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OsACP1, a Novel Acid Phosphatase in Oryza Sativa Induced by Phosphate Deficiency

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Acid phosphatase is important for phosphorus remobilization in plants, but its role in plant adaptation to low phosphorus availability has not known. A phosphate starvation-induced acid phosphatase cDNA was cloned from the rice, Oryza sativa. The cDNA is 1100 bp long and contains an open reading frane encoding a 274 amino acid polypeptide. The deduced amino acid sequence of OsACP1 cDNA showed 53% identity to tomato acid phosphatase and 46~50% identity to several other plant phosphatases. OsACP1 was expressed in cell culture in the absence of phosphate (Pi). OsACP1 expression was responsive to the level of Pi supply, with transcripts of OsACP1 being abundant in Pi-deprived root. The OsACP1 cDNA was expressed as a 30 kDa polypeptide in baculovirus-infected insect Sf9 cells. Functional expression of the OsACP1 gene in the transgenic Arabidopsis lines was confirmed by Northern blot and Western blot analyses, as well as phosphatase activity assays.

Key words: Acid phosphatase, phosphate

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Molecular Cloning and Characterization of Mitochondrial Citrate Synthase Gene from Rice

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Mitochondrial citrate synthase represents the first enzyme of the tricarboxylic acid cycle, catalyzing the condensation of acetyl-CoA and oxaloacetate, finally yielding citrate and CoA.

We report here the isolation of cDNA clones encoding citrate synthase from Oriza sativa. Nucleotide and deduced amino acid sequences were compared with previously published sequnces of mitochondrial citrate synthases from Arabidopsis thaliana, potato, as well as with the sequence of glyoxysomal citrate synthase from pumpkin.

Homologies between the various plant mitochondrial enzymes were in the range from 77.2%(potato vs. Arabidopsis) to 94.2%(potato vs. tobacco) on the nucleotide level(coding regions only), and in the range from 70.1% to 90.4%(potato vs. Arabidopsis, and potato vs. tobacco, respectively) on the amino acid level.

Identities of the mitochondrial isozymes to the pumpkin glyoxysomal enzyme were below 30% on the nucleotide and amino acid level.

In Northern blot experiments citrate synthase mRNA was detected in all tissues analyzed. However, levels of expression showed tissue dependency despite the fact that citrate synthase is usually considered a house-keeping enzyme. Whether these different levels of expression reflect tissue specifc variations with respect to basic metabolim awaits further analysis.