

Radioimmuno-electrophoretic Analysis of Thyroxine Binding Proteins

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Three thyroxine binding proteins, thyroxine binding prealbumin (TBPA), thyroxine binding globulin (TBG) and albumin, have been demonstrated by adding radiothyroxine to the sera and analyzing by various techniques. Conflicting reports have appeared regarding the additional thyroxine binding components in normal sera. The present study was designed to clarify how many thyroxine binding components exist in the normal serum by utilizing radioimmuno-electrophoresis.

Sera obtained from 28 healthy Japanese subjects and 12 occidental people were mixed with ^{131}I -thyroxine (^{131}I - T_4) and subjected to immuno-electrophoresis. After immunophoresis, each plate was washed, dried and autoradiographed.

When Biken's anti-whole human serum was used, at least 5 distinct radioactive arcs could be observed on autoradiogram in all sera, but only 3 or 4 radioactive arcs were shown by Hyland's or Behringwerke's antiserum.

The following findings may indicate that

these 5 radioactive arcs are not artifacts but thyroxine binding proteins 1) fresh sera were used. 2) purified ^{131}I - T_4 was used. 3) ^{131}I - T_4 was added to the serum but no changes were observed in the protein pattern of immuno-electrophoresis. 4) the free ^{131}I - T_4 was eluted by washing: in fact neither precipitin arcs nor radioactive areas were shown when ^{131}I - T_4 was used without adding serum. 5) ^{131}I - T_4 was added to serum to give a low concentration of $0.05 \mu\text{g}/\text{ml}$, and 6) phosphate buffer (pH 7.4) was used. These conditions were used to simulate physiological condition except that thyroxine was added in vitro.

From the radioimmuno-electrophoretic pattern under the following conditions, these 5 thyroxine binding proteins may be identified as TBPA, Albumin, TBG, α_1 -lipoprotein and β (or α_2)-lipoprotein 1) antiprealbumin, anti α_1 -lipoprotein and anti β (or μ_2)-lipoprotein were used, 2) Lipoproteins were stained by Oil red O and Sudan Black B, TBG-deficient serum was used.

Studies on Iodoprotein in Simple Nodular Goiter and Thyroid Carcinoma

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After ^{131}I was administered orally to the patients with thyroid nodules 24 hours prior to operation, iodoproteins in nodular tissues were divided into soluble and insoluble iodoprotein by the Robbins method. Soluble iodoprotein/total iodoprotein ratio was determined and iodinated compounds in each iodoprotein were analysed by paperchromatography. Furthermore, soluble iodoprotein was divided into thyroglobulin and S-1 iodoprotein in the

analytical ultracentrifuge, in order to determine the thyroglobulin/total soluble iodoprotein ratio.

The results obtained were as follows:

1) Soluble iodoprotein/total iodoprotein ratio was 97.4% on an average, ranging 93.5% to 99.8% in the normal thyroid tissue. On the other hand, the ratio was 96.3% on an average in colloid adenoma, 88.6% in tubular adenoma, 85.9% in trabecular adenoma, 83.6%