

Discovering and developing drugs

AQA Combined Science · Biology · Infection and response

Name _____

Class _____

Learning objectives

1. Give examples of drugs that came from plants and microorganisms
2. Describe what new drugs are tested for, and how
3. Explain how clinical trials and double-blind trials work

Key words

Word	Meaning
toxicity	How harmful a drug is.
efficacy	Whether a drug works.
dose	How much of a drug is given.
placebo	A substance that looks like the drug but has no effect.
double-blind	A trial where neither the patients nor the doctors know who has the drug and who has the placebo.

Do now

1 What is a pathogen? [1]

2 Name the four types of pathogen. [1]

3 Why can't antibiotics be used to treat a cold? [1]

1. Where drugs come from

Traditionally, drugs were extracted from plants and _____.

Fill in the gaps in the table.

Drug	Where it comes from	What it is
Digitalis	Foxgloves	A heart drug
Aspirin		A painkiller
Penicillin	Penicillium mould	

Penicillin was discovered by _____.

Today, most new drugs are made (synthesised) by _____ in the pharmaceutical industry. The starting point may still be a chemical extracted from a _____.

2. Testing a new drug

New drugs must be tested to check they are safe and effective before they can be used. Every new drug is tested for:

- **Toxicity:** is it harmful?
- _____: does it work?
- _____: how much should be given?

Preclinical testing is done in a _____ first, using:

- cells
- _____
- _____

3. Clinical trials

Complete the stages of a clinical trial. Use the words in the box for stages 3 and 4.

optimum (best) dose peer review

1. The drug is given to _____ volunteers at a very _____ dose, to check it is safe.
2. If it is safe, it is tested on _____ with the illness.
3. _____
4. _____

4. Placebos and double-blind trials

A **placebo** is a substance that looks like the _____ but has no _____. Some patients are given a placebo so the results can be _____.

In a **double-blind trial**, neither the _____ nor the _____ know who has the drug and who has the placebo. This stops their expectations affecting the _____.

Check your understanding

4.1 Which plant does aspirin originally come from? [1]

4.2 Name the three things a new drug is tested for. [3]

4.3 Why is a very low dose given at the start of a clinical trial? [1]

4.4 What is a placebo? [1]

Exit ticket

1 What is a double-blind trial, and why is it used?

[2]

2 Put these stages in the right order: trials on patients, preclinical testing, peer review, trials on healthy volunteers. [2]

- 1 _____
- 2 _____
- 3 _____
- 4 _____

How confident do you feel?

Tick one box for each learning objective.

I can...	Not yet	Nearly	Yes
give examples of drugs that came from plants and microorganisms			
describe what new drugs are tested for, and how			
explain how clinical trials and double-blind trials work			

Answers

Q	Answer
Do now	
1	A microorganism that causes disease.
2	Bacteria, viruses, fungi, protists.
3	Colds are caused by viruses, and antibiotics only kill bacteria.
1. Where drugs come from	
Gaps	microorganisms · Aspirin: willow · Penicillin: an antibiotic · Alexander Fleming · chemists · plant
2. Testing a new drug	
Gaps	Efficacy · Dose · laboratory · tissues · live animals
3. Clinical trials	
Gaps	1. healthy; low · 2. patients · 3. Trials on patients find the optimum (best) dose. · 4. Results are checked by other scientists (peer review) before they are published.
4. Placebos and double-blind trials	
Gaps	drug · effect · compared · patients · doctors (either order) · results
4.1	Willow
4.2	Toxicity (1), efficacy (1), dose (1)
4.3	To check the drug is safe before larger doses are given.
4.4	A substance that looks like the drug but has no effect.
Exit ticket	
1	Neither the patients nor the doctors know who has the drug and who has the placebo (1); this stops their expectations affecting the results (1).
2	Preclinical testing, trials on healthy volunteers, trials on patients, peer review (2 marks for all correct; 1 mark for one error).