

## New measure trumps HDL levels in protecting against heart disease

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The discovery that high levels of high-density lipoprotein (HDL) cholesterol (the "good cholesterol") is associated with reduced risk of cardiovascular disease has fostered intensive research to modify HDL levels for therapeutic gain. However, recent findings have called into question the notion that pharmacologic increases in HDL cholesterol levels are necessarily beneficial to patients. Now, a new study from researchers at the University of Pennsylvania School of Medicine shows that a different metric, a measure of HDL function called cholesterol efflux capacity, is more closely associated with protection against heart disease than HDL cholesterol levels themselves. Findings from the study could lead to new therapeutic interventions in the fight against heart disease. The new research will be published in the January 13 issue of the *New England Journal of Medicine*.

Atherosclerosis, a component of heart disease, occurs with a build-up along the artery wall of fatty materials such as [cholesterol](#). Cholesterol efflux capacity, an integrated measure of HDL function, is a direct measure of the efficiency by which a person's HDL removes cholesterol from cholesterol-loaded macrophages (a type of white blood cell), the sort that accumulate in arterial plaque.

"Recent scientific findings have directed increasing interest toward the concept that measures of the function of HDL, rather than simply its level in the blood, might be more important to assessing [cardiovascular risk](#) and evaluating new HDL-targeted therapies," said Daniel J. Rader, MD, director, Preventive Cardiology at Penn. "Our study is the first to

relate a measure of HDL function--its ability to remove cholesterol from macrophages--to measures of cardiovascular disease in a large number of people."

In the present study, Rader and colleagues at Penn measured cholesterol efflux capacity in 203 healthy volunteers who underwent assessment of carotid artery intima-media thickness, a measure of atherosclerosis, 442 patients with confirmed coronary artery disease, and 351 patients without such confirmed disease.

An inverse relationship was noted between cholesterol efflux capacity and carotid intima-media thickness both before and after adjustment for the HDL cholesterol level. After an age- and gender- adjusted analysis, increasing efflux capacity conferred decreased likelihood of having coronary artery disease. This relationship remained robust after the addition of traditional cardiovascular risk factors, including HDL cholesterol levels, as covariates. Additionally, men and current smokers had decreased efflux capacity.

The researchers noted that although cholesterol efflux from macrophages represents only a small fraction of overall flow through the cholesterol pathway, it is probably the component that is most relevant to protection against [heart disease](#).

Rader said, "The findings from this study support the concept that measurement of HDL function provides information beyond that of HDL level, and suggests the potential for wider use of this measure of HDL function in the assessment of new HDL therapies. Future studies may prove fruitful in elucidating additional HDL components that determine cholesterol efflux capacity."

Provided by University of Pennsylvania School of Medicine

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