(Aloka: DLA-N12-187) using ^{131}I RISA. Three scintillation detectors were used, one was positioned over each kidney and one over the back of the chest toward the heart. After complete mixing of RISA in the vascular compartment, a proportional estimate of the blood background in each renal region derived from the RISA measurement was made. And then, each renal Hippuran curve was corrected for this blood background.

The subtracted renogram was obtained as the curve which were derived from the ^{131}I Hippuran solely in the renal parenchyma exclusive of circulated media in the blood stream.

An Automatic Analysis of ^{133}Xe Clearance Curve by Digital Computer

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The methods to calculate the regional cerebral blood flow from ^{133}Xe clearance curves are examined. The first one is hight over area method in which regional cerebral blood flow is calculated from a hight at zero minute, a hight at ten minutes and an area under the clearance curve. The second one is two minutes method in which regional cerebral blood flow is calculated from the slope of logarithmic clearance curve during first two minutes. The third one is two compartmental analysis method in which a clearance curve is simulated to two exponentially decreasing curves, i.e. fast component and slow component, and then regional cerebral blood flow of each component and each relative weight are calculated respectively.

The results of calculation are printed each time. And each clearance curve, simulated curve and logarithmic clearance curve during first two minutes can be displayed on CRT in case of need.

Kinetic Studies of the Kidney by the Use of The Interest Area Renogram

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With a use of a scintillation camera, 4096 channel analyzer with alterneus system, and a magnetic taperecorder in recording and playback, kinetic studies of the kidney in different areas of interest were carried out.

Renal functions were evaluated by the interest area renogram, following intravenous injection of ^{131}I-hippuran 400 μCi, and the renal blood flow was also measured by intravenous administration of Tc^{99m} 6 mCi. The dose of these radioisotope compounds were decided considering various significant factors, such as a size of the area of interest, a length of the accumulating time by alterneus system to obtain a satisfactory image, anatomical-physiological characteristics of

the organ examined, and a distribution of the recorded data.

Our clinical materials studied in this report were 30 cases of nephrolithiasis (preoperatively and postoperatively), hydronephrosis, and pyelonephritis. The interest area renogram was obtained in each area of interest in the kidneys, which was selected as the upper pole, the lower pole, and the pelvic area, corresponding to the location of the calyces. On the interest area renogram, abnormal findings were represented as a delay of the peak and/or a pattern of excretory disturbance, in each serected area of interest, depending on the nature and the severity of the illness. Abnormalities were also demonstrated in the blood flow in each area of interest, by the use of Tc^{99m}.

It was interestingly shown that a typical pattern of morphological destruction appeared when the surgical incision involved the renal parenchymal tissue, while the abnormal preoperative findings such as those seen in hydronephrosis completely recovered when the incision was not applied into the renal parenchyma.

Our interest of the study in the near future includes how to estimate preoperatively the range of recovery of the renal function in kidney diseases by these methods.

Measurements of $^{14}CO_2$ by Windowless p-n Semiconductor Radiation Detectors —Preliminary Studies of The Instrument for Inspection of the Existence of Bacteria in Blood Cultures and Urine Samples—

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For the measurement of precise dynamic biomedical and bactriological process with aide of radioisotopes, such as ^{14}C and ^{35}S, stable windowless semiconductor detectors for low-energy beta-ray in vivo or in vitro counting were developed and the fundamental characteristics of the detectors were studied. The instrument for inspection of existence of bacteria in blood cultures and urine samples was also studied.

The windowless p-n semiconductor detectors developed have a sensitive area ranging from 4 mm^2 to 200 mm^2. The effective window (dead layer) of the detectors is less than 0.3 μm.

The fundamental characteristics of counting rate vs discriminator level and counting rate vs temperature were studied for the detectors developed, especially the 20 mm^2 and 200 mm^2 area detectors, using thin solid source of ^{14}C.

The counting efficiency of the detector was proportional to the sensitive area of the detector at the constant discriminator level. The counting rate was about 200 cpm/cm^2 for 3 mμCi/cm^2 of ^{14}C solid source at the discriminator level 15 keV.

The experimental results show that 20 mm^2 area detector is feasible for the invivo measurement of low-energy beta-ray, such as those emitted by ^{14}C and ^{35}S, and that a large area detector is feasible for in vitro application, according to its high counting efficiency for low-energy beta-ray at room temperature.

For in vitro application of windowless p-n semiconductor radiation detector, the test-instrument for inspection of bacteria in blood cultures or urine samples was constructed. The instument consists of the windowless p-n semiconductor detector, gas container, culture vial, and associated electronic circuits to handle the data automatically.

The evaluation of this counting system was