

Cell Cycle POGIL Notes

Model #1- Cell Cycle

1. There are 4 phases in the cell cycle as shown in model #1.
2. The order of the cell cycle is as follow:
 - a. G1
 - b. S
 - c. G2
 - d. Mitosis
3. The size of the cell increase during the G1 phase
4. The number of cells increase at the end of mitosis
5. As organisms grow, they need more cells. Making more cells is accomplished through the cell cycle. Another way that an organism utilizes the cell cycle to make more cells is when cells are damaged and more cells are needed.
6. Accordingly to model #1, G1 phase is more likely affected if some cancerous cells are much smaller than normal.
7. In model #1, the length of the arrow represents time. If some cancerous cells are smaller than normal, then the time spent to make a cancerous cell would be a lot shorter. This means that cancerous cells can divide very quickly, making this process hard for doctors to treat cancer.

Model #2 – Cell Cycle Data

8. Names of the phases

- a. G = Gap1 and Gap 2
- b. M = Mitosis
- c. S = synthesis

9. Model #2 showed that the time spent in mitosis is shorter than gap1.

10. Given a 100 randomly chosen cells, one will expect to find that the majority of the cells will be in the G1 phase because cells spend most of their life growing before making new cells.

11. Comparing the amount of DNA from G1 to the end of synthesis, the amount of DNA doubled because DNA replicated.

12. DNA replication

13. Cytokinesis is when the cell gets cut into 2 separate cells

14. Other than cytokinesis, DNA get separated.

15. The cell grows

16. If you start with one human cell, then you would get 2 cells after 24 hours

17. After another 24 hours, there will be 4 cells in the culture starting from 1 cell because the cells would divide.

18. The original cell does not die or disappear after mitosis because the original cell is split into 2 new cells (daughter cells)

19. Between a starfish limb, human spinal cord, and gecko tail, human spinal cord would be less likely to go through the cell cycle. The reason for this is because both gecko and starfish are able to regenerate the lost limb and tail. Human spinal cord, on the other hand, becomes impaired meaning that the cells do not regenerate itself.

20. Between liver cells and brain cells, new liver cells can produce to replace up to 75% of the liver and brain cells do not reproduce. We can say that the liver cells are able to go through the cell cycle and the brain cells do not.

21. G₀ is the phase in which the cells are no longer in the cell cycle. Cells in G₀ will not reproduce. This phase is located in the middle of G₁ because the cells are functioning properly in G₁, but are not preparing for division.

22. a. In order for a cell in G₀ to divide normally, Synthesis, G₂ and mitosis need to occur

b. If synthesis, G₂, and mitosis do not occur, the outcome for the cell is that the cell would die without dividing.

Model #3 -Radiation

23. Ultraviolet affect G1 phase of the cell cycle accordingly to model #3

24. Mutation that occurs during synthesis may result in replication of the damaged DNA into the new cells. Eventually all daughter cells of the mutated cell will be mutated.

25. If apoptosis did not occur in a cell that has damaged DNA, then the damaged DNA will replicate spreading into other cells.

26. It is beneficial for a damaged cell to enter G0 instead of dividing because the damaged cell will not create more damaged cells.

27. If apoptosis does not occur as it should, it could cause health issues in an organism.