B1 L2 Challenge worksheet: Bacterial cells

Name: _____ Class: _____

A. A new microorganism

Help: online screens 6, 10 and 11 [5]

Scientists found a new microorganism in a hot spring. Table 1 shows what they found out about one of its cells.

Feature	What they found
nucleus	none
cell membrane	present
cell wall	present (not made of cellulose)
ribosomes	present
mitochondria	none
small rings of DNA	present
length of the cell	1.5 µm

Table 1

(a) Is this cell prokaryotic or eukaryotic? Give two pieces of evidence from Table 1. [3]

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(b) A student says: 'This cell has no mitochondria, so it cannot release energy.' Explain why the student is wrong. [2]

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B. Plasmids and an antibiotic

Help: online screens 3, 4 and 9 [4]

A scientist tested an antibiotic on two types of bacteria, X and Y. Type X has a plasmid that carries a gene called P. Type Y has no plasmids. The antibiotic killed type Y, but not type X.

(a) Suggest what gene P does. [1]

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(b) Type Y has no plasmids. Explain how type Y can still make the proteins it needs. [2]

_____

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_____

(c) Gene P is not inside a nucleus. Explain why. [1]

_____

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_____

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C. Sizes and a micrograph

Help: online screens 1, 2 and 7 [6]

Figure 1 is a drawing made from an electron micrograph of a bacterium, cut lengthways.

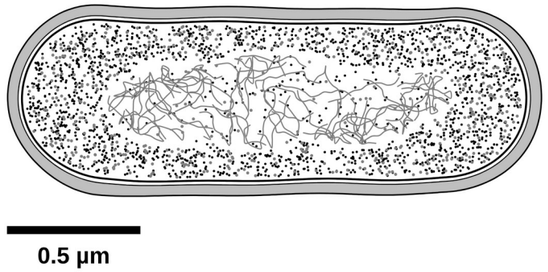


Figure 1

(a) Use the scale bar to estimate the length of the bacterium. [1]

_____ µm

(b) A root hair cell is 0.8 mm long. 1 mm = 1000 µm. Calculate how many times longer the root hair cell is than the bacterium. Use your answer to (a). [3]

_____ times

(c) Pictures of bacteria made with an electron microscope are often shown in bright colours. Explain why these are not the real colours of the bacterium. [2]

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_____

_____

D. Extended response

Help: online screens 3 and 10 [6]

A bacterium is a single-celled organism. It must take in substances, release energy and make proteins, and some bacteria move. Explain how the structures in a bacterial cell help it to stay alive. [6]

In your answer, name the structures and say what each one does.

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