methods, respectively. Bone marrow lymphocytes reached a plateau labeling of 30% at 1/100 dilution of anti-mouse immunoglobulin in the indirect method, while showing a linear increment in percentage labeling up to 30–35% throughout the I^{125}-anti-mouse immunogobulin range in the direct method. Approximately two thirds of bone marrow lymphocytes remained unlabeled in both methods. The intensity of labeling was lower in the marrow lymphocytes than in the spleen cells in both methods under equivalent conditions. The majority of labeled cells showed a diffuse labeling in the direct method. In contrast, the predominant pattern of labeling was cap formation in the indirect method. Background grains were lower in the indirect than in the direct method.

The results demonstrate that the indirect method is 50–100 times more sensitive than the direct method and appears more suitable for studying the surface properties of bone marrow lymphocytes which have lower densities of surface immunoglobulin than the peripheral B cells.

Evaluation of the Tc-99m labeled RBC in the hematological quantitative measurements

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We made attempt to evaluate the accuricy, availability and overcoming the rich label efficiency of Tc-99m RBC.

Our labeled procedure has essentially been that of Eckelman and Atkins.

The labeling yields of Tc-99m RBC without reducing step averaged II, 0% with whole blood samples in which efficiency of plasma removal before labeling was 16.3% and twice-washed samples averaged 24.2%. The labeling yields of Tc-99m RBC with normal procedure averaged 55.9% with whole blood samples in which efficiency of plasma removal before labeling was 74.3% and twice-washed samples averaged 73.7%.

In vivo studies, over 96.1% of the radioactivity was found to be bound to red cell fraction and this distribution in the circulating blood no measurable change throughout the study. In 10 patients, comparison with Cr-51 in a double tagging experiment showed excellent correlation. Namely apparent red cell volume were calculated at the various intervals. The 15 min ratio of Tc-99m RBC volume to Cr-51 RBC volume was used as a measure of the stability of Tc-99m TGC. The ratio of Tc-99m RBC volume to Cr-51 RBC volume was 1.04 at 15 min, 1,02 at 30 min, 1,06 at 60 min and 1.14 at 3 hours. The ratio of Tc-99m RBC 3 hours to 15 min was 1.22. The ratio of Cr-51 RBC 3 hours to 15 min was 1.08. These results indicated that free Tc-99m is released from Tc-99m TBC with increasing time, especially over 3 hours after reinjection.

In conclusion, the results of studies on a limited number of experiments indicated that Tc99m RBC should be used to the various peripheral hematological measurements in a short period.

Studies on mean red cell life span (MRCLS) with DF ^{32}P in the patients with aplastic anemia —in view of ferrokonetics—

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Disopropylfluorophosphate-^{32}P ($DF^{32}P$) has been introduced as a clinically available radiopharmaceutical for measuring mean red cell life span (MRCLS). However, it is not widely used yet.

Therefore, we revealed on this report the availability of the DF ^{32}P not only for the determination of MRCLS, but also for its related subjects in ferrokinetics in view of aplastic anemia.

Materials: The normal healthy volanteers who were 29 males and 8 females were studied for the determination of MRCLS. And patients with aplastic anemia reported here were 12 males and 3 females in age between 4 and 60.

Results:

1. The average DF^{32}P-MRCLS in the normal volanteers was 101 ± 12 days (in males, it was 103 ± 13 days, and in females, 96 ± 12 days).
2. In all cases with aplastic anemia, DF^{32}P-MRCLS was shortened and the average was 57 ± 13 days.
3. Red cell iron renewal rate (RCIR, mg/day/kg) can be obtained from hemoglobin iron divided by MRCLS with DF^{32}P. And effective erythropoietic rate is obtained by dividing RCIR with PIT (R/P). R/P in the patients with aplastic anemia was all decreased and the average was 48%.
4. On whole-body radioiron (^{59}Fe) distribution study, ^{59}Fe retention in bone marrow after 10 days was observed in 8 cases out of 15. And there was a correlation between ^{59}Fe retension in bone marrow and reduction of DF^{32}P-MRCLS.

Clinical Study of Reticuloendothelial Phase in Ferrokinetics in Hemolytic Disorders by Analysing ^{51}Cr- and ^{59}Fe- Red Cell, Spleen and Liver Data Using Analog Simulation Technique

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A clinical study was performed to examine the reticuloendothelial (R.E.) phase of ferrokinetics by tracing and analysing the natural process of red cell destruction, iron release for reutilization in developing red cells or its deposit as a store. The subject of this study was those cases having excess hemolysis, in which early and random destruction of red cells took place, sufficient enlargement of the spleen existed for accurate external probe and R.E. phase in ferrokinetics played an important role.

With ^{51}Cr-labelled autogeneous red cells, their circulating mass and the rate of destruction were calculated assuming the elution rate of ^{51}Cr to be 1.5 percent per day. The sites of their destruction were probed also by calculating excess count according to Lewis and Szur's method and by expressing the value in a ratio to the count over the precordium at equilibrium. In ferrokinetics, red cell incorporation rate of ^{59}Fe was accurately calculated by determining a body/venous hematocrit ratio with ^{51}Cr-red cells and ^{125}I-albumin. On external probes, the radioactivity attributable to that of red cells contained in the subjective organs was subtracted principally according to Elmlinger's formula, which was modified applying distribution data of ^{51}Cr red cell in stead of that of ^{59}Fe transferrin.

For the data analysis, a simulation technique was applied using an analog computer in order to calculate the mean transit time of iron in erythropoietic marrow and the time in R.E.S. for its release and its deposition rate there. The computed values coincided well with actual measurement ones. Simultaneous coincidence in the red cell incorpolation, the bone marrow, spleen and liver values necessitated analysis solution to be almost primary with scarce freedom.

The value obtained by this computation on iron deposition rate was substatiated well by the histological findings on the degree of stainable iron deposited in the cells with correlation coefficient of 0.898 in the spleen and 0.715 in the liver.

In hereditary spherocytosis, there was also a relationship between the amount of iron derived daily from red cell destruction and the time for R.E.S. to release iron through catabolic process. In autoimmune hemolytic anemias, it took more time in the release process for the comparable