tiveness of 99.1%. In radionuclide imaging with ^{99m}Tc-pertechnetate, high positiveness was obtained in meningiomas, acoustic neurinomas and metastatic tumors and those poorly localized were midline tumors, tumors located at the base of the skull. However, improved brain scan images and specificity were obtained with combined use of different radioisotopes (^{99m}Tc-pertechnetate, ^{99m}Tc-diphosphonate and ^{67}Ga-citrate) in 39 cases. Scans with ^{99m}Tc-diphosphonate are useful for detecting lesions of the skull. In cases with meningiomas, scans with ^{99m}Tc-diphosphonate showed contiguous bone damage by tumor infiltration. They are also useful for differentiating tumor from infarction, when CT scans show low density areas. In cerebral infarction, most lesions are better demonstrated with ^{99m}Tc-diphosphonate than with ^{99m}Tc-pertechnetate, while tumors are usually visualized better with ^{99m}Tc-pertechnetate than with ^{99m}Tc-diphosphonate. Brain scanning with ^{67}Ga-citrate was occasionally more useful for delineating tumors than those with ^{99m}Tc-pertechnetate, especially tumors located at the skull base. In addition, dynamic study by bolus injection of radionuclide and delayed scanning are essential for "nature" diagnosis of brain tumors. We emphasized usefullness of different informations from different isotopes.

CT was very sensitive in detecting mass lesions with detailed morphological changes. CT detects glioma of low grade malignancy missed by radionuclide scanning. Basically, CT displays the morphological pattern of the tumor and the brain more precisely, while radionuclide scanning defines tissue function or dynamic aspect. Future emphasis in nuclear medicine must be placed on the study of tumor specificity and dynamic aspect of the lesion rather than its structure, prospecting the development of more specific radiopharmaceuticals. Radionuclide imaging and CT are two noninvasive procedures that have a high rate of detection of intracranial tumors. From this comparative study, we conclude these two procedures are to be complementary in the investigation of intracranial tumors.

Production and Tumor Affinity of Thulium-167

Atsushi ANDO*, Tatsunosuke HIRAKI*, Shigeru SANADA*, Kinichi HISADA**, Itsuko ANDO**, Yoshiaki SHIROTA**, Koh SAKAMOTO***, Kenji DOISHITA****

**School of Paramedicine, Kanazawa University, **School of Medicine, Kanazawa University ***Faculty of Science, Kanazawa University, ****Fukui Prefectural College*

Recent studies have shown that rare earth radionuclides of high atomic numbers concentrate favorably in tumor tissues and bone, Among these nuclides ^{167}Tm is reported to be one of acceptable tumor localizing agents in view of its decay characteristics, the half-life of 9.24 d and the EC dacay followed by a 208 keV gamma-ray. The present study concerns a new method of production of a high activity ^{167}Tm, via a reaction ^{169}Yb (γ, n) ^{167}Yb $\xrightarrow[17.7m]{EC}$ ^{167}Tm. In a photo-reaction on ytterbium at moderate energies the 93.1d ^{168}Tm is not produced and other longlived nuclides ^{170}Tm (T 1/2=130d) and ^{171}Tm (T 1/2=1.91y) are produced in negligible amounts due to small cross sections of the (γ, p) reaction. ^{167}Tm-citrate was injected intravenously to the rats subcutaneously transplanted Yoshida sarcoma and was injected intraperitoneally to the mice subcutaneously transplanted Ehrlich tumor. These animals were sacrificed and distributions of ^{167}Tm in the organs and tumor were determined. On the other hand, the tumor tissues and liver were excised and subcellular fractionation of these organs were carried out according to be method of Hogeboom and schneider. ^{167}Tm of each fraction was counted by a well type scintillation counter. In Yoshida sarcoma and Ehrlich tumor, most of the radioactivity was localized in the supernatant fraction, and small amount of radioactivity was accumulated in the mitochondrial fraction (lysosome contains in this fraction). But in the liver, most of the radioactivity was concentrated in the mitochondrial

fraction and the radioactivity of this fraction was increased with the passage of time after administration. Twenty-four hours later, about 50% of total radioactivity was accumulated in this fraction. About above-described animals, these tumor tissues were frozen in n-hexane (−70°C) cooled with dry-ice acetone. After this, these frozen tumor tissues were cut into several thin sections (10μm) in the cryostat (−20°C). One of the slice of these sections was then placed on X-ray film and this film was developed after exposure of several days. On the other hand, next slice of these section were then stained using the hematoxylin and eosin. From the observation of these autoradiogram and H.E stained slice, concentration of ^{167}Tm was predominant in connective tissue (which contains inflammatory tissues) rather than in viable tumor tissue.

Considering the above-described facts, it is concluded that lysosome does not play an important role in the tumor concentration of ^{167}Tm and lysosome plays an important role in the liver concentration of ^{167}Tm, it is presumed that binding substance of these elements is acidic mucopolysaccharide, as there are large amount of acidic mucopolysaccharide in inflammatory tissues,which has many carboxy radical, sulfonic group in its structure.