How our bodies defend themselves against infectious diseases

1. Our bodies defend themselves naturally against infections. We also use other methods to protect ourselves against infections and to relieve the symptoms of disease.

Match words, **A, B, C** and **D**, with the numbers **1 – 4** in the table.

A antibiotics

B painkillers

C antibodies

D vaccines

1	given to people to provide immunity
2	medicines that kill bacteria
3	produced by white blood cells
4	relieve symptoms of disease

2. Avian influenza (bird flu) is caused by a virus which was first identified in 1900. Recently there have been concerns that new strains of the virus may be able to infect humans.

Match words, **A**, **B**, **C** and **D**, with the numbers **1– 4** in the sentences.

A antibiotics

B natural selection

C pandemic

D resistance

Avian influenza cannot be treated with . . . **1** . . . .

The influenza virus may develop . . . **2** . . . to the drugs used as a result of . . . **3** . . . .

This may cause a . . . **4** . . . of the disease.

3. Some infections are caused by bacteria.

(a) Bacteria can change into strains that are resistant to a particular antibiotic.

What causes this change in a bacterium?

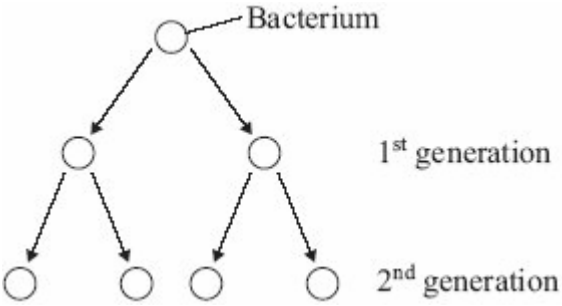
1 immunity

2 mutation

3 natural selection

4 reproduction

(b) The diagram shows how the number of bacteria in the body changes after infection.



In ideal conditions, the population of bacteria doubles every 20 minutes.

In ideal conditions, how many bacteria will there be in the body 2 hours after infection with a single bacterium?

1 4

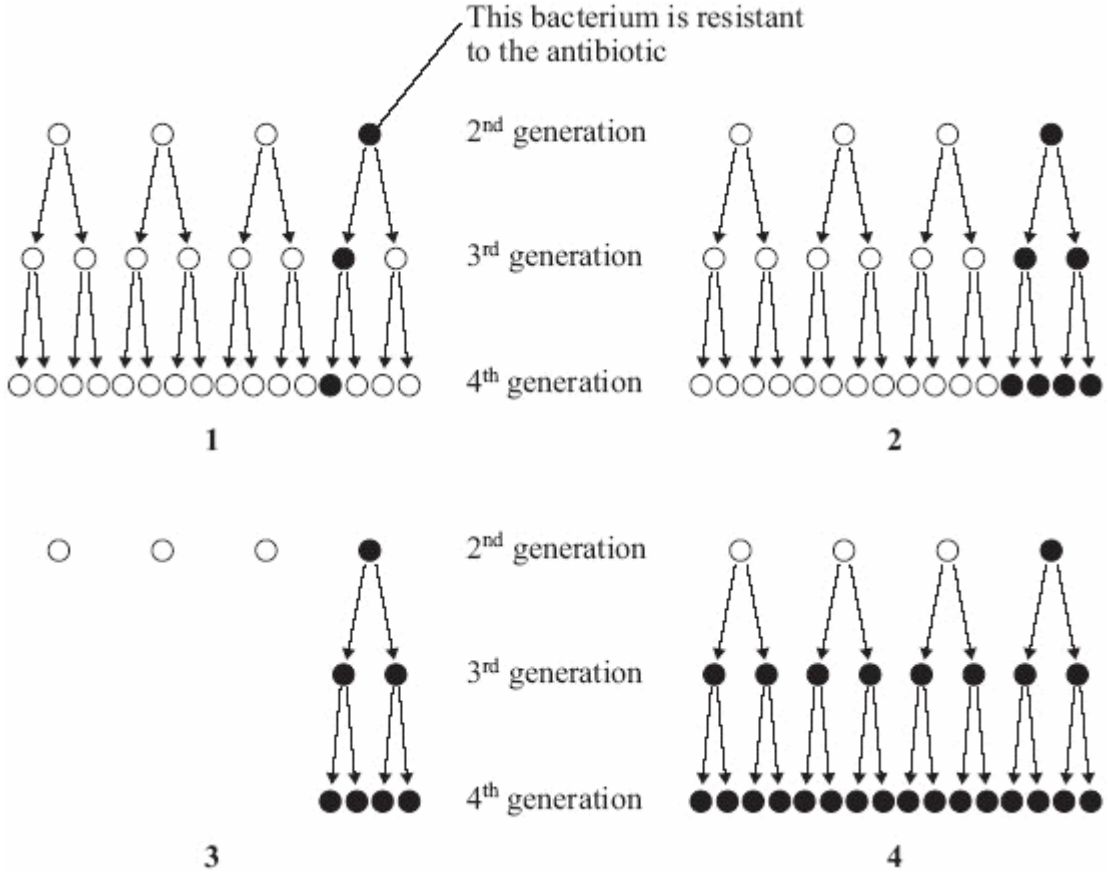
2 8

3 64

4 128

(c) One of the second generation of bacteria changes so that it is resistant to an antibiotic.

Which diagram shows the way in which the population of bacteria changes when this generation is treated with the antibiotic?



(d) The change in the proportions of non-resistant and resistant bacteria by the fourth generation is due to . . .

1 genetic engineering.

2 mutation.

3 natural selection.

4 reproduction.

4. Vaccination helps to protect us from disease.

Vaccination may cause a reaction, such as a rash, in the person who is vaccinated.

The table shows the reported number of reactions to vaccination in the UK in one year.

Vaccine	Type of vaccination	Total number of reactions reported	Number of severe reactions
Measles	Single	414	61
Mumps	Single	54	19
Rubella	Single	685	100
MMR	Triple	20974	2586

(a) Which vaccine caused the highest proportion of severe reactions, when compared with the number of reactions reported?

1 measles

2 mumps

3 rubella

4 MMR

(b) To calculate the percentage of people who had reactions to the vaccines, you would also need to know . . .

1 the number of vaccinations of each type given.

2 the age of each person vaccinated.

3 whether those people given one of the single vaccinations had previously been given one of the other single vaccinations.

4 the total population of the UK.

The table shows the percentage of children vaccinated against some diseases in the UK.

Year	Percentage of children vaccinated			
	Polio	Whooping cough	Flu	Measles, mumps, rubella (MMR)
1996 – 1997	96	94	95	92
1997 – 1998	96	94	95	91
1998 – 1999	95	94	95	88
1999 – 2000	95	94	94	88
2000 – 2001	94	94	94	87
2001 – 2002	94	93	93	84
2002 – 2003	93	93	93	82
2003 – 2004	94	93	93	80
2004 – 2005	93	93	93	81
2005 – 2006	94	94	94	84

(c) For which disease was the percentage of children vaccinated most stable between 1996 and 2006?

1 polio

2 whooping cough

3 flu

4 measles, mumps and rubella

(d) It is important that the percentage of people in the population who have been vaccinated is high.

This is because . . .

1 it reduces the chance of epidemics.

2 fewer people may suffer side effects from the vaccine.

3 there is less chance that resistant strains of pathogen will develop.

4 antibodies will be produced quickly if the live pathogen is caught.

5. In 1970, Linus Pauling, a famous prize-winning scientist, said that high doses of vitamin C had stopped him from getting common colds. As a result, many people believed that taking vitamin C tablets could prevent them catching a cold. A research group looked at over 1000 people who took vitamin C tablets. It concluded that for the average person there was no advantage in taking extra vitamin C.

(a) From the information given, it seems that many people believed that vitamin C could prevent a cold because of . . .

1 a proven causal link.

2 scientific evidence.

3 the status of the scientist.

4 valid and reliable evidence.

(b) Why did the research group want to include as many people as possible in the research?

1 to increase the chances of the conclusion being valid

2 to increase the chances of the hypothesis being correct

3 to reduce the number of anomalous results

4 to reduce the need for placebos

(c) Which of the following methods should be used by the research group to identify if a person has a cold?

1 ask people to report when they have sneezed five times in a day

2 ask people to say when they have a cold

3 have them examined by a doctor

4 measure how deeply they can breathe

(d) In a further study, 300 people were given vitamin C to find out if taking vitamin C stops you from getting a cold.

- People in group **A** were given regular small doses of vitamin C for five years.
- People in group **B** were given one large dose of vitamin C each year for five years.

People in group **B** were found to have a 66% lower chance of catching colds in the five year period than people in group **A**.

The investigation could be criticised because . . .

1 a placebo was not included.

2 it is not ethical to give people different doses of vitamin C.

3 five years is too long to wait for results.

4 a 66% lower chance is not significant.