

Mount Sinai pioneers new cardiac imaging device

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Researchers from Mount Sinai School of Medicine have for the first time developed a way to visualize coronary artery plaques vulnerable to rupture using multi-color computed tomography (CT), an innovation that will lead to better and earlier diagnosis of cardiovascular disease. The data are published in the September issue of *Radiology*.

Ruptures of [atherosclerotic plaques](#) are the cause of nearly 70 percent of heart attacks. High density lipoproteins (HDL), the "good" cholesterol, are drawn to plaques vulnerable to rupture and remove them from the arterial wall. The Mount Sinai team harnessed HDL by encapsulating tiny gold particles within it and injected them into mice. By using a sophisticated multi-color CT scanner, the researchers were able to see the gold particles as the HDL was targeting macrophages, or the cells that cause inflammation in the arterial wall, therefore illuminating the location of the vulnerable plaques.

"The use of multi-color CT and gold nanoparticles to visualize plaque will revolutionize [cardiac imaging](#)," said the research team leader, Zahi A. Fayad, PhD, Professor of Radiology and Medicine and the Director of the Translational and [Molecular Imaging](#) Institute at Mount Sinai School of Medicine. "The acquisition of this technology and development of this method will help us improve cardiovascular disease diagnosis in our patients, furthering our commitment to translational research. We look forward to continuing our study of this technology in the clinical setting."

Conventional CT detectors provide a gray image of the artery being studied, and do not provide contrast to differentiate types and density of tissue. In addition to showing the impact of the gold particles, spectral CT can simultaneously distinguish calcium deposits and contrast agents used such as iodine, which is often used to identify stenoses, or the narrowing of arteries, informing the severity of atherosclerosis and [heart attack risk](#). Mount Sinai is the first institution in the world to use this scanner, made by Phillips Medical Systems, in a pre-clinical setting.

"There is a significant unmet need for imaging technology that visualizes plaque vulnerable to rupture," said the lead author of the work, David Cormode, PhD, Postdoctoral Fellow, Translational and Molecular Imaging Institute, Mount Sinai School of Medicine. "The fact that the multi-color CT technique shows the [gold particles](#), iodine and calcifications, provides us with a more complete picture of the nature of the atherosclerotic arteries."

Multi-color CT technology may also be beneficial in imaging other biological process and diseases, including cancer, kidney disease, and bowel diseases. The Mount Sinai team plans to continue studying the new scanner in additional animal studies and in humans.

"Mount Sinai has a decades-long history of making advances in cardiac imaging that have had a significant impact on the field and in patient care," said Valentin Fuster, MD, PhD, Director of Mount Sinai Heart, the Zena and Michael A. Wiener Cardiovascular Institute and the Marie-Josée and Henry R. Kravis Center for Cardiovascular Health, The Mount Sinai Medical Center. "As the first center in the world to pioneer this imaging method, we are leading the charge once more in improving diagnostic tools that lessen the potentially devastating impact of heart disease."

Provided by The Mount Sinai Hospital / Mount Sinai School of
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