



Cambridge (CIE) IGCSE Biology



Your notes

Drugs in Medicine

Contents

* Drugs in Medicine



What is a drug?

Drug definition

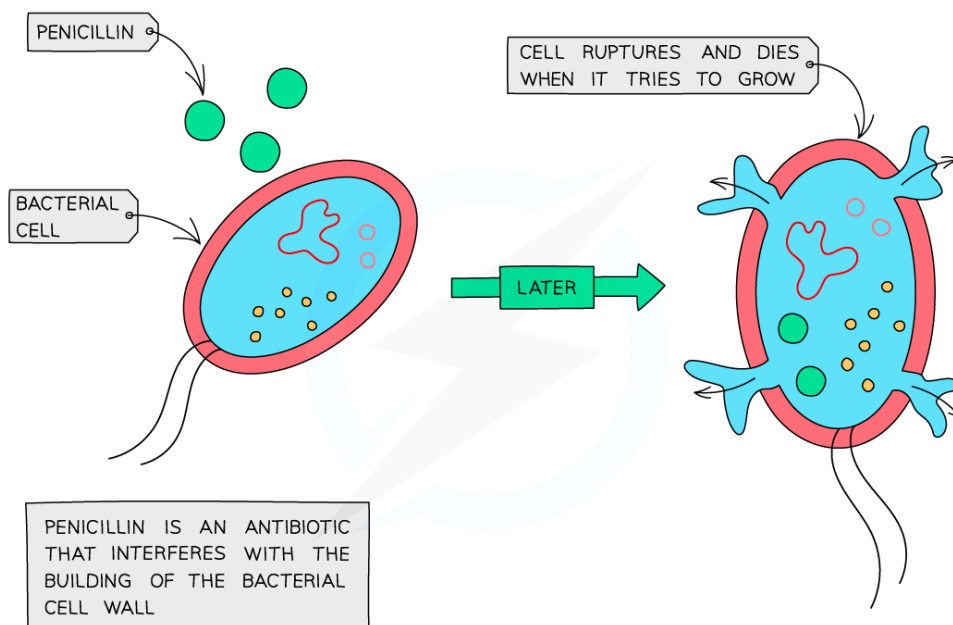
- A drug is **any substance taken into the body that modifies or affects chemical reactions in the body**
- Some drugs are medicinal drugs that are used to treat the symptoms or causes of a disease - for example, **antibiotics**
 - The **liver** is the primary site for drug metabolism

Antibiotics

What are antibiotics?

- Antibiotics are **chemical substances** made by certain **fungi or bacteria** that affect the working of bacterial cells, either by **disrupting their structure or function** or by **preventing them from reproducing**.
- Antibiotics are **effective against bacteria but not against viruses**.
- Antibiotics target processes and structures that are specific to bacterial (prokaryotic) cells; as such they do not generally harm animal cells.

How do antibiotics work?



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Antibiotic resistance & use: extended

- Commonly prescribed antibiotics are becoming **less effective** due to a number of reasons:
 - **overuse** and being prescribed when not really necessary
 - patients **failing to complete the fully prescribed course** by a doctor
 - large scale **use of antibiotics in farming** to prevent disease when livestock are kept in close quarters, even when animals are not actually sick
- This has led to the effectiveness of antibiotics being reduced, and the incidence of antibiotic resistance increasing
- These bacteria are commonly known as superbugs and the most common is **MRSA**

How to prevent antibiotic resistance

- Ways individuals can help **prevent** the incidence of antibiotic resistance increasing include:
 - only taking antibiotics when **absolutely essential**
 - when prescribed a course of antibiotics, **ensure that the entire course is completed** even if you feel better after a few days

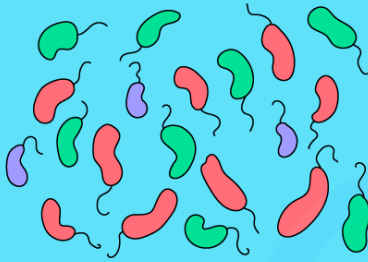
Mechanism of antibiotic resistance diagram



Your notes

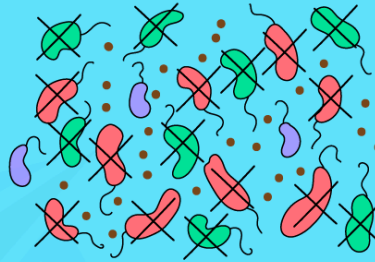
1

A POPULATION OF BACTERIA IN THE GUT. SOME HAVE ANTIBIOTIC RESISTANCE



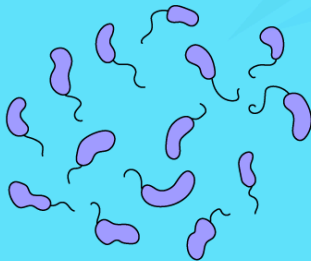
2

WHEN EXPOSED TO AN ANTIBIOTIC, BACTERIA CAUSING ILLNESS, AS WELL AS HEALTHY GUT BACTERIA, ARE KILLED





3


WITH REDUCED COMPETITION FOR NUTRIENTS, ANTIBIOTIC-RESISTANT BACTERIA MULTIPLY, FORMING A LARGER POPULATION THAT IS DIFFICULT TO CONTROL



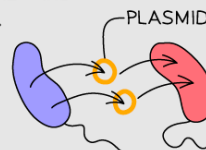
KEY:

 = PATHOGENIC, ANTIBIOTIC RESISTANT, BACTERIUM

 = HEALTHY GUT BACTERIUM

 = PATHOGENIC BACTERIUM

PLASMIDS WITH ANTIBIOTIC-RESISTANT GENES CAN BE SHARED BETWEEN BACTERIA OF BOTH THE SAME AND DIFFERENT SPECIES.



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Antibiotic resistance