Cholesterol

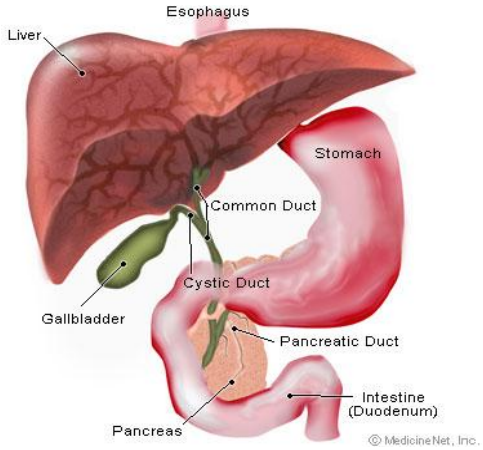
What is it?
Cholesterol is a fatty or waxy substance, which is mainly made in the liver from the saturated fats in food. Bile contains high levels of cholesterol, which is necessary for fat absorption.
Cholesterol plays a vital role in the functioning of every cell wall throughout the body. It is also the material that the body uses to make the hormones oestrogen and testosterone and other vital chemicals and vitamins such as Vitamin D.

Cholesterol is transported around the body in the blood stream, attached to what are known as lipoproteins. As their name would suggest, they are a combination of fats and proteins. It is this process of transportation around the vascular system that can lead to problems of fatty deposits on arterial walls (atherosclerosis) particularly where high blood cholesterol levels (Hypercholesterolaemia) are present.

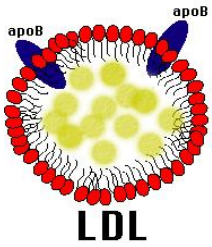
There are two main forms of lipoproteins.
- Low density lipoproteins (LDL), which carry cholesterol from the liver to the cells.
- High density lipoproteins (HDL), which return excess cholesterol to the liver.

How cholesterol is carried around the body

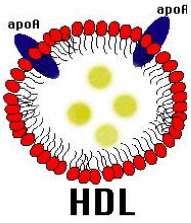
Production of cholesterol is increased by a high saturated fat diet and inherited factors.

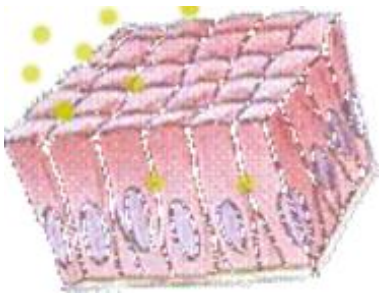


If there is a high level of cholesterol in the blood the artery wall takes up too much LDL. The risks of this happening are greater if you smoke or have high blood pressure, as this will damage the walls of the arteries.



The Liver packages the cholesterol in LDL vesicles so it can be transported around the body and delivered to the tissues. The HDL vesicles collect any stray cholesterol in the blood stream and return it to the liver to be repackaged.





The cells, which need cholesterol, Regulate the amount of cholesterol removed from the blood circulation. In people with familial hyper-cholesterolaemia, the cholesterol is removed at a much slower rate.

Atheroma develops when LDL cholesterol in the blood undergoes a chemical process known as 'oxidation' and is taken up by cells in the coronary artery walls where the narrowing process begins. This can be caused through many reasons, however the most commonly known is the damage caused to LDL cholesterol by free radicals circulating in the blood stream, introduced normally from poor diet, smoking, alcohol etc.

HDL cholesterol removes cholesterol from the circulation, and appears to protect against coronary heart disease. It is important to note that HDL is effective at removing undamaged LDL, but not so effective at removing damaged atheroma forming oxidised LDL. The ratio of HDL to LDL is therefore very important and the goal is to lower the level of LDL and a raise the level of HDL.

What causes high blood cholesterol?
Around 20% of our cholesterol is found in our foods (dietary cholesterol), such as eggs, which contains the most, though offal such as liver and kidneys do contain some cholesterol. Although there is no evidence to suggest that by eating eggs for instance, this will increase cholesterol levels. The most common cause of high blood cholesterol in people in the UK is too much fat in the diet; particularly saturated fat. Some people have high cholesterol levels as a result of an under-active thyroid gland, or chronic renal (kidney) failure, or alcohol abuse. Also, 1 in 500 people have high cholesterol levels because of the inherited disorder familial hyperlipidaemia.

Cholesterol Lowering Lifestyle Steps

Reduce Saturated Fat - The level of cholesterol in the blood tends to rise, with the amount of saturated fats eaten. However, it is the negative impact of a high saturated fat diet on the ability of HDL to effectively remove LDL that is significant. As part of a healthy diet, it is therefore important to reduce the total amount of fat eaten, and to eat unsaturated instead of saturated fats.

How can physical activity help improve cholesterol levels? - Physical activity increases the level of HDL cholesterol (the protective cholesterol), but does not affect LDL cholesterol. Regular daily physical activity - such as brisk walking, swimming or cycling – plays a major role in reducing cholesterol levels. The optimum level of activity is 30 minutes of moderate to vigorous activity every day, or a minimum of five days a week.

Fibre - Dietary fiber has a strong cholesterol lowering effect, particularly soluble fibre. Fibre found in Oats, barley, pulses, nuts & seeds, beets berries, prunes, rye, fruit & Veg Soluble fibre is thought to "soak up" LDL cholesterol, whilst it is in solution in the digestive tract and then removes it from the body**.**

Cholesterol friendly foods
Wholemeal foods, grains, pasta, rice, vegetables fruit, Soya beans and products, oat bran, and garlic have all been strongly linked with lowering cholesterol. Live yoghurt promotes vitamin K synthesis important in lowering LDL, Vitamin C is linked with lowering cholesterol, Omega 3 EFA's (fish oils) increase levels of HDL & reduce LDL and foods that act as anti-oxidants, fruits, vegetables, (phytochemicals) and bioflavonoids reduce the oxidation processes that act to make LDL cholesterol dangerous.

The British Hyperlipidaemia Association gives the following values for total cholesterol:

> 5.2 mmol/l	Optimum
5.2 – 6.2 mmol/l	Borderline high
> 6.2 mmol/l	High

This week consider three changes that you could incorporate into your diet that could improve your cholesterol ratio of HDL to total cholesterol.