

E205Changes of Plasma Membrane H⁺-ATPase Activities and Protein Patterns in Cucumber and Pumpkin after Cold- or ABA-Treatment

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Alternation patterns of plasma membrane H⁺-ATPase activities of cucumber root and leaf tissues following cold or ABA treatment to root tissues were compared to those of pumpkin roots and leaves, and their plasma membrane protein compositions were analyzed by SDS-PAGE. Plasma membrane fractions were purified by Dextran-PEG partitioning method, and purity of plasma membrane preparations was checked by H⁺-ATPase sensitivity to vanadate. While the enzyme activities in roots and leaves of cold resistant pumpkins were recovered to or above the respective levels of control group after 6 days cold- or ABA-treatment, H⁺-ATPase activities of cold sensitive cucumber roots and leaves were remained to basal level even after 7 days cold- or ABA-treatment. Modifications of plasma membrane protein patterns after treatments were mainly identified in pumpkin root tissues, but not many in leaf tissues compared to control. In case of cucumber, more changes of plasma membrane proteins were detected in leaf tissue than in root tissue after treatments. (HRC-96-0302)

E206Effect of Phenolic Compounds on Pollen Germination of Flavonoid Mutants in *Arabidopsis thaliana*.

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Thousands of phenolic structures can be formed in higher plants. Phenolic compounds accumulate on the stigmatic surface that enhance the growth of pollen tubes, and are essential for pollen development. We have examined pollen germination of a flavonoid deficient chalcone synthase mutant (tt4) and a sinapate ester deficient mutant (fah1-7) of *Arabidopsis thaliana* in the solid medium to study the response of pollen germination and pollen tube growth to phenolic compounds. The germination and tube growth of pollen significantly differed in the medium that added caffeic acid, ferulic acid, kaempferol, and quercetin between the mutants and the wild type. The pollen germination of flavonoid mutants was increased on the medium added caffeic acid. The ferulic acid and quercetin inhibited pollen germination in fah1-7, and the quercetin inhibited pollen germination in wild type. *In vitro* pollen tube growth, the pollens of fah1-7 occurred more rapidly relative to those of tt4 in which the tubes were longer than in the wild type. Therefore, ferulic acid and quercetin were more effective than the other compounds in pollen germination. These results suggest that phenolic compounds may have an important physiological role on the pollen germination and pollen tube growth. In addition, these results explain why the *Arabidopsis* chalcone synthase mutant is not a male sterile.