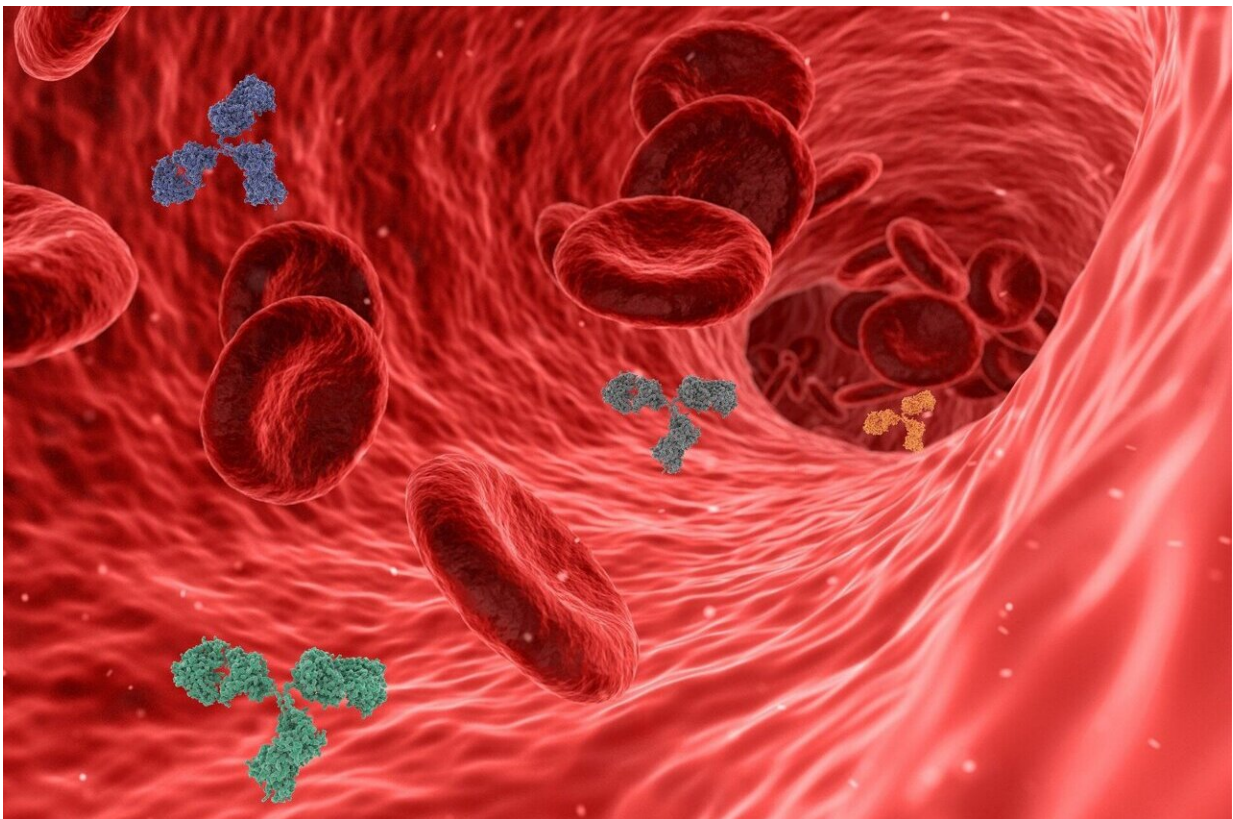


Microplastics found in artery plaque linked with higher risk of heart attack, stroke and death

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Microplastics and nanoplastics are everywhere in our environment—including in our [oceans](#) and [lakes](#), farmland, and even Arctic ice algae.

Microplastics have also been found inside of us—with studies detecting them in various tissues including in the [lungs](#), [blood](#), [heart](#) and [placenta](#). Understandably, concern is rising about the potential risks of microplastics on our health.

However, while a growing body of research has focused on microplastics and nanoplastics, there's still a lack of direct evidence that their presence in [human tissues](#) is harmful to our health—and it's uncertain if they are related to particular diseases.

A [new study](#) has uncovered a correlation between microplastics and heart health, though. The researchers found that people who had detectable microplastics and nanoplastics in the plaque in their arteries had a higher risk of heart attack, stroke and death.

Heart health

The researchers looked at 257 people altogether. All of the patients were already undergoing preventative surgery to remove plaque from their carotid arteries (the main arteries that supply the brain with blood). This allowed the researchers to collect plaque samples and perform a [chemical analysis](#). They then followed up with participants 34 months later.

Of the 257 participants, 150 were found to have the presence of microplastics and nanoplastics in their arterial plaque—mainly fragments of two of the most commonly used plastics in the world, polyethylene

(used in grocery bags, bottles and food packaging) and polyvinyl chloride (used in flooring, cladding and pipes).

A statistical analysis of this data found that patients with microplastics and nanoplastics in their plaque had a higher risk of suffering a heart attack, stroke or death from any cause, compared with those who had no microplastics or nanoplastics in their plaque.

The researchers also analyzed the macrophages (a type of immune cell that helps remove pathogens from the body) in the patients' arteries. They found that participants who'd had microplastics and nanoplastics in their plaque also had evidence of plastic fragments in their macrophages.

They also looked at whether certain genes associated with inflammation (which can be a sign of disease) were switched on in the participants. They found that the participants who'd had microplastics and nanoplastics in their plaque also had signs of inflammation in their genes.

These results may suggest an accumulation of nanoplastics and microplastics in carotid plaque could partly trigger inflammation. This inflammation may subsequently change the way plaque behaves in the body, making it less stable and triggering it to form a blood clot—which can eventually block blood flow, leading to heart attacks and strokes.

Interestingly, the researchers also found the presence of nanoplastics and microplastics was more common in participants who had diabetes and cardiovascular disease. This raises a lot of questions which have yet to be answered—such as why microplastics were more common in these participants, and if there may be a correlation between other diseases and the presence of microplastics in the body.

Other health risks

This study only focused on patients who had carotid artery disease and were already having surgery to remove the build-up of plaque. As such, it's unclear whether the findings of this study can be applied to a larger population of people.

However, it isn't the first study to show a link between microplastics and nanoplastics with poor health. Research suggests some of this harm may be due to the way microplastics and nanoplastics interact with proteins in the body.

For example, some human proteins adhere to the surface of [polystyrene nanoplastics](#), forming a layer [surrounding the nanoparticle](#). The formation of this layer may influence the [activity and transfer](#) of nanoplastics in human organs.

[Another study](#) suggested that nanoplastics can interact with a protein called [alpha-synuclein](#), which in mouse studies has been shown to play a crucial role in facilitating communication between nerve cells. These clumps of nanoplastics and protein may increase the risk of Parkinson's disease.

My [published Ph.D. research](#) in chicken embryos found that nanoplastics may cause [congenital malformations](#) due to the way they interact with a protein called cadherin6B. Based on the interactions myself and fellow researchers saw, these malformations may affect the embryo's eyes and neural tube, as well as the heart's development and function.

Given the fact that nanoplastics and microplastics are found in carotid plaque, we now need to investigate how these plastics got into such tissues.

In mice, it has been demonstrated that [gut macrophages](#) (a type of white blood cell) can absorb microplastics and nanoplastics into their cell

membrane. Perhaps a similar mechanism is taking place in the arteries, since nanoplastics have been identified in samples of carotid plaque macrophages.

The findings from this latest study add to a growing body of evidence showing a link between plastic products and our health. It is important now for researchers to investigate the specific mechanisms by which microplastics and nanoplastics cause harm in the body.

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