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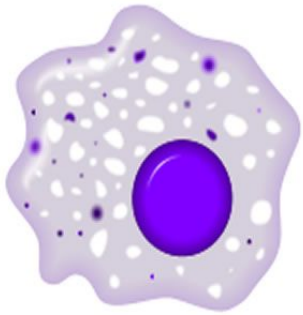
Nanomedicine Therapy Improves Inflammation Inside Artery Plaque



According to a study led by researchers from Icahn School of Medicine at Mount Sinai, a nanotherapeutic medicine can half the growth of artery plaque cells resulting in the fast reduction of the inflammation that may cause a heart attack. The study has been published in *Science Advances*.

"In just one week our novel cell proliferation-specific approach successfully suppressed atherosclerotic plaque growth and inflammation in mice engineered to mimic human vascular disease," says lead study author Jun Tang, MS, a PhD student at Icahn School of Medicine at Mount Sinai. "Atherosclerosis is a major cause of death around the globe, and our nanomedicine strategy promises to offer a new way to reduce the number of heart attacks and strokes."

The research team applied a nanomedicine strategy with a molecule of HDL. The objective was to take advantage of HDL's natural travel routes and load it with simvastatin, a widely used cholesterol-lowering medication.

When macrophages become laded with cholesterol, they start proliferating in plaques and increase inflammation. This can eventually lead to a build-up of atherosclerotic plaque and rupture leading to a heart attack or stroke. The simvastatin-loaded nanoparticles, named S-HDL, target the macrophages within high-risk arterial plaques.

The researchers also tested the possible benefits of adding an eight-week regimen of oral statins after one week of S-HDL nanotherapy. This was done because many patients hospitalised after a heart attack or stroke, demonstrate a high recurrence rate of up to 20 percent within three years. Mice study with this regimen (one week of S-HDL nanotherapy and 8 weeks of oral statins) show superior long-term therapeutic benefit.

Prof Zahi Fayad, PhD, Professor of Radiology and Director of the Translational and Molecular Imaging Institute at Icahn School of Medicine at Mount Sinai, believes that S-HDL nanomedicine therapy could be translated quickly to human clinical trials and this regimen could be used as a short-term infusion therapy for heart attack and stroke patients.

The nanotherapeutic approach can inhibit macrophage proliferation and can be used to treat inflammation inside the arteries. The results of this study demonstrate that the two-step regimen effectively reduces macrophage accumulation and the expression of key genes linked to inflammation in this cell type.

Source: Mount Sinai School of Medicine

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Published on : Tue, 7 Apr 2015