Effect of Body Position and Inhalation Levels on Distribution of Ventilation
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We reported in the previous communication on a pulmonary function study using Kr-81m gas. In this presentation, we report on the effect of body positions and inhalation levels on distribution of ventilation.

METHOD
Ten healthy volunteers with normal pulmonary function were selected for this study. Subjects were kept in sitting, supine and both decubitus positions successively.

In each position, they were asked to (1) breathe Kr-81m gas at a normal, resting tidal volume (SP), (2) inspire from residual volume level to total lung capacity (VC), (3) inhale a bolus of Kr-81m gas (10 ml) at levels of FRC (Functional Residual Capacity) and (4) RV (Residual Volume).

Radioactivity was measured with scintillation camera posteriorly placed over the thorax.

Regions of interest (ROI) were set up in two large areas covering each lung, six small areas for upper, middle and lower lung fields of each lung and four rectangular areas placed over each lung laterally.

Counts from each ROI were accumulated for 10 sec. during breath holding in VC, FRC, RV inhalation and for 30 sec. during tidal breathing in SP method.

RESULTS
In the sitting position, in SP, VC and FRC inhalation methods, activity was higher in lower lung field than in upper. In RV inhalation, activity was lesser in lower than in upper as reported by previous investigators.

In the left decubitus position, radioactive gas was inhaled in larger volume to the dependent lung than to the upper lung in SP, VC and FRC inhalation.

In RV inhalation, distribution of activity was reversed, that is to say, activity was lesser in dependent lung.

This result suggests that uneven distribution of ventilation is caused by gravity in the decubitus as well as in the upright position.

Clinical Application of $^{81}$Rb-$^{81m}$Kr Generator
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Clinical application of $^{81m}$Kr eluted from $^{81}$Rb-$^{81m}$Kr generator is described in 34 patients with lung diseases including pulmonary embolism, pulmonary emphysema and bronchial asthma $^{81}$Rb-$^{81m}$Kr-generator used in this study was produced by Nihon Medi-Physics Co. Japan.

Data for lung images were taken in four projection, ANT, POST, R-lat and L-lat view, using Picker Dyna Camera 3C with 1900 holes parallel collimator.

The following results was obtained by this studies.
1) There is no radionuclide except $^{81m}$Kr in the solution eluted from $^{81m}$Kr-generator by 5% dextrose.
2) Resolution of 1900 holes collimator for 190 Kev γ energies of $^{81m}$Kr is better than 25,800, 10,000 holes collimator by measurement of Line Spread Function.
3) Radioactivity of $^{81m}$Kr eluted from $^{81}$Rb-