

Exercise walk-through

1.1

Cell structure, specialisation and microscopy (4.1.1)

AQA · GCSE · Biology

Exercises 2.1·2.3

2.1 Name the structures present in a bacterial cell that are absent from an animal cell. [2]

2.2 Give one structural feature of a sperm cell and explain how it helps fertilisation. [2]

2.3 A cell image measures 2.4 mm at $\times 800$. Calculate the real size in μm . [3]

3 Exam-style questions

Exercises 2.1·2.3

2.1 Name the structures present in a bacterial cell that are absent from an animal cell.[2]

2.1 Cell wall; plasmid / single DNA loop not in a nucleus.

2.2 Give one structural feature of a sperm cell and explain how it helps fertilisation. [2]

2.2 Tail (flagellum) for swimming to the egg; many mitochondria release energy for movement.

2.3 A cell image measures 2.4 mm at $\times 800$. Calculate the real size in μm . [3]

3 Exam-style questions

2.3 Convert: $2.4 \text{ mm} = 2400 \mu\text{m}$ (C1).

$$\text{real size} = \frac{2400}{800} = \mathbf{3.0} \mu\text{m}$$

(division C1, answer with unit A1.)

Exercises 3.1·3.2

3.1 Explain why muscle cells contain many mitochondria and many ribosomes. [4]

3.2 A student prepares an agar plate to test antiseptics (RP2).

(a) Explain why the inoculating loop is flamed before use. [2]

(b) Explain why the plate is incubated at 25 °C, not 37 °C. [2]

(c) The clear zone around one disc has a diameter of 12 mm. Calculate its area. [2]

Exercises 3.1·3.2

3.1 Explain why muscle cells contain many mitochondria and many ribosomes. [4]

3.1 Mitochondria carry out aerobic respiration releasing energy (ATP) for contraction; ribosomes synthesise proteins – the contractile protein fibres the cell needs.

3.2 A student prepares an agar plate to test antiseptics (RP2).

(a) Explain why the inoculating loop is flamed before use. [2]

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(c) The clear zone around one disc has a diameter of 12 mm. Calculate its area. [2]

3.2 (a) The flame kills any microorganisms already on the loop, so only the intended bacterium is transferred – no contamination. (b) 25 °C limits growth to non-pathogenic bacteria; 37 °C body temperature could grow pathogens harmful to humans. (c) $r = 6$ mm (C1): $A = \pi \times 6^2 = \mathbf{113} \text{ mm}^2 \approx 110 \text{ mm}^2$.

Exercise 3.3

3.3 A bacterium divides every 20 minutes starting from one cell.

(a) How many cells are present after 2 hours? [2]

(b) (HT) Write your answer to (a) in standard form. [1]

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3.3 (a) 2 hours = 120 min = 6 divisions (C1): $2^6 = \mathbf{64}$ cells. (b) $\mathbf{6.4 \times 10^1}$.