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NPC3 AND *NPC4* OF PHOSPHATIDYLCHOLINE-HYDROLYZING PHOSPHOLIPASE C GENE FAMILY OF *ARABIDOPSIS* EXHIBIT HIGH DEGREE OF EXPRESSION SIMILARITIES DURING DEVELOPMENT AND IN RESPONSE TO AUXIN

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ABSTRACT

Phosphatidylcholine specific phospholipase C (PC-PLC) catalyzes the hydrolysis of the most abundant membrane phospholipid phosphatidylcholine. Based on amino acid sequence similarity to bacterial PC-PLC, six putative *PC-PLC* genes (*NPC1* to *NPC6*) were identified in the *Arabidopsis* genome. Experimental evidence on the presence, regulation and functions of the plant *PC-PLC* is limited. The objective of the study was to investigate transcription regulation of the gene family especially of *NPC3* and *NPC4* during plant growth and development and in response to various environmental stimuli to elucidate the potential functions of the genes. Expression of *NPC3* and *NPC4* genes was investigated by semi-quantitative RT-PCR and by producing promoter:*GUS* fusion plants. RT-PCR analysis revealed that *NPC3* and *NPC4* were expressed in roots, stems, leaves, flowers and siliques while enhanced levels of expression was detected in roots. Promoter:*GUS* fusion plants of *NPC3* (PNPC3) and *NPC4* (PNPC4) exhibited high degree of expression similarity across the entire developmental cycle. Constitutive expression of PNPC3 and PNPC4 was observed in the meristematic regions of the primary and lateral root tips. Over the development, *GUS* activity was observed in the cotyledons, rosette and cauline leaves, in the pollen sac tissues and in developing seeds. RT-PCR analysis showed an auxin-mediated increase in *NPC3* and *NPC4* transcription levels relative to the control seedlings. Auxin-mediated expression in PNPC3 and PNPC4 was dramatic in the entire root system and shoots. RT-PCR and organ specific expression pattern of PNPC3 and PNPC4 and strong auxin-mediated *GUS* expression resembling *DR5:GUS* expression pattern suggest possible participation of the *NPC3* and *NPC4* in auxin related functions during growth and development.

Keywords: Arabidopsis, auxin, plant development, phosphatidylcholine specific phospholipase C, gene regulation