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Genome-wide Studies on the High-affinity Phosphate Transporters in Rice

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Objectives

Our ultimate goal is to develop new transgenic plants able to adapt to phosphate deficient condition by understanding the mechanisms that underlie phosphorous homeostasis in plant cell. First of all, we characterized high affinity phosphate transporter genes of rice in the genome-wide level.

Materials and Methods

1. Materials: Rice (*Oryza sativa*) cv. 'Dong-jin'
2. Methods: Northern bolt analysis, genomic/cDNA library screening, PCR cloning, *Agrobacterium*-mediated rice transformation with high-affinity phosphate transporter (OsPTs) genes.

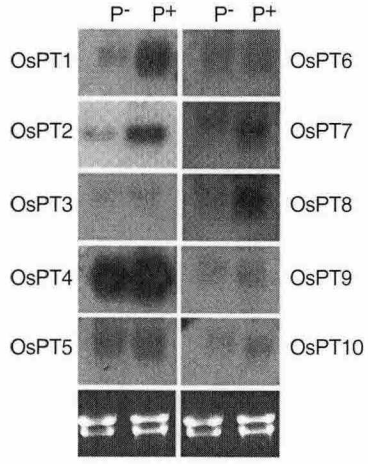

Figure 1. Northern blot analysis of the expression of OsPT genes.

Results and Discussion

We isolated the 10 different high-affinity phosphate transporter genes (OsPT1-10) from rice (*Oryza sativa*). The RNA blot analysis showed that expression of OsPTs are various in response to phosphate deficiency. In particular expression of OsPT1, OsPT2, OsPT7 and OsPT8 were up-regulated in phosphate deficient condition. However, OsPT4 constitutively expressed in the both phosphate deficient and phosphate sufficient conditions. Now, we are generating transgenic rice plants overexpressing each OsPT1, OsPT4, OsPT7, and OsPT8 genes in the direction of sense or antisense. The ability of uptake of phosphate in the transgenic rice plants under phosphate-limited conditions can be investigated by comparing with that of untansformed plants.

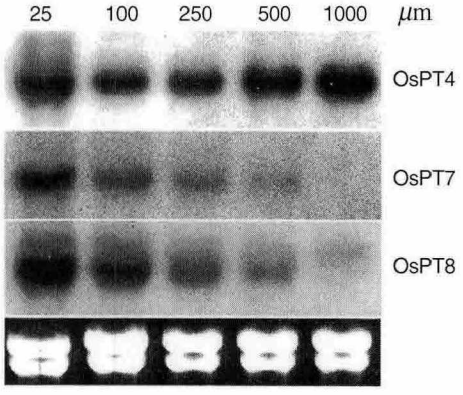

Figure 2. Effect of different concentration of Pi on the expression of OsPT genes transcripts.

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