

Exercise walk-through

4.6

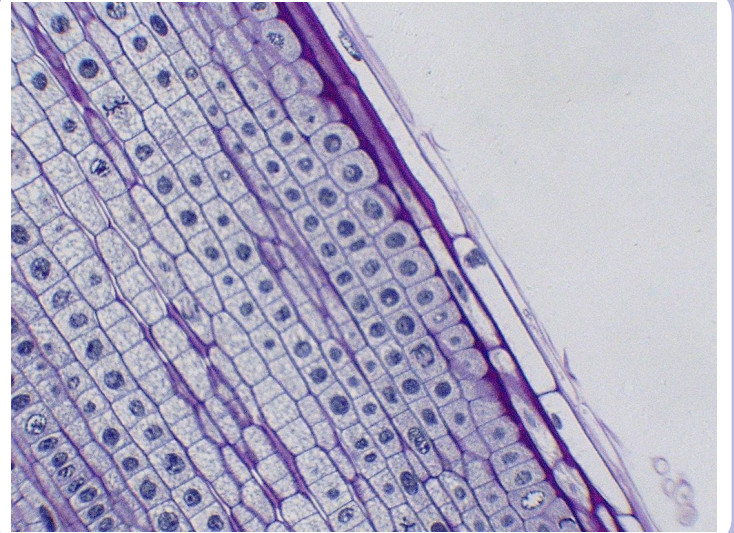
Regulation of Cell Cycle

AP Biology

The cell cycle

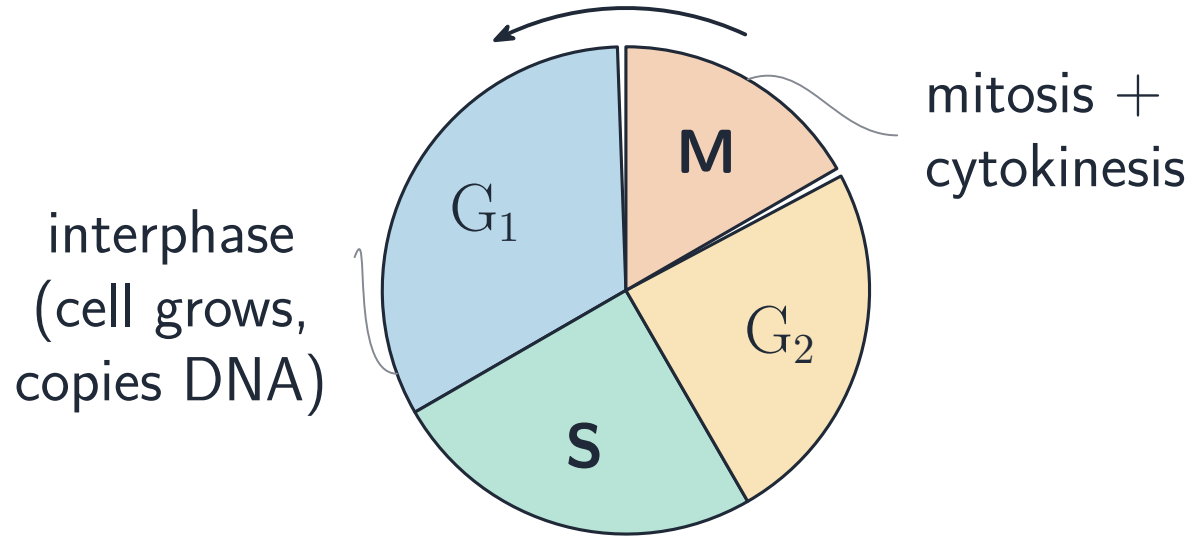
- **interphase** – grow and copy DNA
- **mitosis** (M) – split the nucleus: **P**rophase, **M**etaphase, **A**naphase, **T**elophase
- **cytokinesis** – split the cytoplasm

Two identical **diploid** **daughter cells** ; n divisions $\Rightarrow 2^n$ cells.



Mitosis produces two identical daughter nuclei

The cell cycle: interphase



The cell cycle: interphase, then mitosis and cytokinesis

Exercises 2.1-2.3

2.1 What do cell-cycle checkpoints do?

[1]

2.2 At which checkpoint does the cell decide whether to divide?

[1]

2.3 What can result from a loss of cell-cycle control?

[1]

Exercises 2.1-2.3

2.1 What do cell-cycle checkpoints do? [1]

2.1

- They check that conditions are correct before the cell proceeds to the next phase
-

2.2 At which checkpoint does the cell decide whether to divide? [1]

2.2

- The G1 checkpoint
-

2.3 What can result from a loss of cell-cycle control? [1]

2.3

- Cancer (uncontrolled cell division)

Exercise 3.1

3.1 Uncontrolled cell division caused by failed checkpoints can lead to

[1]

☐

A apoptosis

B cancer

C homeostasis

D meiosis

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3.1 Uncontrolled cell division caused by failed checkpoints can lead to

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A apoptosis

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3.1 B

- cancer

Exercise 3.2 (a)

3.2 A cell has DNA damage at the G2 checkpoint.

(a) State what a healthy checkpoint should do.

[1]

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3.2 A cell has DNA damage at the G2 checkpoint.

(a) State what a healthy checkpoint should do.

[1]

(a)

- It should pause the cycle to repair the DNA (or prevent division)

Exercise 3.2 (b)

3.2 A cell has DNA damage at the G2 checkpoint.

(b) Explain what could happen if the checkpoint fails.

[2]

Exercise 3.2 (b)

3.2 A cell has DNA damage at the G2 checkpoint.

(b) Explain what could happen if the checkpoint fails. [2]

(b)

- If it fails, the cell divides with damaged DNA, passing the errors on and possibly leading to uncontrolled division (cancer)

Exercise 3.3

3.3 Explain why checkpoints are important for producing healthy daughter cells. [2]

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3.3

- Checkpoints ensure the DNA is copied correctly and conditions are right before division, so each daughter cell receives a complete, accurate set of chromosomes