Brain Tumor Uptake of Iodo-Alpha-Methyl-Tyrosine

TO THE EDITOR: I have read with great interest the article by Langen et al. on brain and brain tumor uptake of ^{123}I-labeled iodo-alpha-methyl-tyrosine published in the *Journal* (*J Nucl Med* 1991;32:1225–1229). The accompanying editorial by William Oldendorf in the same issue (pages 1229–1230) is also most interesting and does make the point that once again the possible potential for SPECT work in clinical medicine is further extended.

For the record and as a matter of interest, I would like to demonstrate a case study that we published in 1982 on a 67-yr-old female admitted with a recent history of a swelling in the front of her left ear which was thought to be due to tumor in the parotid gland (*1*). A biopsy specimen revealed an amelanotic melanoma with anaplastic features. We were able to scan this patient with ^{99m}Tc-glucoheptonate and ^{123}I-alpha methyl tyrosine and carry out tomographic studies with both tracers. The 1982 study (Fig. 1) demonstrate the presence of multiple cerebral secondaries which were best demonstrated with the labelled glucoheptonate tracer, but were also shown by the alpha methyl-tyrosine radiopharmaceutical. Interestingly, while three deposits were demonstrated in the ^{123}I-alpha methyl-tyrosine SPECT scan, a large more centrally located lesion demonstrated on the glucoheptonate study was missed.

Multiple tracer studies will add to the interest of SPECT as a tool for the investigation of primary and secondary deposits in the brain. It is important, however, to note that metastasis from a primary tumor even within the same organ may exhibit rather different metabolic properties. This is well known to oncologists with a keen interest in radioimmunoscintigraphy, i.e. the varying differentiation of metastasis arising from a common primary in the same individual at any particular stage of the disease process.

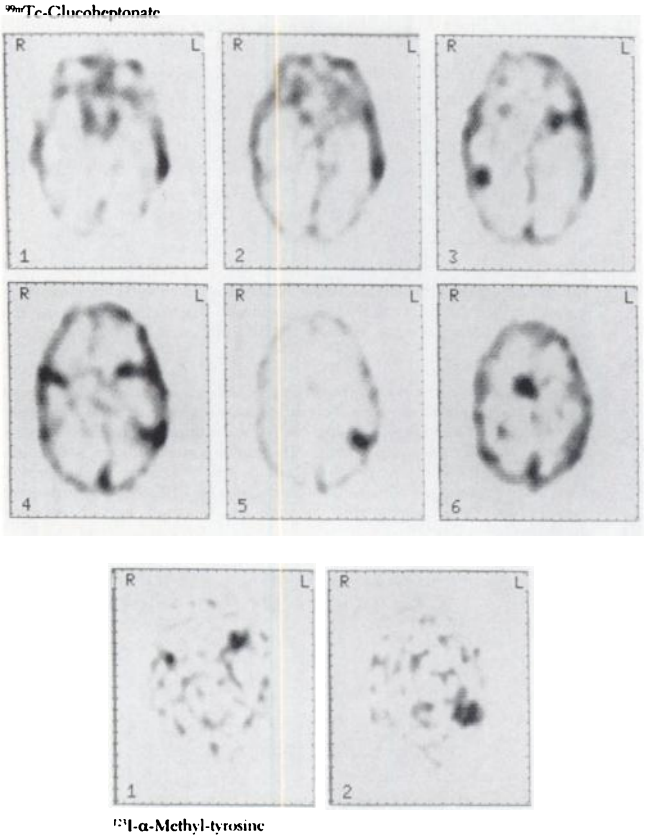

FIGURE 1. Planar gamma camera views are shown in anterior and right lateral projections. Multiple areas of abnormal and focal increased uptake are demonstrated compatible with deposits. This study clearly shows the extent of the multiple intracerebral deposits and provides a dramatic representation of the widespread nature of the disease. Two comparative studies were performed: ^{99m}Tc-glucoheptonate (top) and [^{99m}Tc]pertechnetate (bottom). Note the improved signal-to-noise ratio obtained with ^{99m}Tc-glucoheptonate. (Figure reprinted with permission from reference 1).

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REPLY: We thank Professor P. J. Ell for bringing this interesting case report, which is not in the open literature, to our attention. To the best of our knowledge, his case report represents the first SPECT brain study with ^{123}I-α-methyl tyrosine. The first in vivo studies with this labeled tyrosine derivative, however, were performed by the Jülich group (*1–3*), also in oncology (*2,4*).

It was interesting to note that one of the lesions revealed by ^{99m}Tc-glucoheptonate did not accumulate ^{123}I-α-methyl tyrosine. This observation supports the finding that the accumulation of ^{123}I-α-methyl tyrosine in brain tumors is not due to a disruption of the blood-brain barrier, but rather a consequence of an increased amino acid transport (*5–7*). In the era of computerized tomography and nuclear magnetic resonance it is not the aim of SPECT studies with ^{123}I-α-methyl tyrosine to detect space-occupying lesions, but, instead, to achieve an in vivo characterization of tumor biochemistry. The potential of such investigations, e.g., in determining the grade of malignancy or in measuring therapeutic effects, has clearly been demonstrated by PET studies during the last ten years and may become a routine procedure in clinical practice when tracers like ^{123}I-α-methyl tyrosine are generally available for SPECT studies.

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Characteristics of a Radionuclide Monitoring of Cardiac Function and ST-Segment

TO THE EDITOR: We read with much interest the paper by Broadhurst et al. (*J Nucl Med* 1991;32:37–43) concerning the validation of a new probe to monitor cardiac function and ST-segment. This cesium iodide nuclear probe appears to be a noninvasive and easy means of continuously monitoring global left ventricular ejection fractions (LVEF) and ST-segment. One of the main advantages of such a probe is its high sensitivity to detect changes in left ventricular function, even before symptoms (*1*) and electrocardiographic signs (*2*) appear. We totally agree with most of "ideal detector system" characteristics defined by W.N. Breisblatt (*J Nucl Med* 1991;32:44–47) in order to increase sensitivity, but we would like to underline certain points.

The type and the number of leads are crucial to the sensitivity of long-term ambulatory electrocardiography. Bipolar lead CM-V5 appears to be the most sensitive, but CM-V3 increases ischemia detection by 10% (*3*). CM-V5 alone could be insensitive in cases of a previous inferior myocardial infarction or when ischemic changes are restricted to anteroseptal leads (e.g., leads V1, V2, V3) (*4*). Therefore leads CM-V5 and CM-V3 can examine anterolateral ischemia and modified lead aVf can examine that of inferior ischemia (*5*). Unfortunately, no data were available in the paper of Broadhurst concerning this point. The nuclear VEST permits only the recording of a modified V5 (*6*).

The duration of ambulatory electrocardiography greatly influences diagnostic sensitivity, especially if the nocturnal period is covered. Indeed, the distribution of ischemic episodes over a 24-hr period in chronic stable angina displays a distinct circadian rhythm, with the maximum amount of episodes occurring between 6 am and midday (*7*). A similar peak incidence of myocardial infarction has been described (*8*). If ^{99m}Tc is used, its relatively short half-life will hinder the study of the last part of the night. The use of a radioelement with a long half-life like ^{111}In could lead to an increased sensitivity. The study of regional ejection fraction is known to improve the detection of myocardial ischemia. In a summary of 12 published studies (totalling 771 patients), Gibson and Beller (*9*) reported that the radionuclide angiogram had a sensitivity of approximately 90%, when both failure of a rise in ejection fraction and presence of a new regional wall motion abnormality were required for the test to be deemed positive. As proposed by Breisblatt, study of regional wall motion appears to be an "ideal" characteristic, but it does not necessarily require online imaging. The use of a multi-crystal probe in which the different detectors could be separately recorded after accurate collimation is a low-cost alternative.

In order to achieve these features, an original nuclear probe is now being developed in our laboratory. Three electrocardiographic leads will be recorded as five cesium iodide detectors (e.g., anterior, lateral, septal, inferior walls, and background activity). The option of online and offline monitoring are being considered. Use of ^{111}In will be evaluated. Preliminary results in vitro and in vivo appear promising (*10*).

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False-Positives in Immunoscintigraphy

TO THE EDITOR: We do not have sufficient clinical experience to evaluate the immunoscintigraphy of cancer by ourselves, although many clinical radioimmunodetections have been performed in European countries and in the U.S. We therefore appreciated the paper of Abdel-Nabi et al. (*1*) published in the December issue of the *Journal*, since it gave us the chance to show our case of a false-positive in immunoscintigraphy.

A 68-yr-old woman came to the hospital in January 1989 complaining of abdominal pain. A Ba-enema revealed a mass lesion in the sigmoid colon, which was confirmed as an adenocarcinoma by biopsy. In addition, a CT scan showed a low-density area in the right lobe of the liver, indicating metastasis of the colon Ca. The plasma-CEA level was 11 ng/ml at that time. She received 40 mg of antibody ZCE-025 labeled with 74 MBq of ^{111}In (1 mg of ^{111}In-ZCE-025 mixed with 39 mg of unmodified