

DNA Molecule / Protein Synthesis

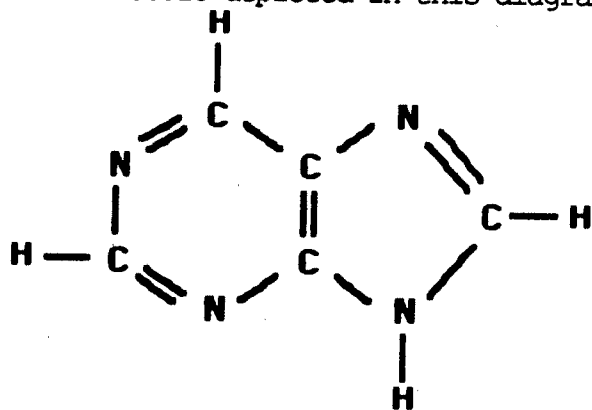
Instructions:

Read each question carefully before answering. Work at a steady pace, and you should have ample time to finish.

- ___ 1. DNA is composed of repeating
 - a. nitrogen bases.
 - b. nucleotides.
 - c. deoxyribose sugar and phosphate groups.
 - d. nucleosides.

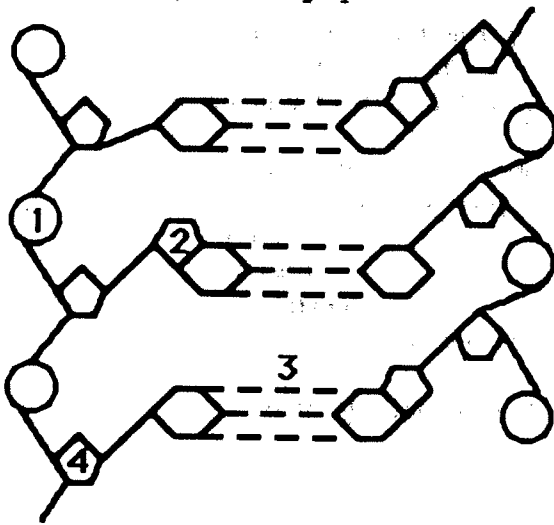
- ___ 2. Complementary base pairing would involve
 - a. adenine bonded to cytosine.
 - b. thymine bonded to guanine.
 - c. adenine bonded to guanine.
 - d. guanine bonded to cytosine.

- ___ 3. The molecule depicted in this diagram is



- a. sugar.
- b. nucleotide.
- c. purine.
- d. pyrimidine.

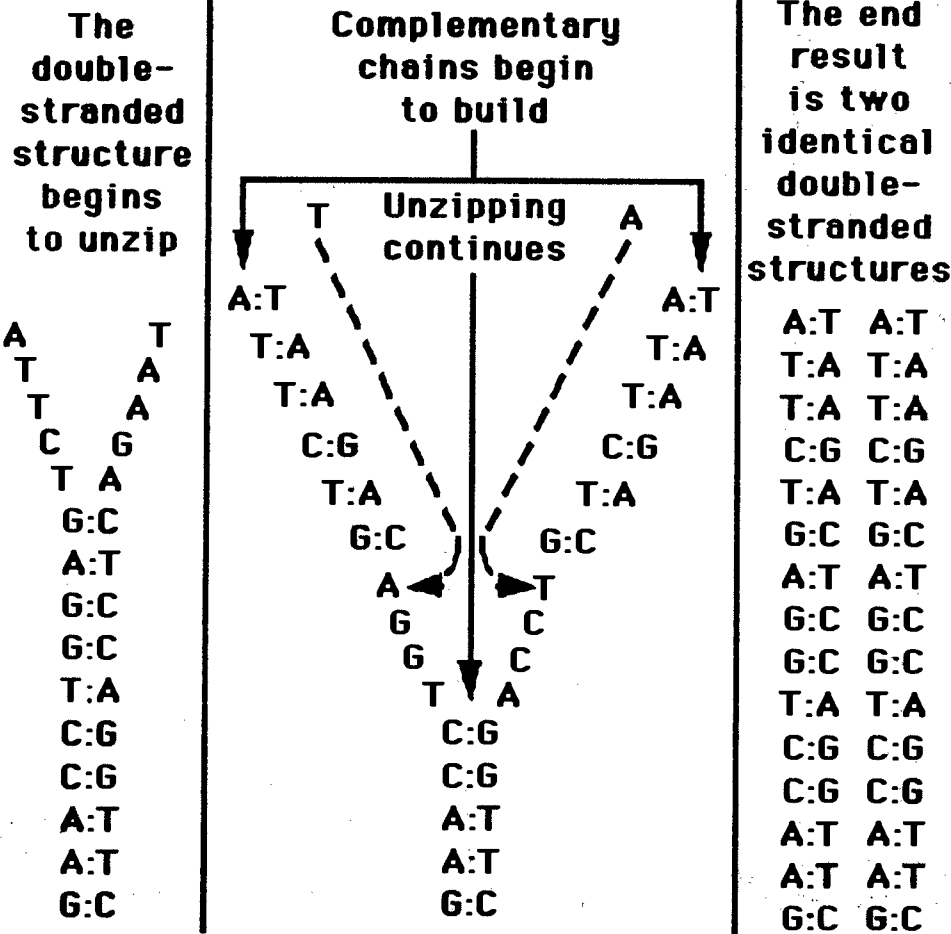
Use this diagram of a portion of a DNA molecule and the key below to match the following questions.



KEY: a. phosphate
b. sugar
c. nitrogenous base
d. hydrogen bond

- ___ 4. ___ Label 1 is a
- ___ 5. ___ Label 2 is a
- ___ 6. ___ Label 3 is a
- ___ 7. ___ Label 4 is a
- ___ 8. Replication of DNA results in
- a. two new DNA strands, each identical to the other in nucleotide sequence.
 - b. two new DNA strands, each different from the other in nucleotide sequence.
 - c. old DNA strands disintegrating while new strands are produced.
 - d. old and new strands of DNA becoming reorganized to form four new strands.

Use this diagram to answer the following question(s).



- ___ 9. The process illustrated is called
- chromosome separation.
 - mitosis.
 - meiosis.
 - DNA replication.
- ___ 10. The illustration represents a
- complete chromosome.
 - portion of a RNA molecule.
 - portion of a DNA molecule.
 - gene mutation.
- ___ 11. DNA is able to control protein synthesis
- by controlling RNA production.
 - because of the sugar-phosphate bonds.
 - by regulating the rate of cell division.
 - because of the purine-sugar bonds.

- ___ 12. The processes of DNA coding for RNA, and the RNA building a protein are called, in sequence,
- transfer and translation.
 - transcription and translation.
 - translation and transduction.
 - translation and transcription.
- ___ 13. The genotype of an organism is determined primarily by which of the following parts of a DNA molecule?
- the base pairs
 - the sugar groups
 - the phosphate groups
 - the tightness of the spiral or helix
- ___ 14. If a short sequence of DNA were A-C-T-C-G-A-T-A-A, the mRNA would read
- A-C-U-C-G-A-U-A-A.
 - T-G-A-G-C-T-A-T-T.
 - U-G-A-G-C-U-A-U-U.
 - A-G-U-G-C-A-U-A-A.
- ___ 15. If the DNA code for isoleucine is T-A-G, then the anticodon is
- A-U-C.
 - A-U-G.
 - U-A-T.
 - U-A-G.
- ___ 16. Codons are usually described by
- a three-letter abbreviation of an amino acid and the DNA base for which it codes.
 - the first letter of the three nitrogen bases coding for an amino acid.
 - the first letter of the three nitrogen bases of the tRNA coding for an amino acid.
 - a three-letter abbreviation of the DNA and the RNA for which it codes.

 Use the information below to answer the following question(s).

Base sequence on mRNA	codes for	Amino acid
GCU		alanine
GAU		aspartate
GGA		glycine
AAG		lysine
CCA		proline
UCG		serine
UAC		tyrosine
GUC		valine

- ___ 17. In protein synthesis, tRNA
- collects and transfers amino acids.
 - initiates the transcription process.
 - acts as a site for the synthesis of the amino acid chain.
 - makes sure the correct codons are translated into amino acids.
- ___ 18. A specific protein produced in a cell is directly related to the
- sugar-phosphate sequence in the DNA molecule.
 - nucleotide sequence in the DNA molecule.
 - number of ribosomes in the cell.
 - number of mitochondria in the cell.
- ___ 19. Which is composed of a specific amino acid sequence?
- DNA
 - RNA
 - polypeptide chain
 - nucleotide
- ___ 20. The coding of amino acids in the formation of a protein is controlled by base pairs in groups of
- 2.
 - 3.
 - 4.
 - 5.
- ___ 21. A gene that controls the production of repressor proteins that switch off structural genes is called
- an oncogene.
 - a repressor gene.
 - a transposon gene.
 - a regulator gene.
- ___ 22. Mutations may be transmitted to offspring when
- they occur in the cells that produce sperm or egg cells.
 - their effect adversely influences the organism without causing its death.
 - the change to the DNA is temporary and gene repair is likely to occur.
 - the new protein produced is limited to a few cells and their descendants.
- ___ 23. Which of the following is not characteristic of most mutations?
- Mutations are changes to the genetic code.
 - Mutations may produce ineffective proteins.
 - Mutations enhance cell functions.
 - Mutations are caused by radiation or chemicals.

- ___ 24. Both bacteria and yeast are used to determine if a chemical is a potential carcinogen. Yeast may be more suitable than bacteria because
- a. the rate at which DNA normally mutates is greater in yeast than in bacteria.
 - b. cell reproduction is faster in yeast than in bacteria.
 - c. human cell reproduction is more similar to yeast cell reproduction than bacterial reproduction.
 - d. yeast cell reproduction is better understood than bacterial reproduction.
- ___ 25. All of the following statements are characteristics of oncogenes except:
- a. carcinogens are produced by oncogenes.
 - b. oncogenes produce proteins that stimulate cell division.
 - c. many oncogenes have been detected in viruses.
 - d. normal genes may form oncogenes after exposure to carcinogens.

Molecular Genetics Answer Key

1. A
2. D
3. C
4. A
5. C
6. D
7. B
8. A
9. D
10. C
11. A
12. B
13. A
14. C
15. D
16. B
17. A
18. B
19. C
20. B
21. Not curricular - D
22. A
23. C
24. Not curricular - C
25. Not curricular - A