sorptive capacity, the absorptive capacity tended to decrease in vagotomized and stimulated groups, compared with the normals.

6. On the autoradiogram of tracheo and bronchial wall, introduction of RI into cells in tracheo and bronchial wall was comparatively clear. The autoradiogram and electronmicroscopic findings showed a character of the absorptive capacity.

VIII. Kidney

A Basic Study of Radioisotope Renogram by Autoradiography

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Radioisotope Renography is now a routine individual kidney function test. But each segment of the renogram is not explained clearly. As autoradiographic study gave us a direct view on the distribution of the $^{131}$I-Hippuran, we tried to analyze each segment by this method.

For this study, we used 23 rabbits weighing about 2kg and 13 male mice which were 3 month old and weighed about 35 gram.

On macroautoradiography we used the freezing method according to Ulberg and Matsuoka, and on microautoradiography stripping method using the films, Sakura NRMI.

In the macroradioautogram of rabbit kidney and whole mice body which is taken within the time corresponding to the segment b, Hippuran is mostly distributed in the renal cortex and not in the urinary bladder. In the time corresponding to the segment c, Hippuran gradually shifts to the renal medulla and the urinary bladder.

On rabbits within a short time such as 20 second after injection, $^{131}$I-Hippuran shows the same distribution as $^{131}$I-PVP which does not excrete from the kidney. It might be supposed that segment a represents renal circulation or vascularity chiefly.

A Clinical Study on the Correlation between the Radioisotope Renogram, Renal Function Tests and Renovascular Diseases

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Among the radioisotope renograms on 250 patients recorded so far at this hospital, 165 tracings on the patients with medical kidney diseases (hypertension, nephritis etc.) were analyzed.

The patients were given 300 ml. of tap water by mouth. Thirty minutes later 0.5 microcuries/kg. of $^{131}$I-Hippuran was injected intravenously and the renogram was taken in the sitting position.

The 165 renograms were divided into 5 types. The patients whose renograms were of the normal type (Type N) in which the gradient of the $\beta$-segment (tan $\theta$) was larger than 1.0 and the half life value (Ht) was less than 6 minutes showed normal PSP, PRF and GFR. The delayed excretion type (Type MIN) in which tan $\theta$ was larger than 1.0 and Ht was
longer than 6 minutes was seen in patients who showed a mild decrease in RPF and GFR. The decreased function type (Type MI) with tan \( \theta \) larger than 1.0 and Ht exceeding 6 minutes was seen in the patients in whom PSP, RPF and GFR were moderately decreased. The deteriorated function type (Type L) was seen in patients with renal insufficiency. The abnormal excretion type (Type M2) was not encountered in the present series.

The renal arteriography was also performed on young hypertensive patients. In 40 of such patients in whom the renograms of both kidneys were of the same type but differed in the maximum cps, the arteriography disclosed no abnormality, whereas in 3 other patients in whom the renogram of one kidney was different in type from that of the other kidney, abnormalities of the renal vessels were demonstrated in the arteriography.

In the patients with wandering kidneys, it was sometimes observed that the renogram of one kidney was different in type from that of the other kidney when the patient was in sitting position, but the difference was no longer evident when the renogram was taken with the patient lying on the abdomen. This observation shows that we must be careful in making diagnosis of renovascular hypertension on the basis of renographic findings.

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**Studies on the Radioisotope Renogram in Senile Hypertension**

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Purpose and Method:

Senile hypertension is characteristic of systolic high blood pressure and good prognosis on the basis of sclerosis of elastic arteries especially thoracic and arcus aorta. In such view points it must be strictly distinguished from essential hypertension. In order to find the relationship between the renogram and laboratory data of senile hypertension, physical examination, fundoscopic test, laboratory studies of urine, serum electrolyte and total cholesterol, X ray photograph of the chest, ECG, PSP excretion test and renograms were carried out for the 40 out patients over 60 years old, who had systolic level of higher than 150 mmHg, and no past history concerning hypertension.

On analysing the renograms, total concentration (TC), minute concentration (MC), minute excretion (ME) were calculated by Krueger's method, and time from maximum counting rate to half value on c-segment (T/2), angle of b-segment (\( \theta \)) were measured. Results:

The renogram appeared following out comes in senile hypertension; TC: 64.5±12.2% , MC: 26.8±6.9% , ME: 14.1±6.1%, T/2: 7'47" ± 2'54", \( \theta \): 57.2°±9.5°. All these values were some what inferior to those of the nonmortensive group of same age, but presented prominent decrease of ME and prolongation of T/2 compared with those of juvenile hypertensive and healthy group from 15 to 35 years old. Spread of the data was also remarkable in senile hypertension. PSP excretion rate correlated positively to MC, ME and \( \theta \) (coefficients of correlation: +0.477+0.678), inversely to T/2 (coefficients of correlation: -0.561~ -0.598). Systolic blood pressure revealed positive correlation to MC and ME but diastolic pressure did nothing peculiar. The higher grade of Keith Wagner, the lower MC, ME and cases having ECG abnormalities also indicated decrease of ME. Serum cholesterol, cardio-thoracic ratio, nycturia, urinalysis did not correlate to MC and ME.

Conclusions:

In senile hypertension renogram data showed inclination of negative correlation to systolic blood pressure but no significant difference to those of senile nonmortensives. Fairly good corelationships were recognized between MC, ME and PSP excretion rate.