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RADIOIMMUNOASSAY FOR SERUM FREE THYROXINE USING AMERLEX TOTAL THYROXINE RADIOIMMUNOASSAY SYSTEM.

S.Satake, M.Fukuchi, H.Kitani, M.Murakami, Y.Kaneko, Y.Fujita, M.Hara and K.Nagai.
Hyoogo College of medicine, Nishinomiya, Hyogo.

Serum free thyroxine (FT₄) assay system was developed using Amerlex total T₄ kit with minor modification. One ml of 0.9% NaCl was used as a incubation buffer. Standard F T₄ were calculated by equilibrium dialysis method in our laboratory. The following fundamental and clinical data of our system were obtained. The coefficients of variation for two control sera were 5.7-7.0% (inter-assay) and 4.8-6.1% (intra-assay). The normal value for FT₄ ranged 1.04±0.36 ng/dl (mean±S.D) as determined on 15 healthy adults. Serum FT₄ was increased in all patients with untreated hyperthyroidism (n=10, 3.93±0.76 ng/dl) and decreased in all patients with untreated hypothyroidism (n=10, 0.18±0.09 ng/dl). It was normal in patients with euthyroid thyroid diseases (n=7) and pregnant women (n=8). The coefficients of correlation between our FT₄ values and FT₄ index (T₇), our FT₄ values and FT₄ values obtained with equilibrium dialysis method, and our FT₄ values and FT₄ values obtained with GammaCoat free T₄ system were r=+0.93, r=+0.78, and r=+0.91, respectively. These data indicate that FT₄ radioimmunoassay system using Amerlex total T₄ radioimmunoassay kit with minor modification was considered quite useful clinically for evaluation of thyroid status.

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RADIOIMMUNOASSAY FOR FREE THYROXINE BY MICRODIALYSIS METHOD. K.Kasagi, T.Kosaka, Y.Iida, K.Ikekubo, J.Konishi and K.Torizuka. Kyoto University School of Medicine, Kyoto.

A rapid, simple and accurate radioimmunoassay for FT₄, Liquisol™ (CIS), has been developed using microencapsulated anti-T₄ antiserum to which ¹²⁵I-T₄ has been complexed. The fundamental and clinical evaluation of the RIA kit was performed. Coefficients of variation for 2 control sera were 5.2% and 8.7% (intra-assay) or 7.6% and 11.0% (inter-assay). The percent cross-reactivity of T₃ and rT₃ to the anti-T₄ antibody was 2.6% and 22.4% respectively. Serum FT₄ concentration was 1.61±0.21 ng/100 ml in 32 healthy subjects, 4.70±1.53 in 9 hyperthyroid patients, 0.43±0.09 in 12 hypothyroid patients, 1.57±0.33 in 4 pregnant women, 1.27±0.19 in 3 subjects with TBG deficiency, 1.15±0.30 in 5 patients with liver cirrhosis, 2.03±0.49 in 6 patients with acute hepatitis, 1.03±0.43 in 4 patients with chronic renal failure and 1.47±0.40 in 18 patients with malignant neoplastic disease. Serum FT₄ concentrations measured by CIS FT₄ RIA showed good correlation with FT₄I (r=0.922), FT₄ by Gamma Coat FT₄ RIA (r=0.913) or FT₄ by equilibrium dialysis (r=0.965). The measurement of FT₄ was clinically useful especially for the diagnosis of subclinical hypothyroidism after radioiodine treatment of Graves' disease and for the follow-up examination on the hypothyroid patients during T₄ replacement therapy.

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EVALUATIONS OF SOLID-PHASE RADIOIMMUNOASSAY WITH AMERLEX PARTICLES FOR SERUM T₃ AND T₄. K.Ohshima, S.Maruta, I.Kobayashi, H.Ishihara, K.Suwa, S.Kamio and H.Fukuda. Division of Endocrinology, Department of Medicine and First Department of Internal Medicine, School of Medicine, Gunma University, Maebashi.

Usefulness of serum T₃ and T₄ radioimmunoassay (RIA) kit (Amerlex T₃ and T₄) were evaluated. The antibody-bound fine particles (Amerlex particles) were used as a suspended solution in this solid-phase system. Blood samples were obtained from patients with high, moderate and low concentrations of thyroid hormones. Intra-assay variability of serum T₃ were 1.4 to 4.9%, 2.5 to 5.1% and 4.8 to 6.9%, respectively. Similar data were also obtained with serum T₄, which were 3.5 to 5.2%, 3.0 to 5.5% and 2.5 to 5.5%, respectively. These results were smaller than those of previously used solid-phase RIA with antibody-coated tubes and similar to those of two antibody method. In addition, inter-assay variability of serum T₃ were 1.7 to 4.0%, while that of serum T₄ were 11 to 16%. The values from this RIA system well reflected the thyroid status with good dilution curves.

In conclusion, measurement of serum T₃ and T₄ by this new RIA system was more rapid than two antibody method, while its reproducibility was similar to the level of two antibody method.

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EVALUATIONS ON CIRCULATING T₄ DETERMINATION BY SOLID-PHASE RADIOIMMUNOASSAY: COMPARATIVE STUDIES AMONG VARIOUS ASSAY SYSTEMS. S.Hayakawa, K.Isano, Y.Takahashi, N.Yoshida, S.Katakai, K.Ohshima, S.Maruta and I.Kobayashi. R1 Laboratory and Department of Medicine, Maebashi Red Cross Hospital, and Division of Endocrinology, Department of Medicine, Gunma University Hospital, Maebashi.

A solid-phase method was widely employed as BF separation procedures of radioimmunoassay (RIA) system for the hormone. We have measured serum T₄ concentration using several commercially available RIA kits with the solid-phase method. The characteristics of each kit were as follows: A, antibody-coated plastic beads. B and C, antibody-coated polystyrene tubes. D, antibody-coated latex particles. Blood samples were obtained from patients with high, moderate and low concentrations of thyroid hormone and determined 10 times each. Intra-assay variabilities were 6.6, 5.8, 5.3% (A), 7.9, 4.2, 3.9% (B), 3.9, 2.6, 4.0% (C) and 4.3, 4.3, 3.6% (D), respectively. However, some variations of each value among different kits were found.

These observations indicate that normal ranges should be determined by each kit for serum T₄. On the other hand, excellent correlations of serum T₄ among solid-phase, PEG and two antibody methods were obtained.