

Family of floral homeotic genes (MADS-box genes) expressed in early flower *Panax ginseng*

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In higher dicotyledonous plants, the floral organs are arranged in four different whorls, containing sepals, petals, stamens and carpels. The specification of floral organ identity is explained by the ABC model (Weigel and Meyerowitz 1994). Expression of an A-function gene specifies sepal formation in whorl 1, the combination of A- and B-function genes specifies the formation of petals in whorl 2, B- and C-function genes specify stamen formation in whorl 3, and expression of the C-function alone determines the formation of carpels in whorl 4. A-, B-, C-function genes have been isolated from many plant species and most of them belong to the family of MADS-box genes encoding transcription factor. In contrast to the flower of higher dicots, the perianths of ginseng plants have three whorls of almost identical petaloid organs. van Tunen et al. (1993) proposed a modified ABC model, exemplified with tulip. In this model, B-function genes are expressed in whorl 1 as well as whorl 2 and 3, therefore the organs of whorl 1 and whorl 2 have the same petaloid structure. They proposed this model with the morphological data of wild type and mutant flowers of tulip, however, there are no molecular data.

To date, B-function genes were isolated several grass plants, rice, wheat and maize. However, grass plants have highly derived flowers, without well-developed perianths. To find out how the ABC model has to be modified for the ginseng plants, we have cloned and characterized orthologs of A-, B-, C-function genes from ginseng.