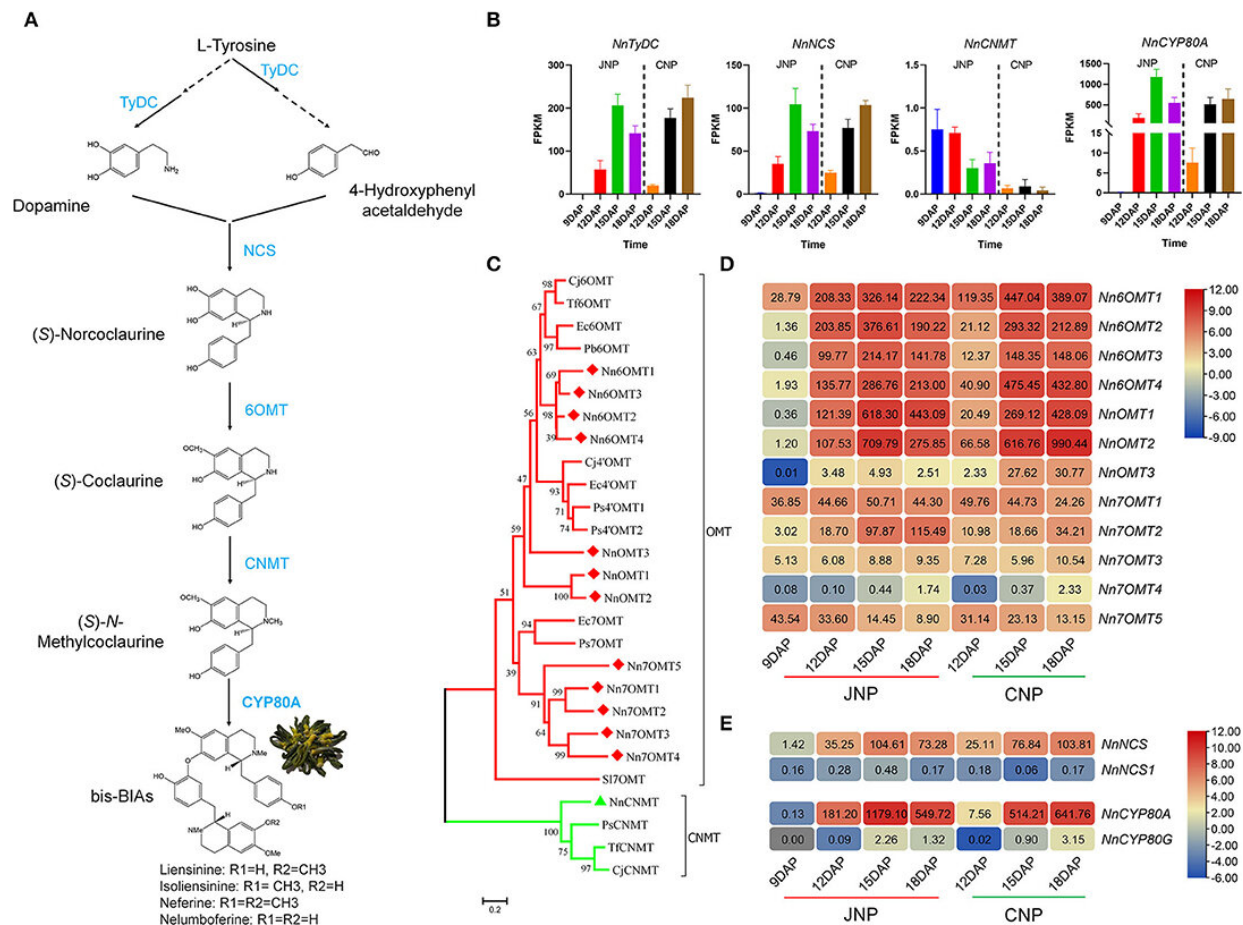


Study unveils alkaloids and chlorophyll biosynthesis in lotus plumule

August 17 2022, by Zhang Nannan



Identification and expression analysis of bis-BIAs biosynthesis genes. Credit: WBG

Bisbenzylisoquinoline alkaloids (bis-BIAs) and chlorophyll (Chl) are

predominantly accumulated in lotus plumule, which is a green tissue in the middle of seeds. Although bis-BIAs and Chl endow lotus plumule with important medicinal value and environmental adaptability respectively, the biosynthetic mechanisms of these two metabolites remain largely unknown in lotus.

A research team from the Wuhan Botanical Garden of the Chinese Academy of Sciences used RNA sequencing technology to reveal the development and molecular mechanisms of bis-BIAs and Chl biosynthesis in lotus plumule.

Lotus plumule accumulated liensinine, isoliensinine, and neferine, with neferine as the most dominant bis-BIA. A total of 16 structural genes potentially involved in bis-BIAs biosynthesis were identified in the lotus plumule. Of these, 12 differentially expressed O-methyltransferases genes were likely involved in the methylation and bis-BIAs diversity in lotus.

In addition, some BIAs biosynthesis gene pairs showed functional redundancy and divergence between paralogous members in lotus.

Rapid biosynthesis and accumulation of Chl was detected from 12 to 21 days after pollination, which was consistent with the observed change in plumule color. 22 [genes](#) encoding 16 conserved enzymes of the Chl biosynthesis pathway were identified, with the majority being significantly upregulated by Chl biosynthesis.

Besides, light-driven Pchlide reduction was essential for Chl biosynthesis in lotus plumule. Notably, photosynthesis and Chl biosynthesis pathways were simultaneously activated during lotus plumule development.

This study also reveals the potential connections between bis-BIAs and Chl biosynthesis pathways in [lotus](#) plumule. These results will be useful

for enhancing our understanding of alkaloids and Chl biosynthesis in plants.

This study, titled "Transcriptome-Wide Characterization of Alkaloids and Chlorophyll Biosynthesis in Lotus Plumule," has been published in *Frontiers in Plant Science*.

More information: Heng Sun et al, Transcriptome-Wide Characterization of Alkaloids and Chlorophyll Biosynthesis in Lotus Plumule, *Frontiers in Plant Science* (2022). [DOI: 10.3389/fpls.2022.885503](https://doi.org/10.3389/fpls.2022.885503)

Provided by Chinese Academy of Sciences

Citation: Study unveils alkaloids and chlorophyll biosynthesis in lotus plumule (2022, August 17) retrieved 20 July 2024 from <https://phys.org/news/2022-08-unveils-alkaloids-chlorophyll-biosynthesis-lotus.html>

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