A Basic Study of Radiorespirometry
Analysis of Expired Air Pattern of Rats Bearing 3′-Me-DAB Experimental Liver Cancer

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Male Donryu rats were pretreated with 0.06% 3′-Me-DAB and then given ^{14}C-labled substrates in a biological system in order to study the differential pattern of $^{14}CO_2$ in respiratory system from the following three view points i.e., (1) peak time (2) peak hight, and (3) total amoutn of $^{14}CO_2$ collected in two hours. With α-fetoprotein (AFP) primary positive rats that are observed a few weeks after the administration of 3′-Me-DAB, the peak time of $^{14}CO_2$ generated from ^{14}C-glucose is temporarily delayed right after the appearance of AFP then the time to reach the peak is shortened.

With the rats the AFP primary reaction of which turned from positive to negative, peak time was delay. However, significant difference was not observed in the total amount of $^{14}CO_2$ between the treated and control rats.

Furthermore, in the period that AFP secondary reaction was positive, the same tendency as that of the primary reaction was observed and then peak hight was also increased.

With hepatoma cells glucose-metabolism is intensive, and with cancer-bearing rats, it is considered that the more rapid the proliferation of the cells is, the more glycolysis is enhanced.

It is suggested from the radiorespirometric pattern that anaerobic glycolysis would already be enhanced in the early stage of carcinogenic process, when the oval cells appear. This finding is considered to be interesting related to the production of AFP.

It seems that radiorespirometric analysis could be an useful method for diagnosis of nuclear medicine.

Evaluation of Liver Function Using Stable Isotope Labelled Benzoic Acid in the Patients with Various Liver Disease

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We have attempted to improve the sensitivity of hippuric acid test using stable isotope labelled benzoic acid (D_5-benzoic acid) and gas chromatography/mass spectrometer system. At present, the hippuric acid test is not commonly used as liver function test despite its significance of indicating hepatic antidotal capacity, because it lacks in sharpness in detecting abnormality.

Approximately 100 mg of D_5-benzoic acid was administered orally, and urine was collected during the ensuing four hours. Hippuric acid was extracted from the urine and D_5-hippuric acid derived from D_5-benzoic acid and H_5-hippuric acid synthesized through normal metabolism were determined separately in high accuracy. Ratio of D_5-hippuric acid excreted into urine within four hours to the equivalent weight of D_5-benzoic acid administered was calculated in 45 cases. (9 normal