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Characterization of an Oxidative Stress-inducible *SWPA2* Promoter in Transgenic Tobacco Plants

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Objectives

In the previous studies, we isolated a strong oxidative-stress inducible POD (*SWPA2*) promoter from suspension cells of sweetpotato, and characterized its expression in transgenic tobacco plants and cultured cells (Kim et al. 2003). In this study, we analyzed further expression patterns of *SWPA2* promoter in transgenic plants and cultured cell under various oxidative stresses.

Materials and Methods

1. Plant material: Transgenic tobacco (*Nicotiana tabacum* CV. Xanthi) plant and cells expressing *SWPA2* pro::GUS or CaMV 35S pro::GUS
2. Method
   - Analysis of promoter activity by fluorometric GUS assay
   - Treatment of abiotic stresses (stress related chemicals) or biotic stresses (pathogen)

Results and Discussion

The activity of the *SWPA2* promoter in transgenic tobacco plants were analyzed upon treatment of stress-related chemicals and pathogens. The *SWPA2* promoter activity was up-regulated by treatments of plant growth regulator (abscisic acid, ethephon, methyl jasmonate, salicylic acid), methyl viologen (MV), pathogenic bacteria (*Pseudomonas syringe pv tabaci*) and tobacco mosaic virus (TMV). The *SWPA2* promoter activity was increased by treatments of ethephon (0.1 mM), MeJA (0.1 mM), and MV (0.1 mM) to the level of CaMV 35S promoter. But the treatments of ABA (0.5 mM) and SA (0.1 mM) did not significantly increase the promoter activity. Infection with pathogenic bacteria or TMV on tobacco leaf increased the activity of *SWPA2* promoter. These results showed that *SWPA2* promoter is regulated in a complicated manner by various stresses. The effects of various treatments on the promoter activity in transgenic cultured cells were also discussed.

Reference

Kim KY et al. (2003) A novel oxidative stress-inducible peroxidase promoter from sweetpotato: molecular cloning and characterization in transgenic tobacco plants and cultured cells. Plant Mol Biol 51: 831-838

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