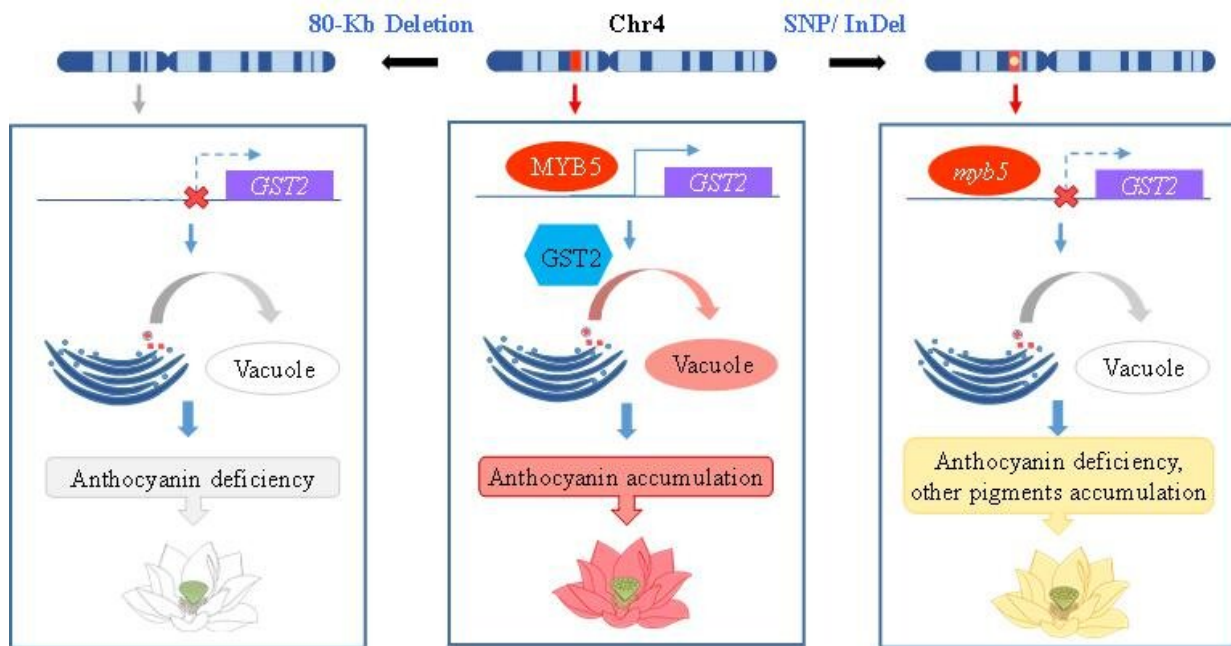


Researchers identify genetic mechanism that controls petal color in lotus

July 7 2023, by Zhang Nannan



Hypothetical model illustrating the genetic mechanism underlying petal color variation in *Nelumbo*. Credit: WBG

Lotus (*Nelumbo*) is a basal eudicot with agricultural and horticultural value. It is a worldwide aquatic ornamental belonging to the Nelmbonaceae family with only two species, *N. lutea* with yellow flowers and *N. nucifera* with red or white flowers. Although it is the most important trait in ornamental lotus, the genetic mechanism underlying the flower color difference in *Nelumbo* has not been fully

characterized.

Under the supervision of Prof. Yang Mei and Prof. Yang Dong from the Wuhan Botanical Garden of the Chinese Academy of Sciences, researchers identified NnMYB5 as the key gene controlling petal color in *N. nucifera* by quantitative trait locus mapping and bulked segregant analysis (BSA) sequencing.

This study was published in *Plant Physiology*, titled "Transcription factor NnMYB5 controls petal color by regulating GLUTATHIONE S-TRANSFERASE2 in *Nelumbo nucifera*."

Transcriptome analysis, dual-luciferase and yeast one-hybrid assays showed that NnMYB5 can directly activate the anthocyanin transporter gene GLUTATHIONE S-TRANSFERASE2 (NnGST2).

This study shows that an 80-kb deletion harboring NnMYB5 in the white petals of *N. nucifera* inactivates the expression of NnGST2, thereby blocking anthocyanin accumulation in the petals.

This causal mutation leading to anthocyanin deficiency in the white *N. nucifera* differs from that in *N. lutea*, which is caused by pseudogenicity of NnMYB5, indicating that two independent mutations on NnMYB5 control color variation among *Nelumbo* species.

The results provide new insights into the regulatory roles of NnMYB5 in enhancing anthocyanin accumulation in *N. nucifera* petals, and establish a regulatory link between NnMYB5 and the [anthocyanin](#) transporter NnGST2 gene in lotus.

In addition, it elucidates that two independent NnMYB5 mutations underlie flower coloration in *Nelumbo*.

More information: Juan Liu et al, Transcription factor NnMYB5 controls petal color by regulating GLUTATHIONE S-TRANSFERASE2 in *Nelumbo nucifera*, *Plant Physiology* (2023). [DOI: 10.1093/plphys/kiad363](https://doi.org/10.1093/plphys/kiad363)

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