

Drugs

IGCSE Biology

What a drug is



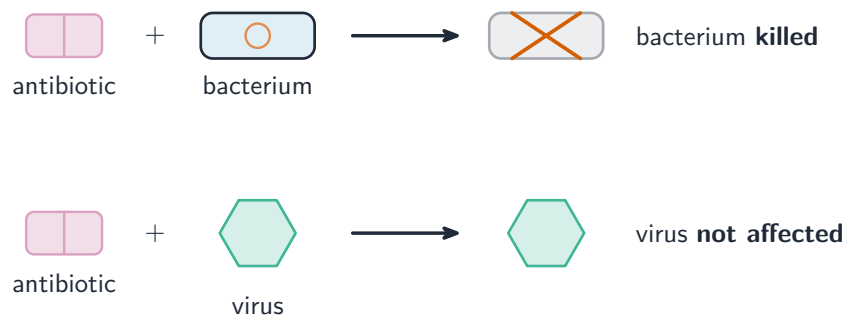
Cigarettes contain nicotine, an addictive drug.

Image: Antonio Kless, CC BY-SA 4.0 (commons.wikimedia.org)

A **drug** 药物 is any substance taken into the body that changes or affects the **chemical reactions** 化学反应 in the body. Many drugs are medicines that help to treat illness.

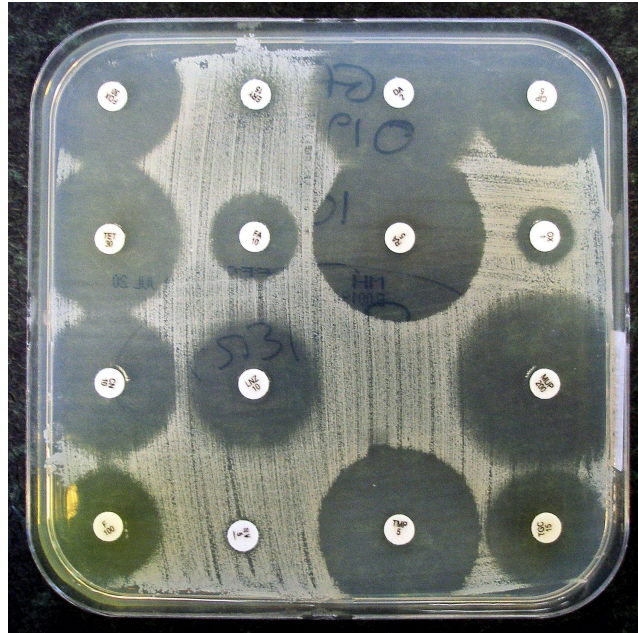
Antibiotics

Antibiotics 抗生素 are drugs used to treat bacterial **infections** 感染. They **kill bacteria** 细菌, or stop them growing, but they do **not** affect **viruses** 病毒. This is why antibiotics cannot cure a cold or the flu, which are caused by viruses.



Antibiotics kill bacteria but have no effect on viruses

To test which antibiotic works best, small paper discs soaked in different antibiotics are placed on a plate covered with bacteria. Where an antibiotic kills the bacteria, a clear ring with no growth appears around the disc. A bigger ring means the antibiotic is more effective.



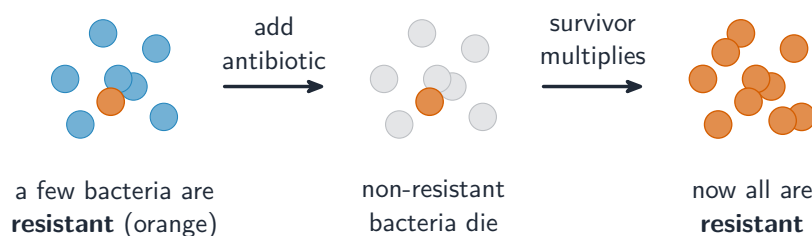
Clear rings show where antibiotics have killed the bacteria on the plate

Image: Dr Graham Beards, CC BY-SA 4.0 (commons.wikimedia.org)

Antibiotic resistance

Some bacteria are **resistant** 耐药 to an antibiotic —the antibiotic no longer kills them. These bacteria survive and multiply, so the antibiotic slowly becomes less effective for everyone.

(Supplement) To slow this down, antibiotics should be used **only when they are really needed**, and the full course should always be finished. Using antibiotics too often lets resistant bacteria, such as **MRSA**, spread.



Resistant bacteria survive the antibiotic and multiply, so the population becomes resistant

Worked example. A patient stops taking their antibiotic as soon as they feel better, and the infection comes back worse. Explain using resistance. In the starting population

a few bacteria are **already resistant**, by chance. The antibiotic kills the non-resistant ones, so those few survive, multiply, and come to make up most of the population - and the antibiotic no longer works on it. Stopping early leaves behind exactly the bacteria that are hardest to kill. Say the resistant bacteria **already existed** and survived: writing that the antibiotic "made them resistant" is wrong and loses every mark.

Exam tips

- A drug is **any** substance that changes the body's chemical reactions —not only illegal drugs.
- Antibiotics kill **bacteria** only; they do **not** work on **viruses** (so they are useless against colds and flu).
- Overusing antibiotics leads to **resistant** bacteria like MRSA. Use them only when needed, and finish the whole course.