Low HDL-cholesterol—Not quantity, but quality

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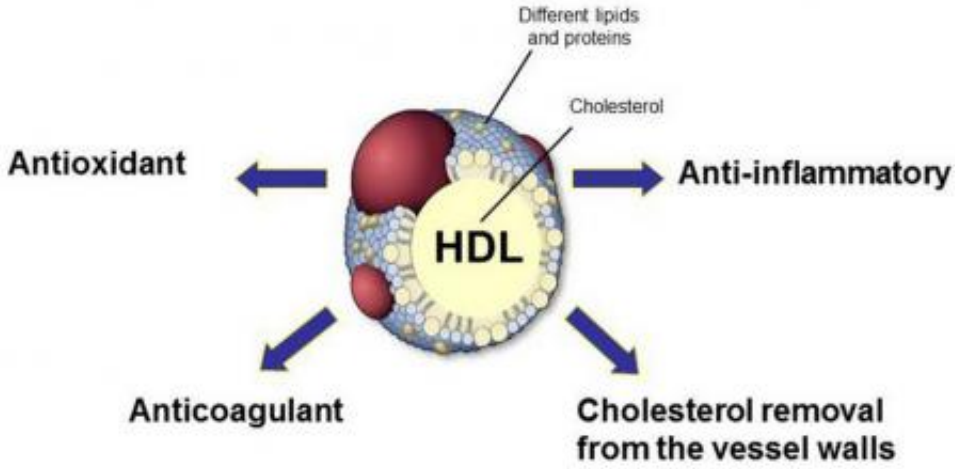

Functions of the HDL particle which protect from coronary heart disease. The amount of antioxidative lipids is decreased so that the antioxidant function of the HDL particle is impaired in subjects with low HDL-cholesterol.

Many of the genes regulating the inflammation and immune response of the body are also associated with low HDL-cholesterol levels in the circulation, tells the recent study conducted at the University of Helsinki, Finland. The research also discovered that the quality of HDL particle can vary considerably.

Cholesterol is a major risk factor for heart disease. Elevated LDL-cholesterol, commonly known as the 'bad cholesterol,' is associated with the increased risk of heart disease while HDL-cholesterol, the 'good cholesterol', is associated with decreased risk.

During the past few years, approximately 40 regions in the genome have been associated with plasma HDL-cholesterol levels. In a recent publication, the genetic background of low HDL-cholesterol was studied by research groups from the University of Helsinki, Finland. The study subjects were Finnish individuals with either extremely high or extremely low HDL-cholesterol.

The scientists discovered several new genes which predispose low HDL-cholesterol levels. They also observed that many of the genes regulating inflammation and immune response of the body were also associated with low HDL-cholesterol levels in the circulation. The results thus validate the strong link between inflammation and low HDL-cholesterol.

"The results of the study tell us that some individuals are genetically more prone to inflammation than others, especially in the adipose tissue and blood vessels. The inflammation may block the transport of cholesterol from vessel walls to circulation leading to lower HDL-cholesterol levels in the circulation", says Dr. Pirkka-Pekka Laurila.

'Good' is not always that good

The researchers also showed that the quality of HDL particle can vary considerably. In individuals, whose HDL-cholesterol levels were low, the quality of HDL particles was also impaired; they contained smaller amounts of lipid molecules which are known to be antioxidant and thus protective to arteries. In individuals with high HDL-cholesterol levels in the circulation, the lipid composition of the HDL particle was more beneficial regarding heart disease risk.

Based on this Finnish study, and earlier ones, the terms 'HDL-cholesterol' and 'HDL particle' should not be confused to indicate heart disease risk. The term 'good cholesterol' appears to be misleading as the cholesterol molecules is exactly the same in both 'good' HDL and 'bad' LDL particles. It is likely that molecules other than cholesterol - the lipid and protein molecules on the surface of the HDL particle - are responsible for the protective effects of HDL particles against heart disease.

More information: Laurila, P. et al. Genomic, Transcriptomic, and Lipidomic Profiling Highlights the Role of Inflammation in Individuals With Low High-density Lipoprotein Cholesterol. *Arterioscler Thromb Vasc Biol*. 2013 Apr;33(4):847-57.

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