right and left lobes of the livers was also different at the stage of cirrhosis. The isotope-accumulation curves above the spleen were also examined in cirrhotic subjects.

131I-BSP Loading Studies in Infancy and Childhood

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0.26–0.66 mg (80–200 μCi) of 131I-BSP was given intravenously to 56 infants and children with liver diseases (1 month–12 years)
The following studies was performed simultaneously.
1) The retention ratio at 30 minutes. 2) The disappearance curve from 1 ml of peripheral blood daily by day. 3) Liver scintiscanning immediately after injection to 5 hours, and 24 or 48 hours, then the case the liver image could be seen, to 14 days was carried out. 4) In infants, both stool and urine were calculated in counts min by Well type scintillation counter during one week.

The result was follows.
1) In normal infants and children, the time of 131I-BSP excretion from liver cell was much longer compared with adults and in infants it was not mean abnormal if the gall bladder could not be seen. 2) Both the case the liver image after 24 or 48 hours remained and not were seen, while the retention ratio or the disappearance curve was normal. 3) In conclusion, 131I-BSP loading studies showed the different liver function in several liver diseases of infants and children including acute or chronic hepatitis infantile hepatitis, congenital biliary atresia and so on.

Binding Capacity Between 131I-BSP and Serum Protein in Liver Disease by Method of Single Radial Immunodiffusion

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It is said that Sulfobromophthalein. Indocyaninegreen and other organic anions used as the test of liver function are bound to albumin and α1-lipoprotein in blood. Binding Capacity between 131I-BSP and sera of the patient suffered from acute hepatitis, chronic hepatitis and liver cirrhosis were studied by the method of single radial immuno diffusion using specific Antisera of 27 kinds.

Method: The antigen plate was made by the method that solution mixed 0.2 ml of serum with 0.1 ml of 131I-BSP was added 1.5 gr of agarose diluted with phophate buffer pH 7.4. 30 wells, 2 cm in diameter were made by inspiration. Into the wells of these plates specific antisera of 27 kinds were put. After incubation for 48 hours, diameter of precipitated rings were measured, then the plates were washed by saline for 48 hours. After dried the plates autoradiography was carried out on X-Ray film for 4 to 6 hours.

Results: Immunodeffusion test by 131I-BSP-antisera plate showed that 131I-BSP was bound markedly to albumin, pre-albumin (pre), haptoglobin (Hp), β-lipoprotein (β-Lipo), α2-HS glycoprotein (α2-HS) and γ-Mglobulin (γ-M), and partly to α1-lipoprotein, α1-acid glycoprotein (α1-AG), α2-Macroglobuline (α2-M) and transferrin.
In cases of acute hepatitis, autoradiography revealed that $a_2$-M, $a_2$-HS, CP, $\beta$-Lipo and $\alpha_1$-E are more increased than those of healthy man and Pre, Hp and $\gamma$-M decreased. In chronic hepatitis $\beta$-AC increased and pre $\alpha_2$-M, $\beta_1$-E decreased. In liver cirrhosis $\alpha_2$-M, $a_2$-HS, CP, $\beta_1$-AC and $\beta_1$-E are increased, and pre and HP decreased. In Single Radial immunodiffusion by using Antisera plate similar results were obtained.

**Dynamic Distribution Study of Hepatobiliary System with $^{131}$I Labelled BSP by Aid of Computer**

—Mainly with Respect to the Cases of Constitutional Jaundice—

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The scintillation camera is employed for dynamic function studies with $^{131}$I labelled BSP mainly with respect to the differential diagnosis of the constitutional jaundice.

**Method:** After injection of $^{131}$I-BSP 120 $\mu$Ci, images of the liver are obtained with scinticamera.

Then, by assuming a three compartments model, kinetic analysis of $^{131}$I-BSP distributions in various organs are calculated based upon disappearance curve of $^{131}$I-BSP radioactivity in the serum, time dependent curve of radioactivity over the liver and urinary excretion of $^{131}$I-BSP in attempts to clarify the kinetic distribution of $^{131}$I-BSP and the time dependent pool size of $^{131}$I-BSP in each compartment such as serum pool, liver pool and the other pool.

**Subjects:** 40 cases of various liver diseases including 6 cases of Dubin-Johnson’s syndrome, 3 of Gilbert’s disease and one of suspected Roter type.

**Results:**

A) Time dependent images of the liver with scinticamera. In the cases of Gilbert’s diseases, normal patterns were obtained. In the case of Roter type, heart pool scan was obtained until 20 minutes after injection of $^{131}$I-BSP, but the following excretion of radioisotope from the liver was normal. In the cases of Dubin-Johnson’s syndrome, the excretion of radioisotope from the liver were very slow, so the liver images were obtained quite deeply after 24 hours and the images of gallbladder were obtained more slowly, but the excretion of $^{131}$I-Rosebengal were not so impaired. The dissociation of the manner of excretion with above two radiopharmaceuticals will be one of the basis of the diagnosis of Dubin-Johnson’s syndrome.

B) Kinetic analysis.

The individual values for the fractional rate constant for distribution and metabolism of BSP are expressed as $k_{01}$, $k_{02}$, $k_{12}$, $k_{13}$, $k_{21}$, and $k_{31}$. In controls, the calculated rate constant of $k_{02}$, expressing the excretion from liver into bile duct, is $0.00071 \pm 0.000256$ min$^{-1}$. In the cases of Dubin-Johnson’s syndrome, remarkable decrease in the values of $k$- and biliary excretion of $^{131}$I-BSP is showed, but the second rising curve in time dependent curve of $^{131}$I-BSP radioactivity in serum is not demonstrated.