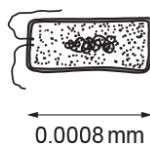


Monitoring & Maintaining Health (H)

1. Look at the bacterial cell that causes disease in humans.



The human eye can see objects 0.1 mm in size.

What **minimum** magnification will be needed before the eye can see this bacterial cell?

- A 12.5×
- B 125×
- C 1250×
- D 12500×

Your answer

[1]

2. When a person has measles they are unlikely to be ill again with the disease for many years.

What is the reason for this?

- A Antigens from the pathogen remain in the body.
- B Memory cells remain in the blood and can release antibodies.
- C The disease can now be treated with antibiotics.
- D White blood cells engulf the pathogens before antibodies are made.

Your answer

[1]

3. Many human diseases are caused by risk factors.

Food and drink can be major risk factors.

Which disease does **not** have food or drink as a major risk factor?

- A Type 1 diabetes
- B Cirrhosis of the liver
- C Type 2 diabetes
- D Cardiovascular disease

Your answer

[1]

4. Females aged between 12 and 13 are offered a vaccination for the human papilloma virus (HPV).

Which statement describes the reason for offering this vaccine?

- A Contracting HPV greatly increases the risk of developing AIDS.
- B Having the vaccination will prevent cervical cancer.
- C HPV can be treated with antibiotics but cervical cancer cannot.
- D HPV has been linked to about 70% of cases of cervical cancer.

Your answer

[1]

5. Which of these is an adaptation of white blood cells?

- A The ability to make clotting enzymes.
- B They can change their shape to pass out of capillaries.
- C They can synthesise antibiotics.
- D They lack a nucleus.

Your answer

[1]

6. Heart disease kills thousands of people in Britain every year.

Why is it difficult to decide why a person gets heart disease?

- A Heart disease is caused by the interaction of many factors.
- B It is not possible to measure any of the risk factors.
- C Many microorganisms cause heart disease.
- D There is no genetic link to heart disease.

Your answer

[1]

7. Which is the **most** effective treatment for HIV?

- A Antibiotics
- B Antigens
- C Antiseptics
- D Antivirals

Your answer

[1]

8. Which is a **chemical** defence of plants?

- A Antimicrobial substances
- B Cell walls
- C Leaf cuticles
- D Thorns

Your answer

[1]

9. Doctors are able to offer a diagnosis and treatment targeted to a patient's genome, known as genomic medicine.

Which is an example of the type of treatment used in genomic medicine?

- A Comparing patients' phenotypes so the best treatment can be given.
- B Designing drugs that are specific to a particular variant of a gene.
- C Using genetic engineering to produce new drugs.
- D Using monoclonal antibodies to destroy pathogens.

Your answer

[1]

10. The table shows estimated data about the global population and the number of deaths from HIV and tuberculosis (TB).

	Year	
	2000	2017
Total population in millions	6143.5	7464.0
Number of people with HIV in millions	36.1	36.8
Percentage of total population with HIV	0.6	0.5
Total number of HIV related deaths in millions	3.0	1.0
Total number of TB deaths in millions	2.2	1.6
Number of TB deaths in people with HIV in millions	0.5	0.3

Which is a correct conclusion from the data in the table?

- A Half of HIV related deaths were due to TB in 2000.
- B HIV became more life-threatening between 2000 and 2017.
- C People with HIV are more likely to die from TB than people without HIV.
- D The percentage of HIV in the population has increased between 2000 and 2017.

Your answer

[1]

11. What is the role of antibiotic resistance markers in producing genetically engineered bacteria?

- A To identify which genes to insert into the bacteria.
- B To identify which bacteria have taken up the plasmid.
- C To identify which plasmids contain the genes.
- D To identify which proteins are produced by the bacteria.

Your answer

[1]

12. New drugs are tested using preclinical trials.

Which statement describes a preclinical trial?

- A One group of volunteers are given a placebo, another group the drug.
- B The drug is tested on human cells.
- C Volunteers are given a placebo only.
- D Volunteers are given the new drug.

Your answer

[1]

13. What does a vaccine contain that protects a person from infection?

- A Antibiotics that will attach to antigens.
- B Antigens that will stimulate antibody production.
- C Antibiotics that kill pathogens.
- D Antivirals that destroy viruses.

Your answer

[1]

14. Which is a definition of cancer?

- A An infection of foreign cells which divide uncontrollably.
- B Body cells that divide uncontrollably many times.
- C Body cells that lose the ability to divide and make stem cells.
- D Pathogens that grow and divide unchecked.

Your answer

[1]

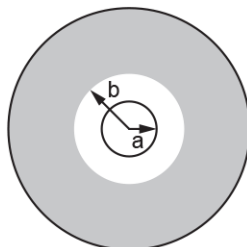
15. Which row on the table is correct for HIV?

	Destroyed by antibiotics	Causes cervical cancer	Sexually transmitted
A	✓	X	X
B	X	X	✓
C	X	✓	✓
D	✓	✓	✓

Your answer

[1]

16. A student places an antibiotic disc onto the surface of agar that is covered in bacteria. She calculates the area around the disc that is free from bacteria.



Which formula should she use?

- A $2\pi b^2 - 2\pi a^2$
- B $\pi b^2 + \pi a^2$
- C $\pi b^2 - \pi a^2$
- D $\pi(b - a)^2$

Your answer

[1]

17. Huntington's disease is a genetic condition. It is caused by a **dominant allele**.

A new study is giving hope for a treatment for Huntington's disease.

Doctors gave patients an injection of a drug that blocks the action of mRNA that is produced by the Huntington allele.

Explain how this drug could prevent the symptoms of Huntington's disease.

[6]

18. Fig. 20.1 is a diagram of an antibody molecule. Antibodies are protein molecules. The ends of the antibody molecule bind with a particular antigen molecule.

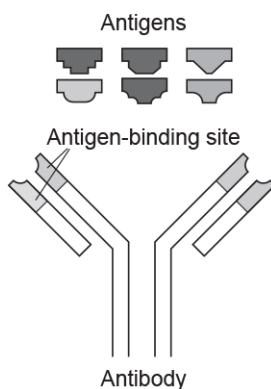


Fig. 20.1

Explain why a different antibody molecule is needed for each antigen.

[2]

19 (a). Fanconi anaemia is a genetic disorder. It results in the bone marrow being destroyed. This causes a decrease in the numbers of red blood cells, white blood cells and platelets.

Explain **two** possible symptoms of Fanconi anaemia.

1

2

[2]

(b). **Table 19.1** shows normal ranges for blood components in people **without** Fanconi anaemia.

Blood component	Number per mm ³
red blood cell	$4.5 - 6.5 \times 10^6$
white blood cell	$6.0 - 16.0 \times 10^3$
platelet	$1.5 - 4.0 \times 10^5$

Table 19.1

i. Suggest why there is such a wide range of white blood cell numbers.

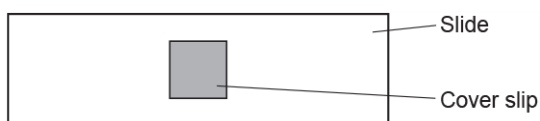
.....

.....

.....

[2]

ii. The diagram shows a microscope slide containing blood from a patient.



The square cover slip is 10 mm wide and the thickness of the blood underneath is 0.001 mm.

Calculate the volume of blood under the cover slip.

Volume of blood = mm³ **[1]**

iii. Under the cover slip are 1000 white blood cells.

Does the blood sample provide evidence that the patient has Fanconi anaemia?

Use **Table 19.1** and your answer to part (ii) to justify your answer.

.....

.....

.....

.....

[3]

(c). There are many different genetic disorders that can affect blood cells. Details of three of these are found in **Table 19.2**.

Name of disorder	Cause of disorder	Symptom
D-B anaemia	dominant allele	low red blood cell numbers
S-D syndrome	recessive allele	low white blood cell numbers
Fanconi anaemia	recessive allele	small numbers of all blood cells

Table 19.2

A blood smear from another patient shows that he has 3×10^6 red blood cells per mm^3 of blood. Neither of his parents have a blood disorder.

Use **Table 19.1** and **Table 19.2** to explain which blood disorder the patient could have.

Name of disorder

Explanation

[3]

20. Methamphetamine is a drug.

Scientists are investigating the use of antibodies as a treatment to control the negative effects of the drug.

These antibodies would **not** work against other drugs.

Explain why.

[2]

21. Huntington's disease is a genetic condition. It is caused by a **dominant allele**.

Explain what is meant by the term dominant allele.

[2]

22. Some people get very painful headaches called migraines.

Scientists think that this is caused by a protein in the brain called CGRP.

Levels of the CGRP protein are higher in the brains of people who get migraines.

Doctors are trying to find a treatment to prevent migraines.

They have produced an antibody against the CGRP protein.

Describe how antibodies are usually made in the human body.

----- [2]

23. Two farmers grow barley in their fields.

They both have a problem with barley powdery mildew infecting their crops.

The farmers test two different fungicides.

They each grow barley in one of their fields. Each farmer sprays a different fungicide on their field. They then compare the crop yield in the two different fields.

How could you improve the farmers' experiment?

Explain your answer.

----- [2]

24. Methamphetamine is a drug.

Scientists are investigating the use of antibodies as a treatment to control the negative effects of the drug.

What is an antibody?

----- [2]

25. Retinitis pigmentosa is a genetic condition that affects the eyes.

It is caused by a mutation to a gene. This mutation produces a recessive allele.

The condition causes rod cells in the retina to break down.

- i. Explain why stem cells could be used as a treatment for this condition.

[2]

- ii. Why is it an advantage to use stem cells from the patient rather than from another person?

[1]

26 (a). Two farmers grow barley in their fields.

They both have a problem with barley powdery mildew infecting their crops.

Powdery mildew is caused by a fungus.

Describe how fungal infections can spread and how they enter plant leaves.

[3]

(b). The farmers want to prevent their crops from getting powdery mildew.

- i. Explain how burning plants after the barley has been harvested can protect the crops.

[1]

- ii. Explain how growing barley in the fields one year, then wheat the next year can protect the crops.

[2]

27. Antibodies are protein molecules.

Large quantities of one type of antibody can be made by the process shown in **Fig. 20.2**.

These antibodies are called monoclonal antibodies.

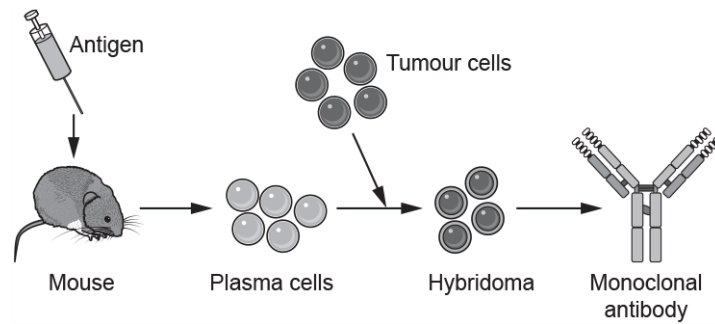


Fig. 20.2

i. Give **two** uses of monoclonal antibodies.

1

2

[2]

ii. Why are tumour cells used in this process?

[1]

29. Methamphetamine is a drug.

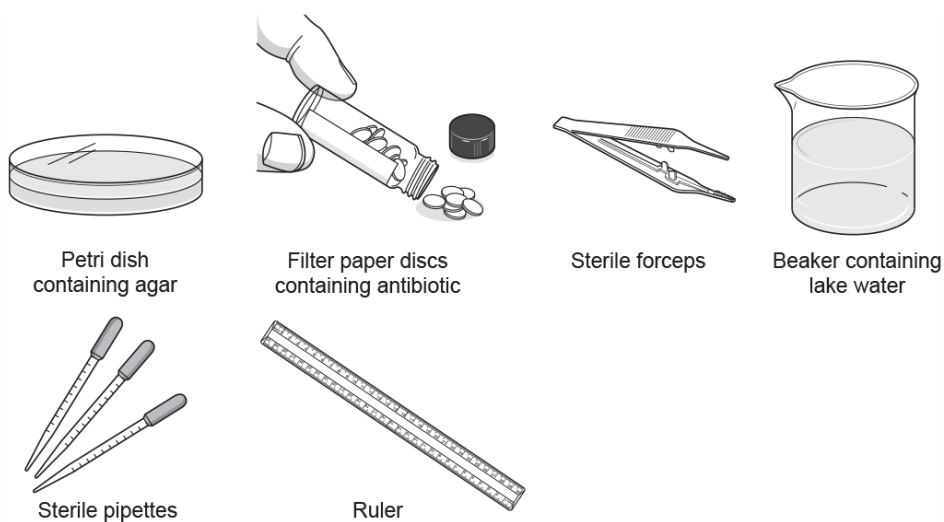
Scientists are investigating the use of antibodies as a treatment to control the negative effects of the drug.

As the human body does not naturally make antibodies against methamphetamine, scientists are using mice to make antibodies.

Describe how large amounts of the antibodies can be made using monoclonal antibody techniques.

[4]**30 (a).** Scientists investigate antibiotic pollution in two different lakes.

They collect samples of water from the two lakes. The scientists then use aseptic techniques to investigate how resistant the bacteria in the water are to antibiotics. **Fig. 16.2** shows the apparatus they use.

**Fig. 16.2**

Describe how the scientists could use **this** apparatus to **measure** how resistant the bacteria are to antibiotics.

[4]

(b). The scientists also counted how many species of bacteria were resistant to antibiotics and how many species of bacteria were killed by antibiotics.

The scientists found these results.

	Number of different species of bacteria	
	In Lake Bellandur	In Lake Jakkur
Resistant to antibiotics	53	35
Killed by antibiotics	28	37

Which lake has the **highest** levels of antibiotic pollution?

Tick (✓) **one** box.

Lake Bellandur

Lake Jakkur

Explain your answer.

[2]

