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This booklet has been produced from an educational grant from Seven Seas Limited, the makers of Pulse.

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An Introduction to

## OMEGA-3 FATTY ACIDS' ROLE IN HELPING HEARTS STAY HEALTHY

An easy to follow training booklet for medicine counter assistants

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## WHY UNDERTAKE THIS TRAINING?

Research has identified the important role that diet and lifestyle play in maintaining a healthy heart.

*Coronary heart disease* (CHD) is a major cause of death and disability in the UK. In many cases, there are no signs or symptoms. A sudden, sometimes fatal, heart attack may be the first sign that anything is wrong. For this reason it can be difficult to persuade people to make the simple lifestyle changes that can protect heart health, despite many Government and charity-funded campaigns.

While management of diagnosed disease is the province of the pharmacist, GP and heart specialist, the medicine counter assistant (MCA) may be approached by concerned individuals with queries on heart health protection.

As a result of robust research and clinical trials there has been extensive media coverage of the heart health benefits associated with the omega-3 *long-chain polyunsaturated fatty acids* (LCPUFA) the type that are found in foods of marine origin like oily fish and fish oil supplements. These omega-3s are also recognised as heart protective by medical and Government advice.

Fish oil supplements offer an attractive natural source of these valuable nutrients for those people who, for whatever reason, do not eat sufficient oily fish.

The science of fatty acids can be complex and messages are often confusing. You may be asked for your opinion on the merits of omega-3 or fish oil supplementation and recommended intakes before you refer them, if necessary, to the pharmacist.

## AIMS

The aim of this training booklet is to provide you with an understanding of heart disease risk factors and the diet and lifestyle changes that can help protect heart health. It provides evidence-based information on the long chain omega-3 fatty acids found in oily fish and fish oil supplements and explains what they are and why they are important, how they can be obtained from diet, how much is recommended and whom they benefit. It also explains that omega-3 fatty acids are available from other food sources and why these are less satisfactory with regard to diet and health.

There are many terms that may not be familiar to you. Please see the Glossary of Terms and discuss with your pharmacist if necessary.

The importance of continually updating your knowledge and skills within pharmacy is vital to help you inform and support your customers.

Assistants who successfully complete the assessment questions will be awarded a certificate. To obtain your certificate you will need to read this booklet carefully before submitting your answers to the address provided. This booklet may then be retained for future reference.

## OBJECTIVES

After studying the training booklet you will:

- Have an understanding of the high incidence of death and disability caused by heart disease
- Be aware of heart disease risk factors
- Be aware of the lifestyle changes that can help reduce the risk
- Have an understanding of essential fatty acids and why there is an imbalance in the typical Western diet
- Be able to explain why the omega-3 fatty acids are believed to help maintain heart health
- Be aware of lifestyle changes that are beneficial to heart health
- Have an understanding of the terms used in coronary heart disease (CHD).

## INTRODUCTION

Despite the falling incidence of death from heart disease, CHD remains the nation's single biggest killer, responsible for around 117,500 deaths annually (British Heart Foundation 2002).

The fact that deaths attributed to heart disease are falling distorts the true picture. Current estimates put the number of people diagnosed with CHD in the UK at a staggering 2.7 million. And this figure does not include the millions who live with blocked arteries without even knowing it - a number that is rising year on year, according to the British Heart Foundation (Statistics-2004).

Fewer people are dying from heart disease, but more people are living with it.

It is recognised that lifestyle changes can exert a powerful effect on heart health. Even simple changes can make a difference.

Publicity and authoritative endorsement for the heart health benefits of the long-chain omega-3 fatty acids – those derived from marine sources like oily fish – has fuelled interest among people who are health-aware or feel they may be at risk. Some may choose to obtain their omega-3 fatty acids from diet. The Food Standards Agency (FSA) recommends at least two fish meals a week, one of which should be oily fish. Others

may prefer to explore alternative options. Fish oil supplements are widely agreed to confer similar health benefits, indeed most intervention trials have used fish oil capsules. Supplementation offers the added attractions of convenience and measured dosage among other advantages.



## BACKGROUND TO LONG CHAIN OMEGA-3 FATTY ACIDS

The association between omega-3 polyunsaturated fatty acids and heart health was made in the 1970s by scientists who noted that heart disease was virtually non-existent among the Greenland Inuits despite their high-fat diet of blubber and oily fish. They concluded that it was the type of fat they ate that made the difference. Many studies since have confirmed this thinking, (notably the DART intervention trial in the UK, the GISSI study in Italy and the Singh trial in Asia). The long-chain omega-3 fatty acids EPA and DHA (eicosapentaenoic acid and docosahexaenoic acid) are proven to help maintain heart health.

The omega-3s are one of the two essential fatty acid (EFA) families vital to life and to health. Like all fats, they provide energy. Their calorific value is similar to other fats and oils but, unlike saturated fats, they have important health roles. In fact, as their EFA description suggests, they are essential and must be consumed regularly as the body has limited storage for them.

Both of the important EFA families – omega-6 and omega-3 - are components of nerve cells and cellular membranes. They are converted by the body into *eicosanoids*, *leukotrienes* and *prostaglandins* – all of which are needed on a second-by-second basis by most tissue activities in the body.

Experts think that man evolved on a diet which would have had roughly 1-2 times more omega-6 than omega-3, though there is a school of thought which argues for a 1:1 ratio. Currently, average UK intakes are in a ratio of around 8:1 in favour of the omega-6s, while in the US it is around 10:1, and in Australia nearer 12:1. Many individuals within those populations will have an even greater omega-6 to omega-3 imbalance.

Because of their wide-ranging roles, virtually every area of the human body is susceptible to problems if the balance of the two polyunsaturates becomes out of kilter.

How extreme the imbalance needs to be before problems are felt is not yet known for sure and in practice it will probably vary from one person to the next.

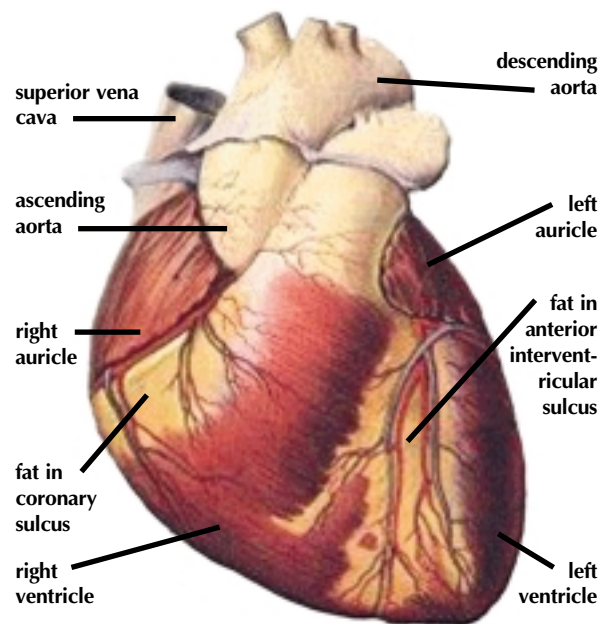
Although it is well established that the omega-3 fatty acids derived from fish are heart-protective, there is still some discussion about exactly how they work. They are known to be *antiarrhythmic* and anti-inflammatory, they reduce platelet aggregation (blood clots), stabilise atherosclerotic plaques and lower blood triglycerides. They also improve arterial elasticity.

This weight of evidence has led governments and the medical profession to encourage consumption of these important nutrients. This advice and the resulting publicity have largely contributed to a reverse in the decline of oily fish consumption and the growth in sales of fish oil supplements.

## HEART DISEASE

The heart is a muscular pump that sends blood around the body to supply it with oxygen and vital nutrients. First the blood travels to the lungs to collect oxygen and then returns to the heart before being circulated round the body through the arteries before returning to the heart via the veins. Then the cycle starts all over again.

The primary cause of CHD is a process called atherosclerosis - the formation of fatty deposits (*plaques or atheroma*) under the lining of a coronary artery, effectively narrowing its circumference. When this happens, blood supply to the heart muscle is restricted, starving it of oxygen. Angina and increased risk of heart attack are the result.



## Angina

Angina (Angina pectoris) is recurring pain or discomfort in the chest. As a result of atherosclerosis, the heart is unable to get all the oxygen it needs from blood.

Angina feels like a pressing or squeezing pain, usually in the chest under the breast bone, but sometimes in the shoulders, arms, neck, jaws, or back. Physical exertion is the most common trigger. Other triggers can be emotional stress, extreme cold or heat, heavy meals, alcohol, and cigarette smoking. An episode of angina is not a heart attack and the pain does not mean that the heart muscle is suffering irreversible, permanent damage. Angina is usually relieved within a few minutes by resting or by taking prescribed medication. Episodes of angina seldom cause permanent damage to heart muscle.

## Heart Attack (Myocardial infarction MI)

Although a heart attack sometimes occurs in people with angina, it can also happen 'out of the blue' in people with no previous symptoms of heart disease. A heart attack (myocardial infarction or MI for short) usually occurs after the age of 50 and becomes more common with increasing age. Sometimes it occurs in younger people. MI is three-times more common in men than women.

A heart attack happens when the blood supply to a part of the heart muscle is interrupted or stops -

usually because a blood clot (thrombus) in an artery already narrowed by atherosclerosis blocks the flow of blood (and oxygen) to a section of the heart. If one of the main coronary arteries is blocked, a large part of the heart muscle is affected.

Clotting is the body's natural response to injury. Without it, we would bleed to death. A complex process forms an intricate network of threadlike fibrils that causes plasma to gel and collects up blood cells and plasma. The resulting blood clot plugs the site of injury to prevent further blood loss. Clots do not usually form in normal arteries. However one may form if atheroma on the artery wall ruptures and triggers the blood's clotting mechanism.

Severe chest pain is the usual symptom of a heart attack. It can be severe or may be mistaken for indigestion. The pain may be similar to angina, but it is usually more severe and lasts longer (usually more than 15 minutes, sometimes several hours). The pain may travel up to the jaw and down the left, or both, arms. Other symptoms include sweating, light-headedness, breathlessness or nausea. A heart attack is not always fatal but in people who survive a heart attack the part of the heart muscle that dies is replaced by scar tissue over the next few weeks.

## WHO'S AT RISK?

Some heart disease risk factors are associated with genetic inheritance and age and cannot be changed.

These include:

- Sex – up to the age of 45, deaths from heart disease in the UK are 6 - 7 times higher in men than women.
- Post-menopausal – Women are protected by

oestrogen and comparatively higher levels of high-density lipoprotein (HDL) known as 'good' cholesterol until menopause. However, the difference in death rates between the sexes falls 3-fold in the 55-65 group. By the age of 75, there is virtually no difference in risk.

- Age – Most people by the age of 40 have some noticeable plaque build-up in the arteries.
- Familial history – people are at a greater risk if one or both parents or a brother or sister suffered from coronary heart disease before they were 60 years old.
- Genetic predisposition – South Asians have higher rates of CHD



There is also a condition known as familial hypercholesterolaemia (or hyperlipidaemia) where individuals have inherited high cholesterol levels and may die prematurely if untreated. The availability of effective medication and the benefits of diet and lifestyle changes make early diagnosis vital. People whose close relatives have died young of heart attack should consult their GP.

## Reducing the risk

Other CHD risk factors can be modified by lifestyle changes and medication:

## Poor Diet

An unhealthy diet is a major risk factor for coronary heart disease. Diet is not only important for maintaining a healthy weight or losing excess weight (itself a CHD risk factor), it can have both a negative and positive effect on heart health. The relatively new science of nutrition has identified certain foods and micronutrients in food that are good for the heart and others that are harmful:

## EAT LESS

- **Salt** on the table and in cooking - and processed foods that are high in hidden salt. (See High Blood Pressure below).
- **Saturated fat found** in hard margarines, lard, fatty cuts of meat and meat products like sausages and burgers. High saturated fat intake is linked to raised cholesterol and triglyceride levels.
- **Full fat** dairy products like cheese, milk and cream, which are also high in saturated fat.
- **Vegetable oils** and margarines containing omega-6 and/or trans-fatty acids. The popularity of soft table margarines and vegetable oils in cooking means the modern Western diet is now too high in omega-6 fats, resulting in an unhealthy imbalance of omega-6 to omega-3 fatty acids.
- **Pre-prepared and processed foods** as most contain salt, fat (saturated and omega-6) and chemicals.
- **Foods fried at high temperatures** that release unwanted chemicals from cooking oils/fats.

## EAT MORE

- Fruit and vegetables (fresh, frozen or canned) that contain antioxidant nutrients like vitamins A, C and E (and beta-carotene – a precursor to vitamin A), and selenium. Antioxidants mop up free radical molecules that might otherwise cause damage leading to diseases like heart disease and cancer.
- Oily fish (eg mackerel, sardines, herring, pilchards and salmon) that contain the long-chain omega-3 fatty acids that protect heart health in many ways.
- For people who, for whatever reason, choose not to eat at least one oily fish meal a week, fish oil supplements are available. Vegetarians and vegans can obtain short-chain omega-3 fatty acids by increasing their intake of green leafy vegetables and supplementing their diet with crushed flaxseeds or flaxseed and walnut oils. Algae supplements in non-gelatin capsules are also available.



- Fibre in wholemeal bread and cereals, pulses like beans and lentils, fruit and vegetables (particularly skin and pith) has been shown to help reduce blood cholesterol levels and to control blood sugar levels.



## High LDL blood cholesterol and triglyceride levels

Cholesterol is a fatty substance that is found naturally in the bloodstream and in all body cells. Only a small proportion of the body's cholesterol comes from cholesterol in food. Most is made in the liver from saturated fat found in food.

Low density lipoprotein (LDL) is the main cholesterol carrier in the blood. A high level of LDL cholesterol may reflect an increased risk of CHD.

High density lipoproteins (HDL) appear to carry cholesterol away from the arteries and back to the liver. High levels of HDL cholesterol help to protect against the development of atheroma in the arteries whereas low levels may increase the risk of atherosclerosis.

Raised levels of triglycerides, another form of blood fat, are also linked with CHD.

Elevated cholesterol and triglyceride levels can be modified by diet, mainly by the reduction of saturated fats. The decision to treat cholesterol levels with drugs is made only after blood cholesterol levels and the extent of other risk factors for CHD are taken into account.

## Smoking

Each year, smoking accounts for around approximately 20% of all heart disease deaths. Pharmacies are well placed to advise and offer advice regarding nicotine replacement therapy. Telephone counselling is available from the NHS Smoking Helpline 0800 169 0 169 and QuitLine 0800 00 22 00.

## High Blood Pressure (Hypertension)

The heart must work harder to pump blood through narrowed arteries and over time the increased pressure causes damage to the heart and blood vessels. Often called the "silent killer," hypertension usually causes no symptoms until it reaches a life-threatening stage.

All adults should have their blood pressure checked at least once every five years but preferably more often for older age groups as blood pressure rises with age. Blood pressure on the high side of normal (between 130/85 and 139/89 mmHg) should be checked every year. Medication may be prescribed, but diet and lifestyle changes can make a difference.

The most important dietary change is salt reduction. Most people eat too much salt, but cutting down on salt at the table and in cooking is particularly important for people with high blood pressure. Processed foods often contain hidden salt.

## Sedentary lifestyle

Exercise helps lower blood sugar and blood pressure, makes arteries more flexible and less prone to hardening and helps weight control. Lifelong regular exercise is one of the cornerstones of heart health maintenance.

People with high blood pressure or pre-existing heart disease should consult their doctor before embarking on an exercise programme.

## Obesity

Obesity is most commonly defined in terms of body mass index (BMI) which is calculated by dividing your weight in kilograms by the square of your height in meters ( $BMI = \frac{kg}{m^2}$ ). A desirable BMI is considered to be in the region of 20 to 25. Above this is defined as 'overweight' and a BMI over 30 is defined as 'obese'.

Being seriously overweight hastens the onset of heart disease by an average of seven years.

Apple-shaped people who carry excess fat round their middle are at greater risk than pear-shaped people whose excess fat is deposited on their bottom and thighs.

## Diabetes

Diabetes appears to increase heart disease risk. It is thought that higher than normal blood glucose levels affect the lining of arterial walls which in turn can increase susceptibility to atherosclerosis. There are an estimated one million people in the UK who have diabetes but don't know it. Modern treatment of diabetes can protect against atherosclerosis, so early diagnosis is important.



## Excess Alcohol

Drinking alcohol above recommended limits is likely to raise blood pressure. Advice is simply to drink no more than two (women) or three (men) units a day and never binge drink.

## Stress

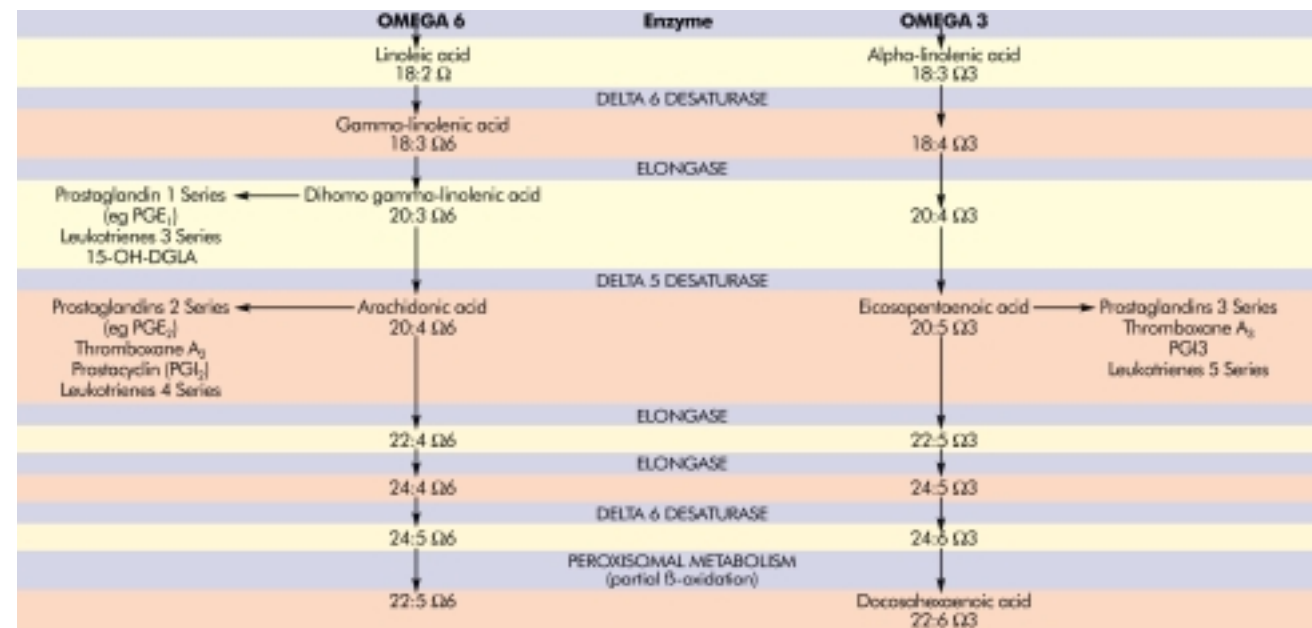
Evidence supporting a link between stress and heart disease is not strong, but individual response to stress may be a contributing factor. Some scientists have noted a relationship between CHD risk and stress.

## THE HEART AND HEALTH PROTECTIVE BENEFITS OF OMEGA-3 FATTY ACIDS

The omega-3 fatty acids are a family of polyunsaturated fatty acids essential to life. They cannot be made in the body but must be obtained from diet. However, the typical UK diet now supplies omega-3 levels well below what the body needs for good health.

The evidence linking consumption of omega-3 fatty acids with reduction of risk of heart disease and heart attack death is so convincing that the government recommends that people increase the amount of oily fish in their diet.

## Omega-3 and Omega-6 Conversion Process (for information only)



A report (SACN/02/12) published by the Scientific Advisory Committee on Nutrition concluded that the evidence supporting earlier guidelines (Committee on Medical Aspects of Food Policy 1994) advocating consumption of two fish meals a week, one of which should be oily fish, has further strengthened the recommendation that the omega-3s are heart-protective and many scientists believe that one oily fish meal a week is not enough.

Oily fish like mackerel, herring and sardine are the only good dietary source of the long-chain omega-3 fatty acids. For people who prefer not to eat oily fish, for whatever reason, fish oil supplements provide an excellent alternative. Please remember that white fish like cod are not oily fish and that convenience fish products (e.g. fish fingers) may not be of any real benefit.

The omega-3 fatty acids are thought to protect the heart in many ways (listed below):

- Help reduce platelet aggregation (the clumping together of red corpuscles that can form a potentially fatal blood clot in a coronary arteries)
- Help keep blood vessels dilated (*vasodilation*).

- Reduce high *triglyceride* (*blood fat*) levels that are a heart attack risk factor.
- Help protect against heartbeat abnormalities (like ventricular tachycardia and fibrillation) that can be fatal.
- Encourage the development of a 'non-stick' lining to the arteries to inhibit the formation of *atheroma* on artery walls.
- Inhibit inflammation of arterial plaques so they are less likely to rupture and lead to a heart attack.
- Maintain arterial elasticity. (Stiff, inflexible arteries are a heart attack risk.)
- Lower high blood pressure slightly.
- Improve circulation so that the heart does not have to work so hard to pump blood around the body.

### Vegetarians and Vegans

For vegetarians and vegans, flax oil supplements offer similar convenience benefits but cannot match the health benefits of fish oil supplements. This is because vegetable sources must undergo a lengthier conversion process in the body. Today's high intakes of omega-6 fatty acids (from vegetable oils and margarines) inhibit this process which is inefficient as a result.

To aid the conversion process, vegetarians and vegans are advised to reduce intake of omega-6 fatty acids by cutting down on sunflower and safflower cooking oils and margarines made from them and limiting consumption of processed foods that often use these oils in their manufacture. Omega-3 intake may be increased by eating more crushed flaxseeds (linseeds), flaxseed oil, rapeseed (canola) oil, chia seeds, walnuts and walnut oil, purslane, and dark green leafy vegetables.

### OILY FISH VERSUS FISH OIL SUPPLEMENTS

In an ideal world, everyone should be able to obtain the long-chain omega-3 nutrients they need from diet by eating at least two fish meals a week. In practice, however, this simply isn't happening despite encouragement from dietitians and nutritionists. Some people do not like the taste or the smell, others find the bones a problem and yet others find shopping, storing and cooking fish an inconvenience. Concerns over pollutants in fish have not helped. The presence of mercury, PCBs and dioxins in oily fish led the Food Standards Agency to issue guidelines on upper limits for consumption of shark, marlin, swordfish and other oily varieties for sectors of the population, women of childbearing age particularly, in 2004.

To maintain good health and protect against inflammatory and degenerative disease, supplementation offers the benefits of:

**Convenience:** Widely available from retail outlets like pharmacies; portable and easy to store over long periods without spoiling; easy to take (any time, anywhere).

**Measurable dose and dosage options** (liquid or capsules in a choice of strengths).

**Refined:** The refining process removes environmental pollutants like *PCBs* and *dioxins*.

### What is the Recommended Dose of Omega-3 Fish Oils?

There is no RNI or RDA for fish oils. Products available in pharmacy offer a choice of omega-3 levels to suit individual requirements. Some contain concentrated omega-3 LCPUFA to increase the amount delivered without increasing capsule size. For heart health protection, a level of 450mg per day is generally recommended.

### Can Omega-3 Fish Oils be Taken with Other Supplements or Medicines?

**Always refer to your pharmacist if unsure.**

While beneficial to health generally and heart health particularly, omega-3 fish oils have blood-thinning effects and therefore should not be taken by anyone taking prescribed anticoagulants. It is advisable that people with a pre-existing condition should seek pharmacist advice before taking fish oils.

It is important to be aware of any contraindications in the use of natural medicines and supplements and to use the 2WHAM technique when advising any patient. If you are in any doubt, particularly when dealing with pregnant women or people who have a long-standing illness, refer these patients to the pharmacist in the first instance. Patients being treated by their GP should be instructed to keep him/her informed of any medicines or food supplements purchased over-the-counter (OTC).





RNI stands for Reference Nutrient Intake, and is the UK value, which was decided after major Government research in 1991. It is the correct amount for 97% of people, broken down into the needs of men, women, children and the over-50s.

RDA stands for Recommended Daily Allowance. It is a minimum requirement, ie how much of a nutrient an adult needs to avoid deficiency.

## GLOSSARY OF TERMS

**Coronary Heart Disease (CHD)** - heart disease caused by narrowing of the coronary arteries that feed the heart.

**Omega-3 fatty acids** - a family of fatty acids derived from the essential omega-3 fatty acid alpha-linolenic acid (ALA) found in walnut and flaxseed oil that includes ALA metabolites DHA and EPA found in foods of marine origin and supplements made from them. DHA and EPA are more useful than ALA to the body.

**Omega-6 fatty acids** - a family of fatty acids derived from the essential omega-6 fatty acid linoleic acid (LA) found in most vegetable oils that includes LA metabolite GLA found in evening primrose and borage seeds and supplements made from them.

**Anti-arrhythmic** - controls heartbeat disorders.

**Anti-inflammatory** - controls inflammation. Inflammation has a role in heart disease.

**Triglycerides** - the chemical form in which most fat exists in food as well as in the body. They're also present in blood plasma and, in association with cholesterol, form the blood lipids. Excess triglycerides in the blood is linked to the occurrence of coronary artery disease in some people.

**Atherosclerosis** - a type of arteriosclerosis that involves deposits of fatty substances, cholesterol, cellular waste products, calcium and fibrin (a clotting material in the blood) in the inner lining of an artery.

**Atheroma** - furring-up of the interior of an artery by deposits, mainly of cholesterol, within its walls. Associated with atherosclerosis, atheroma has the effect of narrowing the artery, thus restricting blood flow. This predisposes to a number of conditions, including thrombosis, angina, and stroke.

**High density lipoprotein** - also known as HDL, this substance acts to "carry" cholesterol in the bloodstream. Sometimes referred to as "good cholesterol", HDL has been correlated with a lower risk for heart disease

Further information and patient advice may be obtained from:

**British Heart Foundation**  
14 Fitzhardinge Street London W1H 6DH  
Tel: 020 7935 0185

**Heart Information Line**  
Tel: 08450 70 80 70 Website: www.bhf.org.uk

**Low density lipoprotein** - also known as LDL, low-density lipoprotein cholesterol is sometimes called "bad" cholesterol. LDL cholesterol collects inside the walls of the arteries and often contributes to the formation of plaque.

**Hypertriglyceridaemia** - elevated triglyceride concentration in the blood that can be inherited. It is linked to higher risk of heart disease and arteriosclerosis.

**Trans-fatty acids** - fats found in foods such as vegetable shortening, some margarines, biscuits, sweets, baked goods, snack foods, fried foods, salad dressings, and many processed foods. Trans-fatty acids are often listed as 'partially hydrogenated vegetable oil' or 'hydrogenated vegetable oil' on packaging.

**Eicosanoids** - hormone-like molecules that affect the synthesis of virtually every other hormone in one's body. Eicosanoids are the body's cellular check and balance system.

**Leukotrienes** - chemicals released by the body as part of the inflammation response.

**Prostaglandins** - a group of hormone-like substances that they play a role in a wide variety of physiological processes

**Vasodilation** - an increase in the diameter of blood vessels.

**PCBs** - synthetic chemicals used in a variety of industrial situations. Their residues have been found in the environment and foods. They have been found to be toxic to some species of laboratory animals and to people who have been exposed to high levels.

**Dioxins** - produced during the burning of materials containing chlorine and in some chemical processes. Population studies suggest that dioxins can cause skin problems and may affect neurological development and the endocrine system.

## References:

DART Diet and Reinfarction trial: Lancet 1989;2:757-61  
GISSI trial: Lancet 1999;354:447-55  
Singh trial: Cardiovasc Drugs Ther 1997;11:485-91.

## ASSESSMENT QUESTIONS

From the list supplied beneath each question, please circle your answer on your Assessment Answer Sheet. Note that there is only one correct answer to each question.

- Q1** The chest pain symptomatic of heart attack may sometimes be mistaken for which other, more common, condition?  
a. bronchitis      b. indigestion  
c. arthritis      d. muscle strain
- Q2** Too much salt in the diet is linked with which heart disease risk factor?  
a. High blood pressure  
b. High cholesterol levels  
c. Formation of blood clots  
d. Atherosclerosis
- Q3** In which decade was the association first made between omega-3 fatty acid intake and heart health protection?  
a. 1950s      b. 1960s  
c. 1970s      d. 1980s
- Q4** Which of the fish named below does not contain high omega-3 levels?  
a. Sardine      b. Sole  
c. Herring      d. Mackerel
- Q5** MI are the initials often used to describe a heart attack. What do they stand for?  
a. Membrane Insufficiency  
b. Mental Imbalance  
c. Myocardial Infarction  
d. Medical Inflammation
- Q6** Some heart disease risks like age and inheritance cannot be changed and some can. Which of the risks below CANNOT be changed?  
a. smoking habit  
b. gender  
c. high alcohol consumption  
d. overweight
- Q7** Government heart health advice is to eat two fish meals a week, one of which should be oily. Fish oil supplements offer similar health benefits and many advantages. Which from the following list is NOT a benefit unique to fish oil supplements?  
a. measurable intake of omega-3 nutrients  
b. convenience  
c. refined to remove pollutants  
d. high in body-building protein
- Q8** Fish oil supplements supply two important long-chain omega-3 fatty acids. Which of the combinations below names both?  
a. ALA (alpha-linolenic acid) and DHA (docosahexaenoic acid)  
b. DHA (docosahexaenoic acid) and GLA (gamma-linolenic acid)  
c. ALA (alpha-linolenic acid) and EPA (eicosapentaenoic acid)  
d. EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid)
- Q9** There is no RDA or RNI for fish oils. What daily intake of long-chain omega-3 fatty acids is generally recommended for heart health maintenance?  
a. 1000mg      b. 250mg  
c. 450mg      d. 750mg
- Q10** Fat in the diet is a complex subject. It is recognized that saturated fats can be harmful to health. Which of the following foods is NOT high in saturated fat?  
a. butter  
b. joint or cut of pork, beef or lamb  
c. cheese  
d. fish
- Q11** Omega-3 fish oils help hearts stay healthy in very many ways. Which of the benefits listed below is NOT associated with omega-3 fatty acid intake.  
a. aiding circulation and helping reduce risk of blood clots  
b. helping maintain elasticity of the artery walls  
c. helping relieve the pain of angina  
d. helping maintain a healthy heartbeat
- Finally, could you answer the following two questions:**
- Q12** Did you find this material helpful?  
a. Very helpful  
b. Fairly helpful  
c. Not helpful
- Q13** Would you be interested in receiving more training information from Seven Seas Ltd.  
a. Yes      b. No

## ASSESSMENT ANSWER SHEET

Name of student: \_\_\_\_\_

Name of Pharmacy: \_\_\_\_\_

Pharmacy address: \_\_\_\_\_  
\_\_\_\_\_

Postcode: \_\_\_\_\_

Phone: \_\_\_\_\_

E-mail: \_\_\_\_\_

NPA number (if applicable) \_\_\_\_\_

Please circle one letter only:

**Q1** a b c d

**Q2** a b c d

**Q3** a b c d

**Q4** a b c d

**Q5** a b c d

**Q6** a b c d

**Q7** a b c d

**Q8** a b c d

**Q9** a b c d

**Q10** a b c d

**Q11** a b c d

**Q12** a b c

**Q13** a b

Please submit your answers to:

**The Marketing Department**  
**FREEPOST**  
**Seven Seas Ltd.**  
**Hedon Road**  
**Hull**  
**HU9 5BR**

You will receive your certificate, subject to the submission of 10 correct answers.

To request further copies of this training booklet telephone 01482 375234 or see your local Seven Seas representative.