- 1 Supplementary Fig. S1
- 2 qRT-PCR analysis of MdMIEL1 expression in the transgenic apple calli (A) and
- 3 transgenic Arabidopsis (**B**).



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## 8 Supplementary Fig.S2

9 The empty vectors do not influence the expression of anthocyanins biosynthetic 10 genes.

11 (A-C) Anthocyanins contents in the transgenic calli (35S:GFP and 35S:Flag) and the 12 wild-type control (WT) grown on medium before and after high-light and low-

13 temperature treatments. The anthocyanins content of WT is set as control. (D)

14 Relative expression levels of *MdMIEL1*, *MdMYB1*, *MdDFR*, *MdUF3GT*, *MdF3H*,

15 MdCHI, MdCHS, and MdANR in the transgenic calli and the wild-type control after

16 high-light and low-temperature treatment. The value for WT is set to 1.



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- 19

## 20 Supplementary Fig. S3

MdMIEL1 regulates ROS production in transgenic apple calli and *Arabidopsis* root.

23 (A)  $O_2^-$  accumulation in the wild-type (WT) and transgenic apple calli (MdMIEL1-24 OX and MdMIEL1-Anti) by histochemical staining with nitro blue tetrazolium (NBT). 25 (B)  $O_2^-$  accumulation in the leaves of wild-type (Col-0) and transgenic plants (#1, #7 26 and #8) by histochemical staining with nitro blue tetrazolium (NBT). (C) Seedlings 27 were treated with H<sub>2</sub>DCF-DA to monitor ROS levels. ROS levels in Col-0 and 28 MdMIEL1#1 primary roots. The Col-0 ROS image was acquired by autoexposure, 29 and MdMIEL1 transgenic plants ROS images were acquired using the Col-0 exposure 30 condition (Scale bar = 100 um). (D) Average primary root ROS intensity was 31 quantified for Col-0 and MdMIEL1 transgenic Arabidopsis.



- 33 34 35
- Supplementary Fig. S4
- MdMIEL1 is not able to interact with MdbHLH3 in yeast two-hybrid assays.

