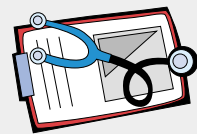


## Controlling your cholesterol levels

Fill up this chart everytime you visit your doctor to monitor your progress.



Name:		Age:		Date of visit		Total cholesterol (mmol/L)	LDL-C (mmol/L)	HDL-C (mmol/L)	Triglycerides (mmol/L)
Visit 1									
Visit 2									
Visit 3									
Visit 4									
Visit 5									
Visit 6									

### References

1. Kastelein JP, Van Dam MI, Br J Cardiol 2001;8:639-653.
2. Bays H. Expert Opin Investig Drugs 2002;11:1587-1604.
3. Ministry of Health (Singapore) Clinical Practice Guidelines 2001.
4. Chapman M. Atherosclerosis 2003;171:1-13.



# MANAGING HIGH CHOLESTEROL

This health educational message is brought to you by:



Committed to Bringing out The Best in Medicine



This leaflet is not intended as a substitute for professional medical care. Only your doctor can diagnose and treat a medical problem. Any liability or obligation for loss or damage howsoever arising is hereby disclaimed.

Editorial development by CMPMedica Medical Education. The opinions expressed in this publication are not necessarily those of the editor, publisher or sponsor. Any liability or obligation for loss or damage howsoever arising is hereby disclaimed. © 2004 CMPMedica. All rights reserved. No part of this publication may be reproduced by any process in any language without the written permission of the publisher.

CMPMedica Asia Pte. Ltd  
No 3 Lim Teck Kim Road,  
#10-01 Singapore Technologies Building,  
Singapore 088934  
Enquiries:  
Tel.: (65) 6223 3788 Fax: (65) 6221 4788  
E-mail: sg@asia.cmpmedica.com  
Web site: www.asia.cmpmedica.com

01-96VVT-04-SG-2021-PA SG-MSD-007

High cholesterol levels are associated with heart disease. If you are obese or diabetic, your risk of developing heart disease is even higher. That's why keeping your cholesterol levels in control helps reduce the possibility of you being struck by a heart attack or stroke event.

### High cholesterol can lead to ...

- Atherosclerosis – build up of fatty plaque in the walls of blood vessels.
- Heart attack – when blood vessels supplying oxygen to heart get blocked.
- Stroke – when blood vessels supplying oxygen to brain get blocked.

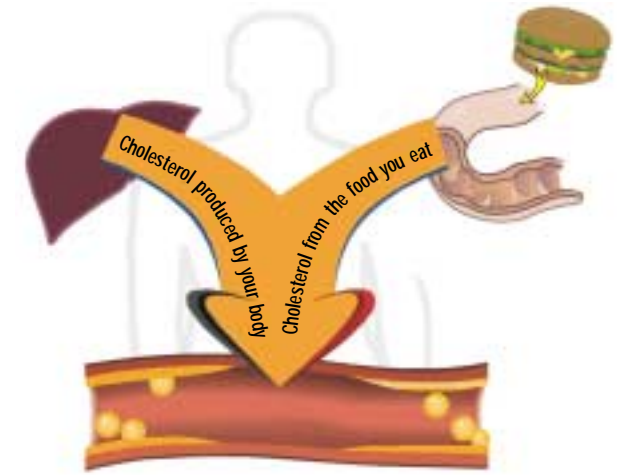
### Where does cholesterol come from?

The cholesterol in our body comes from two main sources — the liver produces about 800 mg of cholesterol daily (called biliary cholesterol) while 300 mg is obtained from the foods we eat (dietary cholesterol).

Cholesterol made in the liver is excreted through the bile duct into the small intestine. Some cholesterol in the small intestine comes from the food ingested. About 50% of all the cholesterol in the small intestine is reabsorbed into blood vessels and brought back to the liver. Reabsorbed cholesterol is then delivered to various parts of the body to be stored and to carry out vital functions, such as to form cell membranes and to manufacture sexual hormones, vitamin D and bile acids.

Cholesterol that is not absorbed will be removed from the body through the faeces.

### Two sources of cholesterol



Cholesterol from both food and the body can accumulate in your bloodstream. To aggressively lower cholesterol, a high-dose statin or a statin in combination with another cholesterol-lowering agent such as a cholesterol absorption inhibitor is required.

### Types of cholesterol lowering drugs<sup>1</sup>

There are several types of cholesterol-lowering drugs that are used to treat high cholesterol. Different classes of drugs vary in their mechanism of action to lower cholesterol levels.

#### • Statins

Often the first line of treatment, this category of drugs blocks certain enzymes in the body that produce cholesterol. Statins inhibit the synthesis of cholesterol in the liver. They effectively reduce low density lipoprotein cholesterol (LDL-C) or "bad cholesterol". Drugs in this class include simvastatin, lovastatin, fluvastatin and rosuvastatin.

#### • Fibrates / Fibric acid derivatives

Fibrates or fibric acid derivatives such as gemfibrozil or fenofibrate work by reducing the production of triglycerides (TG), and are best suited for individuals with high TG levels. In addition, fibrates modestly raise high density cholesterol (HDL-C) known as the "good" cholesterol.



**Take note of this ...**

Use of statins and certain fibrates may be associated with a rare, but potentially fatal muscle reaction known as rhabdomyolysis in which the muscle cells break down.

Consult your doctor if you experience muscle aches and pains, fever, dark urine or generally feel unwell. Your doctor should also conduct liver enzyme testing to monitor your liver function periodically.

**Bile acid sequestrants**

Also known as bile resins, bile acid sequestrants bind bile acids in the intestinal tract, prompting the liver to use cholesterol to make more bile acids in the liver. This lessens the pool of cholesterol available in the bloodstream. One example of a resin is cholestyramine.

Treatment with bile resins may cause nausea, constipation and bloatedness. Include more fiber and fluids in your diet to minimise these side effects.

**Niacin (nicotinic acid)**

Niacin is a form of vitamin B3. At high doses, it works in the liver to lower TG and LDL-C, as well as to raise HDL-C.

It is advisable to gradually titrate the dose of niacin upward. Drastic increments in dosage can lead to flushing, palpitations and nausea.

**Selective cholesterol absorption inhibitors<sup>2</sup>**

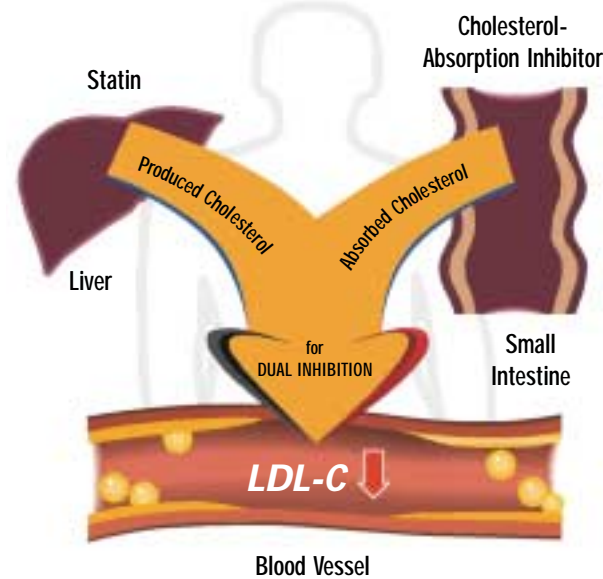
A novel class of lipid lowering treatment, these drugs block the absorption of cholesterol from the small intestine. As a result, the amount of cholesterol that is brought back to the liver is reduced and a



smaller amount of cholesterol is stored in the body. This allows more cholesterol to be removed from the blood circulation.

**Dual control for greater cholesterol reduction**

While most cholesterol-lowering drugs are generally effective, treatment with just one type of medication may not be sufficient to help you achieve the recommended cholesterol levels, particularly that of the LDL-C. High levels of LDL-C put you at higher risk for heart disease.<sup>3</sup>



But when two drugs are used together, for example, a selective cholesterol absorption inhibitor together with a statin, which reduces cholesterol production in the liver, a dual control is achieved to provide greater cholesterol reduction and better cholesterol control.



**Check your cholesterol levels**

To know if your cholesterol levels, including LDL-C, HDL-C and triglycerides (a type of fat in the body), are controlled within the target levels, you can refer to the table below. A high triglycerides level is also a risk for developing heart disease, while a high HDL-C level protects you against it.<sup>4</sup>

	Total cholesterol [mmol/L (mg/dL)]	LDL-C [mmol/L (mg/dL)]	TG [mmol/L (mg/dL)]	HDL-C [mmol/L (mg/dL)]
Optimal	-	<2.6 (100)	<1.7 (150)	Low (undesirable) <1.0 (40)
Near optimal/ Desirable	<5.2 (200)	2.6 – 3.3 (100 – 129)	1.7 – 2.2 (150 – 199)	
Borderline high	5.2 – 6.1 (200 – 239)	3.4 – 4.0 (130 – 159)	-	Desirable 1.0 – 1.5 (40 – 59)
High	≥6.2 (240)	4.1 – 4.8 (160 – 189)	2.3 – 4.4 (200 – 399)	High ≥1.6 (60)
Very high	-	≥4.9 (190)	≥4.5 (400)	

Ministry of Health (Singapore) Clinical Practice Guidelines 2001

**A healthy lifestyle is also important**

Apart from medication, lifestyle modification is also a vital part of a cholesterol-lowering therapy. You can do a lot to make your lifestyle a healthy one, for example:

- Exercise regularly and keep yourself active because this can help lower the LDL-C and raise HDL-C levels. Even just doing some moderate activity on most days can help.
- Watch your weight as overweight (obesity) increases the risk of heart disease.
- Make healthier diet choices by eating more low-fat, high-fibre foods to help control your cholesterol levels. Good choices include
  - Fish, white-meat poultry (without skin);
  - Vegetable protein such as beans and tofu;



- Fresh fruits and vegetables; and
- Foods high in soluble fibres, such as oats, citrus fruits, berries and apples.



- Avoid foods that raise cholesterol, including fatty meats, bacons, sausages, liver and organ meats, egg yolks, deep-fried foods, creamy sauces and fatty gravies, cookies and pastries.
- Quit smoking.

**To know more about high cholesterol and the treatment that is suitable for you, please consult your doctor today.**