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THE CLINICAL SIGNIFICANCE IN FREE THYROXINE MEASUREMENT. Hitoshi Suzuki, Noriko Kanma, & Shin-ichi Shimoda. Dokkyo University, School of Medicine. Mibu, Tochigi.

By the use of free thyroxine(T_4) RIA kit (Damon),which comprised microcapsule containing I-125 T_4 bound anti-T_4 antibody,serum levels of free T_4 were measured in 55 patients with hyperthyroidism, 10 patients with primary hypothyroidism and 45 euthyroid subjects. Mean levels of free T_4 in three groups were 5.62 ± 0.37, 0.58 ± 0.10, and 1.5 ± 0.09 ng/100ml,respectively. The intraassay variation was 7.6 %. Significant correlation was found between free T_4 values and free T_4 indices (FT_4I)(r=0.846) or between two free T_4 kits(Damon & Spac; r=0.802). In hypothyroidism free T_4 level was gradually increased according to the T_4 supplement. In hyperthyroidism this abnormal free T_4 value was gradually decreased according to the PTU and iodide treatment,but serum T_4 or FT_4I was not so decreased for 2 to 4 weeks after initiation of therapy probablly due to high TBG value. Therefore free T_4 measurement in treatment of hyperthyroidism was thought to be important in order to assess the exact thyroid status.

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SERUM FREE THYROXINE: COMPARISON OF MEASUREMENTS BY RADIOIMMUNOASSAY, FREE THYROXINE INDEX, AND EQUILIBRIUM DIALYSIS. N. Akimoto, T. Mitsuhashi, K. Kubota, N. Sasaki, S.C. Chiu, H. Uchimura, F. Matsuzaki, and S. Nagataki. The Third Department of Internal Medicine, Faculty of Medicine, University of Tokyo, Hongo, Tokyo.

Recently various radioimmunoassay kits for measuring serum FT_4 based on different principles have been commercially available. We determined serum FT_4 from patients with various thyroid states by those kits and compared the values with those by the accepted reference method of equilibrium dialysis. Serum samples were obtained from 11 untreated and 30 treated Graves' patients, 2 hypothyroid and 6 replacing patients with Hashimoto's disease and 6 pregnant women. The kits utilized were Gammacoat FT_4(Clinical Assay), Immophase FT_4(Corning) and LiquiSol FT_4(Damon). Equilibrium dialysis was performed by the method of Sterling et al. Comparison of the values obtained by those kits and equilibrium dialysis gave correlation coefficients of greater than 0.8. However, separation of values between hypothyroid and euthyroid and between hyperthyroid and euthyroid were not as good as values by dialysis. It is concluded that the determination of FT_4 by these radioimmunoassay kits can be substituted for equilibrium dialysis although values by these newly available methods are as useful as those by classical or modified FT_4 Index.

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THE RELATION BETWEEN SERUM CONCENTRATIONS OF FREE THYROXINE AND THYROXINE BINDING PROTEINS. S. Nagataki, N. Akimoto, T. Mitsuhashi, K. Kubota, N. Sasaki, S.C. Chiu, H. Uchimura and F. Matsuzaki. The Third Department of Internal Medicine, Faculty of Medicine, University of Tokyo, Tokyo.

Serum concentrations of thyroxine(T_4), triiodothyronine(T_3), thyrotropin(TSH), T_4-binding globulin(TBG) and free T_4(FT_4), values for T_3-uptake(T_3U), TBG-capacity(TBG-C), T_4-binding index(TBI) and %free T_4(%FT_4) were determined in Graves' disease(22), Hashimoto's disease(11), congenital TBG abnormalities (7), pregnancy (15), chronic hepatitis(10), liver cirrhosis(12) and patients with low T_3 syndrome(4). Then, FT_4 concentrations and various FT_4 indeces i. e. 1) FT_4-DIA(T_4 × %FT_4 by dialysis), 2) FT_4-RIA (direct RIA), 3) FT_4-T_3U(T_4 × T_3-U), 4) FT_4-Mod.T_3U(T_4 × T_3U/100 - T_3U), 5) FT_4-TBI(T_4/TBI × 14), 6) FT_4-TBG(T_4/TBG), 7) FT_4-TBG-C (T_4/TBG-C), 8) FT_4-TBG-CT(T_4/TBG-C-T_4) were calculated in each patient.

Summary of the results were as follows:

	False Results	
	Euthyroid	Hyperthyroid
1.FT_4-DIA	None	None
2.FT_4-RIA	↑ Various disease	None
3.FT_4-T_3U	↓ TBG-def	None
4.FT_4-Mod. T_3U	None	None
5.FT_4-TBI	None	↑ T_4> TBG-Cap
6.FT_4-TBG	↑ TBG-def	↑ T_4> TBG-Cap
7.FT_4-TBG-C	↑ TBG-def	↑ T_4> TBG-Cap
8.FT_4-TBG-CT	Variable	↑ T_4> TBG-Cap

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RADIOIMMUNOASSAY FOR SERUM FREE THYROXINE (FT_4) USING SPAC TOTAL THYROXINE RADIOIMMUNOASSAY SYSTEM.
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Serum free thyroxine(FT_4) assay system was developed using SPAC total T_4 kit. one ml of 0.9% NaCl was used as a incubation buffer. Standard FT_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 7.4-8.2%(interassay) and 5.3-6.2%(intraassay). The normal value for FT_4 ranged 0.9±0.2 ng/dl(mean±S.D.)as determined on 15 healthy adults. Serum FT_4 was increased in all 16 untreated patients with hyperthyroidism(5.0± 1.6 ng/dl) and decreased in all 7 untreated patients with hypothyroidism(0.2±0.1 ng/dl). It was normal in 6 patients with euthyroid thyroid diseases and 6 pregnant women. 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=+0.97, r=+0.85, and r=+0.96, respectively. These data indicate that FT_4 radioimmunoassay system using SPAC total T_4 radioimmunoassay kit with minor modification was considered quite useful clinically for evaluation of thyroid status.