Liver scintigrams and hepatograms with $^{131}$I-BSP and $^{99m}$Tc-phytate have been taken, and classed by the IDS classification, in preoperative and postoperative diagnoses of the cases of cholelithiasis, and used as adjuvant diagnosis of biliary diseases. The IDS classification comprises five types, types I to V, with type I denoting the normal outflow type; type II, the delayed outflow type; type III, the deformed outflow type; type IV, the non-outflow type, and type V, the deformed, non-outflow type. This classification and analysis were reported before previous meetings of the Japanese Society of Nuclear Medicine and the Nippon Societas Radiologica. In the present study, the preoperative IDS findings, histologic findings of liver specimens collected intraoperatively, and postoperative IDS findings were examined in 20 cases of choleclocholithiasis. Preoperatively, IDS types III to IV accounted for not less than 30% of cases of choleclocholithiasis, while these types were infrequent in the cases of cholecystolithiasis. The pathologic examination of liver specimens collected intraoperatively disclosed striking pathologic changes such as the presence of bile thrombi, compared with those in the cases of cholecystolithiasis. The postoperative blood biochemical liver function tests were markedly improved as the operation proved successful, which was likewise reflected by the IDS findings, with the IDS types improved to type I or II in many cases.

The IDS findings one to two years after operation in the cases with insertion of the T-shape tube have been improved to types I to II in all cases. The data obtained by transvenous cholangiography after cholecystectomy have to necessarily been satisfactory, but sequential scintigraphy with $^{131}$I-BSP and analysis of the data have proved very useful. The high-speed, sequential photographing of the time course of radioisotope hepatogram with the rapid sequential camera-100 (RSC-100) that has lately been developed has made the accurate observation of the liver function and its excretory behavior possible. A further improvement in its resolving power may be considered to permit the catching and demonstration of the excretory behavior of the biliary system which is comparable to that with a common radiopaque medium for cholangiography, and we plan to present the findings in some cases.

An external fistula with the T-shaped tube is intraoperatively provided in almost all cases of choledocholithiasis, and the postoperative examination has been made by the use of a radiopaque medium. However, even today there is no safe and rapid method of examination after extraction of the T-shaped tube. Considering that radioisotope hepatography and the use of the RSC-100 will prove useful in supplementing the examinations in this field, we are making a further study of them in clinical cases.

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**Study on Organic Anions Transport Mechanism Using Isolated Liver Surface Membranes**

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The purpose of this study is to elucidate the mechanism of liver membrane transport of dyes which has specific affinity to this organ. Plasma membrane was isolated from rat liver by differential centrifugation. Then the ability of plasma membrane to bind $^{35}$S-BSP or $^{131}$I-BSP was investigated in the presence of serum protein. Results obtained were as follows:
1) About 70% of $^{131}$I-BSP was bound to the isolated plasma membrane when the approximately same amount of serum protein and plasma membrane existed. This observation was considered to an equilibrium process of association and dissociation of BSP and plasma membrane.

2) Strong competitive inhibition was observed between $^{131}$I-BSP and carrier BSP and ICG. In contrast, cholic acid and rifampicin did not inhibit the binding of $^{131}$I-BSP to the plasma membrane of the liver.

3) This specific BSP binding was decreased after trypsin treatment of plasma membrane representing suppression of the active transport.

4) Binding of $^{131}$I-BSP was also observed to kidney plasma membrane similar to that observed in the liver plasma membrane.

5) Solubilized plasma membrane protein of the liver was chromatographed on Sephadex G-75 together with $^{35}$S-BSP. The peak absorbance of 280 nm and peak of radioactivity of $^{35}$S were coincided at the same Rf. However, this Rf corresponded to larger protein molecules and not albumin.

Those large proteins of the hepatic plasma membrane which binds organic anions could be considered to be carrier protein of the dyes. And this protein is proved to play major roles in carrier-mediated transport of organic anions through the hepatic membrane.

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**Study on Circulatory Dinamics in the Liver Diseases by**

$^{133}$Xe Intravenous Injection Method


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In the series of liver cirrhosis and chronic hepatitis, established diagnosis by biopsy, study on their circulatory dynamics was carried out together with the cases of acute hepatitis and heathy controls. $^{133}$Xe was injected intravenously and through the lung, when passing the spleen and the liver, the course of radioactivity was registered externally above liver and spleen, from which the following results were obtained.

1) Specific blood flow of the liver, calculated from the wash-out curves of radioactivity was shown to be reduced in most cases of chronic hepatitis, liver cirrhosis and the extreme stage of acute hepatitis respectively.

2) By mathematic treatment of the initial image of the liver with a digital computer, radioactivity of the input per unit time in ROI of the liver was calculated, which had two peaks normally; the earlier was considered as due to the tracer via the hepatic artery, the later as via the portal vein. The later peaks were noted to fall in the chronic hepatitis and so drastically in the liver cirrhosis as well as the extreme stage of acute hepatitis.

3) From combination of the specific flow of the spleen determined from the wash-out curve, the splenic weight estimated from the scintiscan image, and the disappearance coefficient of $^{198}$Au colloid hepatogram, the removal coefficient of the spleen for $^{198}$Au-colloid was calculated, which dispersed over a wide rage in cases of chronic hepatitis and liver cirrhosis, and its elevation was suggested to be a large factor for uptake of Au colloid in the spleen in liver scintiscan.