

# Antibiotics and other drugs

## Antibiotics

 **Antibiotics** are medicines that are used to treat **bacterial** infections. Antibiotics work by breaking down the cell wall of bacteria. They have no effect on human cells or on viruses.

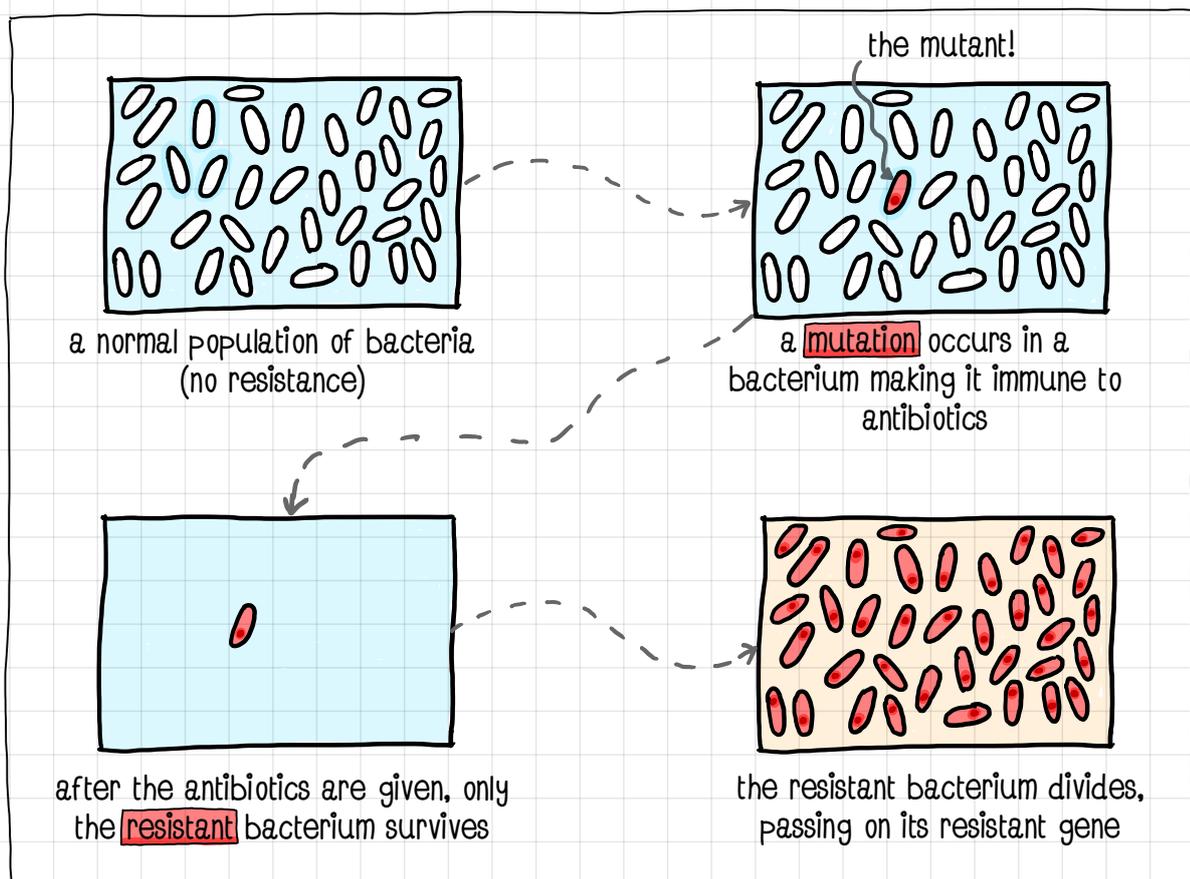
 Antibiotics which work against a wide range of bacteria are called **broad spectrum** antibiotics. Those which only work against a few bacteria are called **narrow spectrum** antibiotics.

Antibiotics such as penicillin can treat infections inside the body. Because they are specific to bacterial cells there are usually few side effects.

## Antibiotic resistance

 Bacteria are said to be **resistant** to an antibiotic when they are no longer killed by an antibiotic which was previously effective.

 Over the years, antibiotic resistance has increased due to misuse of antibiotics and over use of antibiotics. It is also worth noting that few new antibiotics have been developed.



# Antibiotics and other drugs...

## Drug discovery

 **Antibiotics** were discovered by Alexander Fleming from Penicillin mould.

The heart drug **digitalis** was first extracted from **foxgloves**

**Aspirin** (a painkiller) was first extracted from **willow** bark

 Painkillers (analgesics) treat the **symptoms** of the disease but do not effect the pathogens that cause the disease.

 Because viruses are found inside cells it is difficult to develop drugs which kill the virus without harming the body cells.

## Drug development

 New drugs have to be tried and tested before they can be used on the wider population. Many new drugs are synthesised in industrial chemical laboratories though some are still extracted from plants.

 New drugs are tested for **efficacy** (how effective are they), **toxicity** (what side effects do they cause) and **dose** (how much do you need to give to see an effect).

 **Preclinical** testing is usually done in the laboratory using cells, tissues and live animals. If promising, the drug will be tested in clinical trials.

## Clinical trials

 Clinical trials use healthy volunteers and patients.  
Very low doses of the drug are given at the start of the clinical trial.  
If the drug is found to be safe, further clinical trials are carried out to find the optimum dose for the drug.  
In double blind trials, some patients are given a placebo.

 In a **double blind** trial patients are **randomised** to get the drug or placebo. Neither patient or doctor know which is being given. A **placebo** contains none of the new drug and is used to help measure the effectiveness of the treatment.

 The results of the trials are subject to scrutiny by peer review prior to publication of the data. **Peer review** involves other scientists checking the data for errors or bias.

