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Effects of Lipoproteins and Insulin on Phospholipid Transfer Protein Content and mRNA Expression in Human Hepatoblastoma (HepG2) Cells

Key Words

Phospholipid transfer protein
HepG2 cells
HDL
LDL
VLDL
Insulin

ABSTRACT

Phospholipid transfer protein (PLTP) has been identified to be a major transporter for phospholipids in the circulation. To understand if lipoproteins or insulin in the circulation can modulate the synthesis of PLTP by hepatocytes, PLTP content and gene transcription in human hepatoblastoma (HepG2) cells were investigated after adding lipoproteins or insulin. After 24-h serum-free incubation, HDL (50 $\mu\text{g/mL}$), LDL (50 $\mu\text{g/mL}$), VLDL (50 $\mu\text{g/mL}$), or insulin (1 $\mu\text{g/mL}$) was added to the media for 12-24 h. The results showed that protein secretion into the conditioned media in LDL, VLDL, and insulin treatment groups was significantly decreased by 10% as compared to the control group at both 12 and 24 h ($p < 0.05$). The cellular PLTP exhibited 1 major band with a molecular weight of 44 kDa in HepG2 cells. The cellular PLTP content was not significantly different among the 5 groups. The level of PLTP mRNA was also similar among the 5 groups. In conclusion, neither lipoprotein (50 $\mu\text{g/mL}$) nor insulin (1 $\mu\text{g/mL}$) affects PLTP protein or mRNA expression in HepG2 cells.

INTRODUCTION

Phospholipid transfer protein (PLTP), a type of lipid transfer proteins, has been purified from human plasma. PLTP has been identified as able to facilitate the transfer of phospholipid from chylomicron or very low density lipoprotein (VLDL) into low density lipoprotein (LDL) or high density lipoprotein (HDL) by lipoprotein lipase (LPL).¹ It has been reported that

plasma PLTP mediates the conversion of HDL₃ into the larger and lower density particles of HDL,^{2,3} which is accompanied by the release of apolipoprotein AI (Apo AI).^{3,4}

PLTP cDNA with 1750 base pairs has been cloned from human endothelial cells.⁵ The complete PLTP cDNA encodes a leader of 17 amino acids and a mature protein of 476 amino acids with a molecular weight of 55 kDa, which contains highly hydrophobic residues