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Targeted radioisotope generator could be used for molecular imaging

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According to a study presented at SNM's 57th Annual Meeting, a new radioisotope generator could enhance images produced by a molecular imaging technique known as positron emission tomography (PET). The generator, in combination with instant synthesis kits that introduce target constituents like peptides to the mix, could be used to produce molecular imaging agents that enhance the range of targeting capabilities in diagnostic scans, providing physicians with a much broader portrait of how biological processes are working and why.

"This generator is one more advanced technology that can improve the treatment of cancer, cardiovascular conditions and other common conditions," said Jeffrey Lacy, Ph.D., president of Houston-based Proportional Technologies, Inc. "For example, this technology has been shown to be especially effective for measuring myocardial blood flow and renal function.

Physicians could use this technology to more precisely evaluate blood flow through blood vessels and vital tissues, as well as more accurately target treatment for a broad range of cancers."

Using this generator, physicians would be able to inject peptide-labeled agents containing extremely small levels of the targeting peptide, which homes in on biological processes in the body. Only a small number of PET imaging agents are currently available due to their short half-lives, which require daily production and synthesis at more than 100 radiopharmacies across the country. The new generator would depend on

a longer-lived parent isotope (9.3 hr Zn-62) that is relatively easily distributed and obtained, and physicians synthesize and inject the subsequent Cu-62, a copper-based agent, in a matter of minutes prior to scanning.

In this study, investigators miniaturized and redesigned components of a larger-scale generator approved for human investigational studies and tested the system for peptide specific activity using a peptide that targets a melanoma receptor called melanoma-1. Melanoma-bearing mice were injected with the peptide-labeled imaging agent and underwent PET imaging. Tumors showed rapid receptor-specific uptake of the agent with specific activity as high as 200 Ci/umol (a measurement of radioactivity in microcuries per micromolar concentration). Results showed that the generator and kit system was able to instantly label the radioactive copper isotope without further purification. The agent produced by this system has been shown to be favorable to human studies, and may improve upon the image quality of similar copper-based agents.

Provided by Society of Nuclear Medicine

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