Cell division, cell diversity and cellular organisation – 2021/20 GCE Biology A Component 01

1. Nov/2021/Paper_H420/1/No.20(d)

(d) Plant growth requires the production of new xylem cells.

Describe how new xylem cells are produced.

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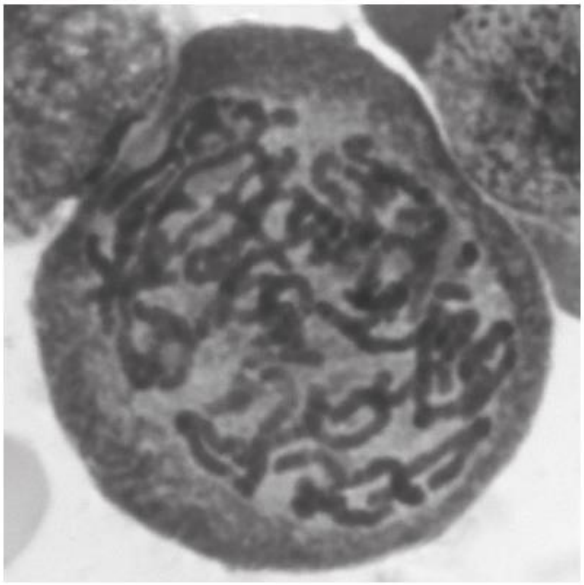
..... **[2]**

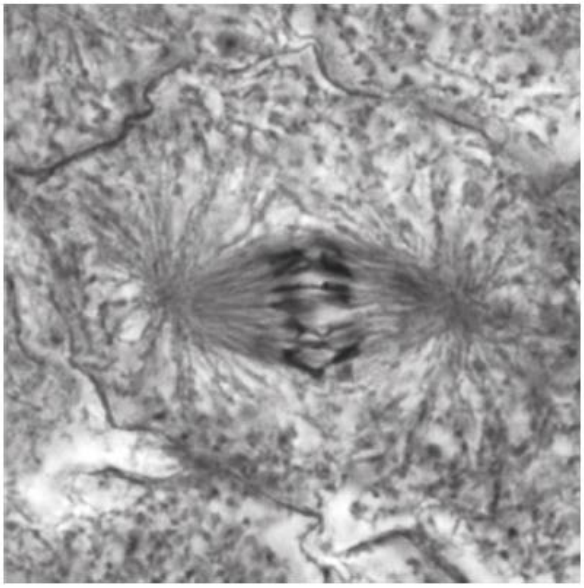
2. Nov/2021/Paper_H420/03/No.2

(a)* **Fig. 2.1** shows three images, **C** to **E**, of animal cells undergoing mitosis.

C



D



E

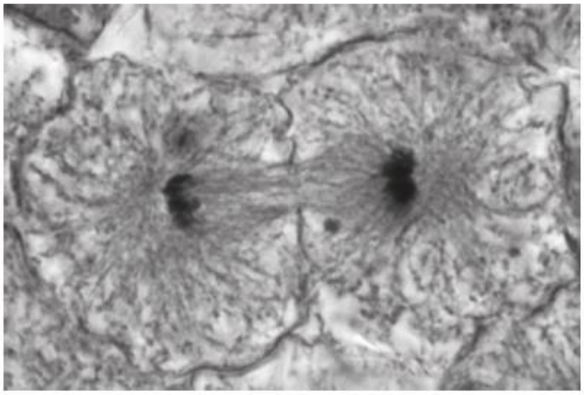


Fig. 2.1

Describe the events taking place in cells **C**, **D** and **E**.

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(b) The eukaryotic cell cycle is regulated by three checkpoints. Mutations can occur in genes that control the cell cycle checkpoints.

Scientists recorded observations of two different tissues.

(i) In one tissue, the scientists found a genetic mutation that stopped the metaphase checkpoint from working.

Suggest an abnormality the scientists might observe in the cells of this tissue.

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..... **[1]**

(ii) In the other tissue, the scientists observed cells with chromosomes that had been replicated despite containing damaged DNA.

Suggest which cell cycle checkpoint is no longer working in this tissue **and** justify your answer.

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(c) Mitosis does not occur in bacteria. Bacterial cells divide using binary fission. Binary fission is shown in **Fig. 2.2**.

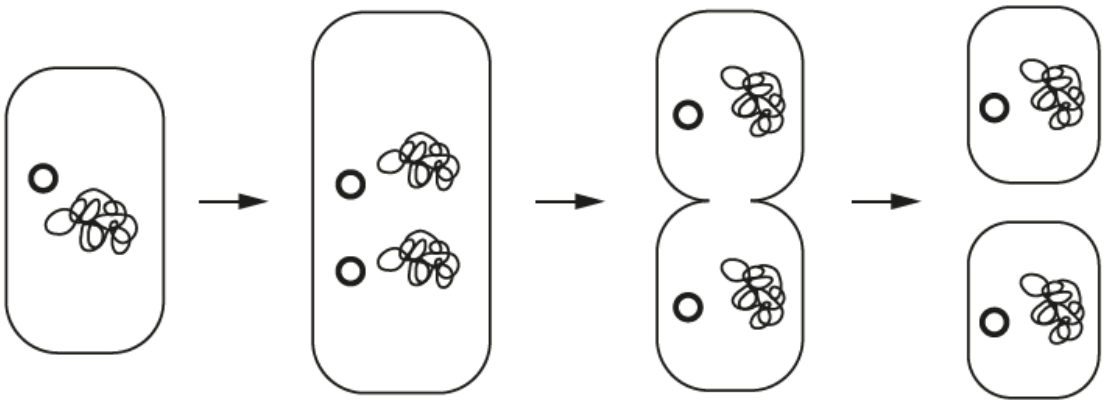

Fig. 2.2

Bacteria do not have a nucleus.

Describe **two other** differences between how DNA is separated during binary fission and mitosis.

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[2]

3. Nov/2020/Paper_H420/03/No.4(a)

(a) Prokaryotic cells have cytoskeletons. The molecules in prokaryotic cytoskeletons are different from the molecules in eukaryotic cytoskeletons.

Table 4.1 lists three molecules present in a prokaryotic cytoskeleton.

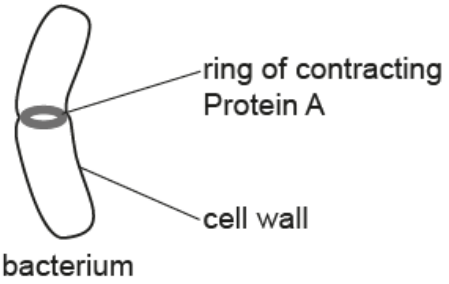
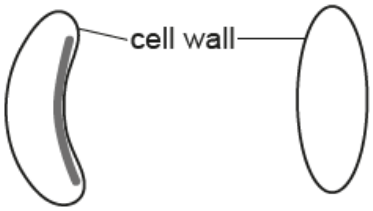
Prokaryotic cytoskeleton molecule	Information
Protein A	
Protein B	Similar structure to actin.
Protein C	

Table 4.1

(i) Suggest the function of Protein A.

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(ii) Suggest the function of Protein C.

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(iii) An antibiotic called A22 binds irreversibly to Protein B. Despite its antibiotic properties, A22 is not used in humans.

Suggest why scientists have advised that A22 should not be used in humans.

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..... **[1]**