D2.1 Cell and nuclear division: data-based questions

What the Cell · DP Biology · data-based questions

Name _____ **Date** _____ **Total** _____ / 9

Read the data carefully before you answer. The number of marks shows how many separate points to make. Show your working in calculations.

1 A drug that targets mitosis

9 marks

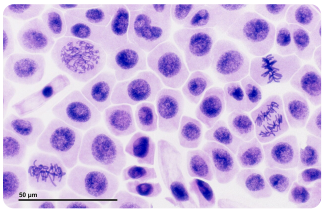
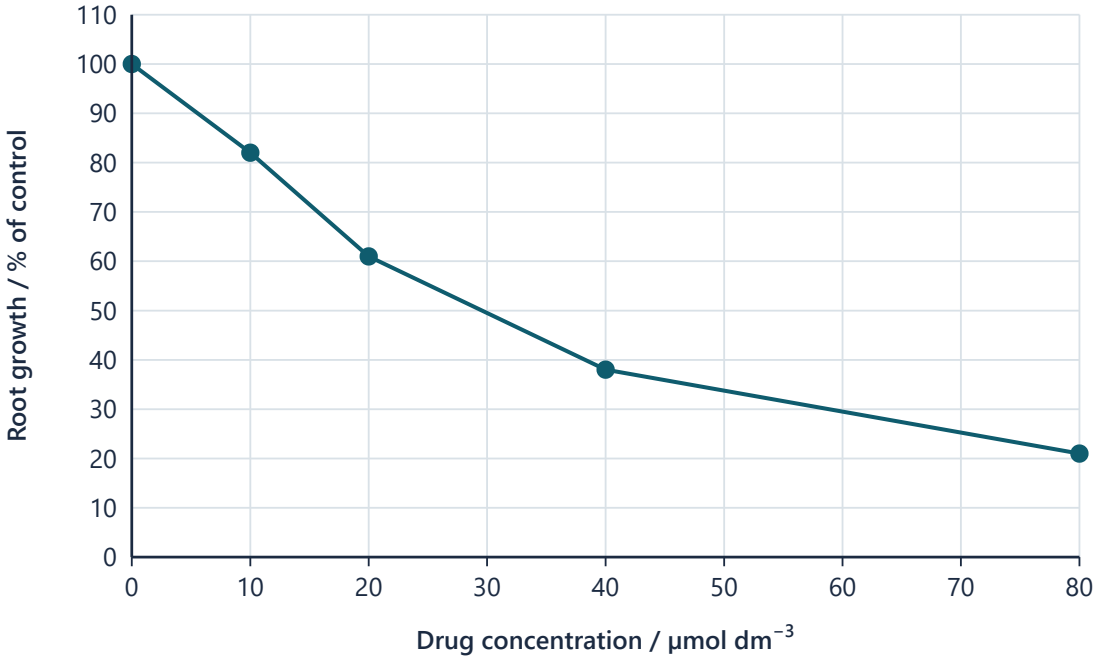


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Onion root tips were grown for 24 hours in different concentrations of a drug being tested as an anticancer treatment. Root growth was measured, and cells from the tips were stained and counted.

Drug / μmol dm^{-3}	0	10	20	40	80
Mitotic index / %	12	15	19	24	27
Cells in anaphase per 100 cells in mitosis	21	14	8	4	2



a **State** the root growth, as a percentage of the control, at 40 μmol dm^{-3}. [1]

b At 80 μmol dm^{-3}, 54 of 200 cells in one field of view were in mitosis. **Calculate** the mitotic index. [1]

c **Describe** the relationship between drug concentration and mitotic index. [1]

d **Evaluate** the hypothesis that the drug stops cells from completing mitosis. **[3]**

e **Suggest** how the drug could prevent cells from entering anaphase. **[1]**

f **State** one advantage and one disadvantage of using plant root tips to test drugs meant for human cancer. **[2]**