

Atherosclerosis: Specific microRNAs promote inflammation

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(Medical Xpress)—Atherosclerosis, an inflammatory reaction, is at the root of the most common forms of cardiovascular disease. Researchers at Ludwig-Maximilians-Universitaet in Munich have now identified a microRNA that plays a prominent role in the process, and offers a promising target for new therapies.

Atherosclerosis – otherwise known as hardening of the arteries – is a prevalent cause of death in modern societies. The condition arises from the build-up of localized [fatty deposits](#) called plaques in the arteries. Macrophages, the phagocytic cells of the immune system, migrate to these sites, inducing [chronic inflammation](#) which exacerbates the accumulation of the atherosclerotic lesions. These can lead to obstruction of major vessels, causing heart attack and stroke. A team of medical researchers led by LMU's Professor Andreas Schober has now identified a [microRNA](#) (miRNA) that helps initiate the [inflammatory process](#).

miRNAs are short segments of RNA derived from longer precursors transcribed from defined stretches of the genomic DNA. They act as versatile regulators of [gene expression](#) in cells, and also control the function of macrophages, in which patterns of [gene activity](#) must respond rapidly to changes in the extracellular environment. "However, the miRNAs that control the inflammation process during the various stages of atherosclerosis had not been identified up to now," says Schober.

In an earlier study, Schober and his team had shown that the microRNA miR-155 is a prominent member of the miRNA population in macrophages. The molecule prevents the synthesis of a protein that inhibits the [inflammatory reaction](#), and thus promotes the progression of atherosclerosis. However, miR-155 does not serve as the initiator of inflammation. Schober and his colleagues have now looked at the patterns of microRNA expression in [atherosclerotic lesions](#) in the mouse,

and noted that levels of a different miRNA, called miR-342-5p, increase in very early plaques.

New therapeutic approaches

"The newly identified miR-342-5p is actually expressed constitutively in macrophages, but it is activated by pro-inflammatory signals. This activation process then induces production of miR-155," Schober explains. The results of the new study thus make miR-342-5p an interesting target for new therapeutic agents. Indeed, in their animal model, the researchers have been able to demonstrate that inhibition of the action of miR-342-5p by means of a specific antagonist retards the progression of atherosclerosis.

"Atherosclerosis in humans should also be susceptible to treatment with inhibitors of microRNAs," Schober suggests. "Synthetic inhibitors are available for each and every microRNA, and could be used for therapeutic purposes as soon as their efficacy and safety has been demonstrated in clinical tests." Hence the researchers now plan to collaborate with biotechnology companies on the development of their own specific microRNA inhibitor for future clinical use.

More information: circ.ahajournals.org/content/112.000736.abstract

Provided by Ludwig Maximilian University of Munich

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