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The GUS Reporter-aided Analysis of the Promoter Activities of *Arabidopsis* Cystatin Genes, *AtCYS1* and *AtCYS2*, during Development and Stresses

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To investigate the phytocystatin gene expression, the promoters of *Arabidopsis thaliana* cystatin genes, *AtCYS1* and *AtCYS2*, were fused to a GUS reporter gene and generated two kind of *AtCYS::GUS* transgenic plants, and used to examine GUS expression at various stages of plant development and stresses. Histochemic studies of these transgenic plants displayed that *AtCYS1* and *AtCYS2* were commonly but differently expressed in root and flower. However, only *AtCYS1* was expressed in vascular bundle. On the other hand, *AtCYS2* showed high activity in trichome and guard cell. Each *AtCYS* gene also has a different expression profile during stresses. High temperature and wound stress commonly enhances the expression of *AtCYS* genes. However, their expressed regions were different under stress conditions. Taken together, these results indicated that each *AtCYS* gene not only has a unique expression profile but also has common expression profile for different regulations of protein turnover in plant development and plant defense.

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Flow Cytometrical Investigation on Lymphoblastogenic Activity of Polysaccharides from *Salicornia herbacea*

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The purpose of this study was to identify the effect of crude polysaccharides(CSP) and more purified polysccharides(SP1) from *Salicornia herbacea* on mouse splenocytes in vitro. The CSP was prepared from *Salicornia herbacea* by extraction with hot steam water and ultrafiltration, and the SP1 from the CSP by gel filtration chromatography and phenol-H_2SO_4 assay. The average molecular weights of SP1 were determined to be 16~30 kDa (F Ⅰ) and 250~3300 Da (F Ⅱ), respectively. In this study, we elucidated the immunomodulating activity of CSP and F Ⅱ of SP1 on the BALB/c mouse splenic lymphocytes using flow cytometrical techniques. Both CSP and SP1 effectively stimulated the formation of lymphoblasts of BALB/c mouse splenic lymphocytes in a concentration-dependent manner. Especially, the treatment of the lymphocytes with CSP and SP1 for 48hr at a concentration of 4mg/ml increased the numbers of them by 12.4% and 16.7%, respectively. These results suggest that polysaccharides from *Salicornia herbacea* could be utilized to develop new immunopotentiating substances and functional alternative medicines.

Key word: Salicornia herbacea, polysaccharide, lymphoblastogenic, flowcytometry