

Supplementary Information

Article title: SIHB8 is a Novel Factor in Enhancing Cold Resistance in Tomato Anthers by Modulating Tapetal Cell Death

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The following Supporting Information is available for this article:

Figure S1–S4

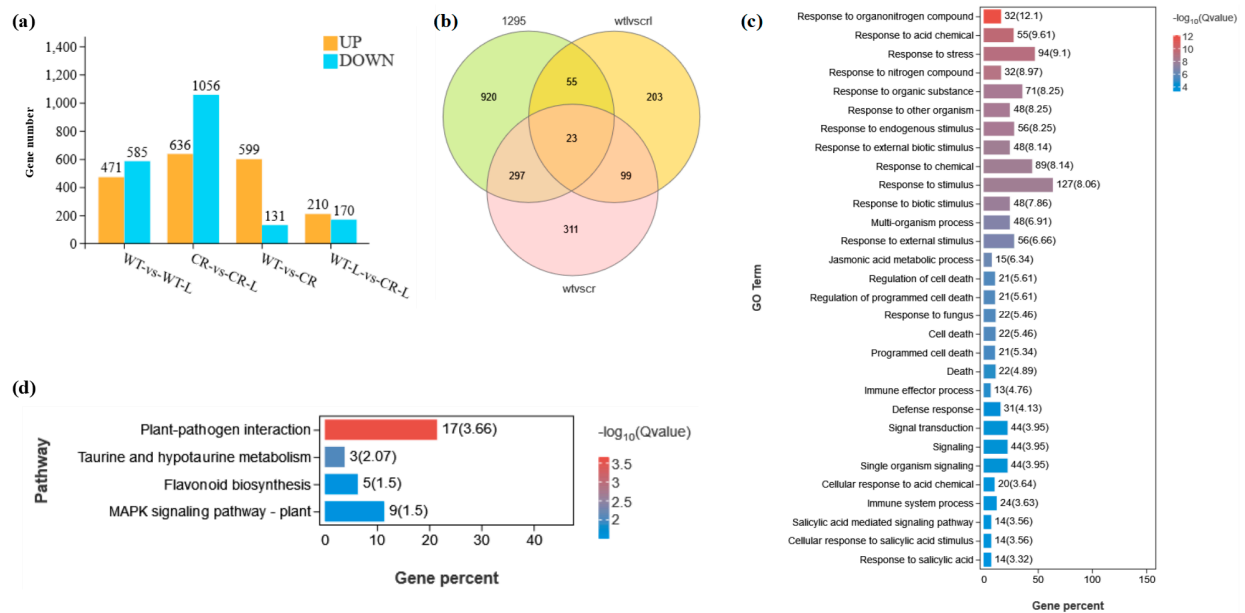


Figure S1. Identification of differentially expressed genes (DEGs) in wild-type and *slhb8* anthers under normal and cold treatment by RNA-seq.

a DEGs among wild-type and *hb8* anthers at the tetrad stage under normal and cold conditions. **b** Venn diagram analysis of genes that specifically differentially expressed in *hb8* (1253+42=1295) were simultaneously differentially expressed between wild type and *hb8* mutant under normal and cold treatment (297+32+55=375). **c** GO analysis of 375 DEGs; **d**. KEGG pathway analysis of the 375 DEGs. The *hb8* mutant was *SlHB8-cr3*.

GATCATTGAAATTAGAACACTTCGTAACACACTATTAGGTGATCTCTTCTTATTTTTTATAACAGTGATATCTAGACTAATTAATACACACATTAATTAATGTACCAAGGGCTTGATC
ATCTCAAAATTTTGTGCACACCAACAATCCAAATACCTTTCCCTTCTAAAACTACCTTGGGGTGTAACAATAAAATCCTTGCAATTCACATACTTGGCATTTCGAAGTGAGAATGTAGATTAT
GCAAAATTTTGCAAAACATTATTAATCTCTTAATACATAAAATGCAAGGATACCAACATCTAATTTATACAAGTCCAGCACCAGCATCCTTTTAAATGTTTAGATCCTCCAATTGATTGAATG
TCAACAGTGAAAATGAACATACCTTAACCTAAGTGCAACAAGCTAAATTTTTGTATAGAGTATATATCCGACCATTCCCTAAACCCCTTCATCACTTCACCTAGCTCAAGTAAACAATCAAA
TCACGTAGCTGAAAGAAGTATGTATGCTAAGGCAAGGAAAGTTCATTCCGAAAGCTCTTATAAGACTGAGCCAACCTAACCCAGTTCTCTCGCAGTTTCAATCTTAGAATGCTCAACCAACAA
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CATAGCCACAAATTTTCAGCTTCAGAAAACCTTTTTCTTCATAAAATGCGGTTAATGACGTGTTACAAGTGACAATATTCCGCTTAATCCCATGATTTTCAATCTCATCCATCAAAATACAC
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CTCTGATTTAAGATATGCTTCCAGTAGGGCATTGAAGGAAAAGACAGTGC GCGGACAATTTAGGTGAGGCATTTGGTC AACAGCTTACGTGCACGATGATCCATTTTCGCTCTGCCATAGAG
AAGAATAAGACGGGCAACAAGGCTTCGTTACGAATATCAGGATACCTTTTTTTGATGTTCAATGATATCTATAATGCCGGATTGTGTTTGGCTTCGGTAAGTTGGTGAATGGCGATTTCAT
AATGGAAGCGCGATTACGTGCGAATTTGGGGCATTCCGATGATTTTGGAAAGAGTCTACCATTGCTTGGGCTCGATCGGTGGGCTTGAACAAGTAATGATCTGATTTATTGCTCTTTCAT
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ATTTATAACAATATTCTCTTTTAAATGGTAGTAATTAGGTGTGCTAAA

Figure S2. The promoter sequence of *SIDYT1*.

The nucleotide in red represents the SLHB8 binding site.

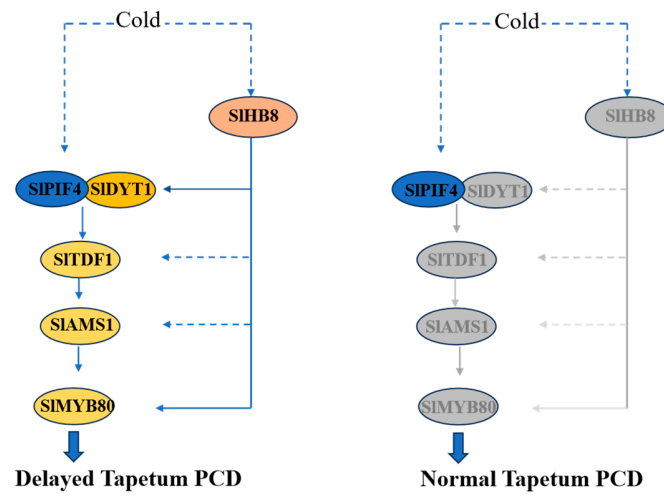


Figure S3. The working model of SIHB8 in regulating tapetum PCD under cold conditions.

Under cold treatment, in wild-type anthers, the increased *SIHB8* expression induces the *SIDYT1* transcripts, which forms a dimer with SIPIF4. This dimer activates the downstream regulators *SITDF1*, *SIAMS*, and *SIMYB80*, thereby leading to a delay in tapetum degradation and subsequent pollen abortion; however, in *slhb8* mutants, cold exposure does not result in an increase in *SIDYT1* expression, leading to an unsuccessful increase of *SITDF1*, *SIAMS*, and *SIMYB80*. This lack of increase inhibited the delayed tapetal PCD under cold stress.

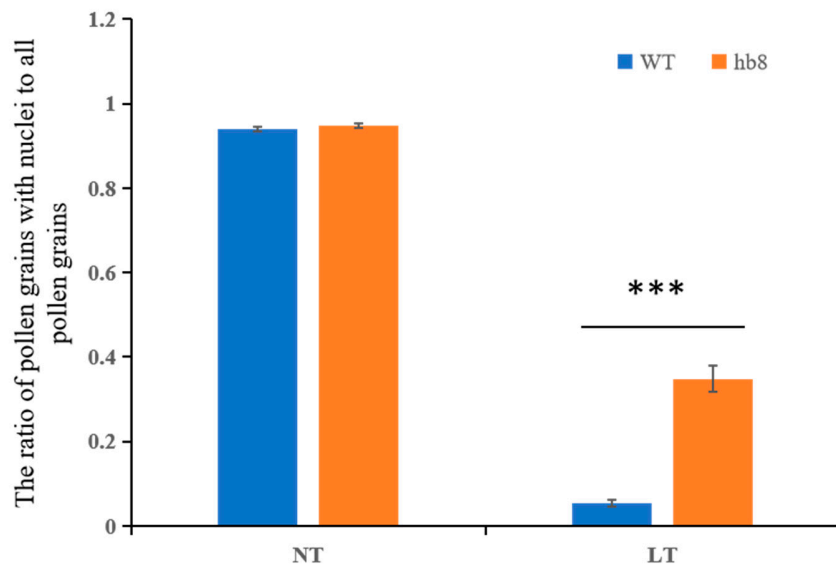


Figure S4. The ration of pollen grains with nuclei to all pollen grains.

NT: normal temperature; LT: low temperature; *hb8*: SlHB8-cr3; The error bars denote SE; *** $P < 0.001$ (Student's t-test; compared with the WT)