# 22 GERMS: UNWANTED INVADERS

Germs are the invaders of the body. They could be bacteria, viruses, fungus or one of many other disease-causing enemies. They can by spread in blood, sweat or saliva – especially in coughs and sneezes, which shoot the germs into the air. A single sneeze can expel 40,000 particles into the air, at around 50 miles per hour, which can travel as far as 30 feet!

You may then breathe the germs in – but you don't have to be present to catch the germs in a cough or sneeze. Germs can live outside of people: you could pick them up by simply putting your hand on a nearby surface afterwards. After that, you could spread them to everywhere else you touch. When you eat, you'll also transfer the germs to your food and eat them.

Once they're inside your body, the germs begin to multiply. They attack the cells in the body, damaging them, killing them or producing toxic chemicals.

**The body's defences**

There are lots of parts of your body that you can't see with your own eyes. One of these is the 'immune system', which is what we call the body's defence system. Your immune system defends your body from illnesses with its very own army of soldiers: white blood cells. White blood cells, and the chemicals they make, attack and kill cells they don't recognise. Unfortunately, white blood cells can't always defeat these unwanted invaders.

**Vaccines**

Some illnesses can be extremely serious – even fatal. In the past, many diseases that are minor or rare today, such as chicken pox and measles, killed thousands of people. Many are no longer deadly because of vaccines. Vaccines are weakened or dead samples of germs. They are injected into healthy people, causing their bodies' white blood cells to fight them and win. The white blood cells never forget how to create the chemicals that beat the germs. This means that the body knows how to kill full-strength germs of the same type, and is known as becoming 'immune'. Vaccines have saved millions of lives across the world.

Unfortunately, many people aren't educated well enough about the power of vaccines. Some of them don't understand the way they work, and some hear bad things about possible side effects. The risks of the diseases, though, are far higher than the risks of the side effects. Diseases like measles still kill children who haven't had vaccines, all over the world.

## Creating a vaccine

Edward Jenner, who lived 1749–1823, was an English doctor who helped create and popularise a vaccination for smallpox. Through his pioneering work, he helped save the lives of countless people. Over time, he became known as the 'father of immunology' and of later vaccinations.

Jenner observed that milkmaids who were in close contact with cows very rarely caught smallpox – although they did catch cowpox, a related virus that was far less dangerous. He developed a theory that giving people a small amount of the cowpox virus could make them immune from smallpox.

In 1796, Jenner tested his theory by infecting James Phipps, a boy of eight, with cowpox blisters from the hand of a milkmaid with the disease. The young James developed a mild fever, but soon recovered. Then Jenner exposed James to a weak form of the smallpox virus. As Jenner had suspected, the boy was completely unaffected by it: he had become immune.

New vaccines are developed every day to try and save human lives. Some diseases, such as whooping cough, diphtheria and meningitis C have been almost eliminated. Others, including smallpox and polio, have been destroyed completely.

## FILL IN THE GAP

**Read the sentences and choose the correct word or words to fill the gap. Refer back to *Germs: unwanted invaders* to find the correct answer.**

They can by spread in blood, sweat or _____ – especially in coughs and sneezes, which shoot the germs into the air.

In the past many diseases that are minor or rare today, such as chicken pox and _____, killed thousands of people.

Jenner observed that milkmaids who were in close contact with cows very rarely caught _____ – although they did catch cowpox, a related virus that was far less dangerous.

## MATCHING

**Draw a line with a ruler to match the information.**

| | |
|---|---|
| milkmaids rarely caught | father of immunology |
| Jenner infected | James Phipps |
| never forget chemical codes | smallpox |
| Edward Jenner | white blood cells |

## LABEL

**Label the description with the correct information.**

| | |
|---|---|
| father of immunology | |
| infected with smallpox by Jenner | |
| often contracted cowpox | |
| have saved millions of lives across the world | |
| the body's very own army of soldiers | |
| invaders of the body | |

## TRUE OR FALSE

**Read the sentences. Put a tick in the correct box to show which sentences are *true* and which are *false*.**

| | | |
|---|---|---|
| Sneezes travel at around 50 miles per hour. | True ☐ | False ☐ |
| Germs can produce toxic chemicals in your body. | True ☐ | False ☐ |
| Vaccines inject dead germs into your body. | True ☐ | False ☐ |
| In the past, chicken pox could be fatal. | True ☐ | False ☐ |
| Measles has been destroyed completely. | True ☐ | False ☐ |