## Analysis of the Hepatic Hemodynamics by RI Tracer Technique

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Measurement of $^{198}$Au colloid uptake rate has been usually performed as a routine hepatic function test for diagnosis of liver cirrhosis, however, this index is not available for diagnosis of localized liver diseases such as liver tumor, liver cyst and liver abscess, because no characteristic finding can be obtained. To identify these space occupying lesions, we have tried to measure regional hepatic blood flow by use of regional uptake curve of $^{198}$Au colloid which can be taken by 4 inputs multiscaler and 4 scintillation probes with narrow angle collinators.

Distribution of regional hepatic uptake rates ($K_L$), "regional flow indexes", which have been taken in normal and cirrhotic cases were demonstrated. In a normal liver, the regional flow indexes measured in many places of the liver and the uptake rate of the whole liver showed nearly the same values; however, the indexes and the uptake rate of the whole liver in cirrhotic cases showed low and indefinite values.

It was concluded that the uptake rate of the whole liver by a single detector showed average value of the regional flow indexes.

To analyze the above mentioned uptake curves, the following articles should be considered:

1) The correlation between $K_L$ and $T\frac{1}{2}$ shows Hyperbolic curve, so the changes of the values of $K_L$ are not so remarkable as the difference of $T\frac{1}{2}$. In case of severe circulatory impairments such as liver cirrhosis, $T\frac{1}{2}$ should be applied for evaluation of the liver function.

2) The size of colloid particles is the most important factor in obtaining constant uptake curves in the same patient.

# 6) Kidney

## Calculation of Renal Plasma Flow Rate and Glomerular Filtration Rate by an Analog Simulation of Radioisotope Renograms with Concomitant Measurement of Urinary Excretion Rate

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Radioisotope renography has been practised for more than ten years. It is well established and recognized as a more sensitive indicator of renal impairment, unilateral or bilateral, than the conventional intravenous pyelogram.

A radioisotope renogram reflects rapidly-changing kinetics in the concentration of the serum isotope carrier ($^{131}$I-Hippuran or $^{131}$I Sodium Iothalamate) and the dynamic "effective" volume of its distribution in body fluids, but principally its accumulation in renal fluids and its further elimination.

The diffusion and accumulation processes are given as

$$V_{pe}(t)\cdot C_p(t)=1-\int\sum RPF\cdot C_p(t)dt \qquad (1)$$

where I=the isotope injected, C (t)=its plasma concentration, and $V_{pe}(t)$=distribution space with some correction on the initial