

INVESTIGATION ON THYROID FUNCTION ASSAY BY GAMMA-COAT SOLID-PHASE RADIOIMMUNOASSAY

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Many different types of kits for thyroid function assay have been developed; and their simplicity of assay procedure and assay accuracy also have been improved promptly. In solid phase RIA system using antibody coated tube, there is no need for specific reagent to separate B and F fractions. Thus the system has several advantages over other methods. They are shorter assay time, better sensitivity, and easy adaptation to automation. After making some basic investigations for above points on GammaCoat T₄, T₃ and T₃ uptake, we now would like to present the report. [Method] As to GammaCoat T₄, 10ul of patient sample is used; and its incubation time and temperature are 45mins and room temperature. As to GammaCoat T₃ uptake, 25ul of patient sample is used; and the incubation of 60 mins at room temperature is made. As to GammaCoat T₃, 100ul of patient sample is used; and the incubation of 60 mins at 37°C is made. Micromedic automatic pipetting station is used for sample pipetting for above three assays; and personal computer is used for data processing according to Drs Miyai and Ichihara's method. [Results] (1) Intraassay variations (c.v.%) for GammaCoat T₄ are 5.6 and 3.0. Those for GammaCoat T₃ uptake are 3.2 and 4.5. And Those for GammaCoat T₃ are 6.9 and 8.6. (2) Correlation coefficient of GammaCoat T₄ with Te-trasorb is 0.97 and that with T₄ RIA (PEG) is 0.98. That of GammaCoat T₃ uptake with Triosorb is 0.92. That of GammaCoat T₃ with T₃ RIA kit II is 0.94. They, all, correlate extremely well. (3) The effects of medium-level hemolysis on those three methods are not significantly high. (4) The effects of lipid on T₄ value by GammaCoat method and that on CPBA method are significantly different in the case of high value of FFA. CPBA is rather easily affected by addition of lipid acid in in-vitro assay. (5) T₄ values by GammaCoat for euthyroid, hyper-, and hypo-thyroidism are 7.4±1.2 (n=34), 18.3±7.0 (n=30), and 3.3±1.5 (n=8) ug/dl. T₃ uptake values by GammaCoat for those three are 39.2±2.4 (n=32), 46.3±6.7 (n=26), and 36.5±2.5 (n=8) respectively. [Summary] GammaCoat T₄, T₃, and T₃ uptake kits are extremely useful because of its simplicity and feasibility of mass routine assay by utilization of automatic pipettor. Moreover, those assay values correlate with those by presently available methods. Thus they are clinically significant kits.

SOLID PHASE RADIOIMMUNOASSAY KIT FOR SERUM T₄ AND T₃ - UPTAKE RATIO

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Ability for measurement of serum T₃ uptake ratio with SPAC T₃ kit and of serum T₄ with SPAC T₄ kit manufactured by Mallinckrodt Company was tested.

Principle of SPAC T₃ kit is that unbound T₃ to serum TBG is separated by coupling to anti-T₃ coated on inner surface of test tube. Effect of incubation temperature was tested at 4, 20 and 37°C.

The value became higher as temperature increased. To test effect of incubation time, the index was measured for 5, 10, 30 and 60 minutes. The value increased as the time was longer. Reproducibility was tested using 7 different serum samples measured on 2 or 4 different assays, and average coefficient of variation was 7.5%. Then relationship of the values by this method and Triosorb was tested using plasma samples of 83 patients with various disorders, and statistically significant positive correlation ($r=0.76$, $p<0.01$) was observed.

Principle of SPAC T₄ kit is that free T₄ competitively binds to anti-T₄ coated on test tube under condition of blocking binding capacity of TBG with ANS. The effect of incubation time was tested incubating sera of three different level of T₄ for 10, 30, 60 and 90 minutes. T₄ values decreased rather sharply for until approximately 60 minutes and then decreased gradually. A nearly linear curve was obtained by measurement of serially diluted serum with known amount of T₄. Reproducibility of values was tested using four different sera on 2 or 4 assays. Average coefficient of variation was 6.4%. Finally relationship was test between the values measured by this method and RESOMAT T₄.

Correlation of coefficient was 0.89 (n=101, $p<0.01$).

These results indicate that SPAC T₃ and T₄ are pretty reliable and accurate kits for clinical use.