sively been studied.

During determination of PRA in aged hypertensive patients, we found with PRA immunoassay kit (CEA. IRE. SORIN) which is only one commercially available kit with regular supply, PRA is not satisfactorily measured because of low sensitivity. Several modifications of this assay kit resulted in improvement of sensitivity. Stress was placed on the importance of adjusting pH during incubation for angiotensin production and of addition of angiotensin free plasma for standard determination. Results obtained by our method were compared with those by bioassay method measured by Dr. Ishii (2nd. Dept. Int. Med. Univ. of Tokyo)

As inhibitor during incubation, BAL and 8-hydroxyquinoline were used besides EDTA. 2Na. The pH of EDTA.2Na treated plasma showed very alkaline, frequently over pH 8.6. As reported previously, in this pH renin activity is suppressed and production of angiotensin is limited. Since optimum pH of renin as enzyme is known to be pH 5.5-5.7, adjustment of pH to this optimum range is absolutely necessary. Adjustment of pH was performed with 1 M acetate buffer and 1 N HCl. By this pH adjustment amount of angiotensin produced during incubation was increased. Amounts of angiotensin produced showed linear relation against time by 4 hours in normal PRA plasma and by 3 hours in low PRA plasma.

For standard determination we added “treated plasma” or “angiotensin depleted plasma” which is otherwise the same as sample plasma. This modification made Bo percent higher and the slope steeper. Sensitivity and precision of assay system were increased. “Treated plasma” was produced by 3-9 hours' incubation of human plasma at 37°C without the presence of inhibitor. By this procedure renin-angiotensin in plasma was damaged. After incubation the same amounts of inhibitors were added to make the standard assay system similar to the unknown sample assay system.

In 15 samples, PRA activity was determined by RIA and bioassay in separate institutes. The comparison of results obtained by RIA and bioassay showed very good correlation. (r=0.907, p: less than 0.1)

Study on the Regional Pulmonary Function Test using 133Xenon

H. KOHMO, M. SASAKI, H. SASAKI, M. KAMBE, S. KATSUTA and M. KODAMA

Department of Internal Medicine and Division of Radioisotope Clinic, Hiroshima University School of Medicine, Hiroshima

This study was carried out in an attempt to elucidate usefulness of new test for regional pulmonary function by using 133Xenon. Cases with various pulmonary conditions were subjected for the study. Following intravenous administration or inhalation of 133Xenon, the distribution of the isotope in the lung in 40 x 40 matrixes was measured at maximal inspiration on supine position by diverging collimator which was made to cover all lung fields. Radioactivity thus measured was recorded by scintillation camera which was connected with 1600 channel memory system and magnetic tape. Ventilation index (V.I.), perfusion index (P.I.), ventilation-perfusion ratio (V/Q)
Estimation of Regional Pulmonary Ventilation using Xenon 133

K. YAMADA, S. YONEDA, O. KITADA, M. SUGITA, H. SAKAKIBARA, Y. NIMURA
and H. ABE

First Department of Internal Medicine, Medical School, Osaka University, Osaka

K. KIMURA

Department of Central Radiology, Osaka University, Osaka

All studies were carried out with the person in the upright position and camera was placed against the posterior thorax. To study regional ventilation, 3–5 mCi of $^{133}$Xe was injected into the cubital vein.

The patients held his breath and the person then rebreathed from the closed system until equilibrium was attained. The system then closed off and the person breathed room air while washout data were recorded on magnetic tape for computer analysis. In the previous study it was found that $^{133}$Xe clearance curve consisted chiefly of two or three exponential components, even if it was corrected for uptake of $^{133}$Xe in the chest wall.

For the purpose of studying regional ventilation mathematical model was applied, in which the lungs were conventionally divided into a common dead space and bilateral upper, middle and lower regions containing the fast and the slow compartments respectively.

Before or during the experiments, several pulmonary function such as functional residual capacity, tidal volume and respiratory rates were measured.

Volume of each fast or slow compartment was estimated from initial counts of each region. These values were substituted for mathematical equation. Then tidal volume of each region was obtained by fitting closely computed points to an experimental curve using digital computer. Summation of these regional tidal volumes was completely equal to the experimental tidal volume. Furthermore $\text{Ve/V}$ value of each region was calculated and these values were compared with the result of Brisco.

and RV/TLC in each matrix were calculated by digital computer of TOSBAC 3400 model. In various pulmonary conditions, regional V/Q and RV/TLC in each matrix were compared with overall values of A-aD and RV/TLC.

Coefficient of variation calculated from mean value of regional V/Q divided by its standard deviation was greater in cases with abnormal A-aD. A good correlation was observed between regional RV/TLC in each matrix measured by $^{133}$Xenon and overall RV/TLC measured by helium closed circuit method.

It was concluded that the measurement of regional residual volume by this method would very much be of diagnostic value in inquiring the presence and degree of regional overinflation of the lung.