

about 160 per cent higher level of unsaturated iron-binding capacity than the non-heparinized serum. This fact indicated that the heparin interfered with the absorbance capacity of sponge.

9) Per cent of resin-sponge uptake; Our uptake rate was 91.7 per cent, that was lower level than 95.0 per cent described on each lot. There are two possibilities for this variation; one depends on the variety of lot, the other depends on a depletion of the absorbance

capacity of sponge after production.

Therefore the correction of the factor of 1.05 which depends on the sponge uptake is necessary in each lot of sponge.

10) Comparison of Irosorb-59 Kit and Tauxe' method; Correlated relationship was observed between the level of unsaturated iron-binding capacity obtained from Irosorb-59 Kit method and Tauxe' method:

$$Y = 1.33X - 60$$

Testing of Irosorb Kit

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The Irosorb value was higher than the previously accepted UIBC value determined by Schade's Peters' etc. For the elimination of free iron in serum, IRA 410 granular resin, $MgCO_3$ powder, and Sephadex G25 fine were used. The UIBC values other than Irosorb showed almost the same results, around 200 $\mu g/100ml$ in normal, while Irosorb showed 338 $\mu g/100ml$ in 34 normal tested twice. This high Irosorb value is due to the poor absorbability of resin in Irosorb sponge. The difference between Irosorb value and UIBC by the other methods were scattered high with a wide range; the lower the UIBC the higher the difference and scattered. Therefore the correction of Irosorb value with any factor was thought impossible. The way to

obtain a correct value without applying correction factor would be to increase the amount of resin 5 times, or to reduce the serum and $^{59}FeFe$ solution to 0.2 ml each which is within the capacity of one Irosorb resin sponge. However the reduction of the test serum and UIBC solution for one sponge resulted in the increase of technical error.

Incubation time may be reduced at the temperature of $37^\circ C$, but the simplicity of the method would be lost to a certain extent. Interference of binding of iron to resin sponge was observed when heparin was used. This is another shortage, since many hematologists would like to withdraw blood with heparin frequently.

Studies on Total Iron Binding Capacity (TIBC)

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TIBC has been determined by adding UIBC and SI so far. UIBC has been determined with $^{59}FeFe$ solution and resin, and SI by colorimetry. SI measured by radioisotope dilution technique was not accurate. The elimination of SI from transferrin was 96%

with charcoal at pH 5.0. However the re-binding of iron to transferrin determined by immunoassay was equivalent to TIBC obtained by adding SI (colorimetric) and UIBC (Peters).

The elimination with desferrioxamine was

not successful. There will be some agent, removed by charcoal, working to recombine with transferrin and iron, and denaturation may occur in the course of acidification and neutralisation with ascorbic acid and buffer.

Radioimmunoassay was more sensitive than immunoassay, and anti-transferrin serum was

not needed, if transferrin was labelled to react with antihuman serum.

Ninety eight % pure transferrin supplied by Hoechst Co. was used to obtain anti-sera and I would like to acknowledge Dr. Izumi Nakashima for his assistance in immunoassay.

LIBC in Liver Diseases Measured by ^{59}Fe Irosorb

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Irosorb-59 was applied for the measurement of LIBC in liver diseases.

Fundamental studies of this method revealed the following characteristics of the method. 1) plasma showed 153% values of the serum. 2) freeze-dried serum could be used for long period however cooled serum (3-5°C) showed the increase in LIBC. 3) iron absorbing capacity of the sponge (25°C, 1 hr incubation) was 95.1 % $\pm$ 1.36 and 1 sponge could absorb 91 γ of iron. 4) Effect of incubation temperature on resin sponge uptake showed calibration between 5°C~30°C room temperature unnecessary. 5) By diluting serum with veronal buffer (PH 7.3) linearity of this method was proved. 6) Reproducibility of this method was confirmed by repeated measurements of the same samples.

Clinical application of this method was per-

formed on 25 cases of control, 15 cases of hepatitis, 11 cases of liver cirrhosis, 18 cases of schistosomiasis japonicum with liver damage, 19 cases of schistosomiasis japonicum without liver damage 2 cases of iron deficient anemia and 2 cases of aplastic anemia.

LIBC values were found to be 279.3 ± 38.5 $\mu\text{gr/dl}$ in control cases, 271.1 ± 81.8 $\mu\text{gr/dl}$ in hepatitis, 147.0 ± 41.0 $\mu\text{g/dl}$ in liver cirrhosis, 236.9 ± 74.9 $\mu\text{gr/dl}$ in schistosomiasis japonicum with liver damage, 294.7 ± 58.5 $\mu\text{gr/dl}$ in schistosomiasis japonicum without liver damage, 386 and 336 in iron deficient anemia & 93.7 & 195 in aplastic anemia. Negative correlation ($r = -0.528$) was found between LIBC & Kunkel values in liver disease.

LIBC measured by simplified Irosorb-59 method was found to be a useful index to follow up the progress of liver cirrhosis.

UIBC and TIBC Values in Liver Diseases Measured by Isotopic Method

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Serum iron $\text{U}_{1/1}\text{BI}$ and T/BC values in patients with liver disease of diverse etiology were measured. They were 10 cases of constitutional hyperbilirubinemia, 19 cases of obstructive jaundice, 29 cases of infectious hepatitis, and 14 cases of liver cirrhosis with 20 cases of normal control.

Serum Iron values were as follows; normal 96.4 ± 18.3 $\mu\text{g/dl}$ constitutional hyperbilirubinemia 89.9 ± 28.8 , obstructive jaundice 91.1 ± 30.4 , infectious hepatitis 212.2 ± 50.2 and liver cirrhosis 137.0 ± 36.0 , $\text{U}_{1/1}\text{BI}$ values were as follows; normal 214.2 ± 39.8 $\mu\text{g/dl}$ constitutional hyperbilirubinemia 192.3 ± 61.7 obstructive jaundice