Cholesterol crystals incite inflammation in coronary arteries

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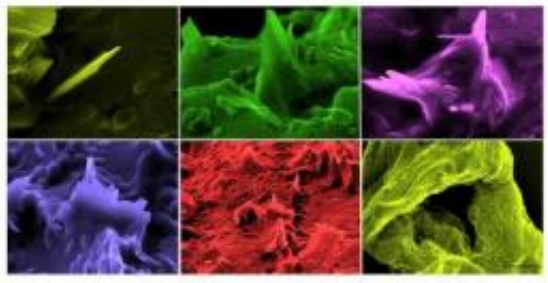

The protruding elements seen in the different slides are cholesterol crystals. Those elements are arising from within the artery wall, causing tearing and damage to the artery. Credit: MSU University Relations

Cholesterol crystals, known to be a catalyst for heart attacks and strokes, also cause cells to send out danger signals that can lead to the inflammation and hardening of arteries, according to a Michigan State University cardiologist.

The discovery by George Abela, chief of the cardiology division in MSU's College of Human Medicine, and a team of researchers provides new insights into how arteries harden — a process called atherosclerosis — and gives hope for new and early treatments of cardiovascular disease.

The findings are published in the most recent edition of the journal

Nature.

Past research has shown that as cholesterol builds up along the wall of an artery, it crystallizes from a liquid to a solid state and expands, said Abela, who has been studying cholesterol crystals for nearly a decade. As the crystals expand, they can disrupt plaque and cause clotting, leading to cardiac attacks. That research also was recently highlighted recently in the *Journal of Clinical Lipidology*.

In a new discovery, Abela and the team — while looking at causes of inflammation during atherosclerosis in mice — found that the once cholesterol crystals form in the arterial wall, they activate a biomarker called NLRP3 that induces inflammation.

"What we have found now, at the cellular level, is that the crystals are an early cause rather than a late consequence of inflammation," Abela said.

The discovery could lead to new treatments for heart disease.

"Since cholesterol crystals form very early in the process of heart disease , with great potential to aggravate atherosclerosis, we can target them early on," Abela said. "We can target new therapies by reducing cholesterol crystal deposits early on or use an inhibitor to block the inflammatory biomarker."

Abela added that the biomarker activated by the crystals could be a better indicator of potential cardiovascular disease than others, such as serum cholesterol, or the amount of cholesterol found in the bloodstream .

"Now we treat atherosclerosis on the systematic level; with this discovery we can also treat it the cellular level," he said.

More information: To review the article in Nature, go to www.nature.com/nature/journal/ … ull/nature08938.html . To review the article in the Journal of Clinical Lipidology, go to www.lipidjournal.com/article/S … (10)00102-9/abstract .

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