

MODULE: *Cells*

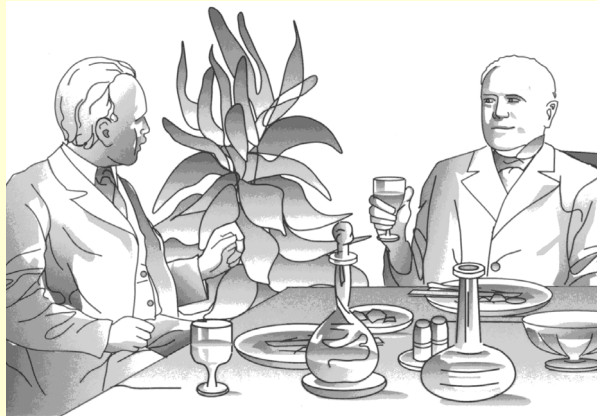
Pre Test

1. (5 minutes)

Read the information below and then answer the questions.

The structure of living things

Theodor Schwann



Matthias Schleiden

In 1838 two scientists were eating dinner and discussing the latest observations of living things made with a light microscope.

Suddenly they realised something. The structures they had observed inside living things were the same. A nerve cell from an animal contained many of the same parts as a leaf cell from a plant!

- a. What two things had they discovered?

- b. What structures do animal and plants cells have in common?

- c. How do plant and animal cells differ?

- d. Explain why they differ.

2. (20 minutes)

Read the information below and then answer the questions.

MRSA

MRSA bacteria are harmless on your skin. But if they get in through a cut they may cause a fatal infection. Doctors fight most infections with antibiotics. Different antibiotics target different bacteria. But antibiotics cannot kill every type of bacteria that make us ill. These bacteria are resistant. Over the years, more and more types of bacteria – like MRSA – have become resistant to antibiotics. Sometimes, the genes in bacteria change, or mutate. This happens naturally. Most mutations are not useful to bacteria, but occasionally they make bacteria resist antibiotics.

Sam has a throat infection. He takes antibiotic tablets. The antibiotic kills nearly all the bacteria. But a few bacteria – the resistant ones – survive. These bacteria reproduce rapidly. This is natural selection.

Bacteria are more likely to become resistant if:

- lots of people take antibiotics for minor illnesses
- if people don't finish all the tablets
- if doctors prescribe the wrong antibiotics.

Resistant strains of bacteria spread quickly from person to person. This is because no one is immune to the bacteria, and there is no treatment that works. Therefore scientists are trying to find and develop new antibiotics and antiseptics.

One possibility is Cockroach brain juice. These are two investigations that have been carried out.

Hypothesis: Cockroach brain juice could cut MRSA infections in humans because it contains substances that kill bacteria.

Investigation 1

- grow two types of bacteria on agar plates
- add cockroach brain juice and leave for two hours at 37 °C.

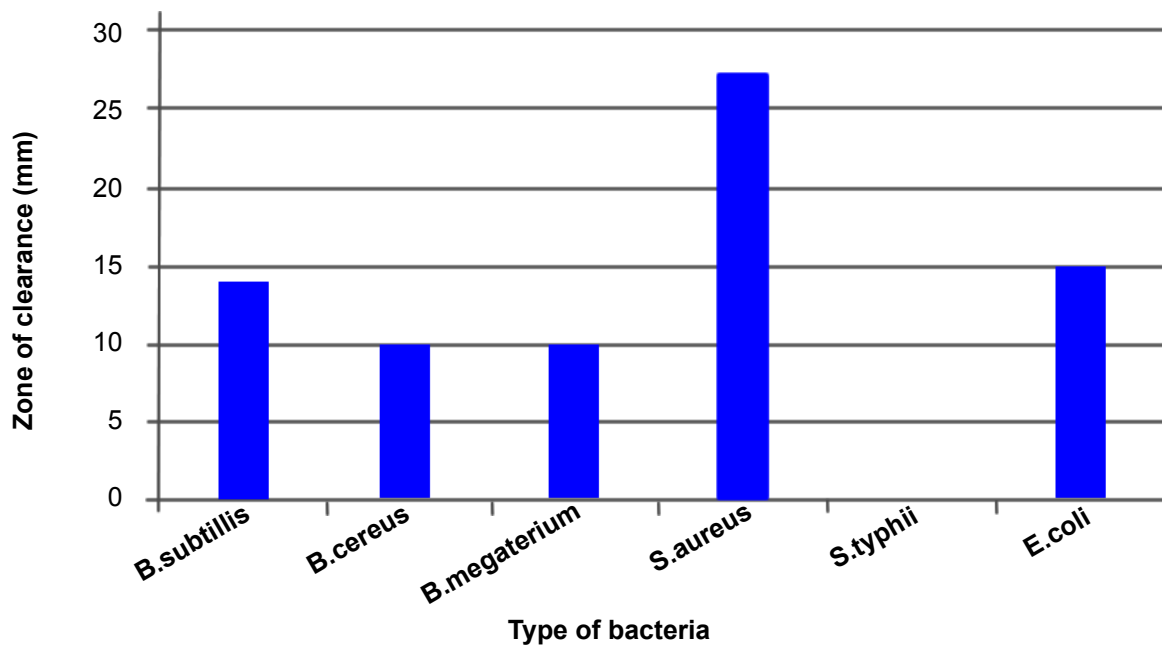
Type of bacteria	Percentage of bacteria killed
MRSA	More than 90
<i>Escherichia coli</i>	More than 90

If an antibiotic kills 90% of the bacteria, your body's immune system can kill the rest.

Investigation 2

- grow different types of bacteria on agar plates
- add cockroach juice and leave overnight at 37 °C.

Results



The bigger the zone of clearance, the more bacteria are killed

a. What type of microorganism is MRSA?

- Virus
- Protozoan
- Bacterium
- Yeast

b. What do doctors normally use to treat MRSA?

c. What natural process causes resistance?

- d. How have they become resistant?

- e. Why do resistant strains of bacteria spread so quickly?

- f. Do the results of investigation 1 support the hypothesis? Explain your answer.

- g. Which bacteria does cockroach brain juice kill most?

- h. Which bacteria are resistant to cockroach brain juice?

- i. Do the results of investigation support the results of hypothesis? Explain your answer.

- j. What do the researchers need to do to ensure the reliability of their results?

- k. What would you need to know to be able to carry out the investigations?