

Antibiotics, culturing microorganisms and new medicines

Revision notes · How antibiotics treat bacterial but not viral infections, and the stages of discovering, developing and testing new medicines.

For Edexcel GCSE Combined Science 1SC0. **Higher tier** is only on the Higher paper.

Antibiotics, culturing microorganisms and new medicines Spec 5.16–5.22B

Antibiotics Spec 5.16

Antibiotics are medicines that treat bacterial infections. They work by **inhibiting cell processes** in the bacterium. They do not harm the host organism's own cells, because the host's cells work differently.

Antibiotics can **only** be used to treat bacterial infections. Viruses are not cells. They live and reproduce inside host cells, so the cell processes that antibiotics inhibit are not present in a virus. Antibiotics therefore do not work on viral diseases such as HIV or Ebola.

Common mistake: Antibiotics do not 'kill viruses', and they cannot treat a cold or flu. State that they act on processes in bacterial cells but not host cells.

Developing new medicines Spec 5.20

Developing a new medicine, including a new antibiotic, takes many stages. Each stage checks that the medicine is safe and that it works.

1. **Discovery**: finding a chemical that might treat the disease. These may come from natural sources, such as plants or microorganisms, or be designed in a laboratory.
2. **Development**: the chemical is studied and improved, and a way to make it as a medicine is worked out.
3. **Preclinical testing**: the medicine is tested in the laboratory on cells and tissues, and then on live animals, to find out if it is toxic and whether it works.
4. **Clinical testing**: the medicine is tested on people. It is first given to a small number of healthy volunteers to check it is safe, then to patients to check that it works and to find the right dose.

Only a medicine that passes all the stages can be used to treat patients. The testing protects people from harmful or ineffective medicines.

Exam tip: Learn the four stages in order: discovery, development, preclinical, clinical. Preclinical comes before any testing on humans.

Quick check

1. Why can antibiotics not be used to treat viral infections?
2. Triple only: why is an inoculating loop heated in a flame before use?
3. Triple only: in the core practical, what does a larger clear zone show?
4. Name the four stages in developing a new medicine in order.
5. Triple only, Higher tier: what is a hybridoma cell?

Quick check answers

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1. Antibiotics inhibit cell processes in bacteria; viruses are not cells and reproduce inside host cells.
2. To sterilise it by killing any microorganisms on it.
3. The substance is more effective at stopping bacteria growing.
4. Discovery, development, preclinical testing, clinical testing.
5. A cell made by fusing an antibody-producing lymphocyte with a tumour cell; it divides and produces antibodies.