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DETERMINATION OF METHIONINE METABOLISM IN ISCHEMIC GERBIL BRAIN BY AUTORADIOGRAPHY.
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Amino acids are known to be taken into brain tissues by active transport using ATP energy. We measured C-11 and C-14 methionine (Met) uptake in unilateral common carotid occlusion and recirculation model. After 30 min ischemia, rt. carotid blood flow was recirculated and 15 min later, C-11·Met of 8 mCi was injected intravenously. 14 min later, C-14 iodoantipyrine (C-14·IAP) of 5 μCi was injected in 60 sec to indicate local CBF and then sacrificed. The dissociation of lCBF and Met metabolism was prominent in rt. hippocampus where Met uptake was low, while lCBF was nearly restored. In affected thalamus and cortical gray, Met uptake was higher in comparison with lCBF. Perhaps, these phenomena caused by regional difference of tissue tolerance for ischemic state and reperfusion injury. Next, to determine the difference between C-11 and C-14, three tracers were administrated to a stroke gerbil; C-11·Met ($CH_3$ label) and C-14·Met(universal label) for Met uptake and I-123·IAP for lCBF. Using this triple-label ARG technique, images from C-11 and C-14 were almost homologous, and as for lCBF, images were same to the previous study mentioned above. Methionine is a useful tracer for detecting metabolic impairment of a stroke brain, but in a human PET study, chronological changes in lCBF or glucose metabolism must be considered for image interpretation.

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AN EXPERIMENT ON MULTI-LABELED AUTORADIOGRAPHY(ARG).
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The history of the ARG using multi-labeled compounds is not so long. There have been only a few reports on the combination of I-123 or I-131 and C-14. In order to establish the multi-labeled ARG, we applied on mongolian gerbils F-18-Fluorodeoxyglucose(F-18-FDG),C-11-Methionine(C-11-Met), N-13-$NH_3$,I-123-Iodoantipyrine(I-123-IAP) and C-14-IAP. The ischemic region of right cerebral hemisphere was induced by means of clipping the right common carotid artery for 30 minutes. After the post-ischemic circulation, each of them was injected on the combination of F-18-FDG and C-14-IAP, or C-11-Met and C-14-IAP, or N-13-$NH_3$ and I-123-IAP and C-14-IAP. In the results, glucose uptake dissociated with post-ischemic blood flow. Methionine uptake by the ischemic brain did not necessarily correlate with tissue perfusion. $NH_3$ incorporation to the brain tissue was not consistent with tissue perfusion. Then we accomplished the triple labeled ARG utilizing N-13-$NH_3$,I-123-IAP and C-14-IAP.

Consequently, the multi-labeled ARG becomes a powerful tool to investigate the cerebral blood flow and metabolism on the same region. Also, this method can provide the useful informations to interpret the imaging of positron emmision tomography.

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CLINICAL STUDY OF ISCHEMIC CEREBROVASCULAR DISEASE WITH POSITRON EMISSION CT - CEREBRAL BLOOD FLOW AND GLUCOSE METABOLISM-
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We have been applying positron emission CT(PCT) for neurologically ill patients. Five cases of ischemic cerebrovascular disease were performed both blood flow imaging with N-13-NH3 and glucose metabolism imaging with F-18-FDG. The dissociation between blood flow pattern and glucose metabolism pattern in ischemic brains was clarified. In acute stage of cerebral infarction, a reactive hyperemia was noted focally. But glucose metabolism was lowered in accordance with the extent of an infarcted area. Both tracers were decreased in watershed zone. In chronic stage, blood flow and glucose metabolism were lacked in an infarcted area. In a small infarction by X-ray CT, blood flow was disturbed in a broadwide area. Glucose metabolism disturbance was more localised and showed a true infarction. In those patients, lowered perfusion seemed a cause of an infarction. In a case who suffered a reconstructive surgery (ST-MCA anastomosis), blood flow was increased postoperatively, but glucose metabolism was not changed.

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In-111 PLATELETS SCINTIGRAPHY FOR THE DETECTION OF VASCULAR THROMBI IN ISCHEMIC CEREBROVASCULAR DISEASE.
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Semiquanitative analysis of platelet deposition induced by atherosclerosis was performed in the patients with ischemic cerebrovascular disease by means of dual isotope technique using In-111 platelets and Tc-99m HSA. This technique offers the correction of the radioactivity of In-111 in the blood pool and the calculation of the ratio between platelets deposited(In-D) and in the blood pool(In-BP). In-D/In-BP(PAI; platelet accumulation index) was calculated at the carotid bifurcations in 11 normal subjects and 27 patients with CVD. The carotid arteries in the subjects were classified into three groups according to their angiographic findings;i.e. 22 carotid bifurcations in normal subjects(group 1), 20 bifurcations without angiographic abnormalities in CVD patients(group 2) and 34 bifurcations with angiographic abnormalities in CVD patients(group 3). The mean PAI of the group 3 was significantly greater than those of group 1($P>0.001$) and group 2($P>0.001$). No significant difference in the PAI was observed between group 1 and 2. From these results, we concluded that platelet deposition occurs more frequently in the arterial walls with angiographic abnormalities than in those without angiographic abnormalities.