281

THE CYCLOTRON NUCLEAR MEDICINE FACILITY OF KYUSHU UNIVERSITY HOSPITAL. Y.Ichiya, Y.Kuwabara, Z.Ayabe, M.Katsuragi and K.Matsuura. Faculty of Medicine, Kyushu University. Fukuoka. M.Kojima. Faculty of Pharmaceutical sciences. A.Yoshimura. Radioisotope center.

The cyclotron nuclear medicine building, which is in the vicinity of existing clinical nuclear medicine facility, was completed in Marchi, 1983. It has two stories and one basement with total space of about 600 square meters.
It includes the cyclotron room, the hot laboratory, the preparation room and two positron CT rooms plus additional space.
The Japan Steel Works BC1710 cyclotron accelerator(proton 17Mev, deutron 10Mev) is currently being installed in the basement.
The positron CT rooms are located on the first floor where a positron CT device will be installed this year.
Initially, the positron-emitter labeled gases, 150-CO_2, 150-O_2 and 11C-CO will be used in the study of brain diseases.
Later studies will focus on the use of 18F-FDG etc.

282

EVALUATION OF THE BABY CYCLOTRON BC-168 AS A CLINICALLY BASED MACHINE. E.Hagami, M.Murakami, K.Takahashi, S.Miura, I.Kanno, T.Hachiya, Y.Shoji, Y.Aizawa, F.Shishido and K.Uemura. Research Institute of Brain & Blood Vessels-AKITA, Akita.

A compact cyclotron (Baby Cyclotron BC-168, Japan Steel Works, Ltd.) has been installed and worked since March 1983. The compact cyclotron is dealt as a site generator of short-lived radioisotope (RI). Therefore, it is desired for such system to be short enough of set-up time by start for RI production dayly use, and to be stable and easy at the operation. We here summarized our experiment on the BC-168.

Preparation time to produce RI was about 20 min including a warming-up operation and beam adjustment. The beam current is stable during the bombardment even with 50 μA for 2 hours, under which condition ^{20}Ne (d, α) ^{18}F reaction is done, while it takes 10 min to increase the beam current up to 50 μA. In the case to supply for the ^{15}O brain study, switching time of RI from $C^{15}O_2$ to $^{15}O_2$ or from $^{15}O_2$ to $C^{15}O$ is less than 10 min. In order to steadily obtain RI, maintenances of an automatic chemical synthesis system and a gas stability controller become system also important duty. Since at scheduled maintenance for exchange of the parts such as the septum radiation dose of the staff would be very high, a simple and easy process for these is indispensable as a clinical machine.

283

SUPPLY AND DEVELOPMENT OF RADIOPHARMACEUTICALS FOR CLINICAL USE IN AKITA. M.Murakami, K.Takahashi, I.Kanno, S.Miura, E.Hagami, T.Yamaguchi, F.Shishido and K.Uemura. Research Institute of Brain & Blood Vessels-AKITA, Akita.

We report the present status of supply, analysis and development of radiopharmaceuticals labelled with cyclotron produced positron emitting isotopes that are clinically appliable in our institute. 1) In the case of clinical study, radiotracers ($C^{15}O_2$, $^{15}O_2$, $C^{15}O$) which are used for the measurement of cerebral blood flow and oxygen metabolism are synthesized, regulated and supplied automatically. Results of quality tests and the condition that produce radioactive or non-radioactive contaminants are reported. 2) [^{18}F]-FDG which is the tracer for cerebral glucose metabolism was synthesized for clinical application and animal experiment by the methods of Ido et al. and Shiue et al., respectively. The comparative data of these two methods and the specific activity of [^{18}F]-FDG and [^{18}F]-F_2 are reported. 3) The compounds showed in 1) are studied to solubilize in physiological saline for continuous or bolus intravenous injection and the results are reported. 3) The synthesis of [^{11}C]-2deoxy-D-glucose which is useful tracer as well as [^{18}F]-FDG is tried, and the fundamental data are showed.

284

A NEW INHALATION SYSTEM FOR CYCLOTRON PRODUCED RADIOACTIVE GAS. E.Hagami, M.Murakami, I.Kanno, I.Suzukawa*, M.Akiyama*, T.Yamada*. Division of Radiology, Reseach Institute of Brain and Blood Vessels-AKITA, Akita. *The Japan Steel Works Ltd.

A new inhalation system for cyclotron produced radioactive gas has been developed. This system is composed of a gas control unit, inhalation units and a radioactive gas reservoir unit. Gas control unit consists of two RI calibrators, gas control valves, an air pump, etc. In case of continuous inhalation, gas flow rate and activity density is precisely controlled with a microcomputer. For a single inhalation, high density radioactive gas can be directly provided to the inhalation unit. The gas control unit is remotely operated by a control console with CRT display.
The inhalation unit is used for both continuous inhalation and single inhalation by changing the gas flow line in the unit, and it contains a bag as a buffer.
The radioactive gas reservoir unit mainly consists of a compressor and gas cylinders.