Your notes

GCSE Biology: revision notes

Antibiotics, painkillers and developing drugs

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Antibiotics and painkillers

- **Antibiotics**, such as penicillin, kill infective bacteria inside the body. Specific bacteria should be treated with specific **antibiotics**.
- **Antibiotics** have greatly reduced deaths from infectious bacterial diseases.
- **Antibiotics** cannot kill viruses. It is difficult to develop drugs that kill viruses without also damaging the body's cells.
- **Painkillers** and other medicines treat the symptoms of disease but do not kill pathogens.

Antibiotic resistance

- Bacteria can mutate; some mutations make them resistant to an **antibiotic**.
- When the **antibiotic** is used, non-resistant bacteria die but resistant ones survive and reproduce, so the resistant strain spreads (for example MRSA).
- To slow resistance: doctors should not prescribe **antibiotics** for non-serious or viral infections, patients should complete the full course, and farmers should limit their use in animals.

Discovering drugs

- Traditionally, drugs were extracted from plants and microorganisms.
- Digitalis, a heart drug, comes from foxgloves. Aspirin, a **painkiller**, comes from willow.
- Penicillin was discovered by Alexander Fleming from the Penicillium mould.
- Most new drugs are now made by chemists in the pharmaceutical industry, although the starting point may still be a chemical from a plant.

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Testing new drugs

- New drugs are tested for **toxicity** (is it safe?), **efficacy** (does it work?) and **dose** (how much?).
- **Preclinical testing** is done in a laboratory using cells, tissues and live animals.
- **Clinical trials** use healthy volunteers first, with very low **doses** to check safety, then patients, to find the optimum **dose**.
- In **double-blind trials**, some patients get a **placebo**; neither the patients nor the doctors know who gets the drug until the end, which removes bias.
- Results are checked by other scientists (**peer review**) before they are published.

Key terms

Antibiotic	A medicine that kills bacteria inside the body, such as penicillin.
Painkiller	A medicine that relieves symptoms but does not kill pathogens.
Antibiotic resistance	When bacteria are no longer killed by an antibiotic.
Efficacy	How well a drug works.
Toxicity	How harmful a drug is.
Dose	The amount of a drug that should be taken.
Preclinical testing	Testing a new drug on cells, tissues and animals in a laboratory.
Clinical trial	Testing a new drug on healthy volunteers and patients.
Placebo	A dummy treatment that contains no drug.
Double-blind trial	A trial in which neither the patients nor the doctors know who receives the drug or the placebo.
Peer review	Checking of scientific work by other experts before publication.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What do antibiotics kill?
2. Why shouldn't antibiotics be prescribed for a cold?
3. What do painkillers do?
4. Which drug comes from foxgloves?
5. Which drug was originally from willow?
6. Who discovered penicillin?
7. What is a placebo?
8. What is a double-blind trial?

Your notes

Answers

1. Bacteria
2. Colds are caused by viruses, which antibiotics cannot kill
3. Relieve symptoms but do not kill pathogens
4. Digitalis
5. Aspirin
6. Alexander Fleming
7. A dummy treatment with no drug in it
8. Neither patients nor doctors know who gets the drug

What to do next

Practise 12 questions on this topic

Try 7 exam questions, with mark schemes

Read the lesson, one step at a time

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