SCIENCE FOUNDATIONS

Prokaryotic versus eukaryotic cells

Difficulty level: Intermediate

Science Foundations

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Overview of the concept

This is how you tell a bacterium from a cell in your own body, since one keeps its DNA loose in the cell while the other stores it in a nucleus. A doctor choosing an antibiotic counts on this difference, because a drug that attacks a bacterial structure your own cells do not have will hurt the bacteria and not you. A yogurt maker relies on bacteria doing their work without a nucleus at all. Knowing prokaryotic versus eukaryotic cells tells you why bacteria are so different from the cells in plants and animals, and why some medicines can target them safely.



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Rule

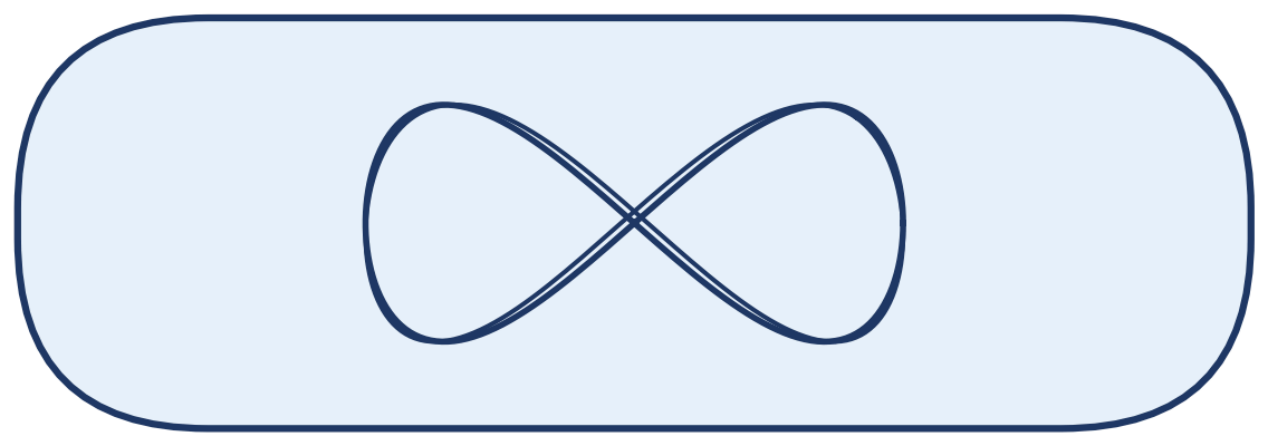
Prokaryotic versus eukaryotic cells: a cell with a nucleus is eukaryotic, and a cell with no nucleus is prokaryotic.

Eukaryotic cells have membrane-bound organelles and are usually larger and more complex, while prokaryotic cells are smaller and simpler.

Worked examples

EXAMPLE 1

Q Classify a bacterium with no nucleus.



SOLUTION

Check for a nucleus: none is present.

No nucleus means prokaryotic.

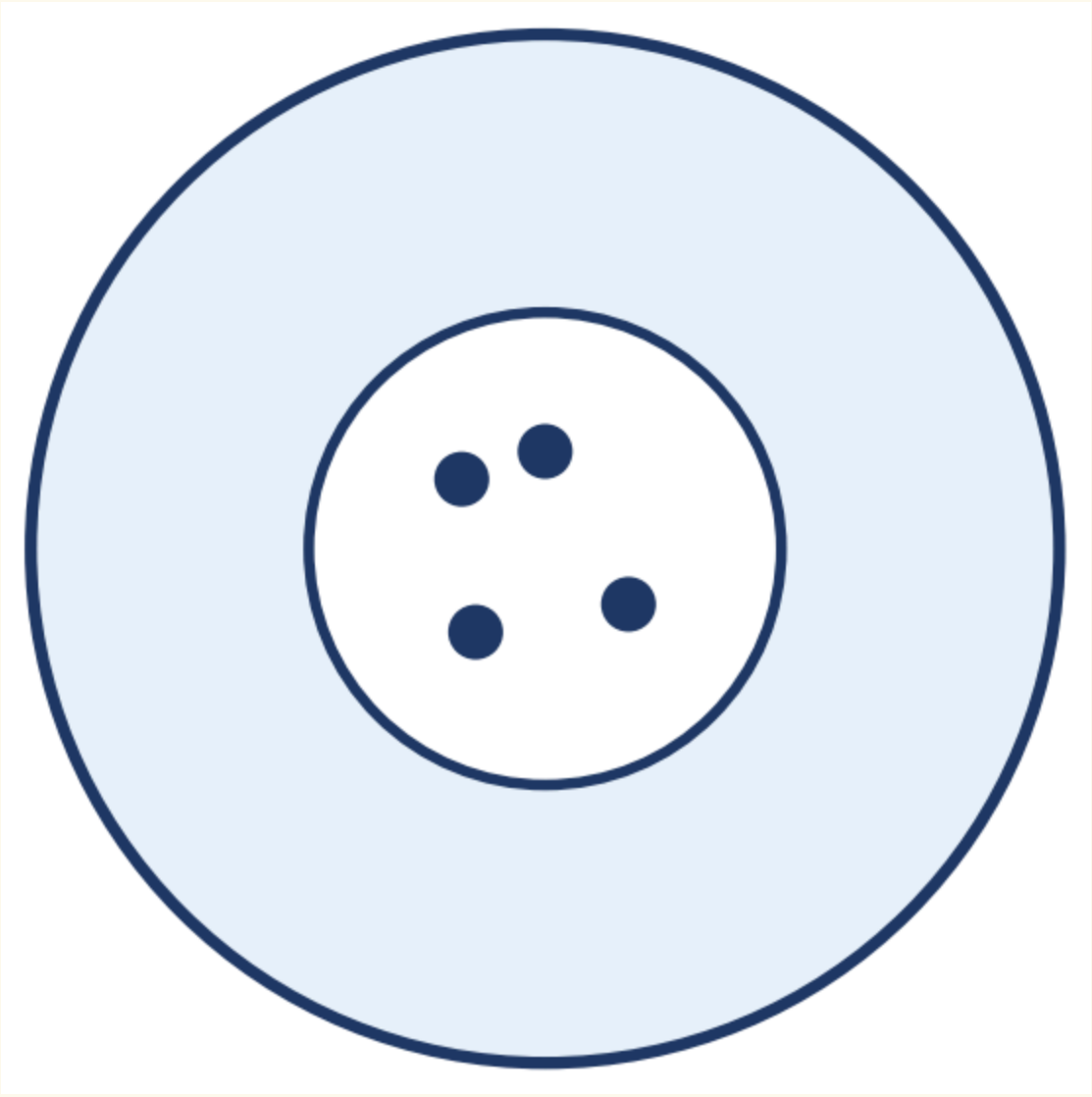
Conclude with an example group: bacteria.

The result is prokaryotic cell.

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EXAMPLE 2

Q Classify a human cheek cell with a nucleus.



SOLUTION

Check for a nucleus: one is present.

A nucleus means eukaryotic.

Conclude: human cells are eukaryotic.

The result is eukaryotic cell.

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Practice questions

1 A cell has DNA floating free in the cell, not inside a nucleus. Is it prokaryotic or eukaryotic?

- **A** Prokaryotic
- **B** Eukaryotic
- **C** Both
- **D** Neither

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2 Which structure holds the DNA in a eukaryotic cell?

- **A** The nucleus
- **B** The ribosome
- **C** The cell wall
- **D** The cytoplasm

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3 Bacteria have no nucleus. Where is their DNA?

- A Floating free in the cell
- B Inside a nucleus
- C Inside mitochondria
- D Outside the cell

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4 Why can some antibiotics kill bacteria without harming human cells?

- A They attack structures bacteria have that human cells do not
- B They attack the nucleus
- C They attack human cells first
- D They only work on large cells

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5

Which type of cell is usually smaller and simpler?

A Prokaryotic

B Eukaryotic

C Both

D Neither

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6

Which type has membrane-bound organelles?

A Eukaryotic

B Prokaryotic

C Both

D Neither

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Are fungi eukaryotic?

A Yes

B No

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8

Name a prokaryotic group.

A Bacteria

B Fungi

C Plants

D Animals

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Do prokaryotes have mitochondria?

A Yes

B No

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Do plant cells have mitochondria?

A Yes

B No

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ANSWER KEY

1. Prokaryotic

2. The nucleus

3. Floating free in the cell

4. They attack structures bacteria have that human cells do not

5. Prokaryotic

6. Eukaryotic

7. Yes

8. Bacteria

9. No

10. Yes

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