

Protein Synthesis Quiz 1

Name: _____

1. The genetic specifications for assembling a protein are in the DNA. The first step in protein synthesis is for that code to be:

- a) transcribed to tRNA
- b) transcribed to mRNA
- c) translated to tRNA
- d) translated to mRNA
- e) Transmitted by SMS

2. Which molecule carries amino acids to the ribosomes?

- a) rRNA
- b) tRNA
- c) DNA
- d) mRNA
- e) cccDNA

3. Which is found in RNA but **not** in DNA?

- a) adenine
- b) cytosine
- c) guanine
- d) uracil
- e) phosphate groups

4. Which of the following is **true** of tRNA?

- a) It functions in carrying messenger RNA from the nucleus to the ribosomes.
- b) It is short-lived.
- c) It consists of a single strand of nucleotides.
- d) It is necessary for transcription.
- e) it is the first 4 letters of the word 'train'

5. Which statement about DNA is false?

- a) The sugar in DNA has one less oxygen molecule than that in RNA.
- b) DNA is a double stranded molecule.
- c) In DNA, the base uracil replaces thymine.
- d) DNA is a polymer made of nucleotide subunits.
- e) It stands for National Dyslexia Association

6. The process of synthesizing mRNA along a DNA template is called

- a) transcription
- b) translation
- c) transformation
- d) translocation
- e) crossing over

In questions 7 and 8 below, a segment of DNA has one strand with the following sequence of bases.

A G C G C A T A G C A A

7. The complementary strand of DNA is

- a) U C G C G U A U C G U U
- b) T C G C C G A T C G T T
- c) T C G C G T A T C G T T
- d) T C G C A T T A C A U U
- e) T C G W R O N G A C U U

8. The mRNA molecule coded for by the original strand is

- a) T C G C G T A T C G T T
- b) U C G C G U A U C G U U
- c) T C A C M R N A T C C C
- d) U A C A T T U C A G G G
- e) U C G G C A T T U G G C

9. Which is true of a codon?

- a) It consists of three nucleotides.
- b) It may code for the same amino acid as another codon does.
- c) It never codes for more than one amino acid.
- d) It extends from one end of a tRNA molecule
- e) It is the basic unit of the genetic code.

10. Which of the following structures is coded for by the shortest (or smallest) sequence of DNA?

- a) a tRNA having 75 nucleotides
- b) a mRNA having 75 codons
- c) a polypeptide composed of 75 amino acids
- d) a protein composed of 2 polypeptides, each 35 amino acids long
- e) the entire genome of a human influenza virus

11. The nucleotides in DNA are grouped in triplets, or 3-letter words. The number of 3-letter words that can be made from the DNA nucleotides is

- a) 64 b) 16 c) 20 d) 46 e) 2^{64}

12. In what direction can a DNA polymerase work when catalyzing the addition of nucleotide monomers to build a strand of DNA?

- a) from the 5' toward the 3' end of the new strand being assembled
- b) from the replication centers in two directions called replication forks
- c) from the 3' to the 5' end of the strand being assembled
- d) in both directions if DNA ligase is present
- e) whichever way it is facing when it starts

13. The DNA of all organisms replicates by

- a) dispersive replication
- b) reverse replication
- c) semi-conservative replication
- d) conservative replication
- e) Liberal Democrat replication

14. The two sides of the DNA molecule are held together at their bases by:

- a) covalent bonds b) peptide bonds c) James Bonds d) ionic charges e) hydrogen bonds

15. The three parts of a nucleotide are held together by

- a) ionic bonds b) covalent bonds c) van der Waals forces d) hydrogen bonds e) James Bonds

16. The technology that finally clarified the structure of DNA was

- a) autoradiography
- b) ultracentrifugation
- c) electron microscopy
- d) X-ray diffraction
- e) gel electrophoresis

17. A chromosome is in its most extended (least condensed) form during

- a) interphase b) prophase c) anaphase d) telophase e) metaphase

18. By estimating the relative quantity of adenine, guanine, cytosine, and thymine in the DNA of various cells, Chargaff played an important role in clarifying the:

- a) genetic code
- b) structure of DNA
- c) mechanism of translation
- d) chemistry of RNA
- e) principle of base-pairing

19. The actual assembly of amino acids into protein occurs on the

- a) endoplasmic reticulum
- b) ribosomes
- c) tRNAs
- d) Golgi bodies
- e) none of these

20. To read the genetic code, the bases of DNA or RNA are placed in groups of

- a) 1
- b) 4
- c) 6
- d) 8
- e) none of these

21. The total number of codons possible in the code system is:

- a) 4
- b) 16
- c) 32
- d) 64
- e) none of these

22. Which remains in the nucleus during translation?

- a) tRNA
- b) mRNA
- c) rRNA
- d) all of these
- e) none of these

23. During translation, chain elongation continues until

- a) no amino acids are left
- b) all tRNAs are empty
- c) the polypeptide is long enough
- d) the ribosomes run off the end of mRNA
- e) chain terminator codons occur

24. Which does NOT represent a difference between RNA and DNA?

- a) RNA is single stranded.
- b) RNA contains the sugar ribose.
- c) RNA utilizes nucleotides in its structure.
- d) RNA substitutes thymine for uracil.
- e) All of the above represent differences between DNA and RNA.

25. Which represents a similarity between DNA and RNA?

- a) Double-stranded helical structure
- b) The presence of uracil
- c) The same number of oxygen atoms in each of their pentose sugars
- d) Nucleotides consisting of a phosphate, sugar, and nitrogenous base
- e) They are both copied in mitosis

26. Research by biologists such as Beadle and Tatum has led to the hypothesis that the synthesis of each protein (enzyme) in a cell is governed by the action of a single

- a) gene
- b) chromosome
- c) nitrogenous base
- d) phosphate molecule
- e) chart record

27. The coded information in a DNA molecule directly determines the formation of

- a) polypeptides
- b) polysaccharides
- c) lipids
- d) glycerol
- e) monosaccharides

Define each of the following terms.

1. codon --
2. anticodon --
3. replication --
4. translation --
5. transcription --
6. complementary base pairing --
7. triplet --
8. alpha helix --
9. degenerate code --
10. polar body --
11. diploid number --
12. DNA polymerase --
13. mutation --
14. ribosome --
15. interphase --
16. polysome --
17. DNA ligase --
18. restriction enzyme --
19. sticky ends --
20. cell recognition protein --