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Tumor imaging After Administration of Technetium-99m-Labeled Bleomycin

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Physicians have long desired a sensitive, simple test to detect and localize malignant neoplasms. Bleomycin has been known to have an inhibitory effect on cancers of epithelial cell origin. Recently, the clinical utility of cobalt-labeled bleomycin for tumor imaging was reported. However, the long half-life of ^{57}Co limits its wide use.

We have prepared $^{99\text{m}}\text{Tc}$ -labeled bleomycin. Metabolism, toxic effect, and tumor affinity were studied in normal and tumor-bearing mice. To determine appropriate scintigraphic timing and to study the stability of labeled compounds, serial measurements of plasma radioactivity were made on four patients with different malignant tumors. A larger series of 142 patients was then examined.

Our studies suggest that $^{99\text{m}}\text{Tc}$ -labeled bleomycin localizes relatively quickly into a number of different tumor types, while

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uptake in nonmalignant inflammatory lesions is infrequent. Its use as a diagnostic agent is associated with a very small whole-body radiation dose.

The method has one disadvantage: high radioactivity distribution in the kidney, urinary bladder, nasal area, and circulating blood pool. This might be responsible for lower detectability rates in patients with cancer of the esophagus and of the abdominal and pelvic organs. ■

Half-Life

Kanji Torizuka, MD, President of Fukui Medical School

Since its introduction by Edwards et al. in 1969, gallium-67-citrate had been the predominant tumor-seeking agent utilized in our laboratory. Because of its relative-

ly low specificity, however, we were actively seeking a more sensitive and specific agent for the detection of malignant neoplasms.

Kyoto University's nuclear medicine department was very different then. There was only one scintillation camera and one whole-body scanner in the entire department. By working with our colleagues in the radiopharmaceutical department, however, we became aware of the rapid progress of research into the chemistry of $^{99\text{m}}\text{Tc}$. It was, in fact, discussions with our colleagues regarding labeling techniques which led us to believe that bleomycin labeled with $^{99\text{m}}\text{Tc}$ had great potential as a tumor imaging agent.

That was the beginning of a long and fruitful relationship between ourselves and the radiopharmaceutical investigators, a relationship which has resulted in many exciting new products.

Today many excellent physicians and investigators are actively engaged in the study of nuclear medicine, and they have access to a wide array of instrumentation, including PET.

When I look back upon these past 15 years, a thousand emotions crowd my mind. ■