1. Which of the following structures is found only in plant cells?
   A. Nucleus
   B. Cell Wall
   C. Mitochondria
   D. Ribosome

2. What phase of the cell cycle involves the replication of DNA?
   A. G1 Phase
   B. S Phase
   C. G2 Phase
   D. M Phase

3. Which of the following is an example of a specialized cell?
   A. Stem cell
   B. Red blood cell
   C. Undifferentiated cell
   D. Generic eukaryotic cell

4. Cancer is caused by:
   A. Rapid differentiation of cells
   B. A mutation that disrupts the cell cycle
   C. Lack of cell specialization
   D. Damage to the endoplasmic reticulum

5. Which process occurs during mitosis?
   A. Crossing over of chromosomes
   B. Separation of sister chromatids
   C. DNA replication
   D. Pairing of homologous chromosomes

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6. Draw and label a plant cell and an animal cell. Identify three differences between them.

7. Explain the role of mitosis in growth and repair in multicellular organisms.

8. Describe how a mutation in DNA can lead to cancer. Provide an example of a carcinogen that may cause such mutations.

9. Compare and contrast red blood cells and nerve cells in terms of structure and function.

10. Outline the main stages of the cell cycle and briefly describe what occurs during each stage.

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11. A scientist observes a tissue sample under a microscope and notices that most cells are in interphase. Explain why this observation makes sense based on the cell cycle.

12. A patient is diagnosed with a cancerous tumor. Describe how the uncontrolled cell division in the tumor may differ from normal cell division.

13. Identify three types of specialized cells in plants and explain their specific roles in the plant's survival.

14. A mutation occurs in a cell, causing it to divide uncontrollably. Explain the relationship between this mutation, the cell cycle, and the development of cancer.

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15. A student conducts an experiment to observe mitosis in onion root tip cells. After staining and examining the cells, they observe cells in various stages of the cell cycle. They count the following:

- Interphase: 50 cells
- Prophase: 10 cells
- Metaphase: 5 cells
- Anaphase: 3 cells
- Telophase: 2 cells

(a) What percentage of the cells are in interphase?
(b) Explain why the majority of cells are found in interphase.

16. Design an experiment to investigate the effect of a carcinogen on the rate of cell division in a controlled laboratory setting.

17. Explain the importance of stem cells in the development of specialized cells. Provide examples of how stem cell research is being used in medicine.

18. A farmer notices that a specific plant species in their field has leaves that are yellowing and not producing enough food. The farmer suspects that the specialized cells in the leaves are not functioning properly. Explain the possible reasons for this and suggest solutions to improve the health of the plant.

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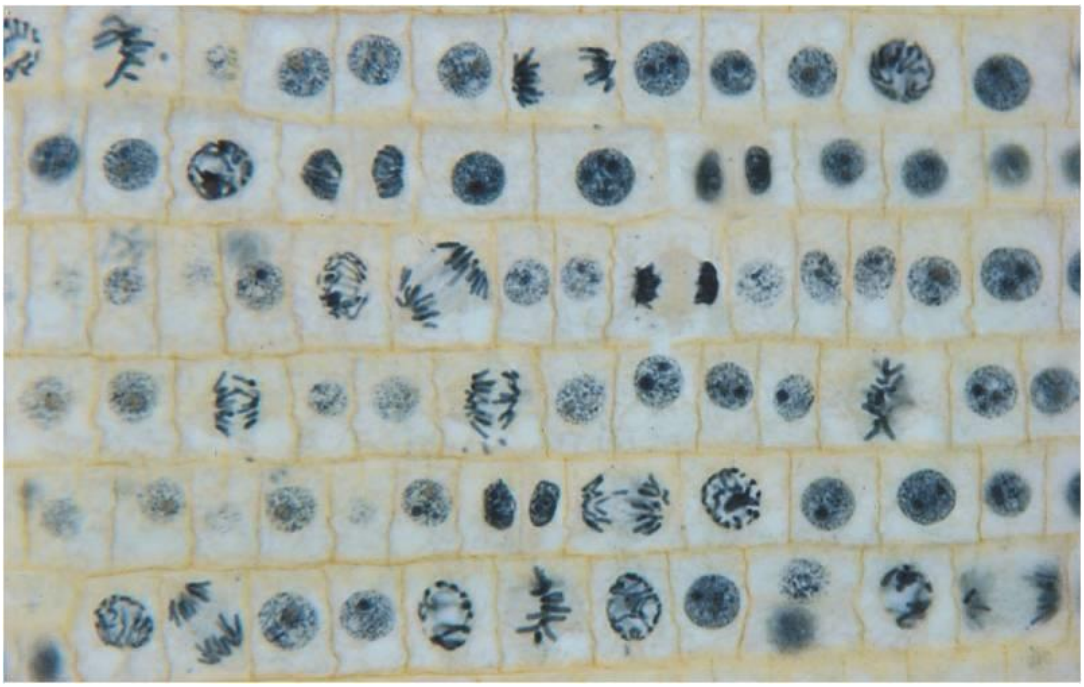
19. Cancer is often referred to as a disease of the cell cycle. Discuss how disruptions in the cell cycle can lead to the formation of tumors and metastasis. Include examples of treatments aimed at controlling the disease.

20. "The structure of a cell is directly related to its function." Evaluate this statement by comparing and contrasting the structure and function of three different specialized cells in plants and animals.

21. X-Rays and other forms of radiation can cause damage to chromosomes. Doctors and dentists ask women if there is any chance might be pregnant before exposing them to such tests. Why? Explain

22. Anabolic steroids are frequently abused by athletes as a quick way to build muscle tissue without having to work for it. Explain what anabolic steroids might do with mitosis and interphase?



a) For each of the following cells from (1 to 12), identify the stage of the cell cycle.

1 _____ 7 _____

2 _____ 8 _____

3 _____ 9 _____

4 _____ 10 _____

5 _____ 11 _____

6 _____ 12 _____

b) Majority of the cells are found in this stage of the cell cycle: _____

c) Is this a realistic portrayal of an onion root tip? Explain.

Label the diagram below. Is this an animal or plant cell? _____