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Ectopic overexpression of a novel R2R3-MYB, NtMYB2 from Chinese narcissus represses anthocyanin biosynthesis in tobacco

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R2R3 MYB transcription factors play key functions in the regulation of secondary metabolites. In the present study, a R2R3 MYB transcriptional factor NtMYB2 was identified from Chinese narcissus (Narcissus tazetta L. var. chinensis Roem) and functionally characterized. NtMYB2 belongs to subgroup 4 of the R2R3 MYB transcription factor family that is related to repressor MYBs involved in the regulation of anthocyanin and flavonoids. Transient expression confirmed that NtMYB2 strongly reduced the red pigmentation induced by MYB-anthocyanin activators in agro-infiltrated tobacco leaves. Ectopic expression of NtMYB2 in tobacco significantly reduced the pigmentation and altered the floral phenotypes in transgenic tobacco flowers. Gene expression analysis suggested that NtMYB2 repressed the transcript levels of structural genes involved in anthocyanin biosynthesis pathway, especially the UFGT gene. NtMYB2 gene is expressed in all examined narcissus tissues; the levels of transcription in petals and corona are higher than other tissues and the transcription level at the bud stage was highest. These results show that NtMYB2 is involved in the regulation of anthocyanin biosynthesis pathway and may act as a repressor by down regulating the transcripts of key enzyme genes in Chinese narcissus.

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