

6.3.7 Resistant bacteria

AQA GCSE Biology (Higher) Question and answer notes

For more resources, visit www.mooramo.com

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 are bacterial pathogens?

Bacterial pathogens are bacteria that cause disease.

What are antibiotics?

Antibiotics are drugs that kill bacteria. They are used to fight infections caused by bacterial pathogens.

What is antibiotic resistance?

Antibiotic resistance is when bacteria are resistant to particular antibiotics - meaning that the antibiotics do not kill them.

Where do antibiotic resistant bacteria come from?

Antibiotic resistant bacteria evolve from non-resistant bacteria through the process of natural selection. This takes place through the following steps:

- Genetic mutations produce new strains of bacteria. Through random chance, some of these strains will be resistant to the new antibiotic.
- The antibiotic kills the non-resistant bacteria, leaving only the resistant strains alive.
- Since the non-resistant bacteria are killed, the resistant strains have little competition for resources and are able to quickly multiply and spread.

How soon do antibiotic resistant bacteria appear after a new antibiotic is introduced?

Antibiotic resistant bacteria often appear within a few years of a new antibiotic being introduced.

Why are bacteria able to evolve resistance to antibiotics so quickly?

Bacteria evolve very quickly because they reproduce at a very fast rate. When a new bacterial cell is created through cell division, it is often able to divide again within minutes or hours, whereas multicellular organisms often take years to reproduce. This fast rate of reproduction accelerates the process of evolution by natural selection, allowing bacteria to evolve antibiotic resistance very quickly.

How does the evolution of antibiotic resistant bacteria endanger human health?

If a person is infected with antibiotic resistant bacteria, it may not be possible to treat the infection, since the antibiotics will not work. This is especially likely to be the case if the bacteria are resistant to multiple different types of antibiotics.

What is MRSA?

MRSA is a strain of bacteria that are resistant to antibiotics.

Why is it hard to fight antibiotic resistance by developing new antibiotics?

The process of developing new antibiotics is currently very expensive and slow. This means that at the current rate we will not be able to develop new antibiotics quickly enough to replace the ones that bacteria have become resistant to.

What can doctors do to slow down the rate at which bacteria evolve antibiotic resistance?

Doctors can do the following to slow down the rate at which bacteria evolve antibiotic resistance:

- Only prescribe antibiotics for infections that are caused by bacteria and not for infections that are caused by viruses (antibiotics do not kill viruses).
- Avoid prescribing antibiotics for minor infections that the body's immune system is likely to be able to handle on its own.
- Encourage patients to complete their course of antibiotics so that all bacteria are killed.

What can be done in agriculture to prevent antibiotic resistant bacteria from evolving?

The use of antibiotics in agriculture can be restricted in order to prevent antibiotic resistant bacteria from evolving.