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Transgenic Micro-Tomato Plants Showing Natural Flower Abscission by Introduction of Serine/threonine Protein Kinase Gene

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Objectives

We tried to analyze the relationship between flower (or fruit) abscission and serine/threonine protein kinase(SK) in transgenic micro-tomato by use of SK gene isolated from Fuji apple cultivar.

Materials and Methods

1. Material

Plant – Apple (Fuji cultivar), Micro-tomato, *Agrobacterium tumefaciens* LBA4404

2. Methods:

We isolated a cDNA encoding serine/threonine protein kinase from fuji fruit cDNA library and then constructed a vector for plant transformation. The transgenic micro-tomato plants were induced by *Agrobacterium*-mediated transformation.

Results and Discussion

A cDNA encoding serine/threonine protein kinase (FSK) was isolated from fuji fruit cDNA library. It is presumed that its deduced amino acid sequence contained two trans-membrane regions. In order to over-express FSK gene, we constructed a vector using pCAMBIA2300 vector as a backbone.

Eight transgenic micro-tomato lines were obtained by *Agrobacterium*-mediated transformation method. The transgenic micro-tomato plants showed normal shape and size of flower. However, we observed the abnormal phenotype including very low self-fertilization and natural flower (or fruit) abscission at the floral abscission zone after shedding of petal. Flowering time was late about 2 to 4 weeks than control tomato. Studies on the pollen shape and germination rate indicated that the abnormal phenotypes resulted from the reduction of pollen germination rate and abnormal shape. The result was supported by the phenomenon that the FSK-over-expressing tomato flower was pollinated with pollens from wild type. In summary, the natural abscission in transgenic tomato occurred by lower germination rate of pollens.