

## F. Thyroid gland

### 180

USEFULNESS AND LIMITATION OF THYROID SCINTIGRAPHY USING Tc-99m AND Tl-201 IN DIFFERENTIAL DIAGNOSIS OF THYROID NODULES.

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In an attempt to define clinical usefulness and limitation of thyroid scintigraphy in differential diagnosis of thyroid nodules, retrospective evaluation was done. Subjects were 120 patients with thyroid nodule, and all of them were performed thyroid scintigraphy using Tc-99m, Tl-201, or combined study of the two during last four years. Histological diagnosis has been confirmed in all of them. We reviewed and classified the findings of scintigram, and then established some findings specific to benign nodule and malignant one by use of statistical analysis. Higher sensitivity and specificity was obtained with reevaluated findings. Moreover we tried to determine clinical value of various parameters obtained by use of computer and contribution of Tl-201 scintigraphy to preoperative evaluation of lymphnode metastasis of differentiated carcinoma of thyroid.

### 181

FUNDAMENTAL AND CLINICAL EVALUATION ON A HIGH SENSITIVE RADIOIMMUNOASSAY FOR SERUM TSH: SUCROSEP TSH IRMA KIT.

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We have reported fundamental and clinical evaluation on a high sensitive IRMA for serum TSH. Serum was collected from 94 healthy euthyroid control subjects, 55 patients with Graves' disease, 45 patients with chronic thyroiditis and 45 patients with other diseases. This method could measure for 120 minutes at room temperature and had standard solution of ranges from 0.1 to 240 uU/ml. The coefficients of variation of intraassay and interassay were 3.25--13.1 and 2.23--16.65%, respectively. The dilution test was shown parallel until 512 times to standard curve. The crossreactivity between this antibody and LH, FSH, HCG,  $\beta$ -HCG was absent within our measured ranges. The mean circulating TSH level was  $1.63 \pm 1.36$  (SD) in normal subjects, less than 0.1 in untreated patients with Graves' disease,  $1.56 \pm 1.41$  in patients with Graves' disease in remission,  $2.69 \pm 5.34$  in patients with Graves' disease treated with antithyroid drugs,  $13.82 \pm 19.45$  in patients with chronic thyroiditis,  $3.65 \pm 6.09$  in patients with other diseases. The normal range was 0.27-4.5 uU/ml by Hoffman's method. In two patients with Sheehan's syndrome, there was a little response to TRH stimulation. From these results, we concluded that the measurement of serum low TSH level used by this assay had clinical usefulness.

### 182

IMPROVED SENSITIVITY OF THE RADIOASSAY FOR THYROTROPIN BINDING INHIBITOR IMMUNOGLOBULINS (TBII).

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We tried to improve the sensitivity of a commercially available kit for the assay of TBII (R.S.R. Ltd.) by analyzing the assay conditions. Among various factors investigated, length of preincubation of the receptors with sample serum was found critical. When the preincubation period was changed from 15 to 240 min. at 25 C, inhibition of the binding of  $^{125}$ I-TSH to the receptor was gradually increased up to 120 min. in the presence of Graves' sera, while that obtained in the presence of TSH or normal sera remained almost constant. Thus, in 20 untreated, 40 treated patients with Graves' disease and 19 patients with "euthyroid Graves' disease" the TBII activities obtained after 120 min. preincubation were significantly higher than those obtained after 15 min. preincubation ( $p < 0.005$ ). No significant increase of TBII activities was observed in the presence of sera from patients with primary hypothyroidism (17 cases), simple goiter (7), adenomatous goiter (10), thyroid adenoma (11) and cancer (12).

TBII assay using a longer preincubation period was found sensitive, specific and useful for diagnosis and follow-up of Graves' disease.

### 183

MECHANISM OF Tl-201 ACCUMULATION IN THYROID TUMORS.

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Tl-201 is clinically used for the thyroid tumor scan, but its accumulation mechanism has not yet been clarified. We previously showed that heart, kidney, and thyroid tumor in which Tl-201 is accumulated had high Na, K-ATPase activities. Now we have reported the in vitro Tl-201 uptake system; incubation of specimens from normal mouse's tissues and human thyroid tumors surgically obtained in the Earle's or Ringer's media. Tl-201 in Earle's medium was taken up in heart, kidney and thyroid tumors (papillary Ca.), but not in liver, normal thyroid and other tumors such as hepatoma, Ehrlich tumor, and mammary Ca. On the other hands, heart, kidney, and thyroid tumor specimens did not take up Tl-201 in Ringer's medium containing no energy sources; indicating that Tl-201 was taken up actively in these tissues. It should be noted that thyroid tumors specimens did not take up I-125, comparing that normal thyroid ones took up I-125 but not Tl-201. The Tl-201 uptake in heart, kidney, or thyroid tumors was inhibited in the presence of ouabain or erythrocytes, suggesting that Tl-201 uptake in these tissues was partly mediated by Na, K-ATPase. Tl-201 i.v. injected would be carried by erythrocytes and free Tl-201 in plasma would be taken up within the thyroid tumors through their membrane's Na, K-ATPases.