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SCANDITRONIX MC16F CYCLOTRON AND RI-PRODUCTION SYSTEMS.

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The small cyclotron MC16F made by Scanditronix (Uppsala, SWEDEN) is a fixed energy (Proton 16MeV and Deuteron 8MeV) isochronous cyclotron especially designed for radionuclide production in a hospital. Control systems are composed of programable controller and operation is quite simplified. With optional radiation shield it is possible to install MC16F in an ordinaryroom without special radiation shield wall. In the radiation shield, four targets for C-11, N-13, O-15 and F-18 are setted on the target support. Each target may be quickly interchanged. C-11O, C-11O_2, HC-11N, N-13_2 gas, N-13_2 solution, N-13H_3, O-15_2, CO-15_2, H_2O-15, F-18_2 and HF-18. production systems are available. These systems have been developed with the cooperation of the MRC cyclotron unit at Hammersmith Hospital, London and Uppsala University. MC16F cyclotrons and RI-production systems are under construction in Uppsala and will be installed in Johns Hopkins Hospital, USA and Karolinska Hospital, SWEDEN.

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ON THE STATUS OF SUMITOMO CGR MeV CLINICAL CYCLOTRON CYPRIS.

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CYPRIS (Cyclotron for Production of Radioisotopes) is now under development to provide positron emitting radioisotopes of ^{11}C, ^{13}N, ^{15}O and ^{18}F labelled compounds for clinical diagonosis by joint study with CGR MeV. This system consists of: (1) model 325 cyclotron, (2) targetry, (3) labelling compound processing system. The model 325 cyclotron, as shown in Fig. 1, can accelerate proton energy of 15 MeV and deuteron 8 Mev. The control system is designed to achieve automatic operation assisted by a micro-processor system and the operation conditions are displayed on a CRT. Six sets of target are accomodated in the target system and a specific target can be selected by the console. This multi-target system serves to keep high specific activity and purity of labelling compounds which will be supplied as follows: ^{11}CO, CO_2, HCN, $^{13}N_2$, NH_3, $^{15}O_2$, CO and CO_2. In the next,another kinds of compound processing unit will be added to this system.

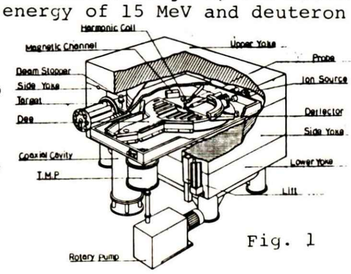

Fig. 1

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EMISSION COMPUTED TOMOGRAPHY USING A SCINTILLATION CAMERA, LFOV.

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The general constitution and the performances of an ECT system using the Anger type camera detector, LFOV-E, are presented. This system can produce not only multiple tomographic images for conventional single photon isotopes but also the whole body image of radioisotope distribution through-out the body. The whole body image is produced by moving the detector stand along the patient instead of moving the patient table. This configuration reduces the required room space considerably.

In the ECT mode, the detector is rotated 360° around the patient. There are two rotation modes, step mode and continuous mode. Any angle larger than 2° can be chosen as step angles. The rotation speed in continuous mode can be selected from 360°/2 min. to 360°/60 min.. The Shimadzu Scintipack 1200 system is used for the data processing. This computer system can perform the data acquisition and the reconstruction of images simutaneously. The filtered-back projection method is used for the reconstruction of image. Several experiments were made by using the liver phantom. Sufficiently good images of the liver phantom were obtained. Tomografic images give us more accurate information on the distribution of radio nuclide than the scintigram.

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EMISSION COMPUTED TOMOGRAPH.

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As for emission computed tomograph (ECT), there are two approaches, that is, rotating the conventional anger camera head and circular ring detector array type of ECT, which has recently been developed. The former is capable of being used as not only ECT but also conventional two dimensional imaging device and features general purpose nuclear imaging device. In the facilities where conventional camera detector stand and nuclear medicine computer system have already been installed, simple rotating chair is a device to modify them for ECT system. They are capable of acquiring data of more than 10 cross-sectional planes by one scanning, and reconstructing sagital and/or coronal images. As for circular ring detector array type of ECT, it features higher sensitivity and better spatial resolution than camera ECT. Further more, as it can be used as positron ECT, it is expected to give useful clinical data in accordance with a popularization of cyclotrons. In conclusion, the camera type of ECT is adequate for cross-sectional imaging of a large volume organ such as liver and ring type of ECT is for dynamic measurement such as brain blood flow study.