

- 1 The fungus, *Trichophyton violaceum*, reproduces asexually by releasing spores.

A single spore was placed in the centre of a Petri dish containing an agar medium with starch and protein.

Fig. 1.1 shows the fungus that grew from the spore.



Fig. 1.1

(a) State the name given to

- (i)** the body of the fungus that grows from a single spore

..... [1]

- (ii)** the thin threads that make up the body of the fungus.

..... [1]

(b) Describe how a fungus, such as *T. violaceum*, obtains nutrients from the agar medium.

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Streptomyces, a soil bacterium, is a major source of antibiotics that are produced by pharmaceutical companies. An antibiotic sensitivity test can be carried out to help doctors decide which antibiotic should be used to treat a specific disease, such as gonorrhoea.

Gonorrhoea bacteria isolated from a person are grown on an agar medium. A ring with eight different antibiotics (**1** to **8**) is placed on the agar medium and left for 24 hours at 35 °C.

Fig. 1.2 shows the growth of bacteria on the agar medium after 24 hours.

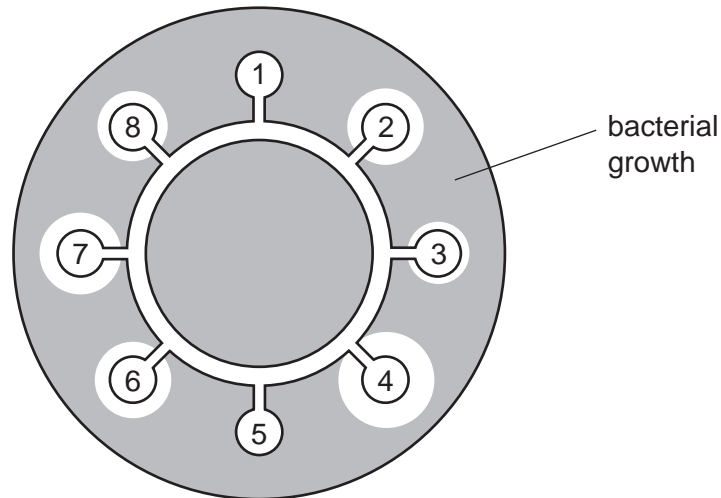


Fig. 1.2

(c) (i) Suggest why there is a clear area around some of the antibiotics.

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..... [2]

(ii) Explain why antibiotics **1** and **5** would **not** be chosen to treat the gonorrhoea infection.

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- (iii) People who take antibiotics should always be told to complete the treatment rather than stop taking the antibiotics when they feel better.

Suggest why people are given this advice.

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[Total: 12]

2 When bacteria are spread onto agar in a Petri dish they form colonies. Each colony forms from one bacterium. Fig. 4.1 shows an investigation into antibiotic resistance in a species of bacterium that causes disease.

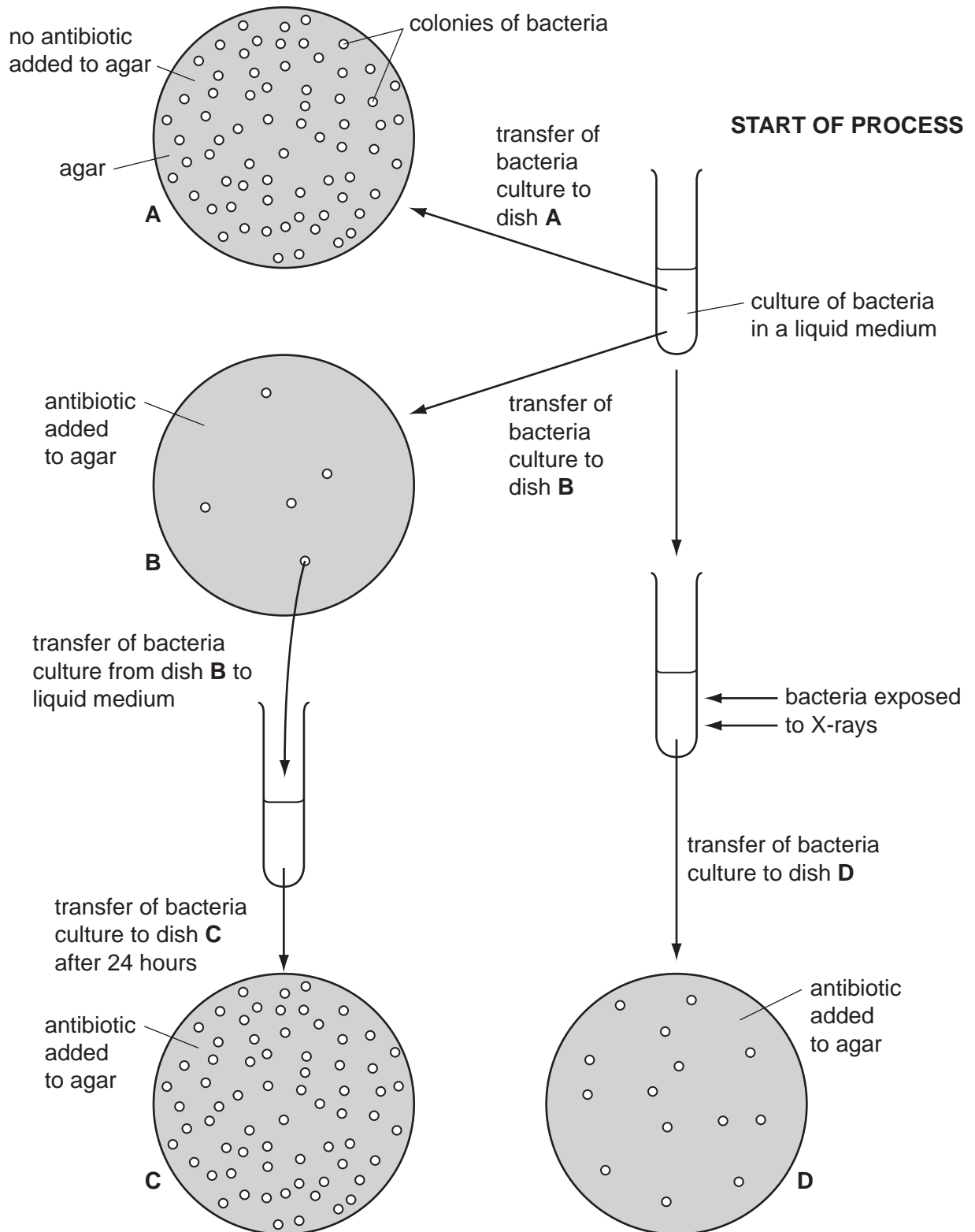


Fig. 4.1

(a) Explain what is meant by the term *antibiotic*.

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(b) Explain why

(i) only a few bacteria grew in dish **B** compared with dish **A**,

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..... [1]

(ii) more bacteria grew in **C** than in **B**.

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(c) Fig. 4.1 shows the effect of an antibiotic on a species of disease-causing bacterium.

Suggest why antibiotics should not be used too often.

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(d) Explain the possible effect of the X-rays on the bacteria.

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(e) State two ways in which the **structure** of a bacterium differs from the **structure** of a virus.

1.

2. [2]

(f) Human Immunodeficiency Virus (HIV) infects cells of the immune system.

Describe the effects of HIV on the immune system.

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..... [4]

[Total: 15]

3 The lymphatic system consists of:

- thin-walled lymph vessels that drain tissue fluid from many organs of the body
- lymph nodes that contain the cells of the immune system

The fluid in the lymph vessels is moved in a way similar to the movement of blood in veins.

Fig. 4.1 shows part of the lymphatic system.

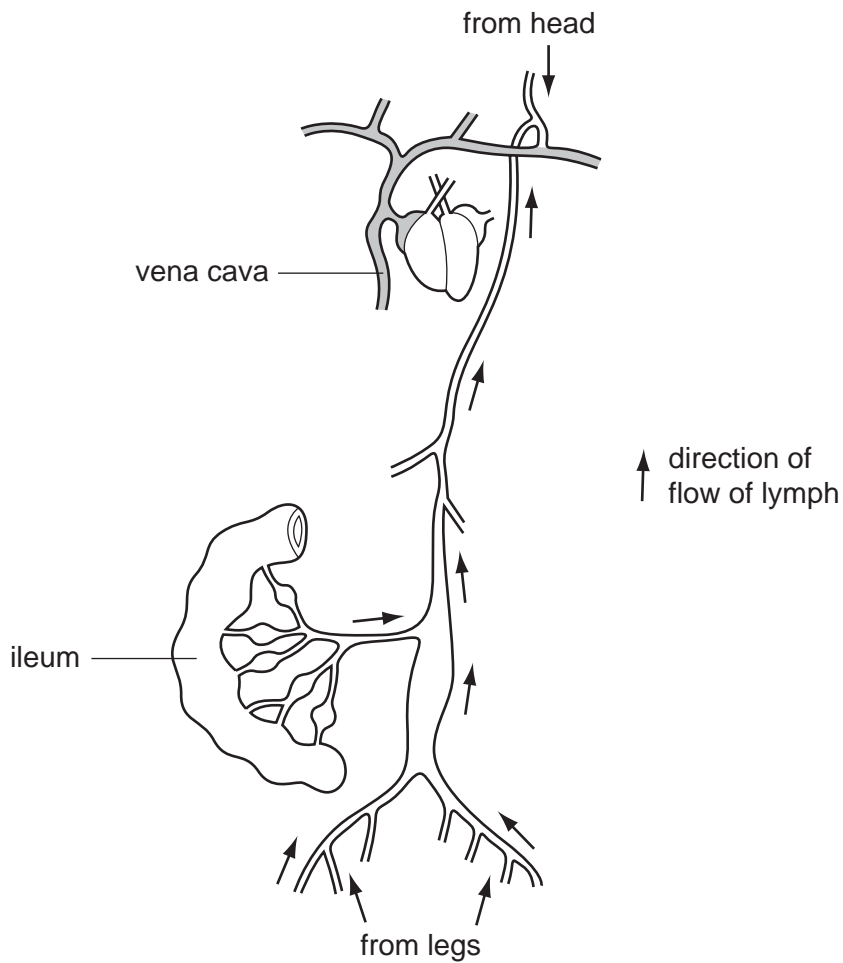


Fig. 4.1

(a) Suggest how lymph is moved in the lymph vessels.

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..... [2]

(b) After a meal rich in fatty foods, the lymph leaving the ileum is full of fat droplets.

Explain why there are fat droplets in the lymph leaving the ileum.

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..... [2]

Lymph flows through lymph nodes. Fig. 4.2 shows the action of white blood cells in a lymph node when bacteria are present.

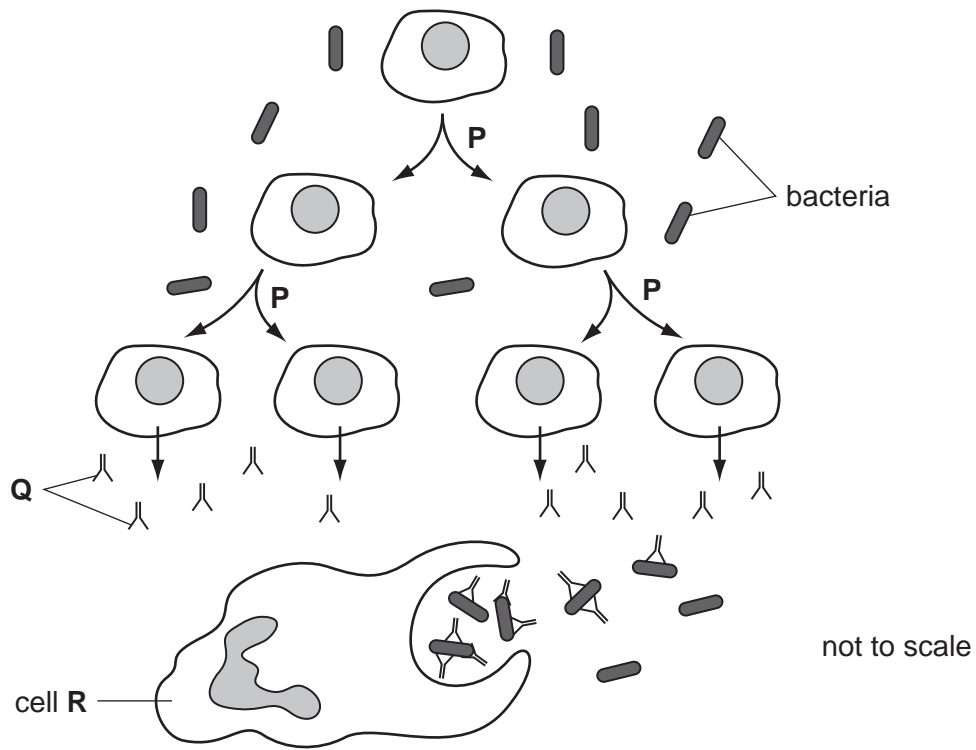


Fig. 4.2

(c) (i) Name the type of nuclear division shown at **P** in Fig. 4.2.

..... [1]

(ii) Name the molecules labelled **Q** in Fig. 4.2.

..... [1]

(iii) Describe how bacteria are destroyed by cell **R**.

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..... [3]

Antibiotics are used to treat bacterial infections. An investigation was carried out into the effect of prescribing antibiotics on antibiotic resistance in 20 countries. Fig. 4.3 shows the results of this investigation. Each point represents the result for a country.

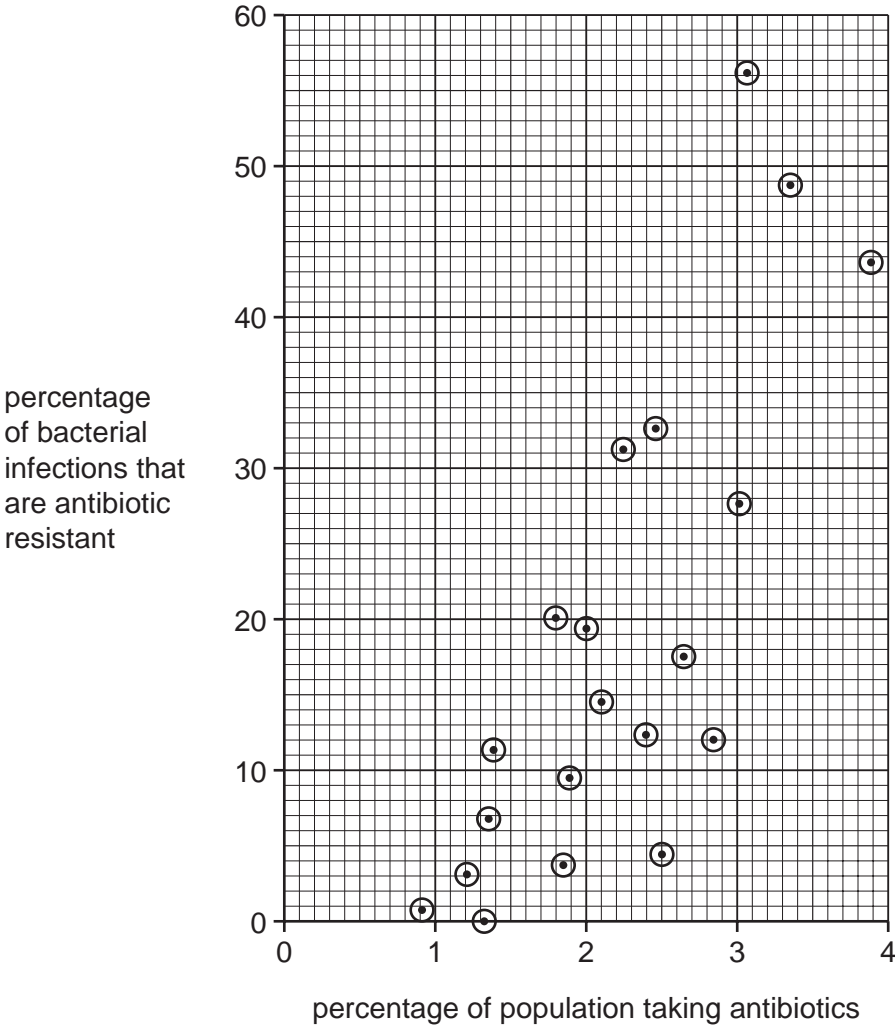


Fig. 4.3

(d) Describe the results shown in Fig. 4.3. Credit will be given for using figures from Fig. 4.3 to support your answer.

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(e) Many different antibiotics are used.

Suggest why some antibiotics are used less frequently than others.

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[3]

[Total: 15]