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## **PREG – gene family: Expression pattern in *Arabidopsis thaliana***

Plant development is strongly affected by different environmental conditions, such as the availability of light, water, oxygen and phosphate (Pi). Pi is the least accessible macronutrient in many ecosystems and plants have evolved an array of molecular and morphological adaptations to cope with Pi limitations, including dramatic changes in gene expression. However, the molecular mechanisms of regulating phosphate starvation genes in plants remain elusive. In *Saccharomyces cerevisiae*, the cyclin PHO80 is involved in the phosphate signalling pathway. The interaction of PHO80 with the cyclin-dependent kinase PHO85 causes PHO85 to phosphorylate specific transcription factors leading to the upregulation of the phosphate starvation genes.

On the basis of sequence similarity, seven PHO80 homologs (PREG S-Y) were identified in *Arabidopsis thaliana*. Phylogenetic analysis showed the genes are highly homologous. The function of the PREG cyclins in *Arabidopsis* is unknown. At present there is limited evidence for the involvement in the regulation of phosphate starvation genes.

The aim of this report was to determine the expression pattern of the PREG genes, using GUS reporter lines, in order to help identify possible roles for these genes. The PREG genes show a diverse range of expression patterns, suggesting a variety of functions in different tissues. PREG-T and -U as well as PREG-X and -Y show highly redundant expression patterns, suggesting that they carry out similar functions. The potential function of PREG-T and -U in lateral root formation is discussed. PREG-W, -X, -Y are expressed in the epidermal tissues of the root. Therefore, of all PREGs only these are possibly involved in the phosphate signalling pathway. The GUS expression patterns are largely supported by expression level data from Gene Atlas, Genevestigator – an online databank based on RNA – level analysis by AG and ATH1 microarrays.

Further functional analysis will depend on the isolation of loss-of-function alleles. To identify transgenic *Arabidopsis thaliana* lines representing mutants in the PREG genes, the T-DNA insertion collection from SIGnAL (Salk Institute Genomic Analysis Laboratory) was searched. These mutants will help in dissecting further roles of the PREG genes in *Arabidopsis*.