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Chrysanthemum transformed with a cDNA for flavonoid 3',5'-hydroxylase produces flowers that change the color from red to yellow as they develop

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Objectives

In order to modify petal color of chrysanthemum cultivars, Petunia flavonoid 3',5'-hydroxylase (*F3',5'H*) gene was introduced into chrysanthemum by Agrobacterium-mediated genetic transformation.

Materials and Methods

1. Plant materials : Hypocotyl and cotyledon of Chrysanthemum (*Dendranthema grandiflora* T. cv. Fashion Scarlet Shadow) seeding
2. Methods : Genetic transformation, PCR, Southern blot analysis

Results and Discussion

After 72h of coculture, cotyledon and hypocotyl were placed on MS medium supplemented with 4 mg/L 6-benzyladenin, 0.1 mg/L α -naphthaleneacetic acid, 400 mg/L carbenicillin and 100 mg/L kanamycin. After 4 weeks of culture, kanamycin-resistant adventitious shoots were formed at frequencies of 77.8% and 58.3% on cotyledon and hypocotyl explants, respectively. Elongated shoots were rooted after an additional 4 weeks of culture on half-strength MS supplemented 0.1 mg/L NAA and were transferred to potting soil.

Integration of the *F3',5'H* gene into plant genome was confirmed by PCR and southern blot analysis. Genomic DNA from kanamycin-resistant adventitious shoots was digested with *Hind*III to release the fragment of *F3',5'H* for Southern hybridization. All of these plantlets showed a hybridization band with the *F3',5'H* probe, which suggested the insertion of a single copy or two copies. Approximately 10 cm high transgenic plants transplanted to potting soil were transferred to short day conditions to accelerate flowering. Transgenic plants produced flower buds with red petals as wild-type plants. However, the petals changed the color from red to yellow, as the buds developed to fully open flowers. The overall results suggest that the modification of petal color is related to a form of expression competition between the transgene *F3',5'H* and the endogenous genes related to anthocyanin biosynthesis.