

Chapter 2: RNA

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ____ 1. In an RNA molecule, adenine always base-pairs with:
 - a. Thymine
 - b. Cytosine
 - c. Uracil
 - d. Guanine

- ____ 2. RNA and DNA are structurally similar because they both:
 - a. Have ribose as their sugar moiety
 - b. Consist of a single strand that folds on itself
 - c. Consist of two complementary strands
 - d. Are polymers of four different nucleotide bases

- ____ 3. RNA is degraded by:
 - a. Helicases
 - b. Polymerases
 - c. Ribonucleases
 - d. Methylases

- ____ 4. The large ribosome subunit in prokaryotes consists of ribosomal proteins and:
 - a. 16S rRNA
 - b. 18S rRNA
 - c. 23S rRNA and 5S rRNA
 - d. 28S rRNA, 5S rRNA, and 5.8S rRNA

- ____ 5. Transfer RNA is different from other types of RNA because transfer RNA has:
 - a. A 3'polyA tail
 - b. Introns and exons
 - c. A 3'methylated cap
 - d. Anticodons

- ____ 6. Synthesis of RNA guided by a DNA template is:
 - a. Translation
 - b. DNA replication
 - c. Transcription
 - d. Reverse transcription

- ____ 7. Synthesis of DNA guided by a RNA template is:
 - a. Translation
 - b. DNA replication
 - c. Transcription
 - d. Reverse transcription

- _____ 8. In transcription, what is the starting material, the ending material, and the major enzyme that catalyzes the process?
- DNA, RNA, DNA polymerase
 - RNA, protein, peptidyl transferase
 - RNA, DNA, reverse transcriptase
 - DNA, RNA, RNA polymerase
- _____ 9. If the following oligonucleotide of double-stranded DNA were transcribed, what would be the sequence of the RNA?
- 5'TGCTAGCTA3'
3'ACGATCGAT5'
- 5'UGCUAGCUA3'
 - 5'ACGAUCGAU3'
 - 3'ACGATCGAT5'
 - 3'ACGAUCGAU5'
- _____ 10. Which of the following enzymes performs transcription in bacteria?
- RNA-dependent DNA polymerase
 - DNA-dependent RNA polymerase
 - DNA-dependent DNA polymerase
 - RNA-dependent RNA polymerase
- _____ 11. The RNA polymerase holoenzyme consists of which of the following subunits?
- α_2 , β , β'
 - α_2 , β , $\beta'\sigma$
 - α , α' , β , β'
 - α_2 , β , β' , ρ
- _____ 12. Which component of RNA polymerase is responsible for initiating transcription at the correct site?
- α
 - β
 - β'
 - ρ
 - σ
- _____ 13. Which of the following is required for termination of transcription in bacteria?
- DNA polymerase
 - Sigma
 - Rho
 - PolyA signal
- _____ 14. Which of the following is involved in termination of transcription in eukaryotes?
- RNA polymerase
 - Sigma
 - Rho
 - PolyA signal

- ____ 15. Which of the following types of RNA is directly involved in removing introns from RNA in eukaryotes?
- Micro
 - Transfer
 - Small nuclear
 - Small interfering
- ____ 16. What is the secondary structure of transfer RNA?
- Cruciform, or inverted L
 - Hairpin
 - Triple helix, or triplex
 - Ring, or inverted C
- ____ 17. The loop of transfer RNA that interacts with the codon on mRNA in translation is called the:
- D loop
 - T ψ C loop
 - Variable loop
 - Anticodon loop
- ____ 18. DNA sequences that are involved in the regulation of gene expression are called:
- Cis factors
 - Trans factors
 - Inducers
 - Repressors
- ____ 19. Which of the following is the binding site for the repressor protein of the lactose operon?
- P site
 - Operator
 - A site
 - Promoter
- ____ 20. Which of the following would prevent transcription of the lactose operon?
- Loss of promoter
 - Presence of inducer
 - Loss of the repressor protein
 - RNA polymerase binding to the promoter
- ____ 21. Which of the following is a cis factor of the lactose operon?
- Inducer
 - Operator
 - Repressor
 - Polymerase
- ____ 22. In the lactose operon, which of the following configurations would result in gene expression?
- Promoter +, Operator +, Repressor +, no inducer present
 - Promoter -, Operator +, Repressor +, no inducer present
 - Promoter -, Operator -, Repressor +, inducer present
 - Promoter +, Operator +, Repressor -, no inducer present

- ____ 23. Multiple products are generated from the same gene by what mechanism?
 - a. Alternative splicing
 - b. Polyadenylation
 - c. Capping

- ____ 24. Thalassemias arise from changes in what part of the beta-globin gene?
 - a. 3'untranslated region
 - b. PolyA tail
 - c. Splice recognition site
 - d. Ribosome binding site

- ____ 25. When gene expression is regulated by mechanisms other than the interaction of cis elements and trans factors, the regulation is called:
 - a. Induction
 - b. Epigenetics
 - c. Attenuation
 - d. Combinatorial control

- ____ 26. Genomic imprinting is accomplished primarily through:
 - a. Methylation
 - b. Acetylation
 - c. Transcription
 - d. Cis and trans factor interactions

- ____ 27. The most frequently methylated base in vertebrates is:
 - a. Adenine
 - b. Cytosine
 - c. Guanine
 - d. Thymine

- ____ 28. MicroRNAs, short endogenous RNA, perform what function in the eukaryotic cell?
 - a. Controlling DNA replication
 - b. Priming RNA synthesis
 - c. RNA splicing
 - d. Repressing gene expression

- ____ 29. What mechanism may explain the difference in symptoms in Prader-Willi and Angelman syndromes?
 - a. Genomic imprinting
 - b. Alternative splicing
 - c. Genetic recombination
 - d. Capping

- ____ 30. Alteration of the nucleotide sequence of RNA after transcription is called:
 - a. Methylation
 - b. RNA silencing
 - c. RNA editing
 - d. Capping

Chapter 2: RNA

Answer Section

MULTIPLE CHOICE

- | | |
|------------|--------|
| 1. ANS: C | PTS: 1 |
| 2. ANS: D | PTS: 1 |
| 3. ANS: C | PTS: 1 |
| 4. ANS: C | PTS: 1 |
| 5. ANS: D | PTS: 1 |
| 6. ANS: C | PTS: 1 |
| 7. ANS: D | PTS: 1 |
| 8. ANS: D | PTS: 1 |
| 9. ANS: A | PTS: 1 |
| 10. ANS: B | PTS: 1 |
| 11. ANS: B | PTS: 1 |
| 12. ANS: E | PTS: 1 |
| 13. ANS: C | PTS: 1 |
| 14. ANS: D | PTS: 1 |
| 15. ANS: C | PTS: 1 |
| 16. ANS: A | PTS: 1 |
| 17. ANS: D | PTS: 1 |
| 18. ANS: A | PTS: 1 |
| 19. ANS: B | PTS: 1 |
| 20. ANS: A | PTS: 1 |
| 21. ANS: B | PTS: 1 |
| 22. ANS: D | PTS: 1 |
| 23. ANS: A | PTS: 1 |
| 24. ANS: C | PTS: 1 |
| 25. ANS: B | PTS: 1 |
| 26. ANS: A | PTS: 1 |
| 27. ANS: B | PTS: 1 |
| 28. ANS: D | PTS: 1 |
| 29. ANS: A | PTS: 1 |
| 30. ANS: C | PTS: 1 |