

Gene Mutation: Causes, Types, and Effects

Part I: Fill in the Blank

Word Bank:

DNA	mutation	radiation	inherited	substitution
deletion	insertion	proteins	harmful	beneficial

1. A change in the genetic material of an organism is called a _____.
2. Mutations can be caused by exposure to chemicals or _____.
3. A(n) _____ mutation occurs when one nucleotide is replaced by another.
4. A(n) _____ mutation occurs when an extra nucleotide is added to a DNA sequence.
5. A(n) _____ mutation occurs when a nucleotide is removed from a DNA sequence.
6. Mutations can affect the production of _____ in cells.
7. Some mutations can be _____ and help organisms survive better.
8. Other mutations can be _____ and cause diseases or disorders.
9. Mutations that are passed from parents to offspring are called _____ mutations.
10. Genes are made up of _____.

Part II: True or False

Write **T** for True or **F** for False.

11. ____ All mutations are harmful.
12. ____ Mutations can occur naturally during DNA replication.
13. ____ Radiation can increase the likelihood of mutations.
14. ____ A deletion mutation adds extra nucleotides to DNA.
15. ____ Some mutations have no noticeable effect on an organism.
16. ____ Gene mutations can affect how proteins are made.
17. ____ Mutations can only occur in plants.
18. ____ Beneficial mutations may help an organism adapt to its environment.
19. ____ Insertion mutations involve adding nucleotides to DNA.
20. ____ Mutations are changes in the DNA sequence.

Part III: Multiple Choice

Circle the best answer.

21. What is a gene mutation?
 - a. A type of cell division
 - b. A change in a DNA sequence
 - c. A protein made by cells
 - d. A chromosome pair
 22. Which of the following is a cause of mutations?
 - a. Water
 - b. Sunlight and radiation
 - c. Gravity
 - d. Oxygen
 23. Which mutation occurs when one nucleotide is replaced by another?
 - a. Deletion
 - b. Insertion
 - c. Substitution
 - d. Duplication
 24. What can mutations affect?
 - a. Protein production
 - b. Cell function
 - c. Traits of an organism
 - d. All of the above
 25. Which mutation removes nucleotides from DNA?
 - a. Deletion
 - b. Insertion
 - c. Substitution
 - d. Replication
 26. A mutation that helps an organism survive is considered:
 - a. Harmful
 - b. Neutral
 - c. Beneficial
 - d. Dangerous
 27. Which of the following may result from a harmful mutation?
 - a. Improved adaptation
 - b. Genetic disorders
 - c. Faster growth in all organisms
 - d. Increased photosynthesis
 28. What is the role of DNA in mutations?
 - a. DNA is unchanged by mutations
 - b. Mutations are changes in DNA
 - c. DNA causes all diseases
 - d. DNA is not involved
 29. Which type of mutation adds extra nucleotides?
 - a. Insertion
 - b. Deletion
 - c. Substitution
 - d. Inversion
 30. Some mutations are called neutral because they:
 - a. Always cause disease
 - b. Always help survival
 - c. Have little or no effect on the organism
 - d. Remove all proteins
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