to the opacity of original scan record. This instrument was proved to be useful for the accentuation and visualization of the small variations of counting rate within the organ that could be suspected on the original scan. The rescanner was also applied to analyzing the original scans of very high or very low density. Little time is required for rescanning in the use of polaroid color film and the novel servomotor mechanism, that allows to set the rescan speed high without any distortion of the image.

Scanning with Technetium-9mm —Brain, Thyroid, Liver, and Bone Marrow—

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Technetium 99m has been used for scanning with the conventional scanners in our hospital since January 1965. Relatively low gamma-ray energy of Tc-99m (140 keV) interacts more effectively with NaI crystal than those of ^{131}I or ^{198}Au. The background can be reduced fairly low by the effective shielding of crystal to its soft gamma-rays. The fact that Tc-99m has no beta-rays and its half life is relatively short (6 hours) makes it possible to administer the large dose of the isotope to the patient without increment of internal radiation. The large-dose administration increases the counting rate in scanning and increases the target to non-target ratio. Besides, Tc-99m can be used for scannings of various organs with various chemical forms.

Methods: Scans of brain, thyriod, liver and bone marrow with Tc-99m were compared with those of ^{197}Hg, ^{203}Hg, ^{131}I, and ^{198}Au. The 3″ × 2″ crystal scanner (37 holes collimator) and the 2″ ×2″ crystal scanner (19 holes collimator) were used. Brains and thyroids were scanned with $^{99m}TcO_4$, and livers and bone marrows with $^{99m}Tc_2S_7$ colloid.

Results: Brain scan with Tc-99m is superior in the detectability of brain tumors to those of ^{197}Hg or ^{203}Hg Neohydrin. This seems to be due mainly to the effect of high dose administration. Scans of thyroid and liver are comparative to those of ^{131}I and ^{198}Au colloid. For the bone marrow scans, Tc-99m is expected to be the substitute of ^{198}Au colloid with the reduction of considerablly high radiation to the liver and spleen. But our results were less satisfactory than those with ^{198}Au colloid.

Application of Tc-99m Preparations for the Organ Scanning

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Recently interest has increased in the use of Technetium-99m as a scanning agent. The main reasons are as follows; 1) short physical half life of 6 hours, 2) the absence of primary particle radiation, 3) the emission of clean 140 Kev gamma ray and 4) the pos-

sibility of forming various compounds or complexes.

The organs in which Tc-99m can be applied as a scanning agent are thyroid, brain, liver, spleen, bone marrow, mediastinum, placenta, ventilation lung and kidney. We recently had a chance to use this nuclide for the organ scannings of our cases. The followings are the results.

The scanning of thyroid was performed by per os administration of TcO_4. The thyroidal uptake of Tc-99m was 3-4% in normal cases and 20-30% in hyperthyroidisms within 1 hour. Therefore the scanning was possible 1 hour after the administration.

Brain scanning was performed by intravenous injection of TcO_4. The presented case is 60 year old female. The activity accumulated in salivary glands and sagittal sinus.

Tc_2S_7 colloid was prepared according to Richards and Harper. There is another method reported by Stern et al. But we adopted the former because by the latter method the contents of sulfur in the colloid is greater. Using this preparation we performed the liver scanning and bone marrow scanning for the 56 year-old male. For the bone marrow scanning we used 16 mc of Tc_2S_7 colloid and results were satisfactory.

When reduced to lower valence by ascorbic acid Tc-99m makes complex with human serum albumin. We performed the blood pool scanning using this preparation. We also performed ventilation scanning of the lung using IPPB. For this scanning the nuclides of short life is mandatory and Tc-99m albumin was satisfactory for this purpose.

III. Endocrinology

Clinical Studies on the Abnormality in the Secretion Rate and Metabolism of Cortisol, Corticosterone and Aldosterone Using Radioactive Steroids

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The present paper is concerned with the secretion and metabolism of cortisol, corticosterone and aldosterone using radioactive steroids in normal persons and in many patients with various diseases.

Since last year further studies have been made and a few interesting results were obtained.

1 Cortisol: In Cushing's syndrome the decreases in the ratios cortolone/cortol, Allo-THF/THF and THE/THF were statistically significant. On the contrary, in hyperthyroidism all these ratios showed statistically significant increases. In simple obesity, iatrogenic hypercorticism, hypothyroidism and liver cirrhosis no definite changes in these ratios was confirmed.

2 Corticosterone: Allo-THB/THB ratios were determined in normal controls and in patients with various diseases. In Cushing's syndrome the ratio was found to be reduced. In one of two cases with hyperthyroidism it increased remarkably, but in hypothyroidism a fairly opposite result was obtained.

3 Aldosterone: Infusion of pressor dose of synthetic angiotensin 11 augmented secretion rates of aldosterone in 6 out of 9 cases. Two out of 3 cases showing no increase were normal controls and the other was a case of liver cirrhosis with ascites. Non pressor dose brought forth no increase at all in all the cases examined.