

HSA, change in their respective radioactivity over the spleen, (liver, precordium and head) was measured and recorded as radiosplenogram. Disappearance rate of splenic ^{133}Xe , tissue-blood partition coefficient of 0.75 and hematocrit value in the systemic circulation gave us plasma and red cell flow rate per unit weight of spleen tissue. Using analog computer including systemic re-circulation circuit, ^{51}Cr and ^{131}I splenic curves were analyzed and mean transit time through the spleen of plasma, τ_p and of red cell, τ_c was calculated. Flow rate times mean transit time gave us the volume contained there of plasma, V_p/V_t , and red cell, V_c/V_t , as millilitre per gram tissue.

Resembled values between τ_p and τ_c of 8 to 32 seconds were obtained in 8 normals with V_p/V_t being 0.11 to 0.21 ml/gr and V_c/V_t being 0.08 to 0.15 ml/gr. In cases with iron deficiency anemia and hypoplastic anemia, τ_p and τ_c fell within normal range but V_c/V_t was decreased. Despite their enlarged spleen, cases with chronic myeloid leukemia and Gaucher's disease showed approximately normal value of τ_p and τ_c and both V_p/V_t and V_c/V_t values were significantly decreased.

In polycythemia vera and congenital spherocytosis τ_c was much elongated with τ_p being normal and V_c/V_t exceeded V_p/V_t . In the latter case τ_c of autogeneous cell was much more elongated than that of isologous normal cell and difference between their respective miscible space was disclosed in the spleen.

In portal congestive splenomegaly such as "Banti's syndrome" and hepatic cirrhosis especially in those with enlarged spleen, both τ_p and τ_c were remarkably elongated and the value of τ_c was significantly correlated with splenic volume calculated by scintigrams. Increased value of V_t/V_t and V_c/V_t of 2 or 3 times normal was also obtained in these cases and their circulating leukocytes counts were closely correlated with V_c/V_t but not with V_p/V_t nor with τ_p or τ_c .

These findings suggest the mechanism to manifest hypersplenic syndrome in relation to the alteration in hemodynamics of the spleen in these cases.

This method was considered to be valuable since it enable us to measure splenic circulation and blood content more precisely under more physiological condition than the other method and it would provide us several information concerning pathophysiology of splenic diseases.

Metabolism of ^{57}Co - and $^{14}\text{CH}_3$ -labeled Methylcobalamin

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The metabolism of methylcobalamin, one of the major natural vitamin B_{12} , has been investigated in relation to its structural change in rats, using ^{57}Co -label in the stable structure of the vitamin and ^{14}C in the methyl moiety which will split off the cobalt atom as the first change ever to occur. The compound is extremely labile in vitro, particularly to light. When a doubly labeled compound was injected intramuscularly to rats in comparison with its photolysis product, it was found that the ratios of ^{14}C to ^{57}Co in tissues were quite

different from those obtained with a photolyzed preparation, yet the two different labels were not parallel, suggesting that the methyl group was not immediately detached but was gradually released in tissue.

Large amounts of ^{14}C accumulated in liver following oral administration of the photolyzed preparation in distinct contrast to the closer ratios of the two labels in this organ obtained with doubly labeled methylcobalamin. Expiration of $^{14}\text{CO}_2$ was far greater with the photolysis product regardless of the route of

administration. Thus structural stability of methylcobalamin during absorption was indicated. To further corroborate the finding, ^{57}Co -methylcobalamin was fed by mouth, the intestine was washed after 1.5 hours, the mucosa homogenized and digested, and the supernatant after protein precipitation was applied to paper for chromatography. The radioactivity was demonstrated at Rf corres-

ponding to that of pure preparation, which shifted to the hydroxocobalamin position following exposure to light. Double labeling, with one label in the stable moiety of a compound in question, and the other in the moiety expected to split off, is a worthwhile technique in the study of chemical changes in relation to its metabolism in animals as well as in man.

A Simple Method of Analyzing Radioiron Appearance Curve in Ferrokinetics Study Using Analog Computer

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Appearance curve of radioiron in circulating erythrocytes was analyzed in ferrokinetics study with simple method using analog computer.

The computer circuit was composed of the third order filters for the process through erythropoiesis and two first order filters in series was added in recircuit in those cases with increased peripheral hemolysis for erythrocytes destruction and iron re-utilization respectively.

Successful simulation of actually obtained data with computed curve gave us four parameters which represent the curve's figure reflecting effective erythropoietic characteristics. The parameters were initial input for computation, U , which implies fractional amount of radioiron for "effective" incorporation into erythrocytes and three parameters of the third order filters, α_1 , α_2 and α_3 , lined from the larger.

Mean transit time for radioiron through erythropoiesis, τ_p was calculated according to the formula, $\tau_p = 1/\alpha_1 + 1/\alpha_2 + 1/\alpha_3$.

In nine normals U was from 0.76 to 0.97 and was between 3.3 and 5.3 days with being from 0.7 to 1.6, being from 0.65 to 1.5 and being from 0.25 to 0.7 day $^{-1}$.

In 64 studies of 59 cases with various hematological diseases nine groups could be dis-

tinguished in the combination of elevated, normal or depressed U versus shortened, normal or elongated. On the other hand four main types could be discernible according to the pattern of α_1 , α_2 and α_3 which decide the shape of the curve. Type I resembles the curve of lower order filters with exceedingly large value of α_1 and Type IV shows typical shape of the third order filters of deep S figure with similar value of three parameters. Type II and the type III are intermediate patterns predominantly observed in normals.

In hemolytic anemias appearance curve belonged to Type I with remarkably shortened τ_p .

In some cases with iron deficiency anemia and hypoplastic anemia and hemolytic type of portal congestive Splenomegaly Type I pattern was observed with shortened τ_p . Shortened τ_p was also observed in iron deficiency anemia and iron deficiency type of congestive splenomegaly showing rather Type II or Type III pattern. With iron administration in these deficiency cases or in cases with non-deficiency type of congestive splenomegaly, Type III pattern was more often encountered with somewhat shortened

There was significant positive correlation of τ_p with mean erythron life span calculated by Huff's method and also with half survival of ^{51}Cr tagged erythrocytes generally in the