

**Title** Towards prolonging the vase life of cut flowers by slowing their opening: analysis of genes involved in petal cell growth of carnation

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### Abstract

Flower opening in carnations (*Dianthus caryophyllus* L.) is the result of the enlargement of petal cells, which requires sugar metabolism and rearrangement of cell wall constituents. A cDNA encoding sucrose synthase (*DcSUS1*) was isolated from carnation petals as a candidate gene acting in the sugar metabolism in petal cells. *DcSUS1* transcripts accumulated abundantly and nearly constantly in petals of opening flowers. Moreover, four cDNAs encoding xyloglucanendotransglucosylase/hydrolase (XTH) (*DcXTH1-DcXTH4*) and three cDNAs encoding expansin (*DcEXPA1-DcEXPA3*) were cloned from petals of carnation flowers. Transcripts of XTH and expansin genes accumulated differently in tissues of opening carnation flowers, indicating regulated expression of these genes. *DcXTH2* and *DcXTH3* transcripts were detected in a large amount in petals as compared with other tissues. *DcEXPA1* and *DcEXPA2* transcripts were accumulated in petals of opening flowers. These findings suggested the involvement of expression of genes for sucrose synthase (*DcSUS1*), XTH (*DcXTH2* and 3) and expansin (*DcEXPA1* and 2) in petal cell growth during the opening of carnation flowers.