rapidly than that of control group for the first five days, but there was no difference in disappearance of the radioactivity among three groups after 5th day. For the first five days, the biological half-life of muscle protein of left ventricle was 12.5 days for AI group and 6.5 days for AI+VB<sub>12</sub> group. After 5th day it was the same value (23 days) in every group. The radioactivity of skeletal muscle protein in control group showed a maximum on the first day, but the maximum specific activity in AI and AI+VB<sub>12</sub> groups occurred between first and 5th day. After reaching the maximum values, disappearance of radioactivity was about the same in every group. The biological half-life of skeletal muscle protein was about 65 days. While radioactivity of free amino acid of myocardium and skeletal muscle already approached back ground levels at the first day after injection of leucine-C<sup>14</sup>.

Disappearance of radioactivity from serum protein and free amino acid was about the same in every group. The biological half-life of serum protein was about 11 days and that of serum free amino acid was about 2 days.

From these results, it seems likely that the turnover rate of myocardial protein in the overloaded heart increases during acute overloaded periods (for the first 5-6 days after the production of aortic insufficiency) and Vitamin B<sub>12</sub> accelerates the turnover rate of protein in acute overloaded heart.

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**Use of <sup>14</sup>CO<sub>2</sub> Measurement Method for the Clinical Study of the Metabolism of Labelled Compounds**


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A new and simple equipment to collect expired <sup>14</sup>CO<sub>2</sub> delivered from given <sup>14</sup>C labelled compounds was modified from that reported by Abt.

The expired air is exhaled through mask into a plastic bottle containing calcium chloride, which removes the moisture from the breath. Then the air is passed directly into a liquid scintillation counting vial which contains 1 ml of 1 molal hydroxyhyamine. The hyamine neutralizes 1m mole of carbon dioxide in the expired air. The end point of the neutralization is indicated by decoloration of phenolphthalein indicator. The time required for the sampling of breath to neutralize hyamine is about 2 minutes. The counting vial is then removed from the apparatus and is added 15 ml of scintillator. Then the <sup>14</sup>C activity is measured by liquid scintillation counter. Using this equipment <sup>14</sup>CO<sub>2</sub> in expired air can be collected and measured in succession with a few minutes intervals.

This apparatus was applied for the study of intestinal absorption of lactose with the purpose to diagnose milk intolerance.

Methods: Lactose-1-<sup>14</sup>C 10 μCi was given orally together with nonradioactive lactose 50 g. The <sup>14</sup>CO<sub>2</sub> in the exhaled air was collected and measured at ½, 1, 2, 3, 4, 8, 12, and 24 hours. Blood sugar was measured at ½, 1, 2, 3 hours. The jejunal biopsy was performed and the intestinal lactase activity was measured by Dalqvist method.

Materials: Ten patients admitted in our department were studied. <sup>14</sup>CO<sub>2</sub> in the breaths was measured in all cases. Blood sugar was measured in 9 cases and lactase activity in 5 cases.

Results: The activity of expired <sup>14</sup>CO<sub>2</sub> reached the highest level at 3 or 4 hours after the administration of lactose. So the curves of<sup>14</sup>CO<sub>2</sub> activity from 0 to 3 or 4 hours were investigated.

Among 7 cases which revealed diarrhea during examination and/or gave low lactase activity, 4 cases showed flat <sup>14</sup>CO<sub>2</sub> curves (group A) and 3 showed normal <sup>14</sup>CO<sub>2</sub> curve.
(group B) as compared with the $^{14}$CO$_2$ curves of 3 control cases which revealed no diarrhea during the examination and/or high lactose level. Three in group A revealed positive lactose tolerance test and two cases in group B gave high lactose level. It might be assumed that diarrhea in group A was caused by lactose deficiency but that in group B was resulted by other causes.

Although further investigation is obviously necessary before giving any conclusion, the results of this study suggests the possibility to use this method for the diagnosis of milk intolerance.

Studies on Albumin Turnover in Leukemia, Hodgkin’s disease, Lymphosarcomatosis, Cancer etc. with Use of RISA

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Albumin turnover in subjects of leukemia, cancer etc. was studied with the use of iodine labeled ($^{131}$I) human serum albumin (RISA). After intravenous administration of RISA, blood samples were taken for 25 days and assayed in a well type scintillation counter. According to Sterling’s method half time of albumin ($T^{1/2}$), albumin turnover rate as %/day, total exchangeable albumin (TEA), intravascular albumin (IVA), extravascular albumin (EVA) and albumin turnover in grams/day were calculated.

5 cases of acute leukemia, 4 of chronic leukemia, 2 of Hodgkin’s disease, 3 of lymphosarcomatosis, 1 of malignant lymphoma, 1 of macroglobulinemia, 4 of lung cancer, 5 of gastric cancer, liver cirrhosis and nephrosis etc. were studied.

In subjects of leukemia, Hodgkin’s disease, lymphosarcomatosis and malignant lymphoma, serum albumin level is slightly decreased. $T^{1/2}$ is shortened in some cases and lengthened in other cases. Albumin turnover is normal except few cases. TEA is increased in some cases and decreased in other cases.

In healthy subjects and in subjects of liver cirrhosis interrelation of serum albumin level and albumin turnover in g/kg/day is high. But in leukemia, Hodgkin’s disease, lymphosarcomatosis and malignant lymphoma this interrelation is low, that is, turnover in g/kg/day is greatly increased but serum albumin level is not so much decreased as in nephrosis. And so albumin turnover is greatly accelerated and albumin synthesis is presumed to be accelerated. But in cancer, serum albumin level is greatly decreased and albumin turnover is not so much accelerator as in leukemia. And so albumin synthesis is presumed to be not accelerated. This difference of albumin metabolism will be studied further.

Turnover Study on Serum Albumin Metabolism in Liver Diseases

Special Reference to the Gastro-intestinal Losing of Protein by the Double Tracer Method with $^{131}$I-albumin and $^{51}$Cr-albumin

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In liver cirrhosis we observed decrease in the serum albumin (SA) concentration, total exchangeable albumin (TEA) and albumin turnover value (ATOV), whilst in the cases of