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Differentially expressed genes in Akane apple cultivar compared to Fuji

In-Jung Kim^{1,*}, Joonseon Yoon², Won-Il Chung², Oh-Sung Jeon¹

¹ Faculty of Biotechnology, Cheju National University, Jeju 690-756, Korea

² Department of Biological Sciences, Korea Advanced Institute of Science and Technology, 373-1, Kusong-dong, Yusong-gu, Taejon 305-701, Korea

Objectives

We want to isolate and analyze the differentially expressed genes in Akane apple cultivar in molecular levels by subtractive cDNA library construction.

Materials and Methods

1. Material

- Plant : *Malus domestica* cv. Akane, *Malus domestica* cv. Fuji
- PCR subtraction: PCR-Select cDNA Subtraction Kit (Clontech)

2. Methods

- Subtractive hybridization, Plasmid library construction, Electro-transformation, Dot blotting, Genomic library construction, Plaque hybridization, RT-PCR (Invitrogene)

Results and Discussion

Most of the domestic apple cultivars produce 5-6 fruits per cluster. To improve the fruit quality, annually a fruit farmer thins out the superfluous fruits, which result in increment of the cost of fruit production. In order to reduce labor cost, it is necessary to develop a new apple cultivar with fewer fruit number per cluster.

Akane cultivar has 2-3 fruits per cluster occurred by severe early-season fruit drop. Akane is a round, bright red apple with crisp, juicy, white flesh. Although Akane cultivar shows the drastic early-season fruit drop of secondary fruits, the central fruits, very strongly, hang on the tree long after it is fully ripe.

Through identification of genes involved in early-season lateral fruit drop, we expect to obtain the information in molecular level on the early-season fruit drop in Akane cultivar. We isolated three genes encoding serine/threonine protein kinase, phosphate transporter, and glycerol kinase. When the expression patterns of ASK, APT, and AGK were characterized, ASK and APT were up-regulated, and AGK down-regulated specifically in Akane lateral flowers compared to Akane central flowers and Fuji central and lateral flowers

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