

Supplementary Material

Aquaporin AtTIP5;1 as an essential target of gibberellins promotes hypocotyl cell elongation in *Arabidopsis thaliana* under excess boron stress

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Table S1. Primers used to identify homozygous T-DNA insertion lines by PCR

Primer name	Sequence (5'-3')
<i>m1</i> LP	ACCAAACAAAACGAAGCACAC
<i>m1</i> RP	TGAGGTTGATGGGAATTTTCAG
<i>m2</i> LP	CATACGTGGGGGACATTTATG
<i>m2</i> RP	TACAGGGACCACCACGTTATC

Table S2. Primers used for reverse transcription-PCR

Primer name	Sequence (5'-3')
<i>AtTIP5;1</i> LP	CGTCATGGAACAGCACGTACCGAT
<i>AtTIP5;1</i> RP	CCACTGCTAAAGGTAGCCCACGTCT
<i>Actin 2</i> LP	TGTGCCAATCTACGAGGGTT'
<i>Actin 2</i> RP	TCATTCGTGCGTGATGCCAA

Table S3. Primers used for quantitative real time-PCR

Primer name	Sequence (5'-3')
<i>AtTIP5;1</i> QLP	CGTCATGGAACAGCACGTACCGAT
<i>AtTIP5;1</i> QRP	CCACTGCTAAAGGTAGCCCACGTCT
<i>Actin 2</i> QLP	ATTACCCGATGGGCAAGTCA
<i>Actin 2</i> QRP	CACAAACGAGGGCTGGAACA
<i>GA3ox1</i> QLP	CCCCAACATCACCTCAACTACTGC
<i>GA3ox1</i> QRP	CAAACCGGGTAGTGATTTAGCTGGA
<i>GA20ox1</i> QLP	CAGCCATTTGGGAAGGTGTATC
<i>GA20ox1</i> QRP	CAAGCAGCTCTTGTATCTATCGT
<i>GA20ox2</i> QLP	GAGCAGTTTGGGAAGGTGTATC
<i>GA20ox2</i> QRP	TAACGTGAGATCTGGTGTTTGG
<i>Elongation factor 1α</i> QLP	CCTTGGTGTCAAGCAGATGA
<i>Elongation factor 1α</i> QRP	TGAAGACACCTCCTTGATGATTT
<i>Ubiquitin 10</i> QLP	GGAGGTGGAGAGTTCTGACA
<i>Ubiquitin 10</i> QRP	AGACCAAGTGAAGTGTGGAC

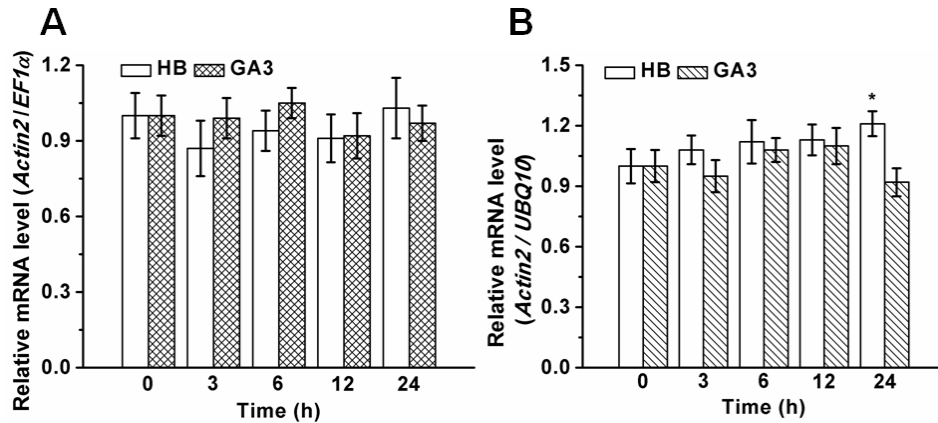


Fig. S1. Relative expression of *Actin2* in response to high concentrations of boron (HB) or GA3 normalized by gene *Elongation factor 1 α* and *Ubiquitin 10*.

Ten-day-old WT seedlings grown on MS medium were treated with 3 mM boron or 5 μ M GA3 for different periods of time. Quantitative real time-PCR analysis of *Actin2* was carried out. Gene *Elongation factor 1 α* (*EF1 α*) and *Ubiquitin 10* (*UBQ10*) were used as controls in A and B, respectively. The asterisk indicate the data derived from the treatments were significantly different from the untreated control at $P < 0.05$ level by Student's *t*-test.

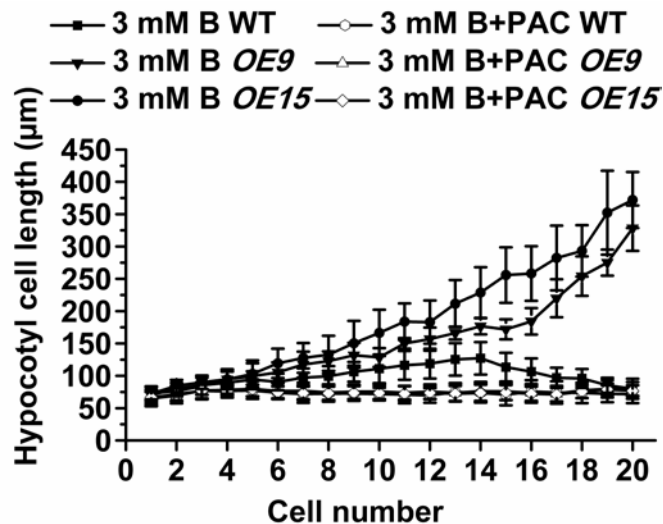


Fig. S2. Effects of paclobatrastrol (PAC) on the hypocotyl cell elongation of *OE9* and *OE15* under high-B stress.

Cell length was measured in the hypocotyls of *AtTIP5;1* overexpressors in the presence of 3 mM H_3BO_3 (B) and 0.1 μ M PAC for 15 d. Error bars are SE, $n \geq 20$.

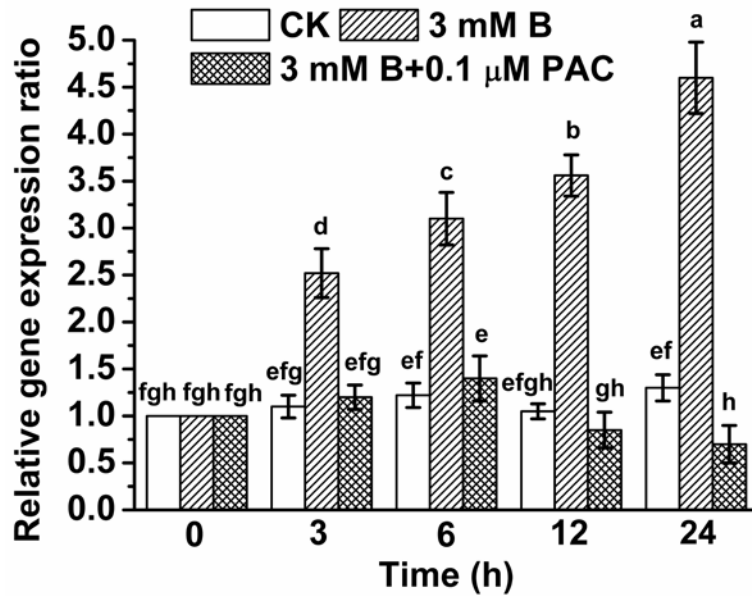


Fig. S3. Effects of paclobatrastrol (PAC) on the expression of *AtTIP5;1* in WT under boron stress. Ten-day-old WT seedlings grown in MS medium with 3 mM H_3BO_3 (B) were treated by 0.1 μM PAC for the indicated times. QPCR analysis of *AtTIP5;1* was conducted. *Actin2* used as a control. Different lowercase letters indicate values from the seedlings significantly differ from each other ($P < 0.05$).

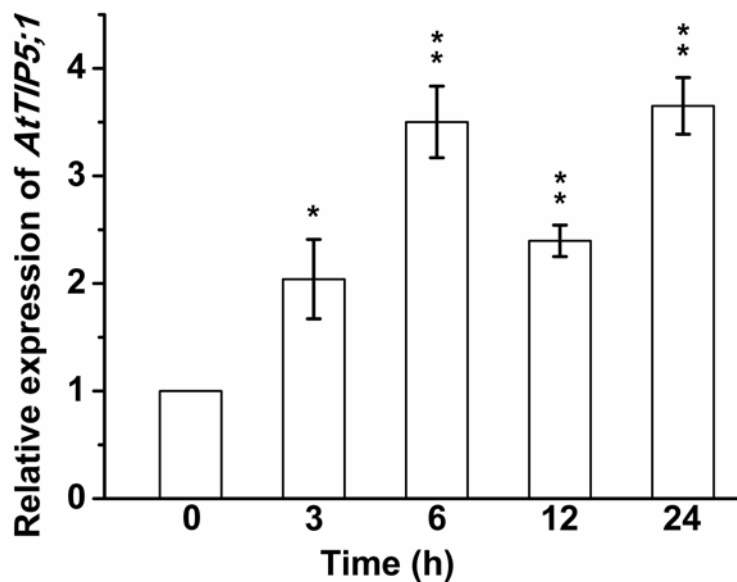


Fig. S4. Effects of GA3 on changes in *AtTIP5;1* expression of WT seedlings. Ten-day-old WT seedlings grown on MS medium were treated with 5 μM GA3 for different periods of time. Quantitative real time-PCR analysis of *AtTIP5;1* was carried out. *Actin2* was as a control. Asterisk and double asterisk indicate the data derived

from the treatments were significantly different from the untreated control at $P < 0.05$ and $P < 0.01$ levels respectively by Student's t -test.

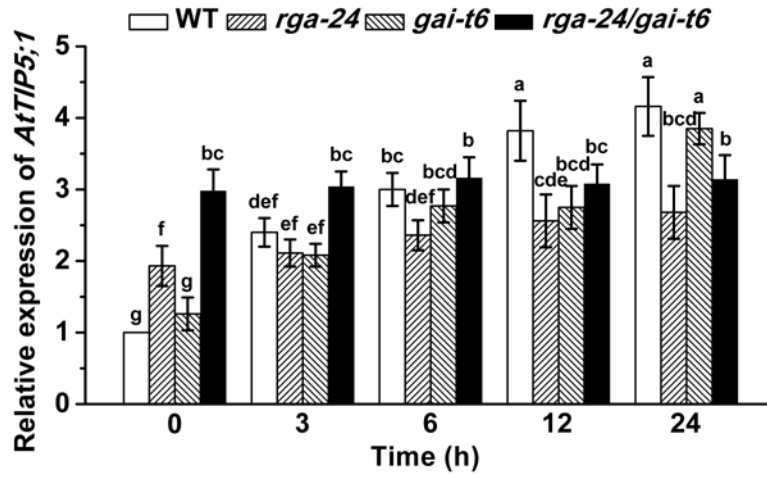


Fig. S5. Expression patterns of *AtTIP5;1* in *rga-24*, *gai-t6* and *rga-24/gai-t6* under boron stress. Ten-day-old seedlings of WT and the mutant *rga-24*, *gai-t6* and *rga-24/gai-t6* grown in MS medium were transferred to MS medium containing 3 mM H_3BO_3 for indicated hours. Quantitative real time-PCR analysis of *AtTIP5;1* was performed. *Actin2* acted as a control. Different lowercase letters represent values from the seedlings significantly differ from each other ($P < 0.05$).