

**The System for Continuous Recording of Expiratory
 $^{14}\text{CO}_2$ Flow Rate by Scintillation Counter**

A. TSUYA

Department of Radiology, Cancer Institute Hospital Tokyo

A. SHIGEMATSU

Life Science Laboratory

A. KUBODERA

Department of Radiopharmaceutical Science

Faculty of Pharmaceutical Sciences, Science University of Tokyo

A new radiorespiro-scintillation counting system was designed by Dr. Shigematsu, in order to count and record the cumulative pattern of expiratory $^{14}\text{CO}_2$ from the non-strained unanaesthetized small animals. This time, some modifications were made to enable to record the $^{14}\text{CO}_2$ flow rate directly, instead of converting the cumulative pattern into differential one, at a later time. Additional scintillation counter is placed immediately next to the expiratory $^{14}\text{CO}_2$ trapping system where the expiratory gas is continuously bubbled and mixed homogenously into the liquid scintillator flowing with constant velocity, regulated by two

mini-pumps. Liquid scintillator is fed into the counting system to measure and record the cumulative pattern and overall $^{14}\text{CO}_2$ yield as in the previous method.

The quality of differential of $^{14}\text{CO}_2$ flow rate pattern recorded was found to be superior to the one previously obtained, but the overall $^{14}\text{CO}_2$ yield became worse. In addition, a simple method for continuously recording overall expiratory CO_2 flow rate is introduced, as it is considered essential to correlate the $^{14}\text{CO}_2$ flow rate to overall expiratory CO_2 flow rate.

**Development of New Radionuclide Bolus Injector
and Evaluation of Bolus Using Venous Phantom**

H. BUNKO, A. KUWAJIMA, A. KUBOTA, N. TONAMI and K. HISADA

Department of Nucluar Medicine, Kanazawa University

Recent progress in cardiovascular radionuclide angiography requires good radionuclide bolus injection. The authors usually employed saline flush immediately after radionuclide injection using

conventional three way stop cock. However, sometimes this method failed to create good radionuclide bolus because of difficult and trouble some handling. The authors thereby created an auto-

matically moving three-way stop cock (Pressure-valve type, PV) and a completely new double syringe type (D.S.) injector. The radionuclide bolus transit was evaluated using a simple venous phantom with single mixing chamber attached on the high resolution collimator surface of Picker dynamometer IIC. Time activity curve of radionuclide bolus transit at the mixing chamber by conventional three-way stop cock showed large second peak after main bolus transit in every instance. Time delay between main peak and second peak was variable according to handling time of three-way stop cock. To compare with this, PV showed a smaller second peak and its time delay was fairly

stable (about 1.5 second). However, these two methods of radionuclide bolus injection inevitably had time delay between main peak and second peak and these were thought to be inadequate for radionuclide bolus injection.

Time-activity curve of radionuclide bolus transit using D.S. showed clear single peak alone and no interrupting second peak in descending portion of the curve. D.S. had no time delay between radionuclide injection and saline flush because of its structure, and thought to be the best method of radionuclide bolus injection with saline flush. Radiation dose to handler was also expected to decrease with D.S. injector.