ing rate of $^{51}Cr$ and that of $^{203}Hg$ are 20 to 22 days and 22 to 25 days, respectively. Determination of the amount of menstrual blood loss are made twice during the connective 2 months in a case of iron deficiency anemia from the total body $^{59}Fe$ activity as incorporated in red cell hemoglobin and menstrual blood loss in this case was found to be 117.27 ml and 175.91 ml on two occasions.

Hemoglobin iron absorption rate was measured using 10 ml of $^{59}Fe$ labelled hemoglobin iron in a normal subject by whole body counting, and was found to be 18% of the oral $^{59}Fe$ hemoglobin in this case.

Because of wide changes in the patterns of radioisotope distribution in the body, the exact decision of the 100% value of radioactive isotopes for these studies is of exceeding difficulty, and is now under investigation.

## Studies of Vitamin $B_{12}$ Meabolism by Whole Body Counter (1) Calibration for $^{60}Co$-$B_{12}$ Absorption Test

T. Hibino, S. Ukyo, M. Fujii, N. Yamaguchi and G. Wakisaka
*First Department of Internal Medicine, Faculty of Medicine, Kyoto University, Kyoto*

Purpose: Whole body counting techniques using a scintillation counter can be especially valuable in the intestinal absorption test of $^{60}Co$ labeled vitamin $B_{12}$ (radio-$B_{12}$). When a single 8 × 4 inch NaI(Tl) scintillator is used, however, the determination of 100 percent value of the oral dose involves many calibration problems resulting from variations in subject's body built or changing distribution of radio-$B_{12}$ within the human body during the test period. The present paper describes the results obtained with 3 different whole body counting techniques designed for radio-$B_{12}$ absorption test, by using a single 8 in. NaI scintillation counter which was equipped in 1961 at Kyoto University.

Techniques: 1) In Arc Technique, subjects were measured in supine position with a detector placed 70 cm above the arc bed. 2) In Sliding Technique, the detector performed a continuous scan over 130 cm along the long axis of subjects lying on the stretcher bed at 80 cm below the crystal. 3) In what we call Multiple Detector Technique, subjects were measured actually with a single detector in 4 positions and theoretically the situation was that 4 detectors were placed, two 80 cm above and the other two 60 cm below the stretcher bed.

Procedures: Each subject received approximately 0.5$\mu$g (0.5$\mu$Ci) of radio-$B_{12}$ while fasting and the initial whole body counting rates were measured, in the region of $^{60}Co$ photopeak, 4 to 5 times within the first 24 hours in order to determine the 100 percent value of the oral dose and the residual whole body counting rate was measured 7 days later to determine the retention. The absorption rates as measured with each technique were compared with the simultaneously performed fecal excretion test.

Results: The radio-$B_{12}$ absorption rates obtained with each technique were in perfect agreement with those of fecal excretion test. The difference in the absorption rate of Arc (10 cases), Sliding (3 cases) and Multiple Detector Technique (5 cases) from those of fecal excretion test were +0.7 to −1.1, +0.7 to −1.3 and −0.1 to −0.8%, respectively.

Arc Technique, however, needed intravenous injection of radio-$B_{12}$ for the determination of the 100 percent value, because of consistently changing whole body counting rates by 11.8 up to 35.2% in 8 subjects during the first 24 hours after the oral dose. The standard 100 percent value for Arc Technique could be obtained from the following result; the mean value for 10 subjects who received 0.42 $\mu$Ci of radio-$B_{12}$ on March 21 '67 was 3908 ±67 cpm and the net count rate increase due to

redistribution of $B_{12}$ during the subsequent 7 days averaged 2.6% of the initial whole body counting rate. In Sliding and Multipe Detector Technique, on the other hand, the initial whole body counting rates after the oral dose, when subjects were measured both in supine and prone positions and each counting rate being added together, varied in 4 subjects by less than 2.7%, showing the results almost independent of the distribution of radio-$B_{12}$ within the human body. In Multiple Detector Technique, when 0.1$\mu$Ci of radio-$B_{12}$ was given 5 times orally to 3 subjects at various time intervals during 12 hours and countings were made in such a situation that the two detectors being placed at 130 cm distance, then straight line relationship could be obtained in each of the test subjects between the whole body counting rates and the oral ammount of radio-$B_{12}$. Hence, in these techniques, the absorption rates could be expressed as percentage of the initial whole body counting rate which was obtained at any time before the first fecal excretion after oral administration of radio-$B_{12}$.

## Distribution of $^{198}$Au-colloid in the Body

H. SAITO and T. MIURA

*Department of Radiology and Radioisotope Laboratory, Nagoya University School of Medicine, Nagoya*

The distribution of radiocolloid in the body was studied with Ring Type Total Body and Section Counter.

Most of radiocolloid injected intravenously was taken up by the liver upto 90%. However in liver cirrhosis, it was 52 to 78% and the low value was characteristic, although splenic uptake increased. In case of cancer of the esophagus and gallbladder showed rather low value of 70 and 72% respectively. In a case of hepatitis, the uptake of radiocolloid was 80% and in an acute myelocytic leukemia, it was 85% in the liver.

The uptake of radiocolloid in the chest and pelvic section showed the same degree of activity two times as observed by animal higher than that in the abdominal section, therefore the half of activity in the chest and pelvic bone area was subtracted from the liver and spleen section as background.

The measurement of uptake of tracer in the liver was one of the most difficult procedure so far, but the present report demonstrated the method of quantitative in vivo determination of tracer in the total body and hepatosplenic section.