

**Title:**

Overexpression of *SIUPA-like* induces cell enlargement, aberrant development and low stress tolerance through phytohormonal pathway in tomato

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## Supplementary Information

**Table S1.** Statistical analysis of putative binding sites for bHLH transcription factor in the promoters of related genes

Genes	the number of CANNTG motifs	the number of CACGTG motifs	Chromosomes
<i>SIGID1-A</i>	3	1	9
<i>SIGID1-B</i>	2	0	6
<i>SIGID1-C</i>	2	2	1
<i>SIGAST1</i>	6	0	2
<i>SIPRE1</i>	8	1	2
<i>SIPRE2</i>	3	0	2
<i>SIPRE3</i>	8	0	6
<i>SIPRE4</i>	6	0	5
<i>SIPRE5</i>	9	0	4
<i>SIJAZ2</i>	2	0	12
<i>SIJAZ9</i>	3	1	8
<i>SIJAZ10</i>	8	1	8
<i>SIJAZ11</i>	6	1	8

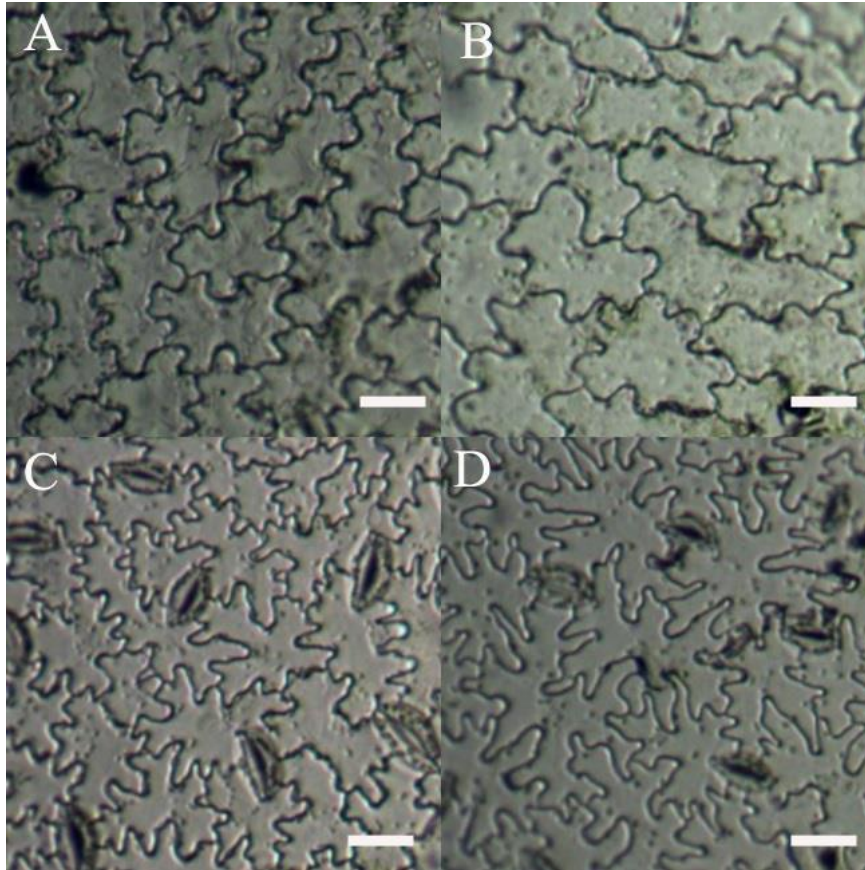
**Table S2.** PCR primers used in this study

Primer names	Sequences (5' → 3')
<i>qSICAC-F</i>	CCTCCGTTGTGATGTAAGTGG
<i>qSICAC-R</i>	ATTGGTGGAAAGTAACATCATCG
oligo(dT)	GCTGTCAACGATACGCTACGT AACGGCATGACAGTGTTTTTTTTTTTTTTTTTTTT
<i>qNPTII-F</i>	GACAATCGGCTGCTCTGA
<i>qNPTII-R</i>	AACTCCAGCATGAGATCC
<i>SIUPA-like-F</i>	CGCGGATCCATGGCTGCTTTTTCATCACACC
<i>SIUPA-like-R</i>	CCGGAATTCTTAATGGAAAGAACAAAAGTTGTTGC
<i>dT-R</i>	GCTGTCAACGATACGCTACGT AACG
<i>qSIUPA-like-F</i>	GGGTCTTCTTCTATGACTTCTGCT
<i>qSIUPA-like-R</i>	TTTCATCTTTGGCTACTAACTTGC
<i>qSIEF1<math>\alpha</math>-F</i>	TACTGGTGGTTTTGAAGCTG
<i>qSIEF1<math>\alpha</math>-R</i>	AACTTCCTTCACGATTTTCATCATA
<i>qGA20ox1-F</i>	TTCTCAAATTGGCTTCATGATCAA
<i>qGA20ox1-R</i>	TTCCCCCTAATTCCCATAACAT
<i>qGA20ox2-F</i>	TAAGAAGGAT AAGGTGGTGAGGC
<i>qGA20ox2-R</i>	CCGTAGTTTTCTGTTGAAGCCA
<i>qGA3ox1-F</i>	ATAGGCACCCACCCTTGTATA
<i>qGA3ox1-R</i>	GGATGAAAGTGCCTTGTCAAAT
<i>qGA3ox2-F</i>	GTAGACCAAAGGAACCCTCAAAT
<i>qGA3ox2-R</i>	GCCGAACAGATGAAAGTGCT
<i>qGA2ox1-F</i>	ATTAAGATCCAATAACACTTCG
<i>qGA2ox1-R</i>	TCTTGATTTACACTATTTGC
<i>qGAST1-F</i>	CAACAACAGAGAAATAACCAAC
<i>qGAST1-R</i>	TTATACGATGTCTTTGAACACC
<i>qSIPRE1-F</i>	CGAAAGAACGAAAAGAGAGACATT
<i>qSIPRE1-R</i>	GCTAGAGCGACGATTGCGAA
<i>qSIPRE2-F</i>	TATGTCTGGGAGAAGGTCAAGGA
<i>qSIPRE2-R</i>	CGACGATTACGAATTTAGGAAG
<i>qSIPRE3-F</i>	TTCACACTCTCCATAGCAACACAT
<i>qSIPRE3-R</i>	TCCCTACTTATCCTTGATCCTCC
<i>qSIPRE4-F</i>	ATCAAATCGCTGATCTTGTTC
<i>qSIPRE4-R</i>	CACTTAATCCATCCACTTCTCTGTGTA
<i>qSIPRE5-F</i>	CCTTCTCTCTTTGTCCATAACTTGTC
<i>qSIPRE5-R</i>	CCTGATGATTGTCTCGAACCG
<i>qSIExPA8-F</i>	CTGATTTGTTAAATGTTTCGGTGA
<i>qSIExPA8-R</i>	AAGAATGATTCTTTTTTTGGGGA
<i>qKRP1-F</i>	GCGGTGATGGTGGGTTCGTAT
<i>qKRP1-R</i>	CGTCCTTAACACCCTTTCCCTC
<i>qKRP2-F</i>	TTCACAAACCACCCACCCC
<i>qKRP2-R</i>	TGACCATTTTCGTCCACCTCC
<i>qKRP3-F</i>	GGCTGGAGAAACCCTTGG
<i>qKRP3-R</i>	CCCTCAAACCTCCGATTCTGTC

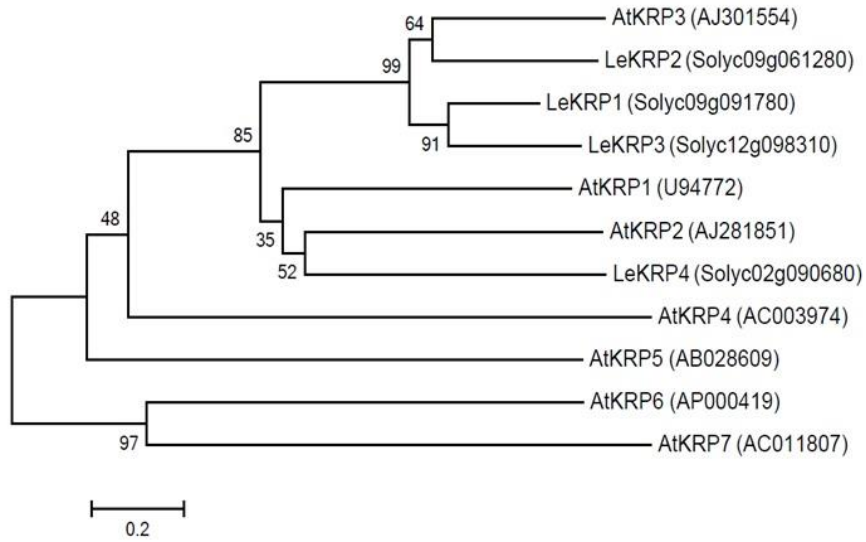
<i>qKRP4-F</i>	CACAAGGAAGAGGAAGAAGCG
<i>qKRP4-R</i>	CCAAAACCAGATGCTGAAACG
<i>CycA3;1-F</i>	CTAAGAAAAGAGCAGCAGAAGCA
<i>CycA3;1-R</i>	GATTCCTTATCTTTTTTCAGCAACAG
<i>CycB1;1-F</i>	GTATCTCGCCCCGTAACAAG
<i>CycB1;1-R</i>	TCTCCTCAGGTTTTGGCTTT
<i>CycD2;1-F</i>	CTGCCAAAGCCTCAAGCG
<i>CycD2;1-R</i>	CAGTGGAGCTAGTGTCATTTCGC
<i>qSlJAZ2-F</i>	TAGCCAACAAACAGAACCCCA
<i>qSlJAZ2-R</i>	AAGTGAATTCCGTCTCGCGAT
<i>qSlJAZ10-F</i>	GGAACACTCTTTCTCCTAGCAAC
<i>qSlJAZ10-R</i>	TGGTGATGAAGGCTCAGACAGCTT
<i>qSlJAZ11-F</i>	GGAGTTTAGGCTTATGCCACCTTC
<i>qSlJAZ11-R</i>	GGCTCAGATATTGGTGACAGACTC
<i>qSlGID1-A-F</i>	GCGGTGTTGTTGAATGAGAATC
<i>qSlGID1-A-R</i>	GTCTTGTGCAGATCAGCTCCC
<i>qSlGID1-B-F</i>	GGTGTTTATTCATTTGATGTTGTTG
<i>qSlGID1-B-R</i>	AGAATGTGTTCGTAAATAGCACTGTT
<i>qSlGID1-C-F</i>	GCCTACTTAGCCGTGTCTATCG
<i>qSlGID1-C-R</i>	AGTGTGCAAACTTCCACCATG
<i>SlUPA-like-F</i>	GGGTCTTCTTCTATGACTTCTGCT
<i>SlUPA-like-R</i>	TTTCATCTTTGGCTACTAACTTGC
<i>qSlPI-I-F</i>	CTTCTTGCAACTTCCTTTG
<i>qSlPI-I-R</i>	TGTTTTTCCTTCGCACATC
<i>qSlPI-II-F</i>	ATGCTTGCACCTTTAATTGTGATC
<i>qSlPI-II-R</i>	TAATAGCAACCCTTGTACCCTGTG
<i>qSlNCED1-F</i>	CCCGATTTGGTATTCTGGATAAGTA
<i>qSlNCED1-R</i>	GAGACGGATTTCGGATAAAACACT
<i>qSnRK2.3-F</i>	ATCATTACCTCACTGGAAGCTTGGAC
<i>qSnRK2.3-R</i>	AAACAGTGGATACCAAAAGATCGCC
<i>CAT1-F</i>	AAATGGGTTGAGTCTTTATCCGA
<i>CAT1-R</i>	TCATTGATTTTTTACATTGTAGGCT
<i>GME2-F</i>	CCATCACATTCCAGGACCAGA
<i>GME2-R</i>	CGTAATCCTCAACCCATCCTTC
<i>LEA-F</i>	TATTGGTAAAGATTGGGACATTGA
<i>LEA-R</i>	TGTCTTCTTGTTTGTACCCGTTTC
<i>Xcc-F</i>	TGCCTACCGAGAAATCCC

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**Figure S1 | Adaxial and abaxial pavement cell of leaves were detected by hand-sliced method and magnification was 40×** The adaxial epidermal cell of AC<sup>++</sup> (A) and *SIUPA-L-OE* lines (B). The abaxial epidermal cell of AC<sup>++</sup> (C) and *SIUPA-L-OE* lines (D).



**Figure S2 | Phylogenetic analysis of *KRPs* in tomato and Arabidopsis.**



**Figure S3 | The leaf veins displayed different phenotypes in control and *SIUPA-L*-OE lines.**

The phenotypes of leaf vein from  $AC^{++}$  (A) and of transgenic lines (B). Their magnification was  $40\times$ . (C). The phenotypes of leaf vein of  $AC^{++}$  and the magnification was  $80\times$ . PM, Phloem; XM, Xylem; PT, Palisade Tissues; ST, Spongy Tissues; PC, Parenchyma Cells.

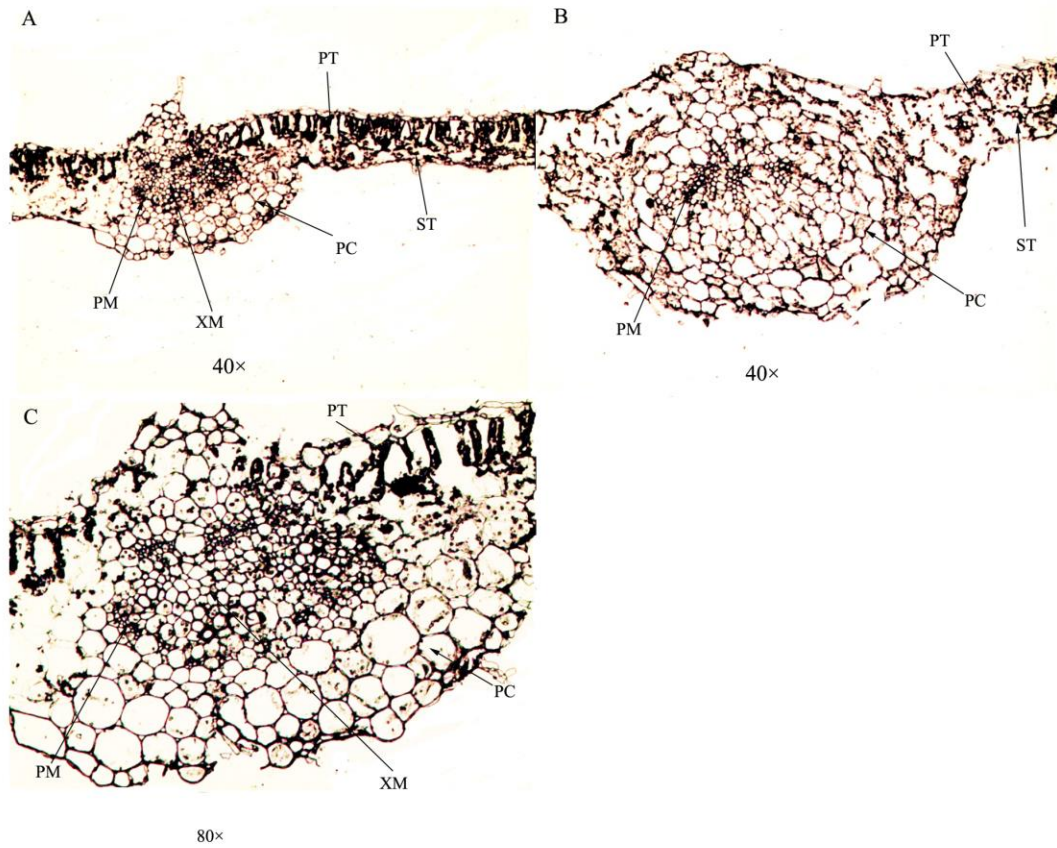
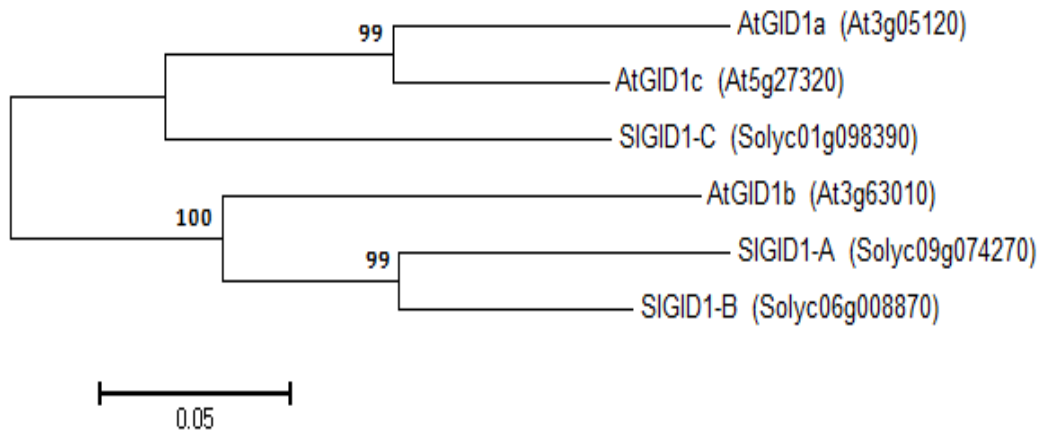


Figure S4 | The auxiliary buds further from apex of plants was repressed in *SIUPA-L-OE* lines.

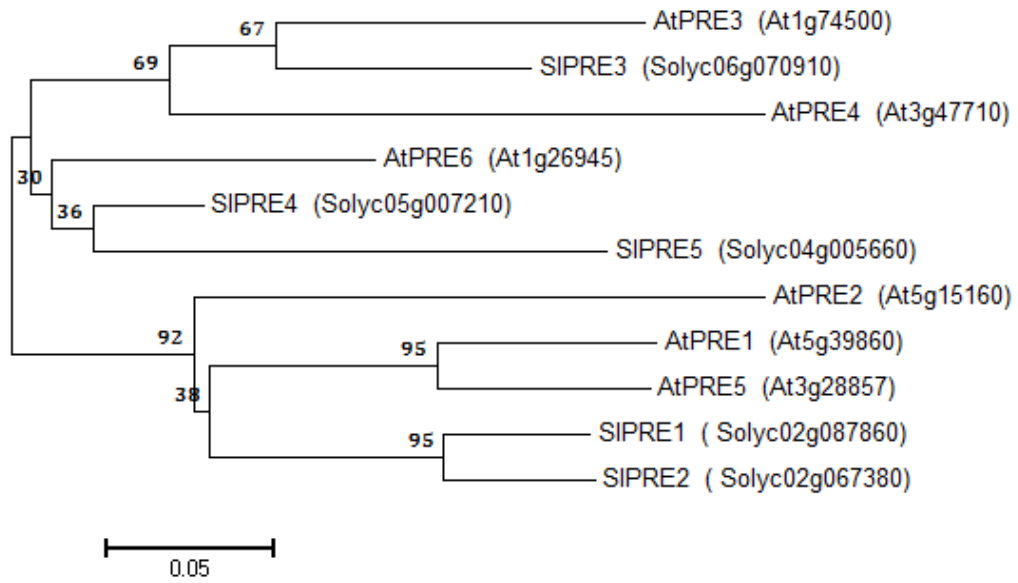




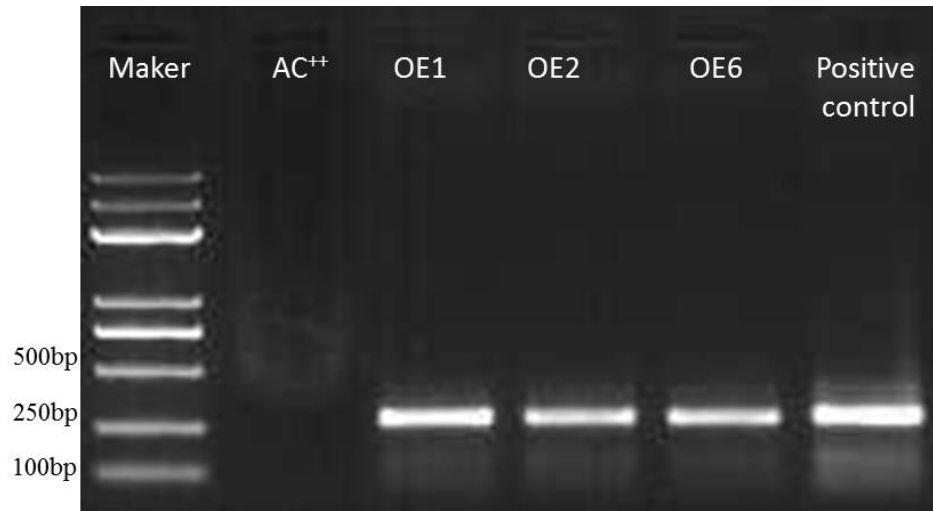
**Figure S5 | Phylogenetic analysis of *GID1s* genes in Arabidopsis and tomato.**



**Figure S6 | Phylogenetic analysis of *PREs* genes in Arabidopsis and tomato.**



**Figure S7 | Detection of PCR products of *Xcc* genomes after 8 days post-inoculation by agarose gel electrophoresis.**



**Figure S8 |  $AC^{++}$  and *SIUPA-L-OE1* showed sick phenotypes when exposed to disease plants after 10 days.** The phenotypes of  $AC^{++}$  not exposed to disease plants (A) and exposed to disease plants (B) for 10 days. The phenotypes of *SIUPA-L-OE1* not exposed to disease plants (C) and exposed to disease plants (D) for 10 days.

