# **A multi-scale model of Human hepatic Galactose Metabolism: Alterations in Cirrhosis**

*König M.*1*, and Holzhütter HG.*1

*Cirrhosis*

## GEC in Cirrhosis

In single injection GEC is overestimated in subjects with reduced liver function, on average 0.68 mmol/min (or about 40% of the GEC) {Ranek1983}

Patients with no expected liver function rarely have GEC values below 0.6 mmol/min {Ranek1983}

GEC is correlated with other tests, the line of regression by extrapolation is found to have an intercept, corresponding to a GEC of 0.5 mmol/l {Ranek1983}

=> Both phenomena could be explained by a fairly constant extraheptaic galactose removal.

It is not known where a significant extrahepatic galactose elimination, if it exists takes place. In human erythrocytes, Isselbacher 1957 found a galactokinase activity of 0.12µmol/ml/h, corresponding to a phosphorylation of 3.3µmol/min of galactose in an adult person, which is about 0.1% of the total elimination.

Steady state studies show that the GEC, estimated from single injection, overestimates the hepatic Vmax by about 25%. The reason for this is probably mainly distribution phenomena and insufficient correction for urinary loss {Lindskov1983}.

The present study shows that under steady state conditions, the total body galactose elimination rate exceeds the splanchnic elimination rate by 25-30%, and that the difference can be accounted for by elimination in the kidneys {Lindskov1983}.

underestimation of conventional correction factors (10%) for urinary loss in subjects with impaired liver function {Lindskov1983} => in reality concentration dependent urinary clearance.

## References

Ranek, L., Lindskov, J., & Tygstrup, N. (1983). Splanchnic galactose uptake in patients with cirrhosis following single injection. Clinical Physiology, 3(6), 173-178.

Lindskov, J., Ranek, L., Tygstrup, N., & Winkler, K. (1983). Splanchnic galactose uptake in patients with cirrhosis during continuous infusion. *Clinical Physiology*, *3*(6), 179-185.