CHARACTERIZATION OF *CIS*-ACTING ELEMENTS IN LIGHT REGULATION OF THE NUCLEAR GENE ENCODING THE A SUBUNIT OF CHLOROPLAST GLYCERALDEHYDE-3-PHOSPHATE DEHTDROGENASE FROM *ARABIDOPSIS THALIANA*

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We have characterized *cis*-acting elements involved in light regulation of the nuclear gene (*GapA*) encoding the A subunit of chloroplast glyceraldehyde 3-phosphate dehydrogenase in *Arabidopsis thaliana*. Our deletion analysis indicate that the −277 to −195 upstream region of *GapA* is essential for light induction of the β-glucuronidase reporter gene in transgenic tobacco (*Nicotiana tabacum*) plants. This region of contains three direct repeats with the consensus sequence 5′-CAAATGAA(A/G)A-3′ (Gap boxes). Our results show that 2-bp substitutions of the last four nucleotides (AA or GA) of the Gap boxes by CC abolish light induction of the β-glucuronidase reporter gene in vivo and affect binding of the Gap box binding factor in vitro. We have alxo identified an additional cis-acting element, AE (Activation Element) box, that is involved in regulation of *GapA*. A combination of a Gap box trimer and an AE box dimer can confer light responsiveness on the cauliflower mosaic virus 35S promoter containing the −92 to +6 upstream sequence, whereas oligomers of Gap boxes or AE boxes alone cannot confer light responsiveness on the same promoter. These results suggest that Gap boxes and AE boxes function together as the light-responsive element of *GapA*.

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