

## **Cotton *PIP 2;3* and *PIP 2;4* Preferentially Expressed in Fibers Display High Water Channel Activity and Function in Cell Elongation and Tolerance to Stresses**

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Aquaporins, which form the main water channels in cells, play important roles in plant development. To investigate the functions of aquaporins in cotton fibers, two cDNA (designated *GhPIP2;3* and *GhPIP2;4*, respectively) were isolated from a cotton fiber cDNA library. The deduced polypeptides contained highly conserved amino acid sequences of PIP2 proteins. Northern blot analysis indicated that both of *GhPIP2;3* and *GhPIP2;4* were predominantly expressed in developing fibers, suggesting that they may be involved in fiber development. *GhPIP2;4* protein displayed high water channel activity in *Xenopus* oocytes, and sensitivity to  $\text{HgCl}_2$ . Over expression of both *GhPIP2;3* and *GhPIP2;4* genes in fission yeast induced atypical longitudinal growth of the host cells by 1.75 to 2.18 and 1.75 to 2.41 fold, respectively, and these yeast cells significantly enhanced their tolerance to salt and drought (water) stresses. These results suggest that the two cotton PIP2s might play important roles in fiber cell elongation and in response to abiotic stresses during fiber development of cotton.