Clinical Evaluation of ^{125}Tetrasorb (Abbott) as a Method of Measuring Serum Thyroxine

H. NAKAJIMA, T. HORIGUCHI, N. SASAKI and S. KUBO

Department of Pediatrics, Chiba University, School of Medicine, Chiba

The authors et al. (Nakajima et al.: J. Clin. Endocrinol. 26: 99, 1966) have extended the principle of saturation analysis as a simple method of measuring total serum thyroxine, by using ^{131}I-triiodothyronine resin sponge uptake. ^{125}Tetrasorb (Abbott's T_4 Diagnostic Kit) based on the same principle offers several advantages. The kit provides a combination package of Tetrasorb resin sponge, a solution containing Thyroxine Binding Globulin ^{125}I, and associated disposable laboratory equipment.

After 1 ml of the serum sample is deproteinized with 2 volumes of 95% ethanol, 0.3 ml of the supernatant is dried in a tube with Tetrasorb Evaporator. Add one ml of ^{125}I-TBG solution to the each tube, and let stand 5 minutes at room temperature. Then let stand for 5 minutes in ice-water bath, and add resin sponge to each tube. After incubation in ice-water bath for 60 minutes, aspirate fluid from the tube, then wash sponge by adding water, depressing sponge with plunger, and aspirating. Obtain final count on resin sponge, and compare with initial count after first 20 minutes of incubation. The uncorrected thyroxine value is determined by the working standard curve prepared by plotting sponge uptake versus known concentration of thyroxine. The uncorrected thyroxine value is corrected for extraction efficiency in ethanol supernatant.

Resin sponge uptake determined at different incubation times and incubation temperatures. The standard curve obtained at 4°C has a steeper rise than that obtained at room temperature. Between 40 and 70 minutes, sponge uptake increases approximately 0.33% per minute, and agrees well with that reported by Abbott Laboratories.

The values for thyroxine iodine (μg/100 ml) in various groups of disease were: 1) 27 euthyroid subjects, 3.8—8.1 (range), 6.0±1.2 (mean ±SD), 2) 5 hyperthroid patients, 9.2—15.5, 12.1±2.4, 3) 6 hypothyroid patients, 0.6—2.5, 2.1±1.0, 4) 3 nephrotic patients, 2.6—3.7, 3.2±0.5, 5) 6 pregnant women, 12.1—13.9, 13.1±0.6.

Satisfactory reproducibility was observed. Range and standard deviation ($\pm\sqrt{\sum d^2/2N}$) obtained from the results of 10 duplicate determinations was respectively 2.0–15.1 μg/100 ml and ±0.56 μg/100 ml.

These results proved that this method could be used as a routine clinical diagnostic test.

Radioimmunoelectrophoretic Analysis of Thyroxine Binding Proteins (Second Report)

K. MIYAI, K. F. ITOH and H. ABE

The First Department of Medicine

Y. KUMAHARA

The Central Laboratory for Clinical Investigation, Osaka University Medical School, Osaka

By means of radioimmunoelectrophoretic technique, five radioactvie arcs have been found and shown not to be artifacts but thyroxine-binding components in normal sera in our laboratory. These five components have been identified as thyroxine-binding preal-