

Full-Body PET Scan Can Detect Blood Clots: Animal Study



A new radiopharmaceutical probe developed at Massachusetts General Hospital (MGH) has allowed researchers to perform full-body scans to locate hidden blood clots in an animal model, according to a report that will appear in the October issue of the journal *Arteriosclerosis, Thrombosis and Vascular Biology*. Finding the location and composition of clots can provide information crucial for diagnosis and prevention of strokes. [Preliminary results](#) also were reported earlier this year at the national meeting of the American Chemical Society.

"We found that, with a single intravenous injection of our clot-finding probe ^{64}Cu -FBP8, we were able to detect blood clots anywhere in the body using a positron emission tomography (PET) scan," says lead author Francesco Blasi, PharmD, PhD, formerly a research fellow at the Martinos Center for Biomedical Imaging at MGH and now at the University of Torino in Italy.

Standard practice for identifying the source of a clot that causes a stroke may involve multiple imaging studies -- ultrasound, echocardiography, MR or CT angiography -- that can be both expensive and time consuming, possibly delaying the use of therapies to prevent a second stroke. The research team developed several PET imaging agents that target the protein fibrin, which is generated as part of the process of clot formation; they found ^{64}Cu -FBP8 to be the most promising.

The team tested the probe's ability to find clots anywhere in the body by inducing the formation of clots in the carotid arteries and the femoral veins of a group of rats. Whole-body imaging studies combining ^{64}Cu -FBP8 PET and CT scanning were conducted either one, three or seven days after clot formation. The team members reading the images, who had not been informed of the precise locations where clots had been induced, accurately detected the locations 97 percent of the time. The intensity of the signal generated by ^{64}Cu -FBP8 decreased with the age of the clot and with the amount of fibrin it contained.

"We also found that the probe may be able to distinguish recently formed clots from older ones — which can indicate the likelihood that a particular clot is the source of the clot causing a stroke or pulmonary embolism — and reveal the composition of a clot, which can determine whether it will respond to clot-dissolving treatments."

Since clot-dissolving drugs act by targeting fibrin, younger fibrin-rich clots are better candidates for treatment with those agents, the use of which needs to be balanced against the risk of bleeding, according to study leader Peter Caravan, PhD, of the Martinos Center and an associate professor of Radiology at Harvard Medical School.

"A clot causing a stroke can arise in the arteries of the neck, from the aorta in the chest, from within the heart or from veins deep within the legs; and knowing if any clot remains at those locations is important because it indicates a higher risk of a second stroke. The patient may be treated differently if that parent clot is still present than if no clot remains," explains Prof. Caravan. His team will soon be testing ^{64}Cu -FBP8 in human volunteers to better understand how the probe is distributed throughout the body and how long it remains after injection, information essential to designing studies of its diagnostic effectiveness in patients.

Source: [Massachusetts General Hospital](#)

Image credit: Institute for Innovation in Imaging at MGH

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