

Summary

Estimation of ^{99m}Tc -GSA Receptor Amount by Non-Linear 3-Compartment Model: Ligand-Receptor Binding Model without Blood Sampling

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^{99m}Tc -GSA (galactosyl serum albumin) receptor amount (R_0) was estimated by a non-linear 3-compartment model of the ligand-receptor binding without blood sampling. Forward/reverse rate constants and receptor amount were assumed to be variable.

Relationship between this parameter and other conventional parameters including ICG R_{15} (15-minutes retention rate of indocyanine green) was evaluated for 43 surgical candidates with liver tumors. Linear relationships between R_0 and HH_{15} and LHL_{15} were $R^2 = 0.73$ and 0.72 , respectively. Linear relationship between R_0 and R_{\max} , the maximum removal rate, is also good ($R^2 = 0.84$), and the regression line ($y = 0.038x + 0.066$) was slightly over 0 at y-interception. Linear

relationship between R_0 and ICG R_{15} , was poor ($R^2 = 0.39$) and relationship was rather a concave shape. Linear relationship of reduction rate between R_0 and non-tumor tissue volume of the liver, which assessed at the same day of two weeks after the operation, was $y = 1.09x - 0.01$ ($R^2 = 0.82$).

GSA receptor amount, R_0 , seems to change proportional to non-tumor liver tissue volume changing before and after hepatectomy. Complementary to ICG R_{15} , it may be an useful and intuitive parameter for hepatectomy.

Key words: ^{99m}Tc -GSA, Asialoglycoprotein receptor, Multicompartment model, Non-linear binding.