Figure S1: Western-blot analysis of OR protein levels in leaves of \textit{AtOR}^{wt} (a) and \textit{AtOR}^{His} (b) T0 transgenic tomato lines. A total of 20 $\mu$g proteins were loaded for each sample. The numbers above gels indicate independent transgenic lines.
Figure S2 OR expression and carotenoid levels in leaves of M82 and the AtOR T1 transgenic plants. (a) qRT-PCR analysis of the OR gene expression in leaves of 4-week old plants. (b) Western-blot analysis of the OR protein levels in leaves of 4-week old plants. Actin shows protein loading. (c) Total carotenoid levels and composition in leaves of 4-week old plants. Data are the means of three biological replicates ± SD. * $P < 0.05$. FW, fresh weight.
Figure S3  Venn diagram analyses of RNA-Seq data. (a) Venn diagrams showing the number of unique and common DEGs between AtOR\textsuperscript{WT} vs M82 and AtOR\textsuperscript{His} vs M82 at various fruit developmental stages. (b) Venn diagrams showing the number of unique and common DEGs for AtOR\textsuperscript{WT} and AtOR\textsuperscript{His} lines at early (7, 17, 27 DPA) and late (MG, B, O, R) fruit developmental stages. (c) Venn diagrams showing the number of unique and common DEGs between AtOR\textsuperscript{WT} and AtOR\textsuperscript{His} lines at early (7, 17, 27 DPA) and late (MG, B, O, R) fruit developmental stages. The expression ratio of >3 and adjusted $P < 0.01$ were used for the analyses. DPA, days post-anthesis; MG, mature green; B, breaker; O, orange; R, red.
Figure S4 MapMan analysis of the common DEGs at 3 early (A) and 4 late (B) fruit developmental stages of ORWT vs M82 and ORHis vs M82. 3DAP, three early stages at 7, 17, and 27 days post-anthesis; 4MS, four mature stages at mature green, breakers, orange, and red
**Figure S5** Expression of carotenoid metabolic pathway genes during tomato fruit ripening in M82, *AtOR<sup>WT</sup>* and *AtOR<sup>His</sup>* lines. Heatmaps show the average RPKM of three biological repeats at each fruit developmental stage. The gene IDs are GGPS (Solyc09g008920); PSY1 (Solyc03g031860); OR (Solyc03g093830); DXS (Solyc01g067890); DXR (Solyc03g114340); PDS (Solyc03g123760); ZDS (Solyc01g097810); CrトISO (Solyc12g098710); LYC-e (Solyc12g008980); LYC-b (Solyc04g040190); BCH1 (Solyc06g036260); BCH2 (Solyc03g007960); β-ΟΗασε1 (Solyc03g007960); VDE (Solyc04g050930); ZEP (Solyc02g090890); NCED (Solyc08g016720); CCD1 (Solyc01g087250); and CCD4 (Solyc08g075490).
Figure S6 MapMan analysis of the DEGs between AtOR\textsuperscript{His} 20 and AtOR\textsuperscript{WT} 21b lines at each fruit developmental stages. DPA, days post-anthesis; MG, mature green; B, breakers; O, orange; R, red stage
Figure S7 MapMan analysis of the common DEGs at 3 early (A) and 4 late (B) fruit developmental stages between $AtOR^{His}$ 20 and $AtOR^{WT}$ 21b lines. 3DAP, three early stages at 7, 17, and 27 days post-anthesis; 4MS, four mature stages at mature green, breakers, orange, and red