# Power of molecular imaging reveals secrets of the heart

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The extraordinary action of a new cellular therapy came to light as a result of powerful PET and SPECT imaging in a recent study reported in the April issue of the *Journal of Nuclear Medicine*. Researchers in Germany were able to observe the repair action of circulating progenitor cells (CPCs), immature blood-derived cells capable of developing into adult stem cells, as they successfully preserved healthy heart tissue and corrected blood flow imbalance within the heart.

Twenty-six patients took part in the randomized, placebo-controlled and double-blinded study. Following the recanalization of blocked coronary arteries (the surgical reopening or formation of new paths for blood flow), one group received an infusion of progenitor cells. FDG PET and 99mTc-tetrofosmine-SPECT were then used to image relative changes in myocardial perfusion (blood flow through the middle and thickest part of the heart) and glucose metabolism.

The results were compared with a control group that had undergone recanalization but did not receive CPCs. In the CPC group, normalization of glucose metabolism and coronary blood flow was seen in nearly 50 percent of the repaired artery segments.

“PET and SPECT are the only techniques capable of validating the metabolic changes we needed to observe in the heart once we had administered the progenitor cells,” said Kai Kendziorra, M.D., a specialist in Nuclear Medicine at the University of Leipzig in Leipzig, Germany. “The results shown by these imaging modalities provide the

evidence needed to expand the use of CPC treatment."

Earlier research has shown that when a patient's progenitor cells are activated by growth factors, the result is increased cell division, which is vital to the tissue repair process. In this study, progenitor cells developed from circulating blood were also found to be capable of repairing dysfunctional—yet viable—myocardial tissue, a condition referred to as "hibernating myocardium."

Kendziorra said he believes that in addition to assisting in monitoring and guiding treatment of heart patients, PET scans may also be helpful in selecting those who would profit the most from CPC administration.

"Early detection of hibernating myocardial tissue via noninvasive imaging modalities such as PET and SPECT will help us to assess a patient's myocardial metabolism and blood flow," he said. "Subsequent early coronary recanalization and CPC administration may lead to treatment-specific normalization and reduce the risk of cardiac events over longer periods."

"For decades, nuclear medicine imaging has contributed functional assessment to the anatomical definition of the presence or absence of disease," said Alexander J. McEwan, M.D., president of SNM. "Today molecular imaging is on the way to revolutionizing patient care—by integrating information about location, structure, function and biology—leading to a package of non-invasive imaging tools with enormous potential for improving patient care and outcomes."

Source: Society of Nuclear Medicine