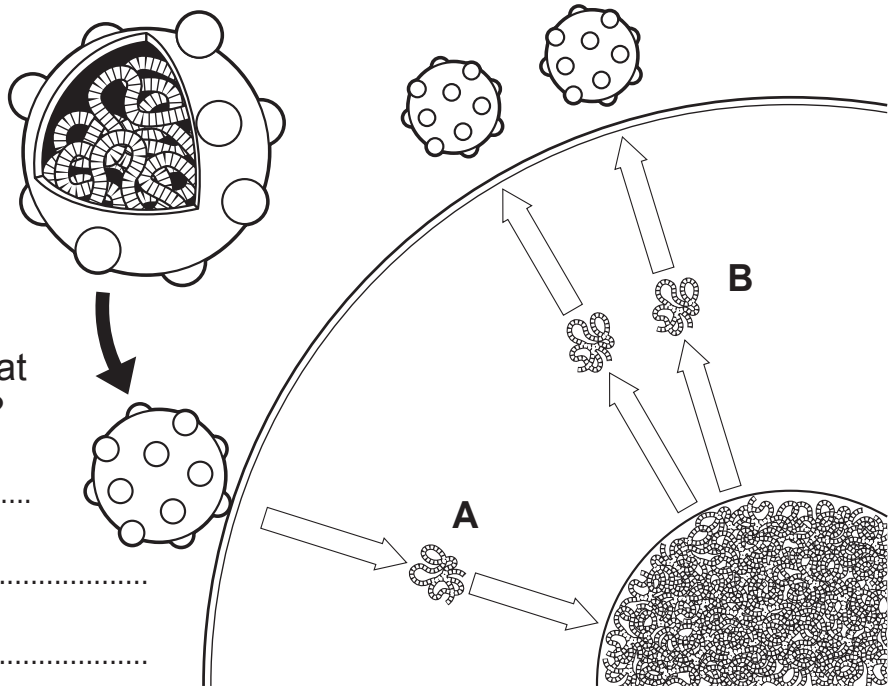
17

Name: ..... Form: .....

See **pages 36 and 37** of *The Body Book*

Bacteria and viruses

Bacteria and viruses are two kinds of tiny organisms that attack the body and cause disease.



Q1. In the diagram, what is happening at point A?

✎ .....

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Q2. In the diagram, what is happening at point B?

✎ .....

.....

Q3. In what ways may bacteria and viruses enter the body?

✎ .....

.....

.....

Q4. What are the main attackers of micro-organisms inside the body?

✎ .....

Q5. How do these attackers destroy bacteria and viruses?

✎ .....

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17 Teacher's sheet: Comprehension

See **pages 36 and 37** of *The Body Book*

ANSWERS

Introduction

Tell the students that diseases seem to come from nowhere. We can feel the effects of the microbes that cause them but cannot easily see them. In a similar way, food in a fruit bowl or bread in a bread bin can suddenly go mouldy. We can easily see this and it also seems to come from nowhere. A feature which connects disease and moulds is that they are both caused by micro-organisms, and these travel unseen (in the air in the case of moulds and some bacteria and viruses) because they are so small. If you wish to illustrate your introduction with mouldy food make sure they are sealed in a bag before they are brought to school and are kept sealed during their stay in school.

Moulds are fungi and you may add that fungi can attack the skin (e.g. athlete's foot) or moist surfaces of the body (e.g. thrush in the mouth and throat).

In ideal conditions a bacterium will reach full size and divide into two every 20 minutes. So at the end of one hour a single bacterium will have become eight individuals. You may like the class to calculate how many would be present after a further two, three, four or five hours. You could invite the class to speculate how many bacteria there may be if there were not one but 100 bacteria beginning to breed at the same time as they invaded the body.

Extension worksheet

Page109 and 126.

Links

Cells, pages 8–9; **Getting immunity**, pages 38–39.

Background

Bacteria range in size from 100 to 2,000 micrometres (a micrometre is a thousandth of a millimetre) and viruses have sizes ranging from 10 to 300 nanometres (a nanometre is a millionth of a millimetre).

Bacteria travel as spores, like fungi, but viruses take on a crystal form outside cells and do not show properties of living things. They can even be stored in jars, like sugar crystals.

The body has a line of defence before the white cells are brought into action. In the first line of defence, bacteria destroying substances are secreted by the skin in the oil in the sweat, tears, which keep the eye moist, and the saliva. The stomach contains hydrochloric acid which kills bacteria. The mucus lining the tubes in the respiratory system traps microbes, and the ciliated cells in the windpipe move mucus up to the throat, where it is swallowed and enters the stomach, where it comes into contact with the acid. When a cut bleeds it swills out invading microbes before the clot forms. Even sneezing and coughing removes microbes, while setting them free to infect other people.

If the microbes penetrate the first line of defence they are attacked by the second line of defence. The main part of this defence are the white blood cells. There are two kinds – the antibody producing cells called lymphocytes which are made in the glands of the immune system (see page 38 to 39 of the *Students' Book*), and the phagocytes which are made in the bone marrow and eat bacteria.

Most viruses are not attacked by white blood cells because they soon leave the blood and enter the cells. However, the cells produce a substance called interferon when they are attacked, and this is released into the blood and affects the body's temperature regulating system. It makes the body temperature rise (producing a fever) which helps to stop the microbe attack, as many microbes can only live in a very narrow temperature range.

A sore throat, caused by a rush of white blood cells to the early site of infection, and a runny nose, caused by excess mucus produced to help flush out the infection, are common symptoms of a range of virus attacks.

In bacterial attack, it is the toxins or poisons released by the bacteria which cause the symptoms of disease as they damage or kill certain kinds of body cells. In a virus attack, it is the destruction of the cells that causes the symptoms of disease.

Answers

Q1. The genes from the virus go inside the cell.

Q2. The virus genes begin to copy themselves.

Q3. In any order: through the air, in droplets of moisture from a sneeze or cough, in food and water, through a cut in the skin.

Q4. White blood cells.

Q5. The white blood cells eat the micro-organisms.