PROTEIN-DNA AND PROTEIN-PROTEIN INTERACTIONS OF STF1, A bZIP PROTEIN HOMOLOGOUS TO HY5

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Introduction

Hypocotyl elongation is a process that is affected by several endogenous and environmental cues such as light, auxin, giberrelin, and brassinolides. Previously, one bZIP protein, STF1, acting as a potential regulatory factor for this process, was isolated from soybean (Cheong *et al.*, 1998). Distinctively, STF1 contains a novel domain homologous to the amino terminus of cellulose synthase RSW1, together with a RING-finger motif and a domain with high homology to HY5 of *Arabidopsis*. Expression studies show that STF1 is highly abundant in the upper hypocotyl, a region that controls cell division, elongation, and differentiation. STF1 interacts with G-box binding factors (GBFs) and competes with GBFs and TGA1 for binding to ACEs. However, the function of STF1 in controlling hypocotyl elongation has not been tested.

HY5 has been genetically defined as a positive regulator of photomorphogenesis, based on the light insensitivity of *hy5* mutants (Kooneef *et al.*, 1980: Ang and Deng, 1994). The role of *HY5* in morphogenesis is well illustrated in hy5 seedlings, which have defects in light inhibition of hypocotyl elongation, light-induced chlorophyll accumulation, and extensive root abnormalities (Oyama *et al.*, 1997). Genetic analysis suggests that *HY5* acts downstream of multiple photoreceptor-mediated pathways, and that it interacts with constitutive photomorphogenic/deetiolated/FUSCA (*COP/DET/FUS*) genes, which are negative regulators of photomorphogenesis (Ang and Deng, 1994). Direct molecular interaction between HY5 and COP1 protein has been demonstrated and may provide a regulatory mechanism for controlling light-regulated genes (Ang *et al.*, 1998). One regulatory circuit involving COP1 is nuclear degradation of HY5. While degradation of HY5 protein is mediated by nuclear COP1 in the dark, light exposure results in extrusion of COP1 from the nucleus into the cytosol, a process that allows accumulated HY5 to interact with DNA and activate light-regulated genes (Osterlund *et al.*, 2000a and 2000b)..

Here we present the binding properties of STF1 and HY5 using RBSS and gel