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

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Serum free thyroxine(FT_4) assay system was developed using Amerlex total T_4 kit with minor modification. One ml of 0.9% NaCl was used as a incubation buffer. Standard F T_4 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%(interassay) and 4.8-6.1%(intraassay). The normal value for FT_4 ranged 1.04±0.36 ng/dl(mean±S.D) as determined on 15 healthy adults. Serum F T_4 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 FT_4 values and FT_4 index(T_7), our FT_4 values and FT_4 values obtained with equilibrium dialysis method, and our FT_4 values and FT_4 values obtained with GammaCoat free T_4 system were r=+0.93, r=+0.78, and r=+0.91, respectively. These data indicate that FT_4 radioimmunoassay system using Amerlex total T_4 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.

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A rapid, simple and accurate radioimmunoassay for FT_4 Liquisol™ (CIS), has been developed using microencapsulated anti-T_4 antiserum to which ^{125}I-T_4 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 T_3 and rT_3 to the anti-T_4 antibody was 2.6% and 22.4% respectively. Serum FT_4 concentration was 1.61±0.21ng/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 FT_4 concentrations measured by CIS FT_4 RIA showed good correlation with FT_4I (r=0.922), FT_4 by Gamma Coat FT_4 RIA (r=0.913) or FT_4 by equilibrium dialysis (r=0.965). The measurement of FT_4 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 T_4 replacement therapy.

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EVALUATIONS OF SOLID-PHASE RADIOIMMUNOASSAY WITH AMERLEX PARTICLES FOR SERUM T_3 AND T_4.

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Usefulness of serum T_3 and T_4 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 T_3 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 T_4, 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 T_3 were 1.7 to 4.0 %, while that of serum T_4 were 11 to 16 %. The values from this RIA system well reflected the thyroid status with good dilution curves.

In conclusion, measurement of serum T_3 and T_4 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 T_4 DETERMINATION BY SOLID-PHASE RADIOIMMUNOASSAY: COMPARATIVE STUDIES AMONG VARIOUS ASSAY SYSTEMS.

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A solid-phase method was widely employed as BF separation procedures of radioimmunoassay(RIA) system for the hormone. We have measured serum T_4 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 T_4. On the other hand, excellent correlations of serum T_4 among solid-phase, PEG and two antibody methods were obtained.