

Fighting Disease

Non-specific defences

Skin is a physical barrier. It also secretes antimicrobial substances to kill pathogens.

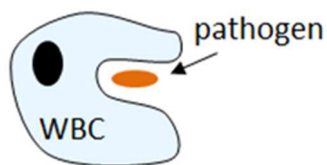
Hairs & mucus – in the nose passages trap pathogens

Cilia in the trachea and bronchi move mucus up to the throat

Stomach acid (hydrochloric acid) kills pathogens

Immune System

White blood cells **engulf** pathogens and digest them.



White blood cells **produce specific antibodies** that bind to antigens on a pathogen. If the person gets infected with the same pathogen in the future, WBCs produce the antibodies rapidly so the person does not feel ill – they are immune.



White blood cells release **antitoxins** to destroy toxins released by pathogens.



Vaccination

An inactive pathogen is injected into a person. This stimulates their white blood cells to release antibodies. If the person is infected with the real pathogen in the future, white blood cells rapidly release antibodies so the person does not feel ill.

Advantages of Vaccination

- Can eradicate or control infectious diseases
- Epidemics can be prevented

Disadvantages of Vaccination

- Don't always work
- Some people can have a bad reaction (rare)

Antibiotic Resistance

Bacteria can **mutate** (change in the DNA). This may make them **resistant** to an antibiotic.

The antibiotic will kill the non-resistant strain of bacteria but not the mutated resistant strain.

The **resistant bacteria will reproduce**, increasing their population.

To help prevent the development of antibiotic resistant bacteria doctors should **not over-prescribe** antibiotics and we should **finish the whole course**.

MRSA is an example of an antibiotic resistant bacteria.

Drugs

Painkillers reduce symptoms of a disease.

Antibiotics kill the bacteria. Antibiotics **do not kill viruses** as they reproduce inside body cells.

Stages of Drug Development

1. Test on **human cell & tissues** in a lab.
2. Test on **live animals** to check the drug works, its toxicity and best dose.
3. Test on **healthy human volunteers** to check for side effects.
4. Test on **ill patients** to find the correct dose. This is done using a **double blind** trial – neither the doctors or patient know if they are getting the real drug or a placebo (does not contain the drug).