

# 2.2.4 Coronary heart disease: a non-communicable disease

## AQA GCSE Biology (Higher) Question and answer notes

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### How to use these notes

These notes cover everything you need to know for this part of the specification. They have been written in question-answer format to make them easier for you to study from.

In order to study successfully, I recommend you do the following for each question and answer:

- Read it carefully and make sure you **understand** it.
- **Memorise** the answer.
- **Practice** applying your understanding to past exam questions.

A good way to memorise information is to use **retrieval practice**. This is when you practise retrieving information from your memory. You could do this by making a flashcard for each question with the question on one side and the answer on the other. Or you could use a flashcard app. Alternatively, use a sheet of paper to cover up the answer so you can only see the question. Try to answer the question and then check how you did.

You should practise retrieving each answer from your memory until you can do it perfectly. Even once you can retrieve the answer perfectly, your ability to retrieve it will probably fade as time passes without practising. Therefore you will need to keep going back to the questions that you have previously mastered and practising them again. However, each time you re-learn the answer, the memory will be stronger and will last longer than the time before.

### What is coronary heart disease (CHD)?

Coronary heart disease (CHD) is a disease in which layers of fatty material build up inside the coronary arteries, causing their lumens to become narrower. This reduces blood flow through the coronary arteries, which reduces the amount of oxygen reaching the heart muscle per second.

### What type of disease is CHD: communicable or non-communicable?

CHD is a non-communicable disease (a disease which cannot be transmitted directly from one person to another).

### **What are the possible consequences of CHD?**

Because CHD reduces the rate at which oxygen is delivered to heart muscle cells, it reduces the rate at which they can carry out aerobic respiration, which reduces the rate at which they can release energy for muscle contraction. This makes it more difficult for the heart to pump blood around the body. This can lead to pain, heart failure, a heart attack and in some cases death.

### **What is heart failure?**

Heart failure is when the heart is unable to pump blood around the body properly.

### **What treatments are available for CHD?**

Treatments for CHD include:

- Statins
- Stents
- Bypass surgery
- A heart transplant (if the person has heart failure)
- A heart and lungs transplant (if the person has heart failure and has problems with their lungs)

### **What are statins?**

Statins are drugs which reduce blood cholesterol levels. This slows down the rate at which fatty material is deposited in the arteries.

### **What are the advantages and disadvantages of using statins?**

An advantage of using statins is that it does not require surgery, which always carries risks. A disadvantage of using statins is that, like all medication, they can have side effects.

### **What is a stent?**

A stent is a metal mesh which is surgically inserted into a blocked artery. A tiny balloon is inflated inside the stent, which pushes the stent and the artery around it open. The balloon is then removed and the stent continues to hold the artery open.

### **What are the advantages and disadvantages of using stents?**

An advantage of using stents is that the surgery does not require general anaesthetic, so it avoids the risks associated with that.

Another advantage is that once a stent has been inserted, the artery is fully open and stays that way.

One disadvantage of using stents is that it requires surgery, which always carries risks (even when not using general anaesthetic).

### **What is bypass surgery?**

Bypass surgery is when a bit of vein from another part of the body is used to replace a narrowed or blocked artery.

**What are the advantages and disadvantages of bypass surgery?**

One advantage of bypass surgery is that once it is done, the blood is able to flow completely freely.

One disadvantage of bypass surgery is that it requires general anaesthetic, which carries risks.

Another disadvantage is that it is expensive.

**What is a transplant?**

A transplant is when an organ from one person is placed into the body of another person to replace an organ that is not functioning properly.

**What are the advantages and disadvantages of using transplants to treat heart disease?**

One advantage of using a transplant is that the patient receives a complete healthy heart (or heart and lungs).

One disadvantage of transplants is that the patient usually has to wait a long time for a donor organ which is a match for them to become available.

**What is an artificial heart? How can it be used to treat heart disease?**

An artificial heart is a mechanical device which is used to perform the function of a person's heart.

Artificial hearts are occasionally used to keep patients alive while they are waiting for a heart transplant or to allow the heart to rest to help its recovery.

**What kinds of problems can occur with heart valves?**

Heart valves can become stiff and not open fully, which reduces the amount of blood that is able to flow through them.

Heart valves can also become leaky, which allows blood to flow backwards. This makes the heart less efficient.

**How can faulty heart valves be treated?**

Faulty heart valves can be replaced with either mechanical valves or biological valves.

Mechanical valves are artificial devices which perform the function of heart valves.

Biological valves are valves made from animal tissue.

**What are the advantages and disadvantages of replacing heart valves with mechanical valves?**

The main advantage of using mechanical valves is that they last a long time.

The main disadvantage of using mechanical valves is that dangerous blood clots can form around them and therefore the patient must take medication to prevent blood clotting for the rest of their life. This medication can increase the chances of excessive bleeding from a cut or injury.

**What are the advantages and disadvantages of replacing heart valves with biological valves?**

The main advantage of biological valves is that they do not increase the chances of blot clots and therefore the patient does not need to take medication.

The main disadvantage of biological valves is that they wear out relatively quickly and may need to be replaced after several years.