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STUDIES ON RENAL SCANNING AGENTS(PART. 6). COMPARISON OF RENAL IMAGING WITH SOME Tc-99m LABELED AGENTS.

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In relation to the development of renal scanning agents, we carried out basic studies on renal imaging with some Tc-99m labeled agents using rats and rabbits. The compounds used were as follows: Phthalic acid, salicyl uric acid, meso-DMS,dl-DMS, thiomalic acid, mesoxalic acid, Unithiol and 2,3-dimercaptopropionic acid(DMP). They were capable of forming complexes with Tc-99m in good yields in the presence of stannous chloride in acidic media. About 500 μCi of each labeled agent was given to rats, and whole body images were obtained using a 7.5 cm NaI(Tl) scintiscanner 2 or 3 hr after i.v. injection. Our results indicated that aliphatic compounds gave much better renal images in comparison with aromatic compounds. Of the agents tested, DMP showed good renal images and the maximum renal uptake(51%) was observed 3 hr after dose. DMP showed greater renal concentration than other Tc-99m-agents except for DMS and Unithiol. Furthermore, we examined the possibility of clinical application of Tc-99m DMP by scinticamera imaging in rabbits. Good renal images at 30 and 40 min after dose were obtained. This product seems to be promise for clinical use judging from the results of animal experiments. We believe that a new agent, Tc-99m DMP deserves further investigation.

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CODING, REGISTRATION AND DATA MANAGEMENT SYSTEM OF NUCLEAR MEDICINE IN CANCER INSTITUTE HOSPITAL.

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In our hospital each of the examination data in nuclear medicine was transformed into code and registered systemically in the microcomputer since last year.

We made our own cord system originally to suit to our pourpose, adopting international ones as many as possible. Especially in bone scans for screening of bone metastasis as it is necessary to detect bone lesions as early as possible, 5 steps grading which is popular in cytology was tried to apply to distingwish false positive findings from true positive one in evaluation of bone scanning. To get over the diffculties to make accurate diagnosis in early stage of bone metastasis and to predict, in near future, the rate of true metastasis, the data base is adding now.

Up to this time, six thousands records of examination datas were registrated in our system and bone scans performed to the patients with breast cancer came to one thousand and five hundred records. From our data about bone scans for breast cancer, eighty per cent of grade 5 and 4 were confirmed to be metastasis. And twenty-two per cent of grade 3, four per cent of grade 2 and 1 were showed to have bone lesions.

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PROCESSING ECT IMAGE OF OPPOSE-POSITIONED GAMMACAMERAS BY NUCLEAR MEDICINE DATA PROCESSING DEVICE GMS-80A

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We reported last year on the Single Photon ECT Unit using opposed-positioned gammacameras. (No. 371) We will report on the improvements in operability and image quality we made by reviewing problems in clinical applications. The features of the newly developed system, from the viewpoint of image processing, are as follows.

1) The ECT function, which was added as a command for GMS-80A, helps learn the operation.
2) Calculation for reconstruction can be performed while acquiring data for ECT.
3) Measuring conditions (step angle, measuring time) can be set on the data processing side.
4) Data acquiring and processing conditions can be overlapped on the tomographic image and displayed, which makes data storage control easy.
5) A projected image can be displayed intermittently to overlap on the reconstruction zone, which make it easy to position the patient.
6) Besides sagittal and coronal conversions, a tomographic image in the desired direction perpendicular to the transverse section of the rotating patient's body can be produced.

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AN AUTOMATED PHOTOSYNTHESIS OF [C-11]GLUCOSE.

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[C-11]glucose, available as radiopharmaceutical, was prepared by photosynthesis using leaves of spinach, and all procedures have been automated.

$^{11}CO_2$ was obtained by proton-irradiation of nitrogen gas using the automated production system of labeled gases, and was adsorbed on Molecular Sieve 4A. Sequence of an automated synthesis of [C-11]glucose is programed as follows.

1. In Vessel A containing leaves of spinach: introduction of $^{11}CO_2$ from Molecular Sieve 4A — photosynthesis — introduction of ethanol — extraction of sugars — transfer to the vessel B.
2. In Vessel B : condensation of ethanol — introduction of HCI — hydrolysis — transfer to the column system.
3. Column system : activated charcoal loaded on AG 11A8 resin. [C-11]-labeled sugars were analysed by HPLC on μBONDAPAK/CH column. Synthesis was completed within 45 min and a mixture of [C-11]glucose and [C-11]-fructose (1:1) was obtained with 30-50 % of radiochemical yield.

[C-11]glucose was applied to the scanning of tumor.