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# How Antibiotics Work to Kill Bacteria

KS4 BIOLOGY

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## What Are Antibiotics?

**Antibiotics** are special medicines that kill **bacteria** or stop them from growing. Unlike **viruses** (which need different medicines called antivirals), bacteria are single-celled living organisms that can multiply inside your body and make you sick. When you get a bacterial infection like strep throat or a wound infection, antibiotics work like tiny soldiers fighting the invaders.

## How Do Antibiotics Attack Bacteria?

Antibiotics work in different ways depending on their type. Some antibiotics, like **penicillin**, attack the **cell wall** that surrounds bacteria. The cell wall is like a protective shield that holds the bacterium together. When penicillin breaks down this shield, the bacterium leaks and dies.

Think of it like popping a water balloon — if you damage the rubber, all the water spills out and the balloon is gone.

Other antibiotics work differently. They might block the bacteria's ability to make **proteins**, which are essential for survival. Or they might damage the bacterium's **DNA** (the instruction manual inside every cell) so it can't reproduce or function properly.

## Why Don't Antibiotics Hurt Us?

A clever thing about antibiotics is that they target features that bacteria have but human cells don't. For example, human cells don't have cell walls — only bacteria and plants do. This means antibiotics can kill bacteria while leaving our own cells safe and healthy.

Think of it like a video game where enemies wear a special uniform — if you design a weapon that only hurts that uniform, it won't hurt the friendly characters.

## The Problem of Resistance

There's an important challenge: bacteria are clever and can evolve **antibiotic resistance**. This means some bacteria develop ways to survive antibiotics, making the medicine less effective. This is why doctors say it's crucial to take all your antibiotics exactly as prescribed, even when you feel better — you must kill every bacterium before they can adapt.

Overusing antibiotics (like taking them when you have a virus) speeds up this resistance problem, which is why responsible use is so important for keeping these life-saving medicines working for everyone.