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QUESTION & ANSWER

Juan asks: "What is atherosclerosis and how does it affect my body?"

Atherosclerosis is the process by which excess cholesterol is deposited as a plaque in the walls of arteries and through which damage to the structure and function of the artery results. For most individuals, the consumption of excessive saturated fat leads to excessive levels of LDL or the 'bad' cholesterol in the blood. Generally, such an increase in circulating LDL in the blood increases the penetration of that LDL cholesterol into the wall of the artery. Once in the artery wall, the LDL becomes oxidized and in the process becomes identified as a foreign invader by the body's immune system—in much the same way that bacteria might be handled. White blood cells called macrophages then target the oxidized LDL for attack, and this infiltration of white cells into the plaque is the inflammation which is the hallmark of atherosclerosis. The inflammation causes damage to the artery wall and weakening of plaque (see below) which may cause a heart attack; it also causes calcification of the arteries which reduces their flexibility (thus sclerosis) and can raise blood pressure.

Aretha asks: "What is unstable plaque, and how can making my blood vessel plaque stronger reduce my risk of heart attack and stroke?"

The inflammation referred to in the previous question contributes to unstable plaque. The plaque itself sits one endothelial cell (smooth cells which line the arteries) thickness beneath the blood flow. Once in the artery the white cells begin to actually take up small bits of the oxidized LDL in the plaque and attempt to destroy it with powerful digestive enzymes which they contain. Unfortunately they are unable to do so.

The white cells continue to absorb the cholesterol until they literally burst and release their digestive enzymes into the plaque and the artery wall. Here the enzymes begin to digest the actual physical connection of the plaque to the artery wall and weaken its structure, making it "unstable." Blood moving through arteries causes a shear force on the artery wall which may cause a small tear to develop in the endothelial cells overlying the plaque (which have lost their normal supporting structure). This tear is viewed as a hole in the artery walls and the body plugs it with a blood clot. Sometimes the clot on top of the plaque gets so big it plugs up the blood flow in the artery and a heart attack or stroke results.

The best known way to make plaque more stable is to reduce inflammation. This is best accomplished by reducing the level of LDL cholesterol in the blood, thereby also reducing a blood test result called hs-CRP, a marker of inflammation. Moderate daily exercise and weight loss—in those overweight or obese—are also two powerful ways to reduce inflammation and reduce unstable plaque.