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Isolation and Characterization of a Red Skin-preferential Anthocyanidin Synthase Gene, *MdANS*, from Apple

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Anthocyanins, the first colored compound in the anthocyanin pathway, are converted from leucoanthocyanidins by anthocyanidin synthase (ANS, leucoanthocyanidin dioxygenase) enzyme. A cDNA (*MdANS*) encoding ANS was cloned and characterized from apple (*Malus × domestica* Borkh. cv Fuji). *MdANS* contains an open reading frame of 357 amino acid residues which has more than 50% homology to ANS proteins from other species. *MdANS* mRNA was preferentially expressed in the red skins of fruits and light-inducible. The transcripts were highly expressed in red cultivars, but barely in a green cultivar after light exposure. Southern blot shows that *MdANS* gene exists as several copies in the genome. A genomic clone corresponding to the *MdANS* cDNA was isolated and analysed. It contains one intron and its promoter region has *cis*-elements found in the light-responsive genes and some flavonoid genes. The promoter region fused to β -glucuronidase (*GUS*) gene showed GUS staining in floral buds, petals, immature ovaries and seeds of transgenic tobacco plants.

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