

# Radioactive antibody fragment may help scientists identify artery deposits

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Creating a radioactive antibody fragment may allow scientists to identify fat and debris deposits in artery walls that are most likely to rupture and cause heart attacks, according to a new study in *Circulation: Research*, an American Heart Association journal.

Of the more than 17 million annual cardiovascular deaths worldwide, most result from ruptured plaque. "The detection of vulnerable coronary plaques is a major clinical challenge because it would allow preventive patient management prior to a heart attack," said Alexis Broisat, Ph.D., the study's lead author and a post-doctoral fellow at the University of Grenoble in France. "In clinical practice, there is currently no early, reliable and noninvasive tool allowing such detection."

The researchers created radioactive antibody fragments called nanobodies that attached to particles in artery plaque called vascular cell adhesion molecule-1 (VCAM1).

"Nanobodies constitute a promising new class of radiotracers for [cardiovascular imaging](#)," Broisat said. Ongoing inflammation in a plaque deposit is a crucial sign that the plaque may rupture, and VCAM1 plays a major role in the inflammation process.

In laboratory tests, the radioactive nanobodies were attracted to VCAM-1.

In [animal tests](#), researchers injected a solution containing the [radioactive](#)

[particles](#) into the blood stream of mice with artery plaques. They then used a single-proton emission computed tomography (SPECT/CT) imaging scan to detect the radioactive particles.

The nanobodies attached to VCAM-1 expressing tissues. Following radiolabeling, some of the nanobodies remained stable in the laboratory and in mouse blood for six hours. This allowed imaging of the mice up to three hours after nanobody injection. These scans revealed plaques in the animals' aortic arches.

If approved for human use, physicians can inject nanobodies into patients to determine if they are at risk of [plaque rupture](#).

"The early detection of trouble looming ahead could trigger steps for intervention, possibly involving the aggressive modulation of risk factors," according to an editorial accompanying the report by Matthias Nahrendorf, M.D., Ph.D., Jason R. McCarthy, Ph.D., and Peter Libby, M.D., of Harvard Medical School in Boston, Mass.

Before the imaging concept can be used regularly, researchers must conduct toxicology studies, produce clinical-quality material and determine whether the radiotracer technique is safe, beneficial and cost effective.

Broisat and his colleagues are planning clinical studies of the radiotracer technique to address these issues, including whether the anti-VCAM1 nanobodies can trigger adverse immune system reactions in people.

Provided by American Heart Association

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