other plant clades. Nutrients, cell wall derived components and fungal signals are all potential ligands. In rice*. ark1* phenotype can be plants. This suggest that nutrients or signals are not ark1 being properly delivered to the fungus in the mutant ARK2 is a close homolog of ARK1. ark2 mutants 10WPI have, like ark1, reduced colonization levels EN CELLINALLY CELLINAL OsARK1 PERIAR BUSCULAR SPACE KINASE DOMAIN OsARK2 SPARK1 ARK2 KINASE DOMAIN ARK1 Fatty acids in ark mutants MYC MOCK Nutrient ark1 ark2 ark1 ark2 exchange ■ 16:1 FA gFW-1 In rice, lipids are uniformly distributed in root cells. In both ark1 and ark2 mutants, lipids Lipid dynamics are altered in ark are arranged in small aggregates mutants in rice and Brachypodium ark1 ark2 WT 55 54 46 28 50 21 23 1 8 2 3 2 3 0 12 11 28 25 42 24 18 27 0 24 As shown by HPLC, fungal derived lipids (blue) correlate with extent of colonization, being lower in ark mutants. The quantity of plant lipids (red) does not change across genotypes suggesting Fluorophore conjugated Wheat production of plant lipids not being impaired in ark mutants. Germ Agglutinin (WGA) labels N-Studying lipid dynamics in Brachypodium ark1 mutant acetylglucosamine residues present in Brachypodium Lipophilic dye - WGA fungal cell walls WT WT MYC ark1 ark2 Ac-201 Dissecting the BdARK1 Ac-201, a composition of thalidomide different lipid analogue, is a blue species across fluorescent lipidtreatments and specific dye ark1 ark1 genotypes results in comparable MOCK signatures. ark mutants are thus unlikely to be Merged impaired in the production of The two certain lipid fluorophores are species compatible due to their differential excitation/emission Acknowledgments UNIVERSITY OF CAMBRIDGE and co-labelling was successful CAMBRIDGE TRUST