AUXIN IS INVOLVED INTTRANSCRIPTIONAL REGULATION OF GOSSYPIUM HIRSUTUM CELLULOSE SYNTHASE CATALYTIC SUBUNIT 4 IN TRANSGENIC ARABIDOPSIS AND CULTURED COTTON FIBERS Hee Jin Kim Norimoto Murai Louisiana State University Baton Rouge, LA David Fang Barbara A. Triplet USDA-ARS, Southern Regional Research Center New Orleans, LA

Abstract

Cotton (*Gossypium hirsutum* L.) fibers are unicellular trichomes originating from the ovule epidermis and consist of almost pure cellulose. *Gossypium hirsutum cellulose synthase catalytic subunit 4* (*GhCesA4*) and other genes involved in cellulose biosynthesis in developing cotton fibers are transcriptionally co-regulated. *GhCesA4* is significantly up-regulated at the transition from primary to secondary wall biosynthesis during fiber development. To study transcriptional regulation of cellulose biosynthesis in cotton fibers, the *GhCesA4* promoter fused to β -glucuronidase reporter gene was transformed into *Arabidopsis* and cotton tissues. Tissue preferential expression patterns of *GhCesA4* in transgenic *Arabidopsis* were similar to those in cotton. *GhCesA4* was developmentally-regulated in leaf trichomes and vascular of transgenic *Arabidopsis* as in cotton fibers. During *Arabidopsis* leaf vascular development, temporal expression patterns of *GhCesA4* matched the pattern of gradual shifts of temporal auxin production in the leaf. Auxin up-regulated *GhCesA4* in *Arabidopsis* leaf trichomes was fully inhibited by an auxin transport inhibitor. In cultured cotton fibers, *GhCesA4* and other co-regulated by auxin. Our results show that auxin may play roles in transcriptional regulation of *GhCesA4* and other co-regulated genes that are involved in secondary cell wall cellulose biosynthesis during cotton fiber development.