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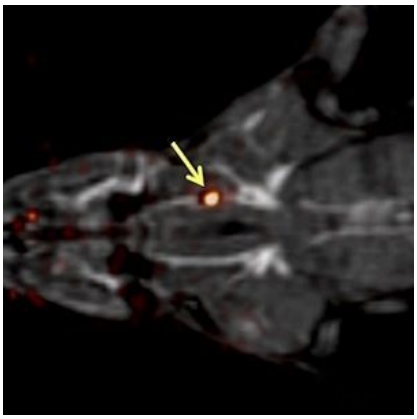
PET Method Scans Whole Body for a Blood Clot



A new imaging method — so far tested in rats — may someday enable clinicians to quickly scan the entire body for a blood clot, according to researchers from the Martinos Center for Biomedical Imaging at Massachusetts General Hospital. The study was presented at the 250th National Meeting & Exposition of the American Chemical Society (ACS), held on 16-20 August 2015 in Boston.

To treat a blood clot, doctors need to find its exact location and this process may require use of three different methods: ultrasound to check the carotid arteries or legs, computed tomography to view the lungs, and magnetic resonance imaging (MRI) to scan the heart.

"Patients could end up being scanned multiple times by multiple techniques in order to locate a clot," explains Peter Caravan, PhD. "We sought a method that could detect blood clots anywhere in the body with a single whole-body scan."

In this study, Dr. Caravan and colleagues developed a blood clot probe by attaching a radionuclide to a peptide, which is a short piece of protein that binds specifically to fibrin -- an insoluble protein fibre found in blood clots. Radionuclides can be detected anywhere in the body by an imaging method called positron emission tomography (PET). Different radionuclides and peptides were linked or combined using different chemical groups in order to identify which combination would provide the brightest PET signal in blood clots. In all, the researchers constructed and tested 15 candidate blood clot probes.

Dr. Caravan's team first analysed how well each blood clot probe bound to fibrin in a test tube, and then they studied how well the probe detected blood clots in rats. Due to metabolism, some probes were broken down quickly in the body and could no longer bind to blood clots. "The best probe was the one that was the most stable," Dr. Caravan says. The team is moving forward into the next phase of research with this best-performing probe, called FBP8, which stands for "fibrin binding probe #8." It contained copper-64 as the radionuclide.

"Of course, the big question is, 'How well will these perform in patients?'" he points out. His team plans to start testing the probe in human patients in the fall but, as Dr. Caravan notes, it could take an additional five years of research before the probe is approved for routine use in a clinical setting.

Source: American Chemical Society
Image credit: Peter Caravan, PhD/Martinos Center for Biomedical Imaging

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