bumin (TBPA), albumin, thyroxine-binding globulin (TBG), α_1-lipoprotein and β (or α_2)-lipoprotein from the radioimmunoelectrophoretic patterns with specific antisera added or stained for lipoproteins and using TBG- deficient serum. Paperchromatographic analysis of ethanolacetone extract of the immunoelectrophoretic plate indicated that only about 10% of inorganic ^{131}I was liberated from the ^{131}I thyroxine, and no distinct radioactive areas were demonstrated when equivalent amount of ^{131}I sodium was added to the serum and analyzed by radioimmunoelectrophoresis.

Diphenylhydantoin sodium (DPH) which has been reported to displace thyroxine from TBG to other thyroxine-binding proteins, was dissolved in solvent (propylene glycol, 40% V/V and ethanol, 10.5%V/V in H_2O, PH 12) and added to the serum to give a final concentration of 3.6×10^{-2}M and 1.4×10^{-1}M. DPH also decreased the arc represented the so-called "TBG" in our first report.

A freshly prepared serum was mixed with purified ^{131}I-T_4 to give a final concentration of 0.05 μg per ml of serum. The low density lipoprotein (L.D.L.) fraction and high density lipoprotein (H.D.L.) fraction were separted from the mixture by means of ultracentrifugation.

On radioimmunoelectrophoretic patterns of these fractions, bindings of ^{131}I-T_4 to β (or α_2)-and α_1-lipoprotein were observed. From the recovery of radioactivity and concentration of lipoproteins determined by immunodiffusion method in each fractions, the binding percentage of T_4 to β (α_2)-lipoprotein in whole serum was estimated as 1.5—3.5% and to α_1-lipoprotein 3.5—13%.

Correlationship between the Liver and Catabolism of Thyroidal Hormones

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Six groups of the rats were used throughout these experiments. The liver of both group I and II was intact and thyroidectomy was performed only on those of group II. The group III rats were not thyroidectomized and were intoxicated with repeated CC14 administration. And those of group IV were thyroidectomized and were given CC14 also repeatedly. This hepatotoxic agent was injected to both group V and VI and these animals were sacrificed 48 hours after the administration, prior to this procedure, thyroidectomy was performed on only group VI rats. The liver of group III and IV showed septal fibrosis and that of group V and VI revealed central necrosis.

All experimental animals were administered with ^{131}I-T_4 intravenously immediately before collecting the following specimens.

T.C.=t/B×100 ("t" indicates the radioactivity per gm in tissue, "B" indicates initial dose per gm in total body) represents tissue concentration of radioactivity in the blood, bile, liver, kidney and muscle at eight hours after ^{131}I-T_4 administration.

In the liver and kidney among non-thyroidectomized groups, group V showed the highest concentration, and group I the lowest. Among thyroidectomized animals, this phenomenon was more remarkable in not only the liver and kidney, but also bile, blood, and muscle.

In order to analyse the ^{131}I-compounds in bile, the specimens from choledochus were collected at 1, 2, 3...., 8 hours after the isotope injection. They were studied by thin layer chromatography. And the radioactivity of each fraction on T.L.C. was determined and represented in percent dosis per milliliter.

In group I and II, the radioactivity from group I was generally lower than that or group II, and conjugates were detected only in the bile from group II.

In group III and IV, T_3 was not revealed in any fraction of T.L.C. The radioactivity of iodine in the bile from group IV was high-

er than that of group III, conjugates were observed only in group IV.

In group V and VI, free T_3 was excreted significantly at the first 1 and 2 hours. Conjugates were found only from group VI as were found from normal or chronically injured liver.

From the results of this study, it is very interesting phenomenon that fractions of conjugates were detected only in the bile from thyroidectomized animals.

An Improved Method for Determining Iodinated Compound in Serum by Neutron Activation Analysis

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Free thyroxine, containing as trace amounts of iodinated compound in serum, has been determined by activation analysis in our laboratory. In a previous report, some defects were found in chemical procedure after irradiation of sample with thermal neutron flux, i.e., incomplete extraction of iodinated compound from irradiation capsule and insufficient recovery of iodine (42.8%) after extraction.

The aliquot obtained by alkali extraction of thyroxine irradiated has four spots, thyroxine, iodide and two unknown iodinated compounds, on paper by means of chromatography using n-butanol-acetic acid-H_2O solvent. Then, the oxygen flask method was applied with the purpose for an improvement of some defects described above, since inorganic iodine is formed by combustion of organic iodide. It, therefore, also showed the better extraction rate of iodinated compounds from irradiation capsule that the filter paper adsorbed thyroxine was used as sample. The products obtained by irradiation and combustion of sample were adsorbed in 10 ml of 1N sodium hydroxide. The recovery of inorganic iodine in the aliquot was performed by Duce-Winchester's method. The recovery rate of iodine in the sample was 71.0% in this present chemical procedure after taking out from capsule. 1×10^{-9}g and 5×10^{-10}g of iodine irradiated were treated by the new method, and then were measured by analysis of β-ray decay curve with low back GM counter. The radioactivity of the former was nearly twice as much as the latter. Triiodothyronine contained in serum was also determined by means of this procedure.

From the above results, it was showed that oxygen flask method is most suitable technique for the post-irradiation chemistry of the trace amounts of organic iodinated compound.