Medical Xpress

How high lipid levels cause inflammation and damage kidneys and blood vessels

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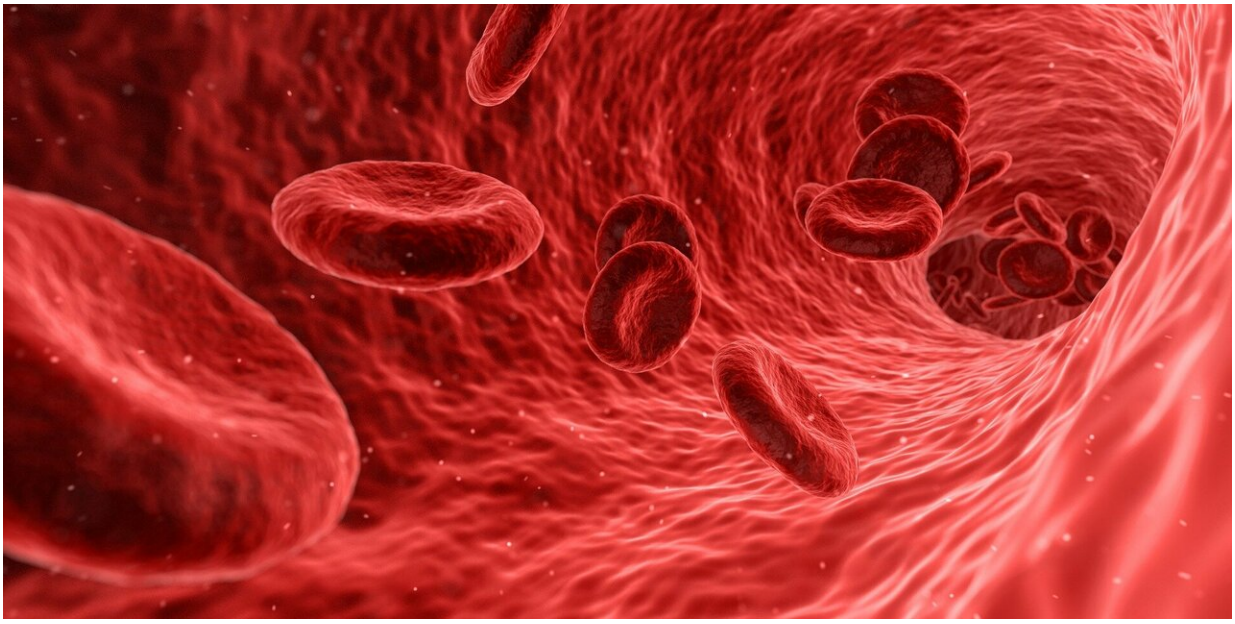

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Doctors interested in ways to minimize the risk of cardiovascular disease have long had blood cholesterol levels in their sights. But other types of blood fats (also known as 'lipids') can also be damaging to health. "Our work has involved studying a special group of lipids, the triglycerides. We've been able to show that when these naturally occurring fats are present at elevated concentrations they can alter our defence cells in such a way that the body reacts as if responding to a bacterial infection. This

leads to inflammation, which, if it becomes chronic, can damage the kidneys or cause atherosclerosis—the narrowing of arteries due to a build up of deposits on the inner arterial wall. And atherosclerosis is one of the main causes of heart attacks and strokes," explains Timo Speer of Saarland University. Speer, who has a doctorate in medicine as well as biology, is the lead author of the work just published in *Nature Immunology*.

The large-scale study was able to demonstrate that patients with elevated levels of triglycerides in their blood had a significantly higher mortality rate than comparison groups with a similar health history. "Put another way, we can now say that adopting a low-fat diet can significantly extend the life expectancy of high-risk patients, such as those with diabetes or those whose blood pressure is too high," says Timo Speer. Blood triglyceride levels rise substantially in people who eat a high-fat diet.

"As a result of biochemical changes, the triglycerides develop toxic properties that activate the body's innate immune system. This initiates a series of self-destructive processes including those in which the walls of the arteries are attacked and the blood vessels become occluded, reducing blood flow," explains Speer. The study has established a definitive link between the chronic inflammation triggered by an elevated triglyceride concentration in the blood and secondary diseases such as kidney failure or heart attack. "We hope that our results will help in developing new strategies for treating and preventing these life-threatening diseases," says Timo Speer.

The publication in *Nature Immunology* is one of the results of the diverse range of scientific investigations being carried out as part of a Transregional Collaborative Research Centre between Saarland University and RWTH Aachen University. The focus of the work performed within the Collaborative Research Centre is to discover which cardiac and vascular diseases can be caused by chronic kidney disease.

The German Research Foundation (DFG) is funding this major research programme with ten million euros over a three-year period. Timo Speer is the lead researcher for one the research projects. He is also a senior physician at Saarland University Hospital and laboratory director for experimental and translational nephrology.

More information: Zewinger, S., Reiser, J., Jankowski, V. et al. Apolipoprotein C3 induces inflammation and organ damage by alternative inflammasome activation.*Nat Immunol* (2019) DOI: 10.1038/s41590-019-0548-1 , nature.com/articles/s41590-019-0548-1

Provided by Saarland University

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