

low thyroxine concentrations and normal ETR values, whereas those with elevated TBG had elevated thyroxine concentrations and normal ETR values. Thus, it was possible to find out patients with abnormal TBG by modified

method. In conclusion, the modified ETR test, by which serum thyroxine concentrations and ETR values were determined simultaneously, was more useful in vitro thyroid test than the original method.

Thyroid Function Test Using Res-O-Mat ETR Kit

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Res-O-Mat ETR (Effective Thyroxine Ratio) tests were carried out in 31 control subjects, 21 cases of untreated hyperthyroidism, 40 cases of treated hyperthyroidism, 10 cases of untreated hypothyroidism, 11 cases of treated hypothyroidism, 16 cases of non-toxic goiter, 10 cases of euthyroid pregnant women, 4 cases of nephrotic syndrome and one case of TBG deficiency. ^{131}I -triiodothyronine resin sponge uptake by Triosorb test and thyroxine by competitive protein-binding analysis using Res-O-Mat T_4 test were also determined in all cases. Free thyroxine indices (T_7 values) were obtained by the products of Triosorb and Res-O-Mat T_4 values.

The ETR values were 0.96 ± 0.04 (mean \pm one standard deviation) for control subjects, 1.28 ± 0.15 for untreated hyperthyroidism,

0.92 ± 0.08 for treated hyperthyroidism, 0.76 ± 0.06 for untreated hypothyroidism, 0.96 ± 0.08 for treated hypothyroidism, 0.94 ± 0.05 for non-toxic goiter and 0.96 ± 0.04 for pregnant women. The values for cases of nephrotic syndrome and TBG deficiency were in the range of control subjects.

When ETR values were plotted against Triosorb, Res-O-Mat T_4 and T_7 values in 123 cases of control subjects, hyperthyroidism and hypothyroidism, the correlation coefficients (γ) were obtained 0.87, 0.86 and 0.90 respectively. A good reproducibility was shown in the results of Res-O-Mat ETR tests.

The present study supported that Res-O-Mat ETR values were useful indicators of thyroid function as well as T_7 values.

Thyroid Function Test Using by Res-O-Mat ETR

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The direct measurement of free thyroxine would reflect the metabolic status of an individual more accurately than any other single thyroid function test. Free thyroxine index has been shown to have a higher degree of correlation with the clinical thyroid status of the patient

than the results of either TBC index or T_4 value alone. The Res-O-Mat ETR test is a single in vitro thyroid function test which can simultaneously consider both the TBC index and T_4 level.

The test procedure was examined and the following results were obtained.

1) Effective thyroxine ratio (ETR): 0.86–1.12 (average 0.946 ± 0.05) for 66 normal subjects, 1.12–1.43 (average 1.228 ± 0.07) for 23 cases with hyperthyroidism, 0.69–0.88 (average 0.804 ± 0.06) for 12 cases with hypothyroidism, 0.78–1.17 (average 0.960 ± 0.08) for 56 cases with non toxic goiter, 0.97–1.11 (average 1.065 ± 0.06) for 4 cases with thyroiditis subacuta, 0.80–0.99 (average 0.924 ± 0.06) for 5 cases with nephrosis, 0.93–1.11 (average 1.013 ± 0.04) for 13 cases of pregnant women, 0.90 and 0.96 for 2 cases of estrogen medication enthyroidism.

The test demonstrated that the ratios obtained with hyperthyroid, enthyroid and hypothyroid

persons very slightly overlapped. ETR in normal subjects were differentiated from those with hyperthyroidism and hypothyroidism. ETR was a high degree of correlation with Res-O-Mat free thyroxine index more than T_7 value.

2) The reproducibility with the same sera was satisfiable.

3) ETR varied as the duration of incubation prolonged and it was considered that the incubation at room temperature for 60 min was the most stable and practical.

4) ETR was influenced by temperature. Res-O-Mat Kit doesn't need rinsing of resin and evaporation of alcohol by N_2 gas and requires extremely simple procedure.

Clinical Experience with Res-O-Mat ETR Test

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A clinical trial of the new thyroid function test, Res-O-Mat ETR, was attempted. This new test can simultaneously consider both the total serum T_4 concentration and the binding capacity of TBG.

The ETR ranged from 0.86 to 0.99 in healthy subjects without any thyroid disorders. The group of untreated patients with hyperthyroidism revealed the ETR ranging from 1.09 to 1.44 whereas the ETR ranged from 0.76 to 1.16 for the euthyroid subjects who had been treated with antithyroid drug or surgery for hyperthyroidism. The ETR ranged from 0.68 to 0.83 in both untreated and T_3 administered patients

with hypothyroidism. In the group of pregnant women, the ETR ranged from 0.86 to 1.04 and these value were similar to those of the healthy non-pregnant subjects.

Thus, except for cases of T_3 administration, the ETR was found to well parallel the symptomatologic manifestations of thyroid disorders, even in cases with pregnancy. Furthermore, there were significant correlation between the ETR and conventional thyroid function tests such as BEI, Triosorb and free thyroxine index. These results, therefore, emphasize usefulness of the new test, Res-O-Mat ETR, in the clinical assessment of thyroid function.