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SYNTHESES OF F-18-HALOPERIDOL,F-18-SPIROPERIDOL AND C-11-AMINO ACID FOR BRAIN FUNCTIONAL DIAGNOSIS. H.Saji. School of Med.,Kyoto Univ., M.J.Welch. Washington Univ.,St.Louis U.S.A.

The labeling of dopamine antagonist like spiroperidol, haloperidol with F-18 for the estimation of dopamine receptor in the brain as well as, the labeling of amino acid with C-11 for the measurement of protein synthesis, have been considered as of importance for the diagnosis of Parkinson, epilepsy, or other diseases of the cerebral system. In this work, basic studies on the labeling of those compounds are presented. For the preparation of high specific activity F-18-haloperidol and F-18-spiroperidol, the reaction of piperidino triazene with anhydrous HF-18 was considered. Upon the study on conditions for the production of anhydrous HF-18, reaction conditions for the optimal preparation of stable and pure F-18 labeled product were studied. Compared with the conventional CsF-18 method, the yield of a high specific activity of F-18 haloperidol was more than twice higher (3.5%), although some problems still remains for the F-18 spiroperidol. As for the labeling of amino acid with C-11, the carboxylation of α-lithioisocyanide with $C\text{-}11O_2$, followed by hydrolysis of intermediate products to the desired amino acid, was introduced. Radiochemical yield of 7.4% was achieved for C-11-norvaline. Based on this data, further conditions for improving the yield needed in future clinical application is under progress.

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SINTHESIS OF RADIOACTIVE TRACERS FOR CEREBRAL BLOOD FLOW MEASUREMENT.—METHYL FLUORIDE,NITROUS OXIDE,IODOANTIPYRINE—. M.Murakami,T.Ido,R.Iwata and K.Ishiwata. Cyclotron and Radioisotope Center, Tohoku University, Sendai.

For the purpose of cerebral blood flow measurement, tracers labelled with cyclotron produced isotopes were synthesized. [F-18]-Methyl fluoride:F-18 has been produced by O-18(p,n)F-18 or Ne-20(d,α)F-18 reactions and trapped as KF. Methyl fluoride was obtained by the nucleophilic substitution of F-18 anion to methyl methane sulphonate in the presence of 18-crown-6 with the radiochemical yield of 10-20% and 25-65% within 40 min at the condition of carrier free and carrier added state, respectively. The radiochemical purity was always 100%. [N-13]-Nitrous oxide:N-13 was induced to ammonia and which was converted to ammonium nitrate. Nitrous oxide was synthesized by pyrolysis with 1 mmol of carrier at 180-225°C. The radiochemical yield increased (34→76.8%) and the purity decreased(98.6→96.5%) as the temperature increased. [C-11]-Iodoantipyrine:C-11 was induced to methyl iodide. Antipyrine was synthesized from 3-methyl-1-phenyl-2-pyrazoline-5-one and methyl iodide, then was converted to iodoantipyrine by molecular iodine. The radiochemical yield was about 20% within 40 min after the end of methyl iodide synthesis. The combined use of these tracers with positron emission tomograph will give insight for the more suitable tracer for CBF measurement.

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TISSUE DISTRIBUTION STUDIES OF [Ti-45]-COMPLEXES WITH DTPA, CITRATE AND HSA. K.Ishiwata, T.Ido, M.Monma, M.Murakami, K. Kawashima, H.Fukuda*, K.Yamada*, T.Matsuzawa*, M.Kameyama** and R.Shirane**. Cyclotron and Radioisotope Center, The Research Institute for Tuberculosis and Cancer* and School of Medicine**, Tohoku University, Sendai.

The [Ti-45]-labeled compounds are expected for the new positron emitting radiopharmaceuticals in the nuclear medicine. The Ti-45 was produced from Sc foil via the $^{45}Sc(p,n)^{45}Ti$ reaction. After separating Ti-45 from Sc by using ion exchange resins, the [Ti-45]-complexes with diethylenetriaminepentaacetic acid(DTPA), citric acid and human serum albumin(HSA) were prepared.

Three compounds showed the similar tissue distribution in the tumor(AH109A)-bearing rats. In the blood the Ti-45 was present at the highest level in all tissues and cleared with a half life of about 4 hours. At 24 hours after injection the highest accumulation was found in the bone. On gel filtration chromatography the Ti-45 was found to be bind albumin in the blood. In the tumor the specific accumulation was not found.

An autoradiogram of the rat brain showed the [Ti-45]-DTPA passing the blood-brain barrier which was broken by the administration of mannitol intraarterialy.

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EXCITATION FUNCTION OF CU-63(p, 2n) Zn-62 REACTION AND THE RI PRODUCTION YIELD. M. Takahashi, Y. Tanaka, M. Yamaguchi and S. Nakamoto. Technical Section, Technical Department, NIHON MEDI-PHYSICS CO., LTD., Takarazuka.

The amount of beam current can be determined by measuring Zn-63 and Zn-62 produced by Cu-63(p,n), (p,2n) reactions. This is so called "Stack Foil Method". We have established a procedure to know the yield of RIs produced in our cyclotrons with this method.

Specifically, a stack of 40-50 sheets of copper foil (0.02mm thickness) is bombarded by proton beam of 0.1-0.5uA for 10-15min, and activity of each copper foil is measured by Ge (Li).By counting γray intensity of each copper foil, precise beam amount can be calculated. Thus, this method is useful in evaluating the production yield, content of radionuclidic impurities, and economical efficiency of nuclides to be produced with our cyclotrons.

Production capacity of Zn-62 - Cu-62 generator was estimated by the excitation function of Cu-63(p,2n) Zn-62(9.13 hr half life). We found that an in-house cyclotron of 15-18 MeV proton energy will have the production yield of 1/10-1/15 Zn-62 compared with our cyclotrons.