High-Density Lipoprotein (HDL) Cholesterol

Known as "good" cholesterol; it helps remove other forms of cholesterol from the bloodstream. Higher levels are generally better for heart health.

High-density lipoproteins (HDL) are recognized for their atheroprotective properties and various antiatherogenic functions. These functions include the inhibition of inflammation, oxidation, and apoptosis. A key role of HDL is to facilitate reverse cholesterol transport (RCT), a process where HDL particles assist in extracting lipids from the subendothelial space and intima, subsequently delivering them to the liver. In contrast, lipoproteins containing apolipoprotein B (such as LDL, VLDL, and IDL) contribute to atherosclerosis by promoting the accumulation of cholesterol and phospholipids in the subendothelial area.

Additionally, HDL is involved in the transport of a diverse array of molecules, including enzymes, apoproteins, globulins, acute phase reactants, microRNAs, and complement components. However, under certain conditions, the protein components of HDL can shift from being atheroprotective to pro-oxidative and pro-inflammatory. This transformation has been noted in individuals with sepsis, chronic kidney disease, chronic inflammatory diseases, recent acute coronary events, and diabetes mellitus. During these situations, the apoprotein and enzyme constituents of HDL may be replaced by acute phase reactants, such as fibrinogen and serum amyloid A, which impair HDL's ability to engage in reverse cholesterol transport and other antiatherogenic activities.

References

1. Toth PP. Reverse cholesterol transport: high-density lipoprotein's magnificent mile. Curr Atheroscler Rep. 2003 Sep;5(5):386-93.
2. Vaisar T, Pennathur S, Green PS, Gharib SA, Hoofnagle AN, Cheung MC, Byun J, Vuletic S, Kassim S, Singh P, Chea H, Knopp RH, Brunzell J, Geary R, Chait A, Zhao XQ, Elkon K, Marcovina S, Ridker P, Oram JF, Heinecke JW. Shotgun proteomics implicates protease inhibition and complement activation in the anti-inflammatory properties of HDL. J Clin Invest. 2007 Mar;117(3):746-56.
3. Ansell BJ, Fonarow GC, Fogelman AM. High-density lipoprotein: is it always atheroprotective? Curr Atheroscler Rep. 2006 Sep;8(5):405-11.