

### Cholesterol

Cholesterol is produced in the liver and comes from saturated fats found in food. It is a waxy substance that is found throughout the body. It is necessary for the production of sex hormones, as well as the repairing of cell membranes.

In order to circulate throughout the body, cholesterol connects to special proteins to form 'lipoproteins', which are carried in the blood. There are two types of lipoproteins: low density lipoproteins (LDL) that transport cholesterol from the liver to the cells, and high density lipoproteins (HDL), which return excess cholesterol back to the liver. You may often hear of "good" and "bad" cholesterol. HDL or "good" cholesterol clears cholesterol from the arteries and takes it to the liver where it is eliminated from the body. LDL or "bad" cholesterol is associated with the hardening of the arteries (arteriosclerosis), which can lead to angina, heart attack and stroke.

Fatty substances found in blood, like LDL and HDL cholesterol are often grouped together with triglycerides and called blood lipids. Triglycerides are one of the basic components that make up fats. Lipid abnormalities have been seen in people living with HIV before the introduction of HAART (Highly Active Antiretroviral Therapy), such as elevated raised LDL cholesterol and declining HDL cholesterol in people living with AIDS. People on protease inhibitor therapy (PI) have shown to have higher levels of total cholesterol compared to people not taking a PI.

#### Measuring your Cholesterol

Cholesterol levels can be measured in two ways: by testing in a laboratory a sample of blood drawn from a vein, or by testing at home a finger-prick blood sample on a desktop analyzer. Fats in the blood are measured in units called millimoles per litre of blood (mmol/l). Like what happens with HIV viral load, cholesterol levels are subject to variation, whether it is day to day or throughout the course of a day. A single test will rarely provide enough information to guide therapeutic decisions. Therefore, taking a series of samples will offer a clearer and more accurate picture of the situation. Food can make a marked difference to blood lipids, which is why it is recommended to measure them before eating. The optimal level of cholesterol in the blood is considered to be less than 5.2 mmol/l.

#### Diet

Cholesterol levels can be reduced by 5 to 10% by following a diet, for example increasing the intake of starchy foods like bread, pasta, rice and cereals, or reducing fat intake and substituting saturated fats by unsaturated fats. For example, it is recommended to eat less butter and pasteurized cheese, and more polyunsaturated fats. This will help to lower LDL cholesterol, but will lower HDL levels too. Polyunsaturated fats are found in cornflower oil, sunflower seed oil and margarines. Eating more monounsaturated fats like olive oil or avocado, reduces the level of LDL cholesterol but does not lower HDL levels.

To help prevent blood clotting and reduce triglyceride levels, it is good to eat more of a kind of polyunsaturated fats called 'omega-3 fats'. These are found in oily fish like mackerel, herring, salmon and sardines.

#### Exercise

Some regular daily activities, like swimming, riding a bike or walking, can increase the levels of HDL cholesterol, although they have not been shown to reduce LDL levels.

#### Medication

Drug therapy to reduce high levels of cholesterol should only been done when diet changes and exercise have failed to produce a significant change. Cholesterol-lowering drugs have been studied and licensed based on the results of clinical trials in HIV-negative people and have shown to reduce levels by approximately 20%. Statins are the main class of drugs of this type, but they are not adequate for people with liver diseases or women who are either pregnant or breastfeeding. Pravastatin seems to be the safest statin to use while taking protease inhibitors. Other drugs used to treat high levels of cholesterol are bile acid binding drugs, and fibrates. Bile acid binding drugs come in powder formulation and have to be mixed with water or fruit juice and be taken with a meal. Since these drugs are not absorbed into the body, they can be prescribed to pregnant women. Fibrates are tablets which reduce triglycerides and have a lesser effect on cholesterol.

#### Risk of cardiovascular disease

The risk of suffering a heart attack increases if you smoke, have high blood pressure, diabetes or if you have a heart condition. Age and sex also play an important part: the risk of coronary illnesses in men occurs ten years earlier than in women. A doctor can assess your risk of suffering a heart attack by observing your cholesterol levels along with other risk factors. Stopping smoking reduces the risk of a heart attack and other illnesses.

#### Protease inhibitor

Some studies have shown thickening of and damage to the arteries in people who are taking protease inhibitors. It has been suggested that these people are exposed to a greater risk of developing a heart illness, although these drugs have not been used long enough to know what the risk will be in the long term. However, it is clear that the additional risk factors described above play an important part.