

Title Isolation of Rh-TIP1;1, an aquaporin gene and its expression in rose flowers in response to ethylene and water deficit

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Abstract

Flower opening is a process that involves water uptake by petal cells, during which aquaporins serve as the channels for water transport across the cell membranes. In this study, we isolated a TIP type aquaporin gene, *Rh-TIP1;1*, from rose (*Rosa hybrida* cv. Samantha). The *Rh-TIP1;1* transcript is 1142 bp in length and encodes a deduced protein of 253 amino acids. Through a prokaryotic expression system, we obtained a predominant ~32 kDa protein band which is consistent with the predicted molecular weight of Rh-TIP1;1. *Rh-TIP1;1* was mainly expressed in petals among all floral tissues at the fully opened bud stage. Its expression was maintained at a high level during rapid flower opening, and decreased when the flowers were fully opened. Ethylene and water deficit both decreased the expression of *Rh-TIP1;1*. Flowers treated with 1-methylcyclopropene (1-MCP), an ethylene action inhibitor, maintained the transcript at a high level for longer than untreated controls. These results indicated that the effects of ethylene and water deficit on flower opening may be related to their influence on the expression of the *Rh-TIP1;1* gene.