

3

RADIOIMMUNODETECTION OF THYROID TUMOR.
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The purpose of this study was to investigate the radioimmunodetection of thyroid tumor using anti-Tg antibody (anti-TgAb).

Anti-TgAb was purified from serum of a patient with Hashimoto's disease who had high titer anti-TgAb using DE Sephacel and Tg bound Sepharose 4B. Anti-TgAb was labelled with I-125 or I-131. Thyroid tissues from various thyroid diseases were transplanted into nude mice and I-125 labelled anti-TgAb was injected intravenously one month after transplantation. Scintigrams of nude mice were taken 1, 3, 7 days after injection and nude mice were sacrificed after the last scintigraphy. The transplanted thyroid tissues were removed, the radioactivity were measured and the ratios of radioactivity of tissues to blood were calculated. The transplanted thyroid tissues were homogenized and centrifugated. Radioactive materials in the supernatant were analysed by gel filtration and affinity column. Patients with thyroid carcinoma and adenoma were injected with I-131 labelled anti-TgAb intravenously and scintigraphies were carried out 1,3,7 days after injection.

The accumulations of I-125 by the transplanted carcinoma and adenoma were clearly shown on the scintigrams of nude mice, but nude mice by the transplanted normal and Graves' thyroid were not shown. The ratios

of radioactivity of carcinoma and adenoma to blood were 4 and 2, respectively. On the other hand those ratios of normal thyroid and Graves' thyroid were less than 0.5. The radioactivity of supernatants of homogenized carcinoma and adenoma showed two peak by gel filtration, but those of normal and Graves' thyroids showed a single peak. The radioactive material of the first peak of carcinoma and adenoma was found to be Tg anti-TgAb bound immune complex by the analysis of the affinity columns of Tg bound Sepharose 4B and anti-IgGAb bound Sepharose 4B. The radioactive material of the second peak of carcinoma and adenoma and a single peak of normal and Graves' thyroids was found to be anti TgAb. The accumulations of I-131 radioactivity by thyroid carcinoma and adenoma were clearly shown on the scintigrams of patients after injection of I-131 anti-TgAb and no side effect was observed.

In summary, radioactive anti-TgAb was accumulated by carcinoma and adenoma and present there forming Tg anti-TgAb immune complex in the experiments of nude mice. When patients with thyroid carcinoma and adenoma were injected with I-131 anti-TgAb, the clear accumulations of radioactivity by carcinoma and adenoma were observed on the scintigrams. It is concluded that the radioimmunodetection of thyroid tumors using anti-TgAb purified from serum of a patient with Hashimoto's disease was developed and found to be clinically useful.

4

IMMUNORADIOMETRIC ASSAY AND RADIOIMMUNODETECTION USING MONOCLONAL HCG ANTIBODY.
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Monoclonal anti human chorionic gonadotropin(hCG) antibody, recognized conformational determinants of hCG molecule, was used for two-site immunoradiometric assay (IRMA) for the measurement of hCG in body fluids and also for radioimmunodetection (RAID) in nude mouse bearing hCG producing tumor. Five monoclonal hCG antibodies were produced against hCG. 21-D-6 reacted with only hCG with high K_a of 8.8×10^9 l/mol, and 3-D-1 had the specificity for the epitopes located on the B-subunit of hCG. 3-A-3,12-A-5 and 24-B-6 crossreacted with LH substantially. 21-D-6 and 3-D-1 reacting with different antigenic sites were used to develop two-site IRMA in which 3-D-1 was immobilized on polystyrene balls and 21-D-6 labelled with I-125. This two-site IRMA was highly specific for hCG, no crossreactivity being observed with α -, B-subunit of hCG, LH and FSH, and its sensitivity was four times higher than that of either individual hCG radioimmunoassay(RIA).

hCG values in amniotic fluids were determined by IRMA and routine RIA using SB-6 as hCG antiserum. Both values were correlated significantly ($r=0.85$, $p<0.01$), however each value by IRMA being 60-70% of that by RIA.

IgG and Fab' prepared from 21-D-6 and 3-D-1 were iodinated with I-131 by lactoperoxidase method and used to detect hCG

containing tumors in nude mice by total-body photoscans with γ scintillation camera. 144 and 240 hours after I-131-IgG injection all tumor sites had positive RAID results with slightly higher background, while 48 hours after I-131-Fab' administration tumor sites had positive RAID with essentially no background. Analysis of radioisotope localization shows the selective uptake of the monoclonal hCG antibody by the tumor. Tumor/blood ratio at 144 and 240 hours after I-131-IgG were 5 and 4.5, and 4.5 at 48 hours after I-131-Fab' injection. These results indicate that monoclonal anti hCG antibody and its radiolabelled fragment, which recognize the conformation of the native hCG is preferable for use for two-site IRMA and also for RAID of hCG producing tumors.