

Effect of galactose on binding and endocytosis of asialoglycoprotein in cultured rat hepatocytes

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Background: ^{99m}Tc -diethylenetriaminepentaacetic acid-galactosyl-human serum albumin (^{99m}Tc -GSA) has been applied clinically in scintigraphy to estimate functioning liver mass, but it is not so sensitive in differentiating mild liver injury from normal liver. ^{99m}Tc -GSA is thought to bind to the asialoglycoprotein receptor (ASGP-R) and is then internalized and degraded in the hepatocytes. The aim of this study is to know whether D-galactose inhibits GSA binding or internalization to hepatocytes because ASGP-R recognizes galactose residues of ligands. **Methods:** Isolated rat hepatocytes were obtained by collagenase perfusion, pre-cultured for 2 h after plating, and then cultured for 16 to 18 h until use. The effect of galactose on GSA binding and internalization into cells was investigated by using cultured hepatocytes. **Results:** Galactose non-competitively inhibited GSA binding to cultured hepatocytes, but its K_i value was quite high (505 ± 38 mM). Galactose significantly inhibited GSA internalization into hepatocytes at 27 mM. **Conclusion:** It was clarified that D-galactose inhibited GSA internalization rather than binding at a low concentration. Further *in vivo* studies in rats are needed to know whether an administration of galactose prior to performing ^{99m}Tc -GSA scintigraphy can make it possible to estimate the functioning mass in mild liver injury.

Key words: asialoglycoprotein, cultured hepatocyte, galactose, inhibition