1. Yoshikazu Tanaka

2. Delphinidin, Flower color, Pelargonidin

3. Horticulture and ornamental flowers (keynote)

4. Oral presentation

5. Yoshikazu Tanaka

6. Flower Color Modification by Engineering of the Flavonoid Biosynthetic Pathway.

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Flavonoids and particularly the colored flavonoid compounds anthocyanins are major contributors to flower color. Many plant species synthesize limited kinds of flavonoids, and thus exhibit a limited range of flower color. It is possible to alter anthocyanin compositions and flower color by over-expressing heterologous flavonoid biosynthetic genes and/or down- regulating endogenous flavonoid biosynthetic genes.

Transgenic torenia accumulating pelargonidin with pink flowers has been developed from blue/violet flowers accumulating delphinidin by down-regulation of endogenous flavonoid 3′,5′-hydroxylase (F3’5’H) and flavonoid 3 -hydroxylase (F3’H) genes and expression of rose or pelargonium dihydroflavonol 4-reductase(DFR) genes. The results of the field trial of these transgenic torenia lines will be presented (1). In violet *Nierembergia* accumulating delphinidin, over-expression of rose DFR gene and down-regulation of F3’5’H and flavonol synthase genes resulted in plants with pink flower accumulating pelargonidin.

Transgenic roses, carnations and chrysanthemums that accumulate delphinidin as a result of expressing a F3’5’H gene and have been developed. These transgenic plants have novel blue-hued flowers. To achieve significant flower color change, it was necessarry to optimize trangene expression and select the correct parental variety for transformation. The color modified rose (SUNTORY blue rose APPLAUSE) and carnations (Moon™ series) have been commercialized. This occurred after extensive regulatory examination, mainly from the viewpoint of possible effects on biodiversity (2).

(1) Tanaka et al. Biosci. Biotechnol. Biochem. 74: 1760–1769. (2010)
(2) Tanaka et al. Int. J. Mol. Sci. 10: 5350–5369. (2009)