

# Why does cholesterol cause heart disease?

published: Thursday | January 24, 2008

by Deborah M. Carroll-Anzinger, Ph.D

## **Smoking is one of the environmental causes of atherosclerosis.**

It may surprise you that cardiovascular disease is the number one killer of Jamaicans. Most of us hear that high cholesterol causes cardiovascular disease, but understanding cholesterol's role in disease of the heart and blood vessels helps individuals work with their physician in choosing effective treatment.

Atherosclerosis means 'artery hardening' from deposits of macrophages (cells that usually help the body fight infections), fat, cholesterol, calcium, and fibrous tissue that build up in the artery lining. This build-up is known as a plaque or lesion, gradual accumulation of which leads to blockage of blood flow in arteries. Obstruction of arteries feeding the heart can lead to heart attack.

How does cholesterol cause lesions? Essentially, excess blood cholesterol deposits in artery lining and induces signals that attract macrophages to the site of cholesterol deposits. The macrophages engorge cholesterol, die and become the core of the lesion. Before dying, macrophages attract muscle cells to invade and disrupt the structure of the artery's lining. The muscle proliferates causing the lesion to grow and bulge into the artery's interior, making blood flow increasingly tight.

## **Harmful or beneficial**

In truth, however, it is the protein transporting cholesterol in blood that determines whether cholesterol is harmful or beneficial. Cholesterol transported by bulky low-density lipoprotein (LDL) is what macrophages consume thereby causing lesions, whereas, smaller high-density lipoprotein inhibits atherosclerosis by transporting cholesterol out of macrophages.

Research shows numerous factors determine why some people develop atherosclerosis while others do not. Family history of naturally high cholesterol, diabetes, mellitus or high blood pressure are linked to greater risk of developing atherosclerosis. These studies indicate as many as 50 per cent of patients have a genetic pre-determinant for developing the disease in the other 50 per cent or more of atherosclerosis patients, environmental risk factors, such as diets high in saturated fats and cholesterol, smoking, low physical activity and excess waistline fat, are some of the causes for atherosclerosis onset.

A compounding fact is that genetic and environmental risk factors combine to more than just an additive extent in inducing heart disease.

How each risk factor contributes to atherosclerosis varies, but one consistent player in the grand scheme is cholesterol. It is no surprise then that current drug therapies aim to lower cholesterol. Two types of prescribed drugs are statins like Lipitor, which stimulate the liver to remove LDL from the blood; and those that prevent the stomach from absorbing cholesterol, like Zetia.

Since these drugs reduce cholesterol, their best candidates are patients with family history of high cholesterol who, with a low cholesterol diet, still cannot reduce their blood cholesterol enough efficient at inhibiting atherosclerosis, and therefore heart failure, the medications' side effects of muscle pain and weakness, as well as treatment cost, are notable.

### **Lifestyle changes**

For individuals without genetic predisposition who begin to develop atherosclerosis, there is strong argument for lifestyle changes. The Heart Foundation of Jamaica recommends a combination of physical activity, healthy weight, and nutrient-rich diets low in animal fats. These choices are sometimes enough to inhibit atherosclerosis in several ways, like lowering blood pressure and cholesterol - the benefits of which are indisputable, even in combination with cholesterol medication.

Ultimately, by staying informed so we know the right questions to ask our doctor, and with regular check-ups, we can take control of our well-being. Following these simple steps, it is within our power to change the statistics by reducing occurrence of cardiovascular disease, Jamaica's number one killer.