
The development of $^{11}$C-palmitic acid as a radiopharmaceutical to be used as a myocardial scanner is highly anticipated. We studied a process for automatically synthesizing $^{11}$C-palmitic acid with a radiochemically high yield and high purity and report our findings as follows. $^{11}$C-palmitic acid is obtained by introducing $^{11}$CO$_2$ gas into Grignard reagent, CH$_3$(CH$_2$)$_3$MgBr, and by hydrolyzing the products obtained. This reaction, however, tends to produce byproducts such as ketone, hydrocarbon and many other compounds which affect purity and yield. In efforts to minimize the amount of these byproducts, we conducted diverse examinations and developed an automatic synthesis system capable of synthesizing high purity $^{11}$C-palmitic acid. 35 - 40 mCi (EOS yield) of $^{11}$C-palmitic acid was obtained after a 20-minute irradiation by CYPRIS at P-20 μA.

DEVELOPMENT OF CANCER DIAGNOSTIC TECHNIC WITH $^{18}$FDG AND ITS CLINICAL APPLICATION TO THE DETECTION OF CANCERS LOCATED IN ABDOMEN. H. Fukuda, K. Yamada, M. Ito, Y. Abe, S. Yoshioka, J. Hatazawa, K. Kubota, T. Matsuzawa (The Res. Inst for TB & Cancer, Tohoku Univ.); T. Ido (Cyclotron and Radiisotope Center, Tohoku Univ.)

By experimental study, $^{18}$FDG was found to be a good radiopharmaceutical for cancer detection, because of high tumor accumulation, rapid blood clearance and low accumulation in liver and pancreas. This cancer diagnostic technic with $^{18}$FDG was applied to primary and metastatic hepatomas and pancreatic cancers. The patients were injected with 4-6 mCi of $^{18}$FDG and serial scanning for every 5 min was done by positron emission tomography. Tumor uptake of $^{18}$FDG was high and increased with time, whereas $^{18}$FDG uptake of normal liver decreased with time. Therefore, by 50-60 min after injection, positive and clear image of intrahepatic and pancreatic cancers were obtained. In a case who was irradiated to a part of tumor, there was a decrease of $^{18}$FDG uptake in agreed with the irradiated area. This meant that $^{18}$FDG uptake depends on tumor viability and so that this technic would be useful for the evaluation of cancer treatment.


Regional cerebral metabolic rate of glucose ($rCMRGlucose$) was measured in post-apoplectic patient. [three months old left putaminal hemorrhage] The procedure was carried out according to deoxyglucose method originally developed by Sokoloff and applied to PET by Phelps. 5 mCi of $^{18}$FDG was injected and a 12 five-minutes scan was performed after injection at the level of OM±50 mm in order to measure accumulation of $^{18}$FDG in brain tissue. Arterial blood sampling from radial artery was performed in order to calculate plasma activity of FDG. After 12 sequential scans, tissue distribution of FDG was measured at the level of OM±50 mm and OM±80 mm. $rCMRGlucose$ was markedly decreased in overall affected hemispher and right cerebellum. The values in frontal, temporal, occipital and parietal cortex were 5.0, 3.1, 4.1 and 3.5 mg/100g/min in left hemisphere, 6.3, 6.4, 6.8 and 7.0 mg/100g/min in right hemisphere. These values by autoradiographic measurement were higher than the values obtained by kinetic measurement of rate constants determined in the least square fitting procedure between tissue and plasma FDG activity.