was calculated from both the metabolism of inorganic and organic iodine.

3. The formula for the calculation of iodine metabolism was based on a program of Dr. Fukuda, my co-worker. This program is characterized by an analysis of multicompartments in a body from a relatively few inputs.

Three interesting results will be summarized as follows.

1. It was possible to determine the rate coefficiency and pool size of iodine from the kinetics of the metabolism of in- and organic iodine.

The radioactivities in a total body and in the region of the calf were determined every day following the administration of ^{131}I in normal and hyperthyroid subjects with blocking the thyroid gland by antithyroid drug. The study was also done in the same subjects after the administration of $^{131}I-T_4$.

From the both results, the rate coefficiencies and pool sizes of three compartments, e.g., the thyroid gland, in- and organic iodine in the extrathyroidal tissues were calculated.

The over-all metabolism of iodine was also studied on the same subjects by giving ^{131}I.

The quite similar results have been obtained from the both separate and over-all studies.

2. The kinetic study on the thyroxine in liver.

A profile scanning was performed 30 minutes, 3 hours, and then every 24 hours after the intravenous administration of $^{131}I-T_4$. The most prominent peak was found in the regio of the liver. The contribution of the radioactivities from the ^{131}I in the blood contained in the neighbour organs, such as heart, spleen, and stomach etc., were estimated by a profile scanning after the administration of RISA. The liver took approximately 40 per cent of $^{131}I-T_4$ within one hour after the injection, and then released it exponentially. From the amounts of ^{131}I in the total body, liver, and blood, we made a model with three compartments, e.g., the liver, blood and extrahepatic tissues. Each rate coefficiency of these compartments was calculated by Fukuda's program using a digital computer. The rate coefficiency from the liver, which means the excretion of $^{131}I-T_4$ from the liver showed a negative result, indicating not a single compartment of T_4 in the liver.

3. The relation between the amount of ^{131}I in a total body and in the other tissues.

The total amount of ^{311}I in the body was found to be estimated from the uptake of ^{131}I by the thyroid gland and the relative amount of ^{131}I in the some part of the body. The amount of ^{131}I in the thyroid gland and in the area of calf was determined by the usual method for external counting. The per cent of the uptake of ^{131}I by the thyroid gland was added by the relative amount of ^{131}I in the regio of the calf, so as to 100 per cent for the initial value. Then both the thyroid and calf was counted and added every day. By this method a similar result was obtained, as the total amount of ^{131}I in the body was estimated by a human counter.

Effects of Chronic Iodide Ingestion on Thyroid Hormone Synthesis in Euthyroid and Hyperthyroid Japanese Subjects

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Absolute iodine uptake (AIU), PBI and $^{131}T_3$-resin sponge uptake (RSU) were determined in 15 euthyroid and 6 hyperthyroid Japanese subjects. Euthyroids were taking their customary diet which included moderate to large quantities of food rich in iodine, while hyperthyroid were given a seaweed restricted diet for 2 weeks and were then given 10 mg of iodide as KI tid thereafter.

AIU was calculated from thyroid clearance of ^{131}I multiplied by serum inorganic iodide and clearance was calculated from the increment in thyroidal ^{131}I between one and two hours divided by serum ^{131}I. Serum inorganic iodide was determined from the specific activity of urinary iodide. AIU determined by this technique could be considered to be the amount of iodine organified in the thyroid, because a) thyroidal transported iodide is in equilibrium with serum iodide, b) serum ^{131}I is mixed with transported ^{131}I within one hour after the injection of ^{131}I, c) serum ^{131}I one hour after the injection of ^{131}I is not lower than that of two hours, that is, transported ^{131}I one hour after the injection of ^{131}I is not lower than that of two hours, so that the increment in thyroidal ^{131}I between one and two hours should be the increment in thyroidal organic ^{131}I.

In euthyroid subjects, serum inorganic iodide ranged from 0.26 to 10.4 μg/100 ml according to the iodine content in their diet, and AIU increased from 2 to 15 μg/hr as serum iodide increased, while PBI and RSU did not differ with differing serum iodide level. This suggests that thyroids of euthyroid subjects on a diet rich in iodine organify more iodide than they secrete as thyroid hormone and the excess is secreted as non-hormonal iodine.

In hyperthyroid patients, the determination of AIU, PBI and RSU was performed after 2 weeks of seaweed restricted diet and 2 and 4 weeks of iodide treatment. Before iodide treatment, their serum iodide level were from 0.118 to 0.35 μg/100 ml and AIU, PBI and RSU were higher than those of euthyroid. After 2 and 4 weeks of iodide treatment, serum iodide increased to 12-40 μg/100 ml,and PBI and RSU decreased to normal range in all cases.

However, AIU averaged 37.5 μg/hr before iodide treatment increased to 98.5 μg/hr by the iodide treatment. Thyroidal iodine content in untreated hyperthyroid patients was reported to be around 5 mg/thyroid and this increased to about 30 mg/thyroid after iodide treatment. This could not account for the increased AIU observed in this experiment, 2.5 mg/day for 4 weeks. These results suggest that the effects of iodide treatment on hyperthyroid were not to decrease total thyroidal iodine release, but to decrease the release of thyroid hormone by increasing the release of non-hormonal iodine.

4) Heart and Lung

Radiocardiogram; A Method of its Analysis With an Analog Computor as a Radiocardiogram Simulator

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Dye dilution method has been used for many years and was proved to be valuable in diagnosis of cardiovascular diaeases, and also the radioisotopes are one of the useful indicator for this purpose.

A superiority of the isotope dilution technique (radiocardiogram) compared to ordinary dye dilution method is simplicity of the skill and the other is to detect the abnormality without heavy bleeding of the patients.

A problem of this method is a complexity