

Development of novel therapies for endothelial damage may heal atherosclerotic plaques

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Heart disease and approximately half of all strokes are the results of advanced atherosclerosis with damaged endothelium, the inner lining of blood vessels. In 2009, the direct and indirect annual cost of heart disease and stroke was approximately \$312.6 billion. Projections are for the total cost of heart disease to increase from \$523 to \$1.126 billion from 2013 to 2030. And by 2030, it is expected that there will be more than 148 million of the US population would have heart disease.

Development of new technologies for assessing and treating endothelium damage will help reduce that financial burden as reduce the human health burden resulting from atherosclerosis.

Dr. Hua Pan, Research Instructor in Medicine at Dr. Samuel Wickline's Laboratory in Washington University School of Medicine, investigated [quantitative evaluation](#) and developed novel therapies for endothelial barrier damage. The evolution and severity of endothelium damage in advanced atherosclerotic plaque remain unknown, in part because quantifiable methods are lacking for its in vivo assessment. Her latest study is the first to demonstrate, in a well-established atherosclerosis mouse model, ApoE deficient mice, a multifunctional perfluorocarbon (PFC) nanoparticle (NP) for quantification of endothelial damage as well as targeted anti-[inflammatory drug](#) delivery to the endothelium damage site.

The study, conducted in ApoE deficient mice, quantified endothelium

damage by using PFC NP retained in mouse aorta as surrogate. It demonstrated the evolution and severity of endothelium damage in correlation to the length of the animal fat-diet consumption. Moreover, the same PFC NP loaded with anti-inflammatory drug, NF- κ B inhibitor, down-regulated inflammation. Dr. Wickline noted, this finding provided a new avenue for defining disease stage and for following therapy to heal dangerous [atherosclerotic plaques](#).

Her findings will be presented April 22, 2013 during [Experimental Biology](#) 2013 in Boston, MA.

Provided by Federation of American Societies for Experimental Biology

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