



Three branches of phospholipase C signaling pathway promote hepatocyte growth in rat liver regeneration

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ABSTRACT. In general, the phospholipase C (PLC) signaling pathway is involved in many physiological activities, including cell growth. However, little is known regarding how the PLC signaling pathway participates in regulating hepatocyte (HC) growth during liver regeneration (LR). To further explore the influence of the PLC signaling pathway on HCs at the cellular level, HCs of high purity and vitality were isolated using Percoll density-gradient centrifugation after partial hepatectomy. The genes of the PLC signaling pathway and target genes of transcription factors in the pathway were obtained by searching the pathways and transcription factor databases, and changes in gene expression of isolated HCs were examined using the Rat Genome 230 2.0 Microarray. The results suggested that various genes involved in the pathway (including 151 known genes and 39 homologous genes) and cell growth (including 262 known genes and 37 homologous genes) were associated with LR. Subsequently, the synergetic effect of these genes in LR was analyzed using a mathematical model (E_i) according to their expression profiles. The results showed that the E_i values of G protein-

coupled receptor/PLC, integrin/PLC, and growth factor receptor/PLC branches of the PLC pathway were all significantly strengthened during the progression and termination phases of LR. The synergetic effect of target genes, in parallel with target gene-related cell growth, was also enhanced during whole rat LR, suggesting the potential positive effect of PLC on HC growth. The present data indicate that the PLC signaling pathway may promote HC growth through 3 mechanisms during rat LR after partial hepatectomy.

Key words: Gene expression profile; Gene synergistic effect; Hepatocyte growth; Phospholipase C signaling pathway; Rat liver regeneration