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FUNDAMENTAL AND CLINICAL EVALUATION OF SERUM FREE TRIIODOTHYRONINE(T_3) RADIOIMMUNOASSAY.
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The free thyroid hormone fraction is considered to exert the main influence on metabolic control. The free fraction of T_4 have been widely measured by radioimmunoassay system in clinical cases. In this study, we evaluated a serum free T_3 radioimmunoassay system namely Amerlex Free T_3 RIA kit for clinical determining serum free fraction of T_3. The specificity of this system shows a minimal cross-react with L-thyroxine by 0.3% or less. The sensitivity of this system is about 0.4 pmol/L. The dilution tests obtained almost desired values. The precision in the performance data(C.V.) were 5.9-9.3% in within-run and 5.3-6.9% in run-to-run. Correlation coefficient between serum free T_3(y) and serum free T_4(x) was shows as follows; n=13, r=+0.92, y=3.70x+1.38. However, correlation coefficient shows a tendency to dissociation in higher free T_3 concentration area. The serum free T_3 concentration in normal subjects was 5.19 pmol/L(mean) and similar results was obtained in pregnant women and patients with TBG defficiency. The value of patients with hyperthyroidism was significant higher than those of normal subjects. In addition, the serum free T_3 concentration of patients with hypothyroidism was significant lower than those of normal subjects.

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EVALUATION OF SERUM FREE T3 LEVELS USING A RADIOIMMUNOASSAY KIT.
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Serum free T3 (F-T3) levels were measured by IMMO PHASE F-T3 RIA KIT (Corning). The F-T3 assay employs a two-tube procedure which was consisted of tube A for F-T3 and tube B containing ANS for T-T3. After the 20 minute incubation at room temperature, T3 antiserum solution was added into each tube. After the 60 minute incubation, each tube was centrifuged and decanted for counting.

Within assay error was 4.53 ± 0.36 pg/ml (mean ± S.D., C.V. 5.5%). Between assay errors using two different concentrations were 1.19 ± 0.16 pg/ml (C.V. 13.4%) and 5.44 ± 0.36 pg/ml (C.V. 6.6%), respectively. Recovery test of F-T3 was 107.7%. Serum F-T3 levels in 40 normal subjects were 4.62 ± 1.39 pg/ml (male 5.09 ± 1.29 pg/ml, female 4.29 ± 1.38 pg/ml), 18.28 ± 3.69 pg/ml in 10 untreated hyperthyroidism, 1.33 ± 1.73 pg/ml in 6 untreated hypothyroidism, 10.49 ± 4.41 pg/ml in 10 successfully treated hyperthyroidism, 8.30 ± 5.66 pg/ml in 10 successfully treated hypothyroidism. Serum F-T3 levels were also determined in pregnancy, liver cirrhosis and renal failure.

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RADIOIMMUNOASSAY OF SERUM FREE T_3 CONCENTRATION IN THYROIDAL AND NONTHYROIDAL ILLNESSES.
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We evaluated Immophase RIA kit(Corning Medical and Scientific,Medfield) for determination of serum free T_3(FT_3) and the results were compared with those by equilibrium dialysis method(ED). The RIA employs the ratio of labeled T_3 bound to antibody in the "A" tube to the total counts(A/TC) and A/TC x T_3 was used as an indicator for FT_3.The A/TC significantly related to %FT_3 in TBG abnormalities and nonthyroidal illnesses(NTI)(r=0.869,n=49,p<0.001), but not in different thyroidal status(r=-0.219,n=58,NS). When T_3(0.0077-77nmol/L) was added to normal sera, %FT_3remained unchanged,whereas A/TC decreased as the T_3more than 7nmol/L was added. There was a reciprocal relation between TBG and A/TC(r=0.675,n=232,p< 0.001). The relation between $FT_3$by ED(x) and by RIA (Y) was excellent(r=0.928,n=232,p<0.001),but the relation was quadratic($y=0.92+0.93x-0.0055x^2$). The normal ranges(mean±2S.D.) for FT_3were 2.7-5.6pmol/L by ED and 2.7-8.4pmol/L by RIA. The $FT_3$by RIA agreed well with that by ED in various thyroidal status and in patients with low or high TBG levels, but FT_3 by RIA yielded a falsely lower values than those by ED in NTI with low serum T_3. These results indicate that the RIA for FT_3 is a rapid and reliable method for quantifying FT_3levels in TBG abnormalities as well as in hyper- and hypothyroidism,although the FT_3 by RIA tends to be lower as the T_3 level in serum increases,presumably because of large T_3pool of antibody in this RIA system. In NTI with low T_3, the present method for FT_3 may not reflect an actual FT_3 concentration.

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STUDIES ON SERUM TRIIODOTHYRONINE MEASUREMENT WITH IMMOPHASE FT_3 KIT.
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IMMOPHASE FT_3 RIA Kit was evaluted fundamentally and clinically. The coefficients of variation estimated by three sera from hyperthyroidism,hypoththyroidism and normals were less than 11% for intra-assay and less than 22% for interassay. Serum FT_3 concentration in normals was 0.43±0.17ng/dl(mean±SD). There was no chnge of FT_3 in relation to age or sexes. Serum FT_3 of untreated hyperthyroidism (1.80±0.03ng/dl) was higher than normals ($p<0.001$). Serum FT_3 of hypothyroidism (0.08±0.03ng/dl) was lower than normals ($p<0.001$). In treated hyperthyroidism, serum FT_3 was 0.41±0.14ng/dl and was the same level with normals. Positive corelation was noted between FT_4 and FT_3 ($r=0.83$, $p<0.001$). And positive corelation was noted between free T_3 index and FT_3 ($r=0.89$, $p<0.001$). In T_4 toxicosis, FT_3 was elevated, although T_3 was within normal limits.